University of Essex

Essex Business School

Essex Finance Centre
Working Paper Series

"A comprehensive analysis of transactions in the Greek residential property market"

"Alexandros Kontonikas and Emmanouil Pyrgiotakis"

A comprehensive analysis of transactions in the Greek residential property market

Alexandros Kontonikas [a] and Emmanouil Pyrgiotakis [b]

Essex Business School, University of Essex

Abstract

We study the Greek residential property market during the recovery period using data from the Property Transfer Value Registry. We examine 132,189 transactions from 2017 to 2024 and find a significant increase in both the number and value of transactions. Markedly, this increase is more profound among older properties and flats. The findings indicate potential overheating in the residential property market, as we move away from an era of relative undervaluation and head toward higher levels of transactions and prices. However, there is significant geographical heterogeneity both across the country and within the Athens area. The econometric analysis reveals a significant relationship between the market value and the objective value of properties. Finally, we find that the "My Home" government program is not associated with an increase in transaction values for homes that meet its criteria.

Keywords: Greek residential property market, Property Transfer Value Registry, "My home" program, hedonic model.

September 2024

[a] Corresponding author: Alexandros Kontonikas, Professor in Finance, Essex Business School, University of Essex, Wivenhoe Park, Colchester, CO4 3SQ, United Kingdom; E-mail: a.kontonikas@essex.ac.uk.

[b] Emmanouil Pyrgiotakis, Lecturer in Finance, Essex Business School, University of Essex, Wivenhoe Park, Colchester, CO4 3SQ, United Kingdom; E-mail: e.pyrgiotakis@essex.ac.uk.

1. Introduction

A decade after the peak of the crisis, the Greek property market is witnessing substantial growth. The market is characterized by imbalance between supply and demand, strong investment financing from abroad, and expansion of the short-term rental market. The role of external financing is significant, as another feature of the market is that the price recovery occurred in an environment of low bank lending. The recovery began in 2018 and has been rapid, with the residential property price index increasing by 68% over six years and now close to fully recovering the losses from the crisis years. These developments have generated great interest among property owners, potential investors, banks, and policymakers. Recent studies focus on the factors that led to the increase in prices and whether these prices are justified based on the fundamentals of the Greek economy (Alpha Bank, 2020; National Bank, 2023; Piraeus Bank, 2024). They also analyse the negative implications that arise for households from the residential property market's tightness (Bank of Greece, 2024).

A common feature of these recent studies is that they typically rely on the Bank of Greece's residential property price index. Therefore, their analysis takes place at the aggregate market level rather than the transaction level. However, transactions provide immediate and significant information on market trends before they are reflected in the overall price index. Therefore, to better understand the market recovery and draw conclusions about potential developments, it is essential to consider transactions-level data. Our article examines the Greek residential property estate market through the lens of transactions. To the best of our knowledge, we are the first to utilize the transaction-level dataset of the Property Transfer Value Registry.

The Registry records transactions across Greece, covering the entire residential property market since March 2017. The database is maintained by the Ministry of Finance and aims to monitor the market and derive statistical conclusions. The Registry provides the market value of properties as well as other characteristics, such as their age at the time of the transaction. Therefore, we can examine whether the value of transactions is related to the characteristics of the properties, as well as whether there are significant differences in transactions across prefectures or municipalities, shedding light on the role of tourism, and over time. An important advantage of the Registry is that it includes the corresponding zone price for each transaction, reflecting the estimated value of the property for tax purposes. Thus, it allows us to conduct an initial assessment of the objective value of the transferred properties and examine the relationship between market value and objective value. Additionally, the Registry data enables

us to investigate the role of interventions, such as regulatory measures or support measures, in the residential property market.

Our analysis begins by presenting stylised facts on transactions in the property market based on the Registry. Our sample focuses on residences and includes 132,189 transactions between 2017-2024. We find that the number and value of transactions start from a low level and increase over time, except for the pandemic period. At the same time, the average transaction value has increased significantly, with the magnitude of increase aligning with the rise in the property price index. Most transactions are below €100,000; however, their share in the total transactions decreases over time. The bulk of transactions by type of residence corresponds to flats, highlighting their crucial role in the Greek market. We also observe a significant increase in the market share of older residences. This development reflects the decrease in the availability of new residences due to low construction activity during the crisis period. Across Greece, Athens and Thessaloniki record the largest share of transactions.

Our analysis of trends in the residential property market also reveals that, at the country level, market values initially were lower than the objective values implied by zone prices. As the market recovered, the fraction of market value to objective value increased, eventually approaching, and exceeding one. This fraction is positively correlated with the OECD's housing unaffordability index for Greece. The findings indicate overheating tendencies in the residential property market, as we move away from a regime of relative undervaluation and head towards higher levels of transactions and prices. However, there is significant geographical differentiation. Tourist areas, such as the Cyclades prefecture, record market values significantly higher than those derived from zone prices, while in other areas, market values fall short of those.

Following the initial examination of the Registry's data, we proceed with an econometric analysis of transaction values. We use a cross-sectional econometric model with fixed effects, consistent with the hedonic modelling approach. The model includes the estimate of the objective value, derived from the zone price, and other characteristics of the residence as independent variables. The fixed effects aim to account for unobservable characteristics of the residential property market and are defined at the level of geographic area and time. In our main results, the geographic area is represented by the prefecture where the transaction took place, while the time corresponds to the year of the transaction. In our alternative approach, the area is represented by municipalities.

Our baseline results are consistent with intuition, as all explanatory variables have the expected relationship with transaction values. Specifically, the approximation of the property's objective value is positively associated with its transaction value (market value). The age of the property negatively correlates with the market value. Flats are cheaper compared to detached houses, but their value increases at higher floors. Generally, the number of the property's facades is positively related with its market value. Furthermore, the objective value is the most important independent variable in terms of explanatory power, while fixed effects reveal statistically significant differences in transactions over time and by prefecture.

The increase in transaction value per year, as reflected in the time fixed effects, is somewhat correlated with the improvement of the economic climate in Greece but exceeds it. The prefecture fixed effects indicate that the geographic differentiation included in the zone price explains a significant portion, but not all, of the geographic variability of market value. The difference between market values and the level consistent with observable fundamental characteristics of residences is higher in the country's tourist areas. These areas exhibit strong tourism intensity in the short-term rental market. Additionally, we find within Athens, there is significant differentiation between the expensive areas of the northern/southern suburbs and west Attica neighbourhoods.

Finally, we examine the relationship between the "My Home" program and the value of transactions in the residential property market. Launched in April 2023, the program supports young people and new couples in acquiring their first home. The homes involved in the program have specific characteristics regarding age, area, and market value. The findings do not indicate a positive relationship between the program and the transaction value of the homes that meet its criteria. Our results are robust to various robustness checks, including alternative model specifications and fixed effects.

Our study contributes to two main strands of the existing literature. Specifically, relative to studies examining the recovery of the general property price index in Greece (Alpha Bank, 2020; National Bank, 2023; Piraeus Bank, 2024), it innovates by focusing on transactions. One of our key conclusions—that the residential property market exhibits overheating tendencies—is consistent with the analysis by Piraeus Bank (2024). This study states that the rate of increase in residential property prices between 2016-2022 surpasses the rate of increase justified by changes in fundamental macroeconomic indicators and highlights the role of an imbalance between supply and demand.

Regarding the literature of property valuation, hedonic-type models have been extensively used in examining sale prices (Glaeser et al., 2005); Sheppard and Udell, 2016; and Ihlanfeldt and Mayock, 2012) and rent prices (Ambrose et al., 2015; and Verbrugge et al., 2017). Doumpos et al. (2021) provide an in-depth discussion of the literature on automated property valuation models, including hedonic models. They emphasize the importance of incorporating geographical heterogeneity into the model.[1] The results of our econometric estimation align with those of previous studies regarding the relationship between the characteristics of residences and their value.

Existing relevant studies on the Greek market are predominantly based on bank estimates of property values (Karaganis, 2011; Kavarnou and Nanda, 2014, 2018; White and Papastamos, 2018; Alexandridis et al., 2019; Doumpos et al., 2021). Contrary to our paper, these studies have smaller samples, as they do not cover the entire market. Moreover, they do not analyse the recent recovery period.[2] Our study innovates by examining the recent period and using the market value of residences based on the transaction prices from the Registry instead of bank estimates.[3] The bank's estimate could differ from the transaction value. As we explain in Section 2, even the stated transaction price in the Registry may deviate from the actual value. Nevertheless, the stated prices serve as a more reliable measure of the value of transactions, as they better reflect overall market conditions.[4]

We should also highlight the use of a new variable compared to most studies of the Greek market. Specifically, we refer to the estimate of the objective value, which reflects the zone price in the Registry. We show how this variable explains a significant share of the variability of market value. Karaganis' (2011) study examines 8,800 bank estimates in Attica (2000-2009)

---

[1] For example, Fik et al. (2003) find that the accuracy of their results improves with the use of dummy variables indicating the geographical area. See Doumpos et al. (2021) for a comparative analysis of alternative approaches, which include, among others, neural network techniques. Also, see the relevant discussion in the study by Alexandridis et al. (2019)

[2] Indicatively, the study by Alexandridis et al. (2019) uses 36,527 estimates from Eurobank Property Services for properties across the country during the period 2012-2016, while White and Papastamos (2018) have 70,750 estimates (2007-2014) from the same provider. A small number of studies use asking prices. For example, Efthymiou and Antoniou (2013) cover Athens (September 2011 - January 2012) with data sourced from residential property agency websites.

[3] Compared to some sectoral analyses of the Registry by residential property market entities, we are the first to examine the entire dataset and conduct econometric estimations. For examples of such analyses, see the report on the insider.gr website (9/4/2023), which refers to a study by the residential property market observatory of the TOPO GES technical office (in collaboration with RE/MAX Estate) on transactions conducted in 2021 and 2022 in Attica and the Cyclades. Also, see the reference in the study by the Research and Analysis Department of Cerved Property Services for the twelve-month period from April 2022 to March 2023 on the ot.gr website (26/6/2023).

[4] Moreover, the price cannot be directly influenced by the bank's risk assessment, which is linked to the protection of its interests within the context of mortgage lending. Finally, during the period we are analysing, a significant share of transactions occurred without bank intermediation, implying a lack of relevant bank estimates.

and uses zone prices to approximate the "neighborhood effect". Regarding the international literature, Ihlanfeldt and Mayock (2012), study sale prices in the American market (Florida), and include property value assessments for taxation purposes as an independent variable. They argue that these estimates summarize significant locational and structural characteristics of properties and help predict sale prices (Ihlanfeldt and Mayock, 2009).

Finally, our analysis considers the specific characteristics of the recent period. We shed new light on the Greek residential property market, as we examine for the first time the "My Home" program. Additionally, analysis at the prefecture-level links out findings with the literature on short-term rentals. Existing studies covering other countries suggest that the expansion of short-term rentals can increase rents and property prices (Sheppard and Udell, 2016; Horn and Merante, 2017; Garcia-López et al., 2020; Barron et al., 2021). Also, some articles indicate that measures to slow down short-term rentals can reduce housing costs (Koster et al., 2021; Chen et al., 2022). Methodologically, many of these studies combine city or neighborhood-level data regarding the local availability of short-term rentals (listings, etc.) and/or relevant regulatory interventions. In our study, we observe that there is a connection between the intensity of short-term rental usage and the geographic heterogeneity of property values. The conclusion regarding the premium value of tourist areas is consistent with previous studies of the Greek market.

The structure of the remaining article is as follows. In Section 2, we describe the database and the variables. Section 3 analyses the developments in the residential property market during the recovery period. In Section 4, we present the econometric model and the analysis of the results. Section 5 includes robustness checks, and Section 6 presents the conclusions.

2. Data: Residential transactions

We collect transaction-level data for the Greek residential property market from the Registry.[5] The recorded transactions were carried out after March 1, 2017. Users can obtain information on property transaction values by prefecture and/or municipality. The transaction data is collected, as applicable, from the Independent Authority for Public Revenue, the land

---

[5] The Registry is maintained in electronic form by the General Secretariat of Public Property of the Ministry of Finance, with technical support provided by the General Secretariat for Information Systems and Administrative Support of the Ministry. Part of the Registry's data is published on a website of the Ministry of Finance in a manner that ensures the anonymity of the involved parties and the confidentiality of tax information: https://webapps.gsis.gr/dsae2/trxregistry/faces/pages/mainmenu/edit.xhtml.

registries, or the collaborating notaries. The variables offered by the Registry include the *contract date*, the *transaction price* (*Market value*), the property's *surface area*, as well as the *zone price* and the *percentage of ownership*, based on which we calculate the initial estimate of the objective value (*Book value*). The Registry also includes other characteristics of the property: *type* (detached house, flat, etc.), *location* (prefecture, municipality according to the Kallikratis plan, and municipal or community district), *year of construction*, *floor*, *number of facades*, *special conditions* (incomplete building, buildings under compulsory expropriation, etc.), and type of legal rights (full ownership, etc).

The data covers period March 2017 to March 2024. In our analysis, we include transactions: (i) with a transaction price between €10,000 – €20 million, (ii) for residential properties.[6] The purpose of the filtering is to focus on the residential property market and reduce the likelihood of including intra-family transfers and symbolic prices that do not reflect market conditions.[7] After filtering, our sample includes 132,189 transactions.

Zone price and initial objective value estimate

Zone prices in Greece are determined by the Ministry of Finance, in collaboration with professional property appraisers. Various factors are considered, such as the purchasing demand in each area, infrastructure, proximity to services (e.g., public transport, schools), and the overall development of the area. They reflect the estimated value per square meter (sqm) and are a key factor for determining the taxable value of properties. Zone prices are higher in areas with increased demand, such as urban centres and tourist areas, as well as in areas with better infrastructure quality. Each zone covers a specific geographic area of the country but does not necessarily coincide with the administrative boundaries of municipalities and communities. Periodically, zone prices are adjusted based on residential property market conditions and the overall economic situation. With the change in June 2018, 37% of the zones experienced price increases, while there was no change in 42% of the zones. With the new zone prices that took effect in January 2022, the zones with higher prices increased as a percentage

---

[6] Specifically, in the "Property Category" of the Registry, we select "Residence or apartment except for a detached house" and "Detached house". When referring to "flat" in the text, we are referring to the first category.

[7] The Registry records transactions that include transactions between third parties as well as intra-family transactions, without distinguishing between the two categories. Additionally, we do not know whether the transaction corresponds to a first sale or a resale, so we cannot track the same property over time. Finally, we do not know the nationality of the buyer.

of the total (55%), with a notable rise in tourist areas, while the zones without change decreased (to 24% of the total).

Objective values in Greece are determined based on zone prices and the state's calculation methods for related taxes. In practice, zone prices provide an initial estimate, as the final determination of objective values includes adjustments based on various factors.[8] For example, depreciation depends on the property's age and reduces the objective value by a specific scale. The Registry does not provide all the necessary data for determining the final objective value, such as the marketability and construction method coefficients. Therefore, our analysis uses the initial estimate of the objective value, prior to adjustments. However, in our econometric estimation, in addition to the initial objective value, we will also consider other available property characteristics provided by the Registry as explanatory variables for the market value.

Using the data from the Registry, the initial estimate of the objective value of a residence is calculated as follows: (*surface area*) x (*zone price*) x (*percentage of ownership*). Weighting by the percentage of co-ownership is necessary, as our analysis will link the market value of the residence with the amount dictated by the zone price and must account for cases where the property is not entirely owned by one owner. To clarify, let's first look at an example from the Registry with an ownership percentage of 100%, meaning one owner fully owns the property.

A 135 sqm flat in Kolonaki, with a zone price of €3,800 per sqm, was transferred on June 7, 2023, for a transaction price of €690,000. Thus, the initial objective value is €513,000 (= 135 x €3,800 x 100%), which is lower than the market value by €177,000. The Market/Book value ratio is 1.35 (= 690/513), indicating an overvaluation of 35% of the commercial price compared to the value that corresponds to the zone price. In the next example, we have an ownership percentage of 50%, meaning two owners each owning 50% of the property.

A 91.4 sqm flat in Piraeus with a zone price of €1,900 per sqm was transferred on February 21, 2024, for a transaction price of €139,061. According to our calculation, the initial objective value is €86,830 (= 91.4 x €1,900 x 50%), and the Market/Book value ratio is 1.6. If we had not weighted by the ownership percentage, the initial estimate would double to €173,660, and the Market/Book would fall below one (0.8), incorrectly indicating a case of relative undervaluation.

---

[8] The adjustment of the initial estimate of the objective value is based on a series of factors, including: (i) the floor, determined by the street's commerciality coefficient combined with the floor level, (ii) the frontage, (iii) the area, (iv) the thickness of exterior walls, (v) the building's age, (vi) special conditions, (vii) completion status, (viii) construction method, (ix) equipment, and (x) co-ownership.

Finally, it should be emphasized that the transaction price stated in the contract, and thus in the Registry, may differ from the actual transaction value. Several publications in the Greek online press highlight the existence of transactions with artificially low prices stated in contracts, compared to actual transaction values, as well as the negative consequences of this practice on transaction tax revenues.[9] Consequently, the relative overvaluation we record when the Market/Book ratio exceeds one likely represents the lower bound of the potential range of actual overvaluation. In conclusion, although the Registry has some limitations, it remains the only available database for transactions in the residential property market.

3. Developments in Greek residential property market

Transactions

Based on the Registry data, Figure 1 shows the number of transactions (left axis) and their value (in € millions, right axis) on a quarterly basis for the whole Greece during the period 2017 Q1 to 2024 Q1. Transactions in the residential property market start from a low level and increase over time, with the exception of the pandemic period.[10] Specifically, we observe an increase of 84% in transactions between 2017-2019 (from 10,889 in 2017 to 20,016 in 2019) and their value rising by 92% (from €671 million in 2017 to €1.291 billion in 2019), according to the annual data in Table 1. The upward trend in transactions is reversed in 2020 due to the pandemic, with the number of transactions decreasing by 28% between 2019-2020, and their value falling by 16%. In 2021, we observe a recovery in transaction levels, followed by further increases in the last two years. Between 2020-2023, the number of transactions increased by 56%, while their value recorded an even greater increase (108%).

---

[9] See, for example, the relevant articles on the websites: newpost.gr (28/6/2017), insider.gr (5/2/2019) liberal.gr (20/9/2023), moneyreview.gr (25/9/2023) and businessdaily.gr (2/10/2023). In areas where the objective value system is applied, the transfer tax is calculated based on the objective value. However, if the price is higher than the objective value, the tax is calculated based on the price. Thus, there is an incentive for the buyer, who is responsible for paying the transfer tax, to declare a price lower than the actual value to reduce the related tax amount. The price also affects other costs, such as notary and lawyer fees, as well as the registration fee for the contract in the land registry and cadastre. The incentive to conceal the actual transaction value is even greater when considering the possibility of money laundering or tax evasion through residential property purchases, especially during the period we are examining, where many transactions were conducted in cash (National Bank of Greece, 2023). Also refer to the European Parliament's study on the role of the residential property market in the issue of money laundering (European Parliamentary Research Service, 2019).

[10] The number of transactions in Figure 1 shows the same temporal trend but a different range of transactions compared to the series from the Hellenic Statistical Authority (ELSTAT). The ELSTAT series is based on the number of notarial acts and is available annually (1997-2022) through the database of the European Central Bank: https://data.ecb.europa.eu/data/datasets/RESH/RESH.A.GR._T.N._TR.NTRA.GR2._Z.N._Z.

Our findings indicate signs of overheating in the residential property market, characterized by record sample levels of transactions. At the same time, the housing price index of the Bank of Greece rose by 65% between 2017-2023 (Figure 2), with nearly two-thirds of the total increase recorded between 2020-2023.[11] The Registry data in Table 1 aligns with that of the Bank of Greece concerning the level of price increases, as the average transaction value increased by 61% during the same period (from €62,000 in 2017 to €100,000 in 2023).

When it comes to the geographic dispersion of our sample, the largest volume of transactions is historically recorded in Athens and Thessaloniki. The municipality of Athens holds the lead in residential transactions with 26,787 transactions. At the prefectural level, the number of transactions in Athens represents 42% of the total transactions in the country during our analysis period, while the corresponding percentage in Thessaloniki is 15%.[12] The value of transactions in the Athens amounts to 52% of the total and increases significantly over time: €43 million in Q1 2017, compared to €310 million in Q1 2024 (Figure 3). During the same period, the value of transactions in the Thessaloniki also shows an increase, although at a lower intensity compared to Athens. In Q1 2024, the largest number of transactions (top-5) is observed in the prefectures of Athens, Thessaloniki, Piraeus, Eastern Attica, and Achaia (Table A1 in the Appendix).

The percentage of the number of transactions per year and by value category (of the total number of transactions) in Table 1 allows us to draw interesting conclusions about trends in the residential property market. First, most transactions correspond to values below €100,000. Second, the percentage of these transactions out of the total decreases over time, from 85.5% in 2017 to 69.3% in 2023. Third, at the same time, the percentage of transactions valued between €100,000 and €250,000 doubles, from 11.3% to 22.4%. Fourth, the percentage of transactions of higher value (over €250,000) also shows an increase.

Figures 4 and 5 focus on the type of properties that are the subject of transactions. Figure 4 presents the value of flat transactions and their market share of total transactions. The data demonstrate the crucial role of flats in the Greek residential property market, as their average

---

[11] The residential price index recorded a 45% increase between 2020 and 2023. Figure A1 in the Appendix presents the price index from the Bank of Greece for Athens and other major cities over a longer time frame (2002 Q1 - 2024 Q1). The data indicate a significant range of fluctuation in housing prices across the country, both during the initial rise (pre-crisis) and during the decline and recovery. The indices from the Bank of Greece are available on their website: https://www.bankofgreece.gr/en/statistics/real-estate-market/residential-and-commercial-property-price-indices-and-other-short-term-indices.

[12] See Table A2 in the Appendix for the percentage of the number of transactions by prefecture (as a proportion of the total number of transactions) during the period 2017 Q1 - 2024 Q1. Table A3 in the Appendix presents the number of transactions for all municipalities in the Athens prefecture.

market share stands at 80%, with a general upward trend in recent years. Figure 5 presents the value of transactions of older properties (over 15 years) and their market share. We observe a significant increase in the market share of older properties, from 68% in 2017 to 82% in 2023. Our finding aligns with the significant decline in construction activity during the crisis.

Market/Book value

Figure 6 shows the Market/Book value ratio of residential properties, as derived from Registry data, as well as the moving average of 4 quarters for the whole of Greece. At the beginning of the sample, the ratio is below one, indicating undervalued market prices compared to the initial estimate of the objective value based on zone prices. For example, in Q1 2017, the market value of all transactions falls short by 25% of the value consistent with zone prices (Market/Book = 0.75). As the market recovered, the ratio increased, surpassing one for the first time in Q3 2020 (Market/Book = 1.03). The adjustment of zone prices in January 2022 is reflected in the significant decrease in the ratio during that period: 0.84 in Q1 2022, compared to 1.02 in Q4 2021.[13] However, after the change, the ratio continued its upward trajectory. The moving average reduces the volatility of the ratio and more clearly shows the historical course of the residential property market as it moves away from an era of relative undervaluation and toward higher prices.

Figure 7 compares the Market/Book of the residential property market with the OECD's index of housing unaffordability for Greece, defined as the ratio of property prices to disposable income. The correlation coefficient of the two series is positive and quite high (0.81).[14] The data indicate tightness in the residential property market, with upward pressure on transaction values and property prices that exceed the improvement in disposable income. The data in Table 2 reveal significant variation in Market/Book value by geographic area in Q1 2024. Tourist areas record market values of transactions significantly higher than the values that are consistent with zone prices. For example, in the Cyclades prefecture, the ratio stands at 1.66, while in Cephalonia, it is 1.62. On the other hand, there are areas with Market/Book prices significantly lower than one, such as the Karditsa (0.58) and Arcadia (0.63) prefectures. Therefore, we have a wide range of variability in the ratio, with market values exceeding the

---

[13] Figure A3 in the Appendix shows the Market/Book ratio for the prefectures of Athens and Thessaloniki. The data reveal an upward trend in both areas. They also indicate that the short-term impact of the change in zone prices was stronger in the Athens market, as the ratio recorded a significant decrease in Q1 2022, which is not observed in Thessaloniki.

[14] Both time series in Figure 7 are stationary with a (positive) linear trend (trend stationary) according to various unit root tests (Augmented Dickey Fuller, Phillips Perron, KPSS)

initial estimate of objective values by over 60% in some popular islands, while in other areas of the country, they fall short by over 30%.[15]

Supply-demand conditions and macro-financial environment

The recovery of the residential property market during the period under review occurred under conditions of a significant imbalance between supply and demand (Piraeus Bank, 2024). The collapse of construction activity during the crisis years drastically reduced the supply of new homes and led home buyers toward older properties.[16] The lack of supply is exacerbated by the high percentage of vacant homes, especially in urban centres, and the fact that many properties are involved in legal proceedings, as collateral in non-performing loans (Bloomberg, 2023). On the demand side, in addition to the increase in the number of households, two significant factors in recent years are the expansion of the short-term rental market and the Golden Visa program (Alpha Bank, 2020). Foreign demand for housing in Greece is reflected in the amount of related net foreign direct investment from individuals in the residential property market, which is on the rise: €328 million in 2017, compared to €923 million in 2022 and €850 million in 2023 (Figure 8). The investment demand for Greek assets, including residences, is fuelled by the improvement in the Greek economic sentiment in recent years.[17]

Beyond the imbalance between supply and demand, another significant characteristic of the Greek residential property market is that the recovery of transactions and prices occurred in an environment of low bank lending. This phenomenon is known in the international literature as "creditless recovery" and typically follows episodes of banking crises. Essentially, banking intermediation slows significantly until balance sheets are cleansed from non-performing loans. Between 2017-2023, the average of new mortgage loans was only €71 million per month. During the same period, the portfolios of banks changed significantly, reducing exposure to

---

[15] See Table A1 in the Appendix for the list of the 2024 Q1 Market/Book values for all prefectures. Figure A4 in the Appendix presents the temporal evolution of the Market/Book value in the top five prefectures listed in Table 2. We observe that in the Cyclades, the ratio is always above one and has increased significantly in recent years.

[16] See Figure A1 in the Appendix, which presents the sum of permits for new constructions and revisions of issued permits, based on annual data (2002–2022) from a study by Piraeus Bank (2024). Construction activity peaked in 2005 with the issuance of 65,979 building permits. The subsequent downward trend led to a low point in 2016 with 6,279 permits. Since then, construction activity has increased, but it still fluctuates at low levels compared to the period before the crisis. For example, construction activity in 2022 amounted to only 30% of the average for the period 2002-2008.

[17] The data in Figure A2 show that, following the pandemic, the economic sentiment index of Greece experienced significant improvement. Between December 2020 and December 2023, the Greek index increased by 12%, while the Eurozone's remained static. The index is produced by Eurostat and is based on questionnaires assessing factors related to the current economic situation and expectations for future developments. The index is closely monitored by economists and policymakers and provides a timely indicator of developments in the real economy (Arghyrou and Kontonikas, 2024).

loans (NPLs). The share of lending activity in the assets of the average systemic bank fell from 64% in 2017 to 45% in 2023, and the flow of bank lending to the property market slowed significantly.[18] The data in Figure 8 highlight the significant role of foreign investors during the period of decline of Greek banks. Notably, during the period 2018-2019, funding from foreign investors amounted (cumulatively) to €1.4 billion, surpassing bank funding, which amounted to €1.2 billion.

4. Model specification and main results

Equation (1) presents the cross-sectional econometric model with fixed effects that we use for analysing the value of transactions. The model specification is consistent with the hedonic approach to property valuation. This method has been extensively used in the residential property literature and assumes that the price of a property is a function of its fundamental characteristics (Malpezzi, 2003; Ihlanfeldt and Mayock, 2012; Sheppard and Udell, 2016; Alexandridis et al., 2018; Doumpos et al., 2020).

$$\ln(MV_i) = a + \beta_1 \ln(BV_i) + \beta_2 age_i + \beta_3 flat_i + \beta_4 flat_i floor_i + \beta_5 front_i + \beta_6 special_i + FE + u_i \quad (1)$$

The dependent variable is the logarithm of the market value (*Market Value, MV*). The set of independent variables includes the logarithm of the initial estimate of the objective value based on the zone price (*Book Value, BV*), the age of the property at the time of the transaction (*age*), the dummy variable *flat* (equal to one if the transaction involves an flat, otherwise zero), *floor* (floor), the interaction of the flat with the floor (*flat x floor*), the number of facades (*front*), and the dummy variable *special* (equal to one if the transaction involves a property with special conditions, otherwise zero).

The model also includes fixed effects (FE), defined at the level of geographic area and time. The fixed effects aim to account for unobservable characteristics that differ between geographic areas or time periods and affect the residential property market. In our basic model, the area corresponds to the prefectures, and the time to the year of the transaction. In the alternative model, the area corresponds to the municipalities. The econometric estimation uses the method of Correia (2017), which, among other things, allows for double clustering of standard errors.

---

[18] Historically, mortgage loans have been the second most significant type of loans for the Greek banking system, accounting for 28% of the total (2002-2023), compared to 61% for business loans and 11% for consumer loans. In 2017, the average monthly flow of bank mortgage lending had collapsed to 5% of the average for the period 2002-2008. Since then, mortgage lending has increased, but it remains at low levels, so that in 2023 it amounted to only 10% of the aforementioned average.

To account for the presence of outliers, we winsorize all continuous variables at the 1% and 99% levels, respectively.

Table 3 reports the estimates of Eq. (1). The analysis is conducted for the full sample period (2017q1-2024q1, Column 1), as well as for annual sub-periods (Columns 2-9).[19] First, the results show that all independent variables bear the expected signs.[20] Specifically, *Book value* is positively associated with *Market value*, and this relationship is statistically significant at the 1% level for the full sample period and for all sub-periods. In terms of economic significance, a 10% increase in the value estimate derived from the zone price and the area of the property is associated with approximately an 8% higher market value. The age of the property negatively relates to the value of transactions. Flats have lower market value compared to detached houses, but their value increases as the floor rises. The role of age and the dummy variable "flat", as well as the interaction of the latter with the floor, are statistically significant. Finally, the number of facades generally has a positive relationship, while special conditions of the property have a negative relationship with the value of transactions.[21]

Second, *Book value* appears to be the main explanatory variable. Specifically, the Adjusted R² coefficient reaches 47% when we estimate the econometric model solely with this variable, without other independent variables and fixed effects. The coefficient increases to 51% with the addition of fixed effects and reaches 56% with the full model (Column 1). In contrast, the coefficient decreases to 21% when we estimate the model without *Book value* as an independent variable. Third, the fixed effects indicate statistically significant differences in transactions over time and across geographic areas, beyond the levels predicted by the model's independent variables. Our results show that the geographic heterogeneity related to the zone price explains a significant portion, but not all, of the geographic variability of the market value. Fourth, with some exceptions, the results do not change significantly when comparing the full sample with the annual sub-periods. Specifically, the discount in transaction value for flats (compared to detached houses) decreases over time. Additionally, the relationship of facades and special conditions with the value of transactions is not statistically significant in all cases.

---

[19] When estimating the model for the sub-periods (Columns 2-9), we do not include time fixed effects.
[20] The problem of multicollinearity does not affect our results, as the correlation coefficients among the independent variables show very low values. The highest correlation coefficient is between the initial objective value and the floor of the residence, which is 15%.
[21] In most cases, the special conditions are related to incomplete buildings.

Prefecture and year fixed effects

Figure 9 presents the coefficient of the year fixed effects, which records a sharp increase during the period 2017-2024. This finding reflects the upward trend in the value of transactions in the residential property market. However, the annual percentage change of this coefficient does not remain stable throughout the sample period. It displays a positive, but low, correlation coefficient (0.27) with the corresponding change in the economic sentiment index of Eurostat for Greece (Diagram 10). Generally, changes in the time coefficient are much more pronounced compared to those of the economic sentiment. The data suggest that the annual increase in transaction values is related to some degree with the improvement in economic sentiment but exceeds it.

Table 4 presents the coefficient of fixed effects by prefecture for the prefectures that record the highest and lowest values of the coefficient. The top-5 prefectures include Cephalonia, the Cyclades, and Corfu, which also exhibit quite a high Market/book ratio in the first quarter of 2024 (Table 2).[22] Therefore, both alternative approaches to relative value—according to the Market/Book (model-free) and based on the fixed effects (model-implied)—lead to similar conclusions. They show the divergence of market values in relation to the level corresponding to the observable fundamental characteristics of properties, with significant differentiation of tourist areas from the rest of the country.

Table 5 presents the findings for the municipalities of the Athens prefecture from the econometric model with fixed effects for municipalities. It includes the top-5 and bottom-5 municipalities regarding the value of the fixed effects coefficient. Alimos and Glyfada record the highest coefficient while Agia Varvara has the lowest.[23] Generally, we observe significant geographic differentiation in transaction values within the Athens prefecture, beyond the extent explained by the different zone prices, especially between west Attica and the expensive areas of the northern and southern axis. The municipality of Athens, which records the largest number of transactions in the country, ranks somewhere in the middle between these two extremes in terms of fixed effects.

---

[22] The prefectures of Pella and Karditsa appear on the list of the bottom five according to both the prefectural fixed effects and the Market/Book ratio.

[23] See Tables A2 and A3 in the Appendix for the list of prefectural fixed effects by prefecture in Greece and municipalities in the Athens prefecture.

Short-term rental activity

The development of the short-term rental market is an international phenomenon that has sparked intense public debate. Most reports focus on the potential negative impacts on housing costs and appropriate measures to address them. In the case of Greece, a recent study by KEPE (Athanasios and Kotsis, 2022) thoroughly examines the evolution of short-term rentals during the period 2018-2020, demonstrating that this constitutes a dynamic and significant part of the tourism market. Based on this background, in this subsection, we further analyse the results of our econometric estimation concerning the geographical area fixed effects. Our aim is to evaluate the potential connection between tourism activity in the short-term rental market and the geographic distribution in the differentiation of market value of properties, as reflected by the fixed effects.

In line with the KEPE study, we rely on Eurostat's database covering short-term rental accommodations offered through four major digital platforms: Airbnb, Booking, Expedia group, and Tripadvisor (Eurostat, 2021).[24] The data is available from 2018 to 2023 at the national and prefectural level. Table 6 (Panel A) presents the number of overnight stays in short-term rental accommodations in 2023 and the percentage change between 2018-2023 for the ten prefectures with the most overnight stays. We observe that the activity of short-term rentals records significant growth. At the national level, the number of overnight stays reached a record level in 2023 (38.4 million), with an increase of 89% compared to 2018. The largest number of overnight stays is observed in the Athens prefecture, with the Cyclades in second place, while the prefecture of Zakynthos records the highest percentage change. Based on the findings in Column 4, we find that prefectures with significant differentiation in transaction values tend to have many overnight stays in short-term rental accommodations. Specifically, in seven out of ten cases, areas with the highest fixed effects coefficient also have the largest number of overnight stays.

Beyond the number of overnight stays, we calculate the "intensity" of tourism activity, as the potential pressure from a large number of visitors should be more pronounced in smaller destinations. In Panel B of Table 6, we approach tourism intensity as the fraction of the number

---

[24] As Athanasiou and Kotsis (2022) point out, the publication of the relevant data resulted from an agreement reached in March 2020 between the European Commission and the four platforms for their cooperation with Eurostat. Guest nights take into account the number of nights stayed and the number of people. For example, the rental of accommodation by a family of three for two nights corresponds to 3x2=6 guest nights. The data are published by Eurostat as experimental since they originate from private sources and available on the website: https://ec.europa.eu/eurostat/databrowser/product/page/TOUR_CE_OAN3

of overnight stays in short-term rental accommodations in 2023 to the population of the prefecture. Population data is based on the 2021 census. The two major urban centres of the country, Athens and Thessaloniki, although recording a large number of overnight stays, do not rank among the top ten prefectures in terms of tourism intensity. Conversely, two islands in the Ionian Sea (Lefkada and Cephalonia) with small populations and simultaneously very high fixed effects coefficients are prominent. Consequently, the number of cases where significant differentiation in transaction values appears to be associated with intense tourism activity through short-term rentals increases in Panel B (nine out of ten).

The scatter plots in the Appendix (Diagram A5) confirm the existence of a positive correlation between the coefficients of fixed effects by prefecture and the two alternative approaches to short-term rentals. The correlation coefficient is higher when using the second approach, which adjusts the absolute number of overnight stays based on the local population. In conclusion, it seems that there is some connection between tourism activity in the short-term rental market and the way the differentiation of property values is distributed throughout the country.

"My Home" government program

The purpose of estimating Eq. (2) is to analyse the relationship between "My Home" government program and transactions in the Greek residential property market.

$$\ln(MV_i) = a + \beta_1 \ln(BV_i) + \beta_2 age_i + \beta_3 flat_i + \beta_4 flat_i floor_i + \beta_5 spiti_i + \beta_6 flat_i spiti_i \\ + \beta_7 front_i + \beta_8 special_i + FE + u_i \tag{2}$$

The "My home" program, with a total budget of €1 billion, started in April 2023 and involves the provision of low-interest or interest-free housing loans to first-home buyers (young individuals and couples). The houses covered by the program must be: (i) over 15 years old, (ii) not larger than 150 square meters, and (iii) have a market value of no more than €200,000. Based on these characteristics, we define the dummy variable *spiti* (equal to one if the transaction involves a residence that meets criteria i-iii, otherwise zero). We then include it in the econometric model both alone and in interaction with the dummy variable flat (*flat x spiti*), to examine the potential connection of the program with the value of transactions in general, as well as that of flats specifically. Estimating Eq. (2) by year will show whether and how the program relates to transaction values. This approach allows us to focus on the potential differences between the periods: pre-2023 (program inactive) and 2023-2024 (program active).

Table 7 presents the results of the econometric estimation. The results do not show a positive relationship between the program and the transaction value of residences that meet its criteria. Throughout the entire period, as well as during the annual sub-periods, the coefficient of *spiti* is not statistically significant at the 1% or 5% significance level. Regarding the relationship between the program and the transaction value of flats, the estimated coefficient of *flat x spiti* not only does not increase but decreases between 2022 and 2023 and falls further in 2024. Specifically, there is a positive and statistically significant difference between the market value of compliant (with the program's criteria) flats and other flats in almost all sub-periods before 2023. The coefficient of *flat x spiti* decreases by 44% between 2022 and 2023, from 0.152 to 0.085 (Columns 7 and 8), indicating a reduction in the value premium of compliant flats during the first year of the program. Finally, in 2024 (first quarter data, Column 9), there is no statistically significant difference. Figure 11 shows that the changes in the transaction value of compliant residences during the program were not greater than those of the overall market.

5. Robustness checks

Market/ Book model

As the administratively determined zone prices are adjusted every few years based on market conditions, they may be correlated with unobserved factors that also influence *Market value*. This scenario raises some endogeneity concerns. So far, to address this issue, we have included geographic (prefecture or municipality) and year fixed effects, which reflect unobserved heterogeneity. Here, we use an alternative approach, by analysing the Market/Book value ratio.

The new econometric model replaces the dependent variable of Eq. (1) with the Market/Book ratio and removes *Book Value* from the set of independent variables. This allows us to omit the potentially endogenous independent variable. Additionally, we can examine whether our findings regarding significant differences in transactions by area and transaction year, as captured by the fixed effects, still hold. Finally, this approach more directly connects the regression analysis with the statistics on the behaviour of the Market/Book ratio discussed in section 3.

$$MV_i/BV_i = a + \beta_1 age_i + \beta_2 flat_i + \beta_3 flat_i floor_i + \beta_4 front_i + \beta_5 special_i + FE + u_i \qquad (3)$$

Table A4 in the Appendix presents the results of this analysis. The estimation of the model in Eq. (3) shows that, our results hold, as the estimated coefficients are similar to what has been reported in our baseline regressions.[25] Table A5 in the Appendix provides the list of fixed effects by prefecture, based on Eq. (3). These fixed effects are statistically significant and highly correlated with those derived from the initial analysis of Eq. (1) (correlation coefficient 0.98). The same applies to the time fixed effects. As a result, the key conclusions of the initial analysis do not change with the alternative modelling approach.

Components of Book Value

Another robustness check involves the use of the property's zone price and surface area in the model. Specifically, in Eq. (4), we replace Book value with its two main components: surface area (*surface*) and the logarithm of the zone price (*TZ*) of the residence. This allows us to examine whether the two components of the objective value are significant on their own. Additionally, this approach connects our analysis with the literature that uses surface area as an explanatory factor in hedonic models.

$$\ln(MV_i) = a + \beta_1 \ln(TZ_i) + \beta_2 surface_i + \beta_3 age_i + \beta_4 flat_i + \beta_5 flat_i floor_i + \beta_6 front_i + \beta_7 special_i + FE + u_i \tag{4}$$

Table A6 in the Appendix presents the results of this analysis. The two new explanatory variables bear the expected signs: higher zone price and larger surface area are associated with higher market value. Furthermore, their coefficients are statistically significant at the 1% level, in all cases. Nevertheless, compared to the results of the initial analysis in Table 3, the Adjusted R^2 coefficient shows some decline, e.g., from 56% to 42% in the full sample (Column 1). This finding suggests that the combination of the two variables within the framework of objective value measurement provides greater explanatory power for the model.

Alternative fixed effects

Finally, we replicate the results of our baseline analysis by using alternative fixed effects: Specifically, we use the following two fixed effects: (i) geographical area defined by the Kallikratis municipalities, instead of prefecture, and (ii) the interaction of geographical area with the year of the transaction (*area x time*). The results remain similar and are available upon request.

---

[25] Specifically, older residences are associated with lower transaction values. Additionally, the discount in value associated with flats is less pronounced as the floor increases. The number of facades and the special conditions of the property play a statistically significant role in certain cases.

6. Conclusions and policy implications

This study is the first to utilize data from the Property Transfer Value Registry to examine the Greek residential property market at the transaction-level. It focuses on the recovery period, which is characterized by an imbalance between supply and demand, significant investment financing from abroad, low mortgage lending, and the development of the short-term rental market. Through the analysis of 132,189 transactions from 2017 to 2024, we observe a significant increase in both the number and value of transactions, mainly for older properties and flats. The market shows signs of overheating, as it moves away from a regime of relative undervaluation towards higher levels of transactions and prices. Concurrently, a "multiple-speeds" market is emerging with significant geographical differentiation. This heterogeneity materialises both across the country and within Athens. The econometric analysis reveals a significant relationship between objective and market values, while the "My Home" program does not seem to correlate with an increase in the value of transactions for eligible properties.

Our analysis underscores the usefulness of the Registry as a tool for monitoring the residential property market and drawing statistical conclusions. Despite its limitations, it remains the only available transaction-level database for the Greek residential property market. We suggest expanding the coverage of characteristics recorded in the Registry. Specifically, it would be beneficial to know whether each transaction is between third parties or an intra-family transaction, whether it is a first sale or resale, as well as the postcode location. Additionally, knowledge of the nationality of the transacting parties could provide further insights into market trends. This information will be useful for future analyses of the Registry, which are sure to follow.

The information provided by the Registry is significant given the upcoming change in the way zone prices are calculated in Greece, based on a system of automatic adjustments. The new system will rely on mass property appraisal models, considering, among other factors, market values according to historical transaction data. One of the goals of the automated system will be to reduce the gap between the objective values and market values of properties. The results of our study provide detailed information on the historical evolution of this discrepancy at the national, prefectural, and municipal levels. They indicate that automatic adjustments must consider transactions over time to reduce their exposure to short-term market volatility.

Our study provides useful insights for formulating effective and sustainable housing policy as, among other findings, it sheds light on the "multiple-speeds" dynamics of the residential property market. Looking to the future, the market faces challenges as well as opportunities. A

key issue is managing the imbalance between supply and demand. Housing policy must take into account the emerging tightness in the market, which has many negative implications for households. As noted by the Bank of Greece (2024), the rise in housing costs could extend social inequality and worsen the demographic problem. We agree with the Bank of Greece's assessment that recent interventions in the residential property market are moving in the right direction regarding the need to ensure citizens' access to housing under acceptable terms.

These interventions include measures to slow investment demand for residences, such as increasing the minimum acquisition value for the Golden Visa program and the recently announced restrictions on short-term rentals. The analysis of the "My Home" program is crucial for evaluating initiatives aimed at expanding the accessibility of the residential property market through subsidized or interest-free loans for youth and young couples. In light of the non-significant increase in transaction values for eligible residences, our findings are consistent with the rationale behind the recent decision for the "My Home 2" program. Beyond measures concerning the resolution of vacant housing issues and those involved in NPLs, a strategic plan is required to expand construction activity. This plan should consider the purchasing power of households. Mega-projects, such as that of the Elliniko area in Athens, are welcome, but they must be combined with the expansion of affordable housing availability for the average household.

Finally, our study provides important insights to Greek banks regarding developments in the residential property market during a period when their participation in financing that market was low. Given that banks have the capacity, through high deposits, as well as the profit motive, we anticipate an increase in the supply of mortgage loans. So far, credit expansion during the recovery has focused on business loans. In any case, banks should consider the risks associated with a significant increase in the pace of mortgage lending in a market that is already showing signs of overheating.

References

Alexandridis, A.K., Karlis, D., Papastamos, D., Andritsos, D. (2019). Residential property valuation and forecasting in non-homogeneous markets: A case study in Greece during the financial crisis. Journal of the Operational Research Society, 70, 1769-1783.

Alpha Bank (2020). The rise, fall and revival of the residential property market in Greece: Bringing new drivers of house price fluctuations to the foreground. Alpha Bank Economic Research, Ιανουάριος 2020.

Ambrose, B.W., Coulson, N.E., Yoshida, J. (2015). The repeat rent index. Review of Economics and Statistics, 97, 939-950.

Arghyrou, M., Kontonikas, A. (2024). Private bank deposits and macro/fiscal risk in the euro-area. Journal of International Money and Finance, 140, 102992.

Athanasiou, E., & Kotsi, A. (2022). Short-term rental of properties in Greece. Center for Planning and Economic Research, Reports, 82

Bank of Greece. (2024). Monetary Policy Report 2023-2024. June 2024.

Barron, K., Kung, E., Proserpio, D. (2021). The effect of home-sharing on house prices and rents: Evidence from Airbnb. Marketing Science, 40, 23-47.

Bloomberg (2023). Athens home prices are surging faster than other European cities. Bloomberg Business, 17/11/2023.

Chen, W., Wei, Z., Xie, K. (2022). The battle for homes: how does home sharing disrupt local residential markets? Management Science, 68, 8589-8612.

Correia, S. (2017). Linear models with high-dimensional fixed effects: An efficient and feasible estimator, Working Paper.

Doumpos, M., Papastamos, D., Andritsos, D., Zopounidis, C. (2021). Developing automated valuation models for estimating property values: A comparison of global and locally weighted approaches. Annals of Operations Research, 306, 415-433.

Efthymiou, D., Antoniou, C. (2013). How do transport infrastructure and policies affect house prices and rents? Evidence from Athens, Greece. Transportation Research Part A: Policy and Practice, 52, 1-22.

European Parliamentary Research Service (2019). Understanding money laundering through residential property transactions, Briefing, PE 633.154.

Eurostat (2021). Short-stay accommodation offered via online collaborative economy platforms. Eurostat Experimental Statistics, 29/6/2021.

Fik, T.J., Ling, D.C., Mulligan, G.F., 2003. Modelling spatial variation in housing prices: a variable interaction approach. Residential property Economics, 31, 623-646.

Garcia-López, M.À., Jofre-Monseny, J., Martínez-Mazza, R. Segú, M. (2020). Do short-term rental platforms affect residential property markets? Evidence from Airbnb in Barcelona. Journal of Urban Economics, 119, 103278.

Glaeser, E.L., Gyourko, J., Saks, R.E. (2005). Why have housing prices gone up? American Economic Review, 95, 329-333.

Horn, K., Merante, M. (2017). Is home sharing driving up rents? Evidence from Airbnb in Boston. Journal of Housing Economics, 38, 14-24.

Ihlanfeldt, K., Mayock, T. (2009). Price discrimination in the residential property market. Journal of Urban Economics, 66, 125-140.

Ihlanfeldt, K., Mayock, T. (2012). Information, search, and house prices: Revisited. The Journal of Residential property Finance and Economics, 44, 90-115.

Karaganis, A.N. (2011). Seasonal and spatial hedonic price indices. Journal of Property Investment & Finance, 29, 297-311.

Kavarnou, D., Nanda, A. (2014). Which attributes influence the residential property markets across the Greek Islands? Journal of Residential property Literature, 22, 233-260.

Kavarnou, D., Nanda, A. (2018). How does tourism penetration affect house prices? Evidence from Crete, Greece. Tourism Analysis, 23, 289-301.

Koster, H.R., Van Ommeren, J., Volkhausen, N. (2021). Short-term rentals and the residential property market: Quasi-experimental evidence from Airbnb in Los Angeles. Journal of Urban Economics, 124, 103356.

Malpezzi, S., 2003. Hedonic pricing models: A selective and applied review. Housing Economics and Public Policy, Blackwell Publishing.

National Bank of Greece (2023). Special focus report: Residential property market outlook. September 2023.

Piraeus Bank (2024). Greek residential residential property: Deep and structural imbalances between supply and demand. Economic Research and Investment Strategy, January 2024.

Sheppard, S., Udell, A. (2016). Do Airbnb properties affect house prices? Williams College Department of Economics Working Papers, 3, 43.

Verbrugge, R., Dorfman, A., Johnson, W., Marsh III, F., Poole, R., Shoemaker, O. (2017). Determinants of differential rent changes: mean reversion versus the usual suspects. Residential property Economics, 45, 591-627.

White, M., Papastamos, D. (2018). An analysis of regional house prices in Greece. Journal of European Residential property Research, 11, 335-352.

Figure 1: Residential property market transactions - number and value
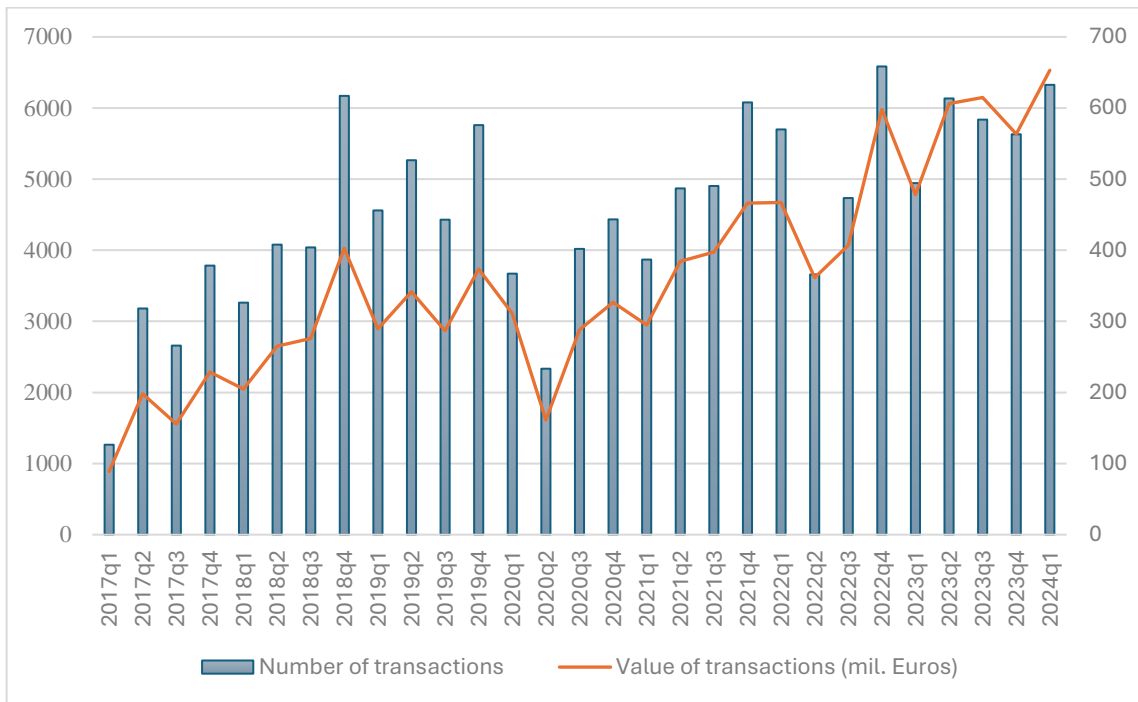
Notes: Quarterly data (2017q1–2024q1) for the number (left axis) and the value (right axis, € million) of residential property transactions in Greece. Source: Property Transfer Value Registry and authors' calculations

Figure 2: Transactions value and property price index
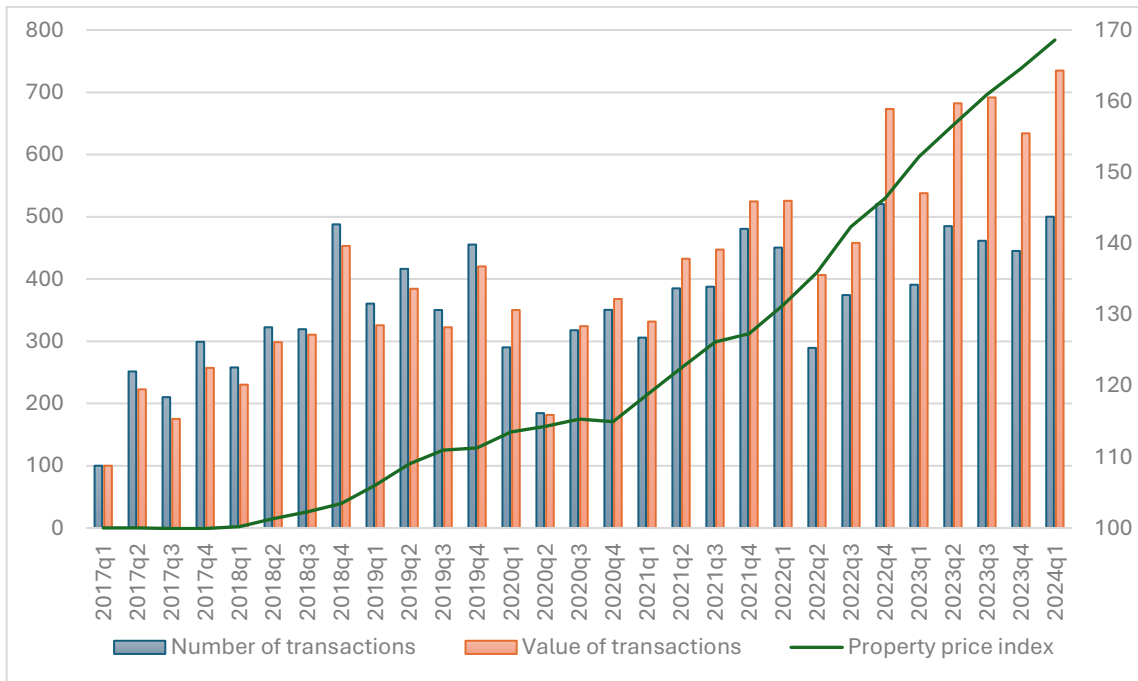
Notes: Figure 2 presents quarterly data (2017q1–2024q1) for the number and value of residential property transactions (left axis) and the house price index (right axis) in Greece. All series have been standardized to be equal to 100 in the first quarter of 2017. Source: Property Transfer Value Registry, Bank of Greece, and authors' calculations.

Figure 3: Transactions value in Athens and Thessaloniki prefectures
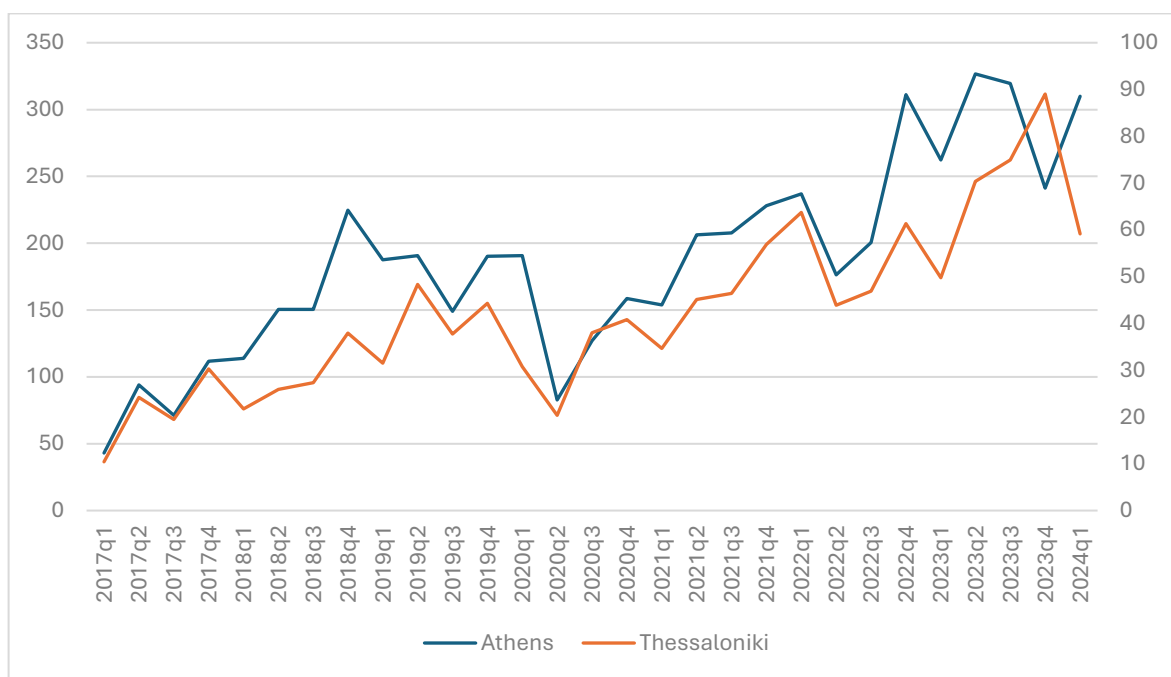
Notes: Figure 3 presents quarterly data (2017q1–2024q1) for the value of residential property transactions (€ million) in the prefectures of Athens (left axis) and Thessaloniki (right axis). Source: Property Transfer Value Registry and authors' calculations.

Figure 4: Flats - transactions value and share of market
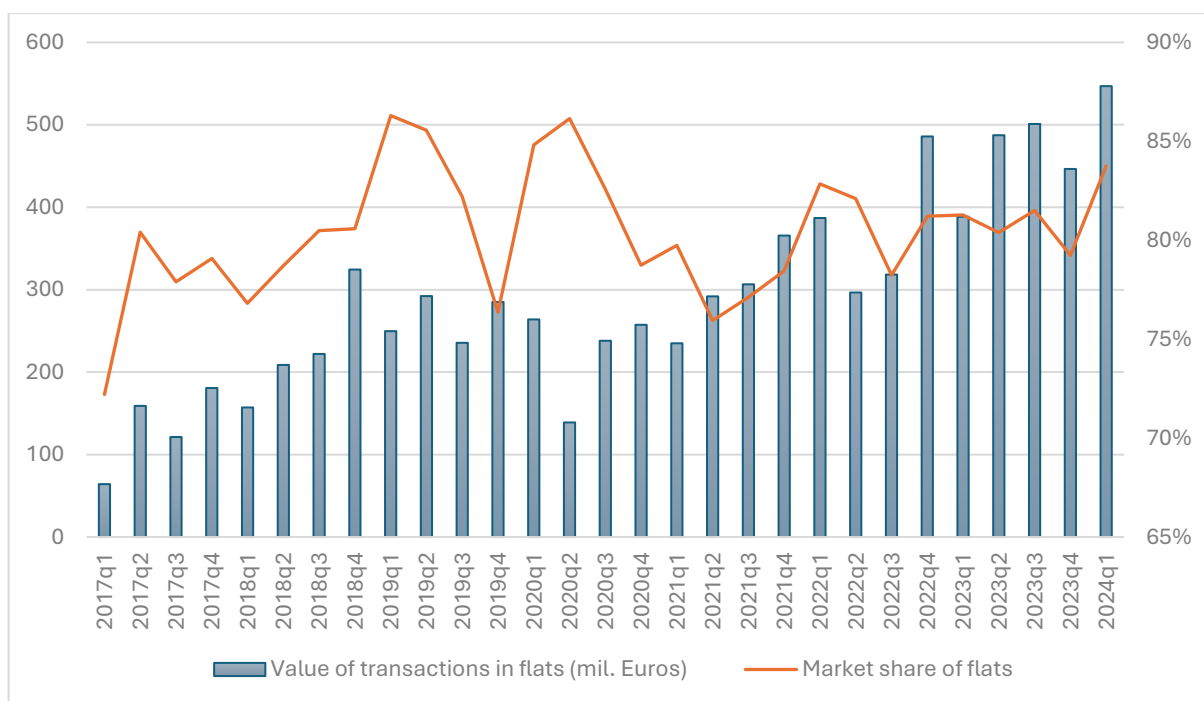
Notes: Figure 4 presents quarterly data (2017q1–2024q1) for the value of flat transactions (left axis, € million) and their market share (right axis), defined as the percentage of the value of flat transactions over the total value of residential property transactions across Greece. Source: Property Transfer Value Registry and authors' calculations.

Figure 5: Old properties - transactions value and share of market
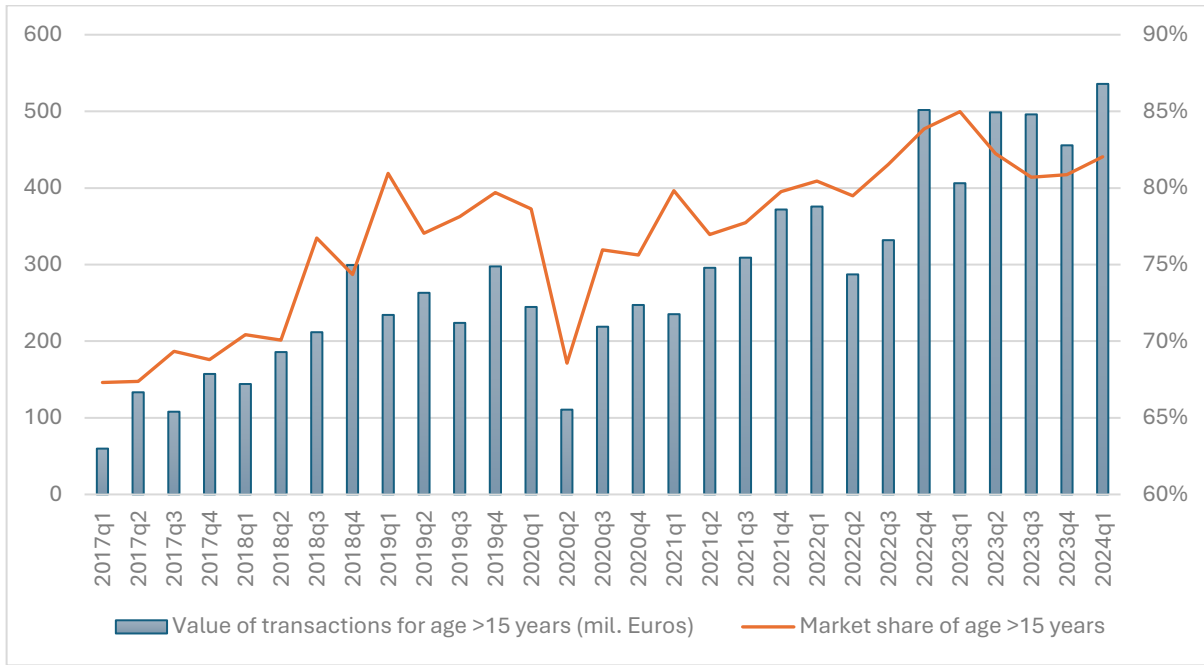
Notes: Figure 5 presents quarterly data (2017q1–2024q1) for the value of residential property transactions of homes older than 15 years (left axis, € million) and their market share (right axis), defined as the percentage of the value of transactions of homes older than 15 years over the total value of residential property transactions in Greece. Source: Property Transfer Value Registry and authors' calculations.

Figure 6: Market/Book value
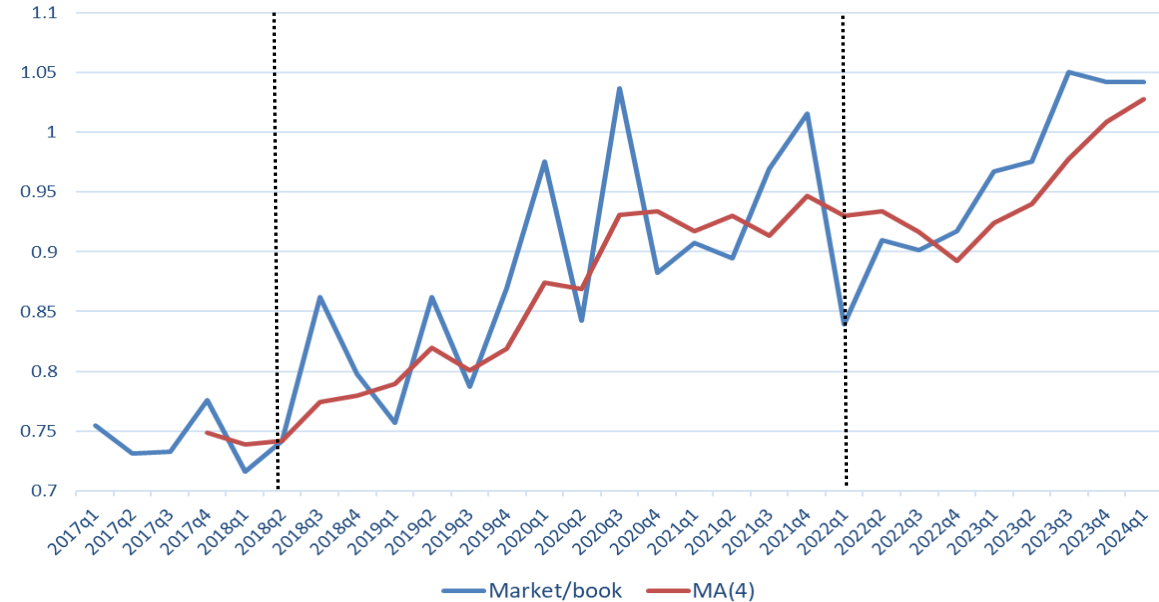
Notes: Figure 6 presents quarterly data (2017q1–2024q1) for the Market/Book value ratio of residential properties, defined as the transactions price (market value) divided by the initial objective value estimate, and the 4-quarter moving average (MA (4)) across Greece. The initial objective value (Book Value) is defined as: (property area) x (zone price) x (ownership percentage). The dashed lines correspond to 2018q2 and 2022q1, when zone prices were updated. Source: Property Transfer Value Registry and authors' calculations.

Figure 7: Market/Book value and housing unaffordability index
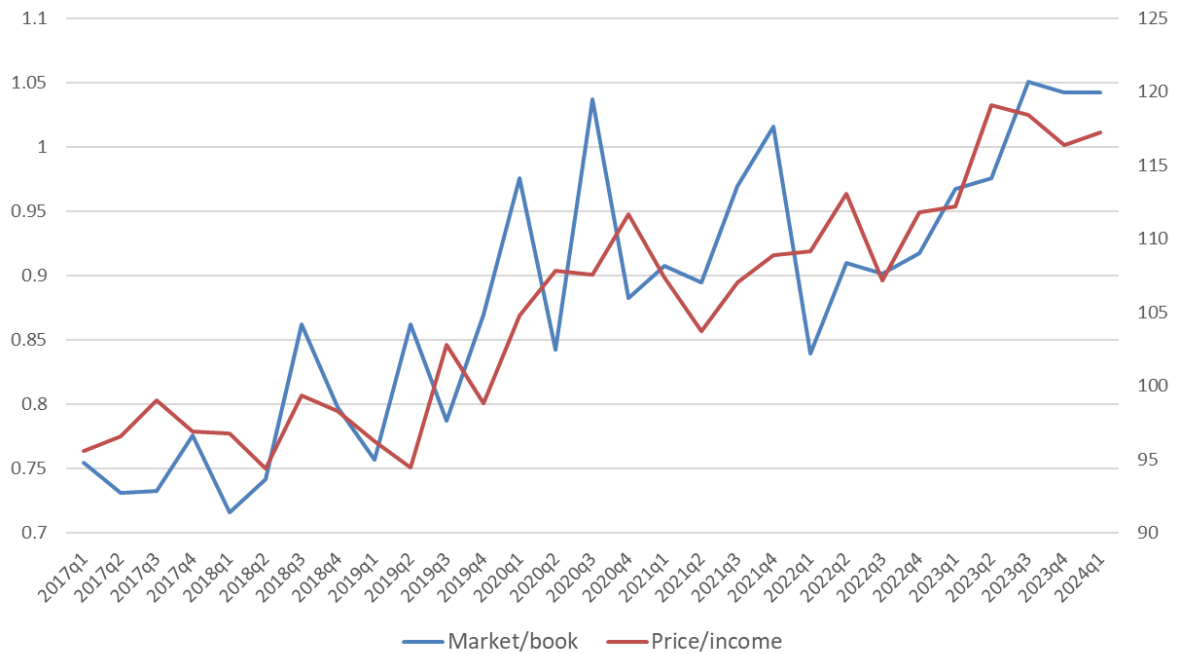
Notes: Figure 7 presents quarterly data (2017q1–2024q1) for the Market/Book value ratio of residential properties and the OECD's housing unaffordability index for Greece, defined as the ratio of property prices to disposable income (Price/Income). For information on the calculation of the Market/Book value, see the notes for Chart 6. Source: Property Transfer Value Registry, OECD, and authors' calculations.

Figure 8: Transactions value, FDI in property market and new mortgage loans

Notes: Figure 8 presents annual data (2017–2023, in € million) on the value of residential property transactions across Greece, foreign direct investment (FDI) by individuals in the residential property market, and mortgage loan flows. Source: Property Transfer Value Registry, Bank of Greece, and authors' calculations.

Figure 9: Year fixed effects
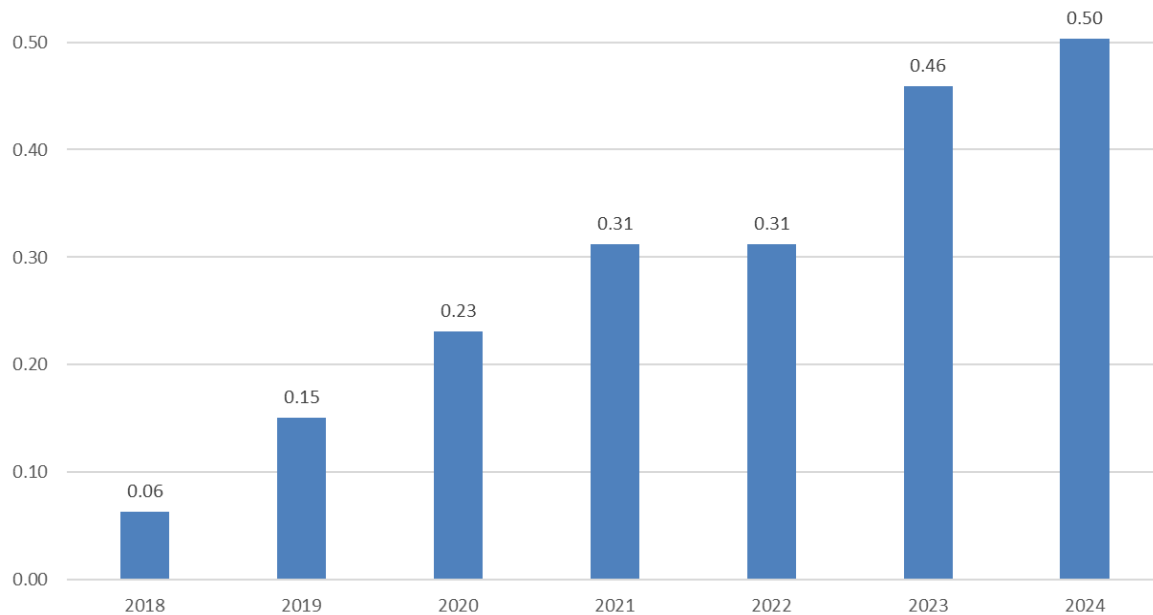
Notes: Figure 9 presents the year fixed effects coefficient from the estimation of the econometric model (Equation 1 in the text) over the full sample period (2017q1–2024q1). For more information on the econometric model, see the notes for Table 3. Source: Property Transfer Value Registry and authors' calculations.

Figure 10: Annual % change in year fixed effects and economic sentiment index
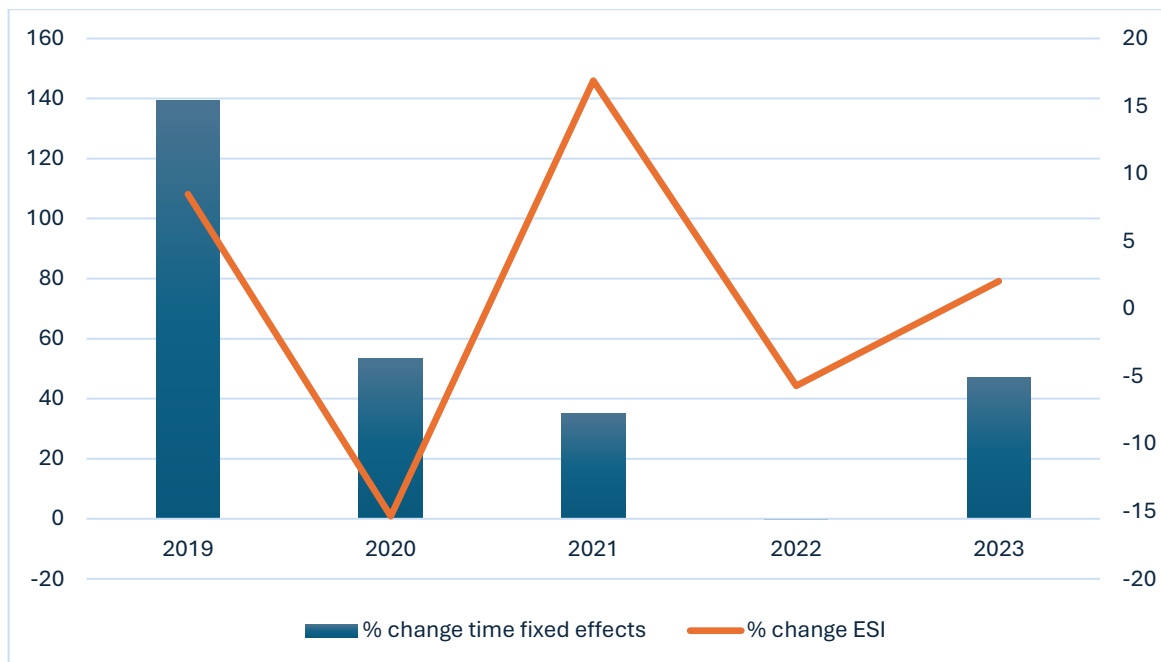
Notes: Figure 10 presents the percentage change in the time fixed effects coefficient (left axis) and the Economic Sentiment Indicator (ESI) from Eurostat for Greece (right axis) during the period 2019–2023. For more information on the fixed effects, see the notes for Table 3. Source: Property Transfer Value Registry, Eurostat, and authors' calculations.

Figure 11: "My Home" government program
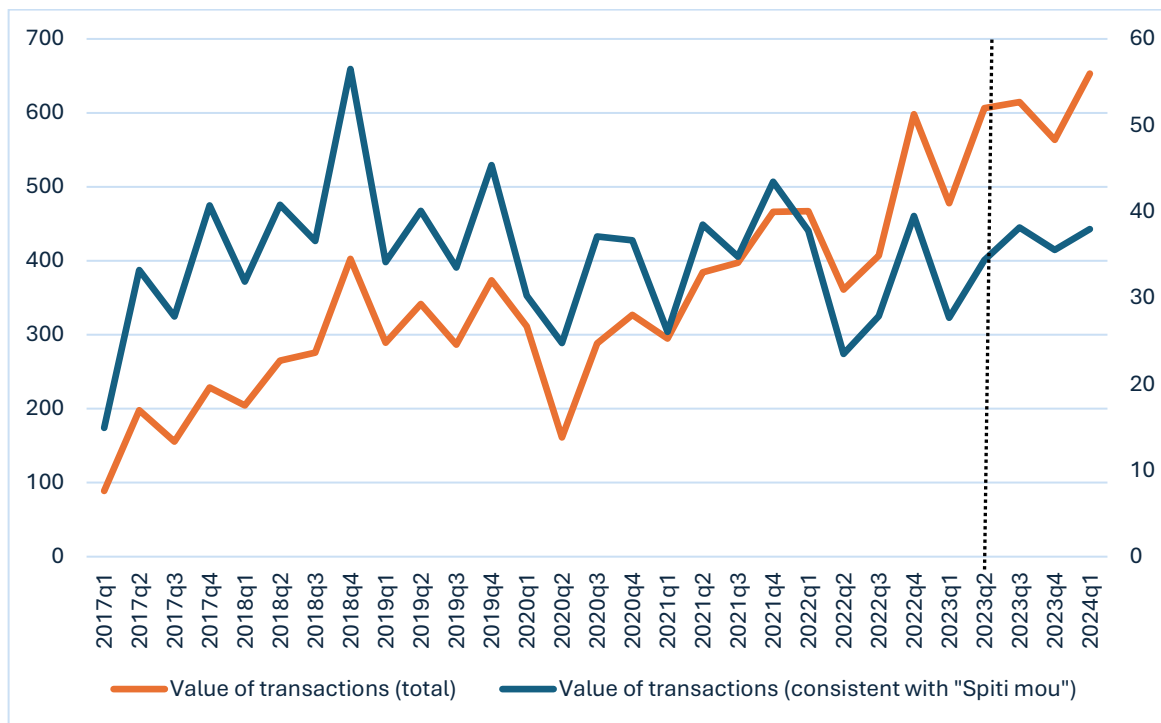
Notes: Figure 11 presents quarterly data (2017q1–2024q1, in € million) on the value of property transactions for all residences in the sample (left axis) and the value of property transactions for residences that meet the criteria of the "My Home" program (right axis) across Greece. The dashed line corresponds to 2023q2, when the "My Home" program started. Source: Property Transfer Value Registry and authors' calculations.

Table 1: Number and value of residential transactions, % of transactions by value category, and average transaction value

Year	Number of transactions	Volume of transactions (mil. €)	% transactions				Average value of transaction (000s €)
			[10 – 99.9] (000s €)	[100 – 249.9] (000s. €)	[250 – 499.9] (000s €)	[500 – 20,000] (000s €)	
2017	10,889	671	85.5%	11.3%	2.5%	0.7%	62
2018	17,553	1,148	84.6%	12.1%	2.5%	0.7%	65
2019	20,016	1,291	84.4%	12.4%	2.5%	0.7%	64
2020	14,459	1,088	82.1%	13.8%	3.3%	0.8%	75
2021	19,722	1,543	80.1%	15.1%	3.7%	1.0%	78
2022	20,678	1,834	75.6%	17.9%	5.2%	1.3%	89
2023	22,547	2,262	69.3%	22.4%	6.9%	1.4%	100

Notes: Table 1 presents annual data (2017–2023) on the number and value of residential transactions (€ million), the percentage of the number of transactions by value category (of the total number of transactions), and the average transaction value (€ thousand) across Greece. Source: Property Transfer Value Registry and authors' calculations.

Table 2: Market/Book value (2024q1) of top 5 and bottom 5 prefectures

Top-5 Prefectures	Market/Book value	Bottom-5 Prefectures	Market/Book Value
Cyclades	1.66	Pella	0.68
Cephalonia	1.62	Trikala	0.67
Corfu	1.31	Ilia	0.65
Samos	1.30	Arcadia	0.63
Halkidiki	1.29	Karditsa	0.58

Notes: Table 2 presents data from the first quarter of 2024 on the Market/Book value ratio of residential properties, for the 5 and bottom 5 prefectures based on the value of the ratio. information on the calculation of the Market/Book value, see the notes for Chart 6. Source: Property Transfer Value Registry and authors' calculations.

Table 3: Baseline results

Variables	2017-24 (1)	2017 (2)	2018 (3)	2019 (4)	2020 (5)	2021 (6)	2022 (7)	2023 (8)	2024 (9)
ln(*BV*)	0.831***	0.802***	0.842***	0.819***	0.820***	0.819***	0.856***	0.853***	0.861***
	(15.86)	(10.53)	(14.60)	(11.93)	(17.28)	(16.61)	(17.64)	(23.53)	(26.49)
Age	-0.008***	-0.011***	-0.008***	-0.007***	-0.008***	-0.008***	-0.007***	-0.007***	-0.007***
	(-10.02)	(-5.93)	(-5.03)	(-7.50)	(-9.66)	(-13.94)	(-9.11)	(-12.25)	(-10.06)
Flat	-0.203***	-0.330***	-0.295***	-0.304***	-0.200***	-0.205***	-0.136***	-0.115*	-0.081**
	(-3.33)	(-3.49)	(-4.47)	(-4.20)	(-2.68)	(-3.52)	(-2.79)	(-1.90)	(-2.09)
flat × floor	0.017***	0.014***	0.016***	0.018***	0.016***	0.016***	0.017***	0.019***	0.020***
	(10.28)	(7.18)	(10.93)	(7.76)	(7.23)	(8.57)	(9.65)	(11.94)	(12.49)
Front	0.011	0.024	0.038**	0.031**	0.023	0.036**	0.005	-0.012	0.012
	(0.78)	(1.12)	(2.08)	(2.19)	(1.48)	(2.37)	(0.35)	(-1.62)	(1.18)
special	-0.086**	0.027	-0.007	-0.090	-0.031	-0.149***	-0.189***	-0.108	-0.078
	(-2.16)	(0.61)	(-0.13)	(-1.55)	(-0.59)	(-2.92)	(-3.10)	(-1.38)	(-1.29)
Intercept	1.862***	2.146***	1.635***	1.942***	1.963***	2.043***	1.545***	1.733***	1.622***
	(3.38)	(2.80)	(2.78)	(2.70)	(3.91)	(3.78)	(2.94)	(4.48)	(4.51)
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	No	No	No	No	No	No	No	No
N	132,117	10,878	17,538	19,999	14,449	19,711	20,673	22,542	6,326
Adjusted R²	0.563	0.529	0.534	0.538	0.548	0.552	0.570	0.574	0.593

Notes: Table 3 presents the results of the econometric model estimation (Equation 1 in the text) for the full sample period (Column 1, 2017q1–2024q1) as well as for annual subperiods (Columns 2–9). In 2024, we only have data for the first quarter. N is the number of observations in the sample. The model includes fixed effects at the time level (Column 1) and at the prefectural level (Columns 1–9). Robust t-statistics are in parentheses. Standard errors are clustered at the time and prefectural level in Column 1, and at the prefectural level in Columns 2–9. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: Property Transfer Value Registry and authors' calculations.

Table 4: Prefecture fixed effects for the top 5 and bottom 5 prefectures

Top-5 Prefectures	Fixed effects	t-statistic	Bottom-5 Prefectures	Fixed effects	t-statistic
Cephalonia	1.80	4.28	Fthiotida	0.83	1.96
Cyclades	1.73	3.99	Karditsa	0.82	1.90
Dodecanese	1.57	3.67	Larissa	0.82	1.88
Corfu	1.50	3.49	Drama	0.79	1.82
Lefkada	1.50	3.47	Pella	0.76	1.74

Notes: Table 4 presents the coefficients of the prefectural fixed effects for the top 5 and bottom 5 prefectures based on the value of the fixed effects, from the estimation of the econometric model (Equation 1 in the text) over the full sample period (2017q1–2024q1). For more information about the econometric model, see the notes for Table 3. Source: Property Transfer Value Registry and authors' calculations.

Table 5: Municipal fixed effects for the top 5 and bottom 5 municipalities in Athens

Top-5 Municipalities	Fixed effects	t-statistic	Bottom-5 Municipalities	Fixed Effects	t-statistic
Alimos	1.25	52.59	N. Filadelfeia	0.73	35.41
Glyfada	1.25	45.45	A. Anargyroi	0.72	38.97
Kifissia	1.18	37.18	Kamatero	0.71	39.94
Philothei	1.18	26.41	Egaleo	0.71	35.42
Penteli	1.16	28.18	Agia Varvara	0.67	36.82

Notes: Table 5 presents the coefficients of the municipal fixed effects for the top 5 and bottom 5 municipalities in the Athens prefecture, based on the value of the fixed effects, from the estimation of the econometric model (Equation 1 in the text) over the full sample period (2017q1–2024q1), using fixed effects at the municipal level (instead of the prefecture level). For more information about the econometric model, see the notes for Table 3. Source: Property Transfer Value Registry and authors' calculations.

Table 6: Short-term rentals and prefectural fixed effects

A: Top-10 number of nights

	Number of nights 2023 (000s)	Number of nights % change 2018-23	Top-10 Prefectures Fixed effects
Athens	6,174	83%	
Cyclades	4,999	65%	✓
Corfu	2,996	102%	✓
Chania	2,881	83%	✓
Halkidiki	2,527	79%	✓
Dodecanese	2,200	112%	✓
Thessaloniki	2,025	121%	
Heraklion	1,518	119%	
Rethymno	1,368	87%	✓
Zakynthos	1,197	129%	✓

B: Top-10 number of nights over the population

Νομαρχία	Number of nights over the population	Population (000s)	Top-10 Prefectures Fixed effects
Cyclades	41	121	✓
Lefkada	37	23	✓
Corfu	29	102	✓
Zakynthos	29	41	✓
Cephalonia	27	39	✓
Halkidiki	25	102	✓
Chania	18	157	✓
Rethymno	16	85	✓
Dodecanese	10	217	✓
Kavala	8	129	

Notes: Table 6A presents the top 10 prefectures based on the number of overnight stays (thousands) in short-term rental accommodations during 2023. Table 6B presents the top 10 prefectures based on the number of overnight stays in short-term rental accommodations during 2023 relative to the population (2021 census data). The ✓ symbol indicates cases where the prefectures also appear in the top 10 based on the prefectural fixed effects coefficients from the econometric model estimation (Equation 1 in the text) over the full sample period (2017q1–2024q1). For more information about the econometric model, see the notes for Table 3. Source: Residential property Transfer Value Registry, ELSTAT, Eurostat Experimental Statistics, and authors' calculations.

Table 7: Econometric model estimation results – "My Home" program

Variables	Full sample (1)	2017 (2)	2018 (3)	2019 (4)	2020 (5)	2021 (6)	2022 (7)	2023 (8)	2024 (9)
ln(*BV*)	0.834***	0.811***	0.849***	0.824***	0.823***	0.820***	0.856***	0.851***	0.859***
	(16.16)	(11.10)	(15.32)	(12.30)	(18.13)	(16.81)	(17.72)	(23.71)	(26.17)
age	-0.007***	-0.009***	-0.007***	-0.006***	-0.008***	-0.008***	-0.007***	-0.008***	-0.008***
	(-8.36)	(-5.03)	(-4.42)	(-5.52)	(-7.20)	(-10.28)	(-7.42)	(-10.47)	(-8.75)
flat	-0.216***	-0.370***	-0.326***	-0.312***	-0.214***	-0.216***	-0.149***	-0.121**	-0.081**
	(-3.63)	(-4.03)	(-5.07)	(-4.33)	(-3.06)	(-3.78)	(-3.10)	(-2.06)	(-2.11)
flat × floor	0.017***	0.014***	0.016***	0.018***	0.016***	0.016***	0.017***	0.019***	0.020***
	(10.27)	(7.33)	(10.97)	(7.82)	(7.26)	(8.64)	(9.59)	(12.03)	(12.10)
spiti	-0.032	-0.098	-0.038	0.063	-0.052	-0.061	-0.100	-0.110*	-0.074
	(-0.36)	(-1.00)	(-0.39)	(0.57)	(-0.59)	(-0.79)	(-1.38)	(-1.68)	(-1.24)
flat × spiti	0.140***	0.320***	0.245***	0.076	0.135**	0.129***	0.152***	0.085**	0.020
	(2.76)	(3.61)	(3.13)	(1.03)	(2.40)	(3.16)	(4.07)	(2.28)	(0.81)
front	0.010	0.022	0.036*	0.031**	0.023	0.036**	0.005	-0.012	0.013
	(0.75)	(0.99)	(1.92)	(2.14)	(1.46)	(2.39)	(0.35)	(-1.64)	(1.08)
special	-0.105***	-0.015	-0.057	-0.116*	-0.044	-0.161***	-0.199***	-0.105	-0.069
	(-2.91)	(-0.36)	(-1.40)	(-2.00)	(-0.91)	(-3.09)	(-3.43)	(-1.28)	(-1.13)
Intercept	1.804***	1.981***	1.503**	1.833**	1.906***	2.019***	1.545***	1.765***	1.657***
	(3.33)	(2.69)	(2.65)	(2.63)	(4.05)	(3.79)	(2.95)	(4.61)	(4.54)
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	No	No	No	No	No	No	No	No
N	132,117	10,878	17,538	19,999	14,449	19,711	20,673	22,542	6,326
Adjusted R²	0.564	0.535	0.539	0.540	0.549	0.553	0.571	0.574	0.593

Notes: Table 7 presents the results of the econometric model estimation (Equation 2 in the text) over the full sample period (Column 1, 2017q1–2024q1) as well as for subperiods (Columns 2–9). In 2024, we only have data for the first quarter. N is the number of observations in the sample. The model includes fixed effects at the time level (Column 1) and at the prefectural level (Columns 1–9). Standard errors are clustered at the time and prefectural level in Column 1, and at the prefectural level in Columns 2–9. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: Property Transfer Value Registry and authors' calculations.

Appendix

Figure A1: Residential prices in major cities and building permits
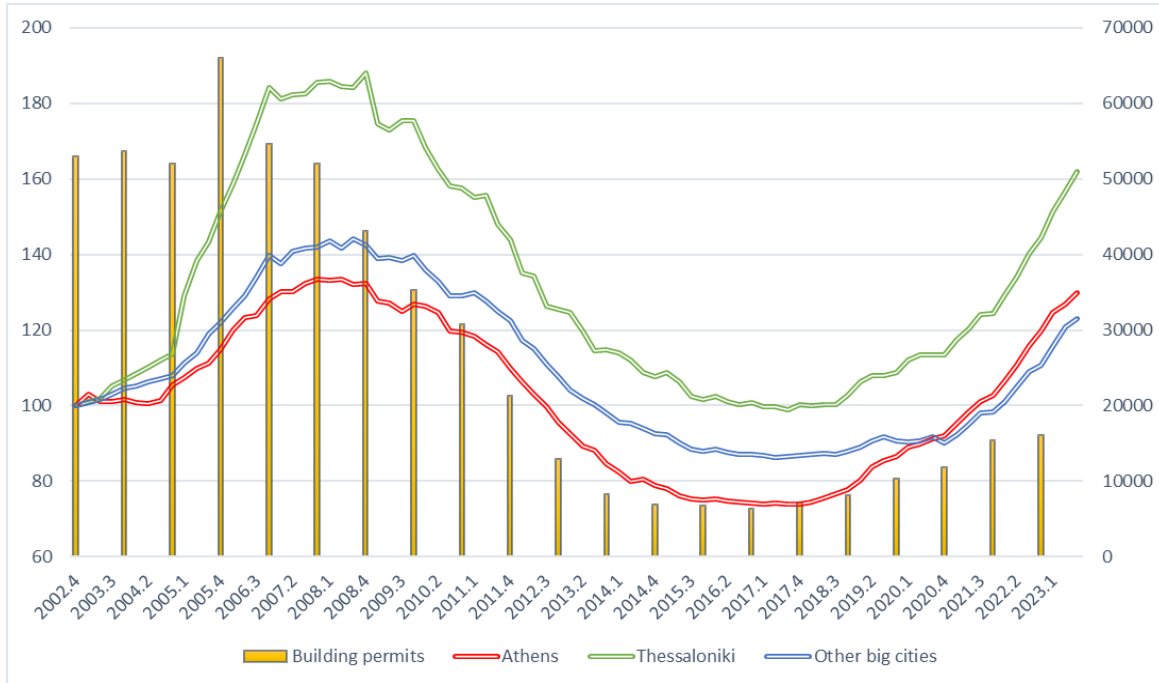
Notes: Figure A1 presents quarterly data (2002q1–2024q1) for the residential price index in Athens, Thessaloniki, and other major cities (left axis). The series have been standardized to equal 100 in the fourth quarter of 2002. It also presents annual data (2002–2022) from a study by Piraeus Bank (2024) for the sum of permits for new buildings and revisions of issued permits (new building permits and revisions, right axis). Source: Bank of Greece, Piraeus Bank, and authors' calculations.

Figure A2: Economic Sentiment Indicator - Eurozone and Greece
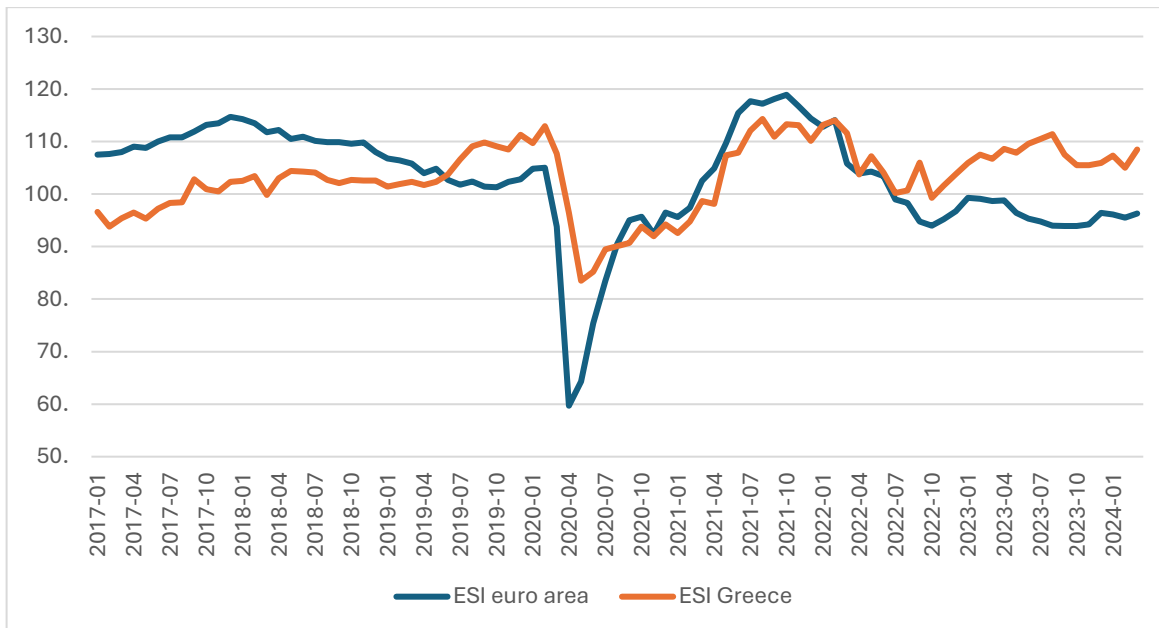
Notes: Figure A2 presents monthly data (January 2017 – March 2024) for the Economic Sentiment Indicator (ESI) in the Eurozone and Greece. Source: Eurostat.

Figure A3: Market/Book value – Athens and Thessaloniki
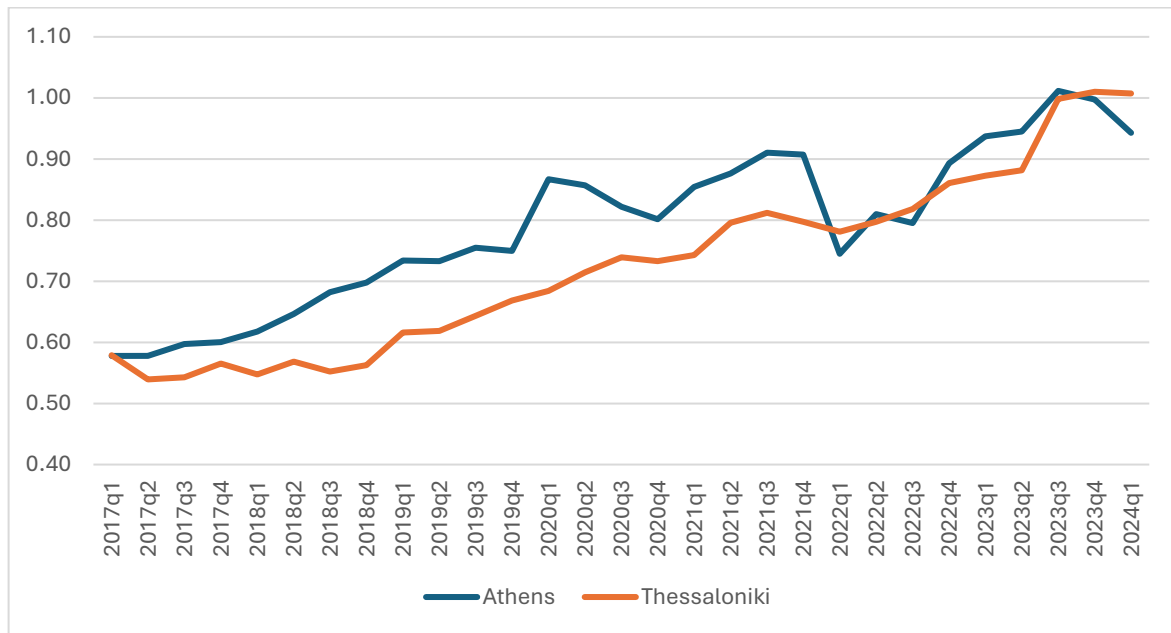
Notes: Figure A3 presents quarterly data (2017q1–2024q1) for the market/book value ratio of residential properties in the Athens and Thessaloniki prefectures. For information regarding the calculation of the market/book value, see the notes for Diagram 6. Source: Property Transfer Value Registry and authors' calculations.

Figure A4: Market/Book value – Cyclades, Cephalonia, Corfu, Samos, and Halkidiki
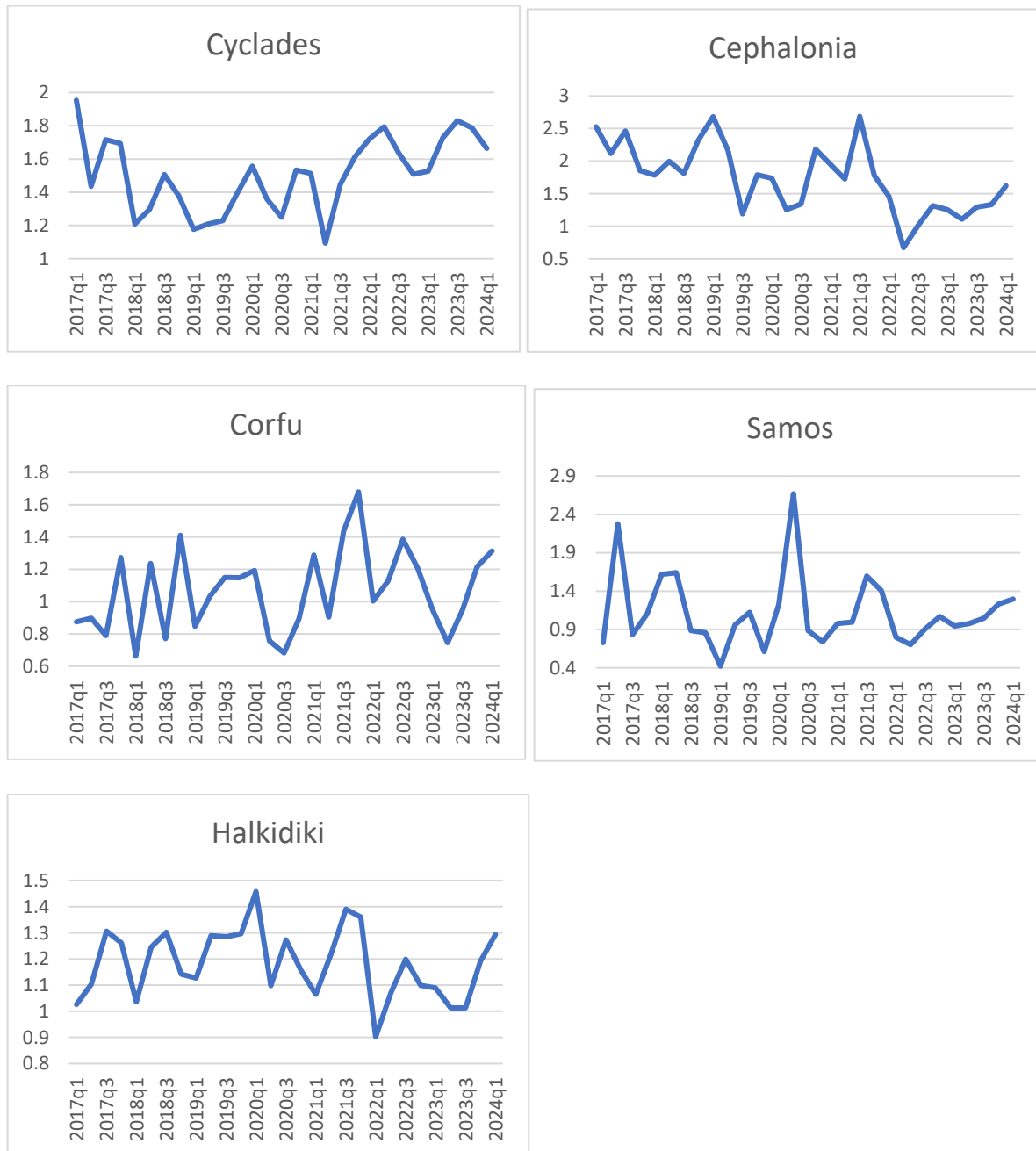
Notes: Figure A4 presents quarterly data (2017q1 – 2024q1) for the market/book value ratio of residential properties in the prefectures of Cyclades, Cephalonia, Corfu, Samos, and Halkidiki. For information regarding the calculation of the market/book value, see the notes for Diagram 6. Source: Property Transfer Value Registry and authors' calculations.

Figure A5: Scatter plots - Short-term rentals and prefectures fixed effects
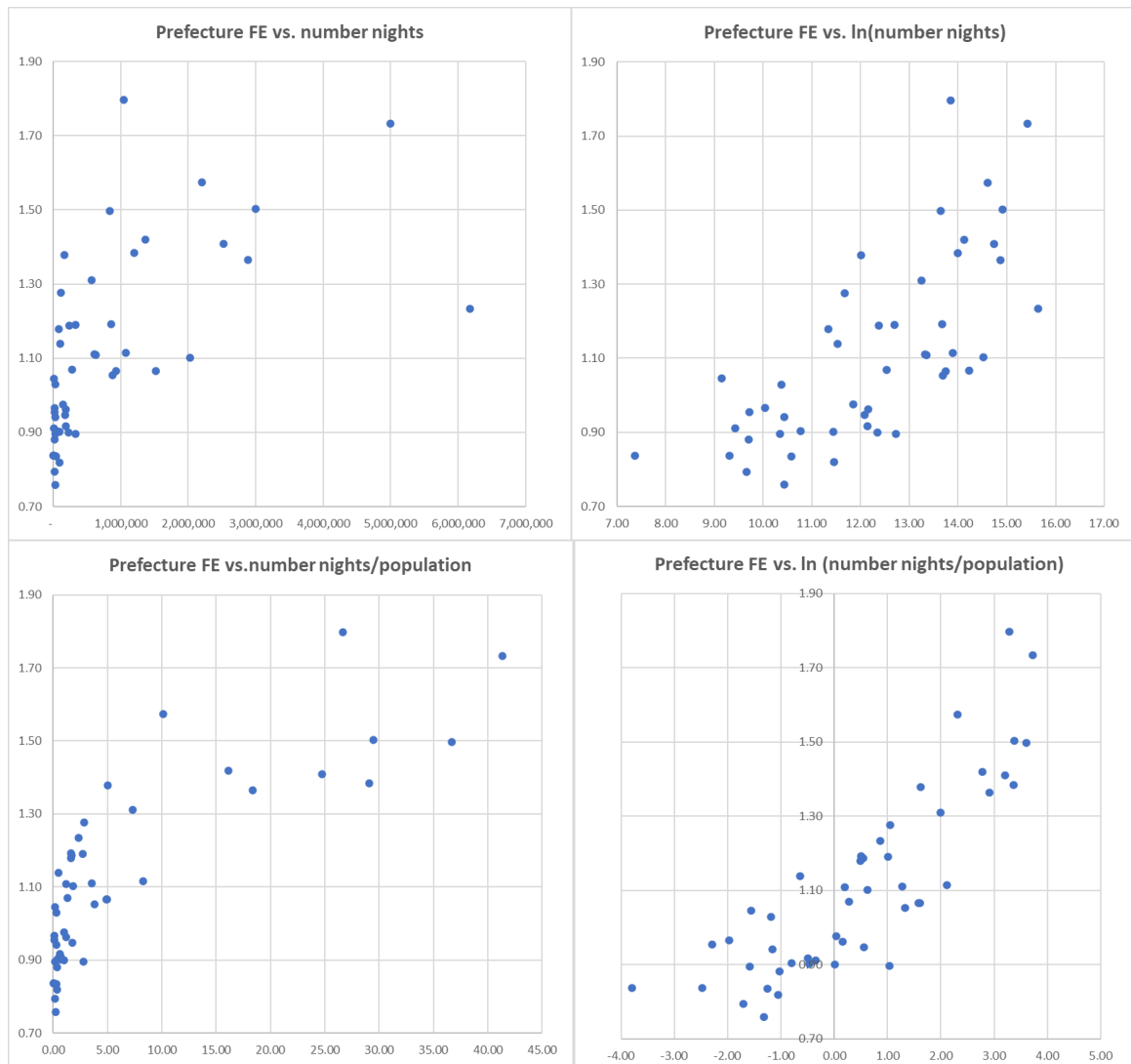
Notes: Figure A5 displays four scatter plot cases based on the number of overnight stays in short-term rental accommodations per prefecture during 2023, the number of overnight stays relative to the prefecture's population, and the coefficients of the prefectural fixed effects from the estimation of the econometric model (Equation 1 in the text) over the full sample period (2017q1–2024q1). The coefficients of the prefectural fixed effects are always on the vertical axis. For more information about the econometric model, see the notes for Table 3. Source: Residential property Transfer Value Registry, ELSTAT, Eurostat Experimental Statistics, and authors' calculations.

Table A1: Market/Book value and transaction volume per prefecture, 2024q1

Prefecture	Market/Book	Number of transactions
Cyclades	1.66	88
Cephalonia	1.62	26
Corfu	1.31	17
Samos	1.30	30
Halkidiki	1.29	110
Preveza	1.27	24
Lasithi	1.26	40
Lefkada	1.24	16
Chania	1.24	21
Rethymno	1.23	45
Argolida	1.21	82
Dodecanese	1.15	109
West Attica	1.14	39
East Attica	1.08	337
Zakynthos	1.07	29
Kavala	1.06	105
Piraeus	1.02	530
Thessaloniki	1.01	737
Corinth	0.99	72
Pieria	0.98	56
Euboea	0.95	92
Athens	0.94	2,584
Kilkis	0.93	28
Xanthi	0.91	75
Lesvos	0.89	49
Magnisia	0.89	67
Achaia	0.89	218
Rodopi	0.87	27
Ioannina	0.87	39
Boeotia	0.86	20
Laconia	0.86	60
Fthiotida	0.84	49
Heraklion	0.82	22
Evros	0.81	29
Larissa	0.80	26
Messini	0.79	28
Drama	0.78	27
Kastoria	0.78	14
Serres	0.76	57
Aetolia-Acarnania	0.75	44

Kozani	0.74	38
Imathia	0.72	37
Chios	0.71	18
Pella	0.68	39
Trikala	0.67	20
Ilia	0.65	36
Arcadia	0.63	27
Karditsa	0.58	14

Notes: Table A1 presents data for the first quarter of 2024 regarding the market/book value ratio of residential properties and the number of transactions. For information regarding the calculation of the market/book value, see the notes for Diagram 6. The prefectures of Arta, Grevena, Evrytania, Thesprotia, Florina, and Fokida are not included in the table due to insufficient data (<10 transactions in 2024q1). Source: Property Transfer Value Registry and authors' calculations.

Table A2: Prefectures fixed effects and transaction volume as % of total volume

Prefecture	Fixed effects	t-statistic	% total transactions
Cephalonia	1.80	4.28	0.3%
Cyclades	1.73	3.99	1.8%
Dodecanese	1.57	3.67	1.4%
Corfu	1.50	3.49	0.5%
Lefkada	1.50	3.47	0.2%
Rethymno	1.42	3.29	0.6%
Halkidiki	1.41	3.37	2.2%
Zakynthos	1.38	3.2	0.3%
Samos	1.38	3.28	0.2%
Chania	1.36	3.12	0.3%
Lasithi	1.31	3.05	0.5%
Preveza	1.30	3.09	0.3%
Thesprotia	1.28	3.02	0.2%
Argolida	1.27	2.93	0.8%
Athens	1.23	2.8	42.1%
Messini	1.20	2.75	0.8%
East Attica	1.19	2.61	4.6%
Corinth	1.19	2.78	1.2%
Chios	1.18	2.76	0.3%
Aetolia-Acarnania	1.14	2.69	0.6%
Kavala	1.11	2.6	1.7%
Piraeus	1.11	2.54	5.7%
Thessaloniki	1.10	2.54	15.2%
Arta	1.08	2.56	0.1%
Magnisia	1.07	2.46	1.1%
Heraklion	1.07	2.42	0.3%
Euboea	1.07	2.47	1.3%
Florina	1.04	2.52	0.0%
Rodopi	1.03	2.42	0.8%
Grevena	1.01	2.44	0.1%
Evros	0.98	2.25	0.5%
Trikala	0.98	2.24	0.3%
West Attica	0.97	2.21	0.5%
Ioannina	0.96	2.22	0.5%
Lesvos	0.95	2.18	0.5%
Arcadia	0.95	2.18	0.7%
Xanthi	0.94	2.18	1.0%
Achaia	0.92	2.12	2.3%
Laconia	0.91	2.08	0.1%
Evritania	0.91	2.1	0.6%

Boeotia	0.90	2.06	0.4%
Serres	0.90	2.13	0.3%
Kozani	0.90	2.1	0.8%
Ilia	0.90	2.07	1.0%
Pieria	0.90	2.09	0.8%
Kastoria	0.88	2.03	0.2%
Imathia	0.84	1.93	0.6%
Kilkis	0.84	1.94	0.4%
Fthiotida	0.83	1.96	0.6%
Karditsa	0.82	1.9	0.2%
Larissa	0.82	1.88	0.8%
Drama	0.79	1.82	0.5%
Pella	0.76	1.74	0.6%

Notes: Table A2 presents the coefficients of the prefecture fixed effects from the estimation of the econometric model (Equation 1 in the text) and the percentage of the number of residential transactions by prefecture (of the total number of transactions) over the full sample period (2017q1 – 2024q1). For more information regarding the fixed effects, see the notes for Table 3. The prefecture of Fokida is not included in the table as it serves as the base prefecture for the calculation of the fixed effects. Source: Property Transfer Value Registry and authors' calculations

Table A3: Municipal fixed effects and transaction volume – Athens municipalities

Municipality	Fixed effects	t-statistic	Number of transactions
Alimos	1.25	52.59	694
Glyfada	1.25	45.45	1,546
Kifissia	1.18	37.18	888
Philothei	1.18	26.41	167
Penteli	1.16	28.18	29
Imitos	1.15	60.47	106
Melisia	1.15	51.43	285
Elliniko	1.13	41.1	217
Ekali	1.11	26.6	150
N. Psychiko	1.09	44.59	261
N. Penteli	1.09	41.46	43
P. Faliro	1.08	44.06	1,515
Chalandri	1.08	43.95	1,091
Vrilisia	1.07	34.58	382
N. Erithrea	1.06	25.38	347
Psychico	1.06	23.21	333
Marousi	1.05	43.37	1,219
Likovrisi	1.05	51.65	92
Papagou	1.04	30.11	202
Pefki	1.04	43.91	273
Ilioupoli	1.04	54.02	817
Kesariani	1.02	48.73	566
A. Dimitris	1.00	54.44	687
A. Paraskevi	0.99	43.89	835
Kalithea	0.97	44.37	2,620
Arghyroupoli	0.96	47.4	309
N. Smirni	0.96	45.5	1,547
Tavros	0.95	44	208
Cholargos	0.94	39.72	623
Dafni	0.92	48.3	355
Metamorfosi	0.90	50.79	204
Athens	0.90	41.71	26,787
Vyronas	0.89	43.96	1,181
Zografou	0.89	41.91	1,826
Moschato	0.86	43.6	343
Petroupoli	0.84	44.73	430
Haidari	0.82	43.5	409
N. Ionia	0.80	43.57	1,063
Ilion	0.79	43.39	759
Galatsi	0.77	38.75	905

Peristeri	0.77	41.43	1,170
N. Chalkidona	0.76	36.36	162
N. Filadelfeia	0.73	35.41	370
A. Anargyroi	0.72	38.97	324
Kamatero	0.71	39.34	131
Egaleo	0.71	35.42	681
Agia Varvara	0.67	36.82	174

Notes: Table A3 presents the coefficients of the municipal fixed effects from the estimation of the econometric model (Equation 1 in the text) using fixed effects at the municipal level (instead of the prefectural level), along with the number of residential transactions by municipality in the Athens prefecture over the full sample period (2017q1 – 2024q1). For more information regarding the fixed effects, see the notes for Table 3. Source: Property Transfer Value Registry and authors' calculations.

Table A4: Results of estimating an alternative econometric model – Market/Book

Variables	2017-24 (1)	2017 (2)	2018 (3)	2019 (4)	2020 (5)	2021 (6)	2022 (7)	2023 (8)	2024 (9)
age	-0.006***	-0.006***	-0.006***	-0.005***	-0.006***	-0.006***	-0.005***	-0.006***	-0.006***
	(-10.80)	(-6.59)	(-6.35)	(-7.89)	(-7.86)	(-10.85)	(-7.42)	(-9.94)	(-7.30)
flat	-0.122***	-0.170***	-0.133***	-0.182***	-0.151***	-0.157***	-0.106***	-0.114***	-0.075*
	(-3.87)	(-3.75)	(-3.55)	(-4.00)	(-3.45)	(-3.82)	(-3.64)	(-2.93)	(-1.80)
flat × floor	0.009***	0.007***	0.009***	0.010***	0.009***	0.009***	0.010***	0.012***	0.014***
	(6.63)	(3.87)	(6.66)	(6.52)	(6.09)	(4.66)	(7.01)	(7.15)	(7.26)
front	-0.010	-0.003	0.027***	0.013	0.006	0.023*	-0.013	-0.027***	0.000
	(-1.20)	(-0.17)	(2.74)	(1.09)	(0.42)	(1.68)	(-1.34)	(-3.15)	(0.04)
special	-0.071*	-0.006	-0.057	-0.099**	-0.030	-0.115**	-0.122*	-0.058	-0.015
	(-1.73)	(-0.12)	(-1.26)	(-2.26)	(-0.61)	(-2.20)	(-1.66)	(-0.79)	(-0.15)
Intercept	1.110***	1.031***	0.966***	1.029***	1.131***	1.178***	1.084***	1.265***	1.242***
	(39.44)	(21.26)	(18.16)	(21.87)	(23.60)	(30.98)	(29.83)	(30.76)	(20.63)
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	No	No	No	No	No	No	No	No
N	132,040	10,751	17,404	19,845	14,290	19,559	20,542	22,406	6,192
Adjusted R^2	0.202	0.353	0.285	0.235	0.223	0.237	0.194	0.161	0.201

Notes: Table A4 presents the results of the estimation of the alternative econometric model (Equation 3 in the text) over the full sample period (Column 1, 2017q1–2024q1) as well as for annual subperiods (Columns 2–9). In 2024, we only have data for the first quarter. N is the number of observations in the sample. The model includes fixed effects at the time level (Column 1) and at the prefectural level (Columns 1–9). Robust t-statistics are shown in parentheses. Standard errors are clustered at the time and prefectural levels in Column 1, and at the prefectural level in Columns 2–9. *** p<0.01, ** p<0.05, * p<0.1. Source: Property Transfer Value Registry and authors' calculations.

Table A5: Prefecture fixed effects –Market/Book model

Prefecture	Fixed effects	t-statistic
Cephalonia	0.93	3.9
Cyclades	0.74	6.66
Dodecanese	0.62	3.18
Lefkada	0.46	2.3
Corfu	0.41	2.31
Rethymno	0.35	2.55
Zakynthos	0.34	2.01
Samos	0.34	2.97
Halkidiki	0.34	3.12
Preveza	0.30	1.02
Lasithi	0.25	1.98
Chania	0.23	1.86
Argolida	0.20	1.46
Thesprotia	0.18	1.6
Messini	0.13	0.95
Corinth	0.11	1.11
Chios	0.09	0.65
Aetolia-Acarnania	0.07	0.54
Athens	0.05	0.63
Kavala	0.00	0.04
East Attica	-0.01	-0.07
Piraeus	-0.01	-0.1
Heraklion	-0.02	-0.2
Grevena	-0.02	-0.27
Magnisia	-0.03	-0.22
Euboea	-0.03	-0.31
Thessaloniki	-0.04	-0.46
Arta	-0.04	-0.37
Florina	-0.07	-0.75
Lesvos	-0.09	-0.91
Laconia	-0.09	-0.95
Rodopi	-0.09	-1.11
West Attica	-0.11	-1.2
Arcadia	-0.12	-1.01
Ilia	-0.12	-1.42
Pieria	-0.13	-1.3
Serres	-0.14	-1.54
Trikala	-0.14	-1.58
Evros	-0.14	-1.58
Ioannina	-0.15	-1.71
Achaia	-0.15	-1.52

Boeotia	-0.16	-1.41
Xanthi	-0.16	-1.9
Kozani	-0.17	-1.88
Kastoria	-0.17	-1.81
Fthiotida	-0.17	-1.83
Evritania	-0.18	-1.82
Kilkis	-0.22	-2.47
Larissa	-0.22	-2.58
Karditsa	-0.22	-2.5
Imathia	-0.22	-2.64
Drama	-0.24	-2.78
Pella	-0.28	-3.17

Notes: Table A5 presents the coefficient of the fixed effects for the prefecture from the estimation of the econometric model (Equation 3 in the text) over the full time period of the sample (2017 Q1 – 2024 Q1). For more information regarding the fixed effects, see the notes in Table A4. The prefecture of Phocis is not included in the table as it serves as the base prefecture for calculating the fixed effects. Source: Property Transfer Value Registry and authors' calculations.

Table A6: Results of estimating an alternative econometric model – Components of Book Value

Variables	2017-24 (1)	2017 (2)	2018 (3)	2019 (4)	2020 (5)	2021 (6)	2022 (7)	2023 (8)	2024 (9)
ln(*TZ*)	0.538***	0.550***	0.632***	0.608***	0.601***	0.622***	0.627***	0.540***	0.549***
	(3.39)	(2.64)	(4.03)	(3.89)	(3.04)	(3.76)	(5.44)	(4.62)	(5.70)
surface	0.005***	0.007***	0.008***	0.008***	0.003**	0.004***	0.007***	0.006***	0.007***
	(12.17)	(12.41)	(13.36)	(7.72)	(1.98)	(3.43)	(7.21)	(9.75)	(11.00)
age	-0.008***	-0.010***	-0.009***	-0.008***	-0.010***	-0.009***	-0.007***	-0.008***	-0.008***
	(-10.70)	(-7.12)	(-6.13)	(-9.33)	(-11.44)	(-9.06)	(-8.10)	(-9.75)	(-7.64)
flat	-0.217***	-0.240***	-0.199***	-0.210***	-0.353***	-0.289***	-0.131***	-0.096***	-0.155***
	(-5.16)	(-5.27)	(-5.74)	(-5.34)	(-4.15)	(-4.90)	(-4.00)	(-2.88)	(-3.66)
flat × floor	0.023***	0.020***	0.021***	0.022***	0.024***	0.022***	0.023***	0.024***	0.026***
	(15.42)	(16.85)	(16.44)	(18.64)	(9.38)	(11.07)	(10.56)	(17.38)	(8.91)
front	0.071***	0.077***	0.067***	0.086***	0.114***	0.113***	0.060***	0.054***	0.098***
	(4.46)	(7.23)	(5.65)	(6.68)	(3.91)	(5.08)	(4.21)	(4.70)	(7.14)
special	0.002	0.045	-0.001	-0.068	0.118*	-0.006	-0.135*	-0.025	-0.021
	(0.03)	(0.71)	(-0.02)	(-0.91)	(1.70)	(-0.11)	(-1.88)	(-0.34)	(-0.22)
Intercept	6.827***	6.460***	5.845***	5.980***	6.720***	6.405***	6.049***	6.865***	6.776***
	(6.32)	(4.46)	(5.33)	(5.19)	(5.40)	(5.37)	(6.87)	(7.99)	(9.53)
Prefecture FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	No	No	No	No	No	No	No	No
N	132,060	10,754	17,409	19,850	14,292	19,562	20,543	22,407	6,192
Adjusted R^2	0.422	0.471	0.469	0.454	0.376	0.388	0.433	0.413	0.434

Notes: Table A6 presents the results of estimating the alternative econometric model (Equation 4 in the text) over the full time period of the sample (Column 1, 2017 Q1–2024 Q1) as well as for annual subperiods (Columns 2 - 9). For 2024, data is available only for the first quarter. N is the number of observations in the sample. The model includes fixed effects at the time level (Column 1) and prefecture level (Columns 1 – 9). Robust t-statistics are presented in parentheses. Standard errors are clustered at the time and prefecture levels in Column 1, and at the prefecture level in Columns 2-9. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Source: Property Transfer Value Registry and authors' calculations.