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Empty Spaces and Cold Beds: Modeling the Construction–Demography Gap in Tourist Destinations

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ABSTRACT

This study examines the paradox of rapid urban development in tourist destinations experiencing demographic decline. By developing a new model to calculate the Construction-Demography Gap (CDG) and its tourism-adjusted variant (TCDG), the research explores the case of North Macedonia. The mismatch between housing construction, demographic trends, and tourism activity is quantified, revealing high vacancy rates and unsustainable development that disturb the environment and diminish residents' quality of life. Detailed field observations, allow a discussion on the socio-economic impacts of these trends. The findings reveal that overbuilding exacerbates housing affordability issues and economic inefficiencies while pressuring the urban space. This research contributes to the theory of “urban shrinkage” by showing how speculative tourism development masks demographic decline, creating a false impression of vitality in tourist destinations while simultaneously decreasing local livability. The suggested model can be easily adopted and applied to any tourism destination seeking to balance tourism development with both local economy and community resilience amidst demographic decline.

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Shrinking cities; modeling; construction-demography gap; tourism development; North Macedonia

1. Introduction

The concept of “growing shrinking cities” where housing growth outpaces demographic decline is well-established in urban studies (Fernandez & Hartt, 2022; Guastella et al., 2019; Hartt & Hackworth, 2020; Hollander et al., 2009; Niiazalieva et al., 2024).

In line with international standards, housing is defined as an accommodation unit pre-supposing habitation, whether permanent or temporary, by a household. Rooted in the International Covenant on Economic, Social and Cultural Rights (ICESCR), the United Nations' definition of adequate housing (UN-Habitat, 2009) posits that housing must transcend its role as a mere physical shelter for people; it fundamentally encompasses security of tenure, affordability, habitability, and cultural adequacy. The functional purpose of housing is, therefore, fundamentally inseparable from demographic demand and established settlement patterns. Consequently, the urban development

and housing sector should be guided by real demographic trends rather than functioning as an arena for speculative investment.

While the tension between residential stability and tourism-driven growth has emerged as a critical challenge in contemporary scholarship (Barbić, 2024; Müller, 2018; Palmer & Mathel, 2010; Ryan-Collins & Murray, 2023; Tanaka et al., 2023), its drivers remain insufficiently quantified in emerging market economies and pressured tourist destinations. This paper addresses this gap by investigating the systemic disconnection between rapid housing construction, pronounced demographic decline, and specific spatial pressures of tourism development. The global phenomenon of “ghost zones” and “cold beds” (units that remain empty for most of the year) is examined through the case of North Macedonia, where intensive construction persists despite a declining population, illustrating a structural imbalance which seems common across the Balkan countries.

This research fills that gap by developing a new model, “Tourism-adjusted Construction-Demography Gap” (TCDG), to quantify the decoupling of urban housing from demographic trends and tourism activity. The proposed model operationalizes the “decoupling” phenomenon found in both shrinking cities and hyper-touristified regions, utilizing growth logic initially established by Haase et al. (2013). The TCDG model also incorporates the “vicious circle” framework (Russo, 2002), which identifies the ratio discrepancy between tourist-oriented units and resident populations’ needs. This aligns with Müller’s (2018) critique of “path dependency” in leisure landscapes, specifically flagging the production of “cold beds” units that fulfill the exchange-value requirements of investors but lack the use-value required by permanent residents (Barke, 2007).

Specifically, this research investigates the relationship between population changes and housing construction dynamics, discussing the socio-economic impacts of identified “ghost areas” by testing the proposed model. It provides empirical evidence from the case of North Macedonia, a context that has received limited attention in the tourism development literature, and examines the implications of these dynamics for tourism planning and destination sustainability. Monitoring the volume of housing construction is, therefore, important for detecting such gaps and enabling policymakers to take targeted actions to address the resulting development challenges. In doing so, the study contributes to the tourism development literature by linking extensive construction dynamics and population change to the emergence of “ghost areas” and discussing their implications for tourism planning and destination development.

2. Literature review

There is extensive academic research on the decoupling of urban development policies from demographic trends in European cities, particularly regarding the relationship between urban sprawl, population decline, and the spatial pressures of tourism development.

Niiazalieva et al. (2024) advocate for unified development strategies that encompass a wide range of considerations, integrating housing and demographic policies to address these complex interactions. In a similar vein, Guastella et al. (2019) emphasize the need for addressing structural inefficiencies caused by declining population densities, while

Fernandez and Hartt (2022) identify common patterns and outliers in housing trends across shrinking regions. Crucially, Haase et al. (2013) indicate that the expansion of built-up areas is no longer strictly related to increasing housing demand, as urbanized areas continue to grow despite significant population loss (Lou et al., 2025). Within the literature on urban shrinkage, increased housing vacancy is often used as a proxy for population loss. To this end, Hollander et al. (2009) argue that vacancy may also signal an increase in building permits and speculative construction activity. Hartt and Hackworth (2020) further demonstrate that city population can drop without a corresponding decline in occupied dwelling units, as depopulation may result from shrinking household sizes. To counter unfavorable demographic trends, some municipalities implement strategies to attract not only new residents, but also secondary housing. This trend is particularly pronounced in tourist destinations, where municipal policies may provide financial incentives to foster physical growth, even if the new housing remains largely vacant (Terzić & Petrevska, 2021).

Increased population mobility and growing visitor demand have intensified tourism development prospects, leading to the mass conversion of housing units into short-term rentals, often driven by lifestyle migration or real estate investment. Evidence suggests that, in the absence of strategic spatial planning, these processes can conflict with existing social structures and local needs. This creates a developmental imbalance where tourism can either save the local economy or become a driver of local decay (Dimelli & 2017), a phenomenon particularly reflected in the tourism gentrification process and its interrelation with housing affordability crises (Lord et al., 2022).

Scholars also explore how residential housing is treated as an investment for tourism development. Globally, housing units are increasingly treated as assets for rent, which is particularly visible in tourism-dependent economies, as discussed by Barbić (2024) and Ryan-Collins and Murray (2023). This phenomenon, that tourism development is often pursued for economic gain, is also elaborated by Tanaka et al. (2023), who elaborate that such pursuit frequently results in significant economic leakage and resident displacement. In attractive destinations, demand for second homes competes directly with primary residences, while rising property prices stimulate new construction, leading to extensive commercialization that favors second-home and rental apartments over traditional hotels (Flognfeldt & Tjørve, 2013).

This strategic conversion of housing into tourism-oriented assets often results in “cold bed” phenomenon, where properties remain vacant for most of the year (Müller, 2004; Palmer & Mathel, 2010), producing a spatially inefficient urban landscape of “ghost zones” that prioritize transient capital over local livability. Local authorities often add to this tourism dependency, prioritizing a high-capacity infrastructure to accommodate seasonal peaks while neglecting long-term residential resilience (Barke, 2007; Müller & Dame, 2016). While studies link tourism to real-estate dynamics, some also discuss the overlapping pressures created by the high-season influx of second-home owners and tourists. This creates extreme pressure on infrastructure and services, fundamentally altering the demographic structure of tourism areas (Terzić et al., 2020, 2024).

Tourism development is also linked with broader entrepreneurial and financial ecosystems, which is important for understanding how innovative opportunities emerge within the global tourism system. Start-ups’ capital structure influences the competitiveness of tourism destinations by relying on context-specific funding structures and innovative

financing methods to grow and survive (Gholizadeh & Mohammadkazemi, 2022), widely utilizing smart technologies for efficiency. In mature destinations, the real estate market often evolves alongside tourism expansion rather than acting as an autonomous driver (Perles-Ribes et al., 2024), whereas accelerated tourism growth may provoke bubble-like dynamics with important implications for real estate markets and the long-term sustainability of destinations. Expressing overtourism concerns, Perles-Ribes et al. (2025) identify phases of explosive tourism demand growth representing an early warning signal of potentially unsustainable development trajectories.

Still, scholarship lacks a unified framework to explain how tourism-led investment functions within a context of systemic shrinkage, leaving the tension between physical expansion and permanent population loss largely unexamined. While research generally links tourism to housing dynamics, there remains a lack of integrated analysis exploring the specific spatial outcomes when urban decline overlaps with speculative, tourism-driven growth. Consequently, the literature has yet to reconcile the paradox of “ghost zones” in regions where construction continues to rise, failing to provide a cohesive strategy for municipalities that are shrinking demographically but expanding physically. This study seeks to address this gap by analyzing tourism and shrinkage together rather than observing them as isolated phenomena. By examining how municipalities with fewer permanent residents manage the peak loads of high-tourist seasons, this research provides evidence of “growth without people”, a state where building permits rise as census figures fall, and where vacancy is redefined not as abandonment, but as seasonal use that still consumes urban resources.

3. Background material

This section establishes stylized facts regarding the case of North Macedonia, situating it within the broader context of demographic shrinkage and construction trends. Specifically, it highlights the spatial phenomenon of municipalities experiencing critical vacancy rates alongside those facing extreme depopulation.

North Macedonia is a former socialist country that shifted from socialist planning to a market-driven economy, without being immune to global trends like demographic shrinkage and overbuilding. It faced the same shockwaves as many Central and Eastern European countries with withdrawal of government involvement in the housing sector, quick privatization process, and severe “policy collapse” with significant effects on residential polarization (Stanilov, 2007).

North Macedonia has been experiencing a steady decline in population of around 11% since the last census in 2021 (Ayerst & Kovachevska Stefanova, 2025) due to a decrease in natural population growth and intensive emigration of young and educated people (Petkovski et al., 2024). This decreasing trend is expected to be more profound, reaching around 4% by 2030, resulting in shrinking municipalities. While European urban shrinkage is typically defined by a 0.15% annual population loss (Wiechmann & Wolff, 2013), North Macedonia faces a more severe crisis, with an average loss of 1.5% between 2021 and 2024. There are 80 municipalities in North Macedonia, including the capital Skopje (a distinct unit of local self-government consisting of 10 municipalities). Only 14 municipalities have experienced population growth, five within the Skopje area—Saraj, Čair, Šuto

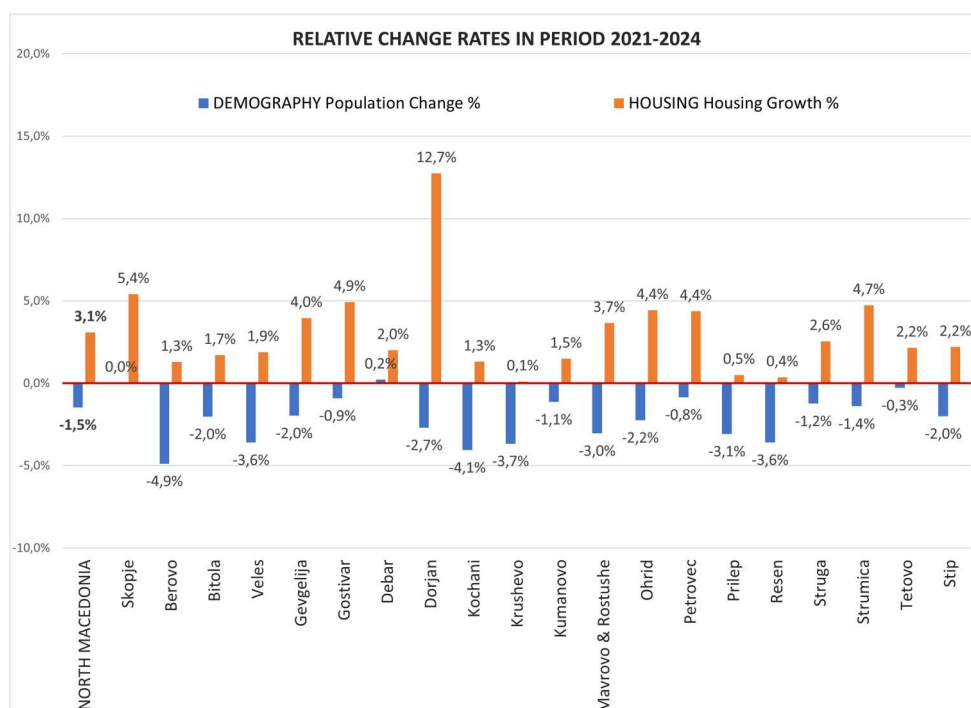


Figure 2. Decoupling between population and housing growth rates in North Macedonia (2021–2024).

result is a landscape of “ghost areas” and “real-estate bubbles” (Romero et al., 2012) in which the housing becomes fully disconnected from both population dynamics and sustainable urban models (Fernandez & Hartt, 2022; Hartt & Hackworth, 2020). This pattern suggests that new construction is mostly speculative and exacerbates vacancy rates rather than addressing local residential or tourist needs. Evidence from Spain and other mature destinations shows that rapid tourism expansion is closely linked to real estate booms, urban transformation and housing developments, as residential and short-term rental markets increasingly respond to tourist demand (Perles-Ribes et al., 2024). The spread of peer-to-peer accommodation reveals spatial patterns of tourism-driven real estate bubbles, contributing to gentrification, rising rental prices, social conflict and anti-tourism local mobilization (Ioannides et al., 2019).

North Macedonia has strategically identified tourism as an activity to contribute to national GDP. A total of 1,260,425 (+8.3% compared to 2023) tourists visited the country in 2024, with 3,297,732 overnights (+5.3 compared to 2023) (State Statistical Office of the Republic of North Macedonia, n.d.). According to the last official 2016 census of capacities in the catering trade, North Macedonia’s accommodation sector comprised 574 legal entities, totaling 17,235 rooms and 46,289 beds. At that time, hotel-style facilities accounted for approximately 51% of total overnight stays (attracting 92% of foreign tourists), with capacities sufficient to meet contemporary demand. By 2024, however, accommodation capacities expanded significantly to 28,620 rooms and 72,110 beds. However, the share of traditional hotel accommodation expansion and

preference dropped; informal accommodation units such as private houses, vacation apartments, and rooms for rent grew to represent 37.2% of total accommodation capacity (<https://makstat.stat.gov.mk/>).

According to Eurostat (n.d.) in North Macedonia, tourist accommodation is available in 324 hotels and similar facilities comprising 11,279 rooms with 24,880 beds, while holiday and other short-stay accommodation provides 175 facilities with 14,517 beds. Reflecting the highly seasonal nature of tourism demand, hotels and motels operated significantly below full capacity, with a national annual net occupancy rate of 45.9% for rooms and only 29.6% for bed places (Eurostat, n.d.). The exception is Skopje, which, as a business destination, reaches 96% for room occupancy net rate, while summer destinations, such as Ohrid, Struga and Dojran record such high occupancy only in the third quarter of the year (July–September).

These shifts indicate that private rentals now command a significant portion of the market. During the peak season, the formal accommodation units are supplemented by the existing housing stock, as secondary residences are frequently converted into short-term rental units. As total accommodation capacity nearly doubled in less than a decade, this construction boom appears to have led to market oversupply that exacerbates the housing gap.

Based on its tourism economy, seven municipalities are identified for further investigation as destinations with strong tourism dynamics coupled with significant demographic change and intense housing construction.

4. Methodology

The study employs a comparative study approach examining seven purposively sampled municipalities (Figure 3), representing a diverse spectrum of urban and rural tourism patterns. Skopje (No. 1), the capital, serves as the primary business destination characterized by a lack of profound seasonality (Petrevska & Nikolovski, 2018). Dojran (No. 2), Ohrid (No. 5), and Struga (No. 6) represent summer destinations. While Dojran, as a small lake destination, caters primarily to a domestic market, Ohrid is a world-famous UNESCO heritage destination, complemented by Struga's lakeside location. Gevgelija (No. 3) is defined by transit- and casino-tourism due to its proximity to the Greek border. Krushevo (No. 4), Mavrovo and Rostushe (No. 7) are rural mountain destinations offering nature-based tourism during summer and ski tourism during winter.

The analysis covers the period 2021–2024, bridging the chronological interval between the last census and the most recent annual statistical data at the municipal level. This timeframe captures the immediate “gap” where housing supply responds predominantly to speculative global capital and gentrification, rather than local social reproduction and realistic tourist needs. An exception in the dataset is the municipal-level accommodation data from 2016, which represents the most recent official statistics available at this granular administrative scale (State Statistical Office of the Republic of North Macedonia, 2016).

The research applies a two-stage methodology:

- (1) Stage 1 incorporates a quantitative analysis utilizing an updated CDG model expanded into a TCDG model.

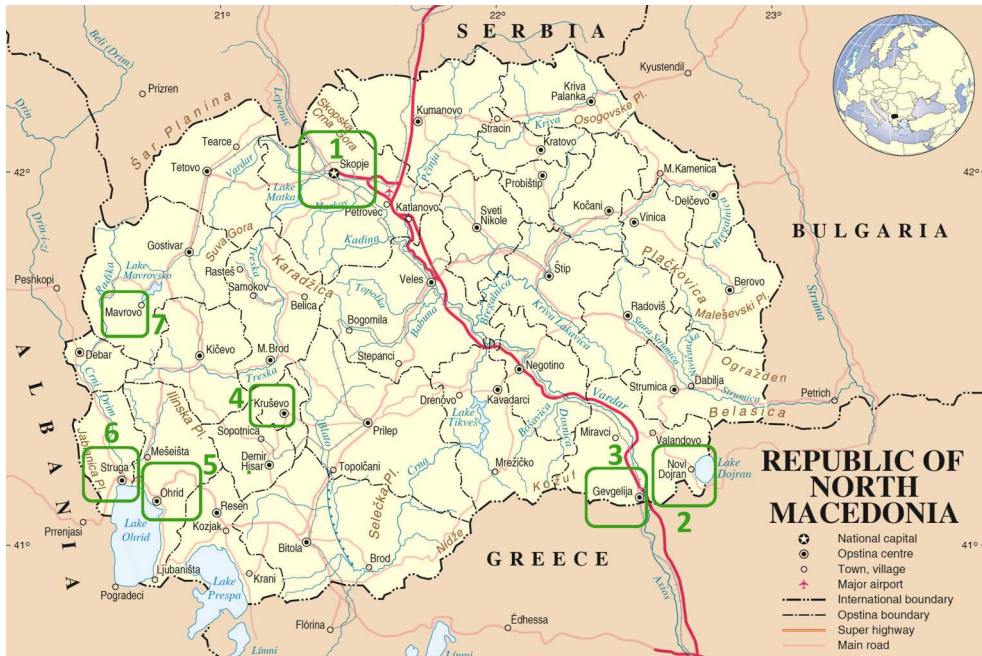


Figure 3. Spatial distribution of selected case study municipalities in North Macedonia U.N. Geospatial (n.d.).

- (2) Stage 2 consists of a qualitative assessment. Two authors undertook detailed field observation to identify “ghost areas” by detecting vacant properties and underutilized infrastructure as empirical evidence of housing oversupply. These observations provide contextual insights to triangulate the quantitative analysis.

To quantify the decoupling of the real estate market from demographic reality, the base CDG model¹ applies two metrics:

- (1) CDG Absolute. A static snapshot of housing surplus measuring the magnitude of structural oversupply at a single point in time (2024). Calculated as the ratio between available housing units and population, a value of 1 represents equilibrium; values above 1 identify a structural surplus unexplained by resident needs (indicative of speculative or seasonal utilization), while values under 1 indicate housing deficit or overcrowding.

$$CDG_{absolute} = \frac{H_{2024}}{P_{2024}} \cdot \frac{1}{S}$$

- (2) CDG Ratio. A metric capturing the decoupling of market trajectories by comparing the relative growth rates from 2021–2024. This indicator determines whether the construction boom has decoupled from demographic reality by analyzing

(a) Absolute change (raw construction volume), and

$$CDGratio = \frac{\Delta H}{\left(\frac{\Delta P}{S}\right) + \epsilon}$$

(b) Percentage change (growth intensity).

$$CDGratio = \frac{H_{2024} - H_{2021}}{\frac{P_{2024} - P_{2021}}{S}}$$

Recognizing that the CDG model omits tourism seasonality, a TCDG² is introduced. This adjustment reconciles existing housing units and tourist accommodation (hotel rooms) with relative occupancy by integrating permanent residents and transient tourists. To ensure analytical comparability, tourism facilities represented in rooms are normalized by an average occupancy of two persons per room, while households are normalized by an average household size of three persons. This adjustment establishes the effective seasonal population, initially converted from tourist overnights into average daily occupancy (annual data divided by 365 days). To prevent the underestimation of peak demand, the measure of Effective daily Tourists (ET) is calculated by dividing absolute peak visitation by monthly days. Corrective factors are introduced to account for “invisible tourists” (1.3 for annual averages and 1.5 for peak seasons) to ensure a realistic assessment of housing pressure.

$$TCDG = \frac{H_{2024} + TU_{2016}}{\frac{P_{2024}}{S} + \frac{ET_{2024}}{A} * p}$$

Finally, three additional indicators are calculated to quantify tourism impacts on housing imbalance:

- The Mismatch Index (MI). It represents the absolute difference between CDG and TCDG, whereas a positive MI indicates tourism mitigates oversupply and a negative MI suggests that current tourism is potentially exacerbating oversupply.
- Tourism Effect (TE). It is a ratio between TCDG and CDG, where values less than 1 imply that tourism reduces oversupply, equal to 1 indicates no effect, and greater than 1 suggests that tourism increases the apparent imbalance. Lower ratios indicate a higher functional impact of tourism on existing surplus.
- Oversupply Reduction (OR). It measures the extent to which tourism alleviates the housing surplus relative to the resident-only baseline.

Spatial visualizations and mapping are conducted using QGIS 3.40.

5. Results and discussion

This section discusses the socio-economic implications of rapid housing construction in the context of demographic decline and tourism development pressures. [Table 1](#) summarizes the main results.

Table 1. Summarized results.

Town	Population change ¹ (%)	Vacancy rate (%) ²	Housing growth (%) ³	CDG ratio ^{1,*}	CDG absolute ^{3,**}	TCDG avg ^{****}	TCDG max ^{***}	MI	TE	OR (%)	OR (%) max
North Macedonia	-1.46	37	3.09	-2.95	1.45	1.45	1.42	0.00	1.00	0	6.67
Skopje	0.03	28	5.41	261.894	1.32	1.30	1.29	0.02	0.98	6.25	9.38
Ohrid	-2.24	53	4.44	-3.80	2.05	2.09	1.46	-0.04	1.02	-3.81	56.19
Struga	-1.24	45	2.55	-2.89	1.42	1.43	1.20	-0.01	1.01	2.4	52.38
Dojran	-2.69	68	12.74	-14.01	3.43	2.89	0.92	0.54	0.84	22.22	103.29
Gevgelija	-1.96	33	3.96	-2.92	1.54	1.63	1.62	-0.09	1.06	-16.67	-14.81
Krushevo	-3.66	36	0.11	-0.04	1.40	1.40	1.36	0.00	1.00	0	10.00
Mavrovo	-3.03	72	3.66	-3.92	3.48	3.82	3.62	-0.34	1.10	-13.71	-5.65
Rostushe											

¹Data for the period 2021–2024.

²Data for 2021.

³Data for 2024.

⁴Stable population (near 0) results in an inflated CDG ratio.

*CDG ratio: ≈ 1 Balanced; > 1 Housing exceeds population growth, < 0 Population decline, signals overbuilding or high seasonal tourism demand.

**CDG absolute: < 0.7 Extremely underbuilt; $0.7\text{--}1$ Moderately underbuilt; $1\text{--}1.25$ Balanced development; $1.25\text{--}1.5$ Moderate overbuilt; $1.5\text{--}2$ Extreme overbuilt; > 2 Unsustainable ("Ghost zones").

***TCDG max ponder = 1.5.

****TCDG avg ponder = 1.3.

5.1. Housing vs demography

The continued expansion of housing stock in analyzed municipalities cannot be explained by demographic-driven household formation. Instead, it points to investment-led and speculative development dynamics. Because the sampled municipalities also serve as tourist destinations, the phenomenon is partly attributable to second home expansion. However, even the most optimistic projections for tourism trends cannot justify such an extreme decoupling intensity.

Results from Table 1 reveal a declining population in North Macedonia, with household numbers either decreasing or stagnating, while the housing stock continues to grow due to strong construction activity. With the exception of Skopje (+0.03%), all municipalities record negative population change. At the same time, the share of “vacant housing units” (including second homes) reaches 37% at the national level, while in some municipalities, such as Mavrovo and Rostushe, it exceeds 70%. This indicates an abandonment process and tourist gentrification, while the seasonal and tourist utilization disguises apparent oversupply. Furthermore, the housing growth in most municipalities is close to the national average of 3%, except for Krushevo, where it is almost fully absent, and Dojran, where it reaches an absolute maximum of 13%.

The CDG indicator provides additional evidence of the imbalances between housing stock and population demand (Figure 4). It clearly indicates an extreme overbuilding activity reflecting housing growth that exceeds demographic requirements by several orders of magnitude, identifying hot-spots with extreme overbuilding.

In general, North Macedonia is characterized with moderate overbuilt development with mild housing oversupply. If population remains stable or declines while the absolute CDG value remains high (like in the Skopje case), housing supply is surely outpacing

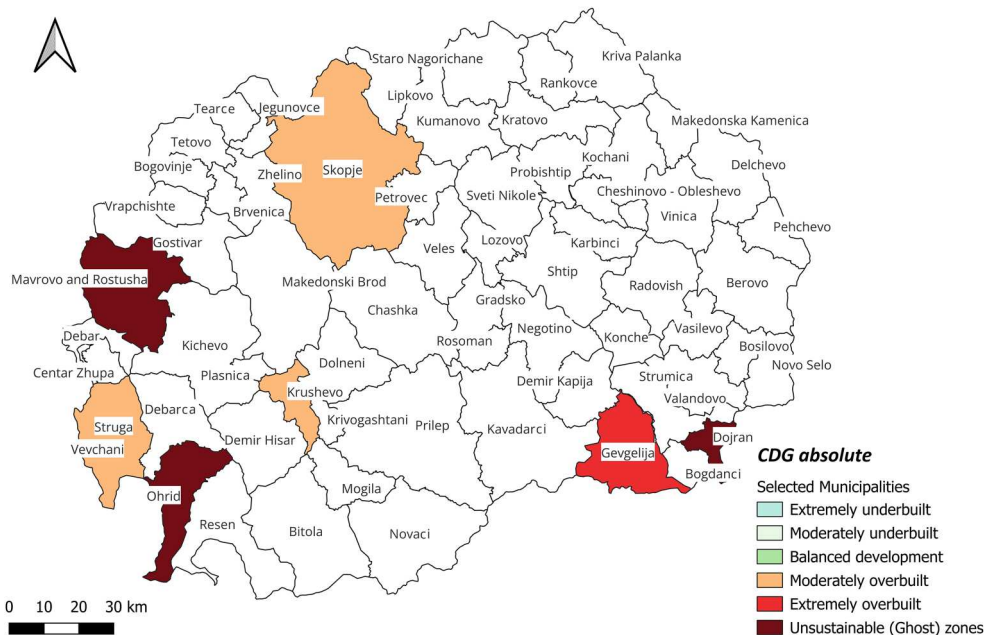


Figure 4. Construction-Demography Gap (2024) in selected municipalities.

demographic demand unless a significant share of housing stock serves tourism purposes, as second homes or short-term rentals. Table 1 reveals that Skopje is the only location with an extremely high CDG ratio value, due to its stable population. It results in moderate overbuilding, with most new-built housing considered speculative, as the high vacancy rate confirms oversupply and investment-driven construction. All other municipalities have a CDG ratio under 0, which confirms population decline and raises alarms for overbuilding and investment-driven construction activity, driven by tourism-rental/second-home demand. The only exception is Krushevo (~25% surplus), with development fully defined by an extreme depopulation process, not marked by intensive construction activity, which is reduced to traditional housing reconstruction within a protected area, whereas the vacancy rate is less pronounced but still high. The most famous summer destinations, Ohrid, Struga and Dojran, are extremely overbuilt with high vacancy rates, while Mavrovo and Rostushe performed with unsustainable development, with identified “ghost zones” and “cold beds”.

In normal circumstances, such excessive construction relative to residential needs would likely depress housing prices and increase vacancy rates or reduce demand and salability, causing potential misallocation of resources, as investment is not matched by net demand. But this is not the case in North Macedonia, where real estate prices jumped excessively, leading to an extreme gentrification process in the most attractive urban and tourist areas. According to the results, the housing market in North Macedonia has decoupled from demographic trends, transitioning from a social utility (habitation) to a speculative asset (capital storage).

As Perić et al. (2022) indicate, residential real estate is not only used for permanent housing but also for short-term rental and second-home usage. Doling and Ronald (2019) call this phenomenon “not for housing” housing, as today housing is becoming more of an “investment asset”, because the formal accommodation sector does not follow current tourism trends. Perić et al. (2022) indicate that population growth is not a significant determinant of housing prices, while tourists, as temporary residents, are becoming an important force, proving the interconnections between tourism, hotel accommodation and housing prices (Dredge & Gyimóthy, 2017). As all observed municipalities are tourism destinations, the tourism influx and presence of second homes and tourist rentals somewhat change the overall image of overbuilding activity. Therefore, new units added in the observed period are “extra-structural” because there was already a substantial surplus in vacant housing units recorded in 2021.

5.2. Tourism leakage

To assess whether tourism demand could partly justify housing expansion, the analysis incorporated the TCDG model, which accounts for temporary population generated by tourism flows. This approach also considers the “grey zone” of unregistered tourists, second-homeowners, and “visiting friends and relatives” (Asllani et al., 2025; Milićević & Galić, 2018). A significant share of tourists remains unrecorded in official statistics, ranging from 30 to–50%, depending on destination and season. Even under the rough assumption that all recorded tourists would somehow fully reorient and occupy only the existing vacant housing stock, the current housing overbuilding rates could still not be justified. Such a substantial portion of unregistered “invisible” tourists represents a

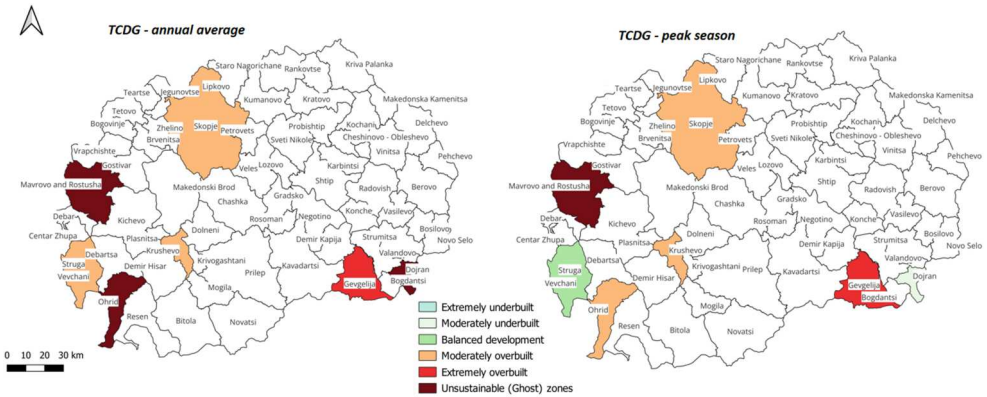


Figure 5. Tourism-adjusted Construction-Demography Gap (2024) in selected municipalities.

fluctuating (temporal) population accommodated in “shadow” capacity of the housing market (second-homes and unregistered short-term rentals).

Figure 5 illustrates the findings from the TCDG model, which represents a highly conservative approach in terms of available accommodation capacities, comparing average annual and peak season utilization levels. It further presents more deeply the relationship between housing stock expansion and effective population growth by adding both residents and tourists, comparing annual average and peak season tourist concentrations and their impact on excessive housing stock utilization levels.

From the results presented in Table 1, it is evident that at the national level, North Macedonia exhibits TCDG values approximately equal to 1.42 during peak season and 1.45 for the annual average. Housing stock growth therefore remains moderately above resident demand, while tourism inflows do not significantly alter this imbalance. TE index equals 1, and MI equals 0, indicating that tourism on a national scale has negligible structural impact on housing oversupply, as in the case of Krushevo. Municipalities such as Ohrid, Struga, Gevgelija, Mavrovo and Rostushe have negative MI and TE values exceeding 1, indicating that tourism is not only insufficient to absorb existing housing surplus but may also intensify oversupply with the building of commercial accommodation facilities (hotels), adding a significant share of “cold beds”.

5.3. Tourism impacts and housing imbalance

Figure 6 illustrates the tourism effect on oversupply reduction, quantifying the degree to which tourism demand absorbs housing surplus relative to a resident-only baseline. To provide a structured comparison of tourism impacts, the results for each sampled location are detailed below.

The results for the capital, **Skopje** (No 1, Figure 3), suggest a speculative “super-bubble” within the national context. The city shows moderate housing oversupply (32% surplus) and negligible tourism effect in oversupply reduction (6.25–9.38%), indicating that tourism demand does not significantly mitigate the imbalance. The observed structural surplus is a permanent feature of the urban landscape, driven by factors independent of transient tourist demand. Despite high emigration and a stagnant population,

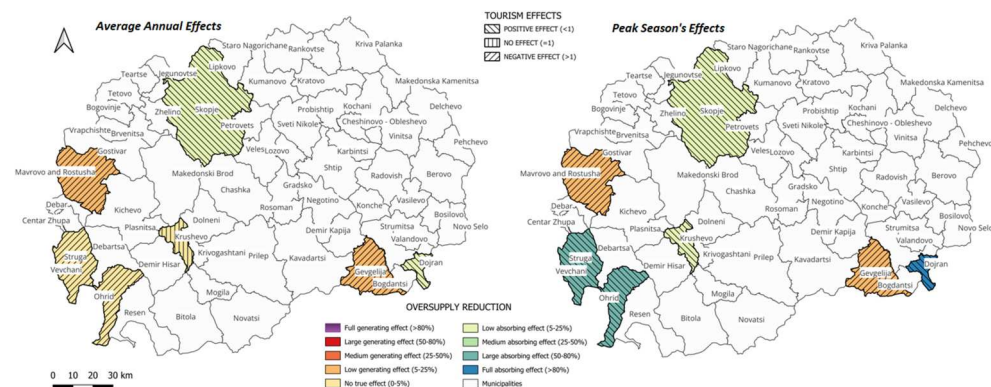


Figure 6. Tourism effects on housing oversupply reduction in selected municipalities.

Skopje accounts for nearly 40% of all residential construction in the country, and the construction intensity has continuously risen since 2011. Property prices nearly doubled in the observed period, reaching €3,000/m². Housing market trends show that developers increasingly market “micro-apartments” and “luxury suites” as low-maintenance assets rather than residential homes. These trends have facilitated a transition from a housing market to an asset market, producing peri-urban displacement and the emergence of “ghost blocks” with unoccupied investment properties. As the capital transforms into a business destination, the mass conversion of housing into tourist rentals contributes to a paradoxical urban landscape characterized by rising construction and declining residential accessibility, pricing out residents from the city center.

Dojran (No. 2, [Figure 3](#)) functions primarily as a summer and weekend destination for residents of Skopje. This has encouraged a transition from traditional hotel accommodation to an apartment-rental model and second-home ownership. Tourism demand substantially absorbs housing oversupply, particularly during peak seasons, signaling a full shift toward a visitor-oriented economy. Lakeside areas have evolved into expensive second-home markets dominated by seasonal owners, while permanent residents are increasingly concentrated in peripheral non-tourist zones with weaker economic activity. Construction significantly exceeds residential demand, with housing development intensifying since 2010, and more so since 2020. Tourism effectively mitigates the structural surplus. Over 80% of existing surplus becomes utilized during the peak season, while seasonal tourist demand can even cause modest shortages in available accommodation. Yet, out-of peak season, only 22% of housing surplus remains justified. The housing market is largely influenced by the investment of the domestic urban middle class, which acts as a catalyst for local inflation. This trajectory aligns with observed trends of significant migration outflows, high rates of illegal construction, and general lack of environmental awareness (Balkoski et al., 2023).

In **Gevgelija** (No. 3, [Figure 3](#)), the housing market reflects borderline transit and casino tourism dynamics. Although in 2024 the municipality accounted for only 4% of national tourist arrivals and overnights, 80% of visitors were foreign tourists (State Statistical Office, n.d.). The results reveal a strong housing imbalance with negative tourism effects that contribute to oversupply and produce 15–17% additional “cold beds”. Property values

are largely influenced by the gambling and hospitality sectors rather than local economic conditions, creating a market where real estate is valued primarily for its proximity to the border and entertainment economy. As property prices rise beyond local purchasing power (aligned with increased demand from Greek investments), the rental market becomes increasingly dominated by short-stay accommodation, pushing the local workforce toward surrounding villages and deepening the housing imbalance.

Krushevo (No. 4, [Figure 3](#)) is a mountain destination contributing less than 2% of national tourism demand in 2024 and heavily relying on domestic tourism (85%) (State Statistical Office, [n.d.](#)). Yet, official statistics likely underestimate tourism activity due to informal accommodation and unregistered guests (Petrevska, [2015](#)). Specializing in ski and adventure tourism, the municipality oscillates between high-demand paragliding and winter seasons and chronic “ghost city” syndrome during the shoulder months. Characterized by the unique nineteenth-century Balkan vernacular architecture with protection status, the town is effectively transformed into a “living museum” destination. The municipality exhibits moderate oversupply driven primarily by demographic decline rather than construction intensity. Tourism has limited influence on construction-demand dynamics and reduces oversupply by only 10% during peak seasons. Real estate development increasingly focuses on heritage-based investment, as properties are often purchased by investors from Skopje and converted into boutique hotels or luxury villas. Strict restoration regulations increase renovation costs, encouraging the displacement of residents toward peripheral areas, resulting in a highly gentrified center with polished lifestyle assets. While visual and infrastructural appeal improves under “beautification” strategies (Müller & Dame, [2016](#)), the human capital continues to erode, creating a profound disconnection between the town’s perceived prosperity and its social reality.

Ohrid (No. 5, [Figure 3](#)) represents the most prominent case of tourism-driven gentrification. The results indicate extreme overbuilding accompanied by the proliferation of tourism infrastructure and “cold beds”. At the annual level, tourism demand does not offset housing surplus, while during peak seasons tourism reduces it by approximately 56%. Nevertheless, even extreme tourism demand cannot fully compensate for the aggressive pace of housing construction. Real estate values in lakefront areas range from €2,000 to €4,000/m² (Delemendo, [2025](#)), creating a distinct “Lakefront Premium” market detached from local socio-economic conditions. Combined with the liberalization of property ownership for EU/OECD citizens in 2019, these dynamics have attracted external capital and intensified speculative development. The result is a tourism-dominated space where locals become increasingly displaced from central areas, while the urban landscape becomes fundamentally transformed (Petrevska, [2022](#); Petrevska & Collins-Kreiner, [2019](#)), residents’ quality of life diminishes (Petrevska et al., [2023](#)), and the heritage value of the destination faces growing pressure and potential loss of world heritage status (UNESCO, [2025](#)).

Struga (No. 6, [Figure 3](#)) is closely linked to the development of neighboring Ohrid and often functions as a more affordable alternative. The municipality shows similar patterns but with a slightly lower surplus. Tourism fills approximately 52% of housing surplus during peak seasons, while annual “cold bed” contributions to offer-demand dynamics remain modest. This remittance-driven urbanization, fueled mostly by nostalgia-led investment from the diaspora, has produced high vacancy rates (45%) and the emergence

of lakeshore “ghost zones” that remain empty for most of the year. Housing prices increasingly reflect diaspora purchasing power that exceeds local affordability, slowly but effectively displacing the resident population. The town is physically expanding through a construction boom of second homes while experiencing demographic shrinking.

Mavrovo and Rostushe (No. 7, [Figure 3](#)) represents a rural municipality located within a protected national park. It is focused on nature-based tourism during summer and ski tourism during winter. The housing market shows extreme oversupply and a negative tourism effect. However, this statistical stability masks a severe seasonal imbalance. The municipality suffers from an extreme 72% vacancy rate, underscoring the vulnerability of small, tourism-dependent areas to structural overbuilding for non-resident use. The results show that available tourist accommodation capacities practically represent “cold beds”, adding to the existing housing surplus. Even during the peak season, tourism is unable to fully absorb available tourist units, indicating that the majority of visitors are the “invisible ones”, second-home owners. The municipality exhibits a dual housing market structure. While Rostushe experiences depopulation and aging, the area around Lake Mavrovo has seen rapid development of recreational units and second homes owned mainly by residents of Skopje and diaspora investors. This has transformed parts of the national park into luxury landscapes largely disconnected from the social realities of permanent residents, stimulating the gentrification process.

The detailed analysis of selected municipalities reveals a spectrum of imbalances in the housing market depending on destination type and societal realities. The quantification of available statistical data supported field observations. The study revealed Skopje’s intensive construction as a typical speculative investment bubble, mimicking the case of other metropolitan areas in the Balkans (Jović et al., 2022; Perić & D’hondt, 2022), becoming fully detached from residential and tourist occupancy. Transnational gentrification is observed in Ohrid and Struga, where a strong seasonal tourist influx changes the perception of “ghost areas” to “vibrant tourist hubs”, and in Gevgelija, where foreign capital and the gambling economy dictate housing market dynamics.

The specific remittance-driven urbanization in Mavrovo and Rostushe and Krushevo, and full leisure commodification in Dojran, represent contrasting cases, from no effect to full housing absorption during the peak season. However, in all observed cases, the traditional housing function has been eroded, resulting in “ghost zones” and “cold beds” syndrome, which appear not only as statistical anomalies but as true spatial manifestations in housing markets that prioritizes speculative investments over residential stability and developmental sustainability. As Jović et al. (2022) found, a reality in which a significant share of available housing units actually represent an investment asset or short-term rental calls for developing new integrated urban planning methodology that balances public and private interests, introducing cautionary space management based on the principles of humanity, progress, and sustainable development.

6. Conclusions

This study examined the case of North Macedonia to explore housing dynamics in tourism destinations through a set of structural indicators. The analysis shows that when housing stock grows while the resident population stagnates or declines, an “overbuilding scenario” becomes inevitable. By applying a newly constructed model based on the CDG

and adjusted for tourism dynamics, the research quantifies the extent to which tourism either mitigates or intensifies housing pressure in different destinations. The model, therefore, serves as a diagnostic tool, assisting in the identification of situations where housing has transitioned from a social infrastructure into a commodified asset.

The findings indicate that in several destinations, including Skopje, Ohrid, and Mavrovo and Rostushe, housing construction has become increasingly detached from demographic realities. Even under a scenario of maximum tourist pressure, the supply-demand imbalance persists, suggesting that construction is no longer responding primarily to housing needs but to investment-based expectations. In such contexts, housing gradually shifts from social infrastructure to a commodified asset, producing what this study describes as an “invisible” or “ghost” population associated with vacant or only occasionally used dwellings. The growing share of empty or intermittently used housing units reflects both demographic shrinkage and the transformation of tourist destinations into spaces increasingly shaped by speculative real estate dynamics.

From a theoretical perspective, the study contributes to the literature on tourism development, residential tourism, and real estate dynamics by offering an empirical framework that links population change, tourism pressure, and housing construction. The proposed model helps identify situations in which housing development becomes structurally disconnected from actual effective demand. In this sense, the research contributes to ongoing debates on tourism-led urban transformation and housing commodification by demonstrating how tourism-related real estate expansion can produce spatial patterns of surplus housing even in relatively small or emerging tourism destinations.

The findings also have important practical implications for tourism planning and urban policy. The persistence of surplus units and “cold beds” suggests that current development patterns may undermine the long-term sustainability of destinations. Policymakers should, therefore, monitor housing construction trends more closely and consider measures that limit speculative oversupply, particularly in areas experiencing demographic decline. Driven by extreme gentrification and social bifurcation, in which resident populations are pushed to the periphery, making way for the elitization of central urban and lake-shore zones. Therefore, local authorities need to balance tourism development with housing accessibility by regulating the conversion of residential properties into short-term rentals or second homes, specifically where this process begins to displace permanent residents. More diversified tourism activities and a reduction of seasonal concentration may also help alleviate pressure on local housing markets and support more stable year-round economies in tourism destinations.

The research has several shortcomings that do not diminish the value of its findings. First, the lack of municipal-level data post-2016 on tourist accommodation limits the absolute precision of quantitative results. Second, official data often exclude “uncategorized” private rooms and apartments. Third, in the Balkan context, illegally built objects may exceed registered construction due to weak legal implementation. Finally, a significant number of tourists and second-home owners remain unrecorded in the official statistics. As in many tourism destinations, official demographic data may not fully capture temporary residents, second-home users, or other non-registered population groups. While this phenomenon appears to be less pronounced in North Macedonia than in some mature Mediterranean destinations, the results should still be interpreted with

this limitation in mind. Despite these constraints, the results provide a useful indication of the broader structural relationship between tourism development, demographic change, and housing construction. Future research could refine this approach further by incorporating real-time mobility data, more detailed local statistics, and comparative analyses across other tourism destinations in the region.

Notes

1. **ΔH**—housing stock growth (%); **ΔP**—population change (%); **S**—average household size (census 2021); **H₂₀₂₄**—total housing units in 2024 (estimate), **H₂₀₂₁**—total housing units in 2021, **P₂₀₂₄**—total population in 2024 (estimate), **P₂₀₂₁**—total population (census 2021).
2. **TU**—Total accommodation units (hotel rooms/apartments) 2016; **ET**—effective daily tourists, **A**—Average tourists per unit/room (2), **p**—ponder value for invisible tourists (1.3 for annual average or 1,5 for peak season).

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