Your room is ready: Tourism and urban revival*

Job Market Paper

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Abstract

Tourism is an essential sector of the global economy, contributing significantly to GDP and employment. Despite its importance, our understanding of its impact on urban economic activity remains limited. This paper aims to fill this gap by examining the impact of tourism on urban transformation using a dataset of hotel openings in Madrid over the period 2001-2010. I show that hotel openings have a positive impact on the number of establishments and employment by using the number of protected buildings as an instrumental variable to account for the non-random distribution of hotel openings. Interestingly, the impacts vary between different economic sectors and areas within the city, with tourism-oriented businesses benefiting significantly while production-oriented activities experience negative impacts. In addition, the spatial impacts of tourism extend beyond the immediate vicinity, suggesting indirect economic spillover effects on job creation in more distant areas. Finally, economic effects extend to the real estate market, increasing rental prices and residential investment.

Keywords: tourism, economic activity, urban transformation, cities
JEL Classification: R10, R23, Z32

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1 Introduction

Tourism plays a pivotal role in the global economy, contributing around 10% to global GDP and employment (World Travel Tourism Council, 2019). It stands out as one of the largest economic sectors, surpassing traditional industries such as construction, transport, information and communication.[1] According to WTO (2019), international tourist arrivals have surged from 400 million in 1990 to 1.5 billion in 2019, with urban tourism leading this trend. At the core of this growth are hotels, representing the largest player in the tourism sector (Kosová and Sertsios, 2018).

Hotels can have a significant impact on the local economic landscape because the services they provide are inherently non-tradeable, requiring consumption where they are offered. This form of trade in which customers travel to suppliers can lead to a transformation in the composition of local economic activities, driven by differences in tourist consumption patterns compared to residents (Allen et al., 2020). Tourists demand a series of goods and services more intensively, such as restaurants, gift stores, bars, and cafes (Hidalgo et al., 2022). In turn, the increase in new tourist-oriented businesses and employment can come at the expense of other tradeable activities, making the overall effect of hotel-induced tourism on the local economy unclear. (González et al., 2020; Gálvez-Iniesta et al., 2023). Similarly, it remains uncertain to what extent the potential job opportunities generated by hotel establishments primarily benefit local residents or extend to other workers living in different areas of the city.

In addition, hotel openings can have an effect on the real estate market, either depriving or revitalizing the surrounding areas of the hotel. On the one hand, the conversion of residential land to accommodation use can create a negative supply shock in the housing sector, leading to higher rents (Garcia-López et al., 2020). Also, hotels located in new or renovated buildings can enhance the overall appeal and vibrancy of an area, potentially driving up property values (Carlino and Saiz, 2019). In contrast, hotel-induced tourism can cause nuisances and changes in amenities, making it less attractive to local residents (Fontana, 2021). The potential impact of hotel openings on the real estate market can further reshape the economic landscape, affecting businesses differently based on its business structure. In this regard, stand-alone businesses, lacking shared resources, may be more sensitive to rising land rental prices, as their fixed operating costs make them vulnerable to financial challenges. All in all, hotels exert a demand and supply pressure on the local economy, the labor market, and the land market,

[1] Specifically, construction (6.2%), transport equipment (1.3%), and the information and communications sector (3.2%). These figures are based on employment data from the EUKLEMS-INTRANPROD database, February 2023 release. The data refer to 2019, the year before COVID-19, and cover an aggregated basis for 30 countries with available information (source: https://euklems-intanprod-llee.luiss.it/).

making the overall economic impact an important research question worth investigating.

To explore the impact of tourism on urban economies, this paper focuses on the contribution of hotel openings to urban transformation. Specifically, I examine how hotel openings influence the number of businesses, employment, and the housing sector within hotel surroundings in Madrid during the 2001-2010 period. Madrid is an ideal destination to study the impact of tourism on cities. It is not only one of Europe's leading urban tourist destinations, but it is also the capital of Spain, a country that ranks second globally in both international tourist arrivals and income from non-resident tourists (World Travel Tourism Council, 2019). To understand the impact of hotels on urban transformation, I build a unique fine-grained dataset that combines hotel supply development, establishment-level data, and employment by workplace and place of residence. I also collect data on rental prices and building renovation permits to analyze hotel impacts beyond local economic activity. By studying the main channels through which hotel openings affect the local economy. I aim to provide a comprehensive understanding of how tourism shapes the urban landscape.

Causal identification in this context is a challenging task as hoteliers select new locations based on unobserved local characteristics and trends. For instance, if hoteliers could predict which areas of the city would flourish in the future, they may systematically place hotels in these zones. This would make it difficult to understand whether changes in the urban landscape are a cause or a consequence of hotel growth. To address this issue, I propose a novel instrument - the number of protected buildings - to tackle the non-random distribution of hotel openings throughout the city.[2] The adaptive reuse of historic buildings for accommodation facilities offers urban developers a solution to the economic challenges associated with repurposing expensive structures, as hotel users are willing to pay more to stay in these facilities (Pedersen, 2002; Lee and Chhabra, 2015). In turn, hotels are among the few economic activities that uniquely benefit from the use of historic buildings for their operations, turning these heritage structures into profitable assets (Lezcano González and Novo Malvárez, 2023). This approach mirrors the instrumental strategy employed by Faber and Gaubert (2019) who study the regional economic impact of tourism in Mexico, using environmental and historical amenities to predict tourism attractiveness.[3] Here, I study the impact of hotel-induced tourism in an urban setting by predicting hotel location decisions

[2]Protected buildings are structures of particular architectural and historic interest that merit special protection. The list of protected buildings, established by the Madrid City Council in 1997, includes structures built before the onset of the tourist boom examined in this paper. For further details on protected buildings, see Appendix B.

[3]While unrelated to the primary research question, Gamalerio et al. (2023) employed a similar approach, using group accommodation buildings (such as homes for disabled people, the elderly, orphans, and drug addicts) to predict the presence of refugees in Italian municipalities.

rather than overall tourism development using the number of protected buildings as an instrument.

Crucially for the identification strategy, I show that protected buildings strongly predict hotel openings across urban geography. In addition, the identification strategy is further supported in the context of Madrid, where changes in land use regulations during the period of analysis have considerably facilitated the conversion of buildings into accommodation facilities (Comunidad de Madrid, 2005). Also, I demonstrate that protected buildings do not have a direct impact on economic outcomes in areas without and prior hotel openings. Lastly, I provide evidence that the source of variation that I am exploiting comes mainly from historic buildings converted into accommodation facilities and not from other economic activities.

The main findings reveal that hotel openings have a positive impact on both the number of establishments and employment in the surrounding areas. Importantly, employment effects are driven by the indirect impact of hotel opening on other economic activities, rather than the direct impact of hotel employees, confirming the multiplier effect of tourism in other sectors (Exceltur, 2018). In quantitative terms, the main estimates reveal a substantial impact. Hotel openings explain the 36% variation in the number of establishments and the 77% variation in the employment in the hotel surroundings between 2001 and 2010. These figures highlight the significant role that hotel openings play in shaping the urban economic landscape. Results are robust to different samples and specifications and are also consistent with different measures of the outcome of interest, hotel activity, and the geography and the period chosen.

Further analyses reveal substantial heterogeneity in the effects of hotel openings on local economic activity. In particular, these effects vary significantly across different sectors. Hotel openings exhibit a positive impact on tourist-oriented businesses such as restaurants, bars, and souvenir stores, but lead to a decrease in production-based activities. This phenomenon signals a structural shift in the city's economic landscape, characterized by a progressive reduction of the tradeable sector in favor of services, especially those targeting tourists. Furthermore, the impact of hotel openings varies widely throughout the city. Areas without prior hotel presence and with hotels specialized in leisure tourism experience larger increases in employment and the number of establishments. Additionally, the opening of hotel rooms generates economic spillover effects on job creation that extend beyond the immediate vicinity. These effects contribute to increased employment opportunities not only for residents of hotel surroundings, but also for workers living in other areas of the city.

Lastly, the economic repercussions of hotel openings extend also to the real estate market, leading to an increase in rental prices and residential investment. Interestingly, the rise in

housing prices appears to be driven by an amenity effect resulting from improved urban amenities, rather than the result of the conversion of residential units into accommodation facilities, reducing the stock of rental houses. In light of this, the findings underscore an alternative mechanism through which hotels influence the real estate market, as opposed to reallocation of housing units away from long-term rentals to short-term rentals. Finally, the increase in rental prices further reshapes the economic landscape, where business groups with a potential stronger financial position displace stand-alone businesses within the same economic activity. This finding underscores the role of tourism, which not only changes the composition of local economic activities, but also reshapes the legal structure of businesses within the same sector.

This paper contributes to the emerging field of research on the economic impacts of tourism.[4] Several studies have focused on analyzing these impacts from a regional perspective (Kadiyali and Kosová, 2013; Lanzara and Minerva, 2019; Faber and Gaubert, 2019; González et al., 2020; Favero and Malisan, 2021; Nocito et al., 2023). The main results show that tourism is associated with increased income, employment in the tourism industry, expenditure and the number of businesses, with positive spillovers in other sectors. Within this body of literature, short-term rental disruption has sparked significant interest in studying the economic impacts of tourism in cities. Consequently, the rise of Airbnb-induced tourism has been associated with a higher number of consumption amenities (Alyakoob and Rahman, 2022; Hidalgo et al., 2022), housing and rental appreciation (Garcia-López et al., 2020; Barron et al., 2021) increased residential investment (Xu and Xu, 2021; Bekkerman et al., 2022), resident discontent (Fontana, 2021), tax evasion (Garz and Schneider, 2023), displacement of businesses geared toward local residents (Hidalgo et al., 2023) and the welfare impact on residents and tourists (Almagro and Dominguez-Iino, 2022; Farronato and Fradkin, 2022).

With respect to the literature, this paper makes several contributions. First, it is the first study to analyze the economic impacts of hotels on urban transformation. Although hotels play a central role in the tourism sector, previous research has focused primarily on other aspects of tourism, overlooking the specific effects of hotels. The lodging industry, which specializes in offering non-tradeable services meant for consumption precisely where they are produced, can reshape the urban economic landscape due to the sheer size and interrelatedness with other activities. Unlike short-term rentals, hotels are typically established in previously unused or newly constructed buildings, which helps reduce the displacement of local residents and lessens the crowding-out effect on residents' consumption of goods and services. Second, it addresses an important methodological

[4]For a comprehensive list of the recent contributions in the literature on the economic impact of tourism, see Table A1 in the Appendix A.

challenge by introducing a novel instrument -the number of protected buildings- to tackle the endogeneity arising from the non-random distribution of hotels throughout the city. This instrument is based on the premise that hoteliers are among the stakeholders who can effectively utilize the historical and architectural features of protected buildings to create unique and desirable accommodations that attract hotel users. By repurposing these protected buildings, hotels can capitalize on the value users place on historical and architectural elements. Third, this paper goes beyond analyzing the local effects of hotel openings and highlights their broader positive impact on job creation in the city, extending to areas outside the immediate vicinity of the hotels through employment commuting flows. In doing so, this paper contributes to the existing literature on the analysis of heterogeneous spatial effects of tourism in the city (Allen et al., 2020).

Building on the work of Glaeser et al. (2001), this research adds a novel dimension to understanding how the composition of local demand influences the urban economic landscape (Card et al., 2008; Guerrieri et al., 2013; Diamond, 2016; Behrens et al., 2022; Lanzara and Minerva, 2019). While previous studies have identified the influx of young, highly skilled individuals as a key driver of these changes (Baum-Snow and Hartley, 2020; Couture and Handbury, 2020; Moreno-Maldonado and Santamaria, 2021; Curci and Yousaf, 2022), this study focuses on how hotel-induced tourism contributes to the emergence of the consumption city by enhancing urban amenities, including consumption-related establishments and aesthetic improvements facilitated by building renovation permits. In this context, the closest paper to this is Lanzara and Minerva (2019), which provides a theoretical framework for understanding the welfare effects of tourism in the city. In the paper, the authors show how tourism alters the sectoral composition of the local economy, driving up land prices and leading to structural transformation away from the tradeable sector, with a focus on specialization in services. I further extend and complement their work by empirically testing these theoretical predictions within the city in a causal setting.

Finally, this paper contributes to the growing empirical literature that leverages within-city variation to credibly identify the effects of economic shocks on various aspects of urban economic outcomes. These include immigration (Mazzolari and Neumark, 2012; Olney, 2013), the entry of big-box stores (Haltiwanger et al., 2010; Wang, 2023), the impact of ride-sharing services (Gorback, 2022; Daniele et al., 2022; Norris and Xiong, 2023), and the influence of sports facilities (Bradbury, 2022; Abbiasov and Sedov, 2023). Against this background, I leverage a supply shock, hotel openings, to gain insights into how tourism affects not only business and employment dynamics, but also the effects on the real estate market.

The rest of the paper is organized as follows. Section 2 presents the data and Section 3 describes the empirical strategy. Section 4 presents the main findings and tests its robustness.

I delve into the heterogeneity and extensions in Section 5. Finally, I conclude and discuss future research in Section 7.

2 Data

To assess the influence of tourism on economic activity, I have assembled a comprehensive dataset aggregated at the level of commuting zones.[5] This dataset includes several variables, such as hotel openings, the number of establishments, employment, rental prices, residential renovation permits and a wide range of sociodemographic characteristics.

2.1 Hotel information

The data set used in this analysis incorporates details on Madrid's hotel supply spanning the period 2001 to 2010.[6] The main data source is the Official Hotel Guide, an annual bulletin published by Tourspain, a public Spanish agency charged with overseeing tourism promotion, from 1936 through 2010. More precisely, the collected data include the coordinates of each hotel, the category and typology of the hotel, its opening date, and the number of rooms. I restrict the analysis to years prior to 2010 to avoid possible contamination effects of other tourists drivers, such as short-term rental disruption.[7]

Figure I illustrates the geographic distribution of new hotel rooms across commuting zones within Madrid municipality. The distribution of hotel room openings spans the city, yet shows a notable agglomeration in proximity to the city center, the business district (North), and the airport (North-East). This pattern underscores the presence of agglomeration economies and the influence of location determinants within the hotel industry (Freedman and Kosová, 2012). Additionally, we can see a clear connection between space and time, since hotels tend to open in specific commuting zones from 2001 to 2010.

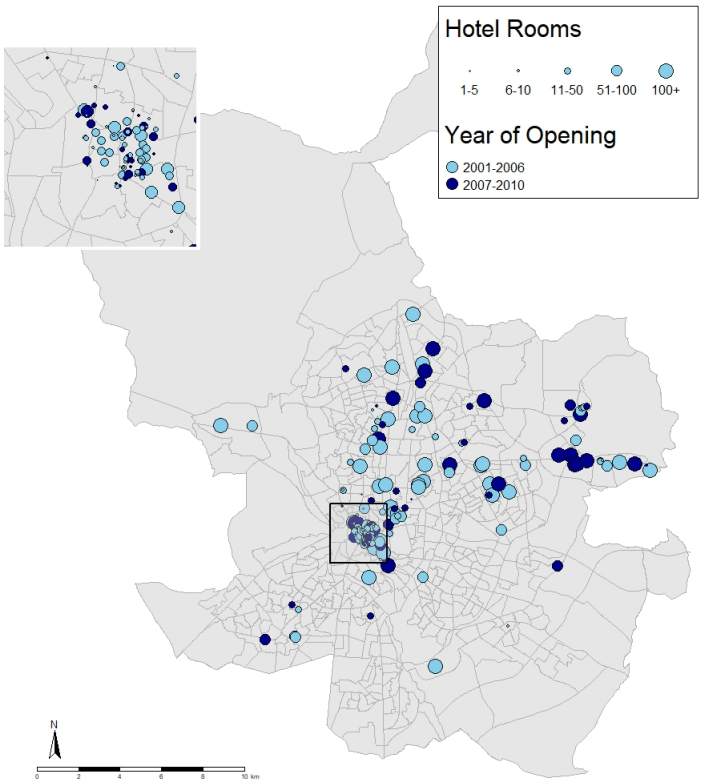
In the period 2001-2010, a total of 188 hotels were opened, which translated to 13,510

[5] Commuting zones represent a fundamental spatial unit for analysis and information aggregation in Madrid. The Madrid Regional Transport Consortium defines these to collect data on the mobility patterns of Madrid residents. They have been built to represent areas homogeneous in terms of socioeconomic, urban, and accessibility characteristics. With approximately 6,000 inhabitants, their size sits between the neighborhood's 20,000 and the census tract's 1,500, offering a middle ground in terms of population. The decision to use commuting zones as the observation unit is rooted in the need to pinpoint local spillovers of hotel entry on economic activity, while encompassing spatial influences. Although other aggregation units, such as census tracts or neighborhoods, could have been chosen, commuting zones strike a balance by being sufficiently small to identify local effects and sufficiently large to capture spatial influences.

[6] In this context, the term "hotel" broadly include a variety of accommodation types, such as hotels, hostels, boarding houses, motels, and resorts, to maintain clarity in exposition.

[7] Despite Airbnb arrival in Madrid was in 2009, the number of Airbnb listings didn't start to surge until 2014 (Hidalgo et al., 2022).

Figure I: Spatial distribution of hotel room changes from 2001 to 2010

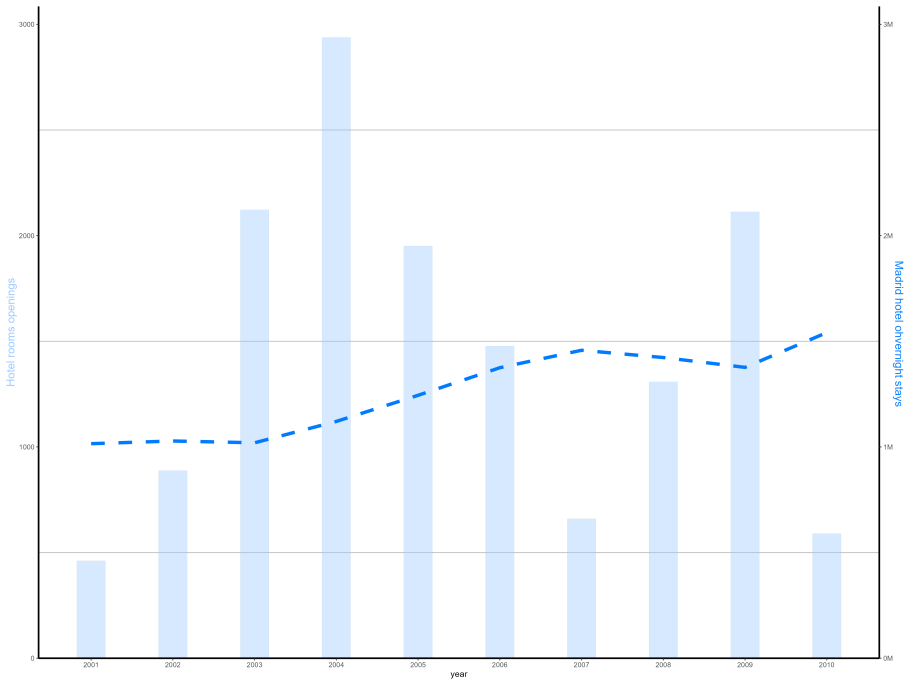


Notes: Gray lines limit commuting polygons.

new hotel rooms, almost an expansion 50% of the previous overall supply.[8] The influx of new hotels peaked in 2004 with almost 3000 hotel rooms opening, as depicted in Figure II. On the demand side, there was a noticeable increase in overnight stays in Madrid, which experienced a minor drop during the initial years of the Great Recession. Despite this, both supply and demand demonstrated rapid recovery in subsequent years, highlighting the resilience of the tourism sector to buffer against the adverse impacts of the economic downturn (Antonakakis et al., 2015). In terms of distribution across hotel categories, 4-star hotels are significantly ahead both in the number of new openings and available rooms. This trend underscores the pivotal role that high-rated hotels have played in fueling recent tourism growth (see Figure A2 in Appendix A).

[8]Between 2001 and 2011, only four hotels experienced permanent closures, while nine others, which had opened prior to this period, temporarily ceased operations for renovations

Figure II: Hotel room openings and Madrid hotel overnights from 2001 to 2010.



Notes: Left scale is for hotel room openings (bars) and the right scale is for the evolution of Madrid hotel overnights stays (dashed lines).

2.2 Outcome of interest

Establishment and employment. Information on employment and establishment comes from *Directorio de Actividades Economicas*. This dataset provides georeferenced information for the universe of all economic activities in the Madrid region during the period 2001-2010. The data set compresses business-level data under a four-digit NACE-based classification, location, and employment size class.[9] I also have access to annual employment by place of residence from the Madrid City Council Statistics Department for 2007-2013. This dataset provides information about the employment level of residents at the census tract level. I collapse this information into commuting zones to be consistent with the geography.

Housing information. Housing data comes from different sources. First, I collect rental market data from the rental guarantee database provided by the Madrid Regional Housing Department for the period 2001-2010. Second, I obtain residential permits from the Madrid City Council that cover the 2007-2013 period. Lastly, I gather information from the

[9]There are ten size class: 1, 1-4, 5-9, 10-19, 20-49, 50-99, 100-199, 200-499, 500-999 and +900. I take the minimum of each category to attribute employment at the establishment level and remove observations for the last two size classes due to the imputation noise. The results remain consistent regardless of the use of other imputation measures such as the average or the maximum.

2001 and 2011 Spanish census about the number of rental units and total dwellings.

2.3 Sociodemographic variables

I enrich the dataset by incorporating additional variables that help to account for various factors related to changes in the local economy, such as the population, the share of educated people, and the unemployment rate. I collect this information from the Spanish 2001 census. By including those sociodemographic characteristics, I aim for controlling for other trends related to changes in the number of establishments, such as gentrification and urban revival (Baum-Snow and Hartley, 2020; Behrens et al., 2022; Couture and Handbury, 2023).

Table 1 presents the descriptive statistics of the main variables used in this study (see Table A2 in Appendix A for the definition and sources of the variables and Appendix B for a more detailed explanation of the data collection).

Table 1: Descriptive statistics

Panel A: Change 2001-2010			
	Sum	Mean	S.D
Establishments	11,333	23.709	44.357
Employment	52,398	109.619	366.364
Hotel rooms	13,510	28.264	123.141
Rental price	-	3.781	1.927
Residential permits*	7,373	15.425	15.88
Panel B: Level 2001			
	Sum	Mean.	S.D
Establishments	114,462	239.46	267.295
Employment	533,833	1116.805	1548.513
Hotel rooms	27,081	56.655	189.877
Population	2,971,924	6204.434	3386.223
Share college	-	0.214	0.125
Share unemployment	-	0.126	0.033

Notes: N = 478. Descriptive statistics for commuting zone level observation. *Residential permits data display the changes for the 2007-2013 period, as it is the only available time frame.

3 Empirical strategy

This paper aims to investigate the impact of the entry of hotels into urban transformation. In the first part, I aim to determine to what extent hotel openings have affected the surrounding areas in terms of number of establishments and employment. To address this research question, I employ the following regression specification:

$$\triangle Y_i = \beta \triangle Hotel\ rooms_i + \rho X_i + \delta Z_n + \epsilon_i$$

where i indexes commuting zones and the operator $\triangle$ denotes long-run differences from 2001 to 2010.[10] The main dependent variables, $\triangle Y_i$, are the change in the number of establishments and employment as a proxy of local economic activity. The key explanatory variable, $\triangle Hotel\ rooms_i$, measures the change in the stock of hotel rooms in a given commuting zone. In this manner, this measure not only captures the number of hotel openings in a commuting zone, but also the size.

I complement the specification and expand it to control for sociodemographic characteristics measured in 2001 at the commuting zone level X_i, such as population, proportion of the educated people and unemployment rate. I measure them at the beginning of the sample period to avoid potential contamination effects of the treatment variable. To account for different geographical business dynamics trends depending on the location of the economic activity, I add the distance to the city center as an explanatory variable.[11] To address the concern that the results are driven by differential pre-hotel opening establishment and employment changes, I include the change in the number of establishments from 1990 to 1997. In this way, the specification allows for differential trends in establishment and employment 2001–2010 based on pre-existing trends. Lastly, I incorporate spatial neighborhood fixed effect, Z_n, to control for contemporaneous shocks that are common to all the commuting zones of a given neighborhood. By including these fixed effects, I effectively capture and account for factors that remain constant over time, but vary across different commuting zones within the neighborhood. Including neighborhood fixed effects and the set of sociodemographic covariates implies that β is estimated from changes in the number of hotel rooms within the commuting zone over time, compared to other commuting zones in the same neighborhood with similar pre-determined and geographical characteristics during the ten window period.

However, the coefficient of interest β could still be correlated with unobserved changes that are not partial out in the regression specification, therefore biasing the coefficient in an unclear direction. On the one hand, hotel openings may be higher in areas that become more attractive to local amenities and with higher perceived quality. On the other hand, hotel openings can be concentrated in declining areas with lower land costs and limited investment

[10] I chose to employ long differences over yearly panel data due to the absence of time-varying control variables at the commuting zone level and the treatment's inherent nature. Although there are areas where hotels have opened several facilities over the years within the same area, many commuting zones only experimented with one hotel opening over the period, making long differences the most convenient specification to identify contemporaneous and subsequent economic effects.

[11] I measure the distance to the center as the distance from Puerta del Sol (main square in Madrid city) to the centroid of each commuting zone.

prospects, such as those close to airports or key transportation hubs, catering primarily to business travelers (Lee and Jang, 2011).

To address any remaining non-randomness in hotel openings location across commuting zones, I use the number of protected buildings as an instrument for the variation in the number of hotel rooms in a given commuting zone. Specifically,

$$\triangle Hotel\ rooms_i = \alpha Protected\ Buildings_i + \rho X_i + \delta Z_n + \epsilon_i \tag{1}$$

Protected buildings have been identified as one of the key price determinants in the hotel management literature (Henderson, 2011, 2013; Lee and Chhabra, 2015; de la Pena et al., 2016). The adaptive reuse of historic buildings for accommodation facilities allows developers to overcome the economic viability of adapting costly structures for new uses, which will not be affordable or cost-effective for other economic activities. Hotel users highly value the opportunity to be hosted in these protected buildings due to their aesthetics and architectural value, making them willing to pay a premium for such unique and culturally rich experiences. As a result, many countries have implemented this approach to modify existing historic buildings to serve purposes that are usually different from their original purpose.[12]

Furthermore, several changes to existing land use regulation were approved during the analysis period in Madrid to facilitate the opening of new accommodations by easing the requirements for the establishment of accommodation facilities (Comunidad de Madrid, 2005). These regulations aimed to respond to the incipient demand for hotel rooms due to the increase in tourist flows and to strengthen its bid for the 2012 Olympic Games (see Figure A1 for real examples of the conversion of protected buildings into accommodation facilities in Madrid). In this manner, the timing of the regulation can be considered exogeneous, as it was chosen specifically to boost the chances of hosting the Olympic Games without affecting any other economic activities except for the lodging industry.

The instrument has two requirements to yield a causal estimate of hotel openings on local economic activity. The first is a strong relationship between hotel room openings and the number of protected buildings. The second requirement is that, conditional on covariates, the number of protected buildings is uncorrelated with unobserved determinants of changes in local economic activity. That is, the number of protected buildings impacts changes in local economic activity only through the hosting of hotel facilities. I provide evidence in favor

[12]For instance, the creation of public-managed hotel chain "Paradores" in Spain, a collection of hotels established in castles, fortresses, and other historic structures, *La Oficina del Historiador* with its hotel chain "Habaguanex" in Cuba, which places hotels in small and medium historical buildings, and *Pousadas* in Portugal.

of these requirements.

First, I present evidence to support the first requirement in Figure A3 and Figure A4 in Appendix A. As shown in Figure A3, commuting zones with a high number of protected buildings exhibit a higher concentration of hotel room openings. This strong relationship also holds spatially, as demonstrated in Figure A4, where I plot the spatial distribution of protected buildings and hotel room openings across commuting zones.

Concerning the exclusion restriction, the identification strategy is based on the assumption that commuting zones with a higher concentration of protected buildings affect local economic activity only through their impact on hotel location decisions and their subsequent economic effects. I provide evidence in favor of the validity of the instrument as follows.

First, I check whether the instrument predicts changes in the number of establishments and employment for commuting zones that have never experienced any hotel opening. This exercise aims to show that the number of protected buildings is only related to changes in the outcomes of interests through its effects on hotel openings. I do not find any significant relation between the instrument and the change in the number of establishments and employment in these areas (see estimates in columns 1-2 in Table A3 in Appendix A).

Second, an important consideration regarding the instrumental variable is the potential influence of the number of protected buildings on an area's economic activity, even before the hotel openings. To examine this, I test whether pre-period changes in both outcomes of interest are correlated with subsequent changes in hotel penetration predicted by the instrument. I provide evidence that commuting zones with a high number of protected buildings are not areas that were already undergoing different trends correlated with changes in local economic activity (see columns 3-4 in Table A3).

Third, the relevance of the instrumental variable strategy is based on the fact that hotels are one of the few economic activities that can take advantage of the repurposing of historic buildings, as hotel users value being hosted in those facilities. However, firms and public administration may select these buildings as their headquarters and offices due to aesthetics (Bargenda, 2015). This could lead to changes in the urban landscape that could be driven by those activities, confounding the effects of hotel economic impacts. To test for this issue, I examined whether the change in the number of hotel rooms predicted by the instrument was correlated with a variation in the number of firms' headquarters and public administration activities in a commuting zone. The existence of this confounder, correlated with the presence of hotels and the change in the dynamics of the local economy, could

invalidate the identification strategy, as I would mistakenly attribute the increase in the number of establishments and employment to hotels. Columns 5-6 in Table A3 show no effect of the hotel openings predicted by the instrument on the location of the headquarters and public offices.

Fourth, to ensure the reliability of the identification strategy and assess whether hotel openings effectively capture the presence of hotel users and tourists in the vicinity, I conduct an additional exercise. This exercise involves testing the predictive capacity of hotel openings for the presence of tourists in the area. To achieve this, I gather photographs taken by tourists from the Flickr platform.[13] The results, shown in column 5 of Table A3, show that hotel openings positively impact the number of photos taken by tourists in the commuting zone.

Having provided evidence about the validity of the proposed instrumental strategy, I now turn to analyze the effect of hotel opening on the number of establishments and employment in Section 4.

4 Results

Table 2 displays the results of the baseline ordinary least squares (OLS) and instrumental variable (IV) specifications. The sample includes 478 commuting zones. The dependent variables are long differences computed between 2001 and 2010 for the number of establishments and employment. I instrument for the variation in the number of hotel rooms with the number of protected buildings in the same area in columns 5-8. Columns 2, 4, 6 and 8 include, as control variables measured in 2001, the population, the share of educated people, and the unemployment rate. I also include the change in the number of establishments from 1990 to 1997 to control for differential trends in establishment and employment based on pre-existing trends. Finally, I add neighborhood fixed effects to remove time-invariant unobserved heterogeneity and the distance to the city center to control for geographical characteristics across commuting zones within neighborhoods.

The main results show a positive effect of hotel openings on the number of establishments and employment, regardless of the model specification.[14] The inclusion of controls makes the

[13] I differentiate between photos taken by tourists and residents by considering users who captured photos in Madrid over a continuous 7-day period between 2007 and 2013. Then, I computed the difference between the tourist photos stock between 2007 and 2013 in each commuting zone.

[14] Table A4 in Appendix A presents the first-stage, reduced-form and regression results taking the class average and the maximum of the employment class mark as a robustness check. Last, I remove hotel employees to test that the employment effects are not driven by mechanical increases in the number of hotel employees. In particular, I find consistent results showing that tourism-induced employment comes mainly from tourist activities other than the hotel industry (Exceltur, 2018). The results show the strength of the instrument and the stability of the coefficient of interest for different employment imputation measures and excluding hotel employees.

Table 2: The impact of hotel room openings on the number of establishments and employment (OLS and IV).

	OLS				IV			
	Δ Establishments		Δ Employment		Δ Establishments		Δ Employment	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Δ Hotel rooms	0.099***	0.091***	1.25***	0.993***	0.527**	0.346***	4.70**	3.12**
	(0.021)	(0.030)	(0.343)	(0.267)	(0.204)	(0.121)	(2.10)	(1.22)
Covariates		x		x		x		x
Adjusted R-squared	0.074	0.527	0.0831	0.597				
F Stat, Excluded instru.					9.77	14.57	9.77	14.57
Observations	478	478	478	478	478	478	478	478

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, ** and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2011. I use the number of protected buildings as an instrument for the variation in the number of hotel rooms. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level.

coefficients for changes in the number of hotel rooms somewhat reduced. However, they remain significant across all specifications. Although I control for an extensive range of factors, I cannot rule out unobserved time-varying characteristics related to the hotel entry and the changes in the number of establishments and employment. Therefore, I use an instrumental variable strategy to overcome the potential endogeneity problem in the hotel location decision. The instrument, the number of protected buildings, predicts hotel location decision as can be seen in the Kleibergen-Paap Wald F-test value. In the second stage, we can see that the sign of the hotel room effect remains positive and the magnitude has increased.[15]

Notably, the coefficients tend to be larger for the IV specification. This suggests that omitted factors negatively correlated with changes in the number of establishments and employment but positively correlated with hotel room availability decisions and measurement errors may push down the coefficient's magnitude. In that sense, hotels may tend to cluster in commuting zones with restricted investment prospects, typically featuring lower prices. The affordability of these areas can attract more accommodations, leading to

[15]One potential criticism of the instrumental strategy lies in the fact that protected buildings encompass a diverse array of structures, making it challenging to pinpoint which types of repurposed structures are driving the observed results. I incorporate all protected buildings into the instrumental strategy in the baseline specification, irrespective of their protection level, with the exception of monuments, museums, and other non-lodging facilities, which have been excluded from the study. This approach aims to show that the main findings remain robust, regardless of the source of exogenous variation leveraged in the identification strategy. To categorize protected buildings according to its level of protection, I follow the classification provided by the Madrid City Council, and created four different instruments: the number of protected buildings with protection levels I, II, III, and the total number of all protected buildings. The results in Table A5 reveal that the significance and magnitude of the results remain consistent, with minor exceptions noted in the establishment specification when paired with the number of protected buildings at level I. This null effect may be attributed to the limited variability observed due to the small number and specific characteristics of these buildings, which may pose challenges in terms of repurposing.

a greater concentration of hotels in such places. In addition, the fact that hotels that cater for business travelers are located in areas outside of downtown that are characterized by a lower number of protected buildings and lower land values helps explain the downward bias in the OLS coefficient. Although the data set provides detailed information on hotel openings, it is important to note that there may be measurement errors, especially for potentially small accommodations that were not included. Finally, an additional explanation for the larger magnitude of IV coefficients may be the fact that estimates capture the effect of repurposing protected buildings into accommodation. In contrast, the OLS specification estimates only the effect of the number of hotel room openings. Consequently, in the presence of heterogeneity of the effect, IV coefficients estimate the local average treatment effect (LATE) related to places with a high density of protected buildings, which may be more sensitive in terms of economic activity to hotel openings.

In quantitative terms, the coefficients in columns 6 and 8 suggest that each additional hotel room leads to the creation of .346 establishments and 3.12 employees. This equates to an approximate 36% increase in establishments and a 77% increase in employment explained by hotel openings from baseline levels in an average transport zone during the period 2001-2010.[16] In summary, the impact of adding hotel rooms on employment is more significant than its impact on the number of establishments. This is because the employment variable considers both the increase in the number of establishments and the increase in the workforce within existing establishments. To contextualize these figures, it can be inferred that 100 overnight stays would typically stimulate an increase of 1.5 employees and .12 establishments, given the average room occupancy in Madrid in 2010. These estimates are consistent with the range of 2-5 jobs per room observed in other studies (Kadiyali and Kosová, 2013; Exceltur, 2022).

4.1 Robustness checks

Now, I test the robustness of the results to changes in the set of controls, specification, and sample definitions.

4.1.1 Alternative specification

In the first part, I start by showing that the results are robust to different specifications. In this manner, I check whether the main tenets hold whenever I change the functional form of the outcome variable by computing growth rates instead of absolute changes. Then, I augment the baseline specification including the pre-treatment control variables not only in

[16] These figures were computed by taking into account the average increase in the number of hotel rooms, which was approximately 28, and the average changes in the number of establishments and employment, which were 23 and 109, respectively, between 2001 and 2010.

levels but also in changes and using the number of hotel openings units as main variable of interest. After that, I estimate the model using panel data instead of long differences. Finally, I address the potential spatial correlation among commuting zones from nearby commuting zones in different neighborhoods.

To begin with, I have opted to compute the growth rate of the dependent variable instead of using absolute changes in the baseline specification to show that the primary conclusions remain consistent and are not contingent on the specific model specification. Result A in Table 3 shows that the results do not depend on the specific functional form of the model.

In addition, I augment the baseline regression specification by incorporating the changes in the explanatory variables as additional control variables.[17] This allows me to consider relevant dynamics, such as the influx of highly skilled young people, which can contribute to urban transformation in the area (Baum-Snow and Hartley, 2020; Couture and Handbury, 2020; Curci and Yousaf, 2022). As evident in result B in Table 3, there is minimal change in the coefficients' magnitudes, suggesting that potential confounding factors related to gentrification are unlikely to drive the results. As an additional robustness check, I test whether the main results hold by measuring hotel-induced tourism through the number of hotel opening units. The decision to use the number of hotel room openings is based on the fact that I can control the size of the hotel in this way. Again, the sign of the result C in Table 3 shows that the findings are not sensitive to alternative ways of measuring hotel activity.

Then, I take advantage of the time variation in the analysis and run a yearly panel data specification. I chose to employ long differences over yearly panel data due to the absence of time-varying control variables and the treatment's inherent nature. Although some commuting zones have seen multiple hotel openings over the years at the same location, many commuting zones had only one hotel opening during the entire period. This makes it more convenient to use long-term differences to identify both immediate and future economic impacts. To solve for the endogeneity problem that arises from the non-random location and timing of hotel openings, I interact the number of protected buildings with the arrival of foreign tourists to Madrid airport in a shift-share style.[18] Result D reveals that the choice of

[17] Specifically, I calculate the decade-long differences (2001-2010) in the proportion of degree holders and population. I exclude decade-long differences in the proportion of unemployed individuals since this information is not available for 2010.

[18] While the number of protected buildings explains the extensive and intensive margin of the treatment, the arrival of foreign tourists describe the timing. In this regard, Forbes and Kosová (2023) provides evidence in favor of the complementarity between the growth of hotels and airlines. Previously, Garcia-López et al. (2020) and Hidalgo et al. (2022) have used a similar identification strategy in a panel data context to instrument the growth and location of short-term rentals. Specifically, while both studies use the same shift (Google searches worldwide for Airbnb), Garcia-López et al. (2020) use the number of tourist attractions, and Hidalgo et al.

a long differences over a panel data does not affect the significance of the results.

Table 3: Robustness checks

Variable	Establishment	Employment
Alternative specification		
A. Growth rate	0.001**	0.002*
	(0.0007)	(0.001)
B. Long-diff controls	0.348**	3.13*
	(0.168)	(1.62)
C. Number of hotel openings	20.5**	193.6**
	(7.75)	(75.1)
D. Panel data	0.192***	2.97***
	(0.113)	(1.28)
E. Conley errors	0.312***	3.62***
	(0.120)	(0.989)
Alternative sample		
F. No city center	0.494**	5.60***
	(0.215)	(1.70)
G. Pre-crisis (2001-2006)	0.553***	2.92**
	(0.192)	(1.45)
H. Great Recession (2007-2010)	0.554**	3.30*
	(0.231)	(1.80)
I. Unit of observation: census tract	0.273*	7.07*
	(0.161)	(3.51)
J. Unit of observation: neighborhood	0.439***	5.11***
	(0.157)	(0.798)

Notes: Statistical significance at levels 1, 5, and 10% is indicated by ***, ** and *, respectively. All specifications are IV regressions with clustered standard errors at the neighborhood level in results A-C and F-H, commuting zones in result D, census tract level in result I, Conley in E, and heteroskedasticity in J. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2011. Control variables include in results A-D and G-I the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997 and the distance to the city center. Result D specification only controls for population. I includes neighborhood fixed effects in results A-I. The number of observations remains constant in all specifications (478), with the exception of Results C (461 commuting zones), Results I (238 census tracts), and Results J (128 neighborhoods).

Up to this point, all the specifications have employed cluster standard errors at the neighborhood level. However, neighborhoods that serve as administrative units may not capture the influence of agglomeration and other economic factors. Consequently, commuting zones located close to each other but in different neighborhoods may be exposed to similar

(2022) use the proportion of rental houses as the share.

shocks and trends. To address the potential spatial correlation among commuting zones from different neighborhoods, I adopt the HAC method proposed by Conley (1999), with a parameter value of 2 km. This choice is informed by previous research that indicates that tourists tend to move a maximum of 2 km from their accommodations (Shoval et al., 2011). Furthermore, considering that the average neighborhood diameter is 1.2km, I opt for a larger distance to adequately account for any remaining spatial correlation. The result E confirm that the main results are robust to the way of computing the standard errors.

4.1.2 Alternative sample

So far, we have seen that the baseline results do not depend on functional form, the addition of new control variables, the way to measure the variable of interest, exploiting the temporal dimension through a panel data set, or potential spatial autocorrelation in the error term. In this section, I want to test the robustness of the results using different samples. First, I remove city-centric areas to show the robustness of the results by excluding tourist areas. Then, I test whether the results hold by splitting the sample into different periods. Finally, I assess whether the baseline results are robust to the geographical aggregation of the data.

First, a possible violation of the exclusion restriction arises due to the non-random distribution of hotel openings, which are predominantly located in the city center. This spatial bias presents a challenge in disentangling the impact of hotel room openings on the local economy activity from other influences, such as those originating from other tourist activities or resident consumption. For example, an increase in the number of establishments and employment can be attributed to city-centric characteristics (García-Palomares et al., 2015; Salas-Olmedo et al., 2018; Aparicio et al., 2021). This situation is particularly relevant in Madrid, where tourists are predominantly concentrated in the city center. Although I address this issue to some extent by accounting for a large set of sociodemographic and spatial covariates, I cannot completely dismiss other factors, such as shifts in resident consumption taste toward the city center or the surge of tourist-related activities such as convention centers or markets. To test for this, I exclude all commuting zones within neighborhoods located in the downtown area.[19] The results presented in Results F in Table 3 show that the findings are not affected by the characteristics of the city center or confounding factors related to tourism.

Second, to further ensure the robustness of the results, I test whether they hold up under different sample periods. This is particularly relevant because the time frame covers both the Spanish economic boom and the onset of the Great Recession. To assess the independence

[19] In particular, I remove all commuting within those city-centric neighborhoods: Justicia, Palacio, Cortes, Embajadores, Sol.

of the findings from the chosen period, I divide the sample into two distinct phases: the "Pre-crisis" period from 2001 to 2006 and the "Great Recession" period from 2007 to 2010. The results G and H show that hotel room openings have a similar impact on establishment and employment creation regardless of the chosen period.

Last, the decision to use commuting zones as the observation unit is based on the need to identify local spillovers of hotel entry on economic activity while still capturing spatial spillovers. Although other aggregation units, such as census tracts or neighborhoods, could have been used, commuting zones strike a balance between being small enough to identify local effects and large enough to capture spatial influences. To demonstrate the robustness of the findings regarding the selected geography, I replicated the baseline observation by aggregating the data into these alternative administrative units. The results I and J reaffirm that the main findings remain consistent regardless of the chosen geography for the establishment specification. Only in the case of the employment specification for the census tracts the significance diminishes, likely due to spatial spillovers that are not adequately accounted for due to the small size of the geography considered.

5 Heterogeneity and Extensions

Having explored the impact of tourism on the local economy and the robustness of the findings, now I turn to explore in more detail other aspects of the urban landscape that may be affected by hotels. First, I analyze the heterogeneous effects of hotel openings in different economic activities. Then I study whether the economic impacts of hotels are different across urban geography and identify which areas of the city are indirectly affected by hotel openings through employment flows. To conclude, I explore whether tourism impacts the real estate market measured through rental prices and building renovation permits and whether that impact, at the same time, affects the configuration of establishments according to the business structure.

5.1 Heterogeneity

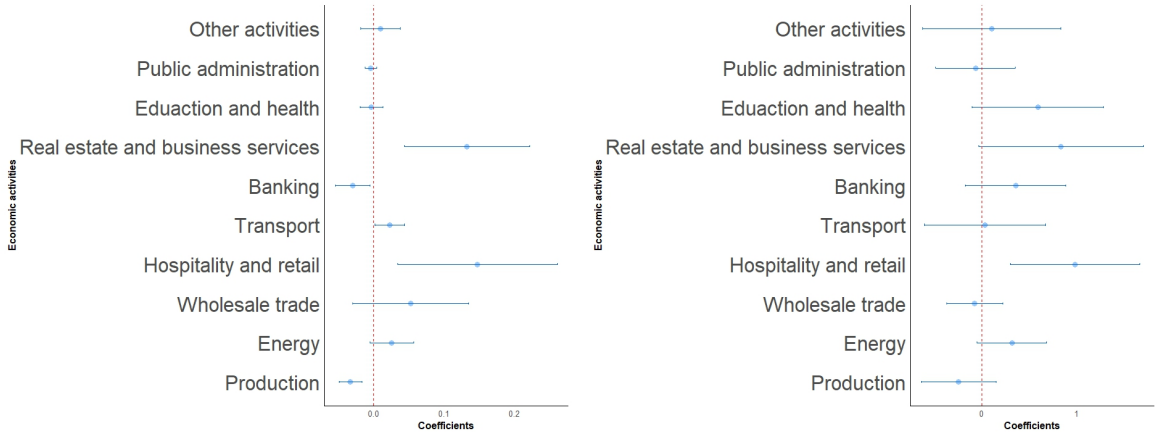
5.2 Sectoral composition heterogeneous effects

The opening of a hotel in a particular area can have a significant impact on various economic activities. This impact is attributed to the different consumption patterns of tourists and residents. Tourists, typically seeking accommodation and entertainment, contribute directly to the hotel industry and related sectors such as restaurants, bars, cafes, or souvenirs (Almagro and Dominguez-Iino, 2022; Hidalgo et al., 2022; Alyakoob and Rahman, 2022). On the other hand, residents often engage in different spending patterns,

focusing more on daily necessities and services within their community. In addition, the fact that tourism consumption is mostly concentrated on the non-tradeable sector can contribute to fasten the transition from a production-based city toward a consumption city, displacing also tradeable activities.

To test whether tourism has an even impact on economic activities, I turn to the narrower analysis of the effect of hotel openings on economic activity by focusing on its differential effects on establishment and employment depending on the activity sector.[20] Figure III shows how tourism has an unequal effect across the establishment sectors, primarily benefiting those activities related to the hospitality sector and the retail sector and negatively impacting manufacturing activities. In this sense, the results are consistent with previous findings in the literature (González et al., 2020; Hidalgo et al., 2023). The adverse effects on the banking sector can be attributed to the banking concentration process that occurred in Spain during the Great Recession (Holl, 2018). This process resulted in the closure and merging of numerous commercial banks, most of them located in central city areas where hotels were proliferating.

Figure III: Heterogeneous effects on other economic activities



Notes: Figure reproduce the heterogeneous effects of hotel openings on establishments (left) and employment (right) across sectors using the main baseline specification (Columns 6 and 8 in Table 2), respectively.

A potential concern may be that the category "hospitality and retail" includes a wide variety of tradeable and non-tradeable activities, potentially masking heterogeneous effects within this category. To check whether the main findings are driven by purely tourist-oriented and non-tradeable activities and not other economic activities, I perform an

[20] I define ten activity sectors according to a NACE-based classification in Spain (CNAE-93). A list of economic activities within the sector can be found in Table A6 in Appendix A.

additional exercise where I define tourist or resident-oriented activities following the classification proposed by Hidalgo et al. (2023). Mainly tourist-oriented establishments include consumption amenities, souvenir and clothing stores, while the resident-oriented category is made up of grocery stores, hairdressers, nursery, and other activities aimed at satisfying the daily needs of locals. Table A7 in Appendix A show that the creation of business and jobs in the analysis is driven by tourist-oriented activities, mainly composed of non-tradeable activities, although I do not find evidence of a negative effect on resident-oriented activities. This could be attributed to the fact that hotel openings during the period were potentially concentrated in unused or newly constructed buildings, thus minimizing the displacement of local residents in the area.

In general, the negative impact on production-based activities, together with the positive effects on tourist-related activities, confirms that tourism contributes to explaining the transition from a production city to a consumption city (Glaeser et al., 2001; Lanzara and Minerva, 2019). In this way, hotel-induced tourism leads the city to undergo a structural shift away from the tradeable sector, with a focus on specializing in services, particularly those catering to tourists.

5.3 Spatial heterogeneous effects

The impact of hotel openings can vary widely across a city. To illustrate, hotels located near airports may not yield as substantial economic spillover benefits in hotel surroundings compared to those located in central areas. This difference can be attributed to the predominant clientele of airport-adjacent hotels, which consists primarily of business travelers rather than leisure tourists (Lee and Jang, 2011). Additionally, areas where hotels have been firmly established for an extended period may experience diminished effects resulting from the inauguration of new hotels. This phenomenon occurs because the economic opportunities associated with hotel openings are limited due to the presence of pre-existing hotels that have already influenced the economic landscape in the area (Hidalgo et al., 2022). To assess these hypotheses, I augment the model presented in Table 2 by introducing various interaction terms. These terms consist of changes in the number of hotel rooms and the specific variable under examination. The results are reported in Table 4.

In columns 1 and 2, I examine the impact of hotel openings on business formation and employment. I do this by introducing an interaction term that indicates the number of hotel rooms available in 2001. The results show that the average effect tends to be smaller in commuting zones with hotel presence. This suggests that the influence of hotel openings on the local economy is less pronounced when other accommodations are already around,

Table 4: Spatial Heterogeneous analysis.

	Previous hotel presence.		Periphery/Airport		Spatial weight matrix	
Dependent Variables:	Δ Est.	Δ Emp.	Δ Est.	Δ Emp.	Δ Resid. emp.	Δ hosp & retail emp.
Model:	(1)	(2)	(3)	(4)	(5)	(6)
Variables						
Δ Hotel rooms	0.766***	6.06**	0.363***	3.87***	0.494*	0.448***
	(0.280)	(2.83)	(0.132)	(1.42)	(0.259)	(0.120)
Δ Hotel rooms × Hotel rooms	-0.0005**	-0.003				
	(0.0002)	(0.003)				
Δ Hotel rooms × Accessibility areas			-0.231*	5.85		
			(0.131)	(15.1)		
Δ Hotel rooms (imputed)					0.602*	0.349*
					(0.324)	(0.191)
Observations	478	478	478	478	422	422

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, **, and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2011 in columns 1-4 and the change in residential employment between 2007-2013 in 5 and the change in residential employment in the hospitality and retail sector between 2007-2013 in 6. I use the number of protected buildings as an instrument for the variation in the number of hotel rooms in columns 1-4. I interact the change in the number of hotel rooms with the number of hotel rooms in columns 1-2 with a dummy variable for areas on the outskirts of Madrid near the main accessibility points in columns 3-4. Then, I instrument for this variable with the number of protected buildings and its interaction term, respectively. I include in the regressions the second terms of the interactions, even if I omit them from the table. Columns 5 and 6 include the number of hotel rooms imputed according to Equation (2). Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level.

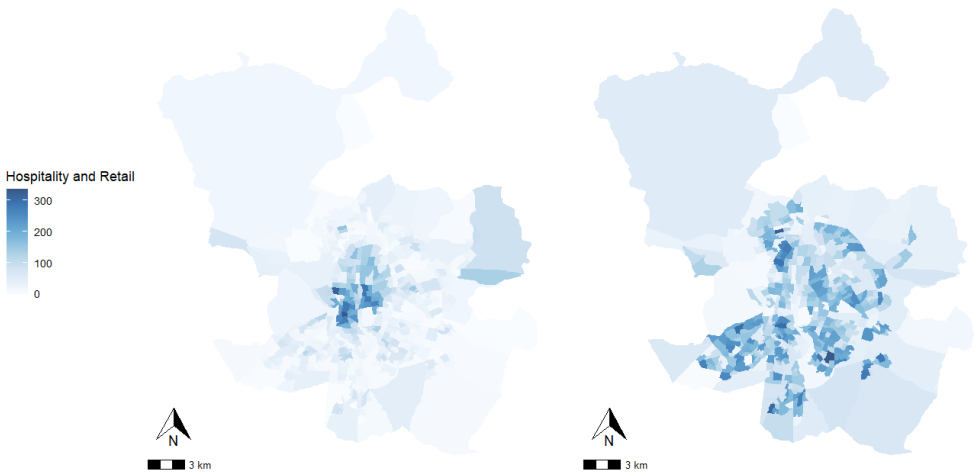
showing diminishing returns in business formation due to hotel expansion. Moving to columns 3 and 4, I consider that the impact of hotel openings on business formation and employment may vary depending on the location and the target tourist segment. To investigate this, I introduce an interaction term that identifies whether the commuting zone is in the periphery of Madrid.[21] Once again, the coefficient of the interaction parameter is negative and statistically significant. This suggests that the primary effects of hotel openings are observed in areas where business travelers are not the dominant user group. In summary, the consequences of hotel openings depend on their geographical location and the prevailing economic conditions, resulting in diverse results in different parts of the city.

Until now, the analysis has focused primarily on examining the local impacts of hotel openings on various factors, such as the number of establishments and employment. However, it is essential to consider that the effects of hotel openings can extend beyond the immediate vicinity and have indirect implications across the urban landscape. This is particularly relevant because hospitality industry employees often do not reside near their workplaces, as seen in Figure IV. The figure reveals that central areas tend to have a higher concentration of employment opportunities in the hospitality and retail sectors, while areas situated further away from the city center tend to have a higher concentration of residential areas where individuals working in these industries live.

To gain a deeper understanding of how tourism impacts job creation in different

[21] I define the Madrid periphery as areas within a 15 km radius of the city center, encompassing zones near the airport and main highway entrances.

Figure IV: Spatial distribution of employment on hospitality and retail activities by workplace and residence in 2007.



Notes: Lighter colors reflect commuting zones with a lower number of employment in hospitality and retail by workplace (left) and by place of residence (right) in 2007.

geographical areas, I have developed a methodology to determine whether the job growth resulting from the opening of hotels primarily benefits those distant regions. This approach relies on historical commuting patterns of workers in the hospitality and retail sectors to establish connections between the locations where hotels open and the residences of those who find employment due to these hotel openings. By doing so, I can pinpoint the specific commuting zones within a city that are likely to benefit from the employment opportunities generated by these new hotels. In essence, this method enables to disentangle the increase in hotel-induced employment between commuting zones with hotel openings and commuting zones that are home to hospitality workers, but without any hotel openings. Formally, it operates as follows:

$$\underbrace{\begin{bmatrix} Z_1 \\ Z_2 \\ \vdots \\ Z_n \end{bmatrix}}_{\text{Vector Z}} = \underbrace{\begin{bmatrix} 0 & \frac{\text{Commuting flow}_{12}}{\text{Commuting flow}_1} & \cdots & \frac{\text{Commuting flow}_{1n}}{\text{Commuting flow}_1} \\ \frac{\text{Commuting flow}_{21}}{\text{Commuting flow}_2} & 0 & \cdots & \frac{\text{Commuting flow}_{2n}}{\text{Commuting flow}_2} \\ \vdots & \vdots & \ddots & \vdots \\ \frac{\text{Commuting flow}_{n1}}{\text{Commuting flow}_n} & \frac{\text{Commuting flow}_{n2}}{\text{Commuting flow}_n} & \cdots & 0 \end{bmatrix}}_{\text{Matrix W}} \times \underbrace{\begin{bmatrix} D_1 \\ D_2 \\ \vdots \\ D_n \end{bmatrix}}_{\text{Vector D}}$$

where the rows represent origin (where workers live), and the columns the destinations (workers' place of residence). Each cell of this matrix is then normalized by the total commuting flow for the respective destination. This results in each cell reflecting the proportion of workers from the origin working at the destination compared to total employment in the destination. The diagonal is set to zero to avoid double counting people who live and work in the same commuting zone. The final step involves the multiplication of this matrix by the vector D. This vector quantifies the number of hotel rooms that opened at each destination between 2007 and 2013. The outcome of this multiplication is a new vector, Z, with a dimension of $n \times 1$. This vector capture the number of rooms that correspond to each origin. In other words, I use the openings of hotel rooms to infer how much and from where employment is created as a consequence of the opening of the hotel.[22]

Once I compute how many hotel room openings correspond to those commuting zone without hotel openings, I regress the changes in employment by place of residence and employment in the hospitality sector by place of residence on the changes in the number of hotel rooms at each commuting zone between 2007 and 2013 and the imputed changes in the number of hotel rooms in the same period. Specifically,

$$\triangle Employment\ residence_i = \beta \triangle Hotel\ rooms_i + \alpha Z_i + \rho X_i + \delta Z_n + \epsilon_i \tag{2}$$

In this manner, β captures the effect of hotel openings on employment for residents within hotel opening commuting zone, α measures the effect of hotel openings on employment for residents which do not live within hotel openings commuting zones. As shown in columns 5 and 6, hotel openings enhance employment opportunities not not only for hotel-surrounding residents, but also other workers across the city. These findings underscore the broader

[22]The entire process hinges on the assumption that past commuting patterns remain unchanged over time. This assumption might not hold in the face of new transportation networks or urban development within the city. To mitigate the risk of violating this assumption, I deliberately focus on a relatively short period after calculating commuting flows. This allows to capture the most relevant data while minimizing the impact of potential confounding factors.

economic impact of hotel developments on urban employment. While residents within the immediate vicinity of hotel openings experience a boost in employment opportunities, the main findings suggest that the benefits extend beyond these local communities. The ripple effect of increased employment can be observed throughout the city, demonstrating how hotels contributes to job creation on a city-wide scale.

6 Extensions

6.1 Housing market

The increase in amenities and building investment aesthetics driven by hotel openings may impact housing prices and contribute to urban revitalization. Previous research has consistently shown the influence of amenities and urban architectural aesthetics on the valuation of surrounding residences, with areas that possess distinct consumption amenities that often attract premium prices (Glaeser et al., 2001; Carlino and Saiz, 2019). Additionally, repurposed residential buildings as accommodation facilities can also positively impact rental prices through a decrease in rental housing stock (Garcia-López et al., 2020). In contrast, hotels can bring other problems in terms of congestion and nuisance, potentially negatively impacting the housing market.

To test the impact of hotels on the housing market, I collect data from rental prices to study whether hotel room openings contribute to real estate revitalization. To do so, I compute the difference in the mean rental price per square meter at each commuting zone level between 2001 and 2010 and see whether hotel openings have an effect on the rentals in hotel's surrounding. The results, as shown in column 1 of Table 5, provide compelling evidence that hotel openings indeed contribute to an increase in rental prices.

Table 5: The impact of hotel room openings on the real estate market.

Dependent Variables:	Δ Rental price	Δ Building renovation permits	Δ Rental houses	Δ Dwellings
Model:	(1)	(2)	(3)	(4)
Variables				
Δ Hotel rooms	0.010**	0.042***	-0.0001	-1.143
	(0.013)	(0.004)	(0.0002)	(0.7276)
Observations	398	478	477	477

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, ** and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the change in the mean rental price per square meter between 2001 and 2010 in column 1, the change in the number of building renovation permits between 2007 and 2013 in columns 2, the change in the number of rental houses between 2001 and 2011 in column 3, and the change in the number of dwellings between 2001 and 2011 in column 4. I use the number of protected buildings as an instrument for the variation in the number of hotel rooms in each respective regression specification period. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level.

However, it is not clear whether the increase in rental prices prompted by hotel openings is due to a demand or supply driver. To better understand which channel explains the increase in housing rental prices, I perform three additional exercises, where I regress the difference in building renovation permits, the difference in the number of rental houses, and the number of dwellings against the change in the stock of hotel rooms between 2001-2011. The results in columns 2-4 in Table 5 confirm that the increase in urban amenities is the most plausible channel that drives the increase in rental prices, given that the opening of hotel rooms appears to have no impact on the stock of rentals or the number of dwellings, while it increases the number of building renovation permits. In general, these results corroborate previous evidence on the role of tourism in neighborhood regeneration (Lanzara and Minerva, 2019; Xu and Xu, 2021; Bekkerman et al., 2022; Vizek et al., 2023).

6.2 Establishments business structure

Having observed that hotel openings contribute to the appreciation of rental properties in nearby areas, it is important to investigate whether this effect unevenly affects economic activities due to the high correlation between residential and commercial rents (Cuestas and Monfort, 2021). In this regard, hotel openings may not only lead to changes in the sectoral composition of the local economy, but also influence the business structures within those sectors. This could be particularly challenging for stand-alone businesses, which may struggle to cope with rising rents. Stand-alone businesses often operate on smaller budgets and may have limited financial resources compared to business groups. When commercial rents increase, stand-alone activities, such as small retail store owners or independent service providers, may face greater difficulties in absorbing these cost increases. They may have limited bargaining power and less access to capital, making it challenging for them to continue their operations in areas where rents are rising rapidly and therefore more sensitive to local shocks (Bartik et al., 2020). On the contrary, business groups often have more substantial financial resources and may benefit from economies of scale that allow them to absorb cost increases more effectively than stand-alone businesses.

To examine the unequal impact of hotel openings on the business structure of establishments in proximity to hotels, I replicate the baseline specification in Equation (1), but differentiating between stand-alone businesses and business groups.[23] The findings in columns 1-4 in Table 6 confirm that hotel openings displace stand-alone businesses in favor of larger business groups, possibly due to the appreciation in the commercial real estate market. These results suggest that when hotels open in a commuting zone, there is a discernible trend towards consolidation within the business sector. Smaller, independent

[23]Business groups refer activities that involve multiple individuals and are structured as entities separate from their owners such as limited liability company, cooperatives and partnerships.

establishments may face challenges in competing with the increased demand and changing dynamics brought about by the presence of hotels. As a result, larger business groups may be better positioned to take advantage of the opportunities arising from the growth in tourism and the subsequent commercial real estate appreciation.

Table 6: The impact of hotel room openings on establishment business structure.

	Stand-alone		Business groups	
Dependent Variables:	Δ Establishments	Δ Employment	Δ Establishments	Δ Employment
Model:	(1)	(2)	(3)	(4)
Variables				
Δ Hotel rooms	-0.094**	-0.211**	0.493***	2.72***
	(0.039)	(0.087)	(0.121)	(0.941)
Observations	478	478	478	478

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, ** and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the change in the number of establishments and the change in employment between 2001-2010 for stand-alone businesses (columns 1-2) and businesses groups (columns 3-4). I use the number of protected buildings as an instrument for the variation in the number of hotel rooms in each respective regression specification period. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between specific years, and the distance from the city center. Fixed effects at the neighborhood level.

However, the negative impact on stand-alone business may be driven by a composition effects where some economic activities are displacing others. To rule out the possibility that this unequal effect results from a composition effect across activities, I test whether hotel openings have unequal effects on the number of establishments and employment across economic activities and business structures. Interestingly, Figure A5 and Figure A6 in Appendix A show that hotel openings do not have an uneven impact on business structures across economic activities, but within activities. In this manner, we can see that hotels replace mainly hospitality and retail activities in stand-alone establishments for business groups within this sector. Again, this evidence reinforces the idea that the increase in rentals prices led by hotel openings leads to a change in the composition of the local economy, where business groups with potential stronger financial position displace stand-alone activities. activities according to the business structure.

7 Conclusions

The paper provides evidence that hotel openings have positive effects on the number of establishments and employment in the surrounding areas. These findings are robust in different samples and specifications. Interestingly, hotel openings have heterogeneous effects in different economic activities and areas of the city. While tourist-oriented establishments benefit greatly, production-oriented activities are negatively affected. This suggests that

hotel openings play a crucial role in the transition from a production-oriented city to a consumption-oriented city. Additionally, areas without previous hotel presence and those with leisure tourism-focused hotels experience larger increases in employment and the number of establishments. On top of that, hotel openings catalyze broader economic benefits, spreading employment opportunities to residents in the vicinity and workers throughout the city. Finally, hotel openings have an impact on the real estate market, leading to appreciation in the rental market and boosting residential investment, ultimately leading to a displacement of stand-alone establishments in favor of business groups within the same economic activity.

The present study makes meaningful contributions to incipient literature about the economic impacts of tourism. Hotels provide a market-driven solution to the conservation and restoration of historic buildings and, at the same time, foster overall economic activity in the vicinity. This covers particular importance due to the structural changes driven by remote working in urban areas after the COVID-19 outbreak. By repurposing vacant office spaces and empty protected buildings into mixed-use spaces, cities can leverage existing infrastructure to meet the growing demand for accommodation and housing. This not only addresses the issue of unused spaces, but also presents an opportunity for economic growth and development. In addition, the positive effects of hotel openings can extend beyond the immediate surroundings. Hotels can serve as a source of income for not only nearby areas, but also more distant parts of the city. Assessing the direct and indirect effects of hotel openings becomes crucial in understanding the overall impact of tourism throughout the city. By taking into account these broader effects, we can better assess the consequences of tourism and its influence in different areas of the city.

However, more research is needed. While hotels can contribute to economic growth and revitalization, there is concern that they may exacerbate gentrification processes by expelled long-term residents. Although homeowners might experience benefits from hotel expansion through property value capitalization effects, tenants could potentially face adverse consequences. This complex interaction requires a comprehensive welfare analysis to determine the overall impact. In addition, the congestion caused by tourism can have adverse effects on the overall livability of a place. Local amenities, such as parks, cafes, and shops, which are essential for the well-being of residents, can become overcrowded and less accessible due to the influx of tourists. It is crucial to fully comprehend the impact of tourism in all its aspects, given its significant contribution to the global economy. By gaining a comprehensive understanding of the effects of tourism, we can promote its sustainable and responsible growth, particularly in urban areas where the concentration of activities can amplify both the positive and negative consequences. Since the IV approach I

introduce in this paper is very general and can be applied to different cities, another possible future development is to extend the analysis to different urban areas other than Madrid.

References

Abbiasov, T. and Sedov, D. (2023). Do local businesses benefit from sports facilities? the case of major league sports stadiums and arenas. *Regional Science and Urban Economics*, 98:103853.

Ahlfeldt, G. M. (2012). The hidden dimensions of urbanity. *Documents de treball IEB*, (36):1–69.

Allen, T., Fuchs, S., Ganapati, S., Graziano, A., Madera, R., and Montoriol-Garriga, J. (2020). Is tourism good for locals? evidence from barcelona. *Dartmouth College, mimeograph*.

Almagro, M. and Dominguez-Iino, T. (2022). Location sorting and endogenous amenities: Evidence from amsterdam. *Available at SSRN 4279562*.

Alyakoob, M. and Rahman, M. S. (2022). Shared prosperity (or lack thereof) in the sharing economy. *Information Systems Research*, 33(2):638–658.

Antonakakis, N., Dragouni, M., and Filis, G. (2015). How strong is the linkage between tourism and economic growth in europe? *Economic Modelling*, 44:142–155.

Aparicio, D., Hernández Martín-Caro, M. S., García-Palomares, J. C., and Gutiérrez, J. (2021). Exploring the spatial patterns of visitor expenditure in cities using bank card transactions data. *Current Issues in Tourism*, pages 1–19.

Avetian, V. and Pauly, S. (2023). You can't sit with us: How locals and tourists compete for amenities in paris. *Available at SSRN 4585524*.

Bargenda, A. (2015). Corporate heritage brands in the financial sector: The role of corporate architecture. *Journal of Brand Management*, 22(5):431–447.

Barron, K., Kung, E., and Proserpio, D. (2021). The effect of home-sharing on house prices and rents: Evidence from airbnb. *Marketing Science*, 40(1):23–47.

Bartik, A. W., Bertrand, M., Cullen, Z., Glaeser, E. L., Luca, M., and Stanton, C. (2020). The impact of covid-19 on small business outcomes and expectations. *Proceedings of the national academy of sciences*, 117(30):17656–17666.

Batalha, M., Gonçalves, D., Peralta, S., and dos Santos, J. P. (2022). The virus that devastated tourism: The impact of covid-19 on the housing market. *Regional Science and Urban Economics*, 95:103774.

Baum-Snow, N. and Hartley, D. (2020). Accounting for central neighborhood change, 1980–2010. *Journal of Urban Economics*, 117:103228.

Behrens, K., Boualam, B., Martin, J., and Mayneris, F. (2022). Gentrification and pioneer businesses. *Review of Economics and Statistics*, pages 1–45.

Bekkerman, R., Cohen, M. C., Kung, E., Maiden, J., and Proserpio, D. (2022). The effect of short-term rentals on residential investment. *Marketing Science*.

Bradbury, J. C. (2022). The impact of sports stadiums on localized commercial activity: Evidence from a business improvement district. *Journal of Regional Science*, 62(1):194–217.

Card, D., Mas, A., and Rothstein, J. (2008). Tipping and the dynamics of segregation. *The Quarterly Journal of Economics*, 123(1):177–218.

Carlino, G. A. and Saiz, A. (2019). Beautiful city: Leisure amenities and urban growth. *Journal of Regional Science*, 59(3):369–408.

Comunidad de Madrid (2005). Pe.00.308 plan especial de ordenacion del uso terciario en su clase de hospedaje. exp. 716/2004/00070, aprobado definitivamente 27/01/2005.

Conley, T. G. (1999). Gmm estimation with cross sectional dependence. *Journal of econometrics*, 92(1):1–45.

Couture, V. and Handbury, J. (2020). Urban revival in america. *Journal of Urban Economics*, 119:103267.

Couture, V. and Handbury, J. (2023). Neighborhood change, gentrification, and the urbanization of college graduates. *The Journal of Economic Perspectives*, 37(2):29–52.

Cuestas, J. C. and Monfort, M. (2021). Co-movement between residential and commercial housing prices: evidence from a new database. *Applied Economics Letters*, 28(5):402–407.

Curci, F. and Yousaf, H. (2022). Gentrifying cities, amenities and income segregation: Evidence from san francisco. *Amenities and Income Segregation: Evidence from San Francisco (December 30, 2022)*.

Daniele, F., Segu, M., Bounie, D., and Camara, Y. (2022). Bike-friendly cities: an opportunity for local businesses? evidence from the city of paris. Technical report, THEMA (THéorie Economique, Modélisation et Applications), Université de ....

de la Pena, M. R., Nunez-Serrano, J. A., Turrion, J., and Velazquez, F. J. (2016). Are innovations relevant for consumers in the hospitality industry? a hedonic approach for cuban hotels. *Tourism Management*, 55:184–196.

Di Giacomo, G. and Lerch, B. (2023). Tourism and human capital: Evidence from italy. *Available at SSRN 4387557*.

Diamond, R. (2016). The determinants and welfare implications of us workers' diverging location choices by skill: 1980–2000. *American Economic Review*, 106(3):479–524.

Exceltur (2018). *Estudio del empleo en el sector turístico español*. Exceltur.

Exceltur (2022). *Principales evidencias de los efectos del resurgir de las viviendas turísticas en las ciudades españolas y recomendaciones para su tratamiento*. Exceltur.

Faber, B. and Gaubert, C. (2019). Tourism and economic development: Evidence from mexico's coastline. *American Economic Review*, 109(6):2245–2293.

Farronato, C. and Fradkin, A. (2022). The welfare effects of peer entry: The case of airbnb and the accommodation industry. *American Economic Review*, 112(6):1782–1817.

Favero, L. and Malisan, I. (2021). The effect of being a european capital of culture: Evidence from matera. *Available at SSRN 3946245*.

Fontana, N. (2021). Backlash against airbnb: Evidence from london. Technical report, Technical report.

Forbes, S. J. and Kosová, R. (2023). Does competition benefit complements? evidence from airlines and hotels. *Management Science*, 69(8):4733–4752.

Franco, S. F. and Santos, C. D. (2021). The impact of Airbnb on residential property values and rents: Evidence from Portugal. *Regional Science and Urban Economics*, 88:103667.

Freedman, M. L. and Kosová, R. (2012). Agglomeration, product heterogeneity and firm entry. *Journal of Economic Geography*, 12(3):601–626.

Gaigné, C., Koster, H. R., Moizeau, F., and Thisse, J.-F. (2022). Who lives where in the city? amenities, commuting and income sorting. *Journal of Urban Economics*, 128:103394.

Gálvez-Iniesta, I., Groizard, J. L., and Portella-Carbó, F. (2023). Sharing my place: the local labor market impact of the p2p technology shock. Technical report, Universitat de les Illes Balears, Departament d'Economía Aplicada.

Gamalerio, M., Luca, M., Romarri, A., and Viskanic, M. (2023). Refugee reception, extreme-right voting, and compositional amenities: evidence from italian municipalities. *Regional Science and Urban Economics*, 100:103892.

Garcia-López, M.-À., Jofre-Monseny, J., Martínez-Mazza, R., and Segú, M. (2020). Do short-term rental platforms affect housing markets? evidence from airbnb in barcelona. *Journal of Urban Economics*, 119:103278.

García-Palomares, J. C., Gutiérrez, J., and Mínguez, C. (2015). Identification of tourist hot spots based on social networks: A comparative analysis of European metropolises using photo-sharing services and GIS. *Applied Geography*, 63:408–417.

Garz, M. and Schneider, A. (2023). Data sharing and tax enforcement: Evidence from short-term rentals in denmark. *Regional Science and Urban Economics*, page 103912.

Glaeser, E. L., Kolko, J., and Saiz, A. (2001). Consumer city. *Journal of economic geography*, 1(1):27–50.

González, L., Surovtseva, T., et al. (2020). *Do more tourists promote local employment?* GSE, Graduate School of Economics.

Gorback, C. (2022). Ridesharing and the redistribution of economic activity. mimeo.

Guerrieri, V., Hartley, D., and Hurst, E. (2013). Endogenous gentrification and housing price dynamics. *Journal of Public Economics*, 100:45–60.

Haltiwanger, J., Jarmin, R., and Krizan, C. J. (2010). Mom-and-pop meet big-box: complements or substitutes? *Journal of Urban Economics*, 67(1):116–134.

Henderson, J. C. (2011). Hip heritage: The boutique hotel business in singapore. *Tourism and Hospitality Research*, 11(3):217–223.

Henderson, J. C. (2013). Selling the past: Heritage hotels. *Tourism: An International Interdisciplinary Journal*, 61(4):451–454.

Hidalgo, A., Riccaboni, M., and Velazquez, F. J. (2022). The effect of short-term rentals on local consumption amenities: Evidence from madrid. *Available at SSRN 4000918*.

Hidalgo, A., Riccaboni, M., and Velazquez, F. J. (2023). When local business faded away: the uneven impact of airbnb on the geography of economic activities. *Cambridge Journal of Regions, Economy and Society*, page rsad009.

Holl, A. (2018). Local employment growth patterns and the great recession: The case of spain. *Journal of Regional Science*, 58(4):837–863.

Kadiyali, V. and Kosová, R. (2013). Inter-industry employment spillovers from tourism inflows. *Regional Science and Urban Economics*, 43(2):272–281.

Kosová, R. and Sertsios, G. (2018). An empirical analysis of self-enforcement mechanisms: Evidence from hotel franchising. *Management Science*, 64(1):43–63.

Lanzara, G. and Minerva, G. A. (2019). Tourism, amenities, and welfare in an urban setting. *Journal of Regional Science*, 59(3):452–479.

Lee, S. K. and Jang, S. (2011). Room rates of us airport hotels: Examining the dual effects of proximities. *Journal of Travel Research*, 50(2):186–197.

Lee, W. and Chhabra, D. (2015). Heritage hotels and historic lodging: Perspectives on experiential marketing and sustainable culture. *Journal of Heritage Tourism*, 10(2):103–110.

Lezcano González, M. E. and Novo Malvárez, M. (2023). Changes in the role of heritage in historic centres: The mutation of historic buildings into tourist accommodation. In *Urban Dynamics in the Post-pandemic Period: Tourist Spaces and Urban Centres*, pages 93–107. Springer.

Mazzolari, F. and Neumark, D. (2012). Immigration and product diversity. *Journal of Population Economics*, 25:1107–1137.

Moreno-Maldonado, A. and Santamaria, C. (2021). Delayed childbearing and urban revival. Technical report, Technical Report.

Nocito, S., Sartarelli, M., and Sobbrio, F. (2023). A beam of light: Media, tourism and economic development. *Journal of Urban Economics*, 137:103575.

Norris, J. J. and Xiong, H. (2023). Ride-sharing and the geography of consumption industries. *The Economic Journal*, page uead034.

Olney, W. W. (2013). Immigration and firm expansion. *Journal of regional science*, 53(1):142–157.

Pedersen, A. (2002). *Managing tourism at world heritage sites: A practical manual for world heritage site managers.*

Saiz, A., Salazar, A., and Bernard, J. (2018). Crowdsourcing architectural beauty: Online photo frequency predicts building aesthetic ratings. *PloS one*, 13(7):e0194369.

Salas-Olmedo, M. H., Moya-Gómez, B., García-Palomares, J. C., and Gutiérrez, J. (2018). Tourists' digital footprint in cities: Comparing big data sources. *Tourism Management*, 66:13–25.

Shoval, N., McKercher, B., Ng, E., and Birenboim, A. (2011). Hotel location and tourist activity in cities. *Annals of tourism research*, 38(4):1594–1612.

Timón, D. A. B. (2010). Gran ciudad y turismo en la transición postindustrial: nuevos y viejos procesos, nuevas y viejas teorías. el ejemplo del área metropolitana de madrid. *Scripta Nova. Revista electrónica de Geografía y Ciencias Sociales*, 14:310–322.

Vizek, M., Barbić, T., and Časni, A. Č. (2023). The impact of the tourism accommodation composition on housing prices: The case of croatia. *Tourism Economics*, page 13548166231180417.

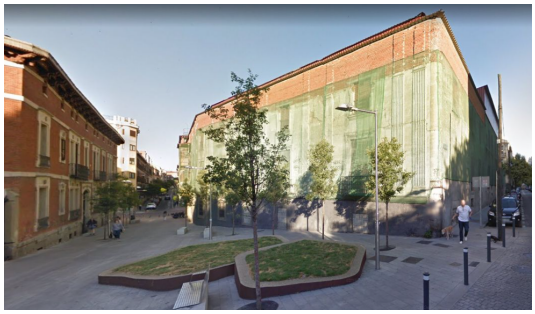
Wang, B. (2023). Is walmart the same as ten years ago? a non-parametric difference-in-differences analysis of walmart development. *Regional Science and Urban Economics*, 99:103863.

World Travel Tourism Council (2019). Economic impact reports. https://www.wttc.org/economic-impact/country-analysis/country-data. [Online; accessed 01-January-2023].

WTO (2019). Unwto tourism highlights. Technical report, United Nations World Tourism Organization.

Xu, M. and Xu, Y. (2021). What happens when airbnb comes to the neighborhood: The impact of home-sharing on neighborhood investment. *Regional Science and Urban Economics*, 88:103670.

A Appendix - Additional Tables and Figures



Before old palace dwelling

After hotel boutique

Before office building

After 5-star hotel

Figure A1: Conversion of protected buildings into accommodation facilities in Madrid

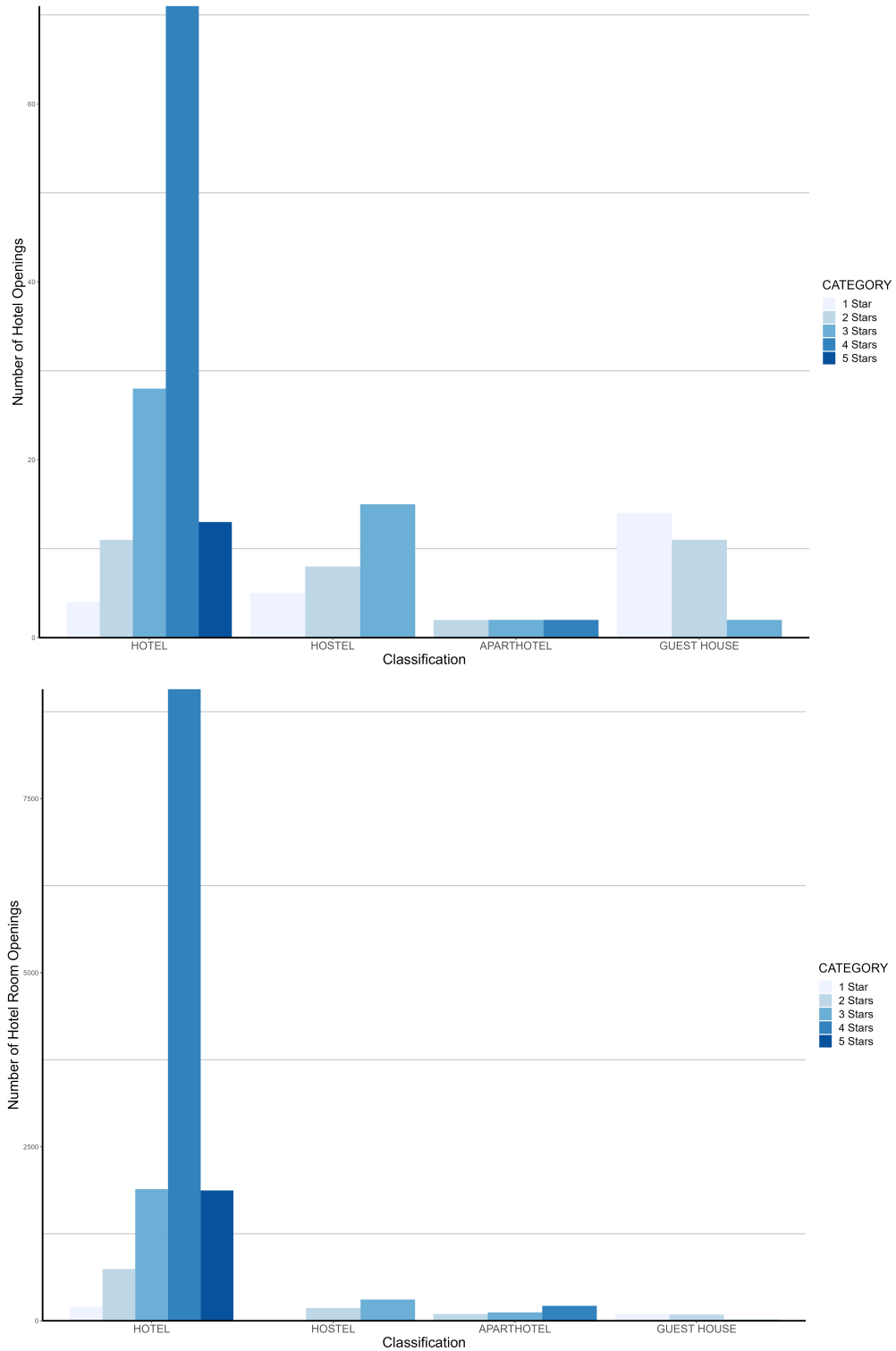
Table A2: Variable definition and source

Variable	Definition	Source	Time Period
Establishment	# of establishments	Directorio de Actividades Economicas	2010-2001
Employment (workplace)	Employment level (categories)	Directorio de Actividades Economicas	2010-2001
Employment (residence)	Employment level	Madrid Statistical Department	2013-2007
Building renovation permits	Stock building renovation permits	Madrid City Council	2013-2007
Hotel opening rooms	Stock of hotel rooms	Spanish Official Hotel Guide	2010-2001
Protected Buildings	# of protected buildings	Madrid City Council	1997
Population	# of inhabitant	Padron Municipal	2013-2001
Share college	% of people who hold a Bachelor's degree	Spanish Census	2001
Share renters	% of dwellings	Spanish Census	2001 and 2011
Share renters	% of rental houses	Spanish Census	2001 and 2011
Share unemployment	% of people unemployed	Spanish Census	2001
Flickr images	# photos taken by a tourist	Flickr	2013-2007

Table A1: Literature review for tourism economic impacts.

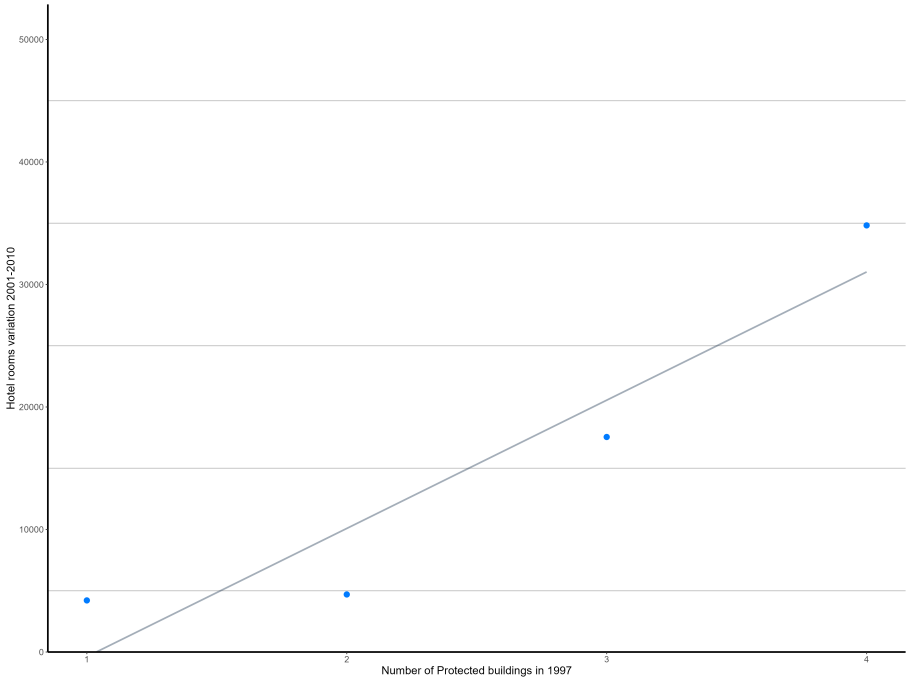
Topic	Reference	Country/City	Period	Geographical unit	Dependent variable	Technique
Regional perspective	Faber and Gaubert (2019)	Mexico	1998-2008	Municipality (2,455)	Employment, population, GDP and labor income,	Structural model & IV
	González et al. (2020)	Spain	2000-2018	Provinces (50) and individual-level data	Employment	Shift-share IV
	Nocito et al. (2023)	Italy	1997–2017	Municipality (390)	Tourist expenditure, rental and housing prices	DiD
	Lanzara and Minerva (2019)	Italy	2001-2011	Municipality (4951)	Number of establishments and employment	GE model
	Kadiyali and Kosová (2013)	USA	1987-2006	Metropolitan Statistical Areas (47)	Employment	GMM-based dynamic panel
	Favero and Malisan (2021)	Italy	2008-2019	Provinces (30)	Unemployment, income, establishments and employment	Event-study
	Di Giacomo and Lerch (2023)	Italy	2010-2019	Provinces (102)	College enrollment and migration flows	IV
Urban perspective	Hidalgo et al. (2022)	Spain (Madrid)	2014-2019	Census tract (2,409)	Consumption amenities and employment	Shift-share instrument
	Avetian and Pauly (2023)	France (Paris)	2018-2020	Establishment-level	Tripadvisor reviews	DiD
	Alyakoob and Rahman (2022)	USA (New York)	2007-2016 (yearly)	ZIP code (121)	Restaurant employment	DiD
	Garcia-López et al. (2020)	Spain (Barcelona)	2009-2017	Basic Statistical Area (221)	Rental and housing price	Shift-share instrument
	Barron et al. (2021)	USA (100 CBSAs)	2011-2016 (monthly)	ZIP code (221)	Rental and housing price	Shift-share instrument
	Batalha et al. (2022)	Portugal (Lisbon)	2018-2020 (quarterly)	Parish (24)	Housing price and Listings	DiD and IV
	Franco and Santos (2021)	Portugal (whole country)	2012-2016 (quarterly)	Municipalities (106) and civil parish (31)	Rental and Housing price	Shift-share instrument and DiD
	Xu and Xu (2021)	USA (Chicago)	2015-2018 (quarterly)	Census tract (800)	Residential renovation project	Bartik instrument
	Bekkerman et al. (2022)	USA (15 cities)	2008-2019 (monthly)	ZIP code (608)	Residential permit	DiD
	Hidalgo et al. (2022)	Spain (Madrid)	2014-2019	Establishment-level data	Business demographics (Births, deaths and displacement)	IV
	Almagro and Dominguez-Iino (2022)	Netherlands (Amsterdam)	2008-2019	Households and ZIP code (100)	Rents, amenities, and within-city migration	IV &Structural model
	Farronato and Fradkin (2022)	USA (50 cities)	2011-2015 (monthly)	City (50)	Hotel performance outcome	IV & structural model
	Fontana (2021)	UK (London)	2002-2019 (yearly)	Ward (624)	Discontent with tourism measures	Shift-share instrument
	Allen et al. (2020)	Barcelona (Spain)	2017-2019	Census tract (1,095)	Tourist expenditure	Structural model & IV

Figure A2: Hotel openings classification and ratings



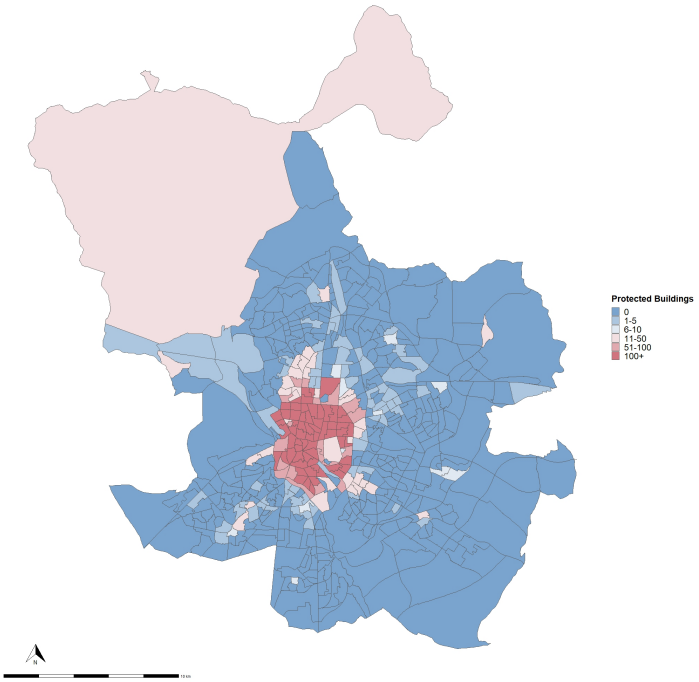
Notes: The graphs show the distribution of the types and categories of hotels that have opened during 2001-2010 in Madrid (up) and taking into account the size of each hotel opening through the number of rooms (bottom). Boarding houses (17) are not included as they do not have a star rating.

Figure A3: Instrument relevance

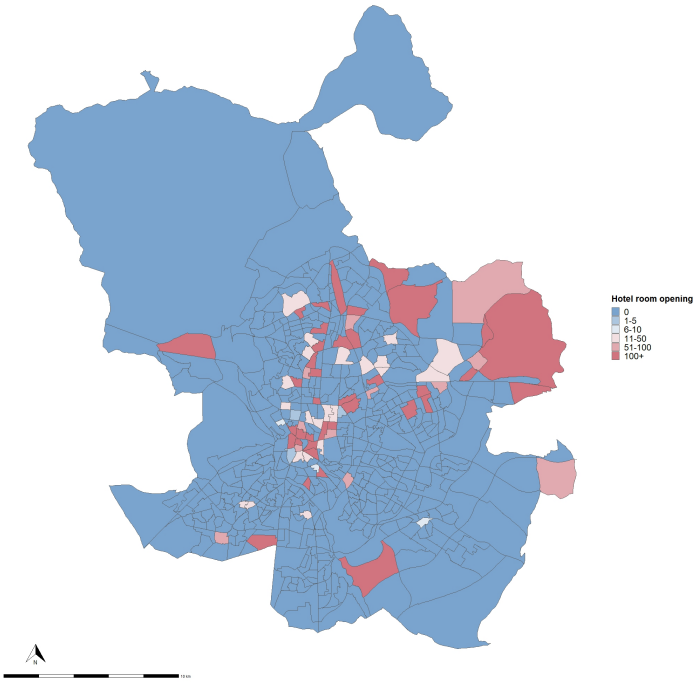


Notes: Figure illustrates the relationship between commuting zones' hotel openings and the number of protected buildings. The data is categorized into quartiles based on the distribution of protected buildings across the city.

Figure A4: Geographic variation in treatment and instrument.



(a) Protected buildings in Madrid



(b) Hotel room opening 2001-2010

Notes: Subplot (a) depicts the distribution of protected buildings in Madrid. Subplot (b) shows the evolution of hotel room opening between 2001-2010.

Table A3: IV validity exercises

	No hotel opening areas.		Pre-trends		Headquarters		Public administration		Flickr images
Dependent Variables:	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.	Tourist images
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables									
Δ Hotel rooms			0.044	4.49	-0.016	-0.158	0.004	0.180	2.12**
			(0.150)	(2.75)	(0.011)	(0.193)	(0.004)	(0.338)	(0.992)
Protected buildings	0.075	0.038							
	(0.089)	(0.599)							
Observations	455	455	401	401	478	478	478	478	169

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, ** and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2010 columns 1-2 and between 1990 and 1997 in columns 3-4. Columns 5-6 and columns 7-8 capture the long differences in the number of headquarters and public administration buildings and employment, respectively. Finally, the dependent variable in column 9 is the long difference in the number of tourist photos between 2007-2013. I use the number of protected buildings as an instrument for the variation in the number of hotel rooms in columns 3-9. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level. In columns 1-2 I remove all commuting zones without hotel opening in 2001-2010. In columns 3-4 I change the dependent variable and measure the number of establishments and employment change in 1990-1997. Finally, in column 9 I regress the changes in the number of hotel rooms predicted between 2007-2013 by the instrument on the number of photos taken by tourists.

Table A4: The impact of hotel room openings on employment (IV, Different employment measures)

Dependent Variable:	First Stage	Reduced Form	Reduced Form	Δ Employment			
	Δ Hotel rooms.	Δ Est.	Δ Employ.	Min	Mean	Max	No hotel employ.
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
Protected Buildings	0.460***	0.159***	1.43**				
	(0.104)	(0.043)	(0.596)				
Δ Hotel rooms				3.12**	4.65**	6.14*	2.72**
				(1.22)	(2.32)	(3.16)	(1.416)
Covariates	x	x	x	x	x	x	x
Observations	478	478	478	478	478	478	478

Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, ** and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in hotel room stock between 2001 and 2010 in column 1, the number of establishments, and employment between 2001 and 2011 in columns 2-4 and employment only in columns 4-7. I use the number of protected buildings as an instrument for the variation in the number of hotel rooms. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level. Columns 4-6 use different imputation measures to assign employment at the establishment level, and column 7 removes direct hotel employment.

Table A5: The impact of hotel room openings on employment (IV, Different instruments)

	Protected buildings level I		Protected buildings level II		Protected buildings level III		All Protected buildings	
Dependent Variables:	Δ Est.	Δ Emp.	Δ Est.	Δ Emp.	Δ Est.	Δ Emp.	Δ Est.	Δ Emp.
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Δ Hotel rooms	0.149	2.71*	0.331***	4.32**	0.316*	3.64**	0.334***	3.97***
	(0.120)	(1.57)	(0.114)	(1.76)	(0.162)	(1.48)	(0.117)	(1.33)
Number of protected buildings	991	991	2537	2537	8998	8998	19476	19476
F Stat, Excluded instru.	1.752	1.752	6.204	6.204	8.232	8.232	12.268	12.268
Observations	478	478	478	478	478	478	478	478

Notes: Statistical significance at levels 1, 5, and 10% is indicated by ***, **, and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2011. I use the number of protected buildings with protection level I in columns 1-2, protection level II in columns 3-4, protection level III in columns 5-6, and all levels in columns 7-8 as an instrument for the variation in the number of hotel rooms. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level.

Table A6: The impact of hotel room openings on employment (IV, Different employment measures)

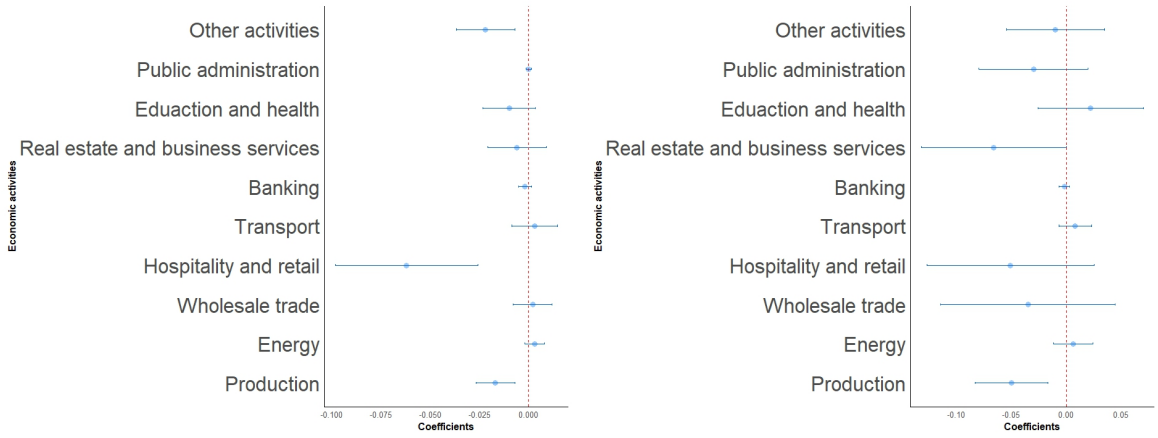
Category	Economic Activity
Production	Agriculture, livestock, hunting, and related service activities
	Forestry, logging, and related service activities
	Fishing, aquaculture, and related service activities
	Mining of coal and lignite; extraction of peat
	Extraction of crude petroleum and natural gas; services related to oil and gas extraction, except exploration
	Uranium and thorium ore mining
	Mining of metal ores
	Mining and quarrying of non-metallic minerals, except fuels
	Food and beverage industry
	Tobacco products manufacturing
	Textile industry
	Clothing and fur product manufacturing
	Tanning and dressing of leather; manufacture of luggage, handbags, and the like; saddlery, harness, and footwear manufacturing
	Wood and cork industry, except furniture; basketry and wickerwork
	Paper and paper products manufacturing
	Publishing, printing, and reproduction of recorded media
	Coke, refined petroleum products, and nuclear fuel processing
	Chemical industry
	Rubber and plastic products manufacturing
	Other non-metallic mineral products manufacturing
	Metallurgy
	Manufacture of fabricated metal products, except machinery and equipment
	Manufacture of machinery and equipment n.e.c.
	Office machinery and computer equipment manufacturing
	Machinery and equipment manufacturing
	Electronic and optical equipment manufacturing; manufacturing of radio, television, and communication equipment and apparatus
	Medical and dental instrument manufacturing, precision optical instruments, and watches
	Motor vehicle, trailer, and semi-trailer manufacturing
	Other transport equipment manufacturing
	Furniture manufacturing; other manufacturing industries
	Recycling
Energy	Production and distribution of electricity, gas, steam, and air conditioning
Wholesale trade	Wholesale trade and commission trade, except of motor vehicles and motorcycles
Hospitality and retail	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
	Accommodation and food service activities
Transport	Land transport; transport via pipelines
	Water transport, coastal and transoceanic
	Air transport
	Supporting and auxiliary transport activities; travel agencies
Banking	Financial intermediation, except insurance and pension funding
	Insurance and pension funding, except compulsory social security
	Activities auxiliary to financial intermediation
Real estate and business services	Real estate activities
	Rental and leasing of machinery and equipment without operator, personal and household goods
	Computer programming, consultancy, and related activities
	Research and development
	Other business activities
Education and health	Education
	Human health and veterinary activities; social work activities
Public administration	Public administration, defense, and compulsory social security
Other activities	Recreational, cultural, and sports activities, associative activities, various personal services activities.

Table A7: Heterogeneous analysis. Interactions

	Tourist-oriented		Resident-oriented	
Dependent Variables:	Δ Establishments	Δ Employment	Δ Establishments	Δ Employment
Model:	(1)	(2)	(3)	(4)
Variables				
Δ Hotel rooms	0.134**	1.24**	0.004	-0.052
	(0.052)	(0.522)	(0.018)	(0.107)
Observations	478	478	478	478

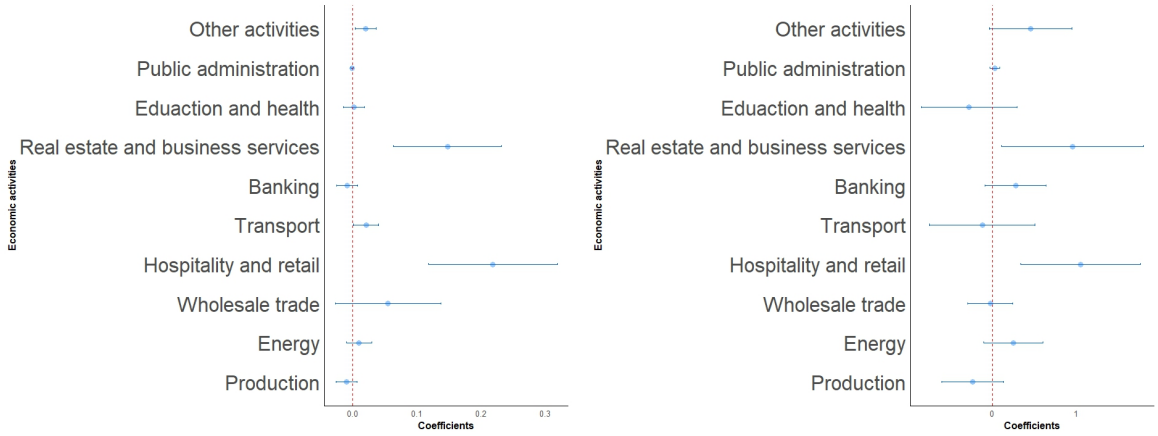
Notes: Statistical significance at levels 1, 5 and 10% is indicated by ***, **, and *, respectively. Cluster standard errors at the neighborhood level. The dependent variables are the long difference in the number of establishments and employment between 2001 and 2011 in tourist activities in columns 1-2 and resident-oriented business in columns 3-4, according to the classification proposed by Hidalgo et al. (2023). I use the number of protected buildings as an instrument for the variation in the number of hotel rooms. Covariates include the population, the share of educated people, the unemployment rate, the change in the number of establishments between 1990-1997, and the distance from the city center. Fixed effects at the neighborhood level.

Figure A5: Heterogeneous effects on stand-alone businesses.



Notes: Figure reproduce the heterogeneous effects of hotel openings on establishments (left) and employment (right) across sectors for stand-alone businesses using the main baseline specification (Columns 6 and 8 in Table 2), respectively.

Figure A6: Heterogeneous effects on business groups



Notes: Figure reproduce the heterogeneous effects of hotel openings on establishments (left) and employment (right) across sectors for business groups using the main baseline specification (Columns 6 and 8 in Table 2), respectively. Business groups refers to businesses that involve multiple individuals and are structured as entities separate from their owners such as limited liability company, cooperatives and partnerships.

B Appendix - Data source and description

B.1 Hotel information

Hotel information comes primarily from the Official Hotel Guide, an annual publication by Tourspain, a Spanish government agency responsible for promoting tourism. This guide was published from 1936 to 2010. Since these data exist solely in physical format, I undertook the task of digitizing the Madrid section covering the years 1998 to 2010. From this digitized data, I extracted key details such as the name of the accommodation, classification, category, year of inauguration, and the number of rooms. I supplemented this data set with information collected from Expedia web scraping and the Touristic Accommodation Register (Registro de Establecimientos Turísticos) provided by the Madrid Region Statistic Department.

It is worth noting that the term "hotel" in this context encompasses various types of accommodations, including hotels, hostels, guest houses, and boarding houses. This broader categorization is used for clarity and to provide a comprehensive view.

Here are specific definitions for each type:

- **Hotel:** These are establishments that either occupy an entire building or a distinct part of a building. They have facilities that create a cohesive unit, complete with exclusive entrances, elevators, and staircases. If they also offer facilities for food preservation, preparation, and consumption within each lodging unit, they are known as Apartment Hotels. Hotels are classified with star ratings ranging from 1 to 5 stars.

- **Hostel:** They provide lodging in rooms, with or without dining areas or additional services. They must have a minimum of 10 rooms and 20 beds. Hostels are categorized with star ratings of 1, 2, or 3.

- **Guesthouse:** These lodging establishments that offer accommodation in rooms, with or without dining areas or extra services. However, they do not meet all the requirements necessary for the classification as hotels. Guesthouses are rated 1, 2, or 3 stars.

- **Boarding Houses:** These are accommodations that may or may not have dining areas and typically offer basic services. They are not categorized with star ratings.

In this paper, I use hotels as a proxy for tourism to assess the influence of tourism in an area. To do this, I calculate a measure of tourism penetration as follows:

$$\triangle Hotel\ rooms_i = Stock\ hotel\ rooms_{i,2010} - Stock\ hotel\ rooms_{i,1998}$$

This equation computes the absolute difference in the number of hotel rooms between the start and end of the sample period in each commuting zone. This approach takes into account both hotel entries and departures and its size, providing a comprehensive view of tourism's impact.

B.2 Establishment and employment by workplace

Data related to employment and establishments are obtained from the *Directorio de Unidades de Actividad Económicas*. This dataset from the business registry includes essential details such as establishment name, location, business status, category, activity, tenure, and employment category for all establishments in Madrid. There are nine employment categories: 1-4, 5-9, 10-19, 20-49, 50-99, 100-199, 200-499, 500-999 and +999 employees. To attribute employment at the establishment level, I take the minimum value within each category. Importantly, the results remain consistent regardless of whether I use the mean, minimum, or maximum values. Additionally, companies with more than 500 employees were excluded from the sample to mitigate the influence of employment imputation on larger businesses. Once again, the results are robust, even when considering potential outliers. I also include only establishments with physical premises that were operational in each year.

This dataset for business records spans 1997 to 2010, with annual updates. However, within this time frame, I can identify two distinct stages: 1) **1997-2000**: During this period, the directory was updated only through administrative processes. 2) **2001-2010**: In this later period, in addition to administrative updates, fieldwork was conducted to validate information for establishments that were deemed less reliable. Consequently, for better data reliability, I have chosen to restrict the time frame to 2001-2010.

B.3 Employment by resident

I also have access to annual employment data from the Madrid City Council Statistics Department for the years 2007 to 2013. This dataset includes information about employment in various sectors, such as agriculture and livestock, extractive industries, manufacturing, energy and water, construction, retail and hospitality, trade and accommodation, transportation and storage, financial services, real estate, public administration, social security, education, health care, social services, and others. These data are broken down by the residents' location at the census tract level. To ensure consistency with the geographical analysis, I aggregate this information into commuting zones.

B.4 Housing sector

Housing data is collected from three different sources. First, I obtain rental price information from the Madrid Regional Housing Department, covering the period 2001 to 2010. In Madrid, tenants are required to provide landlords with a security deposit equal to one month's rent. This deposit must be submitted to a regional government agency within one month of officially signing the rental agreement. The agency safeguards the deposit until the lease agreement is concluded, at which point it becomes eligible for a refund to the tenant. I combine this dataset with the cadastre data to determine the floor size of each apartment. Then, I calculate the difference in the mean rental price per square meter between 2001 and 2010 for each census tract.

Then, I collect data on residential permits from the Madrid City Council covering the period 2007 to 2013. This dataset includes licenses for various types of building construction and conservation works. I calculate the absolute difference in the stock of building permits between the start and end of the sample period in each commuting zone.

B.5 Protected buildings

The protected building information is sourced from the *"Plan General de Ordenación Urbana de Madrid de 1997"* dataset. This dataset serves as a regulatory document that outlines the urban development guidelines for Madrid, Spain. It covers aspects such as land use, density, infrastructure, building conservation, and more, all aimed at achieving balanced and sustainable growth.

Within the Madrid General Urban Plan (PGOU), there is a list of protected buildings. This list includes structures of cultural, historical, or architectural significance, legally protected to ensure their preservation within the urban development framework. These protected buildings are categorized into three levels: Global protection (Level 1), partial protection (Level 2) and element-specific protection (Level 3). Within each protection level, various grades determine the specific areas of a building that require special attention. In this paper, I consider all protected buildings in my instrumental strategy, regardless of their protection level, except for monuments, museums, and other non-lodging facilities, which have been excluded from the analysis. In this way, I keep 18047 protected buildings out of 19476,

When it comes to the adaptive reuse of historic buildings for accommodation facilities, approval from the Madrid City Council is necessary through a legal mechanism known as a "Plan Especial". In 2005, the Regional Government of Madrid revised the regulations to streamline this process, mainly with the aim of increasing the availability of high-quality

hotel accommodations to strengthen Madrid's position as a candidate city to host the 2012 and 2016 Olympic Games (Timón, 2010). In this regard, the new regulation removes this requirement with the exception of protected buildings classified as levels 1 and 2, which will be necessary to create a specific plan to allow lodging and ensure the preservation of their cataloged elements.

B.6 Flickr images

I collect data from the Madrid photography Flickr web community between 2001 and 2011. I specifically looked for pictures with location tags, and I categorized users based on their behavior. Users who posted pictures consistently for at least one week during this period were considered tourists, while others were considered residents. This approach uses the timing of photos to distinguish between residents and tourists, a method used in previous research studies (Ahlfeldt, 2012; Saiz et al., 2018; Gaigné et al., 2022).

B.7 Commuting flows

The 2004 mobility survey conducted by the CTRM (Consorcio Regional de Transportes de Madrid) analyzed commuting patterns and household mobility within the metropolitan area of Madrid. This survey involved around 35,000 households (approximately 85,000 inhabitants) and provided precise data on mobility. An important feature of this survey is its inclusion of occupation data, allowing for an in-depth analysis of the commuting patterns of Madrid residents. In particular, I restrict those commuting flows that correspond to residents who live in the Madrid municipality and work in the hospitality sector.