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The Value of Proximity to a Vacation Home Rental in a Resort Community

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Abstract

Based upon a hedonic regression analysis of home sales in the City of South Lake Tahoe (CA), a vacation home rental (VHR) sells for more than a similar non-VHR. In addition, the presence of VHRs within a quarter-mile radius of a home sale also raises its value. However, the overall effect on the value of all home sale values from the presence of VHRs in South Lake Tahoe is negative. VHRs benefit owners and neighbors near them, but overall reduce the city's residential property values. These findings offer a logical basis for the heated discussions often observed over planning activities that restrict the presence of VHRs and/or attempt to mitigate their neighborhood effects. The paper concludes with implications for planning policy directed at VHRs.

Keywords

hedonic regression analysis, proximity value, public policy, regulate or tax, vacation home rental

Planning and the Impact of Vacation Home Rentals (VHRs)

Overnight visitors to resort communities exhibit an increasing propensity to choose alternatives to traditional lodging by staying in a VHR located in a residential neighborhood. As Guttentag (2015) describes, multiple reasons exist for this growing demand for tourist accommodation in a VHR. These include lower costs (an entire home often rents for less than a five-star hotel), residential amenities such as full kitchen and laundry, and the desired experience of greater immersion in the locality. This rise in demand for VHRs occurred at the same time as a rise in supply made possible through home-sharing platforms such as Home Away and Airbnb which have significantly lowered the costs borne by an owner of a VHR for marketing, scheduling, and fee collection.

The growth in the presence of VHRs in resort communities has resulted in increasing complaints from year-round residents of an undesirable change in the "character" of their neighborhood through increased noise, trash, parking, congestion, and so on from transient visitors lacking any long-term stake in the location. Economists label these "negative externalities" generated by the market process that yielded the greater presence of VHRs but did not fully account for its effect on others. As vacation communities rely on a service-based labor force earning less than stellar pay, many blame the increase in VHRs as at least a partial cause of housing affordability concerns faced by such workers. After all, a VHR represents one less home available for year-round residents to purchase or long-term rent. Beyond these negative concerns are the potential "positive externalities" to the resort community of greater outside visitors who seek the VHR accommodation experience and the increased spending, tax revenue, and jobs they subsequently generate in the local economy. The research question investigated here is whether VHR existence offers VHR owners and neighbors a net benefit and whether this net benefit also applies to the entire resort community. A finding of less than a net benefit of VHRs to all residential property owners in a resort community suggests the need for planning (and/or regulation, taxation, fees, etc.) to mitigate in some way the net cost that VHRs impose upon a resort community.

One method by which to measure the net benefit of VHRs is through a hedonic regression analysis that measures their influence on the selling price of homes. Such an analysis uses data on the sales price of homes, and their specific physical and location characteristics, to calculate the independent contributions on its selling price of whether the home is a VHR and its proximity to other VHRs. The aggregation of these VHR-based effects across all home sales then yields an overall measure of whether their net benefit to a resort community is positive. The reasoning behind this is that a homebuyer takes both the positive and negative aspects of whether a home they wish to pursue is a VHR, and its proximity to

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other VHRs, when deciding upon the price they are willing to pay for it (holding the other characteristics of the home and its neighborhood constant).[1]

South Lake Tahoe (SLT) as an Appropriate Case Study

The City of SLT, California, offers a suitable source of data to examine the now highly contentious issue of whether the increased presence of VHRs is something that permanent residents of a tourist-based jurisdiction should embrace as an entrepreneurial activity that benefits its property owners and local economy or something that planners and other policy makers should control. This research uses SLT data from 2011 to 2016 because in early 2016 the city commissioned the consulting firm of Michael Baker International (2017) to conduct both a qualitative and a quantitative analysis of the *Socioeconomic Effects of Vacation Home Rentals in South Lake Tahoe.* This analysis is in response to vocal citizen groups calling for greater regulation of VHRs in the jurisdiction's boundary. I undertook the quantitative portion of this analysis.

Figures 1 and 2 offer a visual representation of the rise in VHR activity in SLT between 2011 and 2016. Dashed lines in these figures represent the boundaries of SLT. The double-drawn lines represent the boundaries of the eight Census Tracts (neighborhoods) assigned to the City. In the analysis offered here, these neighborhood designations act as controls for the expected average effect on home price if it is in one neighborhood as compared with another. Such neighborhood price differences depend upon proximity to attractions and amenities such as Lake Tahoe, casinos on the Nevada Border, and a major ski area. A dot in Figure 1 or 2 accounts for the location of a licensed VHR. An evaluation of the number of dots (1,213) in 2011 to the number of dots (1,861) in 2016 shows the 53percent rate growth of VHRs in this six-year period and the greater concentration of this growth in some Census Tracts over others. In 2011, 433 single-family home sales occurred in the City of SLT, and 18 (about 4 percent) of these were homes with a VHR license. In comparison, in 2016, 547 single-family home sales occurred, and 42 (nearly 8 percent) of these were licensed VHRs.[2]

Using community surveys, public meetings, and stakeholder interviews, the report on the *Socioeconomic Effects of Vacation Home Rentals in South Lake Tahoe* documents the mixed feelings of residents, resident VHR owners, and nonresident VHR owners regarding this rise in SLT's VHR activity:

> [G]roups agree that the VHR market supports the tourist economy and provides economic benefit to the city, but residents have a more negative perception of VHRs due to the immediate impacts on the neighborhood, such as improper trash management. (pp. 2–25)

I wish to quantify an overall effect, be it positive or negative, regarding the influence of proximity to VHRs on the selling price of a home.

I next offer a brief review of relevant research. The following section includes a discussion of the appropriateness of using hedonic regression analysis as the research method and the data needed to complete it, while section "Results" offers the results of the hedonic regression analysis, and section "Discussion of the Influence of VHRs on Property Value" offers a discussion of their relevance to the research question asked. I conclude with how the findings of this research relate to the policy on VHRs adopted in SLT and the feasibility/desirability of planners suggesting this policy elsewhere.

Research on the Net Benefit of VHRs

The goal of this research is an empirical determination of whether VHRs offer a net benefit to a resort community. Net benefit is determined through an accounting of all benefits, less the summation of all costs. It is, thus, relevant to summarize previous research that describes the potential types of benefits and costs of VHRs to a community, and then mention two studies that use economic impact analysis to put dollar values on these for a specific geographic area. Although this frames the issue examined here in a way essential for a better understanding of it by planners, the final portion of the literature review offers relevant findings from previous studies using the specific empirical method employed here.

Benefits and Costs of VHRs

VHRs in a jurisdiction generate both benefits and costs to the residents living there. An Economic & Planning Systems (EPS 2015) report describes the possible benefits of VHRs to a county as (1) greater tourism and the subsequent economic and fiscal benefits, (2) additional income for VHR owners, and (3) an extension of the economic benefits of tourism to neighborhoods previously not experiencing it. On the cost side, the report mentions the possibility of VHRs causing (1) a reduction housing for full-time residents, (2) evictions of long-term tenants for VHR conversions, (3) a greater violation of local zoning and other ordinances meant to preserve the character of a neighborhood, (4) increased nuisance to neighbors by visitors not as vested in the neighborhood, and (5) a loss of full-time population in neighborhoods that is necessary for a local elementary school, volunteer fire service, and other community groups. In examining the "misuse" of VHRs in Berlin (Germany), Schafer and Braun (2016) describe the cost imposed upon the traditional hotel industry through lost overnight stays and upon permanent residents through a loss in conventional housing and higher rents. Nonetheless, they point out that VHRs generate the benefit of a "new form of urban tourism" at lower prices to

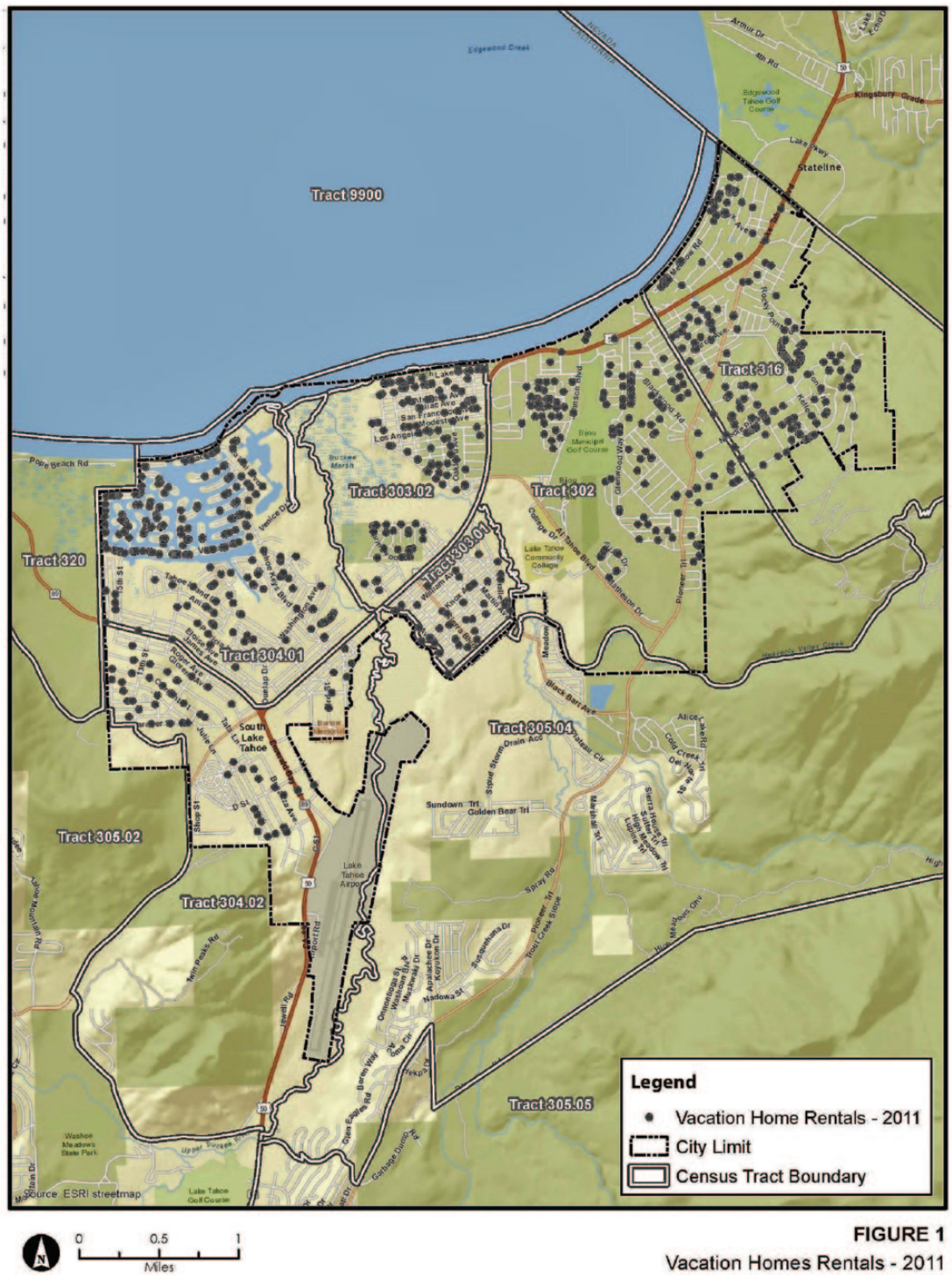

Figure 1. 2011 vacation home rentals within South Lake Tahoe Boundaries and Census Tracts.

tourists seeking the "authentic experience of being more embedded in the everyday life of neighborhoods" (p. 289). Flognfeldt and Tjorve (2013) make similar points regarding the shift from hotels and lodges in Scandinavian mountain resort communities, to what they refer to as "second-home villages," where VHRs dominate entire neighborhoods.

Kasturi and Loudat (2014) catalog the benefits and costs of VHRs in terms of the economic concept of market

Figure 2. 2016 vacation home rentals within South Lake Tahoe Boundaries and Census Tracts.

externalities that result from a free market transaction when a buyer or seller does not consider a benefit or cost resulting from the transaction. In their study of the influence of transient vacation rentals in Maui County (Hawaii), they identify the possible negative externalities of these as: (1) destroying the residential character of neighborhoods, (2) introducing a constant flow of strangers into a neighborhood, (3) reducing the availability of long-term rental housing and raising rents, and (4) infringing upon the property rights of neighbors. Wang et al. (1991) characterize these negative externalities as arising from a proprietor potentially maintaining their residential VHR at a lower level than

Table 1. Potential Externalities of VHRs.

Externality type	Positive	Negative
Economic	• Improved local economy and employment • Increased income and standard of living • Improved infrastructure and public transit • Improved local tax revenues and/or government expenditures • Increased shopping alternatives	• Increased prices and goods/services shortages • Increased price of land and housing
Environmental	• Greater preservation of natural environment that draws tourists • Improved park/recreation opportunities	• Increased air, water, noise, and litter pollution • Disruption of natural habitat through building • Congestion
Sociocultural	• Greater protection of quality of life • Greater preservation of identity of native population • Greater preservation of historical buildings	• Increased crime, prostitution, alcohol, and drug abuse

Note: VHR = vacation home rental.

a residential owner-occupant and VHR occupants exhibiting a lower commitment to the quality of the neighborhood's environment. Alternatively, Kasturi and Loudat (2014) point out the positive externalities of VHRs that can arise through a promotion of tourism that potentially improves a jurisdiction's quality of life. Scanlon, Sagor, and Whitehead (2014), in their analysis of the economic impact of holiday rentals (VHRs) in the United Kingdom, make the crucial point that their induced effect on local employment and income should only count the contribution of tourists who would not have visited, or would have stayed for a shorter time, without the option of a VHR stay.

In thinking about the external influences of VHRs to a neighborhood or jurisdiction, consider the classification system for positive and negative tourism externalities in Table 1 (Brandano 2014; Meleddu 2014). Previous studies also examine the influence of VHRs on a jurisdiction's fiscal situation. Fritz (1982) looks at the effect of vacation home development on the local finances of 240 Vermont towns dominated by winter ski tourism. His finding of a greater number of vacation homes in a town's property tax base driving an increase in rates of effective residential property taxation in smaller towns (less than a thousand population) and having no effect in larger towns (between one thousand and thirty-eight thousand population) is of interest. Hadsell and Colarusso (2009) examine the influence of the presence of seasonal homes on the local property tax rate in New York State's towns and villages between 1990 and 2000. They use regression analysis to control for other factors that influence their dependent variable of "total property taxes paid in a jurisdiction divided by the market value of property in a jurisdiction." They find that the causal variable of "percentage of homes in jurisdiction that are seasonal" exerts a negative influence on this dependent variable in smaller towns and a positive influence in villages. Hadsell and Colarusso speculate the reason for this difference is that in geographically confined villages, vacation homes are more likely to originate through conversion of the existing housing stock. This holds the market value of the village's property base constant but reduces demand for provision of local government services due to a smaller year-round population, and thus results in lower rate of property taxation. Finally, Anderson (2006) examines the influence of the causal variable "concentration of vacation homes" in the local tax base of Minnesota communities on the dependent variable "per-capita local spending." He tests the hypothesis that vacation homes reduce the actual cost of greater public spending in a community because they pay property taxes at the same rate as a nonvacation home, but very likely possess part-time residents who consume fewer local public services. His results suggest that a 1 percent increase in the concentration of vacation homes in local tax base is associated with a 1.5 percent increase in per-capita spending.

Kasturi and Loudat (2014) use input–output tables to derive a specific estimate of the influence of the presence of VHRs to the Maui (Hawaii) County's income and employment. They make the implicit assumption that if these VHRs did not exist, visitors staying in them would not have come to Maui County and $116 million in tourist revenue would not have occurred. Thus, the economic impacts calculated from running this added tourist revenue through an input–output table for the economy are a high-end approximation. Nevertheless, Kasturi and Loudat report a total output influence on Hawaii from the presence of VHRs of about $230 million ($150 million of this occurring in Maui County), with about 2,700 new Hawaii jobs generated and about $14 million in additional Hawaii state taxes collected.

Scanlon, Sagor, and Whitehead (2014) attempt a similar economic impact analysis of "holiday rentals" (VHRs) for the entire United Kingdom that resulted in what they termed a "gross economic impact" of about €4.5 billion from the income earned by holiday rental owners and spent by holiday rental clients. This also resulted in a gross increase of about one hundred thousand new jobs. Going further than the economic impact study for Maui, they rely upon surveys asking holiday rental occupants whether they would have traveled

to the United Kingdom at all if these VHRs did not exist or whether they would have cut their stay shorter. This resulted in "net economic impact" calculations (which attempted to account for travel activity induced only by the presence of VHRs) of about €2.3 billion and thirty thousand to fifty thousand new jobs. Net economic impacts are about half that of the gross economic impacts calculated.

Effect of VHRs on Neighboring Residential Properties Using Hedonic Regression Analysis

Lafferty and Frech (1978) offer an early example of hedonic regression analysis that teases out the influence of different local land uses on the median value of homes in 40 different Boston area communities. They attempt to discern the externalities of surrounding land use at the citywide and neighborhood levels by including in their analysis both the proportions of city land devoted to different forms of land use (multifamily, commercial, industrial, institutional, and vacant/agricultural) and the dispersions of these land uses across the entire city. After controlling for other characteristics expected to influence median home value, they find the greater the fraction of city land devoted to multifamily apartment (or the closest approximation to VHR) use, the higher the median home value in city.

Wang et al. (1991) use hedonic regression analysis to test the claim that the presence of rental properties in a neighborhood exerts a negative influence on the value of single-family, owner-occupied residences. Using 1984–1986 data from over a thousand home sales in the City of San Antonio, Texas, and controlling for other relevant factors, they find that the addition of another rental property within the immediate eight houses that surround a property on average reduces the selling price of the home by approximately 4 percent.

Usrey (2012) completed a hedonic regression analysis of 2,766 homes that sold in 2011 and 2012 in Fort Collins, Colorado. She identifies the number of single-family homes within a radial band of a quarter mile of a home that sold and within a second radial band of a quarter to half mile. After controlling for other relevant characteristics, Usrey finds that if a home had one hundred rental properties within a quarter mile, and this rose 10 percent to 110, the price of the home would decrease by 5.3 percent. However, if a home had one hundred rental properties between a quarter mile and half mile away, and this rose 10 percent to 110, the price of the home would increase by 5.6 percent. Sheppard and Udell (2016) gather data from about 750,000 single-family home sales in New York City to determine the influence of Airbnb activity (measured as a percentage of homes operating as such within fixed radii) after controlling for property and building characteristics, neighborhood demographics and crime, year of sale, and neighborhood fixed effects. They found that a 100 percent increase in Airbnb activity within 150 to 2,000 m resulted in a positive but decreasing influence in a home sale price of 10.9 to 6 percent. In addition, Segu (2018) chose to examine the influence of a similar measure of Airbnb density on the market rental rates of apartments across Barcelona's (Spain) various neighborhoods between 2009 and 2016. Using five hundred Airbnb listings, and matching them to rental rates of apartments and their characteristics in Barcelona neighborhoods, she found that a 1 percent increase in VHR activity resulted in about a 4 percent increase in rent.

The work by Kim, Leung, and Wagman (2017) is one of the first hedonic regression analyses to capture the influence of VHRs on residential property values in a resort community. They did this using both a property's proximity to VHRs as the causal variable of interest and the causal effect on property values of adopting a city ordinance that restricts the future presence of VHRs. The focus of their analysis was Anna Maria Island, Florida, where in 2007 only one of the three cities on the island had adopted a VHR ordinance. The ordinance required a respective thirty and seven consecutive day minimum stay for residential rentals in low- and high-density residential areas. They detect the separate influence of the surrounding density of VHRs, the adoption of the restrictive ordinance, and how the two together exert an even stronger influence on sales price. Specifically, a 10 percent increase in the ratio of "surrounding VHRs within a tenth of a mile of property to total homes" raises the property's value by 11.7 percent. The ordinance restricting the short-term length of residential rentals lowers a property's value by 20.4 percent if the property is subject to it, and there are no VHRs within a tenth of a mile of this property. However, the measure of density of surrounding VHRs to total residential units within a tenth of a mile reduces this negative influence. Mitigation occurs gradually with distance, but when the ratio of VHR homes to all homes within a tenth of a mile of a home reaches about two-thirds and higher, the effect of the ordinance on sales price changes from negative to positive.

Research Design

Using a sample of recent home sales that includes those licensed to operate as a VHR, hedonic regression analysis allows one to calculate the independent contribution that each characteristic of a home (including VHR status) and its location in a specific neighborhood offers to its selling price. This provides an objective answer to whether the proximity of VHRs raises or reduces the market value of a home, and by how much. If the possible negative externalities of VHRs dominate the possible positive externalities, then their detected effect in a hedonic regression of home values is negative. To tease all of this out, the researcher must begin with a model that accounts for the general factors expected to influence observed differences in the sales price of homes.

The model used for this analysis, justified based on the earlier examination of research conducting similar analyses, is

$$\begin{aligned}\text{Selling Price of Home}_i = f(&\text{Structural Characteristics}_i,\\ &\text{Age}_i, \text{Lot Characteristics}_i, \text{Period Sold}_i,\\ &\text{Neighborhood Location}_i, \text{VHR}_i,\\ &\text{Proximity to Other VHRs}_i).\end{aligned} \tag{1}$$

The hedonic regression estimation requires the collection of data that accounts for the categories included in equation (1). The specific observable variables used to represent the broad categories in equation (1) include

$$\begin{aligned}\text{Structural Characteristics}_i = f(&\text{Bathrooms}_i,\\ &\text{Bedrooms}_i, \text{House Square Feet Hundred}_i,\\ &\text{Minimum Remodel Dummy}_i,\\ &\text{Major Remodel Dummy}_i),\end{aligned} \tag{2}$$

$$\text{Age}_i = f\left(\text{Years Old}_i\right) \tag{3}$$

$$\begin{aligned}\text{Lot Characteristics}_i = f(&\text{Condominium Dummy}_i,\\ &\text{Lot Square Feet Thousand}_i,\\ &\text{Multiple Properties Dummy}_i),\end{aligned} \tag{4}$$

$$\begin{aligned}\text{Period Sold}_i = f(&\text{Year 2012 Dummy}_i,\\ &\text{Year 2013 Dummy}_i, \text{Year 2014 Dummy}_i,\\ &\text{Year 2015 Dummy}_i, \text{Year 2016 Dummy}_i,\\ &\text{April May June Sold Dummy}_i,\\ &\text{July Aug Sept Sold Dummy}_i,\\ &\text{Oct Nov Dec Sold Dummy}_i),\end{aligned} \tag{5}$$

$$\begin{aligned}\text{Neighborhood Location}_i = f(&\text{Tract 30200}_i,\\ &\text{Tract 30301}_i, \text{Tract 30302}_i, \text{Tract 30401}_i,\\ &\text{Tract 30402}_i, \text{Tract 30502}_i, \text{Tract 30504}_i),\end{aligned} \tag{6}$$

$$\text{VHR}_i = f\left(\text{VHR Occupancy Number}_i\right), \tag{7}$$

$$\begin{aligned}\text{Proximity to Other VHRs}_i = f(&\text{VHRs Tenth}\\ &\text{Mile Band}_i, \text{VHRs Quarter Mile Band}_i,\\ &\text{VHRs Half Mile Band}_i, \text{VHRs One Mile Band}_i).\end{aligned} \tag{8}$$

As an example consider equation (2) that indicates that Structural Characteristics, which the previous research widely documents as influencing what someone is willing to pay for a house, is measured in this research design by the number of bathrooms and bedrooms, square feet of living space, and dummy variables set equal to one if the home underwent minor, major, or no remodel (base category) since 2001.

The data used contain nearly three thousand observations on all single-family home sales that occurred in SLT between 2011 and 2016. Much of this comes from Realtor-generated Multiple Listing Service (MLS) data recorded for each of these home sales. An exception is whether the home sold was currently operating as a licensed VHR, and if so, the maximum allowed occupancy. VHR license data are necessary to determine the number of VHRs within the chosen four radial bands from a home of zero to a tenth mile, tenth to a quarter mile, quarter to a half mile, and half to one mile.[3] In addition, a search of SLT building permit records revealed whether a home had undergone a moderate (between $20,000 and $50,000) renovation or a major renovation (greater than $50,000) since 2001. Finally, the Census Geocoder identified the location of a home within one of the eight possible Census Tracts in SLT.[4]

The appendix contains background information on the data used for this analysis. The base, or excluded variable, of how neighborhood location influences the selling price of a home is SLT's far eastern Census Tract 31600 (the central business district also near the Nevada casinos).[5] The base of comparison for how the quarter of the year in which a home sold influenced its price is the first three months (winter) of the year, whereas the base of comparison for how the year in which home sold affected its selling price is 2011 (first year observed). Note that there is no adjustment of the home's selling price for differences in annual inflation, and thus, the effects for each year account for that.

When considering the seven years (2011–2016) of home sale data chosen for this analysis, it is relevant to note where it fits within the overall trend in SLT home sales over a longer period. Figure 3 illustrates that the chosen period of home sales includes a city-wide market that was in decline in 2011 and 2012 and then rose in median sales price each year after. I necessarily capture this general trend through year dummy variables included in equation (5). Using 2011 as a base year, Figure 3 indicates that the sign on the Year 2012 Dummy should be negative, and each of the successive year dummies should have positive and increasing in magnitude values.

Before conducting a hedonic regression analysis of the type desired here, there are a few essential issues to consider: (1) the functional form to use (linear or nonlinear), (2) whether the included explanatory variables move so closely together (multicollinearity) that the effect of these variables is undetectable, and (3) whether the standard errors of the calculated regression coefficients exhibit heteroscedasticity. First, researchers often translate the dependent variable of home price into its natural log form before running the regression. This accounts for the likelihood of explanatory variables exhibiting a nonlinear influence on home price. The interpretation of a regression coefficient after such a

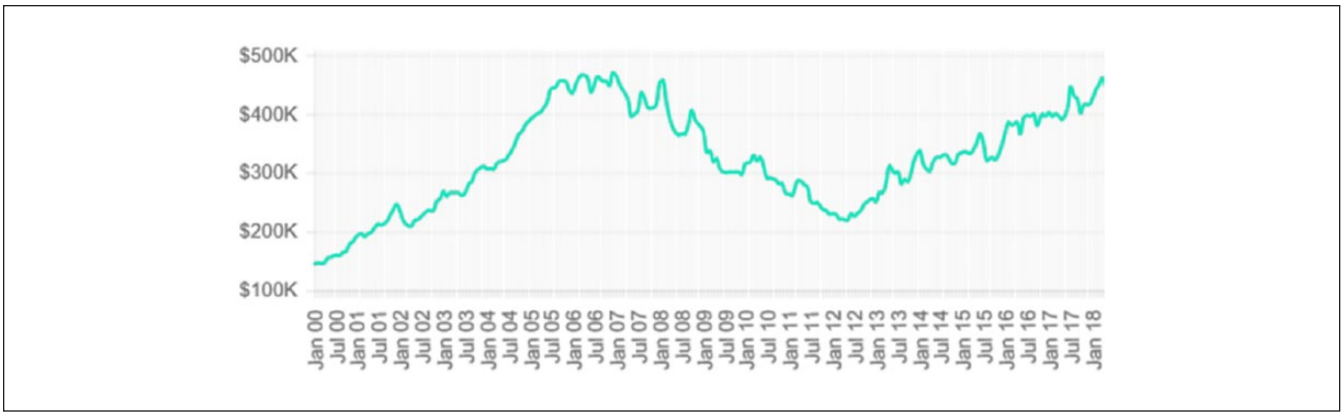

Figure 3. Median owner-occupied residential nominal sales price in South Lake Tahoe (all single-occupancy properties, January 2000 to January 2018).
Source: https://www.trulia.com/real_estate/South_Lake_Tahoe-California/market-trends/.

change is the expected decimal percentage change in home price, from a one-unit change in a respective explanatory variable. The only modification to this interpretation is that the explanatory measure of number of bedrooms is also in natural log form because doing so accounted for the better fit of how a percentage change in bedrooms affects home price in percentage terms.

Second, this research originally explored the possibility of calculating the separate effects on a home's selling price of (1) being a VHR, (2) number of occupants allowed by license if a VHR, and (3) the number of parking spaces allowed by license if a VHR. When including all three of these explanatory variables in the regression analysis, none of them exerted a statistically significant influence on home price. This is a clear symptom of multicollinearity. The necessary solution as these three measures move so closely together (based upon partial correlation coefficients falling between .91 and .94) is to only include one of these measures of VHR activity. That measure is the number of occupants allowed if a VHR. If a sold property is not a VHR, this variable takes on value of zero. By allowing this measure of VHR use to vary by number of allowed occupants, the analysis accounts for the greater revenue stream likely to the owner if it can legally house more occupants.

Results

The appropriate use of regression analysis requires an investigation as to whether the standard errors for the regression coefficients violate the condition of homoscedasticity. An initial examination indicated heteroskedasticity, and I explored three possible corrections to deal with it. The first is the STATA calculation of "clustered robust standard errors" using ordinary least squares (OLS) regression analysis and clusters based upon the eight Census Tracts in the City. The second and third corrections were the GeoDA[6] use of maximum likelihood estimation (MLE), with either a spatial error or spatial lag model that, respectively, accounts for the possibility that there is a correlation between error terms within a certain proximity or that the home price was affected by the explanatory variable values of homes within a certain proximity.[7] As one of these three is not necessarily preferred to another, Table 2 offers the regression results from all. I have chosen to focus on the results of the MLE spatial lag model because the Akaike information criterion values are slightly higher (indicating a minor preference for its use). Nevertheless, note that the use of any of the three specific findings yields essentially the same conclusions.

The results of the spatial lag model (recorded in last column of Table 2) indicate that a one-unit increase in the number of occupants for a licensed VHR raises its value by 0.94 percent. Thus, for the mean number of nine occupants licensed to a VHR in this data set, it sells for about 8.5 (9×0.94) percent more than a similar house with no VHR license (zero occupants allowed). Reading down the same column in Table 2 reveals, relative to a home with similar characteristics, that a condominium sold for 14.4 percent less and every bathroom adds 6.9 percent more value. In addition, (1) every 10 percent increase in bedrooms adds 5.1 percent in value, (2) every 100 square feet in structure adds 4.2 percent in value, (3) every 1,000 square feet in lot size adds 0.52 percent in value, (4) every 10-year increase in years old subtracts 2.7 in value, and (5) single-family properties with multiple units (such as accessory dwelling units) sold for 11.9 percent more. Regarding the location of a home in one of the six different neighborhoods (Census Tracts) in SLT relative to Tract 31600 (containing the state line with NV, central business district, and proximity to lake access), a home in Census Tract 30401 sold for 21.1 percent more, and homes in Census Tracts 30200, 30301, and 30402, respectively, sold for −5.9, −18.9, and −19.7 percent less. As predicted from the aggregate data displayed earlier in Figure 3, a similar home in 2012 sold for 4.9 percent less than in 2011. While as also expected, after 2012 there was a clear trend in

Table 2. Regression Results (Dependent Variable: LN Home Price, 2,956 Observations from Years 2011 to 2016).

Explanatory variable	OLS (clustered robust standard errors)	MLE (spatial error model)	MLE (spatial lag model)
VHR Occupancy Number	0.0092***	0.0095***	0.0094***
	(4.55)	(3.60)	(3.55)
VHRs Tenth Mile Band	0.0017***	0.0017***	0.0017***
	(3.63)	(6.47)	(6.58)
VHRs Quarter Mile Band	0.00096	0.00098***	0.00097***
	(1.09)	(4.49)	(4.43)
VHRs Half Mile Band	−0.00054*	−0.00053***	−0.00054***
	(−1.92)	(4.47)	(4.52)
VHRs One Mile Band	−0.00053	−0.00051***	−0.00052***
	(−1.69)	(0.000092)	(5.77)
Condominium Dummy	−0.145***	−0.145**	−0.144**
	(−7.01)	(5.60)	(−2.35)
Bathrooms	0.068**	0.070***	0.069***
	(2.36)	(4.25)	(4.21)
LN Bedrooms	0.053	0.051*	0.051*
	(1.05)	(1.62)	(1.63)
House Square Feet Hundred	0.042***	0.042***	0.042***
	(12.70)	(19.43)	(19.48)
Lot Square Feet Thousand	0.0052**	0.0052***	0.0052***
	(3.31)	(5.14)	(5.11)
Years Old	−0.0027**	−0.0027***	−0.0027***
	(−3.01)	(0.00061)	(0.00061)
Minimum Remodel Dummy	0.034	0.034	0.033
	(0.97)	(1.10)	(1.09)
Major Remodel Dummy	0.048	0.048	0.047
	(1.56)	(1.19)	(1.16)
Multiple Properties Dummy	0.121	0.121*	0.119*
	(1.81)	(1.69)	(1.67)
Tract 30200 Dummy	−0.059**	−0.059**	−0.059**
	(−2.83)	(−2.05)	(−2.10)
Tract 30301 Dummy	−0.189**	−0.183***	−0.189***
	(−2.40)	(−4.65)	(−4.83)
Tract 30302 Dummy	0.014	0.021	0.014
	(0.35)	(0.59)	(0.40)
Tract 30401 Dummy	0.212**	0.216***	0.211***
	(7.14)	(7.81)	(7.65)
Tract 30402 Dummy	−0.195**	−0.190***	−0.197***
	(0.2.57)	(−4.96)	(−5.13)
Tract 30502 Dummy	0.078	0.059	0.065
	(0.081)	(0.20)	(0.22)
Tract 30504 Dummy	0.066	0.067	0.070
	(0.080)	(0.59)	(0.62)
Year 2012 Dummy	−0.040	−0.041	−0.041
	(−1.43)	(−1.55)	(−1.52)
Year 2013 Dummy	0.105	0.105***	0.107***
	(0.86)	(3.06)	(3.09)
Year 2014 Dummy	0.345***	0.344***	0.346***
	(9.47)	(12.32)	(12.38)
Year 2015 Dummy	0.399***	0.396***	0.399***
	(8.30)	(13.98)	(14.10)
Year 2016 Dummy	0.511**	0.508***	0.510***
	(8.31)	(17.84)	(17.92)
April May June Sold Dummy	0.056***	0.056**	0.056**
	(3.78)	(2.43)	(2.40)

(continued)

Table 2. (continued)

Explanatory variable	OLS (clustered robust standard errors)	MLE (spatial error model)	MLE (spatial lag model)
July Aug Sept Sold Dummy	0.095***	0.096***	0.094***
	(6.15)	(4.34)	(4.24)
Oct Nov Dec Sold Dummy	0.082***	0.081***	0.081***
	(6.83)	(3.55)	(3.53)
Constant	11.606***	11.601***	9.539***
	(107.22)	(177.40)	(11.57)
R^2	.6162	.6173	.6171
Log likelihood	—	−1,545.57	−1,545.84
AIC	—	3,151.15	3,153.68
Lamda (spatial error)	—	0.244***	—
		(2.69)	
W LN Home Price (spatial lag)	—	—	0.165**
			(2.51)

Note: Each cell of this table contains the regression coefficient, its *t* or *z* statistic, and its degree of statistical significance in a two-tailed test: ***99 percent or greater, ***95–99 percent, and *90–95 percent. OLS = ordinary least squares; MLE = maximum likelihood estimation; VHR = vacation home rental; AIC = Akaike information criterion.

rising average home prices (relative to the base year of 2011), with a similar home selling for 10.7, 34.6, 39.9, and 51.0 percent more, respectively, in years 2013, 2014, 2015, and 2016. Also, the hedonic regression analysis indicated a clear seasonal effect, with a home sold in the second (spring), third (summer), or fourth (fall) quarters of a year selling on average for respective percentage differences of 5.6, 9.4, and 8.1 greater than if sold in the first quarter (winter).[8]

Of primary interest to this analysis is the hedonic regression results recorded for the influence of an additional VHR within the four, nonoverlapping, radial bands. Interestingly, a VHR within a tenth of a mile of a purchased home added a 0.17 percent increase to its value. For the mean value of about 17 VHRs observed within a tenth of a mile of a sold home in this SLT data set (see Table 3), this indicates about a 2.9 (17 × 0.17) percent increase in value.[9] An additional VHR, between a tenth and quarter mile of a purchased home, also adds 0.097 percent to its value. For the mean of about 37 VHRs within this band, this translates into about a 3.6 (37 × 0.097) percent increase in sales price. But beyond the quarter-mile boundary, adding a VHR reduces the sales price of a home. For the two measured bands of a quarter to half mile, and half mile to one mile, the appropriate regression coefficients in Table 2 indicate respective −0.054 and −0.052 percent decreases in price for each additional VHR. At the respective means of about 98 and 175 VHRs for these two most distant bands, this yield calculated decreases in sales price of about −5.3 (98 × −0.054) and −9.1 (175 × −0.052) percent.

In summary, a VHR with an average allowed maximum occupancy of nine sells for about 8.5 percent more than a similar house not licensed as a VHR. The presence of the average number of VHRs within a zero to a tenth mile of a home and a tenth to quarter mile of a home, respectively, raises the home's selling price by 2.9 and 3.6 percent. Furthermore, the presence of the average number of VHRs with a quarter to half mile of a home and a half to one mile of a home, respectively, lowers the home's selling price by −5.3 and −9.1 percent.[10]

Discussion of the Influence of VHRs on Property Value

As described earlier, the findings of previous examinations regarding proximity to VHRs on a property's market value are clearly mixed. Lafferty and Frech (1978) report that the greater presence of apartment rentals throughout a city raises the market value of the median value home. Alternatively, Wang et al. (1991) report that a one-unit increase in the number of rentals within the nearest eight homes lowers the sales price of the home affected by it. Usrey (2012) finds the varied influences of a 10 percent increase in rental properties within a quarter mile of a home lower its sales price, while the same increase in rental activity within a quarter to half mile band raises its sales price, whereas Sheppard and Udell (2016) and Segu (2018) find that a 100 percent increase in Airbnb activity within 2,000 m (one and a quarter miles) of a home in New York City and by 1 percentage point in a neighborhood in Barcelona, respectively, raise the selling price by about 6 and 4 percent. Kim, Leung, and Wagman (2017) also detect multiple influences of VHRs on the sales price of neighboring homes—a 10 percent increase in the density of VHRs (VHRs/Total Residential Units) within a tenth of a mile raising a home sale price, and the expected concurrent finding of restricting the number of VHRs in the community that the home sells in for reducing its sales price. They also find, however, a decrease in the second ordinance-based

Table 3. Summary of Overall Effects of VHRs on Value of Home Sales in South Lake Tahoe between 2011 and 2016.

Influence	Total dollar value of influence	Total dollar value of influence as a percentage of total dollar value of homes sold (%)	Total dollar value of influence as a percentage of number homes (VHRs) sold
Increased value in homes sold due to operating as a VHR	$15,954,526	1.45	$46,925 per VHR
Increased value in homes sold due to proximity of VHRs within tenth mile	$35,902,430	3.26	$11,888 per Home
Increased value in homes sold due to proximity of VHRs within quarter mile	$45,066,458	4.10	$14,923 per Home
Decreased value in homes Sold due to proximity of VHRs within half mile	−$60,541,625	−5.51	−$20,046 per Home
Decreased value in homes Sold due to proximity of VHRs within one mile	−$101,081,858	−9.20	−$33,470 per Home
Sum of column	−$64,700,070	−5.89	$20,218 per VHR −$26,707 per non-VHR

Note: Total nominal value of all 3,020 home sales = $1,098,603,250, of which 340 were VHR home sales. VHR = vacation home rental.

price reduction effect as the density of VHRs in the community increases. A comparison of these findings to the only found earlier example of hedonic regression analysis by Kim, Leung, and Wagman (2017), which measured the influence of the density of short-term rentals within a tenth of a mile on a home's price, also detected a positive influence of converting from no short-term rentals within a tenth of a mile from a home to only short-term rentals within that tenth of a mile, yielding about a 12 percent increase in home value. In comparison, this hedonic regression analysis detected both positive (if within a quarter-mile band) and negative influences (if beyond a quarter-mile band) of VHRs on the sales price of homes in the City of SLT between 2011 and 2016.

An overall assessment of the impact of VHRs on home sales in SLT involves simulating for all home sales, the price increase or decrease that occurred because the home (1) could have been a VHR (and thus sold for more), (2) could have been located within a quarter mile of VHRs (and thus sold for more), or (3) could have been beyond a quarter mile of VHRs (and thus sold for less). The results of these calculations are shown in Table 3. The aggregate loss of about −$65 million is around 6 percent of the slightly over $1 billion in home sales that occurred over the six-year period under consideration. If broken down by typical VHR and non-VHR home, however, the final entries in Table 3 reveal a typical net gain in value of VHR home sales and a typical net loss in non-VHR home sales. This is due to the positive increase in an existing VHR that occurs because of the allowance to operate as such. This raises the total value of all VHRs' selling prices, more than the net-negative effects of proximity to VHRs. So, in SLT over the period observed, owners of a VHR benefited from the allowance of VHRs in SLT, whereas non-VHR homeowners did not.

The positive externalities from the within quarter-mile proximity of VHRs on sales prices could be the result of several factors. As VHR marketing often includes photos intended to showcase the unit, properties are more likely to be well maintained, which increases property values in a neighborhood. The presence of nearby VHRs also acts as a positive influence on the selling price of home by indicating the greater likelihood that the property itself has a higher potential to convert to a profitable VHR. Alternatively, when the number of VHRs located between a quarter to one mile of a home increases, these positive externalities are less likely to occur. Instead, the possible negative externalities dominate: greater congestion, pollution, disruption of natural habitat, greater crime, greater local service demands without compensating tax revenue, and so on. Policy prescriptions for planners to consider from such a finding are the regulation of VHR activity, or the levy of an additional license fee/tax to operate a VHR and the use of revenue to mitigate the overall negative externalities of distant VHRs within the city on non-VHR homeowners.

The 2017 report on the *Socioeconomic Impacts of Vacation Home Rentals in South Lake Tahoe* contains some of the empirical results described here, along with further qualitative evidence on the impacts of VHRs. The citizens and elected officials of SLT received these findings in early 2017 as evidence for use in the political process regarding what to do about VHRs within their city. Given the finding of an overall negative influence of VHRs on housing property sale values in SLT between 2011 and 2016, I suggested in this report the adoption of a higher, per-occupancy license fee for existing and future VHRs. The revenue from such a fee could then fund mitigation efforts to reduce the negative externalities generated by them. This is a solution often offered by economists, as opposed to the alternative of regulating the number of VHRs and/or the activities allowed at them. Instead, SLT adopted in late 2017 an ordinance that capped the number of VHRs at 1,400 outside of the core tourist area (basically no new VHRs) and required bear boxes, imposed parking restrictions, and prohibited excessive noise between 10 p.m. and 8 a.m. at all VHRs. Execution

of this ordinance comes from the hiring of three new full-time code enforcement officers, funded from a minimum $1,000 fine levied upon both the owner and guest for each violation. Moreover, the receipt of three of these fines within two years results in a permanent revoke of the owner's VHR permit. In early 2018, there was widespread reporting of the initial outcomes such as a pervasive use of fines, VHR owners and renters shocked to get them, and residents who still say it has done little to alleviate their concerns.

Fast forward to November 2018 where disgruntled residents qualified a city ballot "Measure T" to ban all VHRs in SLT outside the central business district (basically Census Tract 31600 in Figure 1) in 2022 and reduce all VHR occupancy limits immediately to two per-bedroom with a maximum of 12 occupants no matter the number of bedrooms in a VHR. The measure passed with a margin of only 50.4 percent (58 votes). City officials reacted with a declaration that SLT will lose up to $4 million in tourist fees and revenue from this, whereas current owners of VHRs declared this moratorium a violation of their right to do what they wish with private property. Just days after the occupancy limits went into effect, in late December 2018, a county judge agreed with the unconstitutionality of the occupancy ban on private property and blocked the implementation of it. As of the writing of this paper, this issue remains unsettled, but these occurrences clearly indicate the divisions that exist between VHR owners, VHR neighbors, and the desirability/legality of doing something about it (Renda 2019).

Conclusion

For planners, the relevant takeaways from this research are that VHRs within a resort community offer: (1) net benefits to their owners and other residential properties within close proximity, (2) net costs to residents not within proximity, and (3) an overall net cost to the entire community that may justify intervention into allowing the free market to determine their numbers and operating practices. But besides knowing that this overall lack of net benefit justifies some form of intervention to curtail or mitigate the negative externalities of VHRs, what about the legal viability of the strict regulatory route taken by officials and voters in the City of SLT?

A quick scan of the relevant literature indicates that it may be problematic. For instance, Pindell and Boyd (2010) describe how VHR limits already exist in the United States through private covenants and municipal-wide actions. Municipalities have found trouble in some courts when justifying these ordinances as a form of zoning intended to control types of property use in specific zones, rather than the length of occupancy. Instead, courts have suggested the need to employ restrictions based upon violation of family definitions, enforcement of nuisance codes, or not engaging in community-strengthening activities.

Gottlieb (2013) offers a commentary on the reasons for the observed growth in VHRs (vacationer's interest in a diverse and affordable lodging experience, and homeowners' desire for a supplemental income) and the conflicts created with residents in traditional neighborhoods. He describes the actions taken by some jurisdictions to quell such conflicts, including (1) Palm Springs' (California) Vacation Home Rental Ordinance that includes a hotline for neighbor's complaints and restrictions on length of stay and number of occupants, (2) St. Helena's (California) use of only 25 VHR permits that can be in use at the same time in the city, and (3) Maui County's (Hawaii) restriction of VHRs to only certain business/resort districts. Gottlieb concludes that planners should instead consider controlling VHRs through the enforcement of existing noise limits, property care standards, public gathering restrictions, curfews, and parking codes. Lines (2015), after examining the approaches to Airbnb regulations in two Arizona jurisdictions, determines alternatively that the Pima County approach of creating a new regulatory system is superior to Phoenix's reliance on existing ordinances.

Jefferson-Jones (2015) urges that VHRs allow homeowners to shift and share the burden of homeownership by helping to defray mortgage and tax costs. They contend that such action mitigates the negative external effects of housing disrepair, distressed sales, and foreclosure. She therefore questions whether imposing restraints on VHRs furthers the stated goals of such to preserve property values and neighborhood integrity. Similarly, after a review of the policy implications of VHRs to local governments, Mehmed (2016) concludes that jurisdictions take care to proceed deliberately into the adoption of regulations, ordinances, and permitting restrictions that constrain the existence and operation of VHRs within their borders. For as found here, there are groups of citizens living in the jurisdiction helped and hurt by VHRs.

In conclusion, the policy takeaway from this research involving the influence of VHRs on home prices in SLT and the events that have occurred since the city and its voters took a strict regulatory route to deal with the negatives of VHRs is that planners instead consider the imposition of greater fees/taxes on VHRs. In the presence of negative externalities—as demonstrated here through hedonic regression findings—economists point to such a fee/tax as an appropriate way to "internalize" this externality. Doing such sends the necessary signal to private homeowners that using their property imposes costs upon the entire city that need consideration. It also has the added benefits of raising revenue to use to mitigate the negative effects of VHRs (earlier cataloged in Table 1) and is more likely than an outright restriction on VHRs to sustain a legal challenge. Taxes/fees do not prohibit the presence of VHRs in a jurisdiction, they only ask the entrepreneurs benefiting from their operation to pay a reasonable price to deal with their consequences.

Appendix

Table A1. Variable Descriptions.

Variable name	Description
Home Price	Nominal (no accounting for inflation) price of home
VHR Occupancy Number	Number of occupants that VHR license allows
VHRs Tenth Mile Band	Number of licensed VHRs in 0 to tenth mile radius
VHRs Quarter Mile Band	Number of licensed VHRs in tenth to quarter-mile radius
VHRs Half Mile Band	Number of licensed VHRs in quarter- to half-mile radius
VHRs One Mile Band	Number of licensed VHRs in half- to one-mile radius
Condominium Dummy	Dummy equals one if condominium
Bathrooms	Number of bathrooms
Bedrooms	Number of bedrooms
House Square Feet Hundred	Square foot of house in hundreds
Lot Square Feet Thousand	Square foot of lot in thousands
Years Old	Number of years old when sold
Minimum Remodel Dummy	Dummy equals one if less than $50,000 renovation since 2001
Major Remodel Dummy	Dummy equals one if greater than $50,000 renovation since 2001
Multiple Properties Dummy	Dummy equals one if more than one home in Sale
Tract 31600 Dummy	Excluded base census tract nearest Nevada casinos
Tract 30200 Dummy	Dummy equals one if Tract 30200 (see Figure 1)
Tract 30301 Dummy	Dummy equals one if Tract 30301 (see Figure 1)
Tract 30302 Dummy	Dummy equals one if Tract 30302 (see Figure 1)
Tract 30401 Dummy	Dummy equals one if Tract 30401 (see Figure 1)
Tract 30402 Dummy	Dummy equals one if Tract 30402 (see Figure 1)
Tract 30502 Dummy	Dummy equals one if Tract 30502 (see Figure 1)
Tract 30504 Dummy	Dummy equals one if Tract 30504 (see Figure 1)
Year 2011 Dummy	Excluded base year of 2010
Year 2012 Dummy	Dummy equals one if sale occurred in 2012
Year 2013 Dummy	Dummy equals one if sale occurred in 2013
Year 2014 Dummy	Dummy equals one if sale occurred in 2014
Year 2015 Dummy	Dummy equals one if sale occurred in 2015
Year 2016 Dummy	Dummy equals one if sale occurred in 2016
Jan Feb March Sold Dummy	Excluded base first quarter of year sale
April May June Sold Dummy	Dummy equals one if sale in second quarter
July Aug Sept Sold Dummy	Dummy equals one if sale in third quarter
Oct Nov Dec Sold Dummy	Dummy equals one if sale in fourth quarter

Note: VHR = vacation home rental.

Table A2. Descriptive Statistics (2,956 Observations from Years 2011 to 2016).

Variable	*M*	*SD*	Minimum	Maximum
Home Price	$361,974	$341,056	$25,000	$5,750,000
VHR Occupancy Number	1.03	3.08	0	26
VHRs Tenth Mile Band	17.22	35.07	0	267
VHRs Quarter Mile Band	37.49	41.09	0	337
VHRs Half Mile Band	98.15	89.20	3	538
VHRs One Mile Band	175.41	133.01	0	617
Condominium Dummy	0.07	0.13	0	1
Bathrooms	2.00	0.86	1	9
Bedrooms	2.85	0.89	1	8
House Square Feet Hundred	15.09	7.22	3.03	73.39
Lot Square Feet Thousand	7.03	81.19	3.94	2,224.49
Years Old	45.43	15.90	1	105
Minimum Remodel Dummy	0.067	0.250	0	1
Major Remodel Dummy	0.039	0.194	0	1
Multiple Properties Dummy	0.012	0.107	0	1
Tract 30200 Dummy	0.216	0.412	0	1
Tract 30301 Dummy	0.116	0.320	0	1

(continued)

Table A2 (continued)

Variable	*M*	*SD*	Minimum	Maximum
Tract 30302 Dummy	0.117	0.321	0	1
Tract 30401 Dummy	0.303	0.460	0	1
Tract 30402 Dummy	0.128	0.334	0	1
Tract 30502 Dummy	0.00068	0.026	0	1
Tract 30504 Dummy	0.0047	0.069	0	1
Year 2012 Dummy	0.182	0.386	0	1
Year 2013 Dummy	0.177	0.382	0	1
Year 2014 Dummy	0.158	0.364	0	1
Year 2015 Dummy	0.161	0.367	0	1
Year 2016 Dummy	0.177	0.382	0	1
April May June Sold Dummy	0.245	0.430	0	1
July Aug Sept Sold Dummy	0.312	0.463	0	1
Oct Nov Dec Sold Dummy	0.255	0.436	0	1

Note: VHR = vacation home rental.

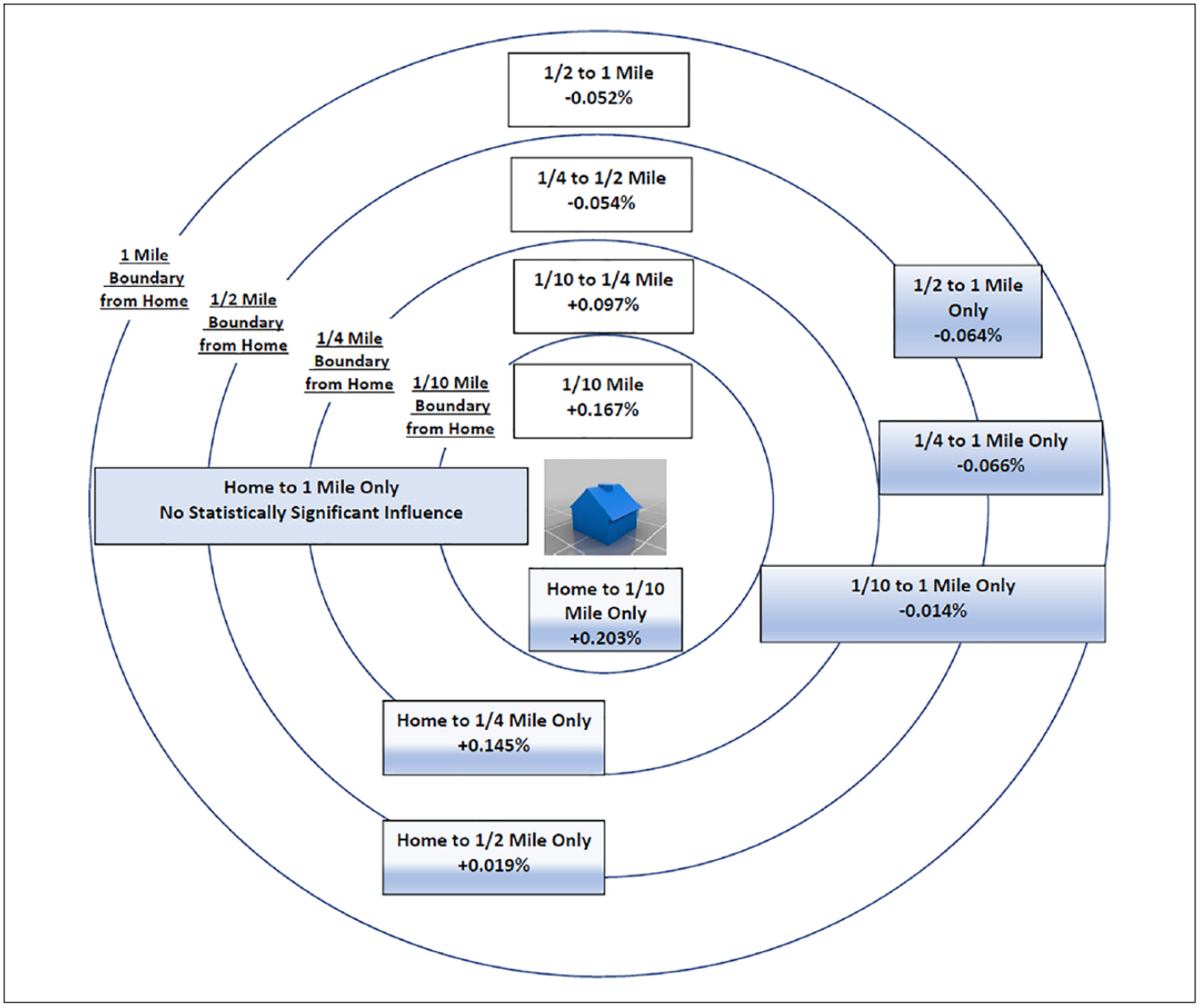

Figure A1. Hedonic regression calculated percentage influence on home price of a one-unit increase in a VHR using various measures of proximity.
Note: VHR = vacation home rental.

The results in clear boxes directly above the house indicate the earlier reported (spatial lag) regression findings of the expected percentage decrease in home value from adding one VHR within four different geographic boundaries (less than a tenth mile, a tenth to quarter mile, quarter mile to half mile, and half mile to one mile) from a home sale, when all four boundary measures included. Alternatively, the results in the shaded boxes are a result of only including that geographic boundary in the regression analysis. Below the house are the separate findings from only looking at the presence of a VHR within a tenth mile (first band near house) of a home, home to quarter mile (first two bands), or home to half mile (first three bands). Here, the percentage effects are all positive and importantly decline in magnitude as the bands included increase. This supports the conclusion that the presence of VHRs near a home sale raises its value, but ones farther away have less of a positive effect (even negative) and diminish the overall positive effect. While to the right of house are the separate findings from only looking at a VHR within one to half mile (last band from house), one to quarter mile (last two bands), and one to a tenth mile (last three bands). Just the opposite of sequentially growing the band size from near the home sale, growing the band size from farthest from the sale indicates a negative influence on sales price that declines as band width increases. This also supports the conclusion that the presence of VHRs farther from a home sale decreases its value, but ones closer have less of a negative effect (even positive) and diminish the overall negative effect. Perhaps most telling is the finding of no influence when looking at the number of VHRs within a mile of a home sale. Thus, there clearly is a relationship between proximity to VHRs and home sale price that goes from positive to negative as you move farther away.

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Notes

1. Admittedly, this is an imperfect measure of the net benefit of vacation home rentals (VHRs) to the entire community, but so is the result from trying to accurately account for all the benefits and costs of VHRs to the community, assigning dollar values to them, and then aggregating them all together to see if a positive or negative total effect.
2. The percentage of total home sales in South Lake Tahoe (SLT) that possessed a VHR license to operate rose by year between 2011 and 2015 from 4.3, 11.1, 14.5, 17.7, to 21.5 percent. In 2016, the percentage of home sales that were VHRs fell to 8.3. Similarly, the ratio of the average VHR home sales price relative to average non-VHR home sale price generally increased between 2011 and 2015 from 1.04, 1.74, 1.33, 1.64, to 1.46. But in 2016, this ratio dropped to 0.97.
3. I also tried radial bands beyond one mile, but ArcGIS was unable to calculate due to encountering the city boundaries in too many cases.
4. Available at https://geocoding.geo.census.gov/geocoder.
5. See Figure 1 for the location of all Census Tracts with SLT.
6. GeoDA is a spatial data analysis program described at https://spatial.uchicago.edu/geoda. I use it here to calculate the specialized spatial error and spatial lag hedonic regression estimates that have become standards to compare against ordinary least squares (OLS) regression.
7. A summary of these models is at https://s4.ad.brown.edu/Resources/Tutorial/Modul2/GeoDa3FINAL.pdf. The maximum likelihood estimation (MLE) regressions for both the spatial error and spatial lag models used a distance spatial metric based upon an arc distance of a quarter mile. An arc distance of 0.192 miles was the minimum determined by GeoDA such that each property has at least one comparable property. I tried a range of values between 0.192 mile and one mile, with no significant differences in magnitude and statistical significance detected.
8. The logic behind this quarterly distribution of the year into distinct time periods that may influence the selling price of an SLT is that they roughly correspond to the four seasons.
9. The regression coefficient of .0017 is the decimal percentage change in home price for the addition of another VHR within a tenth of a mile. The standard percentage change is thus 0.17.
10. It is reasonable to ask whether these differential effects of VHRs on home price by distance are just a statistical artifact due to the distance thresholds chosen or other spurious reasons. See Figure A1 for an investigation of this concern that indicates its nonlikelihood.

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