AMERICAN SOCIOLOGICAL REVIEW

OFFICIAL JOURNAL OF THE AMERICAN SOCIOLOGICAL ASSOCIATION

ONLINE SUPPLEMENT
to article in
AMERICAN SOCIOLOGICAL REVIEW, 2018, VOL. 83

THE SOCIAL ECOLOGY OF SPECULATION: COMMUNITY ORGANIZATION AND NON-OCCUPANCY INVESTMENT IN THE U.S. HOUSING BUBBLE

Adam Goldstein
Princeton University

LPPI Subsample Representativeness

As noted in the main text, data on regulatory institutions in the housing market (the LPPI index) was only available for a subset of places. According to Gyourko, Saiz, and Summers (2008: Table 2), the municipalities included in the Wharton database tend to be larger, have higher median home values, and have a lower proportion of non-Hispanic white residents than does the typical municipality within an MSA.

I do not use sample weights in the subsample analysis because the primary predictors of inclusion in the Wharton database are already included as covariate controls in the model.[1] Figure S1 shows the distributions for the full and restricted samples. The distributions for all the variables are very similar across the full and reduced samples.

Model Specification Robustness

This section reports the results of model specification checks (Young and Holsteen 2017). I examined the sensitivity of the reported results to several aspects of model uncertainty: (1) covariate controls; (2) variable operationalization; (3) functional form of the outcome; and (4) geographic dependence. I also checked the extent to which unobserved variations in the proportion of vacation residences and non-local speculators might bias estimates. Taken together, these tests buttress the findings reported in the main text, notwithstanding a few caveats noted below.

Covariate Controls

To what extent are the reported findings sensitive to variations in the set of included covariates? Although the addition of control variables is typically guided by theoretical intuition about potential confounds, in practice model specification and selection are unavoidably ad hoc (Leamer 1983; Young and Holsteen 2017). Moreover, over-controlling can induce artifactual correlations.

To allay concerns about model specification and selection, I systematically re-specified the models using every possible combination or subset of variables from the full specifications in Tables 2 and 3 (for the LPPI subsample) in the main text (Young and Holsteen 2017). I then examined how the distribution of coefficient estimates varied across the universe of specifications. To test the sensitivity of each focal coefficient estimate, I ran 2^{16} (65,536) different model specifications (Simons 2005). In addition to the

[1] Unreported specifications indicate that the negative association between LPPI and (log) NOI is robust to the use of probability weights. The magnitude of the LPPI coefficient roughly doubles when weights are included (results available).

focal covariate, all specifications retain core measures of (log) population, population density, year dummies, and the controls to adjust for vacation/recreation areas. Of course, this technique does not (and logically cannot) assess robustness to every conceivable model specification. Rather, it reveals the degree to which the estimates of interest are invariant to alternative specifications within the particular modeling space defined by the available covariates.

Figure S2 plots the distributions of coefficient estimates for each hypothesized variable. The overlaid vertical lines represent the coefficients reported in the main text (from specifications with the full set of controls). Overall, the patterns in Figure S2 offer reassurance that the conditional associations reported in the main text are both robust and reasonable in light of potential alternative specifications. The directionality of association for each of the focal covariates remained stable across all 65,536 alternative specifications. In no case did the sign ever change.

Variable Measures

I also examined the sensitivity of the results to variations in the measurement of key covariates. These are described below and summarized in Table S1.

LPPI. As noted in the main text, the index measure of local political participation in the development process (Gyourko et al. 2008) is based on two components: (1) survey responses from local government officials on their perceptions of the degree to which local institutions afford residents control over various aspects of the development and growth governance, and (2) administrative data on the number of land preservation initiatives placed on local ballots from 1996 to 2005 (approximately 14 percent of places had at least one preservation initiative during this period). I disaggregated the index into the two components and ran two separate models, each including one of the individual components instead of the LPPI index. These tests reveal a robust negative association for the administrative component, but not for the survey-based component. Although the sign on the coefficient for the survey-based measure is in the predicted negative direction, it is not statistically significant. This pattern is identical whether or not state fixed-effects are included. The stronger signal from the administrative measure is not surprising, because the survey measure is based on officials' perceptions, and hence presumably subject to a greater degree of measurement error.

Employment localization. The main analyses capture the local embeddedness of economic enterprise by measuring the share of all private non-agricultural employment at establishments of locally-headquartered firms. I also experimented with a more expansive version, which includes government employees in both the numerator and the denominator. Similar to the main analysis, this alternative measure exhibits a small yet statistically significant negative association with NOI.

Walmart. The main analyses gauge Walmart density by counting the number of stores per capita. I also experimented with using a simple count, as well as a store-size weighted count in case the firm utilizes smaller numbers of large "super-stores" in certain areas. These alternative measures yield substantively identical results.

Civic capacity. The main analyses measure the number of locally-based nonprofits classified by the National Center for Charitable Statistics as "community improvement organizations." I also experimented with a more expansive definition, which includes organizations classified as "civic organizations" and "civil rights organizations." Here again we see a similarly negative association between the presence of nonprofits and NOI.

Geographic Dependence: State Fixed-Effects and Regionally-Stratified Models

The models reported in the main text include place- and county-level random intercepts. Given the importance of context in the analysis, I tested whether the results are sensitive to alternative structures of geographic dependence. I fit models with additional state fixed-effects, as well as models stratified by region. By estimating the focal associations from a narrower range of geographic variation, these specifications aim to ensure that the inferred community-level associations are not artifacts of unmeasured process organized at higher levels of analysis.

Table S2 shows the results under these alternatives. The first model in each panel includes state fixed-effects. The inclusion of state fixed-effects controls for all state-varying, time-constant differences (e.g., differing property tax regimes). Here again the results are very similar.

The second two models in each panel show results in which the sample is stratified into high- and low-NOI regions. The high concentration of NOI in the southern and western Sunbelt states could partly reflect distinctive regional cultures. This could generate spurious results if the theoretically derived indicators of "place as exchange value" are simply profiling common characteristics of locales in the South and West. The stratified models test whether the same place-level associations attain separately *within* both high- and low-NOI regions. To do this, I split the sample into two super-regions and ran separate regressions within each. The high-NOI super-region is defined as the Census Bureau Divisions 9 (Pacific), 8 (Mountain), 7 (West South Central), and 5 (South Atlantic). The low-NOI divisions include 1 (New England), 2 (Mid-Atlantic), 3 (East North Central), 4 (West North Central), and 6 (East South Central).

The region-stratified specifications are generally confirmatory, suggesting that the same community-level processes are operative within low- and higher-NOI regions. There was some heterogeneity across the two super-regions, however. The patterns within the Sunbelt divisions were similar to those reported in the main body of the article: all of the coefficients except the LPPI were of similar magnitude and statistical significance. However, the association for the LPPI indicator had no effect within the higher NOI region. In the lower NOI regions, the Walmart density and residential instability associations are attenuated, but the employment localization and LPPI associations are more pronounced.

Functional Form

The specifications reported in the main text model the mean of the log-transformed response as a linear function of the model parameters. An alternative approach involves modeling the log of the mean response using a generalized linear mixed model (GLMM) with a link function. The GLMM approach allows us to account for the fact that the outcome variable is not truly interval because it is bounded at zero. It also allows us to circumvent reverse-transformation bias that can afflict linear regression on log-transformed outcomes (rather than correcting for the reverse transformation bias ex post).

Table S3 shows the results using a negative binomial GLMM model. This model retains the same three-level random intercept structure as those in the main text, but uses a link function to account for nonlinearity of the response distribution. In this case, the two approaches yield very similar results.

Dropping Interpolated Observations

The analyses in the main text rely on linearly interpolating several demographic covariates between the 2000 Decennial Census and the 2005 to 2007 American Community Survey three-year estimates. To ensure that the statistical significance of the main findings are not dependent on the addition of interpolated observations, I reran the regressions using only the 2000 and 2006 waves. These results are shown in Table S4. The results are very similar to those in the main analysis.

Vacation Homes and Non-local Speculators

I conducted several additional checks to address concerns that unmeasured variations in the relative shares of vacation-home buyers or non-local investors might bias the results. These are reported in Table S5.

First, I weighted the regression by the complement of the proportion of seasonal housing units (rather than conditioning on this variable). Second, I reran the analyses, excluding all place-year observations above the 90th percentile of %seasonal units or above the 90th percentile of %tourism industry employment. Both of these techniques yielded virtually identical results.

Finally, I leveraged data on known rates of investment by non-local speculators for a small, non-random sample of 21 large MSAs (Chinco and Mayer 2016). Chinco and Mayer used proprietary transaction data culled from local deed records to develop estimates of non-local investment purchases at the MSA level. Their definition of investment purchases is not directly comparable to the present HMDA-based figures insofar as theirs also includes cash (non-mortgage) purchases. The inclusion of cash purchasers means their measure will tend to pick up more purchases by non-locals. They also tabulated across broader geographic units (MSAs) and only for a subset of cities. Nonetheless, their data highlight four MSAs with particularly elevated ratios of out-of-town speculators: Orlando, FL; Las Vegas, NV; Phoenix, AZ; and Riverside, CA.

Because these four MSAs also exhibited very high rates of NOI, it is important to ensure they are not skewing the results. I re-specified the models, *excluding* all 78 places in the sample located within the Orlando, Las Vegas, Phoenix, or Riverside MSAs. Again, all the main results were substantively identical. Although this check is in no way definitive, the insensitivity of the findings to the omission of these 78 places makes us more confident that unobserved compositional differences in the share of non-local investors are not skewing the results.

Alternative Outcome Measure: Incidence of Six-Month Property Flips

The analyses in the main text focus on the HMDA measure of mortgage-funded non-occupant purchases. Because the HMDA measure necessarily excludes all-cash purchases, I experimented with an alternative outcome indicator: the incidence of property flipping as measured by the (log) number of residential properties in a place that were resold within six months of purchase. This measure is based on administrative transaction data, which I acquired from the firm RealtyTrac (2015). It captures cash- and mortgage-funded arms-length transactions. Resale within six-months is a conventional indicator for flipped properties. The measure is dated to reflect the year in which the original purchase was made (rather than the date of resale).

Although virtually all homes resold within six months were originally purchased as investments, the six-month flip measure represents a much narrower operationalization of NOI compared to the HMDA measure, because it excludes investor purchases in which the buyer held the property for more than six months. Hence it only captures a subset of quick-flip investments by those pursuing very short-term investment strategies. The correlation between the six-month flipping measure and the HMDA non-occupant measure is $r = .61$. This modest correlation suggests that flipping did not perfectly track the incidence of non-occupant loan originations.

Figure S3 shows standardized coefficient estimates from a multilevel model of the incidence of (log) six-month flips. This is based on an equivalent model specification as that used to produce Figure 3 in the main text. The overall pattern of conditional associations is very similar to the analysis of the HMDA NOI measure. The two exceptions are residential instability and LPPI, both of which cease to have a statistically significant association. One possible reason for the less consistently pronounced relationships in the case of

rapid flipping is that this measure likely captures more activity by professionals, who may be less affected by contextual features of place.

References

Chinco, Alex, and Christopher Mayer. 2016. "Misinformed Speculators and Mispricing in the Housing Market." *Review of Financial Studies* 29(2):486–522.

Gyourko, Joseph, Albert Saiz, and Anita Summers. 2008. "A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index." *Urban Studies* 45(3):693–729.

Leamer, Edward. 1983. "Let's Take the Con Out of Econometrics." *American Economic Review* 73(1):31–43.

RealtyTrac. 2015. "Property Flipping Report." Machine Readable Data File.

Simons, Kenneth L. 2005. RCHECK. Stata macro (http://homepages.rpi.edu/~simonk/stata).

Young, Cristobal, and Katherine Holsteen. 2017. "Model Uncertainty and Robustness: A Computational Framework for Multimodel Analysis." *Sociological Methods & Research* 46(1):3–40.

Figure S1: Comaprison of Variable Distributions in Full Sample of Cities (dashed) and Restricted Subsample (solid) of Cities

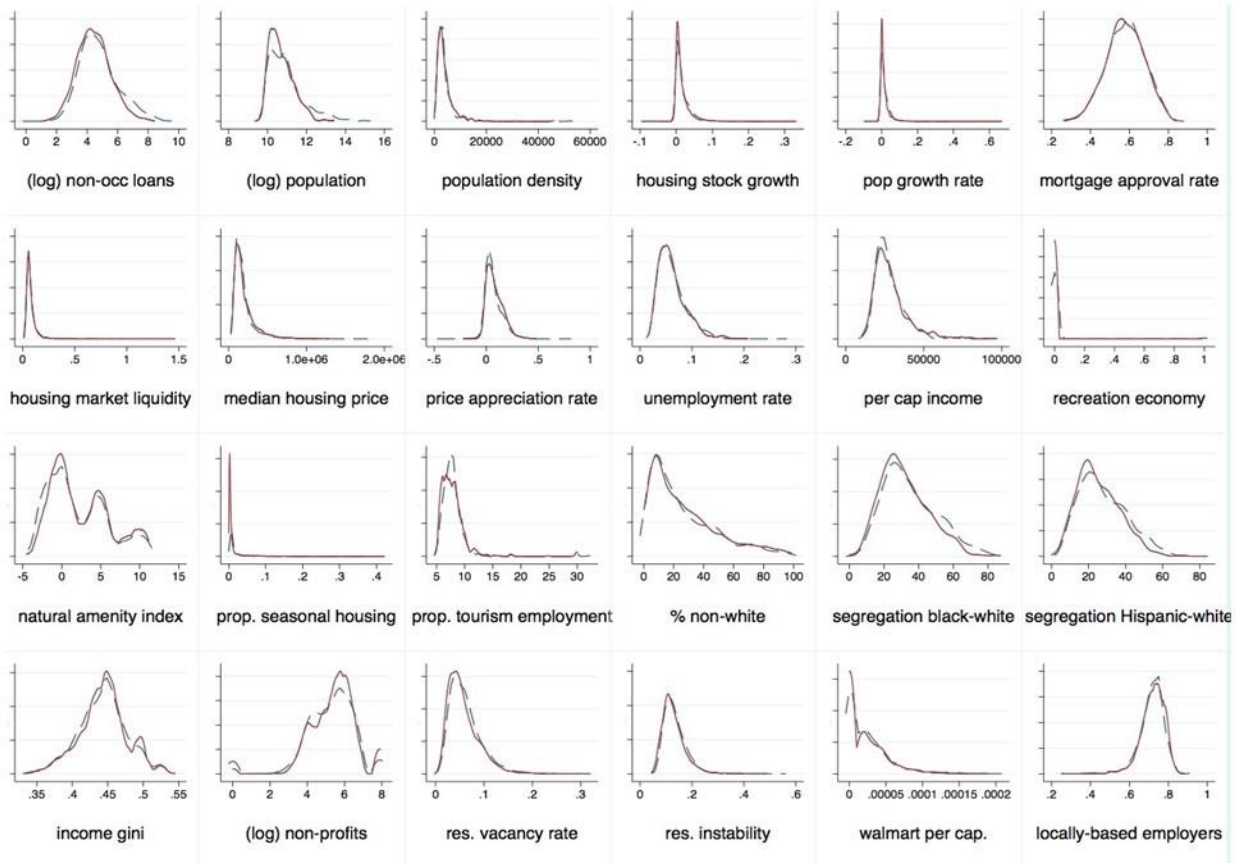

Figure S2: Distributions of Coefficient Estimates from Alternative Model Specifications

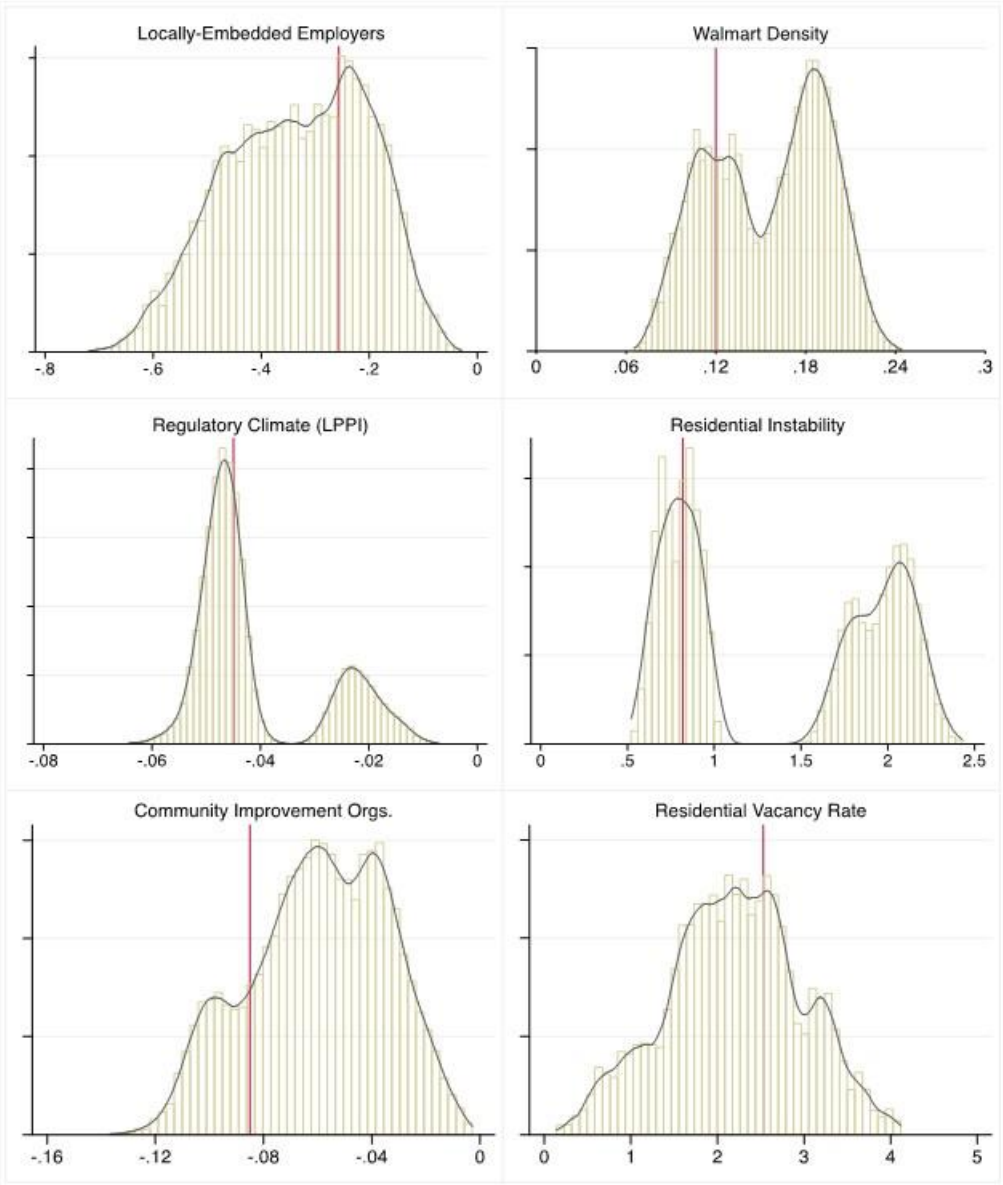

Figure S3: Standardized Coefficient Estimates from Model of 6-Month Property Flips

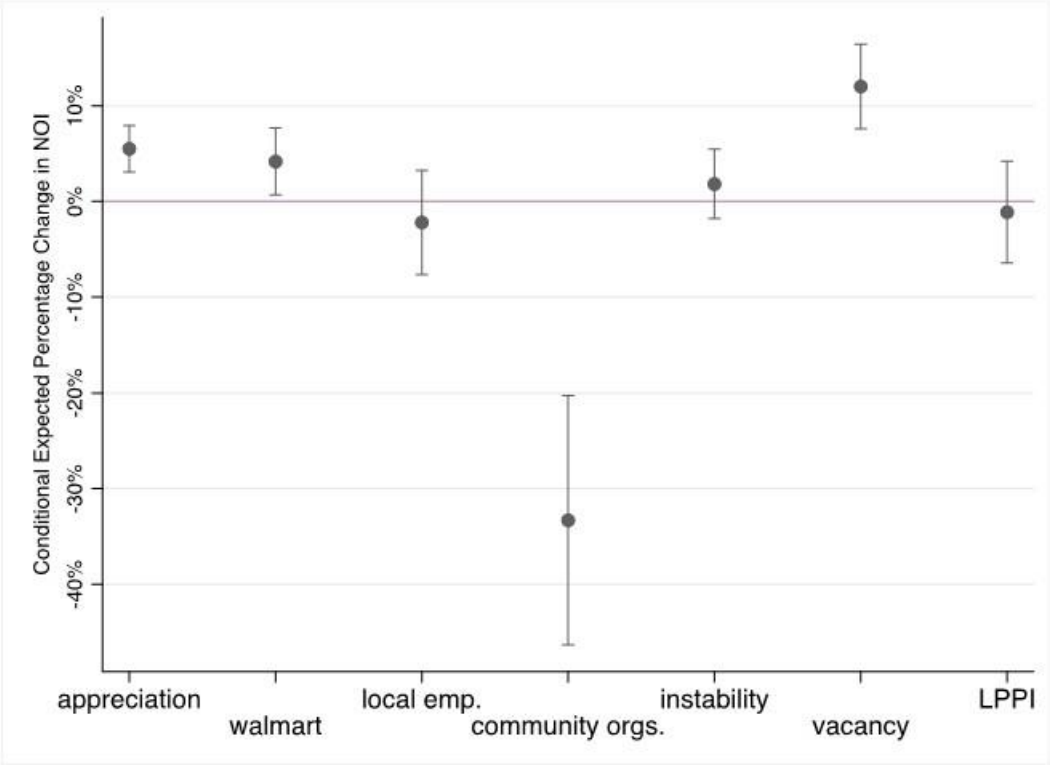

Table S1. Results of Tests Using Alternative Variable Measures of Key Covariates

Hypothesis	Original Measure	Result	Alternative Measure	Alt. Result
2	Wharton LPPI Index	-	Number of land preservation initiatives, survey-based perceptions of political involvement	-/0
3a	Employment at locally-based firms as share of *total private* non-agricultural employment	-	Employment at locally-based firms, govt. agencies, and nonprofits as share of *total* non-agricultural employment	-
3b	Walmart density (per capita)	+	Walmart count, superstore-weighted count	+/+
4	Number nonprofit community improvement orgs.	-	Number nonprofit civil rights orgs.	-
5a	Proportion residents in different house one year prior	+	Proportion residents in different house in different MSA one year prior	+

Table S2. Estimates of (log) Non-occupant Purchases in U.S. Cities, with State Fixed-Effects, Regional Stratification

	Full Sample			Reduced (LPPI) Sample		
State Dummies / Region-Stratified	State FE	Low Region	High Region	State FE	Low Region	High Region
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log Population	1.08***	1.10***	1.05***	1.06***	1.07***	1.03***
	(.017)	(.027)	(.022)	(.024)	(.042)	(.030)
Pop. Density	.0044	.036***	–.023**	.0080	.041**	–.016
	(.0041)	(.0087)	(.0070)	(.0063)	(.014)	(.013)
Pop. Growth Rate	.19	–.84	.33	–.95	–2.30	–.24
	(.40)	(.97)	(.45)	(.63)	(1.28)	(.71)
Housing Supply Growth	2.39***	–.41	2.91***	3.31**	3.16	4.07***
	(.69)	(1.64)	(.77)	(1.05)	(2.15)	(1.20)
Mort. Approval Rate	–.17	.21	–.71***	.038	.55	–.82**
	(.13)	(.19)	(.18)	(.19)	(.28)	(.28)
Market Liquidity	2.01***	2.78***	1.88***	2.90***	1.82***	3.01***
	(.13)	(.42)	(.14)	(.23)	(.51)	(.26)
Unemployment Rate	1.24**	2.85***	.60	.65	5.19***	–.67
	(.47)	(.79)	(.59)	(.72)	(1.24)	(.88)
Income per Capita	.015***	.0010	.025***	.015***	.0033	.027***
	(.0016)	(.0027)	(.0023)	(.0028)	(.0046)	(.0038)
Income Gini	–.22	–.81	2.36**	–.64	–1.78	2.74**
	(.52)	(.75)	(.73)	(.70)	(1.09)	(1.04)
% Non-white	–.25**	–.025	–.56***	–.28*	.24	–.62***
	(.082)	(.14)	(.10)	(.14)	(.25)	(.17)
Racial Segregation	.0030**	.0034*	.0019	.0044**	.0043	.0053**
	(.00095)	(.0015)	(.0013)	(.0015)	(.0023)	(.0020)
Prop. Seasonal Housing	3.67***	5.19*	3.62***	4.96***	4.42	4.82***
	(.38)	(2.21)	(.39)	(.62)	(2.79)	(.62)
% Tourism Employment	.031***	.056**	.034***	.022*	.042	.027**
	(.0071)	(.018)	(.0070)	(.0086)	(.027)	(.0088)
ERS Rec. Economy	.58***	.34	.51***	.64***	.52	.49**
	(.13)	(.31)	(.15)	(.16)	(.50)	(.18)
ERS Natural Amenities	.0081	–.0088	.064***	.0022	.0087	.052***
	(.013)	(.016)	(.0093)	(.016)	(.025)	(.013)
Median House Price	–.0023***	–.00097***	–.0030***	–.0023***	–.00074	–.0030***
	(.000098)	(.00025)	(.00012)	(.00016)	(.00048)	(.00018)
Annual Appreciation	.87***	.64***	.63***	.54***	.23	.32**
	(.060)	(.13)	(.078)	(.091)	(.18)	(.12)
Walmart per Capita	.075	.027	.080	.091	.00015	.18
	(.043)	(.064)	(.056)	(.068)	(.089)	(.091)
Locally Embedded Emp.	–.059	–.46*	.16	–.015	–.75*	.46
	(.16)	(.22)	(.23)	(.23)	(.34)	(.31)
Log Nonprofit Orgs.	–.064***	–.066**	–.095***	–.034	–.075**	–.084*
	(.017)	(.021)	(.027)	(.019)	(.028)	(.036)
Residential Instability	.76***	–.058	.75**	.49	–.55	.60
	(.19)	(.29)	(.28)	(.29)	(.40)	(.43)
Res. Vacancy Rate	2.79***	1.95***	1.26*	3.41***	1.29	1.27
	(.36)	(.58)	(.50)	(.56)	(.88)	(.79)
LPPI				–.039*	–.027	.012
				(.017)	(.024)	(.026)
Constant	–8.34***	–8.07***	–8.39***	–8.44***	–7.28***	–8.64***
	(.33)	(.44)	(.40)	(.45)	(.68)	(.56)
Var. County-Level RE	.028	.033	.042	.013	.055	.028
Var. Place-Level RE	.133	.100	.133	.130	.098	.127
Var. Residual	.074	.058	.077	.074	.058	.073

*p < .05; **p < .01; ***p < .001 (two-tailed tests).

Table S3. GLMM Negative Binomial Models of Non-occupant Purchases in U.S. Cities, 2000 to 2006

	Full Sample						Reduced Subsample
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log Population	1.08***	1.09***	1.08***	1.09***	1.08***	1.07***	1.09***
	(.017)	(.018)	(.017)	(.017)	(.017)	(.017)	(.024)
Pop. Density	–.0014	–.00059	–.00094	.00011	–.0017	.00061	.0053
	(.0043)	(.0043)	(.0043)	(.0043)	(.0042)	(.0041)	(.0063)
Pop. Growth Rate	.071	.13	.081	.078	–.047	–.0012	–1.14
	(.40)	(.40)	(.40)	(.40)	(.40)	(.40)	(.63)
Housing Supply Growth	4.07***	3.90***	4.08***	3.95***	4.06***	3.99***	5.81***
	(.70)	(.70)	(.70)	(.70)	(.70)	(.69)	(1.06)
Mort. Approval Rate	–.17	–.16	–.16	–.17	–.26*	–.15	–.037
	(.12)	(.12)	(.12)	(.12)	(.12)	(.12)	(.18)
Market Liquidity	2.07***	2.06***	2.07***	2.07***	2.08***	2.17***	2.80***
	(.14)	(.14)	(.14)	(.14)	(.14)	(.14)	(.24)
Unemployment Rate	1.30**	1.36**	1.29**	1.23**	1.31**	.71	–.017
	(.47)	(.47)	(.47)	(.46)	(.46)	(.47)	(.71)
Income per Capita	.019***	.019***	.019***	.020***	.019***	.018***	.022***
	(.0017)	(.0017)	(.0017)	(.0017)	(.0017)	(.0016)	(.0029)
Income Gini	–.32	–.31	–.33	.23	–.32	–.62	–.50
	(.54)	(.54)	(.54)	(.55)	(.53)	(.53)	(.73)
% Non-white	–.21**	–.20*	–.21**	–.19*	–.23**	–.29***	–.17
	(.082)	(.082)	(.082)	(.082)	(.081)	(.080)	(.13)
Racial Segregation	.0020*	.0019	.0019*	.0018	.0022*	.0016	.0021
	(.00098)	(.00098)	(.00098)	(.00098)	(.00097)	(.00095)	(.0015)
Prop. Single-Family Rental	2.32***	2.31***	2.28***	2.18***	2.19***	1.98***	3.20***
	(.25)	(.25)	(.25)	(.25)	(.25)	(.25)	(.41)
Prop. Seasonal Housing	4.22***	4.25***	4.24***	4.22***	4.23***	4.06***	6.14***
	(.39)	(.39)	(.39)	(.39)	(.38)	(.38)	(.62)
% Tourism Employment	.047***	.046***	.046***	.045***	.045***	.042***	.036***
	(.0068)	(.0068)	(.0068)	(.0066)	(.0067)	(.0066)	(.0081)
ERS Rec. Economy	.53***	.53***	.53***	.48***	.52***	.51***	.47**
	(.14)	(.14)	(.14)	(.14)	(.14)	(.13)	(.17)
ERS Natural Amenities	.045***	.045***	.045***	.051***	.044***	.054***	.038***
	(.0066)	(.0066)	(.0066)	(.0066)	(.0065)	(.0065)	(.0082)
Median House Price	–.0026***	–.0026***	–.0026***	–.0026***	–.0025***	–.0025***	–.0027***
	(.000097)	(.000097)	(.000097)	(.000097)	(.00010)	(.000097)	(.00015)
Annual Appreciation	.75***	.75***	.75***	.75***	.76***	.80***	.39***
	(.058)	(.058)	(.058)	(.058)	(.059)	(.059)	(.086)
Walmart per Capita		.12**					
		(.044)					
Locally Embedded Emp.			–.26				
			(.16)				
Log Nonprofit Orgs.				–.077***			
				(.019)			
Residential Instability					.86***		
					(.19)		
Res. Vacancy Rate						2.77***	
						(.37)	
LPPI							–.042*
							(.018)
Constant	–8.49***	–8.62***	–8.30***	–8.44***	–8.46***	–8.31***	–8.67***
	(.29)	(.29)	(.31)	(.28)	(.28)	(.28)	(.39)
Var. County-Level RE	.068***	.067***	.067***	.062***	.066***	.066***	.055***
Var. Place-Level RE	.14***	.14***	.14***	.14***	.13***	.13***	.13***

*p < .05; **p < .01; ***p < .001 (two-tailed tests).

Table S4. Estimates of Incidence of (log) NOI in 2000 and 2006 (no interpolated years)

Log Population	1.07***	1.11***	1.07***	1.09***	1.06***	1.05***	1.07***
	(.019)	(.021)	(.019)	(.019)	(.018)	(.018)	(.018)
Pop. Density	–.0059	–.0039	–.0067	–.0040	–.0080	–.0047	–.0048
	(.0046)	(.0053)	(.0047)	(.0046)	(.0043)	(.0043)	(.0042)
Pop. Growth Rate	–6.95***	2.98	–6.91***	–7.14***	–6.91***	–5.13***	–5.74***
	(1.01)	(1.87)	(1.00)	(1.01)	(.90)	(.96)	(.89)
Housing Supply Growth	2.33*	–3.62	2.16*	2.03*	3.95***	2.81**	3.17***
	(1.03)	(2.29)	(1.03)	(1.03)	(.94)	(.97)	(.92)
Mort. Approval Rate	.54*	–.82*	.49*	.51*	–.54*	1.09***	–.029
	(.24)	(.35)	(.24)	(.24)	(.22)	(.23)	(.22)
Market Liquidity	5.00***	2.08***	4.91***	5.12***	3.66***	4.30***	3.50***
	(.24)	(.26)	(.24)	(.24)	(.22)	(.23)	(.22)
Unemployment Rate	6.24***	4.27***	6.28***	6.03***	2.83***	2.41***	1.25*
	(.68)	(.86)	(.68)	(.67)	(.63)	(.66)	(.62)
Income per Capita	–.0066***	.014***	–.0056**	–.0058**	.0057**	–.0073***	.0051**
	(.0020)	(.0027)	(.0020)	(.0020)	(.0019)	(.0019)	(.0019)
Income Gini	2.15**	–1.66*	2.41**	3.07***	.50	.71	.66
	(.74)	(.74)	(.76)	(.75)	(.63)	(.66)	(.61)
% Non-white	–.71***	–.37***	–.71***	–.67***	–.55***	–.69***	–.51***
	(.100)	(.11)	(.10)	(.099)	(.091)	(.092)	(.088)
Racial Segregation	.0096***	.0013	.0095***	.0094***	.0070***	.0057***	.0047***
	(.0012)	(.0015)	(.0012)	(.0012)	(.0011)	(.0011)	(.0011)
Prop. Single-Family Rental	1.93***	2.42***	2.07***	1.73***	1.32***	.92**	.77**
	(.31)	(.34)	(.31)	(.31)	(.28)	(.29)	(.28)
Prop. Seasonal Housing	4.97***	4.55***	4.88***	4.93***	4.79***	4.04***	4.21***
	(.46)	(.45)	(.46)	(.46)	(.43)	(.43)	(.41)
% Tourism Employment	.041***	.044***	.042***	.039***	.031***	.028***	.026***
	(.0091)	(.0087)	(.0095)	(.0089)	(.0077)	(.0081)	(.0071)
ERS Rec. Economy	.51**	.31	.49**	.42*	.45**	.44**	.35*
	(.18)	(.18)	(.18)	(.17)	(.15)	(.16)	(.14)
ERS Natural Amenities	–.014	.0092	–.015	–.0037	.011	.021*	.034***
	(.0091)	(.010)	(.0094)	(.0090)	(.0077)	(.0083)	(.0075)
Median House Price	.00068***	–.0011***	.00057***	.00067***	–.00028*	.00038**	–.00036**
	(.00013)	(.00019)	(.00013)	(.00013)	(.00012)	(.00013)	(.00012)
Annual Appreciation	1.77***	1.09***	1.72***	1.79***	1.41***	1.86***	1.52***
	(.16)	(.27)	(.16)	(.16)	(.15)	(.16)	(.14)
Walmart per Capita		.18*					.23***
		(.072)					(.057)
Locally Embedded Emp.			1.34***				.88***
			(.30)				(.24)
Log Nonprofit Orgs.				–.14***			–.088***
				(.027)			(.022)
Residential Instability					5.97***		4.77***
					(.23)		(.24)
Res. Vacancy Rate						9.30***	5.55***
						(.49)	(.50)
Constant	–9.71***	–7.24***	–1.8***	–9.54***	–8.75***	–9.14***	–9.43***
	(.37)	(.42)	(.43)	(.37)	(.33)	(.34)	(.36)
Var. County-Level RE	.194	.130	.214	.172	.111	.130	.084
Var. Place-Level RE	.051	.156	.053	.049	.055	.027	.044
Var. Residual	.219	.028	.214	.219	.176	.214	.172

Note: Estimates from sample of 1,569 places in 478 counties (n = 8,054).
*p < .05; **p < .01; ***p < .001 (two-tailed tests).

Table S5. Models with Alternative Adjustments for Vacation Areas and Nonlocal Investors

	Weighted by inverse %seasonal housing units		Excluding places in top 10% tourism and seasonal units		Excluding places in MSAs with high non-local NOI	
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Log Population	1.08***	1.08***	1.09***	1.09***	1.10***	1.10***
	(.020)	(.027)	(.017)	(.025)	(.017)	(.025)
Pop. Density	.0028	.0057	.0041	.011	.0031	.0067
	(.0093)	(.0070)	(.0041)	(.0062)	(.0040)	(.0062)
Pop. Growth Rate	.087	–.89	–.32	–1.17	–1.42**	–2.55***
	(.49)	(.94)	(.48)	(.69)	(.48)	(.68)
Housing Supply Growth	3.28**	4.62**	3.67***	5.02***	3.48***	6.34***
	(1.15)	(1.41)	(.77)	(1.16)	(.75)	(1.13)
Mort. Approval Rate	–.14	.043	–.28*	–.057	–.24	.032
	(.22)	(.28)	(.13)	(.19)	(.12)	(.18)
Market Liquidity	2.44***	3.21***	2.64***	2.89***	3.81***	3.56***
	(.52)	(.74)	(.16)	(.25)	(.19)	(.28)
Unemployment Rate	.58	–.87	.84	–.45	1.17*	.22
	(1.08)	(1.28)	(.48)	(.72)	(.46)	(.71)
Income per Capita	.020***	.023***	.017***	.020***	.017***	.019***
	(.0025)	(.0037)	(.0017)	(.0029)	(.0016)	(.0028)
Income Gini	.13	.12	–.93	–1.41	.34	.14
	(.72)	(1.03)	(.56)	(.77)	(.54)	(.75)
% Non-white	–.29	–.25	–.29***	–.21	–.33***	–.27*
	(.16)	(.23)	(.080)	(.13)	(.079)	(.14)
Racial Segregation	.0032*	.0048*	.0033***	.0033*	.0023*	.0026
	(.0016)	(.0024)	(.00098)	(.0016)	(.00095)	(.0016)
Prop. Single-Family Rental	1.71*	2.36**	1.75***	2.71***	1.86***	2.53***
	(.81)	(.72)	(.26)	(.45)	(.25)	(.43)
Prop. Seasonal Housing			5.25***	7.01***	4.59***	5.63***
			(.49)	(.91)	(.44)	(.68)
% Tourism Employment	.053***	.047***	.075***	.074**	.046***	.037***
	(.0084)	(.0083)	(.016)	(.023)	(.0088)	(.011)
ERS Rec. Economy	.68***	.77***	0	0	.42**	.41*
	(.15)	(.17)	(.)	(.)	(.14)	(.17)
ERS Natural Amenities	.064***	.061***	.048***	.043***	.049***	.047***
	(.0081)	(.011)	(.0066)	(.0088)	(.0065)	(.0088)
Median House Price	–.0024***	–.0025***	–.0021***	–.0022***	–.0021***	–.0023***
	(.00033)	(.00051)	(.00010)	(.00016)	(.000097)	(.00015)
Annual Appreciation	.86***	.52**	.85***	.49***	.77***	.51***
	(.15)	(.16)	(.065)	(.097)	(.064)	(.096)
Walmart per Capita	.094	.086	.099*	.085	.13**	.085
	(.069)	(.088)	(.044)	(.067)	(.043)	(.067)
Locally Embedded Emp.	–.080	–.022	–.090	–.061	–.075	–.047
	(.28)	(.38)	(.17)	(.24)	(.16)	(.23)
Log Nonprofit Orgs.	–.079**	–.063	–.067***	–.048*	–.085***	–.062**
	(.028)	(.034)	(.018)	(.022)	(.019)	(.024)
Residential Instability	.61	.22	1.03***	.27	.72***	.29
	(.40)	(.53)	(.20)	(.30)	(.19)	(.29)
Res. Vacancy Rate	2.51**	2.96**	2.44***	2.71***	2.24***	2.58***
	(.84)	(1.09)	(.38)	(.59)	(.37)	(.57)
LPPI		–.045		–.044*		–.043*
		(.024)		(.018)		(.018)
Constant	–8.54***	–8.79***	–8.36***	–8.52***	–8.76***	–8.97***
	(.41)	(.50)	(.31)	(.44)	(.30)	(.43)
Var. County-Level RE	.074	.071	.052	.050	.062	.060
Var. Place-Level RE	.153	.159	.127	.130	.125	.130
Var. Residual	.073	.073	.074	.073	.070	.070

*p < .05; **p < .01; ***p < .001 (two-tailed tests).