J Real Estate Finan Econ (2015) 50:129–149
DOI 10.1007/s11146-013-9446-8

Nonlocal Office Investors: Anchored by their Markets and Impaired by their Distance

Yu Liu · Paul Gallimore · Jonathan A. Wiley

Published online: 6 October 2013

Abstract Nonlocal investors purchase and sell investment property in a distant metropolitan area. In this study, we identify capital value underperformance for nonlocal investors on both sides of the transaction, when they purchase and when they sell. The commercial real estate transactions data include a national sample of office property occurring in more than 100 U.S. markets. Using propensity-score matched sample to control for selection bias, we find that nonlocal investors overpay on the purchase by an estimated 13.8 % and sell at an estimated 7 % discount. These disadvantages relative to local investors expand with the geographic distance separating investor and asset. Nonlocal investors fundamentally overvalue similar assets sold to each other relative to assets transacted between locals, and are less patient as sellers. The positive bias in overpayment is directly tied to office rent differentials between the asset and investor markets.

Keywords Market efficiency · Investor clienteles · Information asymmetry

Introduction

Real estate markets are not perfectly efficient and previous research provides one manifestation of this in a premium paid by nonlocal buyers. Evidence for this has

Y. Liu
Department of Real Estate, J. Mack Robinson College of Business, Georgia State University, 35 Broad St., Suite 1407, Atlanta, GA 30303, USA
e-mail: yliu54@student.gsu.edu

P. Gallimore
School of Real Estate and Planning, Henley Business School, The University of Reading, Reading, Berkshire RG6 6AH, UK
e-mail: p.gallimore@reading.ac.uk

J. A. Wiley (✉)
Department of Real Estate, J. Mack Robinson College of Business, Georgia State University, 35 Broad St., Suite 1408, Atlanta, GA 30303, USA
e-mail: jwiley@gsu.edu

been found on houses (Miller et al. 1988; Ihlanfeldt and Mayock 2012) and apartment complexes (Lambson et al. 2004). Several possible explanations exist for the differential pricing including unobservable selection bias, informational asymmetries, anchoring, and investor clienteles. Selection bias may occur because assets purchased by nonlocal investors may be fundamentally different (e.g., higher quality) in a manner not empirically measured or controlled by previous studies. Nonlocal investors may be less familiar with the market and encounter higher search costs and informational disadvantages that may lead to an upward shift in the distribution of their estimated value, which increases the risk of buyer overbidding (Turnbull and Sirmans 1993). In addition to a wider variance, the mean of the distribution for expected property values may be anchored by reference points from the nonlocal market, leading to overpayment by investors from expensive nonlocal real estate markets. Some investor groups ('clienteles') may systematically overpay for commercial real estate, such as has been found with non-real estate corporations (Wiley 2012). The extent to which nonlocal investors are disproportionately represented by tax-exempt and institutional investors who have superior access to capital markets, or by less sophisticated investor clienteles, may influence the degree of overpayment.

While overpayment on the purchase side of the transaction has been considered by previous studies, local/nonlocal differences in sales outcomes have not. If unobservable selection bias exists in the form of higher quality underlying assets selected by nonlocal investors, then those assets should subsequently be sold at higher prices. Conversely, while nonlocal anchoring bias may contribute to higher prices paid by nonlocal investors, it should have no impact on a subsequent sale: unless the property is sold to another nonlocal investor from an expensive market.[1] Similarly, if low cost of capital investor clienteles play a role on the purchase, the sale price should be unaffected unless the asset is sold to a similar investor. However, if nonlocal investors are truly less well-informed, resulting either from geographic distance to the investment market or because they are drawn from unsophisticated investor clienteles, then the exit price is expected to be relatively lower as a result.

To further investigate these explanations for the behavior of nonlocal real estate investors, we consider in this study the effects on both sides of the transaction. For this purpose, we use commercial real estate rather than housing, because once a home is purchased the buyer typically moves to the property and relinquishes their nonlocal status. Within the commercial real estate sector, we choose office property transactions, where owner-occupants represent a relatively small component of the market.

We build partly on the work of Lambson et al. (2004), who provide evidence of premiums paid by out-of-state investors for apartments in Phoenix, Arizona. We extend this work by considering the outcome when the property is *sold* by distant investors. In addition to examining both purchase and sale sides of the transaction, our study takes a national rather than single-city perspective, utilizing evidence from a large number of metropolitan markets. The data used in our analysis are from 138 distinct CoStar markets and include 10,971 purchases and 11,444 sales of office property where the investor clientele is observable. The empirical analysis controls

[1] Purchase-price anchoring may be present on a subsequent sale (Genesove and Mayer 2001; Bokhari and Geltner 2011), however we do not investigate this in the current study not least because our data are severely limited in repeat sales observations.

for investor clienteles, timing, location and sale conditions. To control for selection bias, and representing a methodological development in such studies, a propensity-score matching procedure is applied to similar assets and conditions for transactions involving nonlocal and local investors. We provide estimates for the differential pricing in purchases and sales involving nonlocal investors, test for whether this pricing is related to reference points from the investor's market or related to distance from the asset, and compare differences in prices that involve transactions between nonlocals and a matched subsample of similar assets transacted between local investors.

The remainder of this study is organized as follows. The next section provides a Literature Review for the existing studies related to nonlocal investment behavior in real estate markets. Section 3 describes the Data and Empirical Methods used to test the alternative expectations. Section 4 provides a discussion of the Empirical Results, and the final section offers some Concluding Remarks.

Literature Review

The idea that nonlocal buyers may pay a premium for real estate is well-established. For example, Vrooman (1978) finds that nonlocal buyers of forest land parcels in the Adirondack Park pay more than locals, and ascribes this to a combination of information asymmetry, higher search costs and the possibility that nonlocals may be 'accustomed' to higher land prices. The last of these explanations is analogous to the anchoring effect, popularized following Tversky and Kahneman (1974). This implies that an individual's investment decision and willingness to pay may be biased by unrelated reference points. In experimental real estate settings, anchoring bias has been revealed with residential salespersons (Northcraft and Neale 1987), and in negotiations between buyers and sellers (Black and Diaz 1996). It has been extensively studied in real estate appraisal, with anchors ranging through previous appraisals (Diaz and Wolverton 1998), transaction price feedback (Hansz and Diaz 2001), and pending sale price (Gallimore and Wolverton 1997).

Studies involving nonlocal premiums have most frequently utilized transactions of residential property. Miller et al. (1988) find that during 1986 to 1988 Japanese buyers paid a significantly higher (c.21 %) price for homes in Waialae-Kahala, Hawaii. They attribute this to a number of causes, including movement in the yen-dollar exchange rate and information asymmetry, but are unable to separate out these effects. Turnbull and Sirmans (1993) present a model which formally develops expectations that out-of-town buyers should pay different prices for real estate due to higher search costs and because they are less informed about the market. They do not, however, find evidence of differential prices for nonlocal buyers in the Baton Rouge, Louisiana housing market, an outcome that they attribute to the efficiency of existing information provision (i.e., MLS). Watkins (1998) in part replicates Turnbull and Sirmans' study, using data from the Glasgow (Scotland) housing market. He finds no evidence of distinctive prices paid by new entrants from outside the market and concludes that this is due to effective information dissemination. However, the ability of both these studies to detect price differences is arguably limited by small sample sizes, and their models have been criticized for under-specification and omitted variables (Lambson et al. 2004; Ihlanfeldt and Mayock 2012).

The nonlocal effect has also been investigated in relation to decisions about the *rental* market. Simonsohn and Loewenstein (2006) find that new residents arriving in cities from more expensive rental markets initially select higher rent homes, and vice versa. After considering various alternative explanations, including imperfect information, they conclude that this behavior is best explained as a background contrast effect (Simonson and Tversky 1992), analogous to but subtly different from anchoring.

Lambson et al. (2004) extend the search and information model of Turnbull and Sirmans (1993) to consider the behavior of buyers whose motive is investment rather than occupation. They apply this to nonlocal buyers of apartment complexes in Phoenix, Arizona. They find that out-of-state buyers pay a significant premium. They use a broad "high-priced state" categorical variable to evaluate whether the out-of-state buyer premiums are associated with anchoring effects, but do not find statistically significant evidence in support of this. Nor do they find that information asymmetry, measured using investor experience of the Phoenix market, explains the premium. However, when they combine their anchoring and information asymmetry proxies, they do find significant differences in the direction of their conjecture: inexperienced buyers from high-price states pay a significantly higher premium than experienced buyers from low-price states.

One feature of the Lambson et al. study, as Clauretie and Thistle (2007) point out, is the absence of control for either time-on-market or intra-market location factors. Clauretie and Thistle incorporate these variables into an investigation of in-state and out-of-state buyers of single-family homes purchased as investment properties in Las Vegas. They find that while out-of-state buyers pay significantly more, anchoring and search costs fail to account for the price differences when location and time-on-market are included in their model. Effectively, they argue that anchoring effects and high search costs operate to direct where within a market, and how quickly, out-of-state buyers buy (rather than cause them to overpay).

Neo et al. (2008) examine buying behavior in the Singapore housing market, and include comparisons between both foreign and local buyers, and buyers from different price districts within the Singapore market. They find that foreign buyers pay more than locals for low-rise houses but not for high-rise condominiums. They interpret this as explicable via information asymmetry, since the low-rise properties are more heterogeneous and transact in a market with poorer information quality. They do not consider the anchoring dimension of foreign buyers, but investigate anchoring instead by isolating buyers' premiums (i.e., where actual price exceeds predicted price) and testing for their presence in prime, high-price districts and in low-price districts. They submit that evidence is stronger for the former, and supportive of anchoring.

Liu and Roberts (2012) use rural housing in the county of Aberdeenshire, Scotland in order to study various relationships in buying behavior. They examine differences in relation to the remoteness or accessibility of the housing, its quality, and the origin of buyers (local, from the city of Aberdeen, and elsewhere). Although they find some evidence consistent with information asymmetry effects, other findings across the range of relationships are not supportive of this, and they are unable in the study to test for anchoring. Ihlanfeldt and Mayock (2012) extend the literature by studying multiple markets rather than, as in previous buyer studies, a single geographic market.

They consider recent residential transactions in 67 Florida counties and find that inter-market movers pay higher prices relative to intra-market movers on single-family house transactions. Ihlanfeldt and Mayock (2012) conclude that distant homebuyers suffer from disadvantages in information asymmetry and are influenced by anchoring. They acknowledge the possibility, however, that the observed anchoring effects may be masking the purchase by buyers from high price locations of greater, but unobserved, housing quality.

Prior research has focused entirely on the residential sector (multifamily or single-family). We treat the literature on this as relevant to our study, while recognizing that buying homes for owner-occupation involves price-decision factors that may differ from those faced by commercial investors. Since the two investor studies are divided in their findings, we believe it worthwhile to further investigate the question by examining investors in the market for offices (in which nonlocal investment plays a nontrivial role, representing 20 %–30 % of transactions). The empirical evidence has also focused so far on the purchase side of the transaction and, with one exception, has been provided for a single geographic market. Our study is distinguished from previous work in that we consider both buying and selling behavior, which we investigate across multiple markets, and, as we outline in the Introduction, utlilize controls for investor clienteles, timing, location and sale conditions. The data description and empirical approach follows.

Data & Empirical Methods

The office property data used in this study are from the CoStar COMPs® database, which provides nationwide coverage for commercial property transactions. The purchase sample used to examine nonlocal buyer clientele effects includes 10,971 observations, and the sales sample used to consider nonlocal seller clientele effects contains 11,444 observations.[2] Transaction dates range from 1996 thru 2012, with observations representing 138 U.S. office markets. Only observations with confirmed transaction prices and where the investor type can be identified are represented in the two samples. The focus of our analysis is the performance and behavior of nonlocal investors, who represent 22 % of the purchase sample and 29 % of the sales sample—identified by comparing the property address to the buyer or seller address.

Table 1 presents the summary statistics for the transaction samples: purchases in Panel A and sales in Panel B. In the purchase sample, the average office building is 53,349 square feet, more than 40 years old, and on a two acre lot. 10 % of the sample is Class A, 47 % Class B, and 43 % Class C. 70 % of the buildings are multi-tenanted. The average rent differential between the buyer submarket and the property market is a positive 3.82 %. The average distance between the purchaser address and the property address is about 133 nautical miles, measured in distance "as the crow flies" based on longitude/latitude coordinates and the spherical law of cosines. The average

[2] The number of observations used in the full sample does not include observations that are more than three observations beyond the sample mean for each of the dependent variables considered in the empirical analysis. An alternative approach to the propensity-score matching procedure uses both the trimmed and untrimmed full samples, resulting in empirical results that are qualitatively consistent in sign and significance with each of the results reported in this study.

Table 1 Summary statistics

Panel A. Purchase sample								
	Full Sample (n=10,971)		Nonlocal (n=2,383)		Local: pre-match (n=8,588)		Local: post-match (n=2,383)	
Variable	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*
Price per square foot ($)	159.34	152.70	204.13	166.59	146.91	146.22	169.31	163.88
Land area (SF)	88,284	263,923	164,926	427,004	67,017	190,591	117,415	255,658
Building size (SF)	53,349	143,531	120,582	209,871	34,693	111,792	78,067	172,055
Property age (years)	40.26	31.56	31.35	27.95	42.73	32.05	34.44	28.46
Class A	0.10	0.30	0.26	0.44	0.05	0.23	0.14	0.35
Class B	0.47	0.50	0.53	0.50	0.46	0.50	0.58	0.49
Class C	0.43	0.50	0.21	0.41	0.49	0.50	0.27	0.45
Nonlocal buyer	0.22	0.41	1	0	0	0	0	0
Rent difference (%)	3.82	20.09	17.59	40.21	0	0	0	0
Buyer distance (miles)	132.86	375.95	597.29	612.38	4.00	8.49	4.35	8.54
Multi-tenant building	0.70	0.46	0.77	0.42	0.69	0.46	0.75	0.43
Panel B. Sales sample								
	Full Sample (n=11,444)		Nonlocal (n=3,335)		Local: pre-match (n=8,109)		Local: post-match (n=3,335)	
Variable	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*
Price per square foot ($)	136.18	96.90	133.82	99.60	137.15	95.76	142.01	98.33
Land area (SF)	87,400	248,765	119,907	231,627	74,030	254,290	112,995	362,150
Building size (SF)	48,283	128,806	78,106	155,196	36,018	113,996	64,486	162,147
Property age (years)	39.62	31.73	33.99	27.64	41.94	33.00	36.10	29.72
Class A	0.10	0.29	0.18	0.38	0.06	0.24	0.13	0.33
Class B	0.47	0.50	0.50	0.50	0.45	0.50	0.51	0.50
Class C	0.44	0.50	0.32	0.47	0.48	0.50	0.36	0.48
Nonlocal seller	0.29	0.45	1	0	0	0	0	0
Rent difference (%)	4.26	22.50	14.63	39.82	0	0	0	0
Seller distance (miles)	185.79	428.99	624.45	599.76	5.39	10.60	6.94	11.92
Multi-tenant building	0.70	0.46	0.73	0.44	0.69	0.46	0.72	0.45
Marketing duration	367.80	370.31	301.73	326.66	394.13	383.21	351.29	343.28
Panel C. Paired transactions								
	Full Sample (n=4,781)		Nonlocal (n=657)		Local: pre-match (n=4,124)		Local: post-match (n=657)	
Variable	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*	*Mean*	*Std dev*
Price per square foot ($)	156.81	153.22	192.78	149.77	151.08	153.00	170.70	162.17
Land area (SF)	78,313	227,037	188,656	303,444	60,734	207,026	127,764	297,978
Building size (SF)	45,097	130,277	141,987	188,863	29,661	110,757	96,338	233,901
Property age (years)	42.47	32.35	28.46	24.47	44.70	32.89	33.62	27.24
Class A	0.08	0.27	0.35	0.48	0.04	0.19	0.17	0.38
Class B	0.45	0.50	0.51	0.50	0.44	0.50	0.60	0.49
Class C	0.47	0.50	0.14	0.35	0.52	0.50	0.23	0.42

Table 1 (continued)

Nonlocal investors	0.14	0.34	1	0	0	0	0	0
Multi-tenant building	0.69	0.46	0.81	0.39	0.68	0.47	0.80	0.40

This table presents summary statistics for the purchase sample, in Panel A, the sales sample, in Panel B, and the subsample of paired transactions, in Panel C. The first column lists the variable name. The subsequent columns report the sample mean (Mean) and standard deviation (Std dev) for the full sample, the subsample of transactions by nonlocal investors, the subsample of transactions by local investors before (pre-match) and after the propensity-score matching (post-match) sequentially

Price per square foot is the transaction price for the office property, in U.S. dollars, divided by Building size. Land area is the gross square footage of the lot. Building size is the rentable building area, measured in square feet (SF). Property age is measured in years relative to the sale date. Class A, Class B and Class C are indicator variables taking on a value of one for the respective property class and zero otherwise. Nonlocal buyer and Nonlocal seller are indicator variables, taking on a value of one when the investor address is located in a different geographic market than the property address. Rent difference measures the difference between the average office rent for the geographic market of the buyer in Panel A (seller in Panel B), and the property market, divided by the average office rent for the property market. Buyer distance (Seller distance) measures the nautical miles difference between the market of the property and the buyer in Panel A (seller in Panel B). Multi-tenant building is an indicator variable that takes on a value of one if the property has multiple tenants and zero for single-tenant properties. Marketing duration is the time to sell the property from the date of listing, measured in calendar days

transaction price in the purchase sample is \$159.34 per square foot, with nonlocal investors paying an average price of \$204.13 per square foot and local investors \$146.91 per square foot. Based on the summary statistics for the full sample, it is clear that the average property purchased by a nonlocal investor is substantially different from the average asset bought by a local investor. The average property purchased by the local investors in both samples is considerably smaller, older and less commonly Class A.

We deal first with the problem of selection bias. In comparing the prices paid and received as between nonlocal and local buyers, we wish to limit the influence from transactions in our sample that are dissimilar to those purchased and sold by nonlocal buyers. In order to do this, a propensity-score matching procedure is applied to the transactions samples and the comparison is made as between the matched samples. In relation to the purchase sample, the purpose is to match each transaction by nonlocal purchasers with the local-purchaser transaction that is most similar to the nonlocal-purchaser transaction in terms of its associated variables. Similarity is measured using an estimate based on these variables (the propensity score) of the probability that the local-purchaser transaction is a nonlocal-purchaser transaction. (The corresponding approach is applied in the sales sample.) The probit model for this is specified in Eq. (1).

$$\Pr\{Nonlocal = 1\} = \Phi\{\beta_0 + \beta_X \mathrm{X} + \beta_T \mathrm{T} + \beta_Y \mathrm{Y} + \beta_C \mathrm{C} + \beta_M \mathrm{M}\}. \quad (1)$$

The binary dependent variable is *Nonlocal*, taking on a value of one for nonlocal investors and zero for local investors. The probit estimation is performed individually for both the purchase and sales samples, in which case *Nonlocal* identifies the buyer and seller respectively. The independent variables include a set of property characteristics (*X*), along with sets of indicator variables controlling for fixed effects according to investor type (*T*), calendar year of the transaction date (*Y*), unique set of sale conditions (*C*), and metropolitan market (*M*). The set of property characteristics (X) includes measures for land area, building size, property age, property class and multitenant indicator variables. 24 distinct investor types (T) are identified, and the distribution of the samples according to investor type is provided in the Appendix. [3] Calendar year indicators (Y) range from 1996 to 2012. There are 36 individual sale conditions identified by CoStar, and the set of indicators for unique sale conditions (C) represents each of the possible combinations that appear in the samples.[4] 138 metropolitan markets (M) are represented in the two samples.

Results from the probit estimations are presented in Table 2. The estimation for the purchase sample reported in Panel A of Table 2 reveals that nonlocal buyers are significantly more likely to select office buildings that are single-tenant, larger, and younger. In Panel B, nonlocal sellers are significantly more likely to divest of properties that are single-tenant and larger, but older than the average property sold by local investors. The strongest influence on asset selection by nonlocal investors is from building size, where a one standard deviation difference in building size increases the probability of selection by more than 4.5 % in both samples. The propensity scores collected from these estimations are used to match each transaction by a nonlocal buyer (seller) with the nearest-neighbor propensity score matched property transacted by a local buyer (seller). The matching procedure is performed with replacement, which enhances the accuracy of the matching outcome but reduces the number of unique observations in the control group—thereby reducing the likelihood of finding statistical significance between the two groups. Post-match, there are 4,766 observations in the purchase sample and 6,670 observations in the sales sample. By construction, both samples have even representation of local and nonlocal investors. Summary statistics for the propensity-score matched sample of local investors are presented on the right-hand side of Table 1, where it can be seen that the differences in property characteristics in transactions involving nonlocal investors and local investors (post-match) have in general been reduced as a result of the matching procedure.

Having addressed the issue of selection bias via the propensity-score matching procedure, the analysis turns to the estimation specified in Eq. (2), which is used to identify whether nonlocal investors pay or receive different prices.

$$In(\text{Price per square foot}) = \beta_0 + \beta_X \mathrm{X} + \beta_T \mathrm{T} + \beta_Y \mathrm{Y} + \beta_C \mathrm{C} + \beta_M \mathrm{M} + \beta_N \cdot I\{\text{Nonlocal investor}\} + \varepsilon. \quad (2)$$

[3] Investor types are identified in the samples using CoStar definitions. The list of possible investor identities includes bank/finance, corporate, developer/owner – national, developer/owner – regional, educational, endowment, equity funds, government, individual, insurance, investment manager, listed funds, medical, nonprofit, other – private, other/unknown – institutional, pension fund, private REIT, public REIT, religious, REOC, sovereign wealth fund, tenants-in-common, and trust.

[4] The list of possible sale conditions identified by CoStar includes 1031 exchange, assemblage, auction sale, bankruptcy sale, build-to-suit, building contamination issue, building in shell condition, business value added, condo conversion, court appointed sale, debt assumption, deed restriction, deferred maintenance, direct exchange, distress sale, double escrow, estate/probate sale, excess land, exercise of option, expansion, ground lease (leased fee simple), ground lease (leasehold), high vacancy property, historical site, land contract, lease option, note purchase, partial interest transfer, purchase by tenant, recapitalization, redevelopment project, REO sale, rolling option/takedown, sale leaseback, short sale, and soil contamination issue. An alternative approach is to include only transactions that occur under normal sale conditions, which does not have a material impact on the empirical results presented in this study.

Table 2 Probit, nonlocal investors

Variable	*Coefficient*	*(Wald X^2)*	*Marginal effect*
Panel A. Probit for Nonlocal buyer			
Constant	−2.861***	(82.71)	-
ln(Land area)	0.018	(1.04)	0.003
ln(Building size)	0.249***	(144.95)	0.049
ln(Property age)	−0.038*	(3.47)	−0.008
Class A	0.090	(1.36)	0.022
Class B	0.046	(1.13)	0.010
Multi-tenant building	−0.161***	(16.23)	−0.032
Buyer type indicators:	Included [23 variables]		
Year indicators:	Included [14 variables]		
Sale conditions:	Included [232 variables]		
Market indicators:	Included [137 variables]		
psuedo-R^2:	31.46 %		
Observations:	10,971		
Panel B. Probit for Nonlocal seller			
Constant	−2.969***	(85.89)	-
ln(Land area)	0.021	(1.85)	0.006
ln(Building size)	0.177***	(96.66)	0.046
ln(Property age)	0.069***	(15.11)	0.018
Class A	0.064	(0.84)	0.015
Class B	0.001	(0.00)	0.0002
Multi-tenant building	−0.114***	(11.45)	−0.028
Seller type indicators:	Included [22 variables]		
Year indicators:	Included [16 variables]		
Sale conditions:	Included [195 variables]		
Market indicators:	Included [137 variables]		
psuedo-R^2:	25.06 %		
Observations:	11,444		

This table presents the results from the probit estimation for buyer (seller) identity, in Panel A (Panel B). The dependent variable is Nonlocal buyer (seller), which takes on a value of one if the property is located in a different market than the address of the buyer (seller). The variables Land area, Building size and Property age are each logged. The panels present the variable name in the first column, the estimated coefficient in the second, the Wald X^2 test statistic (in parentheses) in the third, and the average marginal effect in the fourth. All variables are defined in the notes to Table 1. In addition to the variables listed in the first column, the estimation also includes 23 (22) indicators to control for buyer (seller) types, 14 (16) indicators to control for transaction years, 232 (195) indicators to control for sale conditions, and 137 (137) indicators to control for markets, with one suppressed. *** and * indicate statistical significance of the estimated coefficient, based on the Wald X^2 test statistic at the 1 % and 10 % levels respectively

The dependent variable is Price per square foot, logged. The independent variables include a set of property characteristics (X), along with indicator variables controlling for investor type (T), calendar year (Y), sale conditions (C), and geographic market (M). Equation (2) is estimated for the purchase and sales samples. I{Nonlocal investor} is an indicator variable, taking on a value of one for investors located in a different geographic market than the property purchased and zero otherwise. Based on the log-linear specification β_N provides a point estimate for the average percentage premium or discount in transactions involving nonlocal investors. Based on the results of Lambson et al. (2004) for apartments, our expectation is that the estimated coefficient for β_N will be positive and significant in the purchase sample. However, if observable selection bias (with nonlocal investors selecting fundamentally higher-quality assets) is the dominant reason for the existence of a nonlocal premium, then the propensity-score matching procedure should eliminate the nonlocal premium altogether. Alternatively, if there is unobserved selection bias, then nonlocal investors are expected to purchase at a premium and sell at a premium. Considering both the purchase and sales sides of the transaction allows us to determine whether unobservable selection bias is a contributing factor.

If nonlocal investors do pay a premium on purchase, possible explanations are that they (i) have access to reduced cost of capital, (ii) are disadvantaged by informational asymmetry and (iii) anchor on prices in their more expensive home markets. The reduced cost of capital explanation is based on investor clientele effects. If nonlocal investors are primarily institutional investors, such as REITs, pension funds and life insurance companies, then institutional advantages in the tax and capital markets may provide these investors with an opportunity to outbid other investors. The Appendix table presents the proportions of the sample according to investor classification. The sample of nonlocal purchasers is more heavily represented by institutional investors, including public REITs, private REITs, and investment managers, while local buyers have greater representation from individuals and local corporations. Nonlocal *sellers* are more often identified as banks, individuals and investment managers, compared to local sellers who are more commonly local government, medical and local developers. The propensity-score matching procedure eliminates much of the investor classification differences.

The next step in the analysis attempts to discern information asymmetry from anchoring effects. Nonlocal investors may also overpay for commercial real estate because they have an information disadvantage relative to local participants. As a proxy for price effects attributable to information asymmetry alone, we use the *Distance* variable, measuring the difference in nautical miles between investor and property address. The *Distance* variable is applied to all observations with the underlying assumption that information asymmetry is decreasing in proximity to the site. Less informed investors have higher search costs and are at a disadvantage for investment in the distant office market; our expectation is that this vulnerability will lead to overpayment on the purchase and discounting on asset sales.

To proxy for price anchoring, we use *Rent difference*, which measures the percentage difference in rents between the investor's home market and the property market of the subject site. We use *Rent difference* as an alternative to any metric for price difference due to the limited number of observations and illiquidity in many office property transactions markets. Our expectation is that where *Rent difference* is positive it will have a positive impact on the purchase price, with nonlocal investors from higher rent markets ‘overvaluing’ assets in lower rent markets. However, overvaluation should not have an impact on the sale price, unless the seller is able to identify another buyer who similarly overvalues the asset. Equation (3) provides the empirical specification to jointly test the information asymmetry, based on proximity, and price anchoring hypotheses as explanations for nonlocal investment behavior.

$$In(\text{Price per square foot}) = \beta_0 + \beta_X \mathrm{X} + \beta_T \mathrm{T} + \beta_Y \mathrm{Y} + \beta_C \mathrm{C} + \beta_M \mathrm{M} + \beta_N \cdot I\{\text{Nonlocal investor}\} + \beta_{\mathrm{S}} \cdot \text{Distance} + \beta_{\mathrm{R}} \cdot \text{Rent difference} + \varepsilon. \tag{3}$$

Equation (3) is based on Eq. (2) with the addition of the *Distance* and *Rent difference* variables. The estimation of Eq. (3) is performed for the propensity-score matched samples to limit the influence from asset selection bias and investor classification.

While the *Distance* variable provides a measure for informational asymmetry that relates investor and property proximity, this is an imperfect metric when the relation is non-linear or if there is a fixed component to information asymmetry that is unrelated to distance. A complementary approach to examine information asymmetry considers the valuation applied by nonlocal buyers involved in transactions with nonlocal sellers, relative to the valuation of similar assets transacted among local investors. To test whether there are differences in valuation, the propensity-score procedure is applied to a subsample of transaction between non-local investors, matching with similar assets transacted between local investors. The probit estimation for propensity scores uses the same model as Eq. (1), except in this case I\{Nonlocal investor\} represents both sides of the transaction and all observations for transactions involving nonlocal sales to local buyers and local sales to nonlocal buyers are dropped from the analysis. Equation (2) is then estimated using the paired sample with 1,314 observations, divided evenly between transactions with nonlocal investors on both sides and transactions with local investors on both sides. In this case, the estimated coefficient β_{N} represents the percentage difference in prices involving nonlocal investors on both sides of the transaction, relative to the transaction price for similar assets when local investors are involved on both sides of the transaction.

Marketing duration is another component to office market equilibrium, in combination with transaction prices. The time involved in the sale of an office property includes a behavioral component reflecting seller skill and patience. While time-to-purchase is unobservable, we are able to consider the role of investor marketing duration for the sales sample. To consider its role, the propensity-score matching is once again performed on the sales sample using only observations with marketing duration information available. The marketing duration model is provided in Eq. (4).

$$In(\text{Marketing duration}) = \beta_0 + \beta_X \mathrm{X} + \beta_T \mathrm{T} + \beta_Y \mathrm{Y} + \beta_C \mathrm{C} + \beta_M \mathrm{M} + \beta_P \cdot In(\text{Price per square foot}) + \beta_{\mathrm{N}} \cdot \mathrm{I}\{\text{Nonlocal investor}\} + \varepsilon. \tag{4}$$

Equation (4) contains a consistent set of regressors with Eq. (2), with the addition of Price per square foot. The estimated coefficient for β_N in Eq. (4) identifies the percentage difference in marketing duration for properties sold by nonlocal investors, relative to similar assets sold by locals. If nonlocal investors are less informed sellers, then our expectation is that they will be more likely to accept an offer in a given period, resulting in lower average marketing durations.

Empirical results for each of the estimations outlined above are discussed in the next section.

Empirical Results

Table 3 presents the central results of this study, based on the estimation of Eq. (2) for the purchase and sales samples in this study. Nonlocal investors overpay by an estimated 13.8 % and sell at an estimated discount of 7 % relative to prices on similar assets transacted by local investors. The estimated coefficient for the purchase premium is consistent in sign and significance, but larger in magnitude that the coefficient of 5.4 % found by Lambson et al. (2004) for apartments. One possible explanation is due to tenant heterogeneity in space requirements and leasing terms that occur in the office market, when compared to standardized unit configurations and substitutable tenants in apartments. Increasing complexity in sources for office demand suggests increasing gains to investors with informational advantages. While the results in Lambson et al. (2004) only provide evidence for premiums on the purchase side of the transaction, our findings reveal that nonlocal investors do not achieve premiums when the assets are sold. This provides a strong check on an otherwise intuitively attractive explanation for differential purchase prices. Higher purchase prices, combined with significantly lower sale prices, do not support the notion that unobserved selection bias (with nonlocal investors selecting higher quality assets) is the explanation for premiums paid by nonlocal investors.

The propensity-score matching procedure limits differences attributable to selection bias. In addition, the estimations control for several important factors found to have a significant impact on transaction prices in the office market, including property characteristics, investor classification, calendar year, sale conditions and geographic markets. Among the property characteristics, price per square foot is increasing for density and newer buildings, and decreasing with scale. Class A and B properties are consistently estimated at significant premiums to Class C. Single-tenant office buildings transact at significant premiums relative to multi-tenanted assets. The main empirical results in Table 3 are that nonlocal investors are disadvantaged in the office market; they overpay upon purchase and divest at a significant discount. Several alternative specifications are considered, including use of the full sample before the matching procedure, and the use of indicators for sale condition categories rather than for unique sets. The empirical results remain qualitatively unchanged in sign and significance of the estimated coefficients in each of the alternative specifications. In particular, the coefficient for nonlocal investor is positive and significant when estimated for the purchase sample, yet negative and significant when estimated for the sales sample.

Table 3 Estimated premiums, nonlocal investors

Variable	*Coefficient*	*(t-stat)*
Panel A. Buyers, propensity-score matched sample		
Constant	6.678***	(51.34)
ln(Land area)	−0.046**	(−1.84)
ln(Building size)	−0.110***	(−4.33)
ln(Property age)	−0.168***	(−17.66)
Class A	0.426***	(13.69)
Class B	0.110***	(4.39)
Multi-tenant building	−0.076***	(−3.88)
Nonlocal buyer	0.138***	(8.00)
Buyer type indicators:	Included [22 variables]	
Year indicators:	Included [11 variables]	
Sale conditions:	Included [105 variables]	
Market indicators:	Included [119 variables]	
Adjusted R^2:	56.49 %	
Observations:	4,766	
Panel B. Sellers, propensity-score matched sample		
Constant	6.514***	(51.95)
ln(Land area)	−0.039**	(−1.89)
ln(Building size)	−0.077***	(−2.97)
ln(Property age)	−0.164***	(−10.98)
Class A	0.468***	(18.31)
Class B	0.095***	(5.56)
Multi-tenant building	−0.073***	(−6.79)
Nonlocal seller	−0.070***	(−4.75)
Seller type indicators:	Included [21 variables]	
Year indicators:	Included [11 variables]	
Sale conditions:	Included [123 variables]	
Market indicators:	Included [123 variables]	
Adjusted R^2:	53.84 %	
Observations:	6,670	

This table presents the results from the estimation of Price per square foot for the purchase and sales samples. Panel A presents results for the propensity-score matched buyer sample, while Panel B provides results for the propensity-score matched seller sample. The variables Price per square foot, Land area, Building size and Property age are each logged. The Panels present the variable name in the first column, the estimated coefficient in the second, and the *t*-statistic (in parentheses) in the third. The *t*-statistic and reported significance level are based on standard errors clustered by market and calendar year. All variables are defined in the notes to Table 1. In addition to the variables listed in the first column, the estimation also includes indicators to control for buyer and seller types, transaction years, sale conditions and markets, with one suppressed. *** and ** indicate statistical significance of the estimated coefficient based on the corresponding *t*-statistic at the 1 % and 5 % levels respectively

In considering the role of information asymmetry, nonlocal investors may be disadvantaged because they do not have enough information, because they have biased information, or both. Table 4 presents the empirical estimations which

Table 4 Nonlocal investment determinants, proximity and rent differentials

Variable	*Coefficient*	*(t-stat)*
Panel A. Propensity-score matched sample of buyers		
Constant	6.704***	(50.10)
ln(Land area)	−0.046**	(−2.04)
ln(Building size)	−0.114***	(−3.63)
ln(Property age)	−0.166***	(−16.08)
Class A	0.431***	(10.42)
Class B	0.112***	(4.89)
Multi-tenant building	−0.074***	(−4.02)
Nonlocal buyer	0.091***	(5.30)
Buyer distance	0.00007**	(2.25)
Rent difference	0.076***	(2.47)
Buyer type indicators:	Included [22 variables]	
Year indicators:	Included [11 variables]	
Sale conditions:	Included [105 variables]	
Market indicators:	Included [119 variables]	
Adjusted R^2:	56.63 %	
Observations:	4,766	
Panel B. Propensity-score matched sample of sellers		
Constant	6.501***	(50.37)
ln(Land area)	−0.038**	(−1.86)
ln(Building size)	−0.076***	(−2.92)
ln(Property age)	−0.163***	(−10.75)
Class A	0.469***	(18.56)
Class B	0.094***	(5.57)
Multi-tenant building	−0.073***	(−6.72)
Nonlocal seller	−0.046***	(−2.40)
Seller distance	−0.00004***	(−3.95)
Rent difference	0.003	(0.06)
Seller type indicators:	Included [21 variables]	
Year indicators:	Included [11 variables]	
Sale conditions:	Included [123 variables]	
Market indicators:	Included [123 variables]	
Adjusted R^2:	53.86 %	
Observations:	6,670	

This table presents the results from the estimation of Price per square foot for the purchase and sales samples. Interaction terms are included for Buyer distance (Seller distance) and Rent difference in the estimations. Panel A presents results for the propensity-score matched buyer sample, while Panel B provides results for the propensity-score matched seller sample. The variables Price per square foot, Land area, Building size and Property age are each logged. The table presents the variable name in the first column, the estimated coefficient in the second, and the *t*-statistic (in parentheses) in the third. The *t*-statistic and reported significance level are based on standard errors clustered by market and calendar year. All variables are defined in the notes to Table 1. In addition to the variables listed in the first column, the estimation also includes indicators to control for buyer and seller types, transaction years, sale conditions, and markets, with one suppressed. *** and ** indicate statistical significance of the estimated coefficient based on the corresponding *t*-statistic at the 1 % and 5 % levels respectively consider investor proximity and price anchoring as possible explanations. Panel A presents results for the purchase sample. The estimated coefficients for *Nonlocal buyer*, *Buyer distance* and *Rent difference* are each positive and significant. Both price anchoring and the relation between information sufficiency and proximity contribute to the degree of overpayment by nonlocal buyers. A nonlocal buyer at minimal distance and in a market with a similar rent level is estimated to overpay by 9.1 %. The average distance for the nonlocal buyer is 600 miles, which is associated with an increase in the degree of overpayment by 4.2 % to 13.3 %. The average nonlocal buyer is located in a market where office rents are 17.5 % higher, contributing an additional 1.3 % to the overpayment.

Panel B of Table 4 presents the empirical estimation of Eq. (3) for the sales sample. Estimated coefficients for *Nonlocal seller* and *Seller distance* are both negative and significant. An office property sold by a nonlocal seller is discounted by at least 4.6 %, and the discount grows by 1 % for every 250 miles in distance from the property. The coefficient for *Rent difference* is insignificant from zero. High rents in the investor market lead to overpayment, but the local market is unaffected by these nonlocal rents when the property is sold. While price anchoring provides an explanation for overpayment, it is irrelevant for discounted sales. Information asymmetries that increase with distance have a positive impact on the degree of overpayment in the purchase, and also increase the amount of discounting in the sale. Several additional specifications were considered, yet each alternative permutation to the models return consistent results: rent difference – positive and significant impact on purchase, zero impact on sale; distance – positive and significant impact on purchase, negative and significant impact on sale.[5]

Differences in asset valuation by nonlocal investors increase their vulnerability to informed investors. Table 5 presents results from the estimation of Eq. (2) using a subsample of observations that are matched to compare transactions between nonlocal investors to transactions of similar assets between their local counterparts. The estimated coefficient for *Nonlocal investors* reveals that nonlocal investors significantly overvalue similar assets by an estimated 6.3 %. Compare this to the base case of all transactions involving nonlocal investors, where overpayment is estimated at 13.8 % and sales are discounted by 7 % (from Table 3). The result for differences in valuation suggests that the degree of overpayment is much larger when nonlocals purchase from locals. Discounting is more severe when nonlocals sell to locals. Nonlocal sellers fare much better when they are able to identify another nonlocal as the buyer (i.e., "greater fool theory" holds), but do not perform as well as local sellers who match with nonlocal buyers.

[5] For example, some variations to the model include the distance variable alone (without the nonlocal indicator and rent difference variables), the rent difference variable alone (without the nonlocal indicator and distance variables), the distance and nonlocal indicator variables together (without the rent difference variable), and the rent difference and nonlocal indicator variables together (without the distance variable).

Table 5 Valuation differences, nonlocal investors vs. local investors

Variable	*Coefficient*	*(t-stat)*
Constant	7.607***	(31.98)
ln(Land area)	−0.067**	(−1.86)
ln(Building size)	−0.081**	(−1.92)
ln(Property age)	−0.160***	(−5.74)
Class A	0.382***	(2.80)
Class B	0.144**	(1.88)
Multi-tenant building	−0.119***	(−2.60)
Nonlocal investors	0.063***	(2.75)
Buyer type indicators:	Included [19 variables]	
Seller type indicators:	Included [20 variables]	
Year indicators:	Included [7 variables]	
Sale conditions:	Included [62 variables]	
Market indicators:	Included [85 variables]	
Adjusted R^2:	61.21 %	
Observations:	1,314	

This table presents the results from the estimation of Price per square foot. The propensity-score matched sample is performed again (results unreported) matching transactions between nonlocal investors with comparable assets transacted between local investors. Nonlocal investors is an indicator variable for transactions involving both a nonlocal buyer and nonlocal seller, representing exactly one-half of the sample. Transactions involving a nonlocal investor on only one side of the transaction are excluded from the sample. The variables Price per square foot, Land area, Building size and Property age are each logged. The table presents the variable name in the first column, the estimated coefficient in the second, and the *t*-statistic (in parentheses) in the third. The *t*-statistic and reported significance level are based on standard errors clustered by market and calendar year. All variables are defined in the notes to Table 1. In addition to the variables listed in the first column, the estimation also includes indicators to control for buyer and seller types, transaction years, sale conditions, and markets, with one suppressed. *** and ** indicate statistical significance of the estimated coefficient, based on the corresponding *t*-statistic at the 1 % and 5 % levels respectively

The extent to which the types of investors who make up the nonlocal subsamples are fundamentally different from local investors could bias the results. In particular, certain investor classes enjoy tax benefits and have greater access to capital markets, resulting in a lower cost of capital and the ability to outbid other investors for given schedule of operating income. We attempt to limit the influence from these investor clienteles with indicator variables included in the sampling procedure. Overall, the matching reduces differences in the representation of investor types between the local and nonlocal samples. As an additional test, we estimate Eq. (2) with interaction terms included for the nonlocal investor indicator and each of the investor classes. For concision, the results from these estimations are presented in the Appendix table, reporting the estimated coefficient and its significance. Some institutional investors are found to contribute to the degree of overpayment by nonlocal investors in the purchase sample, including equity funds, insurance funds, investment managers, pension funds and private REITs. The degree of overpayment fails to translate into higher sale prices for nonlocal investors. As an additional robustness check, the estimations presented in Tables 3, 4 and 5 are also performed with the investor class interactions included and the findings are qualitatively unchanged from those previously discussed. The results also remain consistent when an additional restriction is applied which requires that nonlocal transactions be matched according to investor type, or when only transactions between nonlocals and locals are considered.

In addition to price effects, real estate marketing outcomes can be evaluated through the amount of time involved in the property sale. Results from the estimation for marketing duration are presented in Table 6, which considers this behavioral component for the sales sample only. The estimation reveals that nonlocal investors sell their assets in 10.5 % less time than it takes for the average local investor. Whether this reinforces or counters the non-optimal sale price outcome due to the nonlocal effect depends on whether we assume an upward- or

Table 6 Marketing duration, sales sample

Variable	*Coefficient*	*(t-stat)*
Constant	6.965***	(18.06)
ln(Land area)	−0.010	(−0.35)
ln(Building size)	−0.027	(−1.10)
ln(Property age)	−0.102***	(−2.78)
Class A	−0.353***	(−5.37)
Class B	0.096**	(2.32)
Multi-tenant building	−0.110***	(−3.86)
Logged price per square foot	−0.226***	(−7.19)
Nonlocal seller	−0.105***	(−6.16)
Seller type indicators:	Included [20 variables]	
Year indicators:	Included [7 variables]	
Sale conditions:	Included [89 variables]	
Market indicators:	Included [121 variables]	
Adjusted R^2:	13.46 %	
Observations:	4,542	

This table presents the results from the estimation for Marketing duration, considering the sales sample of transactions. Due to missing observations for the Marketing duration variable, the propensity-score matched sample is performed again (results unreported) matching transactions between nonlocal sellers with comparable assets sold by local investors, where marketing duration information is available. The variables Marketing duration, Land area, Building size and Property age are each logged. The table presents the variable name in the first column, the estimated coefficient in the second, and the *t*-statistic (in parentheses) in the third. The *t*-statistic and reported significance level are based on standard errors clustered by market and calendar year. All variables are defined in the notes to Table 1. In addition to the variables listed in the first column, the estimation also includes indicators to control for seller types, transaction years, sale conditions, and markets, with one suppressed. *** and ** indicate statistical significance of the estimated coefficient, based on the corresponding *t*-statistic at the 1 % and 5 % levels respectively downward-sloping price/duration curve. Since the literature is divided on this, we report this finding for presentation.

Concluding Remarks

Results presented in this study provide evidence that nonlocal investors significantly overpay on the purchase by an estimated 13.8 % relative to similar assets purchased and sold by local investors. The overpayment magnitude is not constant, but increases with the distance between investor and asset and is positively influenced by the difference in office rents between the investor and asset markets. Upon exit, nonlocal investors underperform by selling their distant investment at a discount of 7 % relative to similar assets. The reduced sale price suggests that unobservable selection bias does not explain the overpayment. The relative sale price is further reduced for nonlocal investors who have greater distance separating them from their investment. Taken together with the role of distance in overpayment, this evidence suggests that geographic distance is a proxy for the degree of information asymmetry that exists between nonlocal investors and the asset market.

Nonlocal investors demonstrate fundamental differences in their approach to valuation, overvaluing assets by an estimated 6.3 % when sold to each other, measured relative to transaction prices on similar assets exchanged among local investors. This finding illustrates that the estimates mentioned above are tempered by transactions involving dual nonlocal investors. The nonlocal buyer's disadvantage is heightened in transactions with local sellers, while the opportunistic exit scenario is to identify another nonlocal buyer.

A number of empirical steps were incorporated into the analysis in an effort to limit the possible influence from selection bias, including propensity-score matching and controls for investor clienteles, timing, sale conditions, and geographic markets. The empirical results are qualitatively unchanged when only normal sale conditions are considered and in the presence of investor clientele effects. Thus, unobservable selection bias is ruled out as a prevailing explanation for the investment behavior of nonlocal investors. Anchoring to investor office market conditions, investor clienteles and a lack of proximity contribute positively to the amount of overpayment in the purchase, while only information asymmetry that is related to distance explains the willingness to accept below market prices on the asset sale.

The results of this study contribute to the literature because, building on the lessons of sample size constraint and specification issues uncovered in previous literature, they confirm the strong presence of anchoring and information symmetry effects, and in the office market which has previously not been investigated. The office market is one in which the participants are likely to be more sophisticated in their decision-making than in the housing market and systematically more attuned to information about the properties they transact. The study also reveals, for the first time, that the information asymmetry effects are manifest in both buying *and* selling. In sum, the results suggest resilience of actual buyer and seller behavior to improvements in information availability and to the pricing efficiency that might otherwise ensue.

Appendix

Table 7 Investor classification effects

Investor Classification	Purchase sample: Nonlocal (n=2,383)	Purchase sample: Local: pre-match (n=8,588)	Purchase sample: Local: post-match (n=2,383)	Purchase sample: Interaction coefficient	Sales sample: Nonlocal (n=3,335)	Sales sample: Local: pre-match (n=8,109)	Sales sample: Local: post-match (n=3,335)	Sales sample: Interaction coefficient
Bank/finance	3.19 %	1.92 %	4.20 %	−0.20***	33.58 %	11.41 %	26.39 %	−0.04***
Corporate	8.27 %	14.31 %	12.80 %	0.05***	6.09 %	10.40 %	10.01 %	−0.03***
Developer/owner – national	12.34 %	3.24 %	9.65 %	0.13***	7.35 %	4.03 %	8.46 %	0.04***
Developer/owner – regional	12.63 %	11.05 %	18.09 %	0.08***	8.13 %	12.85 %	12.65 %	0.03***
Educational	0.92 %	1.47 %	1.51 %	0.15***	0.15 %	0.38 %	0.21 %	−0.23***
Endowment	0.13 %	0.03 %	0.08 %	0.49***	0.06 %	0.35 %	0.00 %	0.00***
Equity funds	2.73 %	0.34 %	1.13 %	0.53***	1.44 %	1.22 %	0.81 %	−0.02***
Government	0.67 %	2.19 %	1.34 %	−0.13***	0.90 %	39.91 %	1.44 %	0.05***
Individual	18.21 %	39.90 %	25.64 %	0.07***	13.55 %	0.54 %	18.20 %	−0.07***
Insurance	1.09 %	0.51 %	0.97 %	0.47***	1.50 %	3.05 %	1.20 %	−0.07***
Investment manager	16.41 %	2.50 %	7.81 %	0.13***	11.72 %	1.41 %	7.05 %	0.03***
Listed funds	0.04 %	0.01 %	0.04 %	0.47***	0.39 %	1.43 %	0.00 %	0.00***
Medical	0.97 %	4.79 %	1.64 %	−0.28***	0.60 %	7.83 %	0.42 %	0.08***
Nonprofit	0.80 %	2.89 %	1.09 %	−0.26***	3.09 %	0.18 %	1.14 %	0.12***
Other – private	4.99 %	10.51 %	6.80 %	0.13***	0.15 %	0.27 %	4.47 %	−0.09***
Other/unknown – institutional	0.17 %	0.16 %	0.17 %	0.26***	1.26 %	0.26 %	0.27 %	0.14***
Pension fund	0.88 %	0.10 %	0.34 %	0.41***	1.41 %	1.17 %	0.63 %	0.30***
Private REIT	3.82 %	0.31 %	1.13 %	0.42***	6.45 %	0.02 %	0.63 %	−0.11***

Table 7 (continued)

Investor Classification	Purchase sample: Nonlocal (n=2,383)	Purchase sample: Local: pre-match (n=8,588)	Purchase sample: Local: post-match (n=2,383)	Purchase sample: Interaction coefficient	Sales sample: Nonlocal (n=3,335)	Sales sample: Local: pre-match (n=8,109)	Sales sample: Local: post-match (n=3,335)	Sales sample: Interaction coefficient
Public REIT	9.65 %	0.91 %	2.98 %	0.05^{***}	0.18 %	0.44 %	2.82 %	0.11^{***}
Religious	0.55 %	1.33 %	0.97 %	-0.03^{***}	0.18 %	0.20 %	0.24 %	-0.12^{***}
REOC	0.25 %	0.14 %	0.08 %	0.09^{***}	0.21 %	2.65 %	0.06 %	-0.16^{***}
Sovereign wealth fund	0.00 %	0.02 %	0.00 %	0.00^{***}	1.62 %	0.00 %	0.00 %	0.00^{***}
Tenants-in-common	0.29 %	0.22 %	0.34 %	-0.08^{***}	0.00 %	0.00 %	0.21 %	0.08^{***}
Trust	1.01 %	1.13 %	1.22 %	0.03^{***}	0.00 %	0.00 %	2.70 %	-0.01^{***}

The first column lists the investor classification. The second thru fourth columns report the proportion of the purchase sample represented by nonlocal and local investors, before and after the propensity-score matching procedure is applied, respectively. The fifth column reports the estimation coefficient from the interaction term between investor classification and nonlocal investor when included in the price per square foot equation. The far-right columns provide the same sequence of measures for the sales sample. ***, ** and * indicate statistical significance of the estimated coefficient, based on the corresponding t-statistic at the 1 %, 5 % and 10 % levels respectively

References

Black, R. T., & Diaz, J., III. (1996). The use of information versus asking price in the real property negotiation process. *Journal of Property Research, 13*(4), 287–297.
Bokhari, S., & Geltner, D. (2011). Loss aversion and anchoring in commercial real estate pricing: Empirical evidence and price index implications. *Real Estate Economics, 39*(4), 635–670.
Clauretie, T., & Thistle, P. (2007). The effect of time-on-market and location on search costs and anchoring: The case of single-family properties. *Journal of Real Estate Finance and Economics, 35*(2), 181–196.
Diaz, J., III, & Wolverton, M. L. (1998). A longitudinal examination of the appraisal smoothing hypothesis. *Real Estate Economics, 26*(2), 349–358.
Gallimore, P., & Wolverton, M. (1997). Price-knowledge induced bias: A cross-cultural comparison. *Journal of Property Valuation and Investment, 15*(3), 261–273.
Genesove, D., & Mayer, C. (2001). Loss aversion and seller behavior: Evidence from the housing market. *Quarterly Journal of Economics, 116*(4), 1233–1260.
Hansz, J. A., & Diaz, J., III. (2001). Valuation bias in commercial appraisal: A transaction price feedback experiment. *Real Estate Economics, 29*(4), 553–565.
Ihlanfeldt, K., & Mayock, T. (2012). Information, search, and house prices: Revisited. *Journal of Real Estate Finance and Economics, 44*(1), 90–115.
Lambson, V. E., McQueen, G. R., & Slade, B. A. (2004). Do out-of-market buyers pay more for real estate? An examination of anchoring-induced bias and search costs. *Real Estate Economics, 32*(1), 85–126.
Liu, N., & Roberts, D. (2012). Do incomers pay more for rural housing? *Environment and Planning A, 44*, 1986–2005.
Miller, N. G., Sklarz, M. A., & Ordway, N. (1988). Japanese purchases, exchange rates and speculation in residential real estate markets. *Journal of Real Estate Research, 3*(3), 39–49.
Neo, P. H., Ong, S. E., & Tu, Y. (2008). Buyer exuberance and price premium. *Urban Studies, 45*(2), 331–345.
Northcraft, G. B., & Neale, M. A. (1987). Expert, amateurs, and real estate: An anchoring and- adjustment perspective on property pricing decisions. *Organizational Behavior and Human Decision Processes, 39*(1), 84–97.
Simonsohn, U., & Loewenstein, G. (2006). Mistake #37: The effect of previously encountered prices on current housing demand. *The Economic Journal, 116*(1), 175–199.
Simonson, I., & Tversky, A. (1992). Choice in context: Tradeoff contrast and extremeness aversion. *Journal of Marketing Research, 29*(3), 281–295.
Turnbull, G. K., & Sirmans, C. F. (1993). Information, search, and house prices. *Regional Science and Urban Economics, 23*(4), 545–557.
Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, New Series, 185*(4157), 1124–1131.
Vrooman, D. H. (1978). An empirical analysis of determinants of land values in the Adirondack Park. *American Journal of Economics and Sociology, 37*(2), 165–177.
Watkins, C. (1998). Are new entrants to the residential property market informationally disadvantaged? *Journal of Property Research, 15*(1), 57–70.
Wiley, J. A. (2012). Buy high, sell low: Corporate investors in the office market. *Real Estate Economics, 40*(4), 843–860.