House Relistings and Search Theory

William Swymer and Darren K. Hayunga[1]

November 7, 2023

Abstract

This study investigates the impact relistings have on the transaction prices and marketing durations of single-family homes. First listings do not always result in completed transactions and relistings have largely been ignored in the housing literature. As can be expected, relisted homes exhibit substantial increases in marketing times. We find this trait yields higher prices as shown by search theory. Upon rigorously controlling for the longer marketing durations, the results indicate that relistings experience transaction prices similar to single-listing sales. Our study demonstrates the criticality of including marketing durations in house price equations and vice versa.

Key Words: House prices, Listing contract, Days on the market

[1] Swymer (william.swymer@uga.edu) and Hayunga (hayunga@uga.edu) are at the University of Georgia. We thank Jim Conklin, Jim Kau, Rich Martin, Henry Munneke, and Ruchi Singh for valuable comments.

Introduction

The 2022 Profile of Home Buyers and Sellers, an annual survey conducted by the National Association of Realtors, reports that a large majority of homeowners (86 percent) employ real estate agents to help them with their transactions. As part of the relationship, owners sign listing contracts with agents authorizing the representatives to find buyers for their properties. This article investigates the market outcomes experienced by single-family homeowners when they do not sell their properties within the initial listing periods.

Our motivation for this analysis stems from several factors. The first is that there exists a substantial number of prior listings that do not result in completed transactions, but then sell upon relisting. In our sample of almost 700,000 sold homes from the state of Massachusetts over the period from 2000 to 2019, we find that more than 50,000 of these homes were relisted before selling. The prior listings may provide valuable information to both sellers and buyers, and we are interested in determining if relistings yield different price outcomes than single-listing sales.

Our study is further motivated by the fact that prior listings are not examined in the housing literature.[2] This is apparently due to prior listings being largely unobserved in datasets. In most of the Multiple Listing Services (MLS) databases used by real estate agents and economists, prior listings are regularly expunged after a short period like three months. This issue is accentuated in the public-records datasets often used by housing economists as relistings are simply not recorded.

The problem with omitting the initial listing information is a possible sample bias. Censoring occurs when certain data are included in the analysis but are not complete.[3] If information on the prior listings is not available or utilized, a bias can arise due to an incorrect

[2] Smith, Gibler and Zahirovic-Herbert (2016) is the notable exception.

[3] The omission of prior listings could also be described as a truncation sample bias. Truncation occurs when some portion of the data is missing or excluded from the analysis due to a specific criterion. The criterion in this case is a lack of transaction price on the prior listings.

measurement of the true marketing time for relisted homes. Our analysis finds that a bias does indeed occur if the information about the prior listing is censored. Using a system of equations to account for the joint determination of prices and marketing periods, we first consider a specification that uses the true days on market (DOM) for single-listing sales along with the DOM for only the listing that resulted in a sale on the relisted homes. The results suggest that relistings suffer a price decrease of slightly less than 4 percent along with a *reduction* in the marketing period of approximately 11 days (from 105 to 94)

The decrease in the marketing time is a biased finding. The distribution of the total marketing period for relistings–the cumulative days on market (CDOM)–displays a substantial shift to the right compared to single-listing sales. To illustrate, for our sample, the mean CDOM for relistings is 223 days compared to 105 days for single-listing sales. This significant shift in one of the two outcomes of home trades provides further motivation for our study. Fundamental search theory shows that prices and marketing times are positively correlated based upon the probability of sale (Wheaton 1990; Krainer 2001). The research question then arises as to whether the longer marketing periods are accompanied by price increases as shown by search theory or, for instance, is a prior listing a failed listing that offers little informational value to owners, or even is seen as a negative signal by potential buyers (Taylor 1999).

Utilizing the true CDOM for both single-listing and relisted sales, we find that relistings experience a positive price impact. The price increases range from approximately 5 to 9 percent. These handsome premiums suggest that homeowners should consider relisting as an economic strategy. However, further analysis reveals that the positive price impacts are a function of the longer marketing periods. While our system of equations controls for the true CDOMs for both relistings and single-listing sales at the mean, the shift in the marketing duration for relistings is

sufficient to yield the positive price impacts. Our subsequent tests rigorously control for the extended marketing times for relistings using a matched-pair sample. We match the CDOM for each relisting to a single-listing sale with the same DOM as well as the same month and year of listing. Using this matched-pair sample as well as a propensity scored dataset, we find that there is little price impact to relistings relative to single-listing sales, which depends upon the relisting type and economic cycle. Accordingly, one contribution of our analysis is the finding that relistings do not offer an unexplained economic benefit but thorough confirmation of search theory.

Similarly, a further contribution demonstrates the importance of including the CDOM in a system of equations modeling both prices and marketing durations. There are many economic studies of the housing market that only examine prices without including CDOM in the equation or as a system of equations. While Hayunga and Pace (2019) offer a message that finding a lack of positive coefficient on CDOM in price equations should not impact other variables of interest, our analysis demonstrates the importance of including the correct marketing durations in price equations and vice versa.[4]

Another contribution is that ours is the first comprehensive investigation of relistings. This article is most closely related to Smith, Gibler and Zahirovic-Herbert (2016), which is the only prior paper that directly examines relistings. Working with 6,642 relistings in Atlanta over 27 months, they find a price increase using the true CDOM. Our analysis demonstrates that the positive price impact is a function of the longer marketing periods. Our results also offer findings

[4] There are two related studies based upon the correct measurement of the marketing period. Tucker, Zhang and Zhu (2013) and Benefield and Hardin (2015) examine the price impacts of different methods to calculate marketing durations. Their findings underscore the importance of correctly measuring and including marketing periods in a system of equations.

for the two types of relistings, which are expired versus canceled. Further, using more than 20 years of data and 50,000 relistings, we observe that relistings experience slight price decreases during economic expansionary periods (roughly 1.5 percent), but price increases of similar magnitude during the Global Financial Crisis.

A final contribution is the investigation of agent and brokerage office changes. Agent and office changes are one aspect of a relisting, but not all relistings result in these replacements. Daneshvary and Clauretie (2013) and Smith, Gibler and Zahirovic-Herbert (2016) find negative price impacts when sellers decide to switch representatives. Using more than 27,000 agent and brokerage office changes, our results indicate that replacing either does not materially impact prices or marketing times *ceteris paribus*.

In summary, relisting a home is a realistic event especially for sellers who have low discount rates and high reservation prices. Consequently, the price differences relative to single-listings sales are minimal. When the economy is growing robustly, the market seems to view relistings as a slightly negative event and the transaction prices decrease by approximately 1.5 percent. Conversely, relisting has a higher probability of occurring during economic contractions, and the longer CDOM equates to a slightly higher price for one of the two relisting types i.e., expired prior listings.

The remainder of the paper is structured as follows. The next section summarizes the theoretical studies underlying the cruciality of considering liquidity in housing market equilibrium. The subsequent sections detail the empirical approach, data, and findings. The final section offers concluding remarks.

House Prices and Marketing Durations in Search Equilibrium

Housing is a unique good because homes are fixed in their location and every property is heterogeneous to some degree. These aspects require buyers to expend resources to find homes that meet with their utility functions while sellers must also search for buyers with reservation prices that match theirs. Housing is therefore well understood as a search and matching market. In such an exchange, liquidity (or DOM) is as fundamental as are transaction prices.

One of the first papers that models the housing market within a search-theoretic structure is Wheaton (1990). His is the first framework that includes buyers and sellers but with the assumption of variables being constant with respect to time. Williams (1995) extends Wheaton's model to a dynamic setting. Fundamental to these models is that price and liquidity are jointly determined. Krainer (2001) develops an updated framework that yields state-varying liquidity in the housing market. His model shows how rational, forward-looking traders balance liquidity and price-setting decisions, which are determined endogenously. The state-varying liquidity implies that prices do not absorb all the exogenous changes in the economy. Consequently, liquidity, or CDOM in our empirical models, is fundamental to understanding price changes from something like relisting a home.

Empirical Approach

There are three empirical design considerations in a study of relistings. The first being the endogeneity of transaction prices and CDOM. The second is the length of the gap between the end of the first listing and start of the subsequent one that sells i.e., the days off market. Once a gap is selected, the third aspect is the treatment of the eventual sales that have gaps exceeding the threshold for a given test. This section details the specifics.

As to the first consideration, the two primary outcomes of real estate transactions are prices and the total marketing durations. The two are jointly determined as each is a fundamental input to the other. We therefore model our sample using a system of simultaneous equations. Further, our research design must account for the endogeneity of prices and CDOM, which is a material issue because they share the same set of possible variables that can be used for proper identification in a multi-stage regression.

Turnbull and Dombrow (2006) provide a method to overcome this specification challenge using distinct measurements of neighborhood characteristics. The variables are measures of market competition and listing density. Inclusion of these parameters allows us to have proper identification of the model. Prior studies that use this method include Turnbull, Dombrow and Sirmans (2006), Zahirovic-Herbert and Turnbull (2008), Waller and Jubran (2012), Zahirovic-Herbert and Chatterjee (2011), and Hayunga and Munneke (2021).

The variables consider the overlapping days that listings share and the distance between them. Listing density indicates the average competition intensity per DOM, where a negative effect on selling price reflects increased competition that depresses prices. A positive listing density suggests a shopping externality drawing potential buyers, offsetting the competition effect. Market competition reflects the number of competing properties near the subject property, accounting for the overlap between their DOM. The distance between the subject and competing properties is a factor in the market competition measure. Consistent with Turnbull and Dombrow (2006) we use all competing homes within 1 mile of the subject property as well as those within ±20 percent of the subject property's living area measured in square footage.

Following their method, we set $L(i)$ and $S(i)$ to be the listing date and end-of-listing date for property i. The overlapping number of days with other properties j is defined as:

$$O(i,j) = \min\big(S(i), S(j)\big) - \max\big(L(i), L(j)\big) + 1$$

The variable $D(i,j)$ is the straight-line distance between properties i and j. The two variables are computed as:

$$\text{Market competition}_{\text{i}} = \sum_{j \in I} \big(1 - D(i,j)\big)^2 O(i,j)$$

$$\text{Listing Density}_{\text{i}} = \sum_{j \in I} \frac{\big(1 - D(i,j)\big)^2 O(i,j)}{S(i) - L(i) + 1}$$

For application to relistings, we calculated *LD* and *MC* in two ways. When testing the biased DOM for relistings that only measures the marketing durations of the last sold listing, *LD* and *MC* also use the biased DOM. In all our other tests, *LD* and *MC* use the correct CDOM, which combines the prior listing and sold listing periods but excludes the days off market.

With *LD* and *MC* providing unique variables within our system of equations, we model all our results using three stage least squares due to the likely correlation of the error terms. The models are:

$$Ln(P_i) = \alpha + \beta_1 Ln(CDOM_i) + \gamma RL_i + \psi ML_i + \theta AC_i + \zeta BOC_i + \tau X_i + \lambda \text{LD}_i + \omega + \delta + \epsilon_i$$

$$Ln(CDOM_i) = \alpha + \beta_2 Ln(P_i) + \gamma RL_i + \psi ML_i + \theta AC_i + \zeta BOC_i + \tau X_i + \varphi \text{MC}_{\text{i}} + \omega + \delta + \epsilon_i$$

where $Ln(P_i)$ represents the logarithm of the sales price of house i and $Ln(CDOM_i)$ represents the logarithm of the cumulative days on market. The variable, X_i, is a time invariant matrix of many house attributes. Table A1 in the Appendix provides a list and definitions of these characteristics. LD_i and MC_{i} denote listing density and market competition. Temporal fixed effects, ω, are by month and year while spatial fixed effects, δ, are controlled for at the ZIP code level. ϵ_i is the residual term.

Our main variable of interest begins as RL_i, which is a binary variable equal to one for a relisted property and zero otherwise. While they are not a common occurrence, approximately 5,500 properties relist multiple times (1 percent). We account for this factor with another binary variable, ML_i, which is set to one for multiple relistings and zero otherwise. Our equation system also includes AC_i and BOC_i, which are binary variables set to one for agent or brokerage office changes, and zero otherwise. It should be noted that $RL_i \neq AC_i$ and $RL_i \neq BOC_i$ as not all relistings generate agent or brokerage office changes, but all agent or office changes result in relistings. As indicated in Table 1, 54 and 57 percent of relistings experience agent or office changes respectively. Lastly, relistings can be of two types, which are expirations and cancelations. Thus, in most of our models, RL_i, will be replaced with *Expired Prior* and *Canceled Prior*, which are binary variables set equal to one if the prior listings were either canceled or expired, and zero otherwise.

Our next econometric issue is the treatment of the days off market. It is an empirical question as to whether this gap can influence prices or CDOM. For our main specifications, our sample uses a 30-day gap. To confirm that this threshold is not driving our findings, we also investigate gaps of 7, 90 and 180 days. An important benefit of the 7-day gap is that it rigorously controls for changes in the property prior to relisting. Such a short period does not allow owners to make material alterations. In the event the 7- or 30-day gaps are too restrictive, the periods of 90 and 180 days address the possibility that we misclassify listings with longer gaps as new listings and not relistings.

Conditional on the gap length, the third aspect to consider is the treatment of observations that result in sales but have gaps that exceed the threshold for that test. This aspect is novel to the housing literature and important to a relistings study. Take the 30-day gap as an example. The

homes that are off the market 30 days or less between listings will be treated as relistings and added to our pooled sample along with the homes that sell during their first listings. In this example, homes that are off the market more than 30 days will be kept in the sample and classified as new first listings because we cannot be sure that these listings are true relistings. Potentially, the owners left the market, changed their property or other transaction attribute, and are back in the market with a fresh start. This aspect is especially important when considering 90- and 180-day gaps as these longer periods allow much more opportunity for owners to materially change their structure or situation.

In addition to keeping the subsequent sales that exceed the gap period and classifying them as new listings, we also investigate dropping them. Keeping the sales with gaps greater than the 30 day threshold may introduce a bias based upon a misclassification that they are first listings and not relistings. To address the overall issue of gaps between first and second listings, we model our system of equations across the four gap periods while both keeping and dropping the sales with gaps greater than the thresholds for that specific test.

Data

This study uses a comprehensive collection of housing data from the MLS Property Information Network (MLSPIN) covering the entire state of Massachusetts. Our analysis focuses on single-family properties for the period from January 2000 to December 2019. The sample does not include sales after 2019 due to the unique effects we find in the local housing markets associated with the introduction of the COVID-19 virus.

Sample

We begin constructing the sample by removing all records that contain data errors and then apply the following filters to the data. We require the homes to have from 500 to 9999 square feet, from 0 to 10 acres in lot size, 1 to 15 bedrooms, and 1 to 20 bathrooms. Unlike other studies that exclude properties built before 1900, we extend the home age cutoff to 209 years, which acknowledges the significant number of older homes in Massachusetts that are not considered special historical properties but owned and occupied by typical homebuyers. To the extent our upper limits are too lenient, we follow Harding, Knight and Sirmans (2003) in generating a set of indicator variables to identify properties with potentially atypical characteristics. Binary variables are set to one (and zero otherwise) if the living area exceeds 4915 square feet (*Large Home*), the lot is more than 4.8 acres (*Large Lot*), the home age is more than 166 years (*Older Home*), the number of bedrooms exceeds 6 (*Many Bedrooms*), and the number of bathrooms exceeds 5 (*Many Baths*). These variables generally control for the top one percent of their respective distributions.

To better generalize our results, we also trim the transaction prices at the one percent level on both sides of the distribution. This yields a sample with a minimum list price of $82,000 and a maximum of $2.5M. Lastly, we keep CDOM between 8 and 450 days, which trims less than 0.1 percent of the data on the left end of the distribution and 1.5 percent on the right.

The sample also excludes new construction, foreclosures, and short sales. New homes generally exhibit different price/CDOM tradeoffs compared to the existing house stock. Builders can also offer seller concessions that may not be well captured by one dummy variable for new construction. We also remove foreclosures and short sales for a similar reason: quality and price/CDOM tradeoffs can exhibit large variances in the cross section, which is not captured well

using one binary variable. Note, though, we include newly constructed homes, foreclosures, and short sales when calculating the LD and MC variables.

Apropos to our analysis, we require that each property have a terminal listing status of sold, expired, or canceled. The sold classification signifies the successful transfer of ownership for the property. The expired status indicates the termination of the listing upon reaching the pre-agreed expiration date as stipulated in the listing contract. The canceled classification denotes a mutual agreement between the broker and the seller to terminate the listing agreement prior to its designated expiration date. There is another category that has been incorrectly attributed to be an expired listing in the popular press and elsewhere. Some MLS systems will allow for a withdraw status, which is not a terminal condition but a temporary one. Sellers can elect to stop marketing the property through MLS, but the exclusive right-to-sell contract is still in force. Withdraws will then evolve into one of the three terminal statuses. Since withdrawals are temporary, they are not part of our study of relistings.

Descriptives

The final dataset consists of 684,490 property listings of which 50,525 are relistings. Table 1 provides descriptive statistics for the full pooled sample as well as the subsamples of single-listings sales and relistings. While many characteristics are similar, we highlight one notable difference, which is the measurement of the marketing period. Following a standard metric that uses sold listings only, the mean DOM is 105.1 days for the pooled sample. But this average ignores prior listings. For the relisting subsample, the biased DOM using only the sold listings exhibits a mean of 103.6 days, but the true mean CDOM is 223.4 days. This is the first evidence

that relisting sales experiences a shift in the CDOM distribution that is different from the marketing durations of single listing sales.

Table 2 provides descriptive statistics for canceled versus expired listings. Many characteristics are comparable. The number of canceled relistings is 28,083 (55.6 percent) while the number of expired is 22,442 (44.5 percent). The number of owners who change agents is 52 percent for expired prior listings and 55 percent for canceled. The breakdown for owners who change brokerage offices is 53 percent for expired prior listings and 59 percent for canceled. One notable difference is the CDOM between the two relisting types. Instead of waiting for the listing to expire, owners who cancel their experience a CDOM decrease from an average of 250.6 to 201.7 days.

To further illustrate the differences in DOM and CDOM across the two relistings types as well as the single-listing sales, we provide Figures 1 through 4. Figure 1 displays the expired prior listings. Since these are expired first listings the *x*-axis is the DOM and not the CDOM that includes the second listing. We note the clustering of data at 30-day intervals, which is consistent with the length of typical listing contracts.

Figure 2 illustrates the DOM for the canceled prior listings. In contrast to the expired listings, we observe left skewness in these data. Also of interest are the periodic increases in the data. We initially suspected these may be at intervals of 15 days, which would coincide somewhat with the clustering of the expired prior listings. Upon further examination, we find the increases in activity are more frequent. The distribution of canceled prior listings is comparable to the single-listing sales in Figure 3. The data display a left skewness with patterned increases in the number of home exhibiting specific DOM values.

Since the intervals are more frequent than 15 days, we check for daily activity across the three terminal statuses. Figure 4 shows that there are a few patterns in the data. Expired prior listings show a more uniform distribution across all days of the week, supporting the passive actions of sellers with respect to this terminal status. In comparison, canceled prior listings occur during the week. More occur on Mondays, which may reflect owners waiting through the weekend for an offer and then canceling when one does not emerge. Concerning single-listing sales, home closings occur throughout the work week with more happening on Fridays.

Empirical Analyses

This section details the regression equations that model transaction prices and marketing periods in our system of equations. We first consider the use of DOM, which measures the marketing period for the single-listing sales but does not reflect the prior listing for relisted homes. We subsequently model the true CDOM for all transactions in the remainder of our tests.

Model 1 in Table 3 displays the results using the biased DOM. The binary variable in the price equation suggests relisting a property will reduce transaction prices by 3.9 percent ($13,286) versus a single listing sale, all else held equal. The other implication is that relisting a property reduces DOM by 13.2 percent (~11 days) compared to a property sold with a single listing. A decrease in the marketing period does not meet with our priors as a relisting should take longer on average compared to single-listing sales. This illustrates the issues that can arise with an improper measurement of the marketing period (Tucker, Zhang and Zhu 2013; Benefield and Hardin 2015).

Model 2 in Table 3 executes the system of equations using the full CDOM for all transactions. Crucially, the coefficient for the variable of interest, *Relisted*, reverses sign from

negative to positive in both the price and CDOM equations. The slope coefficient in Model 2 is 0.055. The parameter estimate of 0.517 in the CDOM equation is an increase of 64 days.

One possible feature of relistings is agent and Brokerage office changes. These are one of the quickest adjustments sellers can make if their home is not sold within their preferred timespan. If owners employ new agents with higher expertise levels, switching representatives has the potential to increase transactions prices and/or reduce the CDOM. Alternatively, findings in Daneshvary and Clauretie (2013) and Smith, Gibler and Zahirovic-Herbert (2016) suggest that replacing agents decreases transaction prices. Our models in Table 3 include binary variables for both change types. The results indicate that replacing agents or brokerage offices do not significantly impact prices or marketing times.

The covariates in Model 2 meet with our priors. We observe the expected price increases for larger homes and larger lots. Compared to conventional financing, the results demonstrate the expected decrease in prices when sellers purchase with cash. Consistent with Hayunga and Munneke (2021), estate sellers experience negative price impacts holding CDOM constant or a shorter marketing period holding price constant. Lastly, we note the importance of including atypicality measures in hedonic housing equations as all have significant impacts on both prices and CDOMs.

In our next equations, we split the relisting variable into the expired versus canceled terminal types. The results in Table 4 report the findings of our variables of interest for both the pooled sample as well as a subsample of relisted homes. We model relistings as a separate subsample to investigate for any uniqueness in these transactions as well as confirming the findings using the pooled sample. While not reported in subsequent tables, we confirm in all our tests that the relisting subsample does not yield results that conflict with the findings for the pooled sample.

Table 4 reveals that passively letting a listing expire yields higher transaction prices as well as longer marketing periods. The parameter estimate on expired prior listings is 0.067 in Model 1 compared to a slope coefficient of 0.045 on canceled prior listings. We find the price difference between canceled and expired prior listings throughout our analysis.

Consistent with the hypothesis that sellers take a more active role by canceling their listings prior to expiration, the parameter estimates in the CDOM equations equate to marketing periods of 172 days for expired prior listings compared to 147 days for canceled. Using the relistings subsample, we confirm that expired prior listings yield higher transaction prices and longer CDOMs. The *Agent Change* and *Brokerage Office Change* variables in Table 4 indicate minimal to no impact on prices or CDOMs.

Days off Market

No standard exists to delineate when a homes that appears with a canceled or expired prior listing is a relisting or a new listing. Clearly, sold listings separated by years from canceled or expired prior listings are not relistings but owners coming to the market in two unique instances. The empirical question is where to set the threshold for the days off market. For the base model, we fix the off-market period between the initial listing and the sold listing to be 30 days. To confirm that our selection of a 30-day gap is not driving the results, we also examine the thresholds of 7, 90, and 180 days off market.[5] A 7-day gap is particularly insightful as it effectively mitigates material changes in property quality that could influence our results. It also provides the most comfort in determining that a home with two observations in the MLSPIN system is a relist. The 90 days off market matches the definition of a relisting from the MLSPIN system (Tucker, Zhang

[5] Smith, Gibler and Zahirovic-Herbert (2016) use 30, 48, and 60 days.

and Zhu 2013). A gap of 180 days is the most generous definition of a potential relisting given two observations of the same home being recorded in the MLSPIN system. This period opens the possibility of structural alterations as well as changes in sellers' bargaining positions and general economic conditions. It also introduces more of a question whether the two observations are a relisting or is an owner coming to the market in two different instances. Given these potential disadvantages, we do not extend the gap period as longer periods strongly indicate separate listings.

Across the gap lengths, the results in Table 5 demonstrate that our findings are not driven by the number of days off market. As in Table 4, expired prior listings exhibit higher prices than canceled prior listings. We do note monotonically increasing functions for both transaction prices and CDOM across the gaps. This is more evidence that the marketing period distributions for relistings shifts to the right compared to single-listing sales. As the days off market increases, the overall CDOMs increase for both relisting types. The longer market periods permit owners sufficient time to find buyers that meet their reservation prices. We will confirm this hypothesis in our subsequent tests.

Before doing so, we consider the treatment of the sold listings of homes that exceed the four gap thresholds. As mentioned, the homes with the days off market equal to or less than the limit will be treated as relistings and pooled with the single-listing sales. Homes off the market for a period longer than the threshold have been kept in our sample to this point as a single-listing sale. An issue arises because there is no method to be perfectly certain the homes that sell after the gap period are single-listing sales and not relistings. In contrast to the results up to this point that keeps the transactions that sell after the gap period, we examine removing them from our sample. Our tests thus span the breadth of combinations: short versus long days off market with

the sales beyond the gap threshold both kept and dropped. Note, outside of Daneshvary and Clauretie (2013) and Smith, Gibler and Zahirovic-Herbert (2016), housing studies do not consider relistings, thus, by default, the literature drops/censors all prior observations that either expire or cancel without consideration of the days off market.

Table A2 in the Appendix reports the findings across the four gap lengths after dropping the homes that exceed the thresholds. The results match those in Table 5. We see the higher prices for expired prior listings versus canceled. The findings also exhibit monotonically increasing slope coefficients across the gap periods for both relisting types as well as for both prices and CDOM The overall inference is that neither the gap thresholds nor keeping or dropping the sold observations that could be classified as relistings are driving our results.

Propensity Score Matching

Our specifications thus far consider relisted homes to be the same as single-listing sales. However, it could be said that the homes that sell with a single listing may be different than the relisted properties. Homes that experience relisting may be located in less desirable ZIP codes or exhibit more atypicalities such that they stay on the market longer. To address the issue, we use propensity score matching to generate a new balanced sample. For each relisting, we find a matching single listing sale based on the listing period (month and year), ZIP code, home square footage, lot size, year of construction, number of bedrooms, and number of bathrooms.

To control for the shift in the marketing period distribution for relistings, we also match on CDOM. Figures 3 and 5 illustrate the point of this last factor. The single-listing sales shown in Figure 3 are left skewed with 50% of the observations transacting in under 84 days. The CDOM distribution of relistings shown in Figure 5 exhibits a materially different form. The mean and median CDOMs are 223 and 213 days respectively. To control for the shift, we include the

CDOMs in our propensity score matching. The resulting DOM distribution for single-listing sales is shown in Figure 6, which resembles the CDOM distribution in Figure 5 and is distinctly different than the distribution in Figure 3.

In case the matching process using propensity scoring does not sufficiently control for the differences in the marketing periods, we also create a new sample that requires every relisting to pair with a single-listing sale that has the exact DOM as the relisting CDOM. We also require the same listing month and year for every relisting and single-listing pair. After matching each relisting to a single-listing sale, we continue forming the new sample using standard propensity scoring and confirm that our new sample meets the criteria of balance, common support, and the equality of the treated versus untreated means.

The equations in Table 6 report the updated findings. The results demonstrate the importance of controlling for the marketing period in housing price models. Whether using the standard propensity-scored data or the matched-pair sample, the updated price impact is economically and statistically insignificant for expired prior listings. The implication is that a listing that is allowed to expire and then relisted is not a failed attempt but a feasible event that does not alter the home value.

For canceled prior listings, the slope coefficients in Table 6 demonstrate a price decrease of slightly more than 1.5 percent. The mean sales price in the two propensity scored samples is approximately $349,000, hence, the parameter estimates equate to price reductions of about $6,000. Additionally, canceled listings experience a reduction in the marketing period (holding prices constant). The mean CDOMs for these propensity scored samples are approximately 200 days. The parameter estimates indicate decreases in total marketing time of 24 days in Model 1 and 16 days in Model 2. Consistent with the more active nature of a cancellation versus an

expiration, owners cancelling their first listing will shorten the marketing period but at the expense of a lower price. The results and conclusions fully support search theory.

Economic Cycles

Our final analysis considers economic cycles. We can envision differing price outcomes for relisted homes based upon the underlying economic conditions. For instance, in a so-called hot market when there is a relatively high number of buyers compared to homes for sale, relisting a home may be viewed as a strong negative signal. Liquidity during such a period is good and relistings could be viewed as failed first listings, which is a particularly negative occurrence during times when demand is high relative to the number of homes for sale. Alternatively, during such a time, there may be sufficiently high demand compared to the supply that the probability of sale is greater, and relisting is not seen as a detriment as much as a signal from owners of high reservation prices (Krainer 2001). Conversely, during market downturns when there are relatively more houses for sale compared to the quantity demanded from buyers, a relisting could be viewed as nothing more than owners continuing their search for buyers with sufficient reservation prices to find a match.

Across our sample timeframe, the Massachusetts market experienced three distinct periods. Figure 7 illustrates these using the seasonally adjusted S&P/Corelogic/Case-Shiller home price index for Boston. The first period spans from January 2000 to April 2005. This is a time of rapid expansion in the market exhibiting a continuously compounded annual growth rate of 10.9 percent. The subsequent interval is the contracting market from April 2006 to March 2009. The continuously compounded annual growth rate during this period is negative 6.0 percent. The final

period is an expansion market from May 2012 to May 2019 with more gradual price appreciation than in the early 2000s. The continuously compounded growth rate is 5.3 percent.

Table 7 reports our variables of interest across the three economic intervals. Since matching the relisted and single-listing sales is shown to be essential, we use the propensity scored sample from Model 1 in Table 6. The results during the rapidly expanding housing market in the early 2000s suggest that relisting is viewed as a somewhat negative event. Owners who previously allowed a prior listing to expire experience a price decrease of 1.5 percent on average. Sellers who canceled a prior listing encounter a price reduction of 2.2 percent all else held equal.

Model 2 in Table 7 reports the results when the local housing market is contracting. Sellers appear to benefit the most from relisting in this market with expiring prior listings transacting for 2.2 percent higher prices. Consistent across all our previous results has been the difference between expired and canceled prior listings. Canceled experience shorter marketing periods but also lower prices. This holds again in Model 2 during the contracting economic cycle. The parameter estimate is not statistically different than zero. In sum, relisting seems to be a net benefit when liquidity in housing markets is lower.

The third economic interval is an expansionary period that is not as robust as the early 2000s. The relisting variables exhibit no significant price impacts for *Expired Prior* and negative 2.4 percent for *Canceled Prior*. Previous listings that were canceled again experience a reduction in the CDOM.

Conclusion

This article is the first comprehensive study of relistings in the housing literature. Our sample covers the state of Massachusetts over the 20-year period from 2000 to 2019, which yields

a sample of almost 685,000 transactions and more than 50,000 relistings. Our analysis demonstrates that relistings experience longer marketing periods compared to single-listing sales. Consistent with search theory, the extended DOM yields higher prices for relists. Upon strictly controlling for the longer market periods, the results indicate that relistings experience prices that are like single-listing sales.

We find a few price differences when modeled during specific economic conditions. The period from 2000 to 2005 was a rapidly expanding economic time for our sample of Massachusetts homes. When owners relisted during that period, they experienced average price decreases of approximately 2 percent. During another expansionary period of 2012–2019, we find canceled prior listing yield similar negative price impacts, but this is not true for prior listings that owners allow to expire before relisting and selling their home. Notably, prior listings that expired and then sold on relist during the economic downturn from 2006 to 2009 experience a price increase of approximately 2 percent.

Overall, the results suggest that relistings are a feasible event that can occur as sellers wait for buyers with sufficiently high reservation prices that match sellers' values. Consequently, relisting owners do not experience a substantial negative price impact as may be expected *ex ante*. They seem to be viewed as a negative signal during expansionary economic periods when liquidity is generally good. However, owners earn higher prices upon relisting during economic downturns, which supports the notion that sellers with lower discount rates and higher reservation prices can obtain higher prices when liquidity is relatively low, but they may need to relist.

References

Benefield, JD, and WG Hardin 2015. Does time-on-market measurement matter? *The Journal of Real Estate Finance and Economics* 50:52-73.

Daneshvary, N, and TM Clauretie 2013. Agent change and seller bargaining power: a case of principal agent problem in the housing market. *The Journal of Real Estate Finance and Economics* 47:416-433.

Harding, JP, JR Knight, and CF Sirmans 2003. Estimating bargaining effects in hedonic models: Evidence from the housing market. *Real estate economics* 31:601-622.

Hayunga, DK, and HJ Munneke 2021. Examining both sides of the transaction: Bargaining in the housing market. *Real Estate Economics* 49:663-691.

Hayunga, DK, and RK Pace 2019. The impact of TOM on prices in the US housing market. *The Journal of Real Estate Finance and Economics* 58:335-365.

Krainer, J 2001. A theory of liquidity in residential real estate markets. *Journal of urban Economics* 49:32-53.

Smith, PS, KM Gibler, and V Zahirovic-Herbert 2016. The effect of relisting on house selling price. *The Journal of Real Estate Finance and Economics* 52:176-195.

Taylor, CR 1999. Time-on-the-market as a sign of quality. *The Review of Economic Studies* 66:555-578.

Tucker, C, J Zhang, and T Zhu 2013. Days on market and home sales. *The RAND Journal of Economics* 44:337-360.

Turnbull, GK, and J Dombrow 2006. Spatial competition and shopping externalities: Evidence from the housing market. *The Journal of Real Estate Finance and Economics* 32:391-408.

Turnbull, GK, J Dombrow, and CF Sirmans 2006. Big house, little house: relative size and value. *Real Estate Economics* 34:439-456.

Waller, B, and A Jubran 2012. The impact of agent experience on the real estate transaction. *Journal of Housing Research* 21:67-82.

Wheaton, WC 1990. Vacancy, search, and prices in a housing market matching model. *Journal of political Economy* 98:1270-1292.

Williams, JT 1995. Pricing real assets with costly search. *The review of financial studies* 8:55-90.

Zahirovic-Herbert, V, and S Chatterjee 2011. What is the value of a name? Conspicuous consumption and house prices. *Journal of Real Estate Research* 33:105-126.

Zahirovic-Herbert, V, and GK Turnbull 2008. School quality, house prices and liquidity. *The Journal of real estate finance and economics* 37:113-130.

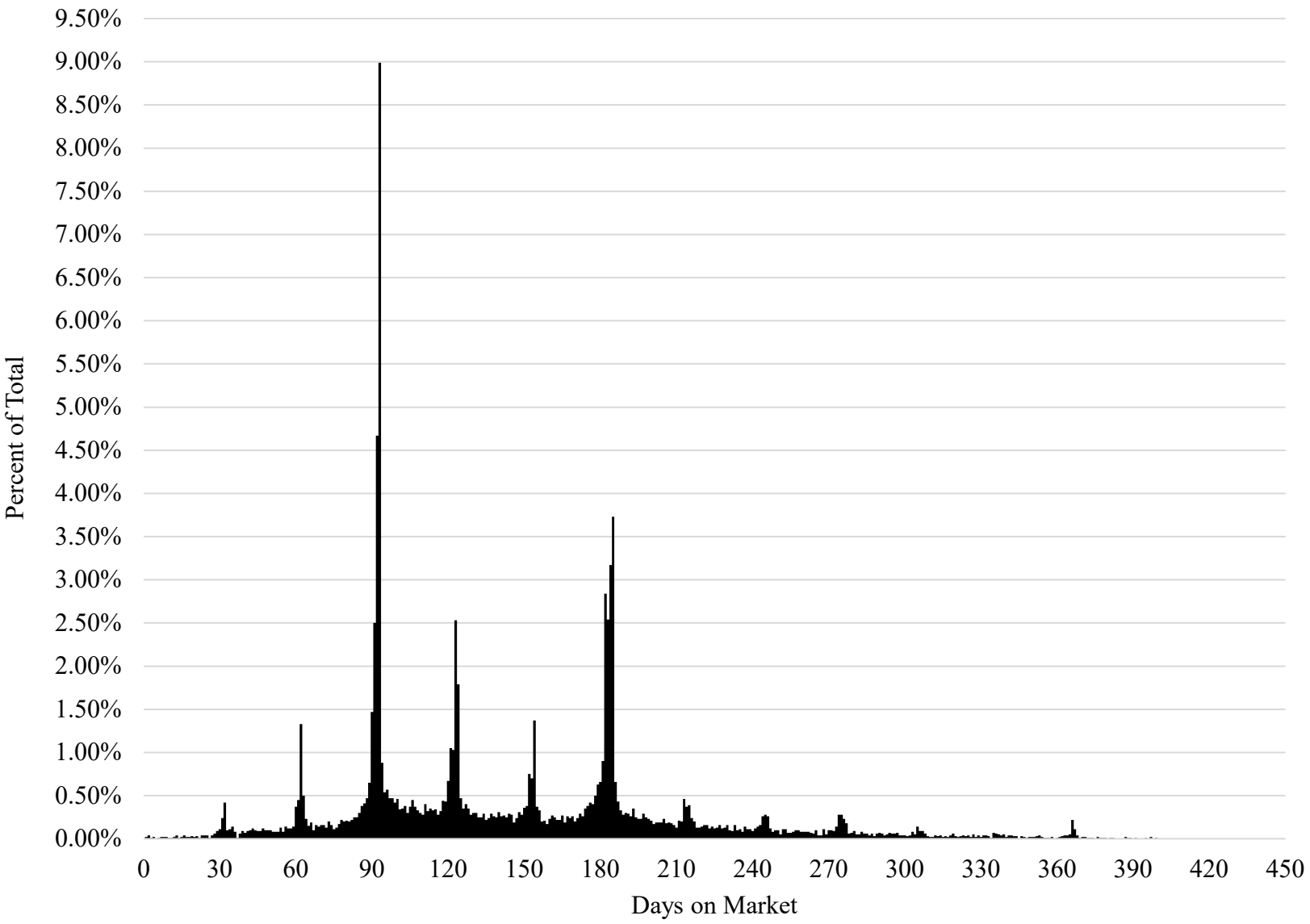

Figure 1: Expired Prior Listings

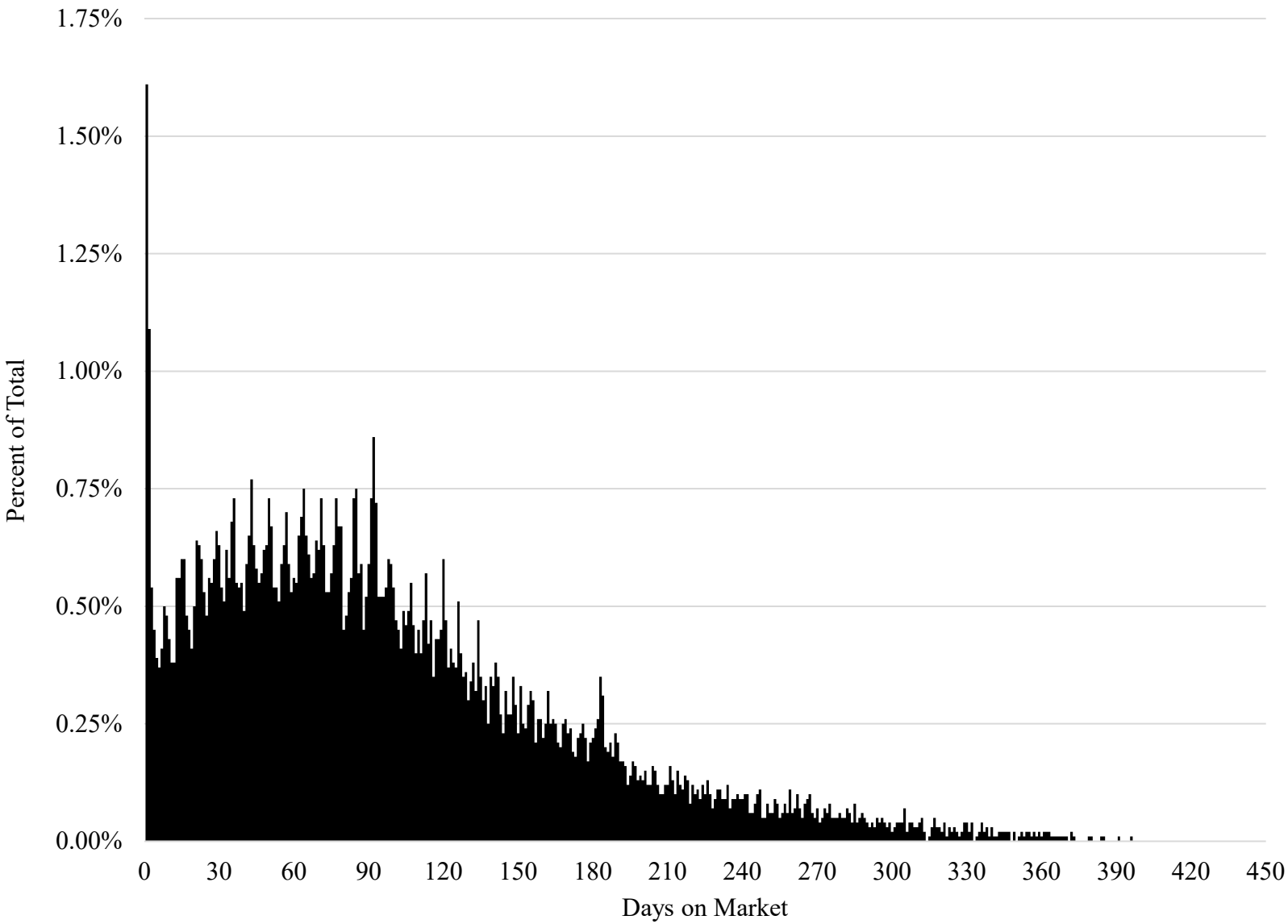

Figure 2: Canceled Prior Listings

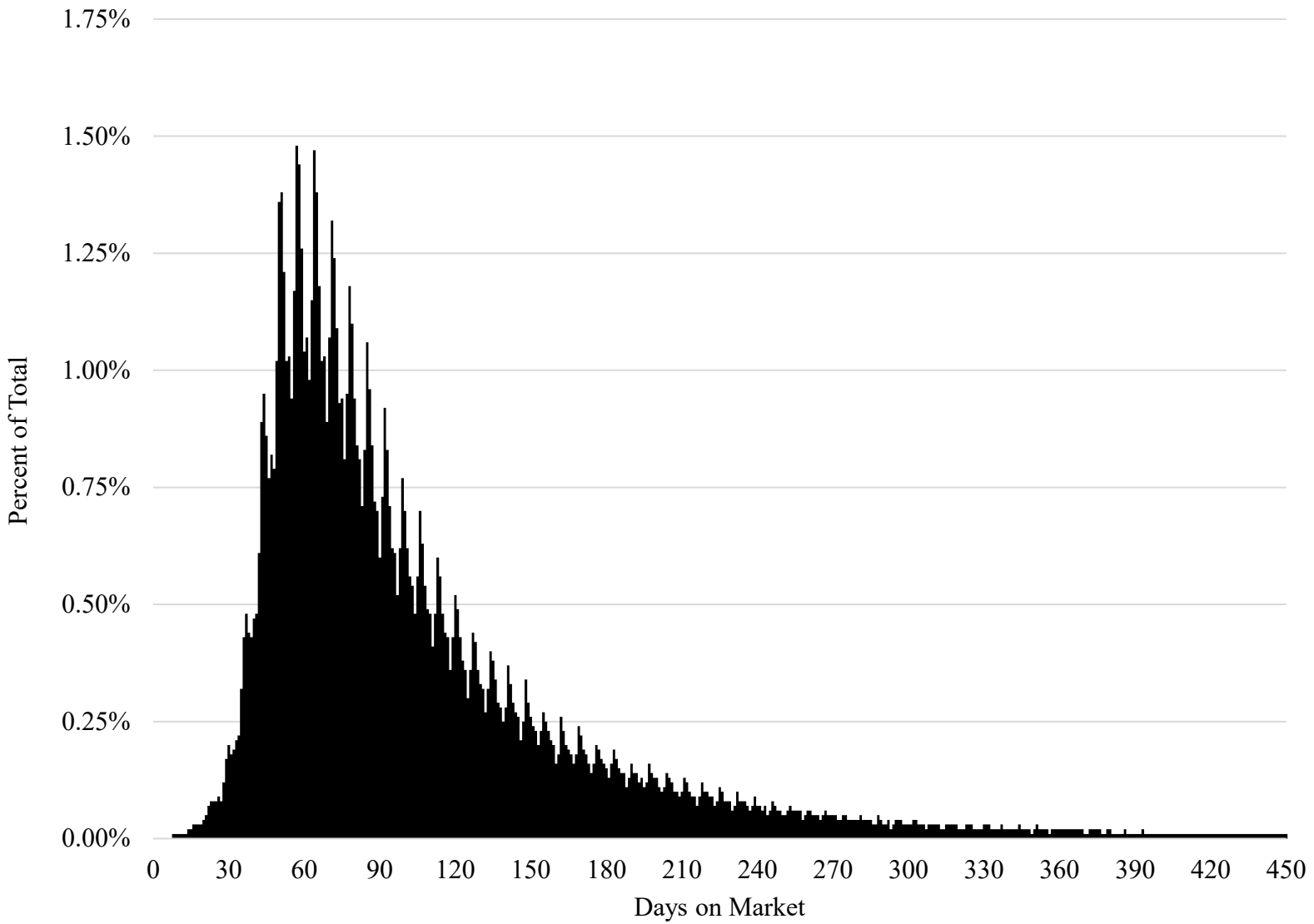

Figure 3: Single-listing Sales

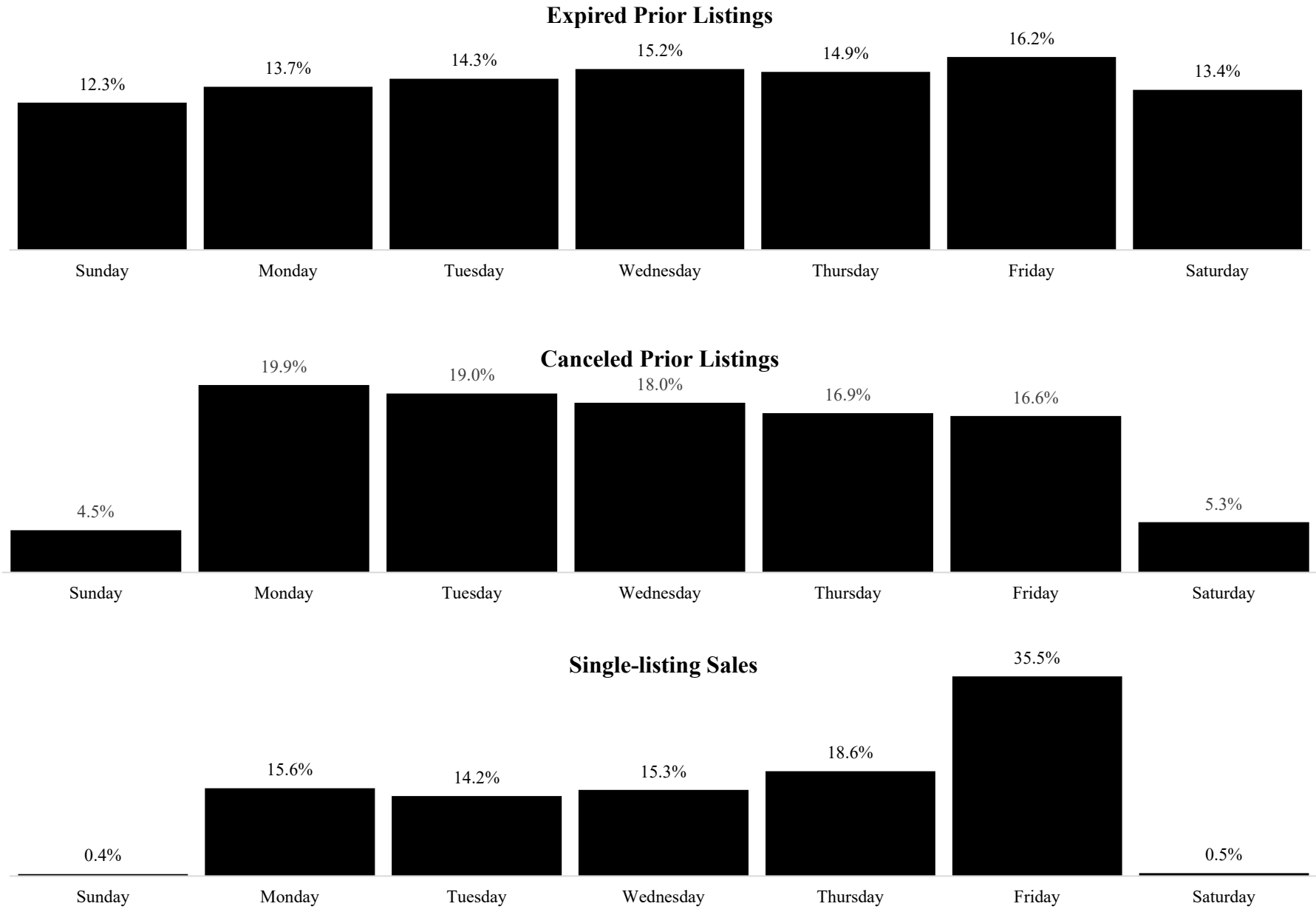

Figure 4: Listing Terminations by Day of the Week

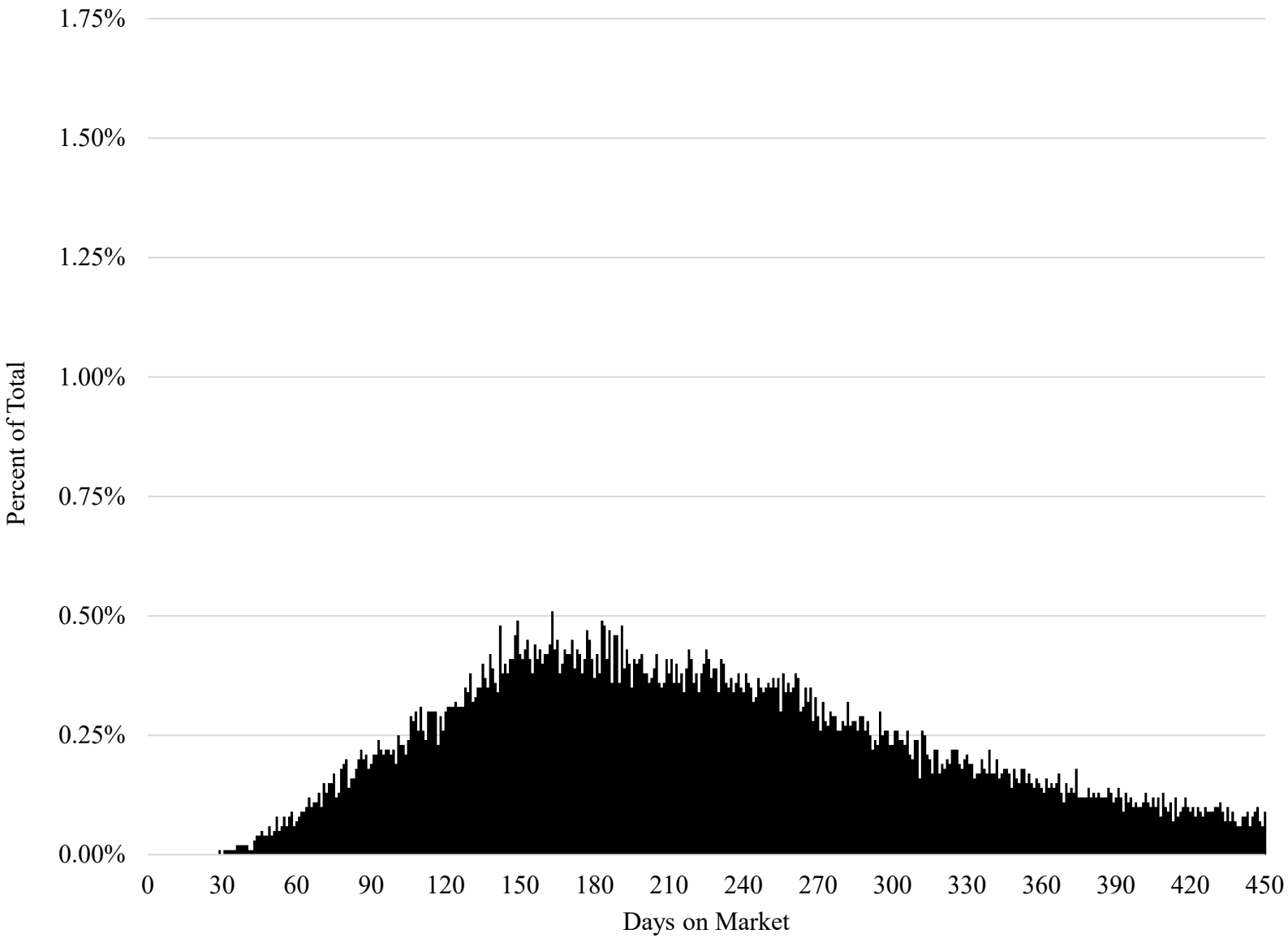

Figure 5: Relisting Sales

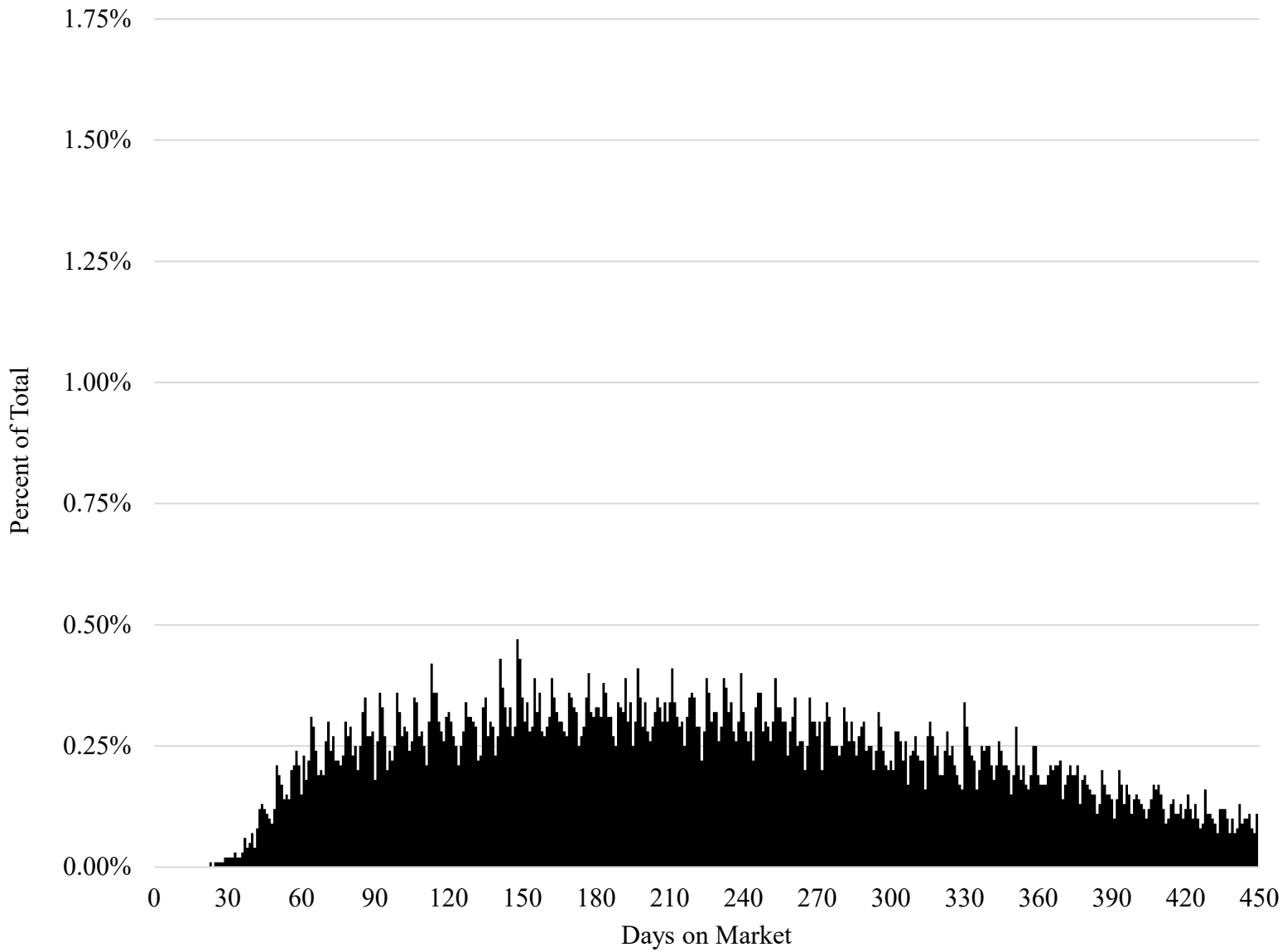

Figure 6: Propensity Score Matched Single-listing Sales

Figure 7: Boston House Price Index (Seasonally Adjusted)

Table 1: Descriptive Statistics

	Pooled Sample			Single-Listing Sales			Relisted Sales		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum	Mean	Minimum	Maximum
List Price	424,163	82,000	2,500,000	423,208	82,000	2,500,000	435,444	82,000	2,500,000
List Price at Time of Sale	414,467	59,900	2,790,000	413,526	59,900	2,790,000	425,571	69,977	2,524,000
Sales Price	404,911	71,000	2,750,000	404,468	71,000	2,750,000	410,131	71,500	2,460,000
Square Feet	1,895	500	9,998	1,878	500	9,998	2,097	500	9,197
Lot Size	26,872	500	448,518	26,430	500	448,518	32,095	548	446,926
DOM	105.1	8	450	105.3	8	450	103.6	8	435
CDOM	114.0	8	450	-	-	-	223.4	16	450
Age	57.2	2	209	57.5	2	209	53.5	2	209
Number of Bedrooms	3.32	1	15	3.31	1	15	3.45	1	13
Number of Bathrooms	2.17	1	20	2.16	1	20	2.35	1	20
Agent Change	0.04	0	1	-	-	-	0.54	0	1
Brokerage Office Change	0.04	0	1	-	-	-	0.57	0	1
Multiple Relist	0.01	0	1	-	-	-	0.11	0	1
Cash Financing	0.05	0	1	0.05	0	1	0.04	0	1
FHA Financing	0.07	0	1	0.07	0	1	0.06	0	1
VA Financing	0.02	0	1	0.02	0	1	0.01	0	1
Rental	0.01	0	1	0.01	0	1	0.01	0	1
Vacant	0.01	0	1	0.01	0	1	0.02	0	1
Estate	0.01	0	1	0.01	0	1	0.01	0	1
Flat Fee	0.02	0	1	0.02	0	1	0.02	0	1
Waterfront	0.03	0	1	0.03	0	1	0.04	0	1
HOA	0.04	0	1	0.04	0	1	0.04	0	1
Sample Size		684,490			611,808			50,525	

Table 2: Descriptive Statistics: Canceled & Expired Listings

	Canceled Relistings			Expired Relistings		
Variable name	Mean	Minimum	Maximum	Mean	Minimum	Maximum
List Price	443,390	82,500	2,500,000	425,996	82,000	2,500,000
List Price at Time of Sale	432,968	69,977	2,524,000	416,777	75,000	2,500,000
Sales Price	418,686	71,500	2,460,000	399,960	71,500	2,410,000
Square Feet	2,118	500	8,756	2,071	503	9,197
Lot Size	31,712	548	446,926	32,551	600	445,619
DOM	102.6	8	435	104.8	8	394
CDOM	201.7	16	450	250.6	29	450
Age	53.0	2	209	54.2	2	209
Number of Bedrooms	3.47	1	9	3.43	1	13
Number of Bathrooms	2.38	1	20	2.32	1	14
Agent Change	0.55	0	1	0.52	0	1
Brokerage Office Change	0.59	0	1	0.53	0	1
Multiple Relist	0.11	0	1	0.011	0	1
Cash Financing	0.03	0	1	0.05	0	1
FHA Financing	0.06	0	1	0.07	0	1
VA Financing	0.01	0	1	0.01	0	1
Rental	0.01	0	1	0.01	0	1
Vacant	0.01	0	1	0.02	0	1
Estate	0.01	0	1	0.01	0	1
Flat Fee	0.02	0	1	0.02	0	1
Waterfront	0.04	0	1	0.05	0	1
HOA	0.04	0	1	0.05	0	1
Number of observations		28,083			22,442	

Table 3: Base Results

	Biased DOM		Unbiased CDOM	
	Ln(Price)	Ln(DOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2	
Relisting	-0.039**	-0.132**	0.055**	0.517**
	(0.001)	(0.009)	(0.001)	(0.008)
Agent Change	-0.001	0.022	0.003	0.024
	(0.003)	(0.019)	(0.003)	(0.017)
Brokerage Office Change	0.014**	0.093**	0.005	0.033
	(0.003)	(0.019)	(0.003)	(0.017)
Multiple Relists	-0.025**	-0.087**	0.019**	0.345**
	(0.003)	(0.017)	(0.003)	(0.015)
Ln(DOM)	-0.110**			
	(0.001)			
Ln(CDOM)			-0.113**	
			(0.001)	
Ln(Square Feet)	0.442**	0.394**	0.443**	0.501**
	(0.001)	(0.022)	(0.001)	(0.023)
Ln(Lot Size)	0.068**	0.089**	0.068**	0.102**
	(0.000)	(0.004)	(0.000)	(0.004)
Ln(Bedrooms)	0.038**	-0.038**	0.038**	-0.023**
	(0.001)	(0.008)	(0.001)	(0.007)
Ln(Bathrooms)	0.135**	0.096**	0.134**	0.124**
	(0.001)	(0.009)	(0.001)	(0.009)
Cash Financing	-0.094**	-0.149**	-0.092**	-0.158**
	(0.001)	(0.008)	(0.001)	(0.007)
FHA Financing	-0.023**	0.039**	-0.023**	0.031**
	(0.001)	(0.006)	(0.001)	(0.006)
VA Financing	-0.004*	0.050**	-0.005*	0.042**
	(0.002)	(0.012)	(0.002)	(0.011)
Rental	-0.013**	0.094**	-0.012**	0.095**
	(0.002)	(0.013)	(0.002)	(0.012)
Vacant	-0.038**	0.015	-0.037**	0.007
	(0.002)	(0.014)	(0.002)	(0.013)
Estate	-0.113**	-0.068**	-0.112**	-0.088**
	(0.002)	(0.014)	(0.002)	(0.014)
Flat Fee	0.028**	-0.003	0.029**	0.009
	(0.002)	(0.011)	(0.002)	(0.010)
Waterfront	0.228**	0.225**	0.229**	0.286**
	(0.001)	(0.013)	(0.001)	(0.013)
HOA	0.073**	0.083**	0.073**	0.097**
	(0.001)	(0.009)	(0.001)	(0.008)
Atypical: Large Home	0.111**	0.177**	0.113**	0.216**
	(0.003)	(0.017)	(0.003)	(0.016)

continued

	Biased DOM		Unbiased CDOM	
	Ln(Price)	Ln(DOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2	
Atypical: Large Lot	-0.006*	0.015	-0.005*	0.021
	(0.002)	(0.015)	(0.002)	(0.014)
Atypical: Many Baths	0.110**	0.116**	0.112**	0.161**
	(0.004)	(0.023)	(0.004)	(0.021)
Atypical: Many Bedrooms	0.011**	0.131**	0.012**	0.136**
	(0.002)	(0.014)	(0.002)	(0.013)
Atypical: Older Home	0.053**	0.133**	0.054**	0.098**
	(0.002)	(0.015)	(0.002)	(0.014)
Ln(Age)	-0.063**		-0.063**	
	(0.000)		(0.000)	
Listing Density	0.014**		0.014**	
	(0.000)		(0.000)	
Ln(Sale Price)		-0.469**		-0.725**
		(0.050)		(0.053)
Age		0.001**		-0.000*
		(0.000)		(0.000)
Age2		-0.000**		0.000
		(0.000)		(0.000)
Market Comp.		0.001**		0.001**
		(0.000)		(0.000)
ZIP code fixed effects	✓	✓	✓	✓
Temporal fixed effects	✓	✓	✓	✓
Observations	684,485	684,485	684,485	684,485
R-squared	0.87	0.27	0.86	0.27

The table presents equations modeling the natural log of prices, days on market, and cumulative days on market using both single-listing and relisted sales. The threshold for the number of days off market between the prior and sold listings is 30 days. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.

Table 4: Prior Listing Termination Method

	Pooled Sample		Relisting Subsample	
	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2	
Expired Prior	0.067**	0.601**	0.022**	0.192**
	(0.002)	(0.009)	(0.002)	(0.010)
Canceled Prior	0.045**	0.443**		
	(0.002)	(0.009)		
Agent Change	0.001	0.012	0.007*	0.056**
	(0.003)	(0.017)	(0.003)	(0.018)
Brokerage Office Change	0.008*	0.053**	0.003	0.031
	(0.003)	(0.017)	(0.003)	(0.018)
Covariates	✓	✓	✓	✓
ZIP code FE	✓	✓	✓	✓
Temporal FE	✓	✓	✓	✓
Observations	684,485	684,485	50,525	50,525
R-squared	0.86	0.28	0.87	0.19

The table reports equations modeling the natural log of transaction prices and cumulative days on market using a 30-day relisting gap. Model 1 uses the full pooled sample of single-listing and relisting sales while model 2 uses a relistings-only subsample. All covariates listed in table 3 are included. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.

Table 5: Relisting Gaps (Keep Sample)

	7-day Gap		90-day Gap		180-day Gap	
	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2		Model 3	
Expired Prior	0.066**	0.583**	0.076**	0.622**	0.088**	0.650**
	(0.002)	(0.013)	(0.002)	(0.007)	(0.001)	(0.005)
Canceled Prior	0.044**	0.442**	0.051**	0.448**	0.059**	0.465**
	(0.002)	(0.011)	(0.001)	(0.007)	(0.001)	(0.006)
Agent Change	0.005	0.011	-0.000	0.013	-0.002	0.006
	(0.004)	(0.021)	(0.003)	(0.014)	(0.002)	(0.011)
Brokerage Office Change	0.006	0.049*	0.003	0.046**	-0.002	0.037**
	(0.004)	(0.021)	(0.003)	(0.014)	(0.002)	(0.011)
Covariates	✓	✓	✓	✓	✓	✓
ZIP code FE	✓	✓	✓	✓	✓	✓
Temporal FE	✓	✓	✓	✓	✓	✓
Observations	686,276	686,276	682,515	682,515	680,088	680,088
R-squared	0.86	0.25	0.86	0.29	0.86	0.30

The table reports the parameter estimates on our variables of interest across various gaps between the prior and sold listings. All covariates listed in table 3 are included. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.

Table 6: Propensity Score Matching

	Propensity-scored Sample		Matched-pair Sample	
	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2	
Expired Prior	0.001	0.060**	-0.003	0.017
	(0.002)	(0.016)	(0.003)	(0.024)
Canceled Prior	-0.018**	-0.127**	-0.016**	-0.089**
	(0.002)	(0.016)	(0.003)	(0.023)
Agent Change	0.002	0.038	-0.010	-0.008
	(0.003)	(0.027)	(0.006)	(0.041)
Brokerage Office Change	0.004	0.014	0.014**	0.028
	(0.003)	(0.027)	(0.006)	(0.041)
Covariates	✓	✓	✓	✓
ZIP code FE	✓	✓	✓	✓
Temporal FE	✓	✓	✓	✓
Observations	98,672	98,672	30,718	30,718
R-squared	0.86	0.22	0.87	0.20

The results report our system of equations using propensity scored samples. Model 1 uses standard propensity scoring to match a single-listing sale with a relisting based upon ZIP code, market times, home and lot sizes, and home age. Model 2 uses a matched-pair subsample that requires the CDOM of the relisted home to be the same as the DOM of the single-listing sale along with having the same month and year of listing. All covariates listed in Table 3 are included in the models. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.

Table 7: Economics Cycles

	Rapid Expansion January 2000 – April 2005		Contraction April 2006 – March 2009		Expansion May 2012 – December 2019	
	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2		Model 3	
Expired Prior	-0.015**	0.090**	0.022**	0.029	-0.002	0.077**
	(0.003)	(0.010)	(0.005)	(0.026)	(0.004)	(0.025)
Canceled Prior	-0.022**	-0.087**	-0.009	-0.135**	-0.024**	-0.157**
	(0.003)	(0.009)	(0.005)	(0.028)	(0.004)	(0.024)
Agent Change	-0.008	-0.002	-0.009	0.013	0.013*	0.068
	(0.005)	(0.017)	(0.007)	(0.038)	(0.006)	(0.041)
Brokerage Office Change	0.003	0.023	0.017*	0.064	-0.005	0.011
	(0.005)	(0.017)	(0.008)	(0.040)	(0.006)	(0.041)
Covariates	✓	✓	✓	✓	✓	✓
ZIP code FE	✓	✓	✓	✓	✓	✓
Temporal fixed effects	✓	✓	✓	✓	✓	✓
Observations	29,070	29,070	16,442	16,442	30,524	30,524
R-squared	0.89	0.19	0.83	0.11	0.87	0.03

The table reports our variables of interest across three economic intervals. The first period from 2002 to 2005 is a rapidly expanding economy. Model 2 uses a contracting period. The duration from 2012 to 2019 is another expanding economy that is not a robust as during the early 2000s. All covariates listed in table 3 are included in the models. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.

Appendix

Table A1 Variable definitions

Sales Price	Contracted selling price reported in MLS
DOM	Marketing time of sales listing (List Date – Sale Date)
CDOM	Marketing time of total listing period (Initial List Date – Initial Off Market Date) + (Subsequent List Date – Sale Date)
Square Feet	Property size measured in square feet
Lot Size	Property lot size measured in square feet
Age	Age of the property
Bedrooms	Number of total bedrooms
Bathrooms	Number of total bathrooms
Relisting	Binary variable = 1 if property was relisted for sale
Canceled Prior	Binary variable = 1 if prior listing was canceled by seller
Expired Prior	Binary variable = 1 if prior listing let expire by seller
Agent Change	Binary variable = 1 if agent change by seller
Brokerage Office Change	Binary variable = 1 if brokerage office change by seller
Multiple Relist	Binary variable = 1 if property was relisting multiple consecutive times
Cash Financing	Binary variable = 1 if purchased with Cash
FHA Financing	Binary variable = 1 if purchased with Federal Housing Administration financing
VA Financing	Binary variable = 1 if purchased with Veterans Administration financing
Rental	Binary variable = 1 if non-owner occupied
Vacant	Binary variable = 1 if property vacant at time of listing
Estate	Binary variable = 1 if owned by an estate
Flat Fee	Binary variable = 1 if flat fee broker listed
Waterfront	Binary variable = 1 if property is fronted by water
HOA	Binary variable = 1 if property is part of homeowners' association
Atypical: Large Home	Binary variable = 1 if property is greater than 4,915 Square Feet
Atypical: Large Lot	Binary variable = 1 if property lot is greater than 209,088 Square Feet
Atypical: Many Baths	Binary variable = 1 if property has more than 5 bathrooms
Atypical: Many Bedrooms	Binary variable = 1 if property has more than 6 bedrooms
Atypical: Older Home	Binary variable = 1 if property is more than 166 years old
Market Comp.	Measure of Market Competition
Listing Density	Measure of Listing Density
Temporal Fixed Effects	Controls for the listing month and year
Spatial Fixed Effects	Controls for the ZIP code of the property

Table A2: Relisting Gaps (Drop Sample)

	7-day Gap		30-day Gap		90-day Gap		180-day Gap	
	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)	Ln(Price)	Ln(CDOM)
	Model 1		Model 2		Model 3		Model 4	
Expired Prior	0.061**	0.588**	0.063**	0.608**	0.074**	0.630**	0.085**	0.655**
	(0.002)	(0.013)	(0.002)	(0.009)	(0.002)	(0.007)	(0.001)	(0.005)
Canceled Prior	0.039**	0.446**	0.041**	0.449**	0.048**	0.453**	0.057**	0.469**
	(0.002)	(0.011)	(0.002)	(0.009)	(0.001)	(0.007)	(0.001)	(0.005)
Agent Change	0.005	0.012	0.001	0.014	-0.000	0.015	-0.002	0.007
	(0.003)	(0.021)	(0.003)	(0.017)	(0.003)	(0.014)	(0.002)	(0.010)
Brokerage Office Change	0.006	0.049*	0.007*	0.053**	0.002	0.046**	-0.002	0.036**
	(0.004)	(0.021)	(0.003)	(0.017)	(0.003)	(0.014)	(0.002)	(0.010)
Covariates	✓	✓	✓	✓	✓	✓	✓	✓
ZIP code FE	✓	✓	✓	✓	✓	✓	✓	✓
Temporal fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Observations	572,354	572,354	590,794	590,794	608,141	608,141	625,681	625,681
R-squared	0.86	0.28	0.86	0.31	0.86	0.32	0.86	0.32

The table reports our variables of interest using four definitions of the gap between the prior and sold listings. The specifications differ from those in Table 5 based upon the treatment of the relisted sale. Homes with days off the market that exceed the gap threshold were previously kept as new listings. These equations drop the homes that have a prior listing with a gap greater than the threshold. Temporal fixed effects are by month and year. Robust *t*-statistics are in parentheses. ** and * denote *p*-values <0.01 and <0.05 respectively.