The Effectiveness of Listing Strategies in the Housing Market

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Abstract

This thesis examines the impact of asking price on the final sale price based on a unique dataset of more than 30,000 transactions of single-family houses in Montreal from 2011 to 2016. We construct different proxies for reference points, including predicted selling price, regional average (and median) asking price, regional average (and median) selling price, and assessment value, used by sellers in setting their asking prices. We explore the effectiveness of high-price strategy and low-price strategy based on these reference points. We find that higher asking prices are associated with higher selling pricing, suggesting buyers anchor to the asking price. Our results support the high-price strategy and reject the low-price strategy in both cold and hot markets, even controlling for unobserved quality. In addition, the anchor effect of the asking price on the final sale price does not differ between the two markets.

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1. Introduction

Housing plays a central role in the life of a typical household, selling a house is one of the most significant financial transactions a family can undertake. According to a recent Bank of Montréal Retirement Institute survey, in 2012, the value of the family house accounts for average 51%[1] of the net worth of a typical Canadian household. In the United States, based on data for 2010, households placed almost one-third[2] of their total assets into primary residences. Moreover, price-to-income ratios in 2017 show that in North America, residents in most of cities have to spend three to five year's income to purchase a house. In Montreal, the price-to-income ratio is 6.49, indicating that people need to work for an average of 6.49 years to pay for a median-priced house in Montreal. In reality, the time it takes is longer because the price-to-income ratio does not take household expenses into account.

The asking price in real estate markets is not to the same as the asking price of ordinary products because the buyer seldom pays the asking price for a house; instead, the buyer negotiates the price with the seller. For this reason, it is tempting to conclude that the asking price has limited impact on the selling price (Han & Strange, 2016). However, Han and Strange (2016) examined the role of the asking price in directing buyers and affecting the selling price by using novel survey data and proved that the asking price does in fact matter. Previous studies analyze and compare several sellers' listing price strategies, including comparing the rounded-price, just-below-price, and precise-price strategies (Seiler & Beracha, 2013; Seiler & Cardella, 2016), as well as comparing the low-price, fair-price, and high-price strategies (Bucchianeri & Minson, 2013).

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[1] It is noted that the average ratio of the value of the family house to net worth of a typical Canadian household is given by and taken from https://www.bmo.com/pdf/mf/prospectus/en/12-1347%20BMO%20Retirement%20Institute%20Report%20-%20Q4%20Cdn%20Oct_FINAL2.pdf.

[2] It is noted that the average ratio of the value of the family house to net worth of a US household is given by and taken from http://eyeonhousing.org/2013/09/housing-remains-a-key-component-of-household-wealth/

Why do the actual prices that customers are willing to pay depart from the real value of the products? Many studies suggest that buyers anchor to asking prices due to insufficient adjustment (Tversky & Kahneman, 1974; Northcraft & Neale, 1987; Green et al., 1998; Ariely et al., 2003; Simonson & Drolet, 2004). The anchoring bias in the purchase of residential real estate stems from two major aspects: (1) a unique house's fair market value (FMV) is difficult to be accurately determined; and (2) the negotiation and bidding activity involve in determining the actual selling price. In the bidding process for the house, the selling price is anchored by the asking price through how the buyers perceive the value of the houses, and this anchoring effect cannot be adjusted away sufficiently even in an information-sufficient world (Northcraft & Neale, 1987).

Asher and Wolinsky (1983) pointed out that the listing price is a signal of the product's quality, especially for a product that shares imperfect information between the buyers and the sellers. The listing price of houses also expresses the quality of the houses: the higher the listing price, the higher the quality of the house. Because of information asymmetry between the seller and the buyer: usually the seller has greater knowledge on the house's quality, when the buyers first notice the listing price, they evaluate the quality of the house based on the listing price of the house. Buyers' confirmation bias, which is a common cognitive error in human behavior, pushes buyers to seek reasons that support the high quality they perceived from the high listing price, and finally pushes up the final sale price.

Pricing strategies affect the final sale price in a hot market differently than in a cold market. In a hot market, housing supply is greater than housing demand, whereas in a cold market, housing demand exceeds housing supply. First of all, the bargaining power of the buyers in the negotiation also differs in the two markets: buyers have more bargaining power in a cold market than in a hot market. In addition, the quality of housing might differ in the two markets. Liu et al. (2016) found that the average house quality is higher in a cold

market than in a hot market. For these reasons, the way in which the asking price affects the selling price and the negotiation process might not be the same in the two markets.

Since the asking price plays an important role in the negotiating process and impacts the final sale price (Cardella & Seiler, 2016), setting the asking price with regard to the listing-price strategy is crucial in housing transactions.

The main motivation of this paper is to explore the impact of the asking price on the selling price and to examine different pricing strategies in both cold and hot markets. We follow the methodologies used in the study by Bucchianeri and Minson (2013), which employed U.S. data during the boom and the crisis periods from January 2005 to April 2009. We use the Montreal data from January 2011 to December 2016 and examine whether and how listing strategies affect final sale prices. In addition, we extend Bucchianeri and Minson (2013) by separately examining the anchor effect of asking price in cold markets and in hot markets by dividing our sample into three market groups: the hot market (seller's market), the cold market (buyer's market), and the balanced market. We examine the anchor effect of the asking price on the selling price in each subgroup separately and test whether the asking price's anchor effect differs between in cold markets and hot markets.

To classify the entire sample into three market types, we apply a commonly used criterion, months of inventory (MOI)[1], which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as having MOI under 4 months; a balanced market is defined as having MOI between 4 and 6 months; a cold market (buyer's market) is defined as having MOI over 6 months. It means that a given region could be classified as a hot market in a given month but a cold market in another month. For example, in December 2016, the

[1] It is noted that the definition of the months of inventory (MOI) is given by and taken from http://www.rew.ca/news/how-to-tell-if-it-s-a-buyer-s-market-1.1342289

house market in Dollard-Des Ormeaux is a hot market because in that region, the MOI in December 2016 is 2.94 months, which is less than 4 months. In addition, instead of classifying the asking price to five levels in the study of Bucchianeri and Minson (2013), we extend the asking price level to nine levels. Therefore, we can clearly examine the change of anchor effect of the asking price on the final sale price with the increase and decrease in the listing price level. For example, we can test how the high asking price affects the final sale price, and whether the relationship between the asking price and the additional increase in the selling price stays linear.

There are two major findings. First, we find that the asking price anchor the final sale price. Our results support the high-price strategy and reject the low-price strategy as there is a positive relation between the asking price level, relative to a reference price, and the final sale price. The high-price strategy recommends the seller to set a high listing price because a high listing price anchors the buyers to believe that the house has high quality, and then pushes the final sale price up. The low-price strategy recommends the seller to set a low listing price because a low listing price attracts more bidders and generates a bidding war, and then push the final sale price up. The results are robust to different proxies for reference prices, subsamples, and model specifications. The results are also consistent when we control for unobserved quality based on a subsample of repeat sales.

Second, we find that there is no difference between the two pricing strategies in cold or hot markets. The low-price strategy works virtually the same in a hot market as in a cold market. In other words, sellers are not likely to induce a bidding war by asking for a low price in a hot market. Moreover, when sellers evaluate their houses 25% lower than the regional average or median asking price, they incur a greater penalty by using the low-price strategy in a cold market than in a hot market as there is less increase in selling price in a cold market than in a hot market.

To the best of our knowledge, this thesis is the first study using Canadian data to

separately analyze listing-price strategies in cold markets and in hot markets. This thesis contributes to the literature in two aspects: (1) the negotiations between buyers and sellers (Ku et al., 2006; Ku et al., 2011), and (2) anchoring behavior and its impact on final transaction price (Bucchianeri & Minson, 2013).

The remainder of the thesis is organized as follows: Section 2 reviews the previous literature on listing price strategies; Section 3 proposes the hypotheses; Section 4 introduces the methodology; Section 5 describes the data sources and summaries the statistics; Section 6 presents and discusses the results and findings; Section 7 addresses the robustness check; and Section 8 concludes the paper.

2. Literature Review on Listing-price Strategies

The literature review focuses on representative works in listing-price strategies and the effectiveness of each strategy in previous studies.

Ku et al (2006) recommended the low-price strategy, which proposes that a low asking price pushes the final selling price high for three reasons: (1) the low-price strategy lowers barriers to entry, therefore generating traffic and a bidding war; (2) the sunken costs from the early bidding action entices the bidders to continue to bid; and (3) the traffic generated by the low asking price activates the auction and attracts more bidders. The authors used a sample from eBay to study how and why a low starting price ends up with a high selling price and to confirm the auction behavior among the buyers. However, the effectiveness of the low-price strategy in the housing market and in the eBay case is not identical because unlike most products on eBay, the quality of a house is hard to be accessed by buyers, and the information of a house is not fairly shared between the buyer and the seller. Moreover, even the transaction on eBay involves a bidding process, the value of most products is much less than the value of the house: housing transaction is one of the most significant transactions that a family can undertake. Therefore, the low-price strategy

approved in the eBay case may not be effective in the housing market. In contrast, Ku et al. (2011) rejected the power of the high starting price's anchor effect, and conclude that an extremely high starting price ends up with nothing because it runs the risk of locking buyers in and frightening them away, even though high asking prices can anchor the buyers and push up the selling price.

Analyzing 385,175 unique residential sales transactions in the Hampton Roads, Virginia, Metropolitan Statistical Area (MSA) from January 1993 to September 2011, Seiler and Beracha (2013) recommended "just below" pricing in both a seller's market (hot market) and a buyer's market (cold market). They pointed out that the "just below" pricing strategy generates greater net yields (the benefit minus discount associated with the strategy) than precise pricing and round pricing strategies. However, based on the same dataset, Seiler and Cardella (2016) classified pricing strategies into round pricing, "just below" pricing, low precise pricing, and high precise pricing, and recommended the high precise pricing strategy. They believed that the high precise pricing strategy generates the highest final selling price, the smallest negotiated discount, and the greatest surplus to the sellers.

Bucchianeri and Minson (2013) analyzed 14,616 completed records of single-family home sales in Delaware, New Jersey, and Pennsylvania from January 2005 to April 2009, controlling for unobservable quality by using repeat-sale data from 1988 to 2004. They tested the initial asking price's anchor effects by examining the interaction terms of the predicted selling price and the underpricing and overpricing dummies. They found that for each unit of increase in the predicted selling price, overpriced houses receive additional increases in the final sale price, confirming the effectiveness of the initial asking price's anchor effects. They concluded that setting the initial asking price 10% to 20% over the house's predicted market price leads to a $117 to $163 increase in the selling price, controlling for listing time, unobservable quality, listing offices, zip code, and school

district. In addition, they pointed out that even in hot markets, there is no evidence to support the viability of the low-price strategy because all the coefficients for the underpricing dummies are negative, indicating that underpriced houses receive less increase than do fairly priced houses for each unit of increase in the predicted selling price.

3. Hypotheses Development

3.1 The Effect of Asking Price on Final Sale Price

We assume that the asking price acts as the anchor for the buyers: the higher the asking price, the higher the selling price for the houses, even though many professional real estate agents and numerous studies in the previous literature support the low-price strategy, which is backed by the buyers' herding behavior. Buyers' confirmation bias in their cognitive process drives them to seek reasons for the high price and, finally, pushes up the selling price. Moreover, since the residential property is not identical to the ordinary goods in the retail market (Han & Strange, 2016), the low-price strategy is not effective in attracting more bidders and causing a bidding war in our sample. In regression analysis, we expect the coefficients for the overpricing dummies in our main regressions to be significantly positive but the coefficients for the underpricing dummies in our main regressions to be significantly negative.

3.2 The Effect of Asking Price on Final Sale Price in Cold and Hot Markets

Buyers and sellers might behave differently in cold markets than in hot markets. In a cold market, buyers have more bargaining power over negotiations because there is more housing supply than demand; however, in a hot market, the lack of house inventory increases the probability that sellers will receive multiple offers on each house, increasing the sellers' negotiating power. Although we presume that the high-price strategy works in both cold and hot markets, we expect that the anchor effect is different in each market because in a hot market, the sellers, who have less concern about overpricing their houses,

have more bargaining power than the buyers. Therefore, in regression analysis, we expect that the coefficients of the overpricing dummies will be significantly different for each market.

3.3 Observable and Unobservable Quality

It is noted that our results could be driven by housing quality, observable and unobservable. For example, the positive relation between the asking price and the selling price could simply be because the high-priced houses are of higher quality. We control for the observable quality through a first-stage hedonic model. For the unobservable quality, we conduct robustness tests by using a sample of repeat sales and including the residual terms from the previous sales. We expect that asking prices still play an important role in explaining final sale prices. In addition, if part of the asking price's anchor power we detect in the main regressions is due to the unobservable quality, we expect to find, based on the repeat sale sample, the same direction but with smaller magnitudes for coefficients of the overpricing dummies and the underpricing dummies in our entire sample, and in both hot and cold markets.

4. Methodology

4.1 Stage 1: Predicted Selling Price Based on the Hedonic Regression Model

We run a hedonic regression model for all the sold houses in the entire sample: we regress the natural log of a house's selling price on the house's property characteristics.

$$P_{ict}^{s} = intercept + h_n \times property\ characteristics$$
$$(FS, LA, HA, \#R, \#Bed, \#Bed_B, \#Bath, \#Powder, \#Garage, \#Carport, \#Driveway)$$
$$+h_m \times characteristics\ dummies\ (D\_FA, D\_F, D\_SP)$$
$$+F_{bt} + F_{pt} + F_y + F_m + F_c + \varphi_{ict} \quad (1)$$

where P_{ict}^{s} represents the natural log of the selling price of the houses i located in city c in month t,

$FS, LA, HA, \#R, \#Bed, \#Bed_B, \#Bath, \#Powder, \#Garage, \#Carport,$and $\#Driveway$ refer to the floor size, the lot area, the house's age, the total number of rooms, the number of bedrooms, the number of bedrooms in the basement, the number of bathrooms, the number of powder rooms, the number of garages, the number of carports, and the number of driveways, respectively. $D\_FA, D\_F,$ and D_SP stand for the dummies for the central air conditioner, the fireplace, and the swimming pool. $F_{bt}, F_{pt}, F_y, F_m,$ and F_c are the fixed effects of five building types (attached, attached corner unit, semi-detached, detached, and quadrex), the five property types (bungalow, mobile home, one-and-a-half storey, two or more storey, and split-level), the 34 municipalities in Montreal, and the time effects of the year and the month. φ_{ict} is the residual terms of the houses i located in city c at time t.

4.2 Stage 2: The Effect of Asking Price on Final Sale Price

We run regressions of the log of the selling price on the log of the predicted price from the previous hedonic regression model, the listing time by number of months, dummies of price difference between the asking price and estimated sale price, and various fixed effects for listing offices and quarter and municipal interactions. We control for the listing time on the market because of the positive correlation between the listing time and the asking price. In the following regression, we examine that with the identical listing time on the market, whether overpriced houses and underpriced houses receive additional increases in the final sale price for each unit increase in the real value of the house. We construct several proxies for estimated sale price, including (1) the predicted selling price given by the hedonic regression model, (2) the average (median) asking price in the same region in the same month when the sales transaction was completed, and (3) the average (median) selling price in the same region in the same month when the sales transaction was completed.

$$P_{ict}^{s} = \alpha + \beta_1 \times P_{ict}^{h} + \beta_2 \times MOM_{ict} + \gamma_i \times P_{ict}^{h} \times overpricing\ dummies + \delta_i \times P_{ict}^{h} \times underpricing\ dummies + F_l + F_{cq} + \varepsilon_{ict} \quad (2)$$

where $overpricing\ dummies$ are defined as below:

$$OD_1 = 1, if\ 1.05 < P_{ict}^{a}/P_{ict}^{b} \leq 1.15, otherwise, OD_1 = 0;$$

$$OD_2 = 1, if\ 1.15 < P_{ict}^{a}/P_{ict}^{b} \leq 1.25, otherwise, OD_2 = 0;$$

$$OD_3 = 1, if\ 1.25 < P_{ict}^{a}/P_{ict}^{b} \leq 1.50, otherwise, OD_3 = 0;$$

$$OD_4 = 1, if\ 1.50 < P_{ict}^{a}/P_{ict}^{b} \leq 2.00, otherwise, OD_4 = 0; \text{ and}$$

$$OD_5 = 1, if\ 2.00 < P_{ict}^{a}/P_{ict}^{b}.\ Otherwise, OD_5 = 0.$$

We define *fair pricing* as our base:

$$Base = 0.95 < P_{ict}^{a}/P_{ict}^{b} < 1.05.$$

And, we define our $underpricing\ dummies$:

$$UD_1 = 1 \quad if\ P_{ict}^{a}/P_{ict}^{b} \leq 0.75, otherwise, UD_1 = 0;$$

$$UD_2 = 1 \quad if\ 0.75 < P_{ict}^{a}/P_{ict}^{b} \leq 0.85, otherwise, UD_2 = 0; \text{ and}$$

$$UD_3 = 1 \quad if\ 0.85 < P_{ict}^{a}/P_{ict}^{b} \leq 0.95, otherwise, UD_3 = 0.$$

where P_{ict}^{s} represents the natural log of the selling price of houses i located in city c in month t; P_{ict}^{h}, MOM_{ict}, F_l, and F_{cq} refer to the log of the predicted selling price from the hedonic regression model, the months the house is listed on the market, the listing company fixed effects, and the city and sold quarter interaction term fixed effects, respectively. ε_{ict} is the error terms of the houses i located in city c at time t. P_{ict}^{a} is the asking price of the house and P_{ict}^{b} is the base price as the fair value of the house.

5. Data and Statistics Summary

Montreal is a multinational city which consists of 31ethnic origins, 23 languages

(Canada Census, 2006)[1], and more than six religions (Canada Census, 2011)[2]. The multinational buyers in Montreal express various prospects regarding the perceived value of the houses. We obtained an account from a real estate broker to access the database on the official website of the Greater Montréal Real Estate Board. We manually collected 30,551 observations of single-family houses that listed and sold through the real estate agents in the city of Montreal from January 1st, 2011 to December 31st, 2016. In order to ensure arm's-length transactions, we exclude transactions with a selling price lower than $10,000. Because some transactions have missing variables in the hedonic regression model to get the predicted selling price, which is the key variable in our main regressions, our final sample consists of 22,021 observations.

Table 1 summarizes the number of closed transactions at a different asking price relative to the reference price level of the entire sample, in cold markets and in hot markets. The reference prices we use to classify the asking price level are the predicted selling price in Panel A, the average asking price in Panel B, and the average selling price in Panel C, respectively. In addition, Figures 1 to 3 illustrate the distributions of the closed transactions with reference to the original asking price for each price level in the entire sample.

Panel A in Table 1 shows that most of the sellers ask a price higher than the predicted value as the percentage of "overpriced" houses is nearly double the percentage of "underpriced" houses in all markets during our sample period. Furthermore, around 50% of houses were sold at the asking price, either the original asking price or the last asking price, in a range between 5% and 50% over their expected selling price. For example, the number of transactions at the original asking price that sold at 5%–50% above their predicted selling price is 50.19% (=(4,925+3,205+2,876)/21,930) of the total number of

[1] It is noted that the 2006 Canada Census result is given by and taken from the official website of the Canadian Statistics. http://www12.statcan.gc.ca/census-recensement/2006/index-eng.cfm

[2] It is noted that the 2011 Canada Census result is given by and taken from the official website of the Canadian Statistics. http://www12.statcan.gc.ca/census-recensement/2011/dp-pd/index-eng.cfm

transactions in the entire sample.

Moreover, the ratio of the overpriced houses in cold markets is greater than the ratio in hot markets: 55.86% (=(2,805+1,856+1,619+429+69)/12,137 based on the original asking price) to 50.24% (=(2,708+1,662+1,327+336+51)/12,110 based on the last asking price) in cold markets versus 51.25% (=(546+367+334+110+15)/2,677 based on the original asking price) to 47.23% (=(533+323+301+96+9)/2,672 based on the last asking price) in hot markets. This finding demonstrates that the sellers, who are subject to loss aversion, are more likely to ask for a high price relative to the estimated sale price in a cold market compared with the sellers in a hot market. Consistently, Panel A and Panel B in Figure 1 show that the distribution of the closed transactions is skewed to the overpricing side.

Panel B in Table 1, together with Figure 2, Panel A and Panel B, support that the low-price strategy is commonly used in all markets. In both the entire sample and the two separate markets, more than 60% (cf. Figure 2, Panel B) of the sellers set the asking price lower than the average asking price[1] of the same region in the same month, and almost one-third (cf. Figure 2, Panel A) of sellers asked for 25% less than the average asking price. In addition, the low-price strategy is more widely used in cold markets than in hot markets because the ratio of underpriced houses, measured using the regional average asking price, to the total number of transactions in cold markets is larger than the ratio in hot markets. For example, the ratio in cold markets, which is 64.68% (=(5,418+2,853+2,364)/16,442) to 67.40% (=(5,902+2,880+2,339)/16,500), is slightly higher, 3% (64.68%-61.06%) to 4% (67.40%-63.24%) higher, than the ratio in hot markets, 61.06% ((1,004+580+511)/3,431) to 63.24% ((1,074+590+516)/3,447). Moreover, Figure 2, Panels A and B show that the distribution of the closed transactions is skewed to the underpricing side with reference to

[1] It is noted that the average asking price is given by and taken from the official website of the Greater Montréal Real Estate Board. http://www.cigm.qc.ca.

the regional average asking price. Panel A in Table A1 (Appendix), based on the regional median asking price as the reference price, shows the same pattern.

Rather than using the regional average asking price as the reference price, Panel A of Figure 3 shows that the number of sellers whose asking price for their house was lower than the regional average selling price is almost identical to the number of sellers whose asking price was higher than the regional average selling price. Figure 3, Panel B indicates that the number of the closed transactions is equally distributed around the fair-pricing range with reference to the regional average selling price. Panel B in Table A1 (Appendix) shows that using the regional median selling price as the reference price results in the same pattern as using the regional average selling price as the reference price.

Table 2 summarizes the mean and standard deviation of the key parameters for the main analysis in the entire sample, and in both cold markets and the hot markets separately. The last column illustrates the differences of the means in buyer's and seller's markets and the P-value for each difference. Numbers in brackets represent the standard deviation of each mean and the P-value of each difference.

Part A in Table 2 shows that the selling price per square foot in cold markets is $7.543 lower, on average, at a 10% significance level. But, an average transaction was listed one month longer during cold markets. The difference is significant at 1%. Even though the average selling price per unit in cold markets is higher than the average selling price in hot markets, this is because housing supply in different real estate markets is of different quality. For example, the average floor size of houses sold in a cold market is significantly larger than the average floor size of houses sold in a hot market.

Panel A and Panel B in Table 2 indicate that the houses sold are overvalued (based on the predicted selling price) in both cold markets and the hot markets. The means of the selling prices, which are 504.594 (000) and 472.635 (000) in each market, are higher than the means of the predicted selling price in each market, which are 472.919 (000) and

452.329 (000), respectively.

In sum, in our entire sample, the sellers tend to set the asking price above the predicted value but below the average asking price. In addition, they tend to refer to the average selling price as the fair value and list their houses with the price in a range close to the fair value: 25% below and above the region's average selling price. In the following section, we will examine whether and how asking prices affect the final sale price. We separately apply difference reference points to asking prices, including the predicted selling price, regional average asking and median asking prices, and regional average selling and median selling prices. We examine the efficiency of the two main listing price strategies: the low-price strategy supported by the auction behavior theory, and the high-price strategy, backed by the anchor effect theory.

6. Results and Discussion

6.1. Hedonic Regression Model

Table 3 indicates that the final prices of the single-family houses are statistically significantly and positively correlated with property features such as the floor size, the lot area, the number of rooms, the number of bedrooms and bedrooms in the basement, the number of bathrooms and powder rooms, the number of garages and driveways, and the dummies of the air conditioner, the fireplace, and the swimming pool. However, a house's selling price is negatively affected by its age at a significance level of 1% and has no significant relationship with the number of carports in the house. Moreover, coefficients of year fixed effects (unreported) demonstrate that during our sample period, the houses sold in 2016 have the highest selling price but the houses sold in 2011 have the lowest selling price, which is probably explained by the recovery of the real estate market. Coefficients of month fixed effects suggest that houses sold in March, April, and May achieve comparatively high selling prices, very likely because the summer in Montreal is the

moving season for the year. According to the adjusted R-squared, our hedonic model explains 84.21% of the houses' selling prices in our sample.

6.2 The Anchoring Effect of the Asking Price in the Whole Market

We begin to analyze the efficiency of the listing strategies in Table 4 by assuming that the predicted selling price correctly measures the fair value of the house. As shown in Columns 1 and 2, which focus on the original asking price and the last asking price, respectively, the log of the selling price increases with the log of the predicted selling price. In addition, for each unit of increase in the predicted selling price, the overvalued houses gain additional increases in the selling price compared to the fair valued houses. Column 1 indicates that a house that is listed at a price 5%–15% higher than the expected selling price will command an additional increase of 0.07% (=0.007×10%) in the sale price for each 10% increase in the expected selling price. The increase of 0.07% could be converted to an additional increase of $351 (=0.07%×$501,388) above the mean selling price ($501,388) of our entire sample. Similarly, for houses priced 15% to 25% above their predicted selling price, an additional increase of 0.13% (i.e., a dollar amount of $652) in the selling price is generated by overpricing for each 10% increase in the expected selling price. For the houses listed 25% to 50%, 50% to 100%, and more than 100% over their predicted selling price, there are additional increases of 0.22% ($1,103), 0.36% ($1,805), and 0.58% ($2,908) in the selling prices, respectively, for each 10% increase in the predicted selling price. In addition, the coefficients of overpricing dummies indicate that the higher the asking price level, the higher the increase in the selling price.

Column 2, based on the last asking price, illustrates the same results as Column 1 except for the asking price level of over 200% of the predicted selling price. For each 10% increase in the expected selling price, the additional benefit generated by overpricing the house by 100% or more through the last asking price is 0.62%, which is greater than 0.58%, the additional increase gained by overpricing the original asking price at the same price

level in Column 1. In general, both the original asking price and the last asking price show the same pattern; therefore, we focus on analyzing the original asking price columns in the following section.

In contrast, the coefficients of the underpricing dummies in Columns 1 and 2 demonstrate that for each unit of increase in the predicted selling price, the undervalued houses experience less increase in the selling price than do the fair valued houses. Column1 indicates that for houses priced 5%–15% below their predicted selling prices, a smaller increase of 0.08% (i.e., $401 in dollars) in the selling price above the mean selling price ($501,388) of our entire sample is generated by underpricing for each 10% increase in the expected selling price. For houses listed between 75% and 85% as well as below 75% of the predicted value, there are smaller increases of 0.17% ($852) and 0.30% ($1,504) from each 10% increase in the predicted selling price. Moreover, the decrease in the negative coefficients with the decreasing of the asking price level shows that the lower the asking price level, the less the increase in selling price for each unit increase in the predicted selling price.

The underpricing dummies in both Column 1 and Column 2 reject the efficiency of the low-price strategy, which proposes that a low price generates a high selling price. For undervalued houses, smaller increases in the selling price are generated by underpricing for each unit increase in the predicted selling price, which is opposed to the theory proposed by the low-price strategy. Furthermore, the lower the asking price, the lower the incremental gain in the selling price. The overpricing dummies in Column 1 and Column 2 support the anchor effect of the asking price, indicating that a high asking price generates a high selling price. For overvalued houses, additional increases are generated by overpricing for each increase in the predicted selling price, which is consistent with the theory proposed by the high-price strategy. In addition, the higher the asking price level, the greater the extra increase in the selling price.

In the real estate market, even well-educated real estate agents seldom use the hedonic model to measure the fair price of houses. Instead, most sellers and their professional real estate brokers prefer to simply use the regional average or median asking prices as reference prices because they believe those asking prices reflect the asking price levels of their competitors. Moreover, they would like to use the regional average or median selling prices as reference values because they consider those selling prices to be a reflection of the recent real estate market situation and the buyers' bargaining power.

Columns 3 and 4 and Columns 5 and 6 in Table 4, which are based on the regional average asking price and the regional average selling price as the reference price, respectively, demonstrate the same results, which support the high-price strategy reject the low-price strategy. Compared with the anchor effect in Columns 1 and 2, Columns 3 and 4 and Columns 5 and 6 illustrate smaller additional increases in the selling price for each increase in the expected selling price. Column 3 indicates that for houses priced 5%–15%, 15%–25%, 25%–50%, 50%–100%, and 100% or more above the regional average asking price, extra increases of 0.06% ($300), 0.10% ($501), 0.15% ($752), 0.27% ($1,354), and 0.45% ($2,256), respectively, are generated by overpricing for each 10% increase in the predicted selling price.

In sum, Table 4 illustrates that overpricing and underpricing the house relative to the predicted selling price, regional average asking price, and regional average selling price introduce opposing effects on the selling price. The coefficients of overpricing dummies are all significantly positive, but the coefficients of underpricing dummies are all significantly negative.

The columns in Table A2 (Appendix) indicate that for houses with asking prices set with reference to the regional average asking price and median asking price or to the regional average selling price and median selling price, the same extra increases in the selling price are generated by overpricing for each unit increase in the predicted selling

price. The coefficients for both the overpricing dummies and the underpricing dummies are similar among those four reference prices.

Furthermore, for houses with asking prices set with reference to the predicted selling price, the total increase (increases generated by the predicted selling price plus additional increases generated by overpricing) in the selling price is the largest for each unit increase in the expected selling price. Column 1 in Table 4 shows that for houses priced at 5%–15%, 15%–25%, 25%–50%, 50%–100%, and 100% or more over the predicted selling price, total increases of 10.05% (=0.998×10%+0.007×10%, $50,389), 10.11% ($50,690), 10.20% ($51,142), 10.34% ($51,844), and 10.56% ($52,947), respectively, are generated for each 10% increase in the predicted selling price.

6.3 The Pricing Strategies in Cold and Hot Markets.

Column 1 and Column 2 in Table 5 replicate regressions in Table 4 for transactions in cold markets and in hot markets separately. Coefficients of both the underpricing dummies and the overpricing dummies in cold markets and in hot markets show the same pattern as the coefficients of the entire sample. The negative coefficients for the underpricing dummies confirm that the low-price strategy is not effective, even in a hot market where the sellers have more bargaining power over the buyers; asking for low prices cannot lead to a bidding war and push up the selling prices.

Column 2 shows that for houses priced 25% or more below the expected selling price, a 0.29% ($1,454) smaller increase is generated by underpricing for each 10% increase in the predicted selling price. The houses priced at 15%–25% and 5%–15% below the predicted selling price are subject to 0.16%–0.08% smaller increases in the selling price for each 10% increase in the predicted selling price.

Columns 3, 6, and 9 in Table 5 explain the difference for the coefficients of each parameter in a cold market versus a hot market.

Column 6 shows that, at most asking price levels, the additional increases in the

selling price driven by each unit of increase in the predicted selling price have no significant difference in cold or hot markets. When sellers initially ask for a price 25% or lower than the regional average asking price, houses have significantly smaller increases: 0.03% ($150) smaller increases in a cold market than in a hot one. Column 3 in Table A3 (Appendix), which uses the regional median asking price as its reference point, shows the same pattern as Column 6 in Table 5.

However, Column 3 and Column 9 in Table 5 and Column 6 in Table A3 indicate that for houses with asking prices set with reference to the predicted selling price and the regional average (median) selling price, the coefficients of the underpricing dummies and the overpricing dummies in both markets have no significant difference, revealing that the anchor effects in both markets are similar. Since the quality of houses supplied in cold markets and in hot markets are different, setting the asking price with reference to the regional average asking price causes a difference in the asking price's anchor effect. Because higher prices are asked for the same quality houses in a hot market, the regional average asking prices are pushed higher in a hot market, and because the seller has less bargaining power in a cold market, the penalty (less increase in selling price) for underpricing is greater in a cold market. Nevertheless, a house's predicted selling price, reflecting the true value of the house based on its property features, seldom changes in a cold market versus in a hot market. The regional average selling price, which reflects the realistic real estate market, has already absorbed the difference between the cold and the hot markets. As a result, in general, the asking price's anchor effect does not differ in a cold market versus in a hot market.

7. Robustness

The results outlined above show that the higher the asking price, no matter the original asking price or the last asking price, the higher the final selling price, which is

supported by the anchor effect of the asking price. However, houses with a higher sale price could simply have higher quality, especially higher unobservable quality, which we do not include in our previous regressions. In order to check the robustness of the high-price strategy, we use the repeat-sale data within our sample period to re-run the regressions, including the residual from the previous sale transaction as the house's unobservable quality. Between January 1st, 2011 and December 31st, 2016, we have a total of 1,362 pairs of usable repeat-sales data points. Because the repeat-sales data are very scant compared to the full sample size, 1,362 versus 22,021, we do not use the repeat-sales data in our main regressions.

$$P_{ict}^{s} = \alpha + \beta_1 \times P_{ict}^{h} + \beta_2 \times MOM_{ict} + \beta_3 \times res_{icp} + \gamma_i \times P_{ict}^{h} \times overpricing\ dummies + \delta_i \times P_{ict}^{h} \times underpricing\ dummies + F_l + F_{cq} + \varepsilon_{ict} \quad (3)$$

where res_{icp} is the residual term from the previous sale of the house, calculating by the previous final sale price minus the predicted selling price of the house at the month of the previous sale transaction. Other variables in equation (3) are defined in the same way as the variables in equation (2).

Results from the testing regressions show that no matter which reference price a house is set at, the unobservable quality a has significant positive effect on the selling price, pointing out that the unobservable quality is perceived by the buyers and reflected in the final sale price.

Most importantly, the results in Table 6 are consistent with our previous finding that asking prices are relevant to the final sale price. The negative coefficients of the underpricing dummies in the first two columns indicate that there is no evidence for auction behavior or herding behavior, which generate a bidding war and push up the final sale price. The positive coefficients of the overpricing dummies indicate that the high-price strategy is effective because, for overpriced houses, additional increases are generated by

overpricing for each unit of increase in the predicted selling price.

In addition, controlling for the unobservable quality, the higher the asking price level, the higher the additional increases for each unit of increase in the expected value. Column 1 in Table 6 reveals that for houses priced at 5%–15%, 15%–25%, 25%–50%, 50%–100%, and more than 100% over the predicted selling price, additional increases of 0.06% (0.006×10%), 0.12%, 0.21%, 0.33%, and 0.52%, respectively, are generated by overpricing for each 10% increase in the predicted selling price. Furthermore, comparing columns in Table 6 and Table 4, the coefficients for each overpricing dummy in Table 6 are comparatively less than the coefficients in Table 4, indicating that in the previous regression, part of the additional increases is from the unobservable quality. However, the significant positive coefficients for all the overpricing dummies, after controlling for the unobservable quality, confirm the existence of the asking price's anchor effect. In sum, coefficients in all columns in Table 6 reject the viability of the low-price strategy and confirm the effectiveness of the high-price strategy.

Next, we compare different asking price strategies in cold and hot markets, controlling for the house's unobservable quality. The coefficients of the underpricing dummies and overpricing dummies in cold markets show a pattern similar to the coefficients in the entire sample. However, in hot markets, we do not have significant evidence to prove the efficiency of either the low-price strategy or the high-price strategy because we have limited observations—only 130 observations, in hot markets.

The robustness tests raise no concerns about the effectiveness of the high-price strategy and the existence of the asking price's anchor effect in the entire sample and in cold markets. However, in further study regarding the anchor effect of the asking price in hot markets and the different anchor effects in cold versus hot markets, we need to either expand our sample period or expand our sample area to cover more repeat-sales data.

8. Conclusion and Discussion

An effective listing price strategy assists the seller in reaching a higher selling price. We analyzed the single-family transaction data in Montreal in recent years. Our main regression results suggest that buyers anchor to the asking price offered by the sellers. The higher the asking price level, the higher the anchor effect of the asking price. This finding is robust to different proxies for reference points, model specifications and subsamples.

By comparing cold and hot markets, we examined the effect of setting asking prices relative to difference reference prices. For houses priced 25% or more less than the regional average (median) asking price, smaller increases in the selling price are generated by underpricing in the cold markets than in hot markets. However, for houses with asking prices set with reference to the predicted selling price and the regional average selling price, the coefficients for both the underpricing dummies and the overpricing dummies are almost identical in both markets.

After including the unobservable quality in our main regressions, we confirmed the robustness of the asking price's anchor effect on the selling price and the effectiveness of the high-price strategy. However, due to the limited repeat-sales data in our sample, we have insufficient evidence to support the difference in the asking price's anchor effect in cold versus in hot markets. For further research, we would either extend our sample period or include more cities in our sample to get more repeat-sales data.

We support the high-price strategy and reject the low-price strategy in the housing market by analyzing the recent Montreal data. We believe the high-price strategy is effective in a typical market. Likewise, the sample used in this study, the real estate market in Montreal between 2011 and 2016, is considered normal: without super cold or extremely hot market such as Hong-Kong, Vancouver, and Peking, in which the MOI is extremely close to one and the final sale price highly exceeds its initial asking price. In the future study, we would examine the effectiveness of the high-price strategy and the low-price

strategy in the super-hot markets, such as in Hong-Kong, Vancouver, and Peking. Nevertheless, we expect the high-price strategy is still effective in those markets because in an extremely hot market, the imbalance between supply and demand makes a low price strategy unnecessary and unattractive. Therefore, a high asking price still attracts more bidders and push up the final sale price in extremely hot markets.

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Tables

Table 1 *No. of Transactions and Sample Distribution*

Panel A documents the number of transaction for each asking price level referring to the predicted selling price. Panel B documents the number of transaction for each asking price level referring to the regional average asking price, which is the average asking price in the region where the house located and at the time when the house was listed on the market. Panel C documents the number of transaction for each asking price level referring to the regional average selling price, which is the average selling price in the region where the house located and at the time when the house was listed on the market. Columns "Original" indicate that the asking price levels are classified by the ratio of the original asking price to the reference price; Columns "Last" indicate that the asking price levels are classified by the ratio of the last asking price to the reference price. We classify our entire sample by using the month on inventory (MOI), which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as MOI under 4 months; a balanced market is defined as MOI between 4 to 6 months; a cold market (buyer's market) is defined if MOI is over 6 months.

	Entire Sample		Cold Market		Hot Market	
	Obs.		Obs.		Obs.	
	Original	Last	Original	Last	Original	Last
Panel A: Reference Price: Predicted Selling Price						
Asking price below 75% of predicted selling price	636	771	324	406	77	85
Asking price 75%–85% of predicted selling price	1,297	1,588	664	838	170	206
Asking price 85%–95% of predicted selling price	3,173	3,560	1,696	1,929	434	455
Asking price 95%–105% of predicted selling price	4,862	5,182	2,675	2,853	624	664
Asking price 105%–115% of predicted selling price	4,925	4,711	2,805	2,708	546	533
Asking price 115%–125% of predicted selling price	3,205	2,894	1,856	1,662	367	323
Asking price 125%–150% of predicted selling price	2,876	2,416	1,619	1,327	334	301
Asking price 150%–200% of predicted selling price	814	670	429	336	110	96
Asking price above 200% of predicted selling price	142	100	69	51	15	9
Total	21,930	21,892	12,137	12,110	2,677	2,672

Table 1 *No. of Transactions and Sample Distribution*

Panel A documents the number of transaction for each asking price level referring to the predicted selling price. Panel B documents the number of transaction for each asking price level referring to the regional average asking price, which is the average asking price in the region where the house located and at the time when the house was listed on the market. Panel C documents the number of transaction for each asking price level referring to the regional average selling price, which is the average selling price in the region where the house located and at the time when the house was listed on the market. Columns "Original" indicate that the asking price levels are classified by the ratio of the original asking price to the reference price; Columns "Last" indicate that the asking price levels are classified by the ratio of the last asking price to the reference price. We classify our entire sample by using the month on inventory (MOI), which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as MOI under 4 months; a balanced market is defined as MOI between 4 to 6 months; a cold market (buyer's market) is defined if MOI is over 6 months.

	Entire Sample		Cold Market		Hot Market	
	Obs.		Obs.		Obs.	
	Original	Last	Original	Last	Original	Last
Panel B: Reference Price: Regional Average Asking Price						
Asking price below 75% of average asking price	9,371	10,185	5,418	5,902	1,004	1,074
Asking price 75%–85% of average asking price	5,087	5,128	2,853	2,880	580	590
Asking price 85%–95% of average asking price	4,212	4,168	2,364	2,339	511	516
Asking price 95%–105% of average asking price	3,235	3,056	1,797	1,667	400	378
Asking price 105%–115% of average asking price	2,135	2,029	1,149	1,094	263	257
Asking price 115%–125% of average asking price	1,459	1,381	769	744	203	190
Asking price 125%–150% of average asking price	1,939	1,758	1,045	934	265	245
Asking price 150%–200% of average asking price	1,267	1,221	693	654	156	158
Asking price above 200% of average asking price	615	504	354	286	49	39
Total	29,320	29,430	16,442	16,500	3,431	3,447

Table 1 *No. of Transactions and Sample Distribution*

Panel A documents the number of transaction for each asking price level referring to the predicted selling price. Panel B documents the number of transaction for each asking price level referring to the regional average asking price, which is the average asking price in the region where the house located and at the time when the house was listed on the market. Panel C documents the number of transaction for each asking price level referring to the regional average selling price, which is the average selling price in the region where the house located and at the time when the house was listed on the market. Columns "Original" indicate that the asking price levels are classified by the ratio of the original asking price to the reference price; Columns "Last" indicate that the asking price levels are classified by the ratio of the last asking price to the reference price. We classify our entire sample by using the month on inventory (MOI), which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as MOI under 4 months; a balanced market is defined as MOI between 4 to 6 months; a cold market (buyer's market) is defined if MOI is over 6 months.

	Entire Sample		Cold Market		Hot Market	
	Obs.		Obs.		Obs.	
	Original	Last	Original	Last	Original	Last
Panel C: Reference Price: Regional Average Selling Price						
Asking price below 75% of average selling price	4,751	5,232	2,686	2,992	504	537
Asking price 75%–85% of average selling price	3,778	4,036	2,088	2,234	454	497
Asking price 85%–95% of average selling price	4,297	4,385	2,411	2,450	529	525
Asking price 95%–105% of average selling price	4,024	4,004	2,280	2,250	508	517
Asking price 105%–115% of average selling price	3,106	3,054	1,710	1,724	366	350
Asking price 115%–125% of average selling price	2,320	2,150	1,333	1,203	268	261
Asking price 125%–150% of average selling price	3,400	3,182	1,856	1,739	424	404
Asking price 150%–200% of average selling price	2,261	2,142	1,289	1,210	256	246
Asking price above 200% of average selling price	1,289	1,154	751	663	104	95
Total	29,226	29,339	16,404	16,465	3,413	3,432

Table 2 *Summary Statistics*

Table 2 summarizes the mean and the standard deviation of the key variables in the entire sample, in the cold market, and in the hot market, respectively. C-H column documents the difference between the mean in the cold market and the mean in the hot market. The number in the bracket under the mean is the standard deviation of each mean, and the number in the bracket under the difference is the P-value of each difference. The significance of the difference as determined by a two-tailed t-test (sign test) is highlight with * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

		Entire Sample		Cold Market		Hot Market		C-H
		Obs.	Mean(SD)	Obs.	Mean(SD)	Obs.	Mean(SD)	Diff (P)
(A)	Selling price (000)	30,551	501.388	16,879	504.594	3,665	472.635	31.959***
			[383.028]		[395.930]		[310.147]	[0.000]
	Selling price per	25,051	442.688	13,838	438.044	3,085	445.588	-7.543*
	sqft		[245.322]		[249.400]		[233.103]	[0.054]
	Original asking	30,256	552.834	16,717	554.847	3,628	507.654	47.193***
	price (000)		[1,056.381]		[495.913]		[391.711]	[0.000]
	Last asking price	30,370	529.696	16,773	534.919	3,644	494.895	40.023***
	(000)		[425.687]		[443.704]		[342.253]	[0.000]
	Floor size	25,051	1,163.923	13,838	1,167.275	3,085	1,125.862	41.412***
			[639.675]		[669.699]		[580.878]	[0.000]
	Months on market	30,551	2.625	16,879	2.882	3,665	1.956	0.926***
	(MOM)		[3.007]		[3.168]		[2.486]	[0.000]
(B)	Predicted selling	22,021	471.003	12,184	472.919	2,689	452.329	20.589***
	price (000)		[304.322]		[329.099]		[252.366]	[0.000]
	Ln predicted	22,021	12.940	12,184	12.929	2,689	12.925	0.004
	selling price		[0.453]		[0.476]		[0.464]	[0.317]
	Average asking	29,604	587.301	16,602	598.158	3,466	533.453	64.705***
	price (000)		[343.765]		[372.887]		[252.232]	[0.000]
	Average selling	29,604	495.945	16,602	501.346	3,466	464.998	36.348***
	price (000)		[277.449]		[297.488]		[223.026]	[0.000]
	Median asking	29,604	505.399	16,602	512.368	3,466	470.616	41.753***
	price (000)		[277.786]		[299.324]		[227.441]	[0.000]
	Median selling	29,604	454.906	16,602	460.195	3,466	430.739	29.456***
	price (000)		[251.589]		[268.704]		[210.779]	[0.000]

Table 3 *Hedonic Regression Model*

Table 3 illustrates the estimated coefficients of equation (1), and the P-value of each coefficient. Dummy: Forced Air is the dummy variable for the air conditioner system: Dummy: Forced Air equals to 1 if the house has a central air conditioner system, and equals to 0 if otherwise. Dummy: Fireplace is equal to 1 if the house has a fireplace, and equals to 0 if otherwise. Dummy: Swimming Pool is equal to 1 if the house has a swimming pool, and equals to 0 if otherwise. We control five building types: Attached, Attached corner unit, Semi-detached, Detached, and Quadrex, respectively, the five property types: Bungalow, Mobile home, One-and-a-half storey, Two or more storey, and Split level, respectively. The numbers in the parentheses indicate number of categories controlled by fixed effects. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent Variable: Ln Selling Price	
	Coefficient	P-value
Intercept	13.2667***	0.000
Floor Size	0.0001***	0.000
Lot Area	0.0001***	0.000
House Age	-0.0024***	0.000
No. of Rooms	0.0138***	0.000
No. of Bedrooms	0.0331***	0.000
No. of Bedrooms in the Basement	0.0134***	0.000
No. of Bathrooms	0.1366***	0.000
No. of Powder Rooms	0.0839***	0.000
No. of Garage	0.0725***	0.000
No. of Carport	-0.0026	0.674
No. of Driveway	0.0076***	0.000
Dummy: Forced Air	0.0307***	0.000
Dummy: Fireplace	0.0683***	0.000
Dummy: Swimming Pool	0.0624***	0.000
Building Type Fixed Effect	Yes (5)	
Property Type Fixed Effect	Yes (5)	
Municipal Fixed Effect	Yes (34)	
Year Fixed Effect	Yes (6)	
Month Fixed Effect	Yes (12)	
Observations	22,021	
Adjusted R-squared	0.8421	

Table 4 *The Effect of Asking Price on Final Sale Price*

In Table 4, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (2) when the reference price for the asking price is the predicted selling price, Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (2) when the reference price for the asking price is the original average asking price, which is the average asking price in the region where the house located and at the time when the house was listed on the market. Column (5) and (6) document the estimated coefficients of equation (2) when the reference price for the asking price is the original average selling price, which is the average selling price in the region where the house located and at the time when the house was listed on the market. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent Variable: Ln Selling Price					
	Predicted Selling Price		Average Asking Price		Average Selling Price	
	(1)	(2)	(3)	(4)	(5)	(6)
	Original	Last	Original	Last	Original	Last
Ln Predicted Selling Price	0.998***	0.990***	0.496***	0.482***	0.478***	0.455***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Listing Time—Months on	-0.011***	-0.003***	-0.007***	-0.003***	-0.006***	-0.002***
Market (MOM)	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_1	-0.030***	-0.031***	-0.020***	-0.020***	-0.020***	-0.021***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_2	-0.017***	-0.017***	-0.009***	-0.009***	-0.010***	-0.010***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_3	-0.008***	-0.008***	-0.004***	-0.004***	-0.005***	-0.005***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_1	0.007***	0.007***	0.006***	0.007***	0.004***	0.005***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_2	0.013***	0.014***	0.010***	0.011***	0.007***	0.008***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_3	0.022***	0.022***	0.015***	0.017***	0.013***	0.014***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_4	0.036***	0.037***	0.027***	0.028***	0.023***	0.024***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_5	0.058***	0.058***	0.045***	0.047***	0.042***	0.044***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Listing Office Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter and Municipal	Yes	Yes	Yes	Yes	Yes	Yes
Interaction Fixed Effects						
Observations	22,021	22,021	22,021	22,021	22,021	22,021
Adjusted R-squared	0.9770	0.9832	0.9165	0.9196	0.9184	0.9231

Table 5 *The Effect of Asking Price on Final Sale Price in the Cold Market and in the Hot Market*

In Table 5, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (2) when the reference price for the original asking price is the predicted selling price, Column (1) focuses on the closed transaction in the cold market and Column (2) focuses on the closed transaction in the hot market. Column (3) indicates the difference of coefficients between Columns (1) and (2). Column (4) and (5) document the estimated coefficients of equation (2) when the reference price for the original asking price is the regional average asking price. Column (6) indicates the difference of coefficients between Columns (4) and (5). Column (7) and (8) document the estimated coefficients of equation (2) when the reference price for the original asking price is the regional average selling price. Column (9) indicates the difference of coefficients between Columns (7) and (8). We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price								
	Predicted Selling Price			Average Asking Price			Average Selling Price		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Cold Mkt	Hot Mkt	C-H	Cold Mkt	Hot Mkt	C-H	Cold Mkt	Hot Mkt	C-H
Ln Predicted Selling Price	1.000***	0.992***	0.008	0.467***	0.471***	-0.004	0.458***	0.440***	0.018
	[0.000]	[0.000]	[0.558]	[0.000]	[0.000]	[0.869]	[0.000]	[0.000]	[0.517]
Listing time – Months on	-0.010***	-0.011***	0.001	-0.007***	-0.009***	0.002	-0.006***	-0.005***	-0.001
Market (MOM)	[0.000]	[0.000]	[0.437]	[0.000]	[0.000]	[0.363]	[0.000]	[0.000]	[0.826]
Ln Predicted Price * UD_1	-0.030***	-0.029***	-0.001	-0.022***	-0.019***	-0.003***	-0.021***	-0.019***	-0.002
	[0.000]	[0.000]	[0.292]	[0.000]	[0.000]	[0.007]	[0.000]	[0.000]	[0.154]
Ln Predicted Price * UD_2	-0.017***	-0.016***	-0.001	-0.010***	-0.011***	0.001	-0.010***	-0.011***	0.001
	[0.000]	[0.000]	[0.395]	[0.000]	[0.000]	[0.400]	[0.000]	[0.000]	[0.470]
Ln Predicted Price * UD_3	-0.008***	-0.008***	0.000	-0.005***	-0.005***	0.000	-0.005***	-0.006***	0.001
	[0.000]	[0.000]	[0.391]	[0.000]	[0.000]	[0.362]	[0.000]	[0.000]	[0.293]
Ln Predicted Price * OD_1	0.007***	0.006***	0.001	0.006***	0.005***	0.001	0.004***	0.004***	0.000
	[0.000]	[0.000]	[0.132]	[0.000]	[0.007]	[0.264]	[0.000]	[0.000]	[0.911]
Ln Predicted Price * OD_2	0.013***	0.013***	0.000	0.010***	0.011***	-0.001	0.007***	0.007***	0.000
	[0.000]	[0.000]	[0.133]	[0.000]	[0.000]	[0.433]	[0.000]	[0.000]	[0.646]
Ln Predicted Price * OD_3	0.022***	0.022***	0.000	0.015***	0.014***	0.001	0.014***	0.014***	0.000
	[0.000]	[0.000]	[0.868]	[0.000]	[0.000]	[0.338]	[0.000]	[0.000]	[0.679]
Ln Predicted Price * OD_4	0.036***	0.036***	0.000	0.028***	0.027***	0.001	0.024***	0.024***	0.000
	[0.000]	[0.000]	[0.840]	[0.000]	[0.000]	[0.551]	[0.000]	[0.000]	[0.810]
Ln Predicted Price * OD_5	0.057***	0.055***	0.002	0.045***	0.046***	-0.001	0.042***	0.044***	-0.002
	[0.000]	[0.000]	[0.661]	[0.000]	[0.000]	[0.979]	[0.000]	[0.000]	[0.544]
Listing Office Fixed Effects	Yes	Yes		Yes	Yes		Yes	Yes	
Quarter and Municipal Interaction Fixed Effects	Yes	Yes		Yes	Yes		Yes	Yes	
Observations	12,184	2,689		12,184	2,689		12,184	2,689	
Adjusted R-squared	0.9791	0.9622		0.9297	0.8968		0.9293	0.9013	

Table 6 *Robustness Tests for the Unobservable Quality*

In Table 6, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (3) when the reference price for the asking price is the predicted selling price, Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (3) when the reference price for the asking price is the original average asking price, which is the average asking price in the region where the house located and at the time when the house was listed on the market. Column (5) and (6) document the estimated coefficients of equation (3) when the reference price for the asking price is the original average selling price, which is the average selling price in the region where the house located and at the time when the house was listed on the market. Unobservable Quality is defined as the residual term from the previous transaction, which is the difference between the previous sale price and the predicted selling price of the house at the time of the previous transaction. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price					
	Predicted Selling Price		Average Asking Price		Average Selling Price	
	(1)	(2)	(3)	(4)	(5)	(6)
	Original	Last	Original	Last	Original	Last
Ln Predicted Selling Price	0.977***	0.957***	0.491***	0.483***	0.428***	0.409***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Listing Time—Months on	-0.008***	-0.001	-0.007***	-0.004***	-0.007 ***	-0.004***
Market (MOM)	[0.000]	[0.335]	[0.000]	[0.000	[0.000]	[0.001]
Unobservable Quality	0.081***	0.071***	0.271***	0.277***	0.249***	0.234***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_1	-0.031***	-0.034***	-0.017***	-0.017***	-0.020***	-0.021***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_2	-0.017***	-0.017***	-0.009***	-0.009***	-0.009***	-0.009***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_3	-0.009***	-0.008***	-0.004***	-0.004***	-0.005***	-0.005***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_1	0.006***	0.006***	0.005***	0.005***	0.005***	0.004***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_2	0.012***	0.012***	0.008***	0.008***	0.007***	0.008***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_3	0.021***	0.021***	0.014***	0.014***	0.013***	0.013***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_4	0.033***	0.032***	0.024***	0.024***	0.021***	0.022***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_5	0.052***	0.052***	0.040***	0.040***	0.038***	0.040***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]

Table 6 *Robustness Tests for the Unobservable Quality*

In Table 6, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (3) when the reference price for the asking price is the predicted selling price, Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (3) when the reference price for the asking price is the original average asking price, which is the average asking price in the region where the house located and at the time when the house starts to be listed on the market. Column (5) and (6) document the estimated coefficients of equation (3) when the reference price for the asking price is the original average selling price, which is the average selling price in the region where the house located and at the time when the house starts to be listed on the market. Unobservable Quality is defined as the residual term from the previous transaction, which is the difference between the previous sale price and the predicted selling price of the house at the time of the previous transaction. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

Dependent variable: Ln Selling Price						
	Predicted Selling Price		Average Asking Price		Average Selling Price	
	(1)	(2)	(3)	(4)	(5)	(6)
	Original	Last	Original	Last	Original	Last
Listing Office Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter and Municipal Interaction Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,362	1,362	1,362	1,362	1,362	1,362
Adjusted R-squared	0.9799	0.9835	0.9451	0.9452	0.9510	0.9542

Figures

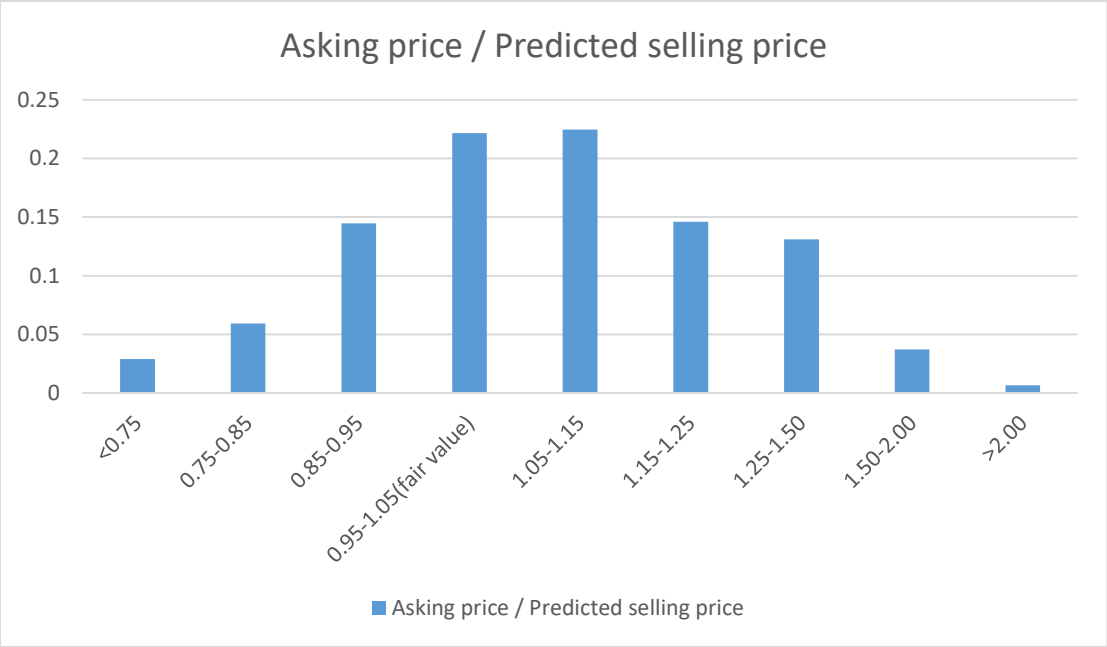

Figure 1, Panel A.

Sample Distribution by Asking Price / Predicted Selling Price

We use the first column data ("Entire sample") in Panel A, Table 1 to draw this figure. In Panel A, Figure 1, the number on the X-Axis documents each asking price level, which classified by the ratio of the original asking price to the predicted selling price. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide the total number of transactions.

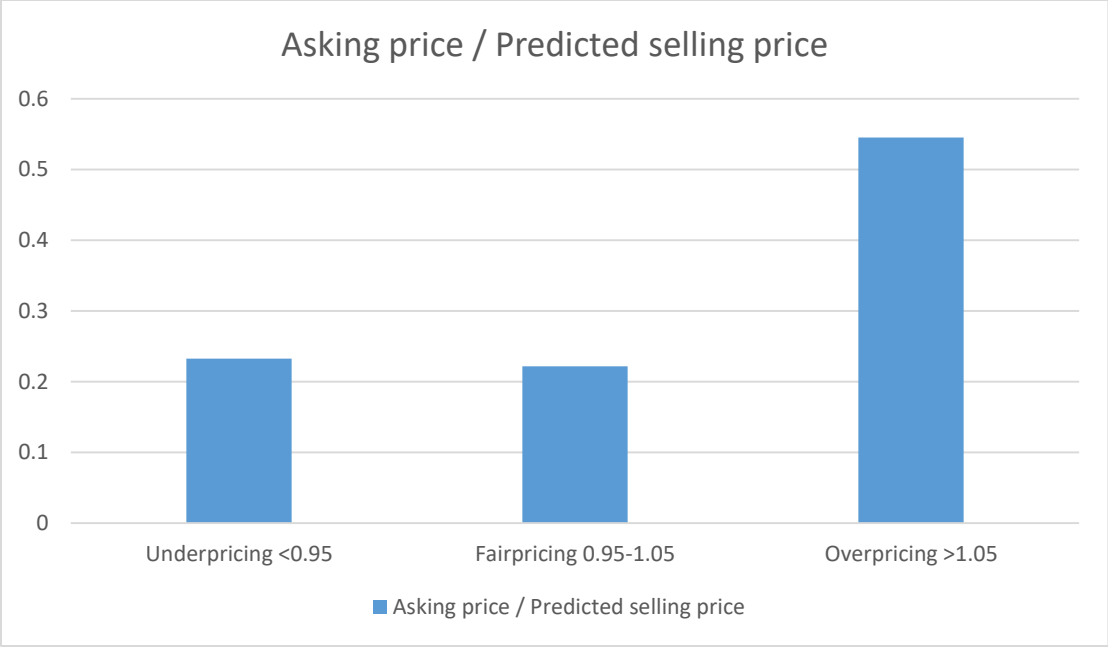

Figure 1, Panel B.

Sample Distribution of Underpricing (Low-price), Fair Pricing and Overpricing (High-Price) (Referring to the Predicted Selling Price)

We use the first column data ("Entire sample") in Panel A, Table 1 to draw this figure. In Panel A, Figure1, the number on the X-Axis documents whether the house is fair priced, overpriced, or underpriced, determined by the ratio of the original asking price to the predicted selling price. We define the house is fair priced when the ratio of the original asking price to the predicted selling price is between 0.95 and 1.05; the house is overpriced when the ratio of the original asking price to the predicted selling price is above 1.05; the house is underpriced when the ratio of the original asking price to the predicted selling price is under 0.95. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide by the total number of transactions.

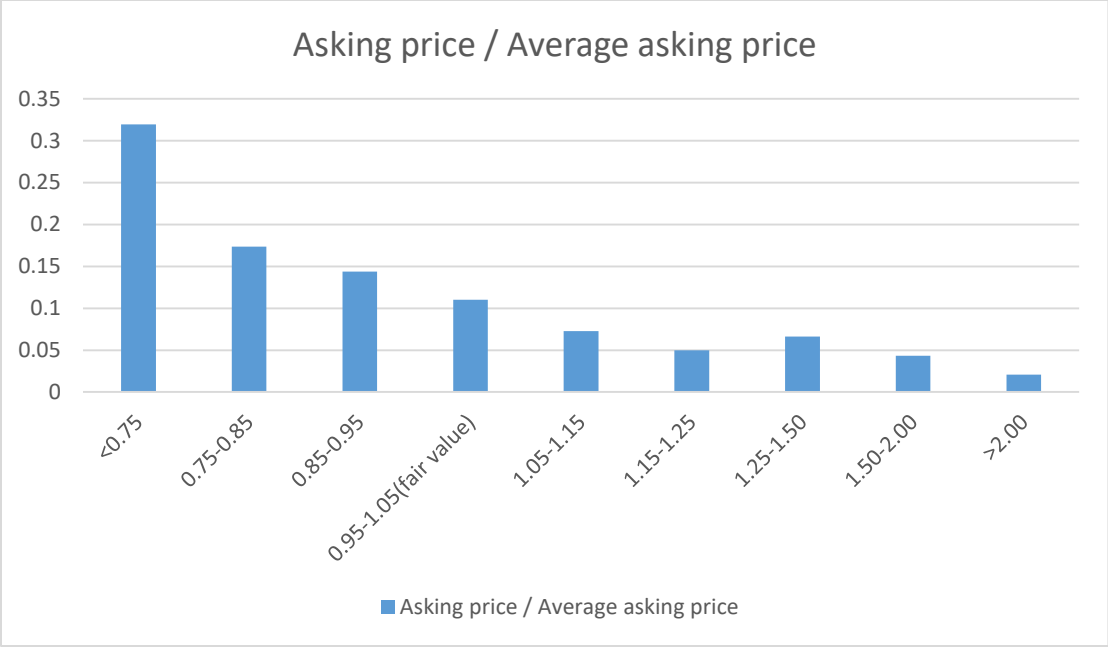

Figure 2, Panel A.

Sample Distribution by Asking Price / Regional Average Asking Price

We use the first column data ("Entire sample") in Panel B, Table 1 to draw this figure. In Panel B, Figure 2, the number on the X-Axis documents each asking price level, which classified by the ratio of the original asking price to the regional average asking price, which is the average asking price in the region where the house located and at the time when the house starts to be listed on the market. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide the total number of transactions. We define the house is fair priced when the ratio of the original asking price to the regional average asking price is between 0.95 and 1.05.

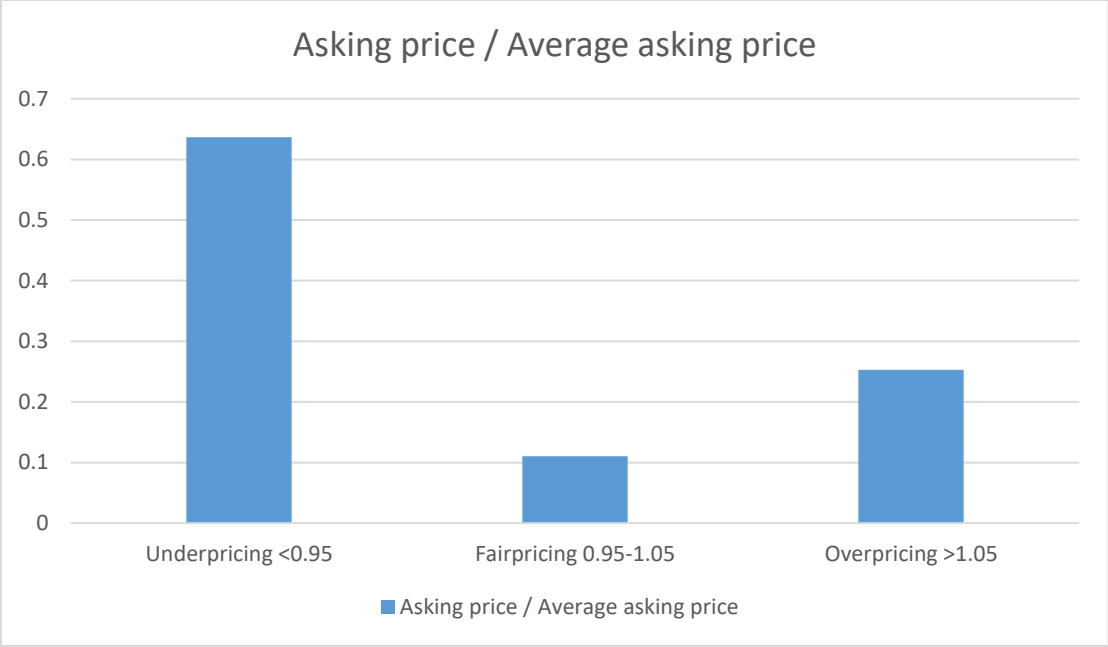

Figure 2, Panel B.

Sample Distribution of Underpricing (Low-price), Fair Pricing and Overpricing (High-Price) (Referring to the Regional Average Asking Price)

We use the first column data ("Entire sample") in Panel B, Table 1 to draw this figure. In Panel B, Figure2, the number on the X-Axis documents whether the house is fair priced, overpriced, or underpriced, determined by the ratio of the original asking price to the regional average asking price, which is the average asking price in the region where the house located and at the time when the house starts to be listed on the market. We define the house is fair priced when the ratio of the original asking price to the regional average asking price is between 0.95 and 1.05; the house is overpriced when the ratio of the original asking price to the regional average asking price is above 1.05; the house is underpriced when the ratio of the original asking price to the regional average asking price is under 0.95. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide the total number of transactions.

Figure 3, Panel A.

Sample Distribution by Asking Price / Regional Average Selling Price

We use the first column data ("Entire sample") in Panel C, Table 1 to draw this figure. In Panel C, Figure 3, the number on the X-Axis documents each asking price level, which classified by the ratio of the original asking price to the regional average selling price, which is the average selling price in the region where the house located and at the time when the house starts to be listed on the market. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide the total number of transactions. We define the house is fair priced when the ratio of the original asking price to the regional average selling price is between 0.95 and 1.05

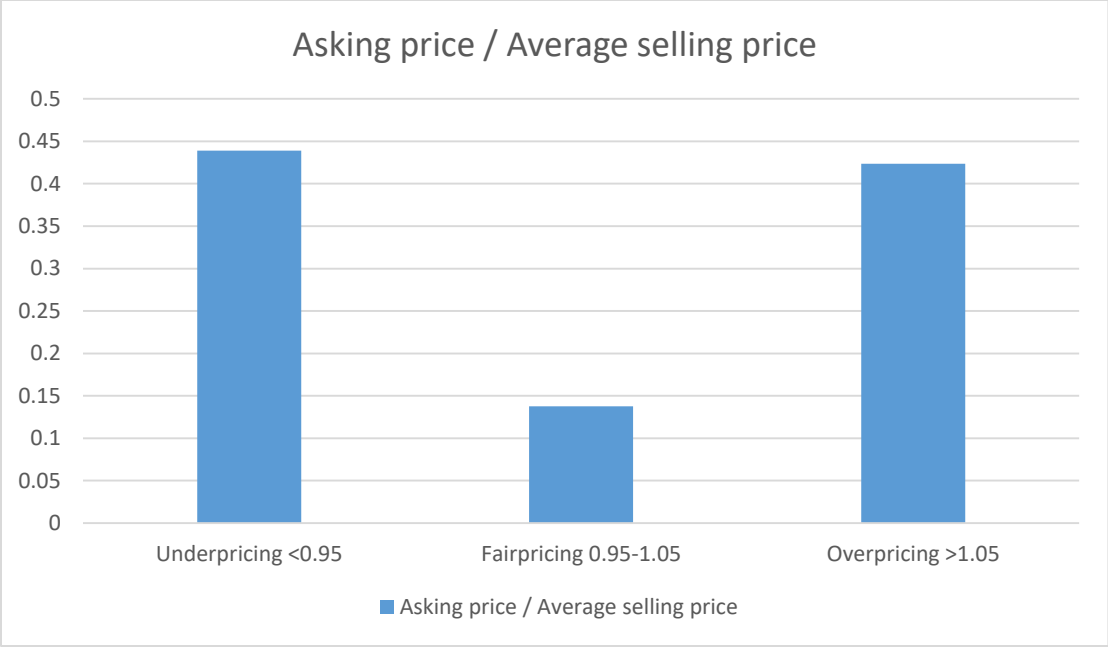

Figure 3, Panel B.

Sample Distribution of Underpricing (Low-price), Fair Pricing and Overpricing (High-Price) (Referring to the Regional Average Selling Price)

We use the first column data ("Entire sample") in Panel C, Table 1 to draw this figure. In Panel C, Figure2, the number on the X-Axis documents whether the house is fair priced, overpriced, or underpriced, determined by the ratio of the original asking price to the regional average selling price, which is the average selling price in the region where the house located and at the time when the house starts to be listed on the market. We define the house is fair priced when the ratio of the original asking price to the regional average selling price is between 0.95 and 1.05; the house is overpriced when the ratio of the original asking price to the regional average selling price is above 1.05; the house is underpriced when the ratio of the original asking price to the regional average selling price is under 0.95. The number on the Y-Axis documents the percentage of the number of transaction in each asking price level, which is the number of the closed transaction in each asking price level divide the total number of transactions.

Appendix

Table A1 *No. of Transactions and Sample Distribution*

Panel A documents the number of transaction for each asking price level referring to the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Panel B documents the number of transaction for each asking price level referring to the regional median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. Columns "Original" indicate that the asking price levels are classified by the ratio of the original asking price to the reference price; Columns "Last" indicate that the asking price levels are classified by the ratio of the last asking price to the reference price. We classify our entire sample by using the month on inventory (MOI), which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as MOI under 4 months; a balanced market is defined as MOI between 4 to 6 months; a cold market (buyer's market) is defined if MOI is over 6 months.

	Entire Sample		Cold Market		Hot Market	
	Obs.		Obs.		Obs.	
	Original	Last	Original	Last	Original	Last
Panel A: Reference price: regional median asking price						
Asking price below 75% of median asking price	4,654	5,169	2,706	2,992	460	498
Asking price 75%–85% of median asking price	3,928	4,236	2,246	2,234	477	506
Asking price 85%–95% of median asking price	4,768	4,884	2,710	2,450	568	590
Asking price 95%–105% of median asking price	5,015	5,047	2,782	2,250	604	606
Asking price 105%–115% of median asking price	3,112	2,784	1,697	1,724	383	348
Asking price 115%–125% of median asking price	1,998	1,902	1,105	1,203	240	234
Asking price 125%–150% of median asking price	2,830	2,619	1,498	1,739	380	358
Asking price 150%–200% of median asking price	1,890	1,801	1,045	1,210	216	218
Asking price above 200% of median asking price	1,132	1,001	751	657	104	90
Total	29,327	29,443	16,540	16,459	3,432	3,448

Table A1 *No. of Transactions and Sample Distribution*

Panel A documents the number of transaction for each asking price level referring to the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Panel B documents the number of transaction for each asking price level referring to the regional median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. Columns "Original" indicate that the asking price levels are classified by the ratio of the original asking price to the reference price; Columns "Last" indicate that the asking price levels are classified by the ratio of the last asking price to the reference price. We classify our entire sample by using the month on inventory (MOI), which is the ratio of the number of active listings to the number of sales transactions in each municipality in a certain month. A hot market (seller's market) is defined as MOI under 4 months; a balanced market is defined as MOI between 4 to 6 months; a cold market (buyer's market) is defined if MOI is over 6 months.

	Entire Sample		Cold Market		Hot Market	
	Obs.		Obs.		Obs.	
	Original	Last	Original	Last	Original	Last
Panel B: Reference price: regional median selling price						
Asking price below 75% of median selling price	3,004	3,327	1,755	1,951	284	313
Asking price 75%–85% of median selling price	2,717	3,001	1,499	1,688	345	368
Asking price 85%–95% of median selling price	3,806	4,033	2,154	2,271	448	468
Asking price 95%–105% of median selling price	4,353	4,390	2,397	2,416	579	592
Asking price 105%–115% of median selling price	3,711	3,630	2,078	2,041	449	427
Asking price 115%–125% of median selling price	2,809	2,644	1,584	1,489	318	306
Asking price 125%–150% of median selling price	4,168	3,973	2,286	2,153	501	487
Asking price 150%–200% of median selling price	2,950	2,785	1,659	1,557	346	334
Asking price above 200% of median selling price	1,733	1,579	1,005	908	146	138
Total	29,251	29,362	16,417	16,474	3,416	3,433

Table A2 *The Effect of Asking Price on Final Sale Price*

In Table A2, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (2) when the reference price for the asking price is the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (2) when the reference price for the asking price is the original median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price			
	Median Asking Price		Median Selling Price	
	(1)	(2)	(3)	(4)
	Original	Last	Original	Last
Ln Predicted Selling Price	0.423***	0.395***	0.477***	0.448***
	[0.000]	[0.000]	[0.000]	[0.000]
Listing time – Months on	-0.007***	-0.002***	-0.005***	-0.001***
Market (MOM)	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_1	-0.024***	-0.024***	-0.022***	-0.022***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_2	-0.012***	-0.012***	-0.011***	-0.012***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_3	-0.006***	-0.006***	-0.006***	-0.006***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_1	0.005***	0.006***	0.004***	0.004***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_2	0.010***	0.011***	0.007***	0.008***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_3	0.015***	0.016***	0.012***	0.013***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_4	0.026***	0.027***	0.022***	0.023***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_5	0.046***	0.048***	0.041***	0.043***
	[0.000]	[0.000]	[0.000]	[0.000]
Listing Office Fixed Effects	Yes	Yes	Yes	Yes
Quarter and Municipal	Yes	Yes	Yes	Yes
Interaction Fixed Effects				
Observations	22,021	22,021	22,021	22,021
Adjusted R-squared	0.9260	0.9310	0.9193	0.9244

Table A3 *The Effect of Asking Price on Final Sale Price in a Cold Market and in a Hot Market*

In Table A3, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (2) when the reference price for the original asking price is the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Column (1) focuses on the closed transaction in the cold market and Column (2) focuses on the closed transaction in the hot market. Column (3) indicates the difference of coefficients between Columns (1) and (2). Column (4) and (5) document the estimated coefficients of equation (2) when the reference price for the regional median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. Column (6) indicates the difference of coefficients between Columns (4) and (5). We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price					
	Median Asking Price			Median Selling Price		
	(1)	(2)	(3)	(4)	(5)	(6)
	Cold Mkt	Hot Mkt	C-H	Cold Mkt	Hot Mkt	C-H
Ln Predicted Selling Price	0.385***	0.404***	-0.019	0.452***	0.426***	0.026
	[0.000]	[0.000]	[0.519]	[0.000]	[0.000]	[0.385]
Listing time – Months on	-0.007***	-0.006***	-0.001	-0.005***	-0.003***	-0.002
Market (MOM)	[0.000]	[0.000]	[0.317]	[0.000]	[0.000]	[0.259]
Ln Predicted Price * UD_1	-0.025***	-0.023***	-0.002**	-0.021***	-0.023***	0.002
	[0.000]	[0.000]	[0.033]	[0.000]	[0.000]	[0.356]
Ln Predicted Price * UD_2	-0.013***	-0.013***	0.000	-0.011***	-0.012***	0.001
	[0.000]	[0.000]	[0.851]	[0.000]	[0.000]	[0.206]
Ln Predicted Price * UD_3	-0.006***	-0.007***	0.001	-0.006***	-0.007***	0.001
	[0.000]	[0.000]	[0.114]	[0.000]	[0.000]	[0.222]
Ln Predicted Price * OD_1	0.005***	0.004***	0.001	0.004***	0.003***	0.001*
	[0.000]	[0.000]	[0.503]	[0.000]	[0.007]	[0.009]
Ln Predicted Price * OD_2	0.010***	0.009***	0.001	0.007***	0.006***	0.001*
	[0.000]	[0.000]	[0.154]	[0.000]	[0.000]	[0.009]
Ln Predicted Price * OD_3	0.016***	0.015***	0.001	0.013***	0.013***	0.000
	[0.000]	[0.000]	[0.315]	[0.000]	[0.000]	[0.900]
Ln Predicted Price * OD_4	0.027***	0.026***	0.001	0.024***	0.023***	0.001
	[0.000]	[0.000]	[0.235]	[0.000]	[0.000]	[0.446]
Ln Predicted Price * OD_5	0.048***	0.044***	0.004*	0.043***	0.042***	0.001
	[0.000]	[0.000]	[0.093]	[0.000]	[0.000]	[0.919]
Listing Office Fixed Effects	Yes	Yes		Yes	Yes	
Quarter and Municipal Interaction Fixed Effects	Yes	Yes		Yes	Yes	
Observations	12,184	2,689		12,184	2,689	
Adjusted R-squared	0.9387	0.9069		0.9303	0.9041	

Table A4 *Robustness Tests for the Unobservable Quality*

In Table A4, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (3) when the reference price for the asking price is the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (3) when the reference price for the asking price is the original median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. *Unobservable Quality* is defined as the residual term from the previous transaction, which is the difference between the previous sale price and the predicted selling price of the house at the time of the previous transaction. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price			
	Median Asking Price		Median Selling Price	
	(1)	(2)	(3)	(4)
	Original	Last	Original	Last
Ln Predicted Selling Price	0.367***	0.344***	0.391***	0.360***
	[0.000]	[0.000]	[0.000]	[0.000]
Listing time – Months on	-0.007***	-0.002**	-0.008***	-0.004***
Market (MOM)	[0.000]	[0.031]	[0.000]	[0.000
Unobservable Quality	0.209***	0.208***	0.232***	0.217***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_1	-0.024***	-0.024***	-0.021***	-0.023***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_2	-0.013***	-0.012***	-0.011***	-0.012***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * UD_3	-0.006***	-0.006***	-0.005***	-0.006***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_1	0.005***	0.006***	0.004***	0.004***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_2	0.010***	0.011***	0.007***	0.008***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_3	0.015***	0.015***	0.013***	0.013***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_4	0.025***	0.026***	0.022***	0.022***
	[0.000]	[0.000]	[0.000]	[0.000]
Ln Predicted Price * OD_5	0.046***	0.047***	0.041***	0.043***
	[0.000]	[0.000]	[0.000]	[0.000]

Table A4 *Robustness Tests for the Unobservable Quality*

In Table A4, the dependent variable is log of selling price. Column (1) and (2) document the estimated coefficients of equation (3) when the reference price for the asking price is the regional median asking price, which is the median asking price in the region where the house located and at the time when the house was listed on the market. Column (1) focuses on the original asking price and Column (2) focuses on the last asking price. Column (3) and (4) document the estimated coefficients of equation (3) when the reference price for the asking price is the original median selling price, which is the median selling price in the region where the house located and at the time when the house was listed on the market. *Unobservable Quality* is defined as the residual term from the previous transaction, which is the difference between the previous sale price and the predicted selling price of the house at the time of the previous transaction. We control the listing office and the interaction term of the quarter and the municipal. The number in the bracket indicates the P-value. * for 10% significance level, ** for 5% significance level, *** for 1% significance level.

	Dependent variable: Ln Selling Price			
	Median Asking Price		Median Selling Price	
	(1)	(2)	(3)	(4)
	Original	Last	Original	Last
Listing Office Fixed Effects	Yes	Yes	Yes	Yes
Quarter and Municipal Interaction Fixed Effects	Yes	Yes	Yes	Yes
Observations	1,362	1,362	1,362	1,362
Adjusted R-squared	0.9561	0.9585	0.9504	0.9546