



Can information regarding previous sales stabilize the house price index? Evidence from a field experiment in Spain

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Abstract

We compare the impact of two different listing price strategies for residential homes on the purchasing price of a property. Previous literature on anchoring effect (Tversky and Kahneman in *Science* 185(4157):1124–1131, 1974) has encountered a direct relation between the listing price and the sale price. Among the listing prices, the asking price, proposed by the seller, has been found to systematically influence the final purchasing price (Bucchianeri and Minson in *J Econ Behav Org* 89:76–92, 2013; Han and Strange in *J Urban Econ* 93:115–130, 2016). In this paper, we study the effect of another possible anchor, *the last sale price*, given its extended use in important housing markets, such as the US. By means of a controlled field experiment carried out in a real estate agency, we find that when the previous purchasing price is available, buyers' offers are characterized by a smaller variance from the average offered price, compared to when only the asking price is reported. This result suggests that the previous sale price is a stronger predictor of purchasing price than the asking price is and could be a valid instrument for policy purposes.

Keywords Housing · Controlled field experiment · Listing prices · Anchoring effect

1 Introduction

Consider the following situation. You are visiting a real-estate agency looking to buy an apartment in your favorite neighborhood in your town. The real-estate agent shows you a set of properties fitting your preferences and willingness to pay by presenting you with some photos, a list of characteristics, such as exact location, square meters, number of rooms, and bathrooms, of each available property.

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Thanks to your previous research and your own experience, you already have a good idea about the average price for properties with these characteristics and in this area. Now, the agent shows you information of an apartment that was just put up for sale and communicate you the asking price proposed by the seller. Would this price information affect your price valuation of the apartment?

Now imagine the same situation but, in addition to the asking price, the agent tells you how much that apartment was previously paid by the current owner.

Would that additional piece of information affect the price you are willing to offer? Moreover, which of the two listed prices would have a stronger weight on your evaluation, if any?

In this paper, we address the question of the relevance and implications of two of the more common listed prices available to a buyer of a real estate: *the asking price* and *the previous sale price*. To pursue this objective, we first acknowledge that, although the literature on hedonic price models considers housing price as the objective function of property and neighborhood characteristics (Palmquist 1984; Rosen 1974), the well-established behavioral literature on anchoring effect, starting with the work of Khanemann and Tversky (1974), suggests that a person's judgement is systematically biased towards alternative and often irrelevant pieces of information (e.g., an initial presented value).

A clear example of anchoring on irrelevant information is provided in the paper of Ariely et al. (2003) in which subjects were first anchored by asking them whether they valued different goods more or less than a price created from the last two digits of their social-security-number. The result indicated a strong anchor to this a priori irrelevant information as subjects with above-median social security numbers stated values that were from 57 to 107% higher than those provided by subjects with social security numbers below the median.¹

Anchoring has been encountered as a bias affecting people in very different domains, including negotiation (Galinsky and Mussweiler 2001), purchasing decisions (Mussweiler et al. 2000) and forecasting (Critcher and Gilovich 2008; Meub and Proeger 2016), among others.²

With respect to the housing literature, we encounter few empirical studies that analyze the role played by anchors in affecting decision making and housing prices. For instance, Genesove and Mayer (2001) identified that the purchase price of a property acts as an anchor on the subsequent selling price for the homeowner due to the effect of loss aversion on owner preferences. Simonsohn and Loewenstein (2006), found a strong anchoring effect on rent prices for those moving from more expensive cities with respect to those moving from cheaper cities given that the former, having their previous rent as reference, were willing to pay a higher rent in their new city. Northcraft and Neale (1987) investigated whether the anchoring effect provided by the distance from the proposed fair market value (FMV)³ of a property and depending on the level of knowledge of a person with respect to the housing sector would affect the participants' disposition to pay for a specific property. The study found that for suggested prices, the anchoring effect was particularly strong both

¹ Although Maniadis, Tufano and List (2014) and Fudenberg, Levine and Maniadis (2012) have recently cast doubt on the robustness of the results obtained by Ariely et al. (2003) and, more generally, on the power of the anchoring effect.

² See Furnham and Boo (2011) for a comprehensive review on anchoring effect.

³ The FMV is the price that considers objective characteristics of a property (e.g. square footage, characteristics of the neighborhood, and exact location).

for non-experts and experts. Although, when the distance from the fair market value was very high, experts were less affected by it. At the same time, Bokhari and Geltner (2011) showed that more experienced investors and larger, more sophisticated investment institutions exhibit at least as much loss aversion behavior as less experienced or smaller firms. Bucchianeri and Minson (2013) studied the effect of different initial listed prices on the final transaction price finding that higher initial starting prices are associated with higher selling prices, evidencing, as suggested by Epley and Gilovich (2006), that individuals are not able to adjust enough with respect to a salient anchor. Black and Diaz III (1996) gathered data through a series of experiments that revealed that the manipulation of asking price led to the manipulation of both buyers' opening offers and eventual settlement prices, thus indicating the use of the asking price as a shortcut and highlighting its strong potential biasing effect.

Further evidence on the "anchoring power" of the asking price is provided by Han and Strange (2016), as they found that many housing transactions are closed at a price exactly equal to the asking price and not at the fair market value, represented by the listed appraised value.

This evidence, with respect to the asking price, is particularly puzzling from our point of view, as, from the perspective of the buyer, the asking price should be a heavily discounted piece of information since it is the result of the subjective evaluation of the seller which is generally higher than the appraised price (Merlo and Ortalo-Magne 2004).

In contrast, with respect to the other analyzed listed price, namely, *the previous sale price*, the anchoring effect is not as clear as for the asking price. On one hand, there is no doubt that the previous sale price acts as an anchor with respect to the seller since the asking price will be affected by it (Genesove and Mayer 2001). On the other hand, there is not clear evidence of a causal relationship for the anchoring effect on buyer's offer.⁴

Real-estate agencies in some countries, such as the US, report the previous sale price or even the history of previous sales of a specific property. For instance, by going to the Zillow.com website, we can easily obtain this type of information. In contrast, in other countries, such as Spain or Italy, this information is not revealed, and very often, the asking price is the only listed price (not even the appraisal is available if it is not requested from a specific agency, which costs money).

In our paper, we argue that these differences in the availability of listed prices among agencies in different countries can have an immediate effect at the micro-level with respect to the final purchase price, and furthermore, these differences may have an aggregate effect on the overall dynamic of housing prices of a market with possible consequences for the house price index.

We consider this possibility because, in line with previous research, the relevance of a price being used as an anchor by the buyer greatly depends on the perceived relevance of the anchor (Mussweiler and Strack 1999) and on the ambiguity and uncertainty associated with it (Einhorn and Hogarth 1985). In this case, while the asking price is imposed by the seller, who is loss averse, the recent transaction price is already the outcome of a previous "market result", and it embeds more information. In turn, the last purchased price may be considered less ambiguous, and thus it should, in principle, convey a more precise estimation, at least with respect to the recent market evolution. Thus, in our paper, we hypothesize

⁴ Leung and Tsang (2013) showed a correlation between previous sale price and current price for the Hong Kong housing market.

that, given the relevance of the last purchased price, a buyer should take it into account and weight the information on the last purchase price more heavily than the information on the asking price. As a consequence, offered prices should be less dispersed among buyers when the last purchased price is available.

Based on this argument, we want to test the following hypothesis:

With respect to the price a buyer was willing to pay, the distribution of offered prices by different buyers is characterized by a lower variance when the information regarding the previous purchased price is revealed.

To test this hypothesis, we constructed a controlled field experiment in which both the buyers and the selected property were real. The experiment was carried out through a real estate agency. Subjects were attending a meeting with the agency because they were interested in buying an apartment in a specific neighborhood of Barcelona. After visiting different properties in person and returning to the agency's office, the real estate agent (supervised by the experimenter) presented a document with a currently available apartment in the same neighborhood and asked the buyer if she wanted to voluntarily participate in an experiment in which she had to state the highest price she would be willing to offer for that apartment. For subjects assigned to the control group, apart from a detailed description of the dwelling, only the asking price proposed by the seller was revealed.

In the treatment group, subjects were given the same information but also received information on the last selling price for the apartment—the real amount paid by the current owner. In both independent groups, subjects had to state the maximum price they would be willing to pay.

Our main result shows that in the treatment group, prices were characterized by a statistically significant smaller variance from the average actual price of offers with respect to the prices offered in the control group. This suggests that, as anticipated, the previous sale price is a stronger predictor of purchasing price than the asking price.

Our paper contains several novelties. First, from a substantive point of view, the paper compares the effect of two of the most commonly used listed prices by real estate agencies, the asked price and the price of the last purchase, showing that the presence of the previous sale price is perceived as more relevant by buyers and thus acts as a stronger anchor on buyers' offers. Our primary innovation is to test whether the presence of an additional piece of information, represented by the last transaction price at which the dwelling was sold, helps to reduce the variance of the price offered by buyers on the same dwelling.

Second, from a methodological perspective, we assess the price preference of buyers that were effectively intended to buy a similar property at the same time, that were well informed with respect to the prices and characteristics of the properties in the neighborhood, and that were making the decision in a non-fictitious context, thus favoring the external validity of our results.

Finally, our main result allows us to offer clear policy advices with direct implications for housing markets such as Spain, as explained in the following section, and for the construction of the house price index.

2 Spanish housing bubble and bust

In recent years, Spain has experienced one of the most important housing booms among developed economies. As a result, housing prices in Spain tripled in nominal terms between 1998 and 2007. This housing boom was one of the main engines for economic growth in Spain. During that period, there were more dwellings built in Spain than in Germany, France and Italy combined. According to the official statistics of the Department of Public Works, new housing constructions reached 860,000 dwellings in 2006. The average number of conceded mortgages was more than 1.1 million per year.⁵ These amounts are quite remarkable if we consider that in Spain, the annual average number of households was 15.5 million in that period. A higher competitive pressure implied that managers of financial institutions could only increase profits drastically by originating a large number of new mortgages. The excessive dependence of the real estate industry, jointly with a softening of the credit standards (Akin et al. 2014), caused the economic and financial crisis to hit Spain more severely than it did other developed economies. As a result, 61.495€ million were needed to rescue the financial system. Today, only 2,8% has been recovered. However, from 2008 to 2014, there was a bust period. From the peak of the bubble, prices decreased by 24.68%.⁶ This figure implies an enormous variability of housing prices not only in boom periods but also in bust periods. Some researchers explain this result by the over-appraisal behaviour of Spanish banks (Akin et al. 2014; Montalvo and Raya 2018). The bias towards producing high appraisal values to accommodate the financial needs of banks' clients led to an aggregated price index that also had a bias towards a rapid growth rate, giving the impression that house prices were growing faster than they actually were. In addition, the inflated appraisal value of a house had external effects on the appraisal value of nearby units, even if the buyer did not need additional financing, since the standard protocol of Spanish appraisal companies was to take the average appraisal value of six houses near the unit being valued to calculate the baseline appraisal. Rapid growth rates in official house prices signalled by the mass media also attracted various large—and many small—private investors. Moreover, many families were led to believe that if they did not buy quickly, house prices would be unattainable in the future (Montalvo and Raya 2012). Similar mechanisms, but in reverse, were observed during the bust period, where under-appraising was a common practice. In this paper, we test whether the presence of an additional piece of information (the past transaction price at which the dwelling was sold) helps to reduce the variance of the price offered by buyers on the same dwelling. If this hypothesis is true, adding this information as compulsory in any housing transaction in a country such as Spain may reduce the variability in prices during boom and bust periods.

⁵ Spain has a much higher rate of homeownership than is typical in Europe. The homeownership rate is 83.2% in Spain, compared with 70.1% for the EU-16 countries.

⁶ This figure corresponds to the most complete official housing price index available, the price index of the Ministerio de Obras Públicas and Urbanismo, later called the Ministerio de Vivienda (and based on appraisal prices). Unofficial statistics reported from companies such as Sociedad de Tasación and Tecnocasa (based in transaction prices) raise this figure to 43.7% and 52.2%, respectively.

3 The controlled field experiment

The experiment took place in an office of a real-estate agency⁷ situated in the city of Barcelona from January to February 2016. The real estate intermediary has 500 branches covering most of the Spanish provinces. To obtain an idea of the size of this company, we can compare its sales with the transactions of the market. For instance, the company made 10,160 sales in 2017, which was approximately 3% of the total sales of homes in the free market in Spain during that year.⁸

During the two months, potential buyers who contacted the agency looking for apartments specifically in the neighborhood of “Gracia” in Barcelona booked a meeting with the agency with the clear intention of buying a dwelling in the area. When the potential buyers came to the office, the agent took them to visit one or more previously identified properties. After the visit, when the clients returned to the office with the agent, we asked them to participate in our study.



Once they agreed to participate,⁹ we gave them the instructions for the experiment and the corresponding information that differed depending on whether they belonged to the control or to the treated group. Participants were sequentially assigned into one of the groups. The beginning of the sequence was randomly determined by flipping a coin. In this way, we guaranteed a very similar split between groups while keeping the same advantages provided by the random assignment of participants.¹⁰

The two experimental conditions were characterized by four sequential parts.

3.1 Part 1—General instruction

This part was the same for both groups. We explained to them that they were participating in an experiment in which they would receive information on an apartment situated in the same neighborhood they were looking to buy a property.

⁷ For confidentiality reasons, we cannot state the name of the company.

⁸ This number excludes social housing and residential units that had some type of public subsidy.

⁹ All of the potential buyers agreed to participate in the experiment after our request.

¹⁰ Once the first subject was assigned to one group by flipping the coin, the following subject was assigned to the other group, and so on.

3.2 Part 2—Information regarding the apartment

This part was the same for both groups. We provided detailed information about an apartment that was for sale in the area. Importantly, in both groups we presented the information of the same apartment in order to avoid possible confounding factors.

First, we presented the basic characteristics of the building and the apartment along with photos. **Address:** Roger de Flor.

- **Square meters:** 68,14
- **Number of rooms:** 3
- **Asking price:** 279.000€

Detailed information (we report here only one table):

Total surface		Room 1 m ²	11,20	Dining Room m ²	20
TOTAL m ²	68,14	Room 2 m ²	4.42	Kitchen m ²	7.14
TOTAL (+balcony) m ²	78,36	Room 3 m ²	9.19	Bathroom m ²	3.62

3.3 Part 3—Price information

In the third part, the two experimental groups differed.

In the control group, we only reported the **asking price**, which, in this case, was equal to **279,000€**.

In the treatment group, we also reported another piece of information—namely, the price at which the apartment last sold. This information referred to the **last purchase** of that apartment, which occurred in November 2015 for **242,000€**.¹¹

We furthermore provided a detailed explanation of the meaning of each of the two prices to guarantee that participants clearly understood their differences.

3.4 Part 4—Questions

Once subjects carefully analyze all the information on the apartment and on the prices presented, they answered a set of questions (see "Appendix" for the complete questionnaire), the main one being:

3.5 How much would you be willing to pay to buy this apartment?

To incentivize subjects to state the real amount they were willing to pay, we communicated to them that once the apartment was sold, they would receive an email with the exact transaction price and with an explicit congratulations from the agency to the person with the price that was most accurate to the final sale price.

¹¹ To notice that in 2015, when the apartment was sold, housing market in Spain was well recovered from the last crash and housing prices were quite stable.

Table 1 Experimental sample

Experimental treatment			Control group		
Age	Observations	Percentage	Age	Observations	Percentage
18–25	1	10	18–25	0	0
25–35	2	20	25–35	3	25
35–45	5	50	35–45	5	50
> 45	2	20	> 45	2	20
Total	10	100	Total	10	100

Furthermore, we gathered personal information and information on whether they had previous experience in buying properties. For the experimental group, once the fourth part was finished, we asked what the most important piece of information was in influencing the offered price, choosing between (1) the description of the property in part two, (2) the asking price, (3) the previous sale price or (4) none of the above.

After the experiment, we debriefed each of the subjects, explaining the objective of the study, and they left the agency.

4 Data and results

4.1 Subjects' profiles

During the two-month span, we gathered a total of 20 participants, 10 men and 10 women. The random division between the two groups split the sample uniformly, with half of the men and half of the women in each of the experimental groups. Even though the sample was quite small, it was composed of all of the potential buyers who visited the agency who were looking in that neighborhood.

With respect to the age of the participant, Table 1 reports the distribution between the two experimental groups, which is very similar. Fifty percent of subjects in both groups were between 35 and 40 years old. The entire sample was composed of Spanish people.

Another question we asked in the questionnaire was the level of expertise they had in buying real estate. Essentially, we asked if it was their first time purchasing a property. In the treatment group, 40% had such experience, while in the control group, 60% did.

4.2 Mean difference

In Table 2, we show the results of the test of equality of means (medians) for the amount each subject was willing to pay for the apartment. Neither the t-test nor the Mann–Whitney test can reject the null hypothesis of equality of means (medians). Therefore, the mean price of the control group is equal to the mean price of the experimental group. Similarly, a one-way between subjects ANOVA for the same comparison with means leads to the same conclusion ($F(1, 18) = 0.33$; $p = 0.57$). As a result, reporting additional information in terms of the price at which the apartment was last sold does not affect the amount potential buyers are willing to pay.

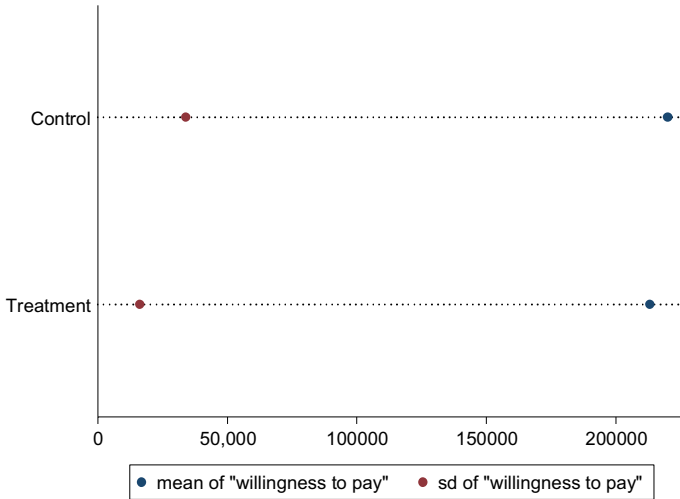


Fig. 1 Mean and standard deviation for the control and the treatment groups. Variable: amount a buyer is willing to pay

Table 2 Test of equality of means and Mann–Whitney test. Variable: amount a buyer is willing to pay

Group	Mean (€)	Std. Dev	t-statistic	Median (€)	Mann–Whitney
Control (only the asking price)	220,000	33,993		230,000	
Experimental (with previous transaction price)	213,200	16,199	0.57	215,000	0.83

***1% level of significance

**5% level of significance

*10% level of significance

Table 3 Test of equality of variances and Levene test variable: amount a buyer is willing to pay

Group	F-statistic
F-statistic	4.40**
Levene test (mean)	3.59*
Levene test (median)	3.07*

***1% level of significance

**5% level of significance

*10% level of significance

Table 4 Which piece of information was most important in determining the amount you were willing to pay?

1. Description of the property	20%
2. The asking price	10%
3. The previous sale price	70%
4. None of the above	10%

4.3 Hypotheses testing

The hypothesis to test is as follows:

When information on the previous sale price is provided, the distribution of prices offered by different buyers will be characterized by a lower variance with respect to cases in which only the asking price is reported.

We test the difference in variance with respect to the offered prices between the two groups.

From Table 2, we can see that the average offered price is 220,000€ and 213,000€ with a variance of 33,993 and 16,199 for the control group and the treatment group, respectively. This information is also reported in Fig. 1.

In Table 3, we perform the F test of the ratio of variances. The null hypothesis of the equality of variances (ratio equal to 1) is rejected. However, the F test may not be considered the best option to compare the ratio of two variances (O'Brien 1981). There is some evidence that Levene's test for the median performs better in terms of robustness and power when the data are skewed (as is the case here; see Fig. 1), while Levene's test for the mean is intended for symmetric, moderate-tailed distributions. The results are similar. Equality of variances is rejected at the 10% level of significance. The result is further supported by running a one-way between subject ANOVA in which we compare the absolute deviation between prices offered with respect to the average price of each group ($F(1,18) = 4.93, p < 0.05$).

In the treatment group, we asked the following:

Which piece of information was most important in determining the price you were willing to pay?

- (1) The description of the property.
- (2) The asking price.
- (3) The previous sale price.
- (4) None of the above.

Table 4 reports the distribution of the answers to the question on the relevance of the piece of information for the treatment group. Seven out of 10 participants (70%) answered that the previous sale price was the most relevant information in making their decision.

5 Discussion and policy implications

According to the literature on hedonic price models, a housing price is the objective function of property and neighborhood characteristics (Palmquist, 1984; Rosen, 1974), which should, in principle, be reflected by the appraisal price. Although appraisal price might, in turn, be artificially inflated (Akin et al., 2014). During a housing boom, financial institutions are incentivized to open the market to borrowers with financial constraints. As a consequence, appraisers are encouraged to introduce an upward bias in appraisals prices. As the appraisal price is the price used by financial institutions to determine the loan to value ratio¹²; this artificially increase in appraisal prices allows for larger mortgages without any cost in terms of loan to value ratio and interest rates to be drawn. Akin et al. (2014) have provided the first evidence of the key features of the last housing boom that ended in 2007 in Spain.¹³ Since 2008, a bust period has begun. From the peak of the bubble, prices have decreased by 24.68%.

In many countries, when an individual wants to buy a property, apart from a description of the characteristics of the property and the appraisal value, the only other piece of information available is the asking price established by the seller. This price is generally higher than the appraisal price (Merlo and Ortalo-Magne, 2004) due to owner loss aversion (Genesove and Mayer, 2001). In the past in Spain, due to this self-fulfilling mechanism between appraisals and asking prices, many families were led to believe that if they did not buy quickly, house prices would be unattainable in the future (Montalvo and Raya 2012).

Previous results from the housing literature highlight the fact that individuals may not be perfectly rational when offering a price on a property. More precisely, they relate and “anchor” to information that should not affect the price they offer. A clear example of such information is represented by the asking price (e.g. Bucchianeri and Minson (2013)). Furthermore, research on anchoring showed that the anchor has a stronger effect depending on its perceived relevance (Mussweiler and Strack, 1999) and on the ambiguity and uncertainty associated with it (Einhorn and Hogarth 1985).

In our paper, we study the effect of the presence of another listed price, the previous sale price, on the prices offered by buyers. The fact that this price is the result of a previous market transaction makes it less ambiguous and uncertain with respect to the asking price, which, on the contrary, is mainly the result of the seller’s subjective evaluation. Hence, buyers should give more weight to the previous sale price and it should be reflected in the prices they offer.

Thanks to our field experiment, we provide evidence that the previous sale price is a stronger anchor for buyers compared to the asking price. Despite the fact that in our case, it did not have a statistically significant effect on the average price offered by subjects, it has a very strong and significant effect in reducing the dispersion of the offers gathered. Our findings, even if characterized by a small sample size, prompt the question of whether housing prices could be characterized by less volatility if it was compulsory for real-estate agencies and web housing portals to display the previous sale price on each of their properties that are for sale.

In this sense, a macroprudential policy (MPP) consisting of requiring the reporting of the previous sale price would minimize the volatility of the housing price index, which is a

¹² The Spanish regulation requires the use of the lower of the market price or the appraisal in order to determine the value to calculate the LTV but the generalized practice has been to use the appraisal price.

¹³ See also Montalvo and Raya (2018).

key indicator of every economy. This MPP is complementary to macroprudential policies that encourage a cap on LTV ratios (which can potentially break the feedback loop between credit and house prices) and to linking the value used for the LTV ratio to the price as reflected on the title kept at the property registry (which can solve the over-appraisal mechanism and recover the effectiveness of the LTV).

6 Limitations and extensions

In this paper, we provide evidence that communicating the previous sale price of a property has a direct effect on the distribution of buyers' offers. Despite the relevance of our main result, we acknowledge that our study is not exempt from serious limitations.

First, we could only gather 20 observations due to the time limitations agreed upon with the real estate agency. Second, our research was carried out at the beginning of 2016, a period in which the Spanish housing sector and, more generally, the overall economy was well recovered with respect to the previous years. It would be interesting to see if our result holds the same in different circumstances, such as during a boom or a bust period.

Additionally, several extensions to these findings could be investigated in the future. For example, a symmetric design could be used to study if, by adding the last rental price, the housing rental market, which has been characterized by a tremendous increase in price in Barcelona in recent years, could be somehow affected.

Appendix

Questionnaire

1. Gender

- Male
- Female

2. Age:

- 18—25
- 25—35
- 35—45
- More than 45

3. Family structure:

- Family (3 to 4 members)
- Large family (more than 4 members)
- Couple
- Single
- Others:

4. Is this the first time you have purchased a property?

Yes

No

5. How much would you be willing to pay for the proposed property? (answer with a number, not with an interval)

.....

After completing the questionnaire, participants in the treatment group received an additional question in a separate document:

6 Which piece of information was most important in determining the amount you were willing to pay?

(1) The description of the property.

(2) The asking price.

(3) The previous sale price.

(4) None of the above.

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