

DOES CLEARER SPECIFICATION OF HOUSING PREFERENCE OPTIMIZE BUYER SEARCH PROCESS AND RESULTS? EXPERIMENTAL EVIDENCE

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ABSTRACT

The possibility that a clear specification of housing preference may optimize the buyer search process and results is a long-standing, but controversial, hypothesis in the field of real estate. To date, empirical evidence on this hypothesis has been scarce. We present controlled experimental evidence on the effect of clear specification of buyer's housing preference on the search process and results in the resale housing market. We compare the data collected from different experimental environment and find that when the buyer specifies their housing preference more clearly, the time-till-purchase is significantly reduced and the number of inspections is significantly decreased, while both the buyer's savings and the degree of satisfaction are increased slightly (non-significantly).

Keywords: housing preference, buyer search, experimental real estate

1 INTRODUCTION

“What kind of house do you want to buy?” This is almost the first and also the most important question that brokers will ask buyers. Answers from buyers vary widely. Some buyers with a clear demand can clearly introduce their housing preferences such as price, size, location, etc... to brokers, whereas most buyers with an unclear demand can only give a brief description of their housing preferences. This article will look at whether a clear specification of housing preference will reduce the time-till-purchase and the number of inspections. Moreover, we will examine whether it will increase the buyer's savings and the degree of satisfaction.

This article aims to explore if a clearer specification of housing preference optimizes the buyer search process and results in the resale housing market. The existing literature has not sufficiently examined the effect of housing preference specification on the buyer search. Few scholars examine the effect of the factors involving the housing preference specification on the buyer search. Anglin (1997) studied the determinants of the buyer search in a housing market by employing the Logit model, based on 265 sets of market research data. The content of this study involves the effect of the broker's understanding of a buyer's housing preferences within the buyer search. It is found that an agent knowing more about a buyer's taste will decrease the time-till-purchase, and this effect became more pronounced as the elapsed time increased. However, the broker's understanding on buyer housing preferences is not the emphasis in Anglin's paper.

Identifying a causal effect of housing preference specification on the buyer search is difficult with field data. Firstly, the field data is not ideal for examining these relationships because buyer demand specification is not observable in transactions data. That is, trading price and time-till-purchase do not at all reflect the underlying communications between a buyer and his agent. Secondly, it is difficult to collect valid field data. For the sake of protecting the buyer's privacy, usually only the buyer and the broker can know about the buyer's housing preference specification. It is difficult for others to know the clarity of the buyer's specification and to access the relevant data. Moreover, the buyer search often spans different regions with a

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duration of several months, which makes it difficult to track and record the buyer search process. Therefore, the relationship between the effect factor (housing preference specification) and the result (buyer search process and results) cannot be established. In addition, field data is generated from events that occurred at a specific time and in a specific place which cannot be replicated, therefore making it difficult to verify the accuracy of the results (Yavas and Sirmans, 2005).

For these reasons, we implement a controlled environment by randomly assigning subjects to different environments. This allows us to collect experimental data and to identify a causal effect of housing preference specification on the buyer search. Particularly, we use the experimental approach of Ikromov and Yavas (2012a, 2012b) and Yavas, Miceli, and Sirmans (2001) to collect experimental data. Ikromov and Yavas (2012a, 2012b) explain that through the careful construction of an experimental design, it is possible to isolate each variable of interest while holding everything else constant within the decision-making process. Alternatively, when using field data, so many variables are changing simultaneously that researchers must rely on complex econometric techniques in an attempt to effectively hold other variables and isolate the desired variables of interest. Even then, with the transactions data, not all the variables are observable. This is exactly the case with buyer demand specification. As a result, this study uses the experimental design approach used in Ikromov and Yavas (2012a, 2012b).

Our experimental evidence shows that the duration of the buyer search process is reduced significantly when a clearer specification of housing preference exists, while the results of the buyer search are not changed significantly. In particular, when the buyer specifies their housing preference more clearly, the time-till-purchase is significantly reduced and the number of inspections is significantly decreased. However, the buyer's savings and the degree of satisfaction are increased slightly (non-significantly).

The paper is organized as follows. The next section reviews the empirical literature on buyer search, as well as related experimental literature. The third section analyzes the process and features of the buyer search and formulates the main hypotheses to be examined. The fourth section describes the experimental design and procedures. The fifth section selects the performance measures and discusses the empirical results. The final section presents the concluding remarks.

2 LITERATURE REVIEW

2.1 Related Researches of Buyer Search

The literature of buyer search in housing market was mainly focus on the effects of brokerage on the duration of buyer search. We only review the most important studies in the past decades.

Baryla and Zumpano (1995) examine buyer search duration using a national database consisting of transactions conducted with and without the assistance of real estate brokers. The results of this study indicate that information asymmetries are present in the residential real estate market. First-time buyers and out-of-town buyers search longer than more experienced and local, more knowledgeable homebuyers. On the other hand, buyers relocated by their employers spend less time looking for a home. More importantly, real estate brokers are able to reduce buyer search time for all classes of buyers, whether first-time, experienced, or an out-of-town buyer.

However, the search duration cannot fully measured by the search time. Anglin (1997) measure the duration in two ways: in terms of time and in terms of the number of houses seen. Anglin estimate the duration of search by a house buyer by using data collected from specially-designed questionnaires.

Different from the previous research, Elder, Zumpano and Baryla (1999) focus on the search intensity and duration of search meanwhile. They examine the impact of the real estate broker on the effectiveness of buyer search by focusing on the linkages between search intensity and the duration of search. How long a buyer searches depends on how sensitive the buyer is to within-period search costs and across-period, sequential search costs. High-income individuals and other homebuyers with high within-period search costs tend to search longer and less intensively. Buyers with high across-period search costs, such as out-of-town buyers, tend to search more intensively. Brokers, by reducing the opportunity costs of within-period search, increase buyer search intensity, which in turn reduces actual search time.

Moreover, Elder, Zumpano and Baryla (2000) focus on the role of buyer brokers in the home-buying process by examining the effects of brokerage representation on home selling prices and search duration. The results of this study indicate that real estate brokers, no matter the type, have no independent effect on home prices.

The principal effect of broker intermediation is a reduction in buyer search time, compared to for-sale-by-owner transactions. The most important finding, however, is that buyer agents are more effective at reducing search time for their clients than more traditional seller agents or non-agent facilitators.

Besides the effect of brokerage on the duration of search, scholars also pay attention to the impact of new technical. D'Urso and Victoria (2002) examine the impact of internet use on the duration of search in the housing market. They develop a model of partial equilibrium in the housing market which suggests an ambiguous effect on the search duration when internet resources are employed. In this model, the impact of using the internet can be viewed as increasing the search efficiency, or as altering the distribution of potential matches from which the home buyer can choose. They use data from the 2000 Home Buyer and Seller Survey collected by the National Association of Realtors. While theory suggests there might be an increase or a decrease in search times when using on-line resources in the search, in this data using an Instrumental Quantile Regression approach they find a tendency for internet use to increase the duration of home search relative to employing more conventional search methods.

2.2 Previous Experimental Literature in Real Estate Area

The experimental economics method was used in the field of housing market more often in past decades.

Yavas et al. (2001) conducted an experimental analysis of the bargaining between a buyer and a seller of the exchange of a single good by means of a broker. They concluded that the primary benefit of brokers is not in the bargaining stage, which commences once a buyer and seller have been matched, but during the matching stage, when potential traders are searching for a match. As a result, this study focuses on the matching function of brokers in the home buying process, not on their lesser important negotiating role.

Yavas and Simans (2005) utilized experimental methodology to generate the data. The results of the experiment indicate that fundamental insights of real options theory are not evident to individual investors. The majority invested too early and failed to recognize the benefit of the option to wait. However, when the investors had to compete with others for the right to invest, their bids generally reflected the value of the embedded option.

Ikromov and Yavas (2012a) examine the impact of transaction costs, short selling restrictions and divisibility of assets on market efficiency in experimental asset markets. They find that transaction costs do not exacerbate the inefficiency of the market. They reduce the magnitude of bubbles and push prices closer to fundamentals. More divisible assets exhibit smaller deviations of prices from fundamentals. Short selling restrictions contribute to prolonged bubbles, while relaxing them increases the occurrence of "bust cycles." They also find that experimental real estate markets display larger deviations of prices from fundamental values, longer boom and bust cycles and smaller turnover than experimental financial markets.

Ikromov and Yavas (2012b) think that the value of an asset is equal to the present value of its expected future cash flows. It is affected by the magnitude, timing and riskiness, or volatility, of the cash flows. They hypothesize that if the expected values of two assets' cash flows are equal, the value of the asset with more volatile cash flows will be lower. Furthermore, they examine the impact of the volatility of cash flows on the volatility of prices. They consider a simple experimental environment where subjects trade in an asset which provides dividends from a known probability distribution. The expected value of the dividends is identical in all experimental treatments. The treatments vary with respect to the volatility of dividends. They find that when dividends are more volatile, transaction prices are lower. They also find that the volatility of prices is lower in the treatment with highly volatile dividends. In addition, as expected, trading volume is lower when cash flows are less volatile.

These experimental studies in housing market have proven that the experimental method is a feasible and effective tool in this area. However, almost all the published studies take housing as a kind of general commodity or as an asset. The multi-attributes of housing haven't reflected in above studies. In our study, we introduce five non-price attributes and one price attribute into the experiment settings.

Another feature of our studies is that we used the professional samples instead of student sample. Because of the special characters of housing and housing market, we are not sure that the student subject can replace the professional subjects even though Mestelman and Feeny (1988) and Dyer, Kagel and Levin (1989), among many others, find little difference when contrasting the behavior of professionals with students when it comes to wealth maximization experiments.

3 BUYER SEARCH AND RESEARCH HYPOTHESES

3.1 Buyer Search in Resale Housing Market

The buyer search process contains three main phases: (1) Buyers specify their demand preference to a broker. (2) Incorporating this preference set, a broker then recommends houses to the buyer. (3) When the buyer's search results in a match, the buyer bargains with the seller to negotiate a transaction. In more detail, buyers first describe their housing preference to the broker, albeit to varying degrees of effectiveness. They not only provide basic housing requirements, but also communicate their unique, individual tastes and preferences. Secondly, to meet the buyer's specific demand, brokers select specific houses from the company's database and recommend them to the buyer. If the buyer agrees to view the property, the broker will lead him to see the house in person. Subsequent to visiting the home, the buyer must then decide if the search process will continue or if he would like the agent to begin the bargaining phase. Entering the bargaining phase represents the third and final component of the home search process. The buyer's search process is complete when an agreement is reached between the buyer and seller. The broker will charge a fee from buyer only after the buyer and seller sign the transaction contract.

There are many characteristics of the buyer search process in the resale housing market. Firstly, the broker is neither working on behalf of the buyer nor the seller because the broker is an independent agent. Secondly, to expedite the sale at a higher price, the seller simultaneously asks several different brokers from different companies to sell his house. As a result, different brokerage companies almost always carry the same property listings. Thirdly, a broker does not charge any fees before achieving a transaction. To expedite the search process, a buyer also often asks several brokers from different companies simultaneously to recommend houses that meet his demand. Fourthly, buyers and brokers interact throughout the entire home buying process, whereas contact between buyers and sellers is limited to the bargaining phase.

3.2 Research Hypothesis

Our key hypothesis is that when the buyer specifies their housing preferences more clearly, the time-till-purchase is shorter and the number of inspections is less, because of three essential reasons. First, information resolves uncertainty. The existence of the buyer's evaluation function is true, no matter whether or not buyer specify his or her preference clearly. In fact, the specification of housing preference is the incomplete description of a buyer's evaluation function. The search scope and the number of blind recommendation can be reduced by clear specifications of housing preference. As a result, the efficiency and the success rate will be improved greatly. Specifically, the number of inspections will be decreased. Second, if buyer cannot specify his or her housing preference clearly, the brokers often try to grasp the buyer housing preferences by recommending house and observing buyer's response to the recommended housing. The interaction in the initial state of buyer search results in more inspections. Third, in general, buyer needs a longer time to inspect more housing, so time-till-purchase will last longer. Of course, we agree that there is no absolutely positive correlation between the time-till-purchase and the number of inspections. The time-till-purchase is determined by both the number and the frequency of inspections. However, in most cases, the larger number of inspections is accompanied by a longer time-till-purchase.

In a competitive market, a successful transaction requires that the broker first seeks to maximize the buyer's saving to ensure that the buyer purchases the recommended housing, and then maximize his or her own earnings on this basis. All brokers know that the buyer will be willing to pay more money to buy the housing in line with their preferences. So the brokers will try to recommend housing which highly match with buyer's housing preference. The clearer the specification of the buyer's housing preference will benefit to satisfy the buyer's requirements on housing attributes and thus improve the match degree between buyer's housing preference and the actual purchased housing's attributes. As for the trading price, all the brokers understand the buyer's housing preference very well, so the attributes of recommended housing are beginning to converge and the price competition among brokers become fiercer. We therefore infer that the buyer's savings will be increased.

In addition, if we take the buyer search as a Multi-attribute Reverse Auction, the buyer search process can be divided into three stages: first, the buyer tell the broker his or her housing preferences; second, the broker recommends housing to the buyer based on these preference specifications and the list of available house for sale; third, the buyer evaluates these houses recommended by all brokers and chooses the most satisfactory one (Chen-Ritzo et. al., 2005). Some scholars have studied the effect of buyer's preference specification on

the buyer search. Strecker (2010)'s research results suggest that revealing the buyer's preferences increases allocational efficiency. Suppliers successfully use the additional information to make more profits, but not at the expense of the buyer whose utility increases slightly albeit not significantly. Koppius (2002) also finds that revealing more information about the state of competition and the buyer's preferences increases the efficiency of multi-attribute auctions.

Based on above analysis and related literature, we hypothesized that when the buyer specifies their housing preferences more clearly, the buyer's savings are larger and the degree of satisfaction is higher.

4 EXPERIMENT

4.1 Experimental Design

The experiment includes two sessions. The two sessions have the same parameters, instructions, and procedural details except the revelation of housing preference. In Session 1, the buyer didn't tell brokers his or her housing attribute preferences; while in Session 2 the buyer gives a clear specification about his or her most important attribute and least important attribute to the brokers. For instance, if a buyer like well decorated house very much and don't care about the housing's floor level, the buyer will tell the broker his or her most important attribute is the decoration of housing and the least important attribute is the floor level. Four brokers are arranged to compete for the consecutively arrived 10 buyers and recommend housings to them.³ A total of 20 suites of housing are available for recommending, as shown in Table 1.

Table1 Information about the Sessions

Sessions	Specification of Housing Preference	Period Duration	Countdown Time	Number of Houses	Number of Buyers	Number of Brokers
1	None	180s	60s	20	10	4
2	Most important attribute and least important attribute	180s	60s	20	10	4

In order to better control the experimental process, and to avoid the interferences aroused by possible mutual familiarity of the participants, the experiment makes use of z-Tree (Fischbacher, 2007), the experiment software licensed from the University of Zurich, Switzerland, to build the buyer searching platform in the lab. In the experiment, participants are assigned a number instead of their real names which guaranty them anonymous. The screenshot of the experimental software is shown in Figure 1.

³The results of the buyer housing search behavior market research that is implemented by the Institute of Real Estate Studies Tsinghua University in 2012 show that averagely the buyer will entrust 3.7 brokers from different brokerage firms or from different stores of one brokerage firm during the search process.

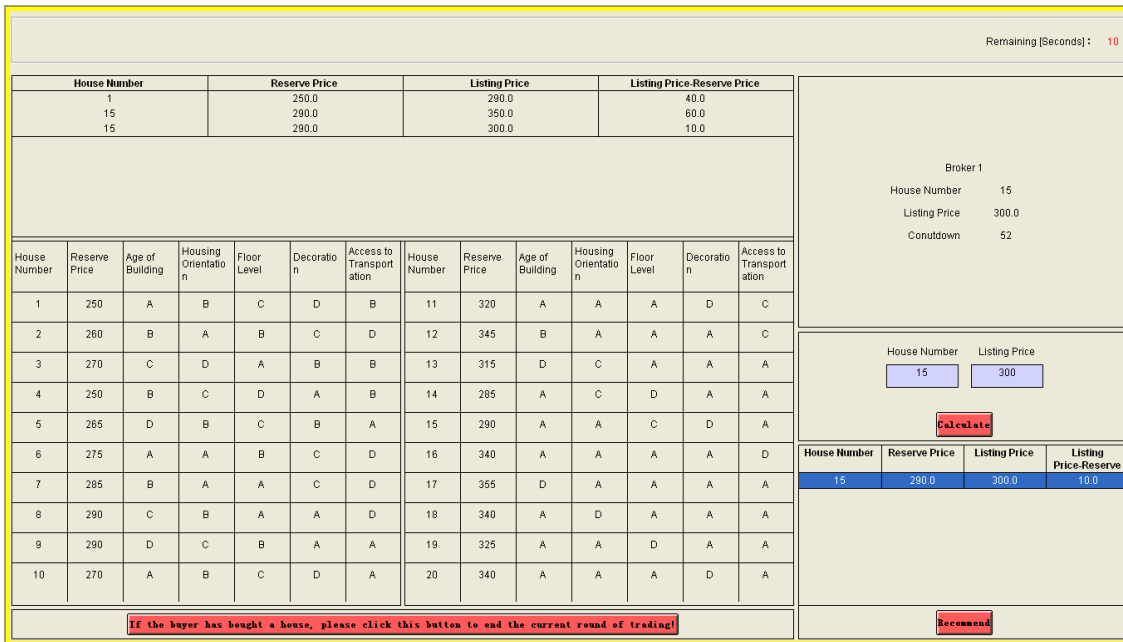


Figure 1 Screenshot of the Experimental Software

In each session, the buyer first describes the housing attribute preferences to the broker via the experimental instructions. Then, broker selects an appropriate house from the list of available houses for sale in the lower-left screen and recommends it to the buyer. On making the recommendation, the broker need to fill in the housing number to be recommended and the proposed sale price in the middle of the right side of the screen, and click the "Calculate" button. Then selects the housing to be recommended and click the "Recommend" button to confirm. If the housing recommended by the broker is currently the most satisfactory one, the information of recommended housing will be displayed in the upper-left "housing recommendations records" area and the upper-right "buyer's most satisfactory housing records" area of the screen in real time, which starts the 60-second countdown. If there is any broker who recommends a more satisfactory housing to the buyer in less than the 60 seconds, then the buyer will update the information about the currently most satisfactory housing and the price. Otherwise, at the end of the 60-second countdown, the buyer will purchase the currently most satisfactory housing.

In the experiment, the buyer makes a comprehensive evaluation on the housing based on the five main attributes. These include the age of building, housing orientation, floor level, decoration and access to transportation. The function for a buyer to make an evaluation is:

$$\pi_b = \sum_{i=1}^m b_i Q_i - P - P \times \alpha \quad (1)$$

Where, π_b is the buyer's saving, b_i is the evaluation coefficient of the buyer on the i^{th} housing attribute, Q_i is the level of the i^{th} housing attribute, P is the transaction price, and α is the commission percentage.

In the experiment, each attribute is equally divided into four grades of A, B, C and D, with corresponding values 4, 3, 2, and 1 in equation (1). Every attribute level of the 20 suites of housings is set based on the information in the real housing market, as shown in Table 2.

Table 2 List of Available Housings for Sale

No.	Age of Building	Housing Orientation	Floor Level	Decoration	Access to Transportation	Seller's Reserve Price (10 Thousands Experimental Currency)
1	A	B	C	D	B	250

2	B	A	B	C	D	260
3	C	D	A	B	B	270
4	B	C	D	A	B	250
5	D	B	C	B	A	265
6	A	A	B	C	D	275
7	B	A	A	C	D	285
8	C	B	A	A	D	290
9	D	C	B	A	A	290
10	A	B	C	D	A	270
11	A	A	A	D	C	320
12	B	A	A	A	C	345
13	D	C	A	A	A	315
14	A	C	D	A	A	285
15	A	A	C	D	A	290
16	A	A	A	A	D	340
17	D	A	A	A	A	355
18	A	D	A	A	A	340
19	A	A	D	A	A	325
20	A	A	A	D	A	340

The values of parameters in the buyer saving function are shown in Table 3.

Table 3 Experimental Design Parameters

Attributes	Value of Parameters (10 Thousands Experimental Currency)									
	Period1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10
Age of Building	25	13	13	18	24	10	15	23	17	5
Housing Orientation	23	15	23	18	23	23	20	22	30	24
Floor Level	20	28	30	23	22	35	20	13	21	24
Decoration	18	23	18	18	16	18	18	17	19	30
Access to Transportation	16	23	17	24	17	16	30	25	16	20

To guarantee the validity of the experimental results, we incentivized the participants to search housing carefully in experimental market by cash. Following the methodological standards in experimental economic, it was essential to incentivize subjects' decisions in the individual condition, i.e., subjects needed to receive money according to their decisions. The economic incentives are imposed to the participants, to prompt

participants to make reasonable decisions as much as possible in the experiment (Smith, 1982; Smith et. al., 1988). In this study, the economic incentive given to participants consists of two parts: one is the basic salary of 150 China Yuan⁴ for each participant; another is the bonus, based on each participant's earning in the experimental market. The experimental earning includes: the difference between the housing transaction price and the seller's reserve price; and the commission that is 2.5% of the housing transaction price. After the experiment, the participants can exchange the experimental market earnings for real China Yuan. The exchange rate is 10,000 experimental currency exchange 1 China Yuan. The broker earning function in the experimental market is:

$$\pi_s = \begin{cases} P - C + P \times 2.5\% - N \times 100 & , \text{ if buyer accept the recommended house;} \\ - N \times 100 & , \text{ otherwise} \end{cases} \quad (2)$$

Where, π_s is the broker earning, P is the transaction price, C is the commissioned sale reserve price of the seller, N is the number of the recommended housing, 2.5% is the commission percentage, and 100 Experimental Currency is the single recommendation cost of the broker.

4.2 Sample

We release recruitment announcement to the top four real estate broker agencies in Beijing, and recruit brokers engaging in buying and selling housing business to participate in the experiment.⁵ The recruitment announcement states that the experiment is about resale housing transactions, the duration is approximately one hour, and averagely each participant will be paid about 200 China Yuan according to their experimental performance after the experiment. Within one week after releasing the recruitment announcement, a total of 56 brokers enrolled, from which we randomly selected eight brokers to participate in the experiment. In the experiment, each participant can only take part in one session of the experiment, and all participants had no such similar experiment experience ever before.

In comparing the demographics of our collected sample to that of the market survey carried out jointly by Ministry of Housing and Urban-Rural Development and China Institute of Real Estate Appraisers and Agents, we find that our sample is somewhat better educated, richer and younger. Specifically, 25% of the experiment participants have a bachelor degree or above, whereas the survey data shows that in Beijing only 20% of the real estate brokers have a bachelor degree or above. 37.5% of the experiment participants have an average monthly income over 10,000 Experimental Currency, while in Beijing the figure is no more than 20%. Finally, 75% of the experiment participants have their ages ranging from 20 to 29, compared to 69% of the real estate brokers who have their ages ranging from 20 to 29 in Beijing. Otherwise, the demographic profiles between the two groups are quite comparable.

4.3 Experimental Procedures

The experiments were implemented from April to May in 2013. Each session has the same procedure.

First, when all participants arrive at the lab, we emphasize that throughout the experiment and the waiting process for the experiment, any forms of communication are prohibited for all participants, and any mobile phone and other communication tools must be turned off. Second, before conducting the sessions, we made sure that the subjects who signed up to participate in an experimental session had not participated in another session before. This is important because prior experience has been repeatedly shown to affect the subjects'

⁴ The experimental earning should be in line with the basic wage, ranging from one to two times of the basic wage, in order to ensure the participants' enthusiasm and prevent irrational operation due to excessive incentive.

⁵ The market share of these four agencies in Beijing resale housing market is approximately 85%. They are: Beijing Homelink Real Estate Brokerage Co., Ltd., Beijing 515J Real Estate Brokerage Co., Ltd., Beijing Maitian Real Estate Brokerage Co., Ltd., and Century 21 Real Estate Co., Ltd.

strategies in experimental resale housing markets. Third, upon arrival, the subjects receive instructions explaining how the experimental market works, and how the subjects' earnings are calculated. Then the experimenter reads the instructions aloud and goes over an example to illustrate the process of recommending resale home, as well as buying and selling shares. Fourth, after the instructions are read and the experimenter answers all the questions the subjects may have, the subjects participate in three training periods, where they practice how to recommend house to buyer. The earnings or losses during the training periods do not count towards final earnings. After the training periods, the subjects participate in a market consisting of 10 three-minute periods. Fifth, after ten periods, all participants are asked to fill out the experiment questionnaire and receive payment from the lab assistants after completing all formal testing. Subjects received their payments in an envelope outside the room where the experiment had taken part. This way, neither other subjects nor the experimenter handing over the envelopes knew what a particular subject had earned.

5. EMPIRICAL RESULTS

5.1 Performance Measures and Experimental Data

5.1.1 Performance Measures

The buyer search process is measured in two ways, in terms of time-till-purchase and in terms of the number of inspections. The buyer search result is measured in two ways, in terms of buyer saving rate and in terms of Euclidean Distance.

Index 1: Time-till-Purchase, defined as the time that elapses between the beginnings of the trading period to the time the search ceased (either due to the purchase of a home or the end of the trading session).

Index 2: Number of Inspections, the number of housings that the broker leads the buyer to inspect.

Index 3: Buyer Saving Rate, the ratio of the buyer actual saving vs. the theoretically highest saving, which is used to measure the buyer saving level.

Index 4: Euclidean Distance, this index is used to measure the matching degree between the buyer's demand and the housing attribute. This index can be used to indicate the degree of buyer's satisfaction. The shorter Euclidean Distance, the higher degree of satisfaction.

$$ED = \sqrt{\sum_{i=1}^5 (Q_{io} - Q_{it})^2} \quad (3)$$

Where, Q_{io} is the level of the i^{th} housing transaction house's actual attributes, Q_{it} is the level of the i^{th} housing the theoretical best house's attributes.

5.1.2 Experimental Data

The experimental data calculated and sorted out based on the above indexes is shown in Table 4.

Table 4 Experimental Data

Indexes	Sessions	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7	Period 8	Period 9	Period 10	Mean
Time-till-purchase (seconds)	1	79	122	180	107	126	88	97	102	99	174	117.4
	2	75	76	112	69	85	106	90	89	130	68	90.0
Number of inspections (units)	1	15	21	31	11	20	5	13	14	13	12	15.5
	2	8	6	11	6	12	8	4	6	9	5	7.5
Buyer's saving rate (%)	1	100	100	100	75	100	79	100	100	100	67	92.1
	2	100	100	100	100	100	93	96	100	100	100	98.9

Euclidean Distance	1	0	0	0	1	0	4	1	0	0	3	0.9
	2	0	0	0	0	0	2	3	0	0	0	0.5

5.2 Testing of Research Hypotheses

5.2.1 The Effect of Preference Revelation on the Buyer Search Process

The experimental data of time-till-purchase and number of inspections in both sessions of the experiment are respectively plotted in Figure 2 and Figure 3. By observing Figure 2 and Figure 3, it can be found that: (1) time-till-purchase in Session 1 is longer than that in Session 2; (2) number of inspections in Session 1 is more than that in Session 2. The results show that as the clarity degree of the buyer housing preference specification increases, both time-till-purchase and number of inspections will decrease greatly.

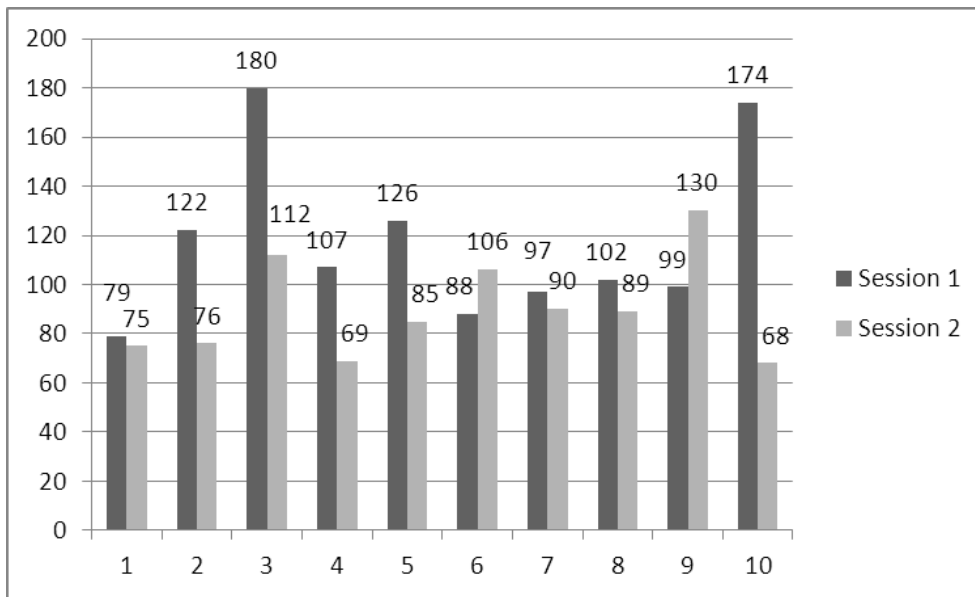


Figure 2 Time-till-Purchase in the Two Sessions

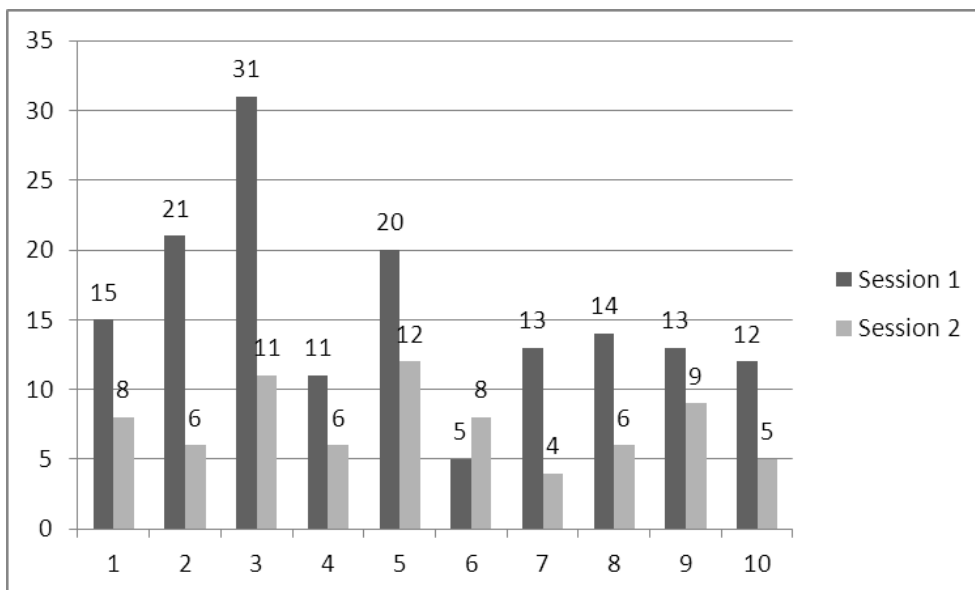


Figure 3 Number of Inspections in the Two Sessions

In order to further verify the preliminary conclusions observed from Figure 2 and Figure 3, we chose the Mann-Whitney U test to test whether time-till-purchase in Session 1 is significantly different from that in Session 2. For number of inspections, we chose the same test. The results are shown in Table 5.

Table 5 Mann-Whitney U Test Results of Buyer Search Process

Null Hypotheses	P-vale
Null hypothesis 1: Time-till-purchase in two sessions has no significant difference	0.049
Null hypothesis 2: Number of inspections in two sessions has no significant difference	0.003

The test results in Table 5 shows the P-values of Null hypothesis 1 and 2 are respectively 0.049 and 0.003. Hence, both the null hypothesis 1 and 2 are rejected at a significant level of 5%. There is significant difference of time-till-purchase between the two sessions. The number of inspections in session 1 also significantly differs from that in session 2. This indicates that as the clarity degree of the buyer housing preference specification increases, the buyer time-till-purchase are reduced significantly, and number of inspections are also decreased significantly. Therefore, our key hypothesis formulated in Section 3 is confirmed. That is, when the buyer specifies their housing preference clearer, the time-till-purchase is shorter and the number of inspections is less.

5.2.2 The Effect of Preference Revelation on Buyer Search Results

The experimental data of buyer’s saving rate in both sessions of experiment are plotted in Figure 4. The Figure 5 shows the Euclidean Distance in the two sessions. By observing Figure 4 and Figure5, we find that the buyer's saving rate in Session 1 is slightly less than that in Session 2. Similarly, Euclidean Distance in Session 1 is fractionally larger than that in Session 2.

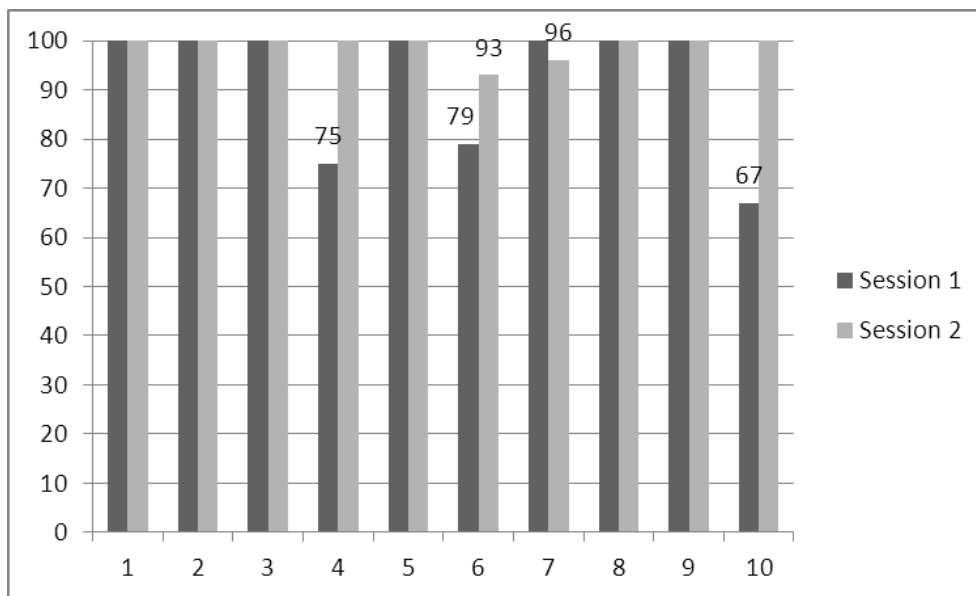


Figure 4 Buyer’s saving Rate in the Two Sessions

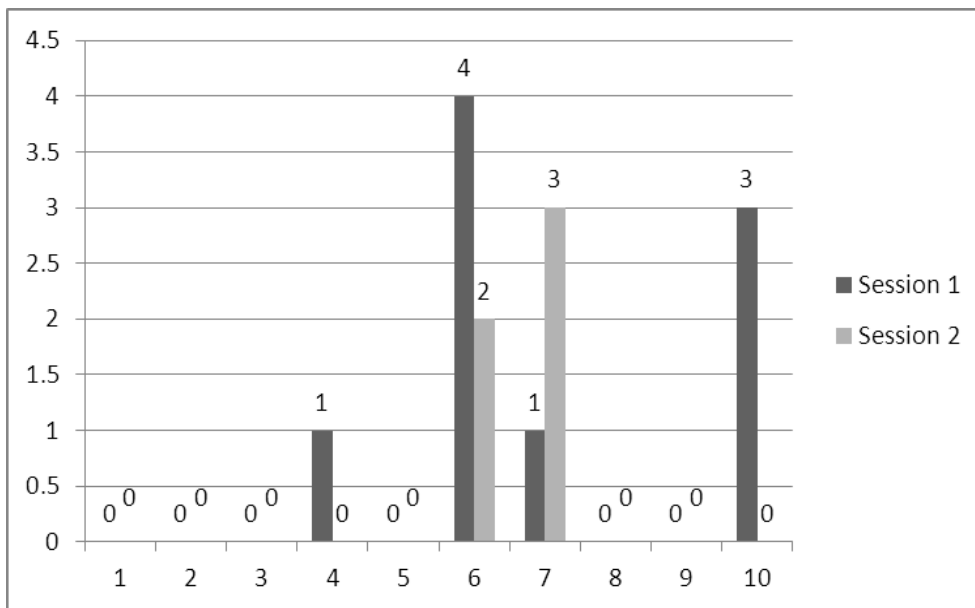


Figure 5 Euclidean Distances in the Two Sessions

In order to further verify the preliminary conclusions observed from Figure 4 and Figure 5, we still chose the Mann-Whitney U test to test whether there is a significant difference between buyers' saving rate in Session 1 and that in Session 2. The same test is for Euclidean Distance. The results are shown in Table 6.

Table 6 Mann-Whitney U Test Results of Buyer Search Results

Null Hypotheses	P-value
Null hypothesis 3: Buyer's saving rate in two sessions has no significant difference	0.427
Null hypothesis 4: Euclidean Distance in two sessions has no significant difference	0.375

Table 6 shows that both the P-values of Null hypothesis 3 (0.427) and the P-values of Null hypothesis 4 (0.375) are larger than the significant level (5%). The buyer's saving rate has no significant difference between two sessions, neither does the Euclidean Distance. This indicates that the clarity degree of the buyer housing preference specification has no significant impact on buyer's saving rate and Euclidean Distance. Therefore, another hypothesis formulated at the end of Section 3 is not fully confirmed.

6 CONCLUDING REMARKS

The results of our experiment support that when the buyer specifies their housing preference more clearly, the time-till-purchase is significantly reduced and the number of inspections is significantly decreased, while the buyer's savings and the degree of satisfaction are increased slightly (non-significantly).

Our results suggest that the buyer should analyze and clarify the housing preferences and tell the broker about their housing preference information as much as possible, so as to improve the search efficiency and reduce the time-till-purchase and the number of inspections, and thus lower the costs of time and inspections. If the buyer cannot clearly specify his or her housing preferences, buyer should entrust more brokers to recommend housings during the buyer search process. The competition among brokers can guarantee the buyer to buy the most satisfactory housing at the most reasonable price. However, the time and cost for searching will be slightly higher.

One extension of our analysis would therefore be to consider the search cost, especially the time cost in experiments. We should examine the effects of preference revelation on buyer search in a friction resale housing market. Such a proposal would clearly require a careful consideration of the multiple real-world factors not included in our experimental setting.

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APPENDIX

Experimental Instruction of Session 1

General Instructions

Welcome! This is an experiment regarding transactions in China's resale housing market. The National Nature Science Foundation of China has provided funds for this research. The instructions are simple, and if

you make proper decisions, you can earn a considerable amount of money. We will pay to you in cash at the end of the experiment.

Market Organization

There is one buyer and four brokers in this experiment. All of you are playing in the broker role, whereas the buyer is represented by the computer. You can recommend houses to the buyers. Other than a time constraint, you are free to recommend houses at any time.

In the experiment, the buyer concerns only 5 housing attributes. These include the age of building, housing orientation, floor level, decoration and access to transportation. The quality of each attributes range from A (high) to D (low). There are 13 periods in our experiment; the first three periods are practice periods, while the last ten periods are formal trading periods. Each period will last 3 minute.

Market Institution

In the experiment, you should clearly mark the house price as well as number of house when recommending a house to a buyer. The buyer will tell you which house is the current “best house” based on its price and levels of each attributes. You can adjust your strategy and recommend a new house to the buyer according to the buyer’s response.

The buyer search process will be stopped when one of the following conditions is satisfied. Firstly, buyers will stop searching if no newly recommended house replaces it for 60 seconds. Secondly, if no house can satisfy the first condition within a 3 minute period, the buyer will buy the current “best house” at the end of period.

Your Earnings

Your earnings consist of two parts: basic salary and rewards. The basic salary is 150 China Yuan. On condition of your participation, you will get the basic salary. Rewards are determined based on your experimental performance. Particularly, in the experiment, the earnings of broker equal to the difference between the housing transaction price and the seller’s reserve price add the commission that is 2.5% of the housing transaction price, and minus the cost of recommendation (100 experimental currencies per time). At the end of the experiment, you can exchange experimental currency (points) into China Yuan, at the rate of 10,000 to one. The more points you earn, the more cash you will receive at the end of the experiment.

Computer Interface

You will use the computer interface to get information and submit recommendations. A screen capture of computer interface is showed in Figure 1. The computer interface consists of five boxes. The upper box shows the remaining time in the current period. Two boxes in the middle and lower-right-hand sides are the recommending boxes. You should key in the house price as well as the assigned number of housing into the text boxes which are entitled “Listing Price”, and “Housing Number,” respectively. You can then calculate your earnings by clicking the “Calculate” button and recommend a house by clicking the “Recommend” button. The price and the assigned number information of the recommended house will be listed in the upper left-hand side box and sorted in chronological order. When the recommended house is the current “best house,” the house’s information and the name of the broker who recommend it will be displayed in the upper right-hand side box. The 60 second countdown will be also displayed in the upper-right-hand side box. The countdown will be ended if no new recommended house replaces the current “best house” within 60 seconds or will be restarted if the new recommended house replaces the current “best house” within 60 seconds.

Notice

You will now play in three practice periods. Your actions in the three practice periods do not count towards your earnings and do not affect your position later in the ten formal periods. The goal of the practice periods is to help you become familiar with the computer interface. Please make sure you understand how to use the computer interface before the end of the practice periods.

It is important that you do not talk or communicate with other people during the experiment. If you have any questions, please raise your hand. Are there any questions?

Experimental Instruction of Session 2

The contents of the experimental instruction 1 and 2 are identical except the revelation of housing preference. In Session 1, the buyer didn't tell brokers his or her housing attribute preferences; while in Session 2 the buyer gives a clear specification about his or her most important attribute and least important attribute to the brokers.

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