

# An Investigation of Buyer Search in the Residential Real

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## Market Conditions

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**Abstract** The purpose of this research is to examine buyer search under different market conditions. We conduct a survival regression analysis of survey data generated by the National Association of Realtors for 1988, 1991 and 1993. We find, in all instances, that economic conditions are the dominant factor influencing search duration. Some evidence does indicate, however, that search is influenced by interest rates. Additionally, the evidence suggests that the probability of finding a home increases for broker-assisted search, while this is not the case for self-conducted search.

## Introduction

A home purchase is a significant and substantial transaction that usually represents the largest financial commitment an individual will ever make. Most homebuyers are infrequent and inexperienced participants, faced with the daunting task of searching through an extensive array of homes, hoping to find the elusive utility-maximizing “perfect” home. The search process is further complicated because the product is unique and immovable. It cannot be transported to a central market where an observable bid-ask auction process occurs. Rather, the buyer must approach and examine an array of homes in various locations. This, then, is a more dynamic search process than the standard price-time choice faced by a home owner attempting to sell a home in a specific location. Under these circumstances, it is important for researchers to pinpoint and assess the factors that influence the amount of time a buyer spends searching for a new residence.

Despite this, prior research on buyer search is somewhat limited. However, studies by Baryla and Zumpano (1995) and Elder, Zumpano and Baryla (1998) determine that real estate brokers significantly reduce buyer search time by increasing the number of homes that a buyer views. Research by Jud (1983) and Jud and Frew

(1986) suggests that real estate brokers influence demand, housing consumption and search by home buyers. A related study by Case and Shiller (1988) finds evidence that the housing market is mainly driven by expectations and that buyers are unaware of fundamentals.

The purpose of this article is to extend the current literature by examining the factors that influence buyer search time in the residential real estate market under different market conditions. To do so, the study uses data from three separate years that were characterized by distinctly different economic and interest rate environments.

The first year included in the study is 1988, the third straight year that existing single family home sales exceeded 3.5 million units. Mortgage interest rates, defined as the average contract rate on new commitments for conventional first mortgages as reported by the Department of Housing and Urban Development (HUD), increased from 10.1% in January to 10.7% in December. This was followed by a downtrend in real estate activity until 1991, when there was a white collar, middle-class recession. Existing single family home sales in 1991 declined to 3.2 million units, while new single family home sales declined to 509,000, the lowest total since 1982. Mortgage interest rates declined from 9.5% in January 1991, to 8.3% in December. This (1991) is the second year included in the study. A recovery began in 1992, with existing single family home sales totaling 3.5 million, and was in full bloom in 1993, with existing single family home sales totaling 3.8 million. Mortgage interest rates declined during 1993 from 7.9% in January to 7.3% in December. This is the final year included in the study.

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## Literature Review

Search theory evolved from two separate search processes into a single optimal search process. The seminal search theory literature is the Stigler (1961) development of the fixed sample size (FSS) model. This is a one-period model, which allows the searcher to pre-select an unlimited number of observations in a time period—a process now commonly known as search intensity. The searcher examines each observation and selects the one with the lowest price. Search ends after the single time period. There is no provision for continued search.

The second search process is the sequential search model of Rothschild (1974). This is a multi-period search model that limits a searcher to a single observation in each time period. Search continues over multiple time periods until an acceptable observation is found. This process is known as search duration. A buyer conducting sequential search will stop if the price of an observation is less than his or her reservation price. Labor market search theorists such as Gal, Landsberger and Levykson (1981) and Benhabib and Bull (1983), subsequently argued that a one-observation-per-period constraint did not reflect reality in labor markets. Morgan and Manning (1985) and McKenna (1986) reached a similar conclusion regarding consumer search. The efforts of these researchers led to a

search process that combines the best features of the fixed sample size model and sequential search model into an “optimal search model.”

The optimal search model allows a searcher to choose an unlimited sample of observations within a time period and search over multiple time periods, if necessary. The model retains the reservation price stopping rule of the sequential search model. Thus, the searcher has the option of searching more intensively with reduced search duration, or searching less intensively with longer search duration. This option is similar to that faced by a home buyer, who can examine an extensive number of homes within a time period to reduce duration, or examine less homes in a search period and search for a longer time

Utilizing the optimal search framework, a study by Baryla and Zumpano (1995) finds that real estate brokers are able to reduce the search time of virtually all classes of home buyers. This result follows from the role of the real estate broker as an institutionalized intermediary that reduces information costs and facilitates the search process. An intriguing result of this study is that, while generally confirming the optimal search model as the proper theoretical framework, it produces evidence that search duration is not the sole measure of real estate broker efficiency in the search process. In fact, the real estate broker influences search intensity as well as search duration.

The issue of real estate brokers and search intensity is fully examined in Elder, Zumpano and Baryla (1999). This is the first study that attempts to separate search intensity costs from search duration costs. The results indicate that searchers with higher opportunity costs were inclined to search less intensively, while searchers with higher duration costs searched more intensively, hoping to reduce search time. The study clearly shows that search intensity increases when search is conducted with a real estate broker.

Jud’s (1983) study of the demand for brokerage services, which includes the effect of search costs, suggests that brokers influence the level of housing consumption and reduce search time for buyers. A later study by Jud and Frew (1986) find that broker-assisted buyers have a greater demand for houses than their non-broker-assisted counterparts. They rationalize their finding by hypothesizing that brokers have an effect analogous to that of advertising in markets with imperfect information. Research by Anglin (1997) finds mixed results for broker use and search time.

A related article by Case and Shiller (1988) examines buyer activity in boom, normal and post-boom markets. The article is similar to ours in that it looks at buyer activity in different markets, but differs in that it focuses on one year, while we focus on three separate years. Case and Shiller find that most market participants view their purchase as an investment and have high expectations for future price increases. Interestingly, while most buyers cited interest rates as a major factor influencing prices in all markets, they were actually the same across markets. The authors also found that home prices were sticky on the downside.

There is also some relevant supply-side research that focuses on the relationship between interest rates and time on the market. To that extent, Kang and Gardner (1989) isolate three different interest rate periods in the early to mid 1980s and find that, in general, the price-time tradeoff by a home seller varies in the different time periods and by price quartiles, while Yang and Yavas (1995) find a similar variation within different price groups, with higher mortgage rates generally extending marketing time. Ferriera and Sirmans (1989) and Kalra, Chan and Lai (1997) also find that higher interest rates increase marketing time.

This study extends the literature by examining buyer search under different market conditions. The data used for this study consists of survey responses by homebuyers who purchased a home during one of three separate years: 1988, 1991 or 1993. Exhibit 1 contains economic statistics from 1980 to 1995 that illustrate the economic environment in each of the three separate years. The first column contains new single family home sales and the second column contains existing single family home sales. Exhibit 1 shows that a period of growth in existing single family home sales began in 1983 and reached a plateau from 1986 to 1988, when between 3.5 million and 3.6 million units were sold annually. Sales in 1988 were the highest in that period. At the same time, new single family home sales peaked in 1986, declined in 1987 and rebounded in 1988. 1988 sales are

**Exhibit 1** | New and Existing Single-Family Home Sales: 1980–1995

Year	New	Existing
1980	545,000	2,973,000
1981	436,000	2,419,000
1982	412,000	1,990,000
1983	623,000	2,719,000
1984	639,000	2,868,000
1985	688,000	3,214,000
1986	750,000	3,565,000
1987	671,000	3,526,000
1988	676,000	3,594,000
1989	650,000	3,346,000
1990	534,000	3,211,000
1991	509,000	3,220,000
1992	610,000	3,520,000
1993	666,000	3,802,000
1994	670,000	3,946,000
1995	667,000	3,802,000

higher than any of the subsequent years included in the study. Interest rates in 1988 ranged from 10.1% to 10.7%. A downturn began during 1989 and bottomed out in 1990-1991, with existing single family home sales were at their lowest since 1985 and new single family home sales at their lowest level since 1982. During 1991, interest rates declined from 9.5% in January to 8.3% in December. A recovery began in 1992 and was fully underway in 1993. Existing single family home sales were at their highest level in thirteen years and new single family home sales were at pre-recession levels. Interest rates were 7.9% in January 1993 and declined to 7.3% by the end of the year.

The supply-side time on the market literature shows that home sellers face longer marketing time during periods of high interest rates. Thus, if the same were to hold for demand-side buyer activity, search duration in 1988 and 1991 should be longer than 1993. On the other hand, if buyer activity is more influenced by economic conditions, search duration in 1991 should be longer than in 1993 or 1988.

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## Data and Methodology

The data for this study was accumulated through three separate surveys of home buyers conducted by the National Association of Realtors. The surveys include buyers who purchased a home in 1988, 1991 and 1993. It should be noted that the sample consists entirely of home buyers. No attempt was made to survey any individuals who may have discontinued search without purchasing a home. The total sample consists of 5,325 observations—2,409 from 1988, 2,065 from 1991 and 851 from 1993. The samples are disaggregated by whether search was broker-assisted or self-conducted. There are 4,450 broker-assisted searches (83.6%) and 875 self-conducted searches (16.4%), which is in line with anecdotal evidence, which suggests that approximately 15% of all transactions are conducted without a real estate broker. The percentages are similar for each year included in the study.

Exhibit 2 presents summary statistics for the entire three-year sample. Search duration (*Duration*), measured in weeks, is longer for self-conducted search than for broker-assisted search. Also, search intensity (*Intensity*), the average number of homes examined per week, is higher for broker-assisted search than for self-conducted search. Both of these summary statistics are in line with prior research.

The mean selling and asking price (*Sell and Ask Price*) are higher for broker-assisted search, as is the discount from the original asking price (*Discount*). Searchers who purchased a new home (*New Home*) represent 17 % of the broker-assisted search sample and around 40% of the self-conducted search sample, while the average distance (*Distance*) moved is higher for broker-assisted searchers than self-conducted searchers. The variable *Loan-to-Value* represents the amount of the purchase that is financed from lending sources and does not vary appreciably between broker-assisted searchers and self-conducted searchers. Approximately

**Exhibit 2** | Summary Statistics for All Years—1988, 1991 and 1993

Variable	Broker-Assisted Search	Self-Conducted Search
Observations	4,450 <sup>a</sup>	875 <sup>b</sup>
Duration (wk.)	13.6	17.4
Intensity	3.81	1.96
Sell Price (\$)	125,480	115,370
Ask Price (\$)	131,770	119,750
Discount (%)	4.4	3.3
New Home (%)	17.2	39.5
Distance (miles)	265.0	125.4
Loan-to-Value (%)	82.8	82.5
First Purchase (%)	41.5	42.3

<sup>a</sup>83.6%.  
<sup>b</sup>16.4%.

40% of each sample consists of buyers who are making their initial home purchase (*First Purchase*).

Exhibits 3, 4 and 5 contain summary statistics for the 1993, 1991 and 1988 samples, respectively. In each instance, despite the different economic environments and interest rates, broker-assisted searchers conducted more intensive search over fewer time periods than self-conducted searchers. The variation in market conditions and interest rate regimes did not change the relationship that search is more intensive and faster with a real estate broker.

The summary statistics also indicate that search took longer in 1991 than in 1988 or 1993 for both groups of searchers. The negotiated discount from asking price is higher in 1991 than in 1993 or 1988, while home asking and selling prices were comparatively lower in 1991 than in 1988 or 1993. In each year, approximately four out of ten self-conducted searches was for a new home, while less than 19% utilized a real estate broker. This is not unusual, since said buyers could purchase a home directly from a builder. The percentage of first-time buyers in the sample was similar for both broker-assisted searches and self-conducted searches in each year. In addition, real estate brokers generally served searchers who moved a further distance. Loan-to-value ratios were similar in each time period for both search groups.

In order to empirically analyze search under the different interest rate regimes and economic conditions, we utilize a survival regression model, which is similar in structure to an ordinary least squares (OLS) regression model. This empirical technique is often used when analyzing factors that influence the duration of

**Exhibit 3** | 1993 Summary Statistics

Variable	Broker-Assisted Search	Self-Conducted Search
Observations	716 <sup>a</sup>	135
Duration (wk.)	12.5	14.6
Intensity	3.34	1.98
Sell Price (\$)	141,270	127,840
Ask Price (\$)	147,410	131,370
Discount (%)	4.0	2.7
New Home (%)	14.7	38.5
Distance (miles)	203.8	78.5
Loan-to-Value (%)	83.1	84.9
First Purchase (%)	39.1	47.4

<sup>a</sup>84.1%.  
<sup>b</sup>15.9%.

**Exhibit 4** | 1991 Summary Statistics

Variable	Broker-Assisted Search	Self-Conducted Search
Observations	1,710 <sup>a</sup>	355 <sup>b</sup>
Duration (wk.)	16.1	20.8
Intensity	3.84	1.82
Sell Price (\$)	118,110	110,850
Ask Price (\$)	125,100	116,360
Discount (%)	4.8	3.5
New Home (%)	18.3	40.3
Distance (miles)	253.84	163.2
Loan-to-Value (%)	84.1	84.2
First Purchase (%)	44.1	43.9

<sup>a</sup>82.1%.  
<sup>b</sup>17.2%.

**Exhibit 5** | 1988 Summary Statistics

Variable	Broker-Assisted Search	Self-Conducted Search
Observations	2,024 <sup>a</sup>	385 <sup>b</sup>
Duration (wk.)	11.9	15.1
Intensity	3.96	2.09
Sell Price (\$)	126,120	115,170
Ask Price (\$)	131,880	118,800
Discount (%)	4.1	3.3
New Home (%)	17.1	39.2
Distance (miles)	296.2	107.9
Loan-to-Value (%)	81.6	80.0
First Purchase (%)	40.2	39.0

<sup>a</sup>84.0%.  
<sup>b</sup>16.0%.

employment and unemployment, the failure time of a machine and the survival time of a patient after undergoing medical treatment. One problem that must be addressed when working with duration data is that, by nature, it is only positive, while a normally distributed variable can be negative. This results in non-normality of the error terms, which can be corrected with survival regression. The general survival regression model form is:

$$Lndur = XB + \alpha\varepsilon. \quad (1)$$

$Lndur$  represents the natural log of duration, where duration is measured in weeks. The covariate vector  $X$  contains the independent variables that search theory suggests will influence search duration, while  $B$  is estimated using maximum likelihood techniques. This is essentially a semi-log regression model with a scale parameter,  $\alpha$ , to adjust the error terms,  $\varepsilon$ , for non-normality. We specify a Weibull distribution for the scale parameter, since it is more versatile than other alternatives. The density function for the Weibull distribution is:

$$f(t) = \lambda p(\lambda t)e^{-(\lambda t)}, \quad (2)$$

and the hazard function is:

$$\lambda t = \lambda p(\lambda t)^{p-1}. \tag{3}$$

The hazard function yields information on duration dependence, or, the probability of finding a home as time elapses. When  $p = 1$ , the Weibull hazard function

**Exhibit 6** | Survival Regression Results: All Years

Variable	Broker-Assisted Search	Self-Conducted Search
Constant	2.277*	2.797*
<i>Intensity</i>	-0.100* (0.002)	-0.201* (0.010)
<i>Discount</i>	1.549* (0.283)	1.129* (0.605)
<i>Asking Price</i>	0.908E-06* (0.139E-06)	0.18E-05* (0.482E-06)
<i>First Purchase</i>	0.144* (0.031)	0.015 (0.071)
<i>Distance</i>	<-0.001* (0.229E-04)	<0.001** (0.81E-04)
<i>Loan-to-Value</i>	-0.196** (0.098)	-0.343*** (0.209)
<i>New Home</i>	0.044 (0.038)	0.139** (0.071)
1988	-0.041 (0.041)	0.009 (0.103)
1991	0.125* (0.042)	0.224** (0.104)
$\alpha$	0.509* (0.014)	0.721* (0.042)
$\theta$	1.11* (0.068)	0.358* (0.117)
Observations	4,450	875

*Note:* Standard errors are in parenthesis.  
 \*Significant at the 1% level.  
 \*\*Significant at the 5% level.  
 \*\*\*Significant at the 10% level.

**Exhibit 7** | Survival Regression Results: Broker-Assisted Search

Variable	1993	1991	1988
Constant	2.468*	2.305*	2.266*
<i>Intensity</i>	-0.106* (0.005)	-0.101* (0.004)	-0.097* (0.003)
<i>Discount</i>	1.27 (0.813)	1.674* (0.434)	1.388* (0.440)
<i>Asking Price</i>	0.636E-06 (0.416E-06)	0.107E-05* (0.296E-06)	0.908E-06* (0.17E-06)
<i>First Purchase</i>	0.128*** (0.071)	0.148* (0.051)	0.147* (0.045)
<i>Distance</i>	<-0.001** (0.66E-04)	<-0.001* (0.43E-04)	<-0.001* (0.29E-04)
<i>Loan-to-Value</i>	-0.289 (0.230)	-0.188 (0.171)	-0.182 (0.139)
<i>New Home</i>	0.045 (0.090)	0.099 (0.066)	-0.001 (0.055)
$\alpha$	0.498* (0.034)	0.491* (0.022)	0.531* (0.021)
$\theta$	0.945* (0.171)	1.35* (0.128)	0.953* (0.089)
Observations	716	1,710	2,024

Note: Standard errors are in parenthesis.  
 \*Significant at the 1% level.  
 \*\*Significant at the 5% level.  
 \*\*\*Significant at the 10% level.

collapses into the exponential hazard function,  $\lambda$ , a constant. A constant hazard function implies no duration dependence. The probability of finding a home does not change over time. When  $p > 1$ , there is positive duration dependence, implying that the probability of finding a home increases over time. The reverse is true if  $p < 1$ . In the general model form represented by Equation (1),  $\alpha = 1/p$ . Therefore, when  $\alpha < 1$ , there is positive duration dependence, when  $\alpha > 1$ , there is negative duration dependence and when  $\alpha = 1$ , there is no duration dependence.

In order to assess the effect of different market conditions on search duration, we include indicator variables for 1988 (1988) and 1991 (1991). If interest rates are the predominant force driving search duration, 1988 and 1991 should be significant and positive, since interest rates were higher in these two years, compared to 1993. However, if general economic conditions are the predominant

**Exhibit 8** | Survival Regression Results: Self-Conducted Search

Variable	1993	1991	1988
Constant	2.430*	2.737*	2.589*
<i>Intensity</i>	-0.207* (0.030)	-0.231* (0.011)	-0.170* (0.028)
<i>Discount</i>	2.002 (0.571)	1.991* (0.720)	0.001 (1.132)
<i>Asking Price</i>	0.453E-05* (0.157E-05)	0.473E-05* (0.862E-06)	0.384E-05* (0.94E-06)
<i>First Purchase</i>	0.010 (0.175)	0.056 (0.099)	-0.002 (0.134)
<i>Distance</i>	<-0.001 (0.001)	<0.001*** (<0.001)	<0.001 (<0.001)
<i>Loan-to-Value</i>	-0.281 (0.703)	-0.347 (0.342)	-0.322 (0.397)
<i>New Home</i>	0.302 (0.227)	0.200** (0.098)	0.056 (0.138)
$\alpha$	0.895* (0.178)	0.963* (0.085)	1.07* (0.105)
$\theta$	0.010 (0.305)	0.010 (0.068)	0.010 (0.124)
Observations	135	355	385

Note: Standard errors are in parenthesis.  
 \* Significant at the 1% level.  
 \*\* Significant at the 5% level.  
 \*\*\* Significant at the 10% level.

force, 1991 should be significant and positive, since this represents the cycle trough with 1988 and 1993 at the peak and recovery ends of the cycle.

Additional independent variables include *Intensity*, the average number of homes examined each week. It is a proxy for the within-period sample size and is expected to reduce search duration. *Discount* is a proxy variable that represents the ability of the searcher to purchase a home at or below the reservation price. We expect a positive sign, since searchers will extend search to secure a higher discount. *Ask Price* defines the feasible set of the searcher. We expect a positive sign since search becomes more discriminating for higher priced goods and the feasible set becomes larger. *Loan-to-Value* indicates the amount borrowed and represents the bargaining power of the searcher. In this case, the expected sign is indeterminate, since, on one hand, a searcher with less bargaining power might

**Exhibit 9** | Survival Regression Results: Broker-Assisted Search  
All Years Included and Segmented into Price Quartiles

Variable	High Price	Med-High Price	Med-Low Price	Low Price
Constant	2.141	1.927	2.296	2.495
<i>Intensity</i>	-0.081* (0.003)	-0.091* (0.004)	-0.123* (0.005)	-0.192* (0.008)
<i>Discount</i>	1.816* (0.574)	1.068*** (0.588)	1.680* (0.599)	1.563* (0.521)
<i>Asking Price</i>	0.477E-06* (0.265E-06)	0.381E-05** (0.182E-05)	0.48E-06 (0.346E-05)	0.49E-06 (0.23E-05)
<i>First Purchase</i>	0.255* (0.079)	0.198* (0.061)	0.084 (0.055)	0.125** (0.059)
<i>Distance</i>	<-0.001* (0.4E-04)	<-0.001* (0.4E-04)	<-0.001* (0.54E-04)	-0.48E-04 (0.55E-04)
<i>Loan-to-Value</i>	-0.025 (0.177)	-0.174 (0.191)	-0.217 (0.208)	-0.216 (0.229)
<i>New Home</i>	0.044 (0.073)	0.023 (0.072)	0.075 (0.073)	0.050 (0.094)
1988	0.016 (0.075)	-0.100 (0.078)	0.076 (0.084)	-0.003 (0.098)
1991	0.128 (0.080)	0.078 (0.078)	0.298* (0.085)	0.080 (0.099)
$\alpha$	0.516* (0.028)	0.505* (0.027)	0.497* (0.027)	0.507* (0.027)
$\theta$	1.205* (0.148)	1.077* (0.141)	1.025* (0.134)	1.039* (0.136)
Observations	1,111	1,120	1,108	1,111

Note: Standard errors are in parenthesis. High Price > \$157,000; \$157,000 > Med-High > \$105,000; \$105,000 > Med-Low > \$75,500; and \$75,500 > Low Price.  
\*Significant at the 1% level.  
\*\*Significant at the 5% level.  
\*\*\*Significant at the 10% level.

search longer, while, alternatively, said searcher may have a higher reservation price, reducing search time. We expect first-time home buyers (*First Purchase*) to search longer, since they presumably lack market knowledge and familiarity with the search process. However, it is also possible that first time home buyers are more anxious and will purchase the first acceptable unit that they examine, reducing search time. A searcher traveling a greater distance (*Distance*) should search longer, since he or she lacks local market knowledge. New home purchasers

**Exhibit 10** | Survival Regression Results: Self-Conducted Search  
All Years Included and Segmented into Price Quartiles

Variable	High Price	Med-High Price	Med-Low Price	Low Price
Constant	3.038	2.356	3.789	2.034
<i>Intensity</i>	-0.190* (0.033)	-0.191* (0.016)	-0.222* (0.026)	-0.203* (0.038)
<i>Discount</i>	-0.475 (1.882)	1.839 (2.004)	3.442** (1.72)	1.011 (1.331)
<i>Asking Price</i>	0.318E-05* (0.104E-05)	0.294E-05 (0.612E-05)	-0.555E-05 (0.142E-04)	0.121E-04** (0.582E-05)
<i>First Purchase</i>	0.066 (0.242)	0.005 (0.176)	0.133 (0.170)	-0.092 (0.190)
<i>Distance</i>	<0.001 (<0.001)	<0.001 (<0.001)	<0.001 (<0.001)	<-0.001 (<0.001)
<i>Loan-to-Value</i>	-0.762 (0.567)	0.137 (0.368)	-0.586 (0.810)	0.078 (0.656)
<i>New Home</i>	0.088 (0.189)	0.191 (0.147)	0.239 (0.199)	0.148 (0.273)
1988	-0.210 (0.267)	-0.040 (0.229)	-0.133 (0.303)	0.016 (0.381)
1991	0.218 (0.295)	0.229 (0.222)	0.009 (0.314)	0.305 (0.394)
$\alpha$	1.049* (0.151)	0.960* (0.135)	1.030* (0.156)	1.002* (0.087)
$\theta$	0.010 (0.221)	0.010 (0.195)	0.010 (0.221)	0.010 (0.189)
Observations	218	226	216	215

*Note:* Standard errors are in parenthesis. High Price > \$142,000; \$142,000 > Med-High > \$96,000; \$96,000 > Med-Low > \$73,000; and \$73,000 > Low Price.  
\* Significant at the 1% level.  
\*\* Significant at the 5% level.

(*New Home*) might search less if there is an attractive array of new homes in their particular geographic area, or they might search longer if they have limited their feasible set to a new home and no appealing choices are readily available. Thus, we measure search duration as:

$$Lndur = f(Intensity, Discount, Ask Price, Loan-to-Value, New Home, First Purchase, Distant, 1988, 1991).$$

## Empirical Results

Survival regression results for the full sample are contained in Exhibit 6. The evidence indicates that, for both broker-assisted search and self-conducted search, duration is longer in 1991, compared to 1993, while there is no significant difference between 1988 and 1993. This is an interesting result that paints a mixed picture of interest rates, economic activity and search time. One would surmise that higher interest rates in 1988 would cause longer search when compared to 1993. However, this is not the case. It seems that the similarity of the economic environments—peak and recovery—is the more relevant factor influencing search time. Alternatively, search is longer in 1991 compared to 1993. This is an entirely plausible result, since interest rates were higher in 1991 than in 1993 and economic activity was at its lowest point in the cycle.

A number of results were similar for both search groups. The results show that search intensity is negative and highly significant for both search groups, as expected, while the asking price is significant and positive in both full models. This, too, is as expected. The discount from asking price is also significant for both search groups, which may indicate that a searcher does follow a reservation price rule. The loan to value ratio is significant and negative, possibly indicating that a searcher with a higher loan to value ratio, presumably with less bargaining power, has a higher reservation price, resulting in faster search time. Real estate brokers are effective at helping a distant searcher find a home, while a first time home buyer searches longer than an experienced home buyer when using the services of a real estate broker. The data also provide information on duration dependence, which, as noted earlier, reflects the probability of finding a home as time elapses. For both subsamples,  $\alpha$  is significantly less than 1, indicating a positive duration dependence. The probability of finding a home increases over time. To shed additional light on these results, additional survival regression models were run for each year of the sample.

The results for broker-assisted search are shown in Exhibit 7. In each year, search intensity is negative and significant, as expected. However, the asking price and negotiated discount are both positive and significant in 1988 and 1991, but not significant in 1993. Searchers are willing to extend search on a price and discount basis during the higher interest rate environments of 1988 and 1991, but not in 1993. One could surmise that lower interest rates allowed searchers to increase reservation prices, since debt service is lower and more affordable with lower interest rates. It is also interesting to note that there is positive duration dependence in each year for broker-assisted transactions. This indicates that when conducting search with a real estate broker, the probability of finding a home increases over time, regardless of the economic or interest rate environment. The balance of the results in Exhibit 7 are similar to the full sample results, with the exception of the loan to value ratio, which is not significant in any of the years.

Exhibit 8 illustrates results for search conducted without a real estate broker. In all years, search intensity is negative and highly significant. However, search is

longer for higher priced homes in all years, while the negotiated discount is only significant in 1991. Although beyond the scope of this article, it is possible that self-conducted searchers maintain a stickier reservation price and find it unnecessary to negotiate a higher discount. Interestingly, there is positive duration dependence in 1993 and 1991, and negative duration dependence in 1988. This implies that in 1988, when searching without a real estate broker, the probability of finding a home actually decreases over time. The balance of the results from Exhibit 8 are similar to the full model results.

Given these results, we ran additional survival regression models with the entire sample segmented by price quartiles. These results are presented in Exhibit 9 and Exhibit 10. Many of the results are similar to those previously presented. However, an interesting anomaly is that, while the interest rate or economic environment do not impact search duration in any of the other price quartiles, broker-assisted search is longer in the \$75,500 to \$105,000 price quartile during 1991. This may reflect the impact of the middle-class recession during that year. The most interesting result is the difference in duration dependence for broker-assisted searches and self-conducted searches. There is positive duration dependence for broker-assisted searches in all price quartiles, indicating that, in all instances, the probability of finding a home increases over time for a broker-assisted searcher. However, for self-conducted searches, there is negative duration dependence in three of the four price quartiles. In effect, when we segment the market into price-based quartiles, we find that the probability of finding a home actually decreases over time for a self-conducted search. A searcher, limited to a price-based feasible set, tends to run out of options when searching without a real estate broker.

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## Conclusion

The purpose of this research is to examine buyer search under different market conditions. In order to do so, we conduct a survival regression analysis of survey data generated by the National Association of Realtors. The surveys cover home buyers in 1988, 1991 and 1993. The samples are segmented by broker-assisted search and self-conducted search.

We generate mixed results for search duration, interest rates and economic conditions. Search duration in 1988 is not significantly different from search duration in 1993. Although interest rates were higher in 1988 than in 1993, economic conditions were somewhat similar, since 1988 and 1993 are at either end of the cycle trough (1990–1991). However, search duration in 1991 is significantly longer than search duration in 1993. Economic conditions in 1991 were much worse than 1993, and, at the same time, interest rates were higher. Thus, we generate evidence that, in all instances, economic conditions are the predominant factor influencing search duration, while, at the same time, some evidence does indicate that search is influenced by interest rates.

The results of this study also shed light on the relationship between broker-assisted search and self-conducted search. In all instances, the evidence indicates that the

probability of finding a home increases over time for a broker-assisted searcher. However, this is not the case for self-conducted search. The evidences here indicates that in many instances, the probability of finding a home actually decreases over time when search is self-conducted.

The evidence produced by this article, while adding to the body of knowledge of buyer search activity, shows that more work need be done in this area to increase our understanding of the linkages between search duration, the economic environment, and real estate brokers.

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## References

- Anglin, P., Determinants of Buyer Search in a Housing Market, *Real Estate Economics*, 1997, 25, 567–89.
- Baryla, E. A. and L. V. Zumpano, Buyer Search Duration in the Residential Real Estate Market: The Role of the Real Estate Agent, *Journal of Real Estate Research*, 1995, 10, 1–13.
- Benhabib J. and C. Bull, Job Search: The Choice of Intensity, *Journal of Political Economy*, 1983, 91, 747–64.
- Case, K. E. and R. J. Shiller, The Behavior of Home Buyers in Boom and Post-Boom Markets, *New England Economic Review*, 1988, November/December, 29–46.
- Elder H. W., L. V. Zumpano and E. A. Baryla, Buyer Search and the Role of the Residential Real Estate Broker, *The Journal of Real Estate Finance and Economics*, 1999, 18:3, 351–68.
- Ferreira, E. J. and G. S. Sirmans, Selling Price, Financing Premiums, and Days on the Market, *Journal of Real Estate Finance and Economics*, 2, 209–22.
- Gal, S., M. Landsberger and B. Levykson, A Compound Strategy for Search in the Labor Market, *International Economic Review*, 1981, 22, 597–608.
- Jud G. D., Real Estate Brokers and the Market for Residential Housing, *Journal of the American Real Estate and Urban Economics Association*, 1983, 11, 69–82.
- Jud, G. D. and J. Frew, Real Estate Brokers, Housing Prices, and the Demand for Housing, *Urban Studies*, 1986, 23, 21–31.
- Kalra, R., K. C. Chan and P. Lai, Time on the Market and Sales Price of Residential Housing: A Note, *Journal of Economics and Finance*, 1997, 21, 63–6.
- Kang H. B. and M. J. Gardner, Selling Price and Marketing Time in the Residential Real Estate Market, *Journal of Real Estate Research*, 1989, 4, 21–35.
- Kohn M. G. and S. Shavell, The Theory of Search, *Journal of Economic Theory*, 1974, 9, 93–123.
- McKenna C. J., Theories of Individual Search Behaviour, *Bulletin of Economic Research*, 1986, 38, 189–207.
- Morgan P., Search and Optimal Sample Sizes, *Review of Economic Studies*, 1983, 659–75.
- Morgan. P. and R. Manning, Optimal Search, *Econometrica*, 1985, 53, 923–44.
- Rothschild, M., Searching for the Lowest Price When the Distribution of Prices is Unknown, *Journal of Political Economy*, 1974, 82, 689–711.

Stigler, G. J., The Economics of Information, *Journal of Political Economy*, 1961, 69, 213–25.

Turnbull G. K. and C. F. Sirmans, Information, Search and House Prices, *Regional Science and Urban Economics*, 1993, 23, 545–57.

United States Department of Housing and Urban Development, U.S. Housing Market Conditions, Various Issues.

Yang S. X. and A. Yavas, Bigger is not Better: Brokerage and Time on Market, *Journal of Real Estate Research*, 1995, 10, 23–34.

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