JOURNAL OF HOUSING RESEARCH VOLUME **16** ISSUE **1**

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Off-Dollar Pricing, Residential Property Prices, and Marketing Time

Sean P. Salter, Ken H. Johnson, and W. Paul Spurlin

Abstract

Academics participating in the residential real estate literature have recently begun to focus on the design of list prices, as opposed to the magnitude of list prices. The specialized design of list prices, referred to as "charm," "even," and "just-below-even" pricing is the subject of three recent works. This paper provides an alternative theoretical framework from earlier works and examines empirically the effect of off-dollar pricing, a heretofore uninvestigated listing design, on market outcomes. The results suggest that off-dollar pricing does not affect selling price, but properties exhibiting off-dollar pricing characteristics show signs of significantly shorter marketing times than their counterparts.

Pricing in residential real estate markets has been the subject of intense study among real estate academics for some time. The residential real estate brokerage literature has had as its primary focus the magnitude of a property's price, the characteristics of the property that drive that price, and the characteristics of a property that affect property marketing time. While these characteristics yield great insight into the dynamics of property prices, there remains the relatively untouched issue of listing price design.

This paper focuses on this issue of listing price design. In particular, the impact of off-dollar listing pricing on residential property price and marketing time is examined. In this study, off-dollar pricing refers to those properties that are not part of the most common pricing cluster of 500s, 900s, and 1,000s. For example, listing prices such as $99,950, $99,800, $99,750, and $99,250 will be considered off-dollar prices, while $100,000, $99,900, $99,500, and $99,000 will be considered round-dollar prices.

Recent works (Allen and Dare, 2004, 2006; and Palmon, Smith, and Sopranzetti, 2004) refer to the huddling of listing prices as "charm," "even," "just-below-even," or "cluster" pricing and represent the original works in the area of listing price design. The terms "off-dollar" and "round-dollar" employed here are unique to this work and are designed to assist in differentiating the study from prior works.

Allen and Dare (2004) investigate the practice of employing charm listing prices on eventual settlement prices. Charm pricing in the original Allen and Dare setting is a listing strategy designed to "take advantage of buyers' cognitive processes" where this particular listing price design favorably (in terms of the sellers) affects the perceptions of purchasers. Charm prices are defined as property listing prices that are set just below some round number and include all listing prices not ending in 000 or 0,000.[1] Their findings indicate that pursuing a "charm" pricing strategy results in favorable premiums for sellers in eventual settlement prices.

Palmon, Smith, and Sopranzetti (2004) scrutinize clustering in prices (both listing and settlement) and note two distinct clusters: even (prices ending in 000) and just-below-even (prices ending in 900). They find that while the majority of listing prices load on the just-below-even cluster, those that load at the even cluster sell faster and at a premium. Their work relies on cognitive as well as more traditional economic arguments to support some of their proposed hypotheses. Of particular interest is the work of Ball, Torous, and Tschoegl (1985) concerning the coarseness of an asset's pricing grid, which is directly related to that asset's cost of information.[2]

Allen and Dare (2006), employing the same data set from their earlier work, consider charm pricing as a signal of listing price precision. Specifically, they investigate the impact of charm pricing on listing discounts (listing price minus settlement price). Using a simple Nash two-party bargaining equilibrium in favor of cognitive perception arguments, they hypothesize that "discounts are smaller when sellers set listing prices nearer to their reservation prices." In particular, sellers use charm pricing to signal the firmness of their listing price. Their empirical results support this premise.

These original three works provide significant food for thought on the design of listing price. However, their results, though significant, are inconsistent with one another. These inconsistencies may stem from the different specifications of the variable(s) of interest and ignoring the most common—and mutually exclusive—price clustering in both data sets (i.e., round-dollar pricing). The current study corrects for this potential misspecification and offers a simple and presently accepted asset pricing equilibrium in combination with a reputation effects argument as an alternative explanation for the off-dollar/round-dollar listing price design.

The findings indicate that the most common clustering of listing prices has been ignored in the above mentioned previous works. Furthermore, the alternative empirical specification discussed here, supported by the Grossman and Stiglitz (1980) asset pricing equilibrium, indicates that off-dollar pricing does not impact property price but does significantly reduce property marketing time.

The remainder of this paper is organized as follows. First, there is a discussion of the relevant literature from economics, marketing, and real estate literature. Second, there is a discussion of the data followed by a presentation of an accepted asset pricing equilibrium, an alternative clustering and listing price design mechanism, and the empirical models. Third, the results of the empirical models are presented and discussed. The paper closes with concluding comments.

Literature

Economics and Marketing Literature

While Allen and Dare (2004, 2006) and Palmon, Smith, and Sopranzetti (2004) provide excellent and thorough reviews of the relevant literature, prior extant work is also mentioned in order to better frame the story. Ginzberg (1936), in an early examination

of catalog pricing strategies, noted that what has become known as "odd" pricing increased demand for some items while the demand for other items was either unchanged or decreased. Ginzberg's comment later sparked a flurry of research in the marketing literature regarding this pricing scheme and its effects on the consumer. Lambert (1975) used Von Neumann and Morgenstern's (1944) "standard gamble" to illustrate that this pricing scheme may lead to substantial demand bias with respect to a consumer's perceived value of a particular item.

Schindler and Warren (1988) show that odd pricing increases the probability of sale, while Schindler and Wiman (1989) investigate price recall and illustrate that consumers were more likely to underestimate prices of odd priced items when later recalled; this second paper suggests that odd pricing has a psychological effect on consumers that could cause them to recall odd priced items as a "bargain" or a "good deal." This concept is reinforced through Schindler (1991), Schindler and Kibarian (1993), Huston and Kamdar (1996), Schindler and Kibarian (1996), Holdershaw and Gendall (1997), Gendall, Fox, and Wilton (1998), Kalyanam and Shively (1998), and Mixon, Trevino, and Bales (2004). In each of these later papers, odd pricing was shown to increase demand for the products tested.

Real Estate Literature

In addition to the three listing design papers discussed, a large number of studies from the housing economics literature and real estate brokerage literature have focused on pricing of residential properties, several of these works stand out. Haurin (1988) shows that properties that differ from the "norm" set listing prices higher than relative market prices to offset the market's uncertainty over how to correctly price these "atypical" properties. Haurin suggests that list prices convey information about the property to prospective buyers. Knight, Sirmans, and Turnbull (1994) use a search model to show that listing prices affect both the number of total offers from buyers and the magnitudes of those offers.

Yavas and Yang (1995) construct a search model to examine the search intensity of both buyers and sellers' agents in light of the listing price presented by the seller. The authors conclude that, among other factors, listing prices are a function of the relative information conveyed to the market by the list price itself. Anglin, Rutherford, and Springer (2003) examine marketing time vis-à-vis Haurin's (1988) model, showing that, as the difference between list prices and market prices increases, marketing time increases.

The residential real estate brokerage literature is rife with studies regarding property pricing and the factors that affect both property price and marketing time. Sirmans, Macpherson, and Zietz (2005) provide an exhaustive review of the hedonic pricing literature, citing approximately 150 unique studies concerning the factors that drive hedonic pricing models. Many of these factors have been shown to influence time-on-market as well. These models are not discussed specifically in this work; however, the interested reader may choose to examine Asabere and Huffman (1993), Benjamin and Chinloy (1995), Jud, Seaks, and Winkler (1996), Zumpano, Elder, and Baryla (1996), and Rutherford, Springer, and Yavas (2001), as exemplary works in this area.

Data, Asset Pricing Equilibrium, and Empirical Methodology

Data

The data set originally included 2,716 conventional[3] residential closings (the population of such transactions) between January 1, 1998 and December 31, 1998, from the Montgomery, Alabama Multiple Listing Service (MLS). The Montgomery MLS provides data on sales price, list price, time-on-market, location, and physical characteristics of listed properties with the exception of age and square footage. Information on age and square footage was obtained from the Montgomery County (Alabama) Tax Assessor's Office.

Observations that did not appear in both the Montgomery MLS and the Montgomery County Tax Assessor's databases were eliminated in order to create a complete data set. Obvious data-entry errors, such as a negative time-on-market, zero bedrooms or baths, etc., were removed. The final sample included 1,549 residential closings. Exhibit 1 is a variable legend. In the interest of compactness, this exhibit provides variable names, definition of variables, purpose of the variable for this study, and the variables expected sign. Johnson, Salter, Zumpano, and Anderson (2001), Gordon, Salter, and Johnson (2002), Salter, Johnson, and Anderson (2004), and Johnson, Anderson, and Benefield (2004), among others, have all employed data from this market in earlier studies and serve to provide the arguments for variable inclusion in the models as controls and ex ante sign predictions. Exhibit 2 provides descriptive statistics for this study.

Grossman and Stiglitz Asset Pricing Equilibrium Combined with Signaling

As mentioned earlier, the original listing price design studies rely heavily on cognitive perception models. However, a ready-made and generally accepted equilibrium pricing distribution already exists in the financial economics literature. Grossman and Stiglitz (1980) concentrate on informationally efficient markets and the necessary condition of normal economic returns to the information producer. Along the way, they develop an equilibrium pricing distribution for a risky asset that is dependent on the cost of acquiring information, the distribution of that information, and the percentage of informed agents.

The current work borrows this pricing distribution and combines it with traditionally accepted reputation signaling arguments. Specifically, imagine a risky asset (a residential property in this example) whose return is represented by:

$$U = \theta + \varepsilon, \tag{1}$$

where U represents the asset's return. This return is based on information consisting of θ, which is observable at a cost, and ε, which is unobservable due to excessive cost. However, the listing agent has already incurred this cost in their informational search during the listing process.[4] Both variables are random. It is helpful here perhaps to think of this information as being comparable information (amount and depth) from the MLS or the lack thereof. Further assume that the agents (intermediaries) in this model exhibit constant absolute risk-aversion utility functions. From these base assumptions an equilibrium price system can be developed that reveals the role of information in the system:

Exhibit 1. Variable Legend

Variable	Definition	Purpose	Exp Hedonic Sign	Exp Sign Duration
SP	Final settlement price or transaction price. Natural Log is employed for modeling purposes.	Independent variable in Hedonic Pricing model	—	—
TOM	Property time-on-market. Measured as the time from listing date to date of contract. Natural Log is employed for modeling purposes.	Independent variable in Duration models	—	—
AGE	Continuous variable representing the age of the property. Natural Log is employed for modeling purposes.	Control variable	Negative	Insignificant
SQFT	Continuous variable representing the size of the property. Natural Log is employed for modeling purposes.	Control variable	Positive	Insignificant
BR	Continuous variable representing the number of bedrooms in the property. Natural Log is employed for modeling purposes.	Control variable	Positive	Insignificant
BATH	Continuous variable representing the number of bedrooms in the property. Natural Log is employed for modeling purposes.	Control variable	Positive	Positive
LEE	Location dummy that equals 1 if the property is in the Robert E. Lee High School district.	Control variable	Negative	Insignificant
LANIER	Location dummy that equals 1 if the property is in the Sidney Lanier High School district.	Control variable	Negative	Insignificant
CARVER	Location dummy that equals 1 if the property is in the George Washington Carver High School district.	Control variable	Negative	Insignificant
JD	Location dummy that equals 1 if the property is in the Jefferson Davis High School district. JD is preferred school district.	Control variable/Omitted location dummy	Capture in intercept	Insignificant
GAR	Parking dummy equals 1 if property has a garage.	Control variable	Positive	Insignificant
CPT	Parking dummy variable equal 1 if property has a carport	Control variable	Positive	Insignificant
DRIVE	Parking dummy equal 1 if property has a driveway only. *DRIVE* is least preferable parking provision.	Control variable/Omitted parking dummy	Captured in intercept	Insignificant

Exhibit 1. Variable Legend (continued)

Variable	Definition	Purpose	Exp Hedonic Sign	Exp Sign Duration
FP	Fireplace dummy equals 1 if property has a fireplace—proxies property quality.	Control variable	Positive	Insignificant
GTUB	Garden tub dummy equals 1 if property has a garden tub—proxies property quality.	Control variable	Positive	Insignificant
SEPSHOW	Separate shower dummy equals 1 if property has a separate shower—proxies property quality.	Control variable	Positive	Insignificant
POOL	Pool dummy equals 1 if property has a pool—proxies property quality.	Control variable	Positive	Insignificant
DOUBOVEN	Double oven dummy equals 1 if property has a double oven—proxies property quality.	Control variable	Positive	Insignificant
NC	New construction dummy equals 1 if property is newly constructed.	Control variable	Insignificant	Negative
EIFS	Exterior siding dummy equals 1 if property has EIFS siding. See Johnson, Salter, Zumpano, and Anderson (2001) for counter-intuitive findings explanation.	Control variable	Positive	Positive
BONUS	Bonus dummy equals 1 if property has a HOW. See Johnson, Anderson, and Benefield (2004) for counter-intuitive findings explanation.	Control variable	Negative	Positive
DAP	Continuous variable representing the degree of above-market pricing. Defined as (list price – hedonic predicted price)/hedonic predicted price. See Johnson, Anderson, and Benefield (2004), among others for additional details.	Control variable	Negative	Positive
ROUND	Round-dollar pricing dummy equals 1 if listing price ends in 500, 900, or 1000.	Control/Omitted inverse to variable of interest	Captured in intercept	Captured in intercept
OFF	Off-dollar dummy equals 1 if listing price ends in digits other than 500, 900, or 1000.	Variable of interest	TBD	TBD

Notes: Johnson, Salter, Zumpano, and Anderson (2001), Gordon, Salter, and Johnson (2002), Salter, Johnson, and Anderson (2004), and Johnson, Anderson, and Benefield (2004), among others, have employed data from this market in earlier studies, which serve to provide the arguments for variable inclusion in the models as controls and as ex ante sign predictors.

Exhibit 2. Descriptive Statistics

Variable	Mean	Median	Std. Dev.
SP	115,657.000	99,900.000	54,011.000
TOM	84.900	67.000	70.340
AGE	20.868	19.000	18.087
SQFT	1,822.000	1,702.000	534.000
BED	3.245	3.000	0.589
BATH	2.192	2.000	0.597
LEE	0.330	0.000	0.470
LANIER	0.132	0.000	0.338
CARVER	0.014	0.000	0.116
JD	0.525	1.000	0.500
GAR	0.291	0.000	0.454
CPT	0.235	0.000	0.424
DRIVE	0.475	0.000	0.517
FP	0.781	1.000	0.417
GTUB	0.324	0.000	0.468
SEPSHOW	0.296	0.000	0.457
POOL	0.108	0.000	0.310
DOUBOVEN	0.087	0.000	0.282
NC	0.058	0.000	0.234
EIFS	0.051	0.000	0.220
BONUS	0.064	0.000	0.245
DAP	0.003	0.002	0.003
NOMKT	0.047	0.000	0.212
ROUND	0.903	1.000	0.297
OFF	0.097	0.000	0.297

Note: N = 1,549.

$$Var(P_{\lambda}^{*}|\theta) = \frac{a^2\sigma_{\partial}^{4}}{\lambda^2} Var(x^{*}), \tag{2}$$

where a is the coefficient of the agent's absolute risk-aversion, λ is the percentage of informed agents, x represents the housing stock, and P represents the price of the asset.[5]

It is clear from Equation 2 that the variability of the property's pricing distribution is directly related to the distribution of ε. So, as the variability in the unobservable signal decreases, the variability in the asset price decreases. Stated differently, listings with significant comparable information should have a narrower pricing distribution, and market outcomes (property price and time-on-market) should behave accordingly.

Understanding this, agents with listings that exhibit significant comparable information will seek to signal this attribute, which is very similar to the Allen and Dare (2006) listing precision concept, to other intermediaries in the information system, thereby allowing

both parties to maximize their respective utilities. Listing price design seems a viable mechanism by which to do send this signal of significant comparable information. At first glance, it may appear that the signal can be easily mimicked; however, reputation effects among the agent force may prohibit mimicking. That is, since agents rely on multiple sales within the same agent force, cheating will not be feasible.[6]

Agents by convention signal the quality of their listings to the agent force by way of listing price design. In particular, properties that are not priced on the 500s, 900s, and 1000s (round-dollar prices) but rather on off-dollar prices exhibit less variance in their comparable properties and should be accompanied by differential market outcomes. While there is nothing "magical" about the 500s, 900s, and 1000s cluster, this cluster is just overwhelming the most popular. It constitutes fully 90% of the sample (see Exhibit 2).

Interestingly, round-dollar listing price clustering as defined in this work, makes up over 95% of the data employed in Allen and Dare (2004, 2006) and approximately 89% of the listings in Palmon, Smith, and Sopranzetti (2004), a fact unrecognized and unaccounted for in all three previous studies.

Empirical Methodology

A hedonic pricing model along with two duration models (OLS and Weibull) are employed to investigate differential outcomes associated with off-dollar pricing. Given the significant use of these modeling techniques in the real estate literature, no space is dedicated here for econometric explanation of these methodologies. The specification of the models is as follows:

Hedonic Pricing Model

$$\begin{aligned}\mathrm{Ln}SP = {} & \beta_0 + \beta_1 LnAGE + \beta_2 LnSQFT + \beta_3 LnBED + \beta_4 LnBATH + \beta_5 LEE \\ & + \beta_6 LANIER + \beta_7 CARVER + \beta_8 GAR + \beta_9 CPT + \beta_{10} FP + \beta_{11} GB \\ & + \beta_{12} SEPSHOW + \beta_{13} POOL + \beta_{14} DOUBOVN + \beta_{15} NC + \beta_{16} EIFS \\ & + \beta_{17} BONUS + \beta_{18} DAP + \beta_{19} OFF + \varepsilon. \end{aligned} \tag{3}$$

OLS Duration Model

$$\begin{aligned}\mathrm{Ln}TOM = {} & \beta_0 + \beta_1 LnAGE + \beta_2 LnSQFT + \beta_3 LnBED + \beta_4 LnBATH + \beta_5 LEE \\ & + \beta_6 LANIER + \beta_7 CARVER + \beta_8 GAR + \beta_9 CPT + \beta_{10} FP + \beta_{11} GB \\ & + \beta_{12} SEPSHOW + \beta_{13} POOL + \beta_{14} DOUBOVN + \beta_{15} NC + \beta_{16} EIFS \\ & + \beta_{17} BONUS + \beta_{18} DAP + \beta_{19} OFF + \varepsilon. \end{aligned} \tag{4}$$

Weibull Duration Model

$$\exp(X\beta) = \beta_0 + \beta_1 LnAGE + \beta_2 LnSQFT + \beta_3 LnBED + \beta_4 LnBATH + \beta_5 LEE + \beta_6 LANIER + \beta_7 CARVER + \beta_8 GAR + \beta_9 CPT + \beta_{10} FP + \beta_{11} GB + \beta_{12} SEPSHOW + \beta_{13} POOL + \beta_{14} DOUBOVN + \beta_{15} NC + \beta_{16} EIFS + \beta_{17} BONUS + \beta_{18} DAP + \beta_{19} OFF + \varepsilon. \quad (5)$$

Variable nomenclature, definition, purpose for specification, and expected sign are all provided in Exhibit 1.

Empirical Results

Exhibits 3, 4, and 5 formally report the empirical results of off-dollar pricing on property price and marketing time. Referring to the respect *F*-Statistics and Log-Likelihood, all three

Exhibit 3. Hedonic Pricing Model

Predictor	Coeff.	Std. Dev.	*T*	*P*	VIF
Constant	8.803	0.171	51.420	0.000	
Ln*AGE*	−0.028	0.008	−3.620	0.000	1.9
Ln*SQFT*	0.253	0.023	10.790	0.000	1.3
Ln*BR*	0.329	0.034	9.660	0.000	1.3
Ln*BATH*	0.462	0.026	17.890	0.000	1.5
LEE	−0.035	0.013	−2.660	0.008	1.2
LANIER	−0.121	0.019	−6.380	0.000	1.3
CARVER	−0.179	0.050	−3.600	0.000	1.1
GAR	0.198	0.014	13.780	0.000	1.4
CPT	0.090	0.014	6.240	0.000	1.2
FP	0.127	0.015	8.460	0.000	1.3
GTUB	0.063	0.015	4.160	0.000	1.6
SEPSHOW	0.158	0.016	9.930	0.000	1.7
POOL	0.096	0.018	5.220	0.000	1.1
DOUBOVEN	0.064	0.021	3.080	0.002	1.1
NC	−0.014	0.028	−0.480	0.630	1.4
EIFS	0.139	0.027	5.140	0.000	1.1
BONUS	−0.042	0.023	−1.830	0.068	1.0
DAP	−4.232	1.666	−2.540	0.011	1.1
OFF	−0.009	0.019	−0.450	0.650	1.1
R^2	72.2%				
F-Stat	208.71			0.000	

Notes: The dependent variable is Ln*SP*. *N* = 1,549.

Exhibit 4. OLS Duration Model

Predictor	Coeff.	Std. Dev.	*T*	*P*	VIF
Constant	3.138	0.964	3.250	0.001	
Ln*AGE*	0.012	0.044	0.280	0.777	1.9
Ln*SQFT*	0.032	0.132	0.240	0.807	1.3
Ln*BR*	0.283	0.192	1.470	0.141	1.3
Ln*BATH*	0.201	0.146	1.380	0.168	1.5
LEE	−0.139	0.074	−1.870	0.062	1.2
LANIER	0.008	0.107	0.070	0.941	1.3
CARVER	0.363	0.280	1.300	0.194	1.1
GAR	−0.083	0.081	−1.030	0.304	1.4
CPT	−0.110	0.081	−1.350	0.176	1.2
FP	0.153	0.085	1.810	0.070	1.3
GTUB	0.123	0.085	1.440	0.151	1.6
SEPSHOW	−0.304	0.090	−3.400	0.001	1.7
POOL	0.013	0.104	0.130	0.899	1.1
DOUBOVEN	0.005	0.116	0.040	0.966	1.1
NC	−0.681	0.160	−4.260	0.000	1.4
EIFS	0.464	0.153	3.040	0.002	1.1
BONUS	0.370	0.129	2.870	0.004	1.0
DAP	40.989	9.384	4.370	0.000	1.1
OFF	−0.796	0.110	−7.260	0.000	1.1
R^2	10.4%				
F-Stat	9.27			0.000	

Notes: The dependent variable is Ln*TOM*. *N* = 1,549.

models reported exhibit statistical significance and appropriateness. The specified controls across all three models are remarkably consistent with earlier studies (Johnson, Salter, Zumpano, and Anderson, 2001; Gordon, Salter, and Johnson, 2002; Salter, Johnson, and Anderson, 2004; and Johnson, Anderson, and Benefield, 2004) from the same metroplex as well as the majority of the extant real estate literature and as such add little in new information. In the interest of compactness, their discussion is omitted.

Exhibit 3 indicates that off-dollar pricing has no statistically identifiable affect on property price in the study area. This result is not suggestive of signaling comparable information via listing price; however, it is not surprising in light of the majority of findings in the hedonic literature. Characteristics that are not intrinsically linked to property rarely impact their price (Sirmans, Macpherson, Zietz, 2005).

Exhibits 3 and 4 formally report the results the duration modeling efforts. In both models off-dollar pricing (*OFF*) can be clearly seen to have a statistically significant effect on property marketing time. In particular, marketing times for properties exhibiting off-dollar pricing characteristics are significantly shorter. An estimation of this marketing time savings can be obtained by "unwinding" the coefficient associated with *OFF* in the OLS model from Exhibit 3. Doing so reveals that, on average, properties exhibiting off-dollar

Exhibit 5. OLS Duration Model

Predictor	Coeff.	Std. Error	*Z*	*P*
Intercept	3.823	0.685	5.580	0.000
Ln*AGE*	−0.026	0.032	−0.830	0.407
Ln*SQFT*	0.046	0.094	0.480	0.628
Ln*BR*	0.102	0.143	0.710	0.477
Ln*BATH*	0.239	0.102	2.350	0.019
LEE	−0.083	0.054	−1.540	0.123
LANIER	0.052	0.078	0.670	0.500
CARVER	0.232	0.203	1.140	0.254
GAR	0.062	0.058	1.080	0.282
CPT	−0.058	0.060	−0.960	0.335
FP	0.097	0.063	1.550	0.122
GTUB	0.086	0.061	1.410	0.158
SEPSHOW	−0.183	0.064	−2.840	0.004
POOL	−0.027	0.076	−0.360	0.717
DOUBOVEN	−0.064	0.084	−0.760	0.447
NC	−0.274	0.115	−2.380	0.017
EIFS	0.310	0.112	2.770	0.006
BONUS	0.220	0.094	2.330	0.020
DAP	18.755	6.867	2.730	0.006
OFF	−0.237	0.079	−3.000	0.003
α	1.119	0.018		

Notes: The dependent variable is Ln*TOM*. N = 1,549. The Log Likelihood is −2,321.00.

pricing characteristics sell approximately 55% (or 46.5 days) faster than those exhibiting round-dollar cluster pricing. These results are consistent with the proposed pricing distribution and signaling argument. Specifically, it appears that the ability to more precisely price property when combined with off-dollar listing price design can lead to an average savings of one and one-half months in marketing time.[7]

Conclusion

The idea that the listing price of residential properties can be used to convey information via design is the subject of three recent works (Allen and Dare, 2004, 2006; and Palmon, Smith, and Sopranzetti (2004). These three works are enlightening and interesting; however, they raise some questions that must be addressed. In particular, they are inconsistent in their theoretical underpinning as well as their empirical findings. All three works rely on a combination of cognitive and economic modeling in the presences of charm, even, and just-below-even listing price clustering to explain differential market outcomes.

Interestingly, all three papers ignore the most common—and mutually exclusive—listing clustering of 500s, 900s, and 1000s or round-dollar pricing. In contrast, the paper offers

a simple rational expectation model combined with signaling to explain this most common clustering and its counterpart's effect on property price and marketing time. Off-dollar pricing is the counterpart to round-dollar pricing in the setup and is used to signal listing precision, per Allen and Dare (2006). Given utility maximizing brokers and the presence of listing price precision signaled via off-dollar pricing, it is reasonable to expect differential market outcomes for these properties.

The result of the hedonic pricing model is inconsistent with the original argument. This is not surprising, given the consistent findings in the real estate literature concerning the non-pricing of non-intrinsic pricing controls (Sirmans, Macpherson, and Zietz, 2005). However, the results of the duration models strongly support the proposition that listing price precision can be signaled through off-dollar pricing resulting in significantly shorter marketing times. For the metroplex in question, property marketing times are lowered, on average, by 55% or approximately 46.5 days.

Is this the final word on listing price design? Is there anything "magical" about the off-dollar pricing signal? Are earlier works vacated by these findings? The answers appear to be: probably not; no magic here, just convention; and most certainly not. There appears to be significant and fertile ground to be plowed in the area of listing price design. Future works should build significantly on the foundations laid down in this work as well as those of prior works when investigating the efficacy of listing price design.

Endnotes

[1] Allen and Dare (2004) classify listings ending in 5,000 as "charm" for properties listed over $100,000, while the 5,000 ending is not classified as charm for those listings offered at less than $100,000. This indiscriminate classification appears to be an attempt to capture the concept that $5,000 means a lot to purchasers of lower priced properties but has less of an impact on purchasers of more expensive properties.

[2] In turn, Ball, Torous, and Tschoegl (1985) interpret the Grossman and Stiglitz (1980) informational equilibrium pricing hypothesis, which plays a direct and important role in the results in the current study.

[3] In this work, conventional closings are non-FHA/VA closings initiated through a real estate broker.

[4] This is a slight variation from Grossman and Stiglitz (1980) in that ε is strictly unobservable. In the current study, ε is observed during the listing process by the listing agent as a matter of course. However, such in depth information search is simply cost prohibitive during the original screening of properties for purchasers by selling agents. This difference is trivial and generalizes to the same result. Specifically, selling agents do not see ε.

[5] Equations 1 and 2 are simply restatements of Grossman and Stiglitz's Equations 1 and 11, where P is informationally equivalent to w and hence the direct substitution of P for w in Equation 2. Also, it is implicitly assumed here that agent and principal incentives are perfectly aligned eliminating any moral hazard issues.

[6] The reader should recognize the second half of the theoretical setup as a simple derivate of Spence (1973).

[7] In addition to the statistical models presented in this work, several alternative specifications of the three empirical models were estimated. The results of these alternative specifications were consistent with the results reported here and are omitted in the spirit of brevity.

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The authors thank session participants at the American Real Estate Society 2005 Annual Meeting in Santa Fe, New Mexico, the Financial Management Association 2005 Annual Meeting in Chicago, Illinois, the editorial board of the Journal of Housing Research, and two anonymous reviewers for helpful comments.

Sean P. Salter, Middle Tennessee State University, Murfreesboro, TN or spsalter@bellsouth.net.

Ken H. Johnson, Florida International University, Miami, FL 33199 or kenh.johnson@fiu.edu.

W. Paul Spurlin, Louisiana Tech University, Ruston, LA 71272 or pspurlin@cab.latech.edu.