An Empirical Analysis of the Determinants of the Value of Vacant Land

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Abstract. **This study extends the literature that investigates the use of buyer and seller characteristics in traditional hedonic price equation regressions. This study adds to the existing literature on the relationship between parcel size and price, coined plattage by Colwell and Sirmans (1980). The results reveal statistically significant buyer and seller effects. Also, the results confirm the existence of the plattage effect and reveal a statistically significant change in the plattage effect over time. The findings of this study should prove useful to those interested in the behavior of land markets on an urban fringe.**

Introduction

Land values have been the focus of many researchers for at least the past 250 years. The contributors to this field of study are documented elsewhere and need not be reiterated here. However, most researchers agree that land markets today are basically structured as monopolistically competitive. Agricultural land not under the influence of a nearby urban area tends to be differentiated on the basis of soil fertility, drainage, moisture content, etc. Undeveloped land under the influence of a nearby urban area may be in an agricultural use, but the value of this land is often driven by factors other than soil fertility, etc. The purpose of this paper is twofold: (1) to investigate the determinants of the price of large parcels of vacant land near a growing urban area with an emphasis upon the effects of buyer and seller characteristics, and (2) to explore the dynamics of the plattage effect.

The importance of buyer and seller characteristics as determinants of land value is of special interest in this study. Large parcels of undeveloped land on the edge of a growing urban area constitute a market in which the characteristics of buyers and sellers may be important. For example, a limited partnership may be willing to pay more for a tract of land than an individual due to differences in tax positions and speculative interest in the land. Also, buyer and seller characteristics may act as proxies for property characteristics missing from the sales data set. Thus, the contribution of buyer and seller characteristics to our understanding of urban land markets is primarily a matter to be determined empirically. One focus of this study is to evaluate the contributions of buyer and seller characteristics in our understanding of urban land markets.

A second argument for including buyer and seller characteristics in an hedonic price equation is that they represent proxies for property characteristics omitted from the equation due to incomplete information about property characteristics in the data set. For example, a particular type of buyer, say a limited partnership, might be willing to pay more for land with a particular characteristic, say substantial drainage and subterranean

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support. If a particular property characteristic desired by a particular buyer is not included in the set of property characteristics used in the hedonic regression, a variable representing buyer characteristics could act as a proxy variable for the omitted property characteristic.

Either way, the rationale for including buyer and seller characteristics in hedonic price equations is justified, because doing so improves our understanding of real estate markets. A key question, addressed by this study, is whether or not buyer and seller characteristics add to our understanding of real estate markets. That is, are buyer and seller characteristics significant variables in an hedonic price equation, and if they are significant, does their absence bias parameter estimates, and does their presence improve our understanding of real estate markets?

A second focus of this study is upon the phenomenon called plattage. Plattage is the presence of a negative relationship between parcel size and price per unit area. Plattage is reported by virtually every study that has looked for it, and it is becoming as predominant as location in determining land values. Therefore, this study investigates and tests for the presence of plattage. Also, this study extends previous studies of plattage by including in the model an interaction effect between plattage and time, thereby allowing the plattage effect to change over time.

Review of the Literature

The justification for including buyer and seller characteristics in our understanding of real estate markets can be supported by two distinct arguments. First and foremost, Rosen (1974) demonstrates that an hedonic equation in property characteristics alone is insufficient for identification of the underlying demand/supply parameters. Epple (1987) further shows that biased parameter estimates are produced by an OLS estimation of an hedonic equation with only property characteristics as independent variables. Bartik (1986) and Kanemoto and Nakamura (1986) include buyer characteristics as independent variables in hedonic equations using HUD Experimental Housing Allowance Program and Tokyo Metropolitan High-Rise Survey data, respectively. Buyer and seller characteristics are generally not included in hedonic equations of land prices, primarily because the buyer and seller data are difficult to obtain. Nonetheless, just because it is difficult to obtain does not justify ignoring the potential contributions this information can make to our understanding of real estate markets.

Much of the interest in land prices in recent literature focuses upon the nonlinearity between the price of urban land and parcel size. Recent empirical studies report that land value increases at a decreasing rate as parcel size increases. Colwell and Sirmans (1980) explore this phenomenon using land sales from Edinburgh, Scotland and Urbana-Champaign, Illinois to estimate the parameters of four different models of the relationship between size and value. Their results suggest that a standard Cobb-Douglas, constant elasticity functional form gives the best fit. In their Cobb-Douglas model, they estimate the value-size elasticity to be .7638 in Edinburgh and .2005 in Urbana-Champaign. Also, the Edinburgh data includes a dummy variable measuring whether the seller is a builder, individual, or farmer. The coefficient of the seller variable is positive and statistically significant in two of their four models.

In a similar study of land prices near Chicago, Chicoine (1981) includes data on more property characteristics than Colwell and Sirmans, including whether the buyer and seller are individuals or not (e.g., corporations, partnerships, etc.). The coefficient of Chicoine's buyer and seller variable is negative and statistically significant. Furthermore, Chicoine reports a negative and significant interaction effect between the buyer and seller variable and commercial zoning, suggesting that his buyer and seller variable may be acting as a proxy for an omitted variable related to commercial zoning.

Kowalski and Colwell (1986) also find that land value increases at a decreasing rate as parcel size increases using sales of industrial land in a single sector of western Wayne County, a suburban area outside Detroit. Also, Kowalski and Colwell collected information on the grantor and grantee for each transaction in order to weed out non-arm's-length sales (i.e., sales between related parties, etc.). However, their regressions did not contain any variables derived from the grantor and grantee information.

None of the studies of the plattage effect allow the relationship between parcel size and price to vary over time, primarily due to data limitations. This study uses data spanning seven years, making it possible to test for changes in the plattage effect over time. This extension of plattage studies has the potential of providing highly useful information to land developers regarding market trends in the profitability of the subdivision of a large tract of land into smaller parcels.

The Data and the Model

The data consist of 363 arm's-length land sales in the Denver, Colorado urban area from 1985 to 1992. The data were gathered from public records by a commercial data collection firm in Denver. The arm's-length nature of each transaction was verified by the firm with grantors and grantees. Only arm's-length sales of parcels of at least five acres (in size) are included in the sample. Information on date of sale, size, zoning, grantor, and grantees is included, along with selling price. As is the case with most real estate sales data sets, information concerning buyer and seller characteristics is very thin. All the data set contains regarding buyers and sellers are names. However, categorical information can be and is extracted from this information.

A model similar to that used by Colwell and Sirmans (Model 3) and Chicoine is adopted for use in this study. Specifically, the log of selling price is regressed upon the log of size, the log of size times the time of the sale, and a series of variables representing zoning, location, and the ten buyer–seller combinations. The general model is given by the equation below:

$$\log(SP) = \alpha + \beta_1 \log(SZ) + \beta_2 \log(SZ)TIMEM + \beta_3\, Dist\ I\text{–}70 + \delta ZON + \eta BYR/SLR,$$

in which the variables are defined as follows:

- SP = selling price in dollars;
- SZ = size of the parcel in acres;
- $TIMEM$ = time of the sale in months (0=Jan. 1, 1995);
- $Dist\ I\text{–}70$ = distance from I–70 in miles;
- ZON = a vector of dummy variables representing zoning;
- BYR/SLR = a vector of dummy variables representing the buyer–seller combinations.

The Greek letters represent parameters to be estimated from the data.

The above model is a standard plattage model with two additional types of variables: (1) the size–time interaction variable given by log(*SZ*)*TIMEM* and (2) the vector of dummy variables (*BYR*/*SLR*) representing the buyer–seller combinations. These new variables are discussed further below.[1]

The Size–Time Interaction Variable

The interaction variable, log(*SZ*)*TIMEM*, adds a new dimension to the traditional plattage model developed by Colwell and Sirmans. Specifically, this new variable allows the relationship between parcel size and price to vary over time. If the parameter estimate for this variable is negative, the increase in the price per acre of land due to subdivision is increasing over time. If the parameter estimate is positive, the increase in the price per acre of land due to subdivision is decreasing over time. Given reasonable cost expectations, this new variable gives us an indication of the potential profitability of future subdivision.

The Buyer and Seller Variables

Previous studies have simply included variables representing particular types of buyers and sellers in the hedonic equation. This study replicates this technique. However in this study an additional approach is introduced. Specifically, variables representing combinations of buyer and seller classification are included in the analysis. The buyer and seller combinations are worthy of exploration, for several reasons. First, buyer and seller combinations could act as proxies for omitted property characteristics, especially if omitted property characteristics are more likely to be correlated with a particular type of transaction than with a particular buyer or seller; although the buyer and seller combinations could also capture differences in the relative bargaining power or position of the buyer and seller in the transaction. Unfortunately, we cannot predict exactly what effect the buyer–seller combinations capture without additional information that would probably be very costly to collect.

The ten buyer and seller combinations are derived based upon the names of the grantors and grantees. First, the grantors and grantees are classified into one of four types: individual, partnership, government, or corporation. Then, this classification scheme is used to create a new variable (*BYR*/*SLR*) that captures the ten types of buyer and seller combinations found in the data shown in Exhibit 1. The only type of transaction that includes government is individual grants to government. Exhibit 1 also reports the frequency and percentage of transactions of each buyer and seller type, as well as univariate statistics for all the data in this study.

Univariate statistics of the rest of the variables are reported in Exhibit 1. Size (*SZ*) is measured in acres, time (*TIMEM*) is measured in months (0=1/1/84), location (*Dist I*–70) is measured as distance (in miles) from I–70, zoning is measured by a series of dummy variables representing commercial (*C*), industrial (*I*), planned unit development (*P*), and residential ($C=I=P=0$) zoning, and price is measured in dollars.

Hypotheses

The relationship between land value (price times size) and size is hypothesized to be positive and nonlinear. All the transactions involve large (at least five acres) tracks of land, basically waiting to be subdivided. Therefore, plottage, or the increase in price per acre by

Exhibit 1
Summary Statistics

Variable	N	Mean	Std Dev.	Min.	Max.
Price	363	$859,372	$1,433,659	$10,000	$18,200,000
Size	363	107.1986	209.7083	5	2690
TimeM	363	46.8209	27.6877	13	102
Dist I–70	363	5.2397	2.2225	3	9

Zoning	Frequency	Percent
Commercial	47	12.9
Industrial	31	8.5
PUD	50	13.8
Residential	235	64.7

Grantor	Frequency	Percent
CORP	102	28.1
INDV	198	54.5
PART	63	17.4

Grantee	Frequency	Percent
CORP	100	27.5
GOVN	23	6.3
INDV	132	29.8
PART	108	19.8

BYR/SLR	Frequency	Percent
I to *I*	80	21.3
P to *C*	79	21.1
I to *P*	47	12.5
C to *C*	36	9.6
I to *C*	30	8.0
C to *P*	28	7.5
P to *P*	25	6.7
C to *I*	21	5.6
I to *G*	18	4.8
P to *I*	11	2.9

Note: The first letter of *BYR/SLR* represents the type of grantor and the last letter represents the type of grantee as follows: *I=INDV, P=PART, C=CORP, G=GPVN.*

assembling small parcels into one large parcel, is not expected to exist in the data. The opposite of plottage, or plattage (per Colwell and Sirmans), is expected to dominate in the data. Specifically, it is hypothesized that land value will increase with increases in size, but the rate of this increase will be diminishing with increases in size. This hypothesis can be tested by examination of the parameter estimate for log(*SIZE*) in the hedonic equation presented earlier. Specifically, the value of this estimate is expected to lie between zero and one.

Expectations regarding the interaction variable (log(*SIZE*)*TIMEM*) are discussed above. Specifically, the parameter estimate for this variable is expected to lie between plus and minus one, but when added to the parameter estimate for log(*SIZE*), the sum is expected to be less than one. Thus, this parameter should be much smaller in absolute value than the parameter for size. Also, if this parameter estimate is negative, the increase in the price per acre due to subdivision is increasing with time. The reverse holds if this parameter estimate is positive.

Expectations concerning zoning are complicated by the large size of the parcels included in this study. In general, the more densely developed the land, the higher the price per acre. Residentially zoned land tends to be the least densely developed, and it is hypothesized to be traded at the lowest price per acre of the four types of zoning examined in this study. Planned unit development (*P*), industrial (*I*) and commercial (*C*) lands are usually developed more densely than residential and are hypothesized to have higher prices per acre than residentially zoned land. However, because the parcels included in this study are so large, they will most likely be rezoned for various other land uses when subdivided. Indeed, the trend in land development just west of the land in this study confirms this observation. When large tracts (over five acres) were subdivided, the new parcels were usually rezoned. Therefore, the traditional effects of zoning may not be present in the data used in this study, and hypotheses beyond those discussed earlier are not warranted.

Because the sales are all located in the far eastern quarter of the Denver area, I–70 represents the major transportation infrastructure. Following traditional location theory, it is expected that a premium is paid for nearness to I–70. No other major transportation infrastructure exists in the area. Although in 1993 it was announced that the new Denver International Airport would be built somewhere in this area, the transactions in this study occur prior to this announcement. Thus, the major locational effect in this study is nearness to I–70.

It is difficult to establish expectations for buyer and seller characteristics, because so little research exists in this area. As noted before, the buyer and seller characteristics may capture the effects of demand/supply shift variables, or they may capture the effects of some omitted property characteristic. Hypotheses based upon differences in motivations, perhaps due to differences in tax status, are tempting to explore. But, the data are insufficient to distinguish between (1) the omitted property characteristic, and (2) shift variable (i.e., motivational) explanations.

Results

Three versions of the model are estimated: Model 1 with no buyer and seller variables; Model 2 with grantor and grantee dummy variables added to Model 1; and Model 3 with the ten buyer and seller combinations dummy variables added to Model 1. Exhibits 2, 3 and 4 report the OLS results for Models 1, 2 and 3, respectively. Model 1 is included as a base point for measuring the effects of the addition of the grantor/grantee variables in Model 2 and the buyer and seller combination variables in Model 3.

Model 1 – No Buyer and Seller Variables

All of the parameter estimates in Model 1 are statistically significant. To avoid forcing the regression through the origin, thereby distorting the *R*-square value, the effect of

Exhibit 2
OLS Results without Buyer/Seller Variables
(Dependent Variable: Log(*Price*))

Source	DF	Sum of Square	Mean Square	*F*-Value	*Prs*>*F*
Model	6	316.8094	52.8016	45.25	.0001
Error	356	415.3959	1.1668		
Corrected Total	362	732.2053			

R-Square	C.V.	Root MSE	LPR Mean
0.432678	8.435971	1.0802	12.8047

Parameter	Estimate	*T* for H0: *Parm.*=0	*Pr* > |*T*|	Std Error of Estimate
INTERCEPT	11.2547	46.74	.0001	.2408
Log(*Size*)	.7007	13.20	.0001	.0531
Log(*Size*) **Time*	−.0031	−5.83	.0001	.0005
Dist. I–70	−.1812	−6.66	.0001	.0272
Zoning *C*	1.3662	7.53	.0001	.1815
I	.9888	4.50	.0001	.2197
P	.8517	5.03	.0001	.1692

residential zoning is captured by the intercept term. The parameter estimate for log(*SZ*) is as expected, namely, positive and less than one. The parameter estimate for log(*SZ*)*TIMEM* is negative, indicating that the increase in price per acre due to subdivision is increasing over time. The parameter estimate for *Dist I*–70 is also as expected, namely, negative. The parameter estimates for the zoning dummy variables are all positive, with the estimate for commercial zoning being the largest, followed in order by industrial, planned unit development, and residential. Because the effect of residential zoning is captured by the intercept term, the parameter estimates for the three remaining zoning dummy variables represent their deviation from residential zoning.

As observed above, it is difficult to compare the parameter estimates for the zoning variables to similar estimates in previous studies. The parcels in this study are so large that rezoning is highly likely when the parcels are subdivided. It cannot be predicted how the parcels in this study will be rezoned. Therefore, the zoning dummy variables may not capture the true, ultimate land uses when the land is subdivided. Indeed, one possible contribution of the buyer and seller data is a refinement of the zoning data in this study.

Model 2 – Grantor/Grantee Variables

In Model 2, dummy variables are added representing the various types of grantors and grantees (sellers and buyers). The OLS results for Model 2 are reported in Exhibit 3. Again, in order to avoid forcing the regression through the origin, the intercept term captures the effects of partnerships as grantors or grantees. The parameter estimates for

Exhibit 3
OLS Results with Grantor and Grantee Variables
(Dependent Variable: Log(*Price*))

Source	DF	Sum of Square	Mean Square	*F*-Value	*Prs*>*F*
Model	11	396.0827	36.0075	37.6	.0001
Error	351	336.1226	.9576		
Corrected Total	362	732.2053			

R-Square	C.V.	Root MSE	LPR Mean
.5409	7.36423	.97858	12.8047

Parameter		Estimate	*T* for H0: *Parm.*=0	*Pr* > |*T*|	Std Error of Estimate
INTERCEPT		11.6763	44.69	.0001	.2613
Log(*Size*)		.6343	12.64	.0001	.0502
Log(*Size*)	* *Time*	−.0027	−5.40	.0001	.0005
Dist. I–70		−.1479	−5.83	.0001	.0254
Zoning	*C*	.8812	5.07	.0001	.1737
	I	.5363	2.57	.0106	.2088
	P	.5264	3.33	.0010	.1583
Grantor	*CORP*	.3332	2.05	.0411	.1626
	INDV	−.4367	−2.89	.0041	.1512
Grantee	*CORP*	.1744	1.25	.2139	.1400
	GOVN	.4970	2.07	.0393	.2402
	INDV	−.5500	−4.07	.001	.1350

the variables common to both models follow the same pattern as in Model 1. The parameter estimates for the grantor and grantee variables are all significant (at the .05 level) except for corporate grantees. These estimates represent deviations from partnership grantors and grantees. Thus, transaction prices are less for individuals, whether they are grantors or grantees, than partnerships. The reverse holds for corporate grantors and government grantees.

Again, interpretations of these parameters cannot be made. We do not know what effects the grantor and grantee dummy variables are capturing; although it is tempting to interpret the higher prices paid by corporate and government grantees as a refinement of the zoning data. Unfortunately, corporate and government grantees might also be willing to pay more for other reasons, such as tax position, greater purchasing power, etc. Nonetheless, the fact that we cannot interpret these parameter estimates does not diminish the fact that these data improve our understanding of land markets.

Model 3 – Buyer and Seller Combinations

In Model 3, the ten buyer and seller combination variables are added to Model 1. The OLS results for Model 3 are reported in Exhibit 4. Again, in order to avoid forcing the

Exhibit 4
OLS Results with Buyer/Seller Combinations Variables
(Dependent Variable: Log(*Price*))

Source	DF	Sum of Square	Mean Square	*F*-Value	*Prs>F*
Model	15	405.4714	27.0314	28.71	.0001
Error	347	326.7339	.9416		
Corrected Total	362	732.2053			

R-Square	C.V.	Root MSE	LPR Mean
.5538	7.578117	.97036	12.8047

Parameter		Estimate	*T* for H0: *Parm.*=0	*Pr* > |*T*|	Std Error of Estimate
INTERCEPT		11.3317	39.78	.0001	.2849
Log(*Size*)		.6495	12.92	.0001	.0503
Log(*Size*)	**Time*	−.0027	−5.57	.0001	.0005
Dist. I–70		−.1545	−6.07	.0001	.0255
Zoning	*C*	.7877	4.47	.0001	.1763
	I	.514	2.43	.0154	.2112
	P	.5172	3.27	.0012	.1584
BYR/SLR	*C* to *C*	.8080	3.32	.0010	.2433
	C to *I*	.1410	.52	.6050	.2724
	C to *P*	.7831	2.94	.0035	.2664
	I to *C*	−.1123	−.44	.6598	.2549
	I to *G*	.4257	1.48	.1403	.2880
	I to *I*	−.6466	−2.91	.0038	.2218
	I to *P*	.0340	.15	.8832	.2318
	P to *C*	.9613	3.32	.0010	.2898
	P to *I*	−.1880	−.58	.5592	.3215

regression through the origin, the effect of the partnership-to-partnership type of transaction is captured by the intercept term. All of the variables common to both models follow similar patterns, but some have different magnitudes. The parameter estimates for the nine *BYR/SLR* dummy variables represent deviations from the partnership-to-partnership type of transaction. Five (*CTOI*, *ITOC*, *ITOG*, *ITOP*, *PTOI*) of the parameter estimates are not statistically significant, while the remaining four (*CTOC*, *CTOP*, *ITOI*, *PTOC*) are statistically significant. According to the pattern of parameter estimates in Exhibit 4, higher prices are observed in partnership-to-corporation transactions, followed closely by corporation-to-corporation and corporation-to-partnership transactions. The partnership-to-partnership transactions (captured by the intercept term) is next, with the lowest price observed in individual-to-individual transactions. The results suggest that when corporations or partnerships are a party to a transaction, that the observed price is higher, everything else held constant. Similarly, when an individual is a party to a transaction, the observed price tends to be lower, everything else held constant. This result is consistent with the hypothesis that individuals may bargain more aggressively than corporations and partnerships because of their different tax positions, although other explanations are possible. For example, the officers of a corporation grantor might also be members of a partnership grantee in what would appear at first glance to be an arm's-length transaction.[2] Alternately, an unobserved property characteristic could explain these results. Sorting out which effect (shift variable or omitted variable) is captured by the buyer–seller information would be interesting, but it is not critical to the basic issue of whether or not buyer and seller characteristics matter. The fact that buyer and seller data do matter in this study as well as in previous studies should be sufficient to warrant the consideration of these data in future studies of land prices.

Comparisons of the Three Models

In Exhibit 5, the parameter estimates, standard errors, *R*-square, sum of squares, degrees of freedom, and *F*-tests for the three models are reported. Also, Exhibit 5 contains the results of subtracting the parameter estimates of Model 1 from those of Models 2 and 3, as well as *F*-test results of Model 1 with Model 2 and Model 1 with Model 3.

The addition of the grantor and grantee variables yields a significantly lower sum of square (F=1.236), and the parameter estimate for *Dist I*–70 is lowered by a statistically significant amount. The addition of the ten buyer and seller combination variables reduces the sum of squares even more than the grantor and grantee variables do, and the parameter estimates for *Dist I*–70 and commercial zoning are reduced by a statistically significant amount. Perhaps the buyer and seller combination dummy variables are refining the location and zoning data. Model 3 with the ten buyer and seller combination variables performs better than Model 2 with the six grantor/grantee variables. Also, the absence of either set of buyer and seller variables produces biased parameter estimates for at least one of the remaining variables in the model.

It is tempting to compare the sum of the parameter estimates for the separate buyer–seller variables to the corresponding combination variables. If the only effect captured by the buyer and seller data is, say, bargaining power, then the sum of the separate parameters could be expected to equal the parameter for the corresponding combination variable. On the other hand, if the buyer and seller information are capturing more than one effect, as hypothesized above, there is no reason to expect the other effects to be additive. Therefore, the fact that the parameters for the separate buyer and seller variables do not add up to the corresponding parameter for the combined buyer–seller variable implies that the buyer and seller data are indeed capturing more than one effect. But, it does not matter how many effects the buyer and seller data captures. What is important is that the buyer and seller information is statistically significant and improved the explanatory (unbiased parameter estimates on the other variables) and prediction (lower sum of squares) power of the model.

Summary and Conclusions

This study adds to the growing documentation that buyer and seller characteristics do matter in real estate transactions, especially in sales of urban land. Sales of large parcels of vacant land in Denver, Colorado are examined for grantor and grantee influences after

Exhibit 5
Summary and Comparisons of OLS Results

	Model 1		Model 2		Model 3		Model 2–1		Model 3–1	
Parameter	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error	Diff.	t-Stst	Diff.	t-Stst
Intercept	11.2547	.2408	11.6763	.2613	11.3317	.2849	.4216	1.1867	.0771	.2066
Log(*Size*)	.7007	.0531	.6343	.0502	.6495	.0503	−.0664	−.9092	−.0512	−.6995
Log(*Size*) **Time*	−.0031	.0005	−.0027	.0005	−.0027	.0005	.0004	.5297	.0003	.4328
Dist I–70	−.0181	.0272	−.1479	.0254	−.1545	.0254	−.1298	−3.487	−.1363	−3.6595
Zoning: *C*	1.3662	.1815	.8812	.1737	.7877	.1763	−.4849	−1.9306	−.5784	−2.2863
I	.9888	.2197	.5363	.2088	.514	.2112	−.4525	−1.4929	−.4748	−1.558
P	.8517	.1692	.524	.1583	.5172	.1584	−.3278	−1.4144	−.3345	−1.4432
Grantor:										
CORP			.3332	.1626						
INDV			−.4367	.1512						
Grantee:										
CORP			.1744	.14						
GOVN			.497	.2402						
INDV			−.55	.135						
BTR/SLR:										
C to *C*					.808	.2433				
C to *I*					.141	.0272				
C to *P*					.7831	.2664				
I to *C*					−.1123	.2549				
I to *G*					.4257	.288				
I to *I*					−.6466	.2218				
I to *P*					.0341	.2318				
P to *C*					.9613	.2898				
P to *I*					−.188	.0322				
R-Square	.4327		.5409		.5538					
Sum of Squares	425.3959		336.1226		326.7339					
Df	356.		351.		347.					
F-Value	45.25		37.6		28.71		1.2358		1.2714	

controlling for other factors that effect land prices. The other factors include size, location, date of transaction, and zoning. The transactions are classified by grantor and grantee type using the following categories: individual, government, corporation, and partnership. Two versions of the grantor/grantee information are constructed: one with two sets of dummy variables representing the type of grantor and grantee; and one with a set of dummy variables representing ten combinations of buyer and seller type.

Some types of grantor and grantee are found to be statistically significant, with the highest prices paid when a governmental unit is the buyer (grantee), and the lowest prices paid when an individual is the buyer. The use of the ten buyer–seller combinations yields better prediction power than the separate grantor/grantee variables. Furthermore, the highest prices paid were in partnership-to-corporation transactions, while the lowest prices paid were in individual-to-individual transactions. Explanations for these findings are not possible in this study. All we can say for sure is that in this study, as in previous studies, buyer and seller characteristics matter.

In addition to the investigation of the effects of buyer and seller data, this study also adds to the growing literature that focuses upon the relationship between parcel size and price. This study confirms the presence of the so-called plattage effect, and it introduces a means of understanding the changes in this relationship over time. Specifically, by adding an interaction effect between time-of-sale and parcel size into the standard Cobb–Douglas model, information regarding future subdivision potential can be extracted from the data.

Additional study is needed to confirm or refute the findings of this study and to identify other buyer and seller characteristics that might influence real estate transactions. Unfortunately, traditional data (e.g., MLS sales) sets do not include information regarding buyers and sellers. Data sets of housing sales with buyer and seller characteristics, such as income, family size, occupation of head of household, age of children, etc., should be gathered for subsequent analysis in order to better understand the role of buyer and seller characteristics in real estate transactions. Additionally, further investigation of the possibility of omitted variables being correlated with the buyer and seller characteristics is warranted.

Notes

[1]Selectivity bias for zoning and the buyer–seller variables may be present in this model, but its effect is assumed to be negligible.

[2]The author wishes to thank a referee for this explanation.

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