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Abstract

Option theory offers a useful way of modeling land value under uncertainty. While this approach underlies much theoretical analysis, the unanswered question is, to what extent does the market value of land reflect this option value? This paper exploits a unique natural experiment to obtain the first direct estimates of the option value of land based on observed transactions. Comparing land sold under constraints that strip away real options to land sold in the same market without such restrictions, we find that approximately 45% of the market value of developable land represents the value of these embedded real options.

Keywords: option value, vacant land value

JEL Subject Codes: D44, G13, R33

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1 Introduction

The seminal work by Titman (1985) stimulated using real options theory as a new and useful way to interpret land values under uncertainty. Investments in real estate structures, once put into place, are highly durable and costly to reverse. The option value approach implies that vacant land has greater value than the expected discounted return to current development because it reflects the value of being able to adapt development plans to future market conditions as they become known. While option value models have proved useful for theoretical and simulation analysis of land development issues, the unanswered question is, to what extent does the market value of land itself reflect option value?

This paper exploits a natural experiment created by the Singapore Government Land Sales (GLS) program in order to obtain the first direct estimates of the option value in developable land. GLS transactions are conducted by first-price sealed-bid auctions. The highest bidder obtains the land, but is also constrained to pursue the development project within the stated time frame. The structure of GLS transactions precludes either holding the land for speculative purposes, reselling the land, or pursuing alternative development plans—hence, GLS transactions strip the property of much of its option value, reducing the sales price to a value closer to the intrinsic value of the land. What makes the natural experiment possible, however, is that GLS transactions represent only part of the land market. The Singapore land market also has private sales by direct negotiation in the open market and, more importantly for our purposes, private sales by first-price sealed-bid auctions without the restrictions imposed in GLS auctions. This combination of transactions in the same market allows us to directly estimate the option value of land as the difference between a particular parcel's predicted price if sold in the private market and its predicted price if instead sold in the GLS program.

Notwithstanding the growing importance of option value theory as an analytical tool in land economics, there have been only a few attempts to empirically test the model much less to determine the extent to which land value reflects option value. The handful of extant empirical studies take a variety of creative approaches. Each hinges upon the theoretical prediction that greater uncertainty about future real estate prices increases the value of retaining flexibility in investment plans, hence increases the option value of undeveloped land.

One approach exploits this basic relationship to empirically test the option model comparative static prediction for development timing. By increasing the option value of vacant land, greater real estate price uncertainty increases the development decision hurdle for current projects, thereby slowing the development pace (Titman, 1985; Capozza and Helsley, 1990; Capozza and Li, 1994). Bulan, Mayer, and Somerville (2002) and Cunningham (2006) estimate the effects of real estate price uncertainty on condominium and housing starts, respectively, and find that greater uncertainty does tend to slow the expected development pace as predicted by the theory.

Other approaches focus instead on the predicted relationship between price variability and land value. Quigg (1993) applies the hedonic method to estimate the value of structures in order to calibrate Williams' (1991) real option model, which is then used to calculate the implied value of vacant land in Seattle. The calculated housing price variability implied by this process appears reasonable, providing support for the option model of land value. Cunningham (2006) also examines the relationship between land value and real estate price variability but tackles the question from the opposite direction, by first calculating housing price variability and then estimating its impact on the price of land in Seattle. His estimates are sensitive to how the price variability is calculated but tend to support the option theory implication that housing price volatility lowers land value.

The natural experiment used in this paper has two methodological advantages over the previous efforts to estimate the relationship between option value and land value. First, it allows us to entirely sidestep calculations of price variability. There is no preferred method of calculating real estate price variability, which is important because, as Cunningham (2006) shows, the hedonic land price estimates can be sensitive to the method used to calculate this key variable. Second, our natural experiment allows us to trace the source of the real options embedded in land—the flexibility of when to develop and how intensely to develop—rather than comparing existing land values to a counterfactual (out-of-sample) environment without price uncertainty.

The empirical estimates imply that about 45% of the value of land sold in private markets represents the value of embedded development timing, intensity, and liquidity options. As expected, our estimate is higher than Quigg's (1993) estimate of the development timing option value alone and appears reasonable in light of the range of liquidity-constraint discounts observed for restricted stock sales.

2 The Natural Experiment

Our study focuses on the residential land market in Singapore. Land transactions in Singapore occur in three types of environments: private negotiation in open market transactions, auctions of land being sold by private parties, and auctions of land being sold by the Government. Table 1 reports the breakdown of transactions during 1994-2004. The presence of both private auctions and government auctions in the Singapore land market is an essential feature of the natural experiment.

The Singapore property market suffered a variety of afflictions in the early 1960's: overcrowding, dilapidated housing, large numbers of squatters, poor sanitation conditions, limited social amenities and congested traffic. Recognizing the importance of involving the private sector to transform the urban landscape of the new nation, Singapore initiated its Government Land Sales (GLS) program. Under this program, the government acquired fragmented urban land plots by purchase and eminent domain, amalgamating them and then offering the assembled parcels to private developers through first-price sealed-bid auctions. The process is as follows. When a development site is released for sale, interested bidders are invited to purchase a Developer's Packet containing the planning and design guidelines for the site and other specific conditions for the sale. The residential sites entail a leasehold tenure of 99-years.[1] Depending on the complexity of the proposed development and other constraints on the site, interested bidders are given between two and four months to carry out their due diligence and prepare the tender submission. By noon on the closing date of the auction, bidders must deposit their sealed-bid together with a deposit equivalent to 10% of the bid amount. The bids are opened and the site is then awarded to the

[1] Lease extensions can generally be obtained for 50% of the redevelopment potential at that time.

highest bidder above the reserve price.

GLS auction tender conditions put a variety of important restrictions on the winning bidder. To summarize, the successful bidder must complete development within the tendered time frame or face punitive fines. Another term of the contract restricts the winning bidder from either reselling the land for immediate profit or holding the land as inventory for future development. The successful tenderer is not allowed to dispose of the land before completing the development. Further, the developer is required to retain a controlling interest of more than 50% in the development. The purpose of these restrictions is to remove alternative investment motives, leaving immediate development as the bidder's only feasible course of action upon successfully obtaining a site. The effect of these restrictions is to strip away many of the most important development options typically thought of as embedded in vacant land. The 99-year leasehold further constrains the ability to redevelop or resell the site without prior approval.

In total, 165 GLS sites were sold for residential development for our 1994-2004 sample period (see Table 1). No sales took place between 1998 and 1999 while the program was suspended during a property market slump. On average, each GLS auction attracted approximately 6 bids. The most popular site attracted 19 bids and the 11 least popular sites attracted only one bid each. (Note, though, that even single bidders must bid against the unannounced reservation price so that single bidder auctions resemble a 2 bidder auctions.)

Our sample also includes private land supplied to the market. The private sales sample covers private transactions reported in the press, namely the *Business Times* and *Straits Times*, during 1994-2004. In total we have a sample of 108 observations on private land sales. In contrast with the 99 year leasehold in the GLS sample, our sample of private transactions entail freehold land tenure or its equivalent. Of the 108 observations, 64 (44) are sold by auction (by private negotiation). With the exception of the residential zoning restriction, the private land sales have no other systematic constraints on embedded options.

3 Option Value and Land Value

We summarize the basic features of the option model to illustrate how our natural experiment uncovers the option value of vacant land. Consider a two period environment, current and future. The developer holds a unit of land. The development decision is whether to develop the land and sell the building units in the current time period or wait to develop the land in the future. The current market price of a building unit is p_c; the future price will either be higher or lower, $p_h > p_c > p_l$. The number of building units per unit of land is q. Given construction costs $C(q)$, with $C' > 0$ and $C'' > 0$, the current return to a unit of land developed with structural density q is $R(q) = pq - C(q)$ in general. The optimal structural density in terms of building units per unit of land depends upon the realized price of building units and is given by the developer's supply function defined in the usual way

$$q(p) \equiv \arg\max pq - C(q)$$

Substituting the developer's supply function into R yields an indirect land profit function $\pi(p)$ which is increasing convex in p. Taking the expectation using the risk neutral synthetic probabilities implied by the no arbitrage condition, the current value of land left vacant can be expressed as

$$E[\pi(p)/(1+r)] = \left(\frac{p_h - p_c}{p_h - p_l}\right)\left(\frac{\pi(p_l)}{1+r}\right) + \left(\frac{p_c - p_l}{p_h - p_l}\right)\left(\frac{\pi(p_h)}{1+r}\right) \tag{1}$$

where the riskless interest rate is r. The value of this parcel of land in the market is

$$V_{mkt} = \max[\pi(p_c), E[\pi(p)/(1+r)]] \tag{2}$$

Define the current period hurdle price, $\tilde{p}$, as the current building unit price that leaves the developer indifferent between current development and holding the land vacant for future development:

$$\pi(\tilde{p}) \equiv E[\pi\left(p\right)/(1+r)] \tag{3}$$

Therefore, $p_c < \tilde{p}$ for land left vacant in the current period. The market value of this parcel of vacant land is $V_{mkt} = E[\pi\left(p\right)/(1+r)]$ from (1), which is the land value embodying the embedded development options.

Real estate sold at auctions, however, sometimes sells at a discount relative to property sold in the open market with negotiated prices because auctions can limit the market exposure of the asset being sold (Ashenfelter and Genesove, 1992; Mayer, 1995). At the same time, the auction discount sometimes varies with the number of participating buyers because increasing the number of bidders increases the likelihood of a high value bidder in the pool of buyers but it also can affect the bidding strategies of the participating buyers, especially in single-price closed-bid auctions like those considered here (Mayer, 1995; Wilson, 1977). Denoting this possible auction discount as A, the value of land sold in the private closed bid auction is

$$V_{auc} = V_{mkt} - A \tag{4}$$

In contrast with the private sector auctions in which winning bidders are free to resell the land or to delay development in response to changing property market conditions, Singapore's Government Land Sales (GLS) program eliminates that flexibility for bidders, as explained in the previous section. It can be shown that the risk neutral probabilities used to calculate the expected values in (2) also ensure that the current price of building units satisfies $p_c \equiv E[p]/(1 + r)$. In this case the maximum bid for a unit of land in the GLS program is the land profit from the development at density $q(p_c)$ less the auction discount, or

$$V_{GLS} = \pi(E[p]/(1 + r)) - A \tag{5}$$

where the first right hand side term is the land profit when there is no real estate price uncertainty, which is Quigg's (1993) "intrinsic value" of land as an asset. Therefore, for otherwise identical vacant land, the price differential for the parcel sold in the GLS program compared with its price if sold in a private auction that does not limit development flexibility is the option value premium (OV) given by

$$OV = (V_{auc} - V_{GLS})/V_{auc} \geq 0 \tag{6}$$

This holds with equality only if the current price meets the hurdle price, $p_c \geq \tilde{p}$, so that immediate development is the optimal strategy when no constraints are imposed on the developer. More generally, the above expression represents the value to the investor of being able to adjust development plans to fully exploit realized market conditions, as revealed through realized real estate prices. What (6) provides is the basis of our natural experiment: using an hedonic approach to control for land attributes, we compare otherwise identical land sold in the GLS with land sold in the private auction; the difference in the log of selling price provides our OV estimate.[2]

Comparing (1) and (3) using (4) suggests another useful comparison, the price differential for the GLS parcel compared with the parcel sold in the open market as

$$(V_{mkt} - V_{GLS})/V_{auc} = OV + A/V_{auc} > 0 \tag{7}$$

Thus, we expect the direct comparison of open market land sales to otherwise identical GLS transactions yield an upward biased estimate of the option value, with the size of the bias depending on the auction discount. This emphasizes that the option value cannot be determined solely by direct comparisons of GLS and open market transactions; the coexistence of both GLS and private auction sales in the same market is an essential feature of the natural experiment.

4 Empirical Results

Table 2 presents the definitions of variables used in the empirical analysis. Table 3 reports summary statistics for the sample of land sales. The total sample is 273 transactions, of which 108 are private land sales and 165 are GLS transactions. The private and government sites are interspaced throughout the main residential areas of Singapore, with about 32% in what are widely regarded as prime locations in terms of surrounding property and accessibility to the central business district (CBD). The price of the land parcels sold during the sample period ranges from a minimum of S\$2.3 million to S\$682.8 million, with an average of S\$90 million. The average parcel size is about 14,200 m^2 and the average plot ratio (the allowed ratio of floor space to land area) is 2.16.

[2]If the Singapore Government auctions a parcel of land at the optimal time to exercise its development option then the estimated OV will be zero. The extent to which the GLS agencies successfully accomplish otpimal development timing will be revealed by the empirical results.

Singapore occupies a small physical area. The greatest distance of a sold plot from the nearest subway station is only slightly above 4 km. Similarly, the development site farthest from the CBD is only 22 km. In view of the short distances involved, we expect a relatively flat rent gradient in Singapore.

The hedonic price function includes variables reflecting the underlying value of the development (site characteristics and location), developer characteristics (previous experience in the Singapore market), time period fixed effects, and transaction type (privately negotiated, private auction, or GLS). We use the popular semi-log functional form, regressing the logarithm of selling price on the specific variables identified in Table 4.

Table 4 reports the estimates for the model estimated on two different samples. Model (1) is the base hedonic model, that is, without the auction variables (*OPTIONS*, *AUCTION*, and *AUCTION*NUMBID*) estimated on the full sample. Model (2) is the same base model estimated on the sample comprising only GLS and private auction transactions. Model (3) is the complete model estimated on the full sample while model (4) is estimated on the sample of GLS and private auction transactions.

The main variables for this study are those pertaining to the transaction mode, the coefficients of which are needed to determine the option value of land following (4) and (5). The variable *AUCTION* is a binary variable indicating that the property is sold in an auction (either private or government). Define *NUMBID* as the number of bidders in the auction. We include the interaction variable *AUCTION*NUMBID* in the hedonic model to control for the structure of the auction regardless of whether private or government.[3] *OPTIONS* is the binary variable for GLS transactions. According to (6) the coefficient on this variable is our estimate the option value. Model (3) is estimated on the entire sample of negotiated sales, private auction sales, and GLS transactions. The *AUCTION* coefficient in Model (3) indicates that there is no stable auction discount beyond the effect of the number of bidders on price. Using the Kennedy (1981) adjustment, the *OPTIONS* coefficient implies that development and liquidity options account for approximately 45% of the market value of land in

[3]The number of bidders (potentially interested buyers) is unknown for privately negotiated sales. This does not matter, since the interaction variable *AUCTION*NUMBID* excludes those cases.

Singapore.

As an alternative way of controlling for the possible auction discount, we estimate model (4) on the sample of private and GLS auction transactions alone. The results for the auction sample model (4) are virtually identical with those for the full sample model (3); of particular interest, the estimated option value is very close to the 45% found for the full sample. This is the value of the flexibility to liquidate, change the specific development project characteristics or postpone the development timing in response to new market information plus the value of retaining the redevelopment options implicit in the freehold associated with private sales.

How does our option value estimate compare with others? The option value found in Singapore land encompasses the value of the real options for the range of development choices, the value of the liquidity or marketability option for resale choices, and the value of redevelopment options associated with freehold ownership. Quigg (1993) and Cunningham (2006) examine the real development options that reflect planning and timing flexibility. This represents one layer of the options stripped away in the GLS transactions in this study. Using her calibration of William's (1991) framework, Quigg (1993) calculates the option value for residential land in Seattle as ranging from 1% to 11% of intrinsic value. At the same time, though, these calculations also lead to the conclusion that little of the built land in her sample should in fact have been developed under the option pricing criteria in William's (1991) model, an admittedly disturbing inconsistency generated by the model. Cunningham (2006) does not try to estimate the option value of land, but his hedonic models suggest an option value ranging from zero to 1% when comparing land values at the mean of his calculated housing price uncertainty to the counterfactual with no price uncertainty (the latter of which corresponds to Quigg's definition of intrinsic value).

Quigg's (1993) estimates show at best an option value of about 11% arising from planning and timing flexibility. Subtracting this amount from our total option value estimate leaves a residual of 34% of land value as the value of embedded liquidity and redevelopment options. The GLS limitation on the developer reselling the land is essentially a liquidity or marketability restriction. The business valuation literature has examined analogous liquidity or "marketability discounts" embedded in restricted stock shares that impose two-year waiting periods for resale. Gelman (1972), Trout (1977), Maher (1976), Silber (1991), and Johnson (1999) find discounts ranging from 20-35% while Wruck (1989) and Hertzel and Smith (1993) use a refined methodology to find smaller but still substantial discounts of 10-13.5%. Given the short duration of the waiting periods for the restricted stocks examined in these studies, it is not unreasonable to expect the more stringent liquidity restrictions imposed in GLS land sales to require marketability discounts that exceed these amounts. As lower bounds, these estimates suggest that the liquidity premium arising from being able to resell the property can account for anywhere from one quarter to three quarters of the estimated option value of privately sold land in our sample. Although on the high end of the limited empirical evidence available thus far, our option value estimate does not appear to be unreasonable in light of these marketability discounts in conjunction with the range of real development option values calculated by Quigg (1993).

Other aspects of the results lend further confidence in our estimates. All of the estimated models are significant and the complete models (3) and (4) explain almost 90% of the observed land price variation. This range of explanatory power is higher than often found in hedonic models based on micro transactions data and indicates that the other variables in the model are controlling for the various effects intended. The first group of variables pick up the effects of site location, parcel size, and other site-specific characteristics. The coefficient on the log of parcel size (*LSIZE*) is positive, as expected, but not significantly different from one. The primary parcel location attributes are captured by the distance from the commercial business district (*CBD DIST*), the distance from the nearest metro subway station (*METRO DIST*), and whether the site is in what is commonly recognized as a prime location (*PRIME LOC*). The *PRIME LOC* coefficient is positive and significant while the *CBD DIST* coefficient is negative and significant in all of the models, as expected. On the other hand, while the value of proximity to a metro station is negative in all models, it is not always significant.

PLOT RATIO reflects the maximum allowed floor area-land area ratio for the site. Like lot size zoning in the U.S., this restriction can be envisioned as following the market or as a binding regulatory constraint, the former case yielding insignificant and the latter case yielding significant price effects. The coefficient is significantly positive in all models; allowing greater structural density increases land value, indicating that this constraint is binding on developers in our sample. This is consistent with the view commonly held by market participants.

The variables *EXEC CONDO* and *SINGLE FAM* are included in the models to control for site value effects from developments that are subject to the special executive condominium restrictions (i.e., no resale of individual units for 5 years) or are to be developed as single family bungalows or townhouses, respectively. The omitted category is high density residential development. The estimated coefficients on both of these variables are negative and significant, indicating that resale restrictions on built units (as in the executive condominium case) or low density use (as in the *SINGLE FAM* case) generate lower returns to developed land.

EXPERIENCE indicates whether or not the buyer is a developer with previous experience in the Singapore land market. There are various rationales for why this buyer characteristic might affect price. Harding, Rosenthal, and Sirmans (2003) argue that including buyer characteristics in an hedonic price equation picks up the relative bargaining skill or bargaining power of specific types of buyers on selling prices. If experience translates into greater bargaining skill, then buyer experience reduces selling price. Alternatively, experienced developers may have greater ability to extract higher returns from the property, which increases the maximum price they are willing and able to offer in a competitive market. Therefore, the net effect of this variable on price is ambiguous a priori. The estimated coefficient is positive but only weakly significant in Model 3, indicating that, regardless of relative bargaining power, buyers who are experienced developers do not appear to be able to extract greater returns from the land than their less experienced counterparts.

5 Conclusion

Modern land economics views vacant land in terms of its embedded development options. While this approach has stimulated increasingly sophisticated theoretical and simulation analysis of land markets in the literature, empirical studies have been limited by the lack of usable data. As a consequence, even the fundamental question of how much of the observed value of land represents its option value and how much represents an intrinsic value remains unresolved.

This paper exploited a natural experiment in the Singapore land market to obtain the first direct estimates of the option value of land. The existence of the Singapore Government Land Sales program and private transactions in the same market over the same period allows us to directly compare land sold by the government restricting the range of actions option theory identifies as the sources of option value–flexibility in development timing and project characteristics, the ability to sell the land or the development project at any stage, and the value of redevelopment under freehold ownership–to land sold without such restrictions in the private market. The hedonic estimates indicate that approximately 45% of the market value of vacant land represents the value of its embedded options.

It is clear that participants in the Singapore market understand the value of flexibility and value the property rights that are the underlying source of this flexibility. How much do U.S. markets value these underlying property rights? The natural experiment offered by the mixture of government and private auctions in the Singapore property market is the essential element of this study. Should the fact that similar circumstances are not readily evident in the U.S. limit the opportunity for direct option value estimates in these important markets? There is, after all, a vast array of zoning laws, growth boundaries, and other land use regulations implemented by local governments in the U.S. For example, why not simply examine how an observed change in land use regulation that strips away (or puts back) an important development option affects vacant land values? One problem with this and conceptually similar cross-section approaches is that resultant changes in the market value of vacant land capture a combination of option value and the effects of market-level quantity restrictions implicit in the regulation (Glaeser, Gyourko, and Saks 2005). It appears that adding to the scant body of option value estimates for U.S. markets will have to rely on more indirect methods than that taken here. This is somewhat disquieting, given that Quigg (1993) and Cunningham (2006) illustrate how sensitive option value estimates can be to the empirical methodology employed.

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Table 1. Sample sites sold for residential development in Singapore (by year)

Year	GLS		Private		Whole Sample	
	No.	Total Value (S$ million)	No.	Total Value (S$ million)	No.	Total Value (S$ million)
1994	28	2,922.29	2	60.69	30	2,982.98
1995	21	1,273.15	6	264.77	27	1,537.92
1996	36	3,824.31	19	1,110.66	55	4,934.97
1997	36	4,638.31	16	1,059.77	52	5,698.08
1998	0	0	1	57.70	1	57.70
1999	0	0	34	2,593.13	34	2,593.13
2000	21	1,759.28	11	1,089.40	32	2,848.68
2001	13	1,091.30	0	0	13	1,091.30
2002	6	643.61	2	88.50	8	732.11
2003	3	489.300	11	888.35	14	1,377.65
2004	1	80.900	6	641.40	7	722.30
Total	**165**	**16,722.45**	**108**	**7,854.37**	**273**	**24,576.82**

Notes: The exchange rate for US$1 is equivalent to S$1.63 in February 2006.

Table 2. Variable Definitions

PRICE	The transacted land price in S$.
LSIZE	The area of the land parcel in square meters.
PRIME LOC	A binary variable indicating that the site is in one of the traditional prime residential districts (districts 10 or 11).
CBD DIST	The distance in kilometers to the Central Business District.
METRO DIST	The distance in kilometers to the nearest metro subway station.
PLOT RATIO	The maximum allowed floor area-land area ratio for development on the site.
SINGLE FAM	A binary variable indicating land parcels that are designated for low density single family dwelling units, such as detached or linked houses, bungalows, or townhouses.
EXEC CONDO	A binary variable indicating land parcels designated for executive condominiums, which is a special class of condominium that restricts resale for the first five years.
EXPERIENCE	A binary variable indicating that the highest bidder has previous experience as a developer.
YR95; YR96; …; YR04	A set of binary variables indicating the year in which the site is sold.
OPTIONS	A binary variable indicating land parcels sold under the Government Land Sales (GLS) program.
NUMBID	Number of bidders for the auction.
AUCTION	A binary variable indicating that the site was sold through auction.

Table 3. Descriptive Statistics

Variable[a,b]	**Mean**	**Std.Dev.**	**Minimum**	**Maximum**
PRICE	90,025,000	83,293,200	2,300,000	682,800,000
LSIZE (m^2)	14,228	13,925	703	125,913
PRIME LOC	0.315		0.000	1.000
CBD DIST (km)	8.082	4.644	0.924	22.100
METRO DIST (km)	1.158	0.896	0.080	4.060
PLOT RATIO	2.155	0.938	0.800	8.400
SINGLE FAM	0.161		0.000	1.000
EXEC CONDO	0.051		0.000	1.000
EXPERIENCE	0.886		0.000	1.000
YR94	0.110		0.000	1.000
YR95	0.099		0.000	1.000
YR96	0.201		0.000	1.000
YR97	0.190		0.000	1.000
YR98	0.004		0.000	1.000
YR99	0.125		0.000	1.000
YR00	0.117		0.000	1.000
YR01	0.048		0.000	1.000
YR02	0.029		0.000	1.000
YR03	0.051		0.000	1.000
YR04	0.026		0.000	1.000
OPTIONS	0.604		0.000	1.000
NUMBID[c]	4.509	3.709	0.000	19.000
AUCTION	0.766		0.000	1.000

Notes:
a. Variables are as defined in Table 2.
b. The descriptive statistics are based on the sample of 273 observations.
c. For auction transactions only.

Table 4. Hedonic Land Price Function Estimates

	Model 1[a]			Model 2[a]			Model 3[a]			Model 4[a]		
	Coeff.	**Std.Err.**[b,c]		**Coeff.**	**Std.Err.**[b,c]		**Coeff.**	**Std.Err.**[b,c]		**Coeff.**	**Std.Err.**[b,c]	
LSIZE	0.9791	0.0336	***	0.9885	0.0412	***	1.0089	0.0323	***	1.0170	0.0393	***
PRIME LOC	0.4758	0.0687	***	0.4334	0.1024	***	0.3212	0.0739	***	0.2729	0.1053	**
CBD DIST	-0.0297	0.0065	***	-0.0248	0.0067	***	-0.0241	0.0060	***	-0.0187	0.0061	***
METRO DIST	-0.0615	0.0271	**	-0.0540	0.0298	*	-0.0498	0.0237	**	-0.0355	0.0262	
PLOT RATIO	0.3261	0.0408	***	0.3542	0.0603	***	0.3676	0.0439	***	0.3926	0.0625	***
SINGLE FAM	-0.6384	0.0871	***	-0.6167	0.1005	***	-0.5271	0.0861	***	-0.5227	0.0994	***
EXEC CONDO	-0.2050	0.0480	***	-0.1987	0.0522	***	-0.1594	0.0466	***	-0.1885	0.0501	***
EXPERIENCE	0.1008	0.0721		0.1074	0.1075		0.1285	0.0662	*	0.1336	0.0981	
OPTIONS							-0.4565	0.0765	***	-0.4419	0.0890	***
AUCTION NUMBID*							0.0190	0.0094	**	0.0241	0.0085	***
AUCTION							0.0420	0.0750				
Observations	273			209			273			209		
Adj R^2	0.881			0.878			0.896			0.892		
F-statistic	113.3	***		89.3	***		112.9	***		91.6	***	

Notes:

a. LnPRICE is the dependent variable. The independent variables are as defined in Table 2. Constant term and year fixed effects are included in all models but not reported in table.

b. White's heteroscedastic robust standard errors.

*c. ***,**, and * denote significance at the 1.0%, 5.0 % and 10.0% level (one tail), respectively.*