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LANDOWNER CHARACTERISTICS AS DETERMINANTS
OF DEVELOPER LOCATIONAL DECISIONS

by

Charles H. Barnard and Walter R. Butcher

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Most the literature on urban sprawl and the urban conversion of farm-land hypothesizes that direct and indirect government policies inadvertently provide incentives that foster discontinuous urban development [see Boling, Dunford, Clawson]. Although merely responding to these incentives and constraints, developers make key locational decisions that are responsible for discontinuous urban growth [see Kaiser and Weiss; Clawson]. It is often hypothesized that in an effort to maximize profit, developers select first those parcels that have the site and accessibility characteristics most desired by consumers. This argument suggests that discontinuous urban growth occurs because the parcel characteristics desired by housing consumers and sought by developers are widely and randomly scattered throughout the urbanizing area. For instance, Kaiser [pp. 351-352] "attempts to illustrate conceptually and verify empirically that the factors influencing the developer's profit motivated locational decisions include, but are by no means limited to, characteristics of consumer demand." He goes on to conclude that [p. 361], "on a fairly general level, the empirical analysis supports the hypothesis that the locational decision should be substantially explainable by the list of site characteristics involved in every such decision."

This paper offers an alternative view of the developers' locational decision, contending that developers (at least implicitly) select parcels according to the characteristics of the landowners, rather than according to the site and accessibility characteristics of the parcel. Thus, if such landowner characteristics are randomly distributed across the

urban plain, the pattern of urban development will also be random and discontinuous. Two premises from the economic theory of the land market combine to yield discontinuous development. The first is related to land market equilibrium, and the second to the relative perceived present values of landowners who hold rather than sell their land. The efficacy of the two alternative hypotheses--whether developer locational decisions are based upon parcel characteristics or landowner characteristics--is tested using discriminant analysis.

Developer Locational Decisions

Land Market Equilibrium

Muth [p. 6], in discussing the equilibrium location of the non-farm housing industry upon a homogeneous Von Thunen-like plain, states that long-run equilibrium within the land market requires that all firms in the non-farm housing industry earn equal profits, regardless of location relative to the urban center (CBD). Competition among firms and between industries drives up the bids for land until the equilibrium rent paid for each close-in site exceeds the rent paid for more distant sites by the value of the transportation savings accruing to close-in sites. A firm's advantage in low transportation costs for close-in sites is eliminated by the higher rents necessary to secure use of those sites--rents which are exacted by the landowner. Consequently, all sites yield equal profits to the land-using firm. Thus, the special conditions of an urban land market equilibrium create an economic circumstance in which firms (developers) are indifferent concerning location relative to the CBD--at least within the range of positive urban land rents. There is no incentive to develop a new residential unit on a site directly adjacent to the existing city.

Although Muth's discussion only encompassed homogeneous land parcels, the argument can be extended to heterogeneous parcels as well. Rents attributable to site and accessibility characteristics also generate rents which are captured by the landowner. In equilibrium, developers earn equal profits regardless of location relative to the CBD or the site and accessibility characteristics of heterogeneous land parcels. Thus, developers should be indifferent both about location anywhere within the urban area and about the site and accessibility characteristics they include in the housing package.

Landowner Perceived Present Value

In the hypothetical world of neoclassicism where markets are competitive, expectations are rational, and all market participants have perfect knowledge, foresight, and certainty, all land market participants arrive at the same conclusion about the present value of a land parcel. But, actual land markets are fraught with imperfect knowledge, uncertainty, short-run rigidities, and speculation. Land investment/disinvestment decisions must be made on the basis of perceived present value rather than on actual present value. That is, developers and landowners must subjectively estimate future rents, which are unpredictable because of changes in land demand factors such as the relative price of goods and services, consumer tastes and preferences, income, and population.

Furthermore, in actual land markets, participants are not homogeneous individuals. Instead, differences in personal characteristics such as net worth, current income, asset liquidity, age, family size, psychic ties to the land, and death in the family cause land market participants to have different perceptions of the value of the rent stream from functionally identical tracts of land. These personal characteristics, and financial

characteristics such as income taxes, capital gains taxes, and credit terms, determine the landowner's and developer's required rate of return. Other landowner characteristics that alter the required rate of return are the subjective estimate of the waiting time until urban conversion and the individual's ability to influence or predict governmental decisions that will change the value of his parcel.

Selection of Parcels

If rents attributable to site and location characteristics are fully capitalized into land values, then developers should be indifferent about which characteristics they include in the housing package they provide. Such evidence is clearly provided by the hedonic price regressions that abound in the land value literature. An hedonic price equation estimated as another part of this study adds to that evidence and indicates its applicability in this study area. If capitalization does make developers indifferent concerning the characteristics of the parcels they develop, a further question is, "How do developers select parcels for development?"

This paper hypothesizes that developers continually scan the urban area for parcels owned by individuals with low perceived present values relative to the value that other owners would attach to comparable site and location characteristics. If a landowner's perceived present value (offer price) is greater than all investor's perceived present values (bid prices), then the landowner rationally holds the parcel off the market as a speculative investment. Conversely, if some investor's bid price is higher, the land becomes available for development. Differences in expectations of future rents, future sales potential, or required rates of return create a very large arena for differences in the perceived present value of comparable or even identical parcels. Consequently, the best opportunity for the purchase of a land parcel is when a prescient

developer finds a landowner with low expectations about future land price increases or a high required rate of return. This, implicitly at least, is the perception of Goldberg and Winder [p. 365]. They state, "shopping for land appears to be one of the developer's prime areas of cost minimization, and as such they ascribe a high level of importance to the price of land." Upon identifying, purchasing, and developing these parcels, the developer earns an economic profit.

Thus, if landowner characteristics are randomly distributed across the urban plain, the pattern of urban development will appear random and discontinuous also. Ottensmann [pp. 390-391] nicely sums up the whole concept:

"Given the conventional assumption, similarly situated landowners should reach the same decision with respect to development. But landowners vary widely with respect to their situation, knowledge, and attitudes, which affects both future expectations and real and perceived holding cost. Some important differences include landowner incomes, income tax positions, alternative investment opportunities, the possible use of the land in agricultural production, and eligibility for preferential property tax treatment. These differences will produce variations in landowner decisions to develop or withhold their land, resulting in the fine-grained pattern of urban sprawl that is observed as development occurs at the periphery of urban areas."

Empirical Analysis

If developers select parcels for development because they are composed of site and locational characteristics that are highly desired by consumers, then the characteristics of those parcels should consistently be different from those not selected for development. That is, according to this hypothesis, one should be able to distinguish parcels that will be selected for development from those that will not be selected for development by examining each parcel's site and locational characteristics. Alternatively, if developers select parcels for development by finding bargain parcels, then the parcels selected for development should consistently be those that were owned by landowners with low perceived present

values for their parcels. Thus, according to this bargain hunter hypothesis, one should be able to identify parcels that will be selected for development by examining the perceived present values (or expectations and financial circumstances) of parcel owners.

This study uses discriminant analysis to evaluate the two hypothesized criteria for developers' parcel selection. First, separate discriminant functions were estimated from parcel characteristics, landowner characteristics, combined landowner and parcel characteristics, and landowner and current parcel use characteristics. Whether parcel characteristics or landowner characteristics are the basis of a developer's selection of parcels is then evaluated by comparing the proportion of sample members correctly classified by the discriminant function based upon each of these vectors of characteristics. The discriminant function with the superior classification ability indicates which vector of characteristics is most successful at distinguishing parcels that were sold from parcels that were held.

Sample

The County Assessor's files were used to identify parcels within approximately 20 miles of the Vancouver [Washington] CBD that were sold during calendar year 1978. The sample was limited to parcels 5 acres or greater in size, having no assessed value for improvements, and that were not part of an existing subdivision. Parcels that appeared to involve quit-claim deeds, gifts, estates, or related parties were removed from the sample. The final 216 parcels represent the entire population of transaction parcels meeting the sample eligibility criteria. A random sample of 230 "holder" parcels was drawn from the list of all parcels fitting the above criteria, but which were not sold during 1978.

A mail questionnaire was then mailed to each landholder and each land seller identified in the sample. The questionnaire asked recipient about their expectations for land price increases and waiting time until development, use of their property, and their socio-economic characteristics. For each parcel for which a completed questionnaire was returned, site and accessibility characteristics were gathered.

Results

The first model classified sellers and holders using a quadratic discriminant function estimated from a vector of site and location characteristics including: acres, distance from CBD, distance from freeway, road frontage, stream frontage, location inside or outside the urban sewer service area, distance from water lines, and soil suitability for septic tanks. [See Barnard, pp. 75-76]. These characteristics were also included in a separate hedonic price regression.

This discriminant function correctly classified 58 percent of the sample members--40 percent of the holders and 81 percent of the sellers (see table 1). Since only 51 percent would be correctly classified purely by chance, the model is statistically better than chance classification at the .01 level of significance [see Barnard, p. 162 for description of the test].

Table 1. Summary of Classifications for Discriminant Function Estimated Solely from Parcel Characteristics

Actual Status	Percent classified as:	
	Seller	Holder
Seller	81	19
Holder	60	40

A second quadratic discriminant function was estimated using 6 expectation and 5 socio-economic characteristics representing the landowner's perceived present value for this parcel. The expectation variables measure expected capital gains, while the socio-economic variables measure required rate of return. Each landowner's expectations concerning parcel price increase were elicited in the questionnaire as discrete points on a subjective probability density function and summarized as expected value and variance [see Barnard, Chapter 4]. Each landowner's expectations concerning the waiting time until development were also elicited as discrete points on a subjective probability density function and summarized as expected value and variance. The landowner's expectations concerning the future use of the parcel were measured by the respondents' expectations of the type of dwellings that will eventually characterize the area surrounding his property and of the intensity of future land use in the vicinity of the property. After-tax family income, age, and education represented the required rate of return. The number of parcels sold (to account for experience in the land market), years of residence in the county (to account for familiarity with the study area), and occupation are proxies for the landowner's skill in the land market.

This function correctly classified 70 percent of the sample members. That is significantly greater--at .005 level--than chance classification and considerably better than the 58 percent correctly classified from parcel characteristics. The summary of this function's classification power is presented in Table 2.

Expectations of waiting time until development and its variance are the most important landowners characteristics for distinguishing between sellers

and holders. Expectations of changes in parcel price and its variance are second in importance. Landowner expectations are apparently more important than socio-economic characteristics (representing required rate of return) in distinguishing between sellers and holders.

Table 2. Summary of Classifications Estimated Solely from Landowner Characteristics

Actual Status	Percent classified as:	
	Seller	Holder
Seller	67	32
Holder	27	72

The superior classification ability of the discriminant function based upon landowner characteristics and expectations is further demonstrated when the vector of parcel characteristics is combined with landowner characteristics and expectations. The discriminant function estimated from the combined model classified 72 percent of the sample members correctly--only a 2 percent improvement over the classification ability of the discriminant function based on landowner characteristics and expectations alone. A summary of this latter model is presented in Table 3.

Table 3. Summary of Classifications Estimated from the Combined Set of Parcel and Landowner Characteristics

From	Percent classified as:	
	Seller	Holder
Seller	71	29
Holder	27	73

In the final model, the unimportant parcel characteristics are replaced by the following landowner and current parcel use characteristics: the number of years the landowner had owned the property, the intensity of current land use in the neighborhood of the sample property, the type of current nearby developments (such as single-family units), whether the parcel was being held for investment, and whether the property was being farmed. The resulting discriminant function's classification ability is substantially better than any of the previous models. In fact, 92 percent of the sample members are correctly classified. A summary of the classification is presented in Table 4.

Table 4. Summary of Classification Estimated from Landowner and Current Use Characteristics

Actual Status	Percent classified as:	
	Seller	Holder
Seller	93	7
Holder	8	92

In this discriminant function, landowner and current use characteristics are much more important in classifying sellers and holders than are the parcel characteristics.

SUMMARY

The superior classification ability of the discriminant function estimated from landowner characteristics and expectations indicates that the current landowner's characteristics are more important to investors than parcel characteristics in the selection of parcels to purchase. This supports the hypothesis that developers search the urban fringe for parcels

owned by individuals with characteristics and expectations that contribute to low perceived present values. The poor classification power of the discriminant function estimated solely from parcel characteristics supports the contention that developers (or speculators contemplating sale to developers) are not tending to buy parcels with a preferred set of characteristics. Evidently they are indifferent with respect to site and location characteristics.

Although not all the land sellers sold to developers, there is evidence that most investment/disinvestment decisions in the urban fringe are made in light of the eventual possibility of urban development. For instance, results from the mail survey conducted for this study indicate that the primary purpose of landownership is speculative for 21 percent of the current landowners. An additional 14 percent said their parcel is a future building site. In any case, the decision process of developers and other land market participants should be identical (especially if the speculator is to be successful in his trade).

Overall, the evidence confirms that landowner characteristics and expectations are superior for classifying landowners as sellers and holders. This supports the hypothesis that developers select parcels by identifying landowners with characteristics and expectations that indicate low perceived present values for the parcel.

The finding that parcels with highly valued locational and site characteristics are not more likely to be purchased by developers has quite broad implications. It appears that any land use policy which simply changes the costs and revenues from development--urban service areas, for example--will be ineffective. Unless the policy is structured to prevent changes in rents

from being capitalized, the predevelopment landowner will capture (suffer) the full extent of the windfall (wipeout) and developers will still be left with no greater financial incentive to first develop close-in sites.

LIST OF REFERENCES

- Barnard, Charles H., "The Urban Fringe Land Market: A Contributor to Discontiguous Urban Growth," unpublished Ph.D. dissertation, Washington State University, 1980.
- Boling, R.E., "Residential Site Development Costs in Southern Clark County, Washington," M.S. thesis, Washington State University, 1978.
- Clawson, M., "Urban Sprawl and Speculation in Suburban Land," Land Economics 38 (1962): 99-111.
- Dunford, R.W., "Farmland Retention: Efficiency vs. Equity," Invited paper presented to the Soil Conservation Society of America, August 3-6, 1980, Dearborn, Michigan.
- Goldberg, M.A., and D.D. Winder, "Residential Developer Behavior 1975: Additional Empirical Findings," Land Economics 52(1976):363-370.
- Kaiser, E.J., "Locational Factors in a Producer Model of Residential Development," Land Economics 44(1968):351-362.
- Kaiser, E.J., and S.H. Weiss, "Decision Agent Models of the Residential Development Process-A Review of Recent Research," Traffic Quarterly 23(1969):597-630.
- Muth, R.F., "Economic Change and Rural-Urban Land Conversion," Econometrica 29(1961):1-23.
- Ottensmann, J.R., "Urban Sprawl, Land Values, and the Density of Development," Land Economics 53(1977):389-400.