Theory of Urban Land Values

By PAUL F. WENDT*

RECENT YEARS have witnessed a re-awakening of interest in urban property values as cities face the problems of decentralization, obsolescence, and new fiscal crises. Important decisions in urban zoning, master planning, redevelopment, transportation, and parking require assumptions concerning the long-term trends in commercial and residential property values and the effects of varying programs of public investment upon these trends.

Herbert B. Dorau has concluded recently that the big city is economically insolvent and physically obsolete and that a significant decline has occurred in the real values of urban land during the past quarter century.[1] Dorau identified the revolution in automotive transportation as the principal factor accounting for the decline in the "big city." The theoretical roots of Dorau's argument can be traced to the writings of land economists in the nineteen twenties. Haig argued explicitly that improvements in urban transportation would cause a decline in urban property values.

". . . . Obviously, an improvement in transportation, other things remaining the same, will mean a reduction in friction and, consequently, the diminution of the aggregate sum of site rentals . . . ."[2]

Ely advanced similar arguments concerning the influence of increased efficiency in both transportation methods and construction techniques, and this provided the basis for his law of the movement of urban land values: "Other things remaining equal, in a progressive society with increasing wealth and stationary population, land values will decline."[3] Dorau and Ratcliff argued in the same vein, maintaining that increasing the speed and decreasing the cost of transportation would increase the supply of urban sites and thus bring about a decline in site rentals and urban land values.[4]

The theoretical structure upon which these hypotheses are based has had a broad and continuing acceptance in urban land economics and is of fundamental importance in considering the future of urban land values. The primary objective of the present article is to examine critically the hypotheses of Haig, Ely, Dorau, and Ratcliff concerning urban land values and technological change to determine whether they provide a useful framework for considering the future of urban land values, require important modification, or should be rejected entirely.

It will be argued that their conclusions are based upon a highly theoretical and oversimplified application of classical price and rent theory to urban land markets; that their acceptance requires unrealistic and unstated assumptions; that they fail to consider the dynamics of demand influences; and that they have little or no applicability to present-day urban land value trends.

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[1] "Urbanism and the Future of Land Values," *The Appraisal Journal*, January 1949, pp. 15-24.

[2] Robert Murray Haig, *Regional Survey of New York and Its Environs*, Vol. I (New York: Regional Plan of New York and Its Environs, 1927), p. 39.

[3] Richard T. Ely and Edward W. Morehouse, *Elements of Land Economics* (New York: The Macmillan Co., 1924), p. 262.

[4] H. B. Dorau and Albert G. Hinman, *Urban Land Economics* (New York: The Macmillan Co., 1928), pp. 509-11; Richard U. Ratcliff, *Urban Land Economics* (New York: McGraw-Hill Publishing Co., 1949), p. 372.

The development of the author's argument will require four major steps: *First*, a consideration of the problems of imputation and estimation involved in land value determination as a basis for understanding the nature of the land valuation process; *second*, a review of the important writings on the theory of urban land value, which will serve to show the historical evolution of the theories under examination; *third*, a synthesis of urban land value theories in a theoretical model representing the various factors impinging upon urban land values; and *fourth*, the employment of this theoretical model as a basis for a critical analysis of the Haig-Ely-Dorau-Ratcliff hypotheses concerning the influence of improvements in transportation and changes in construction costs and efficiency upon urban land values.

Problems in Land Value Determination

It is generally agreed that the value of urban land results from the discounting of future net incomes attributable to urban land by virtue of its location.[5]

Although the theory of urban land values can be simply stated, it is more difficult to apply since urban sites do not yield incomes except in combination with applications of labor, capital, and entrepreneural services. Since the returns from urban land are thus seen as joint returns, the estimation of the future net incomes attributable to an urban site involves a problem of *imputation* as well as *estimation*. Taussig pointed out that urban land rent arises because labor and capital applied on some sites yield unusually large returns and the owners are thus able to "keep for themselves the excess of return over and above what is usually got."[6]

The literature of neo-classical economics recognized that the yield on the advantageous urban sites depends on the skill and foresight of innovators.[7] Thus, a successful new office building or a shopping center will bring a gain first to the promoters and innovators, but it will gradually be reflected in a rising price for the site and for neighboring sites adaptable for the same use.

> "The parcel of 'improved' realty—land and building as one complex—earns an amount determined solely by its serviceability for business or dwelling uses. It is only in the very long run that a difference becomes apparent between rent and interest—between that return which goes to the owner of the site as such and that which goes to the owner of the capital put on it. As time goes on buildings do wear out, old ones are torn down, and new ones are substituted in their place in order to put the land in its most profitable use. Landowners then secure the full differential gain which their site is capable of affording."[8]

Taussig's analysis emphasizes the difficulties in the short-run determination of the net incomes which are imputable to urban land as contrasted with the building investment or entrepreneural profits. Ratcliff maintains that it is impractical to determine the fractions of real estate income which are imputable to land and building separately for an improved site.[9] Appraisal theorists are in general agreement, however, that land value may be estimated by assigning a portion of the total returns from land and building in combination to the amortization of an assumed building investment and capitalizing the remainder to secure land value. This technique is only acceptable, however, when the site is used

[5] Richard M. Hurd, *Principles of City Land Values* (New York: The Record and Guide, 1903), p. 2. Ely and Morehouse, *op. cit.*, p. 242.

[6] F. W. Taussig, *Principles of Economics*, Vol. II (4th ed.; New York: The Macmillan Co., 1947), p. 125.

[7] Alfred Marshall, *Principles of Economics* (8th ed.; London: The Macmillan Co., 1925), Chapter 11.

[8] Taussig, *op. cit.*, p. 128.

[9] "Net Income Can't Be Split," *The Appraisal Journal* April 1950, p. 168.

for its best economic or "highest and best" use.[10]

The latter concept, central to the valuation of urban land, is an application of the economic principles of proportionality and competition of uses. Businessmen, in deciding upon locations and the type of improvements to be placed on urban sites, will decide upon a building which maximizes the net returns to the site after allowing for a return on and amortization of the investment in improvements. The techniques through which decisions are reached require the comparison of estimated total returns on a series of hypothetical alternative types of structures. Ely and Wehrwein illustrate the investment calculations involved in deciding upon the ideal height of an office building.[11] Theoretically, competition for use of sites, using this type of analysis, should result in the adaptation of each site to its highest and best use and the returns to land under this use are capitalized to determine land value. This land residual method of land valuation, as it is called, assumes that building returns are fixed and any residual or excess returns accrue to the land.[12] The assumption implicit in the use of this method, that land is adapted to its highest and best use excludes its application in many cases in which buildings are obsolete or otherwise poorly adapted to a site.

Although short-run imputation of net returns to land presents a difficult problen, competition in the market for the use of advantageous sites should result in the differential advantages of each site being reflected in its rental and value in the long run.[13]

The foregoing discussion emphasizes that future prospects are the principal factors influencing current urban land values since it is the right to receive future income which is transferred in the real estate market. Hoyt, in his study of Chicago land values, pointed up the speculative errors which frequently occur in the market estimation of future incomes from urban land as investors are influenced by successive waves of overoptimism and conservatism regarding the future growth and property incomes in a large city.[14] The importance of the element of psychology as an influence upon urban land values was also emphasized by Unwin:

". . . . What is bought and sold in the market is merely the chance to benefit by a hoped for value, if it is ever realized. The value is of the same nature as the increase in salary which a clerk hopes to receive next year, and on which he may raise a loan if he can find anyone who fully shares his optimism."[15]

The great land booms of history bear testimony to the fact that today's values are based upon expectations of the future. Writing on "Trends in Urban Real Estate Values, Past and Future," in 1930, Stanley McMichael said, "I am not a prophet, nor the son of a prophet, and can only speculate, as the reader may, on what the future holds in store."[16]

It can be seen that problems of *imputation* and *estimation* raise formidable obstacles to the development of "perfect" market systems for urban land and

[10] Paul F. Wendt, *Real Estate Appraisal* (New York: Henry Holt & Co., 1956), pp. 172-78.

[11] Richard T. Ely and George S. Wehrwein, *Land Economics* (New York: The Macmillan Co., 1940), pp. 127-28. A similar analysis is found in Alfred Marshall, *Principles of Economics* (8th ed.; London: The Macmillan Co.) pp. 448-49.

[12] *Ibid.*

[13] Walter Isard, *Location and Space-Economy* (Published jointly by The Technology Press of Massachusetts Institute of Technology and John Wiley & Sons, Inc., New York, 1956), pp. 202-04.

[14] Homer Hoyt, *One Hundred Years of Land Values in Chicago* (Chicago: The University of Chicago Press, 1933), pp. 456-57.

[15] Sir Raymond Unwin, "Land Values in Relation to Planning and Housing in the United States," *Land Economics*, August 1951, p. 282. (Reprinted from *Land Economics*, February 1941.)

[16] *The Annals*, March 1930, p. 173.

the assembly of empirical data as albasis for an adequate theory. It is quite understandable, therefore, that the urban land economist turns to the market for urban land value data, since it is here that "the minds of most men meet." It is fundamental to the discussion that follows, however, to recognize that the market values of urban sites result from the process of discounting expected future returns assignable to urban land.

Review of Urban Land Value Theories

The theory of urban land values is a curious mixture of broad generalizations concerning the future of urban land values, applications of classical rent theory to hypothetical isolated communities under assumed conditions, and classification of multiple demand and supply influences affecting urban land values. Economists are in general agreement that it is the formation of people into communities which gives rise to the utility and scarcity of urban land and hence to its value. The emphasis upon location as the basis for urban land values had its roots in the work of von Thünen who traced the variations in agricultural land rents to differences in fertility and location in a theoretically isolated community.[17] Marshall referred to the locational advantages of urban land as contributing "situation value."[18] Chamberlain states that, "the rent of urban land is explained wholly, that of agricultural land partly, by the factor of location."[19]

Haig endeavored to sharpen the analysis of the influence of location upon land value by consideration of the relative accessibility advantages of different urban sites. In making his argument Haig assumed an isolated city in which accessibility to the central core was the dominant aim. He also assumed that the primary objective of individuals and businesses in making locational decisions was to reduce the sum of site rentals and transportation costs (which he referred to as the costs of friction) to a minimum.

Haig's analysis can be summarized as follows. The center of the city has the advantages of physical proximity or accessibility to all parts of the city. All activities will find the center the most convenient point for location and rents in that sector will therefore be the highest. Competition of uses will result in excluding certain uses which place a lower rental value upon central location. The owners of the relatively accessible sites will impose a rental charge equal to the saving in transportation costs which the use of their sites makes possible.[20] Haig continued his analysis by pointing out that general improvements in transportation or specific developments which made it easier or cheaper to get to or from the center of the city would decrease the relative accessibility advantages of central sites and hence reduce total urban site rents and values. Conversely, reduced accessibility from outlying areas would force businesses and individuals to move in closer to the center and tend to raise site rents and values. Pursuing his analysis further, Haig argued that in the best planned city the aggregate site rents are less or the transportation system is superior—or both.[21] This argument is consistent with his view that the best criterion for city planning is minimizing

[17] Johann Heinrich von Thunen, *Der Isolierte Staat in Beziehung auf Landwrtschaft und Nationalokonomie* (3rd ed.; Berlin: Schumacher-Zarchlin, 1875); Arthur H. Leigh, "Von Thunen's Theory of Distribution and the Advent of Marginal Analysis," *Journal of Political Economy*, 1946, pp. 481-502.

[18] Alfred Marshall, *Principles of Economics* (8th ed.; London: The Macmillan Co., 1925), p. 441.

[19] Edward Chamberlin, *The Theory of Monopolistic Competition*, Harvard Economic Studies 38 (Cambridge: Harvard University Press, 1933), p. 200.

[20] Robert Murray Haig, *Regional Survey of New York and Its Environs, Major Economic Factors in Metropolitan Growth and Arrangement*, Vol. I (New York: Regional Plan of New York and Its Environs, 1927), pp. 38-40.

[21] *Ibid.*

transportation costs and that this in turn results in lowering land values.

Haig's analytical framework and conclusions have been accepted by virtually all land economists. Ely and Wehrwein state:

"Costless transportation would do away with situs; there would be no "centers" and no advantage of location manifesting itself in high values. In fact, the 'peak' of land values would disappear. This, however, would not apply where space did not permit all to enjoy equal advantage."

It is evident that Ely and Wehrwein recognized that costless transportation is a highly abstract concept and that some advantages of location would persist under almost any transportation conditions.

Dorau and Hinman, former students and research associates of Richard T. Ely, classified the factors influencing the value of urban land into three groups; (a) factors affecting income, (b) factors affecting the rate of capitalization, and (c) factors affecting the direct satisfaction from land ownership. The first of these, land income, according to their analysis, is influenced by the demand and supply for the services rendered by urban land. Although they follow Marshall, Ely, and others in regarding population and incomes as the underlying influences responsible for rising rents and land values, they emphasized that the relationship between land values and population is not so direct and immediate as commonly assumed.

Four considerations are cited by Dorau and Hinman as influencing the supply of urban sites: (1) physiographic layout of area, (2) speed and cost of transportation and availability of other municipal services, (3) zoning, taxation and other forms of public control, and (4) cost of production.[22] In general their analysis pointed up the manner in which each of the above factors affected the area adaptable for urban utilization and hence the market supply of land. Citing numerous influences affecting the supply of urban sites, they concluded:

"The wider the area whose physiographic layout is well adapted to urban utilization, the greater will be the number of sites competing for this use, and, all other factors being taken for granted, the less will be the value of any particular site . . . . Increasing the speed and decreasing the cost of transportation increase the supply of urban sites by bringing more of them into possible economic utilization . . . . Let the city's boundaries be extended . . . . and the supply of urban sites is thereby increased. Zoning, taxation and other forms of public control may have a similar effect."[23]

It is important to note that the authors do not state that increased areas of individual cities as a result of physiography, transportation, zoning, or other influences will reduce *total* urban land values. In addition, the statement implies that the authors recognized that any depressing effect upon site values of an increased supply of urban land may be offset by an expansion in demand. The authors also seem to recognize that improvements in transportation add to the accessibility advantages and to the value of certain urban sites:

"People doing business and people employed in a district must be able to come to it and depart from it in reasonable comfort and time. Slow, badly congested transportation facilities lead to the decentralization of central commercial districts and a resulting depression in land values."[24]

It is apparent from the above that any depressing effect of improved transportation by virtue of its influence upon the supplies of urban sites may be offset by the bolstering influence upon the values of sites in areas specifically affected. The

[22] Dorau and Hinman, *Urban Land Economics*, pp. 509-11.

[23] *Ibid.*, p. 511.

[24] *Ibid.*, p. 518.

latter conclusion is in effect a contradiction of Haig's analysis and their own earlier conclusions that a deterioration in transportation would increase site rents and values.

Turning to the rate of capitalization, Dorau and Hinman express the view that rates of capitalization will shift over time for real estate investments as changes occur in interest rates, expectations of risk, investment preference, and chance for capital gain, and that such shifts in capitalization rates will have a direct effect upon valuations resulting from the capitalization of expected future incomes.[25]

Ratcliff follows classical rent theory in holding that the value of urban land services derives in the major part from location and that the value differences among sites are a reflection of differential locational advantages. He argues that value is the capitalized expression of economic rent and that market prices of land will tend to reflect forecasts concerning its future productivity. The business calculations that determine urban land usage, he points out, are fundamentally similar to those employed in other fields of investment and the term "highest and best use" simply describes the type of land development program for a specific site which will justify the highest payment for land.[26]

Ratcliff quotes Haig in explaining the manner in which transportation costs affect site rents and values. At one point Ratcliff appears to recognize elements of potential error in Haig's broad generalizations concerning the adverse influence of general transportation improvements upon site rents and values. For example, after quoting Haig's analysis, Ratcliff makes the following qualification in a footnote: ". . . . Improvements in transportation which benefit only one area will, of course, result in higher rents in that area."[27] Haig had hypothesized a "magic carpet" type of transportation improvement in which it would be easier for everybody to go everywhere. Since transportation facilities always go from one place to another, it is difficult to understand how transportation improvements could avoid increasing the accessibility of these specific areas and hence site rents and values. As will be noted presently, this observation is the key to a major criticism of Haig's theory.

In another work, Ratcliff adopted and extended Haig's theoretical conclusions without appearing to recognize these and other important practical limitations.

> ". . . . when bus fares are raised, total land values tend to increase in the area served because the costs saved by convenience will be greater . . . . the spread in the use of the private automobile has, in fact, tended to reduce land values in central areas by making outlying retail centers more generally accessible. It further follows that the best planned city will have the lowest total land values."[28]

The assumptions which are implicit in Ratcliff's analysis and the acceptability of his broader generalizations will be discussed below.

Richard M. Hurd developed a comprehensive synthesis of the economic theory of urban land values with an empirical review of land value trends in the United States almost 50 years before Ratcliff's textbook in urban land economics and a quarter of a century before publication of the works of Haig, Ely, and Dorau which were cited earlier. Following Marshall, Hurd held that the value of urban land is the resultant of the capitalization of ground rents. He

[25] *Ibid.*, pp. 513-14.
[26] Richard U. Ratcliff, *Urban Land Economics*, (New York: McGraw-Hill Publishing Co., 1949), Chap. 12.
[27] *Ibid.*, p. 372.
[28] Robert Moore Fisher, ed. *The Metropolis in Modern Life* (Garden City, New York: Doubleday, 1955), p. 129.

agreed that economic rent for urban sites is based upon superiority of location. Estimated future prospects, according to his analysis, form the "mastering factor of all exchange values" and capitalization rates will tend to vary with the prospects for growth in different localities, being generally lower in larger cities where the ease of sale and stability of property in-income are generally greater. Hurd pointed out that urban land values are influenced to such a degree by general financial and economic conditions that values at times "represent simply a condition of the public mind."[29]

"If business expands and population increases in a city, the sum total of land values is certain to increase . . . . If population and business become stationary the sum total of land values will decrease in proportion to the present discounting of future growth, subsequent movements consisting of redistribution of value, as one part of the city or another . . . . flourishes or declines."[30]

He assigned chief importance to increases in population and wealth, changes in transportation, and expansion of public facilities as causes of the redistribution of urban land values in a city.

Hurd appears to have recognized the complexity of the influence of transportation improvements upon urban land values in his discussion of the effects of street railroad development upon urban values:

"Street railroads have wrought a revolution in the structure of cities, scattering population over a wide area, adding value to the circumference by rendering it accessible for residences, and to the center by concentrating traffic within it, a part of this added value being removed from the intermediate zone. By rendering new districts accessible, thus increasing the area of supply of land, the value of all competitive land is reduced, so that the effect of street railroads on residence land is to lower its average value."[31]

[29] Hurd, *op. cit.*, pp. 2 and 11.
[30] *Ibid.*, p. 156.
[31] *Ibid.*, p. 94-95.

Hurd's statement contrasts with the sweeping generalizations of Haig, Dorau, and Ratcliff. The influence of any specific transportation improvement will, according to his analysis, vary for different classes of property and for different sectors of the city. It is significant to note that he concludes that the effect of street railroads was to lower the *average* value of residence land and not necessarily to lower the *total* of urban land values in the cities affected. Edwin H. Spengler, investigating the effects of rapid transit upon land values in New York City, found that the building of subways in New York was accompanied by shifts in land values rather than any "supergrowth" in values in the whole city. He concluded that factors other than transit developments were largely responsible for the value trends noted.[32]

Swan concluded that communities with like purchasing powers of their populations will have approximately the same total land values regardless of a very substantial difference in their respective areas.[33] Swan's writing illustrates the confusion which exists in the literature in this field. In one place he held that the limitation of the developed area of a city would result in over-all economies in the costs of development and "to a degree at least . . . . in somewhat lower land values." Immediately following and apparently in contradiction, he holds that "In individual instances, however, such savings would no doubt help to swell the amount of the unearned increment" and that the value of individual parcels of land may be increased by the "capitalization of congestion."[34]

Swan's failure to recognize that the economic laws of proportionality apply to

[32] *Land Values in New York in Relation to Transit* (New York: Columbia University Press, 1930), pp. 129-31.
[33] Herbert S. Swan, "Land Values and City Growth," *Land Economics*, May 1934, 188-201.
[34] *Ibid.*, pp. 188-90.

land as well as to other resources accounts for much of the contradiction and confusion in his writing. As Ely and others had pointed out, the principles of diminishing returns and proportionality provide the realistic limit upon the "capitalization of congestion" and encourage the development of each site for its best economic use.

Theoretical Model of Urban Land Value Theory

Current urban land values represent the present value of the expected future net returns attributable to land. The foregoing review of urban land value theories has focussed attention upon the many factors influencing these expected future returns and their capitalization. As Hurd and others have pointed out, the structure of values within a city undergoes constant change as cities expand or decline and as the characteristics of districts change. It is important, therefore to distinguish between those factors which will affect the values of individual sites and those which will affect the aggregate of urban land values in a city. It has also been evident that specific factors may have varied affects upon the different classifications of urban land in a city.

Theoretically the aggregate of land values in a city may be represented as follows:

$$(1)\quad V = \frac{\text{Average future expected aggregate net annual urban land rent}}{\text{Capitalization rate}}$$

The numerator of the above equation represents an estimated average residual net income to urban land after allowing for costs and can be represented as the difference between expected gross revenues to the property including improvements (R_x) and expected costs (C_x).

$$(2)\quad V = \frac{R_x + C_x}{\text{capitalization rate}}$$

Revenues which are expected to accrue to urban property (R_x) may be shown as dependent upon investors' expectations (x) as to population (P), the average amount of incomes spent for urban services (Y), the competitive pull of the urban area (P_u), the supply of competitive urban land (S) and the prospective investment in public improvements such as parking, street facilities, etc. (PI). Thus:

$$(3)\quad R_x = f_x\,(P, Y, P_u, S, PI)$$

Similarly, cost expectations (C_x) in equation (2) can be represented as the sum of local property taxes (T) operating costs (O_c), interest on capital invested in present and future improvements, (i_{im}), and depreciation allowances on present and future improvements (D_{im}). Thus:

$$(4)\quad C_x = \text{sum of}_x\,(T + O_c + i_{im} + D_{im})$$

The capitalization rate shown in equation (2) can be represented as dependent upon interest rates (i), allowances for expected risk (R) and expectations concerning capital gains (C_g). This represents a conceptual average rate for all urban properties, the individual rates varying with risk, location, etc. Thus:

$$(5)\quad \text{Cap Rate} = f_x\,(i, R, C_g)$$

Equation (2) can thus be represented as follows:

$$(6)\quad V = \left[\frac{f_x\,(P, Y, S, P_u, PI) - \sum_x (T + O_c + i_{im} + D_{im})}{f_x\,(i, R, C_g)}\right]$$

It will be observed that may of the elements in the equation are frequently not established independently by investors. For example, assessed values are based upon property value while local taxes reflect other factors as well and influence property value as an item of cost. Similarly, insurance costs are related to the value of property improvements and constitute an important item of expense.

Many factors influence the expectations of investors concerning future revenues and costs, among them the current trends in land values in the city. The risk factor in the determination of the capitalization rate (R) and expectations of capital gains are influenced by the degree of optimism shown in the revenue and cost estimates and by present values.

Critical Analysis of Haig-Ely-Dorau-Ratcliff Hypotheses

Equation (6) provides a frame of reference for further consideration of the hypotheses of Haig, Ely, Dorau, and Ratcliff concerning the influence of increased efficiency in transportation and in building construction techniques upon urban land values. In a nutshell, their argument is that improvements in transportation or in building technology have an adverse influence upon the total of urban land values through increasing the supply of land available for urban use.

Haig argues that a general improvement in transportation will reduce the relative locational advantages of central urban sites. As the relative advantages of a central location are reduced, business firms and individuals will redistribute activities, resulting in a decrease in the demand for central as compared with outlying locations.[35] Similarly, Ratcliff's conclusion that an increase in bus fares will raise urban land values rests on the assumption that indivudals and businesses will be willing to pay higher site rents because of the greater savings in transportation costs.

It is of some importance to consider the assumptions which are implicit in the Haig-Ratcliff analysis. First, referring to equation (6), it must be assumed that the population (P), incomes (Y) and the geographical area served (P_u), remain constant in order for an improvement in transportation to result in a decline in the aggregate of site rentals and values in a city. Thus Haig's rather sweeping generalizations apply only to an isolated stationary city where an improvement in transportation will not result in increasing the accessibility advantages of the urban area to additional population on the outskirts of the city. In giving exclusive attention to the incremental supply of competitive urban land—(S in equation (6)—Haig and his followers neglected to consider the influence of transportation improvements upon the demand for urban services.

It is also evident that Haig and Ratcliff failed to consider the differential effect of an increase in bus fares upon the various classes of property in a city. By reference to equation (6) it can be hypothesized with Hurd that the short-run effect of an increase in bus fares in an isolated city would be to cause a decline in travel to the central commercial area (a decline in the factor P_u) and hence a fall in commercial property values in the central business area. This might be paralleled by a decline in the values of residential land on the periphery of the city and a corresponding rise in residential values closer in as some commuters were induced to move in closer to the center; but, as will be noted presently, this is by no means certain in modern urban areas.

Ratcliff's conclusions as to the effect of the use of the auto upon land values in the central areas are both unsubstantiated and unconvincing. There is little evidence that the growing use of the private automobile has "tended to reduce site rents in central business locations by making outlying retail centers more generally accessible," as he claimed. Again, it can be argued that Ratcliff has neglected to consider that the use of the automobile has greatly expanded the

[35] Haig, *op. cit.*, p. 38.

total areas served by urban centers. The auto has not only made outlying areas more generally accessible but, by the same token, has made the central areas more accessible to larger populations and buying power.

The Haig-Ely-Dorau-Ratcliff theory of urban land values assumes that accessibility to the urban core is the prime factor influencing locational decisions in urban areas. Lampard and others have recently concluded that the evidence of economic history affirms the continuing vitality of localized concentrations of industry. He points out, however, that actual patterns of land use never approach the high order of rationality posed in Haig's conceptual scheme.[36] A recent study of the attitudes of commuters indicates that there is little or no relationship between the time expended in daily travel to work and the desirability of fringe area residence.[37] This study of residential preferences and other locational studies raise serious doubts concerning the central importance of transportation costs to the urban center per se in urban locational decisions. Individuals and businesses have wide choices concerning location in the complex and interrelated urban communities of today and many factors other than transportation costs to the urban center influence these decisions. The revolution in means of transportation and communication has completely altered the traditional spatial concepts of firms and individuals. Considerations of accessibility to an urban region or to a regional or even an international complex of urban areas have to some extent displaced the older concept of accessibility to the urban core.

These observations emphasize the important qualifications to any acceptance of Haig's theory of the relationship between transportation and urban land values as well as the dearth of empirical knowledge in the field. In the view of this author the assumptions underlying Haig's analysis are so far reaching as to preclude it having any practical significance. It is certain that the effects of improvements in transportation upon urban land values are considerably more complex than appears to be assumed in the Haig-Dorau-Ratcliff analysis. Improvements in transportation will probably tend to raise property values in the urban areas affected. Such increases may be offset in part or as a whole by the increments to the supply of accessible urban land resulting from the improvement. The exact effect in any given situation will depend upon the degree of substitutability among urban sites generally, the relative strength of the demand and supply forces released, and upon the financial costs of supporting the transportation improvements.

The seemingly highly significant conclusion reached by Haig and Ratcliff that the "best planned city" will have the lowest total of land values derives from their view that improvements in transportation are primary goals for city planners and will result in reducing land values. The rejection of the Haig-Dorau-Ratcliff analysis as to the effects of transportation improvements upon land values implicitly negates their conclusions with respect to the relationship

[36] Eric E. Lampard, "The History of Cities in the Economically Advanced Areas," *Economic Development and Cultural Change* (January 1955), 81-136.

[37] Walter T. Martin, *The Rural-Urban Fringe, A Study of Adjustment to Residence Location* (Eugene, Oregon; The University Press, 1953), p. 45. See also, Donald L. Foley, *The Suburbanization of Administrative Offices in the San Francisco Bay Area*, Research Report 10 (Berkeley: Real Estate Research Program, Bureau of Business and Economic Research, University of California, 1957), p. 26.

between land values and the "best planned city."[38]

Richard T. Ely argued that land values will decline with increased efficiency, since increasing the efficiency with which land is used would have the same effect as increasing the supply of urban sites. Based on this analysis, he formulated his law of the movement of land values which was cited above:"Other things remaining equal, in a progressive society with increasing wealth and stationary population, land values will decline." Ely defended the above hypothesis by contrasting the theoretical and actual effects of the development of structural steel and other technological improvements upon the supply of urban land and its values:

". . . . Normally we would expect this great increase in the available services of land to depress prices. This, however, is based upon the premise of a stationary or slowly growing population with a relatively small change in demand. As a matter of fact, the use of structural steel, electric and motor transportation, and other technical improvements made possible and supported a great concentration of population in cities."[39]

In attempting to defend his own hypothesis, Ely put his finger on the weakness brought out above in the Haig-Ratcliff conclusions regarding the influence of improvements in transportation upon land values. Ely's law, however, is grounded in classical rent theory. According to this theory an improvement in building techniques would increase the total capacity of urban land to provide services. Marginal land, or that land bordering on the business district, would no longer be needed for office building use with the assumed improvement in building techniques. Assuming a stationary society with no change in demand, the rent and hence the values of this land would decline. Since classical rent theory assumes that the rent of centrally located sites is calculated as a differential compared with marginal or no rent land, Ely assumed that rents in the central area would also decline with a consequent drop in total land values.

A modified conclusion could result from a different view of the degree of substitutability among urban sites and of urban site rent. Capital goods and land derive their value from the utilities which they furnish and it can be argued that the income-yielding power of each building site would derive from the highly differentiated urban services provided.[40] In this sense, urban sites are in some respects noncompeting price groups and the rent of centrally located sites would not be calculated as a differential return in comparison with cites outside of the central business district. Rental price structures and performance under these assumptions might be expected to resemble those found in the pricing of specialized professional services. A technological improvement which permitted construction of taller buildings might have a market effect similar to that which could result from a technological development permitting surgeons to perform more operations per day. Although theoretically the "supply" of surgeons' services has been increased, surgeons' incomes would not be expected to decline. Doctors might pass on to their patients some

[38] The naive reader may be led to a nonsense conclusion by a separate reading of Ratcliff's discussion of highest and best use (*Urban Land Economics*, p. 356) and the above comments on the best planned city (*The Metropolis in Modern Life*,'p. 129). In the first discussion, he refers to highest and best use as that use which will justify the *highest* land values. In the latter reference he says that the best planned city will have the *lowest* land values. It could be inferred, therefore, that the best planned city would be one in which land generally was not used for its highest and best use. The solution to this apparent dilemma, of course, is that Ratcliff implied that land would be used for its highest and best use under all conditions, but that with improved transportation the general level of values would be lower.

[39] Ely and Morehouse, *op. cit.*, p. 262.

[40] F. W. Taussig, *Principles of Economics*, Vol. II (New York: The Macmillan Co., 1947), pp. 153-54.

of the reduction in costs, but it would appear almost certain that they would not pass on the entire benefit of the time saving development in lower fees.

The above analogy rests on the view that the principles of monopolistic rather than competitive pricing operate in the urban land market. Although the potential supply of land adaptable for urban use is large, the owners of urban sites have a monopoly of the product of each individual site. This view is in accord with Chamberlin, who argued that urban site rent is a monopoly return and quite different from agricultural rent:

> "The movements of buyers being impeded, the product of each site contains an element of convenience to a certain group, and the seller locating on the site has a monopoly of its product, the full value of which he is obliged by the competition of others for its use to pay into the hands of the landlord . . . . Two sites have different rents to the degree that they are in different markets, and to exactly this same degree the concept of an extensive margin is meaningless as applied to them."[41]

A review of the influence of improved building technology upon urban site rents and values conceived in the above manner yields different conclusions from those reached by Ely and others. A technical improvement in building would add to the accessibility advantages of centrally located sites by increasing the potential densities in large structures and in central areas and thus might be accompanied by an increase in the demand for such sites, even in Ely's assumed stationary economy. This increase in accessibility advantages and demand would be capitalized upon by the landlord in higher site rentals, depending on the price elasticities of the relevant supply and demand schedules and the degree of shifts. Any resultant increase in site rentals might offset in whole or in part the decrease in site rentals and values for potentially competitive space on the fringe, which would no longer be needed as a result of the hypothesized technical improvements. Improved building technology even in a stationary state, therefore, need not result in decline in total urban site values, since decreases in site values on the periphery of the business area might be offset by increases in the central area.

This analysis suggests that the influence of increments to the supply of urban land, whether they result from changes in transportation or building techniques, is considerably more complex than is assumed by Ely, Haig, and others, since there are an infinite number of submarkets of the urban site market as a whole, each with distinctive demand and supply schedules. Unfortunately, we know little or nothing about the price elasticities of demand and supply schedules for urban sites. It appears, however, that the assumptions of purely competitive price behavior which are implicit in the theories of Haig, Ely, and Dorau are highly unrealistic and that Ely's law of the movement of land values is of little or no use to the analyst seeking to interpret past or future trends in urban land values.

It is of related interest to consider the influence upon urban land values of changing building costs under dynamic conditions. It can be noted from equation (6) that a decline in building costs with no change in revenues to urban land would increase net urban land incomes and values. Competition among owners of centrally located sites would probably result in a portion at least of the benefits of lower costs being passed on to investors or consumers in lower rents. An increase in building costs during an inflationary period has a dual effect; increasing revenues through incomes (Y)

[41] Chamberlin, *op. cit.*, Appendix D, pp. 267-68.

and increasing operating costs (O_c) and depreciation allowances on building improvements (D_{im}). It can be seen, therefore, that it is necessary to distinguish between the effect of building cost changes which are accompanied by offsetting revenue changes and those which are not. Rising building costs, not offset by increases in revenues, will result in declining urban land values in the short run, while falling costs should have the opposite effect. The effect of rising building costs upon land values may be obscured in the short run, however, by increasing prices for improved sites. The rise in value of such sites, however, is in reality an increase in the value of the improvements, rather than in the land. In the long run, as Taussig's analysis cited above points out, increased building costs will be shifted to investors and consumers and the land owners should "secure the full differential return which their site is capable of affording."

Conclusions

Urban land value theories range from unsubstantiated hypotheses concerning relationships between population growth and land value trends to trite theoretical formulations based upon unrealistic assumptions or conditions. Much of the current urban land value theory stems from the work of Ely, Haig, and Dorau in the nineteen twenties. Examination of these earlier writings reveals serious shortcomings in their attempts to apply traditional price and rent theory to urban site valuation problems. Important assumptions with regard to demand influences are seldom made explicit in the literature. Since the urban land market is divisible into many virtually non-competing submarkets, the rents paid for centrally located sites cannot be explained satisfactorily as differential returns over "no-rent" sites. Further, the spatial concepts within which urban land functions, locational decisions and revenues have been traditionally examined no longer appear adaptable to modern day urban communities. Analysis of the influence of transportation and other technological improvements upon urban land values has revealed that traditional theory has greatly oversimplified the diverse effects which such developments may have upon the demand and supply schedules for urban land.

The growing complexity in interurban economic relationships emphasizes the need for new concepts and sharpened analytical tools. The model which the author presents for representing the multiple factors influencing the value of urban land provides a useful framework for considering many variables recognized in economic theory as influencing urban land values. An experiment with this admittedly crude model has pointed up some of the major deficiencies in traditional urban land value theory. These criticisms appear to call for a new approach to urban land value theory, grounded in a new set of hypotheses and tested by extensive empirical research. The achievement of such a goal will require extended efforts by many scholars working in the field. It is hoped that some modest beginnings may be made in a subsequent article reviewing previous urban land value studies and examining in more detail data recently developed portraying the trends in land values and related factors in a group of California cities over the past twenty-five years.

Richard U. Ratcliff, who read the above article in manuscript, has been invited to extend discussion of the subject in the November issue of *this journal*.—Editor