TRENDS IN, AND DETERMINANTS OF, THE RATE OF GROWTH IN CITY-SUBURBAN EFFECTIVE PROPERTY TAX RATES: A CASE STUDY OF RHODE ISLAND

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CHAPTER 1: INTRODUCTION

In this study, the researcher attempts to determine: (1) if there are factors that explain variation in property tax rates among communities, (2) if there is any consistent relationship between the city or suburban-ness of a community and its property tax rate, and (3) if there has been an increase in the tax rate differentials among communities with varying degrees of city or suburban-ness. The research is based on data for the state of Rhode Island for the years 1958 to 1972.

In Chapter 2, the spatial structure of the SMSA in the post-World War II era is analyzed. The term "spatial structure" means essentially, the locational pattern of residential, commercial, and industrial property, that is, real property, within the SMSA. The value of a community's real property is one of the determinants of its tax rate. Three pieces of information are derived from analyzing the spatial location of people and jobs. First, analysis of the urban spatial structure gives a clear picture of the variation in population, commercial, and industrial densities among the communities comprising the SMSA and, therefore, the variation in the degree of "city-ness" or "suburban-ness" of those communities. Second, a study of these three density gradients over time indicates that

there has been a change in the character of communities lying outside the central city area. Over time, the population, commercial, and industrial densities of outside central city areas have risen faster than the respective densities for the central city. Third, the flattening of these density gradients within the SMSA indicates that most of the increase in the amount and value of real property has taken place outside of the central city area.

Variation in expenditures per capita, tax effort, and tax rates between "types" of communities is studied in Chapter 3. Attention is focused upon those factors which account for variation in expenditure per capita within and between groups of communities such as core cities and suburban areas. Sections three and four of the chapter are used to indicate that variation in expenditures per capita between classes of communities is not offset by an equal variation in either income, tax capacity, or real property per capita among communities. Therefore, effective property tax rates differ as between cities and suburbs, with cities having the higher tax rates.

The technique employed to answer the questions stated in the opening paragraph concerning tax rates, is set forth in Chapter 4. On the basis of the analysis in Chapters 2 and 3, three major components of the research model are presented. First, the hypothesis of an increasing city-suburban absolute tax rate differential is posited. Second, variables are chosen to explain tax rate variation. Third,

the criterion is chosen for classifying communities as city or suburban. Three measures (percentage and absolute change, and level) of tax rates and of the independent variables are used in studying the data so that: (1) factors affecting tax rates, however measured, and (2) the size as well as the direction of change in tax rate differentials can be determined. Stepwise multiple regressions are used throughout the analysis in studying the relationships between tax rates and the independent variables.

In Chapter 5, the results of the analysis are set forth. Variation in the level of tax rates is found to be more readily explained by the chosen set of independent variables than is variation in the percentage or absolute change in tax rates. The levels of population density, real property per capita, median family income, and commercial to total property tax revenue are significantly related to the level of tax rates. Second, since a community's "city-ness" is based on its relative population density, and population density is positively related to tax rates, the degree of "city-ness" of a community affects its tax rate. Third, although relative city-suburban tax rate differentials have remained unchanged, the absolute city-suburban tax rate differential has widened over time.

In Chapter 6, an alternative technique for classifying places as cities or suburbs is tested to determine whether the choice of classification technique affects the conclusions drawn concerning tax rate differentials. Although

some variation in results emerges, the differences are confined to shorter time spans within the entire interval analyzed.

The general conclusions and policy implications derived from the research are outlined in the final chapter of this study.

CHAPTER 2: SPATIAL STRUCTURE

I: Introduction

The 1950's and 1960's witnessed large increases in the urban population of the United States. By 1970, 73.5 percent of the population was defined as urban.[1] In 1960, the percentage had been 69.9 percent. Although both cities and suburbs shared in this urban population growth, the suburban areas received, by far, the larger percentage increases in their population. During the 1960's, considering the aggregate of 243 SMSA's, the population of central cities grew 6.4 percent, while suburban population advanced by 26.8 percent.[2] This surging population growth in the suburbs put a strain on municipal government services. Demand for public services increased. Local governments, in attempting to meet the needs of their constituents, increased their expenditures. Since local expenditures are financed primarily through property taxes, growth in population can have an impact on the property tax rate of a community. How is the property tax rate of a community affected? Whether the tax rate increases, decreases, or remains the same, seems,

[1]United States Bureau of the Census, United States Summary, Characteristics of the Population, 1970 (Washington, D.C.: Government Printing Office, 1970), Table 47. The Census Department defined as urban all population living in (a) places of 2,500 inhabitants or more incorporated as cities, villages, boroughs, or towns, excluding those persons living in rural portions of extended cities, (b) unincorporated places of 2,500 inhabitants or more, and (c) other territory, unincorporated, or corporated, included in densely settled areas.

[2]Ibid, Table 34.

in part, to depend upon the type of people who emigrate to the suburbs, and the type of taxable property growth (residential, industrial, and commercial) which is associated with the population growth.

Since the location of either residential, industrial, or commercial property within an area seems to be dependent upon the placement of the other types of property, the location of these forms of real property will be considered in general terms before theoretical models of their location within an urban area are presented.

II: The Fundamental Factors of Spatial Structure

Most analysts view the process by which decisions are made concerning the location of residential, commercial, and industrial properties as being quite complex.

> ...the spatial pattern of a city in a free-enterprise society is the collective result of a large number of separate business and household locational decisions and transportation choices. These decisions are made in a context of, and influenced by, economic, sociological, and technological circumstances, usually beyond the immediate control of the decision-maker.[3]

Although the process by which decisions are made is quite complex, there are similarities of spatial patterns amongst cities, and a manner by which spatial equilibrium can be achieved. For Professor Hirsch, there is a three-tiered pattern of decisions--the firm, the household, and the second-order firms. Each, in turn, chooses a city

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[3]John R. Meyer, John F. Kain, and Martin Wohl, The Urban Transportation Problem (Cambridge: Harvard, 1965), p. 10.

according to its own set of priorities. The firm must base its decision on the location of its plant on such factors as availability of nonlabor inputs, labor supply markets, and transportation links. Once the firm is situated, it becomes a given piece of data for the households to employ in their own process of selecting a city within which to locate. Households, according to Hirsch, take account of the firms located in a city, transportation links, markets, and amenities in making their decisions concerning a city for their residence. Second-order firms, firms which require only a relatively small market to operate efficiently (groceries, cleaners, etc.) choose a profitable position in or close to a neighborhood which exhibits an available market.[4]

Although the decisions concerning location are many-faceted as Meyer, Kain, and Wohl observed, there do seem to be a few fundamental economic factors which help to explain the overall spatial structure of urban areas. First, the topography and focus of overall accessibility within an urban area are taken as given. Many kinds of property depend solely on natural site features for their locations, such as beaches, parks, etc. Topography obviously narrows down the choice of their locations. The focus of maximum overall accessibility is the point within an urban area at which the population of the area could assemble with the least number of total man hours traveled. There could be a

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[4]Werner Z. Hirsch, Urban Economic Analysis (New York: McGraw Hill, 1973), pp. 40-42.

set of focal points within an urban area designating central accessibility for various economic activities. Over time, these focal points tend to move slowly and over short distances.[5] The reason for their slow change lies in the fact that travel is cheaper and faster along developed routes.

Second, if the spatial structure of an urban area is to be explained, the reason for the concentration of economic activity within the urban area must be understood. If the function of urban concentration is to facilitate contacts, then the most important locational factor shaping the spatial pattern involves the advantage of physical proximity as measured by the money and/or time saved, where costs are a function of distance.[6]

Physical proximity to economic activity is important for both people and businesses. For the individual, access to a point of interest is important because of the costs incurred in money (transportation cost via automobile, train, bus, etc.) and in time (opportunity cost) in making trips to that point. Access for business is also important, as witnessed, in the extreme, by the clustering of many similar businesses within a particular area. Examples are the Manhatten garment district, the Detroit automobile row, and most large cities' financial districts. Access for these firms is measured in terms of sharing a particular

[5]Ibid, p. 42.

[6]Edgar M. Hoover, "The Evolving Form and Organization of the Metropolis," in Harvey S. Perloff and Lowdon Wingo (eds.) Issues in Urban Economics (Baltimore: Johns Hopkins, 1968), p. 240.

advantage, such as specialized labor, business services, customers, or sometimes, as in the financial districts, in terms of quick contact with each other. External economies for clustered businesses find their basis in agglomeration economies.

Clustering may be due to more than simply access possibilities. Clustering may also be attributable to certain environmental qualities of a particular location. Thus, households may seek neighborhoods which are relatively quiet, or are relatively free of pollution, etc. These quality considerations, which affect the location of households, lead to clusters of housing which meet specific environmental standards. Businesses may seek surroundings which are equally agreeable to their needs.

Third, each type of economic activity requires some amount, no matter how large or small, of land. The many users of land bid against one another to purchase it. Those who can make best use of the property are the ones who are capable of bidding the highest for the land. Land sites also differ in quality. Those sites with the best access and/or environmental features will command a high scarcity value. Thus, land sites differ in their desirability, and thereby in their cost.

The above mentioned economic factors form the basis for the spatial structure of an area.

> It appears that basically there are just three kinds of considerations that determine the relative desirability of locations for particular decisions units such as households or business establishments. These are:

> (1) access, (2) environmental characteristics, and (3) cost. They reflect the fact that the user of a site is really involved with it in three different ways. He occupies it, as a resident or producer, and is thus concerned with its site and neighborhood, or immediate environmental qualities. He and other persons and goods and services move between this site and others; he is therefore concerned with its convenience of access to other places. Finally, he has to pay for its use and is therefore concerned with its cost.[7]

Each resident (producer) then is independently attracted to an urban center by access considerations and the space on which to operate.[8] Individually they attempt to guage the value of space and access. Spatial structure is based on the trade-off between these considerations, with the various types of households, firms, etc., having different access/space trade-offs. Since both individuals and businesses are influenced by access/space trade-offs in locating, the spatial structure of an area will be examined here in terms of the placement of residences and of places of employment.

III: Models of Residential Location

The spatial distribution of urban housing has received much attention from researchers. Their analysis has focused on the way transportation costs affect land rent and the residential demand for land. William Alonso, Richard Muth, and Edwin Mills have made major contributions in this field. Their analyses belong in the category of budget constraint models.

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[7]Ibid, p. 247.

[8]Ibid, p. 247.

A. Alonso's Budget Constraint Model

William Alonso's model assumes only the value of housing and cost of transportation are to be variable, while all other goods are fixed in price.[9] The household utility function depends on three variables (goods, housing, and distance from the central city). The price of housing and transportation depend on the distance from the central city, with commuting cost increasing, and cost per unit of land decreasing as one moves further from the central city. The budget constraint equates the sum of expenditures on goods, housing, and transportation to the exogenously determined income of the household. Given the level of household income and the value of all other goods, constrained utility maximization requires a trade-off between the cost and bother of commuting and the advantage of cheaper land and the satisfaction of more space, since the price per unit of land declines as commuting cost increases. Households desiring larger land sites will move farther from the city.

The trade-off between space and access will yield a set of equally satisfying combinations of land and distance which achieve a certain level of utility. These numerical combinations can be written in functional form, which yields, when graphed, a "bid-price" curve. There is a bid-price curve for each level of utility the household chooses. If the price of land at various distances from the central

[9]William Alonso, "A Theory of the Urban Land Market," Papers and Proceedings of the Regional Science Association 6 (1960).

city is known, a "price-structure" curve relating price of land and distance can be formed. Tangency of the "price-structure" and "bid-price" curves will yield the household's equilibrium location. These concepts differ from the theory of consumer demand with its indifference and budget restraints curves.

> Indifference curves map a path of indifference (equal satisfaction) between combinations of quantities of two goods. Bid rent functions map an indifference path between the price of one good (land) and quantities of another and strange type of good, distance from the center of the city. Whereas indifference curves refer only to tastes and not to budget, in the case of households, bid rent functions are derived from both budget and taste considerations. In the case of the urban firm, they might be termed isoprofit curves. A more superficial difference is that, whereas the higher indifference curves are the preferred ones, it is the lower bid rent curves that yield greater profits or satisfaction.[10]

For Alonso, there are many types of land users. There are farmers, firms, and households. Within each category of land users, there are many kinds (e.g., growers of different types of crops). Each kind of activity has its own bid-price curve, with the slopes of the curves differing from one kind of activity to another. The spatial structure of the urban area would then depend upon the slopes of the bid curves for the various economic activities requiring space. Those activities whose bid curves have the highest slopes would locate nearest the central city. Rent and densities would be expected to be higher in the central cities and taper off as distance from the city increases.

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[10]Ibid, p. 155.

Alonso's theory rests very heavily on his assumption concerning consumer preference for increased space versus the convenience of shortened travel. Thus, the rent and density structure of the urban area is determined by the preference of individuals for low residential densities which the rich are more capable of satisfying than are the poor. While this assumption may be correct, there have been presented alternative hypotheses which may equally explain the rent and density gradients which Alonso analyzed. First, it has been suggested that people prefer to live in new housing in clean neighborhoods rather than old housing in deteriorating neighborhoods. Alternatively, high income groups may wish to segregate themselves from low income groups.[11] Thus, rent and density patterns rather than being due to space/access trade-offs may be caused by taste, historical accident, or socialized preferences. Whereas the question of an appropriate hypothesis is important for policy determinations regarding the future development of the city, the fact that distance from the city affects rent and density gradients is the central point of interest in studying residential location.

B. Muth's Budget Constraint Model

Chronologically, the second major budget constraint

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[11]Britton Harris, "Quantitative Models of Urban Development: Their Role in Metropolitan Policy-Making," in Harvey S. Perloff and Lowdon Wingo (eds.) Issues in Urban Economics (Baltimore: Johns Hopkins, 1968), pp. 393-94.

model was presented by Richard Muth.[12] Household utility depends on the consumption of housing services and other commodities. Housing services are taken to include land and size of structure, and other determinants of the value of housing. Other commodities include leisure time, which is related to the level of income. Commuting costs are considered to be "paid for" through reduced leisure time and foregone money income. Therefore, commuting costs depend not only on distance but also on income.

Given the level of income, a constrained maximum utility position is determined. The utility position represents an equilibrium position from which there is no tendency to move. The equilibrium location is determined in Muth's model by the land price and commuting cost function at the point where the marginal decrease in expenditures on housing is equal to the marginal increase in commuting costs for a small change in distance. Graphically, if q is the quantity of housing services purchased, p the price per unit of housing service, which declines with distance, T the household's expenditures on transportation, which is a function of distance and income, and k the distance from the center, distance equilibrium occurs at the point of intersection of the housing service and commuting cost functions. This graph is presented in Figure 2.1. From this condition for equilibrium, Muth was able to show the conditions under

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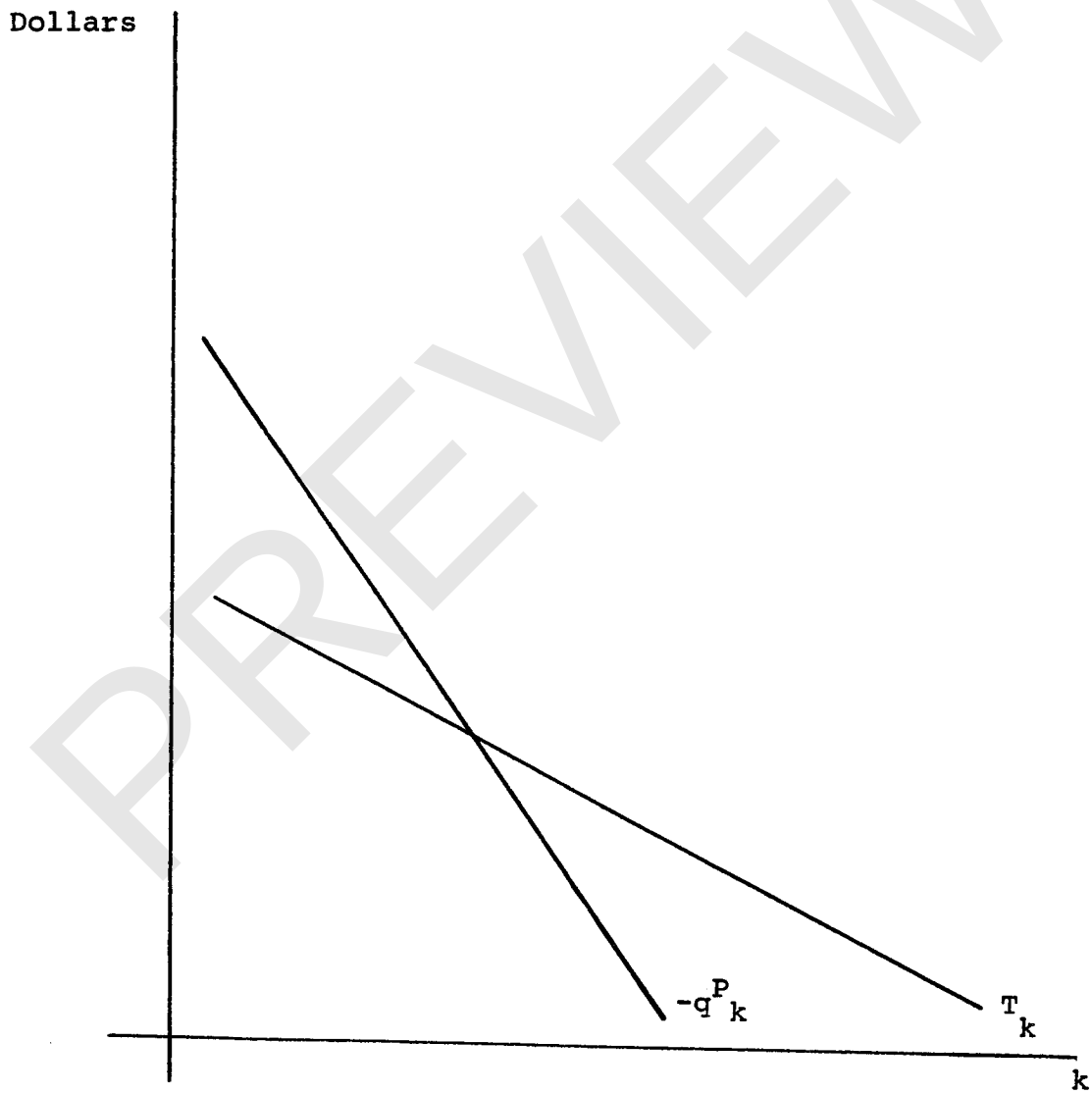
[12]Richard F. Muth, "The Spatial Structure of the Housing Market," Papers and Proceedings of the Regional Science Association 7 (1961) 207-220.

FIGURE 2.1

EQUILIBRIUM RESIDENTIAL LOCATION DETERMINED BY THE LAND PRICE AND COMMUTING COST FUNCTIONS



which population density will be a negative exponential function of distance, as assumed originally by Colin Clark. Given constant commuting cost per mile and a price elasticity of demand for housing of minus one, determined from earlier research by Muth, the Muth equation for equilibrium may be rewritten as:

$$p(u) = p_o e^{-ru}$$

where

$p(u)$ = the price elasticity of demand for housing at distance u
P_o = a constant
r = a constant
e = base of the natural log

If the price elasticity of demand for housing services is unit elastic, aggregate expenditure on housing services must be proportionate to the number of households. Therefore, population density must decline exponentially. This is apparent from the fact that, if construction costs are similar in all parts of the city, declining land prices as one moves from the central city should dictate substitution of land for capital at the outskirts, and vice versa at the center.

Muth has repeatedly tested the density gradient against the actual pattern of urban population density. His findings indicate that population growth, and improved transportation facilities account for most of the changes in urban population distribution during the 1950 to 1960 period. If improvements in transportation are measured in