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Effects of state and federal aid to education, taxes and other socio-economic factors on certain housing values in Nebraska

Wallace W. Decatur

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EFFECTS OF STATE AND FEDERAL AID TO EDUCATION, TAXES AND
OTHER SOCIO-ECONOMIC FACTORS ON CERTAIN HOUSING VALUES
IN NEBRASKA

A Thesis

Presented to the

Department of Land Use Economics and Real Estate

and the

Faculty of the Graduate College

University of Nebraska

In Partial Fulfillment

of the Requirements for the Degree

Master of Business Administration

University of Nebraska at Omaha

by

WALLACE W. DECATUR
October 1975

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THESIS ACCEPTANCE

Accepted for the faculty of the Graduate College,
University of Nebraska, in partial fulfillment of the require-
ments for the degree Master of Business Administration,
University of Nebraska at Omaha.

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The Problem

There have been many studies, papers, articles, and theories which attempt to explain the effect of taxation on real estate values. Occasionally, someone will attempt to correlate some new, here-to-fore unrelated, factor to real estate values. The new factors are often utilized alone or in conjunction with previous study.

Which factor is chosen seems to depend on the sway of the, then current, public opinion. The issue of racial prejudice, though ever present, seems to surface periodically. What it surfaces, as evidenced by eruptions of civil unrest or legal civil rights proceedings, it seems to spur some thought in that vein.

Other factors of public fancy have included transportation effects on city development. The effects of the social strata upon the transportation systems, and vice versa, have been very carefully studied, and, to great length. This is carried further toward its natural conclusion by the energy crisis and the effect it has and may have upon life and life styles in the United States.

Of course, when the environment finally caught the eye, ear and imagination of the public, it, too, was subjected to study. Since the environment is, in fact, an amalgamation of so very many diverse subjects, it offers much food for the banks of computers.

Many of these innovative studies use earlier works of individuals such as Tiebout and Morss as a foundation on

which to build their study. The basic studies are, unfortunately, strikingly similar. Each attempts to postulate a theory: to prove the importance of this or that new variable. Much of this has been done with the aid of various computer techniques based on regression analysis.

The studies are aimed at proving the power of the new variable in the particular theory. For example, that property taxes are capitalized in real estate values; that public education expenditures measure effectiveness of the school system; that the mix of social and public services help determine the proclivity of families to locate in a given community. And, while real estate values, in some form, are usually included, their use is solely to measure the explanatory power of the new variable.

Why, then, if real estate values can be utilized to measure the power of certain variables, can the multitude of variables not be used to measure real estate values? Additionally, the amounts of money spent on education have been studied many times, but, what aid, both state and federal, to local school districts. These, in some instances may amount to as much as 47 percent (25 percent and 22 percent respectively) of the total cost of education in a school district.

The problem then is to attempt to identify variables which affect housing values in Nebraska. Specifically, what effect does property tax have on housing values? Is it capitalized into depressed residential values? Is it off

set by expenditures in the public sector?

Second, what is the effect of state and federal aid on housing values? Does aid result in public improvements which are capitalized into increased residential values?

In pursuit of answers to these questions, I will first present the results of some of the more important studies in the areas of property taxation, public goods and services, and real estate valuation. I will then outline the model I have chosen, present the results of the empirical study, which will utilize regression analysis, and present the conclusions I have drawn from the study.

Survey of Literature

Taxation has long been a facet of human life. There are even biblical stories of tax collectors and the taxes they collected. The Sumerians, who collected taxes 4,000 years ago, were not given credit for their invention. They, too, only implemented an existing form of financing. This activity which was described in the seventeenth century as "a process like the plucking of a goose--designed to produce the maximum of feathers with a minimum of squawk," is envisioned extending into the future. The evolution of taxes has been great as well as their diversification. Their goal: to raise revenue without crippling or destroying the economic activity which must flourish in order to produce taxable revenue.¹

Taxes have long been seen as a method of distributing the economic burden of civilized life. There has been much discussion on the equality, progressivity, regressivity, and impact of various taxes and the attempts to equally distribute this burden. The Federal Income Tax, which in itself absorbs a large proportion of the gross national product, as well as the income of each self-sustaining citizen, is not the "tax". To the average home-owner, "tax" refers to the ad valorem tax on his house or real property investment.²

Real property taxes have been suggested as a sole form of taxation, alone supporting the expenses of government.

¹Jerome P. Pickard, Changing Urban Land Uses as Affected by Taxation, with an introduction by A.M. Woodruff.

(Washington: Land Use Institute, 1962) p. 15-19.

²Ibid.

The basis being that the original value of the soil is joint property of the community and its value should be exhausted before taxing any other property or articles of consumption. The equality of such a land-tax must, of course, be maintained. To accomplish this, the valuation should be reassessed periodically.³

While a single land-tax scheme has not been implemented in this country, the property tax has become very important in the financing of state and local governments.

In 1969 the revenues from property taxes accounted for 85.4 per cent of the tax revenue for local governments. (Property taxes accounted for 88 per cent in 1963 and a low of 86.7 per cent in 1957). The role of property taxes is also important to the federal-state-local revenue system. The revenue from property taxes accounted for approximately 15 per cent of all 1963 tax revenue and 13 per cent of all 1963 general revenue.⁴ State and local governments are credited with the spending of up to 10 per cent of the national product. Their expenditures are separated into current operations and investment operations. The current operations involve the day-to-day operation of the many services, i.e. police, fire, schools, public works, etc.

³ William Ogilvie, Birthright in Land, (London: Charing Cross, 1782; reprinted with biographical notes by D.C. MacDonald, New York: Augustus M. Kelley, 1970) p. 16.

⁴ Benjamin Bridges, Jr. "Past and Future Growth of the property Tax" in Property Taxation, USA, ed Richard W. Lindholm Milwaukee: University of Wisconsin Press, 1969) p. 21; State-Local Finances and Suggested Legislation, 1971 ed Advisory Commission on Intergovernmental Relations (Washington, D.C.: Government Printing Office, 1970) p. 6.

Investment operations refers to capital goods expenditures such as new schools, public buildings, sanitation plant, etc.⁵ The level of these expenditures is not determined in the same manner as expenditures in the private sector, being allocated in a sometimes "nonoptimal" manner.⁶

The expenditures of tax revenues by state and local governments are in the area of public goods. These are "collective consumption goods, which all enjoy in common in the sense that each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good."⁷ An alternative definition of a public good is "one which should be produced, but for which there is no feasible method of charging and consumers."⁸

The determination of the mix of local public goods and services provided is based on the wants of the consumer-voter. The government, which is to provide these goods, then taxes the consumer accordingly. The problem arises in forcing the consumer-voter to reveal his true wants, which would become the basis for determining the appropriate tax. There is, however, no method to force such a revelation from the consumer. A "rational" consumer would even understate his wants with the hope of enjoying the goods while avoiding

⁵ Charles M. Tiebout, The Community Economic Base Study (New York; Committee for Economic Development, 1962) pp. 42-43.

⁶ Charles M. Tiebout, "Pure Theory of Local Expenditures" Journal of Political Economy 44 (October 1956): 416.

⁷ Charles M. Tiebout, "A Pure Theory of Local Expenditures", Journal of Political Economy 44 (October 1956): 417.

⁸ The Theory of Public Economy, cited in Charles M. Tiebout, "A Pure Theory of Local Expenditures," Journal of Political Economy 44 (October 1956): 416.

the taxes.⁹

As a proxy to the truthful declaration by the consumer, the hypothesis is that a consumer will move to the community whose local government best satisfies his preferences for public goods and services. In planning a move, he would choose between municipalities with a mix of those public goods and services he deems desirable, e.g. schools, police and fire protection, parks and recreation facilities, etc. If there are a great number of municipalities with a great degree of variation, the consumer will have a greater possibility of realizing his desires.¹⁰

Such a hypothesis assumes the consumer-voters to be fully mobile and inclined to move to that community where their public goods wants are satisfied. The consumers must, of course, be fully aware of the difference in expenditure and revenue patterns between the communities. There must be a large number of communities from which the consumer-voter may choose, and the communities must attempt to maintain optimum population.¹¹

This hypothesis has received support from some corners due to the growing urbanization of society. Frequently individuals who work in a central city will have a wide choice of suburban communities in which to reside. The final decision being made in favor of the community offering the

⁹ Charles M. Tiebout, "A Pure Theory of Local Expenditures", Journal of Political Economy 44 (October 1956): 417.

¹⁰ Ibid., p. 417.

¹¹ Ibid., p. 418.

best school system or other public service of importance to that individual in his choice of community of residence.¹²

At the same time, however, the increased taxes, it was felt, must have some effect on local property values due in part to the attraction of the community to potential residents. That portion of the taxes which would be levied against the land would be absorbed by the land owner (capitalized in the form of reduced property values) since the income from the land is pure economic rent. On the other hand, taxes applicable to structures would be "shifted" forward to purchasers. Due to the depressing effect of a tax on net rates of return on investment in construction, there would be a resultant diminishing in the stock of structures in future periods.¹⁴

The empirical study of this hypothesis indicated that 93 per cent of the difference in the median value of single family homes in fifty-three municipalities in northeastern New Jersey could be explained.¹⁵ One of the seven factors used to explain this valuation was related to the proximity of the municipality to the central city. The median number of rooms per owner-occupied house as well as the increase (or decrease) in the number of houses over a ten year period,

¹² Ibid., p. 419.

¹³ Wallace E. Oates, "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis", Journal of Political Economy, (November-December 1969):958.

¹⁴ Ibid.

¹⁵ Taro Yamane, Statistics, An Introductory Analysis (New York: Harper and Row, 1964): p. 415.

the median family income, and the percentage of families in the communities with an annual income of less than \$3,000 were all utilized to describe the character of the residences. Finally, the effective property tax rate and the annual current expenditures per pupil, in dollars, were employed to identify the level of public services within the municipality.

Using the ordinary least squares technique of multiple regression, property values were found to bear a significant negative relationship to the property tax rate and a significant positive association with expenditures per pupil. That is, for an increase in property taxes unaccompanied by an increase in the output of local public services, the bulk of the rise in taxes will be capitalized in the form of reduced property values if, however, the increase in taxes is utilized to improve the school systems, the increased benefits will offset (and perhaps even more than offset) the depressive effect of the higher tax ratio on values of local property.¹⁷

A study of Ohio and Indiana firms indicated that the variance in sales prices could better be explained through the present values of the income from the property less the tax payments than by the present values of future incomes alone.

¹⁶ Wallace E. Oates, "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis", Journal of Political Economy (November-December 1969): p. 964

¹⁷ Ibid., p. 468

This study did not include any indication of higher public expenditures which offset the amounts and taxes detracted from future incomes.¹⁸

Owners of residential property in San Francisco experienced substantial increases in their property tax bills in November 1967 as a result of the enactment of legislation (Petrix-Knob Bill called "AB 80"). This legislation changed the assessment ratios of primarily residential property from 10 per cent in 1967 to 25 per cent in 1972. Though the increases were spread over the intervening years at a uniform rate, the impact on local residential property owners was great. The higher residential property taxes resulted in lower taxes on business property. There were no increased expenditures benefiting owners of residential property. The prices of residential properties, determined from actual sales after the enactment of AB 80, compared to the like sales prior to the law, indicated that the tax increases resulted in price reductions of properties sold.¹⁹

The impact of property taxes on rental properties is also great. The tax burden on rental properties is borne by both the renter and the owner, and not shifted entirely to the renter. The typical Supply/Demand graph shows the effect of taxation on rental housing under conditions of inelastic supply and elastic demand. The supply is considered

¹⁸ R. Stafford Smith, "Property Tax Capitalization in San Francisco", National Tax Journal 23 (June 1970): 179.

¹⁹ Ibid., p. 184,

to be inelastic due to the amount of time required to construct more housing to meet consumer demands. The demand is considered elastic due to the competition from neighboring municipalities.²⁰

Thus, when a tax is imposed net demand will fall from D_0 to D_1 , the equilibrium net return to capital will also fall from R_0 to R' and the market price will increase from R_0 to R_1 . The bulk of the tax is therefore borne by the owners and only a small portion $\left(\frac{R_1 - R_0}{R_1 - R'}\right)$ is shifted forward to the tenants. Therefore, the more elastic the demand for housing in the taxing jurisdiction, the smaller be the amount of the tax which is shifted forward. Should the tax be perfectly elastic ($R_1 = R_0$) the tax would be borne by the property owners in its entirety.²¹

In arriving at these conclusions, the variance in residential rents (expressed as median gross rent divided by median number of rooms of all housing units) was examined through the effects of six independent variables: the average price of land per acre; an employment accessibility index (based on travel time to the central city); a housing condition index (based on deterioration or delapidation of housing in the area); the annual educational expenditure per pupil public schools; the equalized property tax rate on single family homes; and a dummy variable which reflected the

²⁰ Larry L. Orr, "The Incidence of Differential Property Taxes on Urban Housing", National Tax Journal 21 (September 1968). p. 262.

²¹ Ibid., p. 257.

source of funds for sewage disposal (property owner or municipality). These accounted for 76 per cent of the variation in residential rents. Property tax was found to be insignificant due to its low t-statistic (0.58) in relation to the 95 per cent significance level (1.71).²²

A subsequent study took exception to the use of the property tax rate on owner-occupied homes to explain rental variations.²³ This was due to the wide disparity in assessment ratios between single-family homes (36 per cent) and multi-family structures containing from three to five apartments (53 per cent). The model was also subjected to criticism and changed. The rent was determined by the median gross rent divided by the median number of rooms of rental housing units only. The delapidation factor was changed to consider only rental units. The sample size was also reduced, due to the lack of information, from thirty-nine to twenty-four municipalities.²⁴

This changed model explained some 93 per cent of the variation in rents. The public education variable, however, was insignificant in this instance.²⁵ Variations in education expenditures, however, have been shown to be partly caused by differences in per capita income and student pop-

22

Ibid., p. 261.

23

J.D. Heinberg and W.E. Oates, "'The Incidence of Differential Property Taxes on Urban Housing': A comment and Some Further Evidence". National Tax Journal 23 (March 1970).

24

p. 92.

25

Ibid., p. 93.

Ibid., p. 96.

ulation ratios between the city and the suburbs.²⁶ The final conclusion was that no reliable inference could be made toward the incidence of property taxes on rental housing, while suggesting that differentials in property tax rates for owner-occupied housing are capitalized.²⁷

North Carolina was found to differ from this general trend. Here, based on a study using a modified supply and demand model and a sample of 106 municipalities, property taxes were found to be of less importance in explaining owner-occupied housing values than changes in population. The study incorporated nine variables and explained 72 per cent of the variation in owner-occupied housing.²⁸

The effective property tax rate, defined as the minimal or actual rate time the assessment ratio, was the independent variable representing property taxes. Educational expenditures were found to be the largest expenditure in most local budgets and the most important single item to families with children.²⁹ But, since the state of North Carolina provides approximately 70 per cent of the current operating expenses

²⁶ Woo Sik Kee, "City-Suburban Differentials in Local Government Fiscal Effort", National Tax Journal 21 (August 1968): p. 186.

²⁷ J.D. Heinberg and W.E. Oates, "'The Incidence of Differential Property Taxes on Urban Housing' A Comment and Some Further Evidence." National Tax Journal 23 (March 1970): p. 98.

²⁸ David N. Human and E.C. Pasour, Jr. "Real Property Taxes, Local Public Services, and Residential Property Values," Southern Economics Journal (July 1972-April 1973) p. 608.

²⁹ Wallace E. Oates, "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis", Journal of Political Economy, (November-December 1969): p. 962.

of local schools, a proxy variable, total per capita municipal taxes, was used for the level of public services. The median family income for each town was included, both as a proxy for construction costs and for the effect it would have on the demand for housing by itself. Since this might tend to understate the median income of homeowners (poorer families are more likely to live in rental housing) the percentage of housing which was owner-occupied was included to offset the downward bias. The median number of rooms was used as a measure of housing quality. The percentage change in owner-occupied housing over a ten year period was used as a measure of the housing stock likely to be highly correlated with the average age of the stock. An accessibility index to measure the influence of major urban areas on housing values was found to be insignificant.³⁰

The empirical results of this study deny the capitalization of property taxes into lower housing values in North Carolina, or in fact, that they have any effect at all. The relationship between the proxy variable for public expenditures was positively related, the magnitude was small.³¹

A study of school districts has provided information which could be extremely useful for relating educational performance to per-pupil expenditures and the size of the administrative unit. The study, conducted over a three year

³⁰ David N. Hyman and E.C. Pasour, Jr. "Real Property Taxes, Local Public Services, and Residential Property Values", Southern Economics Journal (July 1972-April 1973): p. 606.

³¹ Ibid., p. 610.

period, using the average daily attendance (ADA), expenditures per pupil, school district size, and average pupil intelligence (as reflected by achievement scores in basic subjects) to account for motivation (by the family breadwinner) and intelligential differences.³²

The results cover a number of areas, from family background correlation to testing procedures. The relationship of performance to per-pupil expenditure was found to be weak, except in school districts of two thousand pupils or more. The results of this study cast doubt upon the practice of utilizing per capita cost figures as an index of public performance.³³

A study of the expenditures in the public sector was conducted in the Milwaukee Standard Metropolitan Statistical Area (SMSA).³⁴ This study focused on the payments made to local governments for education and other public expenditures. A very dramatic increase in transfers was noted, especially in those for education which climbed from \$8.4 billion in 1965 to 13.3 billion in 1968. A disparity was noticed between the amounts of aid granted the central cities and the suburbs on a per-pupil basis. Here, the cities received lower amounts than the suburbs, receiving, in fact, barely one-fourth the amount received by even the low-income suburb.

³² Herbert J. Kiesling, "Measuring a Local Government Service: A Study of School Districts in New York State", The Review of Economics and Statistics 49 (August 1967): p. 356.

³³ Ibid., p. 366.

³⁴ John Riew, "State Aids for Public Schools and Metropolitan Finance", Land Economics (August 1968): p. 297.

This is caused in part by the low ratio of the population aged one to eighteen to the total population of the central city in contrast to the higher ratio found in the suburbs.³⁵

The aid for education is intended to relieve the local tax burden and, at the same time, provide the school districts with sufficient funds. These monies are not always distributed according to the over-all fiscal pressure, a function of fiscal resources and needs. The central cities, the poorest among all the municipality groups by the standard of property or income and with their current tax rates higher, receive less aid than the other municipalities.³⁶

The quality of education a child receives in the State of Nebraska is dependent on the wealth of his parents and neighbors.³⁷ This was determined by comparing the disparities in educational finance in Nebraska with California and two other mid-west states. The disparity was greatest in Nebraska, ranging from a low current expenditure per ADM of \$562 to a high of \$1,743.³⁸

The variations in expenditure per pupil was studied and an attempt made to explain them using eight independent variables in regression analysis. The assessed value per resident student in the 295 school districts in Nebraska was em-

³⁵ Ibid., p. 302.

³⁶ Ibid., p. 303.

³⁷ Donald A. Nielsen and Keith K. Turner with Robert F. Blair, "Financial Determinants of Disparities in Educational Opportunity Among Nebraska School Districts", University of Nebraska at Omaha, 1974 (Typewritten): p. 7.

³⁸ Ibid., p. 8.

ployed as a measure of wealth of the school district. The greater this wealth, the higher will be the current expenditure per ADM. The general fund millage rate was employed as a measure of the effort of the school district: as the effort increases, expenditure per-pupil will increase because of an implied increase in capacity to finance the needs of the district. State aid per ADM was stimulative, that is, an additional dollar of aid is associated with an increase in expenditures greater than one dollar and would increase the local property tax burden. Federal aid per ADM was found to reduce the local property tax burden.³⁹ These four variables were found to be significant at the one percent level of significance.⁴⁰ The average daily membership (ADM) was also used, although it was only significant at the five percent level.

These variables helped explain 75 percent of the variations in the current expenditures per ADM in Nebraska.⁴¹

Based on the long time conviction that the influx of Negroes or other non-caucasian races into a neighborhood the property values will fall, a study was conducted.⁴² The study also recognized a counter view that those who purchase

39 Donald A. Nielsen and Keith K. Turner, with Robert F. Blair, "Financial Determinants of Disparities in Educational Opportunity Among Nebraska School Districts", Nebraska Journal of Economics and Business 14, (Winter 1975) p. 28.

40 Ibid., p. 35.

41 Ibid., p. 35.

42 Martin J. Bailey, "Effects of Race and of Other Demographic Factors on the Values of Single-Family Homes", Land Economics (May 1966): p. 216.

at reduced rates in a neighborhood typically resell immediately to Negroes at prices at least as high as those which prevailed before Negroes entered the neighborhood. While, it was pointed out, these views were contradictory, they both could be true. The presence of "panic" selling would tend to increase incidences of both occurring.

The relationship of owner/occupant to values is also true, regardless of race, between slum, or low income, and adjacent areas. The correlation was that in an area occupied predominately by low income Caucasians, the degree of crowding and subsequent effects on property values would be the same as in areas occupied by non-Caucasians with the same income levels.

The technique involved in one study was the recording of the repeat sales of properties in a given area.⁴² While this was advantageous in that it removes the questions of quality and type of dwelling sold, it unfortunately only recognizes those properties which sold more than once. This provided the background for a study using each sale, measuring the effects of fifty variables on a single dependent variable. This variable was the amount of federal real estate transfer tax paid when the property was sold.⁴³

The final decision was that the belief that slum dwellers

⁴² Martin J. Bailey, "Effects of Race and of Other Demographic Factors on the Values of Single-Family Homes", Land Economics (May 1966): p. 215.

⁴³ Hugh O. Norse, "The Effect of Public Housing on Property Values in St. Louis", Land Economics 39, (November 1963): p. 438.

and non-Caucasians pay more for housing was unsupported. It did show that the values in slum and Negro areas seemed to have fallen below the values of comparable middle-income housing in near-by areas.

Another study of variances in the values of urban land indicated that changes in building costs will have diverse effects on values over the short run. That is, rising building costs which are not offset by increases in revenue will cause a decrease in urban land values. On the contrary, falling costs will have an opposite effect. This increase or decrease was attributed directly to the change in the value of the improvements, rather than the land alone. In long run situations building costs could be shifted to the consumer or to investors.⁴⁵

A later study by the same author⁴⁶ reflected that urban land values were responsive to any broad changes in supply caused by changing transportation developments. The changes in transportation have been caused in some degree, by changes in demand associated with rising population, incomes and expanded urban services. This study was conducted in six cities in the San Francisco Bay Area and covered a twenty-five year period. The conclusion was that the growth in the total values of urban land was roughly parallel with that of individual cities.⁴⁷

⁴⁵ Paul F. Wendt, "Theory of Urban Land Values", Land Economics (August 1957) p. 239.

⁴⁶ Paul F. Wendt, "Economic Growth and Urban Land Values", The Appraisal Journal.

⁴⁷ Ibid., p. 442.

Residential land values was the subject of a paper which studied Los Angeles County.⁴⁸ This study employed accessibility to economic activities, amenities, topography, present and future use, and historical features in multiple regression to determine their effects on the value of urban land. The accessibility of a site to the central business district was not considered to be entirely correct since it assumed the CBD would be the only work place and journey to and from it would be the only travel household members would take. Further, it would incorrectly assume that travel to and from the CBD would be equally easy in any direction. Therefore, a model was devised which considered the total employment in various work places and the distance between sites. The result was an index of accessibility.⁴⁹

The amenity value was an attempt to quantify certain tangible and intangible features of various sites. These features, i.e. amount of smog, educational standards, neighborhood quality, etc., were strictly subjective judgements made by the people who chose to locate there. It attempted to recognize that individuals differed in their perception of amenities.⁵⁰

The topography variable was a dummy which was assigned based on the natural physical characteristics of a particular site. The historical factor was to identify land uses which

⁴⁸ Eugene F. Brigham, "The Determinants of Residential Land Values", Land Economics (November 1971) p. 327-334.

⁴⁹ Ibid., p. 328.

⁵⁰ Ibid., p. 328.

were no longer suitable. That is, if the opportunity were there today, the decision to use the land would not be the same.

The results of the study were that accessibility to employment was positively related to residential land values. The level of amenities and the other independent variables were correlated.⁵¹

The effect of location, or more specifically distance and accessibility, was shown to have an effect on urban land values. The highest values, in this study, occurred at the point with maximum market accessibility and lowest transport costs. As the accessibility decreased, so did the values of the properties.

The effect of amenities on urban land values was addressed in a study on air pollution.⁵² This study neglects the access of stores to the apartments and houses, as well as the proximity of schools and churches to these habitations. The reasoning is that as the population becomes more concentrated in the new area, these services will follow. The important amenities, amenities which interact to make houses desirable, are the absence of noise and dirt, the economic and social characteristics of the neighbors, and the neighbors' family stage. This implies that people desire to live in a clean, economically homogeneous environment. This, then,

⁵¹ Ibid., p. 329.

⁵² Hugh O. Norse, "The Effect of Air Pollution on House Values", Land Economics 43 (May 1967) p. 181.

means there is great demand for the annual addition to the housing stock which has historically been about three per cent.⁵³

This study employed multiple regression of an air pollution index, median number of rooms, percent of all housing units built from 1950 to 1960, houses per square mile, distance in time from the Central Business District, accessibility to major through streets, school quality, percent of workers in the blue collar professions, persons per unit, percent of unity occupied by non-whites, a dummy variable to account for tax differences between jurisdictions and median family incomes. These variables explained approximately 94 per cent of the variations in property values. Air pollution was attributed with reducing values by \$245 for every 0.5 milligram per 100 square centimeters per day increase in sulfur.⁵⁴

⁵³ Ibid., p. 183.

⁵⁴ Ibid., p. 187.

The Model

Dependent Variable

The sample includes incorporated towns in Nebraska having more than 2,500 inhabitants in 1970. The dependent variable is the median value of owner occupied housing in Nebraska. These values were obtained from the 1970 Census of Housing for the thirty-two towns in the sample. There are actually forty-eight towns in Nebraska which had populations of 2,500 or more in the 1970 census, but in order to test the applicability of the Hyman-Pasour study to Nebraska the nine largest Nebraska municipalities were excluded as they had done in North Carolina.⁵⁵ Seven additional towns which had 2,500 inhabitants in 1970 had to be excluded because they had not been included in a separate 1960 census. In short, they had grown too fast.⁵⁶

Independent Variables

The effective property tax rate (X_2) was chosen to indicate the level of property taxes in the various communities. The effective property tax rate is the nominal or actual rate times the assessment ratio. The effective rate in 1969 in the thirty-two communities ranged from a high of \$11.47 per hundred dollars assessed value to a low of \$4.17 per hundred dollars. The official assessment ratio, i.e. the ratio of

⁵⁵ These nine cities are Bellevue, Columbus, Fremont, Grand Island, Hastings, Kearney, Norfolk, North Platte and Scottsbluff.

⁵⁶ These seven towns (and their 1970 populations) are Central City (2,803), La Vista (4,807), Minden (2,669), Millard (7,460), Offutt East (5,195), Offutt West (8,445), and Papillion (5,606).

assessment to appraised value in the State of Nebraska is set by law at 35 per cent. This variable was hypothesized to have a negative sign and effect on median values,⁵⁷ since the property taxes will tend to increase the individual costs of ownership of real property. The increase in ownership costs would adversely affect the desirability of owning property in that municipality.

The education expenditure rate per average daily member (ADM) in 1969 (X_{10}) was chosen as a measure of the output of public services, in spite of the argument of Kiesling⁵⁸ that expenditure is an inadequate measure of performance. It has been hypothesized by Tiebout that education is an important aspect in the consumer's selection of the community which offers the public goods and services mix which suits him.⁵⁹ Oates identified educational expenditures as the largest expenditure in most local budgets and the most important single item to families with children.⁶⁰ If this is true, this variable should have a positive effect on property values, offsetting, or more than offsetting, the effects of

57 Nebraska, Property Tax 1970, A Statistical Report (1970)
p. 1.

58 Herbert J. Kiesling, "Measuring a Local Government Service: A Study of School Districts in New York State", The Review of Economics and Statistics 49 (August 1967): p. 356.

59 Charles M. Tiebout, "A Pure Theory of Local Expenditures", Journal of Political Economy 44 (October 1956): p. 46.

60 Wallace E. Oates, "The Effects of Property Taxes and Local Public Spending on Property Values: An Empirical Study of Tax Capitalization and the Tiebout Hypothesis", Journal of Political Economy, (November-December 1969): p. 962.

the tax rate.⁶¹ It should point out that even if the correlation between per pupil education expenditures and pupil performance is nebulous, the parents will often choose to reside in a school district with a reputation for higher quality schools, despite the higher tax rates.⁶²

Median Family Income (X_5) was chosen as a measure of consumer income, which should have a positive effect on housing values. This is true since income represents one half of effective demand. The other half is will, that is, intent to purchase something. The intent, or will, is difficult to measure, but a close proxy is the percentage change in owner occupancy, which is presented later. Given the will to purchase, an increase in income, representing the means with which to fill the desire or want, should cause an increase in demand, which should cause the price of existing housing stock to increase. Income should also be highly correlated to wage rates and could then be a proxy measure for construction costs. An increase in construction costs would have the effect of increasing housing values, even of existing stock, by reducing the inclination to build, and creating a greater demand for the existing stock. Again, causing an increase in prices.

The percentage of housing which is owner occupied (X_9) should adjust the downward bias which might exist in the income variable. This bias would be caused by the understate-

⁶¹ Ibid., p. 468.

⁶² The total expense of education per ADM was obtained from the 1969 financial reports of the school districts of each of the thirty-two municipalities involved.

ment of median income of homeowners. Since poorer families would probably rent, more of their income would be subject to taxation since they would not have a deduction for mortgage interest on their income tax returns. The bias would also exist due to the greater number of rooms in owner occupied houses versus rental units, at a lower cost. In order to offset this bias, this variable should have a negative sign,⁶³ since the income variable was hypothesized to be positive.

The median number of rooms (X_4) is a rough measure of housing size, and therefore, a measure of one of the components of housing quality. This is only a rough measure, but a more accurate measure of quality, i.e. square feet of heated floor space, is not readily available. The median number of rooms should therefore exert a positive influence on median house value and, the coefficient should have a positive sign.⁶⁴

The other measure of housing quality, average age of the owner occupied housing stock in the various municipalities was not available. A proxy for this variable is the percentage change in owner occupied housing units from 1960 to 1970 (X_3). This could also be a proxy variable for growth and should have a positive correlation to median housing values. In addition, this is also a measure effective will. That is, not just desire, but desire coupled with action to satisfy that desire.

⁶³ U.S. Department of Commerce, Bureau of the Census, United States Census of Housing: 1970, Vol 29 Nebraska, p. 33.

⁶⁴ Ibid.

It, therefore, is the other half of the demand factor (income being the first half) it should also have a positive effect, and the coefficient should have a positive sign.⁶⁵

A measure of the degree urban (X_8) is obtained by dividing the population of the principal city in the closest SMSA by the distance, in miles, from each municipality to that central city. This factor should be a measure of the accessibility (in contrast to the travel time variable to job centers)⁶⁶ of the major urban areas. This is more desirable than the travel time variable due to the economy of Nebraska. Being an agricultural state, most of the population works in agricultural or agriculture related fields, usually located in or around the smaller municipalities. The two and three hour commuting times prevalent on the east and west coasts are virtually non-existent here. However, since the SMSA central cities are business centers, their nearness should have a positive effect on housing values. (There are three SMSA's in Nebraska: Omaha, Lincoln, and Sioux City, Iowa-Nebraska, But Denver, Colorado, was close enough to affect seven of the western municipalities.)⁶⁷ However, a negative coefficient could be an indication that the effects of air pollution, usually considered to be greater in larger cities, was a factor.⁶⁸

⁶⁵ U.S. Department of Commerce, Bureau of the Census, United States Census of Housing: 1960, Vol. 29 Nebraska, p. 27.

⁶⁶ Oates, "The Effects of Property Taxes".

⁶⁷ U.S. Bureau of Census, Housing Census: 1970. Nebraska Highway Map 1975. Rand McNalley Co.

⁶⁸ Norse, "Air Pollution".

The state aid for education per ADM (X_{11}) is included as a measure of the return of other state tax monies. State aid to education has been found to have a stimulative effect on local school districts in Nebraska. That is, an increase in state aid per ADM of one dollar will result in an increase in expenditures per ADM of more than one dollar by the local school district. When this aid is stimulative, it will have a tendency to increase property taxes.⁶⁹ In this situation, the coefficient of this variable should have a negative sign. This would, in the minds of many tax-payers, tend to increase the impact of the costs of education on their individual tax burden.⁷⁰

In Nebraska, the state aid for education funds are set at \$55 million per year. The legislature establishes a formula annually for the distribution of these appropriations between the school districts.⁷¹

The total population (X_1) is used to indicate the potential market for single-family homes. To put it simply, the population must increase, all other things remaining steady, in order for the potential market to increase, the population must increase. If the population is less than the number of houses, then based on the theory of supply and demand, the

⁶⁹ Nielsen, "Financial Determinants".

⁷⁰ The allocations of the state aid to education funds were obtained directly from the 1969 financial reports for each school district in each municipality.

⁷¹ Interview with Harley Pfeiffer, Nebraska Department of Education, Lincoln, Nebraska. 1 December 1975.

price commanded by the houses will be lower.⁷² The coefficient of the population variable should, therefore, be positive since the population is the group which expresses the will and, combined with the means, becomes effective demand.

Federal aid to public schools (X_{12}) comes in many areas. It is most often seen in the school lunch programs, impact funds (to offset the economic impact of a federal military installation within a school district) and funds paid for the schooling of American Indians.⁷³ This aid source was found to be replacive in the State of Nebraska.⁷⁴ Federal aid, when replacive, will have a tendency to take the place of local funds spent on education. Property taxes could, therefore, be reduced by one dollar for each dollar of federal aid received by causing the expense involved in home ownership to be reduced, thereby causing the school district ownership to be more desireable. The federal aid per ADM in the 32 municipalities ranged from \$4.12 to \$111.68. It is used as a variable here and is hypothesized to have a very positive effect on the median value of single family homes.

A dummy variable (X_7, X_{16}, X_{17}) was included to compensate for intangible factors related to the locational effects which could exist within the State of Nebraska. To assign this variable to each of the municipalities, the state

⁷² Paul A. Samuelson, Economics 8th Edition, (New York: McGraw Hill, 1970).

⁷³ The amount of federal aid to each school district in each municipality were drawn directly from the financial records of each school district.

⁷⁴ Nielsen, "Financial Determinants.

was divided into quarters. To accomplish this, an arbitrary north-south line was drawn approximately fifty miles west of Lincoln, the capitol city. This division placed all three of the SMSA's, Omaha, Lincoln, and Sioux City, Iowa-Nebraska, in the eastern half. Another arbitrary line was drawn from east to west, north of Omaha. This division placed both Omaha and Lincoln in the same, southeast quadrant.

The dummy was composed of three digits to represent the first, second, or third quadrants. Each municipality was assigned a one in the column representing the quadrant of its location, the other two columns would be zero. The municipalities in the fourth quadrant were identified by three zeros. Figure 1 is a map on which the divisions have been drawn and the municipalities listed for each quadrant. This variable was hypothesized to have a positive effect on the value of owner-occupied homes, especially since most municipalities were located in the southern half, and the south-eastern quarter.

The percentage change in non-white population (X_{13}) was chosen as a variable to measure any effect race might have in locational decisions of Caucasian heads-of-households.⁷⁵ In view of the court ordered desegregation in Omaha which found that segregation movements were, in fact, present, a positive coefficient could indicate that Negroes were moving away from the larger urban centers to escape the pressures of racial

⁷⁵ U.S. Department of Commerce, Bureau of the Census, Census of Housing: 1960, and Census of Housing: 1970.

prejudice. Most of the municipalities reflected an increase in the non-Caucasian races. A negative coefficient could indicate that the increase in non-Caucasian races was tending to cause decreases in housing values.

Another variable thought to be a factor in determining the values of owner-occupied single-family homes is the percentage change in owner-occupancy by non-Caucasian races.⁷⁶ In two of the 32 municipalities there was an increase in owner-occupancy by non-Caucasian races. The remaining 30 municipalities had either a decrease or no non-Caucasian races at all. Since the ownership is decreasing, or remaining static, a negative coefficient would be an indication of prejudice on the part of the Caucasians. It could indicate that Caucasians are moving to the smaller municipalities to escape the pressures of minority civil rights movements in the urban areas. This would force the non-Caucasians into the central cities leaving the small town almost totally white and, therefore, more desirable to others who relocate for racial reasons.

The fertility ratio (X_{15}) measures the ratio of five year old children to women over eighteen years of age in each municipality.⁷⁷ A positive coefficient for this variable could be indicative of the power of this variable as a proxy for population, especially if there is a great degree of

⁷⁶ Ibid.

⁷⁷ U.S. Department of Commerce, Bureau of the Census, United States Census of Population: 1960, Vol 29, Nebraska.

inter-dependence.

The per-capita state and local taxes was included as a variable to provide a complete tax figure at the state and local level. This variable (X_6) should have a negative effect on housing values in as much as there are different local taxes in each municipalities. There is a state income tax and a sales tax in Nebraska. If the municipality has added additional taxes, the differential should appear here,⁷⁸ in the form of a negative coefficient.

⁷⁸ Ibid.

II. (X_{16})

Alliance
Broken Bow
Chadron
Gering

Valentine

I. (X_2)

O'Neill
South Sioux City
Wayne
West Point

Kimball
Lexington
McCook

III. (X_{17})

Beatrice
Auburn
Aurora
Blair
Crete
Fairbury
Falls City
Holdrege

IV.
Nebraska City
Plattsmouth
Ralston
Schuyler
Seward
Superior
Wahoo
York

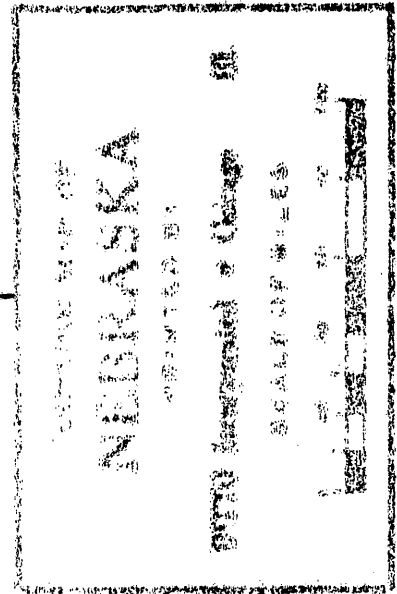


FIGURE 1; Division of the State into Quadrants for Assignment of Dummy Variables

EMPIRICAL RESULTS

The model was analyzed using the least squares regression technique and multiple correlation analysis was employed to test the hypothesis put forth in the preceding sections.

In the combined model using all 17 independent variables, Model I, the coefficient of multiple determination was $R^2 = 0.6006$. The coefficient of multiple determination using only five variables, Model II., was $R^2 = 0.4340$. However, three of the five variables were significant at the 1 per cent level, while the remaining two were significant at the 5 per cent level.

In the combined model, the most significant factor was found to be Median Family Income. This variable when used alone had a coefficient of correlation of $R^2 = 0.0963$. It proved significant in all model sizes. However, the relationship was negative instead of positive, as anticipated. This would indicate that as income goes down, the value of housing would go up. In attempting to explain this anomaly, several hypothesis are formed. The percentage of houses which are owner-occupied did, as anticipated, effect housing values offsetting the effect of median income. However, this variable had a positive sign rather than a negative sign as anticipated. Where income had a negative effect on housing values, percentage of owner occupancy had a positive effect. The median number of rooms in owner-occupied housing, another proxy variable for income, had a positive effect as anticipated. The percentage change in non-white owner occupancy also proved significant. This variable was the second most

TABLE I. MODEL I.

Median Value of Owner Occupied Housing in municipalities with populations greater than 2500 people.

= A	+ 490.1072X ₁	+ 207.5537X ₂	+ 87.2264X ₃
	t: (1.3161)	(0.9562)	(0.5874)
	B: (0.4302)	(0.2588)	(0.1212)
+ 2775.1808X ₄	- 955.4523X ₅ ***	+ 36.9381X ₆	+ 2360.4695X ₇
(0.6630)	(2.6286)	(1.5697)	(1.3827)
(0.1953)	(-0.5725)	(0.5494)	(0.3492)
+ 0.1096X ₈	+ 25.4965X ₉	- 5.0634X ₁₀	- 50.6797X ₁₁
(0.1096)	(0.1915)	(0.3392)	(1.4916)
(0.1339)	(0.0474)	(0.2001)	(-0.3617)
- 6.8863X ₁₂	- 867.7736X ₁₃ *	- 5974.6232X ₁₄	- 10.8309X ₁₅
(0.2011)	(0.8399)	(1.9178)	(1.5697)
(-0.0707)	(-0.2334)	(-0.5930)	(-0.3363)
+ 2875.8440X ₁₆	+ 130.8617X ₁₇		
(0.7402)	(0.1151)		
(0.4254)	(0.0254)		
	F ₂ 32		
	R ² 0.6006		
	F 1.2384		

*coefficient significant at 10 per cent level

**coefficient significant at 5 per cent level

***coefficient significant at 1 per cent level

TABLE II: Model II

Median Value of Owner Occupied Housing in Municipalities with Populations Greater Than 2500 People

$$= A + 790.3733 X_5^{**} + 2747.6465 X_7^{**}$$

t: (2.9046) (2.5230)
 B: (-0.4737) (0.4065)

$$+ 0.2949 X_8^{**} - 48.3079 X_{12}^{***} + 4430.8588 X_{14}^{***}$$

(2.1508) (2.9679) (2.6999)
 (0.3602) (-0.4957) (-0.4398)

N 32

R² 0.4340

F 3.9877

- * Coefficient Significant at the 10 per cent Level
- ** Coefficient Significant at the 5 per cent Level
- *** Coefficient Significant at the 1 per cent Level

TABLE III: Number of Variables in Model and Resultant R-Square

Number in Model	R-Square	Variables in Model
1	0.0963	X5*
2	0.1516	X5**, X14
3	0.2204	X1**, X4*, X5*
4	0.2804	X1**, X4*, X5*, X11
5	0.4340	X5***, X7**, X8**, X12***, X14**
6	0.4567	X5***, X7***, X8**, X12***, X14***, X16
7	0.4727	X3, X5***, X7**, X8**, X12***, X14***, X16
8	0.4920	X3, X5***, X7*, X8**, X11, X12***, X14**, X16
9	0.5032	X3, X5***, X7, X8**, X11, X12***, X13, X14**, X16
10	0.5123	X3, X5***, X7, X8**, X11, X12***, X13, X14**, X15, X16
11	0.5460	X1, X4, X5***, X6, X7, X8, X11, X12, X13, X14**, X16*
12	0.5804	X1**, X2, X4, X5***, X6***, X7, X10, X11*, X13, X14***, X15*, X16
13	0.5902	X1**, X2, X3, X4, X5***, X6***, X7, X10, X11*, X13, X14**, X15*, X16**
14	0.5959	X1**, X2, X3, X4, X5***, X6**, X7, X8, X10, X11*, X13, X14**, X15*, X16**
15	0.5994	X1, X2, X3, X4, X5***, X6*, X7, X8, X10, X11*, X12, X13, X14**, X15, X16*
16	0.6002	X1, X2, X3, X4, X5***, X6, X7, X8, X9, X10, X11, X12, X13, X14**, X15, X16*
17	0.6006	X1, X2, X3, X4, X5***, X6, X7, X8, X9, X10, X11, X12, X13, X14*, X15, X16*, X17

* Coefficient Significant at 10 per cent level
 ** Coefficient Significant at 5 per cent level
 *** Coefficient Significant at 1 per cent level

significant factor. This variable had a negative sign, as expected. This, then, gives credence to the hypothesis that white-flight from the cities and the converse, non-Caucasian drift to the central city, has a significant effect on housing values. The percentage change in non-Caucasian population, which was never significant, was the ninth variable to produce a "best fit" model. This indicates that as the non-Caucasian population decreases the housing value in that city increases.

The education expenditure per ADM did not have the anticipated sign, indicating that increases in school spending causes a decrease in values of houses in that area. This indicates that, if expenditures for education are a valid measure of the quality of the education given by the school, education is not, necessarily, the most important single item to families with children.

Federal Aid to education was found to be significant. However, the sign was negative rather than the anticipated positive. This is perhaps due to the actual incidence of federal aid. These programs are most often encountered in low income areas where the price of housing is already low or depressed. If this is the case, the housing values could be effecting the amount of federal aid and not vice versa.

The fertility ratio had a negative effect on housing values. This should indicate it has little value as a proxy for population.

Surprising enough, the dummy variables took on split significance. The dummy assigned to indicate those sectors in northeast Nebraska was significant at the 5 per cent level in Model II., which employed five variables. The next most significant variable was the dummy variable which identified those cities in the northwest quadrant. In a model using six variables, this variable was most significant. However, this variable was not even significant at the 10 per cent level. It did result in an increase in the coefficient of multiple determination from an R^2 of 0.4340 using five variables to an R^2 of 0.4537 using this sixth variable.

State aid to education had a negative effect on housing values, as anticipated. This variable was not generally significant, only in four of the seventeen models. It was never significant at a level greater than 10 per cent. However, it was one of the variables which produced the "best fit" in 11 of the 17 models.

The effective property tax did not have the anticipated negative effect on housing values. On the contrary, this variable had a positive effect, indicating that, taxes increase, so will property values. This variable produced "best fit" in six of the 17 models. However, it was never significant to even the 10 per cent level.

The other measure of taxes, per-capita state and local taxes, also had a positive effect on housing values. This was also contradictory to anticipation. This variable was important in seven of the 17 models. It was the eleventh

factor, producing a "best fit" model. It was significant at the 1 per cent level in two models, at the 5 per cent level in one model, and at the 10 per cent level in two models.

Total population was instrumental in producing "best fit" in nine of the 17 models. It was significant in five of the nine models, always at the 5 per cent level.

The degree urban, which was measured by the proximity of the subject municipality to the central city of the nearest Standard Metropolitan Statistical Area (SMSA), was an effective variable in 11 of the 17 models. It was significant in six of these models, in five of these at the 5 per cent level. It had a positive effect on housing values indicating that the nearness of the central cities with its jobs and commercial activities is an important factor in housing values.

Results and Conclusions

The goal of this paper was to identify the possible effects of state and federal aid to education on the values of single family owner occupied housing in the State of Nebraska. A second goal was to determine the effects of property taxes on the median values of owner occupied housing. Several variables were introduced in an attempt to identify those which exerted the greatest influence on values to facilitate future study.

State aid to public schools, has a negative effect on housing values. This tends to reinforce the finding that state aid is stimulative, causing more expenditures in the school sector, rather than reducing taxes. The state aid is capitalized into housing in the form of depressed residential values. Federal aid to education is also capitalized into depressed residential values. Therefore, instead of increasing values, these social programs actually play a significant role in reducing the values of housing in the areas of Nebraska receiving the aid. This is contradictory to the widely held belief that these forms of aid will be to the benefit of everyone in the area.

Neither property taxes nor state and local taxes were found to depress housing values. They are not capitalized through residential values. In fact, taxes were found to have a positive effect on housing values. This would indicate that, at least to some extent, people look on higher taxes as favorable. This is possible an indication of anticipated favorable effects on the community in the form of

greater tangible benefits, i.e. police and fire protection, more and better parks. The expenditures for education, do offset the effects of the taxes. However, the education expenses in Nebraska do not increase housing values, but reduce these values.

Median family income has proven very significant in the determination of single family owner-occupied housing in Nebraska. However, the effect is negative instead of positive. This would imply that as the income goes up, the value of the housing goes down. This contradicts the "Filter" theory which states that as people become more affluent, they will move to better housing leaving their old units for elements of the lower economic strata to occupy, thereby increasing their housing standards. The results of this study indicate that just the opposite occurs in Nebraska. This indicates that more study is needed to verify this conclusion.

In attempting to identify some of the determinants in housing values in Nebraska, aside from income, racial prejudices seemed to be most important. This does not substantiate the view of Realtors that economics tends to equalize everyone. In Nebraska, the racial make-up of a municipality has a definite and significant effect on housing values. As the percentage of non-Caucasians in a city increases, the value of the housing in that city decreases. The caucasians seek to escape the non-Caucasians.

The significance of this variable is that Nebraskans

who voice opposition to bussing to achieve integration in public schools are not truly and solely opposed to bussing. The weight the two racial variables indicate that the actual reason for the opposition is racial. This is also an area in which more study is needed.

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