University of the Philippines
SCHOOL OF ECONOMICS

Discussion Paper 8011 December 1980

RACIAL PREFERENCES AND HOUSING PRICES*

by

Cayetano W. Paderanga, Jr.

ABSTRACT

This paper studies and tests a hypothesis about how racial preferences influence the choice of urban residential location. The hypothesis implies a pattern of housing prices which lead to racial segregation. Data from San Mateo County, California is used in the study. Utilizing the technique of hedonic price index estimation, the paper concludes that the empirical results are consistent with the hypothesis of racial preferences by households which ultimately result in racial segregation.

RACIAL PREFERENCES AND HOUSING PRICES*

by

Cayetano W. Paderanga, Jr.

A pattern of housing segregation by race or ethnic group in the urban areas of the United States has been evident for a long time. The exclusion of minority groups, especially the Blacks, from certain neighborhoods through various means has also been pointed out. This has caused concern because of the possibility that not everybody has equal access to housing with the consequent loss of economic welfare. however, almost two decades of anti-discrimination laws have brought no perceptible change in the pattern of housing in urban areas.

---

*This paper is based on my unpublished doctoral dissertation. I would like to thank my committee, Richard F. Muth, Michael Boskin and Michael Block, for valuable advise; Bill Rumpf, for originally suggesting that somebody study housing discrimination in San Mateo County, California; Fred Nold, Nilo Sarmiento, Jeff Mclaughlin, Eli Remolona and other members of the Stanford GSB lunch group for added assistance, and very especially, my wife Delia for direct aid and inspiration. All remaining errors, are mine

San Mateo County in California follows the general pattern of persistent housing segregation. At the start of the seventies, eighty percent of the population were White; ten percent were Black. The rest were Asian, American-Indians and other groups.[1] The two distinguishable minority groups (Black and Spanish-American) differed significantly in their patterns of residential location. Spanish-Americans were distributed relatively evenly over a wide area, while Blacks were concentrated in a few small pockets.

Data from San Mateo will be used to analyze and test an explanation which is hoped to explain the persistence of segregated housing patterns inspite of the sanctions against discriminatory practices by suppliers of housing services, and provide indirect motivation for intentional and de facto discriminatory actions by housing suppliers. The implication of the hypothesis for public policy will also be discussed.

---

[1] As defined by the Bureau of Census, the term "Spanish" meant "Persons of Spanish language or Spanish surname." The Spanish-American population is predominantly White; but includes a small amount of Spanish Blacks.

I. The Hypothesis and Theoretical Model

The hypothesis is based on the constrained utility maximization model used in urban economics.[1] Households with given incomes maximize utility over two explicit commodities: housing services and the composite of all the other goods. The housing market allocates resources in such a way that households are segregated by income level. To the extent that some races are poorer on the average than another race, this factor contributes to housing segregation by race. However, the hypothesis, first discussed by Martin Bailey in 1959,[2] asserts the presence of housing segregation for reasons other than those implied by the basic model.

The Bailey hypothesis ascribes to white households an aversion to living with Blacks and a preference to living close to other Whites. Black households on the other hand, are either attracted or at least indifferent to living close to White households. In the long run, White households will outbid Black households for housing in those neighborhoods that have a higher percentage of White households on the average. Ultimately, the stronger racial preferences of White households will lead to housing segregation between races.

---

[1] See William Alonso, Location and Land Use (Cambridge, Massachusetts: Harvard University Press, 1964), Edwin S. Mills, Studies in the Structure of the Urban Economy (Baltimore: Johns Hopkins University Press, 1972, and Richard F. Muth, Cities and Housing (Chicago: University of Chicago, 1969).

[2] Martin J. Bailey. "A Note on the Economics of Residential Zoning and Urban Renewal," Land Economics (August 1959), 288-290.

Formally, the hypothesis is incorporated into the basic model by reaking down housing services, q, into two components:

s - housing services that flow from the housing structure, and

n - housing services that households obtain from the characteristics of the neighborhood.

The first component measures the households satisfaction from shelter, warmth and other amenities that accrue to individuals with a fixed and secure place to stay. The second component is site specific and households experience it because the consumption of housing services cannot be divorced from its location. In the case of race, this component may be taken as the households' aversion or attraction to different races. Because households do not consume s and n separately even if they may consider these two as separate components, they choose between housing packages that imply varying proportions of q, s, and n. The utility function is:

$$u = u(x, s, n, n_2, \ldots, n_N) \qquad (1)$$

and households are willing to pay for n_i in two ways:

(a) By an outright "payment" for the neighborhood characteristic. In the case of tangible characteristics like the presence of parks, better schools, etc., households may be observed as aggreeing with their neighbors (voting) to pay taxes or dues for these expenditures. Or, perhaps more accurately, households may move to communities with more of the desired neighborhood characteristics and the appropriate tax rates.

(b) By their willingness to pay a premium for houses in neighborhoods with the desired characteristics, or by the necessity for a discount for houses in neighborhoods with distasteful characteristics.

Incorporating these, the budget constraint may be written as:

$$Y = x + p_{\tilde{q}} = x + p_s S + \sum_i p_{n_i} n_i + \sum_i t_i n_i + T(k, y) \qquad (2)$$

where:

$\tilde{q}$ = augmented definition of q.

p_x = normalized as being equal to one.

t_i = explicit payment for the specific neighborhood characteristic

$T(k, y)$ = transportation costs of the household which depends on both distance and income.

For simplicity in exposition, assume that racial composition, c, is the only relevant neighborhood characteristic. Further, since households cannot legally pay to keep members of undesired races out of a neighborhood, the terms t_c is introduced only initially for completeness, and will be ignored thereafter. Hence, the modified model is as follows:

$$\text{Maximize} \quad U = U(x, s, c)$$

$$\text{subject to} \quad Y = x + P_s S + P_c c + t_c c + T(K, Y) \qquad (3)$$

Note that s and c cannot be consumed separately.

$$\text{(i)} \quad U_x - \lambda P_x = 0$$

$$\text{(ii)} \quad U_{\tilde{q}} - \lambda P_{\tilde{q}} = 0 \quad \text{or}$$

$$(U_s + U_c) - \lambda (P_s + P_c) = 0$$

$$\text{(iii)} \quad -\lambda \{qP_{s_k} + T_k\} = 0$$

$$\text{(iv)} \quad y - \{x + P_s S + P_c C + tc + T(k, y)\} = 0 \qquad (4)$$

Households will equate the ratio of the marginal rates of substitution between housing services and the composite commodity and the ratio of their prices. This ratio will vary according to the assumption on racial preferences by the household:

(a) Without racial preferences:

$$MRS_{x, \tilde{q}} = \frac{U_x}{U_s} = \frac{P_x}{P_s}$$

(b) With racial preferences:

$$MRS_{x,\bar{q}} = \frac{U_x}{U_s + U_c} = \frac{P_x}{P_s + P_c}$$

Under the Bailey hypothesis both Blacks and Whites prefer living close to other Whites. However, while Blacks may be indifferent to living close to other Blacks, Whites are not as indifferent to living in a mixed neighborhood. An absolute difference in the intensity of preferences for the desired racial composition arises. Whites have stronger preferences for segregation than Blacks have for integration. This leads to a price differential between what households of each race will pay for desired neighborhoods.

In the following section, it is assumed that households get the same utility from the housing structure regardless of its location. That is,

$$U_{s_b} = U_{s_w}$$

U_{s_b} = utility derived from structure in a Black neighborhood.

U_{s_w} = utility from a structure in a White neighborhood.

Black households:

(a) In the Black neighborhood:

$$\partial u/\partial c_b = 0 \qquad Pc_b = 0$$

$$MRS_{x,\tilde{q}} = \frac{U_x}{U_s} = \frac{P_x}{P_s}$$

(b) In the White neighborhood:

$$\partial u/\partial c_w > 0 \qquad Pc_w > 0$$

$$MRS_{x,\tilde{q}} = \frac{U_x}{U_s + Uc_w} = \frac{1}{P_s + Pc_w}$$

Price differential that Black households are willing to pay:

$$D_{Black} = P_s + Pc_w - P_s = P_{c_w}$$

For White households:

(a) In the Black neighborhood:

$$\frac{\partial u}{\partial c_b} < 0 \qquad P_{c_b} < 0$$

$$MRS_{x,\tilde{q}} = \frac{U_x}{U_s + Uc_b} = \frac{1}{P_s + P_{c_b}} U_{c_b}, \quad P_{c_b} < 0$$

(b) In the White neighborhood

$$\partial u/\partial c_w > 0 \qquad Pc_w > 0$$

$$MRS_{x,\tilde{q}} = \frac{U_x}{U_s + U_{c_w}} = \frac{1}{P_s + P_{c_w}} U_c, \; P_{c_w} > 0$$

Price differential for a White household:

$$D_{White} = P_s + P_{c_w} - (P_s + P_{c_b})$$

$$= Pc_w - P_{c_b} = P_{c_w} + P_{c_b}$$

Since $P_{c_b} < 0$

$$D_{White} > D_{Black}$$

White households which are in every respect identical with Black households are willing to pay a relatively higher to live in a White neighborhood than Black households would.

The differential is indicated by the negative externality experienced by White households in a mixed area.[1]

To summarize, prices of housing services along the boundary, in the White border area, will show the following pattern:

$P_W > P_W + a_W$ $\qquad$ P_W - White interior price

$a_W < 0$

In the Black border area, on the other hand, this pattern will appear:

$P_B < P_B + a_B$ $\qquad$ P_B - Black interior price

$a_B > 0$

---

[1] For housing segregation to result, it need not be assumed that White households a strong aversion to other races ($\partial u/\partial c_b < 0$). It is enough that White households have a strong preference for living among other Whites than Black households have for living close to Whites, and that this difference in intensity be adequately reflected in the premium that households are willing to pay. In fact, estimation of the premium paid by White households from market data does not allow distinction between the two possible components of the White premium. A more accurate statement, then, is that the White households' preference for segregation is more intense than the Black households' preference for integration and that this is reflected in market data.

d - price differential for being on the border

This higher intensity of racial preference by Whites results in racial housing segregation. If we start with housing randomly distributed by race, Whites will start outbidding Black households for sites where the Whites are a higher percentage than the mean. If the process continues long enough, housing segregation as we know it will eventually result.

Methodology

Households are conceptualized as equating the ratio of the sum of the marginal satisfaction for all relevant housing attributes to the price of the housing unit to a similar ratio pertaining to all other goods. Just as households conceive of dwelling units as a bundle of housing attributes, the price of a dwelling unit may be considered as a sum of the incremental prices corresponding to the housing attributes of that unit.

$$P_q = \sum_{i=1}^{n} p_i a_i$$

where

a_i = "quantity" of housing attribute i

p_i = "price" of housing attribute i

and i = 1, ..., j refer to structural characteristics

i = j + 1, ..., n refer to neighborhood characteristics

In the case of households with preferences regarding the racial composition of the neighborhood, a differential will arise in the price that those households are willing to for houses with different racial compositions.

The capitalized value of the flow of services is what is relevant to the household for house purchases.

$$V_h = \sum_{t=0}^{T} p_{\tilde{q}_t} (1 + r)^t = \sum_{t=0}^{T} \sum_{i=1}^{n} p_{i_t} a_{i_t} (1 + r)^t \quad (4)$$

V_h = value of h^{th} house to the household

$p_{\tilde{q}_t}$ = price households are willing to pay for the bundle of housing services at time t.

Given their preferences, households will set an acceptable price for each house they canvass depending on the mixture of the housing attributes provided by that house. The value of two otherwise identical houses that differ only by a specific attribute, e.g. racial composition, will differ only by the capitalized value of that housing attributed.

$$V_{h_1} - V_{h_2} = \sum_{t=0}^{T} p_{j_t} a_{j_t} (1 + r)^t$$

In the present case of racial mix as a housing attribute, a_j would be equal to one or zero depending on the presence or absence, respectively, of the desired racial mix of the neighborhood.

Hedonic price index estimation, the technique used here, takes advantage of the variation in the selling

Price of houses coupled with the variation in the mixture of housing attributes to derive the estimated average prices for each housing attribute.[1] Thus, even though houses are bought and sold with a single price attached to each one, housing attributes can be identified. Multiple regression techniques applied on the observed housing, attributes and prices are used to estimate the contribution of each individual attribute to total price.

The Regression Equation

The marginal satisfaction provided by a house is directly related to the structure and community-specific characteristics it possesses. The household's demand for any specific house is, therefore, determined by the interaction of the totality of these housing characteristics with the price of that house within constraints imposed by the household's income.

Two types of housing characteristics are distinguished:

---

[1] For example, see R.G. Ridker and J.A. Henning, "The Determinants of Residential Property Values with Special References to Air Pollution," Review of Economics and Statistics 44 (May 1967): 246-55, and A. Thomas King and Peter Mieszkowski, "Racial Discrimination, Segregation, and the Price of Housing," Journal of Political Economy (May/June 1973): 590-606.

(a) House-specific variables: h_j

$$H_j = h_j (S_j, L_j)$$

where S_j = a vector of structure-specific variables for j^{th} house

L_j = a vector of lot-specific variables

(b) Environmental variables: E_k

$$E_k = E_k (N_k, G_k)$$

N_k = vector of neighborhood for k^{th} neighborhood

G_k = vector of public sector variables

The i^{th} household's demand for the j^{th} house (in the k^{th} neighborhood) may be represented in terms of the market price for that unit, P_{jk}, all of the housing characteristics attached to the unit, and the income of the household.

$$Q_{jk_i} = Q_i (H_j, E_k) = f \{P_{jk}, Y_i, \underline{/h_j}(S_j, L_j), E_k (N_k, G_k)\underline{/}\} \qquad (5)$$

The sum (horizontal) of all such individual demands by all $\rho = \Sigma_i$ households represents the market demand for the j^{th} house.

$$Q_{jk} = Q(H_j, L_k) = F\{P_{j_k}, H_k (S_j, L_j), L_k (N_k, G_k)\}$$

$$F = f_1 Uf_2 U \ldots Uf_\rho \qquad (6)$$

The income of the particular household can be considered in two ways: (a) as a determinant of the household's effective demand, and (b) as a determinant of the effective (after-tax) price that the household pays for the dwelling unit. For the first consideration, the convention that the same income distribution applies to all the houses offered for sale in the market is used. This allows individual incomes to be ignored while all the potential offers of many buyers are added up.[1]

The effective after-tax sales price for a house may differ from its cash equivalent sales price because of the income tax advantages provided by interest payments on the house mortgage.

$$P^w_{jk_i} = P_{jk}(1-t_i) - P_{jk} = P_{jk} - P_{jk}\, t_i (Y_i)$$

P^w_{jk} = effective selling price

$t_i(Y_i)$ = effective tax rate for household i

---

[1] It is assumed that the same income distribution applies to the entire housing market.

The market demand function can be rewritten as:

$$Q_{jk} = F\ (P^*_{jk},\ h_j,\ E_k)^1 \qquad (6^1)$$

The equivalent estimating form is:

$$Q_{jk} = \beta_0 P^*_{jk},\ + \beta_1 (S_j) S_{jm} + \beta_2 (L_j)\ 1_{jn} + \beta_3 N_k + \beta_4\ G_k + e_{jk} \qquad (6a)$$

$$= \beta_0 P_{jk} + \beta_0\ Y_k + \beta_1\ (S_j) S_{jm} + \beta_2\ (L_j)\ 1_{jn} + \beta_4 G_k\ +\ e_{jk}$$

where S_{jm} = quantity of housing measured by square feet of living area,

1_{jn} = the area of the lot measured in square feet.

Y_k = median family income for the census tract.[2]

Note that $\beta_0 < 0$ is expected. This implies that $\beta_0 > 0$.

---

[1] Median family income for the census tract, Y_k, has been used under the assumption that some form of self-selection by families by income takes place.

[2] Confer footnote number 1 above.

The supply of houses is a function of the prevailing price for dwelling units with certain attributes and the cost of producing the dwelling. The cost of producing a dwelling of quality level j in community k, ϕ_{jk}, is a function of the cost of producing the individual inputs. The supply function can therefore be written as:

$$Q_{jk} = S_{jk}(P_{jk}, \phi_{jk}\{r_s(S_j) S_{jm}, r_{L_k}(L_j) l_{jn}\}) \qquad (7)$$

The corresponding estimating equation is:

$$Q_{jk} = \alpha_0 P_{jk} + \alpha_1 r_S S_j S_{jm} + \alpha_2 r_{L_k} L_j e_{jn} + V_{jk} \qquad (7a)$$

where S_{jm} = the size of the dwelling as measured by the square feet of living area;

r_s = the unit price of structural attributes, a function of the vector of structure characteristics, S_j, and their replacement costs,

r_{L_k} = the unit price of land in community k;

l_{jn} = the size of the lot

V_{jk} = random error term.

The reduced form equation of the market equilibrium can be solved in terms of observable dwelling unit sales prices:

$$P_{jk} = \frac{\beta_0}{(\alpha_0 - \beta_0)} Y_k + \frac{(\beta_1 - {}_1r_s(S_j))}{(\alpha_0 - \beta_0)} S_{jm} \qquad (8)$$

$$+ \frac{(\beta_2 - \alpha_2 r_{L_k})}{(\alpha_0 - \beta_0)} (L_j) + \frac{(\beta_2 - \alpha_2 r_{L_k})(L_j)}{(\alpha_0 - \beta_0)} {}_1l_{jn}$$

$$+ \frac{\beta_3 (N_k)}{(\alpha_0 - \beta_0)} + \frac{\beta_4 (G_k)}{(\alpha_0 - \beta_0)} + u_{jk}$$

As before, S_j, L_j, N_k and G_k are vectors of house and community-specific attributes.[1] The effect of structure and lot-specific variables are assumed to be proportional to the size of the house and lot respectively.[2] More concisely, and incorporating the test as being of one on unit prices for dwelling units, the final estimating equation is weighted by the inverse of the house size, $\frac{1}{S_{jm}}$

---

[1] The individual effect of each attribute will be estimated in the empirical portion.

[2] The effects of neighborhood and government characteristics may well be proportional to the size of the property but there is no a priori reason to support this.

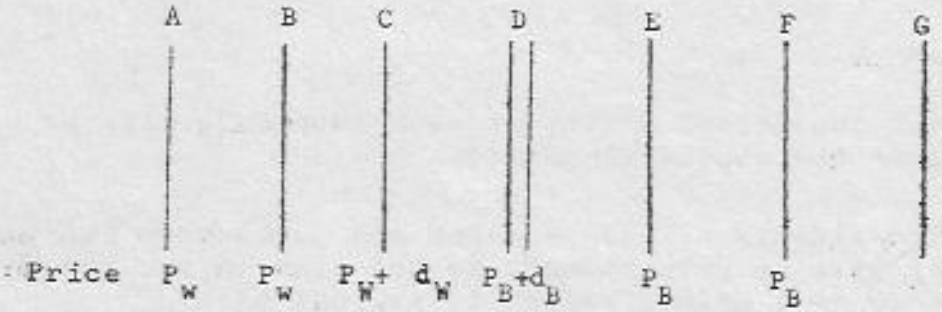
$$P_{jk} = \frac{P_{jk}}{S_{jm}} = \alpha_1 (S_j) + \alpha_2 (L_j) \frac{I_{jn}}{S_{jm}} + \frac{N_k}{S_{jm}}$$

$$+ \alpha_4 \frac{G_k}{S_{jm}} + w_{jk}$$

where $w_{jk} = \frac{u_{jk}}{S_{jm}}$. This transformed error term is expected to be more constant than that in the total sales price equation.

Test of the Hypothesis

A conclusion of the present analysis of the Bailey hypothesis is that, in long-run equilibrium, prices paid for housing services will be lower in interior Black than in interior White areas.[1] The dynamics and implications of the hypothesis are more richly illustrated by looking at a restricted area, e.g., an area of several blocks straddling the boundary between Blacks and Whites.



[1] See Richard F. Muth, Urban Economic Problems (Chicago: Harper & Row, 1969), Chapter 4, for a more complete discussion of this.

Suppose D street is the initial boundary between Whites and Blacks. Listed below are the prices paid by different households as implied by the hypothesis.

P_W = price paid by White households in the White interior.

P_W+d_W = price paid by White households on the White border. By assumption $d_W < 0$.

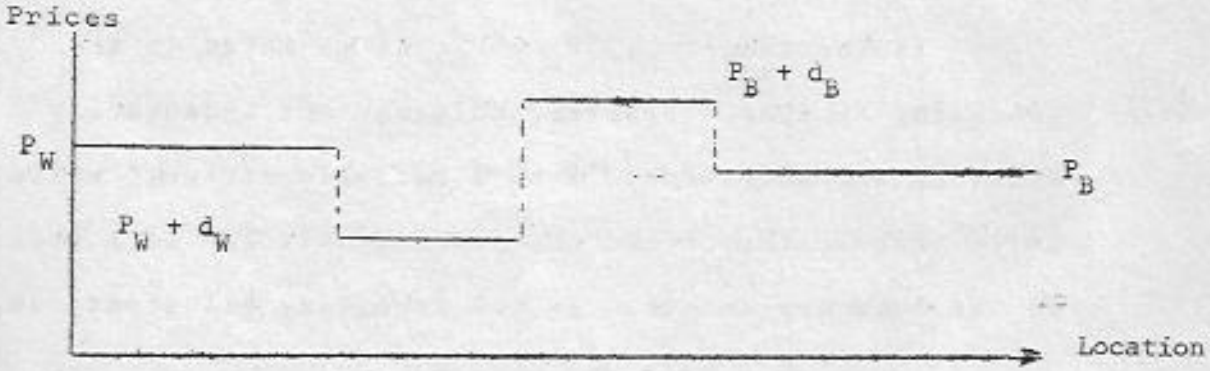
P_B = price paid by Black households in the Black interior.

P_B+d_B = price paid by Black households on the Black border. By assumption $d_B > 0$.

Initially, prices for housing services in the White and Black interiors are assumed to be equal. The following can, therefore, be inferred:

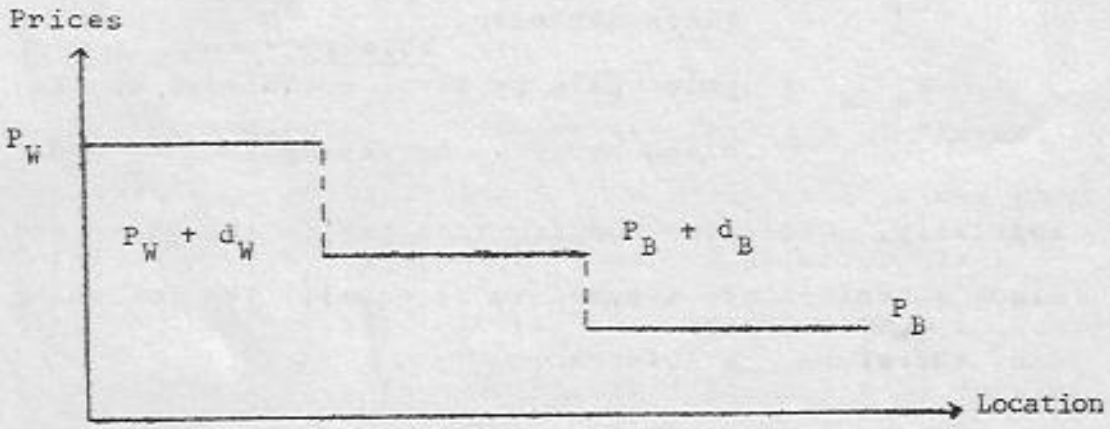
$$P_W + d_W < P_B + d_B$$

(a) short-run



The Black area will expand at the expense of the White area. Given stable populations, at some point P_B will fall to induce households to live in the Black interior. P_W on the other hand, will rise as the White area shrinks. Once the prices at the boundary are equal, the adjustments will cease.

(b) long-run



Long-run equilibrium is reached when prices on both side of the boundary are equal.

In the long-run, $P_W > P_B$, as we noted in the preceding section. However, this may not necessarily exist in the short-run. A more reliable strategy would be to test if the border premium/discount for each side of the boundary exists. In the foregoing illustrations,

this amounts to testing whether housing prices on both sides of the boundary differ from the interior prices by d_W or d_B. One can fit regressions on the data, introducing dummy variables designed to capture the boundary effects of racial differences. Dummy variables according to the following scheme may be set up:

	D_1	D_2	D_3
Interior White	0	0	0
White Border	1	0	0
Black Border	0	1	1
Interior Black	0	0	1

The following signs on the dummy coefficients are expected:

$$D_1 \ (=d_W) < 0$$

$$D_2 \ (=d_B) \gtrless 0$$

$$D_3 \qquad \gtrless 0$$

The expected sign for the dummy variable for housing in the "Black areas," D_3, is ambiguous. The resulting coefficient may be greater or less than zero depending on whether short-run forces such as the relatively rapid increase

in demand for Black urban housing are stronger than the expected long-run tendency for White households to pay a premium to live in White interior areas. However, empirical estimates of D_1 is a sufficient test for the hypothesis (i.e., whether houses on the "White boundary"exhibit discounts).

II. Data Used

The variables used are classified into two major groups: those related to the house and its corresponding lot, and those pertaining to the characteristics of the neighborhood in which the house is located.[1] The first group includes the physical dimensions and characteristics of the house and the accompanying lot as well as relevant facts about the sales price and assessed valuation of the property. The second group includes all information about the activities of the public sector in the different communities, the location of the lot and prevailing land use of the surrounding area, socio-economic and demographic data and the main interest of the study, racial characteristics of the neighborhood.

---

[1] A listing and classification of the variables used is given in the Appendix.

The basic source of house-specific data are the San Mateo Country assessor's records for sales of single family homes. The final sample for the geographic subset chosen contained 9,241 observations for the three years under study, 1971 to 1973. A very important advantage and benefit provided by the data base is the availability of the data on the basis of individual dwelling units and its relative richness in house-specific characteristics.[1] The relative completeness of house-specific variables is particularly critical for the purposes of this study because the ultimate test depends on the ability of binary variables to capture the effect of the racial characteristics of the neighborhood. In such cases, the precision of the test is greatly influenced by the ability to control for the effects of all other significantly relevant variables.

---

[1] Econometric literature has elaborated on the loss of precision due to the aggregation of data for all dwelling units in an area (e.g., census tract). See for example Henri Theil, Principles of Econometrics (New York: John Wiley & Sons, 1971).and Jan Kmenta, Elements of Econometrics (New York: The Macmillan Company, 1971). For the danger of biased coefficients in an area related to our study, see A. Mitchell Polinsky, "The Demand for Housing: A study in Specification and Grouping," Econometrica, Vol. 45, No. 2 (March 1977): 447-64 and Barton Smith and J.M. Campbell, Jr. "Aggregation Bias and the Demand for Housing," International Economic Review, Vol. 19, No. 2 (June 1978): 495-505.

Community variables describe characteristics of an area bigger than just the immediate neighborhood of the dwelling unit. Data in these variables varying levels of aggregation were obtained from the 1970 Census of Population and Housing[1] and a variety of local public agency sources.[2] Because of confidentiality, only the tax code area was available for the dwelling units in the assessor's record. The dwelling units and the corresponding community characteristics were matched through this.

Data was collected around 1974 when the peninsula housing marked had already exhibited an inflationary trend for a few years. The period under study was kept to a short a period as possible while keeping the sample still large enough to give adequate representation to the different sectors and different types of housing in the country. Rising prices could introduce needless variation into the data that would only weaken the precision of the estimates. The most recently compiled information.

---

[1] U.S. Department of Commerce, Bureau of Census, Census of Population and Housing: 1970, by Census Tracts, Final Report PHC(1)-189, San Francisco-Oakland, California, Standard Metropolitan Statistical Area (Washington, D.C.: U.S. Government Printing Office, April 1972).

[2] A summary of information sources is given in the Bibliography.

then was for 1973. The period was extended back to 1971 as a compromise between the conflicting considerations mentioned. It was believed that inflation could be adequately controlled for a period that long.

Construction of Racial Binary Variables

The lowest level of aggregation available -- primary tax code areas, school districts and census tracts -- forecloses exact identifiability of the empirical test with our theoretical model. The study cannot specifically investigate whether a black or white household will pay to live in a certain neighborhood. Rather, the test will show what the housing market as a weighted average of the willingness of all households to pay for housing services will set for the racial characteristics of certain neighborhoods. The specific question answered by our test is: "By how much lower or higher will a house of the 'average' type be bought and sold if it were located in each of the various types of neighborhoods." Binary variables are constructed to capture the differences in mean prices among houses located in the various neighborhoods.

The test evaluates the implications for the hypothesis on the price of housing services on both sides of the boundary between areas predominated by different races. Four types of areas around the boundary were of interest: two interior areas, each of the racial groups on either side of the boundary; and the two corresponding border areas adjacent to the boundary on the inner side of each group. Since long-run conditions of equilibrium may not be sufficiently satisfied for the housing market, one is able to test only for the border effects on housing prices -- effects that show up even under short-run conditions. These border effects are essentially step-like differences in housing prices between the border area prices and interior prices of both racial groups.

Three races are explicitly considered in this study: White (Caucasian), Black, and Spanish-American. Several other races are discernible in the population statistics compiled by the Bureau of Census, e.g., Chinese, Filipinos, Japanese. However, they were not present in San Mateo County in such numbers as to compose distinct racial groupings for our purposes.

Substantial literature on racial segregation and neighborhood tipping suggests that on a broad basis neighborhoods can be classified into areas "predominated" by racial groups.[1] That is, once the percentage of a minority group exceeds a certain threshold, a neighborhood rapidly becomes predominated by that racial group.[2] This has been borne out in the case of San Mateo County. Between the minimum level for a census tract to qualify as Black or Spanish interior (25%), and the very high rates of 60% Black of Spanish and over, very few of intermediate composition can be found. This is especially true of the Black areas where the stronger concentrations were noted earlier. The next concentrations found beyond the 25% threshold were in the 80% levels.

---

[1] See for example, Luigi Laurenti, "Effects of Nowhite Purchases of Market Prices of Residences," The Appraisal Journal (July 1952): 314-29 Martin J. Bailey, "Effects of Race and of Other Demographic Factors on the Values of Single Family Homes," Land Economics (May 1966): 215-20 Chester L. Hunt, "Integrated housing in Kalamazoo," in Alfred N. Page and Warren R. Seyfried (eds.), Urban Analysis (Glenview, Illinois: Scott, Foresman and Co., 1970): 296-310.

[2] See for example, Thomas Schelling, "A Process of Residential Segregation: Neighborhood Tipping," in A.H. Pascal (ed.) Racial Discrimination in Economic Life (Sta. Monica, California: RAND Corporation Memorandum, 1967), pp. 157-184.

On the minority (Black or Spanish) side of the boundary are the Black Border (BB) and Spanish border (SB) areas. These were census tracts that were from 10% to 24% Black (or Spanish) or were adjacent to a census tract that had been classified as Black (or Spanish) Interior area. On the "White side" of the boundary "near" a minority area under the Bailey hypothesis, the areas, called White Border, are defined as those census tracts with 6% to 9% Black or Spanish concentrations. In order to find out whether the housing market treats the Black and Spanish ethnic groups differently, the White Border was further subdivided into the White Black border and the White-Spanish Border.

The sample does not include any confirmed sale of a single-family home in the Black Interior areas of the period. A dummy variable was, therefore, constructed for the Black and Spanish areas showing our inability to distinguish between minority boundary and interior areas.

In summary, the different ethnic areas are:

BA :	Black Area	: 10% - 24% Black or over or the census tract is adjacent to a Black Interior area
WBB :	White-Black Border	: 6% - 9% Black
SA :	Spanish Area	: 10% - 24% Spanish or over or the census tract is adjacent to a Spanish Interior area
WSB :	White-Spanish Border	: 6% - 9% Spanish
BSB :	Black-Spanish Border	: Census tracts fulfilling the conditions for White-Black and White-Spanish Border areas, except that the borders are between Black and Spanish areas.

The last area designated is the Black-Spanish Border (BSB). These are census tracts that fulfill the conditions for the White-Black Border and White-Spanish Borders except that they are between Black and Spanish areas. The dummy variable for these census tracts are expected to indicate how the housing market treats areas of overlap between the two minority groups.

Coefficients for the final estimating equation are shown in Table 1. Statistically significant results for the house-specific and racial binary variables were obtained throughout the whole of the study. Further, the estimated coefficients are empirically sensible in magnitude for almost all variables.

TABLE 1

RACIAL PREFERENCES AND HOUSING PRICES
SAN MATEO COUNTY, CALIFORNIA
EMPIRICAL RESULTS

	Regression Number 1
Dependent Variable: Selling price per square foot (living area)	
Mean of dependent variable	26.9477
Number of observations	9241
R-squared	.6424
F-statistic	375.4900
Degrees of freedom	(44, 9196)
Independent Variables	
A. Inflation Indices	
Dummy for year = 1972	1.6162 (16.4400)[2/]
Dummy for year = 1973	3.9970 (40.2500)
B. Structure-specific Variables	
Square feet of house (living area)	- .0015 (- 5.3100)
Quality	.6993 (10.7900)
Percent Good (1 - depreciation)	7.6198 (22.3000)

TABLE 1 (Continued)

	Regression Number 1
Dummy for multiple-story structure	- 1.6900 (- 11.2600)
Dummy for presence of basement	1.2627 (12.2400)
No. of bedrooms per square foot of house	879.8983 (2.2400)
No. of bedrooms squared per square foot of house	-211.5760 (- 3.0000)
Dummy for presence of garage	1.9766 (9.7200)
Dummy for central heating	.9777 (7.7300)
Extra paved area per square foot of house[3/]	1.3861 (8.1500)
Cost of improvements to house interior per square foot of house	.7854 (8.8100)
Cost of improvements to house exterior per square foot of house	1.2582 (21.3600)
Cost of pool per square foot of house	1.2842 (16.7500)

TABLE 1 (Continued)

	Regression Number
	1
C. Lot-specific Variables	
Width of lot per square foot of house	89.1837 (24.8600)
Depth of lot per square foot of house	23.0814 (12.8900)
Dummy = 1 if lot is uneven	- 1.0424 (- 7.4500)
Dummy = 1 if lot is on a bank or sheif	- .5252 (- 3.5000)
Value of lot relative to neighborhood	1.6620 (8.4600)
Dummy = 1 if area has excess traffic	- .9750 (- 3.5100)
Dummy = 1 if lot is in a cul-de-sac	- .2940 (- 1.8900)
Dummy = 1 if land not fronting a street	1.0161 (2.5000)
D. Public sector Variables	
Total municipal government expenditures per person[1/]	- 1.3783 (- 1.7900)

TABLE 1 (Continued)

	Regression Number 1
Elementary achievement for the school district[1/]	24.4099 (4.1700)
High school expenditures[1/]	2.3682 (2.6400)
Fire class rating for the town[1,3/]	1.6646 (- 10.2500)
Residential burglary rate/1,000 population by city[1/]	713.2965[3/] (4.9100)
b. Location and Land Use Variables	
Population growth rate by city[1,3/]	- 34.9135 (- 13.5600)
Percent dwelling units for sale in census tract[1,3/]	-160.1312 (- 7.0800)
Relative commute into BATS* zone[1/]	-234.0505 (- 3.5000)
Population density in census tract[1/]	- 75.3790 (- 5.8200)
Travel time to San Francisco by census tract[1/]	103.4303 (7.7700)
Temperature[1/]	-190.5975 (- 5.7600)

TABLE 1 (Continued)

	Regression Number 1
F. Socioeconomic Variables	
Percent of population over 5 years residing outside the SMSA in 1965	59.8795 (4.3800)
Percent of population over 25 finished high school[1,3/]	- 3.9773 (- 2.5600)
Percent of population over 25 finished college[1,3/]	- 20.3347 (- 11.0700)
Median family income by census tract[1/]	.8398 (16.8000)
Percent below poverty level in census tract[1,3/]	22.2799 (4.2800)
G. Racial Binary Variables	
SA : Dummy = 1 if census tract is in the Spanish Area; zero otherwise	- 1.6183 (- 6.5600)
WSB : Dummy = 1 if census tract is in the White-Spanish Border; zero otherwise	- .0088 (- 0.0400)

TABLE 1 (Continued)

	Regression Number 1
BA : Dummy = 1 if census tract is the Black Area, zero otherwise	2.3426 (- 7.7600)
WbB : Dummy = 1 if census tract is in the White-black Border; zero otherwise	- 2.9687 (- 10.0900)
BSB : Dummy = 2 if census tract is in the Black-Spanish Border, zero otherwise	- 4.7332 (- 7.3200)
Constant	4.7484 (5.5800)

* Bay Area Transportation Study

1/ Weighted by 1/square feet house

2/ T-statistics are reported in parenthesis below the corresponding coefficient.

3/ Coefficient reported for variable multiplied by 1,000 to deemphasize scaling effects.

III. Empirical Results

The independent variables includes in the final estimating equation explained quite a large amount of the variation of the dependent variable, selling price per square foot of house. The R-squared of the final equation was more than 64%. Most of the independent variables included were highly significant (at the 1% level).[1]

The significant results may be ascribed to the relative completeness of the gathered data on dwelling unit specific variables. If it is true, as the results would seem to indicate, that major portion of housing price variation can be traced to the structure and the lot, using a data set such as the present one substantially avoids the imprecision that would surely crop up in less complete data. This imprecision can be expected to show

---

[1] To find the incremental contribution of each broad group of variables, artificially restricted equations were estimated on the same sample. Each broad group of community variables were eliminated from the estimating equation one by one. Just the structure and lot-specific variables account for 55% of the dependent variables' variation. This is probably the reason behind the robustness of these variables. (The incremental explained variation accounted for by each other group of variables are indicated by the estimating equations with restricted sets of independent variables shown in the Appendix. Once choices were made as to which of duplicati[ng] structure and lot characteristics represent best some commo[n] house attributes, a set of independent variables that explain more than half of the dependent variables variation were obtained. The amount of variation explained by the dwelling unit characteristics alone already account for an explained variation rate that is quite high for these types of studies. The results are shown in Appendix Table 1. Changing the order of elimination did not substantially ch[a]nge the results. (See Paderanga, 1979).

up in the independent variables that would be actually present in a less complete data set, including community-specific data sets. In fact, this feature of completeness may have contributed much toward the robustness of the racial binary variables that has been mentioned. The implications of the estimated coefficients are summarized in Table 2.

Structure-specific Variables

Attributes that pertain to the house structure such as heating and number of bedrooms are conjectured to have an effect on each unit of housing services. They may be viewed as changing the quality of housing services. Hence, structure-specific variables were assumed to be proportional to house size. The results of the estimation generally supported this conjecture.

The absolute size of the house (square feet of living area) had a negative and consistently significant effect on the selling price per square foot of the dwelling unit. The exact magnitude of the estimated coefficient was -.002,

TABLE 2

UNIT EFFECTS OF SELECTED INDEPENDENT VARIABLES

DEPENDENT VARIABLE: Selling price per square foot of house

MEAN VALUE OF DEPENDENT VARIABLE: $26.95
Average house size : 1,355 sq. ft.

Independent Variable	Change in Independent Variable	Dollars Change in Dependent Variable
A. Inflation Indices		
Dummy for sale year, 1972	If yes	1.62
Dummy for sale year, 1973	If yes	4.00
B. Structure-specific Variables		
Square feet of house	792 square feet	-1.00
Quality	1 level	.70
Percent good	1%	.08
Dummy for multiple story structure	If true	-1.69
Dummy for presence of basement	presence	1.26
Number of bedrooms	1 bedroom	.65
Dummy for presence of a garage	presence	1.98
Dummy for central heating	presence	.98
Extra paved area	100 square feet	.10

TABLE 2 (Continued)

Independent Variable	Change in Independent Variable	Dollars Change in Dependent Variable
Cost of interior improvements	$1 per square foot house	.78
Cost of exterior improvements	$1 per square foot house	1.26
Pool Cost	$1 per square foot house	1.28
C. Lot-specific Variables		
Width of lot	1 foot	.06
Depth of lot	1 foot	.02
Dummy for uneven lot	If true	-1.04
Dummy for lot on bank or shelf	If true	- .52
Value of lot relative to neighborhood	1%	.02
Dummy for excess traffic	presence	- .98
Dummy if lot is in a cul-de-sac	If true	- .29
Dummy for land not fronting a street	If true	1.02
D. Public Sector Variables		
Total government expenditures per capita	$1	1.38

TABLE 2 (Continued)

Independent Variable	Change in Independent Variable	Dollars Change in Dependent Variable
Elementary achievement score	1 point	.02
High school expenditures per average daily attendance	$1	*
Fire class rating	1 level	-1.23
Burglary rate per 1,000 population	1 burglary	.53
Population growth rate	1%	- .26
Percent dwelling units for sale in census tract	1%	-1.18
Relative commute into business zone	1	- .17
Population density in census tract	1 person per acre	- .08
Temperature	1° F	- .14
High school graduates in census tract	1%	- .03
College graduates in census tract	1%	- .15
Median family income	$1,000	.84
Percent in census tract below poverty level	1%	.16
Percent new residents in census tract	1%	.04

* Less than $0.01

giving us an elasticity coefficient of -0.06. This implies that the size of the house has to increase by 792 square feet for the price per square foot to decrease by $1.00. The average size of the dwelling unit sold in our sample was 1,355 square feet.

The next two variables pertain to the type of materials used in the construction of the unit (quality class) and its condition at the time of sale (percent good). There were ten quality classes specified corresponding to increasing sturdiness in the frame of construction, the mean level for our sample being 4.73. The coefficient for this variable was positive. However, the exact magnitude was an increase in quality of construction of the house. If the incremental cost of raising a house's quality one level up is more than 70 cents per square foot, the marginal benefit of raising house quality to a house building or remodeller would be negative. The variable percent good, too, had a small absolute coefficient although it was consistently significant: An 8 cent increase in selling price per square foot for a one percentage point increase in the undepreciated portion of the unit (i.e., a one percentage point decrease in depreciation). It implies the break-even point of

maintaining a house in the sample in its existing condition (8 cents per square foot).

Next are several binary variables representing the presence or absence of certain structural characteristics. The sample exhibits a tendency for the San Mateo County housing market to favor one story structures. The selling price per square foot of the dwelling unit is discounted by $1.69 if the structure is multi-story. That amount to a discount of $2,290 for the average house sold during the period if it was a multi-story house. The presence of a basement, a garage and central heating, on the other hand, seemed to increase the price of the house: For the average house, the price was $1,075, $2,685 and $1,328 for the presence of a basement, garage and central heating, respectively.

The intensity of use of any given floor space may be measured by the number of rooms in the house. The number of bedrooms per square foot house had a positive effect on selling price per square foot as may be expected from the primary use of houses for shelter. The significance of the quadratic term of this variable though suggested the decelerating effect that scale economies and potential

overcrowding would have on the positive influence of more rooms on the price of a house. Although no more effort was spent on explicitly studying this point our results roughly indicate that in terms of just adding to the selling price per square foot, the number of bedrooms for which the selling price per square foot was at a maximum, was 2.

Adding extra paved area around the house also increases the price of the house. This coefficient was quite significant and consistently so from the start of the regression runs. An increase of 100 square feet of extra paved area increases the price by ten cents per square foot, an increase of $136 for the average house.

An interesting hint for the economies of household management in the San Mateo County housing market is provided by the results on the following group of structure-specific variables: cost of improvements to the interior of the house and cost of the pool. Where a choice is possible, money is better spent on improvements outside the house. In fact, it does not even pay to spend on improvements inside the house.

Lot-specific Variables

Dummy variables for the presence or absence of specific characteristics comprised most of this group of variables. The only exceptions were the width and the depth of the lot and the value of the lot relative to lots in the neighborhood. Width and depth were introduced in lieu of the lot size for several reasons: (a) To avoid some collinearity between house size and lot size; (b) To enable the use of house size for weighting other lot-specific variables needed (although this did not turn out to be necessary); and (c) To examine the effects of the dimensions of the lot on the selling price of the house, as compared to any other lot characteristic.

Width of lot and depth of lot, both divided by square feet of house, had positive coefficients as expected. However, when translated to a dollar change in selling price per square foot, for every one foot change in either the width or the depth of the lot, the effects of the explanatory variables were surprisingly weak. The results do offer the finding that given fixed lot size, a homeowner should opt for the wider lot whenever a choice was possible.

The value of the lot relative to the neighborhood was included to measure the willingness of some home-owners to pay a premium in house price in order to occupy a lot that is larger than would otherwise be available in the neighborhood. The results imply that a 1% increase in the lot's value relative to the neighborhood would increase the selling price by 2 cents per square foot.

The rest of the lot-specific variables were binary variables for the presence or absence of the following variables: (a) unevenness of lot, (b) location of lot on a bank or shelf, (c) excessive traffic, (d) location in a cul-de-sac, and (e) absence of a street-front. All of these variables, except the last, had negative coefficients. This is not surprising except in the case of the last two.

In the case of the characteristic of the lot being in a cul-de-sac, a closer examination of the area reveals that these cul-de-sacs exist because streets stop right before the railroad tracks or the Bayshore freeway (U.S. 101). This variable may therefore just be capturing the negative externalities of closeness to the railroad tracks and the freeway.

The positive coefficient for the dummy variable for a lot not fronting a street was also initially puzzling. However, more than four-fifths of the observations with this feature are found in census tracts that stand for areas where most of the high income households of the country's population live. Ninety-three percent of the residential land in these census tracts has four dwelling units or less per acre while only 26% of the residential area for the rest of the country are as sparsely populated. This dummy variable may be capturing community-specific characteristics rather than the lot-specific feature that has been hypothesized.

Community Variables

The second major subdivision of our independent variables are the community variables. These are further subdivided for our purposes into the following groups: (a) public sector variables, (b) location and land use variables, (c) socioeconomic, and (d) racial variables.

Community variables as a whole do not really explain much of the variation of our selling price per square foot of house. The house and location-specific variables alone explain 55% of the dependent

variable's variations implying loosely an incremental explained variations of less than 10% contributed by community variables. On the other hand, the coefficients of the house and lot-specific variables change when the community variables are removed, indicating incomplete orthogonality between these two broad groups and emphasizing the inclusion of community variables in order to control for their effects in the estimation.

The other point worth noting is the observation of substantial correlation between some of the community variables that have been used. This problem is especially troublesome within the smaller subdivisions (e.g., among some public sector variables), but there are some cross-relations between groups. Since, the present interest is only in controlling for the combined effects of these community variables, no extra-ordinary effort was spent investigating these results further. For the purposes of the study it is enough that the effects of each significant group of interrelated variables are controlled for by the inclusion of some of them to represent each group. Puzzling results on some of these community

variables will be noted in passing in the course of the study. Of critical importance is refinement of the estimating function to such degree as to eliminate substantial correlation between the main objects of concern - racial variables - and any other variable, and the inclusion of the necessary independent variables so that the estimates of the effect of racial characteristics are reliable.

Public sector Variables

Several measures for government revenue and expenditures were tried.[1] (e.g., expenditures of the different functional departments of the government on the local level, like police and fire departments.) The total tax rate for the tax code area was also included originally. In the end, only total local government expenditures per person was retained.

The sign of the coefficient (negative) was the opposite of what would be expected. However, the very high correlation between local government expenditures

[1]Please refer to the Appendix on the variables used in the study for a more detailed discussion of the variables used and those retained or rejected.

and revenues suggests that this result may be the reduced form coefficient for both expenditures and revenues on the local level. An equal increase in both local government revenues and expenditures would decrease the selling price per unit of house in the jurisdiction affected.

The results of several variables representing local school activities were as expected. Achievement scores of both the elementary and high school levels had positive effects on the selling price of houses in their areas. So did expenditures on the local high school.

Fire class rating for the municipality had the expected negative coefficient (the scale increases with increasing risk of fire) but the coefficient on the burglary rate by city was positive. However, a paper written at the Center for Econometric Studies of Crime and the Criminal Justice System at Hoover Institution, Stanford University[1] suggests that the reporting rate for burglary is influenced by the size of the loss. Further, the size of loss and even the reporting rate is influenced by the income of the household. The burglary

[1] Itzhak Goldberg and Frederick Nold, "Does Reporting Deter Burglars? - An Empirical Analysis of Risk and Return in Kind," Review of Economics and Statistics, Vol. 62, No. 3, (August 1980).

variable may be capturing an effect that has not been adequately controlled for by the median family income variables.

Location and Land Use

The following variables were ultimately chosen: population density in census tract, population growth rate by city, and relative commute into the business zone. The variables presumably represent the intensity of residential land use in an area and its potential for crowding. A separate variable, percent of dwelling units for sale in the census tract, was utilized to represent the relative tightness of the housing market in a dwelling unit's immediate area. The last two variables in this group, however, had confusing signs. Distance to a central business district as measured by travel time to San Francisco by census tract had a positive sign, while average temperature by city had a negative sign.

Socioeconomic Variables

Four socioeconomic variables were retained in the final estimating equation. Median family income by census tract had the expected positive coefficient.

Percent families below the poverty level in the census tract also had a positive coefficient. A surprising finding was that the selling price per square foot of house was negatively influenced by the percentage of the population over twenty-five with a high school diploma or a college degree. The last socioeconomic variable included in the formulation was the percentage of the population over five years old residing outside the standard metropolitan statistical area of San Francisco-Oakland in 1965. This variable was important because it has been suggested as a possible explanation for the higher housing prices in minority neighborhoods. Thus, it was useful both as a control for the socioeconomic characteristics of the neighborhoods and as an indirect test of the hypothesis that higher housing prices in minority areas are caused by the large percentage of the population in these sections that have insufficient information about the local housing market. On one hand, the estimated coefficient for this variable is significant and positive indicating that the hypothesized effect of insufficient information about the housing market by a large percentage of the population leads to higher housing prices. On the other hand, the inclusion of this variable did not affect the results on the racial binary variables

in any significant way, suggesting that the presence of a large number of in-migrants do not completely explain the higher housing prices in minority neighborhoods.

Racial Binary Variables

The estimated coefficients for the racial variables are found in the last portion of Table 1. As mentioned earlier, these racial binary variables showed a surprising robustness. The pattern of which binary variables were significant and their signs were apparent from the earliest estimates. The negative coefficients for all the dummy variables indicated that, as hypothesized, housing prices are highest in the White interior. No test was possible on whether the housing market prices in the Black or Spanish Border were high as contrasted with the interior. However, estimates were made for the housing market's treatment of houses on the White side of the boundary with minority areas (White-Black and White-Spanish Borders). Tested also was the differential treatment by the housing market of the border between Black and Spanish areas.

On the whole the hypothesis that the housing market treats houses differently in different racial neighborhoods held up. In the present sample, houses in the Spanish

area are discounted by less than $2.00 per square foot; those in Black areas by $2.34 per square foot. As was noted in the theoretical portion, these prices may reflect short-run conditions in the long-run tendencies that our theory predicts.

Of crucial importance are the border affects on the selling prices of houses. Houses on the White-Spanish border are treated significantly different from those in the White-Black Border. The dummy variable for the White-Spanish Border (WSB) was insignificant and had been consistently so for most of the empirical phase of our study. While not necessarily contrary to expectations, this result especially when contrasted with the coefficient on the dummy variables for the White-Black Border (WBB) is nevertheless surprising.

The binary variable for WBB on the other hand has a very significant negative coefficient of $2.97. This is an 11% discount from identical houses in the White interior. Alternatively, it may be said that households in the White interior paid at least $4,022: more for an average size house in their area than it would have cost in the White-Border area. The average selling price for

the average house sold during this period was $36,514. Note that this coefficient is the average difference in housing price between the White-Black Border and the band of White interior that is close to the border. Two things may be remembered. First, the average difference in housing price between the White-Black Border and the whole White interior would have been higher. Second, households living in areas of the White interior still farther from the border may be willing to pay premia much higher than the coefficient estimated.

Perhaps the most surprising finding was how the housing market treated houses on the Black-Spanish border. This area, by far, showed the largest discount: $4.73 per square foot of house or 18% of the average selling price for houses in that period. That translates to a $6,413 discount for houses in the area. No explicit treatment of the border area between two minorities can be inferred from the hypothesis being tested. This result is reported here as an interesting finding and a starting point for further research on this topic.

Comparison with Selected Studies

Differential treatment of houses located in areas of varying racial composition has been noted in several other studies. Muth[1] studied the differences in changes

[1]Richard F. Muth, Cities and Housing (Chicago: University of Chicago, 1969).

in average contract rents and median values of one-unit owner-occupied houses from 1950 to 1960 between census tracts located in the central part of the south side of Chicago classified into (a) tracts that remained under White occupancy during the period, (b) tracts that changed from White to Black occupancy, and (c) tracts that remained under Black occupancy. Ridker and Henning[1] also found results on the differential treatment of houses according to percentage Black population of the census tract in which the house was located in a study primarily aimed at measuring the effect of air pollution. Both of these studies found significant premia being paid for housing in a significantly Black area.[2] However, both of these studies were based on data aggregated over census tracts and contained little information on house and lot-specific characteristics. If most of housing price variation is accounted for by variations in these house-specific features, as our data would seem to imply, these results are quite imprecise and can provide only rough approximations of the effects that are of interest here.

---

[1] Ronald G. Ridker and John A. Henning, "The Determinants of Residential Property Values with Special Reference to Air Pollution," Review of Economics and Statistics (May/June 1967): 246-57.

[2] Note that Muth interprets his results as showing the higher operating and maintenance costs for Black housing.

In an early study using disaggregated data, Bailey[1] studied the effect of racial composition of much smaller area (racial composition of individual blocks and equivalent combinations of half-block) on the transaction prices of owner-occupied single-family house units. His results imply that Whites enjoy a discount for housing in area close to Black areas.

Another study using information on sales of individual units was done by Lapham[2] for 650 observations in Dallas, Texas in 1960. Estimating substantially the same hedonic price equation on both the White and Black areas, she concluded that the price of housing in both areas implied by the estimated coefficients were not significantly different. The results were initially surprising considering the marked residential segregation in housing in Dallas and the 60% increase in Black population from 1950 to 1960. However, King and Mieszkowski[3] attribute this to two peculiarities of

---

[1] Martin J. Bailey, "Effects of Race and Other Demographic Factors on the Values of Single-Family homes," Land Economics (May 1966): 215-20.

[2] Victoria Lapham, "Do Blacks Pay More?" Journal of Political Economy, 79 (November/December 1971): 1244-57.

[3] A. Thomas King and Peter Mieszkowski, "Racial Discrimination, Segregation, and the Price of Housing," Journal of Political Economy (May/June 1973): 591-606.

the sample area: (a) Black areas in Dallas are not surrounded by White tracts but rather follow the river running to the city, and (b) during the period studied, land adjacent to Black areas but not previously suitable for building were opened for construction.

In the same paper cited above, King and Mieszkowski used data gathered in a special survey of 220 rental units in New Haven, Connecticut, to examine the effects of racial discrimination and segregation on the rents paid by Blacks and Whites. Due to the special characteristic of their data, they were able to distinguish the race of the renter in the three areas they delineated: (a) the White interior, (b) the boundary area between the White and Black areas, and (c) the Black interior. While not quite having the number and choice of structure and lot-specific information as this study does, their study included substantially all unit-specific variables that were deemed relevant to renters. Their basic conclusion is in accord with that of the present study: that the rents for structurally similar units in New Haven vary, depending on the race (and sex) of the household head and the racial composition of the neighborhood. Whites living in the boundary area enjoyed discounts equal to seven percent of rents in the White interior. They did not find evidence

of Black preference for integration; if any, they found that Blacks in the boundary area paid a discount compared to rents paid by Blacks in the Black interior. Both Blacks and Whites in the Black interior paid a premium compared to rents in the White interior,[1] supporting the hypothesis that it is limitation in supply that leads to higher prices in Black areas.

The conclusions of the last two studies discussed shed further light on the findings of the present paper. Data on the housing market in San Mateo county indicate the presence of discounts on houses in the border area on the White side of the boundary. The findings of King and Mieszkowski indicate something similar. There is no evidence that the supply of houses in the Black areas of San Mateo county were in short supply during the period of the study. In fact, the empirical findings show a discount for houses in the Black area relative to houses in the White interior, although admittedly of a smaller absolute amount compared to houses in the White-Black Border. Of the three areas of Black concentration, on the relatively small Black interior area in Teast

---

[1] White interior in their paper meant no Black families were living in the neighborhood. However, in earlier results they found no significant differences between rents paid by Blacks and Whites in areas where Blacks were 0-20% of the population.

San Mateo is surrounded by developed neighborhoods (Spanish-American concentrations). The large Black concentration of East Palo Alto is the outer fringe of the cities of Menlo Park and Palo Alto. Like the Dallas Black concentration studied by Lapham,[1] there are no immediate barriers to an outward spread of San Mateo County's Black areas. This explains why the coefficient on the Black area is in the same general direction as the expected long-term effects of the Bailey hypothesis.

---

[1] Victoria Lapham, op. cit.

IV. CONCLUSIONS AND POLICY IMPLICATIONS

The ramifications of the results of this study can be explored. The findings are consistent with the hypothesis that housing segregation in the United States is mainly the result of racial preferences by consumers of housing services. Specifically, the preference by White households for segregation are stronger than those of the minority households (Black and Spanish-American) for integration. The study could not test directly whether minority households prefer to live close to the majority. However, the findings are enough to provide a plausible and consistent explanation for housing market phenomena like housing segregation, the apparent and de facto discriminatory practices of suppliers of housing services, and the apparently conflicting results of previous studies on whether housing prices are higher in Black areas than in White areas.

Directly affected by the findings are the prevailing ideas and attitudes on the segregation of ethnic groups in urban areas and the presence of slums. Housing segregation and slums tend to be associated

because minorities have lower income than Whites[1] and tend to live in lower quality housing. People object to slums because of the comparative poverty of its residents. For some, slums are undesirable because of the public nuisance identified with it (crime for example). The result has been legislation to control residential use of land (zoning) and public projects designed to improve slum areas.

However, segregation by race is different from segregation by income. If housing prices are equal for all ethnic groups, segregation by income would still be present due to the limits imposed by the differing market baskets affordable by the households. These are just rational responses by economic individuals to different situations and do not by themselves require corrective public policy.[2]

Racial integration may have desirable effects from the point of view of social welfare. However, given the findings of this and the other studies

---

[1] Albert Wohlsetter and Sinclair Coleman, "Race Difference in Income," in Anthony H. Pascal (ed.), Racial Discrimination in Economic Life (Lexington, Massachusetts: D.C. Heath & Company, 1972), pp. 3-82.

[2] Although the causes of systematic difference in income should, of course, be examined and may require corrective public policy.

mentioned, it is understandable how public policies regarding the housing market (anti-discrimination laws and public housing, for example) have failed to bring it about until now. Anti-discrimination laws have other beneficial effects but they cannot be expected to result in the integration of different ethnic groups in the urban areas.

Perhaps of more immediate importance for the housing market in urban areas is the goal of giving all ethnic groups equal access to housing services. The data examined show forces leading to racial segregation. This is indicated by the discount borne by houses on the White-Black Border areas. In other words, the premium paid for housing in the minority areas result from the inability of the minority areas to expand fast enough to meet the increase in demand for minority housing. Haugen and Heins[1] show that both encirclement of minority areas by majority neighborhoods and sluggishness of evacuation by Whites from areas adjacent to the minority concentrations led to higher prices for Black housing. King and Mieszkowski[2]

---

[1]Robert A. Haugen and A. James Heins, "A Market Separation Theory of Rent Differentials in Metropolitan Areas," Quarterly Journal of Economics, 83 (November 1969): 660-72.

[2]A. Thomas King and Peter Mieszkowski, "Racial Discrimination, Segregation, and the Price of Housing," Journal of Political Economy (May/June 1973): 591-606.

corroborate that White households at the boundary enjoy a discount compared to White households located farther from the Black areas. They also attribute the absence of price differentials between Black and White interior prices in Dallas[1] to the ease of expansion of the Black section. All in all, there is evidence that higher housing prices to Black households are mainly the results of the inability of the Black area to expand in response to an increase in demand. The immediate objective of policy, it seems, should be to raise the elasticity of supply of housing to minorities. Anti-discrimination laws are primarily beneficial only because they help remove barriers to minority expansion artificially set up by housing suppliers. Land use controls passed by suburban governments should also be scrutinized for possible retarding effects on the supply of housing to some ethnic groups.

Local government policies that try to prevent the migration of White middle class families from the central cities to suburbs have harmful side effects. Minority households restricted to the inner minority areas end up paying higher prices for housing because of the

---

[1]Victoria Lapham, "Do Blacks Pay More?" Journal of Political Economy 79 (November/December 1971): 1244-57.

inability of the ethnic area to expand. A more beneficial policy from the point of view of social welfare for these governments would be to abandon trying to save their tax bases and instead work for the establishment of metropolitan organizations that oversee public services with strong redistributive connotations.

Over the long-term though, the most fruitful policy is to formulate policies that directly alleviate poverty, the fundamental problem, rather than to dissipate effort in treating its symptoms in the housing market. The implication for racial segregation is especially enlightening. If racial segregation is caused mainly by the preferences of the consumers of housing, as the findings of this study seem to indicate, one can hardly espouse policies that penalize households for their choice.[1] After policies have been structure that assure the raising of the elasticity of housing in the minority areas to a level high enough to adequately meet changes in demand for minority housing, public effort would seem to be best spent on treating the causes of unequal incomes between different ethnic groups. Households with racial preferences would willingly pay a premium to live in preferred areas. Households indifferent to the racial composition of their neighborhoods would live in disfavored areas at lower housing prices.

---

[1] If integration were desired by itself, then the best policy in this case would be a subsidy for White households to locate in the Black areas. However, there does not seem to be much support for this type of policy at the moment.

In summary, the study has found that racial preferences by consumers of housing is an important cause of segregation in urban areas. However, restriction on the expansion of minority areas sometimes result in higher prices for the minority household. Policies should be formulated to increase the elasticity of housing to the minority to a level adequate to meet changes in demand for housing these areas. After that, efforts are better spent on attacking the fundamental problem -- poverty, specifically differences in income that are systematically related to race -- directly.

APPENDIX

SUMMARY OF VARIABLES TESTED

Variables	Description
I. Dependent Variables	
Selling price per square foot of house	
II. Independent Variables	
A. House-specific Variables	
1. Inflation indices	
Retained	
Sale year = 1972	Dummy Variable
Sale year = 1973	Dummy Variable
2. Structure-specific Variables	
Retained	
square feet house	Square feet of house living area
quality	Indicators for quality class of construction: 1 = inexpensive simple wall cabin; 2 = inexpensive double wall cabin; 3 = cheap, below modern minimum code; 4 = low cost, minimum code; 5 = average; 6 = above average; 7 = good; 8 = very good; 9 = excellent; 10 = exceptional or mansion

Variables	Description
2. Structure-specific Variables (continued)	
central heating	Dummy = 1 if house is centrally heated
percent good	One minus accumulated depreciation rate for house
multiple stories	Dummy = 1 if house has more than one story
basement	Dummy = 1 if house has a basement
garage	Dummy = 1 if house has a garage
The remaining variables were divided by the square feet of house:	
number of bedrooms	
number of bedrooms squared	
cost of improvements to interior	
cost of improvements to exterior	
cost of pool	
extra paved area	Square feet of extra pavement installed in excess for the quality class of house
Eliminated	
age and age^2	In continuous forms and in dummy form for various age intervals (e.g., 20-30, etc.)
effective age and effective age^2	(Same as above)

Variables	Description
2. Structure-specific Variables (continued)	
number of bathrooms and number of bathrooms	Continuous form
garage area/square foot house	(Same as above)
dining room	Dummy = 1 if present
family room	Dummy = 1 if present
carport	(Same as above)
pool	(Same as above)
3. Lot-specific Variables	
Retained	
lot width	Weighted by square feet of house
lot depth	(Same as above)
value of lot relative to neighborhood	Weighted by 1 and by ratio of lot to house size
traffic	Dummy = 1 if traffic in the neighborhood is excessive
uneven	Dummy = 1 if lot is undulating
bank or shelf	Dummy = 1 if lot is excaveted into a bank or shelf
cul-de-sac	Dummy = 1 if house is in a cul-de-sac
streetfront	Dummy = 1 if house has a streetfront

Variables	Description
Eliminated	
lot area divided by square feet of house	
above/below	Dummy = 1 if lot is above or below street level
common green	Dummy = 1 for land held in common land ownership agreement
good view	Dummy = 1 for an above average view
irregular	Dummy = 1 if lot shape is irregular
corner lot	Dummy = 1 if lot is on a street corner

B. Community Characteristics

1. Public Sector Variables

Retained	
total municipal government expenditures per person	
elementary achievement score	Average score for the school district
fire class rating	Town fire insurance ratings, the ratings range from 1 to 5, in the order of increased risk of fire
residential burglary rate	Number of burglaries per 1,000 population

Variables	Description
1. Public Sector Variables (continued)	
Eliminated	
high school achievement score	Average score for the school district
nominal tax rates	Municipal school, elementary and total school
percent of municipal revenue raised by the property tax	
municipal expenditure per capita by category	General government, police, fire, streets, parks, and library
parks	Acres of parks per thousand population in the census tract
2. Location and Land Use Variables	
Retained	
population growth	By city
percent dwelling units for sale	By census tract
relative commute into BATS zone	Relative in-commuting to the BATS zone
population density by census tract	
distance to San Francisco	Measured by travel time in minutes to San Francisco by census tract

Variables	Description
2. Location and Land Use Variables (continued)	
Eliminated	
residual density	Incontinuous form and in dummy variable form for various degrees of residual density
hilly	Dummy = 1 if census tract is hilly
employment density	
percent commercial plus industrial	Portion of total land used for commercial and industrial purposes
percent land in total residential use	Dummy variables = 1 for each type of residential use except 1
percent land in single family use	by census tract
percent land in owner-occupied housing	
3. Socioeconomic Variables	
Retained	
percent population over 25 finished college	By census tract
median family income	(Same as above)
percent below poverty level	(Same as above)
percent of population over 5 years residing outside the SMSA in 1965	(Same as above)

Variables	Description
3. Socioeconomic Variables (continued)	
Eliminated	
percent families with children	By census tract
percent working in San Francisco	(Same as above)
percent working outside San Mateo	(Same as above)
percent over 25 finished high school	(Same as above)
percent of population over 5 years residing outside the U.S. in 1965	(Same as above)
4. Racial Binary Variables	
Spanish	Dummy = 1 if census tract is in Spanish Area
Black-Spanish Border	Dummy = 1 if census tract is in Black-Spanish Border
Black Area	Dummy = 1 if census tract is in Black Area
White-Spanish Border	Dummy = 1 if census tract is in White-Spanish Border
White-Black Border	Dummy = 1 if census tract is in White-Black Border

APPENDIX TABLE 1

RACIAL PREFERENCES AND HOUSING PRICES
SAN MATEO COUNTY, CALIFORNIA
EMPIRICAL RESULTS

	Regression Number				
	1	2	3	4	5
Dependent Variable: Selling price per square foot (living area)					
Mean of dependent variable	26.9477	26.9477	26.9477	26.9477	26.9477
Number of observations	9241	9241	9241	9241	9241
R-squared	.6424	.6349	.6220	.6015	.5475
F-statistic	375.4900	410.2700	445.5500	496.6600	484.3800
Degrees of freedom	(44, 9196)	(39, 9201)	(34, 9206)	(28, 9212)	(23, 9217)
Independent Variables					
A. Inflation Indices					
Dummy for year = 1972	1.6162	1.6014	1.5982	1.5656	1.6346
	(16.4400)[2/]	(16.1400)	(15.8400)	(15.1200)	(14.8300)
Dummy for year = 1973	3.9970	3.9966	3.9518	3.9325	4.0187
	(40.2500)	(39.8700)	(38.7900)	(37.6400)	(36.1200)
B. Structure-specific Variables					
Square feet of house (living area)	- .0013	- .0005	- .0002	- .0003	- .0008
	(- 5.3100)	(- 2.0700)	(- .7900)	(- 1.3700)	(- 3.2300)
Quality	.6993	.6159	.5750	.7000	.7031
	(10.7900)	(9.4700)	(8.8100)	(10.5500)	(10.2500)
Percent Good (1 - depreciation)	7.8198	8.0748	7.3907	7.4797	5.1081
	(22.3000)	(23.0200)	(21.0200)	(21.1400)	(13.9900)

	Regression Number				
	1	2	3	4	5
Dummy for multiple-story structure	- 1.6900 (- 11.2600)	- 2.0435 (- 13.7300)	- 2.0436 (- 13.5700)	2.3169 (- 15.1300)	- 2.5332 (- 15.6100)
Dummy for presence of basement	1.2627 (12.2400)	1.1204 (10.8900)	1.0737 (10.3100)	1.0458 (10.0400)	.7805 (7.2200)
No. of bedrooms per square foot of house	879.8983 (2.2400)	1258.1298 (3.1900)	1295.3252 (3.2700)	-906.0418 (- 2.4100)	511.1166 (1.6000)
No. of bedrooms squared per square foot of house	-211.5760 (- 3.0000)	-293.6631 (- 4.1600)	-313.7344 (- 4.3900)	56.6068 (.8300)	-281.9309 (- 4.8000)
Dummy for presence of garage	1.9766 (9.7200)	1.8439 (9.0000)	1.9102 (9.1900)	2.0213 (9.5600)	
Dummy for central heating	.9777 (7.7300)	.8804 (7.0000)	.8624 (6.7900)	.8260 (6.5000)	
Extra paved area per square foot of house3/	1.3861 (8.1900)	1.3902 (8.1600)	1.4894 (8.6200)	1.5769 (8.9300)	
Cost of improvements to house interior per square foot of house	.7854 (8.8100)	.7534 (8.3700)	.7357 (8.1200)	.8317 (9.0100)	
Cost of improvements to house exterior per square foot of house	1.2582 (21.3600)	1.2704 (21.4000)	1.2714 (21.0600)	1.3182 (21.3000)	
Cost of pool per square foot of house	1.2842 (16.7500)	1.3465 (17.4200)	1.3939 (17.7500)	1.5677 (19.6000)	

	Regression Number				
	1	2	3	4	5
C. Lot-specific Var ables					
Width of lot per square foot of house	89.1837	90.5606	102.5231	107.1880	
	(24.8600)	(25.1000)	(28.6700)	(31.9?00)	
Depth of lot per square foot of house	23.0814	27.1674	28.1205	29.9494	
	(12.8900)	(15.2300)	(15.9300)	(16.6500)	
Dummy = 1 if lot is uneven	- 1.0424	- .8642	- .5800	- .6321	
	(- 7.4500)	(- 6.2000)	(- 4.2000)	(- 4.5300)	
Dummy = 1 if lot is on a bank or shelf	- .5252	- .1838	- .0480	- .2288	
	(- 3.5000)	(- 1.2500)	(- .3300)	(- 1.5300)	
Value of lot relative to neighborhood	1.6620	2.3452	2.6244	3.2536	
	(8.4600)	(13.1300)	(15.3500)	(19.3400)	
Dummy = 1 if area has excess traffic	- .9750	- .8992	- .6754	.2064	
	(- 3.5100)	(- 3.2100)	(- 2.3800)	(- .7100)	
Dummy = 1 if lot is in a cul-de-sac	- .2940	- .1634	- .1341	- .2704	
	(- 1.8900)	(- 1.0500)	(- .8400)	(- 1.6700)	
Dummy = 1 if land not fronting a street	1.0181	.8097	.7351	.7407	
	(2.5000)	(1.9700)	(1.7600)	(1.7300)	
D. Public sector Variables					
Total municipal government expenditures per person[17]	- 1.3783	1.7211	.7092	2.3120	
	(- 1.7900	(2.5500	(1.1000)	(3.7600)	

	Regression Number				
	1	2	3	4	5
Elementary achievement for the school district[1/]	24.4099 (4.1700)	62.5056 (14.2000)	74.5504 (20.5700)	39.7930 (17.9900)	
High school expenditures[1/]	2.3682 (2.6400)	4.9135 (6.1700)	4.9798 (7.5500)	- 1.6251 (- 3.3800)	
Fire class rating for the town[1,3/]	- 1.6646 (- 10.2500)	- 1.8897 (- 13.1900)	- 2.4947 (- 21.6600)	- 1.2361 (- 19.2500)	
Residential burglary rate/1,000 population by city[1/]	713.2965[3/] (4.9100)	599.5151[3/] (4.2900)	1.2265[3/] (10.1100)	539.5764 (5.8600)	
E. Location and Land Use Variables					
Population growth rate by city[1,3/]	- 34.9135 (- 13.5600)	- 38.5296 (- 15.1300)	- 33.1174 (- 16.1600)		
Percent dwelling units for sale in census tract [1,3/]	-160.1312 (- 7.0800)	-177.1843 (- 9.0900)	- 63.6063 (- 3.9000)		
Relative commute into BATS* zone[1/]	-234.0505 (- 3.5000)	-165.3424 (- 2.4700)	-112.8767 (- 1.6900)		
Population density in census tract[1/]	- 75.3790 (- 5.8200)	- 87.3600 (- 7.8500)	- 44.6142 (- 4.6400)		
Travel time to San Francisco by census tract[1/]	103.4303 (7.7700)	122.2937 (10.3200)	79.7900 (8.0700)		

	Regression Number				
	1	2	3	4	5
Temperature[1/]	-190.5975 (- 5.7800)	-255.2716 (- 9.1700)	-320.4314 (- 14.3500)		
F. Socioeconomic Variables					
Percent of population over 5 years residing outside the SMSA in 1965	59.8795 (4.3800)	131.5386 (10.6100)			
Percent of population over 25 finished high school[1,3/]	- 3.9773 (- 2.5600)	- 11.3421 (- 7.9200)			
Percent of population over 25 finished college[1,3/]	- 20.3347 (- 11.0700)	- 10.3892 (- 6.3100)			
Median family income by census tract[1/]	.8398 (16.8000)	.6349 (15.0200)			
Percent below poverty level in census tract[1,3/]	22.2799 (4.2800)	- 10.4855 (- 2.6400)			
G. Racial Binary Variables					
SA : Dummy = 1 if census tract is in the Spanish Area; zero otherwise	- 1.6183 (- 6.5600)				

	Regression Number				
	1	2	3	4	5
WSB : Dummy = 1 if census tract is in the White-Spanish Border; zero otherwise	- .0088 (- 0.0400)				
BA : Dummy = 1 if census tract is the Black Area; zero otherwise	- 2.3426 (- 7.7600)				
WBB : Dummy = 1 if census tract is in the White-Black Border; zero otherwise	- 2.9687 (- 10.0900)				
BSB : Dummy = 2 if census tract is in the Black-Spanish Border; zero otherwise	- 4.7332 (- 7.3200)				
Constant	4.7484 (5.5800)	- .5344 (- .7400)	- .6119 (- .8400)	- 2.0816 (- 2.7900)	4.9227 (6.8900)

---

* Bay Area Transportation Study

1/ Weighted by 1/square feet house

2/ T-statistics are reported in parenthesis below the corresponding coefficient.

3/ Coefficient reported for variable multiplied by 1,000 to deemphasize scaling effects.

BIBLIOGRAPHY

A. DATA SOURCES

Association of Bay Area Governments. Regional Housing Study. Bay Area Regional Planning Program, Supplemental Report RA-4. Berkeley, California: Association of Bay Area Governments, October 1969.

_____. Physical Resources Study, San Francisco Bay Area. Claremont Hotel, Berkeley, California, May 1971.

_____. "San Francisco Regional Transit Travel Projection Project, 1965 Highway Network." Computer Output of Travel Times between Zones, May 1, 1974. ABAG/MTC, Hotel Claremont, Berkeley, California, 94705.

Association of Bay Area Governments, Metropolitan Transportation Commission. Map of San Francisco Bay Region, Central Area. Hotel Claremont, Berkeley, California, 1978.

McGuire, L.J., Jr. Tax Rates and Valuations of Taxable Property of San Mateo County for the Fiscal Year 1972-73. Redwood City, California: San Mateo County Controller's Office, 1972.

Noto, Nonna Anne and Henry C. Moore, Jr. Tape Containing Records of Sales of Single-Family Residences in 1971-1973 and Related Data. Department of Economics, Stanford University. Stanford, California, 1974.

San Mateo County, California, Assessor's Office. Individual Residential Property Appraisal Records. November 1973.

San Mateo County, California, Assessor's Office. Tax Code Map Books, January 1974.

San Mateo County, California, Planning Commission. "1970 Existing Land Use in Acres: San Mateo County." Datafile LU-1. Redwood City, California, October 2, 1972.

_____. "Racial Composition of San Mateo County, By Census Tract." Datafile C-3. Redwood City, California, 1972.

San Mateo County, Regional Planning Committee. The Physical Setting of San Mateo County. Redwood City, California, May 1968.

San Mateo County, Planning Department. Map of Census County Divisions and Census Tracts. Redwood City, California, 1976.

San Mateo County, California, Planning Department. The Initial Housing Element of the San Mateo County General Plan. San Mateo County, California, 1971.

State of California, Documents Section. California Statistical Abstract. North Highlands, California: State of California, Documents Section, Annual, 1967 through 1974.

U.S. Department of Commerce, Bureau of the Census. Census of Population and Housing: 1970, by Census Tracts. Final Report PHC(1)-169, San Francisco-Oakland, California, Standard Metropolitan Statistical Area. Washington, D.C.: Government Printing Office, April 1972.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Services. Climatological Data: California, July 1972, vol. 76, no. 7. Asheville, N.C.: U.S. Department of Commerce National Climatic Center, 1972.

U.S. Geological Survey. Topographical Map of San Mateo County, California, 1974.

Williams and Mocine: City and Regional Planning. County Housing Problems -- A Consultant Report. San Francisco, California, June 1970.

B. REFERENCES

Alonso, William. Location and Land Use. Cambridge, Massachusetts: Harvard University Press, 1964.

Bailey, Martin J. "Note on the Economics of Residential Zoning and Urban Renewal." Land Economics 35 (August 1959): 288-90.

_____. "Effects of Race and Other Demographic Factors on the Values of Single-Family Homes." Land Economics 42 (May 1966): 215-22.

Becker, Gary S. The Economics of Discrimination. Chicago: University of Chicago, 1957.

Boskin, Michael J. "Local Government Tax and Product Competition and the Optimal Provision of Public Goods." Journal of Political Economy vol. 81, no. 1 (January/February 1973): 203-10.

Break, George F. "The Incidence and Economic Effects of Taxation," in Alan S. Blinder, et. al. (eds.) The Economics of Public Finance, Studies of Government Finance. Washington, D.C.: The Brookings Institution, 1974.

Courant, Paul N. and John Yinger. "On Models of Racial Prejudice and Urban Residential Structure." Journal of Urban Economics 4 (1977): 272-91.

Haugen, Robert A. and James A. Heins. "A Market Separation Theory of Rent Differentials in Metropolitan Areas." Quarterly Journal of Economics 83 (November 1969): 660-73.

Henderson, James M. and Richard E. Quandt. Microeconomic Theory. New York: McGraw-Hill, 1971.

Ioannides, Yannis Menelaos. "Equilibrium Adjustment Processes: The Housing Market Case." Doctoral Dissertation: Stanford University, 1973.

Johnston, J. Econometric Methods. Tokyo: McGraw-Hill Kogakusha, Ltd., 1972.

Kain, John F. and John M. Quigley. "Measuring the Value of Housing Quality." Journal of the American Statistical Association vol. 65, no. 330 (June 1970): 532-48.

King, A. Thomas and Peter Mieszkowski. "Racial Discrimination, Segregation, and the Price of Housing." Journal of Political Economy vol. 81, no. 3 (May/June 1973): 590-606.

Lancaster, Kelvin. "A New Approach to Consumer Theory." Journal of Political Economy. 74 (1966): 132-57.

Kmenta, Jan. Elements of Econometrics. New York: The Macmillan Company, 1971.

Lapham, Victoria. "Do Blacks Pay More for Housing?" Journal of Political Economy 79 (November/December 1971): 1244-57.

Laurenti, Luigi. "Effects of Nonwhite Purchases of Market Prices of Residences." The Appraisal Journal (July 1952): 314-29.

Leahy, William H., David L. McKee and Robert D. Dean (eds.) Urban Economics: Theory, Development, and Planning. New York: The Free Press, 1970.

Mills, Edwin S. "An Aggregative Model of Resource Allocation in a Metropolitan Area." American Economic Review. Papers and Proceedings (May 1967): 197-210.

_____. Studies in the Structure of the Urban Economy. Baltimore: Johns Hopkins University Press, 1972.

Murray, Michael P. "Hedonic Prices and Composite Commodities." September 1976. (Mimeographed)

Muth, Richard F. Cities and Housing. Chicago: University of Chicago Press, 1969.

_____. Urban Economic Problems. New York: Harper & Row, 1975.

Noto, Nonna Anne. "The Effect of the Local Public Sector on Residential Property Values in San Mateo County, California." Doctoral Dissertation: Stanford University, 1975.

Page, Alfred N. and Warren R. Seyfried. Urban Analysis: Readings in Housing and Urban Development. Glenview, Illinois: Scot, Foresman and Company, 1970.

Pascal, A. H. (ed.). Racial Discrimination in Economic Life. Sta. Monica, California: RAND Corporation Memorandum, 1967.

Polinsky, A. Mitchell. "The Demand for Housing: A Study in Specification and Grouping." Econometrica vol. 45, no. 2 (March 1977): 447-64.

Perloff, Harvey S. and Lowdon Wingo, Jr. (eds.). Issues in Urban Economics. Baltimore: Johns Hopkins University Press, 1968.

Reid, Margaret G. Housing and Income. Chicago: University of Chicago Press, 1962.

Ridker, Ronald G. and John A. Henning. "The Determinants of Residential Property Values with Special Reference to Air Pollution." Review of Economics and Statistics 44 (May 1967): 246-55.

Rose-Ackerman, Susan. "Racism and Urban Structure." Journal of Urban Economics 2 (1975): 85-103.

_____. "The Political Economy of a Racist Housing Market." Journal of Urban Economics 4 (1977): 150-169.

Samuelson, Paul A. "The Pure Theory of Public Expenditures." Review of Economics and Statistics 36 (November 1954): 387-89.

Smith, Barton and J.M. Campbell, Jr. "Aggregation Bias and the Demand for Housing," International Economic Review vol. 19, no. 2 (June 1978): 495-505.

Straszheim, Mahlon. "Hedonic Estimation of Housing Market Prices: A Further Comment." Review of Economics and Statistics vol. 56, no. 3 (August 1974): 404-6.

Taeuber, Karl and Alma F. Taeuber. Negroes in Cities: Residential Segregation and Neighborhood Change. Chicago: Aldine, 1965.

Theil, Henri. Principles of Econometrics. New York: John Wiley & Sons, 1971.

Tiebout, Charles M. "A Pure Theory of Local Expenditures." Journal of Political Economy vol. 64, no. 5 (October 1956): 416-424.

Weinberg, David H. "Further Evidence on Racial Discrimination in Home Purchase." Journal of Urban Economics vol. 54, no. 4 (1978): 505-13.

Yinger, John. "Racial Prejudice and Racial Residential Segregation in an Urban Model." Journal of Urban Economics 3 (1976): 383-96.

_____. "The Black-White Price Differential in Housing: Some Further Evidence." Land Economics vol. 54, no. 2 (May 1978): 187-206.

Zellner, Arnold (ed.). Readings in Economic Statistics and Econometrics. Boston: Little, Brown and Company, 1968.