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Volume Author/Editor: Gregory K. Ingram, John F. Kain, and J. Royce Ginn

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Chapter Author: Gregory K. Ingram, John F. Kain, J. Royce Ginn

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APPENDIX B

THE CHOICE OF HOUSING TYPES MADE BY SAN FRANCISCO HOUSEHOLDS

THIS APPENDIX contains a summary of submarket demand equations for San Francisco households similar to the equations reported in Chapter 8 for Detroit households. The major hypotheses tested by these equations are identical to those underlying the analyses for Detroit: that the choice of housing type made by urban households depends in a systematic manner on both their socioeconomic characteristics and on the location of the workplace of the family's primary wage earner. The socioeconomic characteristics used to describe San Francisco households—family income, the age and education of the head of household, and the number of persons in the family—are the same as the ones used in the Detroit analyses. The workplace effects are similarly hypothesized to result from workplace-specific variations in the relative gross prices of the several housing types. There are, however, several differences in the data and methods of estimation used that will be evident from the discussion of the San Francisco analysis that follows.

There were two major reasons for estimating submarket demand equations for San Francisco households. First, we wished to obtain information on the importance of workplace effects in other metropolitan areas and to obtain independent confirmation of the results obtained for Detroit. In essence, the San Francisco data provided us with an opportunity to test a crucial behavioral assumption of the basic model design. Second, the San Francisco sample included information on the number of rooms in the dwelling unit and the lot size of single-family houses. As is discussed in Chapter 8, the unavailability of such information for Detroit caused

major estimation problems. For the Detroit analysis it was necessary to estimate dwelling unit size, dwelling unit quality, and lot size by using Census tract statistics. The San Francisco equations provide an independent check of the results obtained using this procedure. The major disadvantage of the San Francisco sample was its relatively small size as compared to the Detroit sample. This meant we could examine only very aggregate workplace effects.

The Data

The data used for these estimates were obtained from the Bay Area Transportation Study Commission (BATSC). In addition to the usual origin-and-destination survey, BATSC conducted a more extensive home interview of 3,000 households. This supplemental survey provided ten-year (1955–65) residential, employment, and household histories for each sampled household. The description of each housing unit includes tenure (ownership versus rental), value or rent, structural type, age of structure, number of rooms, lot size, and location (Census tract). We supplemented each housing record with Census tract information on the median family income, median school years completed, and percentage nonwhite in the Census tract.

The ten-year employment history includes the beginning and end date of each job held by the household head, the location of employment (Census tract), the business or industry of the employer, and the occupation of the employee. Finally, for every person who was in the household during the ten-year period, the record includes age, relationship to the head of household, date of entry into the household, and, when appropriate, date of departure from the household.

From these data we created a movers' file for each move made by each household during the ten-year period, describing (1) the origin of the move, whether outside the region, within the region, or a new household formation; (2) the location, dwelling unit, and neighborhood characteristics, and value or rent for both the old and new residences; (3) the head of household's occupation, industry, and workplace location for each job held during occupancy in the old and new residence; (4) the relationship and age of all household members

present in the old and new residence; and (5) the household characteristics at the time of move.

The movers' file contains roughly 950 records for households who migrated into the region, 3,400 records for households who moved within the region, and 200 records for new households. The submarket demand equations presented in this appendix are estimated for the 3,400 intrametropolitan movers. In contrast to the Detroit analyses, which excluded nonwhite households and households with more than one wage earner, the equations presented in this appendix for San Francisco households include these two categories of households, although the applicability of the model to them is less certain. In addition, the sample used includes moves over a ten-year period. It is likely that important changes in the level and spatial distribution of workplace-specific gross prices occurred over the period. Such changes would be expected to bias the workplace effects toward zero.

The Definition of Housing Submarkets

The definition of meaningful housing submarkets is crucial to the design of the NBER Urban Simulation Model and its empirical implementation. The criterion for defining housing submarkets is clear-cut: Dwelling units assigned to the same submarket should be regarded by households as very close substitutes. Indeed, they should be regarded as virtually identical. Similarly, households should consider the dwelling units assigned to different submarkets as different in important ways and as much less close substitutes. However, we know of no clear-cut theoretical or statistical method of defining submarkets that satisfies this criterion. Therefore, we found it necessary to combine some a priori theorizing about the characteristics of housing with considerable empirical experimentation. The empirical results included in this chapter describe part of an extended process of cut and try used in defining housing submarkets. We are still dissatisfied with our progress in this critical area and are continuing our analysis of these and similar equations in an effort to improve the classification of housing submarkets used in the model.

The San Francisco submarket demand equations reported in this

appendix are presented in nine tables. Each table corresponds to a different set of submarket definitions. Moreover, the definitions used in tables B.1 through B.9 are nested. The first tables define fewer housing types than the latter ones. For example, the first three equations in Table B.1 allocate all San Francisco dwelling units to three housing submarkets defined by structural type: (1) single-family units, (2) two-family units, and (3) apartments. The fourth equation divides the entire sample into only two categories by allocating large two-family units (those with five rooms or more) to the single-family category and small two-family units (those with four or fewer rooms) to the apartment category. Since there are only two types of housing unit, it is not necessary to present the apartment equation. It is identical to the single-family equation, except that the signs are reversed.

In tables B.2 through B.5 single-family and large two-family units are further subdivided by lot size, number of rooms, and neighborhood quality (median Census tract income). Similarly, tables B.6 through B.9 present subdivisions of the apartment and small two-family category by the number of dwelling units in the structure, number of rooms, and neighborhood quality.

Explanatory Variables

The San Francisco demand equations include four socioeconomic variables: age and education of the head of household, family size, and family income. Age of the head of household is represented by two dummy variables: 30 years or less, and between 31 and 60 years. Households with heads over 60 years are reflected in the intercept. Family size is also represented by two dummy variables: three and four individuals and five or more individuals. The intercept reflects households with one or two individuals. Only one dummy variable is used to indicate education differences: households having heads with more than a high school education have the value 1; all others are assigned the value 0. Finally, three dummy variables are used to represent four categories of family income: $4,001 to $10,000, $10,001 to $15,000, and over $15,000. Households with family incomes of $4,000 or less are reflected in the intercept.

The influence of workplace location on the probability of

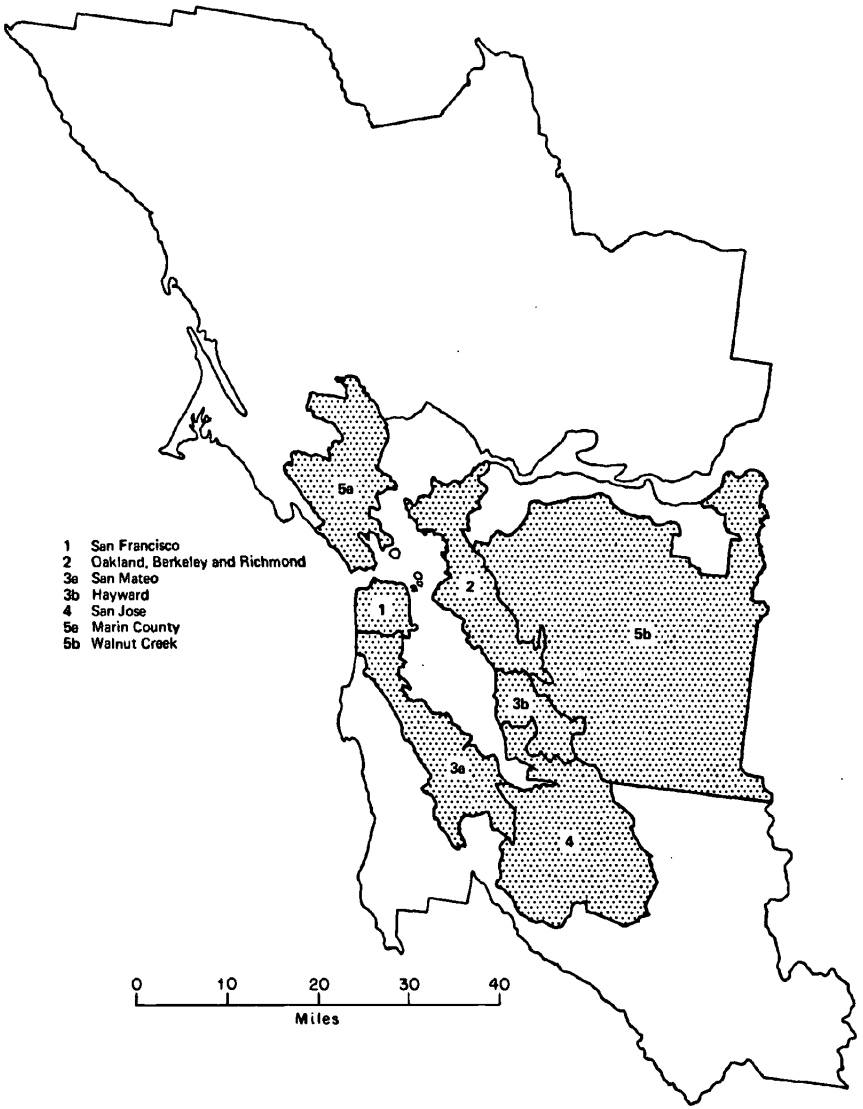
consuming a particular type of housing is similarly represented by dummy variables. The San Francisco region was divided into the six workplace zones shown in Figure B.1. These six workplaces are represented by five dummy variables: (1) San Francisco County (all of San Francisco), (2) Oakland (East Bay, including Oakland, Berkeley, and Richmond), (3) Peninsula (the developed parts of San Mateo County and the area on the southeast side of the bay surrounding Hayward), (4) San Jose, (5) Valley (Marin County and the area east of the bay centered on Walnut Creek). All of the outlying areas around the five other workplace zones are reflected in the intercept. The differences in the coefficients on these workplace dummies show the amount by which similar households working at the different work zones are more or less likely to purchase housing of some particular type.

Equation Results

The dependent variable in each equation is a binary dependent variable, which assumes the value 1 if a household chooses the particular housing type in question and the value 0 for all other housing types. The estimate obtained from solving the equation, which generally will fall between 0 and 1, should be interpreted as the probability that a particular household class will consume a particular type of housing. In the simulation model the probabilities determine the proportion of a particular kind of household choosing each type of housing.

Table B.1 presents three equations which allocate all intrametropolitan movers to single-family units, two-family units, and apartments, and a fourth which describes the proportion of intrametropolitan movers who move to single-family units or to large two-family units (five rooms or more). The probability of a household's choosing an apartment or a small two-family unit (four rooms or fewer) can be obtained by merely reversing the signs of the fourth equation. The last row in Table B.1 gives the mean proportion of the sample choosing each type of housing. Thus, when the entire sample of movers is divided into three categories, 58 per cent occupy single-family units; 11 per cent, two-family units; and 31 per cent, apartments. When only two categories are used, 62 per cent of all

Figure B.1
Workplace Zones, San Francisco Area



intrametropolitan movers during the period choose single-family units or large two-family units, and 38 per cent choose apartments or small two-family units.

The coefficients of all four equations are quite plausible. For

Table B.1
Structural-Type Equations, All Movers, Using Two Housing Submarket Definitions
(t values under coefficients)

Independent Variables	Dependent Variables: Single-Family (1)	Two-Family (2)	Apartments (3)	Single- and Two-Family with 5+ Rooms (4)
Age of head				
1. 30 years or less	−0.1384	0.0971	0.0413	−0.1077
	(2.85)	(2.86)	(0.89)	(2.26)
2. 31–60 years	0.0312	0.0484	−0.0796	0.0630
	(0.64)	(1.43)	(1.72)	(1.33)
Family size				
3. 3–4 persons	0.2549	−0.0181	−0.2368	0.2572
	(15.03)	(1.53)	(14.62)	(15.48)
4. 5+ persons	0.3438	−0.0326	−0.3112	0.3589
	(15.97)	(2.17)	(15.13)	(17.01)
5. More than H.S. ed.	−0.0314	−0.0096	0.0410	−0.0423
	(2.01)	(0.88)	(2.74)	(2.76)
Income				
6. $4,001–$10,000	0.1384	−0.0393	−0.0991	0.1336
	(3.78)	(1.54)	(2.84)	(3.73)
7. $10,001–$15,000	0.2201	−0.0576	−0.1625	0.2101
	(5.80)	(2.17)	(4.48)	(5.65)
8. $15,001+	0.2786	−0.0713	−0.2073	0.2673
	(6.82)	(2.50)	(5.31)	(6.68)
9. Workplace				
a. San Francisco	−0.1699	0.0284	0.1415	−0.1205
	(5.55)	(1.33)	(4.84)	(4.02)
b. Oakland	−0.1349	0.0254	0.1085	−0.1062
	(4.16)	(1.12)	(3.53)	(3.34)
c. Peninsula	−0.1086	−0.0019	0.1105	−0.093
	(3.31)	(0.08)	(3.52)	(2.90)
d. San Jose	−0.0769	−0.0313	0.1082	−0.067
	(2.17)	(1.26)	(3.19)	(−2.20)
e. Valley	−0.0404	−0.0314	0.0718	−0.0435
	(0.95)	(1.05)	(1.76)	(1.04)
10. Constant	0.4222	0.0989	0.4788	0.4154
R^2	0.1789	0.0148	0.1454	0.1828
Mean proportion	0.578	0.112	0.310	0.620

example, those for the single-family equation (column 1 in Table B.1) indicate that the probability of households with heads 30 years or younger choosing single-family or large two-family units is 0.14 less than the probability of households with heads over 60 years of age making this choice. In contrast, the probability that households with heads between 31 and 60 will choose single-family units is 0.03 greater than that for households with heads over 60 years of age. The equation in column 1 similarly indicates that larger and higher-income families are much more likely to choose the single-family units. Families with three or four members have a probability of choosing single-family residences that is 0.25 greater, and those with more than four members a probability 0.34 greater than similar households with one or two persons. The likelihood of choosing single-family dwellings similarly increases as family income increases. Households with income over $15,000 are 0.28 more likely to choose the single-family submarket than are households with income of $4,000 or less. The education dummy indicates that households with more than a high school education are slightly less likely to choose the single-family submarket than are households with heads with less education after the effects of income, age, and family size are controlled.

The workplace dummies similarly indicate that workplace location has a large and systematic effect on the residence choices made by San Francisco households. A household in which the primary wage earner works in either San Francisco or Oakland will be about 0.17 or 0.13 less likely to choose a single-family unit than a similar household in which the head works in the outlying areas.

The equation in column 2 of Table B.1 describes the probability of choosing two-family units. The estimates for both it and the apartment equation are also quite plausible. The latter clearly indicate that young, small, low-income households are far more likely to choose apartments than are other types of households. It suggests, moreover, that households headed by a person with more than a high school education are more likely to choose apartment living than those headed by a person with less than a high school education. The workplace effect is again quite significant. The probability of a worker employed in San Francisco living in an apartment is 0.14 larger than the probability of a worker with the same characteristics

employed at the periphery of the region. This is nearly one-half the mean probability for all movers.[1]

The equations in tables B.2 through B.9, which follow this appendix, subdivide the single-family plus large two-family and apartment plus small two-family categories into a larger number of housing types. For example, tables B.2 through B.5 present estimates of the probability of choosing several kinds of single-family housing described in terms of lot size, number of rooms, and neighborhood quality (median income of the Census tract). In the first three of these single-family tables, the sample of single-family and large two-family units is divided two ways, using three different combinations of the three classification variables. Table B.5, the last of the single-family tables, uses all three variables to define eight housing types. When only two variables are used to define single-family housing types, a larger number of categories of the housing attributes are used. Thus, Table B.2 contains equations for six types of single-family unit defined by two categories of lot size and three of room size. In contrast, Table B.5 contains equations for eight types of single-family unit classified by two categories each of lot size, neighborhood quality, and room size.

The presentation of the equations for multifamily dwellings plus small two-family units, in tables B.6 through B.9, is organized in a similar manner, except that the variables used to define multifamily submarkets are structural size (number of dwelling units in the structure), dwelling unit size (number of rooms), and neighborhood quality. Again, the last of the apartment submarket tables contains equations for eight housing types based on all three variables.

The equations for housing type in tables B.2 through B.9 are estimated using binary dependent variables in the same manner as the equations in Table B.1. But the samples used in estimating the equations in tables B.2 through B.9 include either all households occupying single-family units plus households occupying large two-family units or all households occupying multifamily dwellings plus households occupying small two-family units. Therefore, these equations indicate the probability that households that have

1. Since the occupants of apartments move more often than the occupants of single-family units, they are somewhat overrepresented in this sample of intrametropolitan movers relative to their frequency in the population at any moment in time.

previously decided to live in one of the two major categories will choose a particular kind of single-family unit or apartment. For example, the equations in Table B.2 give the probability that a particular class of household, which has already selected a single-family unit, will choose one of six types of single-family unit classified by lot size and number of rooms. Therefore, if we wish to know what the probability is that a particular household will choose a particular kind of single-family housing unit, we must multiply the probability that the household will choose a single-family unit (Table B.1) by the probability of its choosing the particular type of single-family unit in question (tables B.2–B.5).

For example, from Table B.1, we can determine that a three-person household with an income of $12,000 a year, whose head has more than a high school education, is 40 years old, and is employed in San Francisco has a 0.73 probability of choosing a single-family unit. The probability that this same household will choose a large-lot, single-family dwelling with five rooms or less is the product of the probability that it will choose a single-family house (0.73) and the probability that, having decided on a single-family unit, it will choose one on a large lot with five or more rooms, which is 0.14. The product of these two probabilities is 0.10. If this same household were employed in the Valley, its probability of choosing this house type would be 0.28, the product of the 0.86 probability of its choosing a single-family house and the 0.33 probability of its choosing a single-family unit with five rooms or fewer on a large lot.

Table B.2
Single-Family Equations: Households Stratified by Lot Size and Number of Rooms
(t values under coefficients)

	Dependent Variables					
	Large Lot			Small Lot		
Independent Variables	5 Rms. or Less	6 Rms.	7+ Rooms	5 Rms. or Less	6 Rms.	7+ Rooms
Age of head						
1. 30 years or less	−0.10	−0.04	−0.05	0.19	0.01	−0.01
	(1.2)	(0.5)	(0.7)	(2.9)	(0.2)	(0.2)
2. 31–60 years	−0.13	−0.03	0.03	0.13	0.01	0.00
	(1.8)	(0.3)	(0.4)	(2.1)	(0.2)	(0.0)
Family size						
3. 3–4 persons	−0.04	0.06	0.08	−0.08	−0.00	−0.01
	(1.5)	(1.9)	(2.8)	(3.4)	(0.3)	(0.6)
4. 5+ persons	−0.12	−0.01	0.21	−0.10	−0.01	0.03
	(4.0)	(0.2)	(7.2)	(4.0)	(0.6)	(2.1)
5. More than H.S. ed.	−0.08	0.04	0.12	0.07	−0.02	0.01
	(3.4)	(1.5)	(5.4)	(3.6)	(1.1)	(0.7)
Income						
6. $4,001–$10,000	0.03	0.22	0.09	0.29	−0.10	0.04
	(0.4)	(2.4)	(1.1)	(4.0)	(2.0)	(0.9)
7. $10,001–$15,000	−0.05	0.27	0.20	−0.34	−0.11	0.04
	(0.5)	(2.9)	(2.3)	(4.8)	(2.3)	(0.9)
8. $15,001 +	−0.08	0.14	0.40	−0.37	−0.14	0.06
	(0.9)	(1.4)	(4.6)	(5.0)	(2.7)	(1.4)
9. Workplace						
a. San Francisco	−0.10	−0.13	−0.04	0.15	0.08	0.04
	(3.1)	(3.8)	(1.2)	(5.8)	(4.4)	(2.2)
b. Oakland	−0.07	−0.09	0.02	0.09	0.02	0.05
	(1.9)	(2.4)	(0.5)	(2.9)	(0.8)	(2.6)
c. Peninsula	−0.10	−0.02	0.02	0.07	0.04	−0.01
	(2.8)	(0.4)	(0.7)	(2.2)	(1.9)	(0.5)
d. San Jose	0.01	0.04	−0.11	0.02	0.00	0.03
	(0.1)	(0.7)	(1.2)	(0.3)	(0.0)	(0.7)
e. Valley	0.03	−0.15	0.16	0.03	0.02	0.01
	(0.4)	(1.9)	(2.4)	(0.5)	(0.5)	(0.2)
10. Constant	0.54	0.12	−0.10	0.33	0.14	−0.03
R^2	0.00	0.03	0.17	0.08	0.02	0.01
Mean proportion	0.24	0.28	0.24	0.14	0.06	0.04

Table B.3
Single-Family Equations: Households Stratified by Lot Size and Neighborhood Quality
(t values under coefficients)

	Dependent Variables					
	Large Lot			Small Lot		
Independent Variables	Low-Income Area	Medium-Income Area	High-Income Area	Low-Income Area	Medium-Income Area	High-Income Area
Age of head						
1. 30 years or less	−0.06	0.05	−0.18	0.11	0.05	0.03
	(0.8)	(0.5)	(2.3)	(1.8)	(0.9)	(0.7)
2. 31–60 years	−0.03	0.01	−0.12	0.05	0.05	0.04
	(0.4)	(0.1)	(1.6)	(0.9)	(0.9)	(1.1)
Family size						
3. 3–4 persons	0.01	0.03	0.04	−0.04	−0.04	−0.01
	(0.6)	(1.0)	(1.6)	(2.1)	(2.1)	(0.5)
4. 5+ persons	0.06	0.00	0.02	−0.04	−0.04	0.01
	(2.2)	(0.1)	(0.7)	(1.9)	(1.6)	(0.3)
5. More than H.S. ed.	−0.03	0.02	0.08	−0.04	−0.03	−0.01
	(1.4)	(0.8)	(3.6)	(2.1)	(2.0)	(0.9)
Income						
6. $4,001–$10,000	0.02	0.23	0.10	−0.35	−0.01	0.02
	(0.2)	(2.3)	(1.2)	(5.3)	(0.2)	(0.5)
7. $10,001–$15,000	−0.03	0.24	0.21	−0.43	−0.03	0.04
	(0.4)	(2.3)	(2.5)	(6.4)	(0.5)	(0.9)
8. $15,001+	−0.06	0.16	0.35	−0.43	−0.06	0.03
	(0.8)	(1.6)	(3.9)	(6.3)	(0.9)	(0.9)
9. Workplace						
a. San Francisco	−0.22	−0.12	0.07	0.16	0.07	0.03
	(8.2)	(3.1)	(2.4)	(6.7)	(3.2)	(2.3)
b. Oakland	−0.06	−0.05	−0.03	0.10	0.04	0.01
	(2.0)	(1.2)	(0.9)	(3.5)	(1.6)	(0.5)
c. Peninsula	−0.17	−0.05	0.12	0.03	0.04	0.03
	(5.3)	(1.1)	(3.2)	(1.2)	(1.4)	(1.7)
d. San Jose	0.04	−0.08	−0.01	0.04	−0.01	0.03
	(0.5)	(0.7)	(0.2)	(0.5)	(0.2)	(0.8)
e. Valley	−0.17	0.12	0.03	−0.02	0.03	0.02
	(2.8)	(1.5)	(0.4)	(0.5)	(0.5)	(0.4)
10. Constant	0.34	0.15	0.07	0.40	0.07	0.04
R^2	0.07	0.02	0.09	0.09	0.01	0.00
Mean proportion	0.16	0.36	0.24	0.12	0.09	0.03

Table B.4
Single-Family Equations: Households Stratified by Number of Rooms and Neighborhood Quality
(*t* values under coefficients)

Independent Variables	Dependent Variables: 5 Rms. or Less — Low-Income Area	5 Rms. or Less — Medium-Income Area	5 Rms. or Less — High-Income Area	6+ Rms. — Low-Income Area	6+ Rms. — Medium-Income Area	6+ Rms. — High-Income Area
Age of head						
1. 30 years or less	0.05	0.11	−0.11	−0.07	0.05	−0.02
	(0.9)	(1.5)	(2.3)	(1.1)	(0.6)	(0.3)
2. 31–60 years	0.05	0.03	−0.10	−0.03	0.03	0.02
	(0.8)	(0.4)	(2.1)	(0.5)	(0.4)	(0.3)
Family size						
3. 3–4 persons	0.01	−0.10	−0.02	0.02	0.06	0.04
	(0.3)	(3.9)	(1.1)	(0.7)	(1.9)	(1.3)
4. 5+ persons	0.01	−0.17	−0.04	0.05	0.11	0.04
	(0.4)	(6.0)	(2.0)	(2.0)	(3.1)	(1.3)
5. More than H.S. ed.	−0.07	−0.06	−0.02	0.01	0.03	0.10
	(3.6)	(2.6)	(1.2)	(0.4)	(1.0)	(4.2)
Income						
6. $4,001–$10,000	−0.41	0.04	0.06	0.10	0.15	0.07
	(5.3)	(0.4)	(0.9)	(0.1)	(1.2)	(0.7)
7. $10,001–$15,000	−0.48	−0.04	0.07	0.06	0.20	0.19
	(6.2)	(0.4)	(1.1)	(0.7)	(1.6)	(1.8)
8. $15,001+	−0.51	−0.10	0.07	0.06	0.15	0.32
	(6.4)	(1.0)	(1.1)	(0.7)	(1.2)	(2.9)
9. Workplace						
a. San Francisco	−0.09	0.07	0.06	−0.06	−0.08	0.10
	(3.7)	(2.3)	(2.8)	(2.4)	(2.1)	(3.2)
b. Oakland	−0.05	0.01	0.03	0.03	0.02	−0.04
	(1.7)	(0.2)	(1.1)	(1.1)	(0.4)	(1.0)
c. Peninsula	−0.13	−0.00	0.07	−0.03	−0.01	0.09
	(4.9)	(0.1)	(3.3)	(0.9)	(0.1)	(2.4)
d. San Jose	0.04	−0.02	−0.02	0.00	−0.06	0.06
	(0.5)	(0.3)	(0.3)	(0.1)	(0.6)	(0.7)
e. Valley	−0.09	0.00	0.05	−0.09	0.09	−0.01
	(1.8)	(0.8)	(1.3)	(1.7)	(1.2)	(0.2)
10. Constant	0.61	0.24	0.08	0.08	0.05	−0.07
R^2	0.08	0.07	0.01	0.01	0.02	0.11
Mean proportion	0.15	0.17	0.06	0.13	0.28	0.21

Table B.5
Single-Family Equations: Households Stratified by Lot Size, Number of Rooms, and Neighborhood Quality
(*t* values under coefficients)

	Dependent Variables							
	Small Lot				Large Lot			
	5 Rms. or Less		6+ Rms.		5 Rms. or Less		6+ Rms.	
Independent Variables	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area
Age of head								
1. 30 years or less	0.11	0.08	—0.00	—0.07	—0.01	—0.09	—0.05	—0.04
	(2.3)	(1.5)	(0.1)	(1.9)	(0.1)	(1.3)	(1.0)	(0.5)
2. 31–60 years	0.07	0.07	—0.01	—0.00	—0.01	—0.13	—0.02	0.02
	(1.4)	(1.4)	(0.3)	(0.1)	(0.1)	(1.9)	(0.5)	(0.2)
Family size								
3. 3–4 persons	—0.02	—0.05	—0.02	0.10	0.00	—0.04	0.01	0.12
	(1.4)	(3.1)	(1.4)	(7.2)	(0.2)	(1.8)	(0.6)	(3.8)
4. 5+ persons	—0.04	—0.07	—0.01	0.21	0.01	—0.13	0.05	0.16
	(1.9)	(3.4)	(0.5)	(1.0)	(0.04)	(4.8)	(2.5)	(4.5)
5. More than H.S. ed.	—0.03	—0.04	—0.00	0.01	—0.04	—0.04	0.01	0.15
	(2.3)	(2.5)	(0.2)	(1.0)	(2.9)	(1.9)	(0.9)	(5.4)
Income								
6. $4,001–$10,000	—0.28	—0.01	—0.07	0.10	—0.09	0.12	0.10	0.21
	(5.7)	(0.1)	(1.5)	(3.2)	(1.7)	(1.6)	(1.7)	(2.1)
7. $10,001–$15,000	—0.33	—0.01	—0.09	0.15	—0.12	0.07	0.10	0.37
	(6.2)	(0.1)	(2.0)	(4.8)	(2.3)	(1.0)	(1.6)	(3.7)

(continued)

Table B.5 (concluded)

Independent Variables	Dependent Variables: Small Lot, 5 Rms. or Less, Low-Income Area	Small Lot, 5 Rms. or Less, High-Income Area	Small Lot, 6+ Rms., Low-Income Area	Small Lot, 6+ Rms., High-Income Area	Large Lot, 5 Rms. or Less, Low-Income Area	Large Lot, 5 Rms. or Less, High-Income Area	Large Lot, 6+ Rms., Low-Income Area	Large Lot, 6+ Rms., High-Income Area
Income (continued)								
8. $15,001+	−0.34	−0.03	−0.09	0.14	−0.14	0.05	0.07	0.46
	(6.1)	(0.6)	(1.9)	(4.1)	(2.4)	(0.7)	(1.2)	(4.5)
9. Workplace								
a. San Francisco	0.09	0.06	0.07	−0.02	−0.13	−0.03	−0.10	−0.07
	(4.6)	(3.2)	(4.5)	(1.1)	(6.5)	(1.0)	(4.5)	(1.9)
b. Oakland	0.05	0.03	0.05	−0.04	−0.06	−0.02	−0.01	−0.07
	(2.3)	(1.5)	(2.5)	(1.5)	(2.5)	(0.5)	(0.3)	(1.7)
c. Peninsula	0.01	0.05	0.02	−0.04	−0.12	0.03	−0.04	0.05
	(0.5)	(2.4)	(1.1)	(1.7)	(5.5)	(0.7)	(1.7)	(1.1)
d. San Jose	0.03	−0.01	0.00	−0.07	0.03	−0.03	0.01	−0.07
	(0.6)	(0.2)	(0.0)	(1.2)	(0.6)	(0.3)	(0.1)	(0.6)
e. Valley	−0.02	0.05	−0.00	−0.00	−0.08	0.05	−0.09	0.09
	(0.5)	(1.1)	(0.1)	(0.1)	(2.4)	(0.8)	(1.8)	(1.2)
10. Constant	0.30	0.03	0.11	−0.01	0.29	0.25	0.05	−0.02
R^2	0.07	0.02	0.02	0.09	0.05	0.32	0.02	0.11
Mean proportion	0.07	0.07	0.05	0.06	0.07	0.16	0.08	0.44

Table B.6
Multiple-Family Equations:
Households Stratified by Size of Structure and Number of Rooms
(t values under coefficients)

	Dependent Variables			
	Small Apartments		Large Apartments	
Independent Variables	1 to 3 Rms.	4+ Rms.	1 to 3 Rms.	4+ Rms.
Age of head				
1. 30 years or less	0.08	−0.03	0.15	−0.20
	(1.5)	(0.5)	(2.2)	(3.3)
2. 31–60 years	0.08	−0.04	0.07	−0.12
	(1.4)	(0.6)	(1.1)	(1.8)
Family size				
3. 3–4 persons	−0.08	0.24	−0.32	0.16
	(3.3)	(9.4)	(11.9)	(6.3)
4. 5+ persons	−0.15	0.35	−0.35	0.15
	(3.7)	(7.7)	(7.2)	(3.3)
5. More than H.S. ed.	−0.03	−0.01	−0.03	0.08
	(1.5)	(0.6)	(1.4)	(3.4)
Income				
6. $4,001–$10,000	−0.00	−0.05	−0.00	0.06
	(0.1)	(1.1)	(0.1)	(1.3)
7. $10,001–$15,000	−0.03	−0.03	−0.06	0.12
	(0.7)	(0.7)	(1.2)	(2.5)
8. $15,001+	−0.07	−0.05	−0.05	0.18
	(1.5)	(0.9)	(0.8)	(3.2)
9. Workplace				
a. San Francisco	0.01	−0.10	0.04	0.06
	(0.3)	(3.3)	(1.1)	(1.8)
b. Oakland	0.06	−0.03	−0.06	0.03
	(1.9)	(0.9)	(1.6)	(0.9)
c. Peninsula	0.01	−0.08	0.03	0.05
	(0.1)	(2.1)	(0.7)	(1.2)
d. San Jose	0.02	0.18	−0.10	−0.10
	(0.2)	(1.7)	(0.9)	(0.9)
e. Valley	−0.01	−0.12	0.06	0.07
	(0.1)	(1.4)	(0.7)	(0.8)
10. Constant	0.14	0.32	0.35	0.19
R^2	0.01	0.09	0.12	0.05
Mean proportion	0.17	0.25	0.33	0.25

Table B.7
Multiple-Family Equations:
Households Stratified by Size of Structure and Neighborhood Quality
(t values under coefficients)

	Dependent Variables			
	Small Apartments		Large Apartments	
Independent Variables	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area
Age of head				
1. 30 years or less	0.02	0.07	0.01	−0.06
	(0.3)	(1.3)	(0.2)	(1.1)
2. 31–60 years	0.01	0.04	0.05	−0.09
	(0.1)	(0.7)	(0.7)	(1.5)
Family size				
3. 3–4 persons	0.07	0.09	−0.16	0.00
	(2.6)	(4.2)	(5.7)	(0.1)
4. 5+ persons	0.15	0.05	−0.13	−0.06
	(3.1)	(1.2)	(2.6)	(1.4)
5. More than H.S. ed.	−0.03	−0.02	0.02	0.03
	(1.1)	(1.0)	(0.7)	(1.2)
Income				
6. $4,001–$10,000	−0.17	0.11	−0.05	0.10
	(3.5)	(3.0)	(1.0)	(2.4)
7. $10,001–$15,000	−0.19	0.13	−0.11	0.17
	(3.7)	(3.2)	(2.1)	(3.7)
8. $15,001+	−0.19	0.06	0.03	0.10
	(3.2)	(1.4)	(0.5)	(1.8)
9. Workplace				
a. San Francisco	−0.03	−0.07	0.15	−0.06
	(0.7)	(2.7)	(4.3)	(1.8)
b. Oakland	0.08	−0.05	0.10	−0.12
	(2.0)	(1.6)	(2.4)	(3.6)
c. Peninsula	−0.07	0.00	−0.00	0.07
	(1.9)	(0.0)	(0.0)	(2.1)
d. San Jose	0.22	−0.03	−0.13	−0.07
	(2.0)	(0.3)	(1.1)	(0.7)
e. Valley	−0.19	0.07	−0.04	0.17
	(2.2)	(0.9)	(0.5)	(2.1)
10. Constant	0.45	0.01	0.35	0.19
R^2	0.03	0.03	0.06	0.04
Mean proportion	0.28	0.15	0.36	0.21

Table B.8
Multiple-Family Equations:
Household Stratified by Number of Rooms and Neighborhood Quality
(t values under coefficients)

	Dependent Variables			
	1 to 3 Rooms		4+ Rooms	
Independent Variables	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area
Age of head				
1. 30 years or less	0.18	0.05	−0.18	−0.05
	(2.6)	(1.0)	(2.8)	(0.8)
2. 31–60 years	0.18	−0.03	−0.13	−0.03
	(2.6)	(0.5)	(1.9)	(0.5)
Family size				
3. 3–4 persons	−0.27	−0.12	−0.18	−0.21
	(10.1)	(5.6)	(6.9)	(9.2)
4. 5+ persons	−0.37	−0.13	0.39	0.11
	(7.6)	(3.3)	(8.1)	(2.7)
5. More than H.S. ed.	−0.02	−0.04	0.02	0.05
	(1.0)	(2.0)	(0.7)	(2.3)
Income				
6. $4,001–$10,000	−0.09	0.08	−0.13	0.13
	(1.9)	(2.2)	(2.6)	(3.2)
7. $10,001–$15,000	−0.18	0.09	−0.12	0.21
	(3.4)	(2.1)	(2.4)	(4.9)
8. $15,001+	−0.15	0.02	−0.02	0.14
	(2.4)	(0.44)	(0.3)	(2.7)
9. Workplace				
a. San Francisco	0.08	−0.03	0.06	−0.10
	(2.2)	(1.1)	(1.6)	(3.5)
b. Oakland	0.05	−0.05	0.12	−0.12
	(1.3)	(1.7)	(3.2)	(3.6)
c. Peninsula	−0.05	0.08	−0.03	−0.01
	(1.2)	(2.5)	(0.7)	(0.2)
d. San Jose	−0.03	−0.06	0.13	−0.04
	(0.3)	(0.6)	(1.1)	(0.4)
e. Valley	−0.10	0.16	−0.14	0.08
	(1.1)	(2.2)	(1.5)	(1.1)
10. Constant	0.36	0.13	0.44	0.07
R^2	0.11	0.06	0.09	0.09
Mean proportion	0.31	0.14	0.34	0.21

Table B.9
Multiple-Family Equations:
Households Stratified by Size of Structure, Number of Rooms, and Neighborhood Quality
(t values under coefficients)

	Dependent Variables							
	Small Apartments				Medium and Large Apartments			
	1 to 3 Rooms		4+ Rooms		1 to 3 Rooms		4+ Rooms	
Independent Variables	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area	Low-Income Area	High-Income Area
Age of head								
1. 30 years or less	0.05	0.03	−0.07	0.04	0.13	0.02	−0.11	−0.08
	(1.1)	(1.0)	(1.3)	(0.9)	(2.1)	(0.4)	(2.2)	(1.9)
2. 31–60 years	0.06	0.03	−0.05	0.01	0.12	−0.05	−0.07	−0.04
	(1.2)	(0.7)	(1.0)	(0.3)	(2.1)	(1.1)	(1.4)	(1.0)
Family size								
3. 3–4 persons	−0.04	−0.04	0.11	0.13	−0.24	−0.08	0.07	0.08
	(1.9)	(2.8)	(5.0)	(7.4)	(9.9)	(4.5)	(3.6)	(4.6)
4. 5+ persons	−0.10	−0.05	0.25	0.10	−0.28	−0.07	0.14	0.01
	(2.7)	(2.3)	(6.4)	(3.2)	(6.4)	(2.2)	(3.8)	(0.3)
5. More than H.S. ed.	−0.02	−0.01	−0.01	0.01	−0.01	−0.02	0.03	0.05
	(0.9)	(1.2)	(0.5)	(0.3)	(0.4)	(1.5)	(1.4)	(3.2)
Income								
6. $4,001–$10,000	−0.04	0.04	−0.12	0.07	−0.05	0.04	−0.00	0.06
	(1.2)	(1.6)	(3.2)	(2.4)	(1.2)	(1.4)	(0.1)	(1.9)

(continued)

Table B.9 (concluded)

Independent Variables	Dependent Variables: Small Apartments, 1 to 3 Rooms, Low-Income Area	Small Apartments, 1 to 3 Rooms, High-Income Area	Small Apartments, 4+ Rooms, Low-Income Area	Small Apartments, 4+ Rooms, High-Income Area	Medium and Large Apartments, 1 to 3 Rooms, Low-Income Area	Medium and Large Apartments, 1 to 3 Rooms, High-Income Area	Medium and Large Apartments, 4+ Rooms, Low-Income Area	Medium and Large Apartments, 4+ Rooms, High-Income Area
Income (continued)								
7. $10,001–$15,000	—0.06	0.03	—0.13	0.10	—0.12	0.05	0.01	0.11
	(1.5)	(1.0)	(3.2)	(3.1)	(2.6)	(1.7)	(0.2)	(3.3)
8. $15,001+	—0.08	0.01	—0.11	0.06	—0.06	0.01	0.09	0.08
	(1.9)	(0.3)	(2.3)	(1.5)	(1.1)	(0.3)	(2.0)	(2.1)
9. Workplace								
a. San Francisco	—0.01	0.01	—0.02	—0.09	0.08	—0.04	0.07	—0.01
	(0.2)	(0.8)	(0.7)	(4.0)	(2.6)	(1.9)	(2.8)	(0.6)
b. Oakland	0.03	0.03	0.04	—0.08	0.02	—0.08	0.08	—0.04
	(1.2)	(1.4)	(1.4)	(3.1)	(0.5)	(3.0)	(2.6)	(1.7)
c. Peninsula	—0.03	0.04	—0.04	—0.04	—0.01	0.04	0.01	0.03
	(1.1)	(1.9)	(1.3)	(1.4)	(0.4)	(1.6)	(0.5)	(1.2)
d. San Jose	0.03	—0.01	0.20	—0.02	—0.06	—0.05	—0.07	—0.02
	(0.3)	(0.2)	(2.2)	(0.2)	(0.5)	(0.6)	(0.8)	(0.3)
e. Valley	—0.09	0.08	—0.11	—0.01	—0.02	0.08	—0.03	0.09
	(1.3)	(1.7)	(1.5)	(0.2)	(0.2)	(1.3)	(0.4)	(1.5)
10. Constant	0.14	—0.01	0.30	0.02	0.21	0.14	0.14	0.06
R^2	0.01	0.01	0.05	0.06	0.09	0.04	0.03	0.04
Mean proportion	0.11	0.05	0.21	0.12	0.20	0.10	0.13	0.09