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F

Rent and Value Models with Factor-Analytic Measures of Residential Quality

Perhaps the most vexing problem encountered in attempting to value the several attributes of bundles of residential services is the difficulty of measuring the physical and environmental quality of the dwelling unit and the surrounding residential environment. Indeed, these problems are so serious that the Bureau of the Census omitted all measures of dwelling-unit quality from the 1970 Census of Housing.

The data collection on which this study is based constituted an unusually ambitious effort to measure the quality of sample dwelling units, structures, and blocks, as described in Chapter 4. Residential-quality measures were obtained from three separate surveys. These surveys provided 39 variables indicating the physical or visual quality of the bundle of residential services, including 7 measures of the quality of dwelling units (e.g., condition of floors, windows, walls, levels of housekeeping), 7 measures of the quality of the structure and parcel (e.g., condition of drives and walks, landscaping, structure exterior), 8 measures of the quality of adjacent properties (e.g., condition of structures and parcels), and 17 variables pertaining to the residential quality of specific aspects of the block face (e.g., condition of street and percent of nonresidential use).

Table F-1 presents the simple correlations among the 39 separate estimates of the quality of narrowly defined attributes of the dwelling units, structures, parcels, and microneighborhoods associated with each sample unit. A glance at these zero-order correlations indicates that independent measures of the quality of several housing attributes are very highly correlated, while the intercorrelations among the measured quality of other attributes is small.

Detailed quality judgments about a large number of components of the bundle of residential services were obtained on the premise that individual interviewers and building inspectors would provide more consistent and precise evaluations of narrowly defined individual components than would be the case with broader aggregates. A second premise was that subsequent statistical aggregation of a large number of separate judgments would provide more consistent and meaningful quality measures than the subjective aggregation implicit in obtaining overall quality judgments from the individual evaluators.[1]

Although this procedure reduced the danger of inconsistent and arbitrary aggregation by the interviewers, it created the corollary problem of how to reduce the 39 separate quality measures to a more manageable number of quality dimensions. Of course, it would have been possible to include all 39 variables in the regressions with the remaining attributes of the bundles of residential services. But, in addition to the statistical problems, such as multicollinearity and the loss of degrees of freedom, that would arise from including the original 39 quality variables, there is reason to believe that both the market and individual households evaluate residential quality in terms of a smaller number of broader aggregates.

Two different methods of aggregation were used in constructing these composite quality variables, with generally consistent results. The first set of composite quality indexes, used in Chapter 8, were simple, unweighted means of the individual quality measurements for the dwelling unit, the structure, the adjacent structures, and the block face. The second set, used in the regressions reported in this appendix, were derived from the original 39 variables by factor analysis.

Since there is no way of unambiguously determining the appropriate number of factors, four-, five-, and six-factor representations of the 39 quality variables were computed and evaluated. The five-factor solution, summarized in Table F-2, accounts for 60 percent of the variance among the 39 original variables and seems to provide the most meaningful description of the quality dimensions of the bundles of residential services. Each of the five factors appears to represent a separable and intuitively meaningful quality dimension of the bundles.

[1]In designing the survey, we considered and rejected the technique developed by the Committee on the Hygiene of Housing of the American Public Health Association. The APHA technique, which has been used in a large number of cities, involves a field survey of individual dwelling units. A large number of items are recorded for each dwelling and penalty scores are assigned to each item which falls below a certain standard. These penalty points are then summed to obtain a "dwelling score," which represents the overall quality of the dwelling. See American Public Health Association, Committee on the Hygiene of Housing, *An Appraisal Method for Measuring the Quality of Housing*, Part 1 (New York, 1945).

TABLE F-1

Matrix of Simple (Zero-Order) Correlation Coefficients Between Quality Measures

Qualitative Measurements	Y_1	Y_2	Y_3
Dwelling Unit			
Y_1 Structural condition of dwelling unit	1.000		
Y_2 General housekeeping of dwelling unit	.592	1.000	
Y_3 Condition of ceiling	.931	.557	1.000
Y_4 Condition of walls	.934	.573	.926
Y_5 Condition of floors	.926	.586	.864
Y_6 Condition of lighting	.888	.531	.776
Y_7 Condition of windows	.907	.544	.816
Structure and Parcel			
Y_8 Overall condition of structure exterior	−.305	−.218	−.293
Y_9 Overall parcel condition	−.548	−.407	−.520
Y_{10} Quality of exterior	−.608	.415	−.579
Y_{11} Parcel landscaping	−.544	−.408	−.514
Y_{12} Trash on parcel	−.475	−.364	−.447
Y_{13} Nuisances affecting parcel	.010	.021	−.002
Y_{14} Condition of drives and walks	−.499	−.333	−.456
Adjacent Structures and Parcels			
Y_{15} Average condition of structures	−:036	.031	.032
Y_{16} Average condition of parcels	−.522	−.401	−.501
Y_{17} Structural quality of poorer	−.416	−.282	−.393
Y_{18} Structural quality of better	−.321	−.240	−.296
Y_{19} Parcel quality of poorer	−.513	−.373	−.491
Y_{20} Parcel quality of better	−.492	−.386	−.459
Y_{21} Nuisances affecting adjacent properties	−.156	.067	.145
Y_{22} Sample relative to adjacent properties	−.398	.290	−.375
Micro Neighborhood			
Y_{23} Number of neighborhood problems	.128	.089	.124
Y_{24} Percent of block face residential	−.262	−.206	−.264
Y_{25} Percent of block face commercial and industrial	.209	.187	.203
Y_{26} Percent of block face vacant	.275	.167	.257
Y_{27} Percent of block face poor	.404	.268	.381
Y_{28} Percent of block face fair	.338	.241	.324
Y_{29} Percent of block face good	−.522	−.363	−.496
Y_{30} Block landscaping	−.451	−.337	−.424
Y_{31} Trash on block	−.451	−.352	−.420
Y_{32} Condition of sidewalk	−.336	−.227	−.307
Y_{33} Condition of street	−.126	−.905	−.114
Y_{34} Condition of curbs	−.189	−.142	−.172
Y_{35} Amount of commercial traffic	−.224	−.187	−.206
Y_{36} Nuisances affecting block	.292	.198	.243
Y_{37} Condition of alleyways	−.319	−.260	−.306
Y_{38} Cleanliness of alleyways	−.380	−.257	−.349
Y_{39} Overall block condition	−.543	−.390	−.515

Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}
1.000						
.857	1.000					
.777	.795	1.000				
.797	.816	.822	1.000			
−.282	−.275	−.269	−.271	1.000		
−.515	−.499	−.496	−.510	.622	1.000	
−.572	−.544	−.543	−.568	.595	.826	1.000
−.512	−.496	−.501	−.503	.262	.648	.674
−.451	−.424	−.433	−.439	.496	.695	.675
−.003	.000	−.001	.062	.012	−.014	−.026
−.466	−.456	−.441	−.468	.348	.633	.692
.043	.033	.056	.023	.667	.161	.106
−.492	−.484	−.474	−.504	.362	.709	.731
−.388	−.372	−.361	−.381	.491	.576	.570
−.294	−.299	−.273	−.310	.602	.535	.528
−.479	−.463	−.455	−.483	.327	.676	.696
−.455	−.455	−.446	−.474	.348	.666	.691
.130	.150	.129	.174	−.090	−.154	−.150
−.382	−.363	−.370	−.368	−.236	.348	.433
.120	.109	.114	.111	.051	−.119	−.135
−.245	−.268	−.203	−.259	.072	.284	.275
.216	.223	.166	.198	−.064	−.223	−.202
.238	.237	.247	.244	−.306	−.402	−.432
.353	.353	.351	.402	−.388	−.543	−.589
.341	.330	.315	.285	−.080	−.357	−.345
−.496	−.488	−.471	−.478	.269	.609	.626
−.428	−.414	−.417	−.415	.304	.555	.568
−.416	−.402	−.418	−.432	.348	.590	.601
−.321	−.303	−.302	−.330	.247	.409	.433
−.108	−.092	−.145	−.143	.067	.137	.152
−.177	−.171	−.174	−.181	.208	.202	.183
−.206	−.235	−.189	−.204	.073	.222	.268
.254	.276	.287	.254	−.150	−.308	−.362
−.310	−.294	−.287	−.296	−.181	.311	.354
−.343	−.346	−.351	−.359	.417	.561	.541
−.508	−.495	−.488	−.508	.372	.676	.722

(Continued)

TABLE F-1 (Continued)

Y_{11}	Y_{12}	Y_{13}	Y_{14}	Y_{15}	Y_{16}	Y_{17}	Y_{18}
1.000							
.574	1.000						
−.112	.061	1.000					
.548	.544	−.025	1.000				
.149	.178	.022	−.021	1.000			
.651	.626	−.020	.580	.102	1.000		
.434	.521	−.032	.411	.379	.740	1.000	
.329	.458	.018	.358	.594	.665	.623	1.000
.632	.614	−.031	.557	.091	.945	.774	.534
.604	.565	−.006	.549	.089	.926	.612	.703
−.145	−.117	.170	−.074	−.027	−.104	−.112	−.081
.528	.261	−.005	.419	−.686	.462	.111	−.102
−.149	−.140	.122	−.125	.120	−.167	−.116	−.040
.327	.245	−.099	.195	−.056	.310	.198	.134
−.310	−.233	.147	−.120	.039	−.259	−.150	−.109
−.307	−.340	−.002	−.306	−.120	−.451	−.383	−.385
−.450	−.509	.089	−.431	−.156	−.606	−.512	−.485
−.400	−.296	.026	−.390	.162	−.434	−.304	−.185
.599	.531	−.058	.584	−.070	.714	.547	.424
.687	.518	−.080	.436	.036	.641	.484	.411
.531	.582	−.042	.477	.071	.654	.522	.443
.397	.399	−.009	.344	.055	.502	.411	.344
.109	.133	.035	.137	.028	.180	.100	.106
.142	.238	−.001	.204	.155	.240	.230	.197
.278	.200	−.128	.189	−.042	.283	.183	.131
−.355	−.319	.125	−.270	.011	−.387	−.304	−.217
.438	.274	−.049	.361	−.517	.408	.183	.012
.424	.563	−.082	.436	.192	.532	.517	.434
.612	.596	−.050	.589	.050	.772	.594	.499

Y_{19}	Y_{20}	Y_{21}	Y_{22}	Y_{23}	Y_{24}	Y_{25}
1.000						
.769	1.000					
−.118	−.077	1.000				
.447	.449	−.034	1.000			
−.176	−.141	.053	−.180	1.000		
.325	.262	−.192	.229	−.053	1.000	
−.264	−.227	.243	−.180	.037	−.730	1.000
−.414	−.441	.022	−.135	.055	−.209	.075
−.571	−.576	.084	−.198	.150	−.193	.098
−.429	−.386	.081	−.369	.092	−.154	.246
.691	.654	−.110	.442	−.172	.299	−.256
.611	.600	−.142	.332	−.123	.405	−.463
.630	.604	−.087	.289	−.153	.262	−.247
.481	.461	−.073	.232	−.105	.191	−.107
.187	.140	−.053	.092	−.028	−.007	.025
.242	.184	−.042	.005	−.010	.111	−.112
.283	.257	−.193	.199	−.089	.464	−.483
−.397	−.334	−.180	−.220	.150	−.264	.234
.410	.373	−.057	.637	−.155	.200	−.148
.527	.477	−.104	.138	−.148	.186	−.140
.737	.718	−.130	.389	−.208	.319	−.262

(Continued)

TABLE F-1 (Concluded)

Y_{26}	Y_{27}	Y_{28}	Y_{29}	Y_{30}	Y_{31}	Y_{32}
1.000						
.612	1.000					
.004	−.090	1.000				
−.326	−.452	−.825	1.000			
−.301	−.458	−.423	.604	1.000		
−.424	−.621	−.324	.614	.624	1.000	
−.267	−.399	−.279	.493	.402	.429	1.000
−.078	−.137	−.099	.156	.120	.116	.194
−.091	−.142	−.201	.252	.220	.191	.352
−.081	−.180	−.185	.275	.326	.267	.136
.155	.385	.115	−.319	−.383	−.347	−.265
−.197	−.284	−.346	.464	.291	.366	.265
−.309	−.485	−.324	.543	.445	.570	.371
−.495	−.671	−.455	.764	.631	.702	.483

Y_{33}	Y_{34}	Y_{35}	Y_{36}	Y_{37}	Y_{38}	Y_{39}
1.000						
.304	1.000					
−.158	.024	1.000				
.032	−.126	−.487	1.000			
.097	.052	.141	−.201	1.000		
.155	.218	.182	−.336	.381	1.000	
.170	.258	.272	−.373	.419	.578	1.000

SOURCE: Alan M. Voorhees and Associates, Inc., *Technical Report on a Residential Blight Analysis for St. Louis, Mo.* (prepared for the St. Louis City Plan Commission, March 1969), p. 25.

TABLE F-2
Factor Loadings on Individual Quality Variables

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
			Dwelling Unit		
1 Overall structural condition	—	.93	—	—	—
2 General housekeeping	—	.66	—	—	—
3 Condition of ceilings	—	.88	—	—	—
4 Condition of walls	—	.88	—	—	—
5 Condition of floors	—	.88	—	—	—
6 Condition of lighting	—	.82	—	—	—
7 Condition of windows	—	.83	—	—	—
			Structure and Parcel		
8 Condition of structure exterior	.74	—	—	—	—
9 Overall parcel condition	.72	—	—	—	—
10 Quality of exterior	.52	—	.62	—	—
11 Parcel landscaping	.56	—	—	—	—
12 Trash on parcel	.65	—	—	—	—
13 Nuisances affecting parcel	—	—	—	—	—
14 Condition of drives and walks	.57	—	—	—	—
			Adjacent Structures and Parcels		
15 Condition of structures	—	—	.91	—	—
16 Condition of parcels	.86	—	—	—	—
17 Structural quality of poorer	.71	—	—	—	—
18 Structural quality of better	.70	—	—	—	—
19 Parcel quality of poorer	.81	—	—	—	—
20 Parcel quality of better	.81	—	—	—	—
21 Nuisances affecting adjacent properties	—	—	—	—	—
22 Sample relative to adjacent properties	—	—	−.78	—	—
			Block Face		
23 Neighborhood problems	—	—	—	—	—
24 Percent residential	—	—	—	.77	—
25 Percent commercial and residential	—	—	—	−.81	—
26 Percent vacant	−.55	—	—	—	—
27 Percent in poor condition	−.77	—	—	—	—

TABLE F-2 (Concluded)

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
28 Percent in fair condition	—	—	—	—	−.89
29 Percent in good condition	.65	—	—	—	.56
30 Block landscaping	.58	—	—	—	—
31 Trash on block	.70	—	—	—	—
32 Condition of sidewalk	.50	—	—	—	—
33 Condition of street	—	—	—	—	—
34 Condition of curbs	—	—	—	—	—
35 Amount of commercial traffic	—	—	.62	—	—
36 Nuisances affecting block	—	—	—	—	—
37 Condition of alleyways	—	—	−.61	—	—
38 Cleanliness of alleyways	.61	—	—	—	—
39 Overall block condition	.77	—	—	—	—

NOTE: A dash indicates standardized factor loading less than .5.

The first factor accounts for 38.8 percent of the total variance of the original correlation matrix and loads heavily upon 17 variables describing the overall condition of the structure and parcel, the amount and quality of landscaping, the cleanliness of the parcel and block face, and the condition of the streets, walks, and driveways (Table F-2). In other words, the index appears to measure the overall quality of the exterior physical environment. For this reason, it is termed "basic residential quality."

The second factor, "dwelling-unit quality," which represents both the structural condition and the housekeeping inside the sample dwelling unit, accounts for an additional 8.2 percent of the variance in the original correlation matrix. All 7 variables with factor loadings of more than .5 for "dwelling-unit quality" refer to the interior of the dwelling unit and were obtained by the interviewers as part of the Home Interview Survey. This raises the possibility that the differences in the indexes may be the result of different evaluators, rather than independent dimensions of quality. However, the relatively large number of home interviewers reduces this danger.

The third factor, "quality of proximate properties," which explains an additional 6.0 percent of the total variance, amplifies the basic residential-quality index by specifically accounting for the cleanliness, landscaping, and condition of nearby properties.

The fourth factor, "nonresidential use," measures the presence and effect of commercial and industrial land uses in the immediate vicinity and accounts for another 4.2 percent of the total variance. It undoubtedly represents the effect of nonphysical characteristics such as noise, smoke, and traffic, as well as the proportion of property on the block devoted to nonresidential use. The variables with factor loadings of more than .5 are microneighborhood or block-face variables.

The fifth factor, "average structure quality," adds another 3.2 percent to the explained variance and loads heavily upon only two variables, measures of the average quality of structures on the block face as a whole.

Except for the substitution of the factor-analytic indexes of residential quality for the simple indexes, the structure of the models presented in this appendix are identical to those included in Chapter 8. Separate models are presented for rental and owner submarkets and for the city and for the entire sample. Table F-3 presents the regression results for the entire sample. The estimated coefficients for renters are based on a linear relationship, but the dependent variable is expressed in logarithms in the regression for owners.

The results obtained for the five quality indexes are particularly interesting. In the renter model, the basic-residential-quality, dwelling-unit-quality, and average-structure-quality variables are statistically significant. The coefficient for basic residential quality is almost six times its standard error; more important, the magnitude of the coefficients indicates that the rental market values these dimensions of residential quality very highly. Basic residential quality has an estimated value of \$7.22 per unit. Dwelling-unit quality is valued at \$4.02 per unit and average structure quality at \$2.80 per unit. If they are added together, the five quality coefficients total \$18.43. The mean value of contract rent for the sample is \$63.19 with a standard deviation of \$27.71. Thus, these aspects of residential quality account for a significant portion of monthly rent.

Table F-3 also indicates that households purchasing single-family units place a high value on some of these quality dimensions. The coefficients indicate that property owners will pay over \$1,400 more for an otherwise comparable property that is one standard deviation better than average in terms of basic residential quality, and they will pay over \$750 more for a structure one standard deviation unit better in terms of dwelling-unit quality. Neither the quality of proximate properties nor average structure quality has a coefficient that is statistically different from zero. The final index of quality (nonresidential use), evaluated at the sample mean, suggests that a buyer of a single-family house would pay \$850 more for a house one unit better than average.

TABLE F-3
Linear Rent and Log-Log Value Equations for City Units

Variables	Rental Units (Linear)	Single Detached Owner-Occupied Units (Log-Log)
Factors		
Basic residential quality	7.22[1]	.104[1]
Dwelling-unit quality	4.02[1]	.059[1]
Quality of proximate properties	2.95	.035
Nonresidential usage	1.44[2]	.062[1]
Average structure quality	2.80[1]	−.016
Dwelling quality		
Hot water	4.89[2]	–
Central heating	4.59[1]	–
Age	−.28[1]	−.007[1]
Size		
Rooms	23.23[1]	.220[1]
Baths	8.89[1]	.036
Floor area	–	.370[1]
Parcel area	0.06	.005[1]
Neighborhood		
Median schooling	2.55[1]	.075[1]
Proportion white	−4.20[2]	−.500
School quality	2.62[2]	.037
Crime	−0.00	−.001
Structure type		
Single detached	8.18[1]	–
Duplex	11.46[1]	–
Row house	4.35	–
Apartment	4.21	–
Flat	5.16[2]	–
Rooming house	4.45	
Tenancy terms		
No heat	−9.13[2]	–
No water	−2.63[2]	–
No furniture	−6.97[1]	–
No appliances	−11.17[1]	–
Owner in building	−4.31[1]	–
Years of occupancy	−0.27[1]	–
Constant	13.57	7.93[1]
R^2	.72	.73
Number of observations	579	275

NOTE: Table notes indicate significance of t ratios of coefficients. With the exception of the dummy variables for structure type, the relevant tests are one-tailed.

[1]> .01.

[2]> .05.

Sixteen other coefficients are significant at the 5 percent level in the renter equation; an additional five variables are significant in the owner equation. Also highly significant is the number of rooms in the renter equation; the difference between a two- and three-room unit is $10.17; the difference between a four- and five-room unit is $5.87. Dwellings with hot water rent for $4.89 more per month than cold-water flats, and central heating increases rent by $4.59 per month (the effect of dwelling-unit size and quality being held constant). For owners, the coefficient for the number of rooms indicates that a six-room house costs $550 more than a five-room house with the same floor area, and a nine-room house costs $400 more than an otherwise identical eight-room house.

Age of structure is also strongly related to monthly rent and housing value. The results suggest that a new structure will sell for $3,150 more than an otherwise identical one that is twenty-five years old. Monthly rent decreases by about $2.82 per month for each increase of ten years in the age of the structure. Since the average rental structure is nearly sixty years old, age has a considerable effect on monthly rent. It is worth emphasizing that this difference remains after the effects of the five indexes of quality and the presence or absence of central heating and hot water have been accounted for. This strong age effect is probably attributable to further differences in quality or style not accounted for by other variables.

The surrogate for neighborhood prestige (median schooling of residents of the census tract) is statistically significant in both models. The coefficients indicate that an otherwise identical bundle located in a census tract where the median adult has only completed the eighth grade will rent for $5.24 less per month than one located in a census tract where the median adult has completed the tenth grade; if owner-occupied, it will have a market value of $1,900 less.

For owners, the lot-size and floor-area variables are statistically significant. The floor-area coefficient suggests that a 600-square-foot house can be purchased for $2,900 less than an otherwise identical 1,200-square-foot house; the lot-size coefficient indicates that a house on a 10,000-square-foot lot would cost $4,300 more than an identical unit located on a 5,000-square-foot lot.

Of those variables specific to the renter model, three of the dummy variables representing structure type are significant, as well as three of the contract-rent corrections. For renters, duration of occupancy and whether or not the owner lives in the building are also highly significant. Although the regression coefficient for the duration-of-occupancy variable is small—only 27 cents per year of occupancy—it is highly significant. It is likely that this small difference measures a lagged adjustment of monthly rent. Landlords are less likely to raise rents when their properties are occupied by stable tenants than when the properties change occupancy.

As we have discussed in Chapter 8, a different landlord-tenant interaction is probably responsible for the large and highly significant coefficient of the owner-in-building variable. The lower rents for units with resident landlords may result either from less sophistication and professionalism on the part of these smaller operators, or they may be due to different policies for selecting tenants. When the owner lives on the property, he may select tenants more carefully to achieve lower vacancy rates and lower maintenance and repair costs. The critical impact of these factors on the profitability of rental properties has been emphasized in other studies.[2]

The findings also suggest that standardized dwelling units located inside the ghetto may be somewhat more expensive than those outside. The coefficient for racial composition is statistically significant at the 5 percent level in the rental equation and is approximately equal to its standard error in the owner equation. Taken at face value, the coefficients in both the renter and owner models indicate that a comparable unit in an "all-white" area would cost 8 percent less than one located in an "all-black" area.

When the coefficients of similar models, stratified for ghetto and nonghetto properties, were applied to the mean values of the explanatory variables for units in the two submarkets, the results indicated that the average ghetto unit would rent for about 2 percent less in all-white neighborhoods of the city, but the average nonghetto unit would rent for 10 percent more in the ghetto. Moreover, as we have emphasized throughout this book, price discrimination may be only one of the adverse consequences of housing-market discrimination. The virtual unavailability of certain kinds of housing inside the ghetto and the difficulties blacks experience in obtaining housing outside the ghetto at any price may be of greater importance.

In evaluating these results, it should also be borne in mind that the equations in Table F-3 are estimated for city dwelling units only. Yet, it is clear that for most households, particularly whites, the relevant housing market is the entire metropolitan area. As we have discussed in Chapter 8, expanding the sample to include the 26 suburban rental units and the 136 owner-occupied single detached units makes the sample slightly more representative of the metropolitan housing market but forces us to ignore variations in school quality and public safety.

[2]Richard F. Muth, *Cities and Housing* (Chicago: University of Chicago Press, 1969); George Sternlieb, *The Tenement Landlord* (New Brunswick, N.J.: The Urban Studies Center, Rutgers, 1966).

Table F-4 shows the renter model for the entire sample of central-city and suburban units. The variable "distance from CBD" has been replaced by a dummy variable with a value of 1 for the county observations.[3] For comparison, the table also shows the coefficients for the city renter model when the school and crime variables are deleted.

When the model is reestimated for the entire metropolitan area, the most striking difference is the increase in the significance of the coefficients. Of the 25 variables common to both specifications of the renter model, 21 have larger t values. Moreover, both the magnitude and the significance of the quality-variables coefficients are greater for the more representative sample. When the crime and school variables are deleted from the city model, the magnitude and significance of the quality variables similarly increase. This indicates that there is some interrelationship between the five indexes of residential quality and the level of these public services within the city.

Aside from the differences in the coefficients of the quality variables, the largest changes in regression coefficients are observed for the racial-composition variable. These changes in the magnitudes of the regression coefficients indicate that dwelling units in the ghetto are somewhat more expensive than other units when differences in public services are accounted for. However, this measured price difference between ghetto and nonghetto units disappears when the differences in the quality of schools and other services are not taken into account.

When the owner models are reestimated incorporating the 136 county observations, similar results are obtained. Estimates of the semilog value model for the city and for the larger sample are presented in Table F-5. In both the linear and semilogarithmic forms, the t values and the magnitude of the quality variables increase when the county observations are added. The significance of all 7 remaining variables common to both equations also increases.

The conclusions of Chapter 8 are substantially unchanged when housing quality is measured by the factor-analytic components of the 39 separate evaluations of a household's living conditions. The significance levels and the relative magnitudes of the other variables measuring housing attributes are not affected substantially by the alternative specification, although the coefficients of the variables representing housing quality, as well as their interpretation, vary.

The overall indexes of the several aspects of housing quality are used in the analysis presented in Chapter 8 largely because they can be easily interpreted. We suspect that an important reason why the factor-

[3]As in the previous models, a measure of distance from the CBD, as well as several auto-accessibility indexes, was tested with results no better than those reported above.

TABLE F-4
Rent Equations for Entire Sample (Including Suburban St. Louis County Observations) and for City Without School and Crime Variables

Variables	Entire Sample	City
Factors		
Basic residential quality	8.48[1]	7.61[1]
Dwelling-unit quality	5.14[1]	4.18[1]
Quality of proximate properties	5.22[1]	2.95
Nonresidential usage	1.87[1]	1.48[2]
Average structure quality	3.49[1]	2.97[1]
Dwelling quality		
Hot water	4.28[2]	4.67[2]
Central heating	4.46[1]	4.74[1]
Age	−0.30[1]	−0.29[1]
Size		
Rooms	25.00[1]	23.33[1]
Baths	9.01	8.71[1]
Parcel area	0.08	0.07
Neighborhood		
Median schooling	1.57[2]	2.29[1]
Proportion white	−2.62[2]	−1.94
Miles from CBD	–	−0.05
County dummy	8.66	–
Structure type		
Single detached	8.93[1]	8.26[1]
Duplex	11.81[1]	10.98[1]
Row house	4.32	4.52
Apartment	5.22[2]	3.93
Flat	5.67[2]	5.42[2]
Rooming house	5.06	4.27
Tenancy terms		
No heat	−8.73[1]	−9.00[1]
No water	−3.10[2]	−2.61[2]
No furniture	−7.76[1]	−7.40[1]
No appliances	−11.14[1]	−10.98[1]
Owner in building	−4.73[1]	−4.38[1]
Years of occupancy	−0.27[1]	−0.27[1]
Constant	40.55[1]	34.71[1]
R^2	.75	.72
Number of observations	605	579

NOTE: Table notes indicate significance of *t* ratios for coefficients. With the exception of the dummy variables for structure type, the reported tests are one-tailed.

[1] > .01.

[2] > .05.

TABLE F-5
Value Equations for Entire Sample and for City Units Without School and Crime Variables

Variables	Entire Sample	City
Factors		
Basic residential quality	.117[1]	.114[1]
Dwelling-unit quality	.083[1]	.064[1]
Quality of proximate properties	.005	.049
Nonresidential usage	.071[1]	.068[1]
Average structure quality	−.012	−.015
Dwelling quality		
Age	−.006[1]	−.007[1]
Size		
Rooms	.271[1]	.224[1]
Baths	.039[2]	.031
Floor area	.039[1]	.036[1]
Parcel area	.005[1]	.005[1]
Neighborhood		
Median schooling	.039[1]	.078[1]
Proportion white	−.004	−.014
Miles from CBD	–	.005
County dummy	−.235[1]	–
Constant	8.29[1]	8.17[1]
R^2	.77	.73
Number of observations	411	275

NOTE: Table notes indicate significance of t ratios for coefficients (one-tailed test).

[1]> .01.

[2]> .05.

analytic indexes and the overall indexes are in substantial agreement is the discipline implicit in requiring interviewers and inspectors to make detailed evaluations about narrowly defined attributes of the housing bundle first and then to make overall judgments about the quality of more broadly defined aggregates.