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PARTICIPATION AND BENEFITS IN THE URBAN SECTION 8 PROGRAM: NEW CONSTRUCTION AND EXISTING HOUSING

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EVALUATION BACKGROUND AND DATA COLLECTION

This appendix provides a brief summary of the major components of the Section 8 Housing Assistance Payments Program, an overview of the evaluation research on this program, and an outline of the data collection performed for the current research on the New Construction and Existing Housing components of the program. A review of sampling and weighting issues is found in Appendix II.

I.1 BACKGROUND ON THE SECTION 8 PROGRAM AND ITS EVALUATION

The Section 8 Housing Assistance Payments Program was enacted in the Housing and Community Development Act of 1974 and put into operation by the Department of Housing and Urban Development (HUD) in the late summer and early fall of 1975. The program has three major components: the Existing Housing program, which relies upon eligible renter-households locating qualifying dwelling units in the existing rental housing market, and the New Construction and Substantial Rehabilitation programs, in both of which developers are encouraged to produce or rehabilitate housing because they can be guaranteed that some or all of their tenants will have their rents subsidized.

Existing Housing

This program is a hybrid of the predecessor Section 23 Leased Housing Program, which allowed Local Housing Authorities to lease units in the private rental market as a supplement to conventional public housing, and some of the fundamental aspects of the Experimental Housing Allowance Program. Local Housing Authorities are the basic operators of the program, but as the Experimental Housing Allowance Program showed, there are other organizations--for example, state government agencies and social service agencies that are capable of administering such a program. For this reason, the Public Housing Agency category was developed to include both Local Housing Authorities and all other entities that would be legally eligible to administer the Existing Housing program.

Because the definition of an eligible Public Housing Agency for the Section 8 program is broader than the language encompassing a Local Housing Authority under the conventional public housing program, the responsibility rested with the General Counsel in each HUD Area Office to decide which agencies were appropriate Public Housing Agencies, using federal statutory law and relevant state law. While the Section 8 program expanded the definition of eligible agencies, there appeared to be limited pragmatic effect in terms of actual participation in the early years.

In addition to the use of some non-Local Housing Authority administering agencies, Section 8 Existing Housing differs from its immediate antecedents in that the assistance is tied to the recipient rather than to the housing unit. Leases are between tenants and landlords, rather than between the administering agency and the landlord and a sub-lease arrangement between the Local Housing Authority and tenant. While the payment does not go directly to tenants (as it did in the Experimental Housing Allowance Program), it does go to the landlord as a result of a contract tied to a specific tenant. And, perhaps most important of all, the tenants are asked to find housing units on their own. In order to accommodate the new aspects of the Section 8 program (and to incorporate lessons from the Experimental Housing Allowance Program) the administrative procedures of Section 8 are rather different from those of earlier leasing programs. Public Housing Agencies accept applications for a Section 8 waiting list, award certificates (or promises of assistance), hold briefing sessions with recipients to assist them in understanding the Section 8 program and in looking for an apartment, and then send people out to seek an apartment that meets their needs. Public Housing Agencies can provide "assistance" in finding and securing units but are not allowed to "steer" people to specific units. A certificate holder may elect to present a current residence for the program.

Public Housing Agencies directly assist certificate holders in the process of their housing search by providing apartment listings, making referrals to community agencies, providing transportation, arbitrating discrimination complaints and negotiating the lease. Some Public Housing Agencies routinely perform these services for all certificate holders, and others help only certificate holders who request assistance.

When a unit is selected, the Public Housing Agency arranges for its inspection, reviews the rent requested and signs a contract with the landlord at the same time that the tenant signs the lease. HUD regulations require that the housing leased meet a set of Performance Standards. An operational set of requirements, called Acceptability Criteria, may be adopted by a Public Housing Agency, which may also elect to augment the requirements in accordance with local housing ordinances. One program element that affects a certificate holder's housing search is the Fair Market Rent, a set of guidelines for maximum allowable rents that landlords can expect to receive according to the number of bedrooms in a given apartment. Fair Market Rents are calculated with adjusted census data and therefore vary from one Public Housing Agency's jurisdiction to another.

A special set of Fair Market Rents is determined for Recently Completed housing. Units in this category have been constructed or substantially rehabilitated no more than six years before the leasing date, and thus merit maximum rents higher than those allowed for the older existing housing stock. Public Housing Agencies apply for authorization to use their higher Fair Market Rents when the housing need of a particular household type cannot be met within the Public Housing Agency's jurisdiction due to limitations in the existing housing stock.

In summary, in the Section 8 Existing Housing program, the tenant plays the primary role in apartment search, selection, and negotiation with the Public Housing Agency as a support agency.

New Construction

This aspect of Section 8 is meant to stimulate the addition of entirely new units to the housing stock available to lower income citizens. While initial hopes were high for production under this program, a flood of new developments did not materialize immediately. The primary reason was that the program relied on private (ideally even uninsured) financing. It was hoped that the 20 year potential for "guaranteed" rental income would act as sufficient enticement for the financial community. In most cases, it did not. Since HUD was also encouraging non-100 percent Section 8 developments, the problem

was exacerbated. Also, in the early history of the program, the Fair Market Rents in many locations were not high enough to support the construction costs of development that had to meet Minimum Property Standards and prevailing wage rate requirements under the Davis Bacon Act.

This problem and others have been largely corrected now and production is beginning to flow under the New Construction regulations. For the most part contract authority is made available to HUD Area Offices and Service Offices based on the needs expressed by the accumulated Housing Assistance Plans of the jurisdiction. Area Offices are responsible for issuing Notifications of Funding Availability via the public media to advertise what kind of housing (new construction, substantial rehabilitation) to serve what eligible population (family or elderly) in which locations (usually regional planning districts) the Department is interested in assisting. Developers submit proposals; these are ranked by the Area Office; and "winners" are notified that they may proceed. Response varies widely from Area Office to Area Office. Local Housing Authorities may participate in the New Construction program as developers and owners or as managers under contract to another developer or owner.

A difficult part of the new construction process is the agreement with regard to rents. Developers look at the cost to construct a project and the resulting mortgage payments and the annual operating budget including property taxes, to arrive at an acceptable rent that allows some margin for profit. HUD, on the other hand, must make certain that the rents are comparable to the market rent for similar unassisted apartments in the same locale. Because the construction and management process is so different in unassisted housing, rents are often not comparable. In some communities no multifamily developments have been built within the past several years. As a result, the Rent Reasonableness Test becomes a major issue in Section 8 New Construction.

The New Construction program represents an opportunity for HUD to encourage greater racial and economic integration in urban neighborhoods and to increase the stock of standard housing available to lower income citizens. However, developers who participate in the Section 8 program do not always propose sites or outreach strategies that meet the deconcentration motives of HUD, and the ideal sites are not always available within appropriate price ranges. Construction of subsidized housing on some sites can be unpopular at the local level--thus creating a set of battles and delays that

most developers are not willing to endure.[1] Because the New Construction program ties subsidies to units rather than households, the location factor becomes even more important.

Finally, the issue of concentration of low income households within a single development arises because, as in the conventional public housing program, large numbers of subsidized families and individuals are being housed on the same site. However, since Section 8 eligibility income limits are much broader than Public Housing, the problems of concentration are less serious.

Thus the New Construction program faces a challenge--can it accomplish the goals of diversifying neighborhoods while expanding the housing stock?

Substantial Rehabilitation

There is much about this aspect of Section 8 which is similar to the New Construction program: Fair Market Rents, Notification of Funding Availability and developer competition process, unit allocation calculations, actors involved, tenant recruiting and selection processes are all the same. The programmatic difference of note is that to qualify for funding under this program, the developer must rehabilitate an existing building, spending at least 25 percent of the total construction and acquisition costs on renovations.

However, there are significant differences in the Substantial Rehabilitation program's ability to meet some of HUD's goals. In the first place, in order for a program of any size to be mounted, the housing stock of a city must be appropriate and there must be a viable rehabilitation "industry," (developers, contractors, financers) in the city.

Further, the ability to provide diversifying locations is restricted. Housing suitable for substantial rehabilitation is typically in the center of older cities, and is, in other ways, more restricted by the neighborhoods in which this housing is located and by the developers willing and able to do the rehabilitation.

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[1] The disproportionate production of elderly housing reflects the greater acceptability of this population in many neighborhoods and by managers and investors.

Section 8 Evaluation and Research

Because the Existing Housing program was new and a major federal housing program, HUD initiated a research and evaluation program to examine the extent to which the program objectives were being met. An initial research effort (Phase I) was designed to provide HUD with an early assessment of the program operations, and was based on data collected in the fall of 1976. The findings from this initial effort were used to assess the program's start-up operations and performance and to identify opportunities for realizing improvements in program efficiency and effectiveness. In addition, the findings were used to identify program areas where additional research should be undertaken.

The Phase I research and evaluation effort was undertaken primarily to provide an early assessment of the Existing Housing component of the Section 8 program because it was the most active of the three major programs. Very few projects had reached the occupancy stage in the New Construction or Substantial Rehabilitation programs at the time the Phase I work was undertaken. The objective of the current research is to build upon the findings of the Phase I research and to pursue those research areas which have been identified as being of particular concern to policymakers.[1]

This current portion of the Section 8 Research and Evaluation program is a study of the New Construction and Existing Housing components of the Section 8 program in the urban areas of the United States and focuses on two primary issues: (1) who are the program participants (New Construction only), and (2) what are the benefits of participation, particularly with regard to housing conditions and racial and economic integration.[2]

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[1] In other ongoing research, HUD intends to study the program in rural areas, project feasibility and viability in the New Construction and Substantial Rehabilitation programs, and Section 8 program allocations, and to perform case studies of program administration in the Existing Housing component. The current research does not cover the special uses of Section 8 funds in assisting distressed Section 236 and Section 221(d)(3) projects under the Property Disposition or Loan Management programs nor in providing supplemental assistance to elderly households in Section 202 projects. Program cost data are also excluded from this part of the research.

[2] The term "benefits of participation" is used here in the programmatic sense in that housing improvement and promotion of integration of minorities and low income households are program objectives. Achievement of these objectives is regarded as a benefit in that sense. However, these are not necessarily the primary objectives of eligible households.

I.2 DATA COLLECTION

This section summarizes the data collected for the research reported. Data were collected in three primary categories:

> New Construction Cross-section--these were household and project data for the national program as it was in place in mid-1979. Data were collected at 138 projects over 16 SMSAs, selected as described in Appendix II.
>
> New Construction Panel--household interviews and housing measurements were performed for a longitudinal panel of households entering projects whose construction was completed in mid-1979 at the 32 projects in which there was such program activity among the SMSAs for the cross-section sample. Thirteen SMSAs had such activity.
>
> Existing Housing Panel--household interviews and housing measurements were performed for a longitudinal panel of households entering the Existing Housing program in mid-1979. Data were collected spanning the 83 Public Housing Agencies in which there was such activity among the SMSAs for the New Construction cross-section sample. Fifteen SMSAs had such activity.

Auxiliary data used in the analyses were census and Annual Housing Survey data.

New Construction Cross-section Data

The primary data were household characteristics obtained from project files. These data were transferred to data sheets, or file search forms, for four groups of households:

> Applicants--this refers to households having an application still on file with the project but that never had become recipients in the project.
>
> Recipients--these were households actually living in the project at the time of the data collection and receiving Section 8 assistance.
>
> Terminees--this refers to households who had at one time been recipients but who were not receiving Section 8 assistance at the time of the data collection.

Unsubsidized Households--these were households living in the project but who were not then receiving and never had received Section 8 assistance.

At each of the projects from which household data were recorded from project files, appropriate staff were asked to complete a staff questionnaire, which was divided into sections to allow different major actors to respond in their primary area of involvement in the project (developer, marketer, or manager). Table I-1 summarizes the data collection accomplished at New Construction cross-section projects.

New Construction Longitudinal Panel Data

In the SMSAs already identified for the cross-section data collection, New Construction projects were identified that were nearing completion in mid-1979. For these projects, project staff were asked to complete a staff questionnaire and to provide household lists of applicants most likely to move into their project. These households either had already been selected for the project by project management or were considered the most likely candidates if the project management had not actually reached the tenant selection stage. Because family units were so scarce (only about 400 candidates were available), an Applicant Interview was attempted with all family applicants. The balance of interviews was allocated to elderly candidates, approximately 72 per SMSA. In a few SMSAs fewer elderly candidates were available while in one (Chicago) this interview quota represented about one third of candidate elderly households. Application data on household characteristics were obtained from project files for all of the interview sample and interviews were administered where possible. For households completing the Applicant Interview, a Housing Measurement Survey was administered for their pre-program housing. After an interval of approximately two months, projects were contacted to ascertain which of the interviewed applicants had actually moved into the projects, and these households were given the Recipient Interview. Housing Measurement Surveys were administered for the project units occupied by households completing the Recipient Interview; in projects with identical unit layouts only two Housing

Table I-1

DATA COLLECTION AT NEW CONSTRUCTION CROSS-SECTION PROJECTS

SMSA	NUMBER OF PROJECTS	STAFF QUESTIONNAIRE[a]	FILE SEARCH FORMS			
			CURRENT APPLICANTS	CURRENT RECIPIENTS	TERMINEES	UNSUBSIDIZED HOUSEHOLDS
Appleton-Oshkosh	9	9	188	447	48	0
Atlanta	1	1	38	75	6	0
Baltimore	1	1	25	49	0	0
Chicago	17	12	111	953	133	517
Cleveland	7	7	213	510	58	45
Houston	2	2	68	149	13	2
Los Angeles-Long Beach	16	14	230	873	133	0
Milwaukee	25	25	524	1511	228	3
New York	9	9	345	675	71	49
Philadelphia	10	9	267	728	128	2
Providence-Pawtucket Warwick	15	15	489	963	51	0
Raleigh	1	1	23	46	4	0
Rochester	1	1	24	48	6	0
St. Louis	9	8	292	546	87	14
San Diego	2	2	28	131	22	0
Seattle-Everett	13	13	222	494	102	1
Total	138	129	3087	8198	1090	633

a. Project counted as having returned staff questionnaire even if some parts (Developer, Marketer, or Manager) were not returned.

Measurement Surveys were completed for each distinct type of unit in the project, any discrepancies between the two resolved, and the resulting data assigned to all panel households in units of that type.

In order to be able to characterize the panel projects in terms of their demographic composition and the pre-program addresses of project residents, a file search was conducted following the completion of the panel data (interviews and Housing Measurement Surveys) for a random sample of all project residents. This sample is termed the "representative sample" at the panel projects. Data collection at New Construction panel projects is summarized in Table I-2.

Existing Housing Longitudinal Panel Data

In the SMSAs drawn for the New Construction cross-section evaluation, the Public Housing Agencies were identified at which new certificates would be issued during the field period (summer of 1979). The total numbers of candidate certificate holders were small enough relative to desired sample sizes that essentially all of the candidate certificate holders identified were approached for interviews. The evaluation design called for approximately 1,500 completed Certificate Holder Interviews over the 15 SMSAs visited, or an average of 100 per SMSA. However, in several SMSAs, agencies had issued fewer than 100 certificates in the period immediately preceding the visits by data collection staff. Arrangements were made to extend the collection period for interview candidates in these SMSAs, where feasible, in order to obtain at least a minimal sample. The surplus available sample was distributed to SMSAs with greater activity. The samples obtained constituted a large fraction of all households with certificates recently issued (generally within the preceding seven days) in each of the 15 SMSAs.

The housing units of certificate holders completing the Certificate Holder Interview were administered a Housing Measurement Survey. A short time after the 60-day action period usually allowed for certificate holders to offer a unit for qualification, the agencies were recontacted to ascertain which interviewed certificate holders had become recipients. The housing units of these recipients were administered a Housing Measurement Survey unless the household's Recipient Interview indicated that the household had

Table I-2

DATA COLLECTION AT NEW CONSTRUCTION PANEL PROJECTS

SMSA	NUMBER OF PROJECTS	STAFF QUESTIONNAIRE[a]	LONGITUDINAL PANEL						REPRESENTATIVE SAMPLE FILE SEARCH FORMS
			FILE SEARCH FORMS		INTERVIEWS		HOUSING MEASUREMENT SURVEYS		
			SELECTED APPLICANTS	PANEL RECIPIENTS	SELECTED APPLICANTS	PANEL RECIPIENTS	SELECTED APPLICANTS	PANEL RECIPIENTS	
Appleton-Oshkosh	0								
Atlanta	1	1	14	7	9	7	7	7	81
Baltimore	5	4	139	49	87	47	69	49	316
Chicago	5	5	101	53	64	51	52	51	338
Cleveland	3	3	147	55	89	46	65	47	190
Houston	1	1	44	15	14	15	14	15	75
Los Angeles-Long Beach	0								
Milwaukee	4	4	99	37	51	34	31	37	169
New York	1	1	144	34	75	29	54	32	40
Philadelphia	2	2	78	37	45	36	38	37	96
Providence-Pawtucket-Warwick	4	4	235	68	177	64	149	65	289
Raleigh	0								
Rochester	1	1	14	11	12	9	6	11	31
St. Louis	1	1	91	42	65	38	53	41	64
San Diego	1	1	91	48	66	44	43	48	72
Seattle-Everett	3	3	147	70	79	65	48	70	182
Total	32	31	1,344	526	833	485	629	510	1,943

a. Projects counted as having returned staff questionnaire even if some parts (Developer, Marketer, or Manager) were not returned.

Table I-3

DATA COLLECTION FOR THE EXISTING HOUSING PANEL

SMSA	NUMBER OF PHAs	STAFF QUESTIONNAIRE	FILE SEARCH FORMS		INTERVIEWS		HOUSING MEASUREMENT SURVEYS	
			CERTIFICATE HOLDERS	RECIPIENTS	CERTIFICATE HOLDERS	RECIPIENTS	CERTIFICATE HOLDERS	RECIPIENTS
Appleton-Oshkosh	0							
Atlanta	8	8	207	29	163	29	139	28
Baltimore	3	3	92	25	51	25	39	22
Chicago	12	12	238	44	105	44	86	40
Cleveland	3	3	171	24	109	22	87	21
Houston	4	4	129	65	92	59	73	59
Los Angeles-Long Beach	9	8	290	10	149	9	119	8
Milwaukee	2	2	141	61	112	56	90	49
New York	6	3	185	46	120	45	106	42
Philadelphia	8	8	153	23	98	25	77	24
Providence-Pawtucket-Warwick	12	11	105	43	79	40	62	33
Raleigh	1	1	57	21	53	21	52	21
Rochester	3	3	91	32	61	29	56	26
St. Louis	5	5	190	16	100	15	86	10
San Diego	3	3	137	50	98	50	73	41
Seattle-Everett	4	4	197	48	128	43	78	39
Total	83	78	2,383	537	1,518	512	1,223	463

not moved and that no repairs had been necessary to qualify the unit for the program. Agency staff were also asked to complete a staff questionnaire. Table I-3 summarizes the data collection in the Existing Housing panel.

APPENDIX II

SAMPLING AND WEIGHTING

This appendix provides a summary of the sampling and weighting approaches used in this evaluation. Most attention is paid to the sample for the New Construction cross-section because this sample was drawn to permit estimates of characteristics of the recipients in the national program in place at the time of the data collection, mid-1979.[1] Properties of the New Construction cross-section sample are presented in Section II.1. Samples for the longitudinal panels in the New Construction program and the Existing Housing program were samples of opportunity in that they were drawn in SMSAs already selected for the cross-section New Construction sample; properties of the longitudinal panels are presented in Section II.2.

II.1 NEW CONSTRUCTION CROSS-SECTION SAMPLE

Summary on Sampling and Weights

The population sampled for the New Construction cross-section was recipients in the regular program over the 48 contiguous states of the United States.[2] The sampling frame was all recipients in projects on record as of September 1978 in the Section 8 management information system maintained by the Department of Housing and Urban Development.[3]

The sample was drawn in two stages; first SMSAs were selected, then household records were sampled at projects in the selected SMSAs. Using SMSAs as the primary sampling unit, 16 SMSAs were selected without replacement,

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[1] When New Construction projects, rather than households, are the unit of analysis, no weights are necessary.

[2] The following portions of the New Construction program were excluded:

those in Alaska, Hawaii, and Puerto Rico;
those in programs with special set-aside funding for rural or elderly housing under Section 8/515 or 8/202.

These exclusions amounted to about one fourth of Section 8 New Construction projects at the time the sample was drawn.

[3] Data were not available for occupied units. Instead, project recipients were candidates for selection if the project had an executed contract for housing assistance payments. The existence of an executed contract means that construction of the project is complete and that occupancy can be expected in the near future.

with probability of selection proportional to size of the New Construction program in the SMSA based on the HUD Section 8 management information system. Inclusion probabilities (the probability of selecting each SMSA) were calculated according to a combination of an approximation algorithm and computer simulation. The resulting inclusion probabilities for each of the SMSAs selected and the weights used for each SMSA are tabulated in Table II-1 and are further discussed below under "Background on SMSA Selection."

Within-SMSA weights were calculated according to the sampling fraction for each project and the total program activity (number of units) in the SMSA. At each project, file search sample sizes were set in accordance with project size for each group of households sampled (applicants, recipients, terminees, and unsubsidized households) as indicated in Table II-2.[1] Samples were drawn in most of the projects in a given SMSA. Weights listed in Table II-3 were used to weight together project means to form SMSA means; national means were formed by weighting SMSA means together using the weights shown in Table II-1. For simple cross-tabulations, observations within each project were weighted as shown in Table II-4 which combines project and SMSA-level weights.

The remainder of this section provides a historical background on the selection of SMSAs, a summary on the calculation of SMSA inclusion probabilities, and a review of the methods used for estimating means and variances for the New Construction cross-section sample. Weights for the New Construction longitudinal panel sample are presented in Section II.2.

Background on SMSA Selection

Ability to generalize to the national Section 8 program was an important consideration in the evaluation design. The selection of SMSAs was influenced by the desire to generalize the results of this evaluation to the national Section 8 program for all three of the major components of the program--Substantial Rehabilitation and Existing Housing as well as New Construction. (The evaluation design was revised, after SMSAs had been selected, to delete

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[1] Recipients and unsubsidized households were considered the most critical groups and were sampled at a high enough rate to keep the standard error in estimating project proportions within 0.05.

Table II-1

SMSA INCLUSION PROBABILITIES AND SMSA WEIGHTS

SMSA	INCLUSION PROBABILITY[a]	SMSA WEIGHT[b]
Appleton-Oshkosh	0.050	0.138
Atlanta	0.241	0.013
Baltimore	0.138	0.029
Chicago	0.411	0.068
Cleveland	0.182	0.066
Houston	0.177	0.019
Los Angeles-Long Beach	0.666	0.039
Milwaukee	0.239	0.122
New York	0.785	0.045
Philadelphia	0.261	0.072
Providence-Pawtucket-Warwick	0.129	0.174
Raleigh	0.057	0.009
Rochester	0.111	0.057
St. Louis	0.197	0.062
San Diego	0.174	0.010
Seattle-Everett	0.088	0.078

a. Over the 261 SMSAs in the sampling frame, inclusion probabilities sum to the number of SMSAs drawn.

b. SMSA weights are the ratio of SMSA size (number of units) to inclusion probability, scaled to sum to unity over the 16 SMSAs.

Table II-2

FILE SEARCH SAMPLE FOR NEW CONSTRUCTION CROSS-SECTION PROJECTS

TOTAL SECTION 8 UNITS	RECIPIENT RECORD SAMPLE	APPLICANT RECORD SAMPLE	TERMINEE RECORD SAMPLE	UNSUBSIDIZED HOUSEHOLD RECORD SAMPLE
1-30	all	all (up to 30)	all (up to 30)	same as recipient record sample
31-50	80%	1/2 of the recipient record sample	1/4 of the recipient record sample	same as recipient record sample
51-100	75%	1/2 of the recipient record sample	1/4 of the recipient record sample	same as recipient record sample
over 100	75%	38	19	75

Table II-3

ILLUSTRATIVE PROJECT-LEVEL WEIGHTS FOR NEW CONSTRUCTION CROSS-SECTION RECIPIENTS[a]
(For Estimating SMSA Means From Project Means)

PROJECT[b]	SAMPLE	WEIGHT[c]
AP01	57	0.11315
AP02	45	0.09174
AP03	75	0.18349
AP06	75	0.18043
AP07	75	0.16361
AP08	45	0.09174
AP14	19	0.04128
AP24	36	0.09327
AP34	20	0.04128
AT01	75	1.00000
BA01	49	1.00000
CH01	75	0.13764
CH02	60	0.05219
CH07	66	0.04501
CH08	46	0.04240
CH09	60	0.05153
CH10	30	0.02414
CH11	58	0.05088
CH12	50	0.04371
CH13	75	0.10698
CH14	68	0.05936
CH15	29	0.01957
CH16	56	0.05088
CH17	30	0.02283
CH18	75	0.09393
CH19	35	0.02740
CH20	64	0.04175
CH21	76	0.12981
CL02	42	0.04134
CL05	77	0.19488
etc.	etc.	etc.

a. Separate tables of weights were used for applicants, terminees and unsubsidized households.

b. Project numbers are not in perfect numerical order primarily because projects in the longitudinal panel were part of the same list of identification numbers. In the case of AP04, it was found to have three separate locations and the components were assigned AP14, AP24, AP34.

c. The project level weights represent the relative size of the project in the SMSA. In each SMSA these weights sum to one.

Table II-4

WEIGHTS FOR NEW CONSTRUCTION CROSS-SECTION
(Unstratified Cross-Tabulations)

PROJECT	WEIGHT	SAMPLE SIZE	PROJECT	WEIGHT	SAMPLE SIZE	PROJECT	WEIGHT	SAMPLE SIZE
AP01	1.41060	57	CH21	1.28087	76	MI01	0.99390	38
AP02	1.44872	45	CL02	0.38207	42	MI04	1.06072	50
AP03	1.73847	75	CL05	0.98248	77	MI05	1.06004	47
AP06	1.70949	75	CL06	0.49770	76	MI06	0.98902	39
AP07	1.55013	75	CL07	0.61819	89	MI07	1.27501	75
AP08	1.44872	45	CL08	0.90679	75	MI08	1.95002	75
AP14	1.54403	19	CL09	0.99038	76	MI10	1.07144	60
AP24	1.84109	36	CL10	0.80490	75	MI12	1.01251	50
AP34	1.46683	20	HO01	0.29117	75	MI13	0.95425	32
AT01	0.15442	75	HO03	0.14829	74	MI14	1.05001	75
BA01	0.33816	49	LA01	0.27444	1	MI16	1.07144	66
CH01	1.37621	75	LA02	0.36110	38	MI17	2.28216	75
CH02	0.65223	60	LA03	0.27444	15	MI18	1.01584	53
CH07	0.51141	66	LA04	0.36943	52	MI19	1.52144	75
CH08	0.69123	46	LA05	0.35741	43	MI20	1.76787	75
CH09	0.64408	60	LA06	0.73183	75	MI21	1.55429	76
CH10	0.60332	30	LA07	0.38055	75	MI22	1.37144	75
CH11	0.65786	58	LA08	0.35775	56	MI23	1.89644	75
CH12	0.65549	50	LA09	0.72451	75	MI24	2.29288	75
CH13	1.06966	75	LA10	0.34305	40	MI25	1.07598	59
CH14	0.65463	68	LA11	0.36592	75	MI27	1.00447	32
CH15	0.50604	29	LA12	0.36416	52	MI28	1.57501	75
CH16	0.68135	56	LA13	0.35888	52	MI29	1.00447	28
CH17	0.57070	30	LA14	0.32201	75	MI30	1.04752	56
CH18	0.93922	75	LA15	0.60010	75	MI31	1.36073	75
CH19	0.58701	35	LA16	0.45987	74	NY01	0.44854	75
CH20	0.48918	64				NY02	0.24697	75

Table II-4 (cont.)

PROJECT	WEIGHT	SAMPLE SIZE	PROJECT	WEIGHT	SAMPLE SIZE	PROJECT	WEIGHT	SAMPLE SIZE
NY03	0.27402	76	PR04	1.90694	75	SE05	0.87856	26
NY04	0.14017	75	PR05	1.91366	71	SE06	0.90601	26
NY05	0.13350	75	PR06	2.00229	75	SE07	0.71383	26
NY07	0.13750	75	PR07	1.96415	75	SE08	0.86998	32
NY08	0.73379	76	PR08	2.47903	75	SE10	0.71383	26
NY09	0.35510	75	PR09	1.95028	55	SE11	0.71383	29
NY10	2.30142	73	PR10	1.93770	62	SE12	0.94692	49
PH02	0.85481	75	PR12	1.89503	40	SE16	0.71383	24
PH03	1.36998	75	PR14	2.05950	75	SE20	0.88515	25
PH04	0.58005	75	PR16	1.90694	75	SL01	0.49204	47
PH05	0.57242	76	PR18	1.90694	42	SL02	0.49236	75
PH06	0.36969	48	PR20	2.28833	75	SL03	0.92268	76
PH07	0.79375	75	RA01	0.10249	46	SL04	0.44760	35
PH08	0.45793	75	RO01	0.65289	48	SL06	0.47402	48
PH09	0.88534	75	SD01	0.12309	75	SL07	1.18280	76
PH10	1.59407	79	SD02	0.09838	56	SL08	1.03445	75
PH11	0.57242	75	SE01	0.99936	75	SL09	0.43995	39
PR01	1.90013	70	SE02	0.95829	73	SL11	0.51722	75
PR02	1.78776	40	SE03	0.95718	44			
PR03	1.92338	58	SE04	0.95177	39	SAMPLE TOTAL		8198

NOTE: The sum of the product of weights x sample size (at project level) equals the total sample size. (Reference program WEIGHTN2.)

the cross-section samples for Substantial Rehabilitation and Existing Housing.)

In order to have appropriate measures of program size in each SMSA, data were obtained from the HUD Section 8 management information system indicating the number of units (housing units or households) in each program. Because the original evaluation design called for evaluation of the Substantial Rehabilitation program as well as the other two components and because fewer SMSAs had Substantial Rehabilitation activity than had New Construction or Existing Housing program activity, the strategy used for selection of SMSAs was to give double weight to Substantial Rehabilitation program activity.[1] Program size was taken to be measured by the sum of Existing Housing plus New Construction plus twice Substantial Rehabilitation activity as shown in Table II-5.

SMSAs were then selected at random, proportionate to size, without replacement, from 261 SMSAs. Biloxi-Gulfport, Pine Bluff, Sarasota, and Tallahassee were in the 20 SMSAs drawn but were dropped when the Existing Housing and Substantial Rehabilitation cross-section samples were deleted from the evaluation.

The sample deletions also affected the selection of projects. The original evaluation design called for drawing interview samples in occupied New Construction projects. In each of the selected SMSAs current data on program activity were obtained from HUD Area Offices. Based on these project size figures, hypothetical interview samples were drawn at random within each SMSA to determine the projects to be visited and the target for interviews. The combined number of recipients in the projects identified for data collection at this stage constituted a large fraction of the recipients and of projects in each SMSA, essentially obviating concern about cluster effects within SMSAs. Table II-6 shows the number of candidate projects at each SMSA, the number of projects visited, and the totals for each SMSA of occupied

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[1] Simulation runs on properties of SMSA samples were made with various weightings of Substantial Rehabilitation units. The simulations of characteristics of samples indicated that this double weighting provided adequate representation of SMSAs with Substantial Rehabilitation activity.

Table II-5

PROGRAM ACTIVITY IN SMSAs
ORIGINALLY SELECTED AS PRIMARY SAMPLING UNITS

SMSA	INCLUSION PROBABILITY	EXISTING HOUSING	NEW CONSTRUCTION	SUBSTANTIAL REHABILITATION	PROGRAM SIZE[a]	RELATIVE SIZE
Appleton-Oshkosh	0.05	151	311	0	462	0.0013
Atlanta	0.241	6495	0	157	6809	0.0195
Baltimore	0.138	3392	0	0	3392	0.0097
Biloxi-Gulfport	0.062	472	0	188	848	0.0024
Chicago	0.411	6354	1800	2157	12468	0.0357
Cleveland	0.182	3948	591	0	4539	0.0130
Houston	0.177	4348	200	64	4676	0.0134
Los Angeles-Long Beach	0.666	19487	562	469	20987	0.0601
Milwaukee	0.239	3861	2641	130	6762	0.0194
New York	0.785	19332	3367	1123	24945	0.0715
Philadelphia	0.261	6096	1269	64	7493	0.0215
Pine Bluff	0.047	342	0	0	342	0.0010
Providence-Pawtucket-Warwick	0.129	1502	1065	0	2567	0.0074
Raleigh	0.057	635	60	0	695	0.0020
Rochester	0.111	1480	621	194	2295	0.0066
St. Louis	0.197	4160	1164	0	5324	0.0152
San Diego	0.174	4376	201	0	4577	0.0131
Sarasota	0.045	273	0	0	273	0.0008
Seattle-Everett	0.088	1089	560	40	1729	0.0050
Tallahassee	0.077	1341	0	0	1341	0.0038
SUBTOTAL	4.137	88134	14412	4586	112524	
TOTAL FOR 261 CANDIDATE SMSAS	20.0	287576	41783	9853	349065	

DATA SOURCE: HUD Section 8 management information system as of November 1978.

a. SMSAs were sampled without replacement with probability proportional to size, where the size measure was the sum of program units in Existing Housing plus New Construction plus twice that in Substantial Rehabilitation.

Table II-6

NUMBER AND SIZE OF CROSS-SECTION NEW CONSTRUCTION PROJECTS

SMSA	NUMBER OF ELDERLY UNITS	NUMBER OF FAMILY UNITS	NUMBER OF ELDERLY UNITS IN PROJECTS SAMPLED	NUMBER OF FAMILY UNITS IN PROJECTS SAMPLED	TOTAL NUMBER OF PROJECTS ELDERLY/ FAMILY/ MIXED	NUMBER OF PROJECTS VISITED ELDERLY/ FAMILY/ MIXED
Appleton-Oshkosh	548	122	464	122	3/1/7	1/1/7
Atlanta	105	0	105	0	1/0/0	1/0/0
Baltimore	64	0	64	0	1/0/0	1/0/0
Chicago	1725	358	1078	299	11/0/14	6/0/11
Cleveland	892	0	892	0	7/0/0	7/0/0
Houston	298	0	298	0	2/0/0	2/0/0
Los Angeles-Long Beach	1914	96	1341	91	11/3/12	4/1/11
Milwaukee	2787	259	2330	214	4/2/30	3/0/22
New York	2069	1970	1732	1883	7/1/6	4/1/4
Philadelphia	1358	843	1253	838	4/1/7	3/1/6
Providence-Pawtucket-Warwick	1930	587	870	454	7/1/21	4/1/10
Raleigh	60	0	60	0	1/0/0	1/0/0
Rochester	477	267	64[a]	0[a]	2/0/2	1[a]/0/0[a]
St. Louis	1346	62	1006	62	12/1/0	8/1/0
San Diego	186	0	186	0	2/0/0	2/0/0
Seattle-Everett	610	151	454	149	4/0/13	1/0/12
Total	16369	4715	12197	4112	79/10/112	49/6/83

DATA SOURCE: HUD Section 8 management information system data supplemented by Area Office data as of February 1979.

a. Three projects--one elderly and two mixed--that had been drawn for the sample were dropped at the request of the HUD Area Office because the developer was under indictment.

units in projects visited versus the total of occupied units in all projects in each SMSA. Although the cross-section sample interviews were dropped, the file search mentioned earlier was performed at each of the projects selected.

Calculation of Inclusion Probabilities

The SMSAs selected for this evaluation were chosen with probability proportionate to size and without replacement, as mentioned earlier. Calculation of the inclusion probabilities was more difficult than for simpler sampling situations. When the number of elements being selected is small relative to the total number of elements and the measures of size are roughly equal across all elements, the probability on each draw is just the size of the element relative to the total over all elements, or

$$p_i = S_i/S$$

where

S_i = size of element i

S = the sum over i of all the sizes of all elements in the population, i.e., the total population

and the inclusion probability for each element is simply related to the number of draws, n, or

$$\pi_i = np_i. \qquad (1)$$

Note that the sum over all possible elements, i, of p_i is one and that the sum over all π_i then equals the number of draws, n.

In the present evaluation 20 SMSAs were drawn from a possible 261 in which Section 8 program unit totals (the size measure) vary quite widely. The value of p_i for New York was 0.071, while that for Appleton-Oshkosh was 0.0013. As a consequence, the selection of New York in a sample of SMSAs dramatically changes the revised chances of Appleton being drawn, as the larger number for the New York program size is removed from the list of

competing cities for the next draw.[1] That the simple approximation of Equation (1) is inappropriate is easily seen. An inclusion probability cannot exceed one, but for New York, Equation (1) would yield $\pi_i = 1.4$ (that is, 20 x 0.071).

Direct and accelerated simulation schemes were programmed to estimate exact inclusion probabilities. The simulation attempt was stopped when the calculated inclusion probabilities had not yet stabilized (particularly for the small SMSA) after 100,000 simulations.

An approximation algorithm for the calculation of inclusion probabilities was developed. Notation and definitions used are as follows. The index I is reserved for listing the population, the index i for listing the sample, and the terms "city" and "SMSA" are used interchangeably. The symbol "P" denotes probability throughout. The lower case symbol "p" is used only with first draw probabilities.

S_I = Size of SMSA = # Existing Housing units + 2 (# Substantial Rehabilitation units) + # New Construction units.

$S = S_I + \ldots + S_I + \ldots + S_{261}$, the national total.

$p_I = S_I/S$ the proportion of units in SMSA I or the probability of selecting SMSA I on the first draw.

n is the sample size (in this case n = 20)

N is the population (of SMSAs) size (N = 261).

π_I is the probability over all samples of size n that SMSA I is selected, that is, the inclusion probability.

The approximation must obey a number of constraints. For convenience arrange the cities by increasing size so that $p_1 < p_2 < \ldots p_N$. Then it can be shown that the following conditions must be satisfied

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[1] Alternative sampling schemes are available (Rao, 1978) which do not attempt to recompute the next draw probabilities with the sizes for previous draws subtracted. These yield explicit values for inclusion probabilities but do not have the intuitive appeal of the direct scheme used. In retrospect, a simpler sampling scheme for the current situation would have been to stratify SMSAs into groups of similar size and sample within each stratum.

$$\pi_1 < \pi_2 < \ldots < \pi_N. \tag{2}$$

$$\pi_1/p_1 > \pi_2/p_2 > \ldots > \pi_N/p_N \tag{3}$$

$$\pi_1 + \pi_2 + \ldots + \pi_N = n \tag{4}$$

Equations (2) and (3) require elaborate proof not provided here.

Initially set $\hat{\pi}_1 = np_1$. The caret denotes "estimate of." For consistency with (2) and (3), π_2 must satisfy

$$\hat{\pi}_1 < \hat{\pi}_2 < \hat{\pi}_1 p_2/p_1.$$

So set $\hat{\pi}_2 = \hat{\pi}_1(p_1 + p_2)/2p_i$. That is, put $\hat{\pi}_2$ midway between the bounds set by the inequality. For I = 2,..., N we have

$$\hat{\pi}_{I+1} = \hat{\pi}_I(p_I + p_{I+1})/2p_I. \tag{5}$$

One can also begin with $\hat{\pi}_N = np_N$ and work downward in which case for I = 1,2, ...N-1

$$\hat{\pi}_I = \hat{\pi}_{I+1}(p_I + p_{I+1})2p_{I+i}. \tag{6}$$

Clearly (2) and (3) hold if all π_I are rescaled. Thus having obtained all the $\hat{\pi}_I$ from (5) or (6), rescale so that (4) is satisfied.

The actual process used to generate the $\hat{\pi}_I$ differed only in one detail. Instead of $\hat{\pi}_N = np_N$ as a starting value, the initial value of $\hat{\pi}_N$ was generated by the simulation, then (6) was applied, and finally the estimates rescaled to conform with (4). The resulting values for π_i were shown in Table I-1.

Calculation of Means and Variances

To compute national estimates of means the theory of Cochran (1962, Chapter 11) was used, in which

$$\bar{y} = \frac{y}{s} = \frac{1}{s}\sum_i \frac{s_i \bar{y}_i}{\pi_i} \qquad \text{or} \qquad \hat{\bar{Y}} = \sum_{i=1}^{n} \frac{p_i}{\pi_i}\bar{y}_i$$

where

$\hat{\bar{Y}}$ = national mean (estimate)

$\bar{y}_i$ = weighted mean for SMSA "i" based on sample observations

p_i = program size in SMSA "i" relative to the national program size or the ratio of S_i to the total, S.

and

π_i = inclusion probability of SMSA "i".

SMSA weighting. An essential problem with the SMSA weights (p_i/π_i) generated by the sampling scheme was their failure to add to unity.[1] The circumstances of a few large and many small SMSAs combined in the present situation to produce a value for the sum of the p_i/π_i of 1.27.

Without rescaling and summing over the sample, one would have

$$\Sigma y_i p_i/\pi_i = c\Sigma p_i/\pi_i \neq c$$

i.e., the weights did not satisfy an obvious requirement that the weighted sum of a constant be the value of the constant, unchanged by the weighting.

The decision was made to rescale the p_i/π_i so that their sum over the SMSAs drawn would be unity. Both the rescaled and unscaled versions yield consistent estimates in that with n = N and $\pi_i \equiv 1$, both yield the population mean. The usual primary criterion in sampling problems is minimizing variance in estimates, not unbiasedness. While neither the unscaled nor the rescaled estimate has a systematic bias, the expected value of the rescaled estimate need not equal the population mean. It can be higher or lower. We note that in most circumstances Bayesian estimates are biased (Ferguson, 1969) and that no minimum variance unbiased estimate exists (Godambe, 1955).

Because rescaling was indicated in any event, it was decided to use for p_i the data for New Constructin activity obtained from the HUD Section 8 management information system as of July 1979--the data collection period--and to rescale the resulting values of p_i/π_i such that the sum was identically

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[1] It can be shown that this phenomenon is not unexpected in sampling situations having sampling units with very large and very small sizes.

unity over the 16 SMSAs with cross-section activity in New Construction (occupied projects), i.e.,

$$\left(\frac{p_i}{\Pi_i}\right)_{\text{Adjusted}} = \frac{\frac{p_i}{\Pi_i} \text{ (based on July 1979 HUD data)}}{\text{(calculated from September 1978 HUD data)}} \Big/ \sum \frac{p_i}{\Pi_i}$$

This strategy preserved the relative sizes of the unscaled SMSA inclusion probabilities but with program size weights reflecting the numbers of New Construction recipients contemporary with the collection period. These adjusted SMSA weights were tabulated in Table II-1.

SMSA weights for subgroups. Some analyses also require estimates for subgroups in the program, for example, mean percentage minority in origin census tracts for minority households. In this case the SMSA-to-SMSA variation in the subgroup population relative to the program population also must be accounted for. Therefore the SMSA weights for subgroups also require a rescaling

$$\left(\frac{p_i}{\Pi_i}\right)_{\text{Subgroup}} = \frac{p_i}{\Pi_i} \left(\frac{M_i \text{ Subgroup} / M_i \text{ Total}}{\sum_i \left(\frac{p_i}{\Pi_i} \frac{M_i \text{ Subgroup}}{M_i \text{ Total}} \right)} \right)$$

where

$$M_i \text{ Subgroup} = \sum_{\substack{j \\ \text{projects visited in SMSA}_i}} \left(\text{Number of subgroup among households sampled in project}_j \times \frac{\text{Number of households in project}_j}{\text{Number of households sampled in project}_j} \right)$$

and

$$M_i \text{ Total} = \sum_{\substack{j \\ \text{projects visited in SMSA}_i}} (\text{Number of households in project}_j)$$

Variance Estimates. The usual Horwitz and Thompson formulas for estimating variances for this type of sample (Cochran, 1963) have the unfortunate property that non-zero variances would be estimated for a constant when p_i/π_i are not the same. In general the unscaled estimate has variance, given by Horwitz and Thompson (Cochran, 1963) of

$$\sum_{I,J} \left(\frac{y_I}{\pi_I} - \frac{y_J}{\pi_J} \right)^2 \left(\pi_{IJ} - \pi_I \pi_J \right)$$

where π_{IJ} is the joint inclusion probability.

Clearly if $y_I/\pi_I = y_J/\pi_J$ for all I,J the variance is zero. If y_I is constant, then the variance is positive unless π_I is constant. Thus in general, the unbiased estimate when y is constant has positive variance.

The procedure for this study has been to obtain the estimated national means and across-SMSA variances using the jackknife technique on the weighted SMSA means (see Mostellor and Tukey, 1977, Chapter 2 and Kish and Frankel, 1974).[1] The within-SMSA contribution to the variance in estimates of the national mean was calculated from

$$\text{var}_{\text{within}} = \sum \left(\frac{p_i}{\Pi_i} \right)^2 \hat{V}_i$$

where within the i^{th} SMSA

$$\hat{V}_i = \left[1 - \left(\frac{m}{N} \right)_i \frac{N_i}{M_i} \right] s_i^2/m_i$$

where

m_i = the sample size

$\left(\frac{m}{N} \right)_i$ = Sampling fraction (may refer to applicants, recipients, terminees, or unsubsidized households).

$\left(\frac{N_i}{M_i} \right)$ = Recipients in projects visited to total number of recipients in $SMSA_i$

$$s_i^2 = \frac{\sum (y - \bar{y})^2}{(m_i - 1)}$$

where y is the observed value of the variable being estimated and $\bar{y}$ is the weighted mean at SMSA level (i.e., across project variance is ignored because such a large fraction of projects were sampled in each SMSA).

[1] An alternative calculation based on retrospective stratification yielded a mean and variance within a few percentage points of the jackknife results.

Procedural details of the weighting calculations are included in the data documentation provided to HUD under weighting programs named MEANVAR2 (for unstratified means), MEANVAR (for subgroup stratification), WEIGHTN2 (for simple cross-tabulations), and WEIGHTNG (for stratified cross-tabulations).

II.2 LONGITUDINAL PANEL SAMPLES

The population to which one would like to project the results of the analyses on the longitudinal panels would be that of households entering the program in mid-1979. However, the sample frame was simply such households found in the SMSAs selected for the New Construction cross-section sample. As a consequence, we have not attempted to use the SMSA weights generated for the New Construction sample to project the longitudinal panel results to the national program. They are weighted to account for the sampling performed within these SMSAs so that estimates across all the SMSAs sampled are given in the analysis chapters as though all households were sampled from the total available (entering the program) in the SMSAs where data were collected.

In the New Construction panel, sample weights were required to account for subsampling of elderly households. Observations also were scaled to the total number of households that became recipients (among those that were identified by project management as constituting the pool of selected applicants).[1] No SMSA weights were used. Table II-7 lists the panel weights for unstratified analysis and Table II-8 lists weights for analyses stratified by elderly/non-elderly. (Procedural details are documented in the weighting program called NCPNLWT2 provided to HUD.)

The representative sample of file search records drawn at the New Construction panel projects constituted different sampling fractions of the total numbers of current recipients at different projects. The same sampling

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[1] No attempt was made to weight the sample of applicants because the sample selection was made from among applicants already selected by project management--a status whose exact criteria varied considerably from project to project.

Table II-7

HOUSEHOLD WEIGHTS FOR THE NEW CONSTRUCTION LONGITUDINAL PANEL (UNSTRATIFIED)

PROJECT	ELDERLY SAMPLE	ELDERLY HOUSEHOLD WEIGHT[a]	NON-ELDERLY SAMPLE	NON-ELDERLY HOUSEHOLD WEIGHT[a]
AT02	7	0.960	0	-
BA02	0	-	9	0.471
BA03	5	0.941	0	-
BA04	0	-	6	0.627
BA05	2	5.611	1	1.412
BA06	24	0.887	0	-
CH03	1	3.294	0	-
CH04	6	1.333	0	-
CH05	39	0.953	0	-
CH22	3	2.980	0	-
CH23	2	0.941	0	-
CL01	0	-	6	0.627
CL03	27	0.906	0	-
CL04	13	0.905	0	-
HO02	14	1.445	0	-
MI02	11	1.114	0	-
MI03	1	1.412	0	-
MI15	19	0.694	0	-
MI26	3	0.784	0	-
NY06	28	1.104	0	-
PH01	1	0.470	15	0.596
PH12	11	0.513	9	0.784
PR11	24	0.569	0	-
PR13	6	1.417	0	-
PR15	3	2.918	24	0.529
PR17	7	8.964	0	-
RO02	2	0.470	7	0.672
SD03	44	0.698	0	-
SE09	37	1.030	0	-
SE13	17	0.720	0	-
SE15	0	-	11	0.684
SL05	0	-	38	0.718

[a]Weights for all households combined sum to recipient interview sample size = 483.

Table II-8

HOUSEHOLD WEIGHTS FOR THE NEW CONSTRUCTION LONGITUDINAL PANEL (STRATIFIED)

PROJECT	ELDERLY SAMPLE	ELDERLY HOUSEHOLD WEIGHT[a]	NON-ELDERLY SAMPLE	NON-ELDERLY HOUSEHOLD WEIGHT[b]
AT02	7	0.854	0	-
BA02	0	-	9	0.728
BA03	5	0.837	0	-
BA04	0	-	6	0.971
BA05	2	4.988	1	1.412
BA06	24	0.788	0	-
CH03	1	2.928	0	-
CH04	6	1.185	0	-
CH05	39	0.847	0	-
CH22	3	2.649	0	-
CH23	2	0.837	0	-
CL01	0	-	6	0.971
CL03	27	0.906	0	-
CL04	13	0.804	0	-
HO02	14	1.285	0	-
MI02	11	0.990	0	-
MI03	1	1.255	0	-
MI15	19	0.616	0	-
MI26	3	0.697	0	-
NY06	28	0.982	0	-
PH01	1	0.418	15	0.922
PH12	11	0.456	9	1.214
PR11	24	0.506	0	-
PR13	6	1.260	0	-
PR15	3	2.594	24	0.819
PR17	7	7.968	0	-
RO02	2	0.418	7	1.040
SD03	44	0.621	0	-
SE09	37	0.916	0	-
SE13	17	0.640	0	-
SE15	0	-	11	1.059
SL05	0	-	38	1.112

[a] Weights for elderly households sum to recipient elderly sample size = 357.

[b] Weights for non-elderly households sum to recipient non-elderly sample size = 126.

Table II-9

PROJECT-LEVEL WEIGHTS FOR THE REPRESENTATIVE SAMPLE OF RESIDENTS IN NEW CONSTRUCTION LONGITUDINAL PANEL PROJECTS

PROJECT	SAMPLE	WEIGHTS FOR RESIDENTS (RECIPIENTS PLUS UNSUBSIDIZED)	SAMPLE	WEIGHTS FOR SECTION 8 RECIPIENTS
AT02	81	1.02537	81	1.02861
BA02	11	3.59757	11	3.60895
BA03	75	0.64490	74	0.64906
BA04	67	1.22504	14	1.40030
BA05	76	1.20854	76	1.21236
BA06	87	1.46006	87	1.46468
CH03	69	0.98420	69	0.98021
CH04	87	1.06697	81	1.14963
CH05	73	0.80980	73	0.80565
CH22	19	0.56570	19	0.56749
CH23	90	1.03140	90	1.03466
CL01	38	0.48856	38	0.49010
CL03	72	1.28925	72	1.29333
CL04	80	1.22140	80	1.21913
HO02	75	0.65141	75	0.65347
MI02	75	0.97712	75	0.98021
MI03	20	1.19697	20	1.17625
MI15	39	1.40304	39	1.40748
MI26	35	0.78169	35	0.77016
NY06	40	3.16342	40	3.17342
PH01	36	0.70570	36	0.70793
PH12	60	1.22954	60	1.23343
PR11	75	0.65141	75	0.65347
PR13	72	0.64820	72	0.66028
PR15	67	1.52401	67	1.52883
PR17	75	0.97712	74	0.98683
RO02	31	1.38688	31	1.37545
SD03	72	0.67855	72	0.68070
SE09	101	0.46437	101	0.46099
SE13	44	0.44414	44	0.44555
SE15	37	0.31690	37	0.31791
SL05	64	0.67177	64	0.67389

instructions as for current recipients in the cross-section projects were used (see Table II-2). Observations were rescaled to account for differences in sampling fractions and for missing data among the observations. No SMSA weights were used. Table II-9 lists the weights for the representative sample. (Procedural details are documented in the weighting program REPSMPL provided to HUD.)

For the Existing Housing longitudinal panel, the sampling procedure used was such that practically all of the current certificate holders were contacted for interviews. Consequently, no weighting of the sample observations has been performed.

REFERENCES

Barlow, R.E., D.J. Bartholemew, S.M. Bremnor and H.D. Brunk, Statistical Inference Under Order Restrictions, John Wiley, New York, 1972.

Cochran, W., Sampling Techniques, Wiley, New York, 1963.

Ferguson, T., Mathematical Statistics: A Decision Theoretic Approach, Academic Press, New York, 1969.

Godambe, V.P., "A Uniffied Theory of Sampling from Finite Populations," J. Royal Statistical Society, Series B 17 268-278, 1955.

Kish, Leslie and Martin Richard Frankel, "Inference from Complex Samples," J. Royal Statistical Society, Series B, pp. 1-22, 1974.

Mosteller, F. and J.W. Tukey, Data Analysis and Regression, Addison-Wesley Reading, Mass., 1977.

Rao, S.N.K., "Sampling Designs Involving Unequal Probabilities of Section and Robust Estimation of the Finite Population Total," pp. 69-84 in Contributions to Survey Sampling and Applied Statistics, H.A. David ed., Academic Press, New York, 1978.

Sunter, A.B., "List Sequential Sampling with Equal or Unequal Probabilities without Replacement," Applied Statistics, 26, no. 3, pp. 261-268, 1977.

APPENDIX III

DESCRIPTIONS OF SAMPLED PROJECTS

This appendix provides descriptions of the Section 8 New Construction projects at which data were collected for this research. Both cross-section projects (drawn because they were fully occupied as of late 1978) and panel projects (drawn because they were completed and in initial rent-up during the mid-1979 data collection period) are described in terms of developer types, project characteristics, selected administrative procedures, and managers' satisfaction with Section 8 tenants and with the program in general. The distribution of the cross-section and panel projects across 16 sampled SMSAs is exhibited in Table 1-1 in the introductory chapter of this report.

Descriptions of the cross-section and panel projects are organized in parallel; accordingly, the numbering of tables and sections pertaining to cross-section projects is repeated for the panel project descriptions to facilitate comparisons.

Descriptions are based primarily on the Project Staff Questionnaire. This questionnaire was designed in three parts--Developer, Marketer, Manager--so that a separate person could answer the specific section most relevant to her or his responsibilities in project administration. The questionnaire sections were mailed in June 1979 to the one, two, or three appropriate persons for each project. During the summer of 1979, research project staff picked up questionnaires while on site visits, and in November 1979, a follow-up letter was sent to those who had not yet responded.

The ultimate response rates for the 138 projects in the cross-section sample were:

Developer section	85%	(117 responses)
Marketer section	89%	(123 responses)
Manager section	85%	(117 responses)

The response rates for the 32 projects in the panel were:

Developer section	88%	(28 responses)
Marketer section	91%	(29 responses)
Manager section	94%	(30 responses)

Although in some cases an entire questionnaire is absent from our sample, and in other cases, one or two sections are missing, certain data (such as project location, extent of Section 8 subsidy, and type of project--elderly, family, or mixed) are available from other sources and are included in our data base. Therefore, the analysis of a particular feature may not depend entirely, or at all, on the responses of the developers, marketers, and managers. Because some sections of the Project Staff Questionnaire were not returned for every project in the cross-section and panel, sample size is not constant from table to table.

Chi square tests were computed for cross-tabulations of variables, and the indicated levels of significance are noted on the appropriate tables. However, because of the number of projects in the cross-section (138) and panel (32), and the smaller effective sample sizes caused by missing reponses, over 5 percent of the cells in each cross-tabulation have expected frequencies fewer than five. Consequently, chi square may not be a valid test of statistical significance.

All data in this appendix are unweighted and are intended to be descriptive of the sampled projects only.

CROSS-SECTION PROJECTS

III.1 DEVELOPER CHARACTERISTICS

Which households will become program beneficiaries and which will be rejected depend largely on the project owners and their decisions concerning project development. This appendix, therefore, begins by presenting data on types of development organizations, division of administrative functions, and previous experience of developers.

Types of Organizations and Division of Administrative Responsibilities

Developers of New Construction projects come from three eligible types of organizations. (See Table III-1.) These are the private for-profit corporation, the private not-for-profit organization, and the public agency. In the cross-section sample of developers, the large majority are private for-profit entities. Public agencies make up 11 percent of the project developers,[1] and the least common Section 8 developer is the non-profit organization. This last category includes church/synagogue groups, neighborhood/community groups, and a cooperative.

Three quarters of the developers also serve as the marketing and managing agent[2] for their project.[3] The remainder contract the marketing or management functions, or in most cases both, to other companies or individuals, as presented in Table III-2 below.

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[1] In the cross-section sample, all the public agency developers are local housing authorities and are found in seven of the sixteen sampled SMSAs. In only one SMSA, Appleton-Oshkosh, do they make up the majority (five of seven or 71 percent) of New Construction developers.

[2] The terms developer, marketer, and manager refer to the three key actors in bringing a New Construction project to fruition. Specifically,

> the developer is the person who chooses a site, acquires the land, makes decisions about the type of project to build (percentage of units to be subsidized, unit mix, occupancy by family or elderly tenants), submits the application to HUD for Section 8 funding, and oversees construction;
>
> the marketer advertises the project for initial lease-up, accepts applications for residency and reviews them for eligibility, and selects the tenants;

(Footnote continued on page 42)

Table III-1

TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF DEVELOPER	NUMBER	PERCENTAGE
Private for-profit	98	82%
Private not-for-profit	8	7
Public agency	13	11
TOTAL	(119)	100%

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.

Table III-2

DIVISION OF ADMINISTRATIVE FUNCTIONS

Developer separate, marketer-manager same	23%
Marketer separate, developer-manager same	1
Manager separate, developer-marketer same	1
Developer-marketer-manager same	75
TOTAL	100%
Sample Size	(135)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.

Among private for-profit organizations, the division of administrative functions is generally the same as among developers overall. However, non-profit owners carry out only development, or both development and management (but not marketing) equally often. Public agencies hire a separate company for either marketing and management, or management only, each in a small percentage of cases. Table III-3 displays the allocation of responsibilities by developer type.

Prior Experience of Developer

Most of the sampled Section 8 developers have previously developed, marketed, and managed rental projects, both market-rate and assisted. Eighty-five percent have had development experience, with a median of nine projects. A somewhat smaller percentage have had marketing or management experience, with a median of seven projects in each category. Table III-4 shows the extent of previous experience among sampled developers.

The private for-profit organizations have developed many more projects than the public agencies. Marketing and management experience in terms of number of projects is also greater among for-profit organizations. Not-for-profit developers are novices by comparison in all administrative categories. Refer to Tables III-5 and III-6 for a display of these measures of previous experience.

(Footnote continued)

> the manager provides maintenance and services such as security and tenant activities, collects rent, recertifies household incomes as part of the prescribed program cycle, terminates inappropriately subsidized tenants or those who demonstrate behavioral problems, and administers the continued occupancy of the project.

[3] A determination of how many organizations were involved in the development, marketing, and management of a given project was made by looking at organization names, addresses, and telephone numbers, and names of individual respondents, written in the Developer, Marketer, and Manager information boxes on the cover of the Project Staff Questionnaire. If one of the organizations was a subsidiary or part of the other(s), it was effectively considered to be the same as its parent organization. Only discrete, unrelated entities, affiliated solely through their joint involvement in a project, were counted separately.

Table III-3

DIVISION OF ADMINISTRATIVE FUNCTIONS
AMONG TYPES OF DEVELOPER ORGANIZATIONS

DIVISION OF FUNCTIONS**	TYPE OF DEVELOPER		
	Private for-profit	Private not-for-profit	Public Agency
Developer separate, marketer-manager same	24%	14%	8%
Marketer separate, developer-manager same	1	14	0
Manager separate, developer-marketer same	0	0	8
Developer-marketer-manager same	75	71	85
TOTAL	100%	99%	101%
Sample Size	(97)	(7)	(13)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
** Chi square test shows this to be significantly different among developer types at the 0.01 level.

Table III-4

DEVELOPERS' PRIOR EXPERIENCE

TYPE OF EXPERIENCE	DEVELOPERS HAVING EXPERIENCE		MEDIAN NUMBER OF PREVIOUS PROJECTS (market-rate and subsidized)[a]
	Percentage	Sample Size	
Development	85%	(102)	9
Marketing	71	(101)	7
Management	73	(102)	7

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
a. Calculation of median number of previous projects excludes developers with no prior experience.

Table III-5

PRIOR EXPERIENCE AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE	TYPE OF DEVELOPER		
	Private for-profit	Private not-for-profit	Public Agency
Development**	90%	[29%]	[82%]
Marketing*	73	[29]	[82]
Management*	75	[29]	[82]
Sample Size	(84)	(7)	(11)

SAMPLE: Cross-section project developers.

DATA SOURCE: Project Staff Questionnaire.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

** Chi square test shows this to be significantly different among developer types at the 0.01 level.

* Chi square test shows this to be significantly different among developer types at the 0.05 level.

Table III-6

PRIOR EXPERIENCE AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE	TYPE OF DEVELOPER					
	Private for-profit		Private not-for-profit		Public Agency	
	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size
Development	12	(76)	[1]	(2)	[5]	(9)
Marketing	8.5	(61)	[1]	(2)	[5]	(9)
Management	8.5	(63)	[1]	(2)	[5]	(9)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: Figures enclosed in brackets are based on fewer than 15 observations.
a. Calculation of median number of previous projects (market-rate and subsidized) excludes developers with no prior experience.

Table III-7 shows that the majority of sampled developers also have prior experience with the Section 8 program in particular, with a median of four projects in all phases of involvement.

Distinguishing Section 8 experience by developer types reveals that non-profit organizations as a group are far less familiar with Section 8 than are all other developers. Tables III-8 and III-9, show the percentages of the various developer types and the median number of units in each category of administrative experience.

III.2 CROSS-SECTION PROJECT CHARACTERISTICS

This section describes projects in the cross-section sample in terms of

- designated project type (elderly, family, mixed)
- extent of Section 8 subsidy (100 percent or fewer than 100 percent of the units)
- administrator of the Housing Assistance Payments contract (HUD or a Housing Finance Agency)
- size (number of units)
- age (year of initial occupancy)
- location (central city, inner suburb, outer suburb)
- racial/ethnic and poverty characteristics of the tract (according to 1970 census data)

as well as ancillary items such as the developers' reasons for building a certain project type and for site selection.

Project Types

Projects are classified here, for descriptive purposes, by three features: occupancy designation,[1] that is elderly, family, or mixed; proportion of units which are Section 8 subsidized; and administrator of the Housing Assistance Payments contract, HUD or a state Housing Finance Agency.

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[1]Three sources of information were utilized by research project staff in determining whether a project was occupied by elderly or family tenants, or both. These are:

(Footnote continued on page 51)

Table III-7

DEVELOPERS' PRIOR SECTION 8 EXPERIENCE

TYPE OF EXPERIENCE	DEVELOPERS HAVING EXPERIENCE		MEDIAN NUMBER OF PREVIOUS S8 PROJECTS[a]
	Percentage	Sample Size	
Development	73%	(118)	4
Marketing	61	(116)	4
Management	62	(117)	4

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.

a. Calculation of median number of previous Section 8 projects excludes developers with no prior Section 8 experience.

Table III-8

PRIOR EXPERIENCE WITH SECTION 8 AMONG TYPES OF DEVELOPER ORGANIZATIONS

	TYPE OF DEVELOPER					
	Private for-profit		Private not-for-profit		Public Agency	
TYPE OF EXPERIENCE**	Percentage Having Experience	Sample Size	Percentage Having Experience	Sample Size	Percentage Having Experience	Sample Size
Development	77%	(97)	[12%]	(8)	[77%]	(13)
Marketing	63	(95)	[12]	(8)	[77]	(13)
Management	64	(96)	[12]	(8)	[77]	(13)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.
** Chi square test shows this to be significantly different among developer types at the 0.01 level.

Table III-9

PRIOR EXPERIENCE WITH SECTION 8 AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE	TYPE OF DEVELOPER					
	Private for-profit		Private not-for-profit		Public Agency	
	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size
Development	6	(67)	[1]	(1)	[2]	(10)
Marketing	6	(57)	[1]	(1)	[2]	(10)
Management	6	(57)	[1]	(1)	[2]	(10)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: Numbers enclosed in brackets are based on fewer than 15 observations.
a. Calculation of median number of previous Section 8 projects excludes developers with no prior Section 8 experience.

Seventy percent of the sampled projects are solely for elderly recipients. Of the remaining projects, about half are designated as family (non-elderly) projects, and half are occupied by a mixture of family and elderly tenants. Table III-10 shows both this project mix and the distribution among project types of fully and partially Section 8 subsidized projects, discussed below.

One hundred percent Section 8 projects (that is, those which are fully assisted) predominate in the sample. Only 12 percent (sixteen projects) have assisted units fewer than total units. Ten of the sixteen projects which are less than 100 percent Section 8 are in the Chicago SMSA, and range from 16 percent to 30 percent assisted.

In Chicago, the mix of 100 percent Section 8 projects is markedly different from the mix of the partially assisted projects. As presented in Table III-11, six of seven of the fully Section 8 subsidized projects are for elderly residents but none of the partially Section 8 funded projects are so designated. On the other hand, none of the 100 percent Section 8 projects are mixed, in contrast to half of the partially assisted projects.

When elderly, family, and mixed projects are differentiated according to the type of organization which developed them, no significant differences are found among the private for-profit, private not-for-profit, and public agency developers. Table III-12 shows the distribution of project types by developer types in the cross-section sample.

(Footnote continued)

> the HUD Section 8 management information system data showing the number of elderly units and total units in a project;
>
> an item on the Project Staff Questionnaire asking developers for the number of units intended for small families, large families, and the elderly;
>
> records of reconnaissance calls to New Construction project staff in preparation for field research.

An elderly project is one which is reserved entirely for elderly and handicapped/disabled tenants. A family project is intended primarily for non-elderly families. A mixed project is occupied by both elderly and family tenants.

Table III-10

CHARACTERISTICS OF CROSS-SECTION PROJECTS

CHARACTERISTIC	NUMBER OF PROJECTS	PERCENTAGE OF PROJECTS
OCCUPANCY DESIGNATION		
Elderly projects	97	70%
Family projects	20	14
Mixed projects	21	15
TOTAL	(138)	99%
EXTENT OF SECTION 8 SUBSIDY		
100% of units	122	88%
<100% of units	16	12
TOTAL	(138)	100%

SAMPLE: Cross-section projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

Table III-11

CHARACTERISTICS OF PROJECTS IN THE CHICAGO SMSA

PROJECT TYPE	EXTENT OF SECTION 8 SUBSIDY**			
	100% of Units		<100% of Units	
	Number of Projects	Percentage of Projects	Number of Projects	Percentage of Projects
Elderly	[6]	[86%]	[0]	[0%]
Family	[1]	[14]	[5]	[50]
Mixed	[0]	[0]	[5]	[50]
TOTAL	(7)	100%	(10)	100%

SAMPLE: Cross-section projects in the Chicago SMSA.

DATA SOURCES: Project Staff Questionnaire, Section 8 management information system data, and information collected from project records and HUD field offices by research project field staff.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

** Chi square test shows this to be significantly different among elderly, family, and mixed projects at the 0.01 level.

Table III-12

TYPE OF DEVELOPER BY PROJECT TYPE

PROJECT TYPE[a]	TYPE OF DEVELOPER: Private for-profit	Private not-for-profit	Public Agency
Elderly	74%	[100%]	[54%]
Family	12	[0]	[15]
Mixed	13	[0]	[31]
TOTAL	99%	100%	100%
Sample Size	(98)	(8)	(13)

SAMPLE: Cross-section project developers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

a. Chi square test shows this to be not significantly different among developer types at the 0.10 level.

Table III-13 reports developers' reasons for building a given type of project (that is, an elderly, family, or mixed project, and one which is fully or partially Section 8 assisted), and is stratified by organization type. Among private for-profit developers, the most influential factors were analysis of the market and the financing package that was available. Public agencies, on the other hand, mentioned local government input and the selection process of HUD or the Housing Finance Agency as the greatest influences on their development decisions. Non-profit developers most commonly cited their interest in serving special needs populations as well as the advice and encouragement received from local officials as being important in their choice to build a certain project type.

Table III-14 lists the most influential reasons for building a certain project type among developers of elderly, family, and mixed projects. A majority of elderly project developers reported market analysis and financing as the most important factors in their building decision. In addition to these two factors, family project developers said that the input of local officials and the demonstration of need in a Housing Assistance Plan contributed to their decision. Mixed project developers claimed the HUD (or Housing Finance Agency) selection process and their market analysis to be primary influences. (These differences are not found to be statistically significant.)

The Housing Assistance Payments contract with the developer is administered by either the HUD field office or the state Housing Finance Agency. In the cross-section sample, HUD-administered contracts are slightly more common, representing 55 percent of projects. Of the Housing Finance Agency projects, over half (35 of 62) are concentrated in three SMSAs: Chicago, Philadelphia, and Providence-Pawtucket-Warwick. A separate calculation shows that neither project mix nor type of location of Housing Finance Agency projects is significantly different from HUD projects in these three SMSAs.

Project Size and Age

The next characteristics discussed are project size measured in total number of units, and project age measured by year of initial occupancy.

Table III-13

MOST INFLUENTIAL REASON FOR BUILDING PROJECT AMONG DEVELOPER TYPES

REASON**	All	TYPE OF DEVELOPER: Private for-profit	Private not-for-profit	Public Agency
Market analysis	30%	34%	[12%]	[9%]
Available financing	23	27	[12]	[0]
Local government input	11	7	[25]	[36]
HUD/HFA selection process	9	7	[0]	[36]
Community group input	6	4	[12]	[18]
Fair Market Rents	3	3	[0]	[0]
Zoning requirements	2	2	[0]	[0]
Construction costs	1	1	[0]	[0]
Other factors	15	15	[38]	[0]
TOTAL	100%	100%	99%	99%
Sample Size	(108)	(89)	(8)	(11)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.
** Chi square test shows this to be significantly different among developer types at the 0.01 level.

Table III-14

DEVELOPERS' MOST INFLUENTIAL REASON FOR BUILDING PROJECT TYPES

REASON[a]	DEVELOPERS OF: All Projects	Elderly Projects	Family Projects	Mixed Projects
Market analysis	30%	31%	[25%]	25%
Available financing	23	25	[25]	12
Local government input	11	9	[25]	12
HUD/HFA selection process	9	6	[8]	25
Community group input	6	9	[0]	0
Fair Market Rents	3	4	[0]	0
Zoning requirements	2	1	[0]	6
Construction costs	1	1	[0]	0
Other factors	15	14	[17]	19
TOTAL	100%	100%	100%	99%
Sample Size	(108)	(80)	(12)	(16)

SAMPLE: Cross-section project developers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

a. Chi square test shows this to be not significantly different among developers of elderly, family, and mixed projects at the 0.10 level.

In the cross-section sample, the minimum project size is one unit (a single family home) in Los Angeles, and the maximum is 1,689 units in New York. Excluding these outliers, the sizes range from a 16 unit project in Los Angeles to a New York project of 558 units. The median project size is 104 units.

For the purpose of classification, projects are defined as "small," "medium," and "large" as follows:

small -- fewer than 75 total units
medium -- between 75 and 125 total units
large -- more than 125 total units.

Table III-15 shows the breakdown of projects by size.

As shown below in Table III-16, family projects appear to differ in their size, measured in median number of units, from elderly and mixed projects. In the cross-section sample, the median size of elderly and mixed projects is just over 100 units. Family projects, however, appear to be smaller with a median of 81 units. This would be in keeping with HUD regulations which encourage construction of small projects for non-elderly families by giving preference points to such proposals. The distribution of projects in the three size categories is not significantly different among project types.

The age of a cross-section project is determined here by the year in which the earliest Section 8 lease was signed (by a recipient in the sample) at that project, since this indicates construction completion and initial occupancy. The oldest New Construction project in the cross-section started lease up-in 1975. Table III-17 displays the ages, by year of earliest lease, across all cross-section projects and by project type. Family projects are the oldest type in the cross-section, with 70 percent having begun leasing activity by the end of 1977.

Project Location and Siting Decisions

This part of the appendix addresses the locational characteristics of cross-section projects. Location is classified as:

Table III-15

SIZE OF CROSS-SECTION PROJECTS

SIZE	NUMBER OF PROJECTS	PERCENTAGE OF PROJECTS
Small	46	33%
Medium	37	27
Large	55	40
TOTAL	(138)	100%

SAMPLE: Cross-section projects.

DATA SOURCE: Information collected from project records by research project field staff.

Table III-16

SIZE AMONG PROJECT TYPES

SIZE[a]	PROJECT TYPE		
	Elderly	Family	Mixed
Median Number of Units	104	81	107
	Percentage	Percentage	Percentage
Small	32%	45%	29%
Medium	28	10	38
Large	40	45	33
TOTAL	100%	100%	100%
Sample Size	(97)	(20)	(21)

SAMPLE: Cross-section projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

a. Chi square test shows the project size distribution to be not significantly different among elderly, family, and mixed projects at the 0.10 level.

Table III-17

CUMULATIVE PERCENTAGE OF SAMPLED PROJECTS
BY YEAR OF INITIAL OCCUPANCY

YEAR OF INITIAL OCCUPANCY*	PROJECT TYPE			
	All	Elderly	Family	Mixed
1975	1%	1%	0%	0%
1976	13	8	35	14
1977	43	35	70	52
1978	92	92	95	90
1979	100	100	100	100
Sample Size	(138)	(97)	(20)	(21)

SAMPLE: Cross-section projects.

DATA SOURCES: Recipient Data Form, Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

* Chi square test, computed for the simple distribution of earliest lease year for each project, shows age to be significantly different among elderly, family, and mixed projects at the 0.05 level.

central city[1] -- the main city of an SMSA, not limited to the business district

inner suburb -- a municipality having a contiguous boundary with the central city

outer suburb -- a municipality in the SMSA but not sharing a border with the central city.

Table III-18 splits the New Construction projects of the cross-section by location. Suburban projects account for 63 percent of the sample. The table also shows locational mix by designated project type, size, and developer type. The differential relationships between these paired characteristics are not statistically significant.

In a separate analysis of project age by geographic distribution, it appears that New Construction leasing activity is increasing very slightly in central city locations. In each of the years 1976, 1977, and 1978, central city projects represent 35 percent, 37 percent, and 40 percent, respectively, of leasing activity at sampled projects.

Two factors restricted the siting decisions of some developers. Twenty-two percent of the developers of cross-section projects owned the land prior to their decision to develop a New Construction project in that location. HUD or the Housing Finance Agency preselected 29 percent of the project locations--either the municipality or the specific site.

The Project Staff Questionnaire asked developers for the reasons which entered into their decision concerning site selection. (See Table III-19.) The responses to these questions represent not only those developers who did not previously own the land or whose site was not preselected, but also the developers whose siting choices were limited by those conditions. Virtually all mentioned some form of government input: either HUD (or the Housing Finance Agency) viewed the site favorably; or the site lay within the area designated by the local Housing Assistance Plan; or local officials supported the site and the project explicitly. Nearly as many developers

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[1] Four of the sixteen SMSAs in the cross-section sample are composed of more than one central city. These are Appleton-Oshkosh, Los Angeles-Long Beach, Providence-Pawtucket-Warwick, and Seattle-Everett.

Table III-18

LOCATION OF CROSS-SECTION PROJECTS

LOCATION[a]	ALL PROJECTS	PROJECT TYPE			PROJECT SIZE			TYPE OF DEVELOPER		
		Elderly	Family	Mixed	Small	Medium	Large	Private for-profit	Private not-for-profit	Public Agency
Central city	37%	41%	25%	29%	35%	43%	35%	39%	[38%]	[31%]
Inner suburb	18	20	10	19	15	27	15	20	[12]	[15]
Outer suburb	45	39	65	52	50	30	51	41	[50]	[54]
TOTAL	100%	100%	100%	100%	100%	100%	101%	100%	100%	100%
Sample Size	(138)	(97)	(20)	(21)	(46)	(37)	(55)	(98)	(8)	(13)

SAMPLE: Cross-section projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from HUD field offices by research project staff.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

a. Chi square test shows this to be not significantly different among project types, sizes, or developer types at the 0.10 level.

Table III-19

FACTORS IN SITE SELECTION

FACTOR[a]	PERCENTAGE OF DEVELOPERS MENTIONING THIS FACTOR	SAMPLE SIZE
Government support (local officials, Housing Assistance Plan, HUD or Housing Finance Agency)	98%	(119)
Familiarity with locality	94	(119)
Zoning (already appropriately zoned or easily rezoned)	77	(117)
Community group support	69	(114)
Market conditions (least expensive site or only one available)	47	(119)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

cited their familiarity with the locality as being important in choosing a location. A lesser number responded that the chosen site was already zoned appropriately, or rezoned easily for their use. Other factors included the encouragement of community organizations, and the prevailing market conditions--land cost and supply.

As the single most important factor in site selection, two thirds of the developers indicated government support. Table III-20 shows the primary site selection influences of all sampled developers, and also divides developers according to the location of their projects (although the differences in the latter split are not found to be statistically significant).

Characteristics of Project Tracts

Tables III-21 and III-22 present racial/ethnic and poverty traits of project locations based on data from the 1970 census. These tables contain mean percentages of black, Hispanic, and all minority individuals, and households whose incomes are below the poverty level, as well as percentage point differences between the project tract statistic and the SMSA mean percentage for the black, Hispanic, and poverty traits.[1] These figures are presented for all cross-section projects and then are differentiated by project type--elderly, family, mixed--and by project location.

When projects are distinguished by type, significant differences from the SMSA mean percentages are found in the tracts of elderly and mixed projects. In elderly project locations, both the black and Hispanic populations are proportionately lower than the corresponding populations in all tracts of the SMSAs. The composition of mixed project tracts includes a substantially lower black population than that of the counterpart SMSAs as a whole. Other percentage point differences in this stratification are not found to be statistically significant.

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[1] These differences provide a rough indication of the potential for the projects to accomplish racial/ethnic and economic deconcentration. Projects located in highly concentrated tracts relative to the general population would require that predominantly non-minority or above-poverty-level households move into those projects, and the converse, in order to begin achieving an integrated balance.

Table III-20

MOST IMPORTANT FACTOR IN SITE SELECTION

FACTOR[a]	PERCENTAGE OF DEVELOPERS MENTIONING THIS FACTOR (By Project Location)			
	All Projects	Central City	Inner Suburb	Outer Suburb
Government support	67%	69%	68%	64%
Familiarity with locality	7	3	10	8
Zoning	9	9	5	10
Community group support	10	16	0	10
Market conditions	8	3	16	8
TOTAL	101%	100%	99%	100%
Sample Size	(90)	(32)	(19)	(39)

SAMPLE: Cross-section project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: The most important factors were chosen from those listed in Table III-19.
a. Chi square test shows this to be not significantly different among project locations at the 0.10 level.

Table III-21

RACIAL/ETHNIC AND POVERTY CHARACTERISTICS OF PROJECT TRACTS: ELDERLY, FAMILY, MIXED PROJECTS

CHARACTERISTIC	TRACTS OF: All Projects	Elderly Projects	Family Projects	Mixed Projects
MEAN PERCENTAGE IN PROJECT TRACT				
Minority	13%	12%	29%	5%
Black	8	7	18	1
Hispanic	4	4	11	3
Below poverty level	7	7	11	6
MEAN DIFFERENCE FROM SMSA PERCENTAGE[a]				
Black	-3%†	-3%*	+5%	-6%**
	(2)	(2)	(6)	(1)
Hispanic	0	-1**	+6	0
	(1)	(1)	(4)	(1)
Below poverty level	0	0	+4	-1
	(1)	(1)	(2)	(1)
Sample Size	(138)	(97)	(20)	(21)

SAMPLE: Cross-section projects.

DATA SOURCES: 1970 census, Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

NOTE: Standard error of mean in parentheses below each mean difference from the SMSA percentage.

a. Project tract mean percentage minus SMSA mean percentage.

** t test shows this to be significantly different from the SMSA mean percentage at the 0.01 level.

* t test shows this to be significantly different from the SMSA mean percentage at the 0.05 level.

† t test shows this to be significantly different from the SMSA mean percentage at the 0.10 level.

Table III-22

RACIAL/ETHNIC AND POVERTY CHARACTERISTICS OF PROJECT TRACTS: CENTRAL CITY, INNER SUBURB, OUTER SUBURB

CHARACTERISTIC	All Projects	PROJECT TRACT LOCATION Central City	Inner Suburb	Outer Suburb
MEAN PERCENTAGE IN PROJECT TRACT				
Minority	13%	20%	12%	8%
Black	8	13	3	5
Hispanic	4	5	8	2
Below poverty level	7	10	6	6
MEAN DIFFERENCE FROM SMSA PERCENTAGE[a]				
Black	-3%†	+4%	-5%**	-7%**
	(2)	(3)	(1)	(2)
Hispanic	0	-1	+4	-1**
	(1)	(1)	(3)	(0)
Below poverty level	0	+3*	-1	-1**
	(1)	(1)	(1)	(1)
Sample Size	(138)	(51)	(25)	(62)

SAMPLE: Cross-section projects.

DATA SOURCES: 1970 census and Project Staff Questionnaire.

NOTE: Standard error of mean in parentheses below each mean difference from the SMSA percentage.

a. Project tract mean percentage minus SMSA mean percentage.

** t test shows this to be significantly different from the SMSA mean percentage at the 0.01 level.

* t test shows this to be significantly different from the SMSA mean percentage at the 0.05 level.

† t test shows this to be significantly different from the SMSA mean percentage at the 0.10 level.

Dividing project tracts by location class shows that central city projects are in tracts of a significantly higher mean percentage of below-poverty-level households than the mean of the corresponding SMSAs. Both inner and outer suburban project tracts have proportionately smaller black populations than the SMSA means. Outer suburban project tracts also include smaller percentages of Hispanic individuals and below-poverty-level households than do all tracts of the sampled SMSAs. The remaining mean differences from the SMSA percentages are not significant.

III.3 ADMINISTRATIVE PROCEDURES

Heretofore, this appendix has focused on the role of the developer. This section shifts to the marketing agent, who publicizes a New Construction project to find households eligible for a Section 8 subsidy and chooses which households will eventually become project residents. Marketing functions are carried out by the development organization in 76 percent of the sampled cases. (Refer back to Table III-2.)

The variety of outreach methods and selection criteria used in the cross-section projects is outlined here in order to assess who is being made aware of benefit opportunities and what characterizes the process by which interested households are selected.

Outreach Methods

As delineated in HUD regulations for the Section 8 New Construction program (24 CFR 880.601), a project owner, or marketing agent, is responsible for carrying out "diligent marketing activities . . . not later than 90 days prior to the anticipated date of availability for occupancy of the first unit of the project." These activities must conform to an Affirmative Fair Housing Marketing Plan and Equal Opportunity requirements. The owner is further obliged to direct outreach specifically to non-elderly families (if appropriate for the designated project type) and families "expected to reside" in the project locality for employment, before publicizing to the general, eligible population; these two household types are considered the least likely to apply for Section 8 benefits.

To achieve these outreach objectives, marketers usually use several means of contacting eligible households. Table III-23 shows these outreach methods and their incidence of use.

Newspapers were the most universal channel of publicity. Marketers listed the availability of Section 8 units both in metropolitan newspapers and in publications aimed at a narrower readership such as elderly households or the Spanish-speaking community. Telephone contact or in-person visits were also widely employed. Marketers identified prospective tenants to reach directly with the help of welfare and social service agencies, churches and local organizations, and public housing waiting lists.

Marketers used a mean of 3.1 outreach methods. One marketer did not undertake any outreach activities; two marketers used all six methods listed in Table III-23. Table III-24 shows the extent of outreach performed by all marketers, and by the three organizational types. As a group, public agencies carried out the most varied marketing, with a mean of 3.8 methods.

Special Outreach

In order to afford all household types an equal chance of learning about and applying for Section 8, marketers often target outreach efforts at demographic subpopulations. Table III-25 shows the groups to whom special outreach is directed, and the perceived success of the effort. All marketers who undertook outreach to elderly households considered it successful. In addition to the racial/ethnic minorities in the table, six marketers mentioned conducting special outreach to either Asian or American Indian families, or both. Notably, only 26 percent of marketers attempted to attract households "expected to reside" in the project area, although this is a group at which owners are mandated (by HUD regulations) to direct marketing activities.

Tenant Selection Criteria

Once eligible households have been apprised of the Section 8 program, it is the responsibility of the marketer to accept and review applications and finally to select tenants qualified for the project. Marketers apply a

Table III-23

OUTREACH METHODS

METHOD[a]	PERCENTAGE OF MARKETERS USING
Newspaper announcement	93%
Telephone or in-person contact	78
Brochures and posters	57
Mailings and flyers	56
Radio advertisement	18
Television advertisement	4
Sample Size	(123)

SAMPLE: Cross-section project marketers.
DATA SOURCE: Project Staff Questionnaire.
a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

Table III-24

NUMBER OF OUTREACH METHODS USED

NUMBER OF METHODS†	TYPE OF MARKETER: All	Private for-profit[a]	Private not-for-profit[a]	Public Agency[a]
Mean	3.1	3.1	3.2	3.8
	Percentage	Percentage	Percentage	Percentage
0	1%	1%	[0%]	[0%]
1	6	4	[0]	[0]
2	28	25	[40]	[25]
3	24	28	[20]	[8]
4	33	35	[20]	[50]
5	6	6	[20]	[0]
6	2	0	[0]	[17]
TOTAL	100%	99%	100%	100%
Sample Size	(123)	(71)	(5)	(12)

SAMPLE: Cross-section project marketers.

DATA SOURCE: Project Staff Questionnaire.

NOTE: Percentages enclosed in brackets are based on fewer than 15 observations.

a. Since the organizational characteristic (private, non-profit, public) is known about the developers only, marketers who are not part of the development organization are excluded from these figures.

† Chi square test shows this to be significantly different among marketer types at the 0.10 level.

Table III-25

OUTREACH TO SPECIAL GROUPS

GROUP[a]	PERCENTAGE OF MARKETERS USING TARGETED OUTREACH	MARKETERS FINDING OUTREACH SUCCESSFUL[b]	
		Percentage	Sample Size
Black households	72%	65%	(75)
Hispanic households	64	53	(64)
White households	58	91	(43)
Elderly households	79	100	(85)
Handicapped/disabled persons	68	86	(71)
Households expected to reside	26	75	(28)
Working families	14	[92]	(13)
Sample Size	(122)		

SAMPLE: Cross-section project marketers.

DATA SOURCE: Project Staff Questionnaire.

NOTE: Percentage enclosed in brackets is based on fewer than 15 observations.

a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

b. This is based on only those marketers who performed such outreach. Because of missing responses, sample size in this column is smaller than the percentage of marketers using targeted outreach (in the first column).

range of priority schemes in the selection process, and often combine two or more sets of criteria. HUD must approve these tenant selection plans. Table III-26 collapses the criteria into categories and indicates how often each type is used. They are elaborated upon below.

Marketers most often accepted tenants in chronological order by date of application. A few randomized tenant selection through use of a lottery. Almost half of the marketers exercised some form of subjective judgment in choosing tenants. This involved either collecting credit references, or forming an opinion about desirability as a tenant and neighbor, or discerning the severity of need for housing assistance. Giving preference to certain household types was as prevalent a selection method as staff judgment: marketers set priorities to achieve racial/ethnic and economic balance, to provide appropriate housing for handicapped individuals, and to house displaced persons. Applicants who are local residents received preference from 18 percent of the sampled marketers. Although local residence is not permitted to be a condition for acceptance into a Section 8 project, marketers may give priority to local residents insofar as this practice does not impede affirmative fair housing goals.

In 63 percent of the cases, marketers combine two of the selection schemes described above. Most often, this involved choosing tenants either on a lenient "first come, first served" basis with special attention to certain household types (for instance, racial/ethnic minorities or handicapped persons), or with an eye toward serving those in greatest need (such as Very Low Income or displaced households). Twenty-one percent of marketers incorporated more than two sets of criteria into their tenant selection plans.

III.4 MANAGERS' SATISFACTION WITH THE SECTION 8 PROGRAM

This section of the appendix addresses project managers' satisfaction with their Section 8 tenants and with the program in general. These assessments come from the Manager portion of the Project Staff Questionnaire. As noted earlier in Table III-2, at approximately three quarters of the cross-section projects, the management agent is the same person or organization as (or a subsidiary of) the developer. The remaining managers are not excluded here;

Table III-26

TENANT SELECTION CRITERIA

TYPE OF CRITERIA[a]	PERCENTAGE OF MARKETERS USING
Chronological or random order	59%
Subjective judgment	44
Preference to designated household types	42
Preference to local residents	18
Sample Size	(118)

SAMPLE: Cross-section project marketers.
DATA SOURCE: Project Staff Questionnaire.
a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

this section takes into account the responses of all managers in order to present a general evaluation of the Section 8 New Construction program as it is proceeding at the cross-section projects.

Evaluation of Section 8 Tenants

In a general evaluation of Section 8 tenants, virtually all managers offered a positive review: 37 percent said they were satisfied with the tenants and 62 percent said they were very satisfied. Significantly more managers of elderly projects said they were very satisfied with Section 8 tenants than did family and mixed project managers. Table III-27 contains these results.

Managers compared their experience with Section 8 tenants and their experience with other tenants (i.e., market-rate tenants in the project or any other renters the manager has or had in the past). In Table III-28 are the comparisons on five points of tenant behavior. On all points, the majority of managers reported that their Section 8 tenants provided no more problems, or, indeed, fewer problems, than other tenants.

A composite index, calculated as a sum of the number of favorable ratings of Section 8 tenants against other tenants, shows that project managers assess Section 8 tenants very positively. On a scale from zero to five, with a lower value signifying fewer problems with Section 8 tenants than with other tenants, the mean rating by sampled managers was 0.2.

Satisfaction with the Section 8 Program

New Construction managers in the cross-section sample are happy with the Section 8 program as it is proceeding in their projects. Almost every manager claimed satisfaction, and 60 percent said they were very satisfied with the way the program has gone thus far.

Table III-29 divides manager satisfaction by project type. It is apparent that the program operates most smoothly in elderly projects, where the percentage of managers who are very satisfied is significantly higher than the comparable percentages for family and mixed projects.

Table III-27

GENERAL SATISFACTION WITH SECTION 8 TENANTS

DEGREE OF SATISFACTION*	MANAGERS OF: All Projects	Elderly Projects	Family Projects	Mixed Projects
Very satisfied	62%	71%	40%	39%
Satisfied	37	28	60	61
Dissatisfied	1	1	0	0
Very dissatisfied	0	0	0	0
Sample Size	(125)	(92)	(15)	(18)

SAMPLE: Cross-section project managers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

* Chi square test shows this to be significantly different among elderly, family, and mixed projects at the 0.05 level.

Table III-28

COMPARATIVE RATING OF SECTION 8 TENANTS
WITH OTHER TENANTS

TENANT BEHAVIOR	PERCENTAGE OF MANAGERS EXPERIENCING: Fewer	Equal	More	Total	Sample Size
Maintenance requests	23%	68%	9%	100%	(117)
Instances of property damage	40	58	2	100%	(115)
Problems with neighbors	30	63	8	101%	(118)
Late rent payment	65	35	0	100%	(121)
Nonpayment of rent	73	26	1	100%	(116)

SAMPLE: Cross-section project managers.
DATA SOURCE: Project Staff Questionnaire.

Table III-29

GENERAL SATISFACTION WITH SECTION 8 PROGRAM

DEGREE OF SATISFACTION*	MANAGERS OF: All Projects	Elderly Projects	Family Projects	Mixed Projects
Very satisfied	60%	69%	33%	39%
Satisfied	38	29	67	61
Dissatisfied	1	1	0	0
Very dissatisfied	1	1	0	0
TOTAL	100%	100%	100%	100%
Sample Size	(123)	(90)	(15)	(18)

SAMPLE: Cross-section project managers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

* Chi square test shows this to be significantly different among elderly, family, and mixed projects at the 0.05 level.

PANEL PROJECTS

The New Construction panel was designed to include only projects which were in the process of lease-up during the field research period, summer and fall of 1979. This sample consists of 32 projects in 13 SMSAs. All the projects are less than one year old, measured from date of initial occupancy, and thus illustrate the more recent experience of Section 8.

The sections following are organized to parallel the preceding descriptions of cross-section projects. After the discussion of each feature, the fundamental difference or likeness between the panel and cross-section projects on that feature is briefly described. For ease of reference, section and table numbers are the same as the comparable sections and tables for cross-section projects, followed by the letter "P" (for panel). That is, Table III-1P contains panel data analogous to those in Table III-1 for the cross-section. Note that Tables III-11 and III-17 are not pertinent to panel projects, and thus, do not have counterparts in the sections following.

The convention of bracketing percentages based on fewer than 15 observations is suspended in the tables presenting panel data. Because virtually any subdivision of 32 cases will produce a very small sample size, the many resulting brackets would encumber the tables. In light of this, both frequency counts and percentages are listed to help the reader keep the statistics in perspective.

III.1P DEVELOPER CHARACTERISTICS

Types of Organizations and Division of Administrative Responsibilities

Developers of New Construction projects in the panel are largely private for-profit corporations. They also include non-profit neighborhood and community service groups, and one public agency, a county housing authority. Table III-1P shows the distribution of organization types among panel project developers. In comparison with cross-section developers, the panel includes proportionately more non-profit organizations and fewer public agency developers.

Table III-1P

TYPES OF DEVELOPER ORGANIZATIONS

	NUMBER	PERCENTAGE
Private for-profit	20	71%
Private not-for-profit	7	25
Public agency	1	4
TOTAL	(28)	100%

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.

The majority of developers see their projects through marketing and management. One fourth contract these two functions to a separate party. Additionally, one developer performs marketing and hires another organization to handle management. This division of responsibilities, displayed in Table III-2P, is comparable to the division of responsibilities among cross-section projects. Table III-3P shows the allocation of administrative functions among the three categories of development organizations.

Prior Experience of Developer

Most developers in the panel are experienced in all phases of rental project administration. The number of sampled developers who have previously developed, marketed, and managed both market-rate and subsidized projects is shown in Table III-4P. This table also displays the median number of projects which the experienced developers have handled in each administrative capacity.

The proportions of panel developers who have previous experience in development, marketing, and management, are one to eleven points lower than such proportions in the cross-section, although the median number of projects in the panel developers' experience is slightly higher.

Non-profit developers, as a group, are generally less experienced than private for-profit developers in project development, marketing, and management, though this difference is not statistically signigicant. (See Tables III-5P and III-6P.) The single public agency in the sample had previously developed, marketed, and managed two rental projects.

Table III-7P presents the sampled developers' previous experience with the Section 8 program in particular. Here too, it can be seen that the majority of developers do have such experience.

Juxtaposing prior Section 8 experience of panel and cross-section developers shows that cross-section developers as a group are somewhat more familiar with Section 8, especially with respect to the project management phase.

Table III-2P

DIVISION OF ADMINISTRATIVE FUNCTIONS

	NUMBER	PERCENTAGE
Developver separate, marketer-manager same	8	25%
Manager separate, developer-marketer same	1	3
Developer-marketer-manager same	23	72
TOTAL	(32)	100%

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.

Table III-3P

DIVISION OF ADMINISTRATIVE FUNCTIONS AMONG
TYPES OF DEVELOPER ORGANIZATIONS

DIVISION OF FUNCTIONS[a]	TYPE OF DEVELOPER					
	Private for-profit		Private not-for-profit		Public Agency	
	Number	Percentage	Number	Percentage	Number	Percentage
Developer separate, marketer-manager same	7	35%	0	0%	0	0%
Manager separate, developer-marketer same	0	0	1	14	0	0
Developer-marketer-manager same	13	65	6	86	1	100
TOTAL	(20)	100%	(7)	100%	(1)	100%

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.
a. Chi square test shows this to be not significantly different among developer types at the 0.10 level.

Table III-4P

DEVELOPERS' PRIOR EXPERIENCE

TYPE OF EXPERIENCE	DEVELOPERS HAVING EXPERIENCE			MEDIAN NUMBER OF PREVIOUS PROJECTS (market-rate and subsidized) [a]
	Number	Percentage	Sample Size	
Development	20	77%	(26)	12.5
Marketing	19	70	(27)	9
Management	16	62	(26)	6.5

SAMPLE: Panel project developers.

DATA SOURCE: Project Staff Questionnaire.

a. Calculation of median number of projects excludes developers with no prior experience.

Table III-5P

PRIOR EXPERIENCE AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE[a]	TYPE OF DEVELOPER: Private for-profit Number	Percentage	Sample Size	Private not-for-profit Number	Percentage	Sample Size	Public Agency Number	Percentage	Sample Size
Development	15	83%	(18)	4	57%	(7)	1	100%	(1)
Marketing	14	74	(19)	4	57	(7)	1	100	(1)
Management	12	67	(18)	3	43	(7)	1	100	(1)

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.
a. Chi square test shows this to be not significantly different among developer types at the 0.10 level.

Table III-6P

PRIOR EXPERIENCE AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE	TYPE OF DEVELOPER: Private for-profit		Private not-for-profit		Public Agency	
	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size
Development	12	(15)	13	(4)	2	(1)
Marketing	13	(14)	4	(4)	2	(1)
Management	10.5	(12)	4	(3)	2	(1)

SAMPLE: Panel project developers.

DATA SOURCE: Project Staff Questionnaire.

a. Calculation of median number of previous projects (market-rate and subsidized) excludes developers with no prior experience.

Table III-7P

DEVELOPERS' PRIOR SECTION 8 EXPERIENCE

TYPE OF EXPERIENCE	DEVELOPERS HAVING EXPERIENCE			MEDIAN NUMBER OF PREVIOUS S8 PROJECTS [a]
	Number	Percentage	Sample Size	
Development	19	68%	(28)	3.5
Marketing	18	64	(28)	2
Management	13	48	(27)	2

SAMPLE: Panel project developers.

DATA SOURCE: Project Staff Questionnaire.

a. Calculation of median number of previous Section 8 projects excludes developers with no prior Section 8 experience.

Table III-8P demonstrates that private for-profit developers in the panel are considerably more experienced in the Section 8 program than are non-profit developers, particularly in project management. This observation holds true for the number of Section 8 projects developed, marketed, and managed by for-profit compared to non-profit developers, as well. (See Table III-9P.) The sampled public agency has not had previous Section 8 experience.

III.2P PANEL PROJECT CHARACTERISTICS

The following features of panel projects will be covered in this section:

- designated project type (elderly, family, mixed)
- extent of Section 8 subsidy (100 percent or fewer than 100 percent of the units)
- administrator of the Housing Assistance Payments contract (HUD or a Housing Finance Agency)
- size (number of units)
- location (central city, inner suburb, outer suburb)
- racial/ethnic and poverty characteristics of the tract (according to 1970 census data).

Project Types

Table III-10P presents two breakdowns of projects in the panel: occupancy designation and extent of Section 8 subsidy. The most prevalent designated project type is that reserved for elderly residents only; the least common is the mixed project, for elderly and non-elderly families together. All but one project are 100 percent Section 8 assisted. The exception is a family project in the Baltimore SMSA, with 24 percent of its units subsidized by Section 8.

Compared with the cross-section sample, the mix of projects by occupancy designation in the panel includes an approximately equal percentage of elderly projects, but a higher percentage of family projects and a lower percentage of mixed projects. A comparison of the two samples by the extent of Section 8 subsidies shows that the panel is made up of proportionately

Table III-8P

PRIOR EXPERIENCE WITH SECTION 8 AMONG TYPES OF DEVELOPER ORGANIZATIONS

TYPE OF EXPERIENCE	TYPE OF DEVELOPER: Private for-profit Number	Percentage	Sample Size	Private not-for-profit Number	Percentage	Sample Size	Public Agency Number	Percentage	Sample Size
Development†	16	80%	(20)	3	43%	(7)	0	0%	(1)
Marketing†	15	75	(20)	3	43	(7)	0	0	(1)
Management*	12	63	(19)	1	14	(7)	0	0	(1)

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.
* Chi square test shows this to be significantly different among developer types at the 0.05 level.
† Chi square test shows this to be significantly different among developer types at the 0.10 level.

Table III-9P

PRIOR EXPERIENCE WITH SECTION 8 AMONG
TYPES OF DEVELOPER ORGANIZATIONS

	TYPE OF DEVELOPER				
	Private for-profit		Private not-for-profit		Public Agency[b]
TYPE OF EXPERIENCE	Number of Projects[a]	Sample Size	Number of Projects[a]	Sample Size	
Development	4	(16)	1	(3)	--
Marketing	3	(15)	1	(3)	--
Management	3	(12)	1	(1)	--

SAMPLE: Panel project developers.

DATA SOURCE: Project Staff Questionnaire.

a. Calculation of median number of previous Section 8 projects excludes developers with no prior Section 8 experience.

b. The only sampled public agency has not had previous Section 8 experience.

Table III-10P

CHARACTERISTICS OF PANEL PROJECTS

CHARACTERISTIC	NUMBER OF PROJECTS	PERCENTAGE OF PROJECTS
OCCUPANCY DESIGNATION		
Elderly projects	22	69%
Family projects	7	22
Mixed projects	3	9
TOTAL	(32)	100%
EXTENT OF SECTION 8 SUBSIDY		
100% of units	31	97%
<100% of units	1	3
TOTAL	(32)	100%

SAMPLE: Panel projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

fewer partially assisted projects than the cross-section (3 percent versus 12 percent, respectively).

Distinguishing designated project types by type of development organization reveals no significant differences among private, non-profit, and public developers in their choices to build elderly, family, or mixed projects. This stratification of panel projects is shown in Table III-12P.

The two tables following list the reasons which developers reported as most influential in their decision to build a certain project type. Table III-13P stratifies developers by organizational category. Among all types of developers, the greatest influences on building decisions were the analysis of the market and the available financing packages. The "other" factors cited included anticipated profitability and an interest in serving special needs populations. Table III-14P divides developers according to the type of project they built. The subsample sizes, particularly of non-profit and public agency developers, and of family project and mixed project developers, are so small as not to warrant a detailed discussion of the resulting percentages.

A project developer enters into the Housing Assistance Payments contract with either a HUD field office or a state Housing Finance Agency. HUD-administered contracts are the predominant type (62 percent, or 20 of 32) among panel projects, as they are among cross-section projects. Eight of the twelve Housing Finance Agency projects in the panel are found in two SMSAs, Baltimore and Providence-Pawtucket-Warwick.

Project Size

Panel projects range in size from 22 units--a project in the Chicago SMSA designed exclusively for handicapped residents--to 260 units--an apartment building for elderly households in Baltimore. The median project size is 100 units.

The same limits that were used to define three size classes of cross-section projects are applied here to panel projects (small--fewer than 75 units; medium--between 75 and 125 units; large--more than 125 units). Table III-15P categorizes panel projects accordingly, and Table III-16P further stratifies these categories by project type. The panel consists

Table III-12P

TYPE OF DEVELOPER BY PROJECT TYPE

PROJECT TYPE[a]	TYPE OF DEVELOPER: Private for-profit Number	Private for-profit Percentage	Private not-for-profit Number	Private not-for-profit Percentage	Public Agency Number	Public Agency Percentage
Elderly	14	70%	5	71%	1	100%
Family	4	20	2	29	0	0
Mixed	2	10	0	0	0	0
TOTAL	(20)	100%	(7)	100%	(1)	100%

SAMPLE: Panel project developers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

a. Chi square test shows this to be not significantly different among developer types at the 0.10 level.

Table III-13P

MOST INFLUENTIAL REASON FOR BUILDING PROJECT AMONG DEVELOPER TYPES

	TYPE OF DEVELOPER							
	All		Private for-profit		Private not-for-profit		Public Agency	
REASON[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Market analysis	9	32%	6	30%	3	43%	0	0%
Available financing	8	29	5	25	2	29	1	100
Local government input	3	11	3	15	0	0	0	0
HUD/HFA selection process	2	7	2	10	0	0	0	0
Community group input	1	4	0	0	1	14	0	0
Fair Market Rents	1	4	1	5	0	0	0	0
Other factors	4	14	3	15	1	14	0	0
TOTAL	(28)	101%	(20)	100%	(7)	100%	(1)	100%

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.
a. Chi square test shows this to be not significantly different among developer types at the 0.10 level.

Table III-14P

DEVELOPERS' MOST INFLUENTIAL REASON FOR BUILDING PROJECT TYPES

	DEVELOPERS OF:							
	All Projects		Elderly Projects		Family Projects		Mixed Projects	
REASON[a]	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Market analysis	9	32%	9	45%	0	0%	0	0%
Available financing	8	29	5	25	2	33	1	50
Local government input	3	11	2	10	0	33	1	50
HUD/HFA selection process	2	7	1	5	1	17	0	0
Community group input	1	4	0	0	1	17	0	0
Fair Market Rents	1	4	0	0	1	17	0	0
Other factors	4	14	3	15	1	17	0	0
TOTAL	(28)	101%	(20)	100%	(6)	101%	(2)	100%

SAMPLE: Panel project developers.

DATA SOURCES: Project Staff Questionnaire, Section 8 management information system data, and information collected from project records and HUD field offices by research project field staff.

a. Chi square test shows this to be not significantly different among developers of elderly, family, and mixed projects at the 0.10 level.

Table III-15P

SIZE OF PANEL PROJECTS

SIZE	NUMBER OF PROJECTS	PERCENTAGE OF PROJECTS
Small	7	22%
Medium	11	34
Large	14	44
TOTAL	(32)	100%

SAMPLE: Panel projects.

DATA SOURCE: Information collected from project records by research project field staff.

Table III-16P

SIZE AMONG PROJECT TYPES

SIZE[a]	PROJECT TYPE					
	Elderly		Family		Mixed	
Median Number of Units	104		88		107	
	Number	Percentage	Number	Percentage	Number	Percentage
Small	4	18%	3	43%	0	0%
Medium	8	36	2	29	1	33
Large	10	45	2	29	2	67
TOTAL	(22)	99%	(7)	101%	(3)	100%

SAMPLE: Panel projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

a. Chi square test shows the project size distribution to be not significantly different among elderly, family, and mixed projects at the 0.10 level.

of twice as many large projects (fourteen) as small projects (seven), with medium projects falling between. The size differences across elderly, family, and mixed projects are not found to be statistically significant.

In comparison with the cross-section sample, the more recently built projects comprising the panel tend to be slightly smaller, with a median size of four fewer units. Proportionately more projects in the panel, however, fall into the large category (44 percent versus 40 percent in the cross-section).

Project Location and Siting Decisions

Location of panel projects is defined, as for cross-section projects, as central city,[1] inner suburb, and outer suburb. Table III-18P shows the location of panel projects and also cross-references location by project type, size, and developer type. Overall, outer suburban projects are the most common, and inner suburban the least common. The greatest deviation from this pattern is among large projects, which are chiefly in central city locations.

The distribution of locations in the panel is consistent with the cross-section sample in that the majority of the projects are suburban, although a much smaller percentage of panel projects are in inner suburbs (9 percent versus 18 percent of the cross-section projects).

Responses to the Project Staff Questionnaire reveal that seven of twenty-eight developers, or one fourth, owned the land on which the project was built even before the decision was made to develop the project. In eight cases, or 29 percent of the time, HUD or the Housing Finance Agency had designated the city or town in which the project was to be located, or had preselected the site in particular.

Table III-19P reports the developers' reasons for location choices. The number of developers responding to these questions includes those who already owned the land or whose site was preselected. All responding developers said

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[1] Two of the thirteen SMSAs in the New Construction panel comprise more than one central city. These are Providence-Pawtucket-Warwick and Seattle-Everett.

Table III-18P

LOCATION OF PANEL PROJECTS

LOCATION	NUMBER	PERCENTAGE
Central city	13	41%
Inner suburb	3	9
Outer suburb	16	50
TOTAL	(32)	100%

	PROJECT TYPE[a]					
	ELDERLY		FAMILY		MIXED	
LOCATION	Number	Percentage	Number	Percentage	Number	Percentage
Central city	11	50%	1	14%	1	33%
Inner suburb	2	9	1	14	0	0
Outer suburb	9	41	5	71	2	67
TOTAL	(22)	100%	(7)	99%	(3)	100%

	PROJECT SIZE†					
	SMALL		MEDIUM		LARGE	
LOCATION	Number	Percentage	Number	Percentage	Number	Percentage
Central city	0	0%	4	36%	9	64%
Inner suburb	1	14	1	9	1	7
Outer suburb	6	86	6	55	4	29
TOTAL	(7)	100%	(11)	100%	(14)	100%

	TYPE OF DEVELOPER[a]					
	PRIVATE FOR-PROFIT		PRIVATE NOT-FOR-PROFIT		PUBLIC AGENCY	
LOCATION	Number	Percentage	Number	Percentage	Number	Percentage
Central city	7	35%	5	71%	0	0%
Inner suburb	2	10	1	14	0	0
Outer suburb	11	55	1	14	1	100
TOTAL	(20)	100%	(7)	99%	(1)	100%

SAMPLE: Cross-section projects.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

a. Chi square test shows location to be not significantly different among project types or developer types at the 0.10 level.

† Chi square test shows location to be significantly different among project sizes at the 0.10 level.

Table III-19P

FACTORS IN SITE SELECTION

FACTOR[a]	DEVELOPERS MENTIONING THIS FACTOR		
	Number	Percentage	Sample Size
Government support (local officials, Housing Assistance Plan, HUD or Housing Finance Agency)	28	100%	(28)
Familiarity with locality	24	89	(27)
Zoning (already appropriately zoned or easily rezoned)	19	73	(26)
Community group support	15	56	(27)
Market conditions (least expensive site or only site available)	13	46	(28)

SAMPLE: Panel project developers.

DATA SOURCE: Project Staff Questionnaire.

a. These are not mutually exclusive answer categories; therefore percentages do not add to 100%.

that government support influenced their choice; that is, either local officials or HUD (or the Housing Finance Agency) espoused the site or neighborhood, or the project was to be built in an area covered by a Housing Assistance Plan. Almost all developers mentioned that their familiarity with the city or town was important. A majority also indicated that the zoning status (or zoning flexibility) of the selected site entered into their decision. As the most important factor in site selection, shown in Table III-20P, the greatest number of panel project developers referred to government support. This was the case across all project locations, central city and suburban.

Characteristics of Project Tracts

Tables III-21P and III-22P contain data on racial/ethnic and poverty characteristics of the tracts in which the panel projects are located. These descriptions consist of mean percentages of selected groups--black and Hispanic individuals and below-poverty-level households--in the population, and their deviation from the mean percentages in the corresponding SMSAs.

Across all panel projects, and in a stratification of projects by type, the percentage point differences between project tract means and the respective SMSA means for the racial/ethnic and poverty characteristics are not statistically significant. When projects are split by location, however, three differences are noteworthy. Hispanic residents of tracts where inner suburban projects are located account for a larger percentage of the population of those tracts than they do in the SMSAs taken together. The racial/ethnic compostion of outer suburban project tracts includes a much lower percentage of black individuals and a slightly lower percentage of Hispanic individuals than does the population of the related SMSAs.

The principal difference between the tract characteristics of panel and cross-section projects lies in the higher percentages of black residents and below-poverty-level households in the panel tracts (14 percent and 9 percent) than in the cross-section tracts (8 percent and 7 percent).

Table III-20P

MOST IMPORTANT FACTOR IN SITE SELECTION

FACTOR†	DEVELOPERS MENTIONING THIS FACTOR (By Project Location)							
	ALL PROJECTS		CENTRAL CITY		INNER SUBURB		OUTER SUBURB	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Government support	14	54%	6	54%	3	100%	5	42%
Familiarity with locality	3	12	2	18	0	0	1	8
Zoning	4	15	0	0	0	0	4	33
Community group support	3	12	3	27	0	0	0	0
Market conditions	2	8	0	0	0	0	2	17
TOTAL	(26)	101%	(11)	99%	(3)	100%	(12)	100%

SAMPLE: Panel project developers.
DATA SOURCE: Project Staff Questionnaire.
NOTE: The most important factors were chosen from those listed in Table III-19P.
† Chi square test shows this to be significantly different among project locations at the 0.10 level.

Table III-21P

RACIAL/ETHNIC AND POVERTY CHARACTERISTICS OF PROJECT TRACTS: ELDERLY, FAMILY, AND MIXED PROJECTS

CHARACTERISTIC	TRACTS OF: All Projects	Elderly Projects	Family Projects	Mixed Projects
MEAN PERCENTAGE IN PROJECT TRACT				
Minority	21%	17%	26%	34%
Black	14	9	24	31
Hispanic	2	3	1	1
Below poverty level	9	7	11	19
MEAN DIFFERENCE[a] FROM SMSA PERCENTAGE				
Black	+1%	-4%	+10%	+15%
	(4)	(5)	(13)	(15)
Hispanic	0	-1	0	0
	(0)	(0)	(1)	(1)
Below poverty level	+2	0	+4	+11
	(2)	(1)	(4)	(8)
Sample Size	(32)	(22)	(7)	(3)

SAMPLE: Panel projects.

DATA SOURCES: 1970 census, Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

NOTE: Standard error of mean in parentheses below each mean difference from the SMSA percentage.

a. Project tract mean percentage minus SMSA mean percentage. None of the mean differences from the SMSA percentages is significant at the 0.10 level.

Table III-22P

RACIAL/ETHNIC AND POVERTY CHARACTERISTICS OF PROJECT TRACTS: CENTRAL CITY, INNER SUBURB, OUTER SUBURB

CHARACTERISTIC	PROJECT TRACT LOCATION			
	All Projects	Central City	Inner Suburb	Outer Suburb
MEAN PERCENTAGE IN PROJECT TRACT				
Minority	21%	36%	21%	8%
Black	14	24	15	6
Hispanic	2	3	4	1
Below poverty level	9	12	6	7
MEAN DIFFERENCE FROM SMSA PERCENTAGE[a]				
Black	+1%	+13%	+2%	-8%**
	(4)	(9)	(12)	(3)
Hispanic	0	0	+3*	-1*
	(0)	(1)	(1)	(0)
Below poverty level	+2	+5	-1	0
	(2)	(3)	(1)	(1)
Sample Size	(32)	(13)	(3)	(16)

SAMPLE: Panel projects.

DATA SOURCES: 1970 census and Project Staff Questionnaire.

NOTE: Standard error of mean in parentheses below each mean difference from the SMSA mean percentage.

a. Project tract mean percentage minus SMSA mean percentage.

** t test shows this to be significantly different from the SMSA mean percentage at the 0.01 level.

* t test shows this to be significantly different from the SMSA mean percentage at the 0.05 level.

III.3P ADMINISTRATIVE PROCEDURES

This section covers the marketer's role in project administration: outreach and tenant selection. Twenty-four of the panel developers, or three quarters, perform marketing functions, and the remaining developers engage another organization to carry out marketing (and management). (Refer back to Table III-2P.)

Outreach Methods

Marketers use a number of ways, usually in combination, to reach households eligible for Section 8 assistance. Table III-23P lists these outreach methods and their frequency of use, as encountered in the panel.

A majority of marketers employed, in descending popularity, newspaper announcements, personal contact by telephone or visit, mailings and flyers, or brochures and posters to publicize Section 8 opportunities. Radio and television were less common means of publicity. In all, 26 of the 29 responding marketers made use of at least one news medium, thereby reaching a broader audience than the more individualized forms of contact such as visits, telephone calls, or mailings. Marketers compiled lists of potential applicants to contact directly primarily through local organizations and social service agencies.

Table III-24P indicates that marketers in the panel used, on average, 3.0 methods in the effort to reach eligible households. The mean number of methods is slightly higher for private organizations and slightly lower for non-profit organizations. The single public housing agency in the panel undertook four outreach methods, which was also the maximum among all marketers. One marketer, representing two panel projects, reported performing no active outreach because of the wealth of inquiries resulting from a large sign posted on each of the construction sites.

Special Outreach

Marketing agents often targeted certain household types for special outreach to assure that all segments of the eligible population be made aware of Section 8. Among these groups are black and Hispanic households, elderly

Table III-23P

OUTREACH METHODS

METHOD[a]	MARKETERS USING		Sample Size
	Number	Percentage	
Newspaper announcement	25	86%	(29)
Telephone or in-person contact	21	72	(29)
Mailings and flyers	19	66	(29)
Brochures and posters	15	54	(28)
Radio advertisement	5	17	(29)
Television advertisement	3	10	(29)

SAMPLE: Panel project marketers.
DATA SOURCE: Project Staff Questionnaire.
a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

Table III-24P

NUMBER OF OUTREACH METHODS USED

NUMBER OF METHODS*	TYPE OF MARKETER							
	All		Private for-profit[a]		Private not-for-profit[a]		Public Agency[a]	
Mean	3.0		3.2		2.9		4.0	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
0	2	7%	2	17%	0	0%	0	0%
1	2	7	0	0	1	14	0	0
2	2	7	1	8	0	0	0	0
3	10	34	0	0	5	71	0	0
4	13	45	9	75	1	14	1	100
TOTAL	(29)	100%	(12)	100%	(7)	99%	(1)	100%

SAMPLE: Panel project marketers.
DATA SOURCE: Project Staff Questionnaire.
* Chi square test shows this to be significantly different among marketer types at the 0.05 level.
a. Because the organizational characteristic (private, non-profit, public) is known about developers only, marketers who are not part of the development organization are excluded from these figures.

and handicapped persons, households expected to reside in the project area because of employment, and wage-earning families. Table III-25P presents the number of marketers targeting such outreach and finding it productive.

Marketers of projects in the panel relied generally on the same means of outreach and used roughly the same number of methods as cross-section project marketers. The two samples differ in their performance of targeted outreach, which is somewhat less common in the more recently marketed panel projects.

Tenant Selection Criteria

Marketing agents practice a variety of tenant selection schemes, which are grouped in Table III-26P. The most widely used selection process in panel projects is the assignment of preference to certain household types such as racial/ethnic minorities, handicapped persons, or displaced families. These priorities were set to attain a socioeconomic balance among project residents, and to offer housing to those in greatest need. Chronological acceptance of applicants as tenants is also a common selection method. Three marketers randomized tenant selection by creating a lottery. Approximately a third of the marketers exercised subjective judgment on the basis of the applicant's history as a tenant, credit references, and other information collected from an outside party. In a few cases, preference was given to residents of the project neighborhood. Fifteen of the twenty-eight responding marketers combined at least two sets of criteria, and among these marketers, four incorporated three or more schemes in their tenant selection plan.

The major difference between the selection plans of panel and cross-section marketers is the more widespread use of the "first come, first served" rule in cross-section projects. It is also found that panel marketers, on the whole, use simpler selection schemes, that is, proportionately fewer panel marketers combine two or more sets of criteria.

Table III-25P

OUTREACH TO SPECIAL GROUPS

GROUP[a]	MARKETERS USING TARGETED OUTREACH		MARKETERS FINDING OUTREACH SUCCESSFUL[b]		
	Number	Percentage	Number	Percentage	Sample Size
Black households	17	59%	7	54%	(13)
Hispanic households	16	55	5	38	(13)
White households	8	28	5	71	(7)
Elderly households	19	66	16	100	(16)
Handicapped/ disabled persons	19	66	11	73	(15)
Households expected to reside	9	31	7	100	(7)
Working families	4	14	2	67	(3)
Sample Size	(29)				

SAMPLE: Panel project marketers.

DATA SOURCE: Project Staff Questionnaire.

a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

b. This is based on only those marketers who performed such outreach. Because of missing responses, sample size in this column is smaller than the number of marketers using targeted outreach (in the first column).

Table III-26P

TENANT SELECTION CRITERIA

TYPE OF CRITERIA[a]	MARKETERS USING CRITERIA	
	Number	Percentage
Preference to designated household types	15	54%
Chronological or random order	13	46
Subjective judgment	10	36
Preference to local residents	2	7
Sample Size	(28)	

SAMPLE: Panel project marketers.

DATA SOURCE: Project Staff Questionnaire.

a. These are not mutually exclusive answer categories; therefore, percentages do not add to 100%.

III.4P MANAGERS' SATISFACTION WITH THE SECTION 8 PROGRAM

Just over half the project managers in the panel were far enough along in the Section 8 program at the time they answered the Project Staff Questionnaire to be able to evaluate their tenants and their general experience in the program. It should be noted that these evaluations were made at an early stage in the program since all panel projects were less than one year old by the end of 1979 when the questionnaires were returned.

Satisfaction with Section 8 Tenants

A general evaluation of Section 8 tenants yielded very positive results. Table III-27P shows that all project managers were at least satisfied, if not very satisfied, with their Section 8 tenants. Managers of elderly projects expressed a higher degree of satisfaction than family project managers. The one responding manager of a mixed project claimed to be very satisfied with Section 8 tenants.

The Project Staff Questionnaire asked managers to rate their Section 8 tenants against any other tenants they now have or had in the past, market-rate or assisted. This comparison on five facets of tenant behavior illustrates that Section 8 tenants cause no more problems or fewer problems than other tenants in the managers' experience. Refer to Table III-28P for these ratings.

A composite rating of Section 8 tenants with other tenants, calculated as a sum of the incidence of manager's favorable ratings in Table III-28P, gives evidence that Section 8 tenant behavior is held quite positively. On a scale of zero to five, with a lower value signifying fewer problems with Section 8 tenants than with other tenants, the mean rating of Section 8 tenants by 20 managers was 0.4.

Satisfaction with the Section 8 Program

The project managers in the panel are unanimously satisfied with the Section 8 program overall. Of 21 responding managers, two thirds said they were very satisfied and none expressed dissatisfaction. When managers are divided by project type, as in Table III-29P, the greatest proportion of very satisfied managers is that of elderly project managers.

TABLE III-27P

GENERAL SATISFACTION WITH SECTION 8 TENANTS

	MANAGERS OF:							
	ALL PROJECTS		ELDERLY PROJECTS		FAMILY PROJECTS		MIXED PROJECTS	
DEGREE OF SATISFACTION**	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Very satisfied	14	58%	13	72%	0	0%	1	100%
Satisfied	10	42	5	28	5	100	0	0
Dissatisfied or very dissatisfied	0	0	0	0	0	0	0	0
TOTAL	(24)	100%	(18)	100%	(5)	100%	(1)	100%

SAMPLE: Panel project managers.

DATA SOURCES: Project Staff Questionnaire, Section 8 New Construction management information system data, and information collected from project records and HUD field offices by research project field staff.

** Chi square test shows this to be significantly different among elderly, family, and mixed projects at the 0.01 level.

Table III-28P

COMPARATIVE RATING OF SECTION 8 TENANTS WITH OTHER TENANTS

	MANAGERS EXPERIENCING:							
	FEWER		EQUAL		MORE			
TENANT BEHAVIOR	Number	Percentage	Number	Percentage	Number	Percentage	TOTAL	SAMPLE SIZE
Maintenance requests	2	10%	14	74%	3	16%	100%	(19)
Instances of property damage	6	38	8	50	2	12	100%	(16)
Problems with neighbors	2	12	14	82	1	6	100%	(17)
Late rent payment	7	41	9	53	1	6	100%	(17)
Nonpayment of rent	8	44	9	50	1	6	100%	(18)

SAMPLE: Panel project managers.
DATA SOURCE: Project Staff Questionnaire.

Table III-29P

GENERAL SATISFACTION WITH SECTION 8 PROGRAM

	MANAGERS OF:							
	ALL PROJECTS		ELDERLY PROJECTS		FAMILY PROJECTS		MIXED PROJECTS	
DEGREE OF SATISFACTION*	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Very satisfied	14	67%	12	86%	1	20%	1	50%
Satisfied	7	33	2	14	4	80	1	50
Dissatisfied or very dissatisfied	0	0	0	0	0	0	0	0
TOTAL	(21)	100%	(14)	100%	(5)	100%	(2)	100%

SAMPLE: Panel project managers.
DATA SOURCE: Project Staff Questionnaire.
* Chi square test shows this to be significantly different among elderly, family, and mixed projects at the 0.05 level.

APPENDIX IV

SMSA CHARACTERISTICS

Table IV-1

DEMOGRAPHIC AND HOUSING STOCK CHARACTERISTICS OF THE
16 SAMPLED SMSAs BASED ON 1970 CENSUS DATA

SMSA	PERCENTAGE OF PERSONS AT LEAST 60 YEARS OLD	PERCENTAGE OF BLACK PERSONS	PERCENTAGE OF HISPANIC PERSONS	MEDIAN SCHOOL YEARS COMPLETED BY PERSONS AT LEAST 25 YEARS OLD	PERCENTAGE OF PROF., TECH., MGMT. WORKERS	MEDIAN 1969 INCOME OF FAMILIES	PERCENTAGE OF FAMILIES WITH INCOMES BELOW POVERTY LEVEL	MEDIAN PERSONS PER HOUSING UNIT	PERCENTAGE OF UNITS WITH >1.00 PERSON PER ROOM	PERCENTAGE OF UNITS OWNER OCCUPIED	MEDIAN VALUE OF OWNER OCCUPIED HOUSING	MEDIAN CONTRACT RENT	PERCENTAGE OF HOUSING STRUCTURES BUILT BEFORE 1950	PERCENTAGE OF UNITS LACKING SOME OR ALL PLUMBING
Appleton-Oshkosh	13.0%	0.1%	0.3%	12.2	20.1%	$10,541	5.4%	3.0	a	73.0%	$16,900	$ 88	61.4%	a
Atlanta	9.8	22.3	1.0	12.1	25.9	10,695	9.1	2.9	4.8%	54.8	19,800	98	31.2	1.6%
Baltimore	12.4	23.7	0.9	11.3	23.5	10,577	8.5	2.8	4.8	55.6	15,200	96	54.1	1.2
Chicago	13.0	17.6	4.7	12.1	23.0	11,931	6.8	2.7	6.5	50.4	24,300	116	59.1	2.5
Cleveland	13.4	16.1	1.0	12.1	22.6	11,407	6.9	2.7	2.8	60.0	22,800	93	58.5	2.2
Houston	9.3	19.3	10.7	12.1	25.3	10,191	9.8	2.9	8.1	54.9	14,500	93	32.5	1.4
Los Angeles-Long Beach	13.3	10.8	18.3	12.4	26.2	10,972	8.2	2.4	8.1	46.5	24,300	110	44.7	0.9
Milwaukee	13.8	7.6	1.6	12.2	22.3	11,338	5.7	2.7	3.0	58.0	21,500	100	56.5	3.4
New York	15.8	16.3	12.0	12.1	26.0	10,870	9.2	2.5	7.1	35.8	28,300	99	66.0	2.2
Philadelphia	14.1	17.5	1.7	12.0	23.5	10,783	7.3	2.8	4.2	64.7	14,900	88	61.5	2.1
Providence-Pawtucket-Warwick	15.7	2.3	0.6	11.5	20.5	9,929	7.8	2.7	3.4	56.4	18,100	64	67.2	2.0
Raleigh	10.0	22.1	0.4	12.2	29.8	9,557	11.2	2.9	5.3	55.9	18,500	77	37.3	6.4
Rochester	13.7	6.5	1.4	12.2	25.3	11,969	5.2	2.8	3.0	64.5	20,700	110	61.7	2.8
Saint Louis	14.2	16.0	0.9	11.7	22.9	10,504	8.1	2.7	6.3	60.7	16,300	79	54.0	3.2
San Diego	12.2	4.6	12.8	12.4	27.9	10,133	8.6	2.5	4.6	53.0	22,200	117	30.7	1.0
Seattle-Everett	12.2	2.9	1.7	12.5	28.5	11,676	5.2	2.5	2.1	60.0	21,500	114	45.1	2.5

SAMPLE: SMSAs in the New Construction cross-section or panel or the Existing Housing panel.
DATA SOURCE: 1970 census.
a. Data were not available for Appleton-Oshkosh.

Table IV-2

HOUSING STOCK CHARACTERISTICS OF THE 15 SAMPLED SMSAs[a]
BASED ON ANNUAL HOUSING SURVEY DATA

SMSA	YEAR OF SURVEY	VACANCY RATE NON-RENTAL UNITS	VACANCY RATE RENTAL UNITS	PERCENTAGE OF UNITS OWNER OCCUPIED	PERCENTAGE SINGLE FAMILY UNITS	PERCENTAGE SINGLE FAMILY RENTAL UNITS	PERCENTAGE OF RENTAL UNITS BUILT AFTER 1969	PERCENTAGE OF RENTAL UNITS BUILT BEFORE 1940	PERCENTAGE OF RENTAL UNITS LACKING ALL KITCHEN FACILITIES	MEDIAN ROOMS IN RENTAL UNIT	PERCENTAGE OF RENTAL UNITS WITH >1.5 PERSONS PER ROOM	PERCENTAGE OF RENTERS WHO MOVED WITHIN 12 MONTHS BEFORE SURVEY	MEDIAN GROSS RENT	MEDIAN RENT BURDEN: PERCENTAGE OF INCOME FOR RENT	PERCENTAGE OF RENTERS WITH POOR OPINION OF STRUCTURE	PERCENTAGE OF RENTERS WITH POOR OPINION OF NEIGHBORHOOD
Atlanta	1975	4.3%	15.0%	58.3%	59.3%	18.9%	26.6%	16.2%	0.9%	4.1	1.0%	44.4%	$171	23%	6.5%	4.6%
Baltimore	1976	1.1	5.2	59.7	70.2	37.5	13.8	46.9	1.6	4.3	0.5	29.6	181	23	7.6	5.2
Chicago	1975	1.4	6.7	55.6	48.1	9.6	10.0	62.4	1.5	4.0	1.3	27.7	175	22	6.4	6.3
Cleveland	1976	1.5	5.5	62.9	62.0	18.6	10.0	53.1	1.2	4.3	0.4	29.3	163	24	7.0	6.0
Houston	1976	1.7	8.0	56.2	65.2	31.1	30.0	19.3	1.4	3.9	2.6	48.2	190	22	7.9	5.5
Los Angeles-Long Beach	1974	2.2	7.4	48.3	59.7	31.4	7.8	29.6	2.3	3.6	2.7	38.1	160	22	b	6.1
Milwaukee	1975	1.0	3.6	61.9	58.1	14.3	10.3	52.6	2.4	4.1	0.8	33.5	168	23	5.7	4.8
New York	1976	1.4	5.3	40.7	30.1	4.1	3.4	59.6	1.6	3.7	1.4	17.3	198	26	10.4	9.9
Philadelphia	1975	1.7	7.0	67.6	71.4	27.5	12.9	52.6	1.9	4.0	0.8	30.4	173	24	7.9	5.3
Providence-Pawtucket-Warwick	1976	0.9	6.6	60.2	53.8	13.4	11.0	68.4	1.0	4.2	0.6	27.1	162	24	4.2	3.7
Raleigh	1976	1.6	4.1	59.7	66.7	34.5	27.2	26.1	5.0	4.1	1.4	42.3	168	23	5.6	2.5
Rochester	1975	1.2	8.6	66.6	66.0	21.4	14.5	54.8	0.8	4.0	0.4	37.5	189	24	6.4	4.2
Saint Louis	1976	1.0	7.3	67.3	68.7	26.4	12.1	54.1	1.4	3.9	1.6	33.3	153	23	7.7	6.3
San Diego	1975	2.4	5.7	56.6	60.9	31.2	20.4	16.3	1.5	3.8	1.2	49.8	178	28	4.5	2.4
Seattle-Everett	1976	1.0	5.9	64.5	71.3	32.9	7.5	32.6	1.2	3.8	0.6	45.6	176	23	5.9	3.0

SAMPLE: SMSAs in the New Construction or Existing Housing panel.
DATA SOURCE: Annual Housing Survey conducted in 1974, 1975, or 1976, according to SMSA.
a. Annual Housing Survey data were not available for Appleton-Oshkosh.
b. This item was not included on the 1974 Annual Housing Survey.

APPENDIX V

THE HOUSING MEASUREMENT SURVEY AND ANNUAL HOUSING SURVEY HEDONIC INDICES

Two hedonic indices are used in the analysis of the New Construction and Existing Housing programs. The Housing Measurement Survey (HMS) index was developed by Abt Associates for the Section 8 analysis and is based primarily on the extensive dwelling unit and neighborhood data collected by housing evaluators using the HMS. The Annual Housing Survey (AHS) index is based on household data from the Applicant and Certificate Holder Interviews administered in pre-program dwellings. The questions concerning the dwelling unit and neighborhood were drawn from corresponding items in the Annual Housing Survey. The regression coefficients used to form this index were estimated by Stephen Malpezzi and Larry Ozanne of the Urban Institute, based upon the methodology of Follain and Malpezzi (1979). The AHS samples in the SMSAs in the Section 8 sample were used for estimation. This appendix provides a brief introduction to the general hedonic methodology underlying both the Housing Measurement Survey and Annual Housing Survey hedonic indices. Section V.1 also stresses some of the very important differences between them. Section V.2 describes the specification of the Housing Measurement Survey index and presents the variables used to describe housing attributes. Finally, the Annual Housing Survey equations and the variables used in them are presented in Section V.3.

V.1 INTRODUCTION TO THE HOUSING MEASUREMENT SURVEY AND ANNUAL HOUSING SURVEY HEDONIC INDICES

An hedonic index can incorporate a wide range of housing attributes into one measure of quality, including the size of the dwelling unit, its quality and special features, characteristics of the immediate neighborhood (the blockface and the surrounding parcels), and characteristics of larger neighborhood areas (census tracts). Overall quality is measured as a weighted sum of these attributes. Since the weights cannot be observed directly, they are estimated by regressing rent on the housing and neighborhood attributes and also on other (non-housing) factors that affect rent such as length of tenure.[1]

[1] For a detailed description of the hedonic methodology, see Merrill (1980).

The hedonic model estimated for housing is generally of the form:

(1) $$F = F(H, N, A, T).$$

Rent (R) is expressed as a function of housing unit characteristics (H), neighborhood attributes and amenities (N), access characteristics (A), and conditions of tenure (T). (Sometimes demographic characteristics (D), such as race, are also included in order to test for price differentials based on these characteristics; we judged such variables to be inappropriate to the purposes of this Section 8 evaluation, where the emphasis is on a common measure of housing quality for all subgroups.)

The determinations of rent in equation (1) include items, such as tenure conditions, that do not involve the quality of the unit itself. Thus, if X_i is the vector of quality attributes (H,N,A) for a particular unit, and Z_i is the vector of nonquality attributes (T), one can estimate

(2) $$R_j = \beta_o + \Sigma X_{ij}\beta_i + \Sigma Z_{ij}\gamma_i + \varepsilon_j$$

Thus observed rent is estimated as a function of housing attributes, X, of other factors, Z, and of random error ε.

Once the coefficients (β_o, β_i, γ_i) have been estimated, then for any dwelling unit the hedonic housing services index, Q, is the estimated market value of the housing attributes of the dwelling unit:

(3) $$\hat{Q}_j = \hat{\beta}_o + \Sigma X_{ij}\hat{\beta}_i$$

and the predicted rent of a dwelling unit is

(4) $$\hat{R}_j = \hat{\beta}_o + \Sigma X_{ij}\hat{\beta}_i + \Sigma Z_{ij}\hat{\gamma}_i$$

where the hats (^) indicate estimated values.

One further addition was made to $\hat{Q}_j$ and $\hat{R}_j$ to facilitate the analysis of New Construction and Existing Housing presented in Chapters 4 and 6. In order to compare $\hat{Q}$ to project and program gross rents, which include a utility allowance, household utility payments were added to $\hat{Q}$ for households that did not already have utilities included in rent. (For households that did have utilities included in rent, an estimated amount is included in $\hat{Q}$ via a utility variable in the index.)

Both the HMS and AHS indices followed the same general approach to index construction. However, some very fundamental differences exist in the type and scope of data used for estimation, the samples used for estimation, and the years in which the data were collected. The key differences are summarized below:

The HMS index is based on (objective) evaluator data whereas the AHS index was derived using (subjective) household data The objective data are expected to be more consistent and stable, across sites and across time. Recipient perceptions, like satisfaction, may differ across types of respondents or over time for the same respondent; this is of concern to the index construction when the change is unrelated to actual change in housing attributes or neighborhood quality.

Only a limited number of questions about the unit are asked in the Annual Housing Survey, which constrains the variables available to describe dwelling unit and neighborhood quality. Also, the AHS questions emphasize deficiencies and problems rather than quality and amenities. In contrast, the HMS index is based on detailed information concerning quality and amenities in each room in the unit, mechanical features, building exterior and grounds, the surrounding blockface, and the four surrounding parcels. Census data are also used to describe the larger neighborhood.

The Housing Measurement Survey index was estimated using "pre-program" data (1979) for the New Construction and Existing Housing samples. In addition, a special sample of 256 private unsubsidized, high quality units of recent construction was added to this sample in order to include observations from the upper end of the quality distribution. The index is derived from four separate regional equations; the variables in these equations are the same but the estimated coefficients differ. The final hedonic equations are presented in Tables V-3 through V-6.

The Annual Housing Survey equations were estimated separately for each of the 15 SMSAs but, again, the variable list was the same in every site. (See Tables V-15 through V-29 in Section V.3.) The quality distribution of the AHS data cannot be determined, however, because very few AHS questions are asked about quality features on amenities. In addition, the AHS data were collected in 1974, 1975, and 1976. Thus, the index must be inflated to 1979 dollars; the Consumer Price Index rent subindex was used; this was available for each of the sample SMSAs except Providence and Raleigh, where the U.S. index was used.

V.2 SPECIFICATION OF THE HOUSING MEASUREMENT SURVEY HEDONIC EQUATION

Derivation of the "best" or final form of an hedonic equation is a complex and often ad hoc empirical process. Neither the other types of models used in housing market analysis nor the general hedonic model provides much guidance in the selection or definition of appropriate variables. There are many potential variables and they are often highly correlated, so that empirical tests often do not readily distinguish among alternative subsets. This section briefly describes the sample and basic procedure used in estimating the Housing Measurement Survey hedonic equation.

The Samples Used for Specification and for Estimation of the Regional Hedonic Equations

The sample used for the specification of the hedonic index includes all households from the New Construction and Existing Housing programs who completed an Applicant Interview (New Construction program) or a Certificate Holder Interview (Existing Housing program) and for whom a pre-program Housing Measurement Survey was conducted. Households who lived in subsidized housing as well as households who lived in rooming houses, residential hotels, or other institutions were excluded from the sample.[1]

A "high quality" sample of 256 units was added to the sample. "High quality" data were collected on a sample of relatively new units in buildings and complexes which are not subsidized by the government. Rent information for these units was obtained through an interview with the building managers or appropriate individuals. The purpose of this high quality sample was to collect information on units more representative of the quality of units in the Section 8 New Construction projects, that is, units including some amenities which may not have been present in the pre-program dwelling units of program participants. Whenever possible, buildings located in the same census tracts (or census tracts with similar characteristics) were selected. (No such units were available in St. Louis.)

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[1] Although households living in subsidized housing may have a valid Housing Measurement Survey, the rent reported by the household is not market rent and thus the relationship between rent and unit characteristics is not appropriate for estimation of the index.

None of the 15 SMSAs in the Section 8 analysis had a sufficient number of observations to permit specification of a separate hedonic index for each site. Therefore, the specification relied primarily on the combined sample. As shown in Table V-1, 1595 households met the sample specifications and did not have missing data. However, because regional and/or SMSA level differences do exist in the level and structure of prices and the distribution of housing attributes, some disaggregation is desirable. This was achieved by estimating four regional equations: Northeast, Midwest, South, and West. The equations included dummy variables representing the SMSAs included in the region. See Table V-1 for a list of the sites in each region and the regional sample sizes.

Both the combined and regional samples were used for determining the final variable list (see the specification rules below). This worked as follows. The combined sample was used to test alternative sets of derived independent variables. When a promising candidate set was determined, the regional equations were estimated. If a given variable did not meet the specification criteria (expected sign and significance level) in three of the four regions it was redefined and/or dropped from further consideration.

The specification sample included households in so called subunits, that is, households living in some portion of a larger unit and contributing some (or possibly all) of the rent and utilities cost. In order to maintain the appropriate relationship between unit characteristics and market rent, housing evaluators were instructed to evaluate the entire dwelling unit (not just the subunit). A rent figure for the entire unit was also sought during the relevant household interview. Unfortunately, however, the subunit data appear to have substantial measurement error. Examination of the residuals revealed that subunit observations represented a very disproportionate number of very large residuals, both positive and negative.[1] Thus, to increase precision, the final regional equations have been estimated for a sample excluding subunits. Table V-2 indicates the R^2s, sample sizes, and mean errors for each of the regional hedonic

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[1] A dummy variable representing subunits was included in all the initial specifications.

Table V-1

SPECIFICATION SAMPLES FOR THE HOUSING MEASUREMENT SURVEY HEDONIC INDEX

SAMPLE DESCRIPTION	SPECIFICATION SAMPLE[a]	FINAL ESTIMATION SAMPLE (EXCLUDING SUBUNITS)
Combined Sample	1595	1365
Northeast (Baltimore, New York, Philadelphia, Providence-Pawtucket-Warwick, Rochester)	520	471
Midwest (Chicago, Cleveland, Milwaukee, Saint Louis)	475	400
South (Atlanta, Houston, Raleigh)	289	227
West (Los Angeles-Long Beach, San Diego, Seattle-Everett)	311	267

a. Households with non-missing data that completed an Applicant or Certificate Holder Interview and a pre-program Housing Measurement Survey; includes dwelling units from the High Quality Sample and excludes subsidized housing and households in institutions, rooming houses, or residential hotels.

Table V-2

ESTIMATION OF REGIONAL HOUSING MEASUREMENT SURVEY
HEDONIC EQUATIONS WITH AND WITHOUT SUBUNITS

EQUATION	SUBUNITS EXCLUDED			SUBUNITS INCLUDED		
	R^2	$\left(\text{MEAN SQUARED ERROR}\right)^{\frac{1}{2}}$	n	R^2	$\left(\text{MEAN SQUARED ERROR}\right)^{\frac{1}{2}}$	n
Northeast	.736	$47.34	471	.712	$49.38	520
Midwest	.786	38.72	400	.758	41.61	475
South	.843	36.14	227	.790	44.50	289
West	.782	47.27	267	.717	55.01	311

equations, with and without subunits in the sample. Improvement was particularly pronounced in the South and West. Therefore, estimation of the final regional equations was done for the specification sample with subunit households excluded. This in no way excludes such households from the analysis of housing quality, however, since $\hat{Q}_j$, the estimated market value of the dwelling units' attributes can still be computed for these units.

Regression Strategy

The four major criteria used in deriving the final equation may be summarized as follows:

> maximizing explanatory power, that is, maximizing R^2
>
> including a broad set of attributes whose coefficients are significant at the chosen level and have the "expected" sign
>
> defining variables such that the stability of the estimated coefficients does not appear to be unduly affected by collinearity, and
>
> minimizing reliance on proxy relationships so that all major component groups, including dwelling unit quality, dwelling unit size, neighborhood quality, accessibility, and tenure relationships, are adequately represented in the equation.

Preliminary equations were estimated using a large number of the derived variables in a given equation. Many of the coefficients were smaller than their standard errors or did not have the expected sign. Judgements about what to do with these variables were based on examination of the correlation matrix, sample variances, and on intuitive decisions concerning the importance of the attribute. Many variables whose coefficients were approximately equal to their standard error were kept for further consideration. Variables with the wrong signs, especially when the coefficient differed significantly from zero, were examined for evidence of incorrect definition or specification, or of extreme correlation with other variables in determining whether they should be redefined, combined with other variables, or simply dropped from the equation.

The basic goal of subsequent estimations was to weed out superfluous variables and to find the most broadly descriptive combination of housing bundle attributes. (A variable is defined as superfluous when its exclusion or inclusion in an equation does not "seriously" alter the other coefficient estimates or their standard errors (Rao and Miller, 1971).)

A stepwise regression routine was used to a limited extent in deriving the best variable set. Sole reliance on the stepwise regression results is inappropriate, since the procedure does not guarantee an optimal subset (see, for example, Hocking, 1976).

The test used for the final hedonic regression was a t-statistic of at least 1. This implies a nominal level of significance of at least $\alpha = 0.25$ for a two-tailed test, and $\alpha = 0.125$ for a one-tailed test. (Since prior expectation as to sign exists for most of the coefficients, the one-tailed test is generally appropriate.)

The use of a less stringent test level reflects an emphasis on predictive power. The hedonic regression is used in analysis primarily to derive an overall estimated housing index; predictive power is thus of major importance. The adjusted $\bar{R}^2$ for an equation is improved by retaining any variable that has a t-statistic of greater than 1 (Haitovsky, 1969).[1] More generally, various authors have pointed out that the mean squared error of prediction will be reduced if what might be called the theoretical F-statistic (the F-statistic using the true parameter values) is greater than 1 (see Edwards, 1969; Rao, 1971; and Hocking, 1974), which leads them to suggest a test level of 1. (This applies to the t-statistic as well, since it is simply the square root of the F-statistic for one variable.) In addition, as Rao (1971) points out, omission of a relevant predictor will bias the included variables correlated with it, whereas inclusion of an irrelevant variable introduces no bias.[2]

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[1] Adjusted $\bar{R}^2 = 1 - (1-R^2)(N-1)/N-K$, where N equals the total observations and K equals the total number of parameters. Adjusted R^2 can decrease when a new variable is added to the regression, even though R^2 increases. Thus adjusted R^2 provides a check against the absurd extreme at which a "perfect" fit of N observations is obtained by the use of K = N parameters.

[2] These are heuristic arguments. It may be noted, for example, that the estimated F-statistic is not an unbiased estimator of the "theoretical" F-statistic.

Collinearity

Several groups of variables were very highly collinear. This was expected; better housing units are frequently better in terms of many attributes and are more often found in better neighborhoods. Any data set can be transformed into an orthogonal set without changing predictive power, so that multicollinearity does not affect the overall fit of the model.[1] It does, however, affect the reliability and stability of the coefficients. The more collinear the variables are, the larger is the variance of estimates of their coefficients. It therefore becomes more difficult to reject the null hypothesis that a coefficient is zero, and the coefficient estimates become less reliable. If collinearity is severe, some coefficients may, for example, reverse sign as a result of negligible changes in the data (Marquandt and Snee, 1975).[2] Thus, although collinearity in the predictor matrix cannot be changed--this is a sample problem--it may be appropriate to respecify highly collinear variables to help derive a more interpretable set of parameter estimates.

This approach was used with respect to the numerous variables that describe dwelling unit quality: surface and structure ratings, amenities and special quality of bathroom and kitchen fixtures and appliances, the quality of common areas in multi-family buildings, the availability of security systems and recreational areas, and the presence or absence of hazards in the unit's mechanical and electrical systems and other types of hazards. In addition, the evaluator rated the overall quality of the unit and the overall conditions with regard to the need for renovation and repairs. When a number of these variables were included in the regression equation, many of them were insignificant and/or did not have the expected sign. Thus, principal components analysis for these highly correlated variables was used in preference to excluding some subset of the original variables. Although the mean predictive power is not reduced by exclusion

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[1] It may, however, affect prediction in new samples in which the set of associations do not resemble those in the sample used for estimation.

[2] Prediction in the directions represented by changes in one of the collinear variables, holding other variables constant, for example, has a correspondingly larger variance.

of sufficiently insignificant variables, estimates of housing quality change for an individual household will be less accurate if the "excluded" variables were the ones that changed. Principal components analysis allows estimation of stable coefficients for the components, while retaining a large number of data elements within the component itself (see, for example, Cheng and Iglarsh, 1976).[1] The variables used in the principal components analysis are presented in the following section.

Functional Form of the Housing Measurement Survey Hedonic Index

The general hedonic model does not dictate any particular functional form for the relationship between the market price of a commodity and its attributes. Most hedonic regressions for housing have used either a linear form or semilog form. The general linear form is

$$R_j = \sum_i \beta_i X_{ij} + \varepsilon_j \tag{1}$$

for households, "j," and attributes, "i," and the semilog form is

$$\ln R_j = \sum_i \beta_i X_{ij} + \varepsilon_j \tag{2}$$

The criteria used to assess the linear and semilog forms were the interpretation of the implied relationships and explanatory power. The semilog model represents a multiplicative relationship--that is, it assumes that variables are jointly related to rent. The coefficients of the variables are interpreted as the percentage of change in rent that results from a unit change in the level of the independent variable. Thus, the semilog form is appealing because it allows for a limited type of interaction among the variables. The linear form, on the other hand, allows for the explicit introduction of appropriate interdependencies. Some variables may be independently and others jointly related to rent (King, 1976). For example, it is unclear whether the value of neighborhood attributes is

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[1] In principal components analysis, the original variables are transformed into an equal number of new variables called principal components. These new variables are constructed so that they are not correlated. If the first few components have relatively large variances, these components are then used to summarize the original data.

necessarily proportional to either dwelling unit quality or size (Grether and Mieszkowski, 1974). Some effort was made to define variables that permitted testing for nonlinear effects. For example, the variable indicating that payment for heat was included in the rent, was explicitly defined to permit the interaction between heat payments and the size of the unit.

The percentage of variance (R^2) explained by the linear equation exceeded that of the semilog equation by 6 to 10 percentage points, depending on the test equation. Although the comparison of explanatory power of equations with different dependent variables is not straightforward (and sophisticated tests have been developed[1]) the consistently higher R^2 of the linear equation was persuasive. In addition since the estimated coefficients and the linear form are intuitively easy to understand, the linear functional form was used for final estimation.

V.3 THE RESULTS OF THE HOUSING MEASUREMENT SURVEY HEDONIC INDEX

The results of the regional hedonic equations--Northeast, Midwest, South, and West--are presented in Tables V-3 through V-6.[2] A number of the independent variables are specified in natural log form--length of tenure, building age, the number of boarded-up buildings and the number of rooms--and thus the estimating equation is:

$$R_j = \beta_o + \sum_{i=1}^{4} \beta_i \ln X_{ij} + \sum_{i=5}^{n} \beta_i X_{ij} + \varepsilon_j$$

where

R_j = the rent for the j^{th} unit

X_{ij} = length of tenure

X_{2j} = building age

X_{3j} = number of rooms

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[1] See Merrill, 1980, for a discussion of one approach.

[2] Also see Tables V-8 through V-11 for means and standard deviations on the variables used in the regressions.

Table V-3

HOUSING MEASUREMENT SURVEY HEDONIC INDEX: NORTHEAST[a]

INDEPENDENT VARIABLE	ACRONYM	COEFFICIENT	STANDARD ERROR	T- RATIO
	INTERCEPT	-29.03	30.31	-0.96
Related to the landlord (0,1)	RELATE1	-45.72†	24.69	-1.85
Length of tenure (months; natural log)	LNTIME	-11.83**	1.72	-6.88
Landlord resides in the building (0,1)	RESIDTLL	- 2.50	5.36	-0.47
Air-conditioning (supplied by landlord; 0,1)	LLAC	33.33**	8.94	3.73
Building age (years; natural log)	LNBLDAGE	0.78	4.60	0.17
Single-family detached unit (0,1)	SFAMDET	6.10	14.54	0.42
Duplex or two-family unit (0,1)	DUPLEX	7.28	10.92	0.67
Garden apartment (0,1)	GARDEN	13.55	11.77	1.15
Multi-family (four stories or fewer; 0,1)	MULTI	10.23	9.84	1.04
Single family (row or converted; 0,1)	SINGLE	14.39	11.97	1.20
Highrise (more than four stories; 0,1)	HIGHRISE	13.16	12.52	1.05
No heat or inferior source of heat (0,1)	NOHEAT	0.36	17.90	0.02
Livingroom quality and amenities (factor score)	FAC2A	14.47**	3.24	4.46
Quality of multi-family buildings (factor score)	FAC3A	7.54**	2.84	2.66
Kitchen quality and amenities (factor score)	FAC4A	18.50**	3.46	5.34
Recreational facilities (factor score)	FAC6A	8.85**	3.34	2.65
Overall quality and bathroom and kitchen features (factor score)	FAC7A	25.16**	3.93	6.39
Availability of kitchen cabinets (factor score)	FAC8A	10.36**	3.04	3.40
Balcony, porch, or patio (factor score)	FAC9A	2.61	2.78	0.94
Electrical heating, and water hazards (factor score)	FAC10A	- 7.81**	2.53	-3.08
Well kept, landscaped grounds (0,1)	NICEYD	20.75*	10.47	1.98
Heat per room (heat included in rent x # of rooms)	HEATRMB	7.10**	1.22	5.80
Abandoned and boarded-up buildings (natural log)	LNABAN	- 7.03	4.65	-1.51
Proportion of the blockface that is residential	PRESIDEN	17.88	13.57	1.32
Attractive features of the unit (0,1)	ATTRACT	10.80	6.76	1.60
Proportion of the blockface that is commercial or industrial	PCOMMIND	108.67**	26.47	4.10
Proportion of the blockface used for public services	PSERV	93.76†	51.30	1.83
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	2.44	2.65	0.92
Census tract median housing value (dollars)	CTMDVAL1	0.001**	0.0003	3.48
Census tract median contract rent (dollars)	CTMDCR1	0.14	0.10	1.42
Proportion of the blockface that is park	PPARK	4.14	5.21	0.80
Number of rooms (excluding bath) (natural log)	LNROOMS2	59.54**	10.16	5.86
Number of baths and half-baths	NBATH	30.74**	8.74	3.52
Square feet per room	SQTOTRM	0.20**	0.08	2.50
Baltimore (0,1)	BA1	26.24**	9.87	2.66
New York (0,1)	NY1	48.64**	10.50	4.63
Philadelphia (0,1)	PH1	18.68†	9.52	1.96
Rochester (0,1)	RO1	28.86**	10.33	2.79

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households.

DATA SOURCE: Housing Measurement Survey.

NOTES: F-ratio = 31.64; significance = 0.0001; R^2 = 0.7357; n = 471.

a. Providence-Pawtucket-Warwick is the excluded site.

** t test shows the coefficient to be significantly different from 1 at the 0.01 level.

* t test shows the coefficient to be significantly different from 1 at the 0.05 level.

† t test shows the coefficient to be significantly different from 1 at the 0.10 level.

Table V-4

HOUSING MEASUREMENT SURVEY HEDONIC INDEX: MIDWEST[a]

INDEPENDENT VARIABLE	ACRONYM	COEFFICIENT	STANDARD ERROR	T- RATIO
	INTERCEPT	-47.54	30.06	-1.58
Related to the landlord (0,1)	RELATE1	-13.17	14.96	-0.88
Length of tenure (months; natural log)	LNTIME	-13.93**	1.63	-8.56
Landlord resides in the building (0,1)	RESIDTLL	- 4.73	5.00	-0.94
Air-conditioning (supplied by landlord; 0,1)	LLAC	23.38**	6.75	3.47
Building age (years; natural log)	LNBLDAGE	- 5.92	4.54	-1.30
Single-family detached unit (0,1)	SFAMDET	-12.84	11.34	-1.13
Duplex or two-family unit (0,1)	DUPLEX	-17.99†	10.34	-1.74
Gardan apartment (0,1)	GARDEN	2.51	9.64	0.26
Multi-family (four stories or fewer; 0,1)	MULTI	- 1.39	9.81	-0.14
Single family (row or converted; 0,1)	SINGLE	0.90	11.54	0.08
Highrise (more than four stories; 0,1)	HIGHRISE	38.63**	12.47	3.10
No heat or inferior source of heat (0,1)	NOHEAT	-25.45	16.93	-1.50
Livingroom quality and amenities (factor score)	FAC2A	0.18	2.36	0.08
Quality of multi-family buildings (factor score)	FAC3A	7.46**	2.54	2.94
Kitchen quality and amenities (factor score)	FAC4A	9.76**	3.15	3.10
Recreational facilities (factor score)	FAC6A	3.67	3.04	1.21
Overall quality and bathroom and kitchen features (factor score)	FAC7A	9.24*	3.70	2.50
Availability of kitchen cabinets (factor score)	FAC8A	1.54	1.93	0.80
Balcony, porch, or patio (factor score)	FAC9A	0.51	2.59	0.20
Electrical heating, and water hazards (factor score)	FAC10A	- 4.56*	2.05	-2.23
Well kept, landscaped grounds (0,1)	NICEYD	- 2.66	11.08	-0.24
Heat per room (heat included in rent x # of rooms)	HEATRMB	3.28*	1.34	2.44
Abandoned and boarded-up buildings (natural log)	LNABAN	-16.19**	5.32	3.04
Proportion of the blockface that is residential	PRESIDEN	- 3.59	11.87	-0.30
Attractive features of the unit (0,1)	ATTRACT	6.05	9.37	0.64
Proportion of the blockface that is commercial or industrial	PCOMMIND	10.73	24.54	0.44
Proportion of the blockface used for public services	PSERV	10.71	49.20	0.22
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	7.16*	2.91	2.46
Census tract median housing value (dollars)	CTMDVAL1	0.0004	0.0003	1.30
Census tract median contract rent (dollars)	CTMDCR1	0.50**	0.09	5.43
Proportion of the blockface that is park	PPARK	1.54	4.95	0.31
Number of rooms (excluding bath) (natural log)	LNROOMS2	76.47**	8.53	8.96
Number of baths and half-baths	NBATH	45.59**	8.71	5.24
Square feet per room	SQTOTRM	0.22**	0.07	3.01
Chicago (0,1)	CH1	39.62**	8.69	4.56
Cleveland (0,1)	CL1	17.21†	9.34	1.84
Milwaukee (0,1)	MI1	37.55**	8.57	4.38

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households.

DATA SOURCE: Housing Measurement Survey.

NOTES: F-ratio = 35.82; significance = 0.0001; R^2 = 0.7855; n=400.

a. St. Louis is the excluded site.

** t test shows the coefficient to be significantly different from 1 at the 0.01 level.

* t test shows the coefficient to be significantly different from 1 at the 0.05 level.

† t test shows the coefficient to be significantly different from 1 at the 0.10 level.

Table V-5

HOUSING MEASUREMENT SURVEY HEDONIC INDEX: SOUTH[a]

INDEPENDENT VARIABLE	ACRONYM	COEFFICIENT	STANDARD ERROR	T- RATIO
	INTERCEPT	- 4.06	38.52	-0.10
Related to the landlord (0,1)	RELATE1	-82.11**	27.75	-2.96
Length of tenure (months; natural log)	LNTIME	-15.99**	2.15	-7.45
Landlord resides in the building (0,1)	RESIDTLL	12.89†	7.14	1.80
Air-conditioning (supplied by landlord; 0,1)	LLAC	- 0.90	9.05	-0.10
Building age (years; natural log)	LNBLDAGE	-15.73**	4.85	-3.24
Single-family detached unit (0,1)	SFAMDET	39.79*	19.22	2.07
Duplex or two-family unit (0,1)	DUPLEX	25.01	20.36	1.23
Garden apartment (0,1)	GARDEN	13.43	20.33	0.66
Multi-family (four stories or fewer; 0,1)	MULTI	27.26	24.78	1.10
Single family (row or converted; 0,1)	SINGLE	4.09	23.04	0.18
Highrise (more than four stories; 0,1)	HIGHRISE	0.00	0.00	-
No heat or inferior source of heat (0,1)	NOHEAT	-26.90**	10.00	-2.69
Livingroom quality and amenities (factor score)	FAC2A	5.31	3.28	1.62
Quality of multi-family buildings (factor score)	FAC3A	- 2.97	5.20	-0.57
Kitchen quality and amenities (factor score)	FAC4A	2.56	3.12	0.82
Recreational facilities (factor score)	FAC6A	3.80	3.38	1.13
Overall quality and bathroom and kitchen features (factor score)	FAC7A	0.07	5.28	0.01
Availability of kitchen cabinets (factor score)	FAC8A	- 1.43	3.48	-0.41
Balcony, porch, or patio (factor score)	FAC9A	4.13	3.60	1.14
Electrical heating, and water hazards (factor score)	FAC10A	2.30	3.42	0.67
Well kept, landscaped grounds (0,1)	NICEYD	9.95	12.13	0.82
Heat per room (heat included in rent x # of rooms)	HEATRMB	5.02**	1.66	3.03
Abandoned and boarded-up buildings (natural log)	LNABAN	-21.45**	7.80	-2.75
Proportion of the blockface that is residential	PRESIDEN	34.60*	14.47	2.39
Attractive features of the unit (0,1)	ATTRACT	- 2.49	9.89	-0.25
Proportion of the blockface that is commercial or industrial	PCOMMIND	78.76*	34.29	2.30
Proportion of the blockface used for public services	PSERV	78.65*	30.25	2.60
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	5.85†	3.33	1.76
Census tract median housing value (dollars)	CTMDVAL1	- 0.001	0.001	-1.08
Census tract median contract rent (dollars)	CTMDCR1	0.18	0.11	1.58
Proportion of the blockface that is park	PPARK	25.48**	8.25	3.09
Number of rooms (excluding bath) (natural log)	LNROOMS2	31.05*	13.72	2.26
Number of baths and half-baths	NBATH	57.84**	8.15	7.10
Square feet per room	SQTOTRM	0.40**	0.08	4.92
Atlanta (0,1)	AT1	4.27	11.63	0.37
Houston (0,1)	HO1	41.54**	13.00	3.20

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households.

DATA SOURCE: Housing Measurement Survey.

NOTES: F-ratio = 29.36; significance = 0.0001; R^2 = 0.8433; n=227.

a. Raleigh is the excluded site.

** t test shows the coefficient to be significantly different from 1 at the 0.01 level.

* t test shows the coefficient to be significantly different from 1 at the 0.05 level.

† t test shows the coefficient to be significantly different from 1 at the 0.10 level.

Table V-6

HOUSING MEASUREMENT SURVEY HEDONIC INDEX: WEST[a]

INDEPENDENT VARIABLE	ACRONYM	COEFFICIENT	STANDARD ERROR	T- RATIO
	INTERCEPT	- 7.56	43.75	-0.17
Related to the landlord (0,1)	RELATE1	-116.82**	29.76	-3.92
Length of tenure (months; natural log)	LNTIME	-10.26**	2.61	-3.92
Landlord resides in the building (0,1)	RESIDTLL	- 8.26	7.27	-1.14
Air-conditioning (supplied by landlord; 0,1)	LLAC	32.58*	13.98	2.33
Building age (years; natural log)	LNBLDAGE	-20.77**	5.43	-3.82
Single-family detached unit (0,1)	SFAMDET	16.34	23.94	0.68
Duplex or two-family unit (0,1)	DUPLEX	12.81	24.34	0.53
Garden apartment (0,1)	GARDEN	4.78	23.96	0.20
Multi-family (four stories or fewer; 0,1)	MULTI	3.45	23.17	0.15
Single family (row or converted; 0,1)	SINGLE	22.51	26.48	0.85
Highrise (more than four stories; 0,1)	HIGHRISE	71.70*	32.19	2.23
No heat or inferior source of heat (0,1)	NOHEAT	-11.58	16.13	-0.72
Livingroom quality and amenities (factor score)	FAC2A	4.16	3.70	1.12
Quality of multi-family buildings (factor score)	FAC3A	3.24	5.26	0.62
Kitchen quality and amenities (factor score)	FAC4A	- 0.70	3.25	-0.22
Recreational facilities (factor score)	FAC6A	13.26**	4.73	2.80
Overall quality and bathroom and kitchen features (factor score)	FAC7A	9.53*	4.67	2.04
Availability of kitchen cabinets (factor score)	FAC8A	4.84	5.25	0.92
Balcony, porch, or patio (factor score)	FAC9A	4.84	4.02	1.20
Electrical heating, and water hazards (factor score)	FAC10A	- 6.36	4.10	-1.55
Well kept, landscaped grounds (0,1)	NICEYD	0.45	12.95	0.03
Heat per room (heat included in rent x # of rooms)	HEATRMB	- 3.71	2.76	-1.34
Abandoned and boarded-up buildings (natural log)	LNABAN	- 3.03	12.00	-0.25
Proportion of the blockface that is residential	PRESIDEN	27.78	19.85	1.40
Attractive features of the unit (0,1)	ATTRACT	22.46*	10.28	2.18
Proportion of the blockface that is commercial or industrial	PCOMMIND	62.86	40.32	1.56
Proportion of the blockface used for public services	PSERV	-139.86†	75.24	-1.86
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	- 1.94	4.92	-0.40
Census tract median housing value (dollars)	CTMDVAL1	0.0005	0.0008	0.58
Census tract median contract rent (dollars)	CTMDCR1	0.45**	0.14	3.10
Proportion of the blockface that is park	PPARK	9.35	8.86	1.06
Number of rooms (excluding bath) (natural log)	LNROOMS2	89.60**	14.51	6.17
Number of baths and half-baths	NBATH	63.09**	11.31	5.58
Square feet per room	SQTOTRM	0.31*	0.12	2.51
Los Angeles-Long Beach (0,1)	LA1	7.46	11.78	0.63
San Diego (0,1)	SD1	4.38	11.41	0.38

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households.

DATA SOURCE: Housing Measurement Survey.

NOTES: F-ratio = 22.97; significance = 0.0001; R^2 = 0.7824; n=267.

a. Seattle-Everett is the excluded site.

** t test shows the coefficient to be significantly different from 1 at the 0.01 level.

* t test shows the coefficient to be significantly different from 1 at the 0.05 level.

† t test shows the coefficient to be significantly different from 1 at the 0.10 level.

X_{4j} = number of boarded-up buildings,

$X_{5j} \ldots X_{nj}$ = other dwelling unit, neighborhood, and tenure characteristics

Overall, the results are very satisfactory. The proportion of the variance in rent explained is 0.74 in the Northeast, 0.79 in the Midwest, 0.84 in the South, and 0.78 in the West. A very broad range of variables are included, describing tenure characteristics, building type, dwelling unit size and quality, and blockface, parcel, and census tract housing characteristics. In the great majority of cases, these variables are significant and have the expected sign in all four regions.

Rent is defined as contract rent excluding furnishings.[1] No adjustment is made to rent with regard to utilities. In most cases utilities are not included in contract rent. For cases in which utilities are included, an estimate of utility payment (for heat) is obtained by including a heat per room variable among the explanatory variables.

The variables included in the final equation are listed in Table V-7. Each group of housing attributes will be discussed in turn.

Tenure Characteristics

Tenure characteristics are an important source of variation in rent level. Because tenure factors are excluded from the hedonic quality index, (although included in the predicted rent), accurate estimation of their influence is important. Length of residence is highly significant and, as expected, has an inverse relationship with rent. A natural log specification, which assumes that the discount increases at a decreasing rate, was preferable to the linear form.[2] Households that are related to the landlord obtain a discount, often a very significant one. Also, rent is generally slightly lower when the landlord resides in the building; the presumption is that tenant selection is tailored to the landlord's needs and/or that in-kind services may be exchanged.

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[1] The adjustment factor used for furnishings was derived for the Demand Experiment. When a unit is furnished, 11.5% of contract rent is subtracted from contract rent. See Merrill, 1980.

[2] More complex specifications may, in fact, be preferable; a negative experimental function combined with a log before the discount begins was used for the Demand Experiment indices. See Merrill, 1980.

Table V-7

VARIABLES INCLUDED IN THE HOUSING MEASUREMENT SURVEY
HEDONIC INDEX

Tenure

- Length of tenure (# months; natural log)
- Related to the landlord (0,1)
- Landlord resides in the building (0,1)

Unit Size

- Number of rooms excluding bath (natural log)
- Number of baths and half-baths
- Square feet per room

Dwelling Unit Quality

Factor Scores

- Livingroom quality and amenities
- Quality of common areas and security in multi-family buildings
- Kitchen quality and amenities
- Number of recreation facilities, building exterior (pool, tennis courts, basketball courts, playing fields, children's playground)
- Overall evaluator quality rating and condition of kitchen and bathroom appliances and fixtures
- Availability of kitchen cabinets
- Presences of balcony, porch, patio, or deck
- Number of hazards present (electrical, septic tank, boiler, hot water heater, pipes, water, leaking gases, rats, and structural hazards)
- Building age (years, natural log)
- Central air-conditioning or room units supplied by landlord (0,1)
- No heat or inferior source of heat (fireplace, stove, unvented space heaters, portable electric heaters; 0,1)
- Attractive or beneficial features of the unit (not recorded elsewhere; 0,1)

Utilities

- Heat per room (heat included in the rent X the # of rooms)

Building Type

- Single-family detached (0,1)
- Duplex or two-family unit (0,1)
- Garden apartment (0,1)
- Multi-family unit, four stories or fewer (0,1)
- Single family, row or converted (0,1)
- Highrise, more than four stories (0,1)

Building Exterior and Grounds

- Well kept, landscaped grounds (0,1)

Blockface

- Abandoned and boarded-up buildings (natural log)
- Proportion of the blockface that is residential
- Proportion of the blockface that is industrial or commercial
- Proportion of the blockface used for public services (fire, police, schools, libraries)
- Proportion of the blockface that is public park

Surrounding Parcels and Grounds

- Cleanliness of the surrounding parcel areas

Census Tract

- Census tract median contract rent
- Census tract median housing value

Table V-8

HOUSING MEASUREMENT SURVEY HEDONIC INDEX
MEANS AND STANDARD DEVIATIONS: NORTHEAST[a]

INDEPENDENT VARIABLE	ACRONYM	MEAN	STANDARD DEVIATION
	INTERCEPT	1.00	0
Related to the landlord (0,1)	RELATE1	0.01	0.09
Length of tenure (months; natural log)	LNTIME	3.06	1.60
Landlord resides in the building (0,1)	RESIDTLL	0.56	0.50
Air-conditioning (supplied by landlord; 0,1)	LLAC	0.27	0.44
Building age (years; natural log)	LNBLDAGE	3.39	0.87
Single-family detached unit (0,1)	SFAMDET	0.05	0.22
Duplex or two-family unit (0,1)	DUPLEX	0.15	0.36
Garden apartment (0,1)	GARDEN	0.25	0.43
Multi-family (four stories or fewer; 0,1)	MULTI	0.21	0.41
Single family (row or converted; 0,1)	SINGLE	0.10	0.30
Highrise (more than four stories; 0,1)	HIGHRISE	0.13	0.34
No heat or inferior source of heat (0,1)	NOHEAT	0.02	0.13
Livingroom quality and amenities (factor score)	FAC2A	-0.22	0.79
Quality of multi-family buildings (factor score)	FAC3A	0.28	1.01
Kitchen quality and amenities (factor score)	FAC4A	-0.25	0.87
Recreational facilities (factor score)	FAC6A	0.06	0.87
Overall quality and bathroom and kitchen features (factor score)	FAC7A	0.05	0.96
Availability of kitchen cabinets (factor score)	FAC8A	0.06	0.88
Balcony, porch, or patio (factor score)	FAC9A	-0.13	1.10
Electrical heating, and water hazards (factor score)	FAC10A	-0.04	0.92
Well kept, landscaped grounds (0,1)	NICEYD	0.08	0.28
Heat per room (heat included in rent x # of rooms)	HEATRMB	1.93	1.98
Abandoned and boarded-up buildings (natural log)	LNABAN	0.27	0.55
Proportion of the blockface that is residential	PRESIDEN	0.75	0.25
Attractive features of the unit (0,1)	ATTRACT	0.20	0.40
Proportion of the blockface that is commercial or industrial	PCOMMIND	0.05	0.11
Proportion of the blockface used for public services	PSERV	0.02	0.05
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	3.22	1.01
Census tract median housing value (dollars)	CTMDVAL1	14504.85	8450.66
Census tract median contract rent (dollars)	CTMDCR1	93.28	31.91
Proportion of the blockface that is park	PPARK	0.28	0.45
Number of rooms (excluding bath) (natural log)	LNROOMS2	1.38	0.29
Number of baths and half-baths	NBATH	1.04	0.29
Square feet per room	SQTOTRM	149.50	34.39
Baltimore (0,1)	BA1	0.19	0.39
New York (0,1)	NY1	0.24	0.43
Philadelphia (0,1)	PH1	0.17	0.37
Rochester (0,1)	RO1	0.10	0.30

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households (n=471).
DATA SOURCE: Housing Measurement Survey.
a. Providence-Pawtucket-Warwick is the excluded site.

Table V-9

HOUSING MEASUREMENT SURVEY HEDONIC INDEX
MEANS AND STANDARD DEVIATIONS: MIDWEST[a]

INDEPENDENT VARIABLE	ACRONYM	MEAN	STANDARD DEVIATION
	INTERCEPT	1.00	0
Related to the landlord (0,1)	RELATE1	0.02	0.14
Length of tenure (months; natural log)	LNTIME	3.09	1.43
Landlord resides in the building (0,1)	RESIDTLL	0.51	0.50
Air-conditioning (supplied by landlord; 0,1)	LLAC	0.28	0.45
Building age (years; natural log)	LNBLDAGE	3.43	0.71
Single-family detached unit (0,1)	SFAMDET	0.10	0.31
Duplex or two-family unit (0,1)	DUPLEX	0.22	0.42
Garden apartment (0,1)	GARDEN	0.21	0.41
Multi-family (four stories or fewer; 0,1)	MULTI	0.21	0.41
Single family (row or converted; 0,1)	SINGLE	0.08	0.27
Highrise (more than four stories; 0,1)	HIGHRISE	0.09	0.28
No heat or inferior source of heat (0,1)	NOHEAT	0.02	0.12
Livingroom quality and amenities (factor score)	FAC2A	0.18	1.07
Quality of multi-family buildings (factor score)	FAC3A	0.44	1.14
Kitchen quality and amenities (factor score)	FAC4A	-0.08	0.83
Recreational facilities (factor score)	FAC6A	-0.02	0.86
Overall quality and bathroom and kitchen features (factor score)	FAC7A	-0.27	1.01
Availability of kitchen cabinets (factor score)	FAC8A	-0.17	1.19
Balcony, porch, or patio (factor score)	FAC9A	-0.02	0.92
Electrical heating, and water hazards (factor score)	FAC10A	0.11	1.12
Well kept, landscaped grounds (0,1)	NICEYD	0.05	0.22
Heat per room (heat included in rent x # of rooms)	HEATRMB	0.84	1.62
Abandoned and boarded-up buildings (natural log)	LNABAN	0.20	0.43
Proportion of the blockface that is residential	PRESIDEN	0.73	0.27
Attractive features of the unit (0,1)	ATTRACT	0.08	0.27
Proportion of the blockface that is commercial or industrial	PCOMMIND	0.06	0.11
Proportion of the blockface used for public services	PSERV	0.02	0.05
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	3.32	0.87
Census tract median housing value (dollars)	CTMDVAL1	16535.71	7799.12
Census tract median contract rent (dollars)	CTMDCR1	107.47	34.06
Proportion of the blockface that is park	PPARK	0.26	0.44
Number of rooms (excluding bath) (natural log)	LNROOMS2	1.42	0.30
Number of baths and half-baths	NBATH	1.06	0.26
Square feet per room	SQTOTRM	140.30	31.36
Chicago (0,1)	CH1	0.27	0.44
Cleveland (0,1)	CL1	0.26	0.44
Milwaukee (0,1)	MI1	0.29	0.45

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households (n=400).
DATA SOURCE: Housing Measurement Survey.
a. St. Louis is the excluded site.

Table V-10

HOUSING MEASUREMENT SURVEY HEDONIC INDEX
MEANS AND STANDARD DEVIATIONS: SOUTH[a]

INDEPENDENT VARIABLE	ACRONYM	MEAN	STANDARD DEVIATION
	INTERCEPT	1.00	0
Related to the landlord (0,1)	RELATE1	0.01	0.09
Length of tenure (months; natural log)	LNTIME	1.83	1.59
Landlord resides in the building (0,1)	RESIDTLL	0.67	0.47
Air-conditioning (supplied by landlord; 0,1)	LLAC	0.68	0.47
Building age (years; natural log)	LNBLDAGE	2.50	1.06
Single-family detached unit (0,1)	SFAMDET	0.15	0.36
Duplex or two-family unit (0,1)	DUPLEX	0.09	0.29
Garden apartment (0,1)	GARDEN	0.67	0.47
Multi-family (four stories or fewer; 0,1)	MULTI	0.03	0.16
Single family (row or converted; 0,1)	SINGLE	0.04	0.20
Highrise (more than four stories; 0,1)	HIGHRISE	0	0
No heat or inferior source of heat (0,1)	NOHEAT	0.15	0.36
Livingroom quality and amenities (factor score)	FAC2A	-0.04	1.23
Quality of multi-family buildings (factor score)	FAC3A	-0.51	0.58
Kitchen quality and amenities (factor score)	FAC4A	0.10	1.15
Recreational facilities (factor score)	FAC6A	0.80	1.37
Overall quality and bathroom and kitchen features (factor score)	FAC7A	0.32	0.92
Availability of kitchen cabinets (factor score)	FAC8A	-0.07	0.98
Balcony, porch, or patio (factor score)	FAC9A	0.15	0.93
Electrical heating, and water hazards (factor score)	FAC10A	0.07	0.89
Well kept, landscaped grounds (0,1)	NICEYD	0.09	0.28
Heat per room (heat included in rent x # of rooms)	HEATRMB	1.41	1.98
Abandoned and boarded-up buildings (natural log)	LNABAN	0.14	0.38
Proportion of the blockface that is residential	PRESIDEN	0.76	0.27
Attractive features of the unit (0,1)	ATTRACT	0.09	0.28
Proportion of the blockface that is commercial or industrial	PCOMMIND	0.04	0.10
Proportion of the blockface used for public services	PSERV	0.03	0.10
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	3.54	0.89
Census tract median housing value (dollars)	CTMDVAL1	15508.43	3679.44
Census tract median contract rent (dollars)	CTMDCR1	103.22	35.42
Proportion of the blockface that is park	PPARK	0.11	0.32
Number of rooms (excluding bath) (natural log)	LNROOMS2	1.39	0.25
Number of baths and half-baths	NBATH	1.24	0.45
Square feet per room	SQTOTRM	146.20	35.93
Atlanta (0,1)	AT1	0.39	0.49
Houston (0,1)	HO1	0.43	0.50

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households (n=227).

DATA SOURCE: Housing Measurement Survey.

a. Raleigh is the excluded site.

Table V-11

HOUSING MEASUREMENT SURVEY HEDONIC INDEX
MEANS AND STANDARD DEVIATIONS: WEST[a]

INDEPENDENT VARIABLE	ACRONYM	MEAN	STANDARD DEVIATION
	INTERCEPT	1.00	0
Related to the landlord (0,1)	RELATE1	0.01	0.11
Length of tenure (months; natural log)	LNTIME	2.72	1.50
Landlord resides in the building (0,1)	RESIDTLL	0.52	0.50
Air-conditioning (supplied by landlord; 0,1)	LLAC	0.15	0.35
Building age (years; natural log)	LNBLDAGE	2.83	1.07
Single-family detached unit (0,1)	SFAMDET	0.22	0.42
Duplex or two-family unit (0,1)	DUPLEX	0.11	0.31
Garden apartment (0,1)	GARDEN	0.28	0.45
Multi-family (four stories or fewer; 0,1)	MULTI	0.30	0.46
Single family (row or converted; 0,1)	SINGLE	0.05	0.22
Highrise (more than four stories; 0,1)	HIGHRISE	0.02	0.14
No heat or inferior source of heat (0,1)	NOHEAT	0.04	0.20
Livingroom quality and amenities (factor score)	FAC2A	-0.08	0.95
Quality of multi-family buildings (factor score)	FAC3A	-0.13	0.97
Kitchen quality and amenities (factor score)	FAC4A	0.22	1.20
Recreational facilities (factor score)	FAC6A	-0.46	0.90
Overall quality and bathroom and kitchen features (factor score)	FAC7A	0.35	1.01
Availability of kitchen cabinets (factor score)	FAC8A	0.18	0.65
Balcony, porch, or patio (factor score)	FAC9A	-0.12	0.97
Electrical heating, and water hazards (factor score)	FAC10A	-0.12	0.86
Well kept, landscaped grounds (0,1)	NICEYD	0.09	0.28
Heat per room (heat included in rent x # of rooms)	HEATRMB	0.36	1.13
Abandoned and boarded-up buildings (natural log)	LNABAN	0.08	0.27
Proportion of the blockface that is residential	PRESIDEN	0.79	0.26
Attractive features of the unit (0,1)	ATTRACT	0.15	0.36
Proportion of the blockface that is commercial or industrial	PCOMMIND	0.06	0.12
Proportion of the blockface used for public services	PSERV	0.02	0.04
Cleanliness of surrounding parcels (4 point scale)	CLEANPAR	3.49	0.76
Census tract median housing value (dollars)	CTMDVAL1	17940.12	4793.69
Census tract median contract rent (dollars)	CTMDCR1	109.50	27.04
Proportion of the blockface that is park	PPARK	0.15	0.36
Number of rooms (excluding bath) (natural log)	LNROOMS2	1.32	0.29
Number of baths and half-baths	NBATH	1.07	0.31
Square feet per room	SQTOTRM	140.36	31.26
Los Angeles-Long Beach (0,1)	LA1	0.39	0.49
San Diego (0,1)	SD1	0.37	0.48

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, excluding subunit households (n=267).

DATA SOURCE: Housing Measurement Survey.

a. Seattle-Everett is the excluded site.

Size

Three variables very successfully describe the size of the unit: the total number of rooms excluding baths, the number of baths, and square feet per room. The rooms variable excludes bath but includes all other rooms (for example, enclosed year-round porches or attic rooms) except storage, laundry, or utility rooms that occurred after the first seven rooms were rated by the evaluator. Again, the natural log form assumes that rent increases with the number of rooms but at a decreasing rate. The total square feet in the unit includes all rooms, regardless of use or size. The number of bathrooms variable counted full baths as one and partial baths as one-half.

Dwelling Unit Quality

The extensive amount of information describing dwelling unit quality, amenities, and special features is indeed one of the major strengths of the Housing Measurement Survey. The challenge is to define appropriate variables and employ data reduction techniques such that collinearity is reduced to an acceptable level and the maximum proportion of the variance in the original data is retained.

A number of test equations used different definitions and combinations of quality variables, including various averages of the ceiling, wall, and floor surface and structure ratings, the evaluator's overall rating of quality and condition, separate counts of the number of amenities in the living room, bathroom, and kitchen and in all other rooms, the presence of special features (high quality floors, balcony, etc.), the presence of numerous types of hazards, the condition and quality of kitchen appliances and bathroom fixtures and so forth. Many of these variables are listed in Table V-12. Although other combinations and definitions based on the data points in these variables were also tested, the variables listed in the tables are those used in a principal components analysis.

The principal components analysis proved to be quite successful. Test equations using a large number of the quality variables had suffered from the effects of collinearity, that is, many of the variables were insignificant and some did not have the expected sign. The principal components

Table V-12

VARIABLES INCLUDED IN THE HOUSING MEASUREMENT SURVEY
PRINCIPAL COMPONENTS ANALYSIS OF DWELLING UNIT QUALITY

VARIABLE NAME	DEFINITION
HAZARDS	electrical, septic tank, boiler, hot water heater, pipes, water, leaking gases, rats, structural hazards
HAZ	overall evaluation rating; unit immediately or potentially hazardous
CSTRUC	average of ceiling structure ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
CSURF	average of ceiling surface ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
WSTRUC	average of wall structure ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
WSURF	average of wall surface ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
FSTRUC	average of floor structure ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
FSURF	average of floor surface ratings in all rooms located in the main body of the unit and not used for storage, laundry, or utility
BADWIND	window sash or frame in the livingroom, bathroom, kitchen, or next rated room badly deteriorated or not weathertight
BUILTIN	range built into the countertop
NOCAB	kitchen has no cabinets
DISPOSAL	kitchen disposal present
CABFTA	linear feet of cabinets or shelving in kitchen
KDECOR	kitchen has high quality walls or floors or cabinets or special built-in lighting
NAMENKA	number of kitchen amenities present including breakfast nook, pantry, range hood, double oven or microwave, double sink, fireplace, balcony, special windows or doors, special lighting, special storage, or an extra large kitchen
WPROOF	extent of waterproof construction in bathroom
GROUT	condition of the grout and seals and the bathroom
FIXT	condition of bathroom fixtures
NAMENB	number of amenities in the bathroom including jacuzzi, bidet, heat lamp, other heat source, large mirrors, glass shower/tub door, separate dressing area, vanity, double sink
VANITY	built-in vanity table
OCOND	evaluator overall rating of condition in terms of need for repairs and rehabilitation
OQUAL	evaluator overall rating of unit quality
LVDECOR	livingroom has high quality walls or ceilings or floors or built-in lighting or built-in shelves
LVWIND	special windows or doors in livingroom
HQFLOOR	high quality floors or floor coverings in livingroom
STORMRM	porportion of rooms where some or all of the windows are double glazed or have storm windows

Table V-12 (cont.)

VARIABLE NAME	DEFINITION
CENHEAT	central heating system
HQMULT	multi-family security; security guard or intercom with television or intercom with voice or locked entrance
POOL	exterior pool
SPORTS	(the sum of) tennis courts, basketball, playrooms and playing fields
NAMENLA	# of amenities in the livingroom including high quality walls, ceilings, floors, fireplace or stove, balcony, patio or deck, special windows, built-in lighting, built-in shelves, and exceptional size
BQUAL	bathroom has waterproof construction, good seals, and like-new fixtures
HQBASE	basement is not a crawl space only and none of the floor is dirt
BALC	balcony, deck, porch, or patio
AMENMULT	# of amenities in multi-family buildings including function room, indoor pool, sauna, social service centers, fancy foyer, storage areas, secure private storage, convenience stores, security guard or intercom or locked entrances, well-maintained entrance hall and common areas
AMENOTHA	# of amenities in all other rooms rated by evaluator on the Housing Measurement Survey including high quality walls; high quality ceilings; high quality floors; fireplace or Franklin stove; balcony, patio, or deck; special windows and doors; special built-in lighting; built-in shelves, bookcases, cabinets; separate dressing area; exceptional size
APPCOND	condition of kitchen appliances
KSINK	condition of kitchen sink
NEWAPP	age of kitchen appliances
NICEK	coordinated and balanced kitchen
DISHW	built-in dishwasher present

analysis identified 10 major components (see Table V-13). Eight of these factors proved to be significant and have the expected sign in the hedonic regression.[1] As indicated in Table V-7, the factors describe numerous aspects of unit quality and tend to group descriptors of a given room (for example, living room, kitchen) or given type of variable (for example, hazards, recreational facilities) together. Somewhat surprisingly, the factor describing the surface and structure ratings was not significant. However, the surface and structure ratings were not significant either when the simple averages (that is, ceiling structure, ceiling surface, wall structure, wall surface, floor structure, floor surface) were tested, and the variables frequently had the wrong sign.[2]

Other quality descriptors included in the final equations are building age and two aspects of the mechanical system, the presence of central air conditioning or room units (supplied by the landlord) and the absence of heat or its provision through inferior or unsafe means. Finally, the evaluators indicated the presence of attractive or beneficial features not recorded elsewhere on the Housing Measurement Survey. This information was included in the final equation in the form of a dummy (0,1) variable and had the expected (positive) sign in three of the four regions.

Utilities

As discussed above, utility payments were not added to the contract rent amount if rent did not already include utilities. Thus, it was necessary to estimate the value of utility payments for households that did have utilities included in order to define rent consistently across households.[3]

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[1] This is the case for the full sample equations; the factor scores also behave as expected in almost all cases in the regional equations.

[2] One possible explanation for this is that the distributions of the evaluator ratings, and the quality distribution to which the evaluators related when making their ratings differed across sites. The appropriate distinctions may be lost in a combined site equation.

[3] The individual estimates of amounts paid for utilities provided by households in their interview responses were used in test equations but were found to reduce the predictive power of the equations. The responses were "noisy."

Table V-13

DWELLING UNIT QUALITY AND AMENITIES
ROTATED QUARTIMAX FACTOR MATRIX

VARIABLE[a]	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
HAZARDS	-0.01071	-0.11658	0.02068	-0.09947	0.01599	0.02038	-0.15833	0.01653	0.01998	0.74573
HAZ	-0.26699	0.07902	-0.03269	0.04525	-0.16420	0.01742	-0.26544	-0.03719	-0.07561	0.64217
CSTRUC	0.86655	0.01070	0.02968	0.02913	-0.04266	0.07223	0.33029	-0.02334	0.00026	-0.06216
CSURF	0.70121	0.09414	0.01661	0.03346	-0.09077	0.00898	0.52526	0.13922	0.07044	-0.07230
WSTRUC	0.87393	0.02145	0.02160	0.02997	-0.04976	0.05684	0.33314	-0.02987	1.086E-05	-0.03345
WSURF	0.66747	0.11817	0.02110	0.04105	-0.10366	-0.01769	0.56742	0.11782	0.08361	-0.05363
FSTRUC	0.85606	0.04423	0.04012	0.03539	0.00841	0.08662	0.31169	-0.02297	-0.03394	-0.03234
FSURF	0.56582	0.20171	0.13511	-0.00692	0.03433	-0.06859	0.56895	0.07264	-0.01486	-0.02806
BADWIND	-0.29819	0.02781	-0.02080	-0.05168	-0.28795	-0.09521	-0.29852	-0.23178	0.06939	0.31831
BULTIN	0.09207	0.03427	-0.04377	0.63054	-0.02220	0.03398	0.15802	0.09730	-0.03951	0.07657
NOCAB	-0.01504	0.06657	0.08300	-0.09560	-0.04633	0.10770	-0.19983	-0.68074	-0.09745	-0.00093
DISPOSAL	0.18863	0.01821	0.00476	0.09944	-0.17932	0.31170	0.61429	0.04970	0.11558	0.07575
CABFTA	0.15905	-0.07217	-0.12126	0.29647	0.03313	-0.06382	0.44789	0.42519	0.30734	0.01951
KDECOR	0.03083	0.41507	0.00349	0.38634	0.13881	-0.10677	0.41066	-0.10520	0.07411	0.05783
NAMENKA	0.00749	0.33524	-0.14403	0.44568	0.05855	0.01223	0.52384	-0.07436	0.21708	0.03026
WPROOF	0.28172	0.10017	0.17276	0.01293	-0.05279	0.10354	0.50430	0.43772	-0.19665	-0.10307
GROUT	0.21338	0.12686	0.18080	-0.05615	-0.09193	0.08981	0.56464	0.44157	-0.23198	-0.12619
FIXT	0.08926	0.04988	0.05671	-0.02037	0.03799	0.00377	0.80590	0.00701	-0.00566	-0.06219
NAMENB	0.05793	0.13406	0.04029	0.56852	-0.18388	0.18320	0.49341	-0.04387	0.12091	-0.08781
VANITY	-0.01530	0.12669	0.00799	0.53192	-0.09042	0.15895	0.42689	-0.10076	0.06940	-0.13185
OCOND	0.34525	0.05529	0.16354	0.05343	0.08036	0.07890	0.67118	0.03669	0.03899	-0.36418
OQUAL	0.28144	0.13510	0.25874	0.14938	0.18034	0.03895	0.61918	0.12056	0.03146	-0.28710
LVDECOR	0.07612	0.83028	0.02211	0.02832	0.03077	-0.02641	0.18737	0.03618	0.05203	-0.41000
LVWIND	0.00509	0.13660	0.23318	0.00105	0.09004	0.21990	0.27089	0.22579	0.61586	0.04704
HQFLOOR	0.09788	0.81468	0.09134	0.03090	0.08224	0.01477	0.22510	-0.04432	-0.05598	-0.03052
STORMRM	-0.19915	0.00337	-0.02961	-0.06032	0.65136	-0.26783	0.09896	-0.07897	0.13606	-0.07454
CENHEAT	-0.10221	0.08443	0.15697	0.09040	0.67858	0.39424	0.12728	0.11513	-0.08783	0.05661
HQMLLT	0.09748	0.04724	0.72403	-0.03654	0.01058	0.04341	0.32531	0.05700	-0.03063	0.01962

Table V-13 (cont.)

VARIABLE[a]	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7	FACTOR 8	FACTOR 9	FACTOR 10
SECURE	0.02993	0.01780	0.82681	0.09590	0.09247	-0.06522	0.05494	-0.11618	0.06339	-0.02371
POOL	0.13122	-0.02114	0.01648	0.08170	-0.10154	0.69137	0.38306	-0.04182	0.16524	0.03533
SPORTS	0.06388	0.01978	-0.02894	0.07384	-0.00068	0.69289	0.22039	-0.07583	0.14041	-0.04886
NAMENLVA	0.02876	0.60655	0.12278	0.10119	0.00884	0.18092	0.31235	0.10282	0.55404	-0.01683
BQUAL	0.00364	0.16083	0.22560	-0.07118	-0.14513	0.10237	0.70958	0.11009	-0.11568	0.03232
HQBASE	0.06485	0.20200	0.09056	-0.05004	0.63472	-0.08881	-0.07168	0.01315	0.01345	-0.08313
BALC	0.00387	0.14370	-0.03291	0.00945	-0.00946	0.12898	0.17876	-0.06264	0.69694	-0.05104
AMENMULT	0.05407	0.03144	0.86064	0.01498	0.06434	0.03670	0.26380	0.01131	0.05640	-0.00923
AMENOTHA	0.06641	0.60184	-0.05746	0.18907	0.16457	0.06759	0.17950	-0.05917	0.30081	-0.01537
APPCOND	0.06840	-0.00861	0.03175	0.03355	0.08949	-0.05922	0.81147	-0.06135	0.04469	0.00017
KSINK	0.06551	-0.00487	0.01612	0.04656	0.12330	0.00943	0.75149	-0.05099	-0.00761	-0.01178
NEWAPP	0.03732	-0.04765	-0.09066	0.12077	0.01191	-0.00174	0.67029	-0.01695	0.17236	0.02795
NICEK	-0.01986	0.04605	0.18408	0.63107	0.06395	0.04784	0.24110	0.12829	-0.03485	-0.12852
DISHW	0.06893	0.11123	0.02849	0.15416	-0.07124	0.49911	0.53307	0.00897	0.11892	0.06645

SAMPLE: Households completing the Applicant or Certificate Holder Interview and pre-program Housing Measurement Survey with non-missing data, including subunit households (n=1755).

DATA SOURCE: Housing Measurement Survey.

a. See Table V-12 for variable definitions.

Numerous variables were tested which were designed to separate households that had only heat included, both heat and electricity for nonheat uses, and only (nonheat) electricity. In addition individual heating fuels (gas, electricity, and oil) were considered separately, and the heat and (nonheat) electric variables were interacted with the number of rooms in the unit. The (nonheat) electric variable consistently had the wrong sign; units that had only electricity included in rent may exhibit an unobserved feature quite correlated with the electric variable. The variable was excluded.

Attempts to use individual types of heating fuel were also unsuccessful, especially in the regional equations where the number of observations for some of these variables was extremely small. Thus, all types of heat are considered together and the dummy variable is multiplied by the number of rooms. The estimated coefficients measure the cost of heat per room.

Building Type

Several building type variables proved to be significant in the full sample equation although the patterns of sign and significance are quite mixed across the regions. The expected sign of these variables is unknown; presumably the sign would be a function of the average quality of these building types in each area and the excluded categories of building types. Mobile homes, shacks, tenements, and mixed use units (retail and dwelling) are excluded, so the signs of the included variables were generally expected to be positive. This is true in every region but the Midwest.

Building Exterior and Grounds

Although a number of ratings were made for the building exterior (exterior wall surface and structure, building material, roof structure and surface, roof material, etc.), the variables were generally insignificant. In many instances, they were correlated with the interior quality variables and added no new information. In contrast, a (dummy) variable describing buildings with well-kept grounds, good landscaping, and no accumulations of trash contributed to the equation, particularly in the Northeast. Also

exterior facilities (pool, tennis court, playgrounds, basketball, etc.) were included in the factor analysis and form the basis of factor 6.

Blockface and Surrounding Parcels

The Housing Measurement Survey provided extensive descriptors of the blockface and also ratings of the exteriors and grounds of the units on the four surrounding parcels (if these parcels were residential). The number of abandoned buildings on the blockface proved to be an important proxy of blockface quality. Also, the proportion of the blockface that was residential, commercial or industrial, used for public services, or public park were significant in most of the equations. Again, the expected sign is not proven, but since the excluded uses include vacant land and construction sites, a positive sign was expected for at least the proportion residential (that is the case in three of four regions).

The only parcel variable of those tested that was significant describes the cleanliness of the parcel grounds. This follows the pattern of the building exterior and grounds variables.

Census Tract

Finally, a number of census tract variables describing housing were tested. Median contract rent and median housing value proved to add the most explanatory power. The census housing variables not included (because they were insignificant or had the wrong sign) were median age of unit and percentage with inadequate plumbing.

V.4 THE ANNUAL HOUSING SURVEY HEDONIC INDEX

As indicated in the introduction to this appendix, the regression equations used to form the Annual Housing Survey hedonic index were estimated by Stephen Malpezzi and Larry Ozanne of the Urban Institute. The specification was based on previous work by Follain and Malpezzi (1979).

The AHS-based values of $\hat{Q}$, (the market value of the housing attributes in the unit) and $\hat{R}_j$ (predicted rent) used in the Section 8 analysis were obtained from these equations and from household interview data. The

Applicant and Certificate Holder Interviews, administered to households in their pre-program units, obtained information on the dwelling unit and neighborhood corresponding to questions in the Annual Housing Survey. These data were used in conjunction with the estimated coefficients from the AHS regressions.

The variables included in the Annual Housing Survey regressions are listed in Table V-14. The AHS regressions were estimated separately for each SMSA in the Section 8 analysis. The results for these equations, the sample size, and the year the AHS data were collected in that site, are presented in Tables V-15 through V-29. The equations were estimated using a semilog functional form. With a few exceptions, the independent variables are (0,1) dummy variables. The sample sizes are very large, ranging from 1080 in Rochester to 5477 in Los Angeles. The proportion of explained variance obtained is generally fairly good; the lowest R^2 is .56 in San Diego and the highest is .82, obtained in Raleigh.

Table V-14

VARIABLES INDEXED IN THE ANNUAL HOUSING SURVEY HEDONIC INDEX

Tenure

- Length of tenure (years)
- Length of tenure (squared/100; years)
- Tenure greater than 25 years (0,1)
- Landlord in the building (0,1)

Unit Size

- 1 or 1-1/2 bathrooms (0,1)
- 2 bathrooms (0,1)
- More than 2 bathrooms (0,1)
- # rooms - # bedrooms = 1 (0,1)
- # rooms - # bedrooms = 3 (0,1)
- # rooms - # bedrooms $\geq$ 4 (0,1)
- # bedrooms = 0 (0,1)
- # bedrooms = 2 (0,1)
- # bedrooms = 3 (0,1)
- # bedrooms $\geq$ 4 (0,1)

Dwelling Unit Quality

- Elevator present (0,1)
- Age of structure
- Age of structure (squared/100)
- Building built before 1940 (0,1)
- Wall or room heaters (0,1)
- Room air conditioners (0,1)
- Central air conditioning (0,1)
- Rooms without heat (0,1)
- Bedrooms not private (0,1)
- # poor facilities (incomplete plumbing, shared plumbing, no piped water, no public sewer or septic tanks, inadequate heating system)
- Exposed wiring (0,1)
- # problems with common hall (defective hall lighting; loose, broken, or missing steps; railings not firmly attached)
- # defects (leaky basement, leaky roof, open cracks, holes in floor, broken plaster, rats)

Utilities, Furnishings and Parking

- Non-heat utilities included in rent (0,1)
- Heat included in rent (0,1)
- Parking included in rent (0,1)
- Furniture included in rent (0,1)

Building Type

- Single family attached (0,1)
- Single family detached (0,1)
- Duplex (0,1)
- Multifamily $\geq$ 50 units (0,1)

Neighborhood

- Excellent neighborhood (0,1)
- Good neighborhood (0,1)
- Poor neighborhood (0,1)
- Abandoned buildings in neighborhood (0,1)
- Litter in neighborhood (0,1)
- No convenient shopping (0,1)

Locational Identifiers

- Central city (0,1)
- County or counties (0,1)

Table V-15

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

ATLANTA

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.577**	0.028
1 or 1 1/2 Bathrooms (0,1)	0.073**	0.017
2 Bathrooms (0,1)	0.169**	0.016
>2 Bathrooms (0,1)	0.299**	0.029
# Rooms - # Bedrooms = 1 (0,1)	-0.103**	0.020
# Rooms - # Bedrooms = 3 (0,1)	0.137**	0.011
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.047**	0.005
# Bedrooms = 0 (0,1)	0.172**	0.035
# Bedrooms = 2 (0,1)	0.064**	0.011
# Bedrooms = 3 (0,1)	0.165**	0.017
# Bedrooms $\geq$ 4 (0,1)	0.050**	0.009
Elevator Present (0,1)	0.058†	0.033
Single Family Attached (0,1)	0.015	0.031
Single Family Detached (0,1)	0.029†	0.017
Duplex (0,1)	0.003	0.016
Multifamily $\geq$ 50 units (0,1)	0.051†	0.029
Age of Structure	0.002	0.002
Age of Structure squared/100	-0.001	0.006
Building Built Before 1940 (0,1)	0.173*	0.088
Wall or Room Heaters (0,1)	-0.169**	0.015
Room Air Conditioner(s) (0,1)	0.172**	0.014
Central Air Conditioning (0,1)	0.338**	0.017
Rooms without Heat (0,1)	-0.025†	0.015
# Poor Facilities[a]	-0.276**	0.018
Bedrooms not Private (0,1)	-0.081**	0.014
Exposed Wiring (0,1)	-0.037	0.032
# Problems with Common Hall[b]	-0.011	0.012
# Defects[c]	0.005	0.005
Length of Tenure (years)	-0.029**	0.003
Length of Tenure (years) squared/100	0.067**	0.017
Length of Tenure >25 years (0,1)	-0.024	0.098

Table V-15 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS
ATLANTA

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	0.014	0.020
Non-heat Utilities Included in Rent (0,1)	0.084**	0.026
Heat Included in Rent (0,1)	0.195**	0.018
Parking Included in Rent (0,1)	-0.000	0.041
Furniture Included in Rent (0,1)	0.110**	0.020
Excellent Neighborhood (0,1)	0.052**	0.014
Good Neighborhood (0,1)	0.033**	0.011
Poor Neighborhood (0,1)	-0.012	0.023
Abandoned Buildings in Neighborhood (0,1)	-0.061**	0.014
Litter in Neighborhood (0,1)	-0.011	0.012
No Convenient Shopping (0,1)	-0.042**	0.013
Locational Identifiers		
Central City (0,1)	0.017	0.014
Dekalb or Fulton County (0,1)[d]	0.059**	0.014
R^2	0.7133	
Standard Error of Estimate	0.070	
Sample Size	3928	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

d. Excluding central city.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-16

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

BALTIMORE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.000**	0.050
1 or 1 1/2 Bathrooms (0,1)	0.089**	0.027
2 Bathrooms (0,1)	0.209**	0.030
>2 Bathrooms (0,1)	0.363**	0.077
# Rooms - # Bedrooms = 1 (0,1)	-0.120**	0.035
# Rooms - # Bedrooms = 3 (0,1)	0.061**	0.017
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.029**	0.007
# Bedrooms = 0 (0,1)	-0.383**	0.073
# Bedrooms = 2 (0,1)	0.107**	0.019
# Bedrooms = 3 (0,1)	0.210**	0.029
# Bedrooms $\geq$ 4 (0,1)	0.034**	0.011
Elevator Present (0,1)	0.263**	0.077
Single Family Attached (0,1)	-0.114**	0.027
Single Family Detached (0,1)	0.002	0.037
Duplex (0,1)	-0.041	0.026
Multifamily $\geq$ 50 units (0,1)	0.204*	0.083
Age of Structure	-0.002	0.004
Age of Structure squared/100	-0.003	0.012
Building Built Before 1940 (0,1)	0.060	0.173
Wall or Room Heaters (0,1)	-0.223**	0.043
Room Air Conditioner(s) (0,1)	0.058**	0.020
Central Air Conditioning (0,1)	0.206**	0.028
Rooms without Heat (0,1)	-0.103**	0.025
# Poor Facilities[a]	-0.241**	0.039
Bedrooms not Private (0,1)	-0.113**	0.023
Exposed Wiring (0,1)	0.021	0.036
# Problems with Common Hall[b]	0.008	0.025
# Defects[c]	-0.004	0.008
Length of Tenure (years)	-0.025**	0.004
Length of Tenure (years) squared/100	0.037†	0.022
Length of Tenure >25 years (0,1)	-0.195	0.133

Table V-16 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

BALTIMORE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.074*	0.029
Non-heat Utilities Included in Rent (0,1)	0.052	0.039
Heat Included in Rent (0,1)	0.108**	0.031
Parking Included in Rent (0,1)	0.003	0.151
Furniture Included in Rent (0,1)	0.026	0.036
Excellent Neighborhood (0,1)	0.034	0.023
Good Neighborhood (0,1)	-0.015	0.019
Poor Neighborhood (0,1)	-0.067†	0.038
Abandoned Buildings in Neighborhood (0,1)	-0.067**	0.025
Litter in Neighborhood (0,1)	-0.008	0.020
No Convenient Shopping (0,1)	-0.043†	0.026
Locational Identifiers		
Central City (0,1)	-0.078**	0.024
Baltimore County (0,1)	-0.016	0.022
R^2	0.6499	
Standard Error of Estimate	0.063	
Sample Size	1258	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-17

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

CHICAGO

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.104**	0.052
1 or 1 1/2 Bathrooms (0,1)	0.131**	0.023
2 Bathrooms (0,1)	0.238**	0.020
>2 Bathrooms (0,1)	0.466**	0.055
# Rooms - # Bedrooms = 1 (0,1)	-0.128**	0.017
# Rooms - # Bedrooms = 3 (0,1)	0.093**	0.009
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.046**	0.005
# Bedrooms = 0 (0,1)	-0.176**	0.020
# Bedrooms = 2 (0,1)	0.096**	0.010
# Bedrooms = 3 (0,1)	0.160**	0.014
# Bedrooms $\geq$ 4 (0,1)	0.031**	0.007
Elevator Present (0,1)	0.144**	0.019
Single Family Attached (0,1)	-0.054†	0.030
Single Family Detached (0,1)	-0.127**	0.019
Duplex (0,1)	-0.115**	0.012
Multifamily $\geq$ 50 units (0,1)	0.106**	0.020
Age of Structure	0.005†	0.003
Age of Structure squared/100	-0.027**	0.009
Building Built Before 1940 (0,1)	0.382**	0.133
Wall or Room Heaters (0,1)	-0.282**	0.015
Room Air Conditioner(s) (0,1)	0.085**	0.009
Central Air Conditioning (0,1)	0.221**	0.018
Rooms without Heat (0,1)	-0.069**	0.012
# Poor Facilities[a]	-0.262**	0.023
Bedrooms not Private (0,1)	-0.025	0.018
Exposed Wiring (0,1)	-0.097**	0.023
# Problems with Common Hall[b]	-0.026**	0.008
# Defects[c]	0.012*	0.005
Length of Tenure (years)	-0.024**	0.002
Length of Tenure (years) squared/100	0.066**	0.012
Length of Tenure >25 years (0,1)	-0.159*	0.064

Table V-17 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

CHICAGO

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.063**	0.010
Non-heat Utilities Included in Rent (0,1)	0.025†	0.014
Heat Included in Rent (0,1)	0.024	0.016
Parking Included in Rent (0,1)	0.036†	0.021
Furniture Included in Rent (0,1)	-0.001	0.018
Excellent Neighborhood (0,1)	0.093**	0.012
Good Neighborhood (0,1)	0.026**	0.010
Poor Neighborhood (0,1)	-0.042*	0.019
Abandoned Buildings in Neighborhood (0,1)	-0.065**	0.013
Litter in Neighborhood (0,1)	0.012	0.011
No Convenient Shopping (0,1)	0.002	0.012
Locational Identifiers		
Central City (0,1)	-0.038**	0.012
DuPage County (0,1)	0.023	0.021
Kane County (0,1)	-0.051*	0.023
Lake County (0,1)	-0.000	0.025
R^2	0.6085	
Standard Error of Estimate	0.0641	
Sample Size	4184	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-18

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

CLEVELAND

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.879**	0.055
1 or 1 1/2 Bathrooms (0,1)	0.094**	0.027
2 Bathrooms (0,1)	0.178**	0.041
>2 Bathrooms (0,1)	0.269**	0.083
# Rooms - # Bedrooms = 1 (0,1)	-0.091**	0.032
# Rooms - # Bedrooms = 3 (0,1)	0.071**	0.018
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.026**	0.008
# Bedrooms = 0 (0,1)	-0.201**	0.064
# Bedrooms = 2 (0,1)	0.084**	0.019
# Bedrooms = 3 (0,1)	0.213**	0.029
# Bedrooms $\geq$ 4 (0,1)	0.041**	0.011
Elevator Present (0,1)	0.107**	0.041
Single Family Attached (0,1)	-0.068*	0.033
Single Family Detached (0,1)	-0.009	0.032
Duplex (0,1)	-0.079**	0.023
Multifamily $\geq$ 50 units (0,1)	-0.004	0.041
Age of Structure	0.004	0.005
Age of Structure squared/100	-0.015	0.014
Building Built Before 1940 (0,1)	0.092	0.198
Wall or Room Heaters (0,1)	-0.208**	0.041
Room Air Conditioner(s) (0,1)	0.081**	0.020
Central Air Conditioning (0,1)	0.243**	0.021
Rooms without Heat (0,1)	-0.002	0.030
# Poor Facilities[a]	-0.274**	0.045
Bedrooms not Private (0,1)	-0.069*	0.031
Exposed Wiring (0,1)	-0.106*	0.045
# Problems with Common Hall[b]	0.014	0.700
# Defects[c]	-0.006	0.009
Length of Tenure (years)	-0.022**	0.004
Length of Tenure (years) squared/100	0.059*	0.023
Length of Tenure >25 years (0,1)	-0.272*	0.138

Table V-18 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

CLEVELAND

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.027	0.023
Non-heat Utilities Included in Rent (0,1)	0.026	0.036
Heat Included in Rent (0,1)	0.105**	0.031
Parking Included in Rent (0,1)	0.099**	0.031
Furniture Included in Rent (0,1)	0.059†	0.034
Excellent Neighborhood (0,1)	0.063**	0.024
Good Neighborhood (0,1)	0.050*	0.020
Poor Neighborhood (0,1)	-0.007	0.037
Abandoned Buildings in Neighborhood (0,1)	-0.157**	0.025
Litter in Neighborhood (0,1)	-0.005	0.023
No Convenient Shopping (0,1)	-0.026	0.025
Locational Identifiers		
Central City (0,1)	-0.176**	0.028
Cuyahoga County (0,1)[d]	0.058*	0.026
R^2	0.6999	
Standard Error of Estimate	0.057	
Sample Size	1176	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

d. Excluding central city.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-19

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

LOS ANGELES

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.121**	0.025
1 or 1 1/2 Bathrooms (0,1)	0.125**	0.021
2 Bathrooms (0,1)	0.198**	0.014
>2 Bathrooms (0,1)	0.368**	0.044
# Rooms - # Bedrooms = 1 (0,1)	-0.080**	0.014
# Rooms - # Bedrooms = 3 (0,1)	0.074**	0.011
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.046**	0.005
# Bedrooms = 0 (0,1)	-0.249**	0.017
# Bedrooms = 2 (0,1)	0.161**	0.009
# Bedrooms = 3 (0,1)	0.307**	0.017
# Bedrooms $\geq$ 4 (0,1)	0.077**	0.009
Elevator Present (0,1)	0.113**	0.021
Single Family Attached (0,1)	-0.077**	0.015
Single Family Detached (0,1)	-0.024*	0.012
Duplex (0,1)	-0.056**	0.016
Multifamily $\geq$ 50 units (0,1)	0.075**	0.017
Age of Structure	-0.012**	0.002
Age of Structure squared/100	0.013*	0.006
Building Built Before 1940 (0,1)	-0.023	0.077
Wall or Room Heaters (0,1)	-0.112**	0.013
Room Air Conditioner(s) (0,1)	0.012	0.010
Central Air Conditioning (0,1)	0.125**	0.019
Rooms without Heat (0,1)	0.038**	0.010
# Poor Facilities[a]	-0.399**	0.017
Bedrooms not Private (0,1)	-0.070**	0.012
Exposed Wiring (0,1)	-0.051*	0.026
# Problems with Common Hall[b]	0.003	0.010
# Defects[c]	0.002	0.006
Length of Tenure (years)	-0.024**	0.002
Length of Tenure (years) squared/100	0.059**	0.014
Length of Tenure >25 years (0,1)	-0.001	0.084

Table V-19 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

LOS ANGELES

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	0.026*	0.012
Non-heat Utilities Included in Rent (0,1)	0.022	0.021
Heat Included in Rent (0,1)	0.026	0.020
Parking Included in Rent (0,1)	0.061**	0.019
Furniture Included in Rent (0,1)	0.050**	0.012
Excellent Neighborhood (0,1)	0.085**	0.012
Good Neighborhood (0,1)	0.032**	0.009
Poor Neighborhood (0,1)	-0.009	0.017
Abandoned Buildings in Neighborhood (0,1)	-0.129**	0.013
Litter in Neighborhood (0,1)	-0.039**	0.011
No Convenient Shopping (0,1)	-0.027**	0.013
Locational Identifiers		
Los Angeles Central City	0.013	0.008
Long Beach Central City	-0.057**	0.017
R^2	0.5810	
Standard Error of Estimate	0.074	
Sample Size	5477	
Year of AHS	1974	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-20

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

HOUSTON

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.751**	0.034
1 or 1 1/2 Bathrooms (0,1)	0.127**	0.018
2 Bathrooms (0,1)	0.196**	0.015
>2 Bathrooms (0,1)	0.376**	0.029
# Rooms - # Bedrooms = 1 (0,1)	-0.058	0.016
# Rooms - # Bedrooms = 3 (0,1)	0.077**	0.010
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.045**	0.005
# Bedrooms = 0 (0,1)	-0.164**	0.033
# Bedrooms = 2 (0,1)	0.124**	0.011
# Bedrooms = 3 (0,1)	0.270**	0.017
# Bedrooms $\geq$ 4 (0,1)	0.102**	0.009
Elevator Present (0,1)	0.543**	0.062
Single Family Attached (0,1)	-0.014	0.026
Single Family Detached (0,1)	-0.082**	0.017
Duplex (0,1)	-0.105**	0.020
Multifamily $\geq$ 50 units (0,1)	0.057**	0.014
Age of Structure	-0.005*	0.002
Age of Structure squared/100	0.008	0.005
Building Built Before 1940 (0,1)	-0.079'	0.081
Wall or Room Heaters (0,1)	-0.089**	0.020
Room Air Conditioner(s) (0,1)	0.181**	0.014
Central Air Conditioning (0,1)	0.282**	0.024
Rooms without Heat (0,1)	-0.011	0.019
# Poor Facilities[a]	-0.293**	0.017
Bedrooms not Private (0,1)	-0.025*	0.012
Exposed Wiring (0,1)	-0.114**	0.028
# Problems with Common Hall[b]	0.010	0.013
# Defects[c]	-0.013**	0.005
Length of Tenure (years)	-0.043**	0.003
Length of Tenure (years) squared/100	0.112**	0.017
Length of Tenure >25 years (0,1)	-0.065	0.119

Table V-20 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

HOUSTON

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	0.011	0.019
Non-heat Utilities Included in Rent (0,1)	0.172**	0.024
Heat Included in Rent (0,1)	0.172**	0.020
Parking Included in Rent (0,1)	0.082	0.955
Furniture Included in Rent (0,1)	0.098**	0.014
Excellent Neighborhood (0,1)	0.074**	0.013
Good Neighborhood (0,1)	0.017†	0.010
Poor Neighborhood (0,1)	0.013	0.020
Abandoned Buildings in Neighborhood (0,1)	-0.094**	0.015
Litter in Neighborhood (0,1)	0.001	0.011
No Convenient Shopping (0,1)	-0.026	0.016
Locational Identifiers		
Central City (0,1)	0.040**	0.009
R^2	0.7584	
Standard Error of Estimate	0.068	
Sample Size	4185	
Year	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-21

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

MILWAUKEE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.115**	0.044
1 or 1 1/2 Bathrooms (0,1)	0.155**	0.028
2 Bathrooms (0,1)	0.214**	0.052
>2 Bathrooms (0,1)	0.299**	0.088
# Rooms - # Bedrooms = 1 (0,1)	-0.085**	0.031
# Rooms - # Bedrooms = 3 (0,1)	0.073**	0.016
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.038**	0.008
# Bedrooms = 0 (0,1)	-0.176**	0.043
# Bedrooms = 2 (0,1)	0.116**	0.017
# Bedrooms = 3 (0,1)	0.230**	0.023
# Bedrooms $\geq$ 4 (0,1)	0.053**	0.011
Elevator Present (0,1)	0.086*	0.040
Single Family Attached (0,1)	-0.114**	0.037
Single Family Detached (0,1)	-0.134**	0.029
Duplex (0,1)	-0.034†	0.020
Multifamily $\geq$ 50 units (0,1)	0.063†	0.035
Age of Structure	-0.009*	0.004
Age of Structure squared/100	0.016	0.012
Building Built Before 1940 (0,1)	-0.313†	0.184
Wall or Room Heaters (0,1)	-0.132**	0.036
Room Air Conditioner(s) (0,1)	0.051**	0.015
Central Air Conditioning (0,1)	0.125**	0.029
Rooms without Heat (0,1)	-0.035	0.023
# Poor Facilities[a]	-0.244**	0.039
Bedrooms not Private (0,1)	-0.056†	0.034
Exposed Wiring (0,1)	-0.040	0.030
# Problems with Common Hall[b]	0.012	0.018
# Defects[c]	-0.016*	0.008
Length of Tenure (years)	-0.031**	0.004
Length of Tenure (years) squared/100	0.079**	0.021
Length of Tenure >25 years (0,1)	-0.204†	0.118

Table V-21 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

MILWAUKEE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.067**	0.019
Non-heat Utilities Included in Rent (0,1)	0.035	0.042
Heat Included in Rent (0,1)	0.042	0.029
Parking Included in Rent (0,1)	0.052†	0.026
Furniture Included in Rent (0,1)	0.014	0.030
Excellent Neighborhood (0,1)	0.035†	0.020
Good Neighborhood (0,1)	0.013	0.018
Poor Neighborhood (0,1)	-0.066†	0.034
Abandoned Buildings in Neighborhood (0,1)	-0.086**	0.032
Litter in Neighborhood (0,1)	0.001	0.020
No Convenient Shopping (0,1)	-0.018	0.021
Locational Identifiers		
Central City (0,1)	-0.001	0.022
Milwaukee County (0,1)[d]	0.063**	0.024
R^2	0.6264	
Standard Error of Estimate	0.052	
Sample Size	1349	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

d. Excluding central city.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-22

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

NEW YORK

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.337**	0.042
1 or 1 1/2 Bathrooms (0,1)	0.202**	0.028
2 Bathrooms (0,1)	0.303**	0.025
>2 Bathrooms (0,1)	0.468**	0.054
# Rooms - # Bedrooms = 1 (0,1)	-0.100**	0.017
# Rooms - # Bedrooms = 3 (0,1)	0.050**	0.014
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.026**	0.007
# Bedrooms = 0 (0,1)	-0.105**	0.027
# Bedrooms = 2 (0,1)	0.118**	0.012
# Bedrooms = 3 (0,1)	0.182**	0.017
# Bedrooms $\geq$ 4 (0,1)	0.070**	0.009
Elevator Present (0,1)	0.183**	0.017
Single Family Attached (0,1)	0.057	0.048
Single Family Detached (0,1)	-0.023	0.031
Duplex (0,1)	0.087**	0.017
Multifamily $\geq$ 50 units (0,1)	0.080**	0.017
Age of Structure	-0.000	0.004
Age of Structure squared/100	-0.007	0.009
Building Built Before 1940 (0,1)	0.015	0.124
Wall or Room Heaters (0,1)	-0.148*	0.066
Room Air Conditioner(s) (0,1)	0.117**	0.011
Central Air Conditioning (0,1)	0.274**	0.031
Rooms without Heat (0,1)	-0.061**	0.019
# Poor Facilities[a]	-0.143**	0.042
Bedrooms not Private (0,1)	-0.077**	0.017
Exposed Wiring (0,1)	-0.073**	0.026
# Problems with Common Hall[b]	-0.023†	0.013
# Defects[c]	-0.008	0.005
Length of Tenure (years)	-0.040**	0.003
Length of Tenure (years) squared/100	0.092**	0.013
Length of Tenure >25 years (0,1)	-0.246**	0.063

Table V-22 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

NEW YORK

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.037**	0.014
Non-heat Utilities Included in Rent (0,1)	0.011	0.023
Heat Included in Rent (0,1)	-0.007	0.024
Parking Included in Rent (0,1)	0.119**	0.032
Furniture Included in Rent (0,1)	-0.136**	0.034
Excellent Neighborhood (0,1)	0.085**	0.016
Good Neighborhood (0,1)	0.029*	0.012
Poor Neighborhood (0,1)	-0.056**	0.020
Abandoned Buildings in Neighborhood (0,1)	-0.079**	0.017
Litter in Neighborhood (0,1)	-0.002	0.013
No Convenient Shopping (0,1)	0.010	0.020
Locational Identifiers		
Bronx County (1,0)	-0.163**	0.020
Kings County (1,0)	-0.129**	0.018
Nassau County (1,0)	0.105**	0.022
New York (1,0)	0.018	0.018
Queens County (1,0)	-0.113**	0.018
Richmond County (1,0)	-0.242**	0.049
Suffolk County (1,0)	0.036	0.026
R^2	0.5709	
Standard Error of Estimate	0.101	
Sample Size	4186	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-23

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

PHILADELPHIA

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.774**	0.038
1 or 1 1/2 Bathrooms (0,1)	0.135**	0.030
2 Bathrooms (0,1)	0.211**	0.027
>2 Bathrooms (0,1)	0.491**	0.062
# Rooms - # Bedrooms = 1 (0,1)	-0.121**	0.022
# Rooms - # Bedrooms = 3 (0,1)	0.043**	0.014
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.034**	0.006
# Bedrooms = 0 (0,1)	-0.184**	0.034
# Bedrooms = 2 (0,1)	0.116**	0.014
# Bedrooms = 3 (0,1)	0.206**	0.023
# Bedrooms $\geq$ 4 (0,1)	0.034**	0.009
Elevator Present (0,1)	0.246**	0.024
Single Family Attached (0,1)	-0.229**	0.023
Single Family Detached (0,1)	-0.157**	0.030
Duplex (0,1)	-0.055**	0.017
Multifamily $\geq$ 50 units (0,1)	0.092**	0.024
Age of Structure	0.014**	0.004
Age of Structure squared/100	-0.042**	0.011
Building Built Before 1940 (0,1)	0.371*	0.153
Wall or Room Heaters (0,1)	-0.165**	0.051
Room Air Conditioner(s) (0,1)	0.113**	0.014
Central Air Conditioning (0,1)	0.291**	0.022
Rooms without Heat (0,1)	-0.021	0.024
# Poor Facilities[a]	-0.163**	0.039
Bedrooms not Private (0,1)	-0.064**	0.019
Exposed Wiring (0,1)	-0.110**	0.032
# Problems with Common Hall[b]	-0.039**	0.015
# Defects[c]	0.001	0.005
Length of Tenure (years)	-0.032**	0.003
Length of Tenure (years) squared/100	0.079**	0.018
Length of Tenure >25 years (0,1)	-0.129	0.099

Table V-23 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

PHILADELPHIA

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.014	0.020
Non-heat Utilities Included in Rent (0,1)	-0.024	0.023
Heat Included in Rent (0,1)	0.060**	0.023
Parking Included in Rent (0,1)	0.065	0.040
Furniture Included in Rent (0,1)	0.087**	0.027
Excellent Neighborhood (0,1)	0.106**	0.018
Good Neighborhood (0,1)	0.061**	0.015
Poor Neighborhood (0,1)	-0.005	0.027
Abandoned Buildings in Neighborhood (0,1)	-0.172**	0.017
Litter in Neighborhood (0,1)	0.005	0.015
No Convenient Shopping (0,1)	0.002	0.017
Locational Identifiers		
Camden County (0,1)	0.085**	0.023
Burlington or Gloucester County (0,1)	0.068**	0.024
Bucks County (0,1)	0.080**	0.026
Chester County (0,1)	0.063*	0.028
Delaware County (0,1)	0.092**	0.021
Montgomery County (0,1)	0.135**	0.019
R^2	0.6442	
Standard Error of Estimate	0.087	
Sample Size	2974	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-24

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

PROVIDENCE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.072**	0.062
1 or 1 1/2 Bathrooms (0,1)	0.173**	0.062
2 Bathrooms (0,1)	0.195*	0.087
>2 Bathrooms (0,1)	0.153	0.163
# Rooms - # Bedrooms = 1 (0,1)	-0.089*	0.039
# Rooms - # Bedrooms = 3 (0,1)	0.069**	0.021
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.025**	0.009
# Bedrooms = 0 (0,1)	-0.108	0.076
# Bedrooms = 2 (0,1)	0.105**	0.022
# Bedrooms = 3 (0,1)	0.221**	0.029
# Bedrooms $\geq$ 4 (0,1)	0.060**	0.015
Elevator Present (0,1)	0.018	0.139
Single Family Attached (0,1)	-0.109†	0.062
Single Family Detached (0,1)	0.024	0.038
Duplex (0,1)	0.024	0.023
Multifamily $\geq$ 50 units (0,1)	0.186†	0.105
Age of Structure	-0.008	0.008
Age of Structure squared/100	-0.012	0.021
Building Built Before 1940 (0,1)	0.436†	0.234
Wall or Room Heaters (0,1)	-0.242**	0.035
Room Air Conditioner(s) (0,1)	0.078**	0.021
Central Air Conditioning (0,1)	0.239**	0.068
Rooms without Heat (0,1)	-0.017	0.032
# Poor Facilities[a]	-0.244**	0.046
Bedrooms not Private (0,1)	-0.048	0.031
Exposed Wiring (0,1)	-0.050	0.054
# Problems with Common Hall[b]	0.042†	0.024
# Defects[c]	0.004	0.013
Length of Tenure (years)	-0.048**	0.005
Length of Tenure (years) squared/100	0.135**	0.025
Length of Tenure >25 years (0,1)	-0.328**	0.124

Table V-24 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

PROVIDENCE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.115**	0.022
Non-heat Utilities Included in Rent (0,1)	0.139**	0.048
Heat Included in Rent (0,1)	0.233**	0.038
Parking Included in Rent (0,1)	0.053	0.087
Furniture Included in Rent (0,1)	0.095**	0.036
Excellent Neighborhood (0,1)	0.090**	0.028
Good Neighborhood (0,1)	0.050*	0.024
Poor Neighborhood (0,1)	0.070	0.049
Abandoned Buildings in Neighborhood (0,1)	-0.073*	0.034
Litter in Neighborhood (0,1)	0.057*	0.027
No Convenient Shopping (0,1)	-0.079**	0.028
Locational Identifiers		
Central City (0,1)	-0.072**	0.019
R^2	0.6425	
Standard Error of Estimate	0.089	
Sample Size	1215	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-25

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

RALEIGH

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.817**	0.041
1 or 1 1/2 Bathrooms (0,1)	0.118**	0.021
2 Bathrooms (0,1)	0.212**	0.028
>2 Bathrooms (0,1)	0.284**	0.045
# Rooms - # Bedrooms = 1 (0,1)	-0.045†	0.024
# Rooms - # Bedrooms = 3 (0,1)	0.052**	0.016
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.044**	0.008
# Bedrooms = 0 (0,1)	-0.328**	0.055
# Bedrooms = 2 (0,1)	0.106**	0.017
# Bedrooms = 3 (0,1)	0.204**	0.024
# Bedrooms $\geq$ 4 (0,1)	0.066**	0.014
Elevator Present (0,1)	0.402**	0.074
Single Family Attached (0,1)	-0.030	0.035
Single Family Detached (0,1)	-0.074**	0.023
Duplex (0,1)	-0.089**	0.024
Multifamily $\geq$ 50 units (0,1)	-0.205**	0.056
Age of Structure	-0.012**	0.003
Age of Structure squared/100	0.025**	0.009
Building Built Before 1940 (0,1)	-0.365**	0.136
Wall or Room Heaters (0,1)	-0.235**	0.029
Room Air Conditioner(s) (0,1)	0.122**	0.020
Central Air Conditioning (0,1)	0.226**	0.027
Rooms without Heat (0,1)	-0.024	0.029
# Poor Facilities[a]	-0.286**	0.015
Bedrooms not Private (0,1)	-0.043*	0.021
Exposed Wiring (0,1)	-0.198**	0.043
# Problems with Common Hall[b]	0.018	0.021
# Defects[c]	-0.002	0.009
Length of Tenure (years)	-0.033**	0.004
Length of Tenure (years) squared/100	0.079**	0.023
Length of Tenure >25 years (0,1)	-0.151	0.134

Table V-25 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

RALEIGH

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.069*	0.034
Non-heat Utilities Included in Rent (0,1)	0.106**	0.041
Heat Included in Rent (0,1)	0.232**	0.030
Furniture Included in Rent (0,1)	0.037	0.030
Excellent Neighborhood (0,1)	0.036†	0.021
Good Neighborhood (0,1)	0.022	0.019
Poor Neighborhood (0,1)	0.060	0.053
Abandoned Buildings in Neighborhood (0,1)	-0.054†	0.031
Litter in Neighborhood (0,1)	-0.069**	0.020
No Convenient Shopping (0,1)	0.003	0.002

R^2	0.8230
Standard Error of Estimate	0.054
Sample Size	1416
Year of AHS	1976

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-26

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

ROCHESTER

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.117**	0.042
1 or 1 1/2 Bathrooms (0,1)	0.130**	0.033
2 Bathrooms (0,1)	0.231**	0.050
>2 Bathrooms (0,1)	0.361**	0.121
# Rooms - # Bedrooms = 1 (0,1)	-0.108**	0.033
# Rooms - # Bedrooms = 3 (0,1)	0.044*	0.018
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.010	0.008
# Bedrooms = 0 (0,1)	-0.233**	0.041
# Bedrooms = 2 (0,1)	0.090**	0.017
# Bedrooms = 3 (0,1)	0.145**	0.026
# Bedrooms $\geq$ 4 (0,1)	0.030**	0.011
Elevator Present (0,1)	0.185**	0.060
Single Family Attached (0,1)	-0.026	0.032
Single Family Detached (0,1)	-0.061†	0.032
Duplex (0,1)	-0.052*	0.022
Multifamily $\geq$ 50 units (0,1)	-0.035	0.067
Age of Structure	-0.003	0.005
Age of Structure squared/100	-0.007	0.014
Building Built Before 1940 (0,1)	0.103'	0.211
Wall or Room Heaters (0,1)	-0.176**	0.056
Room Air Conditioner(s) (0,1)	0.108**	0.020
Central Air Conditioning (0,1)	0.180**	0.037
Rooms without Heat (0,1)	-0.065**	0.025
# Poor Facilities[a]	-0.245**	0.031
Bedrooms not Private (0,1)	0.063*	0.028
Exposed Wiring (0,1)	0.028	0.049
# Problems with Common Hall[b]	-0.053*	0.023
# Defects[c]	-0.004	0.009
Length of Tenure (years)	-0.027**	0.005
Length of Tenure (years) squared/100	0.038	0.028
Length of Tenure >25 years (0,1)	-0.093	0.177

Table V-26 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

ROCHESTER

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.043†	0.023
Non-heat Utilities Included in Rent (0,1)	0.043	0.032
Heat Included in Rent (0,1)	0.081**	0.027
Parking Included in Rent (0,1)	0.081†	0.042
Furniture Included in Rent (0,1)	-0.041	0.032
Excellent Neighborhood (0,1)	0.085**	0.024
Good Neighborhood (0,1)	0.030	0.021
Poor Neighborhood (0,1)	-0.021	0.041
Abandoned Buildings in Neighborhood (0,1)	-0.063*	0.027
Litter in Neighborhood (0,1)	0.036	0.239
No Convenient Shopping (0,1)	0.033	0.025
Locational Identifiers		
Central City (0,1)	0.054**	0.020
R^2	0.5816	
Standard Error of Estimate	0.050	
Sample Size	1080	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-27

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

ST. LOUIS

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	4.657**	0.043
1 or 1 1/2 Bathrooms (0,1)	0.163**	0.025
2 Bathrooms (0,1)	0.240**	0.028
>2 Bathrooms (0,1)	0.311**	0.062
# Rooms - # Bedrooms = 1 (0,1)	-0.105**	0.019
# Rooms - # Bedrooms = 3 (0,1)	0.114**	0.013
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.028**	0.005
# Bedrooms = 0 (0,1)	-0.193**	0.034
# Bedrooms = 2 (0,1)	0.110**	0.012
# Bedrooms = 3 (0,1)	0.177**	0.019
# Bedrooms $\geq$ 4 (0,1)	0.034**	0.009
Elevator Present (0,1)	0,297**	0.046
Single Family Attached (0,1)	-0.053*	0.027
Single Family Detached (0,1)	-0.073**	0.017
Duplex (0,1)	-0.100**	0.014
Multifamily $\geq$ 50 units (0,1)	0.079†	0.047
Age of Structure	0.001	0.004
Age of Structure squared/100	-0.022*	0.010
Building Built Before 1940 (0,1)	0.321*	0.145
Wall or Room Heaters (0,1)	-0.246**	0.021
Room Air Conditioner(s) (0,1)	0.060**	0.012
Central Air Conditioning (0,1)	0.185**	0.020
Rooms without Heat (0,1)	-0.009	0.017
# Poor Facilities[a]	-0.277**	0.023
Bedrooms not Private (0,1)	-0.058**	0.012
Exposed Wiring (0,1)	-0.016	0.031
# Problems with Common Hall[b]	0.003	0.014
# Defects[c]	-0.005	0.006
Length of Tenure (years)	-0.026**	0.003
Length of Tenure (years) squared/100	0.072**	0.015
Length of Tenure >25 years (0,1)	-0.211*	0.084

Table V-27 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

ST. LOUIS

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.049**	0.015
Non-heat Utilities Included in Rent (0,1)	0.049†	0.029
Heat Included in Rent (0,1)	0.198**	0.027
Parking Included in Rent (0,1)	0.162**	0.038
Furniture Included in Rent (0,1)	0.147**	0.022
Excellent Neighborhood (0,1)	0.094**	0.015
Good Neighborhood (0,1)	0.056**	0.013
Poor Neighborhood (0,1)	0.007	0.022
Abandoned Buildings in Neighborhood (0,1)	-0.078**	0.015
Litter in Neighborhood (0,1)	-0.019	0.013
No Convenient Shopping (0,1)	-0.015	0.014
Locational Identifiers		
Central City (0,1)	0.015	0.028
St. Louis County (0,1)[d]	0.230**	0.028
St. Clair County (0,1)	0.1o5**	0.033
Madison County (0,1)	0.122**	0.034
R^2	.0.6964	
Standard Error of Estimate	0.081	
Sample Size	3407	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

d. Excluding central city.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-28

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

SAN DIEGO

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.075**	0.035
1 or 1 1/2 Bathrooms (0,1)	0.059†	0.035
2 Bathrooms (0,1)	0.108**	0.026
>2 Bathrooms (0,1)	0.373**	0.077
# Rooms - # Bedrooms = 1 (0,1)	0.023	0.026
# Rooms - # Bedrooms = 3 (0,1)	0.115**	0.021
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.023†	0.013
# Bedrooms = 0 (0,1)	-0.229**	0.038
# Bedrooms = 2 (0,1)	0.161**	0.018
# Bedrooms = 3 (0,1)	0.351**	0.029
# Bedrooms $\geq$ 4 (0,1)	0.058**	0.015
Elevator Present (0,1)	0.217**	0.072
Single Family Attached (0,1)	-0.029	0.041
Single Family Detached (0,1)	0.056*	0.022
Duplex (0,1)	0.015	0.023
Multifamily $\geq$ 50 units (0,1)	0.081*	0.034
Age of Structure	-0.005†	0.003
Age of Structure squared/100	-0.042	0.096
Building Built Before 1940 (0,1)	0.177**	0.034
Wall or Room Heaters (0,1)	-0.074**	0.027
Room Air Conditioner(s) (0,1)	0.014	0.023
Central Air Conditioning (0,1)	0.005	0.040
Rooms without Heat (0,1)	-0.067**	0.026
# Poor Facilities[a]	-0.235**	0.040
Bedrooms not Private (0,1)	-0.032	0.022
Exposed Wiring (0,1)	-0.010	0.064
# Problems with Common Hall[b]	-0.017	0.028
# Defects[c]	0.002	0.010
Length of Tenure (years)	-0.046**	0.005
Length of Tenure (years) squared/100	0.163**	0.031
Length of Tenure >25 years (0,1)	-0.613**	0.196

Table V-28 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

SAN DIEGO

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.024	0.026
Non-heat Utilities Included in Rent (0,1)	-0.123**	0.044
Heat Included in Rent (0,1)	-0.050	0.042
Parking Included in Rent (0,1)	-0.066†	0.036
Furniture Included in Rent (0,1)	0.025	0.019
Excellent Neighborhood (0,1)	0.084**	0.021
Good Neighborhood (0,1)	0.045*	0.018
Poor Neighborhood (0,1)	0.025	0.047
Abandoned Buildings in Neighborhood (0,1)	-0.208**	0.046
Litter in Neighborhood (0,1)	-0.011	0.020
No Convenient Shopping (0,1)	-0.036	0.023
Locational Identifiers		
Central City (0,1)	0.069**	0.015
R^2	0.5603	
Standard Error of Estimate	0.062	
Sample Size	1398	
Year of AHS	1975	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

Table V-29

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

SEATTLE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Intercept	5.157**	0.024
1 or 1 1/2 Bathrooms (0,1)	0.130**	0.019
2 Bathrooms (0,1)	0.184**	0.020
>2 Bathrooms (0,1)	0.466**	0.045
# Rooms - # Bedrooms = 1 (0,1)	-0.126**	0.017
# Rooms - # Bedrooms = 3 (0,1)	0.089**	0.012
# Rooms - # Bedrooms $\geq$ 4 (0,1)	0.029**	0.005
# Bedrooms = 0 (0,1)	-0.177**	0.020
# Bedrooms = 2 (0,1)	0.161**	0.011
# Bedrooms = 3 (0,1)	0.302**	0.018
# Bedrooms $\geq$ 4 (0,1)	0.084**	0.007
Elevator Present (0,1)	0.145**	0.018
Single Family Attached (0,1)	-0.081*	0.032
Single Family Detached (0,1)	-0.068**	0.015
Duplex (0,1)	-0.060**	0.018
Multifamily $\geq$ 50 units (0,1)	0.066**	0.019
Age of Structure	-0.011**	0.002
Age of Structure squared/100	0.011†	0.006
Building Built Before 1940 (0,1)	-0.059	0.090
Wall or Room Heaters (0,1)	-0.118**	0.019
Room Air Conditioner(s) (0,1)	0.115**	0.041
Central Air Conditioning (0,1)	-0.014	0.058
Rooms without Heat (0,1)	-0.052**	0.015
# Poor Facilities[a]	-0.235**	0.023
Bedrooms not Private (0,1)	-0.017	0.016
Exposed Wiring (0,1)	-0.042	0.028
# Problems with Common Hall[b]	0.000	0.016
# Defects[c]	-0.017*	0.007
Length of Tenure (years)	-0.033**	0.003
Length of Tenure (years) squared/100	0.095**	0.016
Length of Tenure >25 years (0,1)	-0.310**	0.116

Table V-29 (continued)

ANNUAL HOUSING SURVEY (AHS) HEDONIC LOG RENT REGRESSIONS

SEATTLE

INDEPENDENT VARIABLE	COEFFICIENT	STANDARD ERROR
Landlord in Building (0,1)	-0.003	0.015
Non-heat Utilities Included in Rent (0,1)	-0.016	0.020
Heat Included in Rent (0,1)	0.053*	0.025
Parking Included in Rent (0,1)	0.107**	0.029
Furniture Included in Rent (0,1)	-0.096**	0.014
Excellent Neighborhood (0,1)	0.050**	0.014
Good Neighborhood (0,1)	0.008	0.012
Poor Neighborhood (0,1)	-0.025	0.029
Abandoned Buildings in Neighborhood (0,1)	-0.059**	0.017
Litter in Neighborhood (0,1)	-0.012	0.013
No Convenient Shopping (0,1)	-0.029†	0.017
Locational Identifiers		
Central City (0,1)	0.055**	0.010
R^2	0.6034	
Standard Error of Estimate	0.061	
Sample Size	3327	
Year of AHS	1976	

Notes

a. Components are (1) incomplete plumbing, (2) shared plumbing, (3) no piped water, (4) no public sewer or septic tanks, (5) inadequate heating system.

b. Components are (1) hall lighting defective, (2) loose, broken, or missing steps, (3) railings not firmly attached.

c. Components are (1) leaky basement, (2) leaky roof, (3) open cracks, (4) holes in floor, (5) broken plaster, (6) rats.

** t-statistic significant at the 0.01 level.
* t-statistic significant at the 0.05 level.
† t-statistic significant at the 0.10 level.

REFERENCES

Box, G.E. and Cox, D.R., "An Analysis of Transformations," Journal of the Royal Statistical Society, vol. 26, no. 2, 1964, pp. 211-252.

Cheng, David and Harvey J. Iglarsh, "Principal Component Estimators in Regression Analysis," Review of Economics and Statistics, vol. 58, no. 2, May 1976, pp. 229-234.

Edwards, John B., "The Relation Between the F-test and $\bar{R}^2$," The American Statistician, vol. 23, December 1969, p. 28.

Follain, James R. and Stephen Malpezzi, Dissecting Housing Value and Rent: Estimates of Hedonic Indexes for Thirty-Nine Large SMSAs, (Washington, D.C.: The Urban Institute, February 1979), Working Paper 249-17.

Grether, D.M. and Peter Mieszkowski, "Determinants of Real Estate Values," Journal of Urban Economics, vol. 1, no. 2, April 1974, pp. 127-146.

Haitovsky, Yoel, "A Note on the Maximization of $\bar{R}^2$," The American Statistician, vol. 23, no. 1, February 1969, pp. 20-21.

Hocking, R.R., "Misspecification in Regression," The American Statistician, vol. 28, no. 1, February 1974, pp. 39-40.

King, Thomas, Property Taxes, Amenities, and Residential Land Values, Cambridge, Mass., Ballinger Publishing Co., 1973.

Marquandt, D. and Snee, R., "Ridge Regression in Practice," The American Statistician, vol. 29, 1975, pp. 3-19.

Merrill, Sally, Hedonic Indices as a Measure of Housing Quality (Cambridge, MA: Abt Associates Inc. 1980, revised).

Rao, Potluri, "Some Notes on Misspecification in Multiple Regressions," The American Statistician, vol. 25, December 1971, pp. 37-39.

Rao, Potluri and Roger Miller, Applied Econometrics, Belmont, California, Wadsworth Publishing Co., 1971, pp. 107-111.