PARTICIPATION IN AN
OPEN ENROLLMENT HOUSING
ALLOWANCE PROGRAM

GRACE M. CARTER AND JAMES C. WENDT

R-2783-HUD JUNE 1982

A FINAL REPORT OF THE
HOUSING ASSISTANCE SUPPLY EXPERIMENT

Sponsored by
The Office of Policy Development and Research
U.S. Department of Housing and Urban Development
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Rand
SANTA MONICA, CA. 90406
PREFACE

This report was prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development (HUD). It integrates Rand's analyses of eligibility and participation in the Housing Assistance Supply Experiment, which was conducted in Brown County, Wisconsin, and St. Joseph County, Indiana. It identifies and describes the effects of the major determinants of participation in the experimental program and provides a multivariate description of the participants.

This is the final report of the Housing Assistance Supply Experiment on eligibility and participation. The other Rand reports on these subjects are C. Peter Rydell, John E. Mulford, and Lawrence Kozimor, Dynamics of Participation in a Housing Allowance Program, N-1137-HUD; Phyllis Ellickson, Who Applies for Housing Allowances? Early Lessons from the Housing Assistance Supply Experiment, R-2632-HUD; Sinclair Coleman, How Housing Evaluations Affect Participation in a Housing Allowance Program, R-2781-HUD; James Wendt, Why Households Apply for Housing Allowances, R-2782-HUD; and Grace M. Carter and Steven L. Balch, Measuring Eligibility and Participation in the Housing Assistance Supply Experiment, R-2780-HUD.

Comments by I. S. Lowry, C. Lance Barnett, and Michael P. Murray on earlier drafts of this report were most useful. Jacqueline Bowens and Dolores Davis typed several drafts of the report. Penny Post edited it and supervised its production.

The report was prepared pursuant to HUD Contract H-1789, Task 2.16.6.
SUMMARY

The Housing Assistance Supply Experiment (HASE) offered housing allowances to nearly all low-income households in Brown County, Wisconsin, and St. Joseph County, Indiana, provided that they occupied housing that met program standards for space and privacy, domestic equipment, safety, and sanitation. It was thus a prototype for a national housing allowance program directed toward improving housing and reducing housing expenses for the poor. But these goals can be achieved only to the extent that eligible households are willing to enroll and to meet the program's housing requirements. This report analyzes participation in HASE and presents the implications of our findings for a national housing allowance program.

In the experimental program, enrollment was continuously open to eligible households. The number enrolled and receiving payments increased for about three years, and then remained essentially constant for the last two years of the experiment. At any given time during the latter period, we estimate that about one-third of all eligible households were receiving allowances, though the proportion was higher in Brown County (36 percent) than in St. Joseph County (31 percent) and higher among renters in both sites (45 and 38 percent respectively) than among owners (about 28 percent in both sites).

Our research sought answers to two questions: First, why were participation rates so low? Second, which population subgroups were best served by the program, and what factors contributed to that outcome?

For analysis, we decomposed the participation process into three steps: 1) learning about the program; 2) enrolling; and 3) responding to housing requirements. An eligible household had to complete all three steps in order to qualify for payments. The first two steps were modeled in a cost-benefit framework by James Wendt (forthcoming); the third was similarly modeled by Sinclair Coleman (forthcoming). Attrition at each step in the process varied by site and housing tenure (see Table 3.1). An average of about 17 percent of eligible households never learned about the program; 40 percent of those who did
learn did not enroll; and 20 percent of the enrollees never received allowances.

One major determinant of participation was the amount of benefits expected from the program; that is, the size of the allowance payment and how long a household might expect to receive it. Larger expected benefits increased the likelihood of completing each step toward recipiency. Because the poorest households would receive the most benefits, and needed them the most, they were more attuned to information about the program; once informed, they were more likely to enroll. The probability that an enrolled household was already living in standard housing declined slightly with greater benefits; however, this negative effect of poverty was offset by a greater effort to comply with housing standards among poorer enrollees whose dwellings initially failed. Among all eligibles, those with the lowest incomes were most likely to receive payments.

A second major determinant of participation was the cost to a household of joining the program, primarily the cost associated with meeting the housing standards. Households occupying better dwellings were more likely to complete each step of the process, but, we believe, for different reasons at each step. Households paying more rent (a crude measure of housing quality) were more likely to pay attention to program information, perhaps because of a greater felt need for help. When they enrolled, few households knew the details of the program's housing standards, but many were aware that some housing requirements would be imposed. Wendt (1981) found that among renter households, recent movers were more likely to enroll than those who had not moved in the preceding year; and that among the latter, those paying more rent per room were more likely to enroll. Housing standards played a more important role after enrollment: The half of enrollees whose dwellings passed the standards immediately received payments; the number and type of defects and the cost of repairing them were important predictors of eventual qualification for payments by enrollees whose dwellings failed.

A third major determinant of participation was a set of household characteristics (such as life-cycle stage), probably because the groups differed as to perceived need or attitudes toward government assis-
tance. However, these characteristics frequently had diverse effects at different steps in the process. For example, when we controlled for program costs and benefits, the elderly were less likely than others to learn about the program and, if informed, less likely to enroll; but those who enrolled were more likely to qualify for payments following a failure of the housing standards. The marginal effect of being an owner was similar to that of being elderly.

Frequent changes in eligibility status and delays en route to enrollment and receipt of payments also contributed to the low participation rates we observed. At any given time, some eligible households who knew about the program and would eventually receive payments had not yet enrolled or qualified for payments. Households did not typically apply immediately upon becoming eligible, and those who did apply needed time to complete their enrollments and housing certifications. Moreover, some households never enrolled because they became ineligible before they got around to applying.

Two approaches demonstrate the relative importance of the determinants of participation. First, we show how the probability of completing each step in the participation process changes as a function of each variable while other variables are held constant. The direction of the effect has been discussed above; numerical values for these effects are reported fully in Sec. IV. Second, we posit several hypothetical circumstances in order to measure the effects of specific determinants on steady-state participation rates (i.e., the percent of eligibles who would be receiving payments

- If all households knew about the program, participation would increase by 6 percent of the eligible population. (Not all uninformed households would choose to participate, given program knowledge.)
- If all households enrolled as soon as they became eligible and learned about the program, an additional 10 percent of eligible households would participate.
- If housing standards were eliminated, an additional 20 percent
of the eligible population would participate. (This estimate may be slightly low, for reasons given in Sec. V.)

- If all other identifiable barriers to participation were eliminated, an additional 12 percent of eligible households would participate. These remaining barriers include dislike of government assistance, and the household's sense that no help is needed despite its eligibility.

The second part of our research focused on the participation patterns we observed. The experimental program was open to all eligible households, and the amount of the allowance entitlement increased as income went down, or as household size increased, thus providing a greater incentive for the poorest households to join. However, because each household had to obtain adequate housing in order to qualify for payments, the number and identity of participants depended on features of the housing market as well as of the program.

We found that the households in greatest need—as measured by both allowance entitlement and duration of eligibility—were more likely than the less poor to receive payments (see Sec. VI). The greater incentive provided by larger allowances more than offset poorer housing quality, causing higher participation among the neediest households.

While recipiency rates varied according to housing preferences, that was a logical result of the voluntary (rather than mandated) nature of the program. The existing structure of the housing market did not appear to put many household groups at a disadvantage in the program, according to the recipiency rates we examined. Controlling for level of need, we found that fewer of the elderly received payments, but this seemed to be due to personal preferences. The elderly who enrolled were actually more likely than other life-cycle groups to receive an allowance. Black households became recipients at the same rate as otherwise similar white households, indicating that minority households encountered no insuperable difficulty in finding adequate housing.
Large households were the only group we found that did have trouble finding adequate housing. They applied to the program at the same rate as smaller households, but failed the housing standards (especially space standards) much more often and hence were less likely to qualify for payments.

In the concluding section we analyze the implications of our research for a national housing allowance program. The differences in participation between the two HASE sites indicate that recipiency rates and the composition of the client populations would vary from community to community. However, our analysis of the reasons for participation identifies the factors most likely to determine such rates. One of the most important features in the design of an allowance program is the housing standards to be implemented. Standards that require expensive or difficult repairs (and that are often violated) will reduce participation, perhaps markedly.

Our analysis of how turnover in the eligible population affects recipiency rates can be extended to some nonhousing welfare programs. Econometric studies of participation in income-transfer programs usually ignore turnover, but it is probably as important as low benefits or lack of knowledge in restricting participation. Households whose heads are in the labor force are much more likely to be newly eligible, and thus less likely to be enrolled, in an income-transfer program than those who are either elderly or primarily dependent on public assistance.
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I. INTRODUCTION

The Housing Assistance Supply Experiment (HASE) was funded by HUD as part of a larger program to determine whether housing allowances are a feasible and desirable way to help low-income households secure decent housing. The primary goals of a housing allowance program are to provide adequate housing and to reduce the burden of housing expenses for the households eligible to join it. Under HASE, allowances were offered to all needy households in two north central metropolitan areas: Brown County, Wisconsin, whose central city is Green Bay, and St. Joseph County, Indiana, whose central city is South Bend. In order to receive an allowance, each household had to meet program requirements as to income, assets, and family composition; it had to be willing to participate in the enrollment process; and it had to occupy a dwelling that met program standards of safety and space.

After three years of operation the program appeared to have reached a steady state of participation; yet only a third of all eligible households were receiving allowances. This report explores two main issues raised by such low participation rates:

- Why did some households and not others participate?
- Who did participate -- that is, which households received allowances?

The reasons some households did not participate fall into three basic groups: First, some households always lack knowledge of the program or can not gain access to it. However, we found in HASE that outreach programs and other elements of program design can ameliorate lack of knowledge. Second, some households have a low level of perceived need, usually because they expect low benefits or short durations of eligibility. But we feel, along with many other observers, that a housing program's goals would not be seriously impaired by the failure of such marginally eligible households to participate.
Third, for some households the costs of participation are too high, primarily the cost of obtaining adequate housing. To the extent that costs act as a deterrent, they limit the program's ability to improve the housing conditions of the families most in need of its help. One of our main concerns is to determine how much each of these familiar explanations contributed to the low participation rates in our two experimental sites.

To answer our second question, who participates, we analyzed patterns of participation among the eligible households. The allowance program is open to all eligible households that choose to enroll, yet participation varies partly according to the quality of a household's dwelling. Some population subgroups may have particular difficulties in obtaining adequate housing. The poorest families may live in substandard units and be ill-equipped to bargain with landlords or contractors about necessary repairs. Minorities may suffer from residential discrimination. Thus we need to consider who actually receives payments and whom the housing standards affect the most.

Wherever a difference in tenure appears to be relevant, our analysis presents results for owners and renters separately, because those two groups participated at different rates in the experimental allowance program. Then too, there are many different ways of implementing housing allowances. For example, a program restricted to renters that issued housing vouchers for rent payments would be a less costly alternative to a full-scale program and has recently been strongly advocated.

THE HOUSING ALLOWANCE PROGRAM

The allowance program is open to all families in Brown and St. Joseph counties who cannot afford the standard cost of adequate housing in the local market without spending more than a quarter of their income.* Each enrolled household receives monthly cash payments equal to the difference between the standard cost (as

*The program is now also open to most single adults, but because they were excluded until August, 1977, we do not have survey information covering a period long enough to observe their application behavior.
measured by local market surveys)* and a fourth of its adjusted
gross income, provided that its housing meets minimum standards of
decency, safety, and sanitation, and is large enough for the family.

Participants, whether renters or homeowners, must find their
dwellings in the open market and are entirely responsible for negotiat-
ing the lease or purchase terms and for meeting their obligations
to landlords, lenders, or other parties to the transaction. They may
change tenure or move anywhere within the program jurisdiction, so long
as their chosen dwellings meet program standards (as determined by
periodic inspections).

At enrollment each household is informed of the amount of its
allowance entitlement and of the housing requirements it must meet
before payments will commence. If an enrolled household's current
dwelling fails the initial inspection, that household is informed of
the reasons; to qualify for payments, it must either arrange for repairs
or move to an acceptable dwelling. There is no time limit for action,
but benefits are not received until the housing requirements are met.

OTHER HABE STUDIES OF PARTICIPATION

Our analysis describes participation as a three-step process:
1) acquisition of knowledge about the program; 2) enrollment; and 3)
response to failure of the housing inspection. Not every household
has to face step 3; households living in dwellings rated adequate at
the time they enroll are automatically entitled to receive payments.
Each of these steps has been modeled in a cost/benefit framework and
reported separately (Wendt, 1981, contains steps 1 and 2;** Coleman,

*The cost of adequate housing (including utilities) is the
amount required to rent a unit that will pass HA0 standards. The
standard cost increases with household size, but is the same for
renters and owners.

**Phyllis Ellickson (1981) modeled the steps of knowledge
acquisition and enrollment during the first program year in St.
Joseph County. Much of the conceptual framework of Wendt's work was
initially presented in Ellickson's report. We use Wendt's later work
here because it covers both sites and a time period during which
startup phenomena do not obscure long-term behavior.
1981, step 3). In this paper we summarize the results of these models, showing how each of the factors in the cost/benefit equation affects each step in the process and which households complete the steps toward receiving an allowance.

We also explore the effect of turnover on recipiency, for the allowance program operates in a dynamic environment. Households move into and out of eligibility as they lose or gain employment or other income sources. Newly eligible households join the program; recipients who lose their eligibility must leave it. Rydell, Mulford, and Kozimor (1980) modeled the enrollment process as one determined by purely random events. On the other hand, the behavioral models cited above treat duration of eligibility as one more motivative factor that distinguishes recipient households. That is, those who are likely to remain eligible for a longer period have more to gain from taking part in the program. Despite the apparent difference between these views, we show a way to reconcile them.

Finally, we draw our basic statistics about participation and turnover rates from Carter and Balch (1981).

OTHER HOUSING ALLOWANCE PARTICIPATION RESEARCH

The Experimental Housing Allowance Program included both HASE and the Housing Allowance Demand Experiment (HADE), which was designed to determine how low-income households use their housing allowances. The Demand Experiment tested response to various forms of allowance plans: Not all of its recipients were required to meet minimum housing standards (while all participants in HASE were); some were required to pay specified minimum rents, while others had no restrictions on their allowances; and allowance amounts were determined by various formulae, whereas HASE used only one. The Demand Experiment's features allowed observation not only of how households spend their allowances, but also of how key design parameters (e.g. the rate at which benefits are reduced as income goes up) directly affect participation.

Participation in an invitational enrollment program such as the Demand Experiment is measured as the percent of the eligible households invited to participate who receive payments. That rate
will always be higher than rates of recipiency measured in an open-enrollment program like HASE, where the proportion of households receiving payments is based on the total number of eligible households. Of the eligible population, some will not even know about the program, and others will be newly eligible but not yet enrolled. Thus data on knowledge and turnover among an eligible population is the unique contribution of HASE to understanding participant behavior in a housing allowance program.

Data from both HASE and the Demand Experiment can be used to analyze a number of research questions, such as which households are most likely to participate in a housing allowance program, and what role is played by need in determining decisions about participation. Wherever possible we have compared and tried to reconcile findings from the two experiments.

DATA SOURCES

We have drawn primarily on two parts of the HASE data base for this analysis: the household survey and housing allowance office (HAO) administrative records.* The household survey was administered to occupants of a panel of residential properties** in each site for four successive years, starting before the beginning of open enrollment. The panel was developed by first classifying all dwellings into strata, and then randomly sampling different proportions of each stratum. Hence weighted counts of survey records are necessary to make population estimates.*** Approximately 2,000 households were interviewed in each site at each wave, of whom about 500 were eligible. The topics covered by the survey included household characteristics, housing characteristics, and participant behavior.

*See Lowry (1981) for an overview of the design of HASE, including the data base.

**The panel was updated annually by adding a sample of newly constructed units.

***Stratum definitions, population sizes, and sample sizes may be found in Carter and Balch (1981).

†Codebooks are available for each survey wave. For example for the wave 4 surveys in Brown County, see: Boren (1980a and 1980b); and Allen et al. (1980).
Since the surveys were administered to the same dwellings each year, many households were interviewed repeatedly. Some surveyed households were encouraged to apply to the program by questions about it, thus biasing later survey data on participation. But because the same data include many households that were not interviewed previously (mainly households that had moved within the preceding year), we can control for such bias in our analysis.

The HAO records likewise provide household and housing characteristics; in addition, they supply dates on which changes occurred in program status, such as enrollment, housing inspections, payment authorizations, and terminations. By the end of the fifth year of program operation, records were available on over 9,000 enrollees in Brown County, and 15,000 in St. Joseph County.

The specific data -- file, wave, number of records, etc. -- on which each of our source models were constructed may be found in the source documents cited above (Carter and Balch, 1981; Wendt, 1981; Coleman, 1981). Similarly, the data used for each of the analyses we report here will be provided.

OUTLINE OF THE REPORT

The remainder of this report is presented in six sections. Section II provides background information on the spread of program knowledge and growth of program operations from the startup phase to a state of equilibrium. It also provides the statistics on eligibility and participation that serve as the basis for our analysis. Section III summarizes the detailed analyses of the steps to participation reported by Wendt (1981) and Coleman (1981). Section IV integrates these analyses into a single model of the probability that an eligible household will ever receive payments. It provides the numerical effects of benefits, household and housing characteristics on each step of the participation process--and on completing the process. In Sec. V we discuss delays to enrollment to explain how our cost/benefit framework can accommodate the random events that both cause transitions into and out of eligibility and
determine dates of enrollment. We also examine the impact of housing standards at each stage of the process by approximating participation rates in a hypothetical program without such standards. We then summarize the effect of each of the major deterrents to participation on steady-state recipiency rates. Section VI analyzes the outcome of the participation process by answering two questions: First, were needier households more or less likely to be served, and second, did identifiable groups of households participate less than others at the same level of need? We also show the evidence that previous interviews biased the survey data in favor of participation. However, in Appendix A we show that such potential bias does not distort our conclusions either here or in earlier research. In the concluding section we use both the earlier reports on the steps to participation and our results here to consider the implications of our findings for a national housing allowance program and other welfare programs. Various supporting tables used as references throughout are contained in Appendix B. Appendix C discusses site differences in enrollees' response to failure of the housing standards.
II. THE ELIGIBLE POPULATION AND PROGRAM GROWTH

About a fifth of all households qualified as eligible for a housing allowance in 1977. The eligibility rate was higher in St. Joseph County (21.4 percent) than in Brown County (16.5 percent), and much higher among renters than among owners (see Table 2.1).

Table 2.1

ELIGIBILITY RATES BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Number of Households</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Eligible</td>
<td>Percent</td>
</tr>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>33,730</td>
<td>4,223</td>
<td>12.5</td>
</tr>
<tr>
<td>Renter</td>
<td>14,342</td>
<td>3,689</td>
<td>25.7</td>
</tr>
<tr>
<td>Total</td>
<td>48,074</td>
<td>7,912</td>
<td>16.5</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>56,267</td>
<td>10,755</td>
<td>19.1</td>
</tr>
<tr>
<td>Renter</td>
<td>15,619</td>
<td>4,644</td>
<td>29.7</td>
</tr>
<tr>
<td>Total</td>
<td>71,886</td>
<td>15,399</td>
<td>21.4</td>
</tr>
</tbody>
</table>

SOURCE: Carter and Balch (1981), Table 4.1.

About half of the eligible households in each site were elderly; of these, the great majority consisted of single persons. Single parents composed another quarter of the eligibles. The remainder were nonelderly couples, most of whom had children.*

Changes in the size of the eligible population over the first three years of program operation were small. In Brown County the number of eligible households grew at the same rate (about 2 percent

*With a few exceptions, program rules categorically excluded nonelderly single-person households (those not living with a relative or spouse) until August 1977.
per year) as in the general population. In St. Joseph County the increase in total households was much smaller (about 0.4 percent per year), and the number of eligible households did not change noticeably over this period. Changes in the composition of the eligible pool were also quite modest; they are discussed in Carter and Balch (1981).

**PROGRAM GROWTH**

Participation in the program grew rapidly during the first three years (see Fig. 1), soon overcoming the initial constraints of households' lack of program knowledge and limited administrative capacity. Vigorous early publicity campaigns in both communities quickly spread word of the program's existence. Each round of advertising elicited a surge of applications that led to its temporary curtailment; as soon as the backlog of applicants was processed the advertising resumed. After about two years advertising in Brown County slowed down; from then on it continued at a level that would maintain community awareness. It also slowed in St. Joseph County, although further efforts were made to reach particular groups such as the elderly and ethnic minorities (see Wiewel and O'Nell, 1979). By the end of the third year 80 to 85 percent of the eligible population (depending on site) knew enough about the program to describe some of its details.

Enrollment leveled off by the end of the third program year, and remained roughly constant for the last two years of the experiment. That circumstance parallels the leveling off of program knowledge; if knowledge had continued increasing, presumably enrollment would have continued to grow as well. (See Wendt, 1981, for additional evidence that program knowledge had reached steady state.) The household survey is the source of our information about eligible households that did not enroll; the last wave of surveys

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*Fig. 1 shows only enrolled households, but the number of households receiving payments shows a similar pattern.

**The Supply Experiment officially terminated after five years of operation in each site. However, allowances will continue to be available for an additional 5 years."
Fig. 1 — Enrollment by program year: Housing allowance programs in Brown and St. Joseph counties, years 1–5

Source: HAO records
Note: To maintain consistency over time, nonelderly singles are excluded
approximately coincides with the end of the third year of program operation.* Therefore, we believe, the effects of program startup were transient and had disappeared by the time of the last survey; the behavior we observed thereafter represented response to the mature program.

**TURNOVER AND PARTICIPATION RATES**

Although the number of households in the program stabilized after the third year, their identity continued to change; each year about one-third of those receiving payments left the program and were replaced by others. This turnover among recipients mainly reflected turnover among the eligible population.** About 30 percent of the households eligible at any given time had not been eligible a year earlier.***

The fact of turnover in eligibility had implications for the number of recipient households as well as their identity. Households expecting to be eligible for only a short time were less likely to be in the program, because they were less motivated to apply for an allowance or to comply with the housing standards if they had enrolled and their dwelling failed the inspection. In addition, the eligible population always contained some households that were newly eligible but had not yet applied for an allowance, although they would do so eventually.

By the time the program reached steady state at the end of the third year, only about one-third of the eligible households were receiving payments (see Table 2.2). The proportion of recipients was higher among renters than owners, and higher in Brown County than in St. Joseph County. Markedly different participation rates were also

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*The fourth survey wave in Brown County was conducted during the first six months of 1977 and the third year of program operation ended in June, 1977. The St. Joseph survey was one year later and third year program operations ended December, 1977.

**Coleman (1981) shows that only 3 percent of recipients terminate each year after failing their annual housing inspection.

***This figure includes newly formed households. The turnover estimate for stable households is 22 to 27 percent depending on site. See Carter and Balch (1981).
found among households at various stages of their life-cycle by Carter and Balch (1981). To understand these differences better, we next analyze the steps in the participation process.

Table 2.2

RECIPANCY RATES AT THE END OF THIRD PROGRAM YEAR, BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Number of Households</th>
<th>Percent Receiving Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eligible</td>
<td>Receiving Payments</td>
</tr>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>4,223</td>
<td>1,191</td>
</tr>
<tr>
<td>Renter</td>
<td>3,689</td>
<td>1,658</td>
</tr>
<tr>
<td>Total</td>
<td>7,912</td>
<td>2,849</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>10,755</td>
<td>2,948</td>
</tr>
<tr>
<td>Renter</td>
<td>4,644</td>
<td>1,770</td>
</tr>
<tr>
<td>Total</td>
<td>15,399</td>
<td>4,718</td>
</tr>
</tbody>
</table>

III. THE PARTICIPATION PROCESS

Those eligible for aid in the housing allowance program had to take three major steps before they could receive payments. First, because enrollment was open to all eligible families, potential recipients had to be aware of the program's existence. Second, they had to decide to apply for aid. Finally, their housing had to meet program standards before they could receive payments. Full models for both the probability of program knowledge and the probability of enrollment given knowledge are reported by Wendt (1981). The full model for recipiency given enrollment and failure of the housing inspection is described by Coleman (1981).

At each stage several factors determined whether or not the step was successfully taken. In this section we shall report what these factors were and describe the models. Quantitative measures of the effect of each factor on program outcome—that is, how many households actually participated in each step—are discussed in Sec. IV. A complete list of the variables used in each model is contained in Appendix Tables B.4, B.5, and B.6.

STEP I: KNOWLEDGE AND ITS FACTORS

When program operation began in each site, the HAO conducted a publicity campaign designed to inform potential eligibles of its existence. The local media—television, radio, and newspapers—ran advertisements, and covered the program itself as a local news event. In addition, each HAO held open meetings at which speakers from its office and from Rand described the program and its potential benefits. Caseworkers at local AFDC agencies were also advised of the existence of the program and some informed their clients. Indirectly, word of the program may have spread through family members or friends who found out about it and passed the news along.

Sources of information were plentiful and eligibles had ample opportunity to learn of the program. While most did, 15 or 20 percent (depending on site) still did not know of the program after three
years of operation (see Table 3.1). For the most part households who learned of the program were needier than households who did not find out about it. Those with large families, low assets and income, and high housing expenses were more likely to take note of program information because it was relevant to their circumstances. In each site the findings related to need were similar, although the importance of each source of information varied.

Table 3.1

ATTRITION AT EACH STEP OF THE PARTICIPATION PROCESS, BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Eligibles With Program Knowledge (%)</th>
<th>Knowledgeables Who Enroll (%)</th>
<th>Enrollees Who Receive Payments (%)</th>
<th>Eligibles Who Receive Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>85</td>
<td>77</td>
<td>83</td>
<td>54</td>
</tr>
<tr>
<td>Owners</td>
<td>78</td>
<td>50</td>
<td>87</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
<td>64</td>
<td>84</td>
<td>44</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>85</td>
<td>75</td>
<td>72</td>
<td>46</td>
</tr>
<tr>
<td>Owners</td>
<td>85</td>
<td>43</td>
<td>86</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>53</td>
<td>79</td>
<td>36</td>
</tr>
</tbody>
</table>

SOURCE: Estimates of knowledge and enrollment rates derived by the authors from the wave 4 survey as described in Appendix A. Recipiency rates among enrollees reflect those households that had received at least one payment by the close of the HAO administrative files for year 4, among those enrolled by the end of year 3. Number of records: in Brown County, 4111 renters, 2413 owners; in St. Joseph County, 5619 renters, 5293 owners.

STEP II: ENROLLMENT AND ITS FACTORS

After learning about the program potential recipients had to decide whether or not they wanted to apply for aid. Their decision was based on several factors: first, whether they believed they were eligible; second, whether they believed that the benefits they would obtain would outweigh the costs of joining; third, whether they
felt a need for aid; and fourth, whether they approved of federal aid to low-income families for housing.

The eligibility requirements concerned family size and composition, assets, and income. Eligible households consisted of either a single person 62 or over,* or two or more related persons of any age. Assets were limited to $32,500 for the elderly and $20,000 for others.** Income eligibility was restricted by the formula for the amount of allowance a household could receive, B:**

\[ B = R^* - 0.25Y \]

where \( R^* \) is the standard cost of adequate housing (varying by household size and site, and over time with inflation) and \( Y \) is adjusted gross income. Gross income was calculated by subtracting a series of deductions and adding income imputed to non-income producing assets.†

A number of applicants apparently did not know exactly what the eligibility requirements were; many households were found ineligible during the enrollment interview. Nevertheless, they must have thought they were eligible in order to have gone to the trouble of applying.

Households that believed they were eligible next had to assess the balance between program benefits and costs. The benefits depended on the amount of the allowance and the length of time it would be received. As a surrogate for the latter in the model we used duration of eligibility for each household, which we estimated from households' income sources.

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*Until August 1977 the program rules categorically excluded all single persons under 62 unless they were handicapped, disabled, or displaced by public action. Since our surveys do not measure for these characteristics, we have excluded them from our analysis.
**These limits were in effect for the first three years of program operation; they were subsequently adjusted to reflect inflation.
***Families entitled to an allowance of less than $10 per month were ineligible.
†See Wang (1981), p. 56, for the deductions.
After enrolling, households had to pass a housing inspection in order to receive payments. Meeting housing standards was the major cost imposed by the program and therefore sometimes acted as a deterrent to enrollment for families living in housing of low quality. Program representatives checked for adequate space, for the presence of numerous essential facilities, and for the safety of various housing features.* If a dwelling failed the inspection, its occupants could either make repairs and have it inspected again or move to a new unit, which would also have to pass the inspection.

The degree of program knowledge was crucial to a household's calculation of benefits and costs. Households had to have heard of the program before they could apply but they differed greatly as to their grasp of its details. Some households knew only that it was a housing program, and believed they might be eligible. Others were aware that the benefits depended roughly on their current income and that they had to pass a housing inspection to receive payments, though they knew no specific details. Still others probably knew the exact formula for calculating benefits and just what the housing inspection entailed. Unfortunately we cannot measure the respondents' level of knowledge precisely enough to make these distinctions.

How much households knew about the program directly affected the influence of expected benefits on each decision to enroll. That is, if they didn't know enough about the program to estimate their benefits correctly, their decisions might be based on a set of considerations slightly different from those we expected, and this would reduce the effect of actual benefit level on those decisions. However, because benefits were allotted in approximate proportion to current income, which in turn was likely to be a major determinant of a household's feeling of need, precise knowledge was not vital to an assessment of probable benefits.

However, knowledge was essential to a valid assessment of costs. Households that knew the details of the inspection could determine

*See Coleman (1981), Appendix A, for a complete list of the housing standards.
whether they were likely to pass or fail; if they expected to fail, they could estimate the cost of repairing the defects and decide whether to move to housing that would pass the inspection. On the other hand, households that knew only of a housing inspection but not its requirements could base their decisions on the general quality of their dwellings. Since measures of quality are rather weakly related to the cost of repairing defects, those households would have little or no basis in fact for their decisions.

Since we could not estimate the cost of repairing these units from our data at that stage, nor could we measure precise knowledge of each household regarding the housing inspection, we used a surrogate measure of quality, rent per room, for the cost of joining the program. This variable includes variations in price as well as in actual quality. We expect our results were somewhat attenuated both by incomplete knowledge of housing standards in the population and by our incomplete measurement of housing quality.

We also expected to find that households that were more crowded (measured by persons per room) were less likely to apply. That was true, but not statistically significant.

An alternative to repairing an adequate dwelling was to move to an adequate one. The cost of moving varied; we found that households that had moved recently were more likely to enroll than those that had not.

Additional psychological costs deterred some households from enrolling, as well. America's traditionally high regard for individualism and self-reliance makes some households reluctant to accept government aid despite a need for it. Those who responded negatively to the survey question, "Do you believe the federal government should help families obtain low-cost housing?" were less likely to enroll than others.

Households varied in the way they valued the benefits and costs of the program. Those with more assets felt a less compelling need for the program and were less likely to apply. Enrollment also varied by life-cycle stage and tenure, depending on different perceptions of need, program costs, and personal attitudes.
Perceptions of need probably weighed more heavily with households whose program knowledge was less precise.

Next, we consider how significant a role the housing inspection played in taking the step from enrollment to qualifying for payments.

STEP III: OBTAINING AN ALLOWANCE

A household's eligibility was determined after it enrolled in the housing allowance program. If it was eligible, the dwelling was then inspected for 38 possible defects, such as missing stair railings, faulty electrical systems, inadequate kitchen or bathroom facilities, or chipped paint.* In addition, the unit was checked for space per occupant. About half of the units passed the inspection the first time and the household immediately qualified for payments. Larger households, poorer households, St. Joseph County renters, and minorities were less likely to pass the inspections. (See Coleman, 1981).

A household whose unit failed the housing inspection had to decide whether to repair, move, or terminate. Its decision was based on a cost/benefit analysis similar to the earlier analysis that provided the basis for the decision to enroll; but this time the household knew much more about both benefits and costs. By now the HAO had calculated its allowance entitlement, and the larger it was the likelier the household was to receive payments. At this point, also, the costs were more specific: The household would know what defects caused the unit to fail the inspection, and would be able to make a fairly accurate estimate of the cost of repairing, given its tenure and type of unit.

The estimated cost, the number of defects, and some particular kinds (notably failure of the paint standard) all lowered the likelihood of repairing.

If repairing was too costly, the household could look for another unit that would pass the inspection, and make a reasonably accurate

*Paint defects caused failure only for units where small children lived or visited frequently. The purpose of the paint standard is to avoid lead-based paint poisoning.
assessment of the costs involved in moving. Although renters frequently moved in response to housing failure, owners rarely did. Failure of the occupancy standard increased the likelihood of both moving and terminating.
IV. DETERMINANTS OF PARTICIPATION

In Sec. III we summarized the models of each step in the participation process. In this section we look more closely at the considerations on which households based their decisions to take each of those steps.

The steps involve different details, but whether or not each one is taken depends on the same general set of determinants. These can be grouped into three broad categories: benefits provided by the program, defined as the expected amount of payment and duration of eligibility for each potentially recipient household; household characteristics, including the number of members, past mobility, family type, and tenure; and characteristics of housing, including its overall quality and space and the degree to which the unit meets program standards.

METHOD

We used the equations from Wendt's and Coleman's models to show how the probability of a household completing each step of the process changed in response to a change in each determinant when the other independent variables were held constant at their means. In this way we can compare the participation behavior of households identical in every respect but one.* We also calculated the unconditional probability of a household ever receiving payments as the product of the other conditional probabilities:

\[ P_R = P_K \cdot P_A \cdot \left( P_H + (1 - P_H)(1 - P_T) \right) \]  

(Eq. 4.1)

where \( P_R \) = probability of ever receiving payments,

\( P_K \) = probability of having knowledge,

\( P_A \) = probability of application,

\( P_H \) = probability of eligibility for household,

\( P_T \) = probability of tenure.

*One could also ask how participation rates differ between typical members of different groups (e.g., an elderly household versus a nonelderly one). The answer to this latter question can be quite different as we will see in Sec. VI.
\[ P_A = \text{probability of ever enrolling, given knowledge}, \]
\[ P_H = \text{probability of passing the housing inspection, given enrollment, and} \]
\[ P_T = \text{probability of terminating after failing the housing inspection.} \]

We estimated \( P_K, P_A, P_T, \) and \( P_R \) for both values of each variable shown in Table 4.1 when the other variables were held constant. Separate equations were fit for knowledge in each site by Wendt, and for \( P_T \) in each site for each tenure by Coleman. We also evaluated Eq. (4.1) separately for each site and tenure (see Table B.1), but found no striking differences in the results. Therefore we averaged \( P_K \) over sites and \( P_T \) and \( P_R \) over sites and tenures. Household characteristics were held at the mean values estimated from the wave 4 survey for the eligible population; housing defects were held constant at the mean values of the HAO data for enrollees who failed the inspection; and \( P_H \) was set at .48. For benefit level and expected duration of eligibility we compared values at the 25th and 75th percentiles of the population; the other intervals were natural.

The reader should be aware that the equations are non-linear in the probabilities. Those for knowledge and enrollment are linear in the log of the odds of \( P \) (i.e. the logit function). The probability of a household receiving an allowance after failure of its dwelling was calculated from discriminant functions that distinguish the outcomes of moving, repairing, and terminating for renters, and from a logit function for owners (because they move so infrequently in response to dwelling failure). Because the functions are non-linear, a change in the independent variable does not produce a proportional change in the dependent variable. Furthermore, the result of a change in each independent variable depends on the values assigned to the other variables. However, the choice of mean values does allow us to compare the effect of changes in the variable on a "typical" household, and also to directly compare the effects of different variables.
### Table 4.1

MARGINAL EFFECT OF PROGRAM BENEFITS AND HOUSEHOLD CHARACTERISTICS ON STEPS TO PARTICIPATION

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Range of Values</th>
<th>Increase in Probability (Percentage Points)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Knowledge (Given Knowledge)</td>
</tr>
<tr>
<td>Program Benefits</td>
<td></td>
<td>3^b</td>
</tr>
<tr>
<td>Amount of payment</td>
<td>510 vs. 1,270</td>
<td>0</td>
</tr>
<tr>
<td>(annual $)</td>
<td>1 vs. 14</td>
<td></td>
</tr>
<tr>
<td>Duration (yrs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>2 vs. 4</td>
<td>1</td>
</tr>
<tr>
<td>Tenure</td>
<td>Renter vs. Owner</td>
<td>-3^2</td>
</tr>
<tr>
<td>Type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Couple with children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vs. Single parents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vs. Elderly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vs. Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from wave 4 household surveys and the models in Wendt (1981) and Coleman (1981).  
NOTE: Values compared for continuous variables are the 25th and 75th percentiles. Footnotes denote significance at .05 levels as follows:  
^a For all applicable equations  
^b In Brown County only.  
^c For St. Joseph County renters only.  
^d For renters only.  
^e Except for Brown County owners.  
^f Significance levels not computed.
PROGRAM BENEFITS

The two principal program benefits, the payments the household receives and how long it expects to receive them, have a major impact on the participation process at the stages of enrollment and qualifying for payments following dwelling failure. (Households who received some payments and then left the program did so because they became ineligible. Because we already have a measure of expected duration of eligibility, and the two are so closely related, we use that measure as a surrogate for how long a household expects to receive payments.)

At the earliest step in the participation process, acquisition of program knowledge, benefits serve as surrogates for need;* those households likely to receive the largest benefits for the longest period of time are usually the ones most in need. Even so, benefits have little effect on knowledge; those households at the 75th percentile of expected payment level are only 3 percentage points more likely to know about the program than those at the 25th percentile. Expected duration of eligibility had no significant effect at all at this stage and was dropped from the knowledge equations.

However, both aspects of benefits have a significant effect on enrollment. Among households that knew about the program, those with higher allowances were 8 percentage points more likely to enroll than those with lower allowances. The effect of duration of eligibility was even more marked: those expecting to remain eligible for a longer period of time were 24 percentage points more likely to enroll than those anticipating a briefer period. The length of expected eligibility measures more than motivation, too; it also takes into account the fact that some households who become only briefly eligible never get around to enrolling.

Larger benefits motivated enrolled households more strongly to qualify for the program. Table 4.1 shows that among households that failed, those at the 75th percentile of payments were 12 percentage

*The knowledge equation actually uses income rather than allowance amount. However, change in income (holding family size constant) can be directly transformed into a change in allowance.
points more likely to repair their dwellings or move and eventually receive payments than households at the 25th percentile; the difference between those with relatively short and relatively long durations of eligibility was 2 percentage points.

The unconditional probability of receiving an allowance demonstrates the overall effect of program benefits on completing the participation process. Those whose allowances were at the 75th percentile for the entire eligible population were 11 percentage points more likely to complete the process than those whose payments were at the 25th percentile, suggesting that more motivation was provided by the larger amount. Likewise the more durably poor were 20 percentage points more likely to receive payments than those expecting a shorter period of eligibility. Thus differences in program benefits did have an important effect on recipiency rates.

HOUSEHOLD CHARACTERISTICS

Certain features of the eligible households themselves, independent of program characteristics, affected the probability of their taking the steps necessary to receive payments. The characteristics considered here are household size, family type, mobility, and tenure.

As Table 4.1 shows, household size is statistically significant only in its effect on enrolled renters whose dwellings failed the housing inspection. Each estimating equation controls for the quality of the unit or for the cost of making the repairs necessary to meet program standards. Either measure takes into account the fact that large households tend to live in lower quality and more crowded housing. (See Coleman, 1981.)

The likelihood of getting through all stages of the participation process varied greatly among family types. Table 4.1 compares four types: couples with children, single parents, elderly, and others. There is a slight difference between the first two groups, mainly due to single parents' persistence in qualifying for an allowance even after dwelling failure. The residual ("other") category, primarily couples without children, contains a relatively small number of
eligible households; the main contrast is between households with children and all other types. As the last column in the table shows, households with children receive payments more often than any of the others. Thus the important contrast among family types is between the two groups of greatest significance to policymakers, elderly households and those with children.

The biggest difference between these two types shows up in the early stages of the process, acquisition of knowledge and enrollment. The elderly are 15 percentage points less likely to know about the program than households with children, possibly because children tend to involve their families in the community. This theory is supported by the fact that other couples are 8 percentage points less likely to know about the program as well, even though they are less socially isolated than the elderly.

Among households that knew about the program, the elderly were 12 percentage points less likely to enroll than families with children. We attribute this difference to a combination of two factors: one, parents' incentive of having to support children, and two, a greater aversion to aid programs among the elderly, which is not adequately captured by our attitudinal variable.

Among those whose dwellings failed the housing inspection, however, the elderly were the most likely to remedy the problem and receive an allowance. Given identical housing, they were 8 percentage points more likely to receive payments than couples with children, 3 percentage points more likely than single parents, and 5 percentage points more likely than other couples. The elderly would have had higher recipiency rates if the housing characteristics of each group were taken into account. For instance, deficiency in the space requirement was the hardest to correct, because it usually meant moving, but that failure seldom occurred among the elderly. Nevertheless, because of the elderly's lower rates of knowledge acquisition and enrollment in the program, they were about 14 percentage points less likely to receive payments than households with children.

Tenure did not appear to affect receipt of payments; after we controlled for other household characteristics, benefits, and housing
quality, owners and renters were equally likely to be recipients. But
tenure did have slight effects at other stages of the participation
process. Owners were 3 percentage points less likely to know about the
program than renters. Among eligible households with knowledge they
also enrolled about 4 percentage points less. That may have been due to
a lesser sense of need because they owned their homes, or to the expense
that would be involved in moving out of an inadequate dwelling. But we
could find no relationship between owners' housing quality (as measured
by their expenses) and enrollment. Owners who failed the inspection
were more likely than renters, given the same defects, to go on and
qualify for payments. That is probably because the allowance would
eventually compensate them for their repairs, whereas repairing by
renters might lead to an increase in their rent. Because owners were
just as likely as renters to obtain an allowance, we think the weight of
the evidence concerning different enrollment rates points to different
perceptions of need.

HOUSING CHARACTERISTICS

To the degree we could measure housing quality, it affected every
step of the participation process. But because our measure was
imprecise, and because many households did not really know what the
housing standards were, the effect of quality was different at each
step. Households that acquired knowledge about the program were
motivated by a vague sense of need rather than exact certainty about
program details. Wendt found that in both counties rent was the
best predictor of knowledge among renters because it accurately
indicated a general need for relief from housing expenses. As the
rent burden of a household increased from the 25th percentile to the
75th, the probability of its knowing about the program increased
about 7 percentage points.

After households learned that the program existed, they might
also have found out that a housing inspection was required, but would
often still not know its requirements in detail. At this step of the
process they might be deterred from enrolling if their housing were poor in quality. We believe that quality was a deterrent for many households, but we did not have a measure of the cost of repairs. Instead we used rent per room and persons per room as surrogates for housing quality in the equation predicting enrollment behavior. Although these variables are related to failure, the relationship is far from perfect.

Table 4.2 shows that as rent per room increases from the 25th percentile ($28 per room) to the 75th percentile ($52 per room) of the distribution, the probability of failing the inspection decreases about 28 percentage points in St. Joseph County, but 50 points in Brown County. (The regressions are presented in Appendix Table B.2.) Likewise, as crowding is reduced from 1 person per room to 1 person per 2 rooms, the probability of failure decreases by 12 to 27 points. These effects are roughly additive, as the last two lines of the table indicate.

Using rent per room as an index of quality, Wendt found that nonmobile renters at the 75th percentile of the rent per room distribution were 9 percentage points more likely to apply than those at the 25th percentile.

When a dwelling actually failed the inspection, the household's knowledge was complete. The head was told exactly why the unit had failed and at that point the family was presumably able to estimate the approximate cost of repairing the defects or of moving to acceptable housing. At this step in the process the difficulty of repairing became the important factor; Coleman (1981) showed that the decision made by households that failed the inspection was largely determined by the number of defects, the type of deficiencies, and the cost of repairing them.

Because housing quality was measured differently at each step of the process, its importance relative to the other factors cannot be obtained by the equations used so far in this section. See instead the discussion of housing standards in Sec. V, Steady-State Participation.
Table 4.2
EFFECT OF QUALITY AND CROWDING ON THE PROBABILITY OF HOUSING INSPECTION FAILURE, BY SITE

<table>
<thead>
<tr>
<th>Rent per room</th>
<th>Persons per room</th>
<th>Probability of Failing Housing Inspection</th>
</tr>
</thead>
<tbody>
<tr>
<td>$28</td>
<td>.62</td>
<td>.86</td>
</tr>
<tr>
<td>52</td>
<td>.62</td>
<td>.34</td>
</tr>
<tr>
<td>42</td>
<td>.5</td>
<td>.52</td>
</tr>
<tr>
<td>42</td>
<td>1.0</td>
<td>.79</td>
</tr>
<tr>
<td>28</td>
<td>1.0</td>
<td>.94</td>
</tr>
<tr>
<td>52</td>
<td>.5</td>
<td>.27</td>
</tr>
</tbody>
</table>

SOURCE: Estimated by the authors from HAO administrative records for all renter households who enrolled in calendar year 1977 (Equation is presented in Table B.2)

NOTE: Values for rent per room and persons per room were chosen as typical of the range of values for eligible households in the wave 4 survey as follows: for renter per room, mean = $42, 25th percentile = $28, 75th percentile = $52; for persons per room, mean = 0.62, .5 = 30 to 47th percentile, 1.0 = .85 to .95th percentile.

SITE DIFFERENCES

The participation process and the effects of the various factors on each step in that process are about the same in both sites. However, the proportion of eligible households who receive payments is different. When all other household characteristics have been taken into account, renter households in Brown County are more likely to receive payments than renters in St. Joseph County.*

*Our survey sample of owner households is too small to reliably detect site differences in enrollment behavior for owners. The data are consistent with St. Joseph County owners enrolling at the same rate as Brown County owners, but also with the former enrolling at the lower rate of St. Joseph County renters.
We believe this single large difference between sites is mainly due to the difference in housing quality. The higher rate of housing inspection failure among renters in St. Joseph County (14 percentage points more often than in Brown County) partly accounts for the difference. On average, 20 percent of enrollees whose units fail eventually terminate without ever receiving payments. But St. Joseph County enrollees who fail have more defects and face a higher estimated cost of repairing; consequently they terminate more often as well (see Coleman, 1981). Appendix C shows that site differences in the proportion of renter recipients can be explained by the frequency of their failure, the types of defects, and their response to failing the paint standard; those who fail the latter terminate more often in St. Joseph County than in Brown County. Although we cannot be certain, we suspect that is due to either the degree of deficiency or the incidence of poor paint used in the rental stock, or both.

The data all point to lower housing quality in St. Joseph County as the explanation of the lower reciprocity rates among renter enrollees there. It is also the likeliest reason for the lower enrollment rate in that site, which was reported by Wendt (1981). Other possible causes we considered seemed to have virtually no effect. Taste appeared to vary little between sites, according to estimates of income elasticity. (See Mulford, 1979.) And there was almost no cross-sectional variation in housing prices to blame.*

On the other hand, the survey data provide us with some support for the influence of housing quality on enrollment rates. Households that knew about the allowance program were asked a series of open-ended questions about their opinion of the program, how they thought it should be changed, and, when appropriate, what their reasons were for not enrolling. Unenrolled eligible households mentioned problems

---

*Higher prices will increase participation if the price elasticity is greater than -1, which it almost certainly is in HASE. See Manuschek and Quigley (1979) for a discussion of evidence on price elasticity, and Rydell (1979), Appendix A, for a comparison of rental prices across sites by type of unit and age of building.
with their housing (such as general quality or specific faults) or
disapproval of housing standards twice as frequently in St. Joseph County
as in Brown County (13.4 percent compared to 6.6 percent). However,
this difference between sites was significant only at the .07 level
(using the chi-square test of independence, which is a two-tailed
test).*

SUMMARY OF HOUSEHOLD BEHAVIOR AND PARTICIPATION

Program benefits, household characteristics, and housing
characteristics all affected each step in the participation process.
Benefits had the strongest, most identifiable impact. Households
entitled to relatively large allowances were 11 percentage points more
likely to receive payments than households with smaller allowances,
and households expecting to be eligible for longer periods were 20
percentage points more likely to receive payments than those expecting
briefer eligibility.

Household characteristics were also important, but less so, and
tended to have opposite effects at different stages. Owners were as
likely as renters to receive payments, but were less likely to enroll,
and more likely to receive payments after dwelling failure. Elderly
households were less likely to receive payments than households with
children because the former were less likely to know about the program
and less likely to enroll.

Housing quality deterred a number of households from enrolling
in the program, but how much it affected their decision depended on
how familiar they were with the participation requirements, and
knowledge of those requirements was different at each step of the
process. Households were initially motivated to learn of the program
by their need for aid; our measure of need at that stage was housing
expenses. Households with relatively high rent burdens were 7 percent-
age points more likely to know about the program than similar households
whose rent was relatively low. Among knowledgeable, the housing

*Sample sizes were 122 in Brown County and 142 in St. Joseph
County.
inspection was a deterrent to enrollment for nonmobile renters who were paying less per room because at that step they simply assumed that low-quality units were more likely to fail. After a unit failed, and households could accurately assess the cost of repairing defects, those whose units would be relatively costly to repair were less likely to do so than those for whom it would be less expensive. The lower average housing quality in St. Joseph County led eligibles to enroll less often, fail more often with worse defects, and terminate more often. In short, fewer households there ended up receiving payments.
V. STEADY-STATE PARTICIPATION

In the previous section we modeled the probability that an eligible household would ever receive a housing allowance (Eq. 4.1). Here we extend the model in order to estimate the probability that an eligible household is receiving payments at a random moment in time, once the program has reached equilibrium.

With the program in steady state, there are always some households that have recently become eligible. Some of them have already enrolled, but are not yet receiving payments; others will enroll eventually but have not yet done so. These delays must be taken into account in order to arrive at an accurate estimate of participation rates. This section shows how we estimate the delays, and how we use the estimates to determine recipiency rates. We then look at the effects of delays, housing standards, and other factors on those rates.

DELAIS IN THE PARTICIPATION PROCESS

To obtain steady-state participation rates, we first estimate the length of delay between when a household becomes eligible and/or learns about the program and when it enrolls; then we estimate the delay between enrolling and receiving payments.* Combining the estimated delays with Eq. (4.1), the probability that a household will ever receive payments, yields the rate of recipiency among eligible households.

Turnover among participating households lowers the actual number of households participating at any given moment. Rydell et al. (1981) modeled the effect of turnover on recipiency rates on the basis of two assumptions: one, that the time required for a household to enroll

*Our model of knowledge acquisition yields the probability that a household knew about the program at the time of the wave 4 survey (when the program was close to steady state), thus including the effect of any delay to knowledge. We expect that in steady state most households would already know about the program when they become eligible, and thus there would be no delay prior to their learning about it.
follows a negative exponential distribution with parameter $\mu$ (i.e., the average delay from becoming eligible to enrolling is $1/\mu$);* and second, that the length of time each household was eligible also follows a negative exponential distribution with parameter $\lambda$. The proportion of households that would be enrolled at steady state, $P$, is therefore

$$P = \frac{\mu}{(\mu + \lambda)} \quad (5.1)$$

The negative exponential distributions assumed by Rydell et al. appear to require only a little modification for our purposes. The average time households spent in eligibility varied in predictable ways according to their income source and the occupation of each head. Within income and occupational groups, however, we assume that how long each household was eligible actually depended on such random events as a job being lost or found.

The same form is also an adequate model for the time required for an eligible household that wants to join to do so, as our evidence shows. In exploratory analysis, Wendt (1981) was unsuccessful in predicting this length of time as a function of program benefits, costs, and household characteristics. Instead, we believe, this delay is also random; a household enrolls at a particular time because of a chance circumstance such as one of its members noticing an advertisement or being reminded of the program by a friend. The data in Table 5.1 support our thinking: The observed and predicted distributions of delay to enrollment for eligible households that knew about the program are very close.** The mean delay was 6.8 months.***

*A random variable $T$ has the negative exponential distribution with parameter $\mu$, if the probability that $T$ is less than or equal to $t$ is given by $1 - e^{-\mu t}$ for any positive real number $t$. In our example $T$ is the time between becoming eligible and enrolling.

**The chi-square goodness of fit test for the data reported in Table 5.1 is 3.82 with 3 degrees of freedom, suggesting only random variation from the model.

***See Appendix A for discussion of possible bias in this estimate.
Table 5.1

DISTRIBUTION OF DELAY TO ENROLLMENT

<table>
<thead>
<tr>
<th>Months to Enrollment&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Percentage of Households</th>
<th>Negative Exponential Distribution&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>3-6</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>6-12</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>12-24</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>24-60</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

SOURCE: Based on enrollment dates from HAO administrative records for all surveyed households who knew about the program at wave 2 and were continuously eligible at waves 2, 3, and 4.

NOTE: See Appendix A for a discussion of possible biases in extrapolating from these observations to households in steady state.

<sup>a</sup>Time from opening of enrollment in each neighborhood locality to household's enrollment date.

<sup>b</sup>Based on 137 observations from both sites.

<sup>c</sup>Mean time was 6.79 months. See footnote, p. 33.

However, Eq. (5.1) is only relevant for the subset of households that do receive payments, or would if they remained eligible long enough. Some households choose not to participate in the program at all, usually because their entitlement is small or because of the inconvenience and expense of complying with the housing standards; 25 percent of the continuously eligible households in our sample did not enroll. A single negative exponential distribution does not fit the data for both groups of households.*

We have to modify Eq. (5.1) to account both for those who chose not to participate and for variations in expected duration of eligibility across households. The procedure we use follows the notation

---

*The chi-square goodness of fit test is 34.6 with 3 degrees of freedom, assuming all unenrolled households became ineligible immediately following the wave 4 survey.
explained in Fig. 2, which shows the partition of eligible households according to their status as of any given moment in a steady-state program. The primary subgroup of interest to us contains all households with knowledge of the program (K). That group is further divided into those whose net benefits are positive, even after all psychic costs are included (B), and those whose net benefits are negative; by definition the latter group includes households that enroll but drop out before qualifying for payments. Also by definition, all households in F and C will eventually receive payments.

The behavioral models discussed in Sec. III give us the probability that each eligible household will ever receive payments; that is, the probability of its being in either C (currently enrolled) or F (enrolled in the future).* For each household $i$ in group $B$,

$$\Pr(C|B,\lambda_i) = \mu/(\mu + \lambda_i)$$

(5.2)

where $\mu = $ the rate at which eligible households enroll, and

$\lambda_i = $ the rate at which household $i$ leaves eligibility.

Using the Markov property of the negative exponential distribution we have:

$$\Pr(F|B,\lambda_i) = (1-\Pr(C|B,\lambda_i)) \Pr(C|B,\lambda_i)$$

or:

$$\Pr(F|B,\lambda_i) = \lambda_i \mu/(\mu + \lambda_i)^2.$$  

(5.3)

Therefore, since

$$\Pr(C|F \text{ or } C,\lambda_i) = \Pr(C|B,\lambda_i)/(\Pr(C|B,\lambda_i) + \Pr(F|B,\lambda_i))$$

*It is necessary to use predictions from the equations rather than observations because of the interview stimulus discussed in Sec. VI and Appendix A.
All currently eligible households

No knowledge of program

Knowledgeable about program (K)

Negative benefits

Positive benefits (B)

Currently enrolled (C)

Future enrolled (F)

Ineligible prior to enrolling (I)

Currently receiving payments (R)

Not receiving payments

Waiting for Inspection

Repairing or moving

---

Fig. 2 — Partition of the eligible population by status in the steady-state program

*aIncludes households that have enrolled but drop out prior to receiving benefits, primarily because their dwellings do not meet the housing standards. Their net expected benefits are therefore negative.
we have:

\[ \Pr(C|F \text{ or } C, \lambda_i) = \frac{\mu + \lambda_i}{\mu + 2\lambda_i} \]  \hspace{1cm} (5.4)

We evaluated Eq. (5.4) for each eligible household surveyed at wave 4, using the mean enrollment delay of 6.8 months and \( \lambda_i \) as estimated from Coleman's equations (1981, Appendix B). Then we averaged those values using weights proportional to the population represented by the sample and proportional to the probability (predicted from our behavioral models) that a household would ever receive payments (i.e., would be in F or C). The result is that 88 percent of all the households that will ever receive payments are enrolled at any point in steady state.

In order to get from those enrolled to those receiving payments, we must include in our model the delay between when a household enrolls and when it receives its first payment. This delay, which averaged 1.65 months,\(^\star\) consists of the time required to have housing units inspected, to repair or move from a substandard unit, and to complete the paperwork. The percent of current enrollees who are awaiting certification is calculated as the ratio of the delay to the mean enrollment time of recipients. Only 4 percent of current enrollees who ever receive payments have not yet received a payment.

Table 5.2 shows steady-state participation rates by site and tenure calculated from these delays and our behavioral model. The first row gives the effect of the delay from enrollment to receiving payments. It shows that 96 percent of households who are now enrolled and will ever receive a payment are receiving payments at any given time. The second row gives the effect of the delay prior to enrollment: Between 85 and 90 percent of the households who will ever receive payments are enrolled during steady state. Multiplying these two rows yields the third row of the table: The percent of

\(^\star\)The delay was estimated from 3,518 recipients who enrolled during the third program year in both sites. The estimate for St. Joseph County (1.74 months) is only slightly higher than the estimate for Brown County (1.47).
<table>
<thead>
<tr>
<th>Status in Program</th>
<th>Given Condition</th>
<th>Notation</th>
<th>Conditional Probability (%)(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Brown County</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Renters</td>
</tr>
<tr>
<td>Currently receiving</td>
<td>Currently enrolled</td>
<td>Pr{R</td>
<td>C}</td>
</tr>
<tr>
<td>payments</td>
<td>Will ever receive</td>
<td>Pr{C</td>
<td>F or C}</td>
</tr>
<tr>
<td>Currently enrolled</td>
<td>payments</td>
<td>Pr{R</td>
<td>F or C}</td>
</tr>
<tr>
<td>Will ever receive</td>
<td>Eligible</td>
<td>Pr{F or C}</td>
<td>54</td>
</tr>
<tr>
<td>payments</td>
<td></td>
<td>Pr{R}</td>
<td>45</td>
</tr>
</tbody>
</table>

\(^a\)Percent are the fractions of column 2 groups described in column 1.

SOURCE: Tabulated by authors from household surveys and HAO administrative records.
ever recipients who are currently receiving payments is roughly 84 percent. Row 4 is the percent of eligibles who will ever receive payments (from Table 3.1). The last row is the steady-state participation rate (the product of the preceding two rows).

Although the above discussion completes our model of the participation process, it does not completely describe the effect of delays on participation because some households become ineligible before they enroll in the program (set I) and therefore never receive payments. In order to measure the importance of delays we have to include those households in our measurement of the entire set of B. The difference between the sizes of B and R (current recipients) is then the effect of delays on the steady-state recipiency rate.

We know Pr(R) in each site, and since

\[
Pr(R | B) = \frac{Pr(R)}{Pr(B)}
\]  \hspace{1cm} (5.5)

we can find Pr(B) if we can find Pr(R | B).

By definition:

\[
Pr(R | B) = Pr(R | C) \cdot Pr(C | B).
\]

We have estimated Pr(R | C) in Table 5.2 and know from Eq. (5.2) that

\[
Pr(C | B) = E(\mu/(\mu + \lambda_i))
\]  \hspace{1cm} (5.6)

where the expectation is over all households in B. Since B includes households that become ineligible prior to receiving payments, as well as those that will ever receive payments, the set over which to calculate the expectation is not known exactly. However, given the reasonable assumption that net benefits are a non-decreasing function of expected duration of eligibility, we can prove that

\[
E(\mu/(\mu + \lambda_i)) \leq Pr(C | B) \leq E(\mu/\mu + \lambda_i)
\]  \hspace{1cm} (5.7)

\[i \in S_0\]  \hspace{1cm} \[i \in S_2\]
where $S_0 =$ all eligible households and
\[ S_2 = \text{all households that ever received payments}. \]

Although we cannot estimate Eq. (5.6) directly, we can estimate bounds for it from Eq. (5.7) that are very close to each other. Using the sample of households eligible at the wave 4 survey, we estimate that the probability that a household in B is currently receiving payments is between .75 and .79, or roughly 77 percent. The probability is averaged across sites; households in St. Joseph County are actually more likely to be receiving payments ($\Pr(R|B)$ is between .76 and .80) because they are more durably poor than those in Brown County, where $\Pr(R|B)$ is between .74 and .76.\*

When participation rates are averaged across sites, 33 percent of eligibles are receiving payments at any point during steady state. We know that 77 percent of eligible households with net benefits greater than zero are currently receiving payments, and therefore an average of 43 percent have net benefits greater than zero (from our estimate of B in Eq. (5.7)). The difference between $\Pr(B)$ and $\Pr(R)$ is the probability that an eligible household will have net benefits greater than zero, and at the same time is not currently receiving payments. The difference between 43 and 33 is 10, the percent of eligible households currently not receiving payments because of delays.\**

Table 5.3 summarizes our results so far on steady-state participation rates. The fraction of households not currently enrolled who lack knowledge is about 17 percent. Adding the 33 percent currently receiving payments, the 10 percent not receiving payments due to delays, and the 17 percent who do not know about the program, we estimate that about 40 percent of eligible households are currently not enrolled for other reasons: low benefits, poor housing, or lack of interest.\***

In the rest of this section we will examine these causes more closely.

---

\*Although these are point estimates and therefore not bounds, strictly speaking, the standard deviation on the unweighted estimate of each point is approximately 0.007.

\**Actually we calculated these numbers for each site separately and then averaged them.

\***Data by site and tenure are provided in Table B.6.
Table 5.3

PROGRAM STATUS OF ELIGIBLE HOUSEHOLDS IN STEADY STATE

<table>
<thead>
<tr>
<th>Status</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving payments</td>
<td>33</td>
</tr>
<tr>
<td>Not receiving payments:</td>
<td></td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>17</td>
</tr>
<tr>
<td>Delay</td>
<td>10</td>
</tr>
<tr>
<td>Other (Low benefits, poor housing, or lack of interest)</td>
<td>40</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from household surveys and HAO administrative records.

NOTE: Percents are averages for each site.

HOUSING STANDARDS

Since housing standards appeared to exert a strong deterrent effect on recipiency rates in the allowance program, we chose to examine that effect more closely by estimating what kind of participation would take place in the program if there were no such standards. No control group exists for whom an open-enrollment program without standards is available, so we can only obtain an approximate answer. Furthermore, a presumed negative bias enters our estimation procedure at certain points, so that our estimates probably understate the recipiency rates we could expect in a standardless program. However, our results are consistent with data from the Demand Experiment, as we will show, so we believe that the degree of underestimation is small.

Several barriers to enrollment, and hence to recipiency, that operated in HASE were unrelated to the housing standards, so those barriers would have continued to affect some households living in adequate housing. Specifically, some households did not know that the program existed; some were newly eligible and had not yet applied; some were entitled to so small an allowance that they would not have enrolled
in any case; some had enough assets that they did not feel a sense of need; and some disapproved of housing aid programs. We can use these barriers as guides to estimating steady-state participation rates in our fictional program.

Using the same notation as that for the model of delay to enrollment,

\[
Pr(R) = Pr(K) \cdot Pr(F \text{ or } C|K) \cdot Pr(C|F \text{ or } C) \cdot Pr(R|C)
\]  \hspace{2cm} (5.8)

where \( R \) = current recipient households;
\( K \) = eligible households with program knowledge;
\( F \) = future recipient households not yet enrolled; and
\( C \) = currently enrolled households that are or will be recipients.

Table 3.1 presents the probability that an eligible household knew about the program by the time of the fourth survey wave, which we will use for \( Pr(K) \) in our fictional program. Since enrollment reached steady state about then, we believe that program knowledge did not change much after that. As we have seen, households with higher rents paid more attention to program information, probably because they had a greater need for relief. It is possible that more households would have noticed the program if it had directly addressed their more fundamental need for money, but we had no way of definitely knowing. Here we assume that the fictional housing allowance program without housing standards would also be advertised as a method of obtaining money for housing expenses, so the actual level of knowledge in the two sites is a good estimate of what the level of knowledge of the fictional program would be.

In the absence of housing standards, all households that enroll would receive payments. Therefore the probability that a knowledgeable household would ever enroll in such a program is \( Pr(F \text{ or } C|K) \). We started by assuming that each household interviewed at wave 4 was living in adequate housing and was therefore not deterred from participation by the standards, and then evaluated Wendt's equation for
knowledgeable households' decision to enroll.* Since this equation was estimated from behavior observed in HASE, the constant term in the model includes a household's reluctance to go through a housing inspection; therefore it may underestimate the percent of households that would enroll if there were no housing standards.

In evaluating the equation, each household in the wave 4 sample was given its appropriate value for benefit level, duration of eligibility, assets, life-cycle stage, household size,** and attitudes. Because our fictional housing allowance program without standards would also be advertised as a housing program, we allowed attitudes toward aid to deter participation to the same extent they did in HASE.

We also assigned to each household the observed value of the mobility variable, which shows whether an unenrolled household moved in the year preceding the survey or an enrolled household moved in the year preceding enrollment. As a group, mobile households enrolled more frequently than nonmobile households, probably because the former found it less difficult to obtain adequate housing. However, nonmobile households occupying already adequate dwellings enrolled slightly more often than mobile ones; and we did not find any relationship between a mobile household's rent and its decision to enroll. Therefore we used the same proportions of mobile and nonmobile households that occurred in the eligible population.***

*The constant term in the model was adjusted for the interview stimulus as described in Appendix A.

**One might justifiably object that the small negative coefficient on household size in the decision to enroll equation occurs because larger households find it more difficult to obtain standard housing. However, the coefficient is not statistically significant and so small that it does not noticeably affect our results.

***Mobile households participated only a little less than nonmobile ones with rent per room at the 95th percentile. Although we could have treated all renter households as nonmobile and living in adequate dwellings, our estimates of steady-state participation rates for renters in the absence of housing standards would have increased by less than 2 percent in each site.
Two of the remaining independent variables in the decision to enroll equation are related to the housing standards: housing expenses per room and persons per room. But since their effects would be quite different for the fictional program—that is, minimal—we wanted to set their values at a level that would not imply the deterrent effect of standards on our sample households. The effect of housing expenses is different for each of the following three groups: owners; renters who have moved within the previous year; and renters who have not moved. The latter is the only group that exhibits an increasing tendency to enroll with increased housing expenses. Consequently we set the value of rent per room for the latter group at the 95th percentile, and used the actual housing expenses per room for each sample household in the other two groups. In Wendt’s model, the sign of crowding is negative for all households; to minimize its effect on our fictional program we have set the variable to the 5th percentile of each tenure group for this prediction.

Despite the use of extreme values for rent per room and crowding, we have not completely eliminated the possibility of failure. For example, in St. Joseph County the probability that a household at the 95th percentile of rent per room and the 5th percentile of crowding would fail the housing inspection was 30 percent.* But we expect that the repairs required for households at these percentiles of rent per room and crowding would be trivial. Nevertheless our results should underestimate the probability of receiving payments if there were no standards at all.

The remaining independent variable in this model is the site dummy. Since we believe that the lower quality of housing in St. Joseph County depressed recipiency rates there below those of Brown County, the absence of housing standards should result in similar households in both sites having the same participation rates. Accordingly we have set the site dummy to indicate Brown County throughout.

---

*In Brown County, the probability of failure at the same values was only 10 percent. For comparison, the average failure rate among HASE renter households was 59 percent in St. Joseph County and 45 percent in Brown County.
The last two terms in Eq. (5.8) are the effects of delays on steady-state participation rates in our fictional program. The only estimate of enrollment delay we have is, of course, derived from the HASE allowance program, which did include standards. However, as discussed earlier, that delay was found to be independent of housing characteristics, and we believe that the same factors that caused delay to enrollment in HASE would affect any transfer program. Therefore we estimated Pr(C|F or C) from Eq. (5.4) using the enrollment delay we estimated for HASE. Finally, we assume that in our fictional program payments begin at the time of enrollment, and that therefore Pr(R|C) = 1.

We evaluated Eq. (5.8) for each sample household eligible at wave 4 and weighted and summed the results. Table 5.4 shows recipiency rates as well as the weighted estimates for the individual terms of the equation. For comparison it also includes the data for the current program contained in Tables 3.1 and 5.2. In the HASE program a household that will ever enroll is not necessarily in either F or C; some households learn the extent of their housing defects only after enrollment, and some of them leave the program rather than comply with the standards. By definition they are excluded from B (see footnote a in Fig. 2). Consequently, in the HASE program,

\[ \Pr(F \text{ or } C|K) = \Pr(\text{Ever enroll}|K) \cdot \Pr(\text{Ever receive payment}|\text{Ever enroll}). \]  

(5.9)

In the absence of housing standards, the recipiency rate would have increased by approximately 40 percent in Brown County and almost doubled in St. Joseph County. It would actually be higher in St. Joseph County because of the poorer population there -- just the opposite of the current program. Most of the increased recipiency in Brown County would result from all enrolled households obtaining payments; a smaller amount would be due to the higher enrollment rate. In St. Joseph County the effect of the two factors would be approximately equal.

Because of the methodology we chose, in several places we underestimated the probability that a knowledgeable household would
<table>
<thead>
<tr>
<th>Status in Program</th>
<th>Given condition</th>
<th>Conditional Probability of Achieving Status</th>
<th>Renters</th>
<th>Owners</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HASE Without Standards</td>
<td>HASE Without Standards</td>
<td>HASE Without Standards</td>
<td></td>
</tr>
<tr>
<td>Knowledgeable</td>
<td>Eligible</td>
<td>.85</td>
<td>.85</td>
<td>.78</td>
<td>.78</td>
</tr>
<tr>
<td>Will ever enroll</td>
<td>Knowledgeable</td>
<td>.77</td>
<td>.81</td>
<td>.50</td>
<td>.63</td>
</tr>
<tr>
<td>Enrolled</td>
<td>Will ever enroll</td>
<td>.85</td>
<td>.85</td>
<td>.87</td>
<td>.85</td>
</tr>
<tr>
<td>Will ever receive payments</td>
<td>Enrolled</td>
<td>.83</td>
<td>1.0</td>
<td>.87</td>
<td>1.0</td>
</tr>
<tr>
<td>Currently receiving payments</td>
<td>Enrolled and will receive payments</td>
<td>.96</td>
<td>1.0</td>
<td>.97</td>
<td>1.0</td>
</tr>
<tr>
<td>Currently receiving payments</td>
<td>Eligible</td>
<td>.45</td>
<td>.59</td>
<td>.28</td>
<td>.41</td>
</tr>
</tbody>
</table>

**Brown County**

| Knowledgeable    | Eligible                 | .85  | .85  | .85   | .85   | .85  | .85  |
| Will ever enroll | Knowledgeable            | .75  | .88  | .43   | .70   | .53  | .75  |
| Enrolled         | Will ever enroll         | .88  | .87  | .90   | .87   | .89  | .87  |
| Will ever receive payments | Enrolled    | .72  | 1.0  | .86   | 1.0   | .79  | 1.0  |
| Currently receiving payments | Enrolled and will receive payments | .95  | 1.0  | .97   | 1.0   | .96  | 1.0  |
| Currently receiving payments | Eligible           | .38  | .65  | .27   | .52   | .31  | .56  |

**St. Joseph County**

**SOURCE:** Estimated by authors from HAO administrative records and the eligible population in the wave 4 household survey. The probability that a household will ever receive payments, given that it is enrolled equals the proportion of households enrolled by the end of the third year of program operation who received payments by the close of the year 4 files. The probability that a household is currently receiving payments, given that it is enrolled and will ever receive payments, equals the mean time from enrollment to its receipt of the first payment divided by mean length of enrollment. See text for methodology concerning other lines.
ever enroll in our fictional program. But that underestimation is probably very slight. For one thing, we can get an upper bound on what participation rates would be in the absence of housing standards by assuming that all eligible households would wish to join our fictional program, a total that is about 10-15 percent (depending on site) higher than the estimates of Table 5.4. This upper bound must overstate what participation might really be because a significant number of households would choose not to participate on the basis of low need or low benefits.

We have an even better indication of how slight our underestimation is from data provided by the Demand Experiment on renter households in its two sites (Phoenix, Arizona, and Pittsburgh, Pennsylvania) for 1973-74. We can directly compare those recipiency rates to our estimates of the probability that knowledgeable renter households would wish to enroll in a program offering payments determined by the same formula as HASE, but without housing standards. The data in Table 5.5 show that our estimated participation rates for an unconstrained program offered to renters in Brown and St. Joseph counties fall within the range of participation rates in the Demand Experiment's sites, although our estimates for owners (who were not eligible for the Demand Experiment) are lower. Rates varied between sites in both experiments, probably due in part to differences in the poverty of the populations. Average benefit levels among renters were higher in Phoenix than in Pittsburgh, and in St. Joseph than in Brown County.* No further information is available on the composition of the population offered the unconstrained option in the Demand Experiment.

Even if our estimates of recipiency rates for renters in a hypothetical program without standards are a little low, we conclude that they are reasonable approximations. But what about owners? The absolute increase in recipiency is almost identical for both tenures.

*The mean renter benefit levels were $66 and $43 in Phoenix and Pittsburgh and $76 and $85 in Brown and St. Joseph counties, respectively. The Demand Experiment data are from the 1973-1974 time period. The corresponding data for owners are $60 and $73 in Brown and St. Joseph counties.
Table 5.5

COMPARISON OF DEMAND EXPERIMENT AND HASE ESTIMATES
OF PARTICIPATION RATES IN THE ABSENCE OF
HOUSING STANDARDS, BY TENURE AND SITE

<table>
<thead>
<tr>
<th>Tenure and Site</th>
<th>Participation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renters</td>
<td></td>
</tr>
<tr>
<td>Brown County</td>
<td>81</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td>88</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>78</td>
</tr>
<tr>
<td>Phoenix</td>
<td>90</td>
</tr>
<tr>
<td>Owners</td>
<td></td>
</tr>
<tr>
<td>Brown County</td>
<td>63</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td>70</td>
</tr>
</tbody>
</table>

SOURCE: Brown and St. Joseph County data from Table 5.4; Pittsburgh and Phoenix data from Kennedy and Macmillan (1980), Tables 2.2, describing "unconstrained households."

NOTE: Participation rates for the Demand Experiment are the percents of households offered the unconstrained plan who accepted the offer. HASE participation rates are the estimated fractions of households who knew of the program who would have enrolled in the absence of standards.

in our fictional program, but owners would still participate less than renters. A good deal of the difference they show in participation behavior in HASE can be attributed to differences in the eligible population itself: Owners are more likely to be elderly, and correspondingly less likely to be parents; they have more assets; and they are more likely to be marginally eligible (i.e. entitled to smaller payments and/or eligible for only a very short period).*

However, as we saw above, even when we controlled for each of those

*Data on average benefits and duration of eligibility will be given in Sec. VI. Although mean duration of eligibility is about the same for each tenure group because of the elderly, the proportion of owners leaving income eligibility each year is higher than renters. See Carter and Balch (1981).
factors, renters were more likely to enroll than owners. This may have been due to some owners perceiving no need for aid because of the security (and equity) involved in owning their own homes. On the other hand, it might have been because one route to receiving payments -- moving to an acceptable dwelling -- is effectively closed to owners. However, renters moved largely in response to occupancy failure, which we have essentially eliminated in our estimate by entering such a low value for crowding. If in the absence of standards owners enrolled like similar renter households at the 95th percentile of housing quality, then the probability of an owner ever enrolling in the program would only be about 2 percent higher than we have estimated it here. After multiplication by the effects of knowledge and turnover, the effect of the difference in owner behavior on steady-state participation would be even smaller.

CAUSES OF NONPARTICIPATION

A number of factors contributed to the low recipiency rates among households eligible to receive aid from the HASE allowance program. The housing inspection was by far the most important factor in St. Joseph County, and was also very important in Brown County. In the previous subsection we saw how recipiency rates would have increased if the housing standards had been removed. That approach can also be used to examine other factors causing the low rates: lack of program knowledge, delay to enrollment, and negative attitudes toward government aid. For instance, how would recipiency rates change if all households knew about the program? What if all households wishing to participate were able to receive payments as soon as they became knowledgeable and eligible? And what if households that disapprove of government aid overcame their negative attitudes and accepted an allowance at the same rate as other households?

Using the same methodology by which we arrived at the results presented in Table 5.4, we evaluated Eq. (5.8) for each of these circumstances for all the households in the wave 4 sample. The resulting predicted increases in steady-state participation are shown in Table 5.6.
Table 5.6

EFFECT OF DETERRENTS TO PARTICIPATION, BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Deterrents to Participation</th>
<th>Increase in Recipiency Rate by Eliminating Deterrent (% of Eligible Households)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brown County</td>
</tr>
<tr>
<td></td>
<td>Renters Owners</td>
</tr>
<tr>
<td>Lack of program knowledge</td>
<td>7 8 8</td>
</tr>
<tr>
<td>Delay to recipiency</td>
<td>15 9 12</td>
</tr>
<tr>
<td>Housing standards</td>
<td>14 13 14</td>
</tr>
<tr>
<td>Explicit negative attitudes</td>
<td>1 2 2</td>
</tr>
<tr>
<td>All others&lt;sup&gt;q&lt;/sup&gt;</td>
<td>6 17 12</td>
</tr>
<tr>
<td>Total not participating</td>
<td>55 72 64</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated from wave 4 household surveys by authors, as described in text.

NOTE: Increases in participation recipiency do not sum to total percentage of households not participating because some households have more than one reason for not receiving payments.

<sup>q</sup>Primarily low benefits or need.

If the 17 percent of all eligible households that lacked knowledge of the program had instead been informed about it, the recipiency rate would increase by about 8 percent in Brown County and 5 percent in St. Joseph County. The remaining households wouldn’t enroll anyway, either because of the housing standards or because they perceived no need.

Delays to enrollment and receipt of payments have somewhat more effect on steady-state participation than knowledge. The effect of delays goes up along with the proportion of households in B -- those who are eligible and whose net benefits from the program are positive. If more households want to join, then more are waiting to join at any given time. Since a greater proportion of renter households than owners are in B, the effect of waiting time varies by tenure as seen in Table 5.6. The difference between sites is due to both a larger number of households with positive net benefits in Brown County and the shorter average period of eligibility there.
Changing negative attitudes would have increased recipiency by only 1 or 2 percent. Wendt (1981) showed that households expressing disapproval of government aid for housing were 13 percent less likely to join the program, but only about 10 percent of eligible households expressed that view.

The rest of the reasons for the steady-state rates we found were primarily low benefits, lack of perceived need, and negative attitudes not captured by our measure of that variable. We calculated the effects of these factors by estimating the number of households that would ever enroll if both of the following conditions were true: there were no housing standards, and no one had an explicitly negative attitude toward the program. Then we transformed this number into an estimate of what B would be under these circumstances, using Eqs. 5.6 and 5.7. The households that never enrolled in HASE because of "other reasons" are then the set of $K - B$ in our model, and the set of these households that are not currently enrolled is $E \left( \frac{\mu}{\mu + \lambda} \right) (K - B)$. The difference between this number and the HASE recipiency rate is given in the last line of Table 5.6. The increase is much greater for owners because they are better off than renters.
VI. WHO PARTICIPATES?

The housing allowance program operated by HASE had two major goals: first, to lower the burden of housing expenses for eligible households; and second, to improve the housing conditions of those living in poor quality dwellings by requiring that each unit pass a housing inspection before the household could receive an allowance.

Unfortunately these goals conflict. As we have seen, the housing standards effectively prevented many households from participating in the program. Because the poorest and largest households often live in the worst housing, there was a possibility that those households who were thus effectively prevented from participating were the neediest ones. One of the findings reported by the Demand Experiment was that "participation rates in the Housing Gap programs were significantly lower for those in the worst housing, including the very poor, minorities, and very large households."* In this section we consider which households are most likely to receive allowances independent of the quality of their housing.

We examine recipiency rates in terms of two sets of household characteristics. The first set is related to a household's need. We have seen that the decision to join the program results from balancing the benefits of participation against the costs of obtaining adequate housing. However, the cost is likely to be greatest for the neediest households, so here we want to know whether the program reaches more of the poorest households despite poorer housing quality. The second set of household characteristics we use are those which may lead to difficulty in obtaining adequate housing (e.g., larger households) or which could be related to attitudinal differences toward welfare or to the difficulty in acquiring program knowledge (e.g., the elderly). We use a multivariate model to determine whether some identifiable groups of households participate less than others at the same level of need.

---

*Kennedy and MacMillan (1980), p. S-5. Some of the Housing Gap programs were similar to that of the Supply Experiment; in others, adequate housing was determined by amount of rent.
THE SURVEY DATA AND BIAS

By the fourth survey wave participation had reached equilibrium in each site, so wave 4 survey data should represent a random time during program steady state. Using households surveyed at wave 4 in each site, we fit a logit model of the probability that an eligible household was receiving payments on the survey date.

However, Table 6.1 shows that weighted counts of survey recipients are much higher than the HAOs' actual number for both tenures in both sites. Moreover, the amount of the overestimate is larger than two standard deviations of the weighted counts in all cases. This is probably due not to sampling fluctuations but to one

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Number of Households</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Estimated</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>1,881</td>
<td>2,187</td>
<td>135</td>
</tr>
<tr>
<td>Owners</td>
<td>1,238</td>
<td>2,140</td>
<td>404</td>
</tr>
<tr>
<td>Total</td>
<td>3,119</td>
<td>4,327</td>
<td>427</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>2,166</td>
<td>2,553</td>
<td>187</td>
</tr>
<tr>
<td>Owners</td>
<td>3,208</td>
<td>5,260</td>
<td>972</td>
</tr>
<tr>
<td>Total</td>
<td>5,374</td>
<td>7,779</td>
<td>990</td>
</tr>
</tbody>
</table>

SOURCE: Brown County actual counts from year 3 HAO file (June 1977). St. Joseph County actual counts from Management Information Report of May 26, 1978. The wave 4 survey was conducted in the first half of 1977 in Brown County and the first half of 1978 in St. Joseph County. Survey estimates are weighted counts of income-complete households.

NOTE: Unlike other tables in this report, this table includes nonelderly single-person households.

*Except for nonelderly singles, who remain excluded from the analysis.)
of two plausible explanations. One is the possible effect of survey response bias. Since the connection between the survey and HASE was probably known by the time of the wave 4 survey in both communities,* survey administrators would be likely to encounter greater cooperation from households already receiving payments; therefore the rates of recipiency might have been considerably higher among those who participated in the survey than among the population at large. Second, the interview itself may have stimulated households to enroll in the program, thus producing a higher proportion of recipients among survey respondents who had been previously interviewed. (Questions asked of the households included whether they had heard of the program, and if so what their opinions were regarding its effect on the county, the neighborhood, and themselves,** thus suggesting that the program might be helpful to them.)

We can test for interview stimulus because our sample includes many households that were surveyed for the first time at wave 4 and therefore could not have been affected by a previous interview. On the other hand, we do not have enough information about nonrespondent occupants of sample dwellings to test for response bias. Below we show that interview stimulus accounts for most of the overestimate in the weighted counts of recipients, making it likely that response bias is small to nonexistent.

How may the nonrepresentative nature of our sample distort our results? We first assume that if any response bias exists, it is not correlated with any of the independent variables in our model. If we are right, it will affect only the constant term in the model. Interview stimulus cannot be dismissed so easily. Our surveys were addressed to occupants of the same housing units each year; 95 percent of the wave 4 households that had been interviewed at earlier waves had not moved within the preceding year, as shown in Table 6.2. Thus the interview stimulus potentially affected nonmobile households more

---

*Indeed, the HAOS had directed a publicity campaign to gain public support for the surveys. See Wiewel and O’Neill (1981).

**The full series of questions may be found in the codebooks for the attitude module of the surveys. Separate books are available for each site and wave; e.g., Boren (1980b).
Table 6.2

ELIGIBLE HOUSEHOLDS' MOBILITY IN YEAR PRECEDING WAVE 4
AND PREVIOUS INTERVIEW STATUS

<table>
<thead>
<tr>
<th>Mobility and Previous Interview Status</th>
<th>Sample Households</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brown County</td>
<td>St. Joseph County</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Renters</td>
<td>Owners</td>
<td>Renters</td>
</tr>
<tr>
<td>Interviewed, did not move(^a)</td>
<td>246</td>
<td>71</td>
<td>173</td>
</tr>
<tr>
<td>Not interviewed, moved</td>
<td>154</td>
<td>7</td>
<td>144</td>
</tr>
<tr>
<td>Interviewed, moved</td>
<td>16</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Not interviewed, did not move</td>
<td>21</td>
<td>4</td>
<td>21</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from the wave 4 household survey.
\(^a\)Includes a small number of cases where the household had been in the unit for less than 12 months but was interviewed at both waves 3 and 4.

because more of them were surveyed. Household mobility (or lack of it) is related to several of our independent variables; for example, because the elderly move less than other households they are more likely to have been interviewed before. If the interview stimulus exists and we ignore it, the coefficient on being elderly in our equation will have a positive bias.

We can control for whether the household was previously interviewed, but this alone does not solve the problem; as Wendt (1981) showed,\(^*\) mobile households are more likely to apply for an allowance. Given the high correlation between previous interview and mobility, merely adding a variable to describe previous interview status will produce a negative bias on the coefficient of the interview effect. Therefore the coefficient on any household characteristics correlated with mobility would still be biased. Consequently, we must control for both mobility and a previous interview. As may be seen from Table 6.2, there are enough cases

\(^*\)This finding is replicated in the Demand Experiment as reported by Kennedy and MacMillan (1980).
available to separate the effect of mobility from the effect of the previous interview.

**MODELING RECIPIENCY**

Exploratory analysis showed that the effect of mobility on receiving payments is best captured by entering length of stay in the sample dwelling. Conceptually our model is

\[
\log(P/(1 - P)) = aX + bL + cI \tag{6.1}
\]

where \( P \) = the probability that a household is receiving allowance payments at the time of the interview,
\( X \) = the vector of household characteristics,
\( L \) = the time since moving into the surveyed unit,
\( I = 1 \) if the household was interviewed at an earlier wave, and 0 otherwise,
b and c are scalar coefficients, and a is a vector of coefficients showing the marginal effect of each household characteristic on the log of the odds of being a recipient, after controlling for mobility and a previous interview. However, the coefficients of interest are the net effect of each \( X_i \), including the part of the effect of \( L \) that is attributable to \( X_i \). Consequently, we first performed the regression

\[
L = dX + r \tag{6.2}
\]

where \( X \) = the vector of variables in Eq. (6.1),
\( d \) = a vector of coefficients, and
\( r \) = the residual length of stay.

Then we calculated the maximum likelihood values for

\[
\log(P/(1 - P)) = \alpha X + br + cI \tag{6.3}
\]

which is identical to Eq. (6.1) except that \( \alpha = a + bd \). Since \( X \) is not correlated with \( r \), \( \alpha \) is now the marginal effect of each
$X_i$ on the log of the odds including the part of $L$ that is attributable to $X_i$. And since all components of $L$ are in the regression, $c$ and $\alpha$ should be unbiased.

**FINDINGS**

The results of estimating Eq.(6.3) are presented in Table 6.3, including t-statistics. The coefficients of the logit equation give

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistic</th>
<th>Mean Value in Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-3.281$^a$</td>
<td>3.70</td>
<td>1.0</td>
</tr>
<tr>
<td>Allowance$^a$</td>
<td>.396$^a$</td>
<td>3.31</td>
<td>6.64</td>
</tr>
<tr>
<td>Duration of eligibility (yrs.)</td>
<td>.036$^a$</td>
<td>5.18</td>
<td>10.56</td>
</tr>
<tr>
<td>Fraction of previous year eligible$^b$</td>
<td>1.143$^a$</td>
<td>3.01</td>
<td>-.26</td>
</tr>
<tr>
<td>Household size</td>
<td>-.206$^a$</td>
<td>3.27</td>
<td>2.71</td>
</tr>
<tr>
<td>Household type$^c$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children in household</td>
<td>1.359$^a$</td>
<td>3.68</td>
<td>.56</td>
</tr>
<tr>
<td>Single parent</td>
<td>-.388</td>
<td>1.70</td>
<td>.34</td>
</tr>
<tr>
<td>Elderly</td>
<td>.089</td>
<td>.24</td>
<td>.36</td>
</tr>
<tr>
<td>Elderly couple</td>
<td>-.196</td>
<td>.70</td>
<td>.10</td>
</tr>
<tr>
<td>Owner</td>
<td>.067</td>
<td>.35</td>
<td>.19</td>
</tr>
<tr>
<td>Minority</td>
<td>.164$^a$</td>
<td>.65</td>
<td>.11</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td>-.456$^a$</td>
<td>2.88</td>
<td>.47</td>
</tr>
<tr>
<td>Previous interview</td>
<td>.571$^a$</td>
<td>3.35</td>
<td>.62</td>
</tr>
<tr>
<td>Residual length of stay (mos.)</td>
<td>-.004$^a$</td>
<td>2.78</td>
<td>.0</td>
</tr>
<tr>
<td>Residual length of stay: Owner</td>
<td>.005$^a$</td>
<td>2.79</td>
<td>.0</td>
</tr>
</tbody>
</table>

**SOURCE:** Estimated by authors from the wave 4 household surveys.
**NOTE:** N = 973; $\chi^2 = 165.7$ with 14 degrees of freedom.

$^a$ Log of annual dollars.

$^b$ Log.

$^c$ The set of household type variables yields a $\chi^2$ of 29.9 with 4 degrees of freedom, which is significant at the .01 level.

$^d$ Significant at the .01 level.
the change in the log of the odds of being a recipient for a unit change in each independent variable. Because most readers are probably not familiar with log odds, we offer a simpler picture in Table 6.4. There we show how the probability of a household being a recipient changes as each independent variable changes over a reasonable range when all other variables are held at their mean values, except for interview status, which is set to 0.* Next we

<table>
<thead>
<tr>
<th>Variable</th>
<th>Range of Value$^a$</th>
<th>Range of Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual allowance ($)</td>
<td>508 vs. 1,275</td>
<td>.30 to .38</td>
</tr>
<tr>
<td>Duration of eligibility (yrs.)</td>
<td>1 vs. 14</td>
<td>.27 to .37</td>
</tr>
<tr>
<td>Fraction of previous year eligible</td>
<td>.7 vs. 1.0</td>
<td>.30 to .40</td>
</tr>
<tr>
<td>Household size (persons)</td>
<td>2 vs. 4</td>
<td>.37 to .28</td>
</tr>
<tr>
<td>Household type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Couple with children</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>Single parent</td>
<td>.41</td>
<td></td>
</tr>
<tr>
<td>Elderly single</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>Elderly couple</td>
<td>.19</td>
<td></td>
</tr>
<tr>
<td>Couple, no children</td>
<td>.21</td>
<td></td>
</tr>
<tr>
<td>Minority status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White vs. Minority</td>
<td>.33 to .37</td>
<td></td>
</tr>
<tr>
<td>Tenure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter vs. Owner</td>
<td>.34 to .35</td>
<td></td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No vs. Yes</td>
<td>.39 to .29</td>
<td></td>
</tr>
<tr>
<td>Residual length of stay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(renters, in yrs.)</td>
<td>.32 to .35</td>
<td></td>
</tr>
<tr>
<td>Previous interview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No vs. Yes</td>
<td>.34 to .47</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from equation of Table 6.3; variable values from wave 4 household surveys.

NOTE: For each measurement, all other variables are held at their mean values except previous interview, which is set to 0 (for no previous interview).

$^a$Values compared are the 25th and 75th percentiles of each variable in the sample.

*Because the function is nonlinear, the results of Table 6.4 are subject to the same limitations as were discussed for Table 4.1 in Sec. IV.
discuss the probability of each household receiving payments at a random point in steady state in terms of need and other household characteristics. Then we examine site differences and the effects of the control variables, residual length of stay and previous interview.

Need

The variables used to measure need are allowance entitlement and duration of eligibility. The allowance entitlement equals the difference between the standard cost of adequate housing and one-fourth of the household's income; the greater this difference, the greater the need of the household. Likewise, a household that is durably poor is more needy than one only briefly eligible, if only because the latter should be able to borrow against future earnings.

As the level of benefits rose from the 25th to the 75th percentile, recipiency increased by 8 percent. In the previous section we saw that after controlling for housing characteristics, a similar rise in benefit level corresponded to an 11 percent increase in recipiency.* Poorer housing quality does reduce the participation rate of those with large benefits slightly more than those with smaller benefits. However, households with larger benefits are still likelier to be in the program. The reason that benefit level has so little effect on recipiency after controlling for household characteristics is probably because the income elasticity of the demand for housing is so low (estimated to be between 0.2 and 0.5).**

Duration of eligibility affects recipiency rates in two ways, as we also discussed in the previous section. First, longer expected duration motivates households to apply for an allowance and to comply with the housing standards. Second, the pool of eligibles always includes some households that have recently become eligible but are

---

*When housing characteristics are controlled in this data set, the results are similar—increasing the benefit level from the 25th to the 75th percentile results in an increase of 12 percentage points in the probability of receiving payments.

**Hanuschek and Quigley (1979), Table 4.
not yet enrolled, although they will be. We entered variables to capture these two effects: The expected duration of eligibility represents motivation, and the average estimated fraction of the preceding 12 months that a household has been eligible represents the effect of turnover.

Using a negative exponential distribution of the duration of eligibility, we can estimate the fraction of the previous year the household was eligible as

\[ T = \frac{1 - e^{-\lambda}}{\lambda} \]

when \(1/\lambda\) is the household's total expected duration of eligibility. \(T\) is entered in its log form because it provides the best fit to the data. Expected duration of eligibility is entered linearly.*

As the expected future duration of eligibility increases from 1 to 14 years, the estimated fraction of the previous year spent eligible extends from .7 to 1 year, and the recipiency rate increases from 23 to 43 percent. Exactly one-half of this 20 percent increase is due to each of the duration of eligibility variables; this is clearly presented in Table 6.4, where each of the two variables varies while the other is held constant.

Since the effects on recipiency of larger allowance payments and longer expected duration of eligibility are all positive and highly significant, we conclude that despite housing standards the neediest households are more likely to be receiving payments, and thus are more often served by the program.

*If we add to the current model the expected length of time a household was eligible during the first two years of program operation, the chi-square improves by only .02 (with one degree of freedom), suggesting no explanatory power for having been eligible during the early program years. However, using the two variables above for the duration of eligibility provides a significantly better fit than any single variable.
Household Characteristics

Household Size. As household size increases, the proportion of households receiving payments decreases: If the household's size goes from 2 to 4, for instance, the likelihood of recipiency drops by 9 percentage points, even after controlling for benefit level. Since many expenses unrelated to housing increase faster with household size than do housing expenses, a larger household is poorer than a smaller one at the same level of benefits.

The difficulty larger households face in qualifying to receive payments can be traced directly to the problems they have securing adequate housing. Enrollees with larger households are much more likely to fail the housing evaluations (see Coleman, 1981), and also to fail the occupancy standard, which is harder to remedy. In addition, the behavioral models in Sec. IV showed that the effect of household size was trivial when housing quality was controlled. The same conclusion is indicated: that lower recipiency rates are caused by the difficulty larger households experience in obtaining adequate housing. To summarize, larger households are needier because they have high nonhousing expenses and tend not to be served by the program because they live in lower quality housing. This finding is an exception to our earlier conclusion that the neediest households have the highest recipiency rate.

Household Type. We compare five different household types for rates of recipiency: couples with children, single parents, elderly couples, elderly singles, and couples without children. In the logit regression we used main effects for the presence of children in the household and for the elderly, and two interaction terms for marital status within those groups; nonelderly couples without children were the default group.

- Controlling for need, households with children participate more than each of the other groups; no other statistically significant distinctions among groups are found in this data set (see t-tests in

*This group also includes a very small number of three-generational households.
Table 6.3). This result is due to a combination of reasons. Households with children have an advantage in acquiring knowledge about the program, as suggested by Wendt, whereas the elderly are at a particular disadvantage due to their relative lack of mobility. However, housing tends to be better than average among the elderly. They are more likely to be living in acceptable dwellings at the time they enroll, and are less likely to terminate from the program when their dwellings fail (Coleman, 1981). The end result is that rates of participation for the elderly and childless couples are about equal, and lower than for those with children.

Bendick (1979) has suggested that accessibility to the program may be the primary reason for lack of participation in public assistance programs by the poorest segment of eligibles. We considered that the low participation rate of childless couples might be due to their inability to get down to the PHA because both heads were employed. However, a dummy variable for such employment was not even marginally significant. Moreover, there is no statistically significant difference in recipiency rates between otherwise similar rural and urban households, suggesting that accessibility (once program knowledge was acquired) did not play a major role in participation in EHAP.*

Tenure and Race. The last two household characteristics of interest are tenure and race. The logit equations show no difference in rates of recipiency for households of different tenure or race after controlling for need and type of household.

Recipiency Rates. We have seen that benefit level, duration of eligibility, and household size are major determinants of participation. These vary systemically according to household type, tenure, and race. This variation produces patterns of recipiency that are quite different from the marginal effects of household characteristics discussed above. As may be seen in Table 6.5, the household types with the highest

*This may be due to the extensive outreach program. Temporary offices were opened in rural areas.
Table 6.5
SAMPLE VALUES FOR DETERMINANTS OF RECIPIENCY, BY HOUSEHOLD CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Household Size</th>
<th>Annual Allowance ($)</th>
<th>Duration of Eligibility (yrs.)</th>
<th>Recipiency Rate$^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household type:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elderly single</td>
<td>1.1</td>
<td>733</td>
<td>16.8</td>
<td>39</td>
</tr>
<tr>
<td>Elderly couple</td>
<td>2.3</td>
<td>637</td>
<td>14.0</td>
<td>27</td>
</tr>
<tr>
<td>Single parent</td>
<td>3.1</td>
<td>1,108</td>
<td>10.8</td>
<td>43</td>
</tr>
<tr>
<td>Couple with children</td>
<td>4.4</td>
<td>981</td>
<td>3.9</td>
<td>33</td>
</tr>
<tr>
<td>Couple, no children</td>
<td>2.1</td>
<td>750</td>
<td>3.8</td>
<td>16</td>
</tr>
<tr>
<td>Tenure:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>2.7</td>
<td>948</td>
<td>10.6</td>
<td>37</td>
</tr>
<tr>
<td>Owner</td>
<td>2.6</td>
<td>738</td>
<td>10.3</td>
<td>30</td>
</tr>
<tr>
<td>Minority status:$^b$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>2.4</td>
<td>828</td>
<td>12.3</td>
<td>32</td>
</tr>
<tr>
<td>Other</td>
<td>3.4</td>
<td>1,171</td>
<td>11.0</td>
<td>38</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from wave 4 household surveys in both sites.

$^a$Average probability of receiving payments, calculated from regression equation of Table 6.3, assuming each household has not been interviewed before.

$^b$For St. Joseph County only; Brown County has virtually no minority population.

Participation rates are elderly singles and single parents. Couples with children participate less, because of their larger household size and their shorter duration of eligibility.* Renters participate much more than owners, but this is completely due to their different socio-economic characteristics.

*The data in Table 6.5 are unweighted sample counts. See Carter and Balch (1981) for population estimates.
SITE EFFECTS

The recipiency rate in St. Joseph County is 10 percentage points lower than in Brown County. We first tested for site differences in the coefficients of the explanatory variables, but found none. The chi-square for a full set of interaction variables is 19.6 with 12 degrees of freedom, which falls short of the 21.0 required for the .05 significance level. Furthermore, none of the t-statistics for the interactions of need and household characteristics with site were significant.

As we explained in Sec. IV, we believe that the lower recipiency in St. Joseph County is largely due to the lower quality of the housing stock there. That deters households from enrolling and makes it more difficult for enrollees to qualify for payments.

CONTROLS

The probability that a household is receiving payments increases from 34 to 47 percent if the household was previously interviewed. This was one of the largest effects we found in the data, and adequately explains almost all of the overrepresentation of recipients in our sample. We used the logit equation shown in Table 6.3 to estimate the probability that each surveyed household would be receiving payments had it not been interviewed before. Then we used a weighted sum to estimate the number of unobserved households receiving payments.* The estimates (shown in Table 6.6) are within 5 percent of the actual totals in each site, whereas the counts unadjusted for the interview effect are off by 38 percent in Brown County and by 48 percent in St. Joseph County. Since the interview stimulus accounts for nearly all of the differences, we believe that response bias, if it exists at all, is very small and has not distorted our results.

*The sample recipients were then added to the estimate for unobserved households. Some of the unobserved households also received the interview stimulus, but any reasonable assumption about the number of such eligible households would result in only trivial changes in the estimate.
Table 6.6

COMPARISON OF ACTUAL NUMBER OF RECIPIENTS
WITH ESTIMATES FROM WAVE 4 SURVEY,
ADJUSTING FOR INTERVIEW EFFECT,
BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Households Receiving Payments</th>
<th>Estimated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Actual</td>
<td>Unadjusted</td>
</tr>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>1,658</td>
<td>1,947</td>
</tr>
<tr>
<td>Owners</td>
<td>1,191</td>
<td>1,989</td>
</tr>
<tr>
<td>Total</td>
<td>2,849</td>
<td>3,936</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>1,770</td>
<td>2,137</td>
</tr>
<tr>
<td>Owners</td>
<td>2,948</td>
<td>4,842</td>
</tr>
<tr>
<td>Total</td>
<td>4,718</td>
<td>6,979</td>
</tr>
</tbody>
</table>

SOURCE: Actual recipients are from the year 3 HAO files (June 1977 in Brown County, December 1977 in St. Joseph County). Estimates are from wave 4 household surveys and equation of Table 6.3. The wave 4 surveys were conducted in the first half of 1977 in Brown County and the first half of 1978 in St. Joseph County.

NOTE: Nonelderly singles are excluded (unlike the figures for Table 6.1) because they are excluded from the regression equations.

Initially we feared that the magnitude of the interview stimulus might vary according to household characteristics because households with greater need might prove to be more attentive to information about the allowance program. However, if that is the case, its effect is too small to detect in our data. An interaction of previous interview status with need and household characteristic variables yielded a chi-square of 14.58 with 10 degrees of freedom, which is not statistically significant at the 10 percent level.\* We also tested

\*This test assumes that there is no interaction between length of stay and the interview effect. The specification also used only a single variable for duration of eligibility.
the possibility that having been interviewed twice was an additional stimulus, but got negative results.* We conclude that the interview provided a uniform stimulus to all types of households to join the program.

The remaining control in the model is residual length of stay in the sampled dwelling. As we expected, renters who have not moved recently were slightly less likely to be in the program, but length of stay had no statistically significant effect for owners. Besides, the marginal effects of household characteristics discussed above include the effect of mobility on recipiency rates.

Our results are further confirmed by comparison with results derived elsewhere from different data and using a different methodology.** The alternative approaches reported in Table 6.7 both find roughly one-third of the eligible households receiving payments in steady state. Renters participated more than owners, and households in Brown County more than in St. Joseph County. The small differences are well within the variance of the estimates.

**SUMMARY**

Our concern in this section has been to consider who receives payments in HASE regardless of the quality of their housing. Because the neediest tend to live in the lowest quality housing, and the housing standards tended to exclude households occupying such housing, we have examined whether the neediest have therefore been excluded from the program. Our conclusion generally is no. Housing quality aside, those with high benefits are more likely to participate than those with low benefits. Likewise the durably poor, those eligible for relatively longer periods, are more likely to participate than

*Although the coefficient was positive, the t-statistic was only 0.7.

**Carter and Balch (1981). The wave 4 St. Joseph County survey used here was not used previously. Only a subset of the wave 4 Brown County eligible sample was used in Carter and Balch. The actual counts of recipients were used in that report, but they were not used to derive the estimates in this one.
Table 6.7

ALTERNATIVE ESTIMATES OF RECIPIENCY RATES:
BROWN AND ST. JOSEPH COUNTIES,
END OF YEAR 3

<table>
<thead>
<tr>
<th>Housing Tenure</th>
<th>Estimated Recipiency Rate (%)</th>
<th>Method A</th>
<th>Method B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>45</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>28</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>All eligibles</td>
<td>36</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>38</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>27</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>All eligibles</td>
<td>31</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Recipiency rates in the first column are from Carter and Balch (1981). Those for the second column are weighted counts of probabilities from equation of Table 6.3 after adjustment for the interview effect.

NOTE: Recipiency rate is percent of all currently eligible households currently receiving payments. For Method A, actual counts of recipients were divided by the estimated number of eligibles in each tenure group. For Method B, the probability of becoming a recipient was estimated by regression analysis on eligibles' household characteristics, and the findings were applied to a representation of the eligible population. See text for details.
those eligible for shorter periods. However, large households do tend
to participate less because although their non-household expenses
are relatively high, which makes them needier, they tend to live in
low quality housing.

Recipiency rates are also different in the two sites. About 10
percent more of the eligible households in Brown County received
payments than in St. Joseph County, where the quality of the housing
stock was poorer and led to more difficulty in qualifying for payments.

Data from the Demand Experiment disagree with those from the
Supply Experiment on the relationship between recipiency rates and
degree of need. Although we cannot rule out site-specific factors
as the reason for differences in recipiency rates, we believe that
the differences are due to two elements in the experiments' design.
In the first place, the open enrollment of HASE resulted in self-
selection of the needier households into the program, whereas the
invitational nature of the Demand Experiment produced enrollment that
was more uniform across income levels. Second, housing standards
were different in the two experiments; more housing units would be
judged inadequate by the standards of the Demand Experiment than by
those of HASE. In both experiments the probability that an enrollee's
dwelling would fail increased with declining income, but response to
failure was different. In HASE, the great majority of enrollees
occupying inadequate dwellings were able to obtain an allowance,
usually after only minor repairs. And poorer households, because they
had more to gain from the program, were actually more likely than
others to qualify. On the other hand, less than half* of the
enrollees whose dwellings failed in the Demand Experiment ever
qualified for an allowance.

Data from both experiments show that recipiency rates were lower
for elderly and large households. The reasons for the elderly's lower
rates appear to be different for the two experiments. The Demand
Experiment's findings attributed the elderly's lower rates to poorer

*Thirty percent in Pittsburgh, 44 percent in Phoenix.
housing. We did not find their housing worse than that of other groups. Indeed, Coleman (1981) found that elderly enrollees were living in somewhat better quality dwellings than others. We find instead that the cause of their lower recipiency rates result from a combination of less program knowledge, less mobility,* and more negative attitudes toward the program. The knowledge problem can be ameliorated and indeed was in the third year in St. Joseph County.

An ancillary conclusion from this section is that the personal contact of the survey interview stimulated households to learn about the program, and therefore to enroll more, as discussed in Appendix A. However, the effect was homogeneous, affecting all respondents equally, and could be controlled by adding a variable in the estimating equation.

*Also found in the Demand Experiment.
A NATIONAL HOUSING ALLOWANCE PROGRAM

We have identified the main determinants of participation in terms of what makes households decide to join the housing allowance program. We have also examined the outstanding deterrents households encountered in their efforts to qualify for payments. Though the neediest households appear to receive the most help, we have seen that the average fraction of households receiving payments is about one-third of those eligible for assistance from HASE.

But what are the implications of our findings for a similar program to be implemented on a national scale? How well can we predict what participation rates in such a program would be? Although a detailed estimate is outside the scope of this report, and although our data are restricted to two fairly small north central metropolitan sites, HASE does provide the best information currently available as to what could be expected of participation in a large-scale open-enrollment housing allowance program.

The extent to which the program achieves its goals of improved housing and reduced rent burdens for the poor increases along with the number of households that participate in it. Likewise the cost of a national program would depend directly on how many households joined. The key to making reliable estimates of national participation rates depends on how the determinants of participation might vary in their effects across the nation. The major determinants of participation in both HASE sites that we found were:

- The extent of program knowledge;
- Expected duration of eligibility;
- Housing quality;
- Household characteristics such as size and income.

These factors offset each other somewhat in the experimental sites; St. Joseph County had worse housing, but also a population that was more program aware, eligible for longer, and poorer than Brown County.
We estimate that households similar except for their location were 10 percentage points less likely to receive payments if they lived in St. Joseph County than if they lived in Brown County, but that the total recipiency rate was only 6 percentage points lower in St. Joseph County.

The spread of program knowledge in the community can be predictably stimulated to some extent by outreach practices, so that the process is at least partly affected by program design. The intensive outreach campaign conducted in our sites, particularly in St. Joseph County, suggests that knowledge of the program had spread as far as possible in the short run, and that further gains would be achieved only very slowly, even in a national program.

Duration of eligibility is very difficult to measure in individual cases from existing files with nationwide data. However, duration as we measured it in HASE is strongly related to life-cycle stage (see Table 6.5 and Carter and Balch, 1981). Thus much of the variation across the nation in this factor should be predictable from the life-cycle stages of the eligible population.

Variation in housing quality causes participation to vary from one community to another. The site differences we observed in rates of inspection failure and of participation also occurred in the Demand Experiment, thus confirming the relationship between substandard housing and recipiency. Similar variation can be expected to occur in a national program.

If the major determinants of participation in a national program would be the same as they are in our sites, then it is important to know where our sites rank in the nation with respect to need, housing quality, and such characteristics of the eligible population as expected duration of eligibility and relative poverty. The process of selecting the sites* was itself designed to find two small**

*See Lowry (1980), p. 20 ff., for an overview of the procedure. The major criteria were growth rate of the central city, percent of blacks in the central city, incidence of other minority groups, housing tenure, multiple dwellings, vacancy rates, unemployment, incidence of welfare recipiency, median housing rents, values and income.

**Defined as having a population of less than 250,000 persons in 1970.
standard metropolitan statistical areas (SMSAs) that would be fairly
typical of the nation's SMSAs in the characteristics of concern to
HASE. Our sites were chosen for variables likely to be relevant to
supply response to a housing allowance program. Among SMSAs surveyed
in samples of the 1975 Annual Housing Survey (Table B.3 in Appendix
B), the renter populations of our sites appear at opposite extremes of
the distribution of variables directly related to participation. Of
the 23 SMSAs (21 from the AHS, plus our 2 sites), St. Joseph County
renters are tied with one other SMSA for having the lowest median
monthly income, while Brown County ranks eighteenth. St. Joseph
County also contains an above average proportion of elderly singles
and single parents (who are most likely to receive payments), tying
for sixth place in the sample, while Brown County ranks twenty-first.

How does average housing quality compare to the housing standards
that a national program might have? Using the Annual Housing Survey,
it is possible to estimate the proportion of rental units in each
surveyed SMSA that would fail the housing standards required by
another housing allowance program, established by Section 8 of the
Housing and Community Development Act of 1974.* Orhan Yildiz of
Rand is in the process of compiling similar information about HASE
standards in HASE sites. A comparison of these two sets of estimates
should indicate that our sites encompass a good deal of the variation
found throughout the nation.

Housing Standards in a National Program

Our research strongly confirms the findings of the Demand
Experiment that housing standards are a major deterrent to qualifying
for a housing allowance. We estimate that in the absence of those
standards participation rates would have increased about 40 percent in
Brown County and doubled in St. Joseph County. Housing standards were
the means of ensuring that housing for the poor improved under the
experimental program; the standards would presumably play a similar role
in a national program.

*Indeed, HUD has performed such calculations. (Private
communication from Howard Hammerman).
Because they have such a strong impact on recipiency rates, the standards chosen for a national program represent one of the most important aspects of program design. For instance, the standards used in HASE were different from those in the Demand Experiment; more dwellings would be judged inadequate by the latter's standards. Although the planners of both experiments intended to define safe, sanitary, and decent housing, their judgment differed as to details.* As a result, recipiency rates differed markedly. Published participation rates are not comparable across experiments because of other differences in program design. The Demand Experiment informed individual households about the program, thus eliminating knowledge of it as a barrier. It invited them to enroll, eliminating delays to enrollment. Its rates of participation include all households that ever received a payment, thus also removing the effect on recipiency rates of delay from enrollment to receipt of payments. Using our models in Sec. V, we can estimate a comparable rate of participation for the HASE sites as the percent of knowledgeable households that ever received payments or would if they remained eligible long enough.** These data, shown in Table 7.1, illustrate the relationship between the percent of households occupying dwellings that meet program standards and participation. The differences between sites within each experiment is due to differences in housing quality. However, much of the difference between experiments is due to the difference in standards.

What constitutes safe, sanitary, and decent housing is clearly a matter of judgment, and a matter in which we have no particular expertise to offer. But we do know that unnecessarily high standards will lower participation and thus impede the goal of reducing the rent burden of the poor. Some standards may even interfere with the improvement of their housing. Coleman (1981) estimated that 24 percent of St. Joseph County renter enrollees who failed the paint

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*See Valenza and Ozanne (1975) for a comparison of the written standards, and Valenza (1977) for the effect of these differences on failure rate.

**In the notation of Sec. V, this is the Pr(B|K).
Table 7.1
HOW RENTER PARTICIPATION VARIES WITH PERCENT OF ENROLLEES WHOSE DWELLINGS FAIL THE HOUSING INSPECTION: SUPPLY AND DEMAND EXPERIMENTS

<table>
<thead>
<tr>
<th>Site</th>
<th>Participation</th>
<th>Failure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Experiment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown County</td>
<td>69</td>
<td>45</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>Demand Experiment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phoenix</td>
<td>45</td>
<td>81</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>30</td>
<td>85</td>
</tr>
</tbody>
</table>

SOURCE: Phoenix and Pittsburgh data are from the minimum standards requirement program, Kennedy and MacMillan (1980), Tables 2-9 and 2-1. Percent of enrollees whose dwellings failed to meet program standards in Brown and St. Joseph counties are from HAO records for year 5 in Brown County and year 4 in St. Joseph County (Coleman, 1981, Table 2). Estimates of HASE participation are from the wave 4 household survey in each site. (See also footnote a).

NOTE: Because different housing standards were used in each experiment, failure rates do not illustrate the relative housing quality of the sites in each experiment.

Demand Experiment figures are percentages of eligibles invited to join who received payments. (Data are restricted to the plan that required dwellings to meet standards.) To get comparable figures in the Supply Experiment, participation was estimated on the assumption that those eligibles had also been invited to join. (See text for details.)

standard* terminated solely because of that failure. Many of them had housing defects which they would have otherwise remedied to obtain payments. Is the improvement in paint quality for the households who

*The rationale for the standard is to prevent children from being poisoned by lead-based paint, and therefore the paint standard applied only to dwellings with small children. Because of the expense of measuring lead content in paint, it was decided instead to prohibit all flaking or peeling of paint. (It is currently unknown whether ingestion of paint chips is a prime cause of lead poisoning among children. See McDowell, 1980, for details.)
complied with that standard worth the lack of improvement in housing and rent burdens for those who could not or would not repait? We cannot answer this question, but we can and do urge that each element in the standards proposed for a national program be critically examined, to eliminate those not entirely necessary for safety, health, or some overriding national concern.

Relationship Between Need and Participation

Two issues raised by the prospect of a national housing allowance program are: whether poorer households would receive more of the program's benefits, and whether all equally needy households would have the same opportunity to obtain an allowance. The design of HASE takes these issues into account. The amount of the allowance entitlement decreases with income and increases with household size; the open enrollment feature allows all households to enroll. However, because each participating household must obtain adequate housing, program outcome depends on features of the housing marketplace as well as on program design. Here we discuss our findings in light of these issues and their implications for a national program.

The poorest households—as measured by both allowance entitlement and duration of eligibility—were more likely than the less poor to participate in the experimental program (see Sec. VI). The greater incentive provided by larger allowances more than offset lower housing quality, causing greater participation by the poorest households.

We expect that a national program with similar housing standards and income-related benefits would produce similar results. The low income elasticity of the demand for housing* means that the poorer segment of eligibles are spending very little less for housing than other eligibles who are better off. The link between income and adequate housing is further weakened by the far from perfect correspondence we found between rent and housing that met HASE standards. Thus the poorest segments of the eligible population are

*See Hanuschek and Quigley for a review of the evidence on income elasticity.
at only a slight disadvantage in their search for adequate housing and have the most to gain by obtaining it under the allowance program.

In any constrained transfer program, households having different preferences for the constrained item will face different costs of participating. Thus the goal of equal benefits for all households with the same level of need must always conflict with other goals of such a program. In the case of HASE, many households living in substandard dwellings chose not to participate. Differential participation based on housing preferences is the logical result of a voluntary program rather than a mandated one.

Aside from housing preferences, does the housing market's existing structure place some households at a disadvantage in an allowance program? Not usually, according to our analysis of the recipiency rates among population subgroups. Although mobile households apply for an allowance less frequently, this seems to reflect only a preference for staying in their current dwellings rather than moving elsewhere in order to obtain an allowance. Controlling for level of need, we found that the elderly are less likely to receive payments, but this seems to be related to mobility, attitudes, and, at least in Brown County, lack of program knowledge rather than a special difficulty in obtaining adequate housing. The elderly who do apply are actually more likely than other household types to receive an allowance. Black households receive payments at the same rate as similar white households, indicating that, at least in St. Joseph County, minority households are at no great disadvantage in the search for adequate housing.

The only group we found that appears to have difficulty in obtaining adequate housing is composed of large households. They apply at the same rate as smaller households, but fail the housing standards (particularly the occupancy standard) much more often and are less likely to receive payments. This could be due either to a systematic decrease in taste for housing as household size increases or to lack of market response to the problems of this small population subgroup.
OTHER WELFARE PROGRAMS

Our research has dealt solely with participation in the Housing Assistance Supply Experiment. However, many of the factors identified here—program knowledge, costs, benefits, and turnover—are also determinants of participation in other transfer programs. We conclude with a discussion of how our findings about program knowledge and turnover in eligibility contribute to understanding participation in other transfer programs.

Lack of program knowledge can be a serious deterrent to participation in any welfare program, but program designers can promote awareness to a considerable extent. General media advertising can reach the majority of eligibles: After less than two years of operation in each HASE site, for instance, about 80 percent of the eligible population had program knowledge (i.e., said they had heard of the program and could describe something about it).* However, the elderly are harder to reach than other types of households—in the same period less than two-thirds of that group learned about the program.

Even hard-to-reach households can be informed if special efforts are made. During 1977 the St. Joseph County HAO directed a publicity campaign toward the elderly. Elderly eligibles were featured in newspaper and television advertisements and special mailings were set to elderly residents. Table 7.2 (copied from Wendt) shows the dramatic results. By wave 4 the elderly were just as likely as the nonelderly to have program knowledge in St. Joseph County, but remained at a disadvantage in Brown County. As demonstrated in Sec. V and Appendix A, personal contact made through the household survey was also effective in informing hard-to-reach households about the program and stimulating their applications.

Unfortunately, targeted outreach activities, especially those involving personal contact, can be very expensive. However, expenses can be reduced somewhat by coordinating benefits and/or referrals from

*All figures in this paragraph are from Wendt (1981), Table 9.
Table 7.2
PERCENT OF ELIGIBLE HOUSEHOLDS WITH PROGRAM KNOWLEDGE, BY SITE, WAVE, AND AGE OF HEAD

<table>
<thead>
<tr>
<th>Age of Head</th>
<th>Brown County</th>
<th>St. Joseph County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wave 3</td>
<td>Wave 4</td>
</tr>
<tr>
<td>Under 62</td>
<td>89</td>
<td>87</td>
</tr>
<tr>
<td>62 and over</td>
<td>61</td>
<td>77</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by Wendt from the wave 3 and wave 4 household surveys (1981, Table 6).

different agencies. Caseworkers at AFDC and the unemployment offices in the sites were asked to inform their clients about the housing allowance program. As Ellickson's work (1981) demonstrated (also confirmed by Wendt, 1981), households already participating in these programs were significantly more likely to know about the allowance program.

As we have shown, turnover in the identity of the eligible population was one of the most important determinants of participation in the allowance program. This factor is usually not measured in empirical studies of participation in transfer programs, but we would expect it to rank with low benefits, knowledge, and other accessibility problems in lowering participation in them. Expected duration of eligibility affects perceived benefits from participation; there will always be some delay between when a household becomes eligible and when it begins to participate. Consequently, we expect that analysis of other transfer programs would show turnover as an important factor in determining participation rates.

Turnover has a greater effect on some welfare programs than on others, depending on the type of eligible population. Households whose heads are in the labor force are much more likely to be newly eligible than those who are primarily dependent on welfare income; consequently the former are less likely to have enrolled yet in a
transfer program. While our observation of delays to enrollment is limited to HASE, the effect of those delays in steady state is due to income fluctuations, which are closely correlated with life-cycle stage. Therefore we would expect to find similar patterns in the effect of delays on other transfer programs. Table 7.3 shows the percent of sample eligibles who would not yet have enrolled in the allowance program even if all households were knowledgeable and wanted to enroll.* The differences by household type are striking: Only 66 percent of couples with children would be enrolled versus 84 percent of single parents. Consequently we regard turnover as one of the important explanations of variation in participation rates in welfare programs targeted to different groups.

Table 7.3

EFFECT OF TURNOVER ON STEADY-STATE PARTICIPATION
(PERCENT OF ELIGIBLE HOUSEHOLDS WHO HAVE BECOME ELIGIBLE SO RECENTLY THAT THEY HAVE NOT YET ENROLLED), BY HOUSEHOLD TYPE

<table>
<thead>
<tr>
<th>Household Type</th>
<th>Eligible Households Not Yet Enrolled (%)</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple, no children</td>
<td>38</td>
<td>79</td>
</tr>
<tr>
<td>Couple with children</td>
<td>34</td>
<td>215</td>
</tr>
<tr>
<td>Single parent</td>
<td>16</td>
<td>332</td>
</tr>
<tr>
<td>Elderly couple</td>
<td>12</td>
<td>94</td>
</tr>
<tr>
<td>Elderly single</td>
<td>9</td>
<td>252</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from the wave 4 household survey, both sites. (Unweighted sample averages).

NOTE: Figures are based on a mean enrollment delay of 6.8 months, the expected duration of eligibility of each sample household, and the assumption that all households wish to enroll.

*In the notation of Sec. V, the percent not enrolled is the average value of $\frac{\lambda}{(\mu + \lambda)}$. 
Appendix A

IMPLICATIONS OF THE INTERVIEW STIMULUS FOR OTHER RESEARCH RESULTS

In this Appendix, we consider the extent to which the interview stimulus may invalidate our conclusions from earlier research. Specifically we will discuss the models of knowledge acquisition, the decision to enroll given program knowledge* and the estimated enrollment rate found earlier (Sec. V) in this paper.

KNOWLEDGE ACQUISITION

It is plausible that previous surveys were a source of some respondents' knowledge about the program. Therefore we reestimated the model of knowledge acquisition reported by Wendt for each site, adding a variable to control for whether the household had been previously interviewed but otherwise using the same specification and the same data set. Preliminary analysis showed that household mobility did not affect knowledge acquisition so we did not need to control for it.**

As we expected, the effect of a previous interview differed according to survey wave. (The data set includes samples from waves 2, 3 and 4.) To see why, we must consider the mechanism by which the surveys could increase program knowledge. Each respondent household was first asked if it had heard of the allowance program. If its

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*Both models are reported in Wendt (1981). Analysis of participation following enrollment was conducted solely on the basis of HAO data and consequently could not be affected by any survey problem. [WHY NOT?]

**Theoretically, the sign of the mobility variable is indeterminate. If mobility were to affect program knowledge it would do so through neighborhood contacts. On the one hand a more mobile household would be exposed to a greater variety of neighborhood contacts and thus might have a greater opportunity to learn. On the other hand, a mobile household would have less chance to develop strong ties in any neighborhood and thus might be less likely to learn of the program. If either effect is operational the two must cancel each other out, because adding mobility to the equation produced a chi-square of .10 and .45 in St. Joseph and Brown counties respectively (1 degree of freedom).
members answered no or if they could not supply any accurate description of the program, they were asked no other questions about the allowance program. It is unlikely that this single question, buried in the midst of a one-and-a-half hour interview, was a strong stimulus to acquiring knowledge. Rather we expected that the fact of a long interview made respondents more attentive to any other information in the environment about the survey. They might learn, perhaps from a neighbor who had also been interviewed, of the connection between the survey and the allowance program and thus indirectly of the allowance program. We expected that the effect of previous interviews would increase over time as information about the survey and the allowance program became more widely known. However, the only interaction of interview and time that is discernible in the data differentiates the effect of the baseline interview and that of subsequent interviews. This corresponds to the period of largest growth in program awareness. At baseline very few households were aware of the program,* but by wave 2, 68 percent of the surveyed households knew of the program (i.e., could provide one accurate statement about it). Program knowledge in the sample increased only 3 more points between wave 2 and wave 3, partly due to the wave 2 survey. The additional possible interaction improved the chi-square only .33 in Brown County and .01 in St. Joseph County. Because of the trivial difference between the two later waves, we decided to drop this interaction in our final model.

In both sites it is clear that earlier interviews were one cause of the wave 3 and 4 respondents' knowledge of the program (see Table A.1). However, a baseline interview does not appear to have increased the probability that a wave 2 respondent would know of the program. Although the interview coefficients suggest a greater effect in Brown County, the difference between the coefficients is not even marginally significant (t = .4).

Table A.1 compares estimation of the model of knowledge acquisition for each site with and without a control for previous

*See Ellickson and Kanouse (1979).
Table A.1

LOGIT MODEL OF KNOWLEDGE ACQUISITION TO DETERMINE INTERVIEW EFFECT, BY SITE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Brown County</th>
<th></th>
<th>St. Joseph County</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not Controlled for Interview</td>
<td>Controlled for Interview</td>
<td>Not Controlled for Interview</td>
<td>Controlled for Interview</td>
</tr>
<tr>
<td></td>
<td>Coefficient</td>
<td>$t$-Statistic</td>
<td>Coefficient</td>
<td>$t$-Statistic</td>
</tr>
<tr>
<td>Constant</td>
<td>-.928</td>
<td>2.24</td>
<td>-.1463</td>
<td>3.33</td>
</tr>
<tr>
<td>Previous interview</td>
<td>n/a</td>
<td>n/a</td>
<td>1.022</td>
<td>4.11</td>
</tr>
<tr>
<td>Wave 2</td>
<td>-.351</td>
<td>2.76</td>
<td>-.153</td>
<td>.56</td>
</tr>
<tr>
<td>Wave 3</td>
<td>.008</td>
<td>.03</td>
<td>.007</td>
<td>.03</td>
</tr>
<tr>
<td>Interview: Wave 2</td>
<td>n/a</td>
<td>n/a</td>
<td>-.948</td>
<td>2.76</td>
</tr>
<tr>
<td>Annual income ($000)</td>
<td>-.077</td>
<td>2.59</td>
<td>-.085</td>
<td>2.80</td>
</tr>
<tr>
<td>Housing expenses ($/mo.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renters</td>
<td>.008</td>
<td>3.17</td>
<td>.008</td>
<td>3.39</td>
</tr>
<tr>
<td>Owners</td>
<td>-.004</td>
<td>1.35</td>
<td>-.003</td>
<td>1.23</td>
</tr>
<tr>
<td>Household size</td>
<td>.113</td>
<td>1.41</td>
<td>.084</td>
<td>1.06</td>
</tr>
<tr>
<td>Parents</td>
<td>.771</td>
<td>3.91</td>
<td>.999</td>
<td>3.59</td>
</tr>
<tr>
<td>Couples, no children</td>
<td>.097</td>
<td>.38</td>
<td>.367</td>
<td>1.29</td>
</tr>
<tr>
<td>Owner</td>
<td>1.624</td>
<td>3.07</td>
<td>1.493</td>
<td>2.75</td>
</tr>
<tr>
<td>Information source:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>.471</td>
<td>2.50</td>
<td>.446</td>
<td>2.33</td>
</tr>
<tr>
<td>Radio</td>
<td>.229</td>
<td>1.36</td>
<td>.237</td>
<td>1.39</td>
</tr>
<tr>
<td>Newspapers</td>
<td>.622</td>
<td>3.63</td>
<td>.642</td>
<td>3.73</td>
</tr>
<tr>
<td>Network</td>
<td>.083</td>
<td>.36</td>
<td>.102</td>
<td>.44</td>
</tr>
<tr>
<td>Public Aid Agency</td>
<td>.432</td>
<td>2.44</td>
<td>.425</td>
<td>3.73</td>
</tr>
</tbody>
</table>

SOURCE: Compiled by authors from 1,007 household survey records in Brown County and 956 records in St. Joseph County, waves 2, 3, and 4. The equations without interview control are from Wendt (1981).

NOTE: Chi-square statistics, in order of equations, are: 119.9, 137.7, 103.5, and 109.4. The default group for household type is all elderly households. See Table B.4 for exact definitions of variables.
interview. Although the directions of change correspond to the expected biases,* the degree of change in each coefficient is trivial, and the conclusions that Wendt drew from his model are not significantly affected. The apparent change in the wave 2 coefficient is due to our use of the interaction form.

This reestimation of the knowledge model suggests a problem with our estimate of the number of households who lacked sufficient knowledge to apply. Table A.2 shows the estimated fraction of the eligible population in each site and tenure that would know of the program if none of the households had been interviewed; in each site the number is off by only about 5 percent.

Table A.2

<table>
<thead>
<tr>
<th>Site and Tenure</th>
<th>Eligible Households With Knowledge (%)</th>
<th>Adjusted for Interview Affect&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weighted Count</td>
<td></td>
</tr>
<tr>
<td>Brown County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>88.3</td>
<td>85.5</td>
</tr>
<tr>
<td>Owner</td>
<td>82.4</td>
<td>77.7</td>
</tr>
<tr>
<td>Total</td>
<td>85.2</td>
<td>81.5</td>
</tr>
<tr>
<td>St. Joseph County</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renter</td>
<td>87.6</td>
<td>85.2</td>
</tr>
<tr>
<td>Owner</td>
<td>91.8</td>
<td>85.5</td>
</tr>
<tr>
<td>Total</td>
<td>90.4</td>
<td>85.4</td>
</tr>
</tbody>
</table>

SOURCE: Estimated by the authors from the wave 4 household surveys, both sites.

NOTE: Estimates exclude resident landlords, those in government-assisted properties, and nonelderly singles. Program knowledge is defined as being able to supply at least one accurate statement about the allowance program.

<sup>a</sup>Weighted sum of predictions from regression assuming no household had been interviewed before.

*E.g., the owner coefficient declines because owners were more likely to have had previous interviews. Similarly, the dummies for the nonelderly groups are larger because the elderly are less mobile.
ENROLLMENT

We are also concerned about whether the interview stimulus distorted our model of the decision of knowledgeable households to apply for an allowance. The independent variable in the decision model is whether the household enrolled at any time during the five experimental years. Thus we cannot test for the existence of an interview stimulus because all households in the sample were interviewed. However, since no interactions between the interview stimulus and household characteristics were found in the model for those who were currently receiving payments, we expect that the interview stimulus affected only the constant term in the model of the decision to enroll.

In Sec. V we used an estimate of the percentage of households eligible and knowledgeable at the wave 4 survey who joined the program during its first five years. We did not use our sample observations because they are biased in favor of joining. However, we can estimate all terms but the probability of enrolling from the following equation:

\[ \Pr(R) = \Pr(K) \cdot \Pr(A) \cdot \Pr(S) \cdot \Pr(T1) \cdot \Pr(T2) \]  \hspace{1cm} (A.1)

where each letter denotes the events:

- \( R \) = currently receiving payments
- \( K \) = has program knowledge
- \( A \) = ever enrolled, given knowledge
- \( S \) = ever received payments, given \( A \)
- \( T1 \) = has enrolled, given ever enrolled
- \( T2 \) = currently receiving payments, given enrolled and ever receive payments

The \( \Pr(R) \) comes from Carter and Balch (1981); the \( \Pr(K) \) comes from Table A.2; \( S \) and \( T2 \) are actual percents from HAO data; for each enrolled household the \( \Pr(T1) \) is given by Eq. (5.4) of Sec. V. \( \Pr(A) \), calculated from Eq. (A.1), is used in Table 3.1 and elsewhere.
The above estimate of the probability of enrolling is consistent with the existence of a positive interview stimulus to enrollment. In each of the four site and tenure combinations, the actual number of wave 4 cases who ever enrolled exceeds the estimate derived from Eq. (A.1).

DELAY TO ENROLLMENT

The final question we have about the interview stimulus is how it affects our estimate of the mean time required for a knowledgeable household to enroll. Recall that the estimate was based only on households who knew about the program at wave 2 and that the great majority (71 percent) of households who ever enrolled did so prior to wave 2. We have just seen that the baseline interview had no measurable effect on program knowledge. Further, there were many fewer questions about the allowance program in the baseline survey than in later ones, and only a tiny fraction of the respondents were asked questions that might stimulate application. Consequently, we expect that the interview stimulus had essentially no effect on the delay to enrollment for households that enrolled prior to wave 2. The remaining households might have hastened to enroll following the wave 2 survey; thus their delay to enrollment might have a negative bias due to the interview effect. As we have just seen, the households who enrolled prior to wave 2 should not share in this negative bias. However, we measured the time from the start of the program until enrollment. Since at least some of these households were not knowledgeable at program startup, and because of the backlog that developed at program start, the delay for these households should be longer than that which would be required for a knowledgeable household in steady state.

To summarize, the sign of the bias in the enrollment delay due to the interview stimulus is as yet undetermined: Households who enrolled prior to wave 2 should be contributing a positive bias and households who enrolled after wave 2 might be contributing a negative bias. To examine the question further we calculated the mean time from the wave 2 survey to enrollment for the 40 households in the sample who had not enrolled prior to wave 2. This was a direct
estimate of the mean time to enroll because of the Markov property of the negative exponential distribution. Contrary to expectations the mean time for this group to enroll was slightly longer (7.9 months) than the estimate for the entire group (6.8 months); the difference can be explained solely by random variation. Thus we believe that the interview effect did not cause any serious distortion in the estimate. However, the biases due to delays in acquiring knowledge and excessive administrative delays remain in the estimate. Thus the mean time of knowledgeable eligibles to enroll in steady state is probably somewhat shorter than we have estimated it here. If the conclusion that there is no interview bias is acceptable, then the data for households who enrolled after wave 2 should provide an estimate that is unbiased but with a high variance; the lower limit of the 90 percent confidence interval is 5.8. Thus we expect that the magnitude of the bias in our estimate of 6.8 months is small.
Table B.1
MARGINAL EFFECT OF SELECTED CHARACTERISTICS ON THE PROBABILITY
OF HOUSEHOLDS RECEIVING PAYMENTS, BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Range of Values</th>
<th>Increase in the Probability of Recipieny</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range of Values</td>
<td>Brown County Renters</td>
</tr>
<tr>
<td>Amount of allowance ($/mo.)</td>
<td>510-1,270</td>
<td>11.6</td>
</tr>
<tr>
<td>Duration of eligibility (yrs.)</td>
<td>1-4</td>
<td>19.6</td>
</tr>
<tr>
<td>Household size</td>
<td>2-4</td>
<td>-3.5</td>
</tr>
<tr>
<td>Household type</td>
<td>Couple with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>children vs.</td>
<td>.8</td>
</tr>
<tr>
<td></td>
<td>Single parent</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elderly</td>
<td>-14.0</td>
</tr>
<tr>
<td></td>
<td>Couple, no</td>
<td></td>
</tr>
<tr>
<td></td>
<td>children</td>
<td>-23.8</td>
</tr>
<tr>
<td>Tenure</td>
<td>Renter vs. Owner</td>
<td>-8</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by the authors from the wave 4 household surveys and the models in Wendt (1981) and Coleman (1981).

Values are compared at the 25th and 75th percentiles.
Table B.2

LOGIT REGRESSION OF THE PROBABILITY OF RENTERS FAILING THE HOUSING INSPECTION ON HOUSING AND HOUSEHOLD CHARACTERISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>St. Joseph County</th>
<th></th>
<th>Brown County</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-Statistic</td>
<td>Coefficient</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>Constant</td>
<td>-.334</td>
<td>-1.12</td>
<td>1.735</td>
<td>3.74</td>
</tr>
<tr>
<td>Rent per room ($/mo.)</td>
<td>-.017</td>
<td>-3.24</td>
<td>-.051</td>
<td>7.25</td>
</tr>
<tr>
<td>Persons per room</td>
<td>1.762</td>
<td>3.87</td>
<td>1.778</td>
<td>3.53</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>-.465</td>
<td>-2.53</td>
<td>-.398</td>
<td>1.18</td>
</tr>
<tr>
<td>Household size</td>
<td>-.016</td>
<td>-.13</td>
<td>-.225</td>
<td>1.94</td>
</tr>
<tr>
<td>Elderly couple</td>
<td>-.396</td>
<td>-.72</td>
<td>-.846</td>
<td>1.24</td>
</tr>
<tr>
<td>Elderly single</td>
<td>-.110</td>
<td>-.46</td>
<td>-.733</td>
<td>2.36</td>
</tr>
<tr>
<td>Single parent</td>
<td>.935</td>
<td>3.83</td>
<td>.732</td>
<td>3.29</td>
</tr>
<tr>
<td>Couple with children</td>
<td>.757</td>
<td>2.22</td>
<td>.801</td>
<td>2.68</td>
</tr>
</tbody>
</table>

SOURCE: HAO administrative records for all renter households whose enrollment dwellings were inspected during calendar year 1977.
Table B.3

SELECTED CHARACTERISTICS OF SMSA RENTER POPULATIONS

<table>
<thead>
<tr>
<th>SMSA</th>
<th>Median Monthly Income ($)</th>
<th>Single Parents (%)</th>
<th>Elderly Singles (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta</td>
<td>728</td>
<td>15.2</td>
<td>8.1</td>
</tr>
<tr>
<td>Chicago</td>
<td>801</td>
<td>15.0</td>
<td>13.6</td>
</tr>
<tr>
<td>Cincinnati</td>
<td>667</td>
<td>13.4</td>
<td>15.3</td>
</tr>
<tr>
<td>Colorado Springs</td>
<td>674</td>
<td>9.8</td>
<td>7.9</td>
</tr>
<tr>
<td>Columbus</td>
<td>675</td>
<td>13.3</td>
<td>10.7</td>
</tr>
<tr>
<td>Green Bay</td>
<td>763</td>
<td>11.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Hartford</td>
<td>733</td>
<td>13.6</td>
<td>14.5</td>
</tr>
<tr>
<td>Kansas City</td>
<td>733</td>
<td>12.5</td>
<td>11.8</td>
</tr>
<tr>
<td>Madison</td>
<td>667</td>
<td>8.1</td>
<td>7.0</td>
</tr>
<tr>
<td>Miami</td>
<td>617</td>
<td>11.2</td>
<td>16.1</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>757</td>
<td>13.0</td>
<td>13.9</td>
</tr>
<tr>
<td>New Orleans</td>
<td>584</td>
<td>17.7</td>
<td>10.2</td>
</tr>
<tr>
<td>Newport News</td>
<td>758</td>
<td>15.1</td>
<td>5.8</td>
</tr>
<tr>
<td>Patterson</td>
<td>939</td>
<td>11.5</td>
<td>11.0</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>708</td>
<td>15.8</td>
<td>13.5</td>
</tr>
<tr>
<td>Portland</td>
<td>684</td>
<td>10.9</td>
<td>12.5</td>
</tr>
<tr>
<td>Rochester</td>
<td>783</td>
<td>13.8</td>
<td>12.0</td>
</tr>
<tr>
<td>San Antonio</td>
<td>583</td>
<td>15.5</td>
<td>10.2</td>
</tr>
<tr>
<td>San Bernardino</td>
<td>625</td>
<td>11.5</td>
<td>11.7</td>
</tr>
<tr>
<td>San Diego</td>
<td>625</td>
<td></td>
<td>10.6</td>
</tr>
<tr>
<td>San Francisco/Oakland</td>
<td>792</td>
<td>11.9</td>
<td>12.3</td>
</tr>
<tr>
<td>South Bend</td>
<td>583</td>
<td>17.4</td>
<td>10.5</td>
</tr>
<tr>
<td>Springfield</td>
<td>607</td>
<td>15.5</td>
<td>16.0</td>
</tr>
</tbody>
</table>

SOURCE: Compiled by HASE staff. Data for Green Bay and South Bend are from the household survey conducted in early 1976 (wave 3 in Brown County and wave 2 in St. Joseph County). All other data from the Annual Housing Survey (wave 2, 1975), conducted from April 1975 to March 1976. All SMSAs (Standard Metropolitan Statistical Areas) surveyed are included in this table.
Table B.4

VARIABLES INCLUDED IN THE ACQUISITION-OF-KNOWLEDGE EQUATION

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>Annual household income ($).</td>
</tr>
<tr>
<td>Housing expenses</td>
<td>Renters: Monthly gross rent. Owners: Sum of mortgage payments, taxes, insurance, utilities, and repairs.</td>
</tr>
<tr>
<td>Household size</td>
<td>Number of household members recorded by the HAO.</td>
</tr>
<tr>
<td>Life-cycle stage:</td>
<td></td>
</tr>
<tr>
<td>Parents</td>
<td>Head of household under 62, with at least one child under 19. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Elderly</td>
<td>One or both heads 62 or over. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Others</td>
<td>Couples under 62 with older children or none. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Information source:</td>
<td></td>
</tr>
<tr>
<td>Television</td>
<td>Household gets most local affairs information from television. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Newspapers</td>
<td>Household gets most local affairs information from newspapers. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Radio</td>
<td>Household gets most local affairs information from radio. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Word of mouth</td>
<td>Household gets most local affairs information from family or friends. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Public aid agency</td>
<td>Household receives AFDC or unemployment. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Owner</td>
<td>Household owns the unit. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Year 1</td>
<td>Interview was conducted at year 1. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Year 2</td>
<td>Interview was conducted at year 2. 1 = yes, 0 = no</td>
</tr>
</tbody>
</table>
Table B.5
VARIABLES INCLUDED IN THE DECISION-TO-APPLY EQUATION

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs/Benefits</td>
<td>The standard cost of adequate housing, less one fourth of the household's current monthly income (entered in logarithmic form).</td>
</tr>
<tr>
<td>Amount of payment ($/mo.)</td>
<td></td>
</tr>
<tr>
<td>Expected duration of eligibility</td>
<td>Derived from a prediction equation using known durations plus amounts and sources of income (entered as log).</td>
</tr>
<tr>
<td>Housing quality</td>
<td>Renters: Monthly rent per room. Owners: Monthly sum of mortgage payments, taxes, insurance, utilities, repairs, and 7 percent of equity; divided by the number of rooms.</td>
</tr>
<tr>
<td>Crowding</td>
<td>Number of people per room</td>
</tr>
<tr>
<td>Mover</td>
<td>Household has moved within the previous year. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Owner</td>
<td>Household owns the unit. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Need</td>
<td></td>
</tr>
<tr>
<td>Nonproperty assets</td>
<td>Sum of stocks, bonds, savings, and cash.</td>
</tr>
<tr>
<td>Household size</td>
<td>Number of persons in household recorded by the HAO.</td>
</tr>
<tr>
<td>Life-cycle stage:</td>
<td></td>
</tr>
<tr>
<td>Parents</td>
<td>Head of household under 62, with at least one child under 19. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Elderly</td>
<td>One or both heads 62 or over. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Other</td>
<td>Couples under 62. 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Willingness to Accept Help</td>
<td></td>
</tr>
<tr>
<td>Against aid for housing</td>
<td>Response to survey question, &quot;Should the national government help low- and moderate-income people get housing at low cost?&quot; 1 = yes, 0 = no</td>
</tr>
<tr>
<td>Site 1 Brown County</td>
<td>Household is located in Brown County. 1 = yes, 0 = no</td>
</tr>
</tbody>
</table>
Table B.6

PROGRAM STATUS OF ELIGIBLE HOUSEHOLDS IN STEADY STATE, BY SITE AND TENURE

<table>
<thead>
<tr>
<th>Status</th>
<th>Percent of Eligible Households</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brown County</td>
</tr>
<tr>
<td></td>
<td>Renters</td>
</tr>
<tr>
<td>Receiving payments</td>
<td>45</td>
</tr>
<tr>
<td>Not receiving payments</td>
<td></td>
</tr>
<tr>
<td>due to:</td>
<td></td>
</tr>
<tr>
<td>Lack of knowledge</td>
<td>15</td>
</tr>
<tr>
<td>Delay</td>
<td>15</td>
</tr>
<tr>
<td>Other (Low benefits, poor housing, or lack of interest)</td>
<td>25</td>
</tr>
</tbody>
</table>

SOURCE: Tabulated by authors from household surveys and HAO administrative records.
Appendix C

SITE DIFFERENCES IN ENROLLEE BEHAVIOR

Renter enrollees in St. Joseph County are less likely than those in Brown County to ever receive an allowance payment (72 percent versus 83 percent), as discussed in the body of this report. Coleman showed that renters in St. Joseph County both fail the housing standards and terminate more frequently than their Brown County counterparts. Here we consider whether housing quality differences are sufficient to account for differences in recipiency rates among enrollees. To avoid the complicating factors of program start-up, the sample we use consists of all households whose enrollment dwellings were evaluated for the first time in 1977, when the program was approximately in steady state.

The first column of Table C.1 shows a logit regression of the probability that a renter enrollee will ever receive payments, given the site and certain demographic and economic characteristics of the household. The size of the St. Joseph County coefficient shows a 10 percent lower participation rate there, corresponding to that found in the large sample. All the other variables are also consistent with our previous analyses: recipiency increases with larger benefits (but not linearly) and smaller household size. Enrollees with children participate less than either the elderly or childless couples.* No interactions between site and other variables could be found in the data ($X^2 = 6.33$ with 6 degrees of freedom).

The lower recipiency rate among St. Joseph County renters can be completely explained by the frequency and type of failures and by a different response to paint failure in each site. In the second column of Table C.1 we have added variables for each of the major types of failure distinguished by Coleman: the paint standard, occupancy, and dwelling condition,** and an interaction of the St.

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*Marital status variables were not significant for either the elderly or households with children.

**All other physical defects. A lease was also required to receive payments, but its presence is not included in the regression in order to identify the constant term.
Table C.1

LOGIT REGRESSION ON THE PROBABILITY OF RENTER ENROLLEES RECEIVING AN ALLOWANCE: COMPARISON OF EQUATIONS WITH AND WITHOUT CONTROLS FOR HOUSING QUALITY

<table>
<thead>
<tr>
<th>Variable</th>
<th>Housing Quality</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Controlled</td>
<td>Coefficient</td>
<td>t-Statistic</td>
<td>Coefficient</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.920</td>
<td>1.94</td>
<td>-1.166</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>Allowance$^a$</td>
<td>.598</td>
<td>4.30</td>
<td>.708</td>
<td>4.57</td>
<td></td>
</tr>
<tr>
<td>Duration of eligibility$^b$</td>
<td>-.092</td>
<td>1.19</td>
<td>-.055</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>Household size</td>
<td>-.199</td>
<td>3.31</td>
<td>-.023</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>Elderly</td>
<td>1.589</td>
<td>4.83</td>
<td>.630</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>Couple, no children</td>
<td>1.173</td>
<td>3.18</td>
<td>.322</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>.297</td>
<td>1.59</td>
<td>.035</td>
<td>.17</td>
<td></td>
</tr>
<tr>
<td>St. Joseph County</td>
<td>-.570</td>
<td>3.35</td>
<td>.059</td>
<td>.21</td>
<td></td>
</tr>
<tr>
<td>Failure of housing inspection:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint failure: St. Joseph County</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: HAO administrative records for households whose first dwelling inspection was in 1977.
NOTE: N = 1,474; chi-squares are 110.6 and 287.9. Nonelderly singles are excluded.

$^a$Log of annual allowance.
$^b$Log of years.

Joseph County variable with paint failure.* In this regression the St. Joseph County variable is no longer significant and is even slightly positive.

It is not completely clear why St. Joseph County renters reacted differently from Brown County households to the paint standard.

*No other interactions with site appear in the data. The $X^2$ for the full set of interactions (except paint failure) is 5.88 with 8 degrees of freedom.
However, paint defects vary in severity from a small flaking or peeling section on the corner of a windowsill that is easy to remedy to large sections of exterior surfaces that are difficult for renters to remedy without permission of the landlord (see McDowell, 1980). It is likely that St. Joseph County, with its older housing stock, had a greater incidence of severe defects. In addition dwellings had paint defects more frequently in St. Joseph County than in Brown County,* suggesting that it might be more difficult for a St. Joseph County household to move to an adequate dwelling.

Including the housing condition variables eliminates the significance of household size, thus providing direct evidence that the lower recipiency rate of large households is due to housing quality. We also note that minority status is not significant in the first regression of Table C.1. Although, as Coleman showed, minorities do fail the inspection more frequently than others, the correlation between minority status and recipiency rates among enrollees is so weak that it cannot be detected in this sample of over 1,400 cases. Thus, it is not surprising that the even smaller survey sample yields no perceptible effect of minority status on participation.

*Sixty percent versus 44 percent. Defective paint caused failure only when children were present.
BIBLIOGRAPHY


Rydell, C. Peter, John E. Mulford, and Lawrence Kozimor, Dynamics of Participation in a Housing Allowance Program, N-1137-HUD, February 1981. (First issued as WN-10200-HUD in June 1978.)


