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HOUSING ASSISTANCE SUPPLY EXPERIMENT

A WORKING NOTE

This Note was prepared for the DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, under Contract No. H-1789. It is intended to facilitate communication of preliminary research results. Views or conclusions expressed herein may be tentative and do not represent the official opinion of the sponsoring agency.

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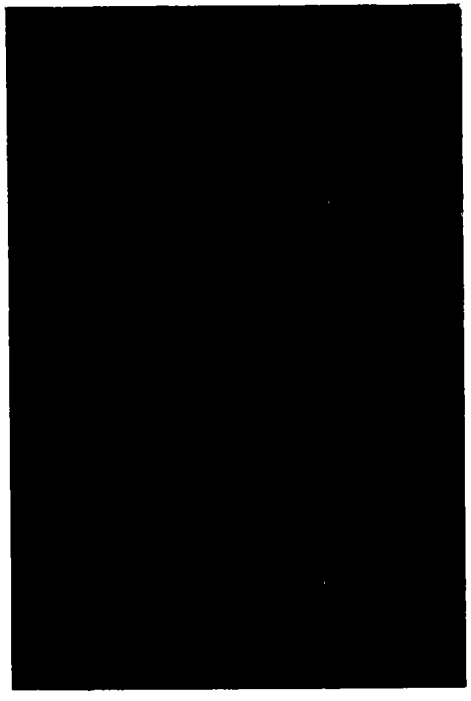

WN-9430-HUD

INFLATION IN THE STANDARD COST OF ADEQUATE HOUSING: SITE I, 1973 – 1976

Ira S. Lowry

March 1976

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PREFACE

This working note was prepared for the Office of Policy Development and Research, U.S. Department of Housing and Urban Development. It analyzes the inflation in housing costs that has occurred in Brown County, Wisconsin, since September 1973; and recommends compensating increases in benefits paid to participants in the experimental housing allowance program there. It also recommends realignment of the schedule of benefits for very small and very large households.

Many people have contributed either directly or indirectly to the preparation of this note. Larry A. Day planned and supervised the construction of the rent-inflation analysis file of survey data that is described in Sec. II. Population weights for that file were constructed by Lawrence Helbers and Timothy M. Corcoran. Daniel A. Relles planned and executed the statistical analysis of survey data.

The analysis of inflation in fuel and utility costs reported in Sec. III is based on methods devised by Barbara M. Woodfill and on data collected and organized by Paul F. Ernst.

The analysis of the experiences of program participants reported in Sec. IV is based principally on work by Marsha A. Dade, who planned and supervised the construction and use of research files based on HAO administrative records for the first year of program operations. Some tabulations for January 1976 were prepared by the staff of the Brown County Housing Allowance Office.

The study was supervised by Ira S. Lowry, who also wrote the text of this note and formatted most of the tables. Drafts of each section were reviewed by the contributors named above and also by Daniel J. Alesch, Rand's site manager for Brown County; Eugene Rizor, director of the Brown County Housing Allowance Office; and G. Thomas Kingsley, Rand's deputy director of the Housing Assistance Supply Experiment. The latter three persons also participated in formulating the recommendations to HUD for changes in the schedule of the standard cost of adequate housing.

Linda Ellsworth prepared most of the first draft typescript and tables. Charlotte Cox edited the typescript and supervised production of final copy. Doris Dong prepared the graphics.

This note was prepared pursuant to HUD Contract H-1789, Mod. 21, Task 2.14.

SUMMARY

The experimental housing allowance program operated by the Brown County Housing Allowance Office (HAO) was designed to enable participants with low incomes to afford the full costs of decent, safe, and sanitary housing in that community. The schedule of benefits that was adopted when enrollment began in June 1974 reflected housing costs in Brown County as of September 1973, as they were reported in a market survey conducted then.

The study reported here was prompted by evidence that inflation in the cost of housing services had made that schedule obsolete, so that program benefits were no longer adequate to serve program purposes. The study also provided an occasion to review certain troublesome features of the original schedule that are separate from the issue of subsequent price inflation.

INFLATION IN RENTAL HOUSING COSTS, 1973-1976

Our analysis of inflation in housing costs addresses two questions, both important in deciding on appropriate revisions of the schedule of benefits:

- *By how much have housing costs risen since the original schedule was designed?*
- *To what extent is the allowance program itself responsible for inflation in housing costs?*

Although the housing allowance program serves both renters and homeowners, the original schedule and the analysis reported here rely on data for renters, whose housing costs are easily measured. Those costs consist of contract rent (the amount paid to the landlord) plus payments for any fuel and utility services that are not included in contract rent. We think the findings are equally applicable to homeowners, whose housing costs are not all explicit payments to others.

The analysis draws on three sources of data: field surveys of renter households in Brown County which are conducted periodically as part of the Supply Experiment, fuel and utility rate schedules obtained from local suppliers of these items, and administrative records of the allowance program that report rents paid by program participants. The three sources address different aspects of the inflation issue and cover different portions of the 30-month interval between September 1973 and January 1976. However, their evidence is mutually consistent, and leads to the following conclusions:

1. Between September 1973 and February 1975, contract rents in Brown County increased at an average annual rate of about 4 percent. Gross rents, which include fuel and utility services billed to tenants, increased at an average annual rate of about 6 percent.
2. There were marked differences in inflation rates for different sectors of the rental market. Rates were higher for single-family homes than for apartments; higher for large units than for small ones; and higher for low-rent units than for high-rent units. For example, gross rents for low-rent single-family homes increased by 8.6 percent annually, while gross rents for high-rent apartments in large buildings increased by only 3.2 percent annually.
3. Less comprehensive evidence for the period after February 1975 indicates that the pace and pattern of inflation described above was characteristic of the entire 30-month period, September 1973 through January 1976.
4. All or nearly all the increase in rental housing costs during these 30 months was due to higher prices for domestic fuels and utility services. A composite index of the cost of these items, reflecting the amounts of each that are consumed by a typical household, increased by nearly 63 percent, equivalent to 21.5 percent annually.

5. The difference in rates of increase for contract and gross rents and the differences in rates of increase for different sectors of the market are all consistent with the attribution of the increases to higher fuel and utility prices. Although we did not attempt to model the interactions of housing supply and demand conditions that might also have influenced prices, we found no evidence of rent increases that would significantly raise landlords' profits.
6. Renters participating in the housing allowance program after June 1974 have of course been affected by rising fuel and utility prices; but their contract rents have been remarkably stable. There is no evidence to support the hypothesis that landlords tend to raise rents for program participants more than they would for non-participants, even though many of the units occupied by participants required minor repairs or improvements to bring them up to program standards. If anything, program participants have been less affected by inflation than has the market as a whole.
7. The effective demand for rental housing created by earmarked allowance payments has so far had no discernible effect on the structure or level of contract rents in Brown County. The inflation that has occurred is clearly attributable to national and international events, primarily to the worldwide upheaval in petroleum marketing practices.

COMPENSATING FOR INFLATION

The allowance entitlement of a program participant is equal to the standard cost of adequate housing (called R^*, and varying with household size), less one-fourth of the participant's adjusted gross income. The income limit for participation in the program is equal to $4R^*$, the level at which allowance entitlement drops to zero.

We think that the evidence is clear that housing costs in Brown County have risen enough over the past 30 months to require compensating increases in the HAO's schedule of R^*. Otherwise, program participants will find it increasingly difficult to afford housing that meets program standards, and some households that need assistance will be denied it because the now-obsolete schedule also defines the income limits for participation.

The analysis whose conclusions were summarized above indicates that the following changes to the current schedule would fully compensate for inflation in housing costs through January 1976:

HAO Occupancy Standard		Standard Cost of Adequate Housing ($ per month)		
Number of Persons	Number of Rooms	Current Schedule	Adjusted for Inflation	Amount of Increase
1	1-2	100	115	15
2	1-3	125	140	15
3-4	4	155	175	20
5-6	5	170	195	25
7-8	6	190	220	30
9+	6	220	245	25

STRUCTURAL PROBLEMS WITH THE CURRENT SCHEDULE

Inflation aside, the current schedule of R^* seems to us defective in its treatment of very small and very large households, relative to those of intermediate sizes.

For households of one and two persons, standard costs are based on occupancy of rented rooms or efficiency apartments, with at most three rooms for two persons. In fact, few such households find the proposed arrangements desirable or even tolerable except under severe budgetary stress. Even before receiving assistance, nearly all of them lived in separate housing units that were larger than the minimum sizes acceptable to the HAO or the sizes on which standard costs were based, even though their housing expenses usually exceeded a fourth of their incomes.

Participation in the allowance program relieved some of the budgetary strain, but small households continue to occupy larger units

than can be supported by their allowance payments plus a fourth of nonallowance income. For instance, 82 percent of the single renters and 97 percent of the single homeowners in the program occupy units larger than the efficiency apartment whose standard cost was set at $100. In June 1975, nearly three-fourths of the renters paid more than $100 per month for their housing. The circumstances of two-person households are similar, but the standard cost is higher ($125) and the problems are less acute.

For households of seven or more persons, we judge that the original schedule overestimated the prices at which standard units of six or more rooms were available on the market. The actual rents paid by the few large renter households participating in the program have usually been less than the standard costs of $190 (for seven or eight persons) and $220 (for nine or more persons), at a time when the expenses of smaller households typically exceeded the standard costs.

SCHEDULE REALIGNMENT

To remedy the structural problems discussed above, we think that when the schedule of R^* is adjusted to compensate for inflation, benefits for households of one and two persons should be increased by more than inflation alone would justify; and benefits for households of seven or more persons should be increased by less than inflation alone would justify. The proposed realignment is compared below with both the current and inflation-adjusted schedules:

HAO Occupancy Standard		Standard Cost of Adequate Housing ($ per month)			
Number of Persons	Number of Rooms	Current Schedule	Adjusted for Inflation	Realigned Schedule	Increase Over Current Schedule
1	1-2	100	115	125	25
2	1-3	125	140	145	20
3-4	4	155	175	175	20
5-6	5	170	195	195	25
7-8	6	190	220	210	20
9+	6	220	245	230	10

EFFECTS OF PROPOSED SCHEDULE CHANGES

Changing the schedule of the standard costs of adequate housing will have three effects on program size and cost. First, payments to each of those already participating will increase by the amount of the change in R^* for households of that size. Second, some who are now eligible but who find their current entitlements too small to warrant participation may decide to enroll if their entitlements are increased. Third, some who are not now eligible will become eligible because an increase in R^* is tantamount to an increase in the income limit for participation.

In January 1976, the HAO paid out $135,000 in allowances to 2,375 renters and homeowners living in certified housing. Our proposed inflation adjustment would immediately increase the monthly disbursements to these households by $42,000; if the schedule is also realigned as we recommend, monthly disbursements would increase by an additional $10,000.

Increased enrollment due to schedule changes is harder to estimate and would in any case be spread over some period of time. We judge that the proposed inflation adjustments would cause 600 to 1,000 additional households to enroll over the course of a year, eventually adding $15,000 to $25,000 to monthly disbursements. Schedule realignment would increase those figures by 150 to 200 enrollees and add about $5,000 to monthly disbursements.

CONTENTS

TABLES

I. INTRODUCTION

The experimental housing allowance program operated by the Brown County (Wisconsin) Housing Allowance Office (HAO) as part of the Housing Assistance Supply Experiment was designed to enable participants to afford the full costs of decent, safe, and sanitary housing in that community. Enrollment and payment of benefits began in June 1974. The initial schedule of benefits reflected housing costs in Brown County in September 1973, based on data collected locally at that time.

Since then, consumer prices have risen sharply, and there are indications that the costs of housing in Brown County have increased enough so that the allowances available to program participants are no longer adequate to meet the program objectives. This report analyzes the evidence concerning the amount of inflation in housing costs from September 1973 through February 1976 and recommends compensating revisions in the initial schedule. As a separate issue, it reconsiders features of the schedule that have led to difficulty in program implementation and recommends additional changes to correct these problems.

The remainder of this section explains the programmatic and empirical bases for the initial benefit schedule, used by the Brown County HAO from June 1974 to the present. The discussion focuses on the estimation of R^*, the standard cost of adequate housing for households of different sizes.

Section II measures the inflation in Brown County housing costs between September 1973 and February 1975, based on comparisons of contract rents and fuel and utility expenditures reported by occupants of a marketwide sample of 1,135 housing units that were surveyed in the fall of 1973 and again early in 1975. An important finding is that rates of inflation differed markedly in different sectors of the market. The inflation rates most appropriate to housing intended for occupancy by program participants are extrapolated forward an additional year, to February 1976.

Section III analyzes the effects of utility rate changes that occurred between September 1973 and January 1976. We use household

consumption norms to estimate the typical effects of these changes on the housing costs for program participants. Our estimates do not distinguish utility bills paid by landlords from those paid by tenants or homeowners.

Section IV reviews the rent expenditures reported by about 1,300 program participants who lived in rental housing units in June 1975 and again in January 1976. For the program's first year, we also analyze changes in rents paid by individual households.

Section V summarizes our conclusions and presents our recommendations. The conclusions relate to the extent of housing cost inflation between September 1973 and February 1976, its causes, and the effects of the allowance program on housing costs. Briefly, we judge that the standard cost of adequate housing, as defined and measured in 1973, has since increased by 11 to 16 percent, the rate varying with size and type of unit. Nearly all these increases appear to be attributable to higher fuel and utility costs, whether paid directly by the tenant or borne by the landlord. They thus affect renters and homeowners alike. We find no evidence that increased housing demand by program participants has significantly influenced the level of rents in Brown County.

To offset the inflation in housing costs, monthly benefits to program participants should be increased by amounts ranging from $15 to $30 per month, the larger amounts pertaining to the larger households. However, we also recommend realigning the R^* schedule so as to narrow the differences between the benefits for households of two to six persons and those for smaller or larger households. This would entail increasing the benefits for elderly single persons by $10 more per month than price inflation alone would justify; and increasing those for households of seven or more persons by $10 to $15 less per month than would be indicated strictly by price inflation.

THE HOUSING ALLOWANCE BENEFIT FORMULA

Households entitled to assistance under the experimental program include (with certain categorical exceptions) all those whose incomes are inadequate to support a specified standard of housing consumption, so long as they actually occupy housing that meets the standard. They

may be either renters or homeowners, and the adequacy of their housing is tested periodically by the HAO.

The assistance formula postulates that any household, whatever its size or composition, can afford to pay 25 percent of its adjusted gross income for housing. The difference between this amount and the standard cost of adequate housing in Brown County is paid monthly by the HAO to all enrolled households whose housing meets program standards. The formula for a household of n persons is

$$A_n = R_n^* - .25Y_a ,$$

where A = the amount of the monthly allowance payment.

R^* = the standard monthly cost of adequate housing, including fuel and utilities.

Y_a = adjusted gross income per month, the adjustments reflecting exemptions and deductions specified by statute or program regulations.

As can be seen from this formula, an increase or decrease in R^* has a dollar-for-dollar effect on the amount of the allowance payment for all participants, regardless of their incomes. It also affects the income limit for participation in the program; raising or lowering R^* by one dollar raises or lowers that limit by four dollars. A change in the income limit may in turn increase or decrease the number of households in the county that are eligible to participate in the program.

Note also that the amount of the allowance payment does not depend on the participant's actual housing expenditures, except that program regulations prohibit payments exceeding those expenditures. A family that finds certifiable housing whose cost is less than R^* normally receives exactly the same payment as another family of the same size and with the same income that spends more than R^*, either by choice or because of the lack of alternatives on the market. This arrangement is intended both to allow each household to adapt its housing consumption to its particular needs and preferences and to encourage careful shopping for housing bargains.

The "standard cost of adequate housing" is thus a critical program standard, affecting both the level of benefits to participants and the potential size of the program. In concept, it is "the price at which specified packages of housing services can be supplied by the private market on a continuing basis, in quantities that meet the program's objectives of enabling all assisted households to secure adequate housing."*

The specifications for these "packages of housing services" are of course those adopted by the HAO for certification of participants' housing. They entail space requirements that vary with household size, and requirements for structural soundness, light and ventilation, safety and sanitation, and the availability of equipment and utility services commonly regarded as necessary for health, comfort, and decency.**

ESTIMATING THE STANDARD COST OF ADEQUATE HOUSING

Before enrollment in the Brown County housing allowance program commenced, Rand estimated the standard cost of adequate housing units of different sizes and recommended to HUD a schedule of such costs to govern benefits to participating households. The estimates were based jointly on evidence collected in a field survey conducted as part of the Supply Experiment and on opinions of a panel of local citizens chosen for their knowledge of the housing market.***

The field survey was conducted in August, September, and October of 1973, and was addressed to the occupants of some 10,000 housing units

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*The concept is explained in David B. Lewis and Ira S. Lowry, *Estimating the Standard Cost of Adequate Housing*, The Rand Corporation, WN-8105-HUD, March 1973. That document also proposes a method for estimating these standard costs, which was followed in both experimental sites. The quotation is from Ira S. Lowry, Barbara M. Woodfill, and Tiina Repnau, *Program Standards for Site I*, The Rand Corporation, WN-8574-HUD, January 1974, pp. 4-5.

**The standards are similar to those of national model housing codes. They are detailed in Chapter 12 of the *HAO Handbook* of the Brown County Housing Allowance Office.

***See Lowry, Woodfill, and Repnau, *Program Standards for Site I*, for details.

in Brown County. These households were interviewed briefly to obtain information on household size, composition, and income; size and quality of housing unit; tenure of occupants; and housing costs.

The questions on housing quality were chosen to test whether the unit would meet program standards. The question on housing costs for renters elicited their contract rents, their use of specified fuels and utility services; and whether these fuels and utility services were included in contract rent. Because of the brevity of the interview and the complexity of the accounting, we did not ask the respondents to estimate their fuel and utility costs. Instead, we estimated these costs from the information they provided about usage and responsibility for payments.*

About 5,300 renters provided enough information for us to measure the size and quality of their units and estimate their gross rents (contract rent plus tenant-paid utilities). Taking each size of unit separately, we analyzed the relationship between gross rent and housing quality and selected the lowest levels of gross rent at which 50 and 75 percent, respectively, of all units met our simplified standards of quality. Inasmuch as the market was manifestly able to supply housing of adequate quality within this range of gross rents, we accepted that range as the first approximation to the standard cost of adequate housing, applicable to renters and homeowners alike.**

Separately from the survey, 25 local residents selected for their knowledge of Brown County housing markets were asked to estimate current

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*The procedure for making these estimates is documented in David M. de Ferranti, Ira S. Lowry, and others, *Screening Survey Audit Report for Site I*, The Rand Corporation, WN-8684-HUD, November 1974, Appendix C. From information provided by fuel and utility suppliers, consumption norms were established for households and housing units of various sizes. The normal consumption was then multiplied by the applicable rates to estimate utility costs for each household. To estimate gross rent for a given household, the estimated cost of utilities paid directly by the tenant was added to the contract rent reported in the survey.

**Although we obtained estimates of the market value of their homes from homeowners and an account of the utilities they used, we could not directly estimate their monthly housing costs. Almost by definition, the true cost of a specified bundle of housing services is the same for homeowners and renters, even though the explicit payments to others may differ.

gross rents for standard housing units of various sizes in each of 14 neighborhoods in the county. A distinction was drawn between rents for new tenants and those for all occupied units.

Each panelist prepared his estimates independently, but only for neighborhoods with which he was personally familiar. The results were compiled and discussed by the panelists; then each was given the opportunity to modify his original estimates. The procedure followed was an adaptation of the so-called Delphi method of securing a consensus among experts.

Finally the panelists' estimates were retabulated and averaged. First, median values for each neighborhood were calculated, then these medians were weighted by neighborhood shares of the countywide inventory of rental housing. A weighted average was then calculated across neighborhoods for each size of unit; this average was the panel's consensus estimate of R^*.

Table 1.1 summarizes the results of these exercises, by number of bedrooms per unit. For each size of unit, the last column shows a range

Table 1.1

COMPARISON OF DIFFERENT ESTIMATES OF R^*, BY NUMBER OF BEDROOMS: BROWN COUNTY, WISCONSIN, 1973

Number of Bedrooms	Monthly Gross Rent ($)				
	Screener Minimum by Incidence of Standard Units		Delphi Average for Modest Neighborhoods		Proposed Range of Values for R^*
	50% or more	75% or more	New Tenants	All Standard Units	
0	70	95	101	96	95-101
1	75	130	131	122	122-131
2	90	130	160	147	130-160
3	95	180	187	168	168-187
4	165	180	219	195	180-219
5	110	200	251	230	200-251

SOURCE: Lowry, Woodfill, Repnau, *Program Standards for Site I*, Table 12.

of values reflecting both our analysis of survey data and the panel's consensus estimates. We believed that the standard cost for each size of unit fell within that range but that the selection of specific values for specific household sizes entailed programmatic considerations that could not be deduced from the data.

In fact, the program's standards for "adequate housing" were still being formulated when this exercise was under way. The main issue outstanding was the occupancy standard, i.e., how the number and type of rooms in a unit should relate to the size and composition of the household. We recommended to HUD a complex but flexible standard that took account of the ages and sexes of household members as well as the number of persons, and which included requirements as to both number of bedrooms and number of other rooms. A schedule of R^* was proposed that began at $125 for a single person and increased in $10 increments to $215 for ten persons.

Reviewing our complex recommendations, HUD opted for simplicity. Table 1.2 shows the occupancy standards and the schedule of R^* that it approved for initial use in Brown County. It was generally understood that the schedule was experimental, in the sense that program experience with either the occupancy standard or the corresponding benefit levels might lead to improvements; and that research into Brown County housing costs might alter the premises underlying the concept of the standard cost of adequate housing or the methods for estimating it.

Our major programmatic concern with the schedule shown in Table 1.2 related to elderly single persons who wished to participate in the program. The scheduled R^* of $100 was certainly adequate to support occupancy of a rented room without kitchen facilities, or even an efficiency apartment (no separate bedroom). However, the number of such units in Brown County was considerably less than the number of eligible single renters, most of whom then lived in apartments of three or even four rooms. And many of those eligible were elderly single homeowners, occupying single-family houses of four to six rooms.

While program rules would not require these persons to move to smaller units, our data indicated that the larger units they then occupied could not be supported by monthly housing expenditures of $100

Table 1.2

OCCUPANCY AND BENEFIT STANDARDS ADOPTED FOR THE BROWN COUNTY HOUSING ALLOWANCE PROGRAM IN MARCH 1974

Number of Persons	Occupancy Standard		Standard Cost of Adequate Housing ($ per Month)
	Number of Bedrooms[a]	Number of Rooms[b]	
1	0	1-2	100
2	1	1-3	125
3-4	2	4	155
5-6	3	5	170
7-8	4	6	190
9+	5[c]	7[c]	220

SOURCE: *HAO Handbook* for Brown County, Secs. 10.06 and 12.03.

NOTE: Program participants may live either in housing units or rooming units. A housing unit must have a bathroom (not counted as a habitable room) and kitchen facilities for the exclusive use of its occupants. A rooming unit need not have a private bathroom or kitchen if these facilities are reasonably available to its occupants.

[a]A unit must have one bedroom for every two members of the household occupying the unit.

[b]A housing unit occupied by more than two persons must have one habitable room in addition to the kitchen and bedrooms to serve as a general living area. The minimum number of rooms is not strictly defined, inasmuch as kitchen facilities may or may not be located in a separate room. Here, we count the kitchen as a separate room.

[c]Revised in December 1974 to 4 bedrooms and 6 rooms altogether.

or less. Whether they participated in the program or not, they would doubtless continue to spend in excess of 25 percent of nonallowance income for housing. The same arguments applied, though with less force, to two-person households, few of whom actually lived in three-room units.

At the other end of the scale, we were concerned about program standards for very large households. First, our estimates of R^* for

large rental housing units were based on very few cases, and there was substantial disagreement between the survey data and the consensus of local experts (see Table 1.1). Second, although we did not expect many applications from households of nine or more persons, we thought they would have abnormal difficulty in locating modestly priced rental units with at least five bedrooms. Finally, there were genuine doubts about the reasonableness of the general limit of two persons per bedroom for families with seven or more children.

The second and third considerations led subsequently to relaxation of the occupancy standard for large households, so that no more than four bedrooms (six rooms, including kitchen and living room) were required for households of seven or more persons. However, households of nine or more persons continued to be entitled to monthly benefits based on a standard housing cost of $220, giving them a greater range of choice in a limited market.

II. MEASURING RENT INFLATION, 1973-1975

In this section, we estimate the rates of increase in both contract and gross rents for conventional rental housing units in Brown County between the fall of 1973 and the early months of 1975. The estimates are based on case-by-case comparisons of rents actually paid for 1,135 specific housing units at the beginning and end of this period. Therefore, they are unaffected by changes in the composition of the rental inventory--a frequent source of ambiguity in rent-inflation estimates.

The housing units used in this analysis are a subset of those included in the Supply Experiment's permanent panel of residential properties, whose owners and occupants are interviewed annually. Because their sampling histories are known, it is possible to weight individual records in proportion to the population of units they represent. Thus, we are able to generalize our findings not only to the rental market as a whole but also to specific sectors of that market.

Briefly, we conclude that between September 1973 and February 1975, contract rents in Brown County were increasing at an average annual rate of 4.1 percent, and gross rents (contract rents plus tenant payments for fuel and utilities) were increasing at an average annual rate of 6.1 percent. However, these rates varied greatly between market sectors. Thus, gross rents for low-rent single-family houses increased at an average annual rate of 8.6 percent, while those for high-rent apartments in large buildings increased at a rate of only 3.2 percent. Regression analysis indicates that the rate of inflation in gross rents varied directly with the number of rooms per unit but inversely with the level of gross rent in 1973 and with the number of units on the properties.

CONSTRUCTING THE DATA BASE

The annual surveys of rental properties conducted as part of the Supply Experiment are without doubt the best available source of data for measuring changes over time in the cost of housing services in Brown County. The surveys are addressed to a scientific sample representing

nearly the entire population of rental properties and housing units in the county; the sample is large enough for detailed analysis; and units selected for the permanent panel are resurveyed year after year. Moreover, the survey instrument probes carefully for details of the financial arrangements between landlords and their tenants and for expenses that are borne directly by the tenant, other than contract rent.

For the purposes at hand, the main drawback of this data source is lack of timeliness. Our large-scale surveys were designed to feed a longterm research agenda rather than the shortterm needs of program administration. Fieldwork in the annual survey of tenants and homeowners is spread over a period of six months, and roughly another six months is required to reduce field reports to "clean" machine-readable records. Only then can the data file be audited to determine the number of usable records and the likelihood of nonresponse bias; and only then can scientific sampling weights be computed for individual records to be used for a given analysis.

Building a Longitudinal File of Housing Unit Records

Our analysis of rent inflation is based on records from all three surveys of rental housing units* that we have completed in Brown County to date. The first is the screening survey that was described in Sec. I. It was conducted in August, September, and October of 1973, in preparation for baseline sample selection, and it yielded nearly 6,200 completed interviews with occupants of rental units. The baseline survey was conducted from mid-December 1973 through April 1974, and resulted in over 2,800 completed interviews with renter households. The wave 2 survey was conducted from January to July of 1975, and yielded nearly 2,200 completed interviews with renters.

*These surveys were addressed to homeowners as well as to renters, but we deal here only with records for the latter. We also exclude renters of mobile homes and lodgers in rooming houses or private homes from our data base. The survey samples deliberately exclude federally subsidized housing units, so our data refer strictly to privately owned, unsubsidized rental housing units of conventional construction.

In order to include records from the wave 2 survey, it was necessary to extract them from the normal sequence of data and file preparation. In December 1975, when this analysis began, tenant interview records from this survey had been keypunched but not cleansed of errors and inconsistencies. In the course of preparing our analysis file, we rejected some records with obviously erroneous or suspicious entries but have no doubt that the final file contained some correctable errors. However, the data items used in this analysis have not presented major cleaning problems in previous surveys.

For our rent-inflation analysis, we selected only housing units that were occupied by renters and whose occupants had been interviewed in all three surveys, linking the triplet of machine-readable records for each case. The steps in building this file were complex and will not be detailed here; but Tables 2.1 and 2.2 summarize the results.

As shown in Table 2.1, there were 2,166 completed interviews for renter households in wave 2. Of these, 1,577 were in housing units whose occupants had been interviewed in both previous surveys. (These were not necessarily the same households that responded in wave 2; records were linked on housing unit, not household, identifiers.) However, item nonresponse prevented computation of gross rent in some cases. We found 1,469 linked records with all the necessary data reported in all three surveys, and 1,478 with all the necessary data reported in both the screening survey and the wave 2 survey. The latter set was chosen for further screening.

Table 2.2 summarizes subsequent deletions from the file of 1,478 records. Many of those deleted were records that could have been included in the analysis had there been more time to resolve case-by-case problems. In the interests of speed, however, we simply deleted all records that presented special analytical difficulties or which appeared to have erroneous or inconsistent entries. These deletions reduced the file to 1,135 linked records.

Reestimating the Costs of Tenant-Paid Utilities in 1973

Although each linked record contained rent data for three separate occasions--the time of the screening interview, the time of the baseline

Table 2.1

LONGITUDINAL LINKAGE OF HOUSING UNIT RECORDS FOR RENT-INFLATION ANALYSIS: SURVEYS OF RENTER HOUSEHOLDS IN SITE I, 1973-1975

Record Characteristics	Number of Housing Unit Records			
	Screening Survey	Baseline Survey	Wave 2 Survey	Linked File
All records with completed interviews	6,183[a]	2,835	2,166	--
Linked records with completed interviews:				
Screening and baseline	2,432	2,432	--	2,432
Baseline and wave 2	--	1,799	1,799	1,799
Screening and wave 2	(b)	--	(b)	(b)
Screening, baseline, and wave 2	1,577	1,577	1,577	1,577
Linked records with computable gross rent:				
Screening and baseline	2,239	2,239	--	2,239
Baseline and wave 2	--	1,768	1,768	1,768
Screening and wave 2	1,478	--	1,478	1,478
Screening, baseline, and wave 2	1,469	1,469	1,469	1,469

SOURCE: Tabulations by HASE staff of records of the screening, baseline and wave 2 surveys of renter households in Site I.

NOTE: Records from successive surveys were linked on housing unit identifiers; respondents may differ between surveys. Records tabulated here are privately owned, unsubsidized rental housing units, excluding rented rooms and mobile homes. Links were attempted for all units classified as rental in baseline survey reports.

[a] Includes about 10 rented mobile homes; exact number not ascertained.

[b] Not available. This link was not made separately.

interview, and the time of the wave 2 interview--we designed our analysis to use only the first and last observations directly. Baseline data were used for two purposes: to reestimate the cost of tenant-paid utilities reported in the screening interview, and to calculate sampling weights for each linked record.

As we explained in Sec. I, the screening survey instrument asked the respondent to list the fuels and utility services he used in operating his home and to indicate which ones he paid for directly. In both baseline and wave 2 surveys, he was also asked to estimate the average monthly cost of each tenant-paid item during the preceding calendar year, a complex line of questioning that we were unable to pursue in the brief

Table 2.2

SELECTION OF RENT-INFLATION ANALYSIS FILE FROM AMONG ALL LINKED RECORDS

Item	Number of Records
Linked records with computable gross rent for both screening and wave 2 interviews	1,478
Records deleted from file, by reason for deletion:	
Tenant reported paying less than market rent in either interview[a]	161
Housing unit added to sample for comparability panel only[b]	128
Evidence of erroneous linkage, response error, or major change in housing unit characteristics	34
Gross rent decreased by 10 percent or more due to large decrease in estimated utility costs	17
Gross rent increased by 35 percent or more due to large increase in estimated utility costs	3
Total records deleted	343
Records remaining after deletions	1,135

SOURCE: Case-by-case analysis by HASE staff of linked records of the screening and wave 2 surveys of renter households in Site I.

[a]Rent reductions to relatives, friends, or employees of the landlord or to tenants in exchange for work on the premises.

[b]These records would be usable for this analysis except that their sampling histories differ from those of housing units selected for the permanent panel (wave 2) and their inclusion would pose difficulties for sample stratification and weighting.

screening interview. In order to have comparable estimates of the tenant's fuel and utility expenditures at the times of the screening and wave 2 interviews, we reestimated those expenditures for each screening survey record in the analysis file.

This reestimation was essentially a deflation of dollar expenditures reported at baseline for each tenant-paid item, taking into

account interim changes in fuel prices and utility service rates.* If there had been a change in the items used or in the allocation between landlord and tenant of responsibility for payment, this was also taken into account. Some missing values were estimated using averages for similar housing units, but these cases were not numerous.

Weighting the Linked Records

The next step was to weight each of the 1,135 linked records in the analysis file. We used a two-step cluster weighting procedure that had been developed in connection with other work with the baseline survey file. The records were grouped by baseline sampling stratum and, within each stratum, by property (i.e., in the case of multiunit rental properties represented in the sample by more than one unit). Each property was assigned the average sampling history weight (the inverse of the property's probability of selection) of all properties in the stratum.** For each multiunit property represented in the sample by one or more housing unit records, the property weight was multiplied by a factor that accounted for all rental housing units on the property. Thus, the sum of weights attached to all housing unit records in a given sampling stratum equals the estimated population of housing units in that stratum.

Table 2.3 summarizes the distribution of housing units in our analysis sample by sampling stratum and indicates the populations represented by units in each stratum. The largest samples were available for strata 2, 4, 5, and 6, all with more than 120 cases. These four strata contain over 60 percent of all rental housing units in the county. Strata 4, 5, and 6 jointly comprise units on properties whose average gross rents per unit fall in the middle tercile of the countywide rent distribution, the range most pertinent to the inflation analysis. For these three strata, we have a total of 582 records, a large enough

*Except for fuel oil, we compared rate schedules in effect in September 1973 and March 1974. For fuel oil, prices current in July 1973 and July 1974 were used.

**All properties in a given stratum would have the same sampling history weights except for the fact that some were misstratified in the early stages of our multistage sample-selection process.

Table 2.3

DISTRIBUTION OF RECORDS AND HOUSING UNITS BY TYPE OF PROPERTY: RENT-INFLATION ANALYSIS FILE, SITE I

Sampling Stratum[a]		Records in Analysis File		Estimated Population of Housing Units at Wave 1	
Stratum Number	Type of Property	Number	Percent	Number	Percent
	Low-rent Urban				
1	Single-family	59	5.2	338	2.5
2	2-4 units	171	15.1	2,725	20.0
3	5+ units	57	5.0	488	3.6
	Medium-rent Urban				
4	Single-family	121	10.7	885	6.5
5	2-4 units	224	19.7	3,077	22.6
6	5+ units	237	20.9	1,806	13.3
	High-rent Urban				
7	Single-family	46	4.1	573	4.2
8	2-4 units	75	6.6	1,927	14.2
9	5+ units	56	4.9	618	4.5
	Rural				
10	Low or medium rent	69	6.1	851	6.3
11	High rent	20	1.8	303	2.2
	All property types	1,135	100.0	13,589	100.0

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

NOTE: Distributions may not add exactly to totals because of rounding.

[a]Records in the analysis file are assigned to sampling strata on the basis of property characteristics reported in the baseline survey. Properties are stratified by average gross rent per unit, roughly into terciles of the overall distribution of gross rents in Brown County.

sample to yield quite reliable estimates. The weakest parts of the data base are for urban low-rent single-family houses and large apartment buildings, and for similar high-rent properties, both urban and rural.

Once sampling weights were on the file, it was possible to group records by characteristics other than sampling stratum while still appropriately weighting those that came from different strata. Thus, records

could be grouped by number of rooms per unit and a weighted tabulation of gross rents for, say, four-room units would still reflect the appropriate proportions of urban and rural homes, single-family dwellings and apartments, and low-, medium-, and high-rent properties. Table 2.4 shows how the sample and population are distributed by number of rooms per unit.

Table 2.4

DISTRIBUTION OF RECORDS AND HOUSING UNITS BY NUMBER OF ROOMS: RENT-INFLATION ANALYSIS FILE, SITE I

Number of Rooms[a]	Records in Analysis File		Estimated Population of Housing Units at Wave 1	
	Number	Percent	Number	Percent
1 or 2	84	7.4	827	6.1
3	251	22.1	2,718	20.0
4	418	36.8	5,371	39.5
5	244	21.5	3,024	22.3
6+	138	12.2	1,650	12.1
Total	1,135	100.0	13,589	100.0

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

NOTE: Distributions may not add exactly to totals because of rounding.

[a]Records in the analysis file are assigned the number of rooms that was reported in the baseline survey.

In weighting these records, no explicit consideration was given to problems of nonresponse bias, potentially a significant issue inasmuch as the sample consisted only of housing units whose occupants had responded to three successive surveys. However, weighting by sampling stratum and property tends to reduce or at least localize any such bias, because each record in the file represents only similar housing units in the population. Within strata, we know of no powerful reason to suppose that nonrespondents might have experienced either more or less rent inflation than respondents.

Calculating Monthly Inflation Rates

The final step in preparing the file was to calculate the average monthly rate of change in contract and gross rent for each of the 1,135 housing units in the sample. The main complication here is that our survey data indicated contract rent levels at the time of interview, rather than at the dates on which rents changed; and for utility costs, the respondent was asked to report the monthly average over the preceding year.* Furthermore, the intervals between interviews varied from record to record because fieldwork in each survey was spread over a period of three to six months.

The best estimate of a monthly inflation rate that can be constructed from these data is obtained by taking the difference between initial and terminal rents and allocating it over the intervening period. The longer the period, the more nearly this estimate approaches the true average rate; on the other hand, the longer the period, the more likely it is that the rate of inflation will have changed, so that an average is misleading when projected into the future or the past.

We followed this procedure, calculating for each record the monthly percentage change in rent which, when compounded over the number of months between interviews, would equal the total percentage change during that interval. This was done separately for contract and gross rent, and the results of the computation were added to each record in the file.

Table 2.5 shows the distribution of records by the months in 1973, 1974, and 1975 that they cover. All 1,135 records span the period from October 1973 through January 1975. Over 1,000 records also cover either September 1973, February 1975, or both of these months. Relatively few cover August 1973 or April through July of 1975. We think our data can most appropriately be described as accounting for inflation that occurred between September 1973 and February 1975. However, some of the records in our analysis file obviously cover a somewhat longer period.

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*That year was 1973 for the baseline survey and 1974 for the wave 2 survey.

Table 2.5

SAMPLE DENSITY OF RENT-INFLATION ANALYSIS FILE
BY MONTH: AUGUST 1973 THROUGH JULY 1975

Period Covered		Analysis Sample		Population Represented	
Month Number	Julian Calendar	Number of Records	Percent of All Records	Number of Rental Units	Percent of All Rental Units
	1973				
1	Aug	193	17.0	2,535	18.7
2	Sep	1,081	95.2	12,953	95.3
3	Oct	1,135	100.0	13,589	100.0
•	*1975*	•	•	•	•
18	Jan	1,135	100.0	13,589	100.0
19	Feb	1,001	88.2	11,913	87.7
20	Mar	524	46.2	6,325	46.5
21	Apr	193	17.0	2,488	18.3
22	May	90	7.9	1,190	8.8
23	Jun	63	5.6	828	6.1
24	Jul	24	2.1	250	1.8

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

NOTE: A record is considered to cover the months in which the screening interview and the wave 2 interview were conducted and all intervening months. All records covered the months of October 1973 through January 1975.

THE RENT-INFLATION ANALYSIS

At the end of the steps described above, we had a sample of 1,135 privately owned, unsubsidized rental housing units, for each of which we had calculated the average monthly rates of inflation in both contract and gross rent over a period of 16 to 24 months, which always included October 1973 through January 1975. Each housing unit record was weighted to represent its appropriate share of all rental housing units in its sampling stratum.

The monthly inflation rates and the weights were accumulated in matrices of the forms shown in Figs. 1 and 2. Matrices in the form of Fig. 1 were constructed separately for contract rent inflation rates and gross rent inflation rates. In either case, each entry in the

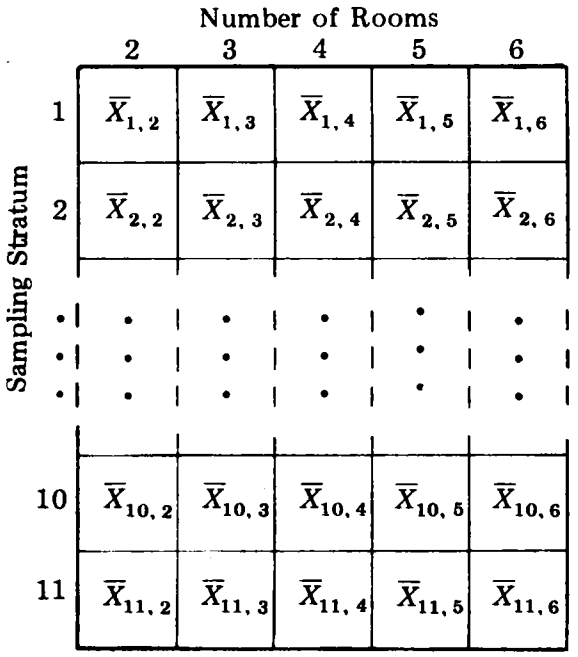

Fig. 1 – Matrix of mean monthly inflation rates (unweighted).

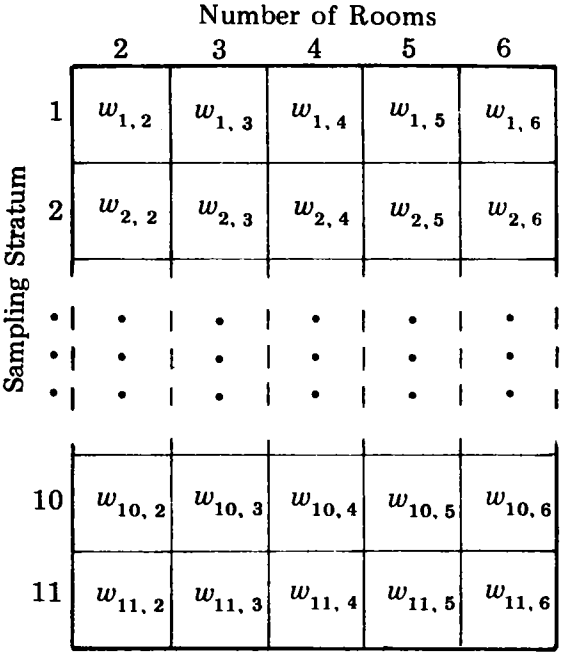

Fig. 2 -- Matrix of population weights.

matrix $(\bar{X}_{ij})$ is a simple arithmetic average of the individual inflation rates indicated on all records pertaining to that cell of the matrix, as defined by sampling stratum (i) and number of rooms per unit (j). Only one matrix of the form of Fig. 2 was required. Each entry (w_{ij}) is a simple sum of the population weights attached to all records pertaining to that cell, equivalent to an estimate of the number of rental housing units of that type in Brown County. All subsequent operations were performed on these matrices.*

Inflation Rates by Type of Property

Our estimate of the monthly rate of inflation by type of property $(\bar{X}_{i.})$ has the following form:

*The actual matrices are presented in Appendix A.

$$\bar{X}_i = \frac{\sum_{j=2}^{6} w_{ij} \bar{X}_{ij}}{\sum_{j=2}^{6} w_{ij}}.$$

In other words, it is a weighted average of the values across one row of Fig. 1. The weights assure us that rates for housing units of different sizes within a given sampling stratum are appropriately represented in the row average.

The results are shown in Table 2.6 for contract rent and in Table 2.7 for gross rent. The first column of each table gives the estimated mean monthly percentage change in rent, and the second column gives the standard error of that estimate. Thus, in Table 2.6, the mean monthly percentage change for stratum 1 is .3463 ±.0868. This is interpreted to mean that there is a 64-percent probability that the true mean for all stratum 1 housing units in Brown County lies between .2595 and .4331; and a 90-percent probability that the true mean lies between .1726 and .5199.*

Subsequent columns compound these monthly rates to arrive at their annual and 30-month equivalents. The annual equivalents are shown because that is the basis on which inflation rates are usually reported. The 30-month equivalent is the percentage increase in rent that would have occurred between September 1973 and February 1976 if the monthly rate shown had been effective for all 30 months.

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*Standard errors were calculated on the assumption that the sample elements in each cell of the matrix shown in Fig. 1 were randomly selected from the population of that cell. In fact, their sampling histories were more complex, in ways that could lead to larger estimates of variance than would be appropriate for a simple random sample. Consequently, the standard errors shown are likely to be slightly biased downward. The levels of confidence indicated (64 and 90 percent) are equivalent to one and two standard errors of a normal distribution, adjusted downward for the minimum degrees of freedom of any component of the estimate.

Standard errors for annual and 30-month equivalent inflation rates were calculated by separately compounding the upper and lower confidence limits of an interval estimate, differencing the compounded limits, then dividing the difference by the width (in standard units) of the interval.

Table 2.6

ESTIMATED RATE OF INFLATION IN CONTRACT RENT, BY TYPE OF PROPERTY: RENTAL HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973 TO 1975

Sampling Stratum		Percentage Change in Contract Rent, Compounded Monthly						Probability of Larger Chance Difference from Grand Mean (%)
		Monthly Change		Annual Equivalent		30-Month Equivalent		
Stratum Number	Type of Property	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	
	Low-rent Urban							
1	Single-family	.3463	.0868	4.24	1.08	10.93	2.88	90.0
2	2-4 units	.5135	.0661	6.34	.84	16.61	2.30	2.2
3	5+ units	.3608	.0669	4.42	.83	11.41	2.23	71.4
	Medium-rent Urban							
4	Single-family	.3965	.0600	4.86	.75	12.60	2.02	34.5
5	2-4 units	.3760	.0438	4.61	.55	11.92	1.47	32.3
6	5+ units	.2108	.0202	2.56	.25	6.52	.64	.5
	High-rent Urban							
7	Single-family	.1841	.0507	2.23	.62	5.67	1.60	3.4
8	2-4 units	.1732	.0356	2.10	.44	5.33	1.12	.6
9	5+ units	.1735	.0317	2.10	.39	5.34	1.00	.6
	Rural							
10	Low or medium rent	.3909	.0729	4.79	.91	12.42	2.45	46.4
11	High rent	.2989	.0872	3.65	1.08	9.36	2.85	69.8
	All property types	.3348	.0191	4.09	.24	10.55	.63	(a)

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

[a]Not applicable. The probability that the difference between the grand mean (all property types) and zero could occur by chance is less than .01 percent.

Table 2.7

ESTIMATED RATE OF INFLATION IN GROSS RENT, BY TYPE OF PROPERTY: RENTAL HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973 TO 1975

Sampling Stratum		Percentage Change in Gross Rent, Compounded Monthly						Probability of Larger Chance Difference from Grand Mean (%)
		Monthly Change		Annual Equivalent		30-Month Equivalent		
Stratum Number	Type of Property	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	
	Low-rent Urban							
1	Single-family	.6857	.0797	8.55	1.03	22.75	2.92	6.0
2	2-4 units	.5775	.0537	7.15	.69	18.86	1.90	11.9
3	5+ units	.4473	.0750	5.50	.95	14.33	2.56	56.2
	Medium-rent Urban							
4	Single-family	.6219	.0554	7.72	.71	20.44	1.99	6.4
5	2-4 units	.5495	.0371	6.80	.47	17.87	1.30	14.1
6	5+ units	.3041	.0213	3.71	.26	10.75	.70	.1
	High-rent Urban							
7	Single-family	.4102	.0676	5.03	.85	13.07	2.28	26.9
8	2-4 units	.3771	.0389	4.62	.49	11.95	1.30	2.6
9	5+ units	.2673	.0334	3.25	.41	8.34	1.08	.2
	Rural							
10	Low or medium rent	.6623	.0647	8.24	.83	21.90	2.35	4.3
11	High rent	.6612	.1168	8.23	.15	21.86	4.24	20.6
	All property types	.4933	.0168	6.08	.21	15.91	.58	(a)

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

[a]Not applicable. The probability that the difference between the grand mean (all property types) and zero could occur by chance is less than .01 percent.

The final rows in Tables 2.6 and 2.7 are weighted averages across all sampling strata, i.e.,

$$\bar{X} = \frac{\sum_{i=1}^{11} w_i \bar{X}_i}{\sum_{i=1}^{11} w_i} .$$

The final column of each table reports on tests of the significance of the differences between stratum means and the grand mean, $\bar{X}$. Thus, in Table 2.6 the mean for stratum 1 (.3463) is not very different from the grand mean (.3348); the probability that the difference of .0015 could have occurred by chance in sample selection is 90 percent. However, the mean for stratum 2 differs from the grand mean by much more than can be attributed to chance in sample selection. The implication of this latter instance is that housing units on low-rent urban properties with two to four units were almost certainly subject to higher rates of inflation than was the general inventory of rental housing.

Inflation in Contract Rents. Table 2.6 shows that the annual rate of inflation in contract rent for all rental housing in Brown County between late 1973 and early 1975 was nearly 4.1 percent. However, the rate varied considerably by type of property. The highest annual rate, 6.3 percent, was for low-rent urban properties of two to four units. For other low-rent properties and for the smaller medium-rent properties, the annual rates were between 4.2 and 4.9 percent. For high-rent urban properties and large medium-rent properties, the rates were between 2.1 and 2.6 percent.

We were surprised to find so much difference in inflation rates for different sectors of the housing market. Looking only at contract rent, the differences could be accounted for by any of several hypotheses, or by a combination of them:

1. Excess demand for low- and medium-rent housing may have enabled landlords to raise rents in that sector of the

market proportionally more than in the high-rent sector, independently of changes in the landlords' costs.

2. Rent increases reflected increases in fixed costs of about the same dollar amount per unit for all property types. Expressed as percentages of 1973 rents, the same dollar increase would work out to a smaller inflation rate for higher-rent units.
3. Rent increases reflected higher costs for landlord-paid utilities, and the customs of the market were such that a larger proportion of all utilities were included in contract rents for low-rent units than for high-rent units.

Inflation in Gross Rents. Table 2.7 shows comparable data for gross rents, enabling us to test at least the third hypothesis. By adding tenant payments for fuel and utilities to the contract rent, we obtain estimates of the total cost of housing to the tenant, which are comparable across units even though the responsibility for utility bills may be different.

The overall annual rate of inflation in gross rent was nearly 6.1 percent, half again as large as the corresponding rate for contract rent. This finding implies that the fuel and utility bills tenants paid increased much more than their contract rents.* Again, the rates vary by type of property, ranging from nearly 8.6 percent for low-rent single-family houses to about 3.2 percent for high-rent apartments in large buildings.

The entries in Table 2.7 exhibit a very regular pattern. Within each category of rent, inflation rates decrease with number of units on the property; and for each size of property, the rates decrease as the rent level rises. The low- and medium-rent rural properties in stratum 10, which are nearly all single-family houses, fit easily into this scheme; however, those in stratum 11--high-rent rural single-family houses--do not.

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*See Sec. III, below, for estimates of the effects on housing costs of changes in rate schedules for fuel and utility services.

The hypothesis that best explains this pattern is that most of the rent increases--whether in contract rent or in the cost of fuel and utilities billed to the tenant--are attributable to higher utility costs, particularly for heating fuel. We know from other data that single-family houses tend to be larger than units on small multiunit properties and that the latter in turn tend to be larger than units in large apartment buildings.* Single-family houses tend also to be more expensive to heat than apartments in multiunit structures, both because the houses have more rooms to heat and because they lose more heat through their exposed walls and roofs. Similar arguments can be made, though with less force, for electricity consumption, the other large conponent of utility costs.

When the price of heating fuel rises, the added dollar cost per unit is thus greatest for single-family homes and least for apartments in large buildings. On the other hand, the added dollar cost will be about the same for a low-rent as for a high-rent unit (controlling for unit size); but it will be a smaller *percentage* increase for the high-rent unit.

Although the explanation fits the pattern of the data, it is important to remember that inflation rates were calculated with respect to the 1973 rents of *individual units*, while the sample stratification of properties by rent is based on average gross rent *per unit on the property*. A multiunit property may have a range of rents, varying most often with the size of its individual units. Thus, one might easily find a large high-rent unit in stratum 2 or a small low-rent unit in stratum 8. In this case, the factors described above as influences on inflation rates would tend to be offsetting.

Inflation Rates by Size of Unit

Table 2.8 shows rates of inflation in contract and gross rent by number of rooms per unit. The entries for each size of unit were constructed by vertical accumulation of the inflation rates represented symbolically in Fig. 1, weighting each element of the sum by the corresponding population estimate represented symbolically in Fig. 2:

*Cf. appendix Table A-2.

Table 2.8

ESTIMATED RATES OF INFLATION IN CONTRACT AND GROSS RENTS BY SIZE OF UNIT, RENTAL HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973 TO 1975

Number of Rooms	Percentage Change in Rent, Compounded Monthly						Probability of Larger Chance Difference from Grand Mean (%)
	Monthly Change		Annual Equivalent		30-Month Equivalent		
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error	
Contract Rent							
1 or 2	.2409	.0388	2.93	.48	7.48	1.25	7.1
3	.4052	.0607	4.97	.76	12.90	2.05	22.4
4	.3284	.0240	4.01	.30	10.34	.79	78.3
5	.3197	.0380	3.90	.47	10.05	1.25	67.8
6+	.3143	.0576	3.84	.72	9.87	1.89	71.8
All sizes	.3348	.0191	4.09	.24	10.55	.63	(a)
Gross Rent							
1 or 2	.2796	.0403	3.41	.50	8.74	1.31	.4
3	.4258	.0454	5.23	.57	13.60	1.54	14.4
4	.4823	.0229	5.94	.39	15.53	.79	60.1
5	.6049	.0392	7.51	.50	19.83	1.40	2.1
6+	.5431	.0494	6.71	.63	17.64	1.73	33.0
All sizes	.4931	.0168	6.08	.21	15.90	.58	(a)

SOURCE: Tabulations by HASE staff of records of the rent-inflation analysis file for Site I.

[a]Not applicable. The probability that the difference between the grand mean (all property types) and zero could occur by chance is less than .01 percent.

$$\bar{X}_j = \frac{\sum_{i=1}^{11} w_{ij} X_{ij}}{\sum_{i=1}^{11} w_{ij}} .$$

Because sample sizes were small for units with one and two rooms, they are combined.* For similar reasons, units with six or more rooms were combined into one category.

There is less variation in inflation rates by size of unit than by type of property. The range of annual rates for contract rent is from 2.9 to 5.0 percent; for gross rent, the range is from 3.4 to 7.5 percent. In both cases, the rates first rise, then decline, as unit size increases; but the point of inflection is very different in the two cases. The peak rate for contract rent occurs at three rooms; the peak rate for gross rent occurs at five rooms.

Although the hypothesis presented earlier to explain differences in the rates of inflation by type of property can also be used to construct a consistent scenario of rent change by size of unit, the effort is less rewarding; with only five rather than eleven data points to be explained, a wider variety of hypotheses perform equally well. It is more fruitful, having developed a plausible hypothesis by inspecting these tables, to use the more powerful tool of regression analysis to test it.

Regression Analysis of Inflation

To test our hypothesis about the causes of inflation in housing costs during this period, we constructed three different statistical models, all using essentially the same variables. They differed mainly in their levels of aggregation and in their assumptions about the interdependence of explanatory variables. The fitted parameters of the

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*Recall that only complete housing units, with private kitchen and bath, are included in the data base for this analysis. Since bathrooms are not counted as habitable rooms, a one-room housing unit must have both its kitchen and its sleeping facilities in that room.

three models are mutually consistent, differing only in ways that suggest that a more complex model with interactions among the explanatory variables would probably provide more efficient estimators than any of the three models actually fitted. However, we concluded that further analytical work was not essential for present purposes, and speed in reaching conclusions was important.

Model A. The first model assumes that the monthly inflation rate for a given housing unit is affected by three independent factors: 1973 gross rent for the unit, number of rooms in the unit, and number of units on the property. The logic for this model was presented earlier.

The model was fitted to 1,135 unweighted observations by conventional least-squares regression, with the results shown in the first two lines of Table 2.9. The inflation rate varies inversely with gross rent, positively with number of units, and inversely with size of property.* All coefficients are significantly different from zero at the 95-percent level of confidence.

The reader will note the low coefficient of determination for this equation (R^2 = .1132). Combining this result with the finding that the coefficients are highly significant, we conclude that although the equation does a good job of assessing the influence of the factors specified, these account for only a small portion of the variance between housing units in their monthly inflation rates.

We do not find this result either surprising or discomforting. Recall that our dependent variable, the average monthly percentage change in gross rent, is based on two observations of gross rent separated by an arbitrary interval of 16 to 24 months. Landlords seldom change contract rents more often than once a year, and many of them

*In all three models, limits were placed on values of the independent variables to avoid bias from a few extreme values. The 1973 gross rent was not permitted to exceed $350; the number of rooms was limited to a minimum of two and a maximum of six; and the number of units was limited to a maximum of ten. A record that violated these limits was not rejected; instead, the limiting value was substituted for the actual value during computations.

Table 2.9

ESTIMATED COEFFICIENTS OF ALTERNATIVE REGRESSION MODELS USED TO EXPLAIN DIFFERENCES IN GROSS RENT INFLATION WITHIN THE BROWN COUNTY HOUSING MARKET

Regression Model	Estimated Regression Coefficients[a]				R^2
	Constant	1973 Gross Rent ($)	Number of Rooms	Number of Units	
Model A	.7754	-.0045	.0925	-.0170	.1132
	(.0887)	(.0004)	(.0178)	(.0060)	
Model B	.6378	-.0049	.1223	--	.1069
	(.0746)	(.0005)	(.0145)	--	
Model C					
1 or 2 rooms	.3322	-.0005	--	--	.9193
	(.0388)	(.0000)	--	--	
3 rooms	.6266	-.0019	--	--	.6894
	(.0347)	(.0003)	--	--	
4 rooms	.8063	-.0021	--	--	.8773
	(.0321)	(.0002)	--	--	
5 rooms	.7610	-.0012	--	--	.5233
	(.0405)	(.0002)	--	--	
6+ rooms	.9208	-.0024	--	--	.9154
	(.0240)	(.0002)	--	--	

SOURCE: Calculations by HASE staff from records of the rent-inflation analysis file for Site I.

NOTE: Regression Models A and B were fitted to 1,135 unweighted observations. Model C was fitted separately for each size of unit to groups of observations whose 1973 gross rents fell within $40 intervals. The number of data points fitted ranges from three to six, hence the high values for R^2.

[a]Coefficients are scaled to estimate the monthly percentage change in gross rent. Standard errors are shown in parentheses below each estimated coefficient; those for Model C, however, were computed without regard for the model's violation of certain standard assumptions.

prefer to change rents only on the occasion of tenant turnover. In other words, the process of inflation in contract rent for individual units is quite irregular, and the intervals covered by our data are not long enough for monthly averaging to smooth out the irregularity for individual units.

The other component of gross rent is the cost of fuel and utilities billed directly to the tenant. While some utility services, such as water and sewage, are provided and priced independently by local governments in Brown County, the large items--fuel oil, gas, and electricity--are provided countywide either by a single public utility or, in the case of fuel oil and bottled gas, in a competitive countywide market. Thus, changes in fuel prices or utility rates tend to affect all housing units simultaneously.*

However, they do not necessarily affect all gross rents simultaneously. For instance, if a landlord provides heat, his costs increase when fuel prices rise; but he may not pass the increase on to his tenants immediately. On the other hand, if a tenant pays directly for heating fuel, gross rent should reflect the increase in price at the first interview after it occurs.**

Finally, it should be noted that fuel and utility consumption vary with household size as well as with the size of the housing unit. Although larger households tend to occupy larger housing units, the correlation is far from perfect. A model that included number of persons per household as a separate explanatory variable would probably explain a somewhat larger fraction of the variance in monthly inflation rates.***

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*For the fall and winter of 1973-1974, this is an overstatement. Because of the Arab oil embargo, the markets for fuel oil and bottled gas were chaotic, with prices changing from day to day and even with different prices coexisting in the local market. This circumstance may have affected our estimates of 1973 fuel costs paid by tenants, since they were based on expenditures for 1973 that were reported in the baseline survey early in 1974. These reported expenditures were deflated in proportion to the change in the average price of No. 2 fuel oil between July 1973 and July 1974, based on a sample of five local distributors. In July 1973, these distributors quoted prices ranging from 16.2 to 28.9 cents per gallon, delivered. In July 1974, the range was much narrower, 32.4 to 35.7 cents per gallon. See appendix Table B-3 for additional qualifications.

**That is, insofar as a recent price increase was figured by the respondent into his estimate of the preceding year's average monthly expenditure.

***Designing such a model would be complicated in that household size at the time of the second observation would often differ from household size at the first observation.

Model B. The second model whose parameters are shown in Table 2.9 differs from the first only in that number of units on the property is not included as an explanatory variable, leaving only 1973 gross rent and number of rooms as factors affecting the rate of inflation in gross rent.

Model B is motivated by the fact that the schedule of the standard cost of adequate housing, which we wished to update, specifies standard costs only by number of rooms and gross rent. Even though Model A tells us that gross rents for single-family houses were rising faster than gross rents for apartments in large buildings, we did not think it would be appropriate to give more or less benefits to program participants depending on the size of the property on which their unit was located. The influence of property size, in any case, would be partly reflected in the other two variables, given their known correlations with property size.

As the entries in Table 2.9 show, this was indeed the outcome. The regression constant for Model B is smaller than that for Model A, because a variable with a negative coefficient was deleted from the equation. The negative coefficient of 1973 gross rent did not change significantly from Model A to Model B. However, the positive coefficient of number of rooms increased by a third, combining the effects of number of rooms and number of units, which are inversely related to each other but which have opposing effects on the inflation rate.

Note that dropping one variable from the equation has very little effect on the coefficient of determination (R^2 = .1069). Model B explains nearly as much of the variance in housing unit inflation rates as does Model A and provides the more convenient formulation for our immediate purposes.

Model C. The plotted residuals from Models A and B offered no evidence of strong misspecification of functional relationships, but the residuals were diffused enough to obscure weak misspecification. Model C was therefore designed to test for interactions between gross rent and number of rooms as influences on the inflation rate.

Rather than postulate a form for this interaction, we divided the data base by number of rooms per unit and fitted separate regressions

for each size of unit. Each regression equation expresses the inflation rate as a linear function of 1973 gross rent.

We also took steps to reduce the "noise" in the dependent variable so as to expose patterns of relationship more clearly. First, the housing unit records in each cell of Fig. 1 were grouped by $40 intervals of 1973 gross rent, and the group was assigned a gross rent equal to the midpoint value of that interval.* Second, a single inflation rate, $\overline{X}_{\cdot jk}$, was created to represent all units of a given size in a given gross rent interval. This rate was a linear combination of the $\overline{X}_{ij}$ shown in Fig. 1, as follows:

$$\overline{X}_{\cdot jk} = \frac{\sum_{i=1}^{11} w_{ijk}\,\overline{X}_{ij}}{\sum_{i=1}^{11} w_{ijk}},$$

where k = a gross rent interval.

w_{ijk} = sum of population weights for all records in sampling stratum i, number of rooms j, and gross rent interval k.

The result of these manipulations is a matrix of the form shown in Fig. 3. The entries in each column of that matrix were then regressed on the 1973 gross rent interval associated with each entry. Because not all unit sizes were represented in all rent intervals, the number of "observations" on which each regression was based varied from three to six. Since most of the variance in the rent-inflation rate was averaged out before regression, the coefficients of determination for these equations are misleadingly high.

Table 2.9 shows the parameters of the five regressions; both the observations and the estimating equations are plotted in Fig. 4. As in both earlier models, the coefficient of gross rent is negative and the coefficient of unit size (now reflected in the constant term of

*The lowest interval was under $80, with a "midpoint" of $60. The upper interval was $240 or more, with a "midpoint" of $260.

1973 Gross Rent Interval	Number of Rooms 2	3	4	5	6
1	$\overline{X}_{.21}$	$\overline{X}_{.31}$	$\overline{X}_{.41}$	$\overline{X}_{.51}$	$\overline{X}_{.61}$
2	$\overline{X}_{.22}$	$\overline{X}_{.32}$	$\overline{X}_{.42}$	$\overline{X}_{.52}$	$\overline{X}_{.62}$
3	$\overline{X}_{.23}$	$\overline{X}_{.33}$	$\overline{X}_{.43}$	$\overline{X}_{.53}$	$\overline{X}_{.63}$
4	$\overline{X}_{.24}$	$\overline{X}_{.34}$	$\overline{X}_{.44}$	$\overline{X}_{.54}$	$\overline{X}_{.64}$
5	$\overline{X}_{.25}$	$\overline{X}_{.35}$	$\overline{X}_{.45}$	$\overline{X}_{.55}$	$\overline{X}_{.65}$
6	$\overline{X}_{.26}$	$\overline{X}_{.36}$	$\overline{X}_{.46}$	$\overline{X}_{.56}$	$\overline{X}_{.66}$

Fig. 3–Derived matrix of mean monthly inflation rates

each equation) is positive. The point of interest is that the inflation rate is increasingly sensitive to gross rent as unit size increases. This point can be seen either in the increasingly negative values of the coefficients of gross rent in Table 2.9, or in the increasing slope of the plotted functions in Fig. 4. The regularity of the pattern is broken only by the function plotted for five-room units, the slope of which is less steep than the slopes of its neighbors on either side.

The simplest interpretation of these findings starts with the assumption that the observed inflation in gross rents is nearly all due to rising costs for fuel and utility services. The larger the housing unit, the more fuel and utilities its occupants use. *If* fuel and utility costs in 1973 comprised a smaller percentage of gross rent for large units than for small units, and a smaller percentage of gross rent for high-rent units than for low-rent units, the slopes of the

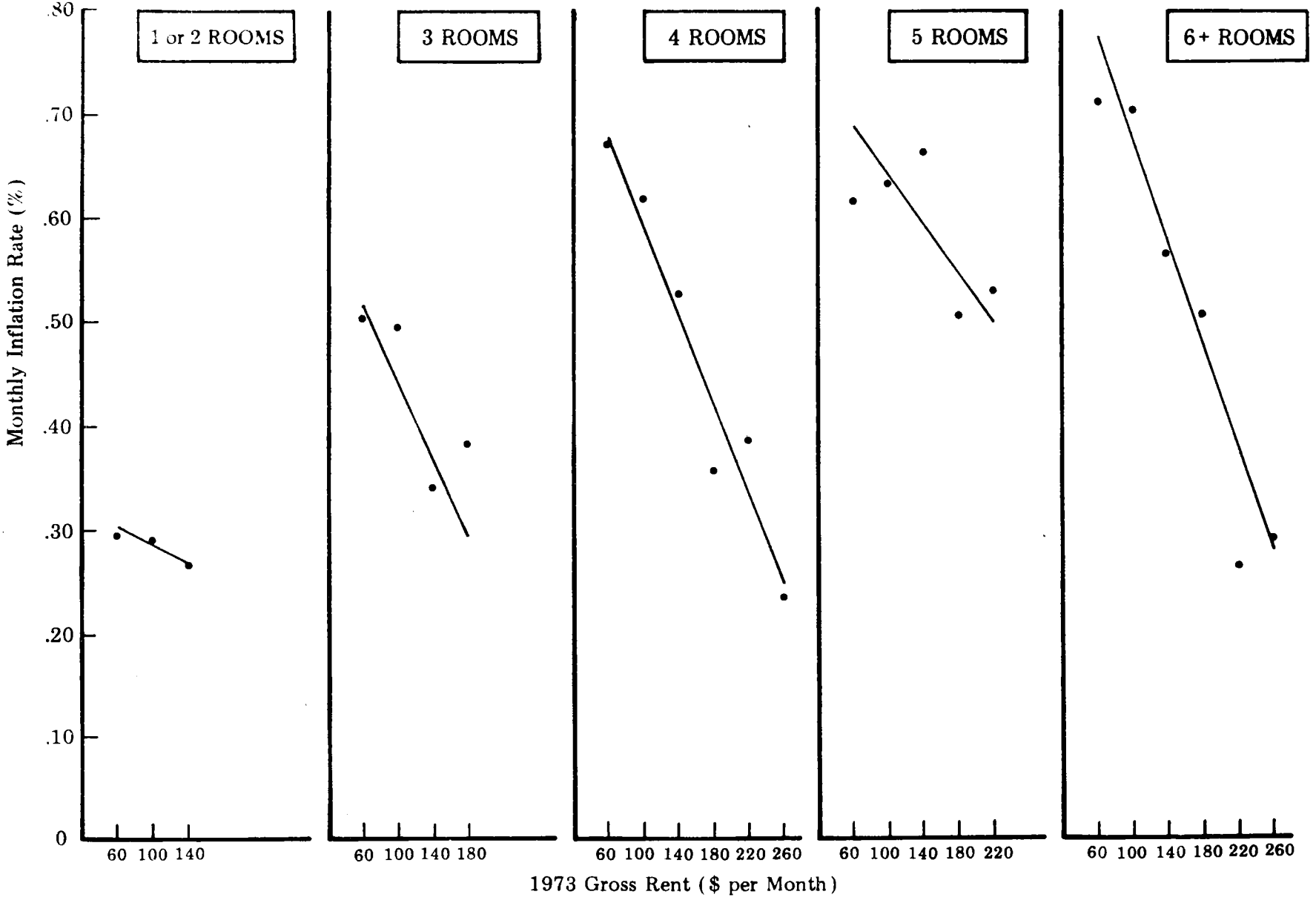

Fig. 4 -- Relationship between monthly inflation rate and initial gross rent, by number of rooms per unit: Site I, 1973-1975

lines in Fig. 4 could reflect the effects on units of different sizes of a marketwide increase in fuel and utility costs.

The premises in the preceding paragraph can all be investigated within our data base, but those introduced by "if" have not been checked. (To learn from survey data about total utility costs--those paid by landlords as well as those paid by tenants--it is necessary to link landlord and tenant interview records.) For the present, we will simply use Model C as one of several methods for estimating rent inflation.

ESTIMATING INFLATION RATES FOR STANDARD CASES

Although the parameters of our three regression models differ, the practical question is whether they lead to different estimates of the rates of rent inflation that should be applied to the 1973-based schedule of the standard cost of adequate housing. Table 2.10 shows that they do indeed.

Table 2.10

ESTIMATES OF 30-MONTH RATES OF INFLATION IN GROSS RENT USING ALTERNATIVE REGRESSION MODELS AND STANDARD CASES: RENTAL HOUSING IN BROWN COUNTY, WISCONSIN, 1973-1976

Standard Case		Estimate of 30-month Percentage Change in Gross Rent				
		Model A, by Units per Property				
Number of Rooms	1973 Gross Rent	1	3	10	Model B	Model C
1 or 2	100	15.9	14.7	10.7	12.5	8.9
3	125	15.2	14.1	10.1	12.6	12.5
4	155	13.8	12.6	8.7	11.2	15.3
5	170	14.6	13.5	9.5	13.4	18.2
6+	190	14.7	13.6	9.6	14.2	14.7
6+	220	10.2	9.1	5.3	9.3	12.1

SOURCE: Calculations by HASE staff from regression parameters in Table 2.9

NOTE: Standard cases are based on occupancy standards and current schedule of the standard cost of adequate housing (R^*) for the Brown County Housing Allowance Office.

The standard cases shown in the stub of the table are those defined by the existing R^* schedule, except that the data base for our regression models was not restricted to housing units that would meet the HAO's standards of decency, safety, and sanitation. However, we know that in 1973 between 50 and 75 percent of all rental units defined by each standard case would probably have qualified for occupancy by program participants.*

The entries in the table are 30-month inflation rates, compounded from the monthly rates that were used in our analysis. They can be interpreted as estimates of the average percentage changes in gross rent for housing units of each type that would have occurred between September 1973 and February 1976 *if* the average monthly rate of increase for the earlier 18 months of that interval had persisted during its last 12 months.

For Model A, we show values separately for single-family houses, three-unit properties, and ten-unit properties. However, one is not likely to find a single-family house with only one or two rooms, or an apartment in a large building with six or more rooms. The most empirically relevant entries are those along the diagonal rising from left to right.

Considered in this light, the entries for Model A are reasonably consistent with those for Model B, in which the number of units per property was suppressed as an explanatory variable. Model B suggests that 30-month inflation rates for all but one of the standard cases were in the range of 11 to 14 percent. The estimated rate for the last case (6+ rooms, 1973 rent of $220) is only about 9 percent.

Model C disagrees with Model B in a number of respects. There is close correspondence between their estimates for only two of the six standard cases, and there are differences of 3 to 5 percentage points for the remaining four cases. The differences are not even consistent as to sign.

These findings are instructive for those of us who are accustomed to accepting published aggregate estimates of consumer price changes

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*See Sec. I of this note and the references indicated there.

as though they were precise enough to motivate delicate policy responses. Clearly, in Brown County, inflation in housing costs has affected some families much more than others, but how much more depends on the model one chooses to describe the phenomenon.

The entries in Table 2.10 will be considered further in Sec. V of this note. First, it is helpful to review data from sources other than our surveys, data that bear directly on the role changing fuel and utility costs play in triggering inflation in gross rents.

III. CHANGES IN THE COSTS OF FUEL AND UTILITY SERVICES, 1973-1976

In Sec. II, we demonstrated that gross rents in Brown County have risen more rapidly than contract rents, 6.1 vs. 4.1 percent annually from 1973 to 1975. Because the difference between gross and contract rent consists entirely of outlays for fuels and utility services that were billed directly to the tenant, this finding implies that increases in such outlays were a major element of gross rent inflation during the period in question. Indeed, since some of these items are usually billed to the landlord rather than to the tenant, the reported increase in contract rent must also reflect the higher costs of fuels and utility services.

In this section, we review the recent history of rate changes for each of the fuels and services whose costs are conventionally included in gross rent. These are fuels (energy sources) for illumination, operating household appliances, cooking, water heating, and space heating; piped water for bathing, washing, and garden use; and disposal of sewage and solid wastes. Then, we estimate how the rate changes would affect the monthly costs of operating typical homes in Brown County, considering variations in consumption levels associated with housing unit and household size.*

The analysis is complicated by both the intricacy of rate schedules and the coexistence of alternative domestic equipment using different fuels for such things as heating and cooking. However, we conclude that the total cost of fuel and utility services consumed by a typical

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*The data used in this section were assembled by Paul F. Ernst for the Brown County Housing Allowance Office, and were used by him to estimate adjustments to standard allowances for fuel and utility expenses incurred by program participants. His computations and findings are reported in *Residential Utility Rate Changes in Brown County, Wisconsin, from September 1973 through January 1, 1976*, Housing Allowance Office of Brown County, Inc., BC/HAO-2, January 1976. Generally, Ernst followed methods devised by Barbara M. Woodfill of Rand for exactly this purpose. His report provides convenient documentation of procedural details only generally described here.

We use Ernst's and Woodfill's data and many of their computations for somewhat different purposes here--to estimate the amount of inflation in gross rents that is attributable to higher costs for fuels and utility services.

renter household in Brown County increased by 60 to 72 percent during the 30-month period, September 1973 through February 1976. (The equivalent annual rates are 21 to 24 percent.) If fully reflected in gross rents, these added costs would account for a 30-month increase of about 15 percent for a typical housing unit. Our estimate from survey data of the countywide average increase in gross rent for the same period was 15.9 percent. Even allowing for some decrease in fuel consumption due to its higher costs, recent rent inflation in Brown County seems to be mostly attributable to rising prices of fuels and utility services.

ESTIMATING CHANGES IN FUEL COSTS

Electricity, gas, and fuel oil are all used by households in Brown County, but in different proportions and for varying purposes (see Table 3.1). Electricity is nearly always used for illumination and to operate household appliances. It competes primarily with piped or bottled gas for cooking and water heating. For space heating, piped gas and fuel oil are the principal competitors, though some households use bottled gas, kerosene, coal, or wood. Because the last four fuels account for only small fractions of all fuel consumed in residential uses, we excluded them entirely from our analysis, dealing only with electricity, piped gas, and fuel oil.

To construct general estimates of household fuel expenditures at different times, we first estimated the amount of each fuel that would be consumed by a typical household using it for a specified function, such as space heating. Then we applied the current rate schedule for each fuel that was usable for that function to obtain an estimate of its cost--e.g., of the cost of heating a typical home alternatively by electricity, piped gas, or fuel oil. Next, we weighted each of the alternative cost estimates by the relative frequency with which Brown

County's households used that fuel for that function. The result was a weighted average fuel cost for each function. Summing over functions, we then obtained an estimate of the typical monthly fuel bill.

Table 3.1

DISTRIBUTION OF HOUSEHOLDS BY TYPE OF FUEL USED FOR SELECTED DOMESTIC FUNCTIONS: BROWN COUNTY, WISCONSIN, 1970

Type of Fuel	Percentage Distribution of Households by Type of Fuel Used for Indicated Function			
	Illumination, Appliances	Cooking	Water Heating	Space Heating
Electricity	100.0[a]	41.2	14.7	.5
Piped gas	(b)	50.8	77.4	70.1
Bottled, tank, or LP gas	(a)	7.0	5.2	4.0
Fuel oil or kerosene	(a)	.4	.9	21.7
Coal or coke	--	(c)	.4	3.2
Wood	--	.4	--	.3
Other fuel	--	--	--	.1
No fuel used	--	.2	1.4	.1
Total, all fuels	100.0	100.0	100.0	100.0

SOURCE: Tabulations prepared by the National Data Planning Corporation from records of the 1970 Census of Housing, Fourth Count.

NOTE: Percentages may not add exactly to 100.0 because of rounding.

[a]Virtually all housing units in Brown County are illuminated by electricity. A small number of farmhouses and seasonal homes may use bottled gas or kerosene.

[b]About 20 percent of all housing units have gas-powered clothes dryers.

[c]Less than 0.1 percent.

Fuel Consumption Norms by Function

The domestic fuel-consuming functions that we distinguish here are illumination and appliance operation, cooking, water heating, and space heating. The consumption norms for each are shown in Table 3.2. They are based on average household consumption data from a variety of sources, generally applying to the census region comprised of Illinois, Indiana, Michigan, Ohio, and Wisconsin. The regional norms for space heating were adjusted to reflect specific meteorological conditions in Brown County.

The sources that we used are distressingly vague about the characteristics of the housing units and households to which these norms apply. We have assumed that each is appropriate for a housing unit of 5.2 rooms occupied by 3.7 persons--averages based on 1970 census data for all housing units and households in the region described above. Monthly cost estimates for other sizes of housing unit and household were scaled from this reference point by a method that is described later in this section.

Rate Schedules by Type of Fuel

Rate schedules for each of the three fuels are reported in Appendix B for various dates between November 1972 and January 1976. In constructing our fuel cost estimates for September 1973 and February 1976, we used the last preceding rate schedule for each fuel. All other factors entering these estimates were the same for both dates.

Applying electrical and gas rate schedules to functional consumption norms is complicated by the fact that there is a fixed charge for each service; moreover, the variable charge per kilowatt-hour or therm drops as the amount consumed increases. Thus, someone using electricity for illumination, cooking, and water heating pays less per kilowatt-hour than someone using electricity only for illumination. Also, rates differ slightly for urban and rural customers.

The first problem was handled by ordering the functions, applying the fixed charge to the first function, and assuming that use of a fuel for a higher-order function implied use of the same fuel for all lower-order

Table 3.2

FUEL CONSUMPTION NORMS, BY FUNCTION: TYPICAL HOUSEHOLD IN BROWN COUNTY, WISCONSIN, 1970-1975

Function	Average Monthly Fuel Consumption when Indicated Fuel is Used		
	Electricity (kwh)	Gas (therms)	Fuel Oil (gallons)
Illumination and appliance operation[a]	377	3[b]	(c)
Cooking	100	8	(c)
Water heating	380	24	(c)
Space heating	1,915	126	108

SOURCE: K. Anderson, *Residential Energy Use: An Econometric Analysis*, The Rand Corporation, R-1297-NSF, October 1973; American Gas Association, *Info Data Sheet*, Nos. 74/1 and 74/2; Public Service Commission of Wisconsin, Accounts and Finance Division Bulletin No. 9, *Comparison of Net Monthly Bills for Electrical Utility Service in Wisconsin*, March 1973, and No. 10, *Comparison of Net Monthly Bills for Gas Service in Incorporated Wisconsin Communities with over 500 Population*, January 1973; 1970 Census of Housing, *Detailed Housing Characteristics*, Wisconsin; and calculations by HASE staff.

NOTE: Consumption norms are generally based on an "average" housing unit of 5.2 rooms occupied by 3.7 persons in the east north central census region.

[a]Fuel used for appliances is based on the average number of each appliance per household in 1970, as follows: refrigerator (1.00), television (1.16), clothes washer (0.53), clothes dryer (0.55), freezer (0.36), diswasher (0.14), other small appliances (1.00).

[b]Gas-powered clothes dryer, used by about 20 percent of all households.

[c]Fuel oil is rarely used for these functions.

functions. Thus, in the case of electricity, the order was illumination and appliances, cooking, water heating, and space heating. The fixed charge was allocated to illumination and appliances, and anyone who used electricity for water heating was assumed to use it also for the two preceding functions. The cost of heating water with electricity was then calculated at the lower marginal rate applicable for a heavy user.

Separate fuel cost estimates were prepared for urban and rural users to reflect the different rates applicable to them; and these separate schedules are in fact used by the Brown County Housing Allowance Office to estimate "actual" housing costs for individual clients. Here, however, we base our estimates of fuel costs only on the urban rate schedules that apply to about 80 percent of all Brown County households.

Table 3.3 shows the estimated monthly cost of each fuel, by function, when consumed in the amounts shown in Table 3.2. Estimates are given for both September 1973 and February 1976. The last column of the table shows a weighted average, constructed by weighting the costs for each fuel according to the proportion of all households using it for the indicated function. Under the rates applicable in September 1973, the composite monthly fuel bill for a typical household would have been $34.39; under the rates applicable in February 1976, the bill for the same amounts of fuel would have been $53.11, an increase of 54 percent.*

ESTIMATING CHANGES IN THE COSTS OF OTHER UTILITIES

Other utilities whose costs are conventionally included in gross rent are water and sewer service and garbage collection. In Brown County, these services are (with minor exceptions) provided by local governments, each of which sets rates within its jurisdiction. In 1973, the two largest jurisdictions of the county funded sewer service and garbage collection from general property tax revenues; beginning in 1975, both shifted to user charges for sewer service.

To estimate typical household expenditures for these services at different times, we applied the current rate schedules to consumption

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*See note to Table 3.3 for qualifications.

Table 3.3

AVERAGE MONTHLY FUEL COSTS, BY FUNCTION: TYPICAL HOUSEHOLDS IN BROWN COUNTY, WISCONSIN, 1973 AND 1976

Function	Average Monthly Cost ($) of Fuel If Used for Indicated Function			Weighted Average Cost ($), All Fuel
	Electricity	Gas	Fuel Oil	
September 1973				
Illumination and appliance operation	11.65	(a)	(b)	11.65
Cooking	2.56	2.09	(b)	2.30
Water heating	9.01	3.40	(b)	4.30
Space heating	40.88	13.53	24.41[c]	16.14[c]
Total	64.10	19.02	24.41[c]	34.39[c]
February 1976				
Illumination and appliance operation	19.02	(a)	(b)	19.02
Cooking	3.41	3.29	(b)	3.35
Water heating	12.94	4.55	(b)	5.89
Space heating	61.89	19.39	42.12	24.85
Total	97.26	27.23	42.12	53.11

SOURCE: Calculated by HASE staff from data in Tables 3.1, 3.2, B-1, B-2, and B-3.

NOTE: Average monthly cost for a specific fuel is based on consumption norms for that fuel for an average month of any calendar year, and on rate schedules in effect for the months indicated. The weighted average for all fuels weights each fuel according to the proportion of all household using it for the indicated function.

[a] To simplify calculations, fuel costs for gas-powered clothes dryers are neglected. See Table 3.2.

[b] Fuel oil is rarely used for these functions.

[c] These entries are arguably underestimates. The average monthly cost for fuel oil is an average of prices quoted by local dealers in July 1973, and includes one low quotation that was subsequently discovered to be for bulk deliveries (see appendix Table B-3). Omitting that quotation, the average cost of fuel oil would be $25.97, the composite fuel cost for space heating would be $16.61, and the total composite fuel cost would be $34.86.

norms, just as we did for fuel expenditures. However, in this case, it was necessary to construct separate expenditure estimates for each jurisdiction that had a different rate schedule; then to compile a countywide average expenditure, weighting the amounts calculated for each jurisdiction by the share of the county's population contained in that jurisdiction.

We treated utility services that were funded from general property tax revenues as though they were free to the user, since the taxes on his home were unaffected by his consumption of the service. As a matter of interest, we do report estimates of the costs to local governments of providing these services.

Water Service

Water is supplied to residential customers by nine units of local government, the seven largest of which serve about 84 percent of the county's population.* All seven bill their customers quarterly according to gallons consumed, the rates dropping as consumption rises. All seven have minimum charges. For each of them, the rate schedules that were in effect in September 1973 and December 1975 are shown in appendix Table B-4. The latter rates were still in effect in February 1976.

According to local authorities, the typical household in Brown County consumes 20,000 gallons of water per quarter, or 6,667 monthly. Table 3.4 shows monthly charges for this amount of water by jurisdiction in 1973 and 1976. The weighted average across jurisdictions was $3.82 in 1973 and $4.31 in 1976.

Sewer Service

The same seven local governments that supply water to their constituents also provide sewer service to them, either directly or by contracting with a newly formed metropolitan sewer district. In 1973, Green Bay and Allouez covered the costs of this service by a general property tax levy, while all other jurisdictions levied quarterly user charges based on the amount of water metered to the customer. In 1975, Green Bay and Allouez shifted to user charges.

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*The other two public systems are in small rural villages. The remaining rural homes are mostly supplied by private wells.

Table 3.4

AVERAGE MONTHLY COST OF WATER SERVICE, BY JURISDICTION: TYPICAL HOUSEHOLDS IN BROWN COUNTY, WISCONSIN, 1973 AND 1976

Jurisdiction	Percent of Covered Population	Monthly Cost ($) for 6,667 gallons[a]	
		1973	1976
City of Green Bay	63.3	4.11	4.61
City of DePere	10.4	4.00	4.00
Town of Allouez	10.6	3.00	4.09
Village of Howard	4.2	3.17	4.36
Town of Ashwaubenon	8.7	2.67	2.67
Village of Pulaski	1.2	3.33	3.33
Town of Bellevue	1.5	5.42	5.42
All jurisdictions	100.0	3.82[b]	4.31[b]

SOURCE: Appendix Table B-4 and calculations by HASE staff. Population estimates by jurisdiction are from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 594, *1973 Population and 1972 Per Capita Income Estimates for Counties, Incorporated Places, and Selected Minor Civil Division in Wisconsin*, June 1975.

NOTE: Population distribution does not add exactly to 100.0 percent because of rounding. The seven jurisdictions for which rate schedules were available contain 84 percent of the county's population and 97 percent of those served by a public water supply.

[a]Based on average annual consumption of 80,000 gallons and rates in effect in September 1973 and February 1976.

[b]Average of monthly costs by jurisdiction, weighting each jurisdiction by its share of total population.

Rate schedules for sewer service in each jurisdiction are given in appendix Table B-5 for September 1973 and either December 1975 or January 1976. The latter rates were still in effect in February 1976. We calculated monthly costs based on water consumption of 6,667 gallons per month. The results are shown in Table 3.5.

In comparing the costs of sewer service for 1973 and 1976, we decided to treat the 1973 costs as zero, since user charges were then imposed on only a fourth of all households in the seven jurisdictions and only a fifth of all households in the county. Although specific tax levies in Green Bay and Allouez were earmarked for sewer service, the amounts paid varied with property value, not use of the service; and when these jurisdictions shifted to user charges, their property tax rates were not reduced.

Garbage Collection

Solid waste collection costs are included in the general property tax levy in most jurisdictions in Brown County. User charges are in effect only in the village of Howard and a few rural areas. Because of the general absence of user charges, we excluded the costs of garbage collection from our analysis of inflation.

As a matter of information, however, we checked with local officials for estimates of the costs of providing this service in 1973 and 1975. User charges in the village of Howard were $3.00 per month in both 1973 and 1975. For Green Bay, the largest jurisdiction, the solid waste collection budget averaged $2.87 per month per household served in 1973, and $3.53 in 1975, an increase of about 11 percent annually. Estimates of costs for other jurisdictions fell in this same general range except for Allouez, where an unusually efficient collection system is expected to bring costs down to $2.00 per month for residential customers. Generally, rural costs are higher than urban costs because the low density of customers entails more travel between pickups.

SUMMARY OF COST CHANGES, 1973 TO 1976

Table 3.6 compares fuel and utility service costs for a typical urban household in Brown County in September 1973 and February 1976,

Table 3.5

AVERAGE MONTHLY COST OF SEWER SERVICE, BY JURISDICTION: TYPICAL HOUSEHOLDS IN BROWN COUNTY, WISCONSIN, 1973 AND 1976

Jurisdiction	Percent of Covered Population	Monthly Cost ($) Based on 6,667 Gallons of Water[a]	
		1973	1976
City of Green Bay	63.3	(b)	5.07
City of DePere	10.4	2.00	2.00
Town of Allouez	10.6	(b)	4.67
Village of Howard	4.2	3.96	9.16
Town of Ashwaubenon	8.7	2.40	3.75
Village of Pulaski	1.2	3.33	3.33
Town of Bellevue	1.5	2.00	5.56
All jurisdictions	100.0	(c)	4.75[d]

SOURCE: Appendix Table B-5 and calculations by HASE staff. See Table 3.4 for source and notes on population estimates.

[a]Sewage charges in all jurisdictions are based on water consumption, except as noted. Costs are calculated from rates in effect in September 1973 and February 1976.

[b]Sewage charge included in general property tax levy, at $3.20 per $1,000 of assessed valuation for Green Bay and $2.775 for Allouez.

[c]Not computed because nearly 75 percent of the population covered did not pay user charges.

[d]Average of monthly costs by jurisdiction, weighting each jurisdiction by its share of total population.

Table 3.6

COMPARISON OF FUEL AND UTILITY COSTS FOR TYPICAL URBAN HOUSEHOLD: BROWN COUNTY, WISCONSIN, 1973 AND 1976

Item	Typical Monthly Cost ($)		Percentage Increase (30 months)
	September 1973	February 1976	
Fuel, by Function			
Illumination and appliances[a]	11.65	19.02	63.3
Cooking	2.30	3.35	45.6
Water heating	4.30	5.89	37.0
Space heating	16.14	24.85	54.0
Total fuel costs	34.39	53.11	54.4
Other Utilities			
Water service	3.82	4.31	12.8
Sewer service	(b)	4.75	--
Garbage collection	(c)	(c)	--
Total other utilities	3.82	9.06	137.2
Total, all utilities	38.21	62.17	62.7

SOURCE: Tables 3.3, 3.4, and 3.5.

NOTE: Estimates are generally based on a housing unit of 5.2 rooms, occupied by a household of 3.7 persons. All costs are calculated by applying then-current rates for the fuel or utility in question to consumption norms for the indicated typical case.

[a]Includes monthly fixed charge for electricity.

[b]Included in general property tax for households in Green Bay and Allouez in 1973. Beginning in 1975, both shifted to direct user charges.

[c]Included in general property tax for nearly all urban households. The estimated cost per household in Green Bay was $2.87 in 1973 and $3.53 in 1975.

summarizing the estimates presented earlier in this section. As explained then, the typical household is assumed to consist of 3.7 persons living in a housing unit of 5.2 rooms. For rental units, some of these costs are usually included in contract rent; others are billed directly to the tenant.

Over the 30-month period, we estimate that fuel costs increased by 54 percent; and user charges for other utilities increased by 137 percent, principally because sewer service in two large jurisdictions was shifted to user-charge financing in 1975. Combining fuel and utilities, the overall cost increase was nearly 63 percent.

Costs by Size of Unit and Size of Household

The sources from which our consumption and cost data were obtained provide very little guidance as to differences in costs for housing units or households of different sizes. In order to estimate standard costs for households participating in the allowance program, we devised formulas for adjusting the average figures given in Table 3.6 to reflect different levels of consumption for different sizes of household and housing unit. Later, we expect to improve on these formulas by analysis of survey data for tenants and homeowners who paid their fuel or utility bills directly.

The present formulas draw on an earlier study by Rand of fuel and utility costs for renter households in New York City--weak guidance, considering the many differences both in housing unit, consumption patterns, and rate structures between New York City and Brown County. However, the formulas were able to do a reasonably good job of estimating the fuel and utility costs in Brown County that were reported by the 1970 Census of Housing.

Essentially, the method entails estimating for each function listed in the stub of Table 3.6 a fixed cost per housing unit and a cost that varies either with number of rooms (for fuels) or number of persons (for water and sewer service). The choice of parameters is constrained by the requirement that the sum of fixed and variable costs for a housing unit of 5.2 rooms (or a household of 3.7 persons) must equal the

amount shown for that typical case in Table 3.6; and by the reasonableness of this sum for larger and smaller housing units or households.*

The results of these calculations for both 1973 and 1976 are shown in Table 3.7 for fuel and Table 3.8 for other utilities.

In Table 3.7, the cost of fuel for each of the four fuel-using functions is estimated by number of rooms. The reader will note that the total fuel cost shown for a five-room unit in 1973 is $33.67, as compared with the estimate in Table 3.6 of $34.39 for 5.2 rooms, the "typical" case. But the amounts range from $19.32 for one room to $51.61 for ten rooms. Costs for 1976 are higher, but follow the same pattern.

Table 3.8 shows similar estimates for water and sewer service, the cost varying by number of persons in the household. Only water service is considered for 1973, for reasons explained earlier. For 1976, both water and sewer service costs are estimated. Their total for four persons is $9.80, comparable with the estimate in Table 3.6 of $9.06 for 3.7 persons, the "typical" case. However, the amounts range from $3.87 for one person (reflecting minimum service charges) to $24.49 for ten persons.

Cost Changes for Standard Cases

Table 3.9 summarizes the data in the preceding tables for selected combinations of household and housing unit sizes. The combinations selected are those embodied in the Brown County HAO's occupancy standards.

Between September 1973 and February 1976, we estimate that the combined monthly cost of fuel and other utilities increased by about $15 for a single person in a two-room housing unit; and by more than $34 for ten persons in six rooms. For the various combinations shown, the 30-month percentage increases ranged from 60 to 72 percent, equivalent to annual rates of 21 to 24 percent.

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*The parameters selected are reported in Ernst, *Residential Utility Rate Changes*. The method was developed and documented internally at Rand by Barbara M. Woodfill.

Table 3.7

ESTIMATED MONTHLY COST OF FUEL BY FUNCTION AND SIZE OF HOUSING UNIT: URBAN HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973 AND 1976

Number of Rooms	Estimated Monthly Cost ($) for Typical Unit				
	Illumination, Appliances	Cooking	Water Heating	Space Heating	Total
September 1973					
1	7.10	1.40	2.62	8.20	19.32
2	8.18	1.62	3.02	10.09	22.91
3	9.27	1.83	3.42	11.98	26.50
4	10.35	2.04	3.82	13.87	30.08
5	11.43	2.26	4.22	15.76	33.67
6	12.52	2.47	4.62	17.65	37.26
7	13.60	2.69	5.02	19.54	40.85
8	14.68	2.90	5.42	21.43	44.43
9	15.77	3.11	5.82	23.32	48.02
10	16.85	3.33	6.22	25.21	51.61
February 1976					
1	11.59	2.04	3.59	12.62	29.84
2	13.36	2.35	4.14	15.53	35.38
3	15.13	2.66	4.69	18.44	40.92
4	16.90	2.97	5.24	21.35	46.46
5	18.67	3.28	5.79	24.26	52.00
6	20.44	3.59	6.34	27.17	57.54
7	22.21	3.90	6.89	30.08	63.08
8	23.98	4.21	7.44	32.99	68.62
9	25.75	4.52	7.99	35.90	74.16
10	27.52	4.83	8.54	38.81	79.70

SOURCE: Estimated by HASE staff from data in Table 3.3 for typical housing unit of 5.2 rooms. See text for explanation.

Table 3.8

ESTIMATED MONTHLY COST OF OTHER UTILITIES BY SIZE OF HOUSEHOLD: URBAN HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973 AND 1976

Number of Persons	Estimated Monthly Cost ($) for Typical Household				
	1973 Water Service	1976			Amount of Change 1973-1976
		Water Service	Sewer Service	Total	
1	1.27[a]	1.57[a]	2.30[a]	3.87[a]	2.60
2	2.06	2.32	2.57	4.89	2.83
3	3.10	3.49	3.85	7.34	4.24
4	4.13	4.66	5.14	9.80	5.67
5	5.16	5.82	6.42	12.24	7.08
6	6.19	6.99	7.70	14.69	8.50
7	7.23	8.15	8.99	17.14	9.91
8	8.26	9.32	10.27	19.59	11.33
9	9.29	10.48	11.55	22.03	12.74
10	10.32	11.65	12.84	24.49	14.17

SOURCE: Estimated by HASE staff from data in Table 3.6 for typical household of 3.7 persons. See text for explanation.

NOTE: In urban Brown County, garbage collection costs are included in the general property tax, so are excluded here. In 1973, sewer service was included in the general property tax for the two largest urban jurisdictions, but both shifted to user charges in 1975.

[a]Minimum charge.

Table 3.9

ESTIMATED INCREASE IN FUEL AND UTILITY COSTS FOR STANDARD CASES BY SIZE OF HOUSEHOLD AND HOUSING UNIT: URBAN HOUSING UNITS IN BROWN COUNTY, WISCONSIN, 1973-1976

Standard Case			Estimated Monthly Cost of Fuel and Utilities ($)		Increase in Cost 1973-1976	
Number of Persons	Number of Bedrooms	Number of Rooms	1973	1976	Amount ($)	Percent
1	0	2	24.18	39.25	15.07	62.3
2	1	3	28.56	45.81	17.25	60.4
3	2	4	33.18	53.80	20.62	62.2
4	2	4	34.21	56.26	22.05	64.4
5	3	5	38.83	64.24	25.41	65.4
6	3	5	39.86	66.69	26.83	67.3
7	4	6	44.49	74.68	30.19	67.8
8	4	6	45.52	77.13	31.61	69.4
9	4	6	46.55	79.57	33.02	70.9
10	4	6	47.58	82.03	34.45	72.4

SOURCE: Calculated from entries in Tables 3.7 and 3.8.

NOTE: Standard cases are based on occupancy standards for participants in the Brown County housing allowance program.

This rapid inflation primarily reflects rising fuel costs, due to the worldwide upheaval in petroleum marketing. It is manifestly independent of any local changes in the demand for fuels that might have been engendered by the allowance program's benefits to low-income families. However, it powerfully affects housing costs for Brown County's residents, participants and nonparticipants alike.

Table 3.10 shows estimates of these effects for housing units whose 1973 gross rents were equal to those specified in the HAO's schedule of the standard cost of adequate housing. The increase in gross rent that would be needed to offset inflation in the cost of fuel and utility services since September 1973 ranges from about 13 to about 17 percent, with an unweighted average of 15 percent.

The reader will recall from Sec. II that our survey data enabled us to measure the increase in gross rents in Brown County between September 1973 and February 1975. Assuming that the average monthly rate of inflation during this period applied also to the following 12 months, we concluded that by February 1976, gross rents would have increased by about 16 percent, counting all rental units in Brown County. For the standard cases described in Table 3.10, the estimated 30-month inflation rates varied according to the method used to estimate them, but were generally in the range of 10 to 15 percent, somewhat below the countywide average.

Thus, it appears that all or nearly all of the actual increase in gross rents during this period is attributable to higher costs for fuel and utilities. One qualification must be offered to temper this conclusion. In comparing fuel and utility costs for our standard cases in 1973 and 1976, we assumed that fuel consumption was unaffected by the substantial changes that occurred in the price of fuel. It seems more likely that many users reduced their consumption in the face of a 54-percent increase in fuel prices.

If we assume instead that fuel consumption was reduced by 10 percent in all households, actual expenditures for fuel and utilities would not have increased by as much as the entries in Table 3.10 suggest. Under this assumption, it can readily be calculated from data in the preceding tables that gross rents for our standard cases would have increased by 10 to 14 percent rather than 13 to 17 percent. Note that

Table 3.10

PERCENTAGE INCREASES IN GROSS RENT NEEDED TO COMPENSATE FOR INFLATION IN FUEL AND UTILITY COSTS: STANDARD CASES IN BROWN COUNTY, WISCONSIN, 1973 TO 1976

Standard Case		Monthly Amount ($)		Cost Adjustment as Percent of 1973 Gross Rent
Number of Persons	Number of Rooms	1973 Gross Rent	Fuel and Utility Cost Adjustment	
1	2	100	15.07	15.1
2	3	125	17.25	13.8
3	4	155	20.62	13.3
4	4	155	22.05	14.2
5	5	170	25.41	15.0
6	5	170	26.83	15.8
7	6	190	30.19	15.9
8	6	190	31.61	16.6
9	6	220	33.02	15.0
10	6	220	34.45	15.7
Unweighted average[a]		169.50	25.65	15.0

SOURCE: Calculated by HASE staff from data in Table 3.9 and from program standards in the *HAO Handbook* for Brown County.

NOTE: Standard cases are based on occupancy standards for participants in the Brown County housing allowance program. The entries for 1973 gross rent are from the current schedule of the standard cost of adequate housing (R^*). Fuel and utility cost adjustments are for the 30-month period, September 1973 through February 1976.

[a]Averages are calculated independently for each column. The average cost adjustment is 15.1 percent of the average 1973 gross rent.

this result is very close to our estimates from survey data of gross rent increases for these same standard cases (10 to 15 percent). The conclusion still holds: All or nearly all of the actual increase in gross rents during this period is attributable to higher costs for fuel and utilities.

IV. HOUSING EXPENDITURES BY PROGRAM PARTICIPANTS

As we explained in Sec. I, participants in the Brown County housing allowance program may draw benefits while living in any housing unit that meets program standards of quality. Allowance payments are based on the standard cost of adequate housing (R^*); program participants may spend more or less than R^*, depending on the size and quality of the unit they select and their skill (or luck) in searching the market and bargaining with landlords or sellers.*

However, allowance payments may not exceed "actual housing expenditures." In the case of renters, actual expenditures are defined as contract rent plus standard allowances for fuel and utility services that, under the lease agreement, are billed directly to the tenant. For homeowners, actual expenditures are defined as mortgage interest payments, real estate taxes, and standard allowances for insurance, maintenance and repairs, and fuel and utility services; neither mortgage principle payments nor the opportunity cost of a homeowner's equity is included.

In this section, we compare the housing expenditures of program participants with the schedule of standard costs, and review the participants' experiences with cost increases. The analysis, based on records maintained by the Brown County HAO, focuses on renters because the data on homeowner housing expenditures are intrinsically ambiguous.

Program records show that participants' housing expenditures vary widely. However, for all except the largest households, the median expenditure has persistently been higher than the scheduled standard cost. Moreover, the gap thus defined has increased as housing costs have risen. In January 1976, median gross rent of record for renters exceeded standard costs by 17 to 27 percent, and the recorded values are known to be understated.

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*In the case of homeowners, financial commitments, except for expenditures on maintenance and improvements, are usually made before enrollment.

Since program participants may choose to spend more than R^* in order to obtain better-than-standard housing, it does not follow that the excess expenditures cited above reflect inflation. Data for the program's first year (through June 1975) show that few participants experienced significant increases in contract rent for the same housing unit; large increases were nearly all associated with changes of residence, usually from substandard to standard housing. There is some evidence since June 1975 of general increases in contract rents. Everyone has been affected by the rising costs of fuel and utility services.

RENTS PAID BY PROGRAM PARTICIPANTS, 1975 AND 1976

The logic underlying the standard cost of adequate housing does not imply that program participants should pay no more or no less than that amount. But if their actual housing expenses increasingly deviate from the standard cost with the passage of time, the continued validity of the standard must be questioned. Moreover, if deviations from the standard are greater for some classes of clients than for others, the basic assumptions of the schedule must also be questioned. The resolution of these questions is not necessarily to revise the schedule of standard costs to conform to actual housing expenditures, but to justify differences in terms of program purposes.

With these points in mind, we compared the contract and gross rents paid by program participants who were living in certified housing units as of June 1975 and January 1976. The first date marks the end of the program's first year of operations, with over 1,800 renter households enrolled and 1,226 receiving payments. This anniversary was the occasion of Rand's first thorough analysis of HAO records. On the second date, the most recent for which we could obtain tabulations, enrollment (net of terminations) had increased to 2,100 renter households, of which 1,356 were receiving payments. About 450 of the latter are households that were not enrolled in June 1975.

Regrettably, some of the comparisons we wish to make are rendered ambiguous by features of the HAO's record system. These are explained below.

Housing Expenditure Records for Program Participants

When a renter household enrolls in the allowance program, the HAO records its current contract rent and the division between landlord and tenant of the responsibility for fuel and utility bills. The HAO then calculates the household's actual housing expenses by adding to contract rent a standard allowance for each item that is billed directly to the tenant.* The sum is equivalent to the gross rent referred to elsewhere in this note.

If the client subsequently moves, or if the rental agreement is altered in ways that affect either contract rent or the responsibility for fuel and utility bills, the client must report the pertinent facts to the HAO. At his semiannual certification, he is queried directly on these points, so the HAO's information is believed to be accurate and reasonably current.

The client's only motivation for misrepresenting housing expenses is that if his income is very low, his actual expenses (calculated as described above) could exceed the standard cost of adequate housing for his size of household. In such an event, the allowance payment is limited to actual housing expenses. In June 1975, 95.6 percent of all renters receiving payments received their full allowance entitlements.

A schedule of standard allowances was constructed shortly before the opening of enrollment in June 1974, based on the fuel prices and utility service rates then in effect. The schedule was used until May 1975 to calculate expenses other than contract rent. It was then updated to reflect interim increases in fuel and utility prices, and the new schedule remained in effect through January 1976.

Those who enrolled after 1 May 1975 were credited with actual housing expenses that reflected the new schedule of standard allowances for fuel and utility services. However, the records of those previously enrolled were not immediately updated. For the few clients

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*The allowance for each item is computed as described in Sec. III, above. Alternatively, the client may document his actual expenses for fuel and utilities; but this rarely occurs.

whose maximum entitlement exceeded the recorded value of actual housing expenses, the update was made at the next semiannual or special recertification. Since payments to other clients would not be affected by the update, the HAO decided to postpone it in each case until a scheduled annual recertification was processed. For a client enrolling in April 1975, the annual recertification would not normally occur until April 1976.

Consdquently, at any date between 1 May 1975 and the present, actual housing expenses as recorded in the HAO's machine records system are sometimes based on the original schedule of standard allowances for fuel and utility services and sometimes on the updated schedule. Since June 1975, many annual recertifications have been conducted, about 350 former clients (renters) have dropped out of the program, and nearly 600 renter households have enrolled and qualified for payments. The result is an increased proportion of client records that reflect the new fuel and utility schedules. As of January 1976, between half and three-fourths of all active records reflected the new schedules in their entries for actual housing expenses.

The upshot is that only contract rents of record in June 1975 and January 1976 are comparable over time. But contract rents are not comparable to the scheduled values of R^*, nor even between housing units for which the responsibility for fuel and utility bills may be differently allocated between landlord and tenant. Actual housing expenses are comparable to scheduled values of R^* and to the gross rents discussed elsewhere in this note only when the standard allowances for fuel and utilities are reasonably current with actual prices. We have seen that those allowances were not current on either date; and in January 1976, actual housing expenses were not comparable between clients. As estimates of gross rents, the recorded expenses are biased downward, but not consistently so.

Contract Rents of Record

Table 4.1 shows the contract rents of record for renters receiving allowance payments in June 1975 and January 1976. Although there were only 131 more recipients on the latter date than on the former, turnover among those enrolled changed the roster of recipients by considerably

Table 4.1

MEDIAN CONTRACT RENT OF RECORD FOR PARTICIPANTS, BY SIZE OF HOUSEHOLD: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JUNE 1975 AND JANUARY 1976

Number of Persons	Number of Households Receiving Payments[a]		Standard Housing Cost (R^* in $)	Median Contract Rent of Record		
				$ per Month		Percentage Change
	June 1975	January 1976		June	January	
1	363	446	100	103	104	+1.0
2	306	332	125	135	138	+2.2
3-4	444	465	155	147	151	+2.7
5-6	79	84	170	152	152	--
7-8	24	22	190	157	172	+9.6
9+	9	7	220	128	128	--
All cases	1,225	1,356	(b)	131	135	+3.0

SOURCE: Tabulations by HASE and HAO staffs of HAO adminstrative records.

NOTE: Distributions of contract rent within household size-groups lack strong central tendencies, especially for the larger sizes. Median values are correspondingly unstable.

[a]Renter households currently enrolled in the program, living in certified housing, and currently authorized for payments.

[b]Not applicable.

more than the difference would indicate. For those receiving payments in both months, a change in contract rent may indicate either a rent increase or a change of residence. Occasionally, a shift in the responsibility for fuel or utility bills is reflected in higher or lower contract rent, but not necessarily in total housing costs.

The reader will notice that even in June 1975, the median contract rent was approximately equal to R^* for one person and exceeded R^* for two persons by about 8 percent. For larger households, the median contract rent was well below R^*, the gap increasing with household size. However, only 24 renter households of seven or eight persons and 9 households of nine or more persons were then receiving payments, and the distributions in each case had a wide range and a weak central tendency.

During the next seven months, median contract rents increased for every size of household, but without a clear pattern. The increase for households of seven or eight persons from $157 to $172 appears to be a fluke; for more heavily populated categories, the rates of increase range from 1.0 to 2.7 percent, with an overall increase for all cases of 3.0 percent.

Even if these seven-month increases were due entirely to rent inflation, they would not be alarming; 3.0 percent for seven months is equivalent to an annual increase of 5.2 percent. However, some of the changes are due to turnover in enrollment, which only ambiguously implies higher contract rents for the population of eligible households. Other changes are due to moves by participants from one certified unit to another, or to rent increases associated with housing improvements.

With more extensive analysis of the data such as is reported below for the period from June 1974 to June 1975, these factors could be sorted out. An interim judgment, perhaps influenced by our findings for the market as a whole (see Sec. II) is that contract rents for program participants were increasing at a rate of less than 4 percent anually, net of increased payments for better housing.

Gross Rents of Record

Table 4.2 shows the gross rents of record for the same populations of renter households that were covered in Table 4.1, and for the same two dates. The impediments to interpreting the entries in Table 4.1 are increased here by the ambiguity of the HAO's records of actual housing expenses other than contract rent. The entries for June 1975 are consistent across cases, but the allowances for fuel and utility services billed to the tenant are based on prices current a year earlier. The entries for January 1976 include similar allowances; for some cases, these allowances are based on prices current in June 1974, and for other cases, on prices current in May 1975.

Considering first the entries for June 1975, we note that the median gross rents of record exceed the standard cost of adequate housing for households of one through six persons. The gap is

Table 4.2

MEDIAN GROSS RENT OF RECORD FOR PARTICIPANTS, BY SIZE OF HOUSEHOLD: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JUNE 1975 AND JANUARY 1976

Number of Persons	Number of Households Receiving Payments[a]		Standard Housing Cost (R^* in $)	Median Gross Rent of Record		
				$ per Month		
	June 1975	January 1976		June	January	Percentage Change
1	363	446	100	112	123	+9.8
2	306	332	125	150	159	+6.0
3-4	444	465	155	168	182	+8.3
5-6	79	84	170	188	199	+5.8
7-8	24	22	190	190	232	+22.1
9+	9	7	220	185	188	+1.6
All cases	1,225	1,356	(c)	151	159	+5.3

SOURCE: Tabulations by HASE and HAO staffs of HAO administrative records.

NOTE: For households of five or more persons, distributions by gross rent lack strong central tendencies. Median values are correspondingly unstable.

[a]Renter households currently enrolled in the program, living in certified housing, and currently authorized for payments.

[b]Contract rent plus standard allowances for fuel and utility services billed to the tenant. In June 1975, virtually all standard allowances were based on prices current in June 1974. In January 1976, these allowances had been increased for new enrollees and for some continuing clients to reflect prices current in May 1975. Consequently gross rents for the two dates are only weakly comparable, and in neither case do they reflect current prices for fuel and utilities.

[c]Not applicable.

largest--20 percent--for two-person households; the next largest gap is 12 percent for one-person households. But for nine or more persons, the median gross rent is only 84 percent of R^*, and only two of these large households paid more than $220.

Our review in Sec. III of rising prices for fuel and utility services indicates that the allowances for these items that were in effect in June 1975 were obsolete, so that actual gross rents paid by program participants were probably about 5 percent greater than the gross rents

of record. Clearly, well over half of all program participants were spending more than the standard cost of adequate housing scheduled for them. This fact does not in itself imply that the standard cost is too low, since we also know that many participants were occupying larger units than those on which the R^* schedule is based.

The entries for January 1976 indicate that some combination of increases in contract rent, changes of residence, new enrollments, and updating of fuel and utility allowances resulted in substantially higher gross rents of record. The overall increase in the median was only 5.3 percent, but increases for all sizes of household (except the largest) were greater. In the high frequency categories, the increases range from 8.3 to 9.8 percent. However, except for contract rent changes, the indicated increases do not reflect real events after June 1975; they only reflect record updates that incorporate earlier changes in fuel and utility prices.

For these reasons, we do not believe that the last column of Table 4.2 offers reliable guidance about the increases in R^* that would restore the schedule to its original function of reflecting the price at which standard housing can be obtained on the local market.

CONTRACT RENT INCREASES, 1974 TO 1975

Above, we compared rent distributions for all those receiving payments in June 1975 and in January 1976, with only ambiguous conclusions. A different approach to program records provides more insight into participants' experiences with rent increases. It is based on a detailed analysis of records for the program's first year of operations, ending in June 1975.

The analysis deals with 1,230 renter households who were living in certified units in June 1975. They are divided into two groups, those who were still in the housing units they occupied at the time they enrolled, and those who moved after enrollment. Each group is further subdivided according to whether the household's preenrollment unit passed its initial evaluation or failed. For each household, we compare the contract rent paid in June 1975 with the preenrollment contract rent.

Table 4.3 summarizes our findings. Among the nonmovers, nearly 80 percent were paying no more contract rent in June 1975 than when they enrolled, despite the fact that the homes of 37 percent initially failed evaluation and had to be repaired before they could be certified. In fact, the incidence of rent increase was somewhat lower for these failed units than for those that passed their initial evaluation.

Most movers did pay more, especially those who moved from an uncertifiable to a certifiable housing unit. However, paying more rent for better housing does not indicate price inflation but, rather, a higher standard of housing consumption made possible by the allowance.

Table 4.3

DISTRIBUTION OF FIRST-YEAR CHANGES IN CONTRACT RENT FOR NONMOVERS AND MOVERS, BY RESULTS OF INITIAL HOUSING EVALUATION: BROWN COUNTY HOUSING ALLOWANCE PROGRAM

Change in Contract Rent, Enrollment to Year's End	Distributions of Nonmovers (%)			Distributions of Movers (%)			Total in Certified Units at Year's End
	First Evaluation of Preenrollment Unit		All Nonmovers	First Evaluation of Preenrollment Unit		All Movers	
	Pass	Fail		Pass	Fail		
Decrease	2.5	2.0	2.3	25.8	8.8	12.5	3.5
No change	74.9	81.0	77.2	9.7	12.4	11.8	69.5
Increase from zero[a]	.4	.8	.6	16.1	10.6	11.8	1.9
Other increase	22.2	16.2	20.0	48.4	68.1	63.9	25.1
All Cases	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of cases	685	401	1,086	31	113	144	1,230

SOURCE: Tabulations by HASE staff of HAO records for Site I, 19 June 1974 through 20 June 1975.

NOTE: Data base consists of 1,230 renter households living in certified units at the end of the program's first year, out of 1,691 then enrolled.

[a]At the time of enrollment, these households were living rent free in housing units owned by someone not a member of the household.

The few who moved from one certifiable unit to another usually paid more for the new unit, but a fourth of them actually paid less.*

Table 4.3 also segregates a small but interesting group, 23 households who were living rent-free at the time of enrollment but who later either began to pay rent on their same unit (6 cases) or moved to another where they paid rent (17 cases). In these cases, the allowance apparently reduced dependency on families or friends who owned the preenrollment housing units--two-thirds of which failed their initial evaluations.

Table 4.4 reports in more detail on the rent increases, excluding the increases from zero just discussed. Altogether, there were 309 cases of rent increases, of which 92 were associated with moves. For nonmovers, the median increase was about 9 percent; for movers, about 38 percent. The smallest increases were for nonmovers whose preenrollment housing passed its initial evaluation; only about a fifth of them reported increases in contract rent, and among this group, the median increase was 8 percent.

It should be noted that the interval between each participant's report of his preenrollment rent and June 1975 varies with the date of enrollment. Many of those participating at the end of the program's first year had been enrolled only a few months earlier. Consequently, although the median increase in contract rent for nonmovers is zero, this cannot be read as an annual rate.**

The clearest conclusion from these data is that landlords have only rarely raised rents upon learning that their tenants are enrolled in the allowance program. We judge that program participants are experiencing no more than general market pressures for rent increases,

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*Changes in contract rent for movers may reflect different divisions of responsibility for fuel and utility bills rather than differences in total housing expenses.

**In principle, the methods used in Sec. II to estimate average annual rates of increase in contract rent from survey data could be applied here for the same purpose. However, because of the shorter time spans and the predominance of zero increases, the resulting annualized estimates would be of questionable significance.

Table 4.4

DISTRIBUTION OF FIRST-YEAR INCREASES IN CONTRACT RENT FOR NONMOVERS AND MOVERS, BY RESULTS OF INITIAL HOUSING EVALUATION: BROWN COUNTY HOUSING ALLOWANCE PROGRAM

Percentage Increase in Contract Rent	Distributions of Nonmovers (%)			Distributions of Movers (%)			Total with Rent Increases
	First Evaluation of Preenrollment Unit		All Nonmovers with Rent Increases	First Evaluation of Preenrollment Unit		All Movers with Rent Increases	
	Pass	Fail		Pass	Fail		
1-4	30.0	9.2	24.0	6.7	7.8	7.6	19.1
5-9	32.9	26.1	30.9	13.3	5.2	6.5	23.6
10-14	10.5	20.0	13.4	6.7	3.9	4.4	10.7
15-24	12.5	13.8	12.9	6.7	14.3	13.0	12.9
25-49	10.5	20.0	13.4	40.0	36.4	37.0	20.4
50-74	.7	7.7	2.8	20.0	24.7	23.9	9.1
75-99	2.6	3.1	2.8	6.7	7.8	7.6	4.2
All increases	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Median increase (%)	8.0	13.7	9.2	35.4	37.9	37.5	9.7
Number of cases	152	65	217	15	77	92	309

SOURCE: Tabulations by HASE staff of HAO records for Site I through 20 June 1975.

NOTE: Data base consists of 309 renter households living in certified units at the end of the program's first year whose contract rents at that time were greater than at the time of enrollment, but excluding 23 households who were living rent free at the time of enrollment. See Table 4.3 for an account of households whose rents did not increase between enrollment and the end of the period.

and possibly less. We can think of no interpretation of these data that would suggest that the allowance program has significantly affected the pace of rent inflation in Brown County.

HOMEOWNER HOUSING EXPENSE, 1975 AND 1976

In the preceding pages, we have compared the housing expenses of renters participating in the allowance program with the standard costs on which their allowance entitlements are based. The same standard costs are used in determining benefits to homeowners, who constitute about 40 percent of all enrolled households and 45 percent of those actually receiving benefits. However, homeowners differ from renters in that not all of their housing expenses are reflected in explicit payments to others. The amounts recorded by the HAO (pursuant to program regulations) badly misstate the true costs of homeownership, so comparing them to the standard costs of adequate housing is not very informative.*

To determine whether the "actual housing expenses" of a homeowner are less than his maximum allowance entitlement, the HAO records the preceding year's interest payments on any mortgages for which the home is collateral, and the most recent annual bill for real estate taxes and special assessments on the property. The HAO then adds an allowance for property insurance that is based on the market value of the home and current insurance rates for full coverage; and an allowance of $120 annually for maintenance and repairs. These annual amounts are all converted to a monthly basis. Finally, monthly allowances for fuel and utility services--calculated as explained in Sec. III--are added into the total, which is designated as "actual housing expense."

Clearly, a major determinant of these actual housing expenses is whether or not there is a mortgage outstanding on the property, and how near it is to maturity. Most mortgages have level payment plans designed so that as the outstanding balance of the loan declines,

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*For a full discussion of this issue, see Ira S. Lowry, *Equity and Housing Objectives in Homeowner Assistance*, The Rand Corporation, WN-8715-HUD, June 1974.

monthly interest payments decrease and principal payments increase. When the mortgage has been fully amortized, interest payments naturally cease. A program participant whose home is mortgaged can therefore expect his actual housing expense as calculated by the HAO to decrease over the years unless he remortgages his equity from time to time. A homeowner with no mortgage debt is recorded by the HAO as having lower housing expense than one whose property is mortgaged, even though the two properties may be identical in value.

The calculated actual housing expense does not measure the homeowner's cash flow, since it excludes payments on mortgage principal. Nor does it measure true costs, since the full cost of capital embodied in the home is captured only in the case of a mortgage whose outstanding balance is equal to the market value of the home, and since there is no allowance for either depreciation or appreciation of the property.

Since actual housing expenses affect allowance payments only if they are less than the maximum entitlement based on income, household size, and R^*, the calculation has only a limited practical significance: In June 1975, only 9.3 percent of all homeowners receiving payments were getting less than their maximum entitlements. But the recorded amount of actual housing expense is only weakly comparable to the standard cost of adequate housing.*

Nonetheless, the reader may be interested in the comparison, reported in Table 4.5 for June 1975 and January 1976. As might be expected, homeowner housing expenses of record on both dates tend to be less than gross rents of record for households of comparable sizes (Table 4.2). In June 1975, the median values for homeowners ranged from 56 to 89 percent of the medians for renters.

The median values of homeowner expenses for both dates were also generally below corresponding values of R^*, but were higher in January than in the preceding June. The interim increases reflect client turnover, occasional changes of residence, and occasional refinancing of

*The HAO records the assessed value of each property and the amount of the outstanding balances of mortgage loans. In principle, homeowner equity and true capital costs could be estimated from administrative records, but assessed values are not very precise guides to market values. We expect at a later date to attempt such estimates.

Table 4.5

MEDIAN HOMEOWNER HOUSING EXPENSES FOR PARTICIPANTS, BY SIZE OF HOUSEHOLD: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JUNE 1975 AND JANUARY 1976

Number of Persons	Number of Households Receiving Payments[a]		Standard Housing Cost (R^* in $)	Median Housing Expenses of Record[b]		
				$ per Month		Percentage Change
	June 1975	January 1976		June	January	
1	312	359	100	80	89	+11.2
2	206	242	125	84	93	+10.7
3-4	251	229	155	149	161	+ 8.0
5-6	128	116	170	158	173	+ 9.5
7-8	57	46	190	148	155	+ 4.7
9+	29	27	220	136	161	+18.4
All cases	983	1,019	(c)	102	107	+ 4.9

SOURCE: Tabulations by HASE and HAO staffs of HAO administrative records.

NOTE: For households of three to six and nine or more persons, distributions by housing expenses lack strong central tendencies. Median values are correspondingly unstable.

[a]Homeowner households currently enrolled in the program, living in certified housing, and currently authorized for payments.

[b]Mortgage interest payments, real estate taxes, and standard allowances for insurance, maintenance and repairs, and fuel and utility services. In June 1975, virtually all standard allowances were based on prices current in June 1974. In January 1976, these allowances had been increased for new enrollees and for some continuing clients to reflect prices current in May 1975. Consequently, expenses for the two dates are only weakly comparable, and in neither case do they reflect current prices for fuel and utilities.

Note also that these expenses exclude payments of mortgage principal, an out-of-pocket expense; and make no allowances for either depreciation or the opportunity cost of the homeowner's equity, both true costs of homeownership.

[c]Not applicable.

mortgages.* But mostly they reflect record updates, in whch fuel and utility allowances were increased to reflect prices current in May 1975.

For the reasons given above, we do not think that the comparisons in Table 4.5 between homeowner housing expenses and the current schedule of the standard cost of adequate housing cast any light on the question whether that schedule should be revised to reflect housing cost increases since 1973.

*Most mortgages in Brown County are written with variable interest rates, subject to change at the discretion of the lender to reflect current market conditions.

V. CONCLUSIONS AND RECOMMENDATIONS

The housing allowance program was designed to enable low-income families to afford decent, safe, and sanitary housing without spending more than a fourth of their nonallowance incomes for shelter and related residential services. In March 1974, before enrollment in the program began, HUD approved a schedule of the standard cost of adequate housing for Brown County that fixed allowance entitlements there for households of different sizes and incomes. It was based on a housing market survey conducted by HASE in the fall of 1973, and reflected prices that were current then.

The study reported in this note was prompted by evidence that inflation in the cost of housing services had made that schedule obsolete, so that program benefits no longer were adequate to serve program purposes. The study also provided an occasion to review certain troublesome features of the original schedule that are separate from the issue of subsequent price inflation.

In this section, we summarize the conclusions of our study and recommend specific changes in the schedule of the standard cost of adequate housing. First, we deal with the question of inflation and the schedule changes needed to compensate for its effects. Then we consider other features of the schedule that have proven to be programmatically awkward, and recommend additional changes that we judge would serve program purposes. By thus separating our recommendations, we hope to make it easier for HUD to deal with each issue on its merits.

INFLATION IN RENTAL HOUSING COSTS, 1973-1976

Our analysis of inflation in housing costs addresses two questions, both important in deciding on appropriate revisions to the schedule of the standard cost of adequate housing:

1. By how much have housing costs risen since the original schedule was designed?

2. To what extent is the allowance program itself responsible for inflation in housing costs?

Although the housing allowance program serves both renters and homeowners, it is easier to measure housing costs for renters than for homeowners, because nearly all a renter's costs are reflected in explicit payments to others. Furthermore, there are many reasons for supposing that if the allowance program were to disturb prices in the local housing market, the effects would be greater in the rental than in the ownership market. For both these reasons, we focused on rental housing to answer the questions posed above, drawing on three sources of data.

First, we analyzed data from the field surveys of renter households in Brown County, which are conducted periodically as part of the Supply Experiment. We compared contract rents and tenant payments for fuel and utility services that were reported for specific housing units in successive surveys. Because the housing units that were surveyed were a probability sample of all rental units in the county, we are able to generalize from them to the market as a whole and to specific sectors of it. However, the data cover only the period from September 1973 through February 1975.

Second, we obtained rate schedules from public utilities, local governments, and retailers of fuel oil. These enabled us to calculate the changes in fuel prices and utility service charges that occurred between September 1973 and January 1976. We used these data to estimate changes in the costs of fuel and utility services consumed by typical renter households in Brown County, whether they were billed to the landlord or to the tenant.

Finally, we reviewed the administrative records of the allowance program, comparing the rents paid by specific participants before they enrolled in the program to the rents they paid in June 1975, at the end of the program's first year; and comparing the distributions of participants by rent paid in June 1975 and in January 1976.

Although the three sources of data deal with different aspects of the inflation issue and cover different spans of time, we find that they tell a consistent story. Our main conclusions are the following:

1. Between September 1973 and February 1975, contract rents in Brown County increased at an average annual rate of about 4 percent. Gross rents, which include fuel and utility services billed to tenants, increased at an average annual rate of about 6 percent.
2. There were marked differences in inflation rates for different sectors of the rental market. Rates were higher for single-family homes than for apartments; higher for large units than for small ones; and higher for low-rent units than for high-rent units. For example, gross rents for low-rent single-family homes increased by 8.6 percent annually, while gross rents for high-rent apartments in large buildings increased by only 3.2 percent annually.
3. Less comprehensive evidence for the period after February 1975 indicates that the pace and pattern of inflation described above was characteristic of the entire 30-month period, September 1973 through January 1976.
4. All or nearly all the increase in rental housing costs during these 30 months was due to higher prices for domestic fuels and utility services. A composite index of the cost of these items, reflecting the amounts of each that are consumed by a typical household, increased by nearly 63 percent, equivalent to 21.5 percent annually.
5. The difference in rates of increase for contract and gross rents and the differences in rates of increase for different sectors of the market are all consistent with the attribution of the increases to higher fuel and utility prices. Although we did not attempt to model the interactions of housing supply and demand conditions that might also have influenced prices, we found no evidence of rent increases that would significantly raise landlords' profits.
6. Renters participating in the housing allowance program after June 1974 have of course been affected by rising fuel and utility prices; but their contract rents have

been remarkably stable. There is no evidence to support the hypothesis that landlords tend to raise rents for program participants more than they would for nonparticipants, even though many of the units occupied by participants required minor repairs or improvements to bring them up to program standards. If anything, program participants have been less affected by inflation than has the market as a whole.

7. The effective demand for rental housing created by earmarked allowance payments has so far had no discernible effect on the structure or level of contract rents in Brown County. The inflation that has occurred is clearly attributable to national and international events, primarily to the worldwide upheaval in petroleum marketing practices.

RECOMMENDATIONS FOR COMPENSATING CHANGES IN R^*

We think the evidence is clear that housing costs in Brown County have risen enough over the past 30 months to require compensating increases in the schedule of the standard cost of adequate housing. Otherwise, program participants will find it increasingly difficult to afford housing that meets program standards, and some households who need assistance will be denied it because the now-obsolete schedule of R^* also defines the income limits for eligibility.

Table 5.1 presents our recommendations for a new schedule, which could be effective as early as April 1976 if HUD acts promptly.* These recommendations assume that the original schedule approved by HUD in March 1974 is satisfactory in every respect except for the obsolescence of the underlying housing cost information, which was gathered in the fall of 1973.

Drawing on the analysis presented in Sec. II, we have calculated the adjustments to the schedule implied by the rates of increase in

*The recommendations and an abstract of the supporting evidence were transmitted to HUD by letter on 26 February.

Table 5.1

RECOMMENDED CHANGES IN THE STANDARD COST OF ADEQUATE HOUSING TO COMPENSATE FOR BACKGROUND INFLATION, 1973-1976: BROWN COUNTY HOUSING ALLOWANCE PROGRAM

HAO Occupancy Standard		Standard Cost of Adequate Housing ($ per Month)				Proposed Monthly Increase	
			Adjusted for 30-month Inflation in				
Number of Persons	Number of Rooms	Current Schedule (1973 Base)	Gross Rents	Fuel and Utility Costs	Proposed New Schedule	Amount ($)	Percent
1	1-2	100	109-113	115	115	15	15.0
2	1-3	125	141	142	140	15	12.0
3-4	4	155	172-179	176	175	20	12.9
5-6	5	170	193-201	196	195	25	14.7
7-8	6	190	217-218	221	220	30	15.8
9+	6	220	240-247	254	245	25	11.4

SOURCE: Occupancy standards and current schedule from *HAO Handbook* for Brown County; adjustments for inflation estimated by HASE staff from data reported in Tables 2.10 and 3.10.

NOTE: The new schedule proposed here is designed only to compensate for inflation in housing costs between September 1973 and January 1976. See Table 5.5, below, for recommendations that also entail other schedule realignments. Proposed monthly amounts are rounded to the nearest five dollars, which affects percentage changes erratically.

gross rents that occurred between September 1973 and February 1975, assuming the same rates of increase persisted through January 1976. These rates are specific to housing unit size and 1973 gross rent level as indicated in the table. The range of values shown for each case reflects the slightly different results of alternative analytical approaches.

Drawing on the analysis presented in Sec. III, we have independently calculated the adjustments that would be needed to compensate for the increases in fuel and utility prices that occurred between September 1973 and January 1976, assuming no change in the consumption of these items.

As would be expected from our conclusion that rent inflation during this period was almost entirely attributable to rising prices for fuel and utility services, these alternative adjustments yield very nearly the same results. Our proposed new schedule reflects some judgmental weighting of these results, and a policy of rounding to the nearest five dollars.

The scope for judgment is narrow. For one-person households, we chose the upper end of the range implied by the evidence; and for households of nine or more persons, we slighted the high estimate of inflation in fuel and utility costs in favor of the lower estimates of inflation in gross rents. Otherwise, the proposed schedule is squarely backed by consistent evidence from two independent sources.

The proposed new schedule exceeds the current schedule by amounts ranging from $15 to $30, the larger amounts pertaining to the larger households. In percentage terms, the increases range from 11.4 to 15.8 percent; but much of the variation is due simply to the policy of rounding the increases to even five-dollar amounts. The judgments noted in the preceding paragraph do result in an exceptionally large percentage increase for one-person households and an exceptionally small percentage increase for households of nine or more persons. Otherwise, percentages tend to increase with household size.

Although the evidence on which the proposed adjustments are based relates most directly to rental housing, we think it applies with few qualifications to owner-occupied homes as well. This is because of the strong indications that housing cost increases during this period were due to rising prices of fuel and utility services. For renters, the higher prices are reflected partly in higher contract rents, partly in larger bills for those items paid directly by tenants; but all are subsumed in gross rent increases. Homeowners face the same price changes but pay all the bills directly.

The main difference in their situations is that virtually all homeowners in Brown County live in single-family houses that require more fuel and other services than do renter-occupied apartments; consequently, a given increase in fuel prices affects average homeowner housing costs more than average renter housing costs. But in allowing more space for larger families, HAO occupancy standards effectively indicate the types of assisted households for which single-family homes are deemed appropriate; and the schedules of standard costs, both current and proposed, reflect the larger appetites for fuel of the larger units. We have some reservations about the occupancy standards (to be discussed later in this section). But given those standards, we

have no hesitation in recommending that the proposed adjustments to the schedule of standard costs be applied indifferently to renters and homeowners.

EFFECTS OF THE RECOMMENDED CHANGES

The proposed adjustments to R^* only compensate for past inflation. Although there are many reasons to expect that housing costs in Brown County will continue to rise, we do not think that it would be wise to anticipate future increases in the standard cost of adequate housing by overadjusting the current schedule. We do not think that such an action would be properly understood either by program participants or by the community in general. When the time came for another review of the schedule, the popular assumption would be that all inflation that had occurred since the last revision should be compensated. We prefer the risk of underpaying participants to the risk of overinflating their expectations.

One argument for conservatism in adjusting the benefit schedule is the possibility that higher allowances will encourage further inflation in housing costs. We cannot deny this possibility out of hand, but the evidence to date shows no indications that allowance payments have perceptibly influenced the market price of housing in Brown County either for program participants or for others.

It is easy to see why the program has so far had a negligible effect on the market. In January 1976, the HAO made payments to 2,375 households, and an additional 341 enrollees were in the process of finding certifiable housing. Including the latter, households actively in the program amounted to about 6 percent of all households in the county. The 1,356 renters receiving payments and the 250 for whom payment authorizations were pending amounted to about 12 percent of all renter households in the county; the 1,019 homeowners receiving payments and the 91 for whom payment authorizations were pending amounted to about 3.5 percent of all homeowners. Nearly all participants were still in the housing units they had occupied when they enrolled, although

many of these units had been repaired or improved to meet program standards.*

Focusing on renters, we note that the allowance payments they received in January 1976 totaled $81,000, averaging $60 per household receiving payments. From 1973 data on landlord revenues, we estimate that the monthly income from rental housing in January 1976 was about $1.5 million. Even if the entire amount of the allowance payments was a net addition to housing expenditures, it would have increased them by less than 6 percent. The actual increase in the housing expenditures of program participants is clearly much less than $81,000 per month, inasmuch as so few have moved to more expensive housing after enrolling.

Allowance payments to homeowners in January 1976 totaled about $54,000, averaging less than $53 per household receiving payments. Although the allowances helped these homeowners to meet their mortgage payments, tax bills, and monthly operating costs, they obviously would have no effect on home prices. Only a handful of former renters have purchased homes after enrolling the program.

Even though current allowance payments have created no significant inflationary pressure in the Brown County housing market, the proposed increases may conceivably have some such effect. We think the risk is small, especially given the evidence that the forces behind the current inflation are not excess local housing demand, but worldwide increases in fuel prices.

Nonetheless, the reader should understand that the proposed increases will be large relative to current payments, even though they are small relative to the standard cost of adequate housing. Table 5.2 presents the pertinent computations. If the proposed new schedule of R^* had been in effect in January 1976, the amount disbursed then in allowance payments would have increased from $135,000 to $177,000, or by 30 percent. This happens because, under the allowance entitlement

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*See Sec. IV, "Contract Rent Increases, 1974 to 1975." It deals only with renters, but homeowner moves are even less common.

Table 5.2

INCREASE IN MONTHLY ALLOWANCE PAYMENTS IF R^* WERE INCREASED TO COMPENSATE FOR BACKGROUND INFLATION: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JANUARY 1976

Number of Persons	Proposed Monthly Increase ($)	Payments to Renters		Payments to Homeowners		Total Increase in Monthly Payments ($)
		Number of Cases	Total Monthly Increases ($)	Number of Cases	Total Monthly Increases ($)	
1	15	446	6,675	359	5,385	12,060
2	15	332	4,980	242	3,630	8,610
3-4	20	465	9,300	229	4,580	13,880
5-6	25	84	2,100	116	2,900	5,000
7-8	30	22	660	46	1,380	2,040
9+	25	7	175	29	725	900
All cases	(a)	1,356	23,890	1,019	18,600	42,490

SOURCE: Calculated by HASE staff from data in Tables 4.2, 4.5, and 5.1.

NOTE: Total monthly increases in payment to program participants are based on the numbers of households receiving payments in January 1976. They do not take into account expected growth in program enrollment.

[a]Not applicable.

formula, an increase in R^* is matched exactly by an increase in allowance entitlement for each participating household.*

The proposed changes in R^* also increase the income limit for participation in the program by an amount four times as large as the increase in R^*. The consequences are shown in Table 5.3. Income limits rise by amounts ranging from $720 for households of one or two persons to $1,440 for households of seven or eight persons.

The significance of a higher income limit is that more households become eligible for assistance. Under the current income limits, we estimate that in 1974 about 8,000 households in Brown County were eligible to participate in the program. Using the same data base,** rough calculations indicate that about 2,000 households then ineligible would become eligible under the new schedule. Of course, incomes as well as housing expenses have increased since 1974, so the correct figure for 1976 is probably less than 2,000.

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*See Sec. I, "The Housing Allowance Benefit Formula," for the relevant algebra.

**The baseline survey of households, in which 1973 incomes are reported. We applied program rules to calculate adjusted gross income for each respondent.

Table 5.3

INCREASE IN INCOME LIMITS FOR PARTICIPANTS IF R^* WERE INCREASED TO COMPENSATE FOR BACKGROUND INFLATION: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JANUARY 1976

Number of Persons	Current Program Standards		Proposed Program Standards		Increase in Y_a^* Due to Increase in R^* ($ per Year)
	R^* ($ per Month)	Y_a^* ($ per Year)	R^* ($ per Month)	Y_a^* ($ per Year)	
1	100	4,800	115	5,520	720
2	125	6,000	140	6,720	720
3-4	155	7,440	175	8,400	960
5-6	170	8,160	195	9,360	1,200
7-8	190	9,120	220	10,560	1,440
9+	220	10,560	245	11,760	1,200

SOURCE: Calculated by HASE staff.

NOTE: R^* is the standard cost of adequate housing; Y_a^* is the amount of adjusted gross income at which allowance entitlement drops to zero. The limit for enrollment in the program is $(Y_a^* - \$480)$.

Because the newly eligible households with incomes close to the upper limit would be entitled only to small allowances, we would not expect many of them to enroll; nor would they add much to program costs if they did enroll. A more likely source of new enrollments is households that are now eligible but whose allowance entitlement under the current schedule was too small to motivate participation in the program.

For example, an elderly couple whose adjusted annual gross income is $5,500 could currently enroll but would be entitled to a monthly allowance of only $10.42. According to the Brown County HAO, many applicants in such borderline circumstances decline to participate when they learn how small their benefits will be. Under the proposed new schedule, these benefits would increase to $25.42 monthly, enough to change the minds of some eligibles who have previously failed to apply or who declined to participate.

Finally, there are about 500 households whose enrollments were terminated following semiannual or annual recertifications that disclosed incomes above the limits for continued participation. Many of these would once again be eligible for assistance under the proposed

new schedule, and the HAO would notify them of their opportunity to reenroll. In principle, this group is a subset of the estimated 2,000 newly eligible households; because of their prior experience with the program, they may respond differently to the new schedule of benefits than those who have not previously participated.

Reenrollments and new enrollments would not occur all at once following the promulgation of the proposed new schedule, and its eventual yield in terms of program participation is necessarily speculative. We judge that adopting the new schedule would result in 600 to 1,000 additional enrollments within the following year, increasing monthly disbursements at the end of that time by $15,000 to $25,000.

In summary, the immediate effect of adjusting the schedule of the standard cost of adequate housing to compensate for inflation after that schedule was fixed will be to increase benefits to households already enrolled, enabling them to afford housing that meets HAO standards without spending more than a fourth of their nonallowance incomes. This result would be achieved at the cost of an increase of $42,000 in monthly disbursements by the Brown County Housing Allowance Office.

The effect over the longer run would be to increase enrollment beyond what should be expected under the current schedule. The increase could be as many as 1,000 households, and their allowances would add about $25,000 to current monthly disbursements.

Using current figures as a base, these projections imply up to a 37-percent increase in the number of households active in the program (from 2,716 to 3,716) over the course of a year; and an immediate increase of 30 percent in monthly disbursements (from $135,000 to $177,000) by the HAO, climbing to 50 percent over the course of a year (to $202,000). Of course, even if the proposed schedule changes are not adopted, we expect some increased enrollment from those already eligible, but we judge that the program in Brown County is approaching a steady state under the current schedule of benefits.

STRUCTURAL PROBLEMS WITH THE CURRENT SCHEDULE OF R^*

In Sec. I, we noted that when the current schedule was designed,

there were concerns about its appropriateness for very small and very large households. The concerns about small households related to the occupancy standard; the concerns about large households related both to the occupancy standard and to the estimated standard cost of large units.

Program experience indicates that these concerns were justified. We think that the schedule of standard costs should not only be adjusted for inflation as recommended above, it should also be realigned to increase benefits for households of one and two persons by more than inflation alone would justify; and to increase benefits for households of seven or more persons by less than inflation alone would justify.

Occupancy Standards for Small Households

Under current HAO occupancy standards, adequate housing for a single person enrolled in the program consists of a single room, with access to shared bathroom facilities in the same building; and reasonable access to shared kitchen facilities or to a public dining room or restaurant. The same arrangements fulfill HAO standards for a two-person household. In the marketplace, these arrangements are to be found in rooming houses and lodgings in private homes.

If a household of one or two persons does occupy a separate housing unit, that unit must have a private bath and complete kitchen facilities. The layouts of small housing units vary, but either two or three habitable rooms are usually needed to meet these requirements: a combined bedroom and living room plus a kitchen; a bedroom plus a combined living room and kitchen; or three separate rooms. (The bathroom does not count as a habitable room.)

The standard cost of adequate housing for one person that was adopted in March 1974 is $100. Our analysis of the local housing market indicated that this amount was then more than adequate to pay for a rented room, and enough to pay for a two-room efficiency apartment that met program standards. Adopting this figure signified that the allowance program did not intend to support occupancy of a larger housing unit by an elderly single client. Although such a person could draw benefits while occupying a larger unit, his housing expenditures

would ordinarily exceed a fourth of his nonallowance income plus the allowance.

The standard cost for two persons was set at $125, then enough to support occupancy of a one-bedroom (three-room) apartment. Again, adopting this figure signified that the program did not intend to support occupancy of larger housing units by two-person households--which might consist of an adult or elderly married couple, a parent and child, or even adult siblings or other related persons.

These decisions reflected a judgment about the housing needs of the elderly single persons and two-person families that comprise about half the households in Brown County that are eligible for assistance and about 60 percent of those that have so far enrolled. The problem is that few such households find the proposed arrangements desirable or even tolerable except under severe budgetary stress. Even before receiving assistance, nearly all of them lived in separate housing units that were usually larger than the minimum sizes acceptable to the HAO or the sizes on which standard costs were based, even though their housing expenses usually exceeded a fourth of their incomes.

Table 5.4 reports on program experience at the end of the first year of operations. It compares HAO occupancy standards for households of different sizes with the sizes of the housing units that were actually occupied by program participants.

Note that 82 percent of the single renters in the program occupied units larger than two rooms and 38 percent occupied units larger than three rooms. Among single owners, the discrepancy between standards and reality is even more striking. Ninety-seven percent occupy units of more than two rooms and 85 percent occupy units of more than three rooms. The housing expenses of record for nearly three-fourths of the single renters exceeded the scheduled $100, and we know that the records underestimate their fuel and utility bills. The housing expenses of record for single homeowners were nearly always below $100, but we know that the expenses counted in the record fall far short of the true amount.*

*See Sec. IV, "Homeowner Housing Expense, 1975 and 1976."

Table 5.4

COMPARISON OF HOUSING UNITS OCCUPIED BY PARTICIPANTS WITH HAO OCCUPANCY STANDARDS: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JUNE 1975

HAO Occupancy Standard		Percentage of Households by Size of Housing Unit[b]				
			Larger Than HAO Standard, by:			
Number of Persons	Number of Habitable Rooms[a]	Same as HAO Standard	1 Room	2 Rooms	3+ Rooms	Total
Renters						
1	1-2	17.8	43.6	22.1	16.6	100.0
2	1-3	32.6	43.9	17.5	6.0	100.0
3-4	4	61.0	28.3	9.0	1.7	100.0
5-6	5	69.3	25.3	5.3	--	100.0
7-8	6	59.1	18.2	18.2	4.5	100.0
9+	6	44.4	11.1	22.2	22.2	100.0
All cases	(c)	41.9	36.0	14.9	7.1	100.0
Homeowners						
1	1-2	2.7	14.8	40.7	41.7	100.0
2	1-3	16.0	40.7	32.0	11.3	100.0
3-4	4	32.2	41.7	18.2	7.9	100.0
5-6	5	48.8	22.0	23.6	5.7	100.0
7-8	6	45.3	34.0	15.1	5.7	100.0
9+	6	40.7	33.3	14.8	11.1	100.0
All cases	(c)	22.8	29.8	28.5	18.8	100.0

SOURCE: Tabulation by HASE staff of HAO administrative records.

NOTE: This comparison is based on records for 1,138 renters and 929 homeowners that were enrolled on 20 June 1975 and had received at least one allowance payment. Records for 87 renters and 56 homeowners were excluded because size of housing unit was not reported. Percentage distributions may not add exactly to 100.0 because of rounding.

[a]HAO occupancy standards require one bedroom for every two persons, with a maximum of four bedrooms; a separate living room for households of three or more persons; and a private kitchen and bathroom, except for rooming houses in which such facilities may be shared with others. All rooms counted against these requirements must meet certain standards for space, light and ventilation, heating, electrical outlets, and privacy. Bathrooms do not count as habitable rooms. Although kitchens are not always habitable rooms, we assume here that households of three or more persons live in separate housing units which include a habitable kitchen and living room in addition to the required number of bedrooms.

[b]Based on the count of habitable rooms in the participant's last certified housing unit.

[c]Not applicable.

There are similar but less striking discrepancies between the occupancy standards and occupancy patterns for two-person households. Two-thirds of the renters and 84 percent of the owners occupied units larger than three rooms, and three-fourths of the renters paid more than the scheduled $125.

We think the evidence is clear that households of one and two persons, whether or not they participate in the allowance program, will continue to occupy larger units than are supported by program standards; and that they will continue to spend in excess of a fourth of their nonallowance incomes for housing unless standard costs are increased to support occupancy of larger units.

In response to these strong signals, we recommend that the standard costs of adequate housing for households of one and two persons be increased relative to the standard costs for larger households. Including the inflation adjustments recommended earlier in this section, we favor $125 for single persons and $145 for two-person households. These are increments of $10 and $5, respectively, to the inflation-adjusted schedule.

These changes need not entail upward revisions in the occupancy standard. To the extent that elderly single persons especially are content to live in rooming houses or as lodgers in private homes, we think that such arrangements should be encouraged. In such cases, the allowance combined with a fourth of nonallowance income will generally exceed the cost of housing. But in those cases also, the lack of private kitchen facilities implies additional costs for meals prepared by others. It does not seem to us that such a rearrangement of housing expenses is socially undesirable for those who choose it.

Standard Costs for Large Housing Units

Designing a schedule of standard costs for large housing units based on evidence from the rental market is particularly difficult because the market is thin. Our survey data for September 1973 indicated that four-bedroom units renting for $180 and five-bedroom units renting for $200 usually met program standards of quality. However, local experts thought that $195 and $230 were the respective rent

levels needed to achieve that quality.* The schedule of standard costs that was adopted by the HAO in March 1974 compromised on $190 and $220.

The occupancy standards adopted at the same time required four bedrooms (six rooms) for seven or eight persons and five bedrooms (seven rooms) for nine or more persons. The latter standard was later reduced to four bedrooms (six rooms) without a commensurate reduction in R^*. The logic behind this decision was that very large families would have difficulty in finding accommodations of any kind and needed more flexibility in domestic arrangements than the original occupancy standard provided. At the same time, they needed an allowance based on a standard cost of $220 to give them financial access to a wider market, including units that exceeded the size specified in the revised occupancy standard.

Subsequent events seem to us to support the need for flexibility in domestic arrangements for these very large families, but we think that our survey data were closer to the mark on standard costs than was the panel of experts. At the end of the program's first year, there were nine renter and 27 homeowner households with nine or more members participating in the program. Of these, 15 lived in certified units with only six habitable rooms, the HAO minimum; the others were in larger units, up to ten rooms. Among the nine renter households in this group, only two had housing expenses of record that exceeded $220; the median value was $185.

The inflation adjustments proposed in Table 5.1 would increase R^* to $220 for seven or eight persons and $245 for nine or more persons. We think that these values will usually result in windfalls for such households because their housing expenses will typically be less. We recommend that the standard cost of adequate housing for 1976 be set at $210 for seven or eight persons and at $230 for nine or more persons.

In terms of program costs, the issue is not important. With the inflation-adjusted schedule, we estimate that there are about 740 eligible households of seven or eight persons and 135 of nine or more persons. In January 1976, only 27 of the former and seven of the latter

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*See Table 1.1 and the associated text.

were participating in the program. Raising their monthly benefits by $20 and $10, respectively, rather than by $30 and $25 would save the HAO $375 per month.

COMBINING INFLATION ADJUSTMENTS AND SCHEDULE REALIGNMENTS

Table 5.5 combines the inflation adjustments proposed in Table 5.1 with the schedule realignments that were suggested above for small and large households. Its last column shows a proposed schedule of the standard cost of adequate housing for 1976 that reflects our best judgments about program requirements in the current market. The preceding columns offer a variety of benchmarks against which our recommendations can be tested.

Table 5.5

RECOMMENDED REALIGNMENT OF THE STANDARD COST OF ADEQUATE HOUSING BY SIZE OF HOUSEHOLD: BROWN COUNTY HOUSING ALLOWANCE PROGRAM

HAO Occupancy Standard		Monthly Amount ($)				
		Median Gross Rent of Record, HAO Clients[a]		Standard Cost of Adequate Housing		Proposed Realignment of Adjusted Schedule
Number of Persons	Number of Rooms	June 1975	January 1976	Current Schedule	Adjusted Schedule	
1	1-2	112	123	100	115	125
2	1-3	150	159	125	140	145
3-4	4	168	182	155	175	175
5-6	5	188	199	170	195	195
7-8	6	190	232	190	220	210
9+	6	185	188	220	245	230

SOURCE: Tables 4.2 and 5.1 and computations by HASE staff.

NOTE: The adjusted schedule is designed to compensate for inflation in housing costs since 1973; see Table 5.1 for details. The proposed realignment of values for small and large households is intended to correct deficiencies in the current schedule that are carried over to the adjusted schedule; see text for explanation.

[a]Contract rent of record plus allowances for fuels and utility services billed to the tenant. For June 1975, these allowances are based on utility prices current in June 1974. For January 1976, some records have updated allowances, reflected prices current in May 1975; others have not been updated.

Table 5.6 indicates how the HAO's monthly disbursements would be affected. Those enrolled and authorized for payment as of January 1976 would receive increases of $10 and $25 per month, for a total of $52,000. Monthly disbursements would rise from $135,000 to $187,000, an increase of nearly 40 percent.

Table 5.6

INCREASE IN MONTHLY ALLOWANCE PAYMENTS RESULTING FROM PROPOSED INFLATION ADJUSTMENTS TO R^* AND SCHEDULE REALIGNMENT: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JANUARY 1976

Number of Persons	Proposed Monthly Increase ($)	Payments to Renters		Payments to Homeowners		Total Increase in Monthly Payments ($)
		Number of Cases	Total Monthly Increases ($)	Number of Cases	Total Monthly Increases ($)	
1	25	446	11,150	359	8,975	20,125
2	20	332	6,640	242	4,840	11,480
3-4	20	465	9,300	229	4,580	13,880
5-6	25	84	2,100	116	2,900	5,000
7-8	20	22	440	46	920	1,360
9+	10	7	70	29	290	360
All cases	(a)	1,356	29,700	1,019	22,505	52,205

SOURCE: Calculated by HASE staff from data in Tables 4.2, 4.5, and 5.5.

NOTE: Total monthly increases in payments to program participants are based on the numbers of households receiving payments in January 1976. They do not take into account expected growth in enrollment.

[a]Not applicable.

Table 5.7 shows how income limits for participants would change. Except for the largest households, the limits would rise by $960 to $1,200; for households with nine or more persons, the increase would be only $480.

The implications for future enrollment of the income limits shown in Table 5.7 are not much different from those discussed earlier in connection with Table 5.3. We judge that over the course of a year following promulgation of the proposed schedule, enrollments would grow by 750 to 1,200 more than they would have under the current schedule. Payments to the newly enrolled households would be relatively small because they would tend to be close to the income limit. We think the extra monthly disbursements to them would amount to between

$20,000 and $30,000, bringing the total to between $207,000 and $217,000.

We consider the inflation adjustments essential and the schedule realignments highly desirable if the experimental allowance program is to fulfill its purposes.

Table 5.7

INCREASE IN INCOME LIMITS FOR PARTICIPANTS RESULTING FROM PROPOSED INFLATION ADJUSTMENTS TO R^* AND SCHEDULE REALIGNMENT: BROWN COUNTY HOUSING ALLOWANCE PROGRAM, JANUARY 1976

Number of Persons	Current Program Standards		Proposed Program Standards		Increase in Y_a^* Due to Increase in R^* ($ per Year)
	R^* ($ per Month)	Y_a^* ($ per Year)	R^* ($ per Month)	Y_a^* ($ per Year)	
1	100	4,800	125	6,000	1,200
2	125	6,000	145	6,960	960
3-4	155	7,440	175	8,400	960
5-6	170	8,160	195	9,360	1,200
7-8	190	9,120	210	10,080	960
9+	220	10,560	230	11,040	480

SOURCE: Calculated by HASE staff.

NOTE: R^* is the standard cost of adequate housing; Y_a^* is the amount of adjusted gross income at which allowance entitlement drops to zero. The limit for enrollment in the program is $(Y_a^* - \$480)$.

Appendix A

SUPPLEMENTARY TABLES FOR RENT-INFLATION ANALYSIS

Table A-1

DISTRIBUTION OF HOUSING UNIT RECORDS BY SAMPLING STRATUM AND NUMBER OF ROOMS PER UNIT: RENT-INFLATION ANALYSIS FILE FOR SITE I, 1973-1975

Sampling Stratum		Number of Housing Unit Records, by Number of Rooms per Unit					
Stratum Number	Type of Property	1 or 2	3	4	5	6+	Total
	Low-rent Urban						
1	Single-family	--	5	18	16	20	59
2	2-4 units	8	63	56	33	11	171
3	5+ units	23	23	6	5	--	57
	Medium-rent Urban						
4	Single-family	--	2	38	45	36	121
5	2-4 units	7	34	99	61	23	224
6	5+ units	45	110	69	12	1	237
	High-rent Urban						
7	Single-family	--	1	6	17	22	46
8	2-4 units	--	--	51	19	5	75
9	5+ units	--	9	37	10	--	56
	Rural						
10	Low or medium rent	1	4	28	22	14	69
11	High rent	--	--	10	4	6	20
	All property types	84	251	418	244	138	1,135

SOURCE: Tabulations by HASE staff of records of the Site I rent-inflation analysis file.

Table A-2

POPULATION WEIGHTS FOR HOUSING UNIT RECORDS GROUPED BY SAMPLING STRATUM AND NUMBER OF ROOMS PER UNIT: RENT-INFLATION ANALYSIS FILE FOR SITE I, 1973-1975

Sampling Stratum		Sum of Population Weights for Housing Unit Records, by Number of Rooms per Unit					
Stratum Number	Type of Property	1 or 2	3	4	5	6+	Total
	Low-rent Urban						
1	Single-family	--	29	102	90	118	339
2	2-4 units	152	1,091	773	517	191	2,724
3	5+ units	216	194	56	22	--	488
	Medium-rent Urban						
4	Single-family	--	13	274	333	265	885
5	2-4 units	90	392	1,297	906	392	3,077
6	5+ units	355	819	560	69	3	1,806
	High-rent Urban						
7	Single-family	--	6	81	202	284	573
8	2-4 units	--	--	1,209	548	170	1,927
9	5+ units	--	96	476	45	--	617
	Rural						
10	Low or medium rent	13	79	348	253	158	851
11	High rent	--	--	195	38	70	303
	All property types	826	2,719	5,371	3,023	1,651	13,590

SOURCE: Tabulations by HASE staff of records of the Site I rent-inflation analysis file.

NOTE: Entries in the table are the estimated numbers of rental housing units in Brown County that fall in each category.

Table A-3

MEAN PERCENTAGE CHANGE IN CONTRACT RENT, BY SAMPLING STRATUM AND NUMBER OF ROOMS PER UNIT: UNWEIGHTED SAMPLE DATA

Sampling Stratum		Mean Monthly Percentage Change in Contract Rent, by Number of Rooms per Unit				
Stratum Number	Type of Property	1 or 2	3	4	5	6+
	Low-rent Urban					
1	Single-family	--	.445	.409	.169	.404
2	2-4 units	.267	.564	.492	.435	.720
3	5+ units	.282	.418	.521	.227	--
	Medium-rent Urban					
4	Single-family	--	.136	.449	.369	.390
5	2-4 units	.164	.398	.401	.418	.221
6	5+ units	.167	.175	.300	.086	1.471
	High-rent Urban					
7	Single-family	--	.000	.236	.232	.139
8	2-4 units	--	--	.172	.114	.373
9	5+ units	--	.349	.134	.216	--
	Rural					
10	Low or medium rent	1.794	.731	.410	.365	.103
11	High rent	--	--	.345	.075	.293

SOURCE: Tabulations by HASE staff of records from the Site I rent-inflation analysis file.

NOTE: Entries in the table are unweighted arithmetic averages of monthly percentage changes in contract rent that were calculated separately for each 1,135 records in the file.

Table A-4

MEAN PERCENTAGE CHANGE IN GROSS RENT, BY SAMPLING STRATUM AND NUMBER OF ROOMS PER UNIT: UNWEIGHTED SAMPLE DATA FOR SITE I, 1973-1975

Sampling Stratum		Mean Monthly Percentage Change in Gross Rent, by Number of Rooms per Unit				
Stratum Number	Type of Property	1 or 2	3	4	5	6+
	Low-rent Urban					
1	Single-family	--	.950	.676	.578	.712
2	2-4 units	.308	.499	.672	.610	.774
3	5+ units	.286	.527	.795	.433	--
	Medium-rent Urban					
4	Single-family	--	.354	.766	.627	.480
5	2-4 units	.095	.433	.507	.725	.505
6	5+ units	.290	.249	.400	.211	1.375
	High-rent Urban					
7	Single-family	--	.248	.493	.335	.433
8	2-4 units	--	--	.342	.532	.130
9	5+ units	--	.397	.237	.308	--
	Rural					
10	Low or medium rent	.836	.836	.595	.653	.725
11	High rent	--	--	.478	.892	1.046

SOURCE: Tabulations by HASE staff of records of the Site I rent-inflation analysis file.

NOTE: Entries in the table are unweighted arithmetic averages of monthly percentage changes in gross rent that were calculated separately for each of 1,135 records in the file.

Appendix B

SUPPLEMENTARY TABLES FOR ANALYSIS OF CHANGES IN THE COSTS OF FUEL AND UTILITY SERVICES

Table B-1

ELECTRICITY RATES FOR RESIDENTIAL SERVICE:
BROWN COUNTY, WISCONSIN, 1972 TO 1976

Type of Charge	Amount of Charge, by Class of Service			
	Rg-1: All-year Urban Residential		Rg-2: All-year Rural Residential	
November 1972				
Annual minimum ($)	30.00		39.00	
Fixed monthly charge ($)	.75		.75	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 100 kwh	3.62	3.62	5.11	5.11
Next 500 kwh	2.43	2.43	2.75	2.75
Next 900 kwh	2.09	2.24	2.40	2.55
Over 1,500 kwh	1.88	2.03	2.20	2.35
Surcharges	4.0% sales tax			
September 1973				
Annual minimum ($)	30.00		39.00	
Fixed monthly charge ($)	.75		.75	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 100 kwh	3.647	3.647	5.137	5.137
Next 500 kwh	2.457	2.457	2.777	2.777
Next 900 kwh	2.117	2.267	2.427	2.577
Over 1,500 kwh	1.907	2.057	2.227	2.377
Surcharges	4.0% sales tax			
March 1974				
Annual minimum ($)	32.40		42.00	
Fixed monthly charge ($)	1.00		1.00	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 100 kwh	3.80	3.80	5.35	5.35
Next 500 kwh	2.60	2.60	2.94	2.94
Next 900 kwh	2.25	2.40	2.60	2.80
Over 1,500 kwh	2.05	2.25	2.40	2.60
Surcharges	4.0% sales tax			

Table B-1 (continued)

ELECTRICITY RATES FOR RESIDENTIAL SERVICE:
BROWN COUNTY, WISCONSIN, 1972 TO 1976

Type of Charge	Amount of Charge, by Class of Service			
	Rg-1: All-year Urban Residential		Rg-2: All-year Rural Residential	
February 1975				
Annual minimum ($)	44.40		66.00	
Fixed monthly charge ($)	2.00		3.00	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 200 kwh	4.30	4.50	5.70	6.10
Next 1,300 kwh	2.60	2.80	2.60	2.80
Over 1,500 kwh	2.15	2.80	2.15	2.80
Surcharges	4.0% sales tax			
December 1975				
Annual minimum ($)	44.40		66.00	
Fixed monthly charge ($)	2.00		3.00	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 200 kwh	4.567	4.767	5.967	6.367
Next 1,300 kwh	2.867	3.067	2.867	3.067
Over 1,500 kwh	2.417	3.067	2.417	3.067
Surcharges	4.0% sales tax			
January 1976				
Annual minimum ($)	44.40		66.00	
Fixed monthly charge ($)	2.00		3.00	
Meter rate (¢ per kwh):	Nov-Jun	Jul-Oct	Nov-Jun	Jul-Oct
First 200 kwh	4.567	4.767	5.967	6.367
Next 1,300 kwh	2.867	3.067	2.867	3.067
Over 1,500 kwh	2.417	3.067	2.417	3.067
Surcharges	10.3% plus 4.0% sales tax			

SOURCE: Wisconsin Public Service Corporation.

Table B-2

NATURAL GAS RATES FOR RESIDENTIAL SERVICE: BROWN COUNTY, WISCONSIN, 1972 TO 1976

Type of Charge	Amount of Charge, by Class of Service[a]					
	Rg-1	Rg-2	Rg-1	Rg-2	Rg-1	Rg-2
	November 1972		*September 1973*		*March 1974*	
Fixed monthly charge ($)	.75	.75	.75	.75	.75	.75
Meter rate (¢ per therm):						
First 20 therms	15.52	17.52	15.79	17.79	16.52	18.52
Next 30 therms	11.18	12.12	11.45	12.39	12.19	13.13
Over 50 therms	9.87	9.97	10.14	10.24	10.89	10.99
Surcharges	4.0% sales tax		4.0% sales tax		4.0% sales tax	
	February 1975		*December 1975*		*January 1976*	
Fixed monthly charge ($)	1.50	1.50	1.50	1.50	1.50	1.50
Meter rate (¢ per therm):						
First 20 therms	18.47	20.60	20.21	22.34	20.21	22.34
Next 30 therms	14.02	15.04	15.76	16.78	15.76	16.78
Over 50 therms	12.69	12.83	14.43	14.57	14.43	14.57
Surcharges	4.0% sales tax		4.0% sales tax		1.2% plus 4.0% sales tax	

SOURCE: Wisconsin Public Service Commission.

NOTE: One therm equals 100,000 BTU or 96.62 cubic feet (U.S. average).

[a]Rg-1 is all-year service to urban residential customers. Rg-2 is all-year service to rural residential customers.

Table B-3

QUOTED PRICES FOR NO. 2 FUEL OIL DELIVERED TO RESIDENTIAL CUSTOMERS: BROWN COUNTY, WISCONSIN, 1973 TO 1975

Dealer Code	Quoted Price (¢ per Gallon), Delivered				
	July 1973	July 1974	March 1975	July 1975	December 1975
A	16.2[a]	32.4[a]	(b)	(b)	(b)
B	28.9	35.7	32.7	34.9	37.7
C	18.9	33.9	30.9	37.7[c]	37.7
D	21.9	34.0	34.5	34.5	37.5
E	22.8	35.5	33.8	33.9	38.4
F	(b)	(b)	32.9	(d)	(d)
G	(b)	(b)	(b)	34.9	35.6
H	(b)	(b)	(b)	35.9	37.9
Average	21.7[a]	34.3[a]	33.0	35.3	37.5
Surcharges	4.0% sales tax				

SOURCE: Compiled by HASE staff from queries to dealers.

NOTE: Dealers' names are on file with HASE site office. In 1975, it was learned that Dealer A's prices were for bulk deliveries of 7,000 gallons or more, rarely to residential customers; that dealer was subsequently excluded from the periodic price survey.

[a]Excluding Dealer A, the average prices would be 23.1 cents per gallon in July 1973 and 34.8 cents in July 1974.

[b]No quotation obtained.

[c]One cent less on deliveries of more than 500 gallons.

[d]No longer in business.

Table B-4

WATER RATES FOR RESIDENTIAL SERVICE: SELECTED JURISDICTIONS IN BROWN COUNTY, WISCONSIN, 1973 AND 1975

Type of Charge	Quarterly Amount ($)	
	September 1973	December 1975
City of Green Bay[a]		
Fixed charge:		
5/8" meter	2.70	3.65
3/4" meter	4.00	5.25
Meter rate per 1,000 gals.:		
First 3,750 gals.	.30	.40
Next 71,250 gals.	.25	.34
Next 1,050,000 gals.	.20	.29
Over 1,125,000 gals.	.13	.19
Surcharge	20%	(*b*)
City of DePere		
Minimum charge	3.50	3.50
Meter rate per 1,000 gals.:		
First 5,000 gals.	.90	.90
Next 15,000 gals.	.50	.50
Next 30,000 gals.	.30	.30
Town of Allouez		
Minimum charge for 6,000 gals.	3.70	5.00
Meter rate per 1,000 gals.:		
Next 19,000 gals.	.38	.52
Next 50,000 gals.	.25	.35
Next 625,000 gals.	.20	.27
Village of Howard[c]		
Minimum charge for 10,000 gals.:		
5/8" meter	5.25	7.25
3/4" meter	6.75	9.50
1.0" meter	10.00	13.75
1.5" meter	19.00	25.00
2.0" meter	31.00	38.00
Meter rate per 1,000 gals.:		
Next 40,000 gals.	.35	.47
Next 150,000 gals.	.20	.27
Next 200,000 gals.	.12	.17
Over 400,000 gals.	.08	.17

Table B-4 (continued)

WATER RATES FOR RESIDENTIAL SERVICE: SELECTED JURISDICTIONS IN BROWN COUNTY, WISCONSIN, 1973 AND 1975

Type of Charge	Quarterly Amount ($)	
	September 1973	December 1975
Town of Ashwaubenon		
Minimum charge for 10,000 gals.	5.00	5.00
Meter rate per 1,000 gals.:		
Next 40,000 gals.	.30	.30
Next 50,000 gals.	.25	.25
Next 300,000 gals.	.17	.17
Over 400,000 gals.	.10	.10
Town of Bellevue		
Minimum charge for 7,500 gals.	10.00	10.00
Meter rate per 1,000 gals.:		
Over 7,500 gals.	.50	.50
Village of Pulaski		
Minimum charge for 10,000 gals.	6.00	6.00
Meter rate per 1,000 gals.:		
Next 20,000 gals.	.40	.40
Next 70,000 gals.	.30	.30

SOURCES: Rate schedules of local water departments.

NOTE: Typical household consumption is 20,000 gallons per quarter. Rates for larger amounts would usually apply only to multiple dwellings with a single meter.

[a]Rates shown for December 1975 were effective 1 July 1975.

[b]Not applicable.

[c]Rates shown for September 1973 were effective until mid-December 1975.

Table B-5

SEWAGE RATES FOR RESIDENTIAL SERVICE: SELECTED JURISDICTIONS IN BROWN COUNTY, WISCONSIN, 1973 AND 1975

Type of Charge	Quarterly Amount ($)	
	September 1973	December 1975
City of Green Bay		
Tax per $1,000 assessed value	.80	(a)
Minimum charge	(a)	12.00[b]
Meter rate per 1,000 gals.	(a)	.57
City of DePere		
Minimum charge	1.75	1.75
Meter rate per 1,000 gals.:		
First 5,000 gals.	.45	.45
Next 15,000 gals.	.25	.25
Next 30,000 gals.	.17	.17
Town of Allouez		
Tax per $1,000 assessed value:		
Metropolitan Sewer District	.55	(a)
Fox River Sewer District	.57	(a)
Southeast Sewer District	.96	(a)
Meter rate per 1,000 gals.	(a)	.70
Village of Howard		
Multiple of water bill[c]	1.25 × water bill	2.10 × water bill
Town of Ashwaubenon		
Multiple of water bill[c]	.90 × water bill	(a)
Minimum charge for 16,000 gals.	(a)	9.00
Meter rate per 1,000 gals.:		
Over 16,000 gals.	(a)	.56

Table B-5 (continued)

SEWAGE RATES FOR RESIDENTIAL SERVICE: SELECTED JURISDICTIONS IN BROWN COUNTY, WISCONSIN, 1973 AND 1975

Type of Charge	Quarterly Amount ($)	
	September 1973	December 1975
Town of Bellevue		
Fixed charge	6.00	(a)
Minimum charge for 10,000 gals.	(a)	7.50[d]
Meter rate per 1,000 gals.:		
Over 10,000 gals.	(a)	.57
Village of Pulaski		
Multiple of water bill[c]	1.00 × water bill	1.00 × water bill

SOURCE: Rate schedules of local sewer departments.

NOTE: Annual tax rates on assessed value have been converted to quarterly equivalents. Meter rates are based on gallons of water metered to the customer. As indicated by inapplicable entries, several jurisdictions changed the basis for their charges between 1973 and 1975.

[a] Not applicable.

[b] Reduced to $9.00 effective January 1976.

[c] See Table B-4.

[d] Minimum charge is $11.00 if residence also has water service.