

LOOKING BACK ON THE HOUSING ASSISTANCE
SUPPLY EXPERIMENT

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PREFACE

This overview of the Housing Assistance Supply Experiment is for a volume of essays* on various aspects of the Experimental Housing Allowance Program (EHAP) sponsored by the U.S. Department of Housing and Urban Development and conducted by The Rand Corporation, Abt Associates, Inc., and The Urban Institute between 1971 and 1981. EHAP had four major components: the Housing Allowance Demand Experiment, conducted by Abt; the Housing Assistance Supply Experiment, conducted by Rand; the Administrative Agency Experiment, conducted by Abt; and the Integrated Analysis, conducted by The Urban Institute.

This essay on the Supply Experiment assumes the reader's familiarity with the concept of housing allowances (also known as "housing vouchers") as a device for delivering housing assistance to low-income families; and with the other experiments that were part of EHAP. Other essays in the planned volume will deal with those topics.

The author directed the research aspects of the Supply Experiment from its inception in 1971. Field operations commenced in 1973 and continued through 1979. The final report on the experiment was prepared in 1981, and will be published in 1982.**

* Joseph Friedman and Daniel H. Weinberg, eds., The Great Housing Experiments (tentative title), to be published by Sage Publications, Inc., Beverly Hills, California.

** Ira S. Lowry, ed., Experimenting with Housing Allowances, The Final Comprehensive Report on the Housing Assistance Supply Experiment, The Rand Corporation, R-2740-HUD, forthcoming (1982).

LOOKING BACK ON THE HOUSING ASSISTANCE
SUPPLY EXPERIMENT

The Housing Assistance Supply Experiment (HASE) was designed to test the market and community effects of a full-scale allowance program. It was undertaken because many observers doubted the ability of low-income families to bargain effectively in local housing markets, and feared that their allowances would be absorbed by rent increases that were not matched by housing improvements, to the detriment of both participants and others. For example, The President's Committee on Urban Housing warned in 1968 that:

The immediate adoption of a massive housing allowance system would be likely to inflate the cost of existing housing considerably, at least in the short run. The large infusion of new purchasing power would result in a bidding up of housing prices for the existing standard inventory. Consequently, any large-scale allowance system would have to be introduced gradually. Such a system might also require strong programs of consumer education and vigorous attacks on racial discrimination to work effectively.

Others were interested in or concerned about the neighborhood effects of such a program. The optimists foresaw rejuvenation of deteriorating neighborhoods as landlords repaired rental dwellings to attract allowance recipients and low-income homeowners obtained allowances that enabled them to improve their homes. The pessimists foresaw a general exodus of allowance recipients from deteriorated neighborhoods, leading to the collapse of property values there; and social tensions arising in better neighborhoods as allowance recipients

sought housing there. How such a program would affect racial segregation was not clear to anyone; although it would provide minority participants with the means to pay for better housing and neighborhoods, it would not directly address exclusionary practices.

EXPERIMENTAL DESIGN

To explore these issues, HUD authorized ten-year allowance programs in two metropolitan areas: Brown County, Wisconsin (metropolitan Green Bay), and St. Joseph County, Indiana (metropolitan South Bend). Rand supervised program operations for the first five years, and monitored concurrent events in local housing markets by means of annual field surveys addressed to the owners and occupants of marketwide samples of residential properties. Whereas the Demand Experiment observed the effects on individual households of the "treatment" each received, the Supply Experiment's subjects were housing markets and the treatment was an allowance program.

The experimental strategy was to apply the same treatment to markets that differed in ways likely to affect outcomes. Because a full-scale allowance program would be expensive, only two sites were chosen-- both small in size, but contrasting as to market structure and initial condition.

Brown County (48,000 households) had a relatively new housing inventory, its population was growing, property values were high, and vacancy rates were low despite steady growth of the inventory. Less than 2 percent of the county's inhabitants belonged to racial minorities, so its housing market was unsegregated. St. Joseph County (76,000 households) had an older inventory, including much deteriorated housing in central South Bend; South Bend's population was decreasing,

property values were low, and vacancy rates were high. Nineteen percent of the city's households were black or Latin, nearly all of them living in deteriorated neighborhoods where rental vacancy rates exceeded 12 percent and single-family houses often sold for under \$10,000. In each site, we initially estimated that about a fifth of all households would be eligible for assistance.[1]

Identical allowance programs, open to nearly all low-income renters and owners, were operated in the two sites. By the end of the first three program years, enrollment had reached 3,600 households in Brown County and 6,500 in St. Joseph County. Thereafter, program growth was slow; about a third of all enrollees dropped out each year (usually because they became ineligible), and were replaced by others who were newly eligible. During this steady state, about 8 percent of all households (about 15 percent of all renter households) in each county were enrolled in the program.

The allowance programs offered eligible households monthly cash payments calculated on the "housing gap" principle. That is, a household's entitlement equaled the estimated local cost of adequate housing, less one-fourth of the household's adjusted gross income. In practice, this formula worked out to an average annual payment (in 1977) of about \$1,000 to renters whose gross incomes averaged \$4,000; and \$800 to owners whose gross incomes averaged \$4,900. At that time, a well-maintained 4-room dwelling rented for about \$2,150 annually, including utilities.[2]

[1] The most detailed description of the two sites at baseline is given in the Third Annual Report of the Housing Assistance Supply Experiment (1977), Sec. IV.

[2] These cross-site averages conceal significant differences between Brown and St. Joseph counties. In the latter, incomes were lower and payments were higher. Rents for comparable dwellings were about the same in the two counties, though property values were much lower in St. Joseph County.

Although enrollment was open to anyone whose allowance entitlement would exceed \$120 annually, payments were made only to enrollees whose dwellings met detailed standards as to living space, domestic facilities, safety, and sanitation. These standards were enforced by initial and annual on-site inspections. An enrollee whose dwelling failed could either arrange for repairs or move to an adequate dwelling, and thereby qualify for payments. Recipients whose dwellings failed annual inspections or who moved to inadequate housing faced suspension of payments unless the housing defects were remedied.

The allowance program in each site was administered by a nonprofit corporation created for that purpose, called a housing allowance office (HAO).[3] The two HAOs publicized the program, inviting applications from all who thought they might be eligible. Applicants who passed the eligibility tests were enrolled and informed of their entitlements and of the housing requirements they had to meet in order to receive payments. Participants found their housing on the private market without help from the HAOs; and could move or change tenure (renting or owning) without losing their allowances, provided always that their dwellings met program standards.

The HAOs did not set either minimum or maximum housing expenses for participants, and the amount of the allowance did not vary with actual expenses. Participants were entirely responsible for negotiating rents or home purchases, for arranging repairs, and for meeting their financial obligations. The HAOs had no dealings with or obligations to

[3] The administrative regulations governing the program were developed jointly by Rand and HAO staffs and are documented in the Housing Allowance Office Handbook (Katagiri and Kingsley, eds., 1980).

landlords, lenders, repair contractors, or others who might be involved in a participant's housing transactions.

EXPERIMENTAL FINDINGS[4]

During the first five years of program operations, a total of 25,000 households enrolled in the two sites and 20,000 received one or more payments. Four annual surveys of residential properties in each site produced nearly 8,400 records of interviews with landlords, 18,200 records of interviews with renters and homeowners, and 11,500 records of observations on residential buildings. Joint analysis of program and survey data yields the following findings of fact:

- o In the mature program, about a third of those who were currently eligible were currently receiving payments. The main reasons for nonparticipation were the small entitlements of those who were only marginally or briefly eligible; and the unwillingness of some whose dwellings were unacceptable to either repair them or move to better housing. The neediest were most likely to participate, but more of them would have participated in the absence of minimum housing standards. However, the standards did prompt considerable housing improvement, as noted below.
- o About half of those who enrolled were then living in dwellings that did not meet the program's quality standards. Among those who had to repair or move in order to qualify for payments, about two-thirds did so and one-third dropped out. Overall, 80 percent of the enrollees eventually qualified for payments.

[4] The following section is taken from the executive summary of the HASE final report (Lowry, 1982a). The findings are detailed in the full report (Lowry, ed., 1982b, forthcoming).

Most of those who dropped out could have recovered repair costs from their first few allowance payments.

- o Participation in the program increased the likelihood of occupying standard housing from about 50 to about 80 percent, and reduced preenrollment housing expense burdens from about 50 percent of gross income to about 30 percent. In addition to making required repairs, three-fourths of the owners voluntarily improved their dwellings each year and two-fifths of the renters moved to larger or better dwellings. However, the average participant increased his housing expenditures by only 8 percent over his estimated expenditures absent the program.
- o Enrollees were able to meet program standards without much increase in expenditure because their housing defects were mostly minor health and safety hazards, rather than major structural defects or lack of basic domestic equipment. Repairs were generally made by the participants themselves, their friends, or their landlords, rather than by professional contractors. The average cost of repairing a failed dwelling was about \$100, including an imputed wage for unpaid labor. Although allowances augmented the typical renter's income by about a fourth and the typical owner's income (\$4,600) by a sixth, they chose to spend only a fifth of the extra money on housing. Thus, four-fifths of all allowance payments were allocated to nonhousing consumption.
- o A full-scale open-enrollment allowance program had no perceptible effect on rents or property values in either a

tight housing market (Green Bay) or a loose market (South Bend). One reason was that the program increased aggregate housing demand by less than 2 percent. Another was that it proved relatively easy and inexpensive to transform substandard to standard dwellings. When a renter joined the program without moving, his rent typically increased by less than 2 percent, even though his landlord may have made minor repairs to bring the dwelling up to program standards.

- o The program had little effect on the physical appearance or social composition of residential neighborhoods. Even in neighborhoods where participants made up a fifth or more of all residents, the housing improvements were inconspicuous because program standards were not concerned with cosmetics. Though many renters moved, the origins and destinations of the moves were too diffuse to alter neighborhood populations. The degree of racial segregation did not change perceptibly because of the program.
- o After three years of experience with the program, a majority of all household heads and 90 percent of all participants thought it was a "good idea." Landlords were less enthusiastic, but a majority of those whose tenants included recipients approved of the program. In general, the public approved of who got help, what the help was for, and how the program was run.
- o The allowance programs in Green Bay and South Bend were administered by nonprofit corporations under the supervision of Rand and HUD. Hiring staff locally at prevailing wages, these housing allowance offices performed their functions promptly,

equitably, and humanely at the surprisingly low cost of \$163 per recipient-year. Many of the program's administrative features that contributed to this outcome are transferable to other federal programs.

Reflecting on the experimental evidence, and consulting available national data, we offer the following judgments about the effects of a national program that followed the same design as the experimental one:

- o Some poor households live in inexpensive and inadequate dwellings; others are adequately housed by dint of spending half or more of their incomes for housing. Housing allowances are flexible enough to remedy whichever circumstances apply to a particular case, and can serve homeowners as easily as renters. Nationally, as well as in the experimental sites, budgetary relief is probably a higher priority for low-income households than is better housing.
- o The public cost per assisted household would be far below that entailed in programs that build new housing for the poor; moreover, we estimate that 85 cents of each program dollar would directly benefit participants. A comparable estimate for the Section 8 Existing Housing program is 57 cents; for the federal public housing program, 34 cents; and for an income maintenance program with no housing requirements, 89 cents.
- o At most, 10 percent of all households (half of those eligible) would participate in a permanent national program, at an average public cost of about \$1,100 per recipient year (1976 dollars), including administration. About 30 percent of the

participants would occupy safer and more sanitary dwellings than they otherwise would, and all would be able to spend more for nonhousing consumption.

- o We judge that a national housing allowance program would affect only participants and their housing; the broader community would be unaffected for good or ill. Specifically, we think that a program open to all low-income renters is not at all likely to cause significant rent increases for either participants or others, even in moderately tight housing markets. On the other hand, we do not think that a full-scale program would much alter the appearance or social composition of low-income neighborhoods, nor would it much expedite the residential integration of racial minorities.

METHODOLOGICAL ISSUES: MARKET EFFECTS

HUD's Experimental Housing Allowance Program was planned in a period of great ferment in federal housing policy. Those plans were further shaped by a new sense of the possibilities of applying experimental science to the problems of government. Until the mid-sixties, experimentation in government essentially meant launching new national programs whose designs at best reflected theoretical analyses of probable effects, but which sometimes provided for systematic evaluation after the programs were operating. The new idea was that the essential features of a contemplated national program could be tested by a carefully designed experiment conducted on a relatively small scale, the results of which would allow much more precise estimation of the effects of the full-scale counterpart and provide valuable guidance on program rules, administrative requirements, and costs if a national program were adopted.

The intellectual model for these social experiments, as they came to be called, was the clinical trial in medical research. In clinical trials, a therapy of unknown effectiveness is administered under controlled conditions to a carefully chosen sample of ailing persons; similar samples get alternative or no treatment. Even if detailed causal links between the treatment and the subject's response cannot be identified, clinical trials enable experimenters to assess the statistical effectiveness of the treatment as against alternative or no treatment of the same ailment.

The Demand Experiment follows this model quite closely. Screened samples of low-income households in two metropolitan areas were offered housing allowances on various terms and conditions. Their responses to those offers and the housing conditions, actions, and expenditures of those who accepted were analyzed as functions of the terms of the offers; and their experiences were compared to those of a control group of households in each site. Thanks to the attentiveness and imagination of a highly capable research team, the comparisons among treatment groups and between treatment and control groups forestalled many attractive but erroneous inferences. Response parameters were estimated with as much precision as sample sizes would support.

As guides to housing policy, these experimental findings were limited in several respects. First, because those treated comprised only small fractions of those in each site who would be eligible for a similar national program, their housing actions rarely impinged on each other and would not be generally noticed as market signals. Second, the housing market context of their actions was neither controlled nor

deeply investigated; the analysts could only speculate about reasons for intersite differences in responses. Third, the recruitment of participants and subsequent transactions with them differed substantially from the modes likely to be employed in a national program. Fourth, the maximum term of participation was three years, of which only the first two were analyzed (to avoid misleading termination effects).

These limitations were foreseen, and motivated HUD to commission the complementary Administrative Agency and Supply Experiments. The latter's mission was to estimate the market and community effects of a permanent full-scale program. After exploring various alternatives (computer simulation using nonexperimental data, analysis of naturally occurring analogues to the market stimulus expected from an allowance program, micro-experiments to test the responses of individual landlords and homeowners to a hypothetical program, and experiments at the neighborhood scale within larger housing markets), Rand and HUD agreed that the best way to learn about the effects of a full-scale program was to conduct one. None of the alternatives seemed likely to provide reliable and generally credible evidence about the effects of an actual program when so little was known about how eligibles would respond to the allowance offer, how they would communicate their housing demands in the open market, and how the suppliers of housing would respond to the resulting market signals.[5]

[5] The history of the HASE experimental design can be traced through a series of reports first published in 1971-73, but subsequently republished in the years indicated by the citations: Lowry, Rydell, and de Ferranti (1981); Lowry (1980a); HASE Staff (1980); Lowry, ed. (1980b, 1980d); HASE Staff (1981). The authoritative account of the final design is Lowry, ed. (1980b).

There were two obvious drawbacks to full-scale experimentation: its expense, and the risks it entailed for the host communities. Considerations of cost led us to limit the experiment to two small metropolitan housing markets; risks were managed in two ways--by securing the informed consent of the host communities, and by preparing contingency plans that included aborting the experiment after it was under way, if necessary to forestall or limit damage to the community.[6]

Methodologically, the limit on the number of sites was particularly vexing. In the Demand Experiment, the experimental treatment was an allowance offer to an individual household, whose behavioral responses would then be observed. In the Supply Experiment, the treatment was a housing allowance program "offered" to a community, whose aggregate (market) responses would then be observed. From the perspective of statistical inference, the Supply Experiment had a sample size of two. Furthermore, a little thought persuaded us that there was no practical way to identify an appropriate "control group" of sites that could be observed without treatment. However closely we matched the experimental sites with control sites, unpredictable events during the course of the experiment (a flood, the closing of a major industrial plant, or a municipal fiscal crisis) might invalidate the comparison. Comparably monitoring housing markets in a large control group of sites would be impossibly expensive.

[6] See Lowry (1980c). As it turned out, the experimental allowance program did not perturb housing markets in either site in ways that bothered local residents, so the contingency plans were never exercised.

In short, the model of the clinical trial was inappropriate for the Supply Experiment. Instead we chose sites that differed sharply as to market characteristics likely to affect outcomes, and conducted identical allowance programs in each. From administrative records of the program, we could precisely measure the experimental stimulus (number of participants and their allowances) to local housing markets. By annually surveying the markets themselves, we could measure market outcomes (price and quantity of housing services consumed). However, we were dependent on analytical modeling rather than probability theory to distinguish the role of the measured stimulus in producing the measured outcomes, given uncontrollable nonprogram events in each site that could also affect housing markets.

From other essays in this volume and from the final reports of the Supply Experiment, the reader can judge how well we succeeded, both as to measurement and causal attribution. I judge that we established beyond controversy that the market stimulus inherent in a program of this type is much smaller than most observers expected, and for surprising and very important reasons. First, many who are eligible will not participate; second, most low-income households live in dwellings that can be easily and cheaply improved to meet program standards; and third, augmenting low incomes causes only a small increase in voluntary housing expenditures (i.e., beyond the expenditures needed to meet program standards). Further, I can think of no politically plausible variant of the allowance concept that would be likely to generate a substantially larger stimulus to local housing markets.

The measurement of market outcomes as regards housing prices was clouded by the instability of the unit of measurement. The experiment was conducted during a period of rapid national price inflation, led by escalating energy prices that especially affected housing. We established that rents and property values in the experimental sites approximately tracked regional and national indexes, and that the net operating return from rental properties was stable or diminishing during the period of rapid program growth (implying no shortrun profits due to increased demand). Multivariate analysis of rent changes for individual dwellings indicates that participants paid a small premium when they brought a dwelling into the program; but if there was any spillover effect on nonparticipants' housing, it was too small to be detected in an inflationary environment (Rydell, Neels, and Barnett, 1982).

As to neighborhood effects, program records enabled us to measure the direct effects--moves by participants, repairs to their dwellings--with precision; and our field surveys showed us that indexes of neighborhood quality, rents, and property values did not change in patterns that reflected the neighborhood concentration of enrollees or allowance payments. More important, it was clear that the direct program effects, when set against neighborhood aggregates, were too small to perturb neighborhood averages; only a large multiplier effect could have produced substantial neighborhood change (Hillestad and McDowell, 1982).

In short, whatever its benefits to participants, the experimental allowance program did not measurably disturb the housing markets of Brown and St. Joseph counties during the years of rapid program growth

when market disturbances were most likely. That finding was important, because HUD-sponsored computer simulations of allowance programs, one using Brown and St. Joseph counties as examples, came to contrary conclusions (Barnett and Lowry, 1979).

However, the experiment was undertaken to provide guidance for a national program, and a sample of two small metropolitan areas does not provide the basis for statistical inference to other places.[7] Although statistical inference has many advantages as a mode of generalization, it is not the only valid form of inference. Understanding the logical structure of a process enables us to estimate how it would behave in contexts other than the experimental one. We did not, for example, have to launch a thousand rockets to the moon in order to program a trajectory that would reach the target.

As explained above, we observed the joint effects of the allowance program and other events on the housing markets of Brown and St. Joseph counties, and found little evidence of program-induced market disturbance. We also explicitly modeled the effects of the allowance program in each site, abstracting from background price inflation and local population and income changes that might have affected actual market outcomes independently of the program. The structure of the model was suggested by our observations on program and market processes; some of its parameters were estimated from HASE data, and some from national data gathered in the Annual Housing Survey. Initial conditions for the modeling exercise were those observed in our sites at baseline,

[7] This limitation, incidentally, applies also to social experiments more closely modeled on clinical trials. Those conducted to date have, for practical reasons, chosen their subjects in only a few places; there is no guarantee that similar subjects would behave identically in different local contexts, especially if the reasons for their observed behavior are not well understood.

and the program's market stimulus was given by the actual histories of participation in each site. The market effects of the program, as estimated by the model, are reasonably consistent with observed market outcomes, once allowance is made for background inflation (Rydell, Neels, and Barnett, 1982).

To help HUD with the generalization problem,[8] we devised a variant of this model that could subsist on the population and housing market data available from the Annual Housing Survey. HUD compiled the data and ran the model for a hypothetical allowance program conducted in a national sample of 20 metropolitan areas, varying the key parameters around the values estimated for the Supply Experiment. The results indicated that only in exceptional circumstances would an allowance program significantly perturb a local housing market.

METHODOLOGICAL ISSUES: OTHER RESEARCH TOPICS

After the Supply Experiment was under way, it became apparent that its design offered opportunities for complementary research on issues originally assigned to the Demand and Administrative Agency experiments: the determinants of participation, effects on participants, and administrative effectiveness and efficiency. These studies were added to our agenda with only minor modifications of the data-collection plan.

The Supply Experiment offered an unusual opportunity for participation analysis in that our marketwide household surveys obtained enough data from respondents to determine their eligibility under program rules. Within the limits of sampling variability, we therefore had a solid base for the measurement of participation rates. Whereas

[8] Generalizing experimental findings to a national program was not part of Rand's charter for the Supply Experiment. Originally, that task was assigned to The Urban Institute.

the Demand Experiment individually invited a screened sample of eligible households to enroll, the Supply Experiment extended a general invitation (without time limit) to the public--a mode close to that of a permanent national program. Thus, one might expect the participation experience in the two experiments to differ. Because enrollment was open throughout the experiment, we were able to observe turnover (not just attrition). For all these reasons, HASE participation studies (Ellickson, 1981; Carter and Balch, 1981; Coleman, 1982; Wendt, 1982; Carter and Wendt, 1982) provide a valuable complement to those of the Demand Experiment, which focus on the effects of program variation.

With respect to effects on participants, the main advantage offered by the Supply Experiment was large samples. In the two sites combined, over 25,000 households enrolled and over 20,000 qualified for payments. We had complete dossiers on each case from the time of initial application. However, there were also disadvantages; an open-enrollment program does not allow for a control group--households similar to the experimental subjects but not permitted to participate. Furthermore, there was only one allowance program design for the Supply Experiment; the effects of program variations could not be tested.

The control problem was handled analytically, by a Latin-square design (Mulford and others, 1982). From our baseline (preprogram) household surveys, we retrospectively identified households who later became allowance recipients. We compared their preprogram housing consumption with that of other baseline households, controlling on income and demographic characteristics. We found that, except for a small intercept shift, future recipients' consumption responded to the same factors in the same way as did the consumption of those who never

joined the program. Taking account of that intercept shift as well as of temporal shifts in other parameters, we were able to estimate how much housing all allowance recipients would have consumed absent the program. This analytical control method is less foolproof than using a contemporaneous control group as a benchmark, but it guards against the most prominent dangers of before-and-after comparisons.

The administrative studies (Kingsley and Schlegel, 1982; Kingsley, Kirby, and Rizor, 1982; Tebbets, 1979; and Rizor, 1982) were based on detailed time-and-task records maintained by the HAOs under Rand's supervision, and on quality control programs for eligibility and housing certification. The former enabled us to estimate with unusual precision the cost per case of each step in administrative processing, and thereby to highlight opportunities for administrative change or program redesign that would save money without reducing program effectiveness; however, such variations were not systematically tried. The latter enabled us to estimate the incidence of errors in allowance entitlements and housing inspections and their fiscal and other consequences.

INCIDENTAL BENEFITS OF THE EXPERIMENT

In order to estimate program effects on the housing markets of our two sites, we compiled detailed time-series on key market variables, and analyzed market structure and processes. Our observations led to some new insights into market processes and parameters that are both theoretically and practically important.

The annual surveys of residential properties conducted in Brown and St. Joseph counties were designed to measure changes in the characteristics of the housing inventory, its utilization, the cost of supplying housing services, and the prices charged for them. Our sample

design yielded annual marketwide probability samples of households, dwellings, properties, and landlords; and time-series on specific properties, including their current owners and occupants. For each property in the sample, we compiled detailed annual accounts of both operating and capital expenses; for rental properties, the data cover both tenant and landlord outlays, as well as accounting for rental revenues and vacancy and collection losses (Neels, 1982a, 1982c). We know of no other marketwide survey that provides comparable financial detail.

From these data, we were able to estimate hedonic indexes for housing attributes (Barnett, 1979; Noland, 1980), the income elasticities of housing expenditures for both renters and owners (Mulford, 1979), and the elasticities of demand for specific housing attributes (Barnett and Noland, 1981); a four-factor (land, improvements, energy, building services) production function for housing services, including the elasticities of substitution between the factors (Neels, 1982b); the price elasticity of the rental occupancy rate (Rydell, 1982); and the determinants of housing repair and improvement policies (Helbers and McDowell, 1982).

The parameters we estimated are, of course, specific to our sites, and their generality remains to be confirmed by replication elsewhere. But the insights they suggest are powerful ones. Without going into detail, a few examples are in order:

- o The cross-sectional income elasticity of housing demand is far below the longrun aggregate elasticity. In other words, cross-sectional variation of income about the mean has less effect on housing consumption than a longrun change in the average income of all households.

- o The existing inventory of housing is flexible in response to demand changes. The output of housing services, as valued by the market, can be substantially increased or decreased by varying current inputs (energy, building services, repairs) without great loss of efficiency.
- o In rental housing, rents vary surprisingly little with market condition. Imbalances between supply and demand tend to be reflected in vacancy rates rather than remedied by price changes. Property values, however, are quite sensitive to rental revenue, which reflects both price and vacancies.
- o With respect to the production and consumption of housing services, submarkets are not salient; the flow prices of housing attributes are about the same throughout the market. Investment submarkets, however, are quite distinct; physically comparable properties in different neighborhoods may differ in market value by a factor of two for a long time.

DISAPPOINTMENTS

As one of the few who participated in the Supply Experiment from beginning to end, I of course formed expectations about what might be accomplished, some of which were disappointed. Other participants and observers, with different expectations, doubtless were differently disappointed, but it seems worthwhile to call attention to a few aspects of our research whose yield seems to me less than it might have been.

My principal disappointment is that we were not nearly able to exploit all the opportunities for useful research that were offered by the HASE data files. That outcome is less attributable to the topical

limitations of our charter than to the time and expense entailed in converting raw data to clean, well-organized, well-documented research files. The HASE analysts "practiced" on early data from the allowance programs and the field surveys, and what they learned thereby greatly affected both the subsequent research agenda and the way data files were assembled and managed. But they had less than a year to operate on the full data sets before time and money ran out.

At least, however, the data are preserved for others. Along with data from the other experiments, the HASE files--8 five-year files of program data and 32 files of survey data--and their documentation were deposited in HUD's Housing Research Data Center, where they will be accessible to the public.[9]

A more specific disappointment was the low yield of our research into residential mobility. How the allowance program affected the mobility of participants and the composition of neighborhood populations was a topic included in our initial research charter. Although our household surveys did not follow movers (the sample element was a dwelling whose current occupants were interviewed), we did obtain a five-year mobility retrospective on each household that entered the sample. Although the HAOs did not directly record moves as dated events, the approximate dates of moves by participants could be inferred from their housing evaluation records. Despite a large amount of data on movers and their circumstances before and after moving, we never developed a powerful model of residential mobility as an economic or social process.[10]

[9] The files are described in a 3-volume User's Guide to HASE Data (Hansen and others, 1982).

[10] We did, however, produce a useful study of housing search by renters who moved (McCarthy, 1979); it relates search techniques and outcomes to household characteristics.

We were much more successful at modeling market adjustments to shifts in demand. As noted above, the data led us to some analytically powerful insights exploited in a series of theoretical and empirical papers, mostly by Peter Rydell (1979a, 1979b, 1982). However, we never achieved micro-models of consumer and producer behavior that rigorously supported our macro-model, the parameters of which we estimated from HASE and AHS data. There were times when micro-macro integration seemed in reach; but each possibility faded under close scrutiny.

Finally, we contributed little to the theory of tenure choice. Nearly all our work follows the tradition of treating renters and homeowners as though they were different species. For me, this disappointment is mitigated by the observation that our data collection effort was not designed to serve the analysis of tenure choice; and further, that the separate-species assumption was adequate for program analysis. But I had hoped for a wider model of consumer behavior than we achieved.

VALEDICTORY

Of the "social experiments" undertaken by the federal government in the 1960s and 1970s, the Supply Experiment was the largest in number of participants, longest in duration, most expensive, and operationally most complex. Nearly everyone who has paid attention to it thinks that important things were learned from it, but not everyone agrees that, on balance, it was worth the trouble and expense. That judgment surely should depend on the scientific and political consequences of the experiment, which cannot be fully evident at the moment of its completion, and may never be clearly attributable to it.

This book is one among several vehicles for placing the methods and findings of the EHAP experiments before the public for assimilation and application. As one who was present at the creation, I await the outcome with interest.

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