

UC Berkeley

IURD Working Paper Series

Title

UNDERUTILIZATION IN AMERICAN HOUSING: RESIDENTIAL SPACE STANDARDS AND SOCIAL CHANGE

Permalink

<https://escholarship.org/uc/item/7b2273qm>

Journal

Institute of Urban and Regional Development

Author

Gellen, Martin

Publication Date

1983

UNDERUTILIZATION IN AMERICAN HOUSING:
RESIDENTIAL SPACE STANDARDS AND SOCIAL CHANGE

Martin Gellen

Working Paper No. 399

January 1983

Institute of Urban and Regional Development
University of California, Berkeley

-

UNDERUTILIZATION IN AMERICAN HOUSING:
RESIDENTIAL SPACE STANDARDS AND SOCIAL CHANGE

Martin Gellen

INTRODUCTION

Most projections of the nation's housing needs for the 1980s agree that we will have to add between 2.2 to 2.6 million new units to the existing supply if we are both to accommodate the expected number of new households and provide for a moderate amount of replacement over the decade. Because land, construction and financing costs have been rising faster than incomes, effective demand will be much lower, and new production consequently will fall short of this projected need by a considerable margin.

The prospect of a production short-fall during this decade will lead to an increase in the rate of utilization of the existing stock of housing. To some extent we have already begun to do so with the shift in housing policy during the past decade away from slum clearance and towards rehabilitation and conservation of housing. In practice, this policy has been limited to efforts to improve maintenance in the older portions of the stock and to upgrade vacant and abandoned units which might otherwise be demolished. In the latter case we have sought to increase utilization of the aggregate inventory; in the former, the objective was to prevent neighborhood decline and abandonment.

Making better use of the existing stock means that we must also consider the problem of how well space is utilized in the occupied portion of the inventory. The rate of utilization of space within occupied units has dropped substantially over the past quarter century. The intensity of use of the occupied portion of the inventory is generally measured in terms of the number of persons per room.¹ During the past 30 years, this ratio has fallen. While the average household size has declined by 12.1% between 1950 and 1980, the average persons-per-room ratio dropped 28.3% over the same time period.

This fall in the rate of space utilization means that Americans are consuming more housing today than ever before. Some of this increased level of space consumption results from the fixed level of overhead space in a dwelling unit (kitchen, bathroom and other common areas) which does not vary as the household size falls. However, part of the drop in the persons-per-room ratio also reflects an increased tendency toward underutilization of space in American housing. Underutilization takes two forms. As real income rises, households can keep space in reserve for visitors, for use only on special occasions, or for sporadic or non-continuous purposes including hobbies, storage, etc. This practice is extremely common, as studies of space consumption norms have shown. Underutilization in the sense of overconsumption occurs, however, when small households live in dwellings originally intended for larger households, and the underutilized space is not kept as a reserve but is strictly redundant.

The purpose of this paper is to explore the social and economic causes of underutilization, and to estimate how much underutilization

there is in American housing today. At the conclusion, some implications for housing policy will be discussed.

THE DECLINE IN AVERAGE HOUSEHOLD SIZE

The key factor which has led to underutilization in American housing is the secular decline in average household size. This trend began more than a hundred years ago. As Exhibit 1 shows, average household size has been declining steadily since the middle of the 19th century. With the exception of the decade of the 1950s, average household size has fallen twice as fast in this century than in the last.

The explanation of the trend is complicated. The table in Exhibit 2, which compares the distribution of household sizes over time, suggests that two different processes have been at work.

First, from 1900 to 1950 the decline in average household size was primarily caused by fewer households of five or more and rapid growth of those with two persons. Lower average female fertility was one reason for the growth of relatively more smaller households during this period. Between 1920 and 1945, the total fertility rate dropped from 3,248 children per 1,000 women to 2,523 per 1,000--a decline of slightly more than 22%.

Another cause was the increased survivorship of couples after the departure from home of their last child, which occurred as life expectancy increased (Glick and Parke, 1965). Married couples in the 19th century survived together less than a year on average after the last child left home. By the end of the first quarter of the 20th century,

Exhibit 1

Average Household and Family Sizes: United States,
1790-1980.

Decennial Census	Household Size	Change Since Previous Census	Family Size
1790	5.79		
1850	5.55		4.79
1860	5.28	-.27	4.69
1870	5.09	-.19	4.40
1880	5.04	-.05	4.83
1890	4.93	-.11	-
1900	4.76	-.17	-
1910	4.56	-.22	-
1920	4.34	-.20	-
1930	4.11	-.23	-
1940	3.77	-.34	-
1950	3.39	-.38	3.54
1960	3.33	-.06	3.67
1970	3.07	-.26	3.57
1980	2.75	-.32	3.27

Source: 1790-1940, Seward (1980); 1950-1980, U.S. Bureau of Census

Exhibit 2

Distribution of Households by Size^a: United States, 1790-1980

Household Size	1790 ^b	1900	1950	1960	1970	1980	1900 1950	% Change 1950- 1980
1	3.7	5.1	9.3	13.1	17.6	22.2	+ 4.2	+ 12.9
2	7.8	15.0	28.1	27.8	29.6	31.3	+13.1	+ 3.2
3	11.7	17.6	22.6	18.9	17.3	17.4	+ 5.0	- 5.2
4	13.8	16.9	17.8	17.6	15.8	15.4	+ 0.9	- 2.4
5+	62.9	45.5	20.0	22.6	21.1	13.3	-25.5	- 6.7
Average HH Size	5.79	4.76	3.39	3.33	3.07	2.75		

Sources: 1790-1950, Tauber and Tauber (1971)
1950-1980, U.S. Bureau of Census

(a) All dates exclude paying, unrelated individuals living in group quarters.

(b) "Free population" only (U.S. Bureau of Census, 1909)

the "empty nest" phenomenon had made its appearance; couples could expect to spend together 10 years on average between the departure of their last born and the death of one spouse (Well, 1973). Since that time, life expectancy has been extended further and married couples have been tending on average to postpone the birth of the first child by two or more years. Couples now entering marriage can expect to spend 30% of their time together without any children in their home (Glick and Norton, 1979).

In the period after World War II, other factors came into play. Since 1950, however, average household size has also been pared down by the increased propensity of single persons to form separate households. Francis Kobrin (1978) has shown that the rise of the single-person households during the post-war era was the product of increased numbers of persons living apart from families particularly young unmarries (20-29), never married over 30, as well as adults who are divorced, separated or widowed. (See Exhibit 3.) Prior to the third quarter of the 20th century these individuals generally lived with parents or other relatives, or as boarders with non-kin (Goldin, 1981). Many others dwelled in temporary arrangements, registry homes, and boarding houses (Rose, 1947; Rose, 1948). It was not uncommon for native-stock, middle-class homes to contain unmarried relatives or boarders. Prior to the extraordinary affluence following World War II, residential facilities and services were usually too expensive for singles and many couples to afford; and at least two scholars contend that, from the 1880s onward till the 1950s, housing costs rose faster than incomes in the major metropolitan areas (Rodwin, 1960; Jackson, 1975). Doubling up, boarding houses, and the boarding phenomenon in general were all

Exhibit 3

Proportion of Unmarried Adults
Heading Their Own Households: United States, 1930-1970

Age and Sex	Year				
	1930	1940	1950	1960	1970
Males					
20-24	.0368	.0333	.0437	.0812	.1512
25-29	.0754	.0834	.1109	.2133	.3859
30-34	.1435	.1646	.1960	.3415	.5226
35-44	.2660	.3059	.3349	.4788	.6484
45-54	.4319	.4719	.4868	.6108	.7715
55-64	.5168	.5636	.5437	.6632	.8095
65-74	.4972	.5661	.5459	.6671	.7830
75+	.3834	.4542	.4428	.5267	.6235
Females					
20-24	.0439	.0452	.0811	.1956	.2721
25-29	.1212	.1363	.2221	.4557	.6474
30-34	.2491	.2893	.3785	.6604	.8401
35-44	.4375	.5227	.5509	.7696	.9152
45-54	.5579	.6415	.6480	.7632	.8762
55-64	.5487	.6080	.6071	.7073	.8173
65-74	.4718	.5426	.5494	.6527	.7609
75+	.3395	.4170	.4158	.4862	.5695

Source: Masnick and Bane (1980). Calculated from data contained in Census of Population, various "Special Reports," 1930-1970.

Note: "Unmarried adults" includes never-married, divorced, and widowed population.

adaptations to this problem and were quite widespread (Modell and Harenen, 1976).

After 1955, increased real income permitted single persons to set up separate households and led to the creation of a genuine housing market for the "unattached." Michael, Fuchs and Scott (1980) estimate that rising real incomes explained about 75% of the increase in the incidence of households for single-persons between 1960 and 1970, with geographic mobility and a more "liberal" social climate accounting for much of the rest. Ermisch (1981) has similarly estimated that at least one-third of the total increase in households in Great Britain during the post-war period (1950-1970) consisted of primary individuals and was attributable to a rise in real personal disposable income per adult (persons 15 years and older).

The economic changes which led to the rise of the primary individual household were considerably more dynamic than these studies indicate. As the number of persons with the income necessary to live alone increased, markets responded in ways that encouraged more individuals to set up separate households. The construction industry in particular built more one-bedroom and studio apartments. Various types of pre-prepared food products, housekeeping aids and services are now produced and marketed especially for single adults living alone. While more individuals gained the income to live alone, the establishment of services and housing to meet the needs of this segment of the population have simultaneously increased the opportunities for living alone. These changes in turn have lowered the full economic cost of living alone and thus reinforced the income effect itself.²

The affluence of the post-World War II era has thus permitted adults to obtain a greater degree of privacy and social distance than was possible in the past. Beresford and Rivlin over 15 years ago analyzed this phenomenon and its impact on the structure and functioning of American families:

value on having a separate dwelling unit, into which he can retreat and close the door. He is reluctant to share a dwelling with relatives outside his nuclear family or to live as a roomer or boarder in the household of a nonrelative. Since World War II, Americans have expressed these preferences by using part of their rising income to buy privacy. At all age levels, individuals and nuclear families have succeeded in obtaining not only more housing and better housing but housing separate from other people (1966:247).

The sheer abundance of opportunities to live alone has led to a process of social change which I term the attenuation of the family system--a process in which more and more people spend greater parts of their lives living by themselves or apart from nuclear families. This process is characterized by increasing age segregation which has affected family relationships across generations. Liberalized divorce laws and the economic emancipation of women have also contributed to the attenuation process, causing the family experience for many individuals to become less continuous over the life-cycle.

The attenuation of the family system means not that the nuclear family will become extinct but simply that it will no longer be the dominant form of householding in our society. Instead, American society

will contain more diverse household types and life-styles. This is already occurring. While married couples represented 75% of all households in 1960, they accounted for 61% in 1980. Masnick and Bane (1980) of the Joint Center for Urban Studies of MIT and Harvard have projected that by 1990 the share of married-couple households will drop to 55% and probably continue to fall before levelling off. Furthermore, married couples with children under 15 who represented 42% of all households in 1960, dropped to 31% in 1975 and are projected to decline to 28% by 1990, even though birth rates are supposed to rise. (See Exhibit 4.)

THE IMPLICATIONS FOR HOUSING CONSUMPTION AND HOUSING DEMAND

The attenuation of the family system has also transformed the character of housing demand during the past decade. The share of net household formation represented by married couples has fallen sharply. Up until 1970, half or more of all newly formed households were headed up by married couples. By the late 1970s, however, their annual share had fallen to 11.5% of the total. (See Exhibit 5.) Some of this change can definitely be ascribed to the the post-war baby-boom cohort, whose coming of age has brought into existence very large numbers of young adult households during the past decade. The size of this cohort however has also made more dramatic the impact of the attenuation of the family system in our society as young adults have increased their propensity to delay or forego marriage while still living apart from relatives or immediate family. Substantially higher divorce rates have similarly interacted with this cohort effect to raise even further the share of new households represented by primary individuals.

Exhibit 4

Distribution of Households by Type:
United States, 1960, 1975 and 1990 (Projected)
(Percent of Total)

Household Type	Year		
	1960	1975	1990
Married Couples	74.8	65.4	54.9
No Children Under 15 Present	33.3	34.0	27.2
Children Under 15 Present	41.5	31.4	27.7
Other Male Head	8.1	10.9	16.0
Never-Married	3.2	4.7	6.8
Previously Married	4.9	6.2	9.2
No Children Under 15 Present	4.4	5.6	8.3
Children Under 15 Present	0.5	0.6	0.9
Other Female Head	17.2	23.6	29.0
Never-Married	2.8	4.4	6.3
No Children Under 15 Present	2.6	3.7	5.0
Children Under 15 Present	0.2	0.7	1.3
Divorced/Separated	4.7	8.2	10.8
No Children Under 15 Present	2.6	4.2	5.8
Children Under 15 Present	2.1	4.0	5.0
Widowed	9.7	11.0	11.9
No Children Under 15 Present	8.6	10.2	11.2
Children Under 15 Present	1.1	0.8	0.7
Households With Children Under 15 Present	43.4	37.5	35.6

Source: Masnick and Bane (1980)

Exhibit 5

Components of Household Increase, United States
1950-1979

Years	Total Net Increase in Households (1,000)	Percentage of Total Increase		
		Husband/Wife Wife	Other Families	Unrelated Individuals
1950-1955	4,320	50.4	6.2	43.2
1955-1960	4,925	61.0	3.4	35.6
1960-1965	4,637	52.5	10.8	37.6
1965-1970	5,965	50.9	9.9	39.3
1970-1975	7,719	28.8	24.4	46.8
1975-1979	6,210	11.5	19.7	68.8

Source: Current Population Reports, "Households and Families

by Type; March 1979 (Advance Report)," series P-20, no. 345
(1979), Table 3.

The implication of these charges for housing consumption are two-fold. First, declining household size means a greater market demand for smaller units. With fewer three- and four-person households, the market for larger dwelling units will shrink in relative terms. Vacancy data for the United States provides some support for this inference. Vacancy rates for rental units with more than four rooms have risen since 1965, while those for units with four rooms or less have dropped. Duration of vacancy for larger units has also increased (U.S. Bureau of the Census, 1981). The shift in preferences towards more condominium ownership represents another expression of this demand for smaller units.

Insofar as it is associated with increased headship rates, falling average household size also leads to increased aggregate demand for housing units per se. The rising incidence of households among unmarried, separated, widowed, and divorced persons has accounted for between 30% and 40% of all net household growth in the United States since 1950 (Frieden and Solomon, 1977).

Bert Hickman's simulations have also provided evidence that rising headship rates since 1940 have become a stabilizing factor in the demand for housing starts. Prior to 1930, long swings in actual household formation followed quite closely the swing in required additions, or population change weighted by headship rates. Change in headship rates were thus of minor importance in explaining household formation. However the long swing in the rate of household formation between 1923 and 1940 was larger than can be explained by weighted population change alone. After 1945 the departures are even more striking as the rate of household formation far outpaced the growth rate of standardized households. Hickman

postulates that household formation has in effect become independent of strictly demographic factors and has acted a genuinely exogenous force during the post-war era to stabilize housing demand.

Declining household size also leads to greater aggregate consumption of housing, particularly in the form of more space per person. As household size falls, and everything else is held constant, the per capita consumption of housing as measured by rooms per person will increase. The inverse--the persons per room ratio--consequently falls. This latter ratio is not only an indicator of housing consumption but also functions as a measure of household density, or residential space utilization. As Exhibit 6 shows, while average household size declined by 18.88% between 1950 and 1980, average household density as measured by the person-per room ratio dropped by 28.26% during the same period. Moreover, while slightly more than one-third of all households enjoyed persons-per-room ratios less than .5 in 1950, 60% did so by 1980. (See Exhibit 7.) Despite the big drop in space utilization rates for renters, owner households as a proportion of all households with densities less than .5 increased from 66% in 1950 to 68% in 1980.

UNDERUTILIZATION OF HOUSING

Falling household densities over the past 30 years have led to underutilization of housing, that is, a level of space consumption by some households which exceeds what is required on the basis of household size and space norms for domestic activities--food preparation, rest, recreation, personal care, etc.

Exhibit 6

Change in Average Household Size and Persons-Per-Room Ratio, United States, 1950-1980

	1950	1980	%
Average Household Size	3.39	2.75	-18.88
Average Persons Per Room	.69	.49	-28.26

Sources: Winnick (1957); U.S. Bureau of the Census, 1980;
Census of Population; 1980 Annual Housing Survey.

Exhibit 7

Distribution of Households by Persons per Room by Tenure, 1950-1980

Panel A

	Total		Owners		Renters	
	1950	1980	1950	1980	1950	1980
LT .50	13,241	48,326	8,883	32,843	4,490	15,483
0.51-1.00	18,470	28,410	9,486	18,042	8,979	10,368
1.01-1.50	3,301	2,549	1,387	1,305	1,886	1,244
1.50+	2,040	787	673	326	1,335	461
	37,052	80,072	20,399	52,516	16,690	27,556

Panel B

PPR	Total		Owners		Renters		Owners as a % of Total	
	1950	1980	1950	1980	1950	1980	1950	1980
LT .50	35.7	60.4	43.4	62.5	26.9	56.2	66.4	68.0
0.50 - 1.00	49.8	35.5	46.5	34.4	53.8	37.6	51.4	63.5
1.01 - 1.50	8.9	3.2	6.8	2.5	11.3	4.5	42.4	51.2
1.50+	5.5	0.1	3.3	0.1	8.0	1.7	34.2	41.4
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Winnick (1957); U.S. Bureau of the Census, Annual
Housing Survey, 1980.

The relationship between household size and space utilization was first analyzed systematically by Louis Winnick in his 1957 study, American Housing and Its Use. Winnick showed that, in general, as household size declined, the rate of space utilization as measured by the persons-per-room ratio also dropped. Winnick explained this relationship as a product of a) the more efficient utilization by larger households of "overhead" rooms, i.e., the kitchen, living room, bathrooms and utility rooms; b) by "the need on the part of larger households to devote more of their budgets to food and clothing"; and c) by the greater "inertia and immobility" of homeowners.

The assertion concerning larger households who devote greater portions of their budget to non-housing consumption is open to question. It is true that if disposable income and housing preferences are held constant, smaller households will be able to spend more on housing than larger ones. However, this does not mean that person-per-room ratios will necessarily fall with household size; households also tend to trade off additional space for improved quality. Larger households for example may sacrifice quality in order to obtain as much or even more space per person as small households consume.

The more intensive use of overhead space by larger households arises because of the peculiar technological characteristics of modern housing and has been recognized elsewhere (Schiff, 1946; Grebler, Blank and Winnick, 1956). Winnick's account of this phenomenon is based primarily on studies by the American Public Health Association:

This tendency for the rate of utilization to increase with household size is due in part to the large amount of overhead

space that is either invariant to any increase in the size of the household or that increases more slowly. Waiving the jump from one to two persons, as household size increases from two to six, the space needs for activities, such as "care of infant or the ill" and "operation of utilities" remain constant, and most of the remainder, except for "sleeping and dressing" and to some extent "recreation and self-improvement," have low response elasticities. Thus, while total space requirements for "sleeping and dressing" increase from 19.3% to 29.1%, "food preparation" decline from 19.0% to 17.0% and "housekeeping" from 11.9% to 9.6%. The only other important items that show a substantial increase are the social activities (recreation and extra-familial association), which rise from 23.6% to 28.0%. Thus as the household gains in size, the greatest demand for extra space is exerted for bedrooms and social activity, while the hard core of the dwelling unit meets the extra demand through more efficient utilization as well as by a relatively small expansion (17).

This aspect of the relationship between household size and the rate of space utilization is a product of the unique technological characteristics of modern dwelling units as well as housing and building code standards which specify minimum overhead space requirements and mandate mechanical systems such as plumbing and heating.

The propensity of homeowners to underutilize space has always been the predominant influence on the overall rate of underutilization in the United States. Ageing owners are less inclined to reduce the amount of

space they occupy when family size drops because of the much higher transaction costs which they face by comparison to renters and because their housing costs are often fixed at lower historic levels. Young homeowners also tend to anticipate future space needs in advance in order to avoid the transaction costs associated with moving. (Abu-Lughod and Foley, 1960)

The extent to which households will actually underutilize space--or "undercrowd"--depends on whether they pay historic or current market prices for housing. The greater the gap between the historic level at which mortgage payments and other costs are fixed, and the current market level, the lower the marginal cost of holding surplus space. The size of the gap, in turn, depends on the rate of inflation and the various institutional provisions which fix housing costs at historic levels, i.e., fixed-rate mortgages, fixed property-tax assessments, or special tax relief provisions. Proposition 13, for example, has lowered the real marginal cost of holding onto underutilized space.

Insofar as it lowers the real marginal cost of housing, the federal income tax treatment of homeownership has also tended to increase the level of underutilization, particularly among two-earner homeowners and others in the higher marginal tax brackets. Douglas Diamond (1980) has estimated that while the average real after-tax cost of ownership fell by 37.5% between 1970 and 1979, the marginal real after-tax cost fell by 46.7%. (The real after-tax cost of ownership is derived from the nominal before-tax cost by 1) subtracting expected annual appreciation and reduced income taxes due to the deductibility of mortgage interest and property tax payments, and by 2) adding an amount equal to the foregone

return on the downpayment.) This occurred because the expected annual rate of appreciation on homes during these years exceeded mortgage interest rates and returns on alternative investments. Diamond contends that the drop in the real after-tax marginal cost explains the 46% increase in the number of new homes with more than 1,600 square feet of living area constructed between 1970-1978. During these same years, the median size of new homes sold increased by slightly more than 18% (U.S. Bureau of the Census, 1977). At the margin, one could expect a higher return from buying an additional room when purchasing a house than investing in stocks, bonds, or savings accounts. Grebler and Mittelbach (1978) also cite investment value as the factor which explained why close to 20% of the respondents in their surveys of new homebuyers in California between 1975 and 1977 reported purchasing more extra rooms than they required on the basis of household size alone.

The tendency for the persons-per-room ratio to fall faster than household size in the United States over the past 30 years can also be explained by institutional factors which prevent the adaptation of the existing housing stock to a population of increasingly smaller households through conversions. Although the secular decline in household density has lowered both gross and net densities, density standards written into residential zoning ordinances have not changed accordingly. In the absence of zoning laws, or in cases where zoning is poorly enforced, the market would probably generate conversions only when, along with household size, real disposable income per household falls or the relative price of housing increases faster than incomes. The former occurred in the 1930s during the Great Depression and spurred a large wave of conversions (Grebler, Blank, Winnick, 1956); the latter

condition characterizes our own time.

Net density--or population per acre of residential land-- is a composite of several measures of the intensity of residential land use. These components can be broken down as follows:

$$\frac{P}{A} = \frac{P}{R} \frac{R}{D} \frac{D}{S} \frac{S}{A}$$

In this equation, P equals total population, A the land area (in acres) of a district or zone, R the total number of rooms, D the total number of dwellings, and S the total number of residential buildings in the area. These components can vary independently and each has a unique meaning. P/R (the persons-per-room ratio) is the average household density; R/D is the average dwelling size; D/S is average building size and expresses the tendency of the stock toward multiple occupancy; S/A measures land coverage. Zoning attempts to regulate P/A by principally controlling S/A, land coverage, and D/S, the tendency toward multiple occupancy.

In many neighborhoods which are zoned R-1 and are fully built out, population has declined, average dwelling size has increased because of room additions, while the other components which are directly subject to zoning controls have remained constant. The result is that net population densities have also fallen. Thus the assumed relationships between a) density standards written into zoning controls which fix D/S and S/A and b) the utilization rates of infrastructure and various public services are probably no longer valid in such places. These neighborhoods can probably accommodate more population than they now hold, if current

zoning regulations were modified to permit structural conversions. The number of dwelling units per structure (D/S) could be permitted to increase by internal conversions. This would help to raise residential densities up to historic levels.

ESTIMATES OF UNDERUTILIZATION

Precisely how much underutilized housing we have in the United States today cannot be estimated easily. To do so requires that we specify the threshold point where normal occupancy turns into "under-crowding." This in turn requires that we specify space norms consistent with observed behavior of households.

Baer (1980), for example, has estimated that there were 15.7 million underutilized dwelling units in the United States in 1970, 78% of which were owner-occupied. This estimate is astounding, for it means that 42% of all owner-occupied residences were underutilized. Baer's estimate is too high because it is based on person-per-room ratios for normal occupancy which are too high. Baer's standards fail to account for the practice common among middle-income homeowners of keeping "reserve" space in the form of guestrooms and using extra bedrooms for office use, as studies, or for sewing rooms and storage (Morris, 1976; Yockey, 1976). Grebler and Mittelbach (1979) reported a high incidence of "extra bedrooms" among buyers of new homes in California during the 1970s. Approximately 65% of all respondents indicated that their new home included an "extra bedroom." As for the use of this additional room, respondents named a study/office, guestroom, sewing room, and space for recreational activities in that order (220).

For the following estimate a set of space standards adjusted for household size were derived from the survey work of Morris and Winter (1978) were used. These standards were then adjusted to include an extra room for each household size. This procedure yields an estimate of gross underutilization. Households with dwelling units containing more rooms than specified by this space standard were considered to be underutilizing. For each household size, space standards were then adjusted for two extra rooms. This yields an estimate of dwelling units with purely redundant space. These represent high and low estimates and together constitute a range. The low estimate contains dwelling units which have the greatest potential for structural conversion. That is, these units are severely underutilized and contain a sufficient amount of space to accommodate an additional household of 1 or 2 persons without violating current space norms. The high estimate includes not only these dwelling units but also many with underutilized space, but probably not enough to accommodate an additional household. A greater proportion of the latter are probably not appropriate for conversion. Using space utilization data from the 1970 census and Winnick (1957), estimates of underutilization rates for 1950 and 1970 were calculated for both the owner and rental tenures. These are displayed in Exhibit 8.

Estimates of the number of underutilized dwellings in the United States in 1980 are displayed in Exhibit 9. Here several different estimates were derived with underutilization rates computed from the 1970 Census and then multiplied by the number of dwelling units for each tenure and household-size category as reported in the 1980 Annual Housing Survey. Gross and redundant estimates were calculated, as well as

Exhibit 8

Tenure-Specific Underutilization Rates of the
Housing Stock: United States, 1950-1970

<u>Tenure</u>	<u>1950</u>	<u>1970</u>	<u>% Change</u>
<u>Owner</u>			
Gross	.2073	.2649	27.8
Redundant	.1101	.1539	39.8
N of households (in 1000s)	20,399,	39,886	
<u>Renter</u>			
Gross	.0512	.0723	46.2
Redundant	.0252	.0456	80.9
N of households (in 1000s)	16,690	23,560	

Sources: Winnick (1957:Appendix A, Table A-1, p. 104);
U.S. Bureau of the Census, 1970 Census of
Housing, Space Utilization of the Housing
Inventory, 1972.

Exhibit 9

Estimates of Underutilized Housing in the U.S., 1980

Indicator	1970 Under- utilization Rate	1980 Households	1980 Estimates
<u>Owner</u>			
1. Gross	.2649	52,516,000	13,911,500
2. Redundant	.1539	52,516,000	8,082,200
3. 1-2 person households	.4725	24,987,000	11,805,200
<u>Renter</u>			
1. Gross	.0723	27,556,000	1,992,300
2. Redundant	.0456	27,556,000	1,256,500
3. 1-2 person households	.1061	17,789,000	1,888,105
4. 7-8 room houses	.4404	1,464,000	644,700

Sources: U.S. Bureau of the Census, 1970 Census of Housing, Space Utilization of the Housing Inventory, 1972, Table A-4; Annual Housing Survey, 1980, Table A-1.

separate ones for one- and two-person households. Until space utilization information from the 1980 Census is available, this method gives a rough approximation. Because underutilization rates have probably risen since 1970, these estimates are on the conservative side.

CONCLUSION: SOME IMPLICATIONS FOR POLICY

Over the past 30 years, the concern of national housing policy with residential space utilization has been limited to efforts to reduce the incidence of over-crowding. Since 1940, the percentage of overcrowded households (households with 1.5 persons per room or more) has fallen from 9.0% to 0.9%. At the same time, however, the percentage of households with severely underutilized space has risen from approximately 7% in 1950 to above 12% and perhaps as high as 15% of the total existing housing inventory. On the one hand this is a sign of affluence and progress in general living standards. At the same time, undercrowded housing constitutes also a valuable social resource insofar as it can function as a source of additional dwelling units.

The thrust of national housing policy today is being redefined by a new set of priorities which will force us to make better use of this resource. Housing will no longer hold the special status in credit markets which was secured for it by the reforms of the 1930s and 1940s. On the other hand, the mortgage market reforms of the past several years and the restructuring of federal tax incentives under the Economic Recovery Tax Act of 1981 are designed to encourage more resources into industrial development and revitalization and less into housing. The allocation of capital for housing consequently will be smaller in

relative terms in the future than it has been for the past 30 years. This will make capital for housing more expensive, so that the average consumer dollar will be able to buy less residential land and building than formerly. The very high rents and occupancy costs faced by renters and homebuyers today already reflect this shift.

The implication for housing policy is less emphasis on construction and more on improved utilization of the existing stock. During the past decade, national housing policy has sought to make more intensive use of the existing stock only through rehabilitation of abandoned and vacant dwellings. Structural conversions--either in single-family or in multi-family housing where feasible--represent another way to utilize more intensively the existing stock. Not only are conversions cheaper than conventional new apartment construction. Insofar as conversions are a form of infill, they require no additions to infrastructure. Conversions also involve considerably lower social cost in that they cause no displacement, in contrast to demolition and redevelopment to higher densities.

In the face of these economic constraints on housing production, the attenuation of the family system as a process of social change suggests that we will probably see an increased rate of structural conversions of the existing stock during the next several decades. Our housing stock was built for or adapted to meet the needs of a population with larger and more stable households than we have now or will have in the future. This mismatch between housing need and housing supply cannot be corrected by an increased rate of replacement. Given the unfavorable relationships between building costs, interest rates and

household incomes which prevail today, investment in new construction on a scale sufficient to replace larger units with smaller ones would require an expenditure of resources far beyond what the nation can reasonably be expected to allocate to the housing sector or what would even be desirable given competing priorities. Conversion represents a much less costly strategy of adjusting our housing supply to a society in which the nuclear family is in relative decline.

"Recycling" various sections of the housing stock through structural conversion requires a modification of those aspects of residential zoning laws which have prevented property owners from increasing the degree of multiple occupancy. This implies the modification, if not elimination, of the principle of exclusive residential use districts and the creation of considerably more diverse neighborhoods than we now have in this country.

FOOTNOTES

1. By far the most common unit of measurement for space utilization is the person-per-room ratio. The Bureau of the Census has long used this indicator to measure utilization. The decennial census reports both the total number of rooms for any geographic area (SMSA, city, and census tract) and the number of persons in households. From these the ratio can be calculated. Both total rooms and total persons in households are available broken out by tenure so that comparisons between owners and renters can also be made. The Census also publishes tables which cross tabulate household sizes by dwelling unit sizes; from these the persons-per-room distribution for each household size can be computed for any population.

As a measure of space utilization, the persons-per-room ratio has some obvious faults. It assumes that all rooms are alike in size and function, and that all persons use space in identical ways, regardless of their cultural background, ethnicity, household composition or occupation (Winnick, 1957). Various kinds of self-employed professionals and artists, for example, may require far more dwelling space than their household size alone would imply.

Another problem with this measure is that the census bureau only counts as rooms whole rooms used solely for living purposes. This includes living rooms, dining rooms, kitchens, bedrooms, finished recreation rooms, family rooms, etc. Not counted are attics, basements or other non-habitable rooms used for storage which can easily be converted to dwelling space. In this sense the persons-per-room ratio tends to underestimate the total volume of underutilized space.

A preferred measure is the persons-per-bedroom ratio. Although overhead space may vary with household size, the number of bedrooms varies more dramatically. Also, as noted below many families keep extra bedrooms as guestrooms or as studies. Unfortunately, the Bureau of the Census does not publish tables which breakdown household sizes by number of bedrooms.

Because of the convention established by the Bureau of the Census, most housing analysts have continued to use the persons per room ratio when analyzing space utilization.

2. Frieden and Solomon (1977), for example, point out that during the apartment boom of the 1960s, rents rose less than inflation, thus making living alone cheaper than in earlier times. They calculated that the difference between the combined average monthly cost of two separate living accommodations (a 5-room house and a 3-room apartment) and the cost of one large unit with the same living space (a 7-room house) dropped from \$40 in 1960 to only \$22 in 1970.

BIBLIOGRAPHY

- Abu-Lughod, J. and M.M. Foley. 1960. "Consumer Differences," in N. Foote, J. Abu-Lughod, M.M. Foley and L. Winnick, eds., Housing Choices and Constraints, New York: Basic Books, pp. 95-133.
- Baer, William. 1980. "Empty Housing Space: An Overlooked Resource." Policy Studies Journal 8(2):220-227.
- Beresford, John C. and Alice M. Rivlin. 1966. "Privacy, Poverty and Old Age." Demography 3(1):247-258.
- Campbell, Bert O. 1965. "Long Swings in Residential Construction: The Post-War Experience." American Economic Review 53:508-518.
- Carliner, Geoffrey. 1975. "Determinants of Household Headships." Journal of Marriage and the Family 37(1):28-38.
- Dantzig, George B. and Thomas C. Saaty. 1976. Compact City: A Plan for a Liveable Urban Environment. San Francisco: W.H. Freeman and Co.
- Downs, Anthony. 1981. "Are We Using too Much Capital for Financing Housing," Federal National Mortgage Association, Housing Finance in the 80s, Issues and Options. Papers and Proceedings, Washington, D.C. FNMT, 68-79.
- Ermisch, John F. 1981. "An Economic Theory Household Formation," Scottish Journal of Political Economy 28(1):1-19.
- Frieden, Bernard J. and Arthur Solomon. 1977. The Nation's Housing: 1975-1985. Cambridge, MA: Joint Center for Urban Studies of MIT and Harvard.
- Furstenberg, Frank F. Jr. 1979. "Recycling the Family: Perspectives for a Neglected Family Form," Marriage and Family Review 2:11-22.
- Glick, Paul. 1957. American Families. New York: John Wiley and Sons.
- _____. 1977. "Updating the Life-Cycle of the Family," Journal of Marriage and the Family, 39(February):5-13.
- _____ and Arthur J. Norton. 1979. "Marrying, Divorcing and Living Together in the U.S. Today," Population Bulletin 32(5).
- _____ and Robert Parke, Jr. 1965. "New Approaches in Studying the Life Cycle of the Family," Demography 2:187-202.
- Goodman, John L. 1978. Urban Residential Mobility: Places, People and Policy. Washington, D.C.: The Urban Institute.
- Grebler, Leo, David M. Blank and Louis Winnick. 1956. Capital Formation in Residential Real Estate: Trends and Prospects. NBER. Princeton, NJ: Princeton University Press.

- _____ and Frank G. Mittelbach. 1978. The Inflation of House Prices, Its Extent, Causes and Consequences. Lexington, MA: D.C. Heath.
- Goldin, Claudia. 1981. "Family Strategies and the Family Economy in the Late 19th Century: The Role of Secondary Workers," in Theodore Hershberg, ed., Philadelphia: Work Space, Family and Group Experience in the 19th Century. New York: Oxford University Press, p. 277-310.
- Hickman, Bert G. 1974. "What Became of the Building Cycle," in DP. David and M. Reder, eds. Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz, New York: Academic Press, pp. 291-314.
- Jackson, Anthony. 1976. A Place Called Home: A History of Low Cost Housing in Manhattan. Cambridge, MA: MIT Press.
- Kobrin, Francis E. 1978. "The Fall in Household Size and the Rise in the Primary Individual in the United States," in Michael E. Gordon, ed., The American Family in Social Historical Perspective. New York: St. Martin's Press, pp. 69-81
- Maisel, Sherman J. 1960. "Changes in the Rate and Components of Household Formation," Journal of American Statistical Association 55(June):268-283.
- Modell, John and Tamara K. Harenen. 1978. "Urbanization and the Malleable Household: An Examination of Boarding and Lodging in American Families," in Michael Gordon, ed., The American Family in Social Historical Perspective, 2nd ed. New York: St. Martin's Press, pp. 51-68.
- Morris, Earl W. 1976. "A Normative Deficit Approach to Consumer Satisfaction." Paper presented at the Marketing Science Institute Workshop on Consumer Satisfaction, 11-13 April 1976, Chicago.
- _____, S. R. Crull and Mary Winter. 1976. "Housing Norms, Housing Satisfaction and the Propensity to Move," Journal of Marriage and the Family 38(May):309-320.
- _____ and Mary Winter. 1975. "A Theory of Family Housing Adjustment," Journal of Marriage and the Family 37:79-88.
- _____ and Mary Winter. 1978. Housing, Family and Society New York: John Wiley and Sons.
- Niebanck, Paul. 1970. Rent Control and the Rental Housing Market: New York City, 1968. New York: New York Housing and Development Administration.
- Rose, Arnold M. 1947. "Living Arrangements of Unattached Persons," American Sociological Review 12:429-35.

- _____. 1948. "Interest in the Living Arrangements of the Urban Unattached," American Journal of Sociology 53:483-493.
- Ryder, N.B. 1965. "The Cohort as a Concept in the Study of Social Change," American Sociological Review 30:843-861.
- Riley, Matilda W. 1973. "Ageing and Cohort Succession: Interpretations and Misinterpretations," Public Opinion Quarterly 37(Spring):35-49.
- Rodwin, Lloyd. 1961. Housing and Economic Progress: A Study of Housing Experiences of Boston's Middle-Income Families. Cambridge, MA: Harvard University Press.
- Schiff, Eric. 1946. "Family Size and Residential Construction," American Economic Review (March):111-119.
- Seward, Rudy R. 1978. The American Family, A Demographic History. Beverly Hills: Sage Publications.
- Stegman, Michael. 1982. The Dynamics of Rental Housing in New York City. New York: Department of Housing Preservation and Development.
- Taeuber, Conrad and Irene Taeuber. 1971. People of the United States in the 20th Century. A Census Monograph. Washington, D.C.: U.S. Government Printing Office.
- Uhlenberg, Peter. 1974. "Cohort Variations in Family Life Cycle: Experiences of U.S. Females," Journal of Marriage and the Family 36(May):287-292.
- U.S. Bureau of the Census. 1979. Characteristics of New Housing, C-25-77-13, Washington, D.C.: U.S. Government Printing Office.
- _____. 1981. Current Housing Reports: Housing Vacancies, H-111. Washington, D.C.: U.S. Government Printing Office.
- Waring, Joan M. 1975. "Social Replenishment and Social Change: The Problem of Disordered Cohort Flow," American Behavioral Scientist 19(Nov.-Dec.):237-256.
- Wells, V. Robert. 1971. "Demographic Change and the Life Cycle of American Families," in Theodore K. Rabb and Robert I. Rotberg, eds., The Family in History: Interdisciplinary Essays. New York: Harper and Row, pp. 85-94.
- Winnick, Louis with Ned Shilling. 1957. American Housing and Its Use: The Demand for Shelter Space. New York: Russell and Russell.
- Yockey, K.M. 1976. "Space Norms and Housing Satisfaction of Low-Income Families," Housing Educators Journal 3:2-10.