

Size matters in housing design

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ABSTRACT: Architects of assisted housing must be nimble to react to the shifting constraints placed on them by clients and funders. The objective of this paper is to provide a context for assisted housing requirements. Ultimately, understanding the history of dwelling-size changes can help architects anticipate future constraints, and help make adaptive changes to the design of buildings that were created in the context of past requirements.

The paper begins with a literature review of policies and precedents that have shaped housing size (both assisted and market-rate). It continues with a description of housing size trends in the private housing market and Low Income Housing Tax Credit assisted housing stock. This analysis shows that the size changes are the result of four driving factors: building and health codes, market conditions, federal regulations, and local housing preferences. The paper includes an empirical analysis of Low Income Housing Tax Credit dwelling size that reveals the quantitative results of the driving factors. The paper concludes with an explanation of both how and why the assisted dwelling size has varied from year to year.

KEYWORDS: Housing, LIHTC, Crowding dwelling, Subsidized

INTRODUCTION

The average size of the U.S. market-rate dwelling has grown steadily, from 141.68 m² to 201.51 m² (1,525 to 2,169 square feet) since 1987¹. During this time, the size of the average newly constructed assisted dwelling has remained steady, from an average in 1987 of 75.25 m² (810 square feet) to a peak in 2001 of 80.83 m² (870 square feet), back down to 77.11 m² (830 square feet) in 2013. Essentially, assisted dwelling units are becoming, relative to the market, smaller and smaller each year, with more and more constraints placed on their design. This investigation of assisted housing reveals a series of incremental “pushes and pulls” that have influenced the size of dwellings, both in terms of absolute size and dwelling type.

This change in the average size of newly constructed assisted dwellings is primarily related to *unit mix*: the ratio of studios, one-bedrooms, etc. in a given building or planned community. One key research question, then, is: Why has this mix varied so much from year to year? What are the forces that influence unit size and the mix of unit types?

1.0 POLICIES AND PRECEDENTS

1.1. Historical context

Beginning at the end of the 19th century, new cultural awareness influenced significant change in dwelling sizes for the urban poor. Crowding was a serious problem with tenement housing in the late 1890s and early 1900s in the United States, and tenement laws were included in the 1905 National Building Code (Listokin 2005). As the urban population boomed due to immigration and industrialization, the average dwelling area per occupant decreased. This can be seen both qualitatively (through Jacob Riis' stunning flash photography) and quantitatively (seven people in a 30.19 m² apartment was typical in the tenements (Eagle 2012)). There became a strong social interest in improving the conditions of tenement living, especially with regard to crowding and public health. By the 1930s, increasing the space, air and light for the urban working class was an institutionalized priority of the first federal housing programs. The size of apartments increased and, simultaneously, the absolute number of people living in them decreased.

But this change in conditions for the poor was too stark to be politic and there was popular reaction against the new standards in the name of austerity. After the Second World War, the regulation of room dimensions and arrangements was reduced in scope, based on the assumption that they were provided for adequately by the marketplace (Listokin 2005). By the time the Housing Reform Act was passed in 1949, the typical size of a new apartment in public housing was smaller than it had been in the 1930s though still much larger than the tenement housing.

In the 1950s and 1960s, children were seen as the social problem against which to engineer. Gwendolyn Wright notes: “By the 1950s.... Rooms were smaller, site densities were higher, and playgrounds or social areas inside the buildings were fewer. Housing authorities tried to discourage tenants with large families by

providing only small dwellings in new projects” (Wright 1981, 233). Using the size of the apartment as a means of family planning was not effective and there was a resultant increase in crowding.

There is no evidence of specific regulations related to dwelling size again until the 1970s when the federal department of Housing and Urban Development (HUD) updated the Minimum Property Standards (MSP) to include multifamily housing. These standards regulated the minimum dwelling size, as well as light and air standards. Conversely, in the 1980s, HUD created maximum dwelling size regulations through the institution of cost-containment measures for newly constructed apartments. These two actions had diametric outcomes for the size of dwellings: The MSP effectively increased the size of affordable dwellings yet at the same time cost-containment measures decreased the size of new dwellings. Ultimately, the effects of each appear to be negated by the other.

1.2. Recent trends in family housing units

Affordable housing moved into its privatized era in the 1980s and market conditions set dwelling size for Section 8 voucher-eligible apartments. The early Low-Income Housing Tax Credit (LIHTC) projects relied on market studies, if not the market itself, to determine dwelling sizes. By 1990, each state-level housing finance agency set priorities for the allocation of tax credits through Qualified Allocation Plans (QAP). By the mid 1990s, state agencies adapted the HUD Minimum Property Standards to include guidelines for minimum and maximum dwelling size.

During public housing revitalization in the 1990s, unit mix was seen as a way to social engineer the ghetto. During the initial community meetings for the Boston Public Housing revitalization, debates phrased in terms of “dwelling mix” raised questions of race:

Should the housing authority base its dwelling mix on the immediate need to rehouse existing residents? Should it be determined on the basis of the projections of the development-based waiting list, skewed toward the particular preferences of South Boston whites, 80 percent of whom requested one- or two-bedroom apartments? Or should the dwelling mix of the revitalized development attempt to reflect the broader pattern of Authority-wide demand (Stone 1993, 133)

Ultimately, the housing authority decided to restrict large families within the project, “to further minimize risk,” permitting only enough large dwellings to meet the legitimate needs of current tenants and skewing the rest of the dwelling mix toward one- and two-bedroom apartments to attract smaller families, including more elderly.

The 2000s did not see a large shift in dwelling size, though there is evidence, explored later in this paper, that the HOPE VI program has resulted in a change in the distribution of dwelling types, from “large-family” (three- and four-bedroom dwellings) to “small family” (one- and two-bedroom) dwellings. Multiplied across all of the HOPE VI projects, this trend has the potential to significantly reduce the dwelling size of public housing. From 1994 to 2012, 260,000 dwellings of public housing have been demolished or sold in the United States (HUD 2012), though the data on the number of those that were three- and four-bedroom dwellings is not readily available.

1.3. The smallest units

The conflicting HUD policies of the 1970s and 1980s relate to the very smallest dwellings available to low-income people. At the start of the 20th century, more than 11 million people lived in SROs in the ten largest U.S. cities. In 1973, the HUD’s minimum Property Standards forbade the use of Single Room Occupancy (SRO) dwellings as permanent housing because the dwellings lacked individual kitchens and bathrooms within the dwelling (Fodor 1998). Numerous affordable accommodations were thus removed from the market.

The senior housing program, HUD 202, has undergone many changes over its tenure that can illustrate trends in dwelling size change. In 1981, HUD institutionalized cost containment measures for these projects, and required that new efficiency apartments (kitchen and bath en-suite, with one room for sleeping and living) be less than 50.17 m² (415 square feet) and one-bedroom apartments, less than 50.17 m² (540 square feet). In addition, the cost containment measures required that 25% of new or rehabbed dwellings be efficiency dwellings, rather than one-bedroom dwellings (Turner 1985). As a result, the average size of a one-bedroom size dropped from 4-9% across the four HUD field office study sites.

Because Section 202 tenants pay 30% of their income toward rent, each resident pays the same amount whether she is living in an efficiency apartment or a one-bedroom apartment, resulting in resentment between residents. Efficiency apartments may create hardship for seniors, many of whom are moving out of their single-family homes. “A 415 square foot efficiency apartment provides little space for traditional furniture, for even a portion of a lifetime’s accumulation of possessions, for entertaining, or for private activities” (273 Turner 1985). HUD made changes to the program in 1992 and eliminated the 25% efficiency apartment requirement and now their senior-housing guidelines actively discourage new efficiency apartments.

However, the existing efficiency apartments continue to plague the HUD 202 system. In 2008, HUD issued a memorandum allowing Section 202 projects to convert efficiency apartments that had experienced less than 75% occupancy to convert to one-bedroom apartments. Building owners may join two adjacent efficiency dwellings and combine them into a one-bedroom dwelling (HUD 2008). This results in a one-bedroom apartment that is larger than the maximum allowed. It also results in a net loss of dwellings and a net gain in dwelling size.

1.4. Underhoused and overhoused

Though there were dramatic examples of crowded tenement housing, crowding has been reduced significantly in the United States. While 20% of all U.S. homes had more than one person per room, and 9% had more than 1.5 people per room in the 1940s, by 2000, only 5.7% of dwellings had more than one person per room. Crowding decreased for all incomes from 1985 to 2005, including those earning less than \$25,000 a year for whom the incidence of crowding (more than one person per room) fell from 4 to 3% in that time period (Blake 2007).

In the early 20th century, encouraging Americans to have bigger homes made sense because of crowding. According to three economists (Kevin Blake, Edward Glaeser and Rachel Dwyer), this is no longer rational because Americans are so significantly overhoused. In 2000, on average, each American had more than two rooms and 92.16 m² (992 square feet) of living space (Glaeser 2011).

There are differences in overhousing related to tenure, type and income. In terms of tenure, Kevin Blake of Econometrica finds that in 2005, the median *owner-occupied* home was 172.61 m² (1,858 square feet) compared to the median *rented* home of 124.86 m² (1,344 square feet). The economist Edward Glaeser suggests that because home ownership is tightly tied to housing *type* (85% of single-family houses are owned and 85% of apartments are rental) the U.S. is essentially subsidizing people to live in large single-family houses instead of smaller apartments in denser environments. Furthermore, the home mortgage interest deduction subsidy scales with the size of the mortgage, exacerbating the problem (Glaeser 2011). Rachel Dwyer finds that higher status populations tend to occupy newer housing while lower status groups tend to be restricted to older housing (Dwyer 2007). Because older dwellings tend to be smaller than new dwellings, the differential in dwelling size for the poor and the middle expands even more.

1.5. Energy use as an effect of overhousing

The increasing costs of heating and cooling are also a market condition that may influence dwelling size. Barry Fischer (2013) found that when heating energy use is controlled, electricity use correlates positively with home size: a 400 m² (4300 square foot) home uses, on average, twice as much electricity as a 140 m² (1,500 square foot) home. Fischer's analysis shows the role income plays in energy use: households in the top 20% income bracket who live in a 140 m² (1,500 square foot) home use four times as much electricity as the bottom 20% in the same sized home (Fischer 2013). According to AHS findings, lower-income homes tend to be older, less well insulated and have older less-energy-efficient appliances and space heating systems, and yet they still use less energy per person than their higher-income cohorts (Energy Research Consortium). More nuanced research may reveal that dwelling size is the most important determinant of energy use. Low-income people are motivated to conserve energy because of the cost (Dastrup 2012) and they are aided by the lower average size of their dwellings.

2.0 QUANTITATIVE ANALYSIS

In order to triangulate the evidence from the literature, and to answer the research question about how size matters comprehensively, empirical analysis is necessary. An examination of publically available LIHTC project data reveals historical dwelling change patterns as well as providing substantiation of some of the evidence on dwelling size change from the literature.

2.1. Unit mix

The state agencies that allocate Low Income Housing Tax Credits create Qualified Allocation Plans (QAP), affecting dwelling size in two ways: through preferences and through design guidelines. Preferences are created because tax credits are allocated competitively and each state sets its own preferred set-asides. In 1990, 29 states had stated preferences related to dwelling type (number of bedrooms per dwelling); in 2001, 30 states had dwelling-type preferences, though only 20 states overlapped, meaning between 1990 and 2001, 39 states attempted to influence dwelling type at some time. In 1990, 50% of the QAPs with preferences favored large-family dwellings (three-bedrooms or larger) but only 25% favored large-family dwellings in 2001.

The LIHTC data reveals a general movement toward increased dwelling size (Fig. 1), peaking in the early 2000s, with a shallower slope toward smaller dwellings since. There is a sharp increase in the early 1990s

toward more three- and four-bedroom dwellings and then they flattened out at 20% and 3% of total dwelling types, respectively. In the meantime, studios have held steady at 6% of total LIHTC dwellings.

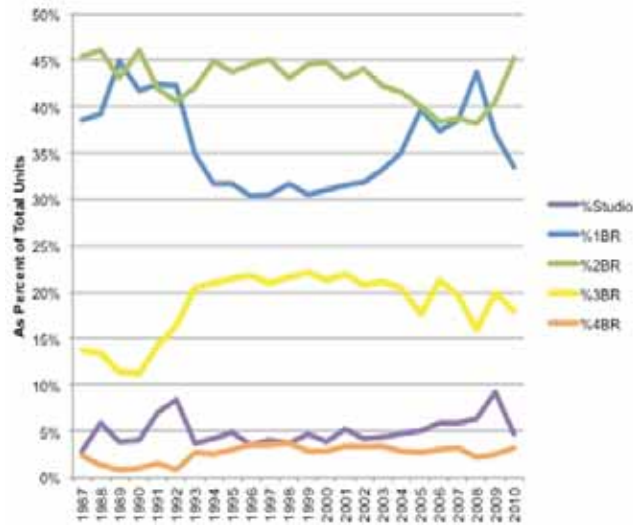


Figure 1: Trends in Unit Mix in LIHTC Projects, 1987-2010

The trend of one-bedroom apartments is intriguing: graphically, there are two peaks at 45% in the early 1990s and mid-2000s surrounding a ten-year wide trough at 30%. This trough (Fig. 1) is during the era of public housing demolition and one hypothesis is that the LIHTC housing providers were responding to an influx of large families relocating from public housing. Another hypothesis is that housing providers have a static number of dwellings they choose to provide, but the dwelling mix is dynamic, dependent in part on the preferences and set-asides of the state’s qualified allocation plan. Therefore, as three-bedroom apartments increase, one-bedroom apartments decrease.

The percentage of studio apartments has experienced two sudden increases, in 1992 and 2009. These spikes occur at the same time as the one-bedroom increases mentioned previously, and the two conditions may be related. Another influence may be the result of plans to end homelessness. Significantly, studios created through LIHTC account for 8% of the projects sponsored by non-profits and 3% of the projects developed by for-profit entities.

2.2. Unit size

Only a handful of states had design guidelines associated with their QAPs in 2004 and all states have some design guidelines in 2013. The Oregon Housing Finance Commission is a case study for this section of the paper, in part because the state uses the guidelines to control the size of dwellings, regulating both a maximum and minimum for each dwelling type (Table 1). Occasionally, conflicts arise between the LIHTC minimum and HUD maximum. For example, Oregon’s minimum one-bedroom size is 55.74 m² (600 square feet) and the maximum for HUD 202 is 50.17 m² (540 square feet) so the conflicting requirements must be negotiated if there is HUD 202 funding involved.

Table 1: Oregon Housing Services 2011 Architectural Guidelines

Unit Type	Minimum Required Unit Floor Area, m ² (square feet)	Maximum Required Unit Floor Area, m ² (square feet)
SRO	16.25 (175)	
Studio	32.50 (350)	
1 Bed / 1 Bath	55.74 (600)	64.10 (690)
2 Bed / 1 Bath	74.32 (800)	83.61 (900)
3 Bed / 2 Bath	92.90 (1000)	111.48 (1200)
4 Bed / 2 Bath	116.13 (1250)	130.06 (1400)

Though this empirical study analyses changes in average dwelling size and dwelling mix, it does not focus on dwelling area by type nor residents per bedroom nor residents per m² and many questions remain. Is a subsidized studio apartment getting smaller as building codes are adopted and the minimum size decreases? What is the actual size difference between a three-bedroom and a four-bedroom apartment? For example, in Oregon, the minimum for a four-bedroom apartment is 116.13 m² (1250 square feet). and the maximum for a three-bedroom apartment is 111.48 m² (1200 square feet). How does that affect perceptions of crowding when there could be, legally, 2 more people sleeping in that extra five square meters?

CONCLUSION

The LIHTC dataset employed for this research contains data for all 50 states, but its use is limited by the lack of detail. State agencies collect additional, dwelling-scale data that could provide a more thorough picture of dwelling size change in LIHTC housing. The American Housing Survey (AHS) could help to answer some of these questions because it contains dwelling size data for its sample, as well tenant satisfaction data. The AHS also includes a sample of remaining public housing dwellings, as well as HOPE VI and HUD 202/811 dwellings, which would provide a more complete picture of dwelling size and dwelling size change in U.S. affordable housing. cursory evidence from the AHS suggests that, of the 17 million rental dwellings affordable to households at 50% of area median income, only about 5 million dwellings, or approximately 30%, are subsidized.

The subject of dwelling size calls for a larger empirical and historiographical analysis, with panel data and an inventory of HUD and State requirements over time. A Building Code historiography may reveal why New York and San Francisco view 28 m² (300 square foot) apartments as “micro-living” while Seattle and Portland have been building 21 m² (220 square foot) dwellings to little fanfare for several years. A systematic inventory of zoning laws would expose the forces working against shared living and accessory dwellings. An architectural analysis of dwelling design at different sizes would help policy-makers and architects of affordable housing. The subject of dwelling size, and dwelling size change, is interdisciplinary, simultaneously architectural, sociological and political, and a compelling topic for further study.

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