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The evolution of suburban relative housing-unit diversity

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The diversity of housing-unit supply in suburban areas has been a central concern for planners and policy makers for at least 50 years. Absence of census cross-tabulation data on housing unit structure-type by unit-size (number of bedrooms), has limited our understanding of the historical and regional evolution of relative suburban housing-unit diversity. I use census microdata to estimate measures of relative housing diversity between cities and suburbs, including the housing-unit portfolio compositions, and availability ratios of diverse housing-unit types. Data are presented for the US, regions, metropolitan areas, and across different time periods. Effects of housing-unit supply on household structure and location are estimated. Results indicate that suburban areas, while growing in terms of the absolute number of diverse housing units constructed, are relatively undersupplying diverse housing units, thereby constraining households' housing opportunities.

Keywords: availability; land use/zoning; suburban; multifamily

Introduction

"Where a municipal subdivision is a logical place for development to take place, it should not be heard to say that it will not bear its rightful part of the burden... as long as we allow zoning to be done community by community, it is intolerable to allow one municipality to close its doors at the expense of surrounding communities and the central city... [the municipality] cannot refuse to make any provision for apartment living." Appeal of Girsh, 437 Pa. 237, 263 A.2d at 399 (Pennsylvania 1970, internal citations omitted)

A perennial concern for planners and urban policy makers is the availability of a wide variety of housing-unit types in suburban communities able to accommodate a range of household types. Critical to a metropolitan area's labor and housing markets, and directly related to the structure of the "geography of opportunity," housing-unit diversity in the suburbs potentially allows all types of households to live in those communities which best serve their housing needs. A widespread assumption in both research and policy communities has been that multiple barriers to housing development (including exclusionary zoning and a suburban preference for larger single-family detached houses) limit the diversity of housing-unit types in suburban communities.

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The majority of housing units constructed in the past decades have been located in the suburbs. Therefore, the diversity of housing-unit supply in suburban communities fundamentally shapes not only the demographic structure of suburban communities but also geographically structures opportunities for all metropolitan households. Housing-unit diversity, in and of itself, is of course not sufficient for demographic diversity because the location, accessibility to employment and services, and the price of units are also of critical importance. Housing-unit diversity is a necessary, but not sufficient, condition for suburban socioeconomic and demographic diversity.

For nearly as long as there have been suburbs, they have faced criticism – and sometimes political and legal challenges – for their inadequate housing-unit diversity. Even from the earliest days, suburban developers in the United States utilized various covenants and restrictions to exclude townhomes and apartments, long before the Supreme Court in *Euclid* (1926)[1] authorized zoning to protect single-family districts from the "nuisance" and "parasite" of non-single-family houses (Jackson 1985; Fischel 2004; Fogelson 2005). To the extent that a limited number of multifamily units were permitted in suburban areas, they were often located in buffer zones between detached residences and commercial/industrial land. Defenders and promoters of single-family detached houses argued or assumed that permitting developers to respond to market demand by supplying a greater variety of housing-unit types would negatively impact the value – and *values* – of single-family houses.

For purposes of this research, the diversity of suburban housing-unit supply is defined in terms of structure-type (single-family detached, attached, and small and large multifamily) and size of the units (number of bedrooms). The interaction of structure-type and unit-size comprises the housing-supply portfolio of a community. Housing-unit supply shapes affect the demographics of households who occupy housing units (Goodman 1999; Larco 2010). With the continued development of highways, a growing diversity of household types, the suburbanization of employment, and concomitant with civil rights and "open suburbs" campaigns (Pritchett 2007), there is a demand among households for "diverse" suburban housing units which do not include the prototypical large (three-or-more bedrooms) single-family detached house (Myers and Gearin 2001; Larco 2010).

Despite this interest in and concern for the diversity of the suburban housing stock for at least 50 years, empirical knowledge of the contours of this diversity has been limited by the lack of consistent, national data. The contours of housing-unit diversity as defined in this paper (structure-type and unit-size) are not produced for any geography by the US Census: there are no cross-tabulations for any defined geography of "units in structure" by "number of bedrooms" (or "number of rooms) in any of the main housing and population products.[2] I describe these data availability issues more fully below.

The purpose of this paper is to present microdata estimates on the evolution of relative suburban housing-unit diversity, both over time and across regions and metropolitan areas of the United States. In this paper, I will do this in three ways. First, I estimate the composition of the suburban housing stock relative to the city housing stock. Second, I measure the actual availability of diverse housing units in

[1]Village of Euclid v. Ambler Realty Co., 272 US 365, 387 (1926).
[2]This includes the decennial censuses, the American Community Survey, or the American Housing Survey.

the suburbs. Third, I examine the relationships between relative suburban housing-unit diversity and household-size demographics.

This paper is organized as follows. First, the literature on the importance of suburban housing-unit diversity and the literature on the supply impediments are reviewed briefly. Next, I detail the methodological and data issues involved in development of these measures of relative suburban housing-unit diversity. This is followed by the results of these metrics with discussions, followed by discussion and some recommendations.

The importance of suburban housing unit diversity

There are at least four areas where the diversity of suburban housing-units has risen as a concern in the literature. These include the growing diversity of household structure, the "spatial mismatch" hypothesis, a shift in federal urban and housing policy towards "mobility" strategies for poverty deconcentration, and the emphasis within transportation on the problem of "excess commuting" and the "jobs-housing balance". Each of these areas has a growing and complicated literature, and in each area the diversity of suburban housing units plays a critical role.

First, US households are becoming increasingly diverse in their structure (Day 1996; Kreider and Elliott 2009). In the past decades, there has been a substantial increase in the diversity of American households, including a rise in single households (both the young and the old), a reduction in the number of households with children, a decline in overall average household size, a rise of multi-generational households, and increased immigration and racial and ethnic mixing (El Nasser and Overberg 2011). Changing demography of household types should translate into changing demands for different types of housing units. According to the 2010 census, married-family households with children-under-age-18 present constitute only 20.2 percent of all households, the lowest ever recorded. Yet, as detailed below, the dominant housing-unit type constructed in suburban areas remains not only the single-family detached house but larger houses with 3- or more-bedrooms.

Myers and Doyle (1990) in their pioneering study in "housing demography" demonstrate that housing unit characteristics within an area can a substantive impact on the population structure. More recently, Larco (2010) demonstrates that occupants of multi-family housing in the suburbs differ significantly from single-family detached households in the suburbs in terms of age, size, and family structure, suggesting at least a strong correlation between the diversity of housing-unit supply and the demographic composition of suburban communities. Of course, household demographic differences translate into different demand preferences for housing. But housing-unit diversity is itself important in matching supply and demand, or matching unit-type with household-type. When there is a mismatch between the types of housing units supplied and the types of units which might be demanded by different household types, one of three situations could result, each of which potentially reduces household welfare. The household could relocate to a different jurisdiction where the desired housing-unit type is supplied, the household could consume a higher-tier of housing or a bigger unit than desired, or the household might alter its choice to consume a lower-tier or smaller unit of housing than desired. Any observed "mismatch" in household demographics and housing-unit (such as below in Tables 4 and 5 where many larger single-family detached suburban houses are occupied by one-person households) may reflect household preferences rather

than diversity-constrained supply. However, when household-type/housing-unit type mismatches appear to be more prevalent in areas with a less-diverse housing supply, this is consistent with the idea that supply constraints impact household sorting. The purpose is not necessarily to identify causation but rather for planners, policy makers and even housing developers to identify potential diverse housing-unit types for new construction.

The second area of research where housing-unit diversity in the suburbs plays an important role is in structuring "spatial mismatch" (Kain 1968; Wilson 1987). Although there are important variations in understanding the forces of spatial mismatch and their direct or indirect effects on minority household income, welfare and employment outcomes, all versions of the spatial mismatch hypothesis identify the significant level of job growth in suburban areas (Glaeser and Kahn 2004) and a lack of affordable and available housing opportunities in suburban areas. This results in the "mismatch" between job opportunities and housing opportunities: un(der)employed minority residents of central cities are either forced to commute long distances to suburban jobs or suffer higher rates of unemployment.

In surveying 30 years of research into spatial mismatch, (Kain 1992, p. 436) concluded that "... there is growing evidence that housing market discrimination, and the particular pattern of racial residential segregation it created in most, if not all, US metropolitan areas, are important causes of low employment levels of the Afro-American residents of central-city ghettos." While the empirical disputes within the spatial mismatch literature concern directions of causality, the magnitude of housing discrimination on earnings, and the efficacy of suburban-housing solutions to concentrated city poverty, the literature generally concludes that a lack of housing opportunities in suburbs results in segregation race across metropolitan areas (Kain 2004). For purposes of this present research, the spatial mismatch literature draws attention to one of the most significant consequences of a lack of suburban housing unit diversity.

Third, many authors have identified a shift in federal urban and housing policy towards one of household mobility and poverty deconcentration (de Souza Briggs 2003; Goetz 2003; Popkin and Cunningham 2005; Goetz and Chapple 2010; Schwartz 2010). Household mobility and poverty deconcentration strategies seek to expand the options for households currently residing in high-poverty and/or racially-segregated neighborhoods to move to lower-poverty and/or less-segregated neighborhoods. But mobility strategies rely on the availability of actual housing units able to accommodate dispersed households. The evidence in mobility programs indicates that most movers locate not to suburban communities but to nearby neighborhoods which, while generally lower-poverty and less-segregated than previous neighborhoods, are still higher-poverty and more segregated neighborhoods than the metropolitan area at large (Goetz and Chapple 2010; Schwartz 2010). Only the *Gautreaux* program, which involved significant counseling, education and real estate assistance, saw any significant number of suburban movers (Rosenbaum and Zuberi 2010).

Debate within this literature continues as to whether the reluctance of dispersed minority households to relocate into suburban areas results from household demand characteristics (desire to remain closer to social connections, fear of suburban social/racial isolation), discrimination, lack of access to public transportation options in suburban areas, or from a general lack of supply of diverse housing units in suburban areas. Certainly the lack of available and affordable housing options

within the suburbs constrains household decision making, even if this isn't the most binding constraint.

Fourth, housing-unit diversity in the suburbs also plays a significant role in metropolitan spatial structure in terms of "excess commuting" and the "jobs-housing balance." To oversimplify this complicated literature, growth of jobs in suburban communities without a corresponding availability of housing in those communities leads to increased commuting, longer commutes and increased congestion. There is still some dispute within the transportation field about the magnitude of the jobs-housing balance relative to household demand factors in driving transportation choices of households (Handy 2005, 2006; Handy, Cao et al. 2005; Cervero and Duncan 2006). However, to the extent that an imbalance between jobs and housing in an area impacts travel behavior and congestion, then the lack of an available and diverse housing-unit supply in suburbs could negatively affect regional welfare in terms of excessive commuting and congestion.

How do suburban communities restrict housing unit diversity?

The four areas discussed show the critical role that housing-unit diversity could play in households' locational opportunities and metropolitan spatial structure. But why and how is the diversity of housing in suburban areas restricted? There is a large and growing literature on the general problem of the exclusionary nature of many suburban zoning and land use controls (see, for example, Windsor 1979; Rolleston 1987; Bogart 1993; Fischel 1999, 2004; Myers 2003; Ihlanfeldt 2004; Calabrese, Epple, and Romano 2006; Paulsen 2006; Rothwell and Massey 2009; Schmidt and Paulsen 2009). An excellent review of this literature in found in Ihlanfeldt (2004). Although the literature on exclusionary zoning is large, for purposes of this present research I limit the review to recent empirical work on the effects on specific types of housing units constructed. These studies focus on the extent to which zoning and other land use policies restrict construction of diverse housing units – most typically multifamily apartments – rather than the more general problem of restricting overall growth through large minimum lot-size requirements.

Levine (1999) studied California cities and found that many zoning restrictions on density, when combined with growth management policies, had the effects of reducing the supply of rental housing and served therefore to displace rental housing to more distant communities. His measure of housing diversity was the number of units classified as "renter-occupied" along with building-permit data on multifamily units constructed. He estimated that as much as one-third of total rental housing in the state was displaced to less regulated, distant communities. He also found that the effect of such displacement was significant changes in the racial and ethnic composition of communities. Because minority communities are more heavily dependent on the availability of rental housing, there was significant displacement of racial minorities to the outskirts of metropolitan areas.

Pendall (2000) examined a range of local land use restrictions which, taken together, form what he calls the "chain of exclusion." In a survey of over 1100 municipalities in large metropolitan areas, his study documented the effect of suburban zoning and other land-use and growth management policies on different housing-unit types. Most relevant to this study, restrictions on multifamily rental housing led to decreased affordability and increased racial exclusion. His variables measuring housing-unit types included percent of rental units considered affordable,

percent of rental units in structures greater than five-units, and percent of rentals with fewer than two bedrooms. Of additional interest is his finding relating unit-type to household demographics: places with a greater percentage of the available rental units having fewer than two bedrooms were associated with a statistically significant reduced black population. This study was one of the first to find an important connection between unit-sizes and demographic composition.

In a recent update of the survey on land use restrictions to include jurisdictions in the 50 largest metropolitan areas, Pendall, Puentes et al. (2006) also develop a "prototype" apartment development (40 units, 2-story building on 5 acre lot)[3] and inquire whether such a development would be permitted "by right" or under a special permit process in jurisdictions. They find that 30.4 percent of metropolitan jurisdictions would not permit such an apartment development, either by right or special permit. Nationwide, nearly 67 percent of all multifamily units are found in these smaller buildings (fewer than 50 units) so their exclusion from so many jurisdictions reduces housing-unit diversity.

Mitchell (2004) studied the effects of different state exclusionary-zoning statutes and case law on the diversity of housing-types in the Philadelphia metropolitan region. His study is one of the first to break out unit-type to include less expensive single-family housing units (townhouses and mobile homes) as well as apartments. He finds that suburban areas on the Pennsylvania side of the Philadelphia region provided greater housing-unit diversity than New Jersey.

Knapp, Meck et al. (2007) undertake a detailed case study analysis of six metropolitan areas to examine the effects of zoning restrictions on multifamily housing construction. In both statistical analysis and qualitative analysis, they find multiple barriers to higher-density multifamily housing construction in the suburbs of most metropolitan areas. Importantly, though, they find significant differences across metropolitan areas. Zoning restrictions in their study include not only the total amount of land zoned to allow multifamily dwellings, but also density and size constraints. They find some support for the idea that greater regional supervision of municipal zoning can reduce barriers to multifamily housing construction.

Schuetz (2009) measured the stringency of multifamily zoning and permitting in 186 suburban cities and towns in Massachusetts. She finds that jurisdictions with stricter regulations on multifamily construction experience less overall multifamily construction, even when controlling for demand and other factors. Her variable measures the number of multifamily lots able to be developed, rather than the total number of multifamily units able to be developed. She finds that allowing more multifamily lots to be developed "by right" is associated with statistically significant, yet small, decreases in median rent levels.

Data and methodology

The discussions above draw attention to the need for more research and understanding of the process of the supply of structure-type and unit-size diversity in suburban areas. As noted above, the US Census Bureau, in its decennial census data products, does not produce or make available any cross-tabulation of the variable "units in structure" with the variable "number of bedrooms" (or "number of rooms") for any geographic level. These data are also not available in reports or

[3]Corresponding to my definition of "small multifamily" in this paper.

data products based on the American Housing Survey, nor available through HUD's special tabulation data (CHAS) made available to jurisdictions for Consolidated Plan preparation.

Any census cross-tabulation which is not reported may be estimated using micro-data, but the standard errors of the estimates may not permit as fine of geographic detail. The source data for this paper is the 5 percent sample PUMS – Public Use Microdata Sample for the year 2000 census. The sample utilized is the housing unit record, and I use the un-weighted sample of non-institutional housing units.[4] (Institutionalized housing units include college dormitories, prisons, military bases, senior care facilities, etc.) Because the interest is in calculating measures of the diversity of residential housing units (bedrooms and units in structure) for suburban areas relative to cities, a number of steps were required to produce the final sample. First, observations without data on either the number of bedrooms or units in structure were dropped from the sample. Second, units which were labeled as "farms" were dropped from the analysis. Third, housing units which were classified as being a "boat, tent, van, or other" were also dropped from the analysis. Fourth, I drop all non-institutionalized group quarters from the sample.

Classification of areas as either being "suburban" or in a city has been the subject of controversy, and the definition of "suburban" in using census data has long been recognized as problematic by scholars in this area (Anacker 2010). Census PUMS data does include variables indicating metropolitan area status, which is the only locational data able to distinguish cities and suburbs. Census classification of whether a unit is located in an "urban" area (formally an "urban area" or "urban cluster") is not available within the PUMS. Therefore, the established practice of researchers using census data and American Housing Survey data is to classify suburbs as those areas which are within metropolitan areas (identified metropolitan statistical areas) but not located in a "central city." Although this has become standard practice – and the approach I will follow in this paper – using this approach introduces potential biases into the numbers and conclusions of this research.

Firstly, because the definition of Metropolitan Statistical Areas (MSAs, CMSA/PMSAs) in the 2000 census is based on county boundaries, each MSA contains some amount of land area which is more legitimately thought of as "rural" rather than "suburban." Many counties which abut urban counties have significant economic linkages to a central city (as exhibited by commuting patterns) and usually include a sizeable area of land classified by the census as "urban." Such counties would be included in a metropolitan area boundary, even though there are significant amounts of "rural" land in the county. Defining "suburban" as non-central-city within a metropolitan area could therefore likely classify some "rural" lands as being "suburban." To the extent that rural housing development is less likely to include non-single-family detached housing, therefore, this definition could potentially bias my measures of suburban housing-unit diversity downward.

Secondly, the definition of "central city" within MSAs is problematic in terms of identifying suburbs. The census bureau defines "central cities" of MSAs based on

[4]The data were accessed via the IPUMS server at the University of Minnesota Population Center, http://usa/ipums/org/usa/index.shtml (last accessed August 15, 2011). Full citation of the data is: Steven Ruggles, Matthew Sobek, Trent Alexander, Catherine A. Fitch, Ronald Goeken, Patricia Kelly Hall, Miriam King, and Chad Ronnander, 2008. Integrated Public Use Microdata Series: Version 4.0 [Machine-readable database]. Minneapolis, MN: Minnesota Population Center [producer and distributor].

population density standards. There are often additional areas classified as ''central cities'' for purposes of PUMS data which do not appear within the name of the MSA, as only the ''principal cities'' of an MSA are included in its name. For example, the Los-Angeles CMSA has 14 ''central cities,'' including Long Beach, Pasadena, Anaheim, San Bernadino and Irvine, and the New York CMSA has 16 central cities including Jersey City, Newark, and White Plains.

Because the census classifications are based on municipal boundaries, the potential bias in the data is that what classifies as a city has as much to do with annexation and incorporation policies as it does with density (Jackson 1985; Rusk 2003). Large areas of what many might consider ''suburban'' style development occurs within the boundaries of the cities of Phoenix or Houston and would be classified as ''central city'' in the census. Likewise, many areas of what many might consider ''urban'' development occurs just outside of the boundaries of the central city in older, northeastern areas such as Philadelphia or Boston.

Therefore, there are potentially areas reported in census data as ''central cities'' which are more suburban in character, and reported as ''suburban'' which are more city-like in character. There is no way to identify *a priori* within these data which possible biases could result from a classification system reliant on municipal boundaries. To the extent that these classifications are not random across metropolitan areas, then results would require careful interpretation. As shown in the data below, there are substantial regional and metropolitan variations in the relative housing-unit diversity of suburbs relative to cities, and these regional differences potentially arise from the boundary-definition problem rather than representing true regional differences in housing-supply trends.

A further complication of classifying defining suburbs only as within a metropolitan area outside of central cities is that it is not possible to distinguish between older, ''inner-ring'' suburbs and newer suburbs. Although the ability to know the year when the housing unit was built in the data allows us to track changes over time, it is not possible to track changes over space within the suburbs of any particular region. Again, the necessity of using micro-data to estimate these relationships results in a tradeoff of a lack of geographic specificity.

Therefore, although it is problematic for reasons identified, the definition of suburban used in the remainder of the paper is ''within a metropolitan area, outside of a central city.'' In order to operationalize this definition, I remove all observations from the sample where the metropolitan and/or central city status of the observation is unknown or not reported. Out of the approximately 6 million observations in the full 5 percent sample, approximately 2.2 million observations have the metropolitan area and central city status identified. To the extent that observations missing metropolitan status variables are systemically related to the constructs used in this study, this also introduces potential bias into these results. There is no way to know *a priori* the direction or magnitude of this potential bias.

In order to assess the extent to which excluding cases from my sample introduces errors, I use statistical tests on a number of variables which are available in both the larger sample and my reduced sample. *t*-tests on the differences in means for household income, house value (only available for owner-occupied, not rented properties), and average number of bedrooms between my final sample and excluded observations are all statistically significant, even when the magnitude of difference is not large. The average household income in the included sample is $1750 larger ($56,035 vs. $54,285) than the observations excluded from analysis. The average

house value in my included sample is $7000 higher, while the average number of bedrooms is 0.004 smaller. The difference in number of bedrooms, while statistically significant, is not actually meaningful. The differences in income and house value between my sample and the excluded observations indicate that these observations excluded for missing data are from slightly poorer households in slightly lower-value housing units.

Definition of different housing-unit types requires careful consideration of both housing and real estate markets and data availability. For each housing-unit type, there needs to be a sample size large enough to make city-suburb and regional and metropolitan comparisons, but the classifications also need to translate into types of units which would be recognizable to planning classifications and real estate markets. Classification of census housing-unit data into housing types consistent with local planning and real estate markets has also proven difficult, with various researchers classifying units differently. For purposes of this research, I propose to classify four distinct structure types: single-family detached, single-family attached, small multifamily and large multifamily. Note that this definition examines building type and not tenure, because the concern is with the overall diversity of housing supply and because built units can switch tenure status: single-family detached units can be renter-occupied and large multi-family buildings could be owner-occupied (condos).

Using census classifications, then, mobile homes and single-family detached houses are classified as ''single-family detached.'' I combine the census categories ''1-attached'' with 2 and 3–4 units to create the category ''single-family, attached.'' Although ''1-attached'' houses typically involve row-houses and/or townhouses, two to four unit structures can include duplexes, quadplexes and very small apartment buildings or converted detached structures. This is really the ''in-between'' category which different researchers handle differently. I have two reasons for classifying these units in with single-family attached. First, FHA mortgage insurance for what it calls its ''Single-Family'' program is available for one to four unit structures.[5] Second, in most states, one to four unit structures are assessed for property tax purposes as ''residential,'' while five or more units in a building are assessed as ''commercial'' or apartments. Because elements of the real estate community (finance and assessment) treat one to four unit buildings as constituting a different housing-type than multifamily units, I follow this practice. This category could be more appropriately called ''single-family attached, duplexes and very, very small multifamily,'' but I will use the term ''single-family attached'' for simplicity of exposition.

I define multifamily units as any unit located in a structurewith five or more units. Small multifamily units are those with 5–49 units in structure, while large multifamily units are those with 50 or more units in structure. The choice of the 50 + units as the break point between small and large was also driven by the nature of real estate and apartment construction and financing. Fannie Mae, for example, distinguishes its ''small multifamily'' portfolio from its ''large multifamily'' portfolio with a cut off of buildings with 50 units or more.[6] Research on the financing and operational structure of multifamily dwellings confirms a difference in ownership and financial structure for smaller units. Bogdon and Ling (1998) found that

[5]See Section 203, National Housing Act (12 U.S.C. 1709 (b), (i)); and 24 C.F.R. Part 203.
[6]See, for example: ''Fannie Mae's Role in the Small Multifamily Market'' at: https://www.efanniemae.com/mf/refmaterials/pdf/wpmfloanmkt.pdf [last accessed August 17, 2011]

properties with fewer than 50 units had lower rent-to-value and net-operating-income-to value than did larger units. Weaker financial conditions of smaller units may reflect the fact that smaller units are more likely owned by local investors or that larger units reflect economies of scale in terms of management and finance. Within the entire sample presented in this paper, 66.8 percent of all multifamily units are in small-multifamily structures while in suburban areas, 72.4 percent of all multifamily units are in small-multifamily structures. Of course, all other things being equal, we would expect a greater percentage of multifamily housing units in the suburbs to be in smaller buildings because of land value differentials. In the discussion below, it is the relative difference across places and not the absolute difference between city and suburbs for multifamily which is considered.

Classification of unit-sizes also reflected data availability and real estate market considerations. For the single-family detached and single-family attached categories, categories include two- or fewer-bedrooms, three-bedrooms, and four- or more-bedrooms. For multifamily buildings my categories include one-bedroom units, two-bedroom units, and three- or more-bedroom units.

Results: Housing-unit type diversity across regions and throughout time

One way to characterize suburban housing-unit diversity is to examine the relative composition of the housing-supply portfolio. Table 1 presents estimates of the percentage distribution of metropolitan housing unit-types, for both suburbs and cities, including breakouts by census region and decade of construction and subtotals for single-family, detached and multifamily categories. The rows in Table 1 sum to 100 percent (excluding subtotals), and each observation indicates the percent of the total housing stock for the relevant geography which is comprised of by the structure-unit type in the column heading.

The nationwide figures (top panel) show over 70 percent of all suburban housing units as single-family detached, while only 41 percent of city housing units are. Cities have a greater than double percentage of their housing stock in multifamily than do suburbs (32 percent to 15 percent). These differences are not unexpected and conform to prior research. However, the distribution by specific size of units exhibits city-suburb differences. The most prevalent type of suburban multifamily housing unit is the two-bedroom unit, while it is the one-bedroom unit in cities.

Regional differences are quite evident in the composition and location of the housing stock.[7] The Midwest has the highest percentage of its suburban housing stock as single-family detached, followed by the South, the West, and the Northeast. Within the single-family detached stock there are regional variations in size distributions: the Northeast has a greater percentage of its suburban single-family detached housing stock as larger houses (4 + bedrooms) than any other region, and decadal observations (not in table) confirm that the Northeast has always had the highest percentage (relative to other regions) of its new single-family stock constructed as larger (4 + bedrooms) houses. In terms of the suburban multifamily housing stock, the West has the greatest percentage of units as multifamily (17.86 percent), followed by the South, the Midwest and with the Northeast having the smallest percentage (13.17). Northeastern cities, however, have the greatest share of city housing units as multifamily, followed by the West, the South and the Midwest.

[7]Decadal observations by region and metro area are not reported because of table size.

Table 1. Percent distribution of housing unit types, by region and by decade.

	Single-family, detached			SF detached totals	Single-family, attached			Small multi-family			Large multi-family			Multi-family totals
	1 or 2 BR	3 BR	4 + BR		1 or 2 BR	3 BR	4 + BR	1 BR	2 BR	3 + BR	1 BR	2 BR	3 + BR	
Nationwide	13.82	29.60	17.26	60.68	11.51	5.21	1.34	7.21	5.87	1.12	4.53	2.12	0.40	21.26
Suburbs	14.72	34.32	21.32	70.36	9.25	4.15	0.93	5.09	5.17	0.82	2.60	1.43	0.20	15.31
Cities	12.05	20.34	9.28	41.67	15.94	7.30	2.15	11.37	7.24	1.72	8.33	3.47	0.81	32.94
Northeast	9.64	24.62	16.88	51.14	14.50	8.09	2.59	7.64	5.29	1.35	5.99	2.70	0.70	23.67
Suburbs	12.40	32.56	22.95	67.92	11.74	5.50	1.68	4.89	3.92	0.64	2.55	1.03	0.14	13.17
Cities	3.84	7.91	4.12	15.87	20.32	13.54	4.51	13.44	8.18	2.84	13.21	6.23	1.87	45.76
Midwest	14.17	34.66	17.23	66.07	10.84	3.90	0.93	6.27	5.95	0.89	3.53	1.41	0.21	18.26
Suburbs	13.67	39.87	21.03	74.57	7.78	2.72	0.47	4.81	5.68	0.60	2.12	1.14	0.11	14.45
Cities	15.14	24.71	9.98	49.83	16.67	6.14	1.82	9.05	6.45	1.45	6.24	1.94	0.41	25.54
South	15.20	32.85	17.36	65.41	8.97	4.72	0.90	6.10	6.38	1.21	3.86	2.11	0.34	20.00
Suburbs	15.84	35.69	20.36	71.88	6.83	4.45	0.72	4.56	5.91	1.13	2.43	1.78	0.30	16.11
Cities	14.06	27.74	11.96	53.76	12.82	5.20	1.22	8.85	7.22	1.35	6.44	2.70	0.43	27.00
West	17.18	27.44	17.64	62.26	11.53	3.22	0.63	8.93	5.90	0.91	4.39	1.98	0.26	22.37
Suburbs	17.27	30.20	20.64	68.11	10.27	3.18	0.58	6.25	5.48	0.84	3.30	1.77	0.22	17.86
Cities	16.99	21.73	11.44	50.17	14.12	3.29	0.74	14.48	6.77	1.04	6.63	2.40	0.36	31.69
Built in 1950s	19.32	38.84	13.29	71.45	9.58	4.02	0.90	5.44	3.39	0.69	2.82	1.40	0.32	14.05
Suburbs	20.29	44.99	16.49	81.77	6.92	2.59	0.63	3.47	2.45	0.36	1.17	0.56	0.08	8.09
Cities	17.67	28.44	7.90	54.01	14.08	6.44	1.35	8.77	4.98	1.24	5.60	2.82	0.72	24.13
Built in 1960s	11.94	31.69	18.05	61.68	9.46	3.48	0.85	8.24	6.22	1.00	5.68	2.79	0.60	24.53
Suburbs	13.00	36.37	22.14	71.51	7.64	2.57	0.59	6.51	5.55	0.72	3.04	1.66	0.22	17.68
Cities	9.81	22.28	9.83	41.91	13.12	5.30	1.37	11.74	7.58	1.56	10.98	5.06	1.37	38.29
Built in 1970s	11.41	26.83	18.03	56.27	10.38	4.49	0.85	8.58	8.10	1.29	6.43	3.09	0.53	28.02
Suburbs	12.76	30.10	20.93	63.79	9.19	4.17	0.74	6.93	7.30	1.06	4.14	2.39	0.30	22.11
Cities	7.78	18.01	10.23	36.03	13.57	5.34	1.14	13.04	10.25	1.93	12.57	4.99	1.14	43.92
Built in 1980s	10.77	27.54	18.06	56.37	11.74	5.46	0.74	7.52	8.40	1.12	5.57	2.72	0.35	25.69
Suburbs	11.94	30.09	20.66	62.69	10.89	5.40	0.70	5.80	7.60	0.99	3.65	2.05	0.24	20.33
Cities	7.00	19.27	9.61	35.88	14.50	5.67	0.88	13.12	11.02	1.57	11.78	4.88	0.71	43.08
Built in 1990s	8.64	32.23	26.86	67.73	7.83	4.90	0.72	5.12	6.31	1.40	3.71	1.93	0.35	18.82
Suburbs	9.09	34.23	29.39	72.71	7.12	4.77	0.67	3.88	5.60	1.20	2.40	1.40	0.27	14.73
Cities	6.69	23.52	15.86	46.07	10.92	5.48	0.94	10.55	9.42	2.27	9.43	4.25	0.69	36.60

Attention to the relative diversity of suburban housing units focuses attention on the composition of the non-single-family-detached suburban housing stock. For ease of exposition, I refer to non-single-family detached units as constituting the "diverse" housing stock. To the extent that suburban areas do allow "diverse" units, their relative distribution matters. In the three regions outside of the Northeast, the percentage of suburban units which is multifamily greatly exceeds the percentage which is single-family attached. In the Northeast, however, the percentage as attached units greatly exceeds that of multifamily units. These row-house/townhouse type units would be consistent with the older "Streetcar Suburbs" around many northeastern cities (Warner 1978; Jackson 1985; Weiss 1987).

The data presented in Table 1 draw attention to regional variations in the composition of the suburban multifamily stock. Among small multifamily suburban units, the most prevalent type in the Midwest and South is the two-bedroom unit, while in the Northeast and West it is the one-bedroom unit. However, this regional difference disappears for large multifamily suburban units, with one-bedroom units about twice as prevalent as two-bedroom units for all regions. To the limited extent that suburban areas have larger multifamily units (three- or more-bedrooms), those units are at least three times more prevalent in small multifamily buildings than in large multifamily buildings, consistent across all regions.

The decadal observations (lower panel) reveal how the suburban housing stock has evolved. The percent of all total suburban units constructed as single-family detached units declined from a high of nearly 82 percent of all new units in the 1950s to just over 62 percent of new units constructed in the 1980s. However, this number increases back to nearly 73 percent in the 1990s. The size of detached units has increased nearly steadily over time: in the 1950s, only 16 percent of all suburban units constructed were large detached houses (four or more bedrooms), but by the 1990s this percentage had nearly doubled to 29.39 percent.

The percent of suburban units constructed as multifamily units first increases from a low of 8.09 percent in the 1950s to 22.11 percent in the 1970s, but declines in the 80s and 90s to 14.73 percent, below the 1960s percentage. While the reasons for this increase and then decrease cannot be established from these data, this result is consistent both with research from Fischel (2004) and Schuetz (2009) that suburban zoning became more restrictive for apartment construction and that tax law changes in 1986 reduced many of the tax advantages for rental housing construction (DiPasquale and Cummings 1992; Green and Malpezzi 2003). The decline in the percentage of units constructed as multi-family units shows a similar magnitude percentage-point drop in both the cities and suburbs in the 1990s, however, suggesting that the macroeconomic investment environment for multifamily construction rather than relative changes in zoning restrictiveness is a more likely explanation.

Results: Suburban housing unit diversity relative to the cities

The discussion above presented the concept of relative diversity in terms of how much of an area's suburban housing was in diverse housing types. A second way to analyze the relative diversity of suburban areas is to measure how much different the suburban housing-stock portfolio is from the city composition. Whereas Table 1, for example, enabled us to know that suburbs in the West had a greater percentage of suburban housing units as one-bedroom multifamily than any other region, Table 2

would enable us to know how many percentage points fewer of one-bedroom multifamily did suburbs in the West have than did cities in the West. Western suburbs may have more of a particular type of housing units than do northeastern suburbs, but the difference in composition between cities and suburbs in the Northeast may exceed that of the West. Table 2 allows us to compare the suburb-city *differential* across regions and metropolitan areas.

Table 2 presents the same basic data as Table 1, except that the observations are calculated as the suburban percentage of housing in a particular unit-type minus the city percentage. It is a measure of how much more or less of a percentage of the housing stock is represented in suburban areas relative to their cities. Positive numbers indicate a greater prevalence of a particular housing type in the suburbs than in the cities, and negative numbers indicate a lesser concentration of a particular type in suburban areas than in cities. The data are in *percentage-point differentials*, not percentage differentials. So, for example, in the nationwide data on single-family 4 + bedroom housing units, the number 12.05 indicates that suburban areas have a 12.05 percentage-point greater concentration in this housing-unit type than do cities. The rows, by definition, sum to zero.

Table 2, demonstrates, not surprisingly, that suburbs – relative to cities – are more abundantly concentrated in single-family detached housing, and under-concentrated in every other housing type. Suburbs' relative underconcentration in "diverse" housing-unit types is most acute in small attached units and smaller (1-bedroom) multifamily units. This result is mostly consistent across all four regions.

Beginning with the figures for multifamily housing, Table 2 indicates that, except for the Northeast, the percent of the suburban housing stock in 2- or 3 + bedroom configurations is close to the corresponding city percentage. The south and the west have 1.3 percentage points fewer two-bedroom units than do their cities, and all other non-northeastern categories of non-single-bedroom multifamily are within a percentage point of their cities. The northeast has the biggest differences between suburb and city housing stock composition in terms of multifamily, suggesting a significantly undersupply of all multifamily units relative to their cities.

Within each region, the percentage differential between suburb and city declines as the number of bedrooms in multifamily units increases. That is, compared to the city housing portfolio, the suburban stock is most different in terms of under-supplying one-bedroom units, and more close to the cities in terms of 3 + bedroom units, which is shown by reading across the table for each region within the multifamily subcategory. The exception is only a slight difference in the Midwest in the small multifamily category.

If, over time (decadal data in middle panel), the number for a particular type of multifamily unit becomes more negative, that indicates that the suburban housing composition is becoming more unlike the city composition. Comparing the 1960s to 1990s, shows that the suburbs are becoming more unlike the cities in terms of small multifamily percentages (numbers get more negative), while becoming less unlike the cities in terms of large multifamily units (numbers get less negative). The underlying data show that this convergence in terms of portfolio composition of large multifamily units is due to a larger (in percentage point terms) decline of large multifamily construction in the cities over this period than in the suburbs. In terms of the divergence seen in smaller multifamily units, if suburban areas were responding to shifting demographics and market demands for one- and two-bedroom units in small buildings, then these numbers should go the other way.

Table 2. Percentage-point differential in housing stock composition, suburbs to cities.

	Single-family, detached			Single-family, attached			Small multi-family			Large multi-family		
	1 or 2 BR	3 BR	4 + BR	1 or 2 BR	3 BR	4 + BR	1 BR	2 BR	3 + BR	1 BR	2 BR	3 + BR
Nationwide	2.67	13.97	12.05	−6.69	−3.15	−1.23	−6.28	−2.07	−0.90	−5.73	−2.04	−0.61
By Region												
Northeast	8.56	24.65	18.84	−8.58	−8.04	−2.84	−8.55	−4.26	−2.19	−10.66	−5.20	−1.73
Midwest	−1.48	15.16	11.06	−8.88	−3.41	−1.36	−4.24	−0.77	−0.85	−4.12	−0.81	−0.29
South	1.78	7.95	8.39	−5.99	−0.75	−0.50	−4.29	−1.31	−0.22	−4.02	−0.92	−0.13
West	0.27	8.47	9.20	−3.85	−0.11	−0.15	−8.24	−1.30	−0.20	−3.33	−0.63	−0.14
By Decade												
1950s	2.62	16.55	8.60	−7.16	−3.85	−0.72	−5.31	−2.53	−0.88	−4.42	−2.27	−0.64
1960s	3.19	14.10	12.31	−5.48	−2.73	−0.78	−5.24	−2.03	−0.85	−7.94	−3.40	−1.15
1970s	4.98	12.10	10.70	−4.38	−1.18	−0.40	−6.12	−2.96	−0.87	−8.43	−2.60	−0.85
1980s	4.94	10.82	11.05	−3.61	−0.27	−0.18	−7.32	−3.42	−0.58	−8.12	−2.83	−0.47
1990s	2.40	10.72	13.52	−3.79	−0.71	−0.27	−6.68	−3.82	−1.07	−7.03	−2.85	−0.42
By Metro												
New York	6.45	23.25	23.51	−4.49	−4.86	−2.37	−9.56	−5.65	−2.78	−13.60	−7.33	−2.55
Los Angeles	1.48	6.55	7.73	−1.21	1.15	0.07	−10.35	−1.73	−0.13	−2.86	−0.53	−0.17
Chicago	2.55	20.72	14.29	−11.53	−6.76	−2.41	−4.36	−0.09	−2.02	−7.67	−1.83	*
Washington, D.C.	2.22	10.92	23.91	−9.89	0.40	−2.45	−8.05	−0.15	0.26	−14.59	−2.31	−0.27
San Francisco	1.52	21.56	18.80	−14.39	−4.74	−1.93	−13.51	−0.68	−1.14	−5.61	0.22	*
Philadelphia	6.35	24.22	23.71	−14.60	−30.26	−6.57	−0.55	1.40	0.01+	−3.02	−0.52	*
Boston	6.71	22.16	16.86	−11.73	−7.02	−2.94	−10.13	−4.62	−2.41	−5.29	−1.23	*
Detroit	−5.96	8.81	7.18	−4.72	−3.87	−1.28	−0.37	3.30	0.22	−2.80	−0.47	*
Dallas-Ft. Worth	−3.14	23.48	12.07	−6.84	−0.35	−0.09	−9.76	−2.63	−0.27	−8.97	−3.26	*
Houston	1.40	17.56	9.95	−6.47	−0.69	−0.31	−5.77	−3.51	−0.44	−8.08	−3.27	*

Note: *indicates insufficient sample size for robust estimation
+ indicates difference is not statistically significantly different from zero.

In terms of single-family attached housing units, the opposite trend seems to be occurring, as the numbers become less negative, indicating a greater convergence between suburban percentages and city percentages of the housing-unit portfolio. This could suggest that suburban areas are becoming more accommodating (or, technically, less un-accommodating) of attached housing options.

Over the decades, the numbers for three-bedroom single-family detached houses declines, indicating the suburban housing composition is becoming more like the city portfolio. However, the numbers for four-bedroom houses increases, indicating that suburban housing markets are shifting to larger houses.

Metropolitan areas show significant differences in the relative diversity of the suburban housing stock relative to their central cities, as seen in the bottom panel of Table 2. The largest 10 metropolitan areas are presented, sorted by year 2000 population. In terms of larger (4 + bedroom) single-family detached housing units, the suburban areas of Washington, DC, Philadelphia and New York have the highest percentage point overconcentration relative to their central cities. The lowest differentials are found in Houston, Los Angeles, and Detroit.

In terms of single-family attached units, positive numbers (which indicate that suburban areas have a greater concentration of these units than do their respective central cities) are in only two regions: Los Angeles for 3 and 4 + bedroom attached housing units and Washington, DC for three-bedroom units. Positive numbers in terms of multifamily units (indicating a greater percentage of the suburban housing stock than the central-city housing stock) are also quite rare, but illustrative. For small multifamily units (in buildings of less than 50 units), Washington, DC and Detroit have a slightly higher of larger (3 + bedroom) units than do their respective central cities. Philadelphia has a significantly higher concentration of two bedroom small-multifamily units than does its central city, and San Francisco has a slightly higher abundance of two-bedroom large-multifamily units in the suburbs.

The suburbs of every metropolitan area and census region shown all exhibit a lower concentration of one-bedroom multifamily housing (whether in large or small buildings) than their central cities. Even though one-bedroom units actually constitute 51 percent of all suburban multifamily units, they are the most undersupplied relative to their central cities. Scholars who have written about this phenomenon attribute suburban resistance to one-bedroom units because of concerns about "transients" and a desire to promote "family" type housing (Ritzdorf 1994). Such historical and cultural reluctance seems no longer consistent with trends in household demography. Single-person households now constitute 26.4 percent of all American households in 2003 (Fields 2004), and 27 percent of single-person households are composed of women over the age of 65.[8]

Although the relationship between the relative supply of a particular unit and its impact on household formation and location is developed more fully in the next section, the discussion on one-person households is relevant here. 22.79 percent of all suburban housing units are occupied by one-person households, but only 20.85 percent of all one-person households in the suburbs reside in multi-family housing. Nearly 70 percent of these one-person households who reside in multifamily units in the suburbs reside in one-bedroom units. The forecasts for continued growth in single-person households (particularly among those over age 65) suggest increasing demand for suburban multifamily one-bedroom units. If such units remain relative

[8]Author's calculation based on data presented in Fields, 2004.

undersupplied, one-person households may face many housing and locational challenges.

Results: The availability ratio

Even though suburban areas may have a housing supply relatively less diverse than their corresponding central cities, the absolute number of housing units of any particular type may be substantially higher in suburbs than in central cities because the total number of all housing units is higher in the suburbs. So, for example, even though suburban areas supply about 2 percentage points fewer two-bedroom small-multifamily units as a percentage of their housing supply, there are – in absolute terms – far more two-bedroom small-multifamily units located in suburbs than in central cities. Although the *relative* supply of housing may be of concern for planners and policy makers, household decision making may be more impacted by the *actual availability* of a particular housing-unit type than by its relative percentage distribution. Thus, an additional way to measure suburban housing-unit diversity is to look at the actual availability of diverse units. In absolute numbers, in fact, suburban housing-unit diversity has been increasing: more diverse housing units are being constructed in suburbs than in central cities, even though these diverse units are a small and declining percentage of all suburban units constructed.

Table 3 presents a measure of suburban housing unit diversity in terms of the total availability of particular types of unit relative to cities. This "availability ratio" is the ratio of the number of units of a particular type in the suburbs divided by the number of units of that particular type in the cities. Numbers greater than 1 indicate greater availability of units in suburbs than in cities, while numbers less than 1 indicate lower availability. An additional way to interpret these numbers is to read them as "for every 1 unit of this particular type located in the cities, X number of units of the same type are located in the suburbs." For example, in the national estimates in Table 3, for every single-family, detached three-bedroom house in the cities, there are 3.3 such units available in the suburbs. For every one-bedroom large-multifamily unit in the cities, there are only 0.6 such units in the suburbs.

The West has more of every type of housing unit (except one-bedroom small-multifamily) available in its suburbs than in the cities. Suburbs in the Northeast only have slightly more small (one- or two-bedroom) single-family attached and two-bedroom small-multifamily units than do their cities. For all other diverse housing types, there are fewer total units in the suburbs than in the cities of the Northeast, and this is most notable in multifamily units. Conversely, the Northeast has the highest availability of single-family detached housing in the suburbs relative to the cities of any region. The South consistently has more of every type of non-small (three or more bedrooms in attached, two or more in multifamily) diverse units in suburbs than in cities.

For every one-bedroom multifamily unit in the cities, there is less than one such unit in the suburbs, except for nearly identical number of units in small-multifamily buildings in the Midwest and large-multifamily buildings in the West. However, with the exception of larger multifamily buildings in the Northeast, the suburbs of every region contain more two-bedroom multifamily units than do their cities. And, every region has a greater availability of small-multifamily two-bedroom units in the suburbs than large-multifamily two-bedroom units in the suburbs. Development of

Table 3. Availability ratio, by housing type, for region, decade and metro areas.

	Single-family, detached			Single-family, attached			Small multi-family			Large multi-family		
	1 or 2 BR	3 BR	4 + BR	1 or 2 BR	3 BR	4 + BR	1 BR	2 BR	3 + BR	1 BR	2 BR	3 + BR
Nationwide	2.398	3.312	4.512	1.139	1.117	0.845	0.878	1.403	0.936	0.613	0.810	0.481
By Region												
Northeast	6.787	8.658	11.729	1.215	0.855	0.781	0.765	1.007	0.477	0.406	0.347	0.160
Midwest	1.724	3.083	4.028	0.892	0.648	0.489	1.016	1.683	0.785	0.648	1.116	0.524
South	2.027	2.314	3.061	0.959	1.541	1.065	0.927	1.474	1.505	0.678	1.186	1.250
West	2.102	2.875	3.733	1.504	2.002	1.636	0.892	1.672	1.676	1.030	1.528	1.281
By Decade												
Pre-1950s	1.422	1.858	2.098	0.608	0.460	0.521	0.311	0.357	0.246	0.157	0.180	0.103
1950s	1.940	2.673	3.529	0.831	0.680	0.788	0.668	0.831	0.495	0.355	0.334	0.188
1960s	2.663	3.280	4.526	1.170	0.974	0.870	1.113	1.471	0.921	0.557	0.658	0.317
1970s	4.410	4.497	5.502	1.823	2.097	1.748	1.429	1.915	1.477	0.887	1.287	0.700
1980s	5.532	5.066	6.972	2.437	3.089	2.594	1.434	2.236	2.039	1.006	1.364	1.102
1990s	5.921	6.343	8.072	2.843	3.793	3.096	1.601	2.592	2.299	1.107	1.433	1.687
By Metro												
New York	3.732	6.282	10.848	0.838	0.569	0.483	0.456	0.460	0.231	0.236	0.186	0.097
Los Angeles	1.842	2.307	3.030	1.550	2.424	1.914	0.768	1.317	1.486	1.006	1.331	0.961
Chicago	1.686	3.179	3.907	0.563	0.508	0.279	0.768	1.270	0.318	0.285	0.568	*
Washington, DC	6.343	8.598	16.605	1.453	3.809	1.789	1.740	3.614	4.422	0.857	1.912	2.262
San Francisco	3.080	10.267	16.209	1.156	1.265	0.715	0.912	2.432	0.987	1.155	3.073	*
Philadelphia	11.676	17.985	27.861	1.141	0.722	0.678	2.485	4.145	2.802	1.268	1.963	*
Boston	9.715	11.740	13.213	1.575	1.286	1.339	1.013	1.524	0.692	1.093	1.572	*
Detroit	2.208	4.095	5.295	2.015	1.098	0.667	3.064	7.837	5.558	1.537	2.124	*
Dallas-Ft. Worth	2.643	6.782	7.423	1.322	2.485	2.095	1.073	1.925	2.132	0.682	0.969	*
Houston	0.511	0.843	0.926	0.169	0.319	0.189	0.211	0.242	0.282	0.165	0.224	*

*insufficient sample size.

attached housing in the suburbs is generally more preponderant in the South and the West than in the Northeast or Midwest.

The decadal figures in Table 3 require some care in interpretation, as they represent the relative abundance of suburban units relative to city units constructed in that particular decade, not the cumulative total of units available in that decade. For every type of housing unit reported, reading down the column, the numbers increase for each decade, even though some were below 1 for most of the decades. This is because the total number of all types of housing units constructed in the suburbs has been increasing faster than city construction.

For single-family detached dwellings of all sizes, more total units were constructed in suburbs than in cities for all decades, and the increasing numbers over time indicates an acceleration of this trend. Considering 3-bedroom detached units, in the 1950s 2.6 suburban units were constructed for every city unit, but in the 1990s, 6.3 suburban units were constructed for every city unit. Four-bedroom units were constructed at 3.5 times the rate in the suburbs as the cities in the 50s, increasing to eight times the rate in the 1990s. Single-family attached units were only constructed in greater numbers in the suburbs than in the cities in the 1970s, with numbers increasing since then.

Multifamily construction statistics tell a different story. For the 1950s, more central city multifamily units of all types were constructed than were suburban multifamily units. By the 1960s, more small multifamily units were constructed in the suburbs, while large multifamily buildings were constructed in greater abundance in the cities. By the 1980s, more of every type of multifamily unit was constructed in the suburbs than in the cities, and these numbers have consistently increased. Thus, in absolute numbers, the availability of ''diverse'' housing units has been increasing in the suburbs. Although single-family detached construction continues to dominate suburban areas, housing units of all types are being constructed.

Results: Relationship between housing-unit supply and household location and size

The previous sections presented three different ways of describing and characterizing the evolution of suburban housing unit diversity. An implicit assumption of both this research and the literature reviewed is that a relative lack of housing unit diversity in the suburbs reflects (at least in part) supply constraints which could reduce households' location and housing options. Such an approach does recognize that housing consumption by households reflects a wide range of demand factors, and that therefore supply data cannot definitively be used to identify causal relationships. From the point of view of housing planning and housing demography, however, the observation of ''mismatches'' between household type and housing-unit type is consistent with a supply constraint explanation.

In this section, I examine the relationship between housing-unit supply and household demographics. Although there are many demographic (household structure) relationships likely to be related to the relative supply of the suburban housing stock (including race, age of householder, income, etc.), in this paper I focus the analysis in terms of household size. Household size is often used as a proxy for household structure and housing-unit demand (Myers and Doyle 1990).

There are two ways to understand the relationships between housing-unit types and household size structure: ''who lives where'' and ''where households live.'' The first, ''who lives where'' focuses on how housing units are occupied: what types of

households live in a particular type of unit? For example, what is the distribution of household types who live in small multifamily two-bedroom units? The second, "where households live" looks at the types of units where particular types of households live. For example, where do two-person households live? Taken together, these describe the relationship between housing supply and household location decisions. If we accept the assumption that national figures represent household demand characteristics, then there is some reason to believe that observed differences between suburbs and cities is partially reflective of supply differentials. Of course, household location decisions are affected by a wide range of demand factors related to income, amenities, and location.

Table 4 shows estimated average household size by housing-unit type, both in terms of aggregate (national) numbers and in break-outs comparing suburbs to cities. All of the differences in estimated average household size for each housing-unit type between cities and suburbs are statistically significant at the 1-percent level.[9] A number of interesting relationships are observed.

Within each category of housing-type (detached, attached, small and large multifamily), average household size increases with an increase in bedrooms, reflecting the basic relationship between household size and housing demand: three-or-more-person households likely reflect family households with children present, necessitating at least two bedrooms.

The data and discussion of housing supply above suggested a traditional suburban reluctance to provide for larger (more bedrooms) units in multifamily housing. Perhaps this reluctance is drawn from the relationship of bedrooms and household size as shown in Table 4. For both small and multifamily units, moving from a two-bedroom unit to a three-bedroom unit is associated with an increase in average household size by nearly one person, for both cities and suburbs. To the extent that household sizes greater than 3 indicate the presence of school-age-children, suburban areas may be concerned with rising educational costs. If suburban jurisdictions allow for larger bedroom multifamily units, families with children may be more likely to move into the jurisdiction. Of course, offering larger (more bedrooms) single-family detached housing is also an invitation for families with children to locate in the community.

In 2003, the *New York Times* reported on legal challenges to the zoning ordinances of suburban Lopatcong Township, New Jersey, which limited all multifamily units to 2-bedrooms (Mansnerus 2003). In this fast growing suburban area, rather than restricting one-bedroom multifamily dwellings to avoid the perceived social ills of a transient renter population, the zoning ordinance was designed to limit families with children because of the perceived costs of public education. Lopatcong Township had no similar restrictions on the number of bedrooms in single-family detached (and particularly large-lot) houses. Whether such exclusion is primarily for fiscal motivations or continues to represent class and racial concerns remains a much debated issue (Pogodzinski 1991; Bogart 1993; Myers 2003; Ihlanfeldt 2004; Paulsen 2006).

Table 4 presents the difference in estimated average family size, by housing-unit type, between cities and suburbs. The difference is calculated as the suburban value minus city value, such that positive numbers indicate higher average household sizes in suburban areas for each housing-unit type, while negative numbers indicate larger

[9]Test statistics omitted for space considerations, but available from the author upon request.

Table 4. Relationship between housing-unit type and household structure.

	Single-family, detached			Single-family, attached			Small multi-family			Large multi-family		
	1 or 2 BR	3 BR	4 + BR	1 or 2 BR	3 BR	4 + BR	1 BR	2 BR	3 + BR	1 BR	2 BR	3 + BR
Average household size by housing-unit type												
Nationwide	2.358	2.756	3.375	2.260	2.929	3.521	1.779	2.324	3.392	1.572	2.286	3.282
Suburbs	2.316	2.760	3.383	2.193	2.830	3.464	1.723	2.239	3.249	1.529	2.182	3.130
Cities	2.454	2.743	3.337	2.337	3.040	3.570	1.827	2.441	3.522	1.599	2.365	3.347
Suburb-city difference	−0.138	0.017	0.046	−0.144	−0.210	−0.106	−0.104	−0.202	−0.273	−0.070	−0.183	−0.217

Note: Suburb-city difference is computed as suburban value minus city value. Positive (negative) numbers indicate higher (lower) average household sizes in suburban areas.

Table 5. Relationship between housing-unit type and household structure.

	Single-family, detached				Single-family, attached			Small multi-family			Large multi-family			Multi-family totals
	1 or 2 BR	3 BR	4 + BR	SF detached totals	1 or 2 BR	3 BR	4 + BR	1 BR	2 BR	3 + BR	1 BR	2 BR	3 + BR	
Who lives where: percent housing unit-type occupied by:														
1-person households	31.38	16.63	8.08	17.36	36.86	18.81	14.11	58.65	29.27	13.18	66.60	30.42	14.48	46.49
Suburbs	31.09	15.74	7.54	16.25	37.93	19.23	13.08	59.86	31.20	14.37	68.16	33.15	15.43	46.48
Cities	32.04	19.57	10.51	21.05	35.62	18.34	14.98	57.60	26.60	12.10	65.54	28.32	14.08	46.50
2-person households	35.75	35.43	27.53	33.21	31.41	27.77	22.88	22.99	36.66	20.21	20.66	37.06	23.97	27.44
Suburbs	37.36	35.90	27.31	33.53	32.42	29.94	24.46	23.67	37.19	22.48	20.48	37.88	26.95	28.87
Cities	32.02	33.88	28.56	32.15	30.22	25.33	21.54	22.39	35.92	18.15	20.77	36.43	22.71	26.15
3- or-more-person households	32.87	47.94	64.39	49.42	31.73	53.41	63.01	18.36	34.07	66.61	12.75	32.52	61.55	26.08
Suburbs	31.54	48.37	65.15	50.22	29.65	50.83	62.46	16.47	31.61	63.15	11.36	28.98	57.62	24.65
Cities	35.94	46.55	60.93	46.80	34.16	56.32	63.48	20.01	37.48	69.76	13.59	35.25	63.21	27.35
Totals	100	100	100	100	100	100	100	100	100	100	100	100	100	
Where do households live: percent of household-type living in unit-type														
1-person households	16.39	19.63	5.61	41.63	16.20	3.82	0.72	16.33	6.41	0.55	11.69	2.42	0.22	37.61
Suburbs	19.22	24.18	7.26	50.67	15.19	3.51	0.52	13.18	6.72	0.48	7.67	1.94	0.12	30.11
Cities	12.32	13.08	3.23	28.63	17.66	4.28	1.02	20.86	5.95	0.64	17.49	3.11	0.37	48.42
2-person households	15.25	34.16	15.62	65.03	11.27	4.61	0.96	5.23	6.55	0.69	2.96	2.40	0.30	18.13
Suburbs	16.19	38.66	18.44	73.28	9.10	3.83	0.68	1.5	5.61	0.53	1.62	1.55	0.14	13.11
Cities	13.19	24.27	9.40	46.87	16.06	6.33	1.56	8.69	8.61	1.04	5.93	4.28	0.63	29.18
3-or-more-person households	10.24	33.77	26.68	70.69	8.32	6.47	1.93	3.05	4.45	1.66	1.34	1.54	0.56	12.59
Suburbs	9.94	37.88	32.00	79.81	6.05	4.73	1.27	1.85	3.47	1.08	0.65	0.86	0.22	8.14
Cities	10.92	24.60	14.80	50.32	13.39	10.38	3.40	5.73	6.63	2.94	2.86	3.06	1.30	22.51
Totals	100	100	100	100	100	100	100	100	100	100	100	100	100	

households in cities than in suburbs. For each of the housing-unit types which we have been calling "diverse" (non-single-family-detached), average household sizes in the cities are slightly larger than in the suburbs. The results are reversed for three- and four-bedroom single-family detached housing units, where suburban household sizes are larger than for city units of the same housing-type.

Table 5 presents in greater detail the relationship between housing-unit type and household size structure. This table presents both "who lives where" (the percent of a particular housing-unit type occupied by a particular household-type) and "where households live" (for a particular household size-type, what types of units they occupy). Within the first panel ("who lives where") the totals sum down the columns to 100 percent of each housing-unit type, while for the second panel ("where households live) totals sum across to 100 percent of a particular household-size type. Sub-totals are provided for single-family detached units and for multifamily units (small and large buildings combined). As an illustration of how to interpret the table, consider that while only 16.25 percent of single-family detached suburban housing units are occupied by one-person households, 50.67 of one-person suburban households live in single-family detached units.

Looking at the first panel (who lives where) and in terms of multifamily units, there is a clear relationship between what types of units are available and which types of households occupy those units: one-bedroom units are predominantly occupied by one-person households, and 3 + bedroom units are predominantly occupied by 3 + person households. However, one of the potential mismatches identified in the data is that about 15 percent of 3 + bedroom multifamily units in the suburbs (both small and large buildings) are occupied by one-person households, even though this constitutes less than half of one percent of the dwellings occupied by one-person suburban households. Perhaps because of a demand or need for one-person households to live in suburban areas, and a shortage of one-bedroom apartments, these households are renting the only apartments they can find – even larger-bedroom units which might be more appropriate for families. Even though there are relatively very few larger-bedroom multifamily units in the suburbs, the supply available to families with children would be even further limited if occupied by single-person households. If this is the case, then it is possible that construction of more single-bedroom multifamily units could induce one-person households to shift their consumption, opening up larger units to family households.

Although the city data on one-person households in 3 + bedroom units shows a smaller mismatch than in the suburbs, the fact that still about 13 percent of 1-person households in the cities occupy 3 + bedroom units might actually reflect some underlying difficulties in using census data. It is possible, although unable to be verified, that some number of households designated by the census as one-person households may actually include additional persons. For any number of reasons, respondents to the census may not be forthcoming in identifying other individuals as residing in the housing unit.

The data in Table 5 also identify a potential mismatch in terms of both suburban and city multifamily units in regards to larger (3 + person) households. 16.47 percent (small buildings) to 11.36 percent (large buildings) of suburban one-bedroom multifamily units are occupied by these larger households. Although the most commonly used technical definition of overcrowding within housing analysis is more than one person-per-room, an alternative measurement is more than two persons per bedroom (US Department of Housing and Urban Development 2007). These units

would thus be counted as "overcrowded." Further study would be required to determine the extent to which households in overcrowded multifamily housing are constrained more by price and income or the lack of available larger (more bedrooms) housing units.

Turning to the occupancy of single-family detached housing units, over 16 percent of three-bedroom and over 8 percent of 4 + bedroom detached units are occupied by single-person households, with the percentages slightly less in the suburbs and slightly more in the cities. A significant portion of these households are likely to be seniors who are "aging-in-place," and for whom already built up home-equity means that housing costs for remaining in the house appear lower on a cash-flow basis than moving to a smaller house or a rental unit. Because nearly a third of the smaller detached houses (two- or fewer-bedrooms) are occupied by one-person households, this does indicate substantial demand for smaller detached houses, even though such units are relatively less abundant in suburban areas.

Although a greater percentage of detached units in the cities are occupied by one-person households than in the suburbs, more than 2.5 times as many one-person households who live in detached housing live in the suburbs as compared to the cities.[10] Over 50 percent of all one-person suburban households live in detached housing units, about 20 percent live in attached housing, and the remaining 30 percent live in multifamily housing units. For single-person city households, nearly 50 percent live in multifamily housing units and only 28 percent live in detached housing. These one-person household location trends, while requiring further study, are consistent with a relative undersupply of smaller (two- or fewer-bedroom-attached and one-bedroom multifamily) units in suburban areas. From the overall perspective of housing planning – balancing the supply of housing-unit types with the demands of household-size types – these patterns indicate a potential mismatch resulting from relatively less "diverse" housing-unit construction in the suburbs.

Larger households (3 + members) are predominantly located in suburban single-family detached housing units, while only 50 percent of city-dwelling larger households are in detached housing units. In terms of larger households living in multifamily units, the numbers show that these larger households are more likely to be in small multifamily buildings than in large multifamily buildings, both in the suburbs and the cities. However, suburban 3 + person households in multifamily buildings are four times more likely to be in small multifamily than in large multifamily buildings, while city 3 + person households are only twice as likely to be in small buildings. Larger households are more likely to be found in two-bedroom units in multifamily buildings than in other unit-sizes.

Discussion and conclusions

Although the absolute number of "diverse" housing units in the suburbs has been increasing over the decades, the relative supply of suburban housing-unit diversity has not likely kept up with evolving household demands. Such an observation, of course, would have been consistent with previous empirical research and conventional wisdom even without the data and analysis in this paper. What this research contributes is a greater understanding of the magnitude and historical

[10]Calculated from base data in sample but not shown in Table 5.

evolution of diverse housing-unit supply in terms of the combination of structure-type and unit-size, and their co-effects on household location patterns.

Interpretation of the meaning of the relationships presented here (and therefore potential policy interventions) depends on one's theoretical understanding of the extent to which the co-evolution of metropolitan spatial patterns, housing sub-markets, and household sorting reflect mostly household demand characteristics or supply constraints. To the extent that observed location patterns represent households' demand for a bundle of structure-type, unit-size, price, and location (suburb or city), then one would interpret the suburban undersupply of diverse housing units as primarily reflecting a market outcome. To regulate or intervene in such a market, such as requiring suburban areas to produce more diverse housing, could therefore potentially introduce inefficiencies into regional housing markets. One could, under such an argument, still argue for something like the housing voucher program to subsidize lower-income households to acquire minimally decent housing in the private market, without arguing for regional incentives or regulations to encourage/force suburban areas to accommodate more diverse housing.

Alternatively, if one interprets the suburban relative undersupply of diverse housing units as representing exclusionary supply-restrictions, then there might be a potential justification for some governance mechanism to either encourage or enforce increases in supply-diversity in suburban areas. If the lack of housing-unit diversity in the suburbs is harmful to regional welfare or household mobility, than policies to increase the supply of diverse housing units in the suburbs could potentially improve metropolitan housing and labor markets. If the mismatch between some household types and housing-unit types represents supply constraints, then building additional units of one type might affect the availability of other housing types.

The data presented in this paper, of course, cannot test between these different interpretative paradigms. For those of us, however, who largely interpret the lack of diverse housing opportunities in the suburbs as reflecting somewhat objectionable rent-seeking behavior of suburban homeowners to protect their privileged position in metropolitan housing markets (see Fischel 2004; Levine 2006; Paulsen 2006) and the racial and class segregation which results, then this research suggests a number of implications.

First, although the original inspiration for this research was rooted in concern for the opportunities for lower-income families with children to access suburban housing opportunities, one of the clear implications which emerges in this data is effect on housing opportunities for single-person households. Because of the undersupply of smaller units and the increasing dominance of larger detached housing, many single-person households may end up "overconsuming" housing. The housing needs of single-person households is frequently overlooked in much of the housing and planning literature and the research presented here draws attention to the potential mismatch and undersupply of units for this household size type. Many demographic forecasts point to an increase in single-person households – a significant percentage of whom will be elderly. This suggests the need to rethink what appears to be a suburban overemphasis on larger detached houses. Construction of new units which are appropriate for smaller households may induce 1-person households to move out of larger units, thereby opening up larger units for occupancy by larger or households. Townhouses, city-houses, accessory dwelling units, and other flexible housing arrangements could represent a modest way that suburban areas could

increase the diversity of housing units to accommodate demand. Additional research is needed on the particular demographics of single-person suburban households to understand the extent to which changes in supply might induce relocation.

Second, a larger percentage of the supply of the ''diverse'' housing stock in suburbs is in small multifamily buildings. This is both an opportunity and a challenge for the overall diversity of housing in the suburbs. Smaller multifamily buildings might be less likely to arouse neighborhood opposition than larger buildings. As a practical strategy, then, advocates and housing developers could focus on scattered-site smaller apartment buildings to meet growing housing needs in the suburbs. The challenge is that smaller buildings face more difficult access to financial capital, face more administrative and financial challenges, and may lack economies of scale in terms of management and tenant selection (DiPasquale and Cummings 1992). Many suburban areas face the challenge of an aging rental stock in need of investment and rehabilitation, and smaller buildings' reduced capital access may be problematic (Schwartz 2010).

Third, there are important regional and metropolitan variations in the extent to which suburban housing-units are supplied in a diverse fashion. More detailed investigation in a few metropolitan areas could add further insights into which particular policies, land use regulations or suburban structures are more accommodating of diverse housing-unit supply.

The dominant housing-unit type supplied in the suburbs continues to be the large single-family detached house, even though only 20.2 percent of all households are married-family with own-children-present households. Evolving and diversifying household demographics should require a more diverse housing supply. An expanded range of housing opportunities across the metropolitan landscape would most likely improve the ''geography of opportunity'' for households of all sizes and types – and, by extension of all races and income levels (de Souza Briggs, 2003). Although suburban areas have seen increases in the absolute availability of diverse housing units, and a relative increase in the proportion of multifamily units, this supply remains modest in the context of overall suburban housing unit construction and an evolving household structure.

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