Defining Suburbs: How Definitions Shape the Suburban Landscape

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Introduction

After the 2018 midterm elections, many reports noted that Democrats gained House seats by winning suburban voters. Some journalists broke down the analysis further and examined how suburbs of different densities voted.[1] While suburbs of the same density could have been broken down even further to examine high-income and low-income neighborhoods, the analysis does suggest a growing recognition that suburbs are diverse and suburban voters should not be viewed as a uniform bloc. The analysis also suggests a more complex consideration of what we mean by suburb. For many decades, the term "suburb" evoked a specific image, perpetuated through policy, culture, and a discourse of striving for the American Dream. The enduring image of places like Levittown painted suburbs as largely white and middle-class, taking the form of single-use zoning and repetitive postwar housing. Of course, this image is not representative of all American suburbs and reflects a moment in suburban history. In fact, suburbs have always exhibited a range of built forms and demographics.[2] The breadth of suburban diversity has been increasingly highlighted in recent decades by scholars and commentators.[3] A growing focus on issues of inner-ring suburban decline in metropolitan areas like Cleveland and Baltimore and expanding suburban poverty across the country have stood in direct contrast to the traditional image of suburbia and have called into question the ways in which we define and conceptualize suburbs.

As our understanding of suburban variety expands, so do the methods for categorizing metropolitan space. These methods offer increased depth for describing suburbs, but the many definitions that exist make it difficult to assess the comparability of examples and studies. To understand sweeping statements such as, "More impoverished people now live in suburbs than in cities," or even, "Democrats picked up seats because of suburban voters," it is necessary to understand the suburban frame.

Embedded in every mention of the suburbs and every comparison between city and suburb is a defining categorization of what a suburb is. Scholars, research institutions, policymakers, and planning organizations have created and used a variety of definitions to categorize space as urban and suburban. The definition often appears as one element of a larger methodology along with a justification for its use. It is rare for scholars to give the suburban frame primacy or to provide an explanation of how the definition might shape the outcomes of interest.

[1] Montgomery (2018); Skelley (2018).
[2] McManus & Ethington (2007).
[3] Lucy & Phillips (2000); Orfield (1998); Jackson (1985).

Recent calls for a deeper understanding of suburban space challenge existing definitions and, at a minimum, demand considering them more broadly. Roger Keil and his colleagues have been at the forefront of this movement as part of the Major Collaborative Research Initiative project on Global Suburbanisms. Hamel & Keil (2015), for example, developed a framework around suburban governance that invites scholars to examine the universality of suburbanization as a process while simultaneously identifying the particular forces that shape suburbanization across the globe. Each author throughout Hamel & Keil's (2015) edited volume describes the range of formal and informal types of suburban development that emerge from variations in suburban governance, including the role of the state, private capital, and private governance. The framing requires scholars to consider how similar processes of urban expansion produce different types of suburbs, expanding the notion of what a suburb is. Additionally, Forsyth (2012) recommends that scholars use descriptive terms to explain what "suburb" means, encouraging scholars to carefully describe the type and characteristics of the suburbs they study.

While the recommendations of both Hamel & Keil and Forsyth advance urban and suburban theory and provide nuance to the term "suburb," their concepts are difficult to operationalize at a large scale. The authors provide guidance on how to apply their definitions but do not propose specific guidelines for identifying suburbs in the context of quantitative data analysis. Amidst larger debates about what constitutes suburban space, there is a continued need to differentiate between neighborhood types in empirical research. Although the usefulness of the city-suburban dichotomy has been undermined to some extent by changes in US suburbs—including increased poverty, fiscal distress, and sociocultural heterogeneity—as well as the increasing presence of suburban characteristics in cities, there is still an interest in considering the differences and gradations between the two geographies. In regard to the distribution of resources and infrastructure, the distinction between cities and suburbs can still be meaningful in some places. As long as scholars, planners, and policymakers have an interest in comparing cities and suburbs, the need for producing suburban definitions using national data will remain.

This paper examines three types of suburban definitions to understand how they differentially shape our understanding of suburban space and suburban change. The objectives of the paper are to investigate replicable methodologies for defining US suburbs at the neighborhood scale using national, publicly available datasets, to help researchers understand how these definitions compare to one another, and to provide scholars and practitioners with a guideline for evaluating and selecting suburban classifications. We compare the geographic reach, descriptive characteristics, and benefits for research of three common types of suburban definitions, discussed in detail below, to provide a picture

of suburban neighborhoods and evaluate how definitions might impact empirical findings. Finally, we provide recommendations for how researchers might approach choosing a classification method most appropriate for their research question.

The Problem of Suburban Definitions

The problem of defining suburbs in the US arises in part because the US Census Bureau doesn't produce a suburban classification.[4] The Office of Management and Budget (OMB) presumably helps by defining metropolitan areas and principal cities. However, the agency is clear that its metropolitan and micropolitan areas do not delineate an official urban-rural divide,[5] let alone provide a definitive separation of urban and suburban. The Census Bureau also asserts that "nonmetropolitan" doesn't necessarily equate to "rural" and produces its own urban-rural classification. Under the Census Bureau's criteria, urbanized areas and urban clusters are defined based on population thresholds, density, land use, and distance between developments, while everything else is considered rural.[6] Low-density exurbs may appear on the periphery of metropolitan areas under OMB's definition or within rural areas under the Census Bureau's definition, complicating the identification of suburbs. In the absence of a formal definition, practitioners and scholars have produced a range of methodologies to identify and further classify suburban space. The methods they choose fundamentally shape how their findings can be interpreted.

Suburban definitions vary widely in terms of their content, their concepts of boundaries, and their methods of drawing relationships between cities and suburbs. Forsyth's (2012) comprehensive literature review of suburban definitions characterized the dimensions of suburbia that scholars have used, including combinations of attributes related to physical, functional, social, process (e.g., who builds, designs, and plans suburbs, and the timing according to which these activities occur), and analytical dimensions (e.g., suburbs as defined through the problematics of sprawl or isolation or defined through a composite index of characteristics). Acknowledging the multiple dimensions that can underlie suburban definitions, we focus on three types of suburban definitions that are representative of attempts to understand suburban space: the *census-convenient*, *suburbanisms*, and *typology* definitions. The three types are prominent in North American suburban studies. In this section, we

[4] Anacker (2015a); Hanlon (2010).
[5] OMB (2017).
[6] Ratcliffe et al. (2016).

describe the conceptualization of suburbs within each definition and provide examples of how the definitions have been used.

The first definition we refer to as the *census-convenient* because it is easily constructed using publicly available Census data, including Census TIGER/line files and population estimates. This definition conceptualizes suburbs as remainders in relation to the political boundaries of cities. Though there are several variations of this definition, the basic structure treats cities as places or tracts that fall within OMB-defined central or principal cities, while suburbs encompass any space that falls outside of categorized cities but within metropolitan area boundaries. The census-convenient definition has been used widely in the last two decades and was popularized by work from the Brookings Institution in particular. In terms of Forsyth's (2012) dimensions of defining suburbs, this definition falls squarely within the political places aspect of the social dimension, providing information about the location of suburbs relative to set geopolitical boundaries alone.

The census-convenient definition appears frequently in national studies examining variations in phenomena across city and suburb and within suburbs. Papers coming out of the Brookings Institution have employed the definition in examining geographies of population growth,[7] immigration,[8] and poverty[9] in the 100 largest metropolitan areas. Each of these studies compares place-level cities to pooled suburbs. Kneebone & Nadeau (2015) and Beck Pooley (2015) define suburbs in a similar manner but instead classify tracts based on the location of their centroids within or outside of qualifying principal cities. Both works take advantage of the tract-level classification to describe suburban neighborhood characteristics such as poverty and homeownership share.

Additional scholarship has used variants of this census-convenient definition to explore a range of city-suburban dynamics. Lucy & Phillips (2000) is one of the older examples, using this type of definition to understand patterns of suburban decline. More recently, Owens (2012) used the definition to compare trajectories of socioeconomic ascent between cities and suburbs. Morris & Pfeiffer (2017) used this census-convenient definition in their study of social connectedness in cities and suburbs. The definition has been used throughout these examples to highlight a variety of trends within suburbs and across the city-suburb boundary.

The second type of definition falls within the literature on suburbanisms. By this definition, there is no singular "suburb" understood to exist in a dichotomous relationship with the city; rather, the

[7] Frey (2010).
[8] Frey (2011); Suro, Wilson, & Singer (2011).
[9] Kneebone & Berube (2013).

suburbanisms definition proposes a continuum of suburban ways of life that can be present across a metropolitan area. Instead of relying, like the census-convenient definition, on notions of physical location or centrality to characterize suburbs and cities, the suburbanisms definition foregrounds ways of life as the critical distinguishing factor.

The suburbanisms definition is particularly prominent in the Canadian suburban literature. Walks (2013), for example, presents a theory of suburbanisms as a subset of Lefebvre's dialectical urbanism. Walks describes six distinct dimensions of suburbanism, conceptualizing the dimensions as flows on an urban-suburban continuum rather than as static, place-based characteristics. As such, places infused with high degrees of Walks' suburbanisms may not always be defined as suburban in the census-convenient definition. Moos & Mendez (2015) operationalize Walks' theory of suburbanisms, creating neighborhood types based on the presence of three easily measurable aspects of suburbanism relative to the larger metropolitan area: single-family dwelling occupancy, homeownership, and automobile commuting. An additional use of the suburbanisms definition appears in Hamel and Keil (2015), who describe suburbanism(s) as the social and cultural norms of suburban residents engendered by the particular land use patterns of suburbs as opposed to cities. Hamel and Keil point to differences in socio-economic conditions as well as density as it relates to transportation as key explanatory factors in the emergence of suburban norms. While the census-convenient and typology definitions have been used extensively in empirical suburban studies over many years, the suburbanisms definition is emergent.

The conceptualization of suburbs defined by suburban ways of life has gained traction in recent years,[10] but few studies have employed the definition empirically. Moos and Mendez (2015) implemented an eight-category suburbanisms definition to examine the relationship between individual income and the degree of suburban ways of life for neighborhoods in 26 Canadian metropolitan areas. Their results show that neighborhoods ranking higher in the suburbanisms categories are associated with higher incomes. Using a slightly different approach, Moos et al. (2015) use a series of Principal Component Analyses to consider automobility (dependence on car commuting), domesticity (unpaid housework and child or senior care), middle-class status, and socio-cultural homogeneity as indicators of suburban ways of life. They map the resulting factor scores across Canadian metropolitan areas, finding expanses of neighborhoods that feature classic suburban characteristics associated with metropolitan decentralization. Additionally, the authors highlight the presence of suburbanisms within metropolitan cores. Though Moos and his colleagues focus primarily on Canadian metros, they note the similarity

[10] See Walks (2013); Moos & Walter-Joseph (2017); Keil (2018) for examples.

between Canadian and US patterns of suburbanization. In its operationalization, the suburbanisms definition provides information about several of the dimensions that Forsyth (2012) outlines, including built environment characteristics, functional operations, activities, and sociocultural features. When the definition is applied in conjunction with municipal boundaries and distance from the central business district, it provides evidence of how suburbanisms span physical locations and socially constructed political divisions.

The third type of definition is the *typology* definition. Typologies seek to further divide the concept of suburb to categorize specific types of suburbs, providing additional detail about the built form, location within the metro, demographics, or history of a suburb. There have been many efforts to consider different types of suburbs,[11] but a commonly used subset of typologies conceptualizes suburbs in terms of eras of building. This form of typology is most often employed in studies that seek to identify inner-ring suburbs or highlight variations in suburban form or age.

For example, Lee & Leigh (2007) used GIS to group tracts into inner city, inner-ring suburbs, and outer suburbs. They use density and contour maps to identify areas built primarily before 1950 and categorize these as the inner city. Areas built predominantly between 1950 and 1969 constitute inner suburbs, and areas built after 1969 are outer suburbs. Hanlon (2010) similarly differentiated cities, inner suburbs, and outer suburbs by era of building but used place-level geography. Cities are not explicitly defined but presumably fall along the lines of the OMB central cities for each metropolitan statistical area (MSA). Inner suburbs are places where the majority of units were built before 1969 and are either contiguous to the city or to another inner suburb. Older outer suburbs are places built before 1969, not contiguous to the city or other inner suburbs, and within the MSA. The remainder of the MSA consists of outer suburbs. Anacker (2015b) and Anacker, Niedt, & Kwon (2017) used a variation of this method, combining the census-convenient and the typology definitions into one definition. They characterize tracts within the central city as "city." The remaining tracts within the MSA are defined as "mature suburbs" if the median housing age is 1969 or earlier and as "developing suburbs" if the median housing age is 1970 or later. Of the three common types of definitions, typologies most explicitly speak to Forsyth's (2012) recommendation that scholars specify the kind of suburb they are studying. These definitions often encompass built environment characteristics and the process of suburban development, meaning the era and type or density of building, to highlight how and when suburbs were built and the forms that they take.

[11] Harris (2003); McManus & Ethington (2007); Mikelbank (2004); Hanlon (2010).

Constructing Suburban Definitions

We based each of the three definitions above on an example in the existing literature that operationalizes the definition. We developed three criteria for selecting the definitions. It was necessary that we could construct each definition:

1) at the tract level;
2) in a manner applicable to all metropolitan areas in the United States; and
3) using publicly available, national datasets.

The tract-level requirement permits analysis that is sufficiently fine-grained to capture neighborhood-level differences and illustrates neighborhood change over time, particularly because researchers may want to exploit the variety of neighborhoods within suburban jurisdictional boundaries. While previous studies have examined a limited number of metropolitan areas, such as a single case study or the top 100 metropolitan areas, the growing importance of small cities merits a definition that is applicable to all metros. The final criterion ensures that any researcher or organization can easily construct and update the definitions. These criteria limited the definitions we chose to those that can be constructed from the American Community Survey and TIGER/Line shapefiles.

We constructed each definition based on an established methodology presented in a scholarly paper or book. Figure 1 provides a summary of each definition. The *census-convenient* definition comes from Kneebone & Nadeau (2015), a tract-level definition that follows the methodology of Kneebone & Berube's (2013) *Confronting Suburban Poverty in America*. City tracts are those that fall within the first principal city listed in the official Metropolitan Statistical Area name and any other listed principal city with a population greater than 100,000. We identified all cities that met these criteria, using Census place boundaries as a proxy for principal city jurisdictions. We coded any tracts with a centroid inside the identified principal city places as city tracts. Tracts that are not categorized as city but fall within a metro area are considered to be suburban.

The *suburbanisms* definition we use is outlined in Moos & Mendez (2015). Moos and Mendez present eight neighborhood types classified according to the relative prevalence of single-family homes, homeownership, and commuting by automobile; they describe as most "urban" those neighborhoods with below-average rates of each of these three variables relative to the metro area, and as most

Figure 1: Three suburban definitions and how we categorized them as city or suburb for the dichotomous comparison

	Dichotomous City or Suburban Categorization							
Definition	**City**				**Suburban**			
Census-Convenient (Kneebone & Nadeau, 2015)	City: located within first principal city listed in official MSA name or within any other listed principal city with a population > 100,000				Suburb: In an MSA not categorized as city			
Suburbanisms (Moos & Mendez, 2015)	Category 1: Car commuting, homeownership, and single-family housing rates below metro average	Category 2: Car commuting rate above metro average	Category 3: Homeownership rate above metro average	Category 4: Single-family housing rate above metro average	Category 5: Single-family housing and car commuting rates above metro average	Category 6: Homeownership and car commuting rates above metro average	Category 7: Homeownership and single-family housing rates above metro average	Category 8: Car commuting, homeownership, and single-family housing rates above metro average
Typology (Cooke & Marchant, 2006)	Urban Core: more than 400 housing units built before 1940 per square mile; and contiguous tracts with more than 200 pre-1940 housing units/square mile with a population density greater than 1,000 people/square mile				Inner Suburban: more than 400 housing units built 1950-1969 per square mile; and contiguous tracts with more than 200 1950-1969 housing units/square mile with a population density greater than 1,000 people/square mile		Outer Suburban: In an MSA and not categorized as urban core or inner suburban	

"suburban" those with higher relative rates of all three variables. [12] The second-most urban category includes neighborhoods where only the share of car commuting is higher than the metro area, while the seventh category—or the second-most suburban—includes neighborhoods where rates of homeownership and single-family housing are higher than in the metro area, but where car commuting is lower. We treat census tracts as neighborhoods and compare them to their surrounding metropolitan areas. We do reference all of the categories in presenting the results, but for the sake of comparability to other definitions, we also consider categories 5 through 8 to be suburban. These categories lean toward the suburbanisms end of the spectrum (including higher relative shares of at least two of the three selected variables compared with the metro area), while categories 1 through 4 are more aligned with the city because they lean toward the urbanisms end of the spectrum (including only one or none of the three variables higher than the metro area).

Finally, the *typology* definition we use is developed in Cooke & Marchant (2006). Under this definition, city tracts are defined as the urban core, consisting of census tracts with greater than 400 housing units built before 1940 per square mile. Contiguous tracts with at least 200 pre-1940 housing units per square mile and a population density exceeding 1,000 people per square mile are also coded as part of the urban core. Inner suburban tracts are defined next. These tracts have greater than 400 housing units built between 1950 and 1969 per square mile. Contiguous tracts with more than 200 1950-69 housing units per square mile and a population density exceeding 1,000 people per square mile are included in the inner suburban category. Outer suburban tracts are all other tracts in the metropolitan area that are not defined as part of the urban core or inner suburbs. These neighborhoods are lower-density and/or newer. Again, we discuss these three categories in the results and also combine the inner and outer categories into one suburban category for comparisons across definitions.

There are a few important caveats for these definitions. They are applicable to the United States and are not intended to serve as any form of global definition. This approach therefore does not address calls for an expanded examination of suburbia as a global phenomenon. We also do not grapple with the rural-suburban divide. We consider non-metropolitan and non-micropolitan areas to be rural, but the legitimacy of this boundary certainly merits further analysis in future work. Local planning and research may also require more specific definitions than can be constructed at the national level. In light of local

[12] Moos and Mendez applied their definition in a Canadian context using Statistics Canada Census data. However, the framework for their operationalization comes from work on North American suburbanization that highlights the association between single-family homes, homeownership, and commuting by automobile and suburbanization in the US as well as Canada. We include their definition because it is easily transferable to the US context given the comparability of suburbanization trends and the similarity of available data.

data and expertise, the definitions presented in this paper may appear lacking or counterintuitive within a given context. We acknowledge that there are many other definitions that can be used to identify and classify suburban space. However, the goal is to provide a standardized set of definitions that cover various conceptualizations of suburban space and have already been employed in previous studies as a starting point for suburban investigations.

To examine differences between the three definitions, we first look at the number of tracts categorized as city and suburban by each definition and the number of tracts that are classified in the same way across definitions. We provide three metropolitan examples of how geographies vary across the definitions in different contexts.

We then consider the characteristics of suburban neighborhoods and of suburbia as a whole under each definition using descriptive statistics. We organize this discussion around three types of statements that scholars might make about suburbs. The first statement is about median characteristics of suburban neighborhoods (e.g., "The median share of impoverished residents in suburban neighborhoods is 10 percent"). We take the median value of housing and population characteristics for suburban neighborhoods and the median value for urban neighborhoods within each definition, comparing how similar neighborhoods look across classifications. The next statement is about the extent of a phenomenon within suburban and urban neighborhoods (e.g., "12 percent of suburban residents are impoverished"). We aggregate the same characteristics at the suburban level and calculate the characteristic as a percentage of the suburban population or housing stock within each definition. The final statement is about the geographic split of a given characteristic (e.g., "More impoverished residents live in suburban areas than urban areas"). To identify differences in these dynamics across definitions, we aggregate demographic and housing characteristics and calculate the split of each phenomenon between cities and suburbs. We use the comparison of differences in suburban characteristics according to each definition to evaluate the definitions and provide our recommendations for the development of a standard Census definition.

Geographic Reach of Suburbs

The US looks more or less suburban depending on the definition that is used (Table 1). In this section, we examine the number of tracts that are categorized as city and suburban under each definition. The typology definition produces the highest number of suburban tracts (74 percent of all tracts), and therefore the smallest number of urban tracts, followed by the census-convenient (65 percent). The suburbanisms definition produces the smallest number of tracts defined as suburban, with

Table 1: Geographic reach of suburban definitions

	Census-Convenient	Suburbanisms	Typology
	Count of Census tracts (Percent)		
All Regions			
City	21,160 (35)	26,189 (43)	15,402 (26)
Suburb	39,107 (65)	34,078 (57)	44,865 (74)
Northeast			
City	3,944 (33)	5,634 (47)	6,463 (53)
Suburb	8,163 (67)	6,473 (53)	5,644 (47)
Midwest			
City	4,546 (36)	5,480 (43)	4,065 (32)
Suburb	8,226 (64)	7,292 (57)	8,707 (68)
South			
City	7,078 (34)	9,035 (43)	2,114 (10)
Suburb	14,016 (66)	12,059 (57)	18,980 (90)
West			
City	5,592 (39)	6,040 (42)	2,760 (19)
Suburb	8,702 (61)	8,254 (58)	11,534 (81)

57 percent of all tracts classified on the more suburban half of the continuum. The difference between the census-convenient and the typology definitions arises from the strict year-built constraints on defining tracts as urban and also reflects the fact that many US cities include lower-density neighborhoods built after World War II.

The city/suburb split is fairly consistent across regions of the country. In all four Census regions, the census-convenient definition classifies between 61 and 67 percent of tracts as suburban. The regional suburban classification under the suburbanisms definition also mirrors the national figure with 53 to 58 percent of tracts in each region defined as suburban. There are slight regional variations in the distribution of tracts across the eight suburbanisms categories. The Northeast closely follows the binary of urban and suburban with a greater proportion of tracts in the most urban and most suburban categories as compared to the nation as a whole. In contrast, the South has more tracts that fall in the middle categories, bearing both urban and suburban characteristics. The typology definition is most sensitive to variations in development patterns and shows the most variation in city/suburban split across regions. The Northeast, with its older and denser pattern of development, is only 47 percent suburban under this definition. However, 70 percent of suburban tracts in the Northeast are categorized as outer suburban. The Midwest is slightly more suburban at 68 percent, with about 65 percent of these categorized as outer suburban. In contrast, the South and West, two places with lower density and newer development, are 90 and 81 percent suburban. As in the Northeast, about 70 percent of tracts in the South are outer suburban, compared to only 57 percent of suburban tracts in the West. While the census-convenient and suburbanisms definitions are fairly close in their estimation of US suburbanization across the country, the typology definition can portray regions as significantly more or significantly less suburban.

There is substantial agreement between the definitions. The three definitions produce the same classification for 56 percent of all tracts and have the greatest agreement in categorizing suburbs in particular. Of the 51,771 tracts classified as suburbs according to at least one definition, 49 percent are suburban under all three definitions while an additional 30 percent are suburban under at least two definitions (Table 2). The census-convenient and typology definitions produce the most similar classifications of suburbs, categorizing the same tracts as suburban 66 percent of the time. The definitions produce less agreement for city tracts; of the 34,995 tracts classified as city according to at least one definition, 24 percent were categorized as such by all three definitions with an additional 31 percent categorized as city by at least two definitions. The census-convenient and suburbanisms

Table 2: Intersection of three definitions in classifying city and suburban tracts

	Number of Tracts	Percent of City Tracts	Percent of All Tracts
City Classification			
At least one definition	34,995	100	58
All Definitions	8,496	24	14
Census-convenient & Suburbanisms	6,058	17	10
Census-convenient & Typology	1,734	5	3
Suburbanism & Typology	2,972	8	5
Census-convenient only	4,872	14	8
Suburbanisms only	8,663	25	14
Typology only	2,200	6	4
	Number of Tracts	Percent of Suburban Tracts	Percent of All Tracts
Suburban Classification			
At least one definition	51,771	100	86
All Definitions	25,272	49	42
Census-convenient & Suburbanisms	2,200	4	4
Census-convenient & Typology	8,663	17	14
Suburbanism & Typology	4,872	9	8
Census-convenient only	2,972	6	5
Suburbanisms only	1,734	3	3
Typology only	6,058	12	10

definitions have the greatest agreement for city tracts with matching city classifications 42 percent of the time.

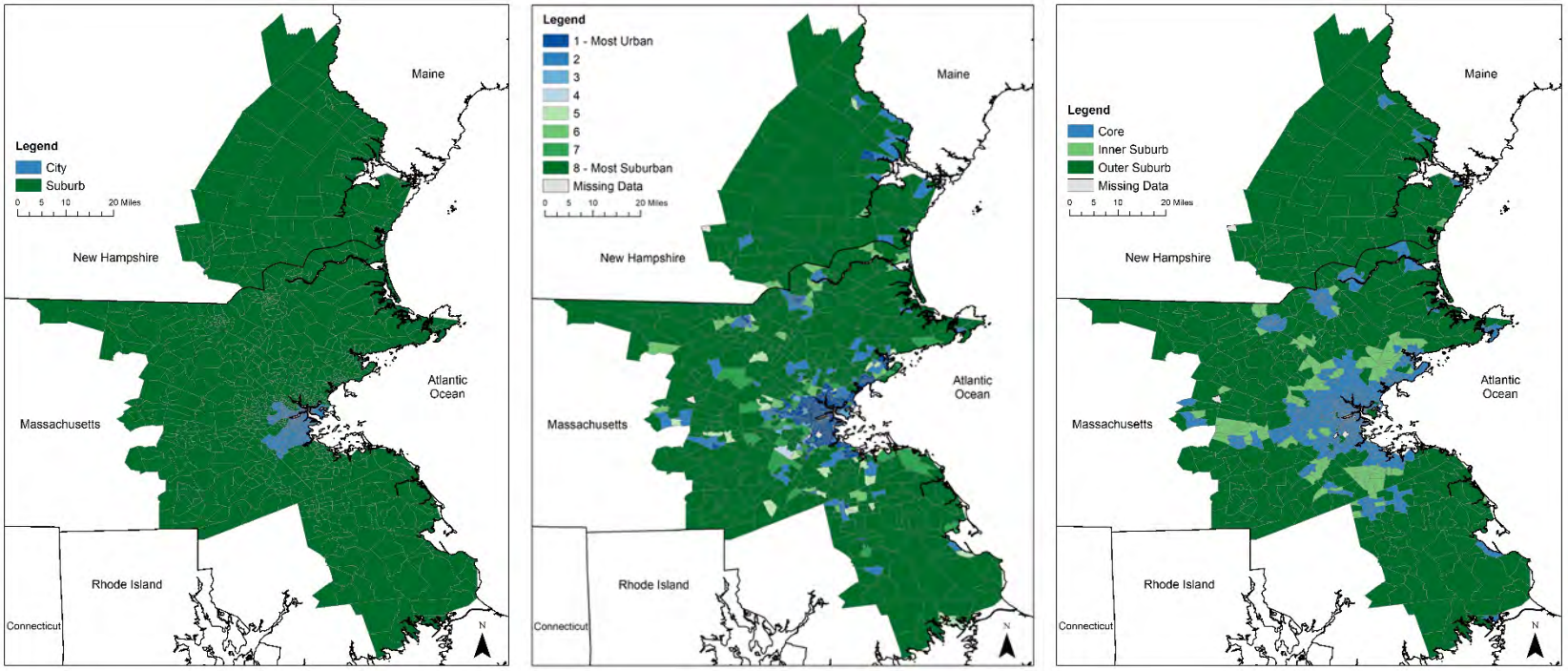
Metropolitan Examples

The age, elasticity, and planning contexts of cities impact the geography of suburbs under each definition. Elasticity is a function of how much peripheral land a city has annexed. Cities with greater elasticity cover more land area and incorporate more neighborhoods with suburban characteristics into the city, harnessing the economic and population benefits of suburban building within city limits.[13] Conversely, under-bounded cities with low elasticity cover a much smaller land area, and many older neighborhoods fall within suburban jurisdictions. Elasticity therefore provides a useful framework for understanding how definitions behave when the city is politically over- or under-bounded. We examine three metros to compare how suburban definitions play out in places with different characteristics: Boston-Cambridge-Newton, Portland-Vancouver-Hillsboro, and Houston-The Woodlands-Sugar Land.[14] Boston is a zero elasticity metro in Rusk's (2013) rankings, meaning that the jurisdictional boundaries of the city do not capture any of its suburban development. The metro is jurisdictionally fragmented with many incorporated suburban municipalities that make the annexation of additional land unlikely. The metro is also older, with a median housing age of 1957. The Portland metro, famous for its urban growth boundary, is newer, with a median age of 1979, and falls within Rusk's medium elasticity category. The Houston metro is the newest and most elastic metro of the three with a median housing age of 1986 and a high elasticity ranking. Some of Houston's sprawling suburban development is enveloped within the city boundaries, giving the city a larger and newer footprint.

The low elasticity of the Boston metro makes it appear more suburban under the census-convenient definition and substantially less suburban under the typology definition (Figure 2). The small city boundaries of Boston and Cambridge leave 80 percent of the metro categorized as suburban under the census-convenient definition, though nearly half of these neighborhoods qualify as part of the urban core under the typology definition. Furthermore, about a third of these census-convenient suburban neighborhoods bear less than two suburban characteristics within the suburbanisms definition. The typology and suburbanisms definitions have greater agreement. While the census-convenient definition

[13] Rusk (2013).
[14] These examples are not intended to be representative but merely illustrate how variations in metropolitan development and city boundaries can lead to greater or less alignment among the three definitions.

Figure 2: Categorizations of neighborhoods in the Boston metropolitan area under each definition

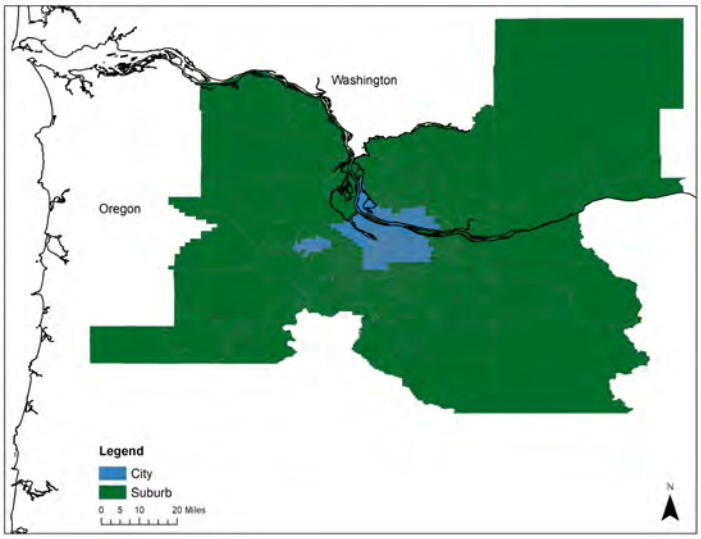


Census-convenient **Suburbanisms** **Typology**

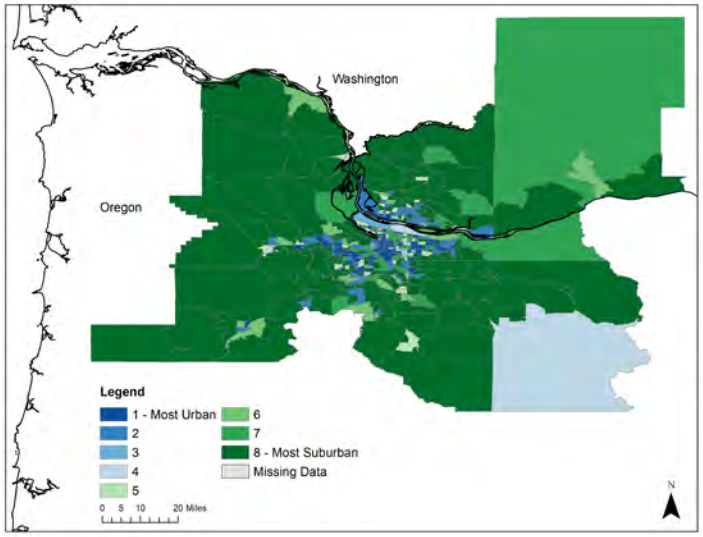
Note: Interactive maps for all metropolitan areas in the US are available here (http://harvard-cga.maps.arcgis.com/apps/MapSeries/index.html?appid=90e2bc4e4f7a457094f11d6a9f6176ae).

Figure 3: Categorizations of neighborhoods in the Portland metropolitan area under each definition

Census-convenient



Suburbanisms



Typology

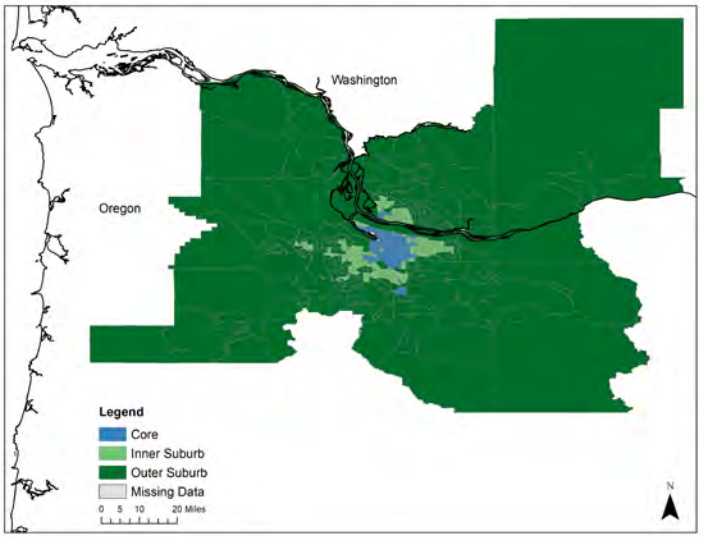
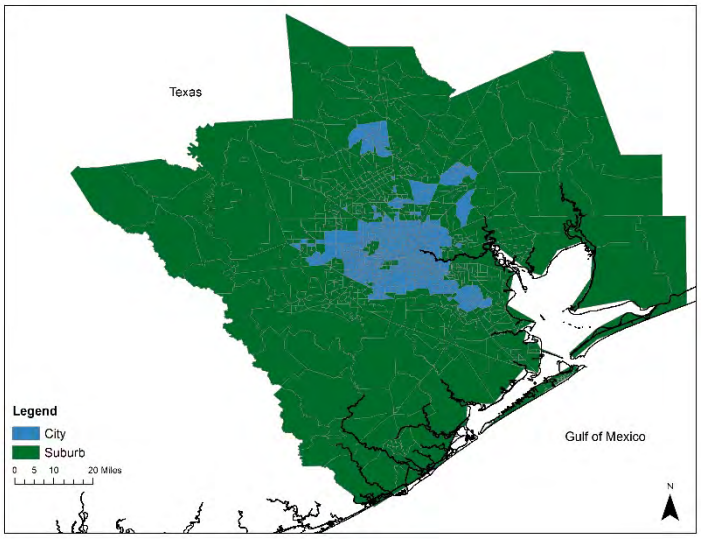
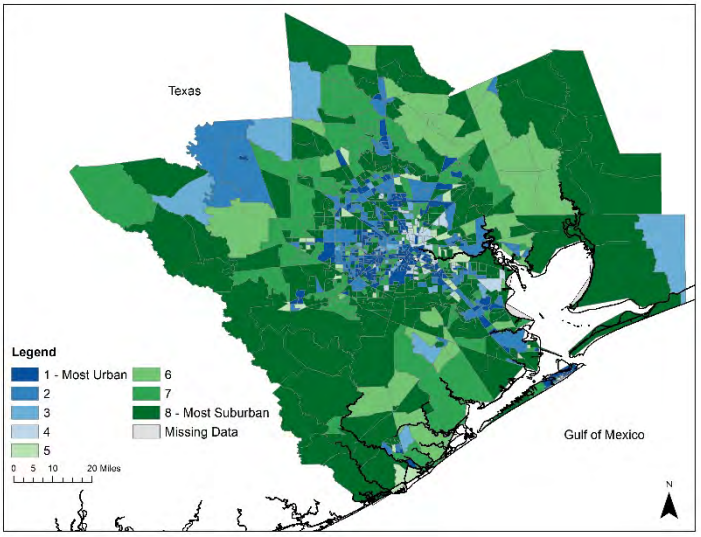


Figure 4: Categorizations of neighborhoods in the Houston metropolitan area under each definition

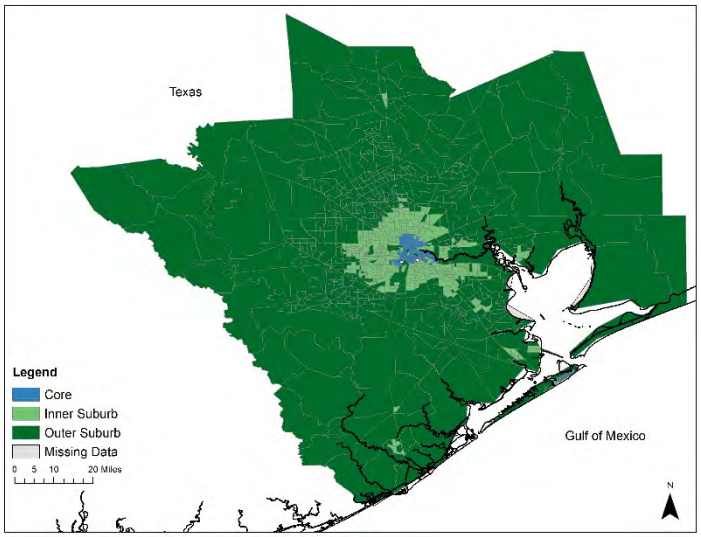
Census-convenient



Suburbanisms



Typology



captures the small jurisdictional boundaries, this definition likely underestimates the suburban landscape in older, low-elasticity cities like Boston.[15]

The definitions are more closely aligned in the Portland metro (Figure 3). With its medium elasticity, the metro appears to be 59 percent suburban under the census-convenient definition. The vast majority of these suburban neighborhoods also meet the criteria for inner and outer suburbs under the typology definition (97 percent) and/or fall in the most suburban categories of the suburbanisms definition (74 percent). The metro is considerably more suburban when the latter two definitions are used, amounting to 72 percent of tracts with at least two suburban characteristics under the suburbanisms definition and 76 percent of tracts that fall outside of the typology core. The close alignment between the census-convenient and typology definitions suggests that Portland and Vancouver's medium elasticity has enabled them to encompass the majority of the urban core without subsuming a large portion of suburban development. The same is true in other medium elasticity cities.[16]

Of the three examples, Houston exhibits the greatest over-bounding of the city jurisdiction paired with large swaths of low-density suburban housing (Figure 4). The census-convenient definition splits the metro nearly in half, with 45 percent of neighborhoods falling within the city's boundaries, which encompass both Houston and the Woodlands. While Houston is a car-centric and single-family landscape, the relative measures in the suburbanisms definition actually produce a metro with a mix of urban and suburban characteristics. About 55 percent of neighborhoods have at least two suburban characteristics. With its newer and lower-density development, the Houston metro is 94 percent suburban under the typology definition, with the majority of suburban neighborhoods built in the postwar period. Compared to the Boston metro, Houston illustrates how the census-convenient definition can overestimate the urban core in high elasticity cities[17] while the typology definition can overestimate the suburban landscape in newer cities.

Median Characteristics of Suburbia

What do suburban neighborhoods look like, and is that picture different depending on the definition used? We compared the median tract characteristics of urban and suburban neighborhoods

[15] Other low elasticity cities include Cleveland, Pittsburgh, and Detroit (Rusk, 2013).
[16] Other medium elasticity cities include Denver, Atlanta, and Sacramento (Rusk, 2013).
[17] High elasticity cities also include Indianapolis and Memphis (Rusk, 2013).

across the suburban definitions to highlight the average features of neighborhoods. When we compared the median tract characteristics across the suburban definitions using the collapsed binary categories, we did not see substantial differences in any indicator (Table 3).[18] On average, the three definitions produce a consistent picture of suburban neighborhoods. However, the expanded suburbanisms and typology categories produced a larger gradient of differences between the most urban or core neighborhoods and the most suburban or outer suburban neighborhoods (Appendix Table A2).

In terms of demographics, the average suburban neighborhood under each definition generally mirrors the classic image of suburbia with slight deviations. Despite increasing suburban diversity, the median suburban neighborhood is overwhelmingly white, ranging from 72 percent white in the typology definition to 76 percent and 78 percent white in the census-convenient and suburbanisms definitions, respectively. At the median, the greatest concentrations of white residents are located in the most suburban neighborhoods within the suburbanisms classification (80 percent) or outer suburban neighborhoods within the typology classification (78 percent). Immigrant households have increasingly moved to the suburbs,[19] but the vast majority of households in the median suburban neighborhood are native-born, with only 7 to 8 percent of residents in each definition born outside of the US.

The average suburban neighborhood is also composed primarily of married households without kids and single-person households. At the median, only about 20 percent of households in suburban neighborhoods are married couples with children, which stands in contrast to the traditional image of suburbs overwhelmingly comprised of young, nuclear families. More suburban neighborhoods do have higher rates of families, reaching 22 to 23 percent in the most suburban categories under the suburbanisms definition and 21 percent in outer suburban neighborhoods under the typology definition. Suburban neighborhoods under all definitions do have higher rates of family households than city, core, or urban neighborhoods. Suburban neighborhoods also have slightly higher shares of children under the age of 18. About 23 percent of suburban residents are children, slightly higher than the 22 percent in city neighborhoods. The share of children in suburbs is consistent across the census-convenient definition, the two most suburban categories of the suburbanisms definition, and the outer suburban category of the typology definition.

Suburban neighborhoods are wealthier than city neighborhoods at the median across all definitions, which also translates into higher rates of homeownership. Under the census-convenient and

[18] This finding holds, even when calculating the median value for city and suburban neighborhoods in each metro and then taking the average or median of metro medians.
[19] Wilson and Svajlenka (2014).

Table 3: Median tract characteristics under each definition

	Definition					
	Census-Convenient		Suburbanisms		Typology	
	City	Suburb	City	Suburb	City	Suburb
Demographic Characteristics						
Age Group (%)						
Under 18	22.3	22.8	22.1	23.0	21.6	23.0
18-24	9.6	8.0	9.8	7.7	9.4	8.2
25-44	28.5	24.8	28.8	24.3	28.8	25.1
45-64	24.2	27.9	23.6	28.8	24.9	27.3
65+	10.1	12.8	10.0	13.2	10.1	12.5
Race/ethnicity (%)						
White	46.6	75.7	49.5	78.0	49.0	71.7
Black	9.2	3.3	9.6	2.7	8.6	3.9
Hispanic	11.8	6.9	11.8	6.5	10.5	7.7
Asian	3.7	2.5	3.3	2.6	3.2	2.8
Foreign-Born (%)	12.3	7.8	12.7	7.2	13.8	8.2
Household Type (%)						
Married with kids	14.1	20.2	13.1	21.8	13.3	19.7
Married without kids	20.3	31.4	19.4	33.7	19.1	30.7
Other family	20.5	15.4	20.8	14.6	21.2	15.7
Live alone	31.4	24.0	33.6	22.1	33.0	24.4
Nonfamily	6.9	4.7	7.2	4.3	7.1	4.9
Median Income ($1,000s)	45.4	61.1	42.1	67.4	45.1	59.5
Below Poverty Line (%)	19.1	9.8	20.4	8.2	19.7	10.3
Tenure (%)						
Owners	47.8	73.6	42.3	78.5	44.2	72.0
Renters	52.2	26.4	57.7	21.5	55.8	28.0
Built Form Characteristics						
People/Square Mile (1,000s)	5.5	1.9	5.0	1.8	8.1	2.0
Commute by Car (%)	85.0	90.8	84.6	91.6	76.8	91.1
Housing Type (%)						
Single-family attached	3.7	2.7	4.4	2.2	4.2	2.7
Single-family detached	50.0	71.8	38.7	79.7	39.8	71.7
2-9 units	16.5	6.7	21.0	4.4	23.3	6.7
10+ units	12.4	3.7	18.8	1.7	12.0	4.3
Housing Age (%)						
Pre-1940	10.7	3.9	9.2	3.6	39.5	2.3
1940-1970	31.3	22.8	27.9	23.2	34.2	21.6
1970-1990	17.5	28.2	22.8	26.7	10.5	30.7
1990-present	11.4	26.5	14.6	26.4	6.6	28.2

typology definitions, suburban neighborhoods have median incomes of about $60,000, while incomes in city neighborhoods average about $45,000. Outer suburban neighborhoods within the typology definition had the highest median incomes at $62,400, with incomes in inner suburban neighborhoods $10,000 lower. The suburbanisms definition produces wider income disparity between cities ($42,100) and suburbs ($67,400), with the two most suburban categories having the highest incomes at over $70,000. Poverty rates are about 10 percent at the median for suburban neighborhoods and are nearly twice that in the median urban neighborhood. In the average suburban neighborhood, more than 70 percent of residents are homeowners. This share is slightly higher for suburban tracts under the suburbanisms definition at 78 percent, largely because homeownership is one of the criteria for identifying suburbanisms. In the most suburban tracts under this definition, the share of homeowners reaches 81 percent. The typology and census-convenient medians are closer to each other with a 72 percent and 74 percent homeownership rate, respectively. The suburban median under the typology definition, however, reflects an outer suburban homeownership rate of 77 percent, while inner suburbs have a much lower rate at 60 percent.

The built form and housing characteristics of suburban neighborhoods differ slightly based on the definition used. The median suburban neighborhood is far less dense than the median urban neighborhood, ranging from 1,800 to 2,000 people per square mile as compared to 5,000 to 8,000 people per square mile. The typology definition produces the highest median population density for cities, a feature that is endogenous to the definition because it captures high density neighborhoods as the urban core. The suburban densities have less variation across the binary versions of the three definitions. However, the census-convenient definition produces the most dense suburban neighborhoods at 1,890 people per square mile, compared to about 1,700 per square mile in the most suburban categories of the suburbanisms definition and only 890 per square mile in outer suburbs classified through the typology definition. With the lower density in the median suburban neighborhood, a greater percentage of workers in these neighborhoods commute by car. In the median suburban neighborhood, about 91 percent of workers drive to work. This is true across all definitions; despite the fact that car commuting is a central component of the suburbanisms definition, it is nearly equally captured in the other two definitions.

The average suburban neighborhood is largely composed of single-family units and housing built after 1970. At the median, more than one-quarter of the housing stock in suburban neighborhoods consists of single-family homes, the majority of which are detached. Under both the census-convenient and the typology definitions, 72 percent of the housing stock in the median suburban neighborhood

consists of detached single-family homes. Within the typology definition, outer suburbs have a slightly higher share of detached single-family housing at 75 percent, while inner suburbs have a lower share at 65 percent. The share rises to 80 percent under the suburbanisms definition because single-family housing is one of the three criteria for distinguishing suburbanisms. In fact, single-family homes account for 83 percent of the housing stock in the two most suburban categories of this definition.

In terms of housing age, the typology definition makes suburban neighborhoods look newer than the other two definitions. Older, dense neighborhoods and dense neighborhoods adjacent to older neighborhoods are included in the typology core, slightly reducing the median share of housing units built before 1970. Because housing age factors into the typology definition, core neighborhoods are predictably older, with a median of 40 percent of the housing stock built before 1940. Conversely, 40 percent of the housing in outer suburban neighborhoods was built after 1990. In comparison, 23 percent of the neighborhoods in the most urban category of the suburbanisms definition were built before 1940, and only 27 percent of housing in the most suburban categories was built after 1990. As binary classifications, all definitions show that on average the largest share of housing in suburban neighborhoods was built after 1970, with the census-convenient and suburbanism definitions aligning most closely.

Variations in the Aggregate Suburban Landscape

With regard to the median characteristics of suburban neighborhoods, the three definitions produce slight differences. Larger differences emerge when aggregating characteristics to the urban and suburban level and examining suburban characteristics across definitions (Table 4). We aggregate the same demographic and housing characteristics that were presented in the previous section into suburban and urban categories to show the share of suburban residents or housing units that exhibit a given trait.

The suburbs continue to exhibit characteristics that are traditionally associated with suburban space. The majority of suburban residents are white and have incomes above the poverty line. Most suburban residents were born in the US and drive to work. These characteristics are true regardless of the definition used. As with the median characteristics, these features are more concentrated in the most suburban categories under the suburbanisms definition and in outer suburban neighborhoods under the typology definition (Appendix Table A2). For example, the three most suburban categories in the suburbanisms definition have the highest shares of white residents, at over 67 percent, and the lowest shares of immigrant residents, at less than 13 percent. Outer suburban neighborhoods under the

Table 4: Aggregate city and suburban characteristics

	Definition					
	Census-Convenient		Suburbanisms		Typology	
	City	Suburb	City	Suburb	City	Suburb
Demographic Characteristics						
Age Group (%)						
Under 18	23.0	24.0	22.7	24.4	21.9	24.2
18-24	11.9	9.2	12.6	8.4	11.6	9.6
25-44	30.3	26.1	30.6	25.3	31.0	26.4
45-64	24.0	27.6	23.3	28.6	24.8	27.0
65+	10.7	13.1	10.8	13.4	10.7	12.8
Race/ethnicity (%)						
White	45.2	65.5	46.9	67.2	45.7	62.7
Black	19.8	9.8	19.2	8.8	19.6	11.2
Hispanic	24.5	16.3	23.9	15.5	24.1	17.5
Asian	8.0	6.1	7.5	6.2	8.2	6.3
Foreign-Born (%)	18.5	13.2	19.2	12.0	21.3	13.1
Household Type (%)						
Married with kids	15.6	21.6	14.6	23.3	14.4	21.1
Married without kids	21.9	31.3	20.7	33.7	20.0	30.6
Other family	20.8	16.6	21.0	15.8	21.3	17.0
Live alone	32.9	25.0	34.7	22.5	34.9	25.5
Nonfamily	8.9	5.5	9.1	4.8	9.4	5.8
Below Poverty Line (%)	20.0	11.8	21.0	9.9	20.7	12.7
Tenure (%)						
Owners	47.9	69.2	41.7	77.1	43.8	67.5
Renters	52.1	30.8	58.3	22.9	56.2	32.5
Built Form Characteristics						
Commute by Car (%)	76.7	88.8	77.4	90.0	67.8	89.6
Housing Type (%)						
Single-family attached	7.6	6.2	8.4	5.3	8.6	6.0
Single-family detached	46.3	66.0	36.8	76.8	38.5	65.7
2-9 units	20.1	10.8	23.2	6.8	26.6	10.2
10+ units	24.3	10.7	28.2	5.4	25.8	12.1
Housing Age (%)						
Pre-1940	19.6	9.1	18.1	8.4	38.7	5.1
1940-1970	31.8	25.0	28.5	26.2	36.5	24.6
1970-1990	25.6	30.7	28.8	29.2	14.0	33.3
1990-present	23.1	35.2	24.6	36.2	10.9	37.0

typology definition have similar aggregate characteristics to neighborhoods that fall within these suburbanisms categories.

The largest variation in suburban characteristics comes again with the share of suburban homes that are detached single-family structures and the share of homeowners. Under the census-convenient definition, 66 percent of suburban housing units are detached single-family and 69 percent of suburban households own their homes. The typology definition produces similar shares of single-family housing and homeownership, with both characteristics being more common in the lower-density outer suburbs than in inner suburbs. The suburbanisms definition produces higher shares than the other two definitions, with detached single-family homes making up 77 percent of the housing units and 77 percent of suburban households owning their homes. Because homeownership and single-family housing are embedded in the suburbanisms definition, neighborhoods in the most suburban categories have even higher rates of both phenomena.

Similarly, the construction of the typology definition drives differences in housing age. Within this definition, 39 percent of the housing stock in core neighborhoods was built before 1940, while 4 percent of the housing in inner suburbs and 6 percent of outer suburban housing was built in the same era. In comparison, city neighborhoods under the census-convenient definition have only 20 percent of housing built before 1940. The suburbanisms definition produces a complex distribution of housing built in this prewar era. While the most suburban category has the lowest share of housing built before 1940 and the most urban category has the highest share, the urban-suburban continuum does not directly correspond to a gradient of housing age. Of the middle categories, those that have a single-family housing component have higher shares of prewar housing than those that do not.

Geographic Split: The Spread of Urbanisms?

A good portion of the recent suburban literature has examined the geographic spread of characteristics that were previously associated with urban areas, including poverty and the presence of immigrants. In describing the extent of urbanisms in the suburban landscape, it can be useful to make statements about the geographic split of a group or characteristic (e.g., “More renters live in the city,” or “Most families live in the suburbs”). In this section, we aggregate the same demographic and housing characteristics and calculate the shares of each phenomenon that fall within urban and suburban regions.

The geographic reach of each definition impacts the magnitude of a phenomenon and can therefore shape these statements. Within the typology definition, 74 percent of all tracts are

categorized as suburbs, as compared to only 57 percent of tracts in the suburbanisms definition. This difference means that suburbia as a unit will look like it encompasses more of the total population under the typology definition than under the suburbanisms definition. The geographic reach of the definition can heighten the appearance of a characteristic in cities or suburbs simply as a function of coverage. We illustrate the impact of each definition on geographic splits using the same characteristics of residents and housing (Table 5).

The suburban population varies based on the definition. The suburbanisms classification has the smallest share of suburban residents at 60 percent (about 164 million people), with 38 percent of the total population residing in the most suburban neighborhoods. The typology definition captures the largest suburban population at 79 percent (about 215 million people), with 55 percent of the population residing in outer suburban and 25 percent in inner suburban neighborhoods (Appendix Table A3). Suburbs under the census-convenient definition capture 69 percent of the population (about 187 million people). Children under age 18 and adults aged 45 and older are all disproportionately represented in suburban neighborhoods by all definitions, as are married couples.

The geographic split by race and ethnicity varies depending on the definition. Under the census-convenient and typology definitions, the majority of black and Hispanic residents as well as immigrants live in the suburbs, though they are disproportionately underrepresented in the suburbs. Under the census-convenient definition, for example, 69 percent of the total population but only 52 percent of the black population lives in the suburbs. In the suburbanisms classification, the majority of black, Hispanic, and immigrant residents live in neighborhoods that fall on the urban end of the spectrum rather than suburban. This difference is likely a function of the homeownership component of the definition, as the homeownership rate among these groups remains well below that of white households.[20]

Similarly, the census-convenient and typology definitions show greater suburban poverty as compared to the suburbanisms definition. The majority of the impoverished population lives in the suburbs under the first two definitions but not the latter. Suburban poverty is most extensive under the typology definition, with 70 percent of the impoverished population residing in suburbs (including 57 percent in the outer suburbs and 24 percent in the inner suburbs) as compared to 56 percent by the census-convenient definition. The picture is different under the suburbanisms definition, with the majority of the impoverished population living in urban neighborhoods. While the most urban category accounts for 19 percent of the population, fully 32 percent of the impoverished population lives in these

[20] Goodman & Mayer (2018).

Table 5: Geographic split of demographic and housing characteristics

	Definition					
	Census-Convenient		Suburbanisms		Typology	
	City	Suburb	City	Suburb	City	Suburb
Demographic Characteristics						
Population (%)	31.3	68.7	39.8	60.2	20.9	79.1
Age Group (%)						
Under 18	30.4	69.6	38.1	61.9	19.3	80.7
18-24	37.3	62.7	49.9	50.1	24.1	75.9
25-44	34.7	65.3	44.4	55.6	23.6	76.4
45-64	28.5	71.5	35.0	65.0	19.5	80.5
65+	27.3	72.7	34.8	65.2	18.0	82.0
Race/ethnicity (%)						
White	23.9	76.1	31.6	68.4	16.1	83.9
Black	47.8	52.2	58.9	41.1	31.7	68.3
Hispanic	40.6	59.4	50.4	49.6	26.6	73.4
Asian	37.6	62.4	44.6	55.4	25.4	74.6
Foreign-Born (%)	39.1	60.9	51.5	48.5	30.0	70.0
Household Type (%)						
Married with kids	25.6	74.4	31.1	68.9	16.1	83.9
Married without kids	25.0	75.0	30.6	69.4	15.5	84.5
Other family	37.3	62.7	49.0	51.0	25.9	74.1
Live alone	38.6	61.4	52.6	47.4	27.7	72.3
Nonfamily	43.6	56.4	57.6	42.4	31.1	68.9
Below Poverty Line (%)	43.7	56.3	58.4	41.6	30.2	69.8
Tenure (%)						
Owners	24.8	75.2	28.0	72.0	15.4	84.6
Renters	44.7	55.3	64.7	35.3	32.6	67.4
Built Form Characteristics						
Commute by Car (%)	28.3	71.7	36.0	64.0	16.8	83.2
Housing Units (%)	32.5	67.5	42.8	57.2	22.1	77.9
Housing Type (%)						
Single- family attached	37.1	62.9	54.3	45.7	28.8	71.2
Single-family detached	25.2	74.8	26.4	73.6	14.3	85.7
2-9 units	47.1	52.9	71.7	28.3	42.5	57.5
10+ units	52.0	48.0	79.6	20.4	37.7	62.3
Housing Age (%)						
Pre-1940	50.8	49.2	61.7	38.3	68.3	31.7
1940-1970	37.9	62.1	44.9	55.1	29.6	70.4
1970-1990	28.5	71.5	42.4	57.6	10.6	89.4
1990-present	24.0	76.0	33.7	66.3	7.7	92.3

neighborhoods. At the other end of the continuum, 38 percent of the population lives in the most suburban category, but these neighborhoods contain only 23 percent of the impoverished population. This is again likely a function of the homeownership component of the suburbanisms definition. Under this definition, a disproportionately high share of homeowners live in the suburbs; while the more suburban neighborhoods include 60 percent of the population, they encompass 72 percent of all homeowners.

As noted in the previous section, the suburbanisms definition makes suburbs appear to disproportionately consist of detached single-family units, while the typology definition skews to representing suburbs as newer. More suburban neighborhoods within the suburbanisms definition contain 57 percent of all housing units but 74 percent of all detached single-family homes. In comparison, the census-convenient and typology definitions account for 68 and 78 percent of all housing units, containing 75 and 86 percent of all detached single-family dwellings, respectively. Under the typology definition, 91 percent of housing units built after 1970 are in suburban neighborhoods, with 78 percent of these units located in outer suburban neighborhoods. This is a much larger geographic split in housing age than either of the two other definitions produces.

Evaluating Suburban Definitions

The three definitions we presented have slight variations across different metrics but are not as substantially different as one might expect. Still, the nature of the definitions does create discrepancies in some measures. The suburbanisms definition pulls the median, aggregate, and geographic split measures toward higher rates of homeownership, car commuting, and detached single-family housing. Under this classification, the most suburban category tends to amplify suburban characteristics while the middle categories produce a mix of urban and suburban characteristics. Similarly, the typology definition classifies neighborhoods with higher population densities as suburban while older neighborhoods are categorized as core, reducing the median and aggregate percentage of suburban housing built in the prewar era. The definition also captures a larger share of impoverished households in suburban neighborhoods. Outer suburban neighborhoods within the typology have median and aggregate characteristics that most reflect the traditional image of suburbia. Inner suburban neighborhoods generally fall between the characteristics of outer and core tracts. Because the census-convenient definition relies only on the features of population and place boundaries, it does not pull median, aggregate, or geographic split characteristics like the other two definitions.

The endogenous effect of these definitions should be considered when selecting an appropriate classification. However, the additional merits and drawbacks of each definition should also be considered. Deciding which categorization to use depends largely on the type of study and the conceptualization of suburbia that is most meaningful (Table 6).

The census-convenient definition has three major benefits. It is the only definition of the three to capture some level of jurisdictional variation. City tracts generally align with a city/suburban jurisdictional divide. For planning and policy, these jurisdictions may be significant borders to consider. The definition is also very easy to construct, requiring only a series of GIS maps or a geocoded crosswalk and place-level population counts. From an analysis standpoint, the census-convenient definition has the benefit that components of the definition itself will usually not be endogenous to the outcome of interest.

Despite these benefits, there are a few complications with the census-convenient definition. First, the definition does not capture the diversity of the suburban landscape, showing only a binary of urban and suburban. The characteristics of suburbs that exist across the suburbanisms spectrum and across the inner and outer suburbs of the typology definition reinforce the importance of considering variety in the suburban landscape. Additionally, the definition accounts for jurisdictional boundaries, but tracts don't perfectly fall within census places, complicating the coding of neighborhoods that straddle city boundaries. Cities are also different across regions, and this definition provides very little information about those differences. Phoenix, for example, is a considerably different type of city in age, density, building, and footprint than Boston. Finally, this definition does not address the role of smaller principal cities within a metropolitan area. Conceivably, a variation of this definition could include any listed principal city as urban. In its current form, the definition discounts smaller cities as part of a metropolitan area's urban core. The definition is likely to be most useful as a standard classification that considers jurisdictional boundaries.

A major benefit of the suburbanisms definition is that it highlights the varied landscape of urban and suburban characteristics, thus providing more detailed information about the form of suburbs than the census-convenient definition. The suburbanisms definition also allows for a dynamic look at changing metropolitan structures over time. Because the definition is not strictly rooted in a population number or a building density, it is flexible and invites an analysis of the changing geography of suburban characteristics over time. This definition is also computationally the easiest of the three to construct, requiring minimal census data and basic calculations.

Table 6: Summary and evaluation of suburban definitions

	Definition		
	Census-convenient	Suburbanisms	Typology
Conceptualization of suburbia	Non-city remainders	Way of life	Era of development
Benefits	Captures some jurisdictional variation	Shows geography of urban and suburban characteristics	Provides more detail about the type of suburban environment
	Easy to construct	Easy to construct	Provides comparable tract dimensions
		Dynamic geography that invites an analysis of changing suburban characteristics over time	Gives information about density and era of building
Drawbacks	Tract and place boundaries not perfectly aligned	Eight-point scale is difficult to interpret	Revitalized urban neighborhoods get picked up as suburban
	Cities differ in age and density across regions	Older populations and telework may skew the quality of this definition	Ignores jurisdictional boundaries
	Does not address smaller principal cities within the metro		More difficult to construct
When to use	For city-suburban comparisons when jurisdictional boundaries are significant	For focusing on suburban attributes that span jurisdictional boundaries	For studies examining a phenomenon across neighborhoods of different densities and building eras

The eight-point scale of the suburbanisms definition is both a merit and a drawback: it is useful in providing a nuanced geography of shades of suburbanisms, but the ordering of the intermediary categories is somewhat arbitrary, making it difficult to interpret how those differences matter. Additionally, the components of the definition could skew some analyses, showing suburbs to be whiter and higher-income than they appear under other definitions. Another possible weakness of the definition is its reliance on commuting patterns. With the rise of telework and the aging population in some suburbs, commuting by car may be an unreliable indicator of suburbanisms. Despite its dynamic possibility, the definition is fundamentally rooted in a stereotypical view of what is suburban and urban. This definition should be employed in studies that are focused on classic suburban attributes and how urban and suburban attributes have spanned jurisdictional boundaries.

The typology definition produces the greatest specificity about the built environment in which a phenomenon is occurring. Its primary benefit is that it produces a classification of tracts that are comparable across several dimensions, including housing age, housing density, and population density. The differentiation between inner and outer suburbs acknowledges the variations in suburban types, providing more detail about the type of suburb. The data presented in the Appendix Tables show that there are meaningful differences between inner and outer suburban neighborhoods. However, because the typology definition intentionally ignores cities' political boundaries, it leaves audiences wondering how the areas classified as "urban core" actually align with those boundaries. Because of the way the definition is constructed, dense but newer city revitalization could be picked up as outer suburban, and newer metros appear more suburban while older metros appear more urban. This definition is also the most complex of the three definitions to construct; its contiguity rules require a more adept use of GIS and coding in a statistical program to employ the definition nationally. The typology definition is useful for studies that are interested in examining a phenomenon across neighborhoods of different densities and building eras.

Conclusions

Suburban definitions are crucial in shaping planning and policy problems. Metros and regions can look more or less suburban just by virtue of how these spaces are defined. The choice of definition is particularly important when aggregating characteristics, because each definition has a slightly different geographic reach which, combined with other features of the definition's construction, can heighten some urban and suburban metrics. Definitions also matter in terms of what a researcher, planner, or policymaker is trying to show. It is necessary to carefully evaluate whether the focus is on political

geographies, housing densities, suburban ways of life, or other attributes when selecting an appropriate definition. The goal of the research or project should ultimately drive the definition selected.

We presented three common definitions that can be used for national-level studies. Other definitions do exist, and we do not suggest that those included in this study are the only ones that should be used. The definitions could also be used in combination by overlaying city jurisdictional boundaries or further disaggregating suburban categories into typologies or suburbanisms. Local data and local knowledge may produce more meaningful definitions than can be created at the national level. However, it is important for scholars and researchers to consider the comparability of definitions across studies in order to build a broader understanding about suburban space and about phenomena that span urban and suburban boundaries. Researchers using unique definitions could compare their suburban geography to a common definition in an effort to help others understand how their definitions and findings fit within the existing literature. At a minimum, researchers should explain their methodology for defining suburbs, provide basic descriptive statistics of their suburban frame, and discuss how their choice of definition might affect their results.

Though conceptions of what is suburban are likely to evolve and may be place-specific, there is a need for standardization within the US context as a starting point. The US Bureau of the Census or the Office of Management and Budget could take leadership in choosing and implementing a suburban definition into federal data sources. Unsurprisingly, we recommend the census-convenient definition for the purpose of creating a nationally consistent definition within federal data products. The census-convenient categorization is easily constructed with basic Census data and provides a neutral definition that does not substantially skew any of the metrics presented in this paper. If a variation of this definition were to become standard, the definition could include all named principal cities as cities regardless of their population. There would also need to be consideration of how micropolitan areas should be treated and whether it makes sense to further divide neighborhoods in these areas into city and suburban categories. This census-convenient definition also lends itself to being layered on and combined with other definitions, allowing researchers to describe demographic and physical features relative to political boundaries. While no suburban definition will be perfect, standardization would increase understanding of how suburban studies relate to each other.

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Appendix

Table A1: Comparison of tract categorization for each definition with expanded and binary categories

Census-convenient-Suburbanisms Comparison

	Suburbanisms		
Census-convenient	City	Suburb	Total
City	14,554	6,606	21,160
Suburb	11,635	27,472	39,107
Total	26,189	34,078	

	Suburbanisms								
Census-convenient	1 - Most Urban	2	3	4	5	6	7	8 - Most Suburban	Total
City	9,340	2,947	686	1,581	1,149	578	1,709	3,170	21,160
Suburb	3,931	5,554	1,115	1,035	2,291	2,880	4,885	17,416	39,107
Total	13,271	8,501	1,801	2,616	3,440	3,458	6,594	20,586	

Census-convenient-Typology Comparison

	Typology		
Census-convenient	City	Suburb	Total
City	10,230	10,930	21,160
Suburb	5,172	33,935	39,107
Total	15,402	44,865	

	Typology		
Census-convenient	Core	Inner Suburban	Outer Suburban
City	10,230	6,210	4,720
Suburb	5,172	9,088	24,847
Total	15,402	15,298	29,567

Typology-Suburbanisms Comparison

	Suburbanisms		
Typology	City	Suburb	Total
City	11,468	3,934	15,402
Suburb	14,721	30,144	44,865
Total	26,189	34,078	

	Suburbanisms								
Typology	1 - Most Urban	2	3	4	5	6	7	8 - Most Suburban	Total
Core	7,982	1,749	505	1,232	926	237	1,037	1,734	15,402
Inner	3,113	2,932	320	822	1,231	630	1,229	5,021	15,298
Outer	2,176	3,820	976	562	1,283	2,591	4,328	13,831	29,567
Total	5,289	6,752	1,296	1,384	2,514	3,221	5,557	18,852	44,865

Table A2: Median neighborhood characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1- Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Demographic Characteristics													
Age Group (%)													
Under 18	22.3	22.8	21.2	23.0	19.7	24.5	24.7	21.8	22.9	22.9	21.6	22.4	23.2
18-24	9.6	8.0	10.3	9.8	6.8	9.7	9.4	7.6	6.8	7.7	9.4	8.9	7.9
25-44	28.5	24.8	29.9	29.3	23.5	26.6	27.2	25.0	22.5	24.1	28.8	26.6	24.4
45-64	24.2	27.9	22.8	23.5	27.9	25.0	24.8	27.8	29.7	29.3	24.9	25.8	28.0
65+	10.1	12.8	9.2	10.1	15.7	10.4	10.7	14.0	14.1	13.2	10.1	12.2	12.7
Race/ethnicity (%)													
White	46.6	75.7	43.0	55.9	75.2	31.6	52.6	75.5	81.8	79.5	49.0	55.4	77.9
Black	9.2	3.3	11.4	8.2	2.6	17.6	8.9	3.1	2.1	2.4	8.6	5.4	3.2
Hispanic	11.8	6.9	12.2	13.6	6.7	8.5	13.0	7.1	5.4	6.2	10.5	12.3	6.2
Asian	3.7	2.5	3.7	3.8	2.5	1.2	2.0	2.5	2.7	2.6	3.2	3.7	2.4
Foreign-Born (%)	12.3	7.8	14.7	12.6	10.9	6.2	9.3	8.0	6.9	7.0	13.8	13.2	6.4
Household Type (%)													
Married with kids	14.1	20.2	11.1	15.6	15.8	12.6	16.8	18.3	22.5	22.9	13.3	17.3	21.0
Married without kids	20.3	31.4	16.5	21.7	31.4	19.9	23.8	31.2	35.9	34.9	19.1	25.6	33.3
Other family	20.5	15.4	21.1	20.5	13.6	28.5	23.9	16.0	11.7	14.3	21.2	19.3	14.4
Live alone	31.4	24.0	36.2	31.9	29.3	30.8	27.7	26.7	21.8	20.7	33.0	28.1	22.9
Nonfamily	6.9	4.7	8.3	6.9	4.9	6.0	5.6	4.9	4.0	4.2	7.1	5.7	4.5
Median Income ($1,000s)	45.4	61.1	38.1	46.5	61.1	65.9	44.3	65.1	76.1	71.6	45.1	52.2	62.4
Below Poverty Line (%)	19.1	9.8	24.6	16.2	10.3	26.4	18.6	10.9	6.9	7.3	19.7	13.5	9.2
Tenure (%)													
Owners	47.8	73.6	33.5	45.5	72.5	52.8	56.5	74.0	81.0	81.0	44.2	60.3	76.6
Renters	52.2	26.4	66.5	54.5	27.5	47.2	43.5	26.0	19.0	19.0	55.8	39.7	23.4

Table A2: Median neighborhood characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1 - Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Built Form Characteristics													
People/Square Mile (1,000s)	5.5	1.9	7.2	3.7	2.8	3.9	3.4	1.5	1.7	1.6	8.1	4.3	0.9
Commute by Car (%)	85.0	90.8	75.9	92.3	83.2	85.3	93.0	93.2	86.3	92.6	76.8	89.4	91.8
Housing Type (%)													
Single-family attached	3.7	2.7	4.4	5.2	6.4	2.5	2.6	6.0	1.9	2.1	4.2	3.6	2.3
Single-family detached	50.0	71.8	26.2	42.4	45.9	74.1	72.0	52.5	83.8	82.8	39.8	64.5	74.6
2-9 units	16.5	6.7	25.5	20.7	9.4	12.1	11.5	7.6	3.3	3.5	23.3	10.7	5.0
10+ units	12.4	3.7	24.2	20.0	6.4	4.5	5.9	4.7	1.1	1.2	12.0	11.0	2.2
Housing Age (%)													
Pre-1940	10.7	3.9	23.2	2.4	3.0	16.5	7.2	2.1	3.7	3.6	39.5	2.2	2.3
1940-1970	31.3	22.8	27.7	25.0	20.0	46.7	41.7	15.2	21.1	23.0	34.2	48.7	13.2
1970-1990	17.5	28.2	17.9	32.3	31.6	14.9	21.2	35.1	24.2	26.8	10.5	29.7	31.2
1990-present	11.4	26.5	11.7	21.8	24.8	8.6	13.2	35.9	27.4	27.3	6.6	11.5	39.5

Table A3: Aggregate characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1- Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Demographic Characteristics													
Age Group (%)													
Under 18	23.0	24.0	21.5	24.1	20.7	25.0	25.9	22.8	24.3	24.4	21.9	23.6	24.5
18-24	11.9	9.2	14.5	11.2	7.9	11.4	10.2	8.3	7.7	8.3	11.6	10.3	9.3
25-44	30.3	26.1	31.9	30.6	24.5	27.7	28.1	26.1	23.7	25.2	31.0	27.7	25.9
45-64	24.0	27.6	22.3	23.4	28.2	24.9	24.8	27.9	29.5	29.0	24.8	25.8	27.5
65+	10.7	13.1	9.9	10.6	18.6	11.0	11.0	14.9	14.8	13.1	10.7	12.6	12.9
Race/ethnicity (%)													
White	45.2	65.5	42.5	51.3	64.6	38.9	47.8	67.6	72.1	68.6	45.7	49.6	68.6
Black	19.8	9.8	21.5	15.0	11.3	29.8	17.6	8.2	7.8	7.9	19.6	14.8	9.6
Hispanic	24.5	16.3	25.1	23.8	15.0	25.2	27.1	15.3	12.2	14.8	24.1	25.0	14.1
Asian	8.0	6.1	8.4	7.3	7.1	3.8	5.0	6.8	5.7	6.4	8.2	8.2	5.5
Foreign-Born (%)	18.5	13.2	21.5	18.0	16.1	14.2	15.5	12.9	10.6	11.7	21.3	19.1	10.4
Household Type (%)													
Married with kids	15.6	21.6	12.6	16.9	16.5	14.4	18.1	19.2	24.4	24.4	14.4	17.8	22.6
Married without kids	21.9	31.3	17.7	22.2	32.3	21.5	24.6	31.4	36.1	34.7	20.0	25.8	32.7
Other family	20.8	16.6	21.2	20.7	14.8	26.7	23.9	16.3	13.2	15.2	21.3	20.2	15.6
Live alone	32.9	25.0	37.7	32.3	30.7	30.3	27.3	27.7	21.7	21.0	34.9	29.4	23.7
Nonfamily	8.9	5.5	10.8	7.8	5.7	7.1	6.2	5.4	4.6	4.6	9.4	6.8	5.3
Below Poverty Line (%)	20.0	11.8	24.3	17.5	12.5	25.0	19.2	12.0	8.5	8.6	20.7	16.4	11.0
Tenure (%)													
Owners	47.9	69.2	33.6	44.1	72.7	52.9	55.8	73.6	80.4	79.9	43.8	57.8	71.9
Renters	52.1	30.8	66.4	55.9	27.3	47.1	44.2	26.4	19.6	20.1	56.2	42.2	28.1

Table A3: Aggregate characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1- Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Built Form Characteristics													
Commute by Car (%)	76.7	88.8	66.2	90.4	76.9	82.8	91.6	91.4	84.2	91.2	67.8	87.6	90.5
Housing Type (%)													
Single-family attached	7.6	6.2	8.3	8.7	12.7	4.0	4.3	12.6	3.8	4.6	8.6	6.6	5.8
Single-family detached	46.3	66.0	27.5	40.0	41.5	73.4	71.1	49.2	82.1	80.9	38.5	57.7	69.3
2-9 units	20.1	10.8	27.0	22.6	12.5	13.0	12.7	10.7	5.3	5.7	26.6	14.1	8.4
10+ units	24.3	10.7	35.4	24.7	20.3	7.6	9.2	10.6	4.3	4.2	25.8	19.2	8.9
Housing Age (%)													
Pre-1940	19.6	9.1	25.7	8.8	9.8	20.3	12.5	5.0	10.2	7.8	38.7	3.8	5.7
1940-1970	31.8	25.0	29.3	24.9	22.3	45.1	38.5	18.5	23.6	26.5	36.5	46.2	14.8
1970-1990	25.6	30.7	24.7	35.0	35.7	19.5	25.8	37.9	26.7	29.0	14.0	34.0	33.0
1990-present	23.1	35.2	20.2	31.2	32.1	15.2	23.2	38.6	39.4	36.7	10.9	16.0	46.5

Table A4: Geographic split characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1-Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Demographic Characteristics													
Population (%)	31.3	68.7	18.9	14.7	2.6	3.5	5.6	6.0	11.0	37.6	20.9	24.6	54.6
Age Group (%)													
Under 18	30.4	69.6	17.2	15.0	2.3	3.7	6.2	5.8	11.2	38.7	19.3	24.3	56.4
18-24	37.3	62.7	27.3	16.5	2.0	4.0	5.7	4.9	8.4	31.1	24.1	25.2	50.7
25-44	34.7	65.3	22.0	16.5	2.3	3.6	5.8	5.7	9.5	34.6	23.6	24.7	51.6
45-64	28.5	71.5	16.0	13.0	2.7	3.3	5.3	6.3	12.2	41.2	19.5	23.8	56.6
65+	27.3	72.7	15.1	12.6	3.9	3.1	5.0	7.2	13.2	39.8	18.0	25.0	56.9
Race/ethnicity (%)													
White	23.9	76.1	13.6	12.8	2.8	2.3	4.6	6.9	13.4	43.6	16.1	20.6	63.3
Black	47.8	52.2	31.4	17.1	2.3	8.1	7.7	3.8	6.6	23.1	31.7	28.1	40.2
Hispanic	40.6	59.4	25.1	18.5	2.1	4.7	8.1	4.9	7.1	29.5	26.6	32.5	40.9
Asian	37.6	62.4	23.8	16.0	2.8	2.0	4.2	6.1	9.2	35.9	25.4	30.0	44.6
Foreign-Born (%)	39.1	60.9	27.4	17.9	2.8	3.4	5.9	5.2	7.8	29.6	30.0	31.7	38.4
Household Type (%)													
Married with kids	25.6	74.4	12.9	13.3	2.4	2.5	4.9	6.1	13.4	44.6	16.1	22.3	61.6
Married without kids	25.0	75.0	12.7	12.1	3.2	2.6	4.7	6.9	13.8	44.0	15.5	22.4	62.0
Other family	37.3	62.7	23.8	17.8	2.3	5.0	7.1	5.7	7.9	30.4	25.9	27.7	46.4
Live alone	38.6	61.4	27.7	18.1	3.1	3.7	5.3	6.3	8.5	27.3	27.7	26.2	46.1
Nonfamily	43.6	56.4	33.1	18.4	2.4	3.7	5.0	5.1	7.5	24.8	31.1	25.5	43.4
Below Poverty Line (%)	43.7	56.3	32.0	17.9	2.3	6.1	7.5	5.0	6.5	22.5	19.2	24.2	56.7
Tenure (%)													
Owners	24.8	75.2	10.9	10.9	3.3	2.9	4.8	7.4	13.9	45.9	15.4	22.8	61.8
Renters	44.7	55.3	35.6	22.9	2.0	4.2	6.3	4.4	5.6	19.1	32.6	27.5	39.9

Table A4: Geographic split characteristics with expanded definition categories

	Definition											
	Census-convenient		Suburbanisms								Typology	
	City	Suburb	1- Most Urban	2	3	4	5	6	7	8 - Most Suburban	Core	Inner Suburb	Outer Suburb
Built Form Characteristics													
Commute by Car (%)	28.3	71.7	14.7	16.0	2.2	3.1	5.7	6.3	10.8	41.2	16.8	25.1	58.1
Housing Units (%)	32.5	67.5	20.8	15.3	3.2	3.5	5.4	6.3	10.8	34.8	22.1	24.3	53.6
Housing Type (%)													
Single-family attached	37.1	62.9	26.0	20.1	6.1	2.1	3.5	11.9	6.2	24.1	28.8	24.4	46.8
Single-family detached	25.2	74.8	9.6	10.3	2.2	4.3	6.4	5.2	14.9	47.2	14.3	23.6	62.2
2-9 units	47.1	52.9	40.5	25.0	2.9	3.3	4.9	4.9	4.2	14.3	42.5	24.9	32.6
10+ units	52.0	48.0	48.6	25.0	4.3	1.8	3.3	4.4	3.1	9.6	37.7	30.9	31.4
Housing Age (%)													
Pre-1940	50.8	49.2	42.7	10.8	2.5	5.7	5.4	2.5	8.8	21.6	68.3	7.5	24.2
1940-1970	37.9	62.1	22.4	14.0	2.6	5.8	7.6	4.3	9.4	33.9	29.6	41.3	29.0
1970-1990	28.5	71.5	17.7	18.5	3.9	2.4	4.8	8.2	9.9	34.7	10.6	28.5	60.9
1990-present	24.0	76.0	13.5	15.3	3.3	1.7	4.0	7.8	13.6	40.9	7.7	12.5	79.8