Beyond the Metroplex: 
Examining Commuter Patterns 
at the “Megapolitan” Scale

Robert E. Lang and Arthur C. Nelson

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Working Paper

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Abstract

This paper explores the geography of “megapolitan areas.” Megapolitans are super regions that combine at least two, and often several, metropolitan areas. People intuitively sense a large-scale metropolitan convergence is underway as they see metros that were once distinct places merge into enormous urban complexes. In the 1960s, Dallas and Fort Worth were clearly colliding, as were Washington and Baltimore by the 1980s. Now regions with more distant urban cores such as Phoenix and Tucson, Tampa and Orlando, and San Antonio and Austin are exhibiting the same pattern, only on a more massive scale. This research predicts that a total of 20 megapolitan areas will exist in 2040.

Megapolitan areas are based on the census’s new (2003) method for determining combined statistical areas (CSAs). When separate metropolitan areas exchange at least 15 percent of workers as measured by commuting, they are designated as CSAs. The same holds true for megapolitans. Based on projections of commuting, by 2010 the census should find that Phoenix-Tucson and Washington-Baltimore-Richmond could become CSAs. In 2020, several more metropolitan areas will pass this threshold, and at mid century all 20 megapolitan areas identified by Virginia Tech should officially be CSAs.

The census predicts that the U.S. will grow to 400 million residents by 2043. While the census projects population, it does not show how growth will impact future metropolitan geography. Yet it is critical that planners consider the metropolitan units that will emerge over the next several decades. Before Phoenix and Tucson functionally integrate, for example, it is necessary to explore the challenges and opportunities their merger presents for infrastructure investment, environmental impact, and economic development. This paper develops megapolitan geography as tool to help America plan for its next 100 million people.
About the Authors

Robert E. Lang is Director of the Metropolitan Institute at Virginia Tech in Alexandria, Virginia, and an Associate Professor in Urban Affairs and Planning in Virginia Tech’s School of Planning and International Affairs. Dr. Lang is also Editor of the scholarly journal *Housing Policy Debate*, which until recently was published by the Fannie Mae Foundation. In the spring of 2007, Dr. Lang was named a Nonresident Senior Fellow of the Brookings Institution and is currently a Fellow of the Urban Land Institute. In 2006, he was a Visiting Distinguished Professor at Arizona State University. Dr. Lang’s newest book titled *Boomburbs: the Rise of America’s Accidental Cities* was published in April 2007 by the Brookings Institution Press.

Robert E. Lang, Ph.D.
Co-Director and Associate Professor
Metropolitan Institute at Virginia Tech
College of Architecture and Urban Studies
1021 Prince Street, Suite 100
Alexandria, VA 22314
rlang@vt.edu
703.706.8101 (p)
703.518.8009 (f)

Arthur C. Nelson is Director of the Metropolitan Institute at Virginia Tech in Alexandria, Virginia, and Professor of Urban Affairs and Planning in Virginia Tech’s School of Planning and International Affairs. Dr. Nelson is also Editor of the scholarly journal *Housing Policy Debate*, which until recently was published by the Fannie Mae Foundation. Previous to Virginia Tech’s appointment, he was Professor of City and Regional Planning and Professor of Public Policy at Georgia Tech, as well as adjunct Professor of Law at Georgia State University. Dr. Nelson’s most recently authored or co-authored books are *The Social Impacts of Urban Containment* (Ashgate), *Urban Containment in the United States* (American Planning Association) and *Planners’ Estimating Guide* (American Planning Association).

Arthur C. Nelson, Ph.D., FAICP
Co-Director and Professor
Metropolitan Institute at Virginia Tech
College of Architecture and Urban Studies
1021 Prince Street, Suite 200
Alexandria, VA 22314
rlang@vt.edu
703.706.8110 (p)
703.518.8009 (f)
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Introduction

This study looks at a new urban unit of analysis—the “megropolitan area.” Megapolitans (or “megas”) are bigger than existing metropolitan areas, but smaller than the newly identified “megaregions” (Carbonell and Yaro 2005). Lang and Dhavale (2005) used the term megapolitan to describe an extended urban area similar to the megaregions. However, in this study megapolitan areas comprise a smaller and more narrowly defined unit of analysis.¹

Megas are super regions that combine at least two, and often several, metropolitan areas. Megapolitan areas are big, but not enormous and can easily be traversed by car in a day, round-trip. Many of us sense that a large-scale metropolitan convergence is under way because we see metros that were once distinct places now merging into enormous urban complexes. Megas are defined here as having economic linkages as demonstrated by commuter patterns. The “anchor urban cores” of megapolitans lie at least 50 miles, but no more than 180 miles apart. The research examines 10 representative megas, which are found in all corners of the U.S.

The megas we identify are essentially the Combined Statistical Areas (CSAs) we project to 2040—derived by extending the census’s current method several decades forward. Table 1 shows the relationship between metropolitan areas, CSAs, megapolitan areas, and megaregions.

Table 1: The New Regional Hierarchy

<table>
<thead>
<tr>
<th>Types</th>
<th>Descriptions</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan Statistical Area</td>
<td>An “urbanized area” or “principal city” with at least 50,000 people plus surrounding counties with a 25% “Employment Interchange Measure” (EIM) in 2000</td>
<td>Pittsburgh, Denver</td>
</tr>
<tr>
<td>Combined Statistical Area</td>
<td>Two or more adjacent micro and metropolitan areas that have an EIM of at least 15% in 2000</td>
<td>Washington/ Baltimore, Cleveland/Akron</td>
</tr>
<tr>
<td>Megopolitan Area—Defined by Virginia Tech Metropolitan Institute</td>
<td>Two or more metropolitan areas with anchor principal cities between 50 and 200 miles apart that will have an EIM of 15% by 2040 based on projection</td>
<td>Sun Corridor (Phoenix/Tucson), Northern California (Bay Area/ Sacramento)</td>
</tr>
<tr>
<td>Mega-Region—Defined by RPA and Lincoln Institute</td>
<td>Large, connected networks of metropolitan areas that maintain environmental, cultural, and functional linkages</td>
<td>Piedmont, Texas Triangle</td>
</tr>
</tbody>
</table>

¹ Note that the proposal to Lincoln referred to “macropolitan areas.” We have switched the term macropolitan for megopolitan because the latter now refers to urban geographic units that are smaller than megaregions. At the time the Lincoln proposal was written, megapolitans were roughly equivalent to megaregions in scale so the term macropolitan was suggested to capture a smaller urban unit.
The main criterion for a census-defined CSA is economic interdependence as evidenced by overlapping commuting patterns. The same holds true for megapolitans. Based on projections of commuting patterns, the 2010 census could find that Phoenix-Tucson and Washington-Baltimore-Richmond qualify as CSAs. In 2020, several more metropolitan areas will pass this threshold, and at mid-century all the megopolitan areas we have identified should officially be CSAs. Indeed, in mid-decade, the Census merged the Providence MSA into the New England CMSA (see below) – an event the model we posed in our Lincoln Institute of Land Policy proposal leading to this research predicted (Lang and Nelson 2006).

Organizations such as the Lincoln Institute of Land Policy and the New York-based Regional Plan Association are also developing new regional models and planning strategies to manage future metropolitan expansion (see Table 1). In 2006, those two organizations convened the National Committee for America 2050—a coalition of planners and civic leaders—to develop a national framework for America’s rapid population growth and the emergence of what they call megaregions.

This new concept was explored during a University of Pennsylvania planning studio taught in 2005 by Armando Carbonell, chairman of the Lincoln Institute’s department of planning and urban form, and Robert Yaro, president of the Regional Plan Association. Although the Penn megaregions do not account for overlapping commuter sheds, they nonetheless describe networks of mostly contiguous metropolitan areas.

Six of the Penn megaregions are comprised of two or more of the megopolitan areas we have identified, five of which lie east of the 100th meridian line—the nation’s midpoint. The Texas Gulf, Texas Corridor, and Greater Metroplex form what Carbonell and Yaro call the Texas Triangle. When our megopolitan areas combine into even larger urban complexes, 10 megaregions result—five east and five west (See Table 2). Some megas, such as the Sun Corridor, are both megopolitan areas and stand-alone megaregions. In contrast, the Texas Corridor megopolitan area (San Antonio-Austin) is one of three megapolitans in the Texas Triangle megaregion. Likewise, the Willamette Valley is one of two megapolitans (along with the Puget Sound) that form the Cascadia megaregion. The 20 megapolitans result from a test of the commuting patterns in each region. The megapolitans are based on both projections of building trends and an extrapolation of commuter patterns.
Table 2: Megapolitan Areas and Megaregions

<table>
<thead>
<tr>
<th>Megapolitan Areas and Megaregions</th>
<th>Anchor Metro(s)</th>
<th>2005 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Northeast</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New England</td>
<td>Boston/Providence</td>
<td>51,601,118</td>
</tr>
<tr>
<td>Mid-Atlantic</td>
<td>New York/Philadelphia</td>
<td>8,276,116</td>
</tr>
<tr>
<td>Chesapeake</td>
<td>Washington/Baltimore/Richmond</td>
<td>33,527,905</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,797,097</td>
</tr>
<tr>
<td><strong>Great Lakes</strong></td>
<td></td>
<td>34,267,189</td>
</tr>
<tr>
<td>Steel Corridor</td>
<td>Cleveland/Pittsburgh</td>
<td>7,067,896</td>
</tr>
<tr>
<td>Ohio Valley</td>
<td>Cincinnati/Columbus</td>
<td>5,344,052</td>
</tr>
<tr>
<td>Michigan Corridor</td>
<td>Detroit</td>
<td>8,969,861</td>
</tr>
<tr>
<td>Lakefront</td>
<td>Chicago/Milwaukee</td>
<td>12,885,380</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9,797,097</td>
</tr>
<tr>
<td><strong>Piedmont</strong></td>
<td>Carolina Piedmont</td>
<td>13,953,787</td>
</tr>
<tr>
<td></td>
<td>Charlotte/Raleigh</td>
<td>7,012,769</td>
</tr>
<tr>
<td></td>
<td>Georgia Piedmont</td>
<td>6,941,018</td>
</tr>
<tr>
<td><strong>Florida</strong></td>
<td>Florida Corridor</td>
<td>13,823,188</td>
</tr>
<tr>
<td></td>
<td>Tampa/Orlando</td>
<td>7,851,525</td>
</tr>
<tr>
<td></td>
<td>Treasure Coast</td>
<td>5,971,663</td>
</tr>
<tr>
<td><strong>Texas Triangle</strong></td>
<td>Texas Gulf</td>
<td>18,187,772</td>
</tr>
<tr>
<td></td>
<td>Houston</td>
<td>6,247,170</td>
</tr>
<tr>
<td></td>
<td>Texas Corridor</td>
<td>3,965,018</td>
</tr>
<tr>
<td></td>
<td>Greater Metroplex</td>
<td>7,975,584</td>
</tr>
<tr>
<td><strong>Front Range</strong></td>
<td>Denver</td>
<td>3,880,126</td>
</tr>
<tr>
<td><strong>Sun Corridor</strong></td>
<td>Phoenix/Tucson</td>
<td>4,988,564</td>
</tr>
<tr>
<td><strong>Cascadia</strong></td>
<td></td>
<td>7,350,438</td>
</tr>
<tr>
<td></td>
<td>Puget Sound</td>
<td>4,106,956</td>
</tr>
<tr>
<td></td>
<td>Willamette Valley</td>
<td>3,243,482</td>
</tr>
<tr>
<td><strong>Northern California</strong></td>
<td></td>
<td>11,288,313</td>
</tr>
<tr>
<td></td>
<td>Bay Area/Sacramento</td>
<td>17,410,150</td>
</tr>
<tr>
<td><strong>Southern California</strong></td>
<td></td>
<td>21,720,656</td>
</tr>
<tr>
<td></td>
<td>Los Angeles/San Diego</td>
<td>181,061,151</td>
</tr>
<tr>
<td></td>
<td>US Total</td>
<td>296,410,404</td>
</tr>
</tbody>
</table>

Note: Megaregions are shown in bold; Anchor Metros rank in the top 50 US Metropolitan Areas

Source: Metropolitan Institute at Virginia Tech, US Bureau of the Census
No megapolitan area identified in this study was a CSA as of the 2003 census origination of the concept (although one—New England—became a CSA in 2006). This research reveals the next generation of combined statistical areas in advance of the census. It uses census methods to explore trends toward ever more extended metropolitan form. The research analyzes recent commuter data to show that megapolitans now maintain economic connectivity at a threshold just below the level the census uses to define CSAs.

This report begins with a background on current metropolitan theory by covering the literature relevant to large-scale urban development. The analytic basis for megapolitans derives from theories that Lang and Knox (2007) categorize as “new metropolis” thinking. The theory background is followed by a methods section that defines the terms for how megapolitans are measured. Next are the ten case studies that test the theory and methods throughout the U.S. Finally a discussion section concludes the report that addresses the meaning of the megapolitan development.

**Metropolitan Evolution**

**The Metroplex Model**

To say that megapolitan areas are “beyond the metroplex” means that they exceed the size of a metroplex. The term metroplex as a proper noun refers to the Dallas/Fort Worth, TX Metroplex. The Metroplex is a precursor of today’s megapolitan areas. The Metroplex is a large, extended metropolitan area that has two key anchor urban cores—Dallas and Fort Worth. The Metroplex cores do not touch as in the case of twin cities, such as Minneapolis/St Paul. Dallas and Fort Worth lie about 35 miles apart from downtown to downtown. In this way, the Metroplex was really the first true megapolitan area.

Consider that the Dallas/Fort Worth region is the first metropolitan area to join two relatively distant urban cores, being roughly 30 miles apart as the crow flies. In contrast, the “other” conjoined metropolitan area, the “Twin Cities” composed of Minneapolis and St. Paul, are just 10 miles apart as the crow flies – although they are 50 miles apart when floating down the Mississippi River. It is interesting to note that the two regions were long bitter rivals that competed for business. What brought the region together was the federal government. First the census found that Dallas and Fort Worth had suburbs that so overlapped and interpenetrated that they formed one statistical region. When in 1964, Dallas and Forth Worth both sought federal aid to improve their airports, the Federal Aviation Administration argued that the improved airports would be too close and that the region should build one large airport at the midpoint between Dallas and Fort Worth. And so with the runways located right at the county line the Dallas-Fort Worth (“DFW”) airport was born.

The Dallas/Fort Worth region then began to think regionally about other issues, including economic development. It first tried marketing the region as “North Texas,” but focus groups revealed that most people associated the term with places such as Amarillo and the Texas Panhandle, so the label “Metroplex” was developed. It is meant to imply that Dallas and Forth Worth are not twin cities; rather they are proximate places that are joined across an urban
complex—or metroplex. The country is now seeing the rise of multiple metroplexes. The scale of these regions now extends well beyond the progenitor Dallas/Fort Worth metroplex, but they maintain much the same connectivity. In the 1960s, Dallas and Fort Worth were clearly converging, as were Washington and Baltimore two decades later. Now regions with more distant urban cores such as Phoenix and Tucson, Tampa and Orlando, and San Antonio and Austin are exhibiting the same pattern, only on a more massive scale.

**Urban Realms**

Within metropolitan areas there is another phenomenon emerging: Urban realms. Until the middle of the 20th century, urban and metropolitan form could safely be conceptualized in terms of the outcomes of competition for land and ecological processes of congregation and segregation, all pivoting tightly around a dominant central business district and transportation hub (Figure 1a). During the middle decades of the 20th century, however, American metropolises were unbound by the combination of increased automobile use, massive federal outlays on highway construction, and mortgage insurance that underwrote the “spatial fix” to the over-accumulation crisis of the 1930s (Checkoway 1980; Harvey 1985; Lake 1995). The result was a massive spurt of city building and the evolution of dispersed, polycentric spatial structure, and the emergence of urban realms (Figure 1b).
Initially, the shift to an expanded polycentric metropolis was most pronounced in the northeastern United States, and Gottmann captured the moment with his conceptualization of megalopolis. It was not long, however, before observers noted the change elsewhere. Muller (1976) was among the first to note the emergence of a new outer city. Vance (1977) argued that major metropolitan areas in the United States, such as Los Angeles, New York and San Francisco had grown so decentralized that they had become a series of semi-autonomous sub-regions, or “urban realms.”

Vance’s (1964) basis for identifying different realms within metropolitan areas rested on several criteria. The first is the overall size of the region—the bigger the metropolis, the more plentiful and differentiated the realms. Next is an area’s terrain and topography. Physical features such as mountains, bays and rivers often serve to delimit realms by directing the spread of urbanization into distinct and geographically defined areas. The third variable is the amount and type of economic activity contained within it. Realms can also be distinguished by either an overriding economic unification, such as the Silicon Valley in California, or shared employment centers as are identified by commuter sheds. Finally, the regional geography of transportation, as originally recognized by Homer Hoyt (1939), also plays a role in separating urban realms. This process began with trolley cars but is now centered on Interstate Highways, in particular metropolitan beltways. Beltways can either define the boundary of an area, as reflected by the expression of one being located “inside the Washington beltway,” or unify a realm as in the case of the LBJ Corridor north of downtown Dallas.

To Vance, urban realms are natural functions of the growth of cities; the city has changed structurally as a collection of realms, that has grown “one stage beyond that of a metropolis” (1964, p. 78). The core-periphery relationship weakens as realms become more equal. The basic organization of the region becomes more cooperative as the shared urban and cultural identity of the urban realms creates what Vance called a ‘sympolis’ rather than a metropolis.

For example, consider the relationship between Orange County and Los Angeles. Orange County is clearly part of Greater Los Angeles, but it also maintains a distinct and semi-autonomous identity as “South Coast.” Orange County contributes significantly to the region’s larger economy but mostly does not compete with Los Angeles. Industries such as the automotive design found at the Irvine Spectrum, a master-planned high tech office park in the center of the county, show this pattern. Several car companies chose the Spectrum for access to California trends and regard Orange County as “the next capital of cool” (Sklar 2003). Orange’s association with the Los Angeles helps makes this once sleepy suburban county cool and the larger Southern California region gains by additional economic activity.

Realms have their own sub-regional identities, such as those in the Los Angeles region like South Coast (or Orange County) or the Inland Empire (Riverside and San Bernardino Counties). The realms around Los Angeles are so distinct that South Coast and the Inland Empire have their own sub regional newspapers and airports. On a smaller, but emerging scale, a place such as the East Valley of Phoenix (with such major suburbs as Mesa, Tempe, Chandler and Gilbert) already has its own newspaper and will soon have a separate national airport from Phoenix. Finally, urban realms also show up in business names, such as South Coast Plaza, Inland Empire National Bank, or the East Valley Tribune.
Lang and Hall (2007) synthesized thinking on urban realms and offered four realm types based on a mix of social characteristics, built densities, and development age. The four types are:

- **Urban core realms**—the original places of substantial 19th and 20th century development, including the region’s major principal city and downtown.
- **Favored quarter realms**—the most affluent wedge of a metropolitan area, containing upscale communities, luxury shopping, and high-end office districts.
- **Maturing suburban realms**—the areas of substantial late 20th century and early 21st century development that are rapidly filling in and will ultimately extend the edges of the metropolis.
- **Emerging exurban realms**—extended, rapidly growing, lower-density spaces that contain leapfrog development and will not be full extensions of the main metropolitan development for decades to come. Yet commuting from these realms often serves as the link between metropolitan areas that lead to the formation of census-defined CSAs.

The relationship between these realm types plays a role in determining the overall megapolitan dynamic. Favored quarters, such as Southern California’s South Coast (Orange County), are often job rich, but have expensive housing. A less affluent maturing suburban realm, such as the Inland Empire (or Riverside and San Bernardino Counties), can develop a dependence on the favored quarter. Thus, an important traffic pattern in Southern California is the commute between these two suburban realms. In fact, one of the biggest bottlenecks in the region’s freeway system is along a mountain pass (known locally as ‘The 91’) that divides the two realms. Without alluding to it, Gordon, Richardson, and Choi (1992) characterized the Los Angeles basin as a series of urban realms each serving a population base of around one-half to one million residents with about half to twice as many jobs centered in each.

Exurban realms also serve a critical role in megapolitan formation. The “mid” exurban realms that emerge between two proximate metropolitan areas lie in the crosshairs of regional growth. Figure 1c graphically depicts the new megapolitan form based on extended urban realms, including the development of mid corridor realms. It is in these places where commuters go in both directions and provide the linkages—based on a shared economy—that join metropolitan areas. These mid exurban realms are the focus of this study. We focus specifically on the counties that comprise these realms to see if their divided commuter patterns indicate an emergent CSA. The methods section that follows provides a detailed analysis for how commuting data was used to predict megapolitan formation.
Figure 1c.

The New Metropolitan Form

Parallel with the development of urban realm theory were models of a new metropolitan form (Lang and Knox 2007). These concepts captured the ever-expanding scale and fracturing nature of the late 20th century metropolis. The French geographer Jean Gottmann in 1961 proposed that the entire Northeastern US formed one long extended metropolis that he termed “megalopolis.” In 1962, a now-obscurer urban thinker Jerome Pickard took Gottmann’s megalopolis idea a step further and developed a national map of “urban regions.” Pickard (1966) then followed up with an analysis of how U.S. migration patterns were expanding these regions. In 1970, Pickard projected growth in urban regions to the year 2000 (see Figure 2). With remarkable precision Pickard predicted the basic frame of the nation’s current pattern of urbanization. He also cleanly delineated between an urban region and a metropolitan area. An urban region, to Pickard (1970) is “not necessarily a contiguous ‘super city’ but rather it is a region of high concentrations of urban activities and urbanized population” (p. 154). From even his original work on urban regions, Pickard (1962) argued that urban regions were not simply an extended city:
Our largest urban region, sometimes called “megalopolis,” extends along the northern Atlantic seaboard from Portland, Maine to Washington, DC. A popular misconception has led to calling this a “city 500 miles long.” It most definitely is not a single city, but a region of concentrated urbanism—a continuous zone of metropolises, cities, towns and exurban settlement within which one is never far from a city (page 3, emphasis in the original).

**Figure 2.**

Pickard (1970) also noted that “urban regions have evolved during the automobile era form multiple urban nodes that expanded very rapidly toward regional cities” (p. 154). By Pickard’s definition, an urban region is required to have a total population of 1 million and an average population density of at least three times the national average (Pickard 1962).

Pickard was indeed a seer, but he was not alone in noting the role that post war metropolitan expansion played in changing basic regional form. Friedmann and Miller (1968) crafted the concept of the “urban field” suggesting that the reach of the largest central cities was upwards of 100 miles. Blumenthal (1983) envisioned an “extended metropolis” composed of urban areas stitched together with vast exurban commuting sheds. These views, however, were merely extensions of *New York Times* journalist Auguste Spector’s (1955) pioneering observations that modern transportation technology allowed some downtown Manhattan workers to live in eastern Pennsylvania – traversing all of the state of New Jersey to and from work daily. Nelson
(1992) and Nelson, Dawkins and Sanchez (2007) observe that by the end of the 20\textsuperscript{th} century the exurban landscape (as they define it) is home to about a quarter of all Americans and accounted for a fifth of the nation’s growth in the 1990s.

In advancing these concepts, Pierce Lewis (1983) coined the term “galactic metropolis” to capture the disjointed and decentralized urban landscapes of late twentieth century North America. The galactic metropolis is vast, with varying sized urban centers, sub-centers and satellites; it is fragmented and multi-nodal, with mixed densities and unexpected juxtapositions of form and function. Looking at U.S. cities established after 1915, Lewis found that every one had evolved in the “galactic” form rather than with a traditional nucleated morphology (Lewis 1995). Lewis also found that even older, more established metropolitan areas have subsequently developed in this same direction, especially at their edges.

The megapolitan spatial model used in this study extends elements of Gottmann’s, Vance’s, Pickard’s and Lewis’s thinking. When the notion was first proposed several decades back that super, multi-metropolitan regions were emerging, the focus clearly lay on the vast physical extent of development. We now add a vital functional component to this analysis—the focus on economic interdependency as defined by the U.S. Census Bureau. In the 1960s and 1970s, commuting was still mostly focused on a relatively limited set of core cities and counties. But the explosion of suburban and exurban employment into Edge Cities and even Edgeless Cities (Lang 2003) projected commuter sheds into a much wider hinterland. The metropolitan space that now exhibits economic interdependence has grown exponentially since the 1960s. The physical convergence of large regions visible even in the early post-World War II decades now has an accompanying functional reality. By the middle of this century a decades-long process of decentralization and metropolitan interpenetration should result in functionally connected spaces that dwarf today’s big regions.

**Metropolitan and Megapolitan Commuting**

Many millions of Americans live in one metropolitan area but work in another. The prevalence of this trend has been growing steadily since completion of the Interstate highway system in the 1980s. It became so prevalent by the end of the 1980s, for instance, that the Census Bureau created a new metropolitan category—the Consolidated Metropolitan Statistical Areas or CMSAs. This geographic designation was included in the 1990 and 2000 Census tabulations.

In 2003, however, the Census Bureau reconsidered the role of commuting in forming networks of metropolitan areas. The upshot was a wholesale change in how regions are defined (Frey et al. 2006) based on new commuting formula. The idea of a consolidated area, where one core dominated, was thrown out and replaced with the concept that multi-centered regions could overlap and share commute sheds. The updated model opens the door to even larger regional networks with a daisy chain of overlapping interdependencies, which provides the basis of megapolitan areas.

Urban economies are successful if they do many things. One is to capitalize on the economies of agglomeration. Another is to capitalize on comparative advantages. A third is to create efficient means of connecting them to larger landscapes in ways that facilitate both agglomeration
economies and comparative advantages. O’Sullivan (2007) observes that there is a fourth ingredient that is uniquely 21st-Century: high-quality social interaction. Indeed, O’Sullivan argues that not only have place-centric models run their course so have deconcentration models (where jobs follow people into the suburbs and beyond). The economy is now becoming homo-centric. This means that because of technology, flexible working conditions, and so forth people have unprecedented residential location options. But they also depend on social interaction. For instance, the 1990s saw the advent of Internet-based shopping which some thought would doom retailing. Others foresaw the rise of telecommuting as the savior to traffic congestion and pollution as work-based trips would be reduced—and a reduction in the demand for office space. Yet Nelson (2006) has found that more retail and office space per capita exist today than in the 1990s. Census data also reveals that urbanized land area density is rising for the first time in half a century. We speculate that regardless of technological advances—or maybe because of them—people pursue personal interaction.

There is another feature. As people have congregated into settlements that have become cities and metropolitan regions, so have trans-metropolitan networks emerged. While people may shop and receive personal services close to home and certainly in the same urbanized area where they live, their livelihood is less bounded but nonetheless constrained spatially. The principal source of that constraint is mobility—being able to conduct business efficiently. A growing literature is showing that this is done in situations where person-to-person exchanges are possible even though most actual business may be conducted on the telephone, e-mail, or the Internet.

Moss and Townsend (2000) argue that the Internet is the backbone of the modern American metropolis, yet not in the way normally viewed. Conventional thinking holds that the Internet acts as a leveling technology between regions but this has not been the case. While a high percentage of households across the nation and an even higher percentage of businesses use the Internet, economically lagging areas remain disconnected to the emerging American economy. They go on to worry that the Internet may actually aggravate economic disparity between regions—yet they posed no explanation.

It would also seem that telecommunications and the Internet would allow innovation to occur across the nation yet this is also not the case. Lim (2003) demonstrates that the spatial distribution in the United States during the 1990s became more concentrated in clusters of metropolitan areas, not less. He concludes that the spatial distribution of innovation is highly concentrated in a relatively small number of metropolitan areas including both coasts, the New England-Middle Atlantic area, the Front Range, and emerging clusters in the South. He does not explain why.

To understand why, we turn to the location and work behavior of “information” workers. Bolan and Xu (2004) asked: Do information workers locate in concentrated fashion or in a highly dispersed fashion? Do they congregate in central downtown areas, in edge city areas, or do they disperse randomly throughout a metropolitan area? Their central findings are worthy repeating here verbatim:

The study has reinforced the notion that information workers thrive best on proximity to other information workers to a significant degree but with the
substantial growth and dynamic of the 1990’s, proximity is a relative characteristic mediated by limits of land markets. Thus, the workplaces of information workers were more dispersed in 2000 than in 1990, but in that suburban movement, such workplaces tended to be clustered. Overall, the speculative thinking during the 1990’s that information technology would change the shape, form and function of the contemporary city has not been borne out in this study. Indeed, there seems to be some reinforcement of traditional urban form (Bolan and Xu 2004: 92).

This brings us to the supposition that despite technological advances economies of agglomeration remain important but across a larger space than conventionally perceived. How large? That is the research question to be addressed.

The census sees commuting patterns as the key variable to identify an economically integrated space. It has used this measure since metropolitan areas were first officially defined by the census in 1949. Commuting is taken as a proxy for host of other variables such as retail and housing markets. For example, if job losses occur in one metropolitan county, then the residents of a neighboring metro county that commute to these jobs will be impacted. It will also affect their ability to purchase goods and services and afford housing. Commuting therefore reveals much larger patterns of economic integration. These relationships at the metropolitan scale should hold for megapolitans as well.

Data showing commutes of 50 and 100 miles each way indicate a growing number of people who journey to work between big megapolitan metros. According to the U.S. Census Bureau, the number of “extreme commuters” (or those who travel 90 or more miles to work is growing (Naughton 2006). In 2005, 3.4 million people made such a commute, or double the number in 1990. In addition, the fastest growing commuting departure time is between 5 and 6 a.m., indicating a boom in long journeys to work (Naughton 2006). The percentage of people that participate in a regional economy without technically living in its officially designated metropolitan area is correspondingly rising (Morrill, Cromartie, and Hart 1999). But one question the U.S. Census Bureau does not ask is the frequency of commutes—or the number of days in an average week that a worker reports to their place of employment. It may be that while commuting distances grow, the number of trips drops (Lang and Nelson 2007).

The changing nature of work is also feeding the emergence of megapolitan areas. In many fields, workers simply need not be present in the office five days per week. The practice of “hoteling” where employees “visit” work infrequently and mostly work at home or on the road is common in high tech firms and will soon spread to other sectors. This allows people the flexibility to live at great distance to work in remote exurbs or even a neighboring metropolitan area. Over the next several decades the very nature of metropolitan connectivity is likely to shift from a situation where only locals workers contribute to an economy to a condition where a significant share of “local” jobs are held by people living outside the region. The megopolitan research anticipates this change by analyzing the scale at which the 21st century economy will emerge. The shift also reflects the changing nature of metropolitan form.
Methods

The U.S. Census Bureau has very specific criteria for defining regions. As noted above, the most important criterion is commuting. The census provides population projections to the mid 21st century, but does not extend its current geography forward to reflect new growth. Yet, the census does provide a set of rules whereby researchers can mostly construct such a geography that conforms in rough approximation to the federal government's officially defined metropolitan spaces. In a nutshell that is what we do in this study.

This paper explores potential future linkages between metropolitan areas by examining the commuting patterns in mid corridor urban realms. Because the US Census Bureau uses county commuting data, we identify the key counties that approximate these realms. For example, in the case of the Phoenix-Tucson megapolitan area (known also as the “Sun Corridor”), the key county is Pinal, which lies between Maricopa County (Phoenix) and Pima County (Tucson). Although we looked at multiple regions around the country to test for linking counties where future commuter patterns would predict convergence, we focus on ten case studies here to explore this process of change in more detail. Note that the preliminary analysis of these counties commuting and growth trends by Lang and Nelson (2007) produced the twenty megapolitan areas that were shown in Table 2.

In sum, our method locates key counties between metropolitan areas that lie from 50 to 175 miles apart core-to-core; checks current commuting patterns in these places; determines the direction and velocity of changes in commuting patterns there; and examines local development conditions and projected growth to predict future commuting. If these key counties show: 1.) a commuter pattern well on its way to the 15 percent EIM with two proximate metropolitan areas; or 2.) have high projected growth rates that will produce spill over commuting patterns likely to generate a 15 percent EIM by 2040; then the two adjacent metropolitan areas form a megapolitan area.

The 10 Megapolitans at a Glance

The 10 megapolitans lie across the US and vary by several key dimensions (See Table 2). Places such as Phoenix/Tucson are booming, while Chicago/Milwaukee is growing slowly. The Los Angeles/San Diego megapolitan area has nearly 22 million residents, while Salt Lake City/Provo contains only 2 million. The closest megapolitan anchor metros are Boston and Providence at just 50 miles distance from core to core. One megapolitan—Seattle/Portland—tops the list for long distance anchor metros. In total, five of the megapolitan areas have anchor metros at less than 100 miles apart, while five run over that mark.
Table 3: The 10 Megapolitan Area Cases at a Glance

<table>
<thead>
<tr>
<th>Anchor Metros</th>
<th>State(s)</th>
<th>Distance</th>
<th>2005 Pop.</th>
<th>Megapolitan/ Megaregion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boston/Providence</td>
<td>MA/RI</td>
<td>50</td>
<td>8.3</td>
<td>New England</td>
</tr>
<tr>
<td>Chicago/Milwaukee</td>
<td>IL/WI</td>
<td>90</td>
<td>12.8</td>
<td>Lakefront</td>
</tr>
<tr>
<td>Denver/Colorado Springs</td>
<td>CO</td>
<td>110</td>
<td>3.8</td>
<td>Front Range</td>
</tr>
<tr>
<td>Los Angeles/San Diego</td>
<td>CA</td>
<td>125</td>
<td>21.7</td>
<td>Southern California</td>
</tr>
<tr>
<td>Phoenix/Tucson</td>
<td>AZ</td>
<td>120</td>
<td>5.0</td>
<td>Sun Corridor</td>
</tr>
<tr>
<td>San Antonio/Austin</td>
<td>TX</td>
<td>85</td>
<td>3.9</td>
<td>Texas Corridor</td>
</tr>
<tr>
<td>Salt Lake City/Provo</td>
<td>UT</td>
<td>55</td>
<td>1.9</td>
<td>Wasatch Front*</td>
</tr>
<tr>
<td>Seattle/Portland</td>
<td>OR/WA</td>
<td>175</td>
<td>7.3</td>
<td>Cascadia</td>
</tr>
<tr>
<td>Tampa/Orlando</td>
<td>FL</td>
<td>85</td>
<td>7.9</td>
<td>Florida Corridor</td>
</tr>
<tr>
<td>Washington/Richmond</td>
<td>MD/VA</td>
<td>105</td>
<td>9.8</td>
<td>Chesapeake</td>
</tr>
</tbody>
</table>

Note: Distances are measured from "core-to-core" between "anchor metros". Megapolitans are designated by the Metropolitan Institute at Virginia Tech. Population figures are for the total for the megapolitan or megaregion. Anchor metros may include combined statistical areas.

* The Wasatch Front falls below the megapolitan threshold

Sources: Census Bureau, Rand McNally, Metropolitan Institute at Virginia Tech

Research Design

This is a blended deductive/inductive analysis intended to find the key structural linkages between major US metropolitan areas as revealed by an analysis of commuting data. The deductive dimension is that the study starts with a predicted category—the megapolitan area. The research design is also inductive in that these categories are tested and modified according to the empirical results. Some places, such as Cascadia and the Texas Triangle, simply did not hold together using this method and are broken into subcomponents. Thus, there is no “Cascadia” megapolitan area, but we did find two sub regions—Puget Sound (anchored by Seattle) and Willamette Valley (anchored by Portland) that do qualify as megapolitan areas. However, the label Cascadia can be applied to the more spatially derived megaregions identified by Yaro and Carbonell.

The study will analyze two types of commuting data. The first is data as is reported in the census “long form.” The other data are local commuting statistics kept by metropolitan planning organizations. One in six U.S. households receive the census long form, which asks detailed questions about commuting, including the length, time and direction of commuting. The data is then analyzed and on the basis of the findings the census adjusts metropolitan area boundaries. A county is included in a metropolitan area if a quarter of its residents commute to another metropolitan county.

The census therefore tests counties for economic connectivity and uses the pattern to establish metropolitan geography. This study does the same to establish megapolitan geography. Each of
the 10 megas proposed in this report are tested for connectivity. It is already established that none of these places meet the 15 percent commuting threshold in 2003 or they would already qualify as CSAs. But how far below this mark these places fall is unknown. Any area that does not meet this study’s minimum shared commute of five percent will be dropped from the megapolitan area. Thus, all megapolitans that are verified by this study will maintain a 5-to-15 percent shared current commuting connectivity between its subcomponents, and will be moving toward the 15 percent threshold.

Our most basic axiom is that commuting patterns demonstrate economic integration. This is also the logic by which the census’s metropolitan geography works. We assume that commuter linkages that fall below the census thresholds are also significant and suggest future connectivity based on the shifting nature of work and the evolving metropolitan form.

Geographic Units of Analysis

This study works of a hierarchical urban system that uses several levels. The smallest units are what the census defines as “micropolitan areas.” Micropolitan areas (or micros) have a principal city with at least 10,000 residents and usually contain just a single county, although a few have as many as four counties. There are 571 micropolitan areas in the US and they are home to just over one in ten Americans. The census established micros to distinguish small cities from other non-metropolitan places.

Metropolitan areas form the urban unit above the micros. Metros have at least 50,000 residents in their principal city urban core and are mostly made up of multiple counties, although some are just a single county. There are nearly 300 metropolitan areas in the US, and together they represent over 82 percent of the US population. The top 50 metropolitan areas alone exceed half the US population.

The threshold for any county to be included in a metropolitan or micropolitan is that a quarter of its workforce commutes into other counties that are within a metro or micro area. In bigger metropolitan areas, such as for example Atlanta, rings of counties can form around the principal city urban core all of which maintain commuting levels that indicate economic integration with the region. As noted above, the pattern can resemble a daisy chain, where one county A links to county B, which links to county C and so on.

Both metropolitan and micropolitan areas can join to form combined statistical areas. The threshold commuting level for a CSA falls below a metro at 25 percent of the workforce. In parts of the South and Midwest, stings of micros in particular line up in CSAs. Some big metropolitan areas do as well. Note that metropolitan areas can also link to micros to form CSAs. The CSA links are: metro-to-metro, metro-to-micro, and micro-to-micro. There are some CSAs that even have several metros and micros.

At the moment, all but one proposed megopolitan (Boston/Providence) examined in this study do not meet the 15 percent threshold to form a CSA. But this research will establish how close the other nine megas come to this commuting level. A quick test of the Phoenix/Tucson

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2 For a discussion of micropolitan areas see Lang and Dhavale (2006).
megapolitan shows Pinal County, which is in the southern part of the Phoenix region, had nine percent of its workers commuting to Pima County (or metropolitan Tucson) in 2000 (Lang and Hall 2007). Therefore, Phoenix/Tucson is just six percentage points away from official recognition by the census as a CSA. Given the dynamic nature of these metropolitan areas, the Phoenix/Tucson megapolitan area may have already crossed into CSA status but this status would not be assigned until the 2010 census.

**Commuting Data**

Because the history and rationale for using commuting to define development patterns is documented by the census a review is not provided here. Also in 2003, the Bureau of Transportation Statistics (BTS) reported that in 2001 about 3.3 million Americans traveled 50 miles or more one way to get to work, and they commute these distances 329 million times a year. This is based on the National Household Travel Survey (NHTS). Near one out of every 200 trips is a “stretch commute.”

Yet another report released by the BTS, also issued in 2003, showed that Americans make more than 405 million long-distance business trips per year (trips to destinations at least 50 miles from home), accounting for 16 percent of all long-distance travel. It found that contrary to the stereotypical image of the business traveler heading off to catch a cross-country flight, the majority of long-distance business trips were taken to destinations within 250 miles of home using the automobile. Nearly three-fourths are less than 250 miles from the point of departure and most of those are within 100 miles. All this may change the way metropolitan areas are conceptualized in the future. The U.S. Census Bureau has certainly wrestled with the issue.

BTS analysis of NHTS data reviewed earlier is the starting point for analysis. The NHTS is evaluated for trans-metropolitan patterns of stretch-commuting with rank-ordering between MSA/CMSA metropolitan areas. This provides a first impression snapshot of the extent to which trans-metropolitan commuting occurs.

Because the NHTS is limited to about 60,000 households and the stretch-commuting pool is quite small, we will expand our analysis to include Public Use Micro-Survey data (PUMS) which are sorted geographically into units called Public Use Micro-Survey Areas or PUMAs, each with about 100,000 residents. PUMS data include individual households and persons. Relevant household information includes PUMA residence, whether the PUMA is within an MSA or CMSA or is non-metropolitan (using the 2000 Census geographies), and income. PUMS also includes information on persons with the relevant information being the MSA or CMSA in which they work means of commuting and commuting time, and occupation. Although commuting distance is not given it can be estimated from NHTS data.

PUMS data also provide information on migration. This is used to assess the extent to which recent-movers (within five years) engage in trans-metropolitan commuting as a consequence of their move. Third, the Census Transportation Planning Package (CTPP) is used. The CTPP provides information on the MSA/CMSA origin of workers working in a transportation analysis zone, census tract, county, and metropolitan area.
The population projection and commuting analysis relies on data from the US Census Bureau and Woods & Poole Economics, Inc. The latter source provided projected population and jobs by place of work for the years 2010, 2020, and 2030. Because Woods & Poole does not strictly adhere to Census Bureau geography, researchers consolidated county or equivalent geographic areas to match the Woods & Poole data. The most significant variation between the two sources of data is in Virginia where Woods & Poole combines numerous, independent cities with their surrounding county to minimize problems with small-area demographic data.

In both 1990 and 2000 the Census Bureau tabulated long-form responses on commuting patterns, published as part of the Census Transportation Planning Package (CTPP) or available on the internet as “County-to-County Worker Flow” files. These sources provide detailed data on workers (16+ years old) and the county in which they worked during the week prior to the census date. In addition to indicating journey-to-work patterns, the data are summarized by place of work to yield the number of jobs in each county. A concise, county-level summary of the worker flow data is available from the Census Bureau under the title, “Estimated Daytime Population and Employment-Residence Ratios.”

The megapolitan analysis uses a concept similar to the Census Bureau’s Employment Interchange Measure (EIM), but with a couple of key differences. To highlight the conceptual distinction, the megapolitan method evaluates Employment Interchange Connectivity (EIC). Both indices evaluate employment interchange, but have different intents. The Census Bureau’s core-bases statistical areas are conceived as concentric rings with counties used as boundaries to delineate the geographic area either inside or outside the statistical area. In contrast, megapolitan areas are composed of multiple centers in large geographic area in which counties form “seams” or “links” between the metropolitan areas. Given the different concepts and purposes, the EIC metric is not concerned with the details of specific county to county flows, but rather the general direction that out-flowing commuters are headed. Thus the EIC consolidates an average of 25 different county-specific flows into one, summary indicator. The EIC is a slight tweak of the EIM, but measures much the same phenomena.

Future employment interchange connectivity scores for counties, or their equivalent, were derived using a combination of the year 1990 and 2000 daytime population and employment data along with demographic projections from Woods and Poole. The latter are proprietary data purchased by the Metropolitan Institute.

**Case Analysis**

The cases below show the application of the Metropolitan Institute’s EIC commuting data analysis to ten possible megapolitan areas. The analysis reveals highly varied outcomes, with some cases being just on the edge of a full megapolitan connection (or the threshold needed to be defined as a megapolitan area). Indeed, one case is already past the threshold and has been recently designated as a megapolitan area. Other places are decades away from qualifying as megas. Only one case—Portland/Seattle—appears unlikely to form a megapolitan area by 2040. The cases below were selected from a larger analysis that produced 20 megapolitan areas (Lang and Nelson 2007). The ten includes one region—Sal Lake City/Provo—that did not qualify as a megapolitan as defined by Lang and Nelson because it did not reach 5 million residents by mid
century. The other nine did achieve that scale, with eight possessing both the population and projected commuter connectivity to be defined as megapolitan areas. The case analyses varied by several dimensions, including physical size, population, region of the country, and distance core-to-core.

**Linking Counties**

The “linking counties,” or the mid corridor urban realms, also varied in size, population, and character. Note also there may be more than one linking county tested per region. In two regions—Washington/Richmond and Denver/Colorado Springs—we looked at three counties. Table 4 shows the 16 linking counties in the analysis.

**Table 4: The Linking Counties at a Glance**

<table>
<thead>
<tr>
<th>Macropolitan Areas at a Glance</th>
<th>CBSA/CSA</th>
<th>Linking County</th>
<th>CBSA/CSA</th>
<th>SqMi</th>
<th>Pop2000</th>
<th>Pop/SqMi</th>
<th>Hsehlds00</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Boston</td>
<td>Bristol</td>
<td>Providence</td>
<td></td>
<td>582</td>
<td>534,678</td>
<td>918</td>
<td>205,411</td>
</tr>
<tr>
<td>1 Boston</td>
<td>Providence</td>
<td>Providence</td>
<td></td>
<td>430</td>
<td>621,602</td>
<td>1,445</td>
<td>239,936</td>
</tr>
<tr>
<td>2 Chicago</td>
<td>Walworth</td>
<td>Milwaukee</td>
<td></td>
<td>577</td>
<td>93,759</td>
<td>163</td>
<td>34,522</td>
</tr>
<tr>
<td>3 Denver</td>
<td>El Paso</td>
<td>Colorado Springs</td>
<td></td>
<td>2,130</td>
<td>516,929</td>
<td>243</td>
<td>192,409</td>
</tr>
<tr>
<td>3 Denver</td>
<td>Larimer</td>
<td>Colorado Springs</td>
<td></td>
<td>2,634</td>
<td>251,494</td>
<td>96</td>
<td>97,164</td>
</tr>
<tr>
<td>3 Denver</td>
<td>Teller</td>
<td>Colorado Springs</td>
<td></td>
<td>559</td>
<td>20,555</td>
<td>37</td>
<td>7,993</td>
</tr>
<tr>
<td>4 Los Angeles</td>
<td>Riverside</td>
<td>San Diego</td>
<td></td>
<td>7,303</td>
<td>1,545,387</td>
<td>212</td>
<td>506,218</td>
</tr>
<tr>
<td>5 Orlando</td>
<td>Polk</td>
<td>Tampa</td>
<td></td>
<td>2,010</td>
<td>483,924</td>
<td>241</td>
<td>187,233</td>
</tr>
<tr>
<td>6 Salt Lake</td>
<td>Utah</td>
<td>Provo</td>
<td></td>
<td>2,141</td>
<td>368,536</td>
<td>172</td>
<td>99,937</td>
</tr>
<tr>
<td>7 Seattle</td>
<td>Lewis</td>
<td>Portland/Longview</td>
<td></td>
<td>2,437</td>
<td>68,600</td>
<td>28</td>
<td>26,306</td>
</tr>
<tr>
<td>8 Washington</td>
<td>Caroline</td>
<td>Richmond</td>
<td></td>
<td>539</td>
<td>22,121</td>
<td>41</td>
<td>8,021</td>
</tr>
<tr>
<td>8 Washington</td>
<td>Hanover</td>
<td>Richmond</td>
<td></td>
<td>474</td>
<td>86,320</td>
<td>182</td>
<td>31,121</td>
</tr>
<tr>
<td>8 Washington</td>
<td>Louisa</td>
<td>Richmond</td>
<td></td>
<td>511</td>
<td>25,627</td>
<td>50</td>
<td>9,945</td>
</tr>
<tr>
<td>9 Phoenix</td>
<td>Pinal</td>
<td>Tucson</td>
<td></td>
<td>5,374</td>
<td>179,727</td>
<td>33</td>
<td>61,364</td>
</tr>
<tr>
<td>10 San Antonio</td>
<td>Comal</td>
<td>Austin</td>
<td></td>
<td>575</td>
<td>78,021</td>
<td>136</td>
<td>29,066</td>
</tr>
<tr>
<td>10 San Antonio</td>
<td>Guadalupe</td>
<td>Austin</td>
<td></td>
<td>715</td>
<td>89,023</td>
<td>125</td>
<td>30,900</td>
</tr>
</tbody>
</table>

One key insight from looking at linking counties around the US is the difference in county size and commuter patterns between the Eastern and Western halves of the US. The West often contains enormous counties, which can make commuting between counties a formidable task. By contrast, most Eastern counties are quite modest sized and economic linkages easily spill over from county to county. The big Western county size tended to dampen commuter interchanges in the region, which means part of the higher interchange rates in the East is simply due to the use of counties as census’s official the metropolitan building blocks. Were the census
to use Western sub-county civil divisions in its estimates (as proxies for Eastern counties); the West’s metropolitan designations could shift dramatically.

Another insight gained by the exercise of looking at commuter relationships across space is that distance matters. The longest distance relationships produced the weakest connectivity. This make intuitive sense when one considers the need for most workers to make at least several visits to the office per week. At too long a stretch, the commute becomes unworkable. At this point, it appears that a 100 mile gap between regions from core-to-core is easily surmounted. Their commuter sheds so overlap at the fringes that future economic integration seems fated. But there are few places where the main anchor metropolitan cores lie over 150 miles distance that are on a clear path to economic integration. Also, as noted below, there are cases where even close proximity between regions is a guarantee as to their integration. Commuter flows are often historically based and may reflect prevailing social and physical patterns that have shaped the metropolis for years.

Consider, for example, the case of South Florida. The region has three large urban counties that line up in a row along the coast from north to south. Miami-Dade, Broward, and Palm Beach Counties have literally grown up next to each other but did not form a unified metropolitan area until this decade. The reason is that workers in these places mostly commuted from the western part of each county to employment at or near the coast to the east. Much of the early employment was tourist driven and thus near the ocean, while service workers lived in less expensive locations inland in a direct line west of the coast. Thus, there was very little north-south commuting between the counties. But as the South Florida economy diversifies, and its office locations scattered (Lang 2003), commuting became more complex than the old east-west pattern. Add to that the construction of key north-south roads in the western parts of South Florida’s counties, such as Florida’s Turnpike and the Sawgrass Parkway, and much greater economic integration was inevitable. The region is in fact so integrated today that Miami-Dade, Broward, and Palm Beach County join into an MSA (metropolitan statistical area) rather than a CSA because each county exceeds the 25 percent EIM commuter threshold.

The Ten Cases

*Boston to Providence.* Boston and Providence are now part of a CSA as designated in December 2005. The 15 percent EIM was actually achieved in 2003; however, Providence opted not to immediately join Boston in a combined area. The census’s 15 percent EIM threshold gives regions the option of forming a CSA, but the relationship is contingent on an official request by locals to join. In fact, the census has found literally dozens of CSA relationships that are so far unreported pending local approval. Paul Mackun, an analyst at the U.S. Census Bureau, is currently preparing a full list of these places, which will reveal a much more widespread set of significant commuter linkages than is now reported (personal communication, November 30, 2006). Our estimates are that the census’s full CSA list may confirm several more megopolitan areas now exist under the census’s current data and methods but await official designation because local elected officials have so far not given their final approval. The key linking county joining Boston and Providence is Bristol County, MA (part of metropolitan Providence), which sends nearly a quarter of its commuters to the Boston region.
Chicago to Milwaukee. Walworth County, WI, an exurban county that sends commuters to both the Chicago and Milwaukee region, should someday be the critical link in a Chicago/Milwaukee CSA. Walworth County is now home to its own separate micropolitan area of Whitewater outside both Chicago and Milwaukee, but may join both regions in relatively short order. Commuter data from the 2000 census indicates that Walworth County already qualifies to as part of the Milwaukee CSA. By this date, the county also had already reached about half commuter connectivity threshold needed to join the Chicago CSA. This figure had jumped from almost zero in 1990 and is likely to keep growing. In addition, there are significant commuter exchanges between Racine and Kenosha Counties located between Chicago and Milwaukee along Lake Michigan in Wisconsin. These two counties lie at the edge of their respective CSAs, with Kenosha in Chicago and Racine in Milwaukee. Urbanized space (or settlement above 1000 persons per square mile) links the cities of Racine and Kenosha into a unified built up area.

Denver to Colorado Springs. Development on the I-25 Corridor along the Front Range of the Rockies would seem to strongly link Denver to Colorado Springs. Yet, our analysis of commuter patterns revealed a nearly clean break between these two regions south of Denver. Douglas County, CO a booming exurb between the two cities sends virtually all its commuters north to Denver. Teller County, west of Colorado Springs, likewise sends a large share of commuters east into the city but not north to Denver. Thus, Colorado Springs and Denver do not form a megapolitan area. However, a Front Range megapolitan area does exist—its just runs north of Denver to places such as Fort Collins and Greeley. In fact, Weld County, home to Ft Collins, just opted to join the Denver CSA. Larimer County, where Fort Collins is found, should have that same option by 2010. In 2000, it sent 13 percent of its commuters to Boulder, Weld, Denver and Adams Counties (the northern most counties in the Denver CSA) and has probably crossed the 15 percent EIM this decade. The Denver/Fort Collins CSA will easily reach the 5 million population threshold by 2040 and is therefore designated by Lang and Nelson as a megapolitan area.

Los Angeles to San Diego. The merging of Los Angeles and San Diego seems the stuff of science fiction. Indeed the 1993 film Demolition Man depicts a “San Angeles” region in 2032 that stretches from Santa Barbara to San Diego that arose from the ashes of a disastrous earthquake that occurred in 2010. In a less dramatic fashion, we predict a similar integrated region by 2040. At first glance, it would appear that the union between Los Angeles and San Diego would prove one of the more easily predicted future CSAs. The reality is that, at the moment, greater Los Angeles—from Ventura County in the north to Orange County in the south is a rather separate world from the much smaller San Diego. While Los Angeles and Orange Counties maintain enormous commuter sheds that reach deep into the Inland Empire of Riverside and San Bernardino Counties, there is little current flow between San Diego County and greater LA. The disconnect is due in part to topography and the presence of Camp Pendleton, a large U.S. Marine training facility that sits on the last large patch of undeveloped coast in Southern California. Despite the current weak connectivity, we project that San Diego will join the Los Angeles CSA by 2040 based on two main assumptions. The first is that Southern California is mostly out of developable land (Lang and Nelson 2007) and that much of the space that remains lies at the critical intersection of Orange, San Diego, and Riverside Counties. Lang and LeFurgy (2007) document the rise of southern Riverside County near the San Diego border as one of the fastest growing areas in Southern California to 2030. This will
place many new workers in proximity to employment in northern and mid San Diego County. Our second assumption is that Camp Pendleton will be decommissioned sometime in the next decade. We make this assumption based on the value of this land to a federal government seeking to offset defense expenditures. Camp Pendleton, at over 125,000 acres is remarkably valuable in land—starved and desirable Southern California—perhaps worth conservatively 10 to 20 billion dollars. The base fills the entire border between Orange and San Diego Counties, with all of the land lying within the latter. Assuming even that mixed use and denser development would preserve vast open spaces as part of a decommission deal; this would none the less draw thousands of San Diego workers to the southern edge of job rich Orange County. Within a decade or so, the economic link between the San Diego and Los Angeles regions would be complete.

**Orlando to Tampa.** Orlando and Tampa lie just over 80 miles apart along the rapidly developing I-4 Corridor. Because of land constraints in South Florida due to Everglades’s preservation and concerns about storm safety on both the Gulf and Atlantic coasts, this inland area of Florida will grab a good share of the state’s overall growth. Booming Polk County sits along I-4 and accounts for much of the developable space between Tampa and Orlando. Historically, Polk has been a relatively self contained world, with employment centered on such cities as Lakeland and Winter Haven. But commuter patterns can shift quickly in Florida as evidenced by the rapid integration of counties in South Florida. By 2000, Polk was over halfway to the 15 percent commuter threshold to Orlando and about a third of the way to that link with Tampa. Interestingly, Polk’s biggest city, Lakeland, lies just 20 miles from Tampa and the space between these two places on I-4 is rapidly filling in. Orland and Tampa are thus well on the road to CSA status by 2040.

**Phoenix to Tucson.** Arizona’s two largest metropolitan areas—Phoenix and Tucson—are on a collision course to become a combined statistical area in the not-to-distant future. Arizona, like its Western neighbors, has large counties. For years, Maricopa County, which is about the size of New Jersey, could easily contain the entire sprawling Phoenix metropolitan area. The same was true of Pima County, which swallowed the Tucson region. The county in between Maricopa and Pima—Pinal—until recently remained a relatively small and isolated place despite its strategic location. Partly the isolation is due to a large Indian reservation that hemmed in Phoenix to the south along I-10, which creates over a twenty mile development buffer. Yet as Phoenix’s development spread into its far East Valley, commuting from the eastern side of Pinal to Maricopa became common. By 1990, Pinal joined Maricopa to create a two county Phoenix metropolitan area. But the smaller and slightly slower growing Tucson region did not see its development encroach much into Pinal County until the late 1990s. By 1990, just over four percent of Pinal’s commuters were working in Pima, but by 2005 the Maricopa Association of Governments updated survey showed this figure at nine percent (Lang and Hall 2007). The jump in commuters between the two counties, while impressive, is just the start of the flood. New development, especially of employment centers in the northernmost Pima County city of Marana, should project commuter sheds deep into Pinal County in the next several decades. The Phoenix/Tucson CSA will emerge by 2020 at the latest. A project at Arizona State University by Lang and Hall (2007), which labels the region the Sun Corridor, describes this megapolitan area in more detail.
Salt Lake City to Provo. The Wasatch Front in Utah resembles a mini version of the Front Range in Colorado. Interstate 15 in Utah functions much the same as I-25 in Colorado—both link up a string of metropolitan areas in a 150 mile-long urban corridor. Salt Lake City is the main anchor in the center of the urban region, with development spreading north along the front to Logan and south to Provo. The Ogden-Clearfield metropolitan, also north of Salt Lake City, is already part of Salt Lake’s CSA. The Micropolitan areas of Brigham City (Box Elder County) and Herber City (Wasatch County) are also part of the CSA. In 2000, Utah County (Provo) sent 13 percent of its workers into the same CSA. It is likely that within the past few years, Provo had crossed the 15 percent commuter threshold and will join the Salt Lake City CSA with the 2010 census. In the longer term, Logan (Cache County) should also wind up in the CSA long before 2040. While the Wascatch Front will be a fully integrated CSA in function, projections of population growth means the region will fall short by about a million residents from the megapolitan scale derived by Lang and Nelson.

San Antonio to Austin. Just 85 miles apart on the busy I-35 Corridor, San Antonio and Austin are heading toward a metropolitan convergence in the next few decades. Austin, home to both the Texas State capital and the University of Texas, has established itself as a high tech center just behind places like the Silicon Valley of California. San Antonio is bustling gateway city for immigration with an expanding manufacturing base that now includes car assembly. These two magnets are drawing workers from along the corridor, including the counties that lie between them. The northeast boundary of the San Antonio region is comprised of Comal and Guadalupe Counties. These places are exhibiting an increasing integration with Austin based on commuting patterns. In 2000, over nine percent of workers in of Guadalupe County headed northeast to Austin and another seven percent in Comal did the same. Austin, which is growth constrained in the hill country to its west, is pushing development south along I-35 to San Antonio which should further strengthen integration with it neighboring anchor metro in the coming years. Texas has been debating the idea of building a new super “Trans-Texas Corridor” to link the northern parts of the state with Mexico that could be several football fields wide. The proposed project would include separate auto and car lanes and freight and passenger rail. The planned route parallels I-35 and runs just to its east, including a section through Guadalupe County. Were even a more modest version of this project built it would go a long way to bringing about the San Antonio/ Austin CSA.

Seattle to Portland. Compared to the other megapolitan case studies, the urban cores of Seattle and Portland are the farthest. This distance—175 miles—is sufficiently large to produce a clean break between the Portland and Seattle regions and makes it highly unlikely that the two regions will form a unified Cascadia megapolitan area by mid century. Lewis County, WA, or the Centralia micropolitan area, lies about midway between Portland and Seattle and looked to be a good candidate to bridge the two regions. However; our analysis shows that Lewis County is nearly part of the Seattle CSA, with over 13 percent of its workers heading north to the region. At this point, just 4 percent make the southbound trip toward Portland into the Longview, WA metropolitan area (which has so far not joined the Portland metropolitan area). While the Seattle and Portland form a rather tenuous link and have dim prospects to fully link via commuter sheds, the respective sub-regions of Puget Sound (Seattle) and Willamette Valley (Portland) do have strong internal connectivity as evidenced by a test of their worker flows. By 2040, the Puget Sound region should stretch from Bellingham in the north to Centralia in the south, with Seattle
at the center. Likewise, The Willamette Valley should run from Longview, WA in the north to Eugene, OR in the south with Portland at the center. Both urban spaces will likely reach the 5 million resident megapolitan area threshold by 2040.

*Washington to Richmond.* Washington, DC formed one of the most notable combined CSAs with Baltimore in 2003 to create the 4th most populous region in the US. In fact, the Washington-Baltimore connection was one of the test cases for the CSA model. Washington-Baltimore became a CMSA (consolidated metropolitan statistical area) in the mid 1990s and caused the census to rethink how they looked at big regions according to census demographer Marc Perry. Now, with growth in the booming Washington region surging south to Richmond it appears that DC may soon have a new metropolitan partner. We looked at three potential linking counties between the Washington and the Richmond metropolitan areas—Caroline, Louisa and Hanover Counties, VA. Of the three, Caroline County is the closest to Washington DC and has the strongest commuter connection to the north. In 2000, a quarter of its workers headed to the Washington region while 28 percent headed to the Richmond metropolitan area. Louisa County exhibited a different commuter pattern in 2000 with a significant flow of workers heading westward towards Charlottesville. Of the three potential linking counties, Hanover is by far the most Richmond-centric, with most workers commuting to the south. Yet the three counties are exhibiting a trend toward a mid corridor urban realm based on the trajectory of worker flows. Just based on the Caroline County commutes, it is possible that the Washington-Baltimore CSA may add Richmond by 2010, and will certainly form an integrated region by 2040. Lang and Nelson have dubbed this region the Chesapeake megapolitan area.

**Conclusion**

This study has major implications for the policy movement advancing a new mega-regional planning. Megapolitans are networks of metropolitan areas that group into larger, but discrete geographic structures. Only deductive research has so far been done in the field. These studies start with an *a priori* geographic structure and seek empirical verification. This paper offers a different approach. It uses both inductive and deductive methods that determine the nature of trans-metropolitan connectivity. This study assumes that megapolitan form can be shown by a census-based data analysis that reveals the commuter linkages between metropolitan areas. The results of this research will inform a growing audience of academics, planners, and policy makers who seek to improve the land use practices on the trans-metropolitan scale.
References


