Residential Construction Trends in America's Metropolitan Regions

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Residential Construction Trends in America's Metropolitan Regions

2010 Edition

Development, Community, and Environment Division
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Acknowledgements

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Note on the 2010 Update

In June of each year, the Census Manufacturing and Construction Division releases summary data on building permits issued during the pervious calendar year. This update incorporates more current data from 2008. Therefore, it provides a better picture of how the trend toward more residential construction in core areas has held up during the steep downturn in the real estate market and the U.S. economy as a whole.

Cover Images

Atlantic Station and Midtown Atlanta, GA – Public domain image downloaded from http://en.wikipedia.org/wiki/Image:Midtownatl.jpg

Lakelands, Gaithersburg, MD – Courtesy Lee Sobel

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Introduction

Across the country, many urban neighborhoods are experiencing dramatic transformations. Parking lots, underutilized commercial properties, and former industrial sites are being replaced with condos, apartments, and townhouses. In spite of the many impressive projects, a central question remains: *Do such examples add up to a fundamental shift in the geography of residential construction?*

To answer this question, US Census residential building permit data for the 50 largest metropolitan regions was examined over a 19 year period (1990 to 2008). Specifically, the amount of permits issued by central cities and core suburban communities was compared to the amount issued by suburban and exurban communities. The main goal was to clarify: 1) if there has been a shift toward redevelopment; and 2) in which regions the shift has been most significant.

The permit data showed that, in several regions, there has been a dramatic increase in the share of new construction built in central cities and older suburbs. Specifically, in roughly half of the metropolitan areas examined, urban core communities dramatically increased their share of new residential building permits. For example:

- In fifteen regions, the central city more than doubled its share of permits.
    - In the early 1990's, New York City issued 15 percent of the residential building permits in the region. Over the past six years it has averaged 48 percent.
    - The City of Chicago saw its share of regional permits rise from 7 to 27 percent over the same period.
    - Portland, Oregon went from 9 to 26 percent.
    - Atlanta, Georgia went from 4 to 14 percent.
- The increase has been particularly dramatic over the past five years.
- Data from 2008 show the inward shift continuing in the wake of the real estate market downturn even though the overall number of permits is down in nearly all jurisdictions.

This acceleration of residential construction in urban neighborhoods reflects a fundamental shift in the real estate market. Lower crime rates in central cities and changing demographics are often cited as forces driving this change. The increased demand for homes in walkable communities close to high-paying jobs has also been documented by a number of studies (Leinberger 2007, Nelson 2007, ULI 2006). For example, the 2007 edition of the annual *Emerging Trends in Real Estate* report singles out infill and mixed-use development as "best bets":

> "Energy costs add fuel to the fire—people want greater convenience in their time-constrained lives. Far-flung greenfield homes may cost less, but filling the gas tank burns holes in wallets. Both empty nesters and their young adult offspring gravitate to live in more exciting and sophisticated 24-hour places—whether urban or suburban—with pedestrian-accessible retail, restaurants, parks, supermarkets, and offices. Transit-oriented development at subway or light-rail stations almost cannot miss." (ULI 2006, p. 14)

However, even with solid economic fundamentals, many large-scale redevelopment projects still require changes in local regulations or public infrastructure investments to be move forward. For example, transit-oriented development often requires updates to zoning codes, more flexible parking regulations, assistance with land assembly, or improvements to upgrade water, sewer and local streets (TCRP 2004). A recent national survey provides an indication of just how common infrastructure adequacy and inflexible parking regulations are as a barrier to redevelopment. Sixty percent of developers stated that projects are constrained by a lack of infrastructure and seventy percent consider minimum parking requirements a significant burden on their typical development projects (ULI 2009). Additionally, some potentially viable redevelopment sites face the burden of real or perceived contamination and need assistance to evaluate conditions and conduct any necessary clean up .

The clear trend toward more redevelopment has a couple key implications for smart growth. First, regions often cited as leaders in promoting growth management and redevelopment (Portland, Denver, Sacramento and Atlanta) are among the medium sized cities where the shift inward has been most dramatic. Second, in metropolitan regions with large and diverse central cities with strong ties to the global economy (New York, Chicago, Boston, Miami, Los Angeles) the market fundamentals are shifting toward redevelopment even in the absence of formal policies and programs at the regional level.

The following sections of this report cover the trends in more detail. First, a brief description is provided to clarify how the data was organized, the types of redevelopment included, and other significant limitations of the analysis. Next, the trends for central cities and core suburban communities across the 50 regions are described and summarized in a set of tables. Tables and charts with sub-regional detail are also provided for the seven regions with the strongest shift toward redevelopment. Finally, the trends are placed in a national context and key future research questions are identified.

Assembling the Data

The first step in answering the basic question of how much residential development might be shifting inward was to assemble Census Bureau residential building permit data for the 50 largest U.S. metropolitan regions.[1] County-level summary files provided totals for suburban counties.[2] However, since many urban core counties include both developed and undeveloped land, it was important to reach below the county level. Therefore, the "permit issuing place" files were organized by region to assemble permit data for each individual jurisdiction within urban core counties. Two kinds of jurisdictions were of particular importance: ***central cities*** and ***urban core suburbs***.

The latter group is important since many larger metropolitan regions do have suburban communities that are essentially built out. Therefore, increased construction activity in these places primarily consists of redevelopment. Two criteria were used to identify such communities: 1) the land area of the jurisdiction did not significantly increase between the 1990 and 2000 Censuses[3]; and 2) the community was within 5 miles of the central city or within a clear regional boundary, such as a beltway interstate, separating expanding suburbs from hemmed-in urban core suburbs.[4]

Urban Infill and Smart Growth Not Captured by This Definition

In this analysis, urban core places were defined in a way that excludes some types of redevelopment. Since the Census data are provided at the jurisdiction level, it is not possible to determine where in a permit-issuing city or county the residential units are being built. Therefore, communities in which development is taking place on both undeveloped and previously developed land are grouped into the expanding suburb category. As a result, regional shares reported in the tables and charts below underestimate the level of infill-oriented residential construction that is actually taking place in many regions.

For example, Montgomery County, Maryland, a county with nearly one million people, is a single building permit issuing jurisdiction in this dataset. However, residential building permits issued by the county include high-rise apartments and condos near Metrorail stations, as well as detached single-family homes built on exurban farmland. Since there was no way to make such distinctions in this dataset, Montgomery County was classified as an expanding suburban community. In other regions suburban cities such as Pleasant Hill, California, are also expanding onto vacant land as well as issuing permits for infill development near major rail transit facilities.

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[1] Annual summary files for 1990 through 2006 were provided by the Census Manufacturing and Construction Division covering building permits for new residential units. http://censtats.census.gov/bldg/bldgprmt.shtml

[2] The December 2006 definition of Metropolitan Statistical Areas was used as the basis for deciding which counties were associated with a particular region.

[3] Significant expansion is an indicator of annexation of undeveloped land.

[4] In most cases, an inner "beltway" freeway or a group of key intersecting freeways separated built-out urban core suburbs from expanding suburbs. See appendix for the boundaries used for each region.

In 13 of the largest metro areas, it is difficult to make any distinctions between redevelopment and suburban expansion with this dataset. In some cases, the central city has annexed substantial amounts of undeveloped land. In other cases, the central city is part of a consolidated city/county government and does not separately report building permits issued within the core urban area from those issued in rural areas.

Finally, building permits associated with transit-oriented neighborhoods developed on greenfield[5] sites are categorized as construction in expanding suburban areas. Therefore, although major development projects such as Orenco Station in Hillsboro, Oregon, and King Farm in Gaithersburg, Maryland, are often considered examples of smart growth, they are not counted as urban core development in this analysis.

Other Limitations of the Analysis

The geographic distribution of commercial development was also outside the scope of this analysis. There are reasons to expect that office development in many regions would be more concentrated than residential development. Retail patterns would be more complex, but probably follow residential trends. Manufacturing, wholesale, and distribution center development, on the other hand, will tend to be more dispersed than residential development in most regions. However, since the Census stopped gathering commercial building permit data in 1995, such analysis would require an entirely different data source, such as the zip code business patterns data or employment data from a private data provider.

Finally, an increase in residential construction in urban core neighborhoods translates only indirectly into increased density. Invariably, some shares of the permits are simply replacing old housing units with new units at similar density. This is most likely a small share of the permits in central cities, but it might be a significant share in some suburban communities where older single-family homes are torn down and replaced with larger single-family homes.

Central City Trends

Across the 50 largest metropolitan regions, the increased amount of new residential development taking place in many central cities is striking. Given the fluctuations in building activity from year to year, examining total building permits presents only part of the story. Looking at the average share over multiple years also helps to clarify the nature of the trends. Comparing the early 1990s to the early 2000s is another way to look beyond some of the variation from year to year. In 26 cities, the share has doubled or tripled since 2000. In many cases, 2006 also represented the highest annual share over the past 17 years (1990 to 2006). Generally, cities can be grouped into four categories:

[5] The term "greenfield" means land that was previously undeveloped.

- Saw a substantial increase, and account for a significant share of new construction in the region (Figure 1).
- Saw a substantial increase, but still account for a modest share of new construction (Figure 2).
- Small changes or declines in the central city share of regional construction (Figure 3).
- Trend is unclear due to central city expansion or consolidated city / county government (Table 1a).

Figure 1

Central City Share of Residential Construction
(Substantial increase and a significant share of regional construciton)

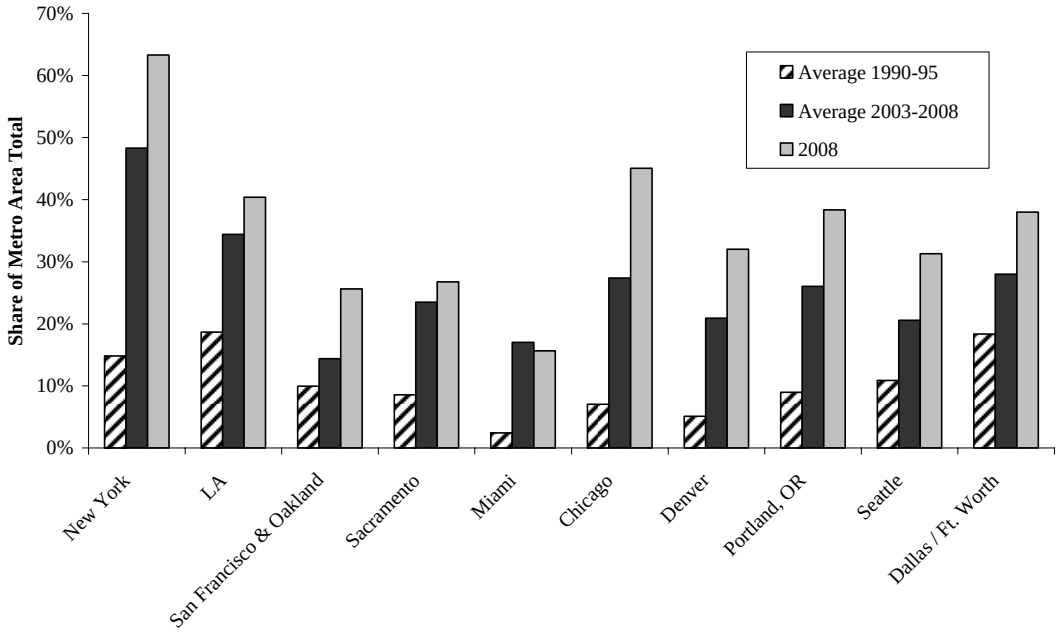


Figure 2

Central City Share of Residential Construction
(Substantial increase, but less than a fifth of regional permits)

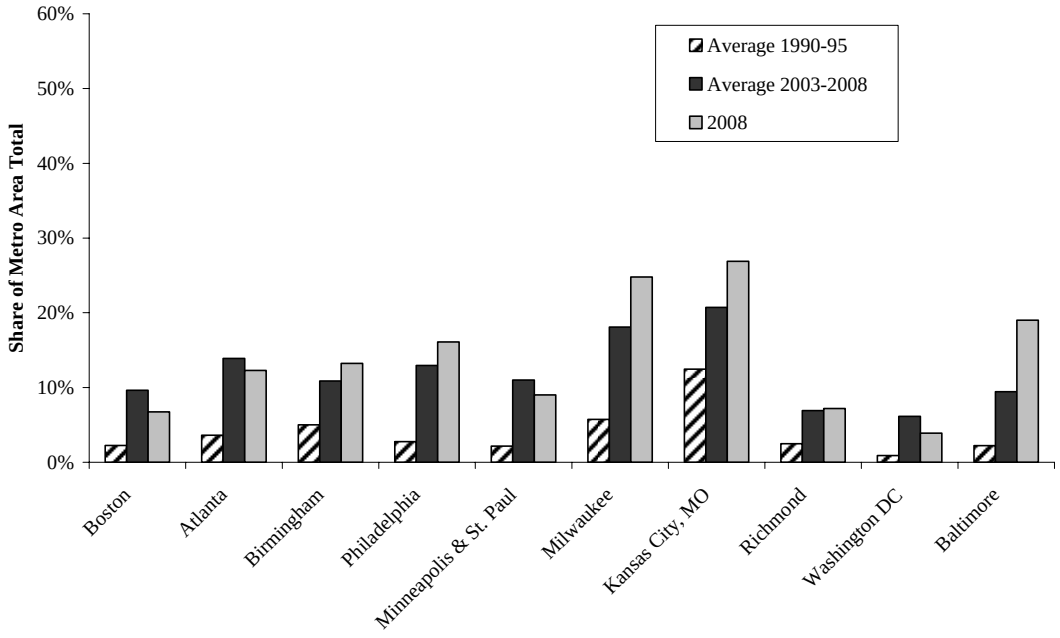


Figure 3

Central City Share of Residential Construction
(Minimal change or a decreased share)

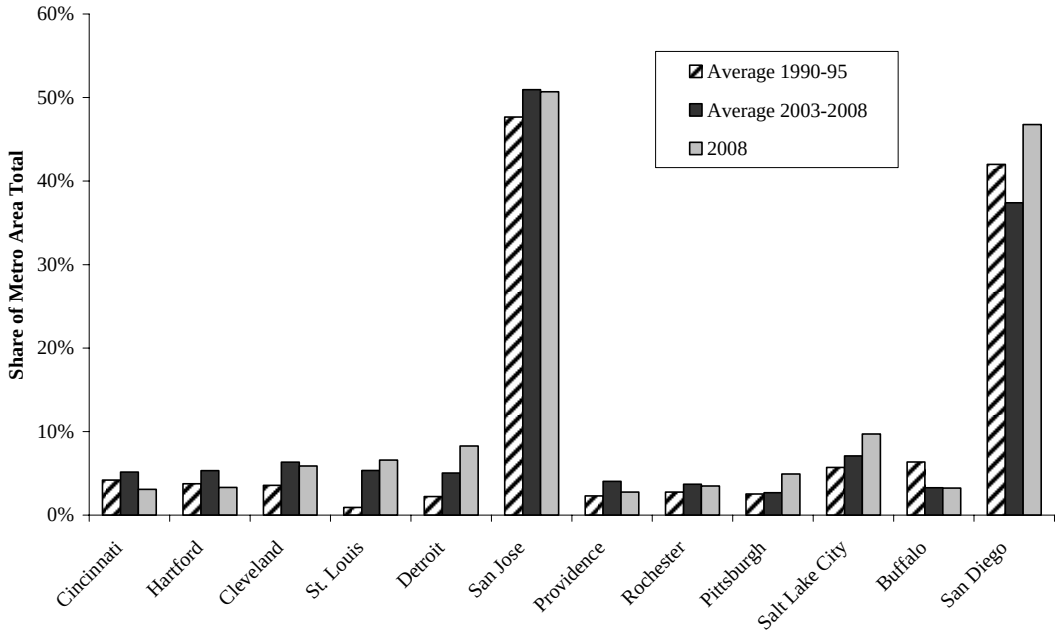


Table 1 - Central City Share of Metropolitan Residential Building Permits

	Average Share		
	1990-95	**2003-08**	**2008**
New York City*	15%	48%	63%
San Diego	42%	37%	47%
Chicago	7%	27%	45%
Portland	9%	26%	38%
Sacramento	9%	23%	27%
Denver	5%	21%	32%
Kansas City, MO	12%	21%	27%
Seattle	11%	21%	31%
Milwaukee	6%	18%	25%
Miami	2%	17%	16%
*Los Angeles***	11%	17%	25%
Dallas / Ft. Worth			
Dallas	13%	12%	22%
Ft. Worth	5%	16%	16%
Atlanta	4%	14%	12%
Philadelphia	3%	13%	16%
San Francisco / Oakland / San Jose			
San Francisco	5%	11%	18%
San Jose	11%	12%	14%
Oakland	3%	6%	5%
Birmingham	5%	11%	13%
Boston	2%	10%	7%
Baltimore	2%	9%	19%
Minneapolis / St. Paul			
Minneapolis	2%	7%	6%
St. Paul	1%	4%	3%
Salt Lake City	6%	7%	10%
Richmond	2%	7%	7%
Cleveland	4%	6%	6%
Washington DC	1%	6%	4%
St. Louis	1%	5%	7%
Hartford	4%	5%	3%
Cincinnati	4%	5%	3%
Detroit	2%	5%	8%

* Manhattan, Brooklyn, Queens, Bronx Boroughs only - excludes Staten Island
** Share includes Riverside and San Bernardino Counties

Table 1a - Difficult to Distinguish Redevelopment From Construction on Greenfield Sites

	Average Share		
	1990-95	**2003-08**	**2008**
Houston *	20%	23%	23%
Phoenix *	28%	25%	22%
Orlando, FL *	9%	14%	21%
San Antonio *	63%	62%	62%
Columbus, OH *	38%	38%	45%
Austin, TX *	48%	36%	37%
Las Vegas *	40%	19%	22%
Tampa, FL *	8%	15%	17%
Raleigh, NC *	30%	39%	42%
Oklahoma City **	43%	46%	41%
Nashville, TN ***	26%	31%	28%
Jacksonville, FL ***	58%	54%	57%
Memphis, TN ***	66%	53%	50%
Louisville, KY ***	60%	57%	66%
Indianapolis ***	36%	27%	26%
Charlotte, NC ***	60%	53%	56%

* Land area increased substantially in the 1990s through annexation.

** Substantial undeveloped land within city boundaries.

*** Consolidated city/county government, central city permit data not reported separately.

Core Suburban Community Trends

Urban redevelopment extends beyond the boundaries of major central cities. Many older suburbs near central cities have been built out for some time, and new residential units are almost entirely built upon previously developed sites. When these communities are added to the mix, redevelopment's share changes significantly in a few regions. Specifically, in eight metropolitan areas, urban core suburbs have significantly increased their share of regional housing starts.

Table 2 - Core Suburban Communities' Share of Residential Building Permits

	Average Share		
	1990-95	**2003-08**	**2008**
New York MSA			
Core Suburbs in Bergen County, NJ	4%	6%	3%
Washington, D.C. MSA			
Arlington County, VA	2%	6%	9%
Alexandria, VA	1%	2%	3%
Boston MSA			
Core Suburbs in Middlesex County, MA	6%	10%	8%
Miami MSA			
Core Suburbs in Broward County, FL	5%	11%	11%
San Francisco / San Jose CMSA			
Core Suburbs in Alameda, Contra Costa, and San Mateo Counties, CA	6%	9%	12%
Core Suburbs in Santa Clara County, CA	4%	6%	8%
San Diego MSA			
Core Suburbs in San Diego County, CA	2%	5%	10%
Minneapolis MSA			
Core Suburbs in Hennepin County, MN	1%	3%	5%

The method for identifying these communities was described above. However, Figures 6-10 provide a visual illustration of urban core suburbs in three regions. The table in Appendix B also provides definitions for each region.

Table 3 - Central City + Core Suburban Community Share

	Average Share		
	1990-1995	**2003-08**	**2008**
New York-Northern New Jersey-Long Island, NY-NJ-PA	18%	54%	67%
San Francisco-Oakland-San Jose, CA **	29%	43%	57%
San Francisco-Oakland-Fremont, CA *	14%	33%	49%
San Jose, CA *	66%	76%	80%
Miami-Fort Lauderdale-Pompano Beach, FL	15%	35%	36%
San Diego-Carlsbad-San Marcos, CA	44%	42%	57%
Dallas-Fort Worth-Arlington, TX	30%	32%	42%
Sacramento--Arden-Arcade--Roseville, CA	9%	23%	27%
Kansas City, MO-KS	14%	24%	29%
Los Angeles-Santa Ana-Riverside-San Bernardino **	23%	26%	34%
Los Angeles-Long Beach-Santa Ana, CA *	35%	51%	59%
Riverside-San Bernardino-Ontario, CA *	6%	4%	3%
Chicago-Naperville-Joliet, IL-IN-WI	11%	33%	51%
Boston-Cambridge-Quincy, MA-NH	8%	19%	15%
Seattle-Tacoma-Bellevue, WA	13%	23%	34%
Portland-Vancouver-Beaverton, OR-WA	13%	29%	41%
Washington-Arlington-Alexandria, DC-VA-MD-WV	4%	14%	16%
Minneapolis-St. Paul-Bloomington, MN-WI	7%	16%	16%
Denver-Aurora, CO	5%	21%	32%
Hartford-West Hartford-East Hartford, CT	10%	13%	17%
Milwaukee-Waukesha-West Allis, WI	12%	22%	34%
Birmingham-Hoover, AL	5%	11%	13%
Tampa-St. Petersburg-Clearwater, FL	12%	18%	18%
Atlanta-Sandy Springs-Marietta, GA	4%	15%	14%
Providence-New Bedford-Fall River, RI-MA	9%	10%	7%
Virginia Beach-Norfolk-Newport News, VA-NC	12%	37%	42%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	3%	13%	16%
Cleveland-Elyria-Mentor, OH	8%	11%	12%
Cincinnati-Middletown, OH-KY-IN	7%	6%	4%
Buffalo-Niagara Falls, NY	20%	19%	17%
Richmond, VA	2%	7%	7%
Baltimore-Towson, MD	2%	9%	19%
Detroit-Warren-Livonia, MI	4%	7%	12%
Salt Lake City, UT	6%	7%	10%
St. Louis, MO-IL	1%	5%	7%
Rochester, NY	3%	4%	3%
Pittsburgh, PA	3%	3%	5%

* Share with MSA defined as Los Angeles and Orange Counties

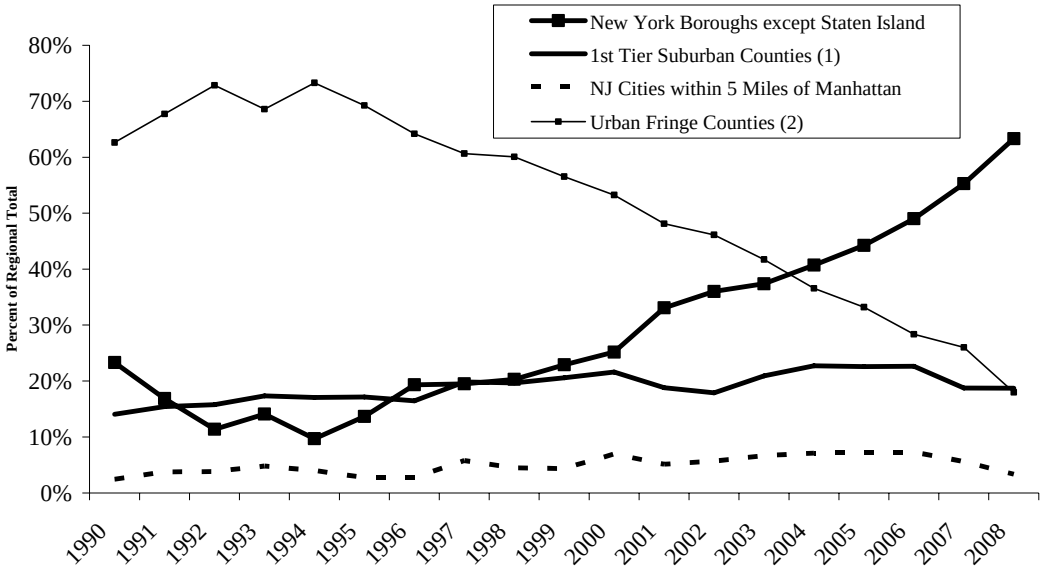
** Share with larger CMSA definition. Includes Los Angeles, Orange, San Bernardino, Riverside and Ventura Counties.

Key Regions

New York-Northern New Jersey-Long Island MSA

	Average Share		
	1990-95	**2003-08**	**2008**
Core Boroughs (without Staten Island)	15%	48%	63%
Manhattan Borough	4%	12%	14%
Queens Borough	2%	11%	12%
Brooklyn Borough	4%	14%	15%
Bronx Borough	4%	7%	8%
1st Tier Suburban Counties (1)	16%	21%	19%
NJ cities within 5 miles of Manhattan	4%	6%	3%
Urban Fringe Counties (2)	69%	31%	18%

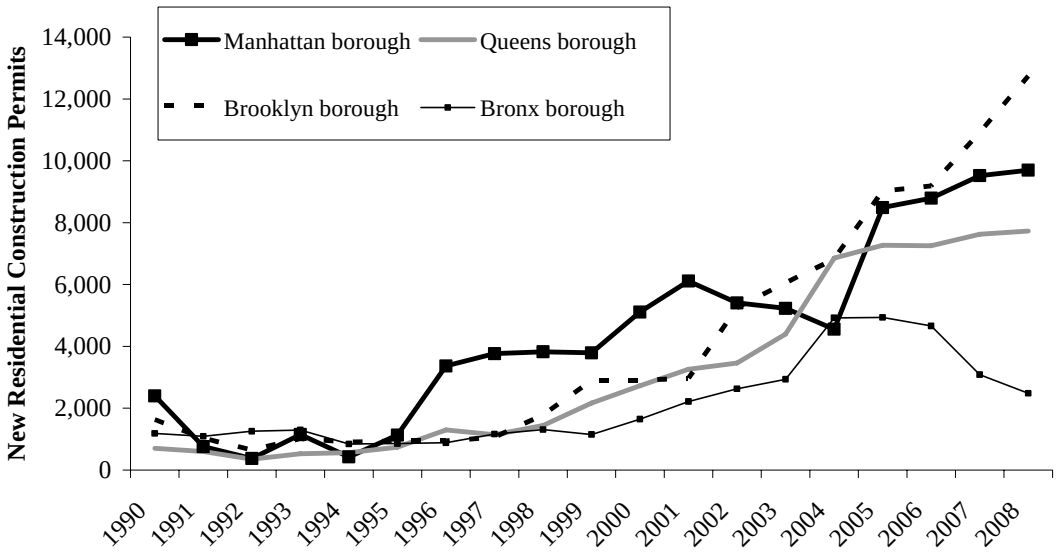
Share of New Housing Starts by County
(New York MSA)



Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

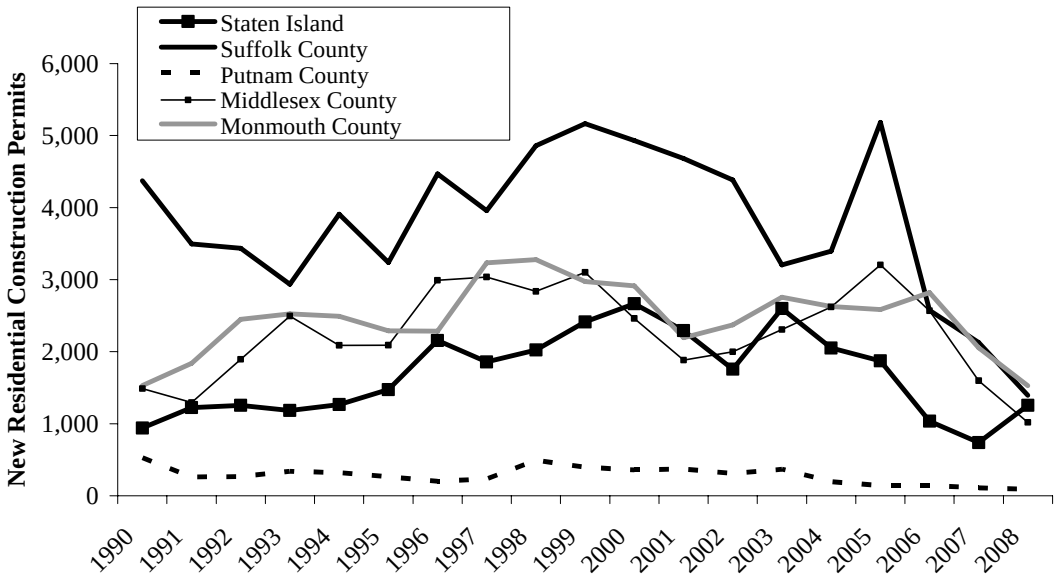
(1) 1st Tier Suburban Counties - Nassau and Richmond Counties, NY; Essex, Union, Bergen, and Hudson Counties, NJ.
(2) Urban Fringe Counties - Rockland, Westchester, Putnam, and Suffolk Counties, NY; Middlesex, Monmouth, Ocean, Hunterdon, Morris, Sussex, and Passaic Counties, NJ; Pike County, PA.

New Housing Starts by County
(New York MSA)



Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

New Housing Starts by County
(New York MSA)

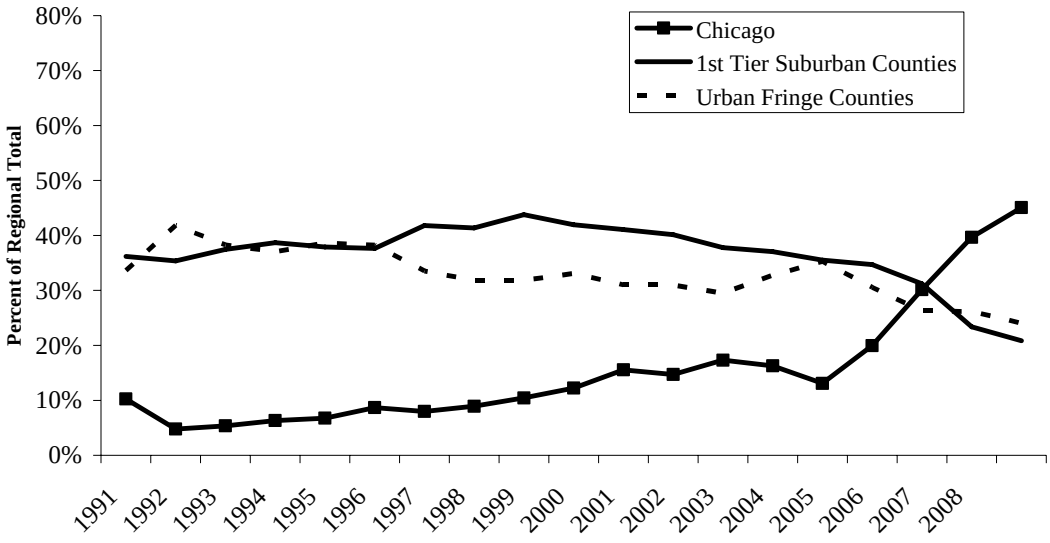


Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

Chicago-Naperville-Joliet MSA

	Average Share		
	1990-95	**2003-08**	**2008**
Cook County	25%	40%	55%
Chicago	7%	27%	45%
Core suburban cities	4%	6%	6%
1st Tier Suburban Counties (1)	37%	30%	21%
Urban Fringe Counties (2)	38%	29%	24%

Share of New Housing Starts by County
(Chicago MSA)

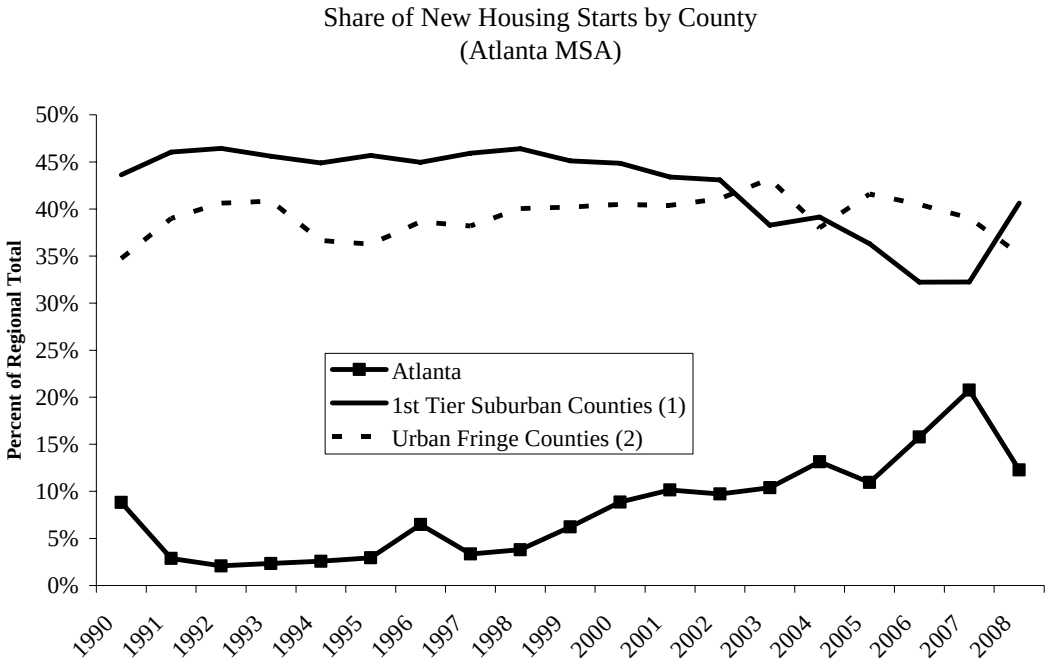


Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) 1st Tier Suburban Counties - DuPage, Kane, Lake, and Will Counties, IL.
(2) Urban Fringe Counties - DeKalb, Grundy, Kendall, and McHenry Counties, IN; Japser, Lake, Newton, and Porter Counties, WI; Kenosha.

Atlanta-Sandy Springs-Marietta MSA

	Average Share		
	1990-95	2003-08	2008
Fulton County	17%	23%	22%
Atlanta	4%	14%	12%
1st Tier Suburban Counties (1)	45%	36%	41%
Urban Fringe Counties (2)	38%	40%	35%



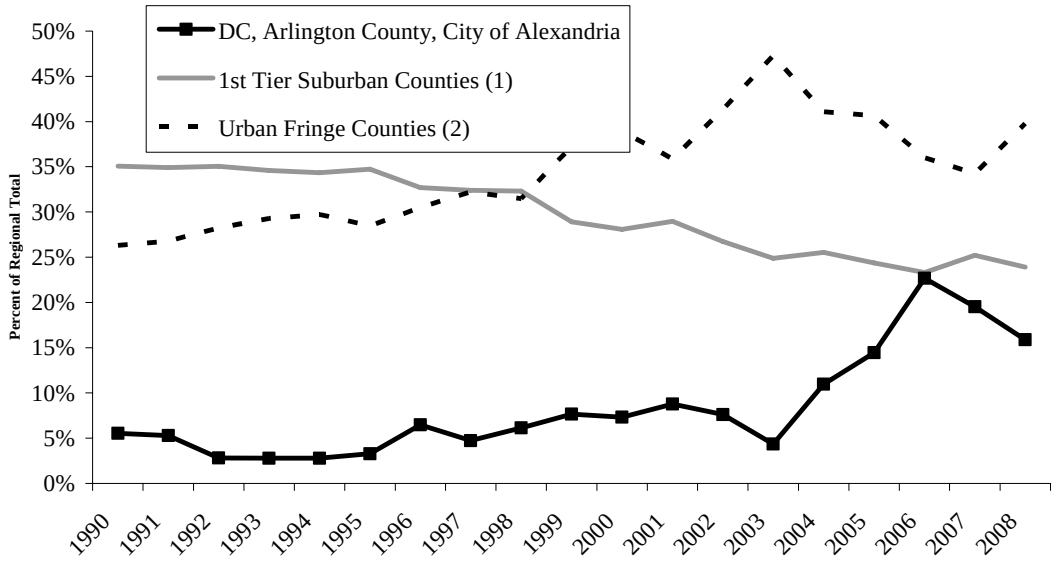
Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) 1st Tier Suburban Counties - DeKalb, Cobb, Clayton, Douglas, and Gwinnett Counties, GA.
(2) Urban Fringe Counties - Barrow, Bartow, Butts, Carrol, Cherokee, Coweta, Dawson, Fayette, Forsyth, Haralson, Heard, Henry, Jasper, Lamar, Merriwether, Newton, Paulding, Pickens, Pike, Rockdale, Spaulding, and Walton Counties, GA.

Washington-Arlington-Alexandria MSA

	Average Share		
	1990-95	**2003-08**	**2008**
DC, Arlington, Alexandria	4%	14%	16%
Washington, D.C.	1%	6%	4%
Arlington County	2%	6%	9%
City of Alexandria	1%	2%	3%
1st Tier Suburban Counties (1)	52%	31%	31%
Urban Fringe Counties (2)	44%	54%	54%

Share of New Housing Starts by County
(Washington, DC MSA)



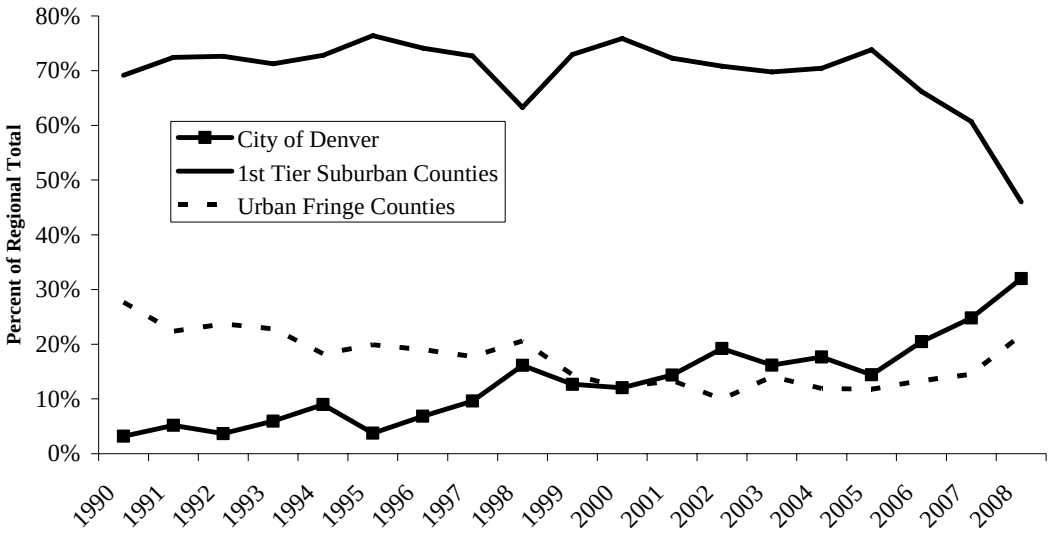
Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) 1st Tier Suburban Counties - Montgomery and Prince Georges Counties, MD; Fairfax County, VA.
(2) Urban Fringe Counties - Calvert, Charles, and Frederick Counties, MD; Fauquier, Loudoun, Prince William, Spotsylvania, and Stafford Counties, VA.

Denver-Aurora MSA

	Average Share		
	1990-95	2003-08	2008
City and County of Denver	5%	21%	32%
1st Tier Suburban Counties (1)	72%	64%	46%
Urban Fringe Counties (2)	22%	15%	22%

Share of New Housing Starts by County
(Denver MSA)

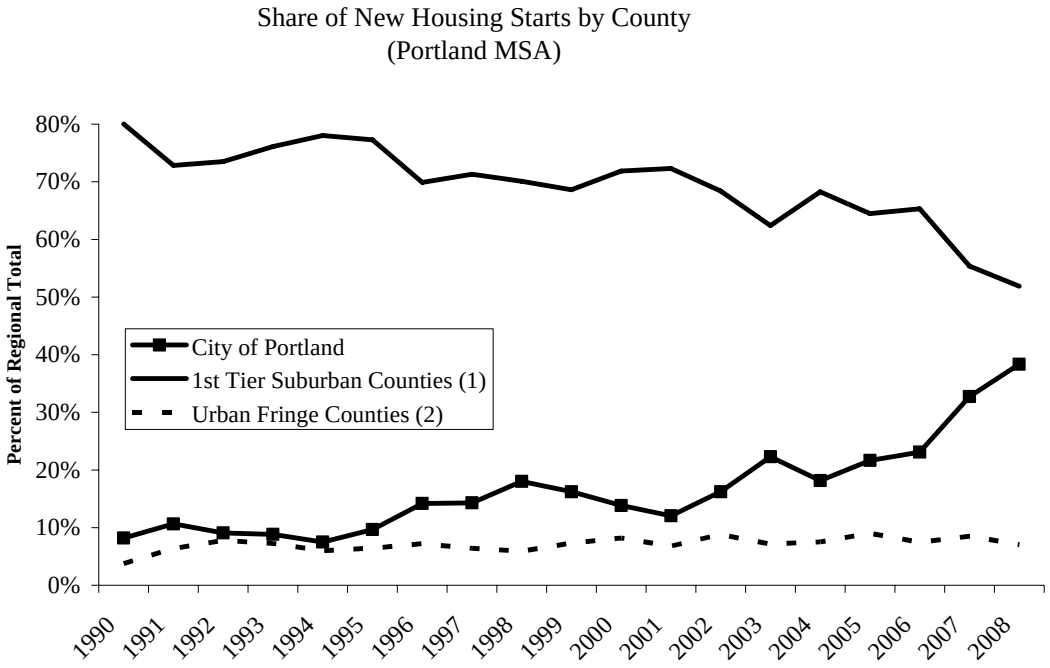


Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) 1st Tier Suburban Counties - Adams, Arapahoe, Douglas, and Jefferson Counties, CO.
(2) Urban Fringe Counties - Boulder, Broomfield, Clear Creek, Elbert, Gilpin, and Park Counties, CO.

Portland-Vancouver-Beaverton MSA

	Average Share		
	1990-95	2003-08	2008
Multnomah County	17%	31%	41%
Portland	9%	26%	38%
Gresham	4%	3%	2%
Suburban Counties (1)	76%	69%	59%



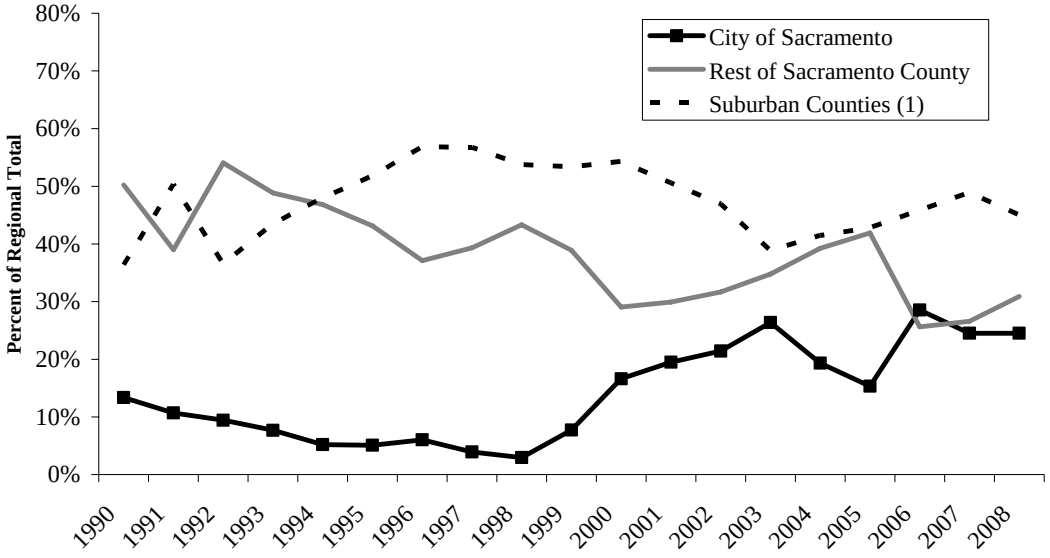
Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) 1st Tier Suburban Counties – Clackamas and Washington Counties, OR; Clark County, WA.
(2) Urban Fringe Counties - Columbia and Yamhill Counties, OR; Skamania County, WA.

Sacramento--Arden-Arcade--Roseville MSA

	Average Share		
	1990-95	2003-08	2008
Sacramento County	56%	56%	55%
City of Sacramento	9%	23%	27%
Suburban Counties	44%	44%	45%

Share of New Housing Starts by County
(Sacramento MSA)



Source: New Residential Building Permits, U.S. Census Bureau, Manufacturing and Construction Division

(1) Suburban Counties - El Dorado, Placer, and Yolo Counties, CA.

The National Context

Examining the national trends over the past few years helps place these regional trends in context. Between 2001 and 2005, the number of residential units built each year grew dramatically across all categories and regions. In 2006 and 2007, there was a sharp decline. However, it has been uneven across the housing market:

- Single family units have declined most rapidly, while the construction of multifamily units has fallen more modestly.
    - The number of new high-density residential units has not declined from the 200,000 units per year level produced at the height of the real estate boom.
    - Construction of rental units is actually up slightly in 2007, while condos have declined at a rate similar to single-family detached units.

Table 4 Housing Starts by Unit Type - National Total 2001-2008 (in Thousands)

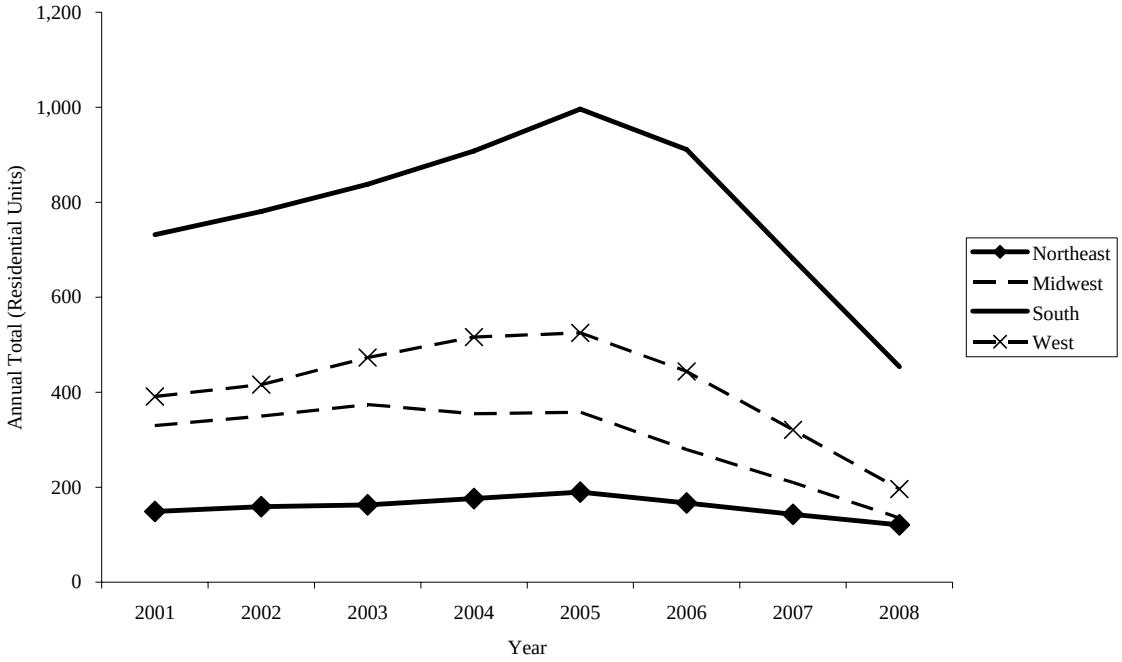
Year	Total	Single Family		Multifamily			
		Detached	Attached	Total Multifamily Units	For Sale Units	Rental Units	Units in Large Buildings (20+ units)
2001	1,602	1,133	140	329	71	258	178
2002	1,705	1,198	160	346	71	275	183
2003	1,848	1,309	190	349	87	262	196
2004	1,956	1,397	213	345	120	225	192
2005	2,068	1,494	222	352	150	203	208
2006	1,801	1,264	201	336	151	185	206
2007	1,355	900	146	309	115	194	207
2008	906	535	87	284	64	220	209

Table 5 Share by Unit Type

Year	Detached Single Family	Townhouses	Condos	Rental Apartments	Large Multifamily Buildings
2001	71%	9%	4%	16%	11%
2002	70%	9%	4%	16%	11%
2003	71%	10%	5%	14%	11%
2004	71%	11%	6%	12%	10%
2005	72%	11%	7%	10%	10%
2006	70%	11%	8%	10%	11%
2007	66%	11%	8%	14%	15%
2008	59%	10%	7%	24%	23%

Source: U.S. Census Bureau, Residential Construction Branch, Table Q1 "New Privately Owned Housing Units Started in the United States by Purpose and Design."

Residential Housing Starts by Census Region



Insights and Suggested Research Questions

While these trends reveal a substantial shift in residential construction patterns, they also suggest that the change is not yet reshaping the face of urban America as a whole. A large share of new residential construction still takes place on previously undeveloped land at the urban fringe. In some regions there has been little change in the share of new construction taking place in central cities. In other regions, central cities have increased their relative share of building permits, but still account for a small overall share at the regional level. Although urban core neighborhoods have doubled or tripled their share of residential construction since the early 1990s, they still account for less than half of all new residential units in most regions. The "urban infill" share would be larger if redevelopment in growing suburbs was also considered, but it would still not likely represent a majority of new construction in more than a handful of regions.

Additionally, evaluating residential construction based on the Census building permit data provides less geographic detail than could be achieved by studying a single region. Previous studies have examined patterns within particular regions (Knaap Song 2004). With the increased availability of GIS-based parcel data in many regions, it is possible to evaluate residential construction patterns within jurisdictions and answer more precise questions, such as:

- What percent of residential units are being built upon previously developed parcels, and how has that share changed over time?
- How much has average residential density increased in various regions?
- What percent of new housing units are being built in walkable / transit-accessible places?

Although this analysis does not directly address these questions, it does provide a broad picture of the magnitude and direction of residential construction trends across the country. The results of this analysis raise a set of important research questions for subsequent work:

- To what extent are these trends driven by real estate market fundamentals versus public sector policies?
    - Land use regulations, infrastructure provision, and incentive programs.
- In regions where urban core communities' share of new construction has increased, what kinds of projects are driving the trend?
    - Transit-oriented development, high-rise buildings in prime waterfront or downtown locations, redevelopment of former industrial sites, redevelopment of strip commercial parcels, or large underutilized parking lots.
- In regions where urban fringe development is still increasing its share, what is behind such trends?
    - Continued decentralization of employment, a weak overall housing market, deficiencies in urban core infrastructure.

Resolving these questions will provide a more complete picture of the policy implications of these trends. First, it could further clarify the approaches that most effectively increased the overall rate of redevelopment. Second, it could also identify specific policies and strategies that state and local governments can put in place to capitalize on these trends.

Finally, continued research will also be needed to shed light on the right mix of policies as we emerge from the current real estate market turmoil. The data suggest that the shift toward redevelopment continued in 2008 even as the real estate market weakened. Although the number of building permits in urban core areas slowed, the declines were more precipitous in outlying areas. However, redevelopment projects are often capital intensive and constraints on developer's access to credit and cities access to municipal bonds financing may begin to substantially reduce the pace of redevelopment.

References Cited

Nelson, Arthur C. "Where Will Everybody Live?" Working Paper for EPA Publication *The Business Case for Smart Growth.*

Leinberger, Christopher B. 2007. *The Option of Urbanism: Investing in a New American Dream*. Island Press.

Song, Yan and Gerrit J. Knaap. 2004. "Measuring Urban Form: Is Portland Winning the War on Sprawl?" *Journal of American Planning Association*, Vol. 70, No. 2: 210 - 225.

Transit Cooperative Research Program. 2004. *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects.* Report 102.

Urban Land Institute / PricewaterhouseCoopers. 2006. "Best Bets: 2007" *Emerging Trends in Real Estate 2007.*

Urban Land Institute / Ernst & Young. 2009. *Infrastructure 2009: Pivot Point.*

U.S. Census Bureau, Residential Construction Branch. "Relationship Between Building Permits, Housing Starts, and Housing Completions." Available at http://www.census.gov/const/www/nrcdatarelationships.html.

Appendix A –Regional Summary Table

Share of Metro Region's New Residential Building Permits

	Average Share		
New York-Northern New Jersey-Long Island, NY-NJ-PA	**1990-95**	**2003-08**	**2008**
Core Boroughs (w/out Staten Island)	15%	48%	63%
Manhattan borough	4%	12%	14%
Queens borough	2%	11%	12%
Brooklyn borough	4%	14%	15%
Bronx borough	4%	7%	8%
Core Suburban Counties	16%	21%	19%
NJ Cities w/in 5 Miles of Manhattan	4%	6%	3%
Fringe Suburban Counties	69%	31%	18%
Los Angeles-Long Beach-Santa Ana, CA	**1990-95**	**2003-08**	**2008**
Los Angeles County	58%	40%	55%
Los Angeles	19%	27%	45%
Core Suburbs	11%	8%	9%
Orange County	42%	26%	22%
Urban Core Suburbs	5%	5%	4%
Chicago-Naperville-Joliet, IL-IN-WI	**1990-95**	**2003-08**	**2008**
Cook County	18%	40%	55%
Chicago	5%	27%	45%
Core Suburbs	3%	6%	6%
1st Tier Suburban Counties	27%	30%	21%
Urban Fringe Counties	28%	29%	24%
Dallas-Fort Worth-Arlington, TX	**1990-95**	**2003-08**	**2008**
Dallas County	39%	25%	33%
City of Dallas	13%	12%	22%
Core Suburbs	6%	2%	3%
Tarrant County	22%	25%	21%
City of Ft. Worth	5%	16%	16%
Core Suburbs	5%	2%	1%
Suburban Counties	33%	34%	30%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	**1990-95**	**2003-08**	**2008**
City and County of Philadelphia	3%	13%	16%
1st Tier Suburban Counties	52%	47%	44%
Urban Fringe Counties	45%	40%	40%
Miami-Fort Lauderdale-Pompano Beach, FL	**1990-95**	**2003-08**	**2008**
Dade County	33%	50%	44%
Miami	2%	17%	16%
Core Suburbs	5%	4%	5%
Broward County	36%	21%	28%
Core Suburbs	5%	11%	11%
Palm Beach County	31%	29%	28%
Core Suburbs	3%	3%	4%

Share of Metro Region's New Residential Building Permits

	Average Share		
Washington-Arlington-Alexandria, DC-VA-MD-WV	**1990-95**	**2003-08**	**2008**
DC, Arlington, Alexandria	4%	14%	16%
Washington DC	1%	6%	4%
Arlington County	2%	6%	9%
City of Alexandria	1%	2%	3%
1st Tier Suburban Counties (1)	52%	31%	31%
Urban Fringe Counties (2)	44%	54%	54%
Atlanta-Sandy Springs-Marietta, GA	**1990-95**	**2003-08**	**2008**
Fulton County	17%	23%	22%
Atlanta	4%	14%	12%
1st Tier Suburban Counties (1)	45%	36%	41%
Urban Fringe Counties (2)	38%	40%	35%
Boston-Cambridge-Quincy, MA-NH	**1990-95**	**2003-08**	**2008**
Suffolk County	3%	12%	10%
Boston	2%	10%	7%
Middlesex County	31%	29%	26%
Core Suburbs	6%	10%	8%
1st Tier Suburban Counties	50%	45%	49%
Urban Fringe Counties	16%	15%	14%
Detroit-Warren-Livonia, MI	**1990-95**	**2003-08**	**2008**
Wayne County	21%	29%	37%
Detroit	2%	5%	8%
Core Suburbs	1%	2%	3%
1st Tier Suburban Counties	62%	55%	49%
Urban Fringe Counties	18%	16%	14%
San Francisco-Oakland-Fremont, CA	**1990-95**	**2003-08**	**2008**
San Francisco (City / County)	6%	14%	26%
San Mateo County	7%	6%	11%
Core Suburbs	4%	4%	7%
Alameda County	21%	25%	22%
Oakland	3%	8%	7%
Core Suburbs	1%	4%	6%
Contra Costa County	29%	28%	23%
Core Suburbs	2%	3%	2%
Urban Fringe Counties	37%	27%	19%
Riverside-San Bernardino-Ontario, CA	**1990-95**	**2003-08**	**2008**
Riverside County	58%	66%	64%
City of Riverside	4%	4%	3%
San Bernardino County	42%	34%	36%
City of San Bernardino	3%	1%	0%

Share of Metro Region's New Residential Building Permits

	Average Share		
Seattle-Tacoma-Bellevue, WA	**1990-95**	**2003-08**	**2008**
King County	48%	55%	67%
Seattle	11%	21%	31%
Core Suburbs	2%	2%	2%
Pierce County	27%	23%	15%
Snohomish County	25%	23%	17%
Minneapolis-St. Paul-Bloomington, MN-WI	**1990-95**	**2003-08**	**2008**
Hennepin County	21%	24%	27%
Minneapolis	2%	7%	6%
Core Suburbs	1%	3%	5%
Ramsey County	7%	7%	6%
St. Paul	1%	4%	3%
Core Suburbs	3%	2%	2%
1st Tier Suburban Counties	64%	60%	59%
Urban Fringe Counties	8%	10%	8%
San Diego-Carlsbad-San Marcos, CA	**1990-95**	**2003-08**	**2008**
City of San Diego	42%	37%	47%
Core Suburbs	2%	5%	10%
Expanding Suburban Cities	40%	41%	24%
Unincorporated San Diego County	16%	17%	19%
St. Louis, MO-IL	**1990-95**	**2003-08**	**2008**
City of St. Louis	1%	5%	7%
1st Tier Suburban Counties	78%	67%	66%
Urban Fringe Counties	21%	28%	28%
Tampa-St. Petersburg-Clearwater, FL	**1990-95**	**2003-08**	**2008**
Hillsborough County	45%	54%	64%
Tampa	8%	15%	17%
Pinellas County	29%	10%	7%
St. Petersburg	3%	3%	1%
Suburban Counties	26%	36%	29%
Baltimore-Towson, MD	**1990-95**	**2003-08**	**2008**
City of Baltimore	2%	9%	19%
1st Tier Suburban Counties	55%	46%	45%
Urban Fringe Counties	43%	46%	35%
Denver-Aurora, CO	**1990-95**	**2003-08**	**2008**
City of Denver	5%	21%	32%
1st Tier Suburban Counties	72%	64%	46%
Urban Fringe Counties	22%	15%	22%
Pittsburgh, PA	**1990-95**	**2003-08**	**2008**
Allegheny County	39%	37%	39%
Pittsburgh	3%	3%	5%
Suburban Counties	61%	63%	61%

Share of Metro Region's New Residential Building Permits

	Average Share		
Portland-Vancouver-Beaverton, OR-WA	**1990-95**	**2003-08**	**2008**
Multnomah County	17%	31%	41%
Portland	9%	26%	38%
Gresham	4%	3%	2%
1st Tier Suburban Counties (1)	76%	69%	59%
Urban Fringe Counties (2)	6%		
Cincinnati-Middletown, OH-KY-IN	**1990-95**	**2003-08**	**2008**
Hamilton County	25%	17%	15%
Cincinnati	4%	5%	3%
Core Suburban Cities	3%	1%	1%
Suburban Counties	75%	83%	85%
Cleveland-Elyria-Mentor, OH	**1990-95**	**2003-08**	**2008**
Cuyahoga County	40%	29%	28%
Cleveland	4%	6%	6%
Core Suburban Cities	4%	5%	6%
Suburban Counties	60%	71%	72%
Sacramento--Arden-Arcade--Roseville, CA	**1990-95**	**2003-08**	**2008**
Sacramento County	56%	56%	55%
City of Sacramento	9%	23%	27%
Suburban Counties	44%	44%	45%
Kansas City, MO-KS	**1990-95**	**2003-08**	**2008**
Wyandotte County	2%	4%	3%
Kansas City, KS	1%	3%	3%
Jackson County	35%	39%	37%
Kansas City, MO	12%	21%	27%
Suburban Counties	64%	58%	60%
San Jose-Sunnyvale-Santa Clara, CA	**1990-95**	**2003-08**	**2008**
Santa Clara County	91%	99%	99%
San Jose	48%	51%	51%
Core Suburban Cities	18%	25%	29%
San Benito County	9%	1%	1%
Virginia Beach-Norfolk-Newport News, VA-NC	**1990-95**	**2003-08**	**2008**
Core Cities (Norfolk, Portsmouth, Hampton)	35%	37%	42%
1st Tier Suburban Counties	52%	44%	43%
Urban Fringe Counties	13%	19%	15%
Providence-New Bedford-Fall River, RI-MA	**1990-95**	**2003-08**	**2008**
Providence County	24%	25%	20%
City of Providence	2%	4%	3%
Core Central Cities	6%	6%	4%
1st Tier Suburban Counties	54%	52%	50%
Urban Fringe Counties	22%	23%	29%

Appendix B –Core Suburban Community Definitions

MSA	Core Suburban Community Definition (No Change in Land Area 1990-2000, and…)
New York-Northern New Jersey-Long Island, NY-NJ-PA	Bergen County, NJ within 5 miles of Manhattan
Los Angeles-Long Beach-Santa Ana, CA	LA County West of I-605, South of I-210 / Hollywood Hills Orange County South of Imperial Hwy (SR 91) West of Costa Mesa Freeway (SR 55)
Riverside San Bernardino	City of Riverside, City of San Bernardino
Chicago-Naperville-Joliet, IL-IN-WI	Inside I-294
Dallas-Fort Worth-Arlington, TX	Dallas County Inside I-635 Tarrant County, Between Ft. Worth and Dallas Ft Worth Airport or wtihinin 5 miles of the Ft. Worth Central Business District
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	None Identified
Houston-Sugar Land-Baytown, TX	None Identified
Miami-Fort Lauderdale-Pompano Beach, FL	Dade County West of Palmetto Expressway
	Broward County West of Florida's Turnpike
	Palm Beach County West of I-95
Washington-Arlington-Alexandria, DC-VA-MD-WV	Arlington County and City of Alexandria
Atlanta-Sandy Springs-Marietta, GA	Inside I-285
Boston-Cambridge-Quincy, MA-NH	Inside I-95
Detroit-Warren-Livonia, MI	Within 5 miles of CBD
San Francisco-Oakland-Fremont, CA	Alameda County West of East Bay Hills, North of I-238
	Contra Costa County West of East Bay Hills
	San Mateo County East of I-280 / Foothill Expressway
San Jose-Sunnyvale-Santa Clara, CA	Santa Clara County West of I-280
Phoenix-Mesa-Scottsdale, AZ,	None Identified
Seattle-Tacoma-Bellevue, WA	West of I-405 Loop
Minneapolis-St. Paul-Bloomington, MN-WI	Inside I-494 I-694 loop
San Diego-Carlsbad-San Marcos, CA	South of I-8, West of SR-125, North of South Bay Freeway
St. Louis, MO-IL	None Identified
Tampa-St. Petersburg-Clearwater, FL	City of Clearwater
Baltimore-Towson, MD	None Identified
Denver-Aurora, CO	None Identified
Pittsburgh, PA	None Identified
Portland-Vancouver-Beaverton, OR-WA	None Identified
Cincinnati-Middletown, OH-KY-IN	Inside I-275 E of Hwy 264
Cleveland-Elyria-Mentor, OH	North of I-480 West of I-271 East of the Cleveland Airport
Sacramento--Arden-Arcade--Roseville, CA	None Identified
Orlando-Kissimmee, FL	None Identified
San Antonio, TX	None Identified
Kansas City, MO-KS	None Identified
Las Vegas-Paradise, NV	None Identified
Columbus, OH	Inside I-270 Loop
Indianapolis-Carmel, IN	None Identified
Virginia Beach-Norfolk-Newport News, VA-NC	Within 5 Miles of Norfolk CBD
Charlotte-Gastonia-Concord, NC-SC	None Identified
Providence-New Bedford-Fall River, RI-MA	Within 5 Miles of CBD
Austin-Round Rock, TX	None Identified
Milwaukee-Waukesha-West Allis, WI	Inside I-894 Loop
Nashville-Davidson--Murfreesboro--Franklin, TN	None Identified
Jacksonville, FL	None Identified

MSA	Core Suburban Community Definition (No Change in Land Area 1990-2000, and…)
Memphis, TN-MS-AR	None Identified
Louisville/Jefferson County, KY-IN	None Identified
Richmond, VA	None Identified
Oklahoma City, OK	None Identified
Hartford-West Hartford-East Hartford, CT	Within 5 miles of CBD
Buffalo-Niagara Falls, NY	Inside I-290
Birmingham-Hoover, AL	None Identified
Salt Lake City, UT	None Identified
Raleigh-Cary, NC	None Identified
Rochester, NY	None Identified