Rental Housing Affordability Dynamics, 1990–2009

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Abstract

Housing is the single largest expense for most American families. For one-third of American households, this expense is not a monthly mortgage payment to a lender, but rather a monthly rent payment to a landlord. Rental housing is the typical tenure choice for the young, the elderly, the disabled, people in highly mobile professional sectors, and low-wage working families, it is also likely to be an important alternative—at least in the short term—for many of the millions of families uprooted by the foreclosure crisis. In light of the potential increased role of rental housing as a tenure option, this article attempts to (1) describe key facts and trends in the affordability of rental housing for low- and moderate-income renters from 1990 through the recession of the late 2000s and (2) examine early evidence on the effects of the recession and foreclosure crisis on rental housing affordability. Although Harvard University's Joint Center for Housing Studies (JCHS) and the U.S. Department of Housing and Urban Development's Office of Policy Development and Research (HUD PD&R) have made important empirical contributions to the understanding of rental housing affordability trends during the past two decades, few studies have analyzed both national level and metropolitan level rental housing affordability dynamics.[1] This article is intended to provide a data-rich update on rental housing market dynamics at both the national and metropolitan levels, drawing on a variety of data sources to provide a more nuanced picture of housing trends and needs. The content is organized as follows: the first section, Renter Income Trends, analyzes trends in renter incomes at the national and metropolitan levels since 1990; the second section, Rent Trends, describes rent trends from 1990 through 2009; and the third section, Affordable Rental Housing Stock Trends, examines trends in rental housing affordability, as measured by rent burdens and affordable supply gap.

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[1] See JCHS (2008) and Eggers and Mouman (2008) for an overview of national rental housing cost trends.

Renter Income Trends

The following section describes trends in renter incomes since 1990. First, broad macro renter income trends are explored, and then individual metropolitan-level trends are examined.

Renter Income Trends at the National Level

Before exploring rent burdens and other measures of rental housing affordability, it is useful to examine how the economic profile of renters in the United States has changed since 1990. The median renter income tended to track the performance of the broader economy. Real renter incomes declined in the first half of the 1990s, but increased as the economy picked up steam in the second half of the 1990s; the recession of the early 2000s drove renter incomes down, although some recovery existed in the mid-2000s, but real renter incomes ended the 2000s nominally below 1990 national levels (exhibit 1).

A more interesting comparison is renter incomes to all household incomes. In the 1990s the median renter earned nearly 70 percent of the median household income, and in the ensuing two decades, the median renter income fell to 62 percent of the median household income (exhibit 2). From 1990 through the present, renters have become poorer on a relative basis, and as the homeownership rate climbed, the higher income renter households became first-time homeowners. The flow of higher income renters into homeowners is likely one of the main contributors to the apparent increased stresses in rental housing affordability experienced by median-income renter households. Increased income inequality during this two-decade stretch also contributes to this phenomenon (exhibit 3).

Exhibit 1

Real Renter Incomes, 1990–2009
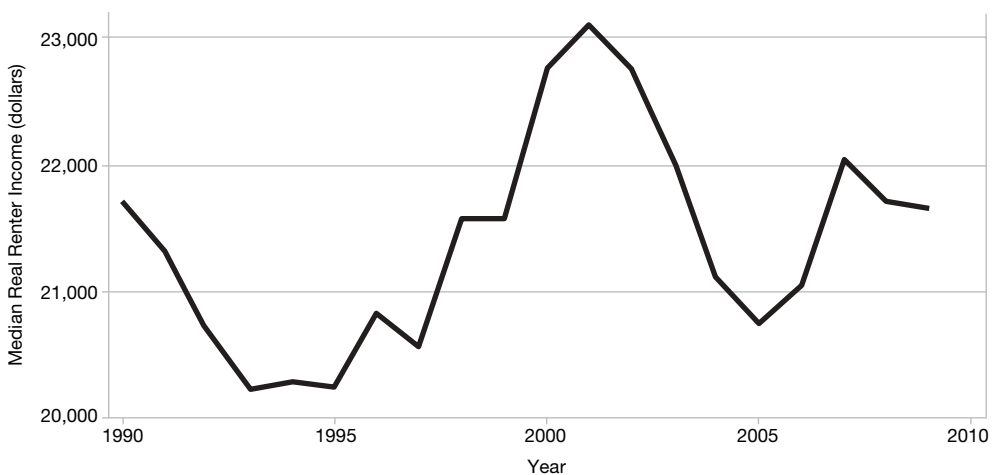
Source: Census Bureau, Current Population Survey, Public Use Microdata Sample, 1990–2009
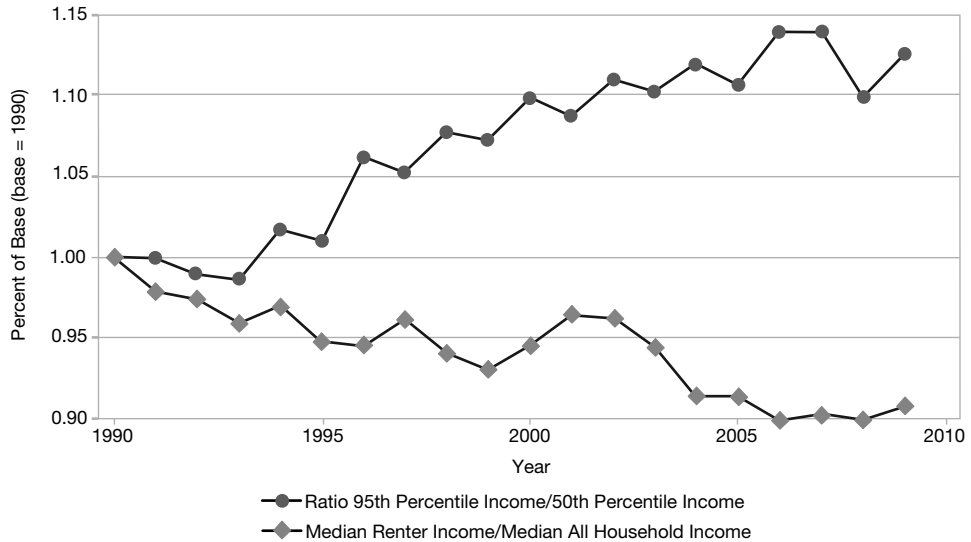
Exhibit 2

Renter Income/All Household Income Versus Homeownership Rate, 1990–2009

Source: Census Bureau, Current Population Survey, Public Use Microdata Sample, 1990–2009

Exhibit 3

Renter Income/All Household Income Versus Income Inequality

Source: Census Bureau, Current Population Survey, Public Use Microdata Sample, 1990–2009

Renter Income Trends at the Metropolitan Level

Although national statistics may reveal interesting changes in the aggregate, housing, particularly rental housing, is inherently local. America's metropolitan areas are incredibly heterogeneous and have undergone profoundly distinct economic and demographic shifts during the past two decades. This article uses a time series of median renter incomes by metropolitan area derived from the 1990 and 2000 Census 5-percent Public Use Microdata Sample (PUMS), American Community Survey (ACS) PUMS 2005, and 2009 microdata from the Minnesota Population Center's Integrated Public Use Microdata Series (IPUMS). These values were converted to 2009 dollars by deflating them using the local Consumer Price Index (CPI). Accompanying the ACS-based time series are estimates of the median renter income between 1990 and 2009 from the Current Population Survey (CPS) at the census region level.

Exhibit 4 presents the real renter income by census region from the CPS. Only the South experienced an increase in real renter incomes. The other regions ended 2009 at or slightly below 1990 levels. Exhibits 5 through 8 display inflation adjusted median renter incomes between 1990 and 2009 from the metropolitan area estimates derived from the ACS PUMS. The economic boom in the second half of the 1990s lifted renter incomes in 17 of 24 metropolitan areas.[2] The 2000s were far less friendly to renters. Stalled wage growth for lower income Americans and the movement of higher income renters into the ownership space, led to falling renter incomes. By 2007 real median renter incomes had fallen below 1990 levels in 22 of 24 metropolitan areas. Only the median renters in San Francisco and San Diego had higher real income than their 1990 counterparts.

Exhibit 4

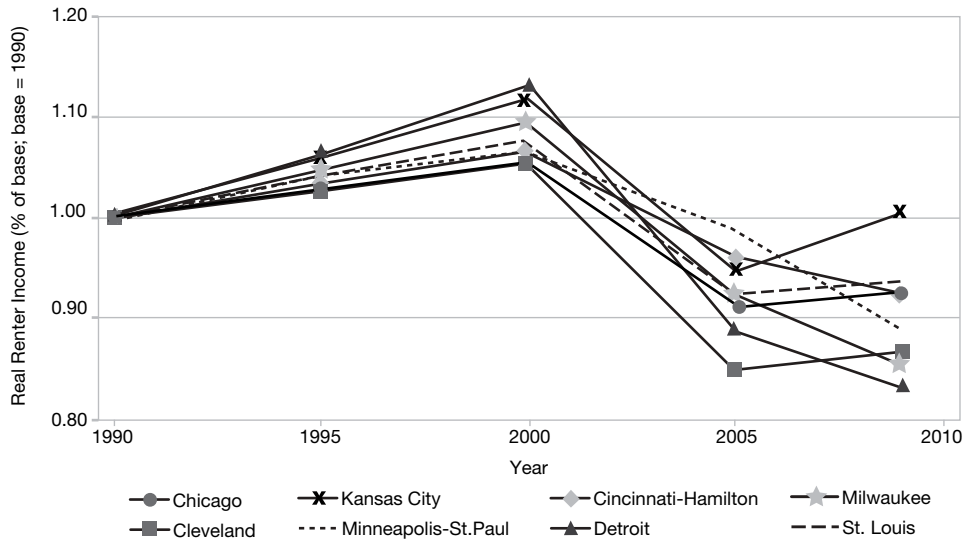Real Renter Income by Region
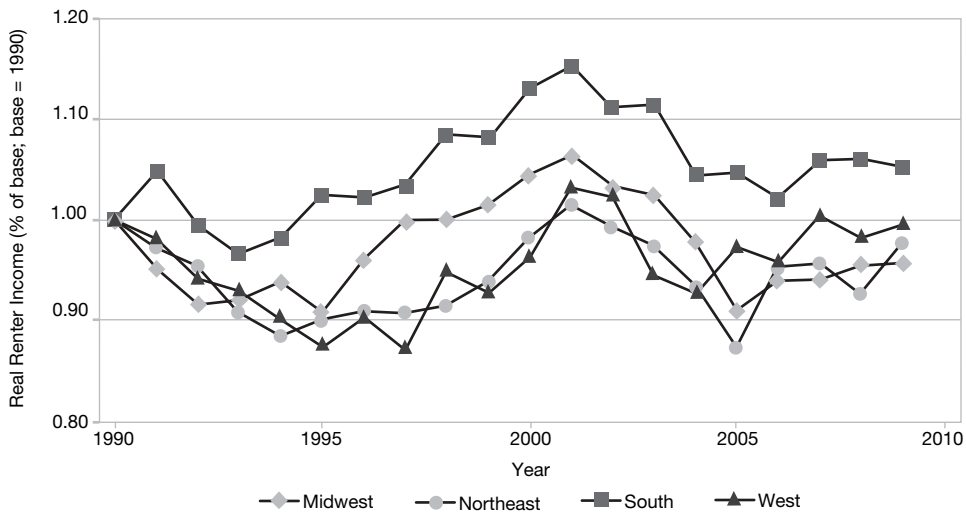
Source: Census Bureau, Current Population Survey, Public Use Microdata Sample, 1990–2009

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[2] Washington, DC, and Phoenix, Arizona, needed to be excluded because the Bureau of Labor Statistics did not publish local CPIs for these two metropolitan areas going back to 1990.

Exhibit 5

Midwest: Real Renter Income by Metropolitan Area

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 1990, 2000, 2005, and 2009

Exhibit 6

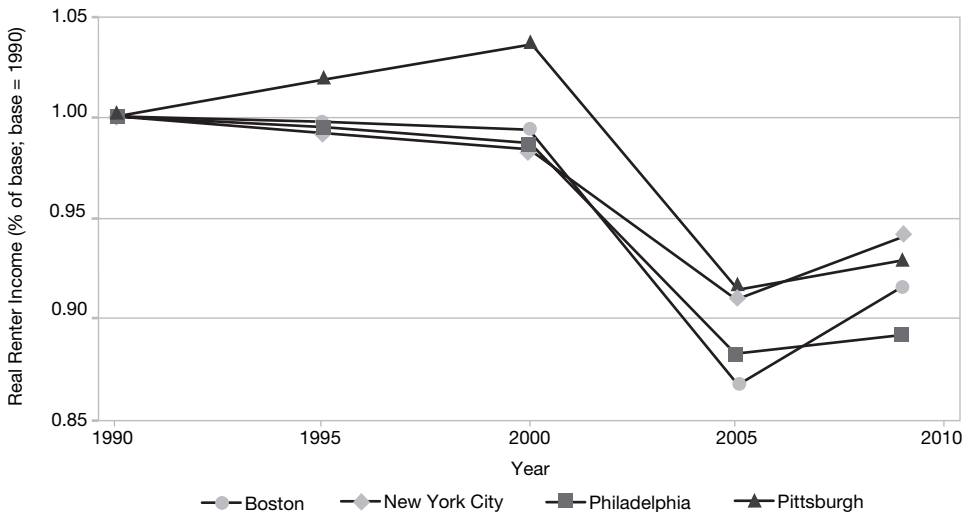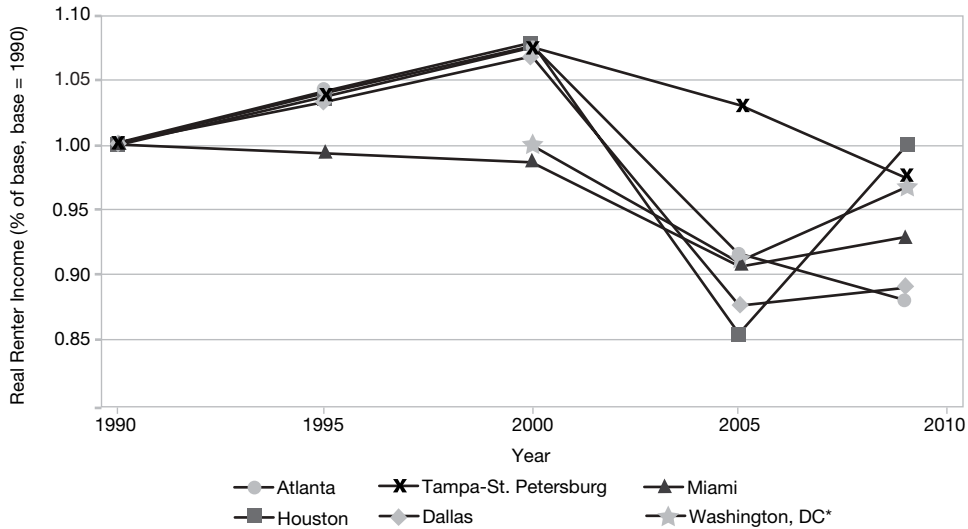Northeast: Real Renter Income by Metropolitan Area

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 1990, 2000, 2005, and 2009

Exhibit 7

South: Real Renter Income by Metropolitan Area

Atlanta ✕*Tampa-St. Petersburg* ▲*Miami*
■*Houston* ◆*Dallas* ★*Washington, DC**

* Washington, DC needed to be excluded prior to 2000 because the Bureau of Labor Statistics did not publish local Consumer Price Indexes for this metropolitan area going back to 1990.

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 1990, 2000, 2005, and 2009

Exhibit 8

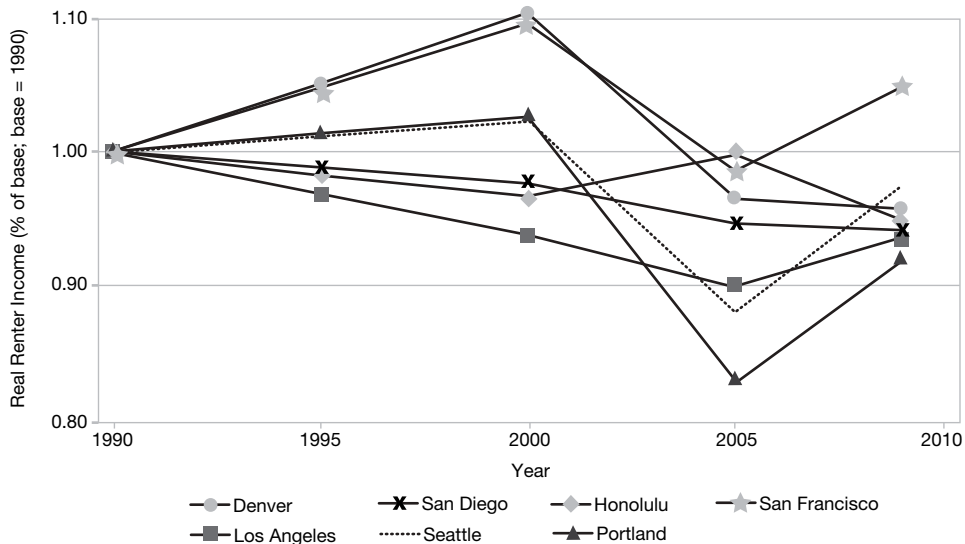West: Real Renter Income by Metropolitan Area

Denver ✕*San Diego* ◆*Honolulu* ★*San Francisco*
■*Los Angeles* ┈*Seattle* ▲*Portland*

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 1990, 2000, 2005, and 2009

Renter Income Trends Since 2007

Beginning officially in the fourth quarter of 2007, the United States entered into what by many measures was the deepest recession since the Great Depression. Although the primary causes of the economic downturn are heavily debated, it is clear that the foreclosure crisis and tumult in the housing market were key contributors to the broader economic collapse. Much attention has been paid to the owner-occupied housing market throughout the crisis, but very little research has examined the effect of the economic recession on the rental housing market.

The most obvious effect of the recession on the rental housing market is lower renter incomes. The inflation adjusted median renter income fell by almost $1,000 from 2007 to 2009 in the ACS. The number of extremely low-income and very low-income renter households—those with incomes 0 to 30 percent and 30 to 50 percent of their local Area Median Income (AMI)—increased from 15.9 to 17.1 million households according to the AHS. These income reductions were not shared equally across U.S. metropolitan areas. The real median renter income fell in 16 of 26 metropolitan areas. Among these areas, Detroit, Michigan; Cleveland, Ohio; Minneapolis, Minnesota; and San Diego, California experienced the largest declines. Houston renters fared the best in the 2-year stretch from 2007 to 2009 with a 6-percent increase in median renter incomes.

Rent Trends

The following section explores trends in rents from 1990 through 2009 across a number of large metropolitan areas. These trends help explain the patterns of affordability levels described in subsequent sections.

### Rent Trends at the Metropolitan Level

Renter incomes have largely remained flat or declined in real terms during the past two decades; understanding the change in real rents will provide a richer understanding of rental housing affordability trends. One significant limitation to any analysis of rent trends is the lack of frequent data on rents representative of the entire rental housing market. Several private housing market research firms provide rich, frequent data for a rental housing market segment. These data typically sample from exclusively larger, professionally managed properties, however, which represent no more than about one-third of the rental housing market.[3] Because a large rental housing stock segment is located in small buildings with mom and pop ownership structures that might differ in their rent-setting methods than larger professionally managed properties, these proprietary sources are not completely representative. For this reason, this analysis uses the local CPI residential rent indices, which are derived from the CPI Housing Survey and capture rental housing statistics across all structure types— mobile homes to multifamily projects. The CPI Housing Survey features six panels that are sampled biannually on a continuous cycle, so that the rent index can be refreshed monthly.

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[3] Rental properties with 50 or more units make up 31 percent of the rental stock, according to the 2001 Residential Finance Survey.

The CPI publishes the residential rent index for 27 metropolitan areas and 4 census regions. Exhibit 9 shows the change in real rents by region. The Northeast and the West experienced the largest increases of nearly 15 percent from 1990 through 2009. Exhibits 10 through 13 show the movement of real rents—the rent index deflated by the less shelter index—in 24 of these metropolitan areas by region from 1990 through 2009.[4] The real rent index is normalized, so that base year 1990 has a value of zero (0), and changes can be interpreted as percentage changes relative to all other goods. With a few exceptions, the first half of 1990s were marked by downward movement in real rents, although the 10 years from 1996 to 2006 were characterized by upward movement in rents. Very apparent in these exhibits is the incredible heterogeneity in trends across different metropolitan areas. Real rents in the metropolitan areas of Chicago, Illinois; New York, New York; San Francisco, California; Los Angeles, California; San Diego, California; Miami, Florida; and Washington, District of Columbia increased by more than 15 percent during the time period. Whereas real rents fell in the metropolitan areas of St. Louis, Missouri; Cincinnati, Ohio; Phoenix, Arizona; and struggling Detroit, Michigan, which led with a 4-percent decrease in real rents. Although the statistics are inflation adjusted, median renter incomes declined relative to their 1990 level in 22 of 24 metropolitan areas, 18 of 24 metropolitan areas experienced an increase in real rents during this same period. The metropolitan areas with the largest increases in real rents are primarily major immigrant hubs or supply-constrained rental housing markets. Several studies have estimated the effect of immigration on rents, Saiz (2006), Susin (2001), and Greulich, Quigley, and Raphael (2004) all found evidence that immigrant inflows increases rents. Greulich, Quigley, and Raphael (2004) found that natives experience a commensurate increase in incomes, however, it is such that their rent burden is relatively unchanged.

Exhibit 9

Real Rents by Region
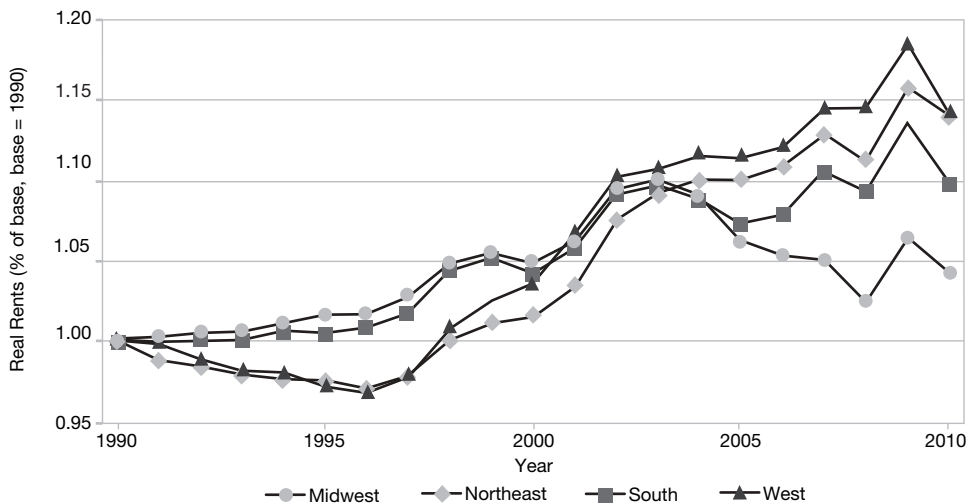
Source: Consumer Price Index (Rent Index/Less Shelter Index), 1990–2010

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[4] Anchorage, Alaska, is excluded because it is nearly twice as small as the next smallest metropolitan area in the analysis. Local CPIs for Phoenix, Arizona, and Washington, DC, were not published in 1990, so they are excluded from this part of the analysis.

Exhibit 10

Midwest: Rents by Metropolitan Area
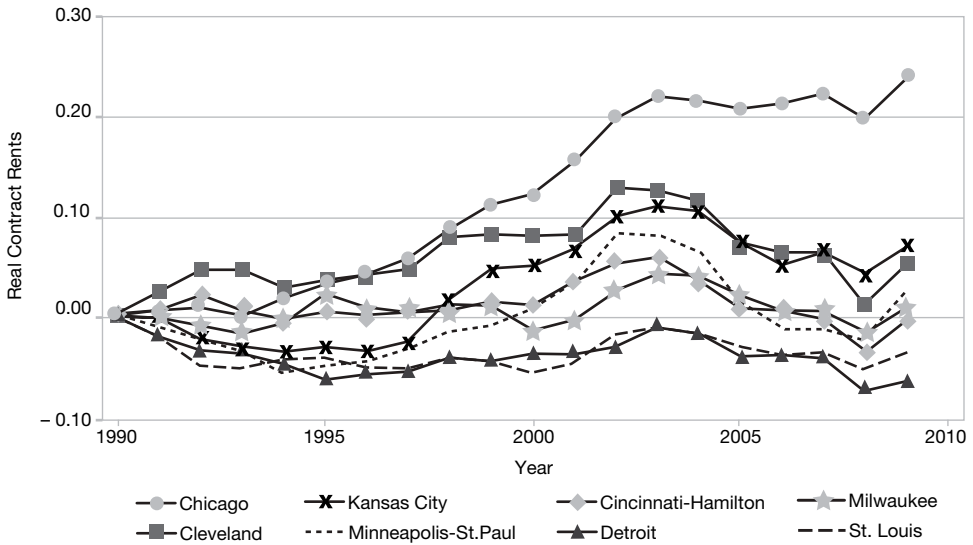
Source: Consumer Price Index (Rent Index/Less Shelter Index), 1990–2009

Exhibit 11

Northeast: Rents by Metropolitan Area
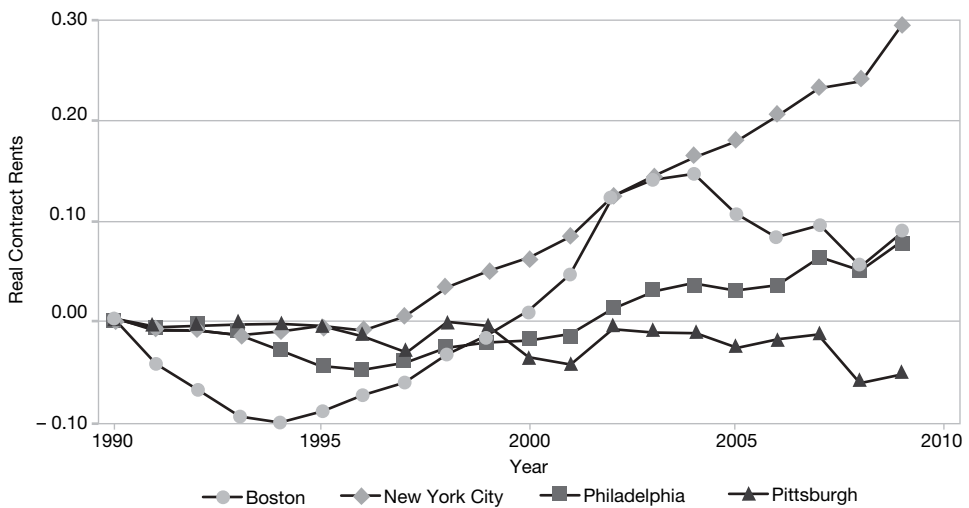
Source: Consumer Price Index (Rent Index/Less Shelter Index), 1990–2009

Exhibit 12

South: Rents by Metropolitan Area

* Washington, DC needed to be excluded prior to 1996 because the Bureau of Labor Statistics did not publish local Consumer Price Indexes (CPIs) for this metropolitan area going back to 1990.

Source: CPI (Rent Index/Less Shelter Index), 1990–2009

Exhibit 13

West: Rents by Metropolitan Area

Source: Consumer Price Index (Rent Index/Less Shelter Index), 1990–2009

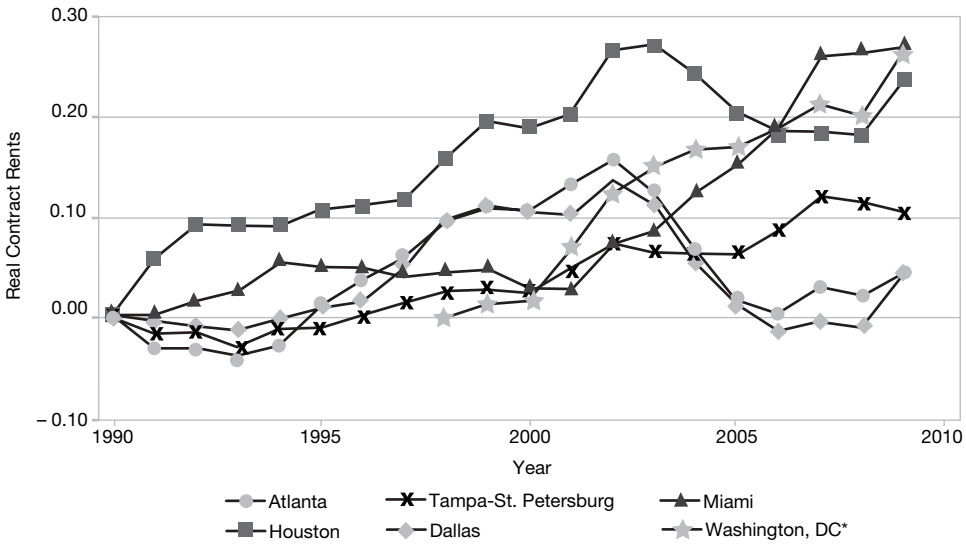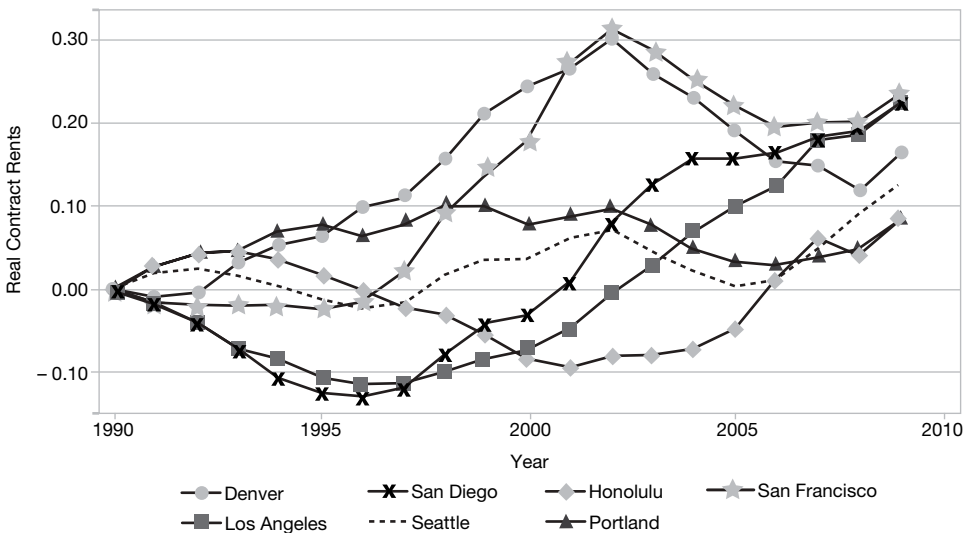Glaeser and Gyourko (2008) have demonstrated the important role that housing supply elasticity plays in the volatility of rental housing cost. In housing markets with inelastic housing supply, the housing stock is unable to accommodate growth in demand without significant upward pressure on rents. This is particularly evident in coastal metropolitan areas such as San Francisco, California, and New York, New York, and in both San Diego and Los Angeles, California, in which regulatory constraints and limited developable land hinder rental housing stock growth (through new construction or additional density), and contribute to rising rents (Glaeser and Gyourko, 2008).

Rents Since 2007

In general, trends in the rental housing market tend to track broader trends in the macroeconomy. Rental housing demand is very fungible due to the significant young household segment that has more housing flexibility than the established family household segment. With significant job losses beginning in 2008 and rising unemployment rates among the young, rental housing demand contracted, which caused vacancy rates to rise. For the most part, this rising vacancy rate was a function of plummeting demand, and not a function of rental housing overbuilding. Painter (2010) finds evidence that new household formation reached recent historic lows during the recession.

Although widespread job losses created downward pressure on rents, different rental housing markets experienced very different stresses. A closer look at rents from 2007 through 2010 is provided in appendix A. In 14 of 26 metropolitan areas real rents fell from the 2007 to through 2010. In housing markets hard hit by foreclosures (such as Phoenix, Arizona, and Tampa, Florida), rents fell by a significant 6- to 8-percent range. Even with the prevailing softness in the rental housing market, real rents were up modestly through 2010 in 12 of 26 metropolitan areas—with New York, New York; Washington, District of Columbia; and Seattle, Washington experiencing the largest rent increases. Unfortunately, rent levels reported in the CPI Housing Vacancy Survey are not effective rent (rent net of concessions) levels, so discounts provided to tenants are likely not reflected in these data. High vacancy rates and stalled rent growth tend to ease rental housing affordability stresses (if they are not offset by significant income declines), but create challenges for property owners, particularly those operating relatively affordable unsubsidized rental units. Weakening housing market fundamentals, falling home values, and increasing numbers of foreclosures could potentially reduce the supply of affordable rental housing. The next section explores the dynamics of affordable rental housing stock segments.

Affordable Rental Housing Stock Trends

This section examines the dynamics of the rental housing stock during the recession in the context of affordability. The central question is; what happened to the affordable rental housing stock segment from 2007 and 2009? The analysis in this section relies on the 2007 and 2009 American Housing Survey (AHS) and the 2007 and 2009 ACS to explore dynamics in the affordable rental housing market segments during a period of downturn. Although the AHS National Sample does not allow for the granularity to conduct metropolitan level analysis consistently, it has the benefit of being longitudinal and nationally representative, so it is possible to track the how the affordability of a given sample of rental housing units changes over time and estimate the magnitude of these changes for the rental housing market at large.

For this article, rental housing affordability is considered a function of gross rents relative to incomes.[5] In addition, rental housing affordability is examined in the context of HUD published AMIs. This approach is sensitive to heterogeneity in wages across housing markets, it allows for greater ease in historical comparisons, and it aligns with HUD program rules. Using the 2007 and 2009 AHSs, rental housing units were categorized according to affordability based on the rent level relative to AMI levels that are consistent with HUD's Housing Affordability Data Systems (HADS). Rental housing units are categorized at different percentages of AMI by the ratio of gross rent to the monthly AMI, housing units renting for less than 30 percent of the particular percentage of AMI threshold are considered affordable. For example:

$$\text{30 percent AMI Affordable Unit} = \begin{cases} \text{Yes if Gross Rent} \leq \ 30\ \%\ AMI * (3/10) * (1/12) \\ \text{No if Gross Rent} > 30\ \%\ AMI * (3/10) * (1/12) \end{cases}$$

30–50 percent AMI Affordable Unit =

$$\begin{cases} \text{Yes if Gross Rent} > \ 30\ \%\ AMI * \left(\dfrac{3}{10}\right) * \left(\dfrac{1}{12}\right) \text{AND Gross Rent} \leq \ 50\ \%\ AMI * \left(\dfrac{3}{10}\right) * \left(\dfrac{1}{12}\right) \\ \text{No if Gross Rent} \ > 50\ \%\ AMI * \left(\dfrac{3}{10}\right) * \left(\dfrac{1}{12}\right) \text{OR} < 30\ \%\ AMI * \left(\dfrac{3}{10}\right) * \left(\dfrac{1}{12}\right) \end{cases}$$

Vacant housing units that are for rent or rented, but not occupied, are assigned a utility payment through a hot deck allocation based on Census Division, structure type (mobile homes, single family, or multifamily), and number of bedrooms.[6] The rental housing affordability level is adjusted using the standard bedroom adjustment that is applied for HUD sponsored programs.[7] This analysis uses six mutually exclusive categories of rental housing affordability:

1. Extremely Low-Rent Unit: (Unsubsidized) Gross rent affordable to households at 30 percent of AMI.

2. Very Low-Rent Unit: (Unsubsidized) Gross rent affordable only to households at 50 percent of AMI.

3. Low- to Moderate-Rent Unit: (Unsubsidized) Gross rent affordable only to households at 80 percent of AMI.

4. Moderate- to High-Rent Unit: (Unsubsidized) Gross rent affordable only to households at 120 percent of AMI.

5. Extremely High-Rent Unit: (Unsubsidized) Gross rent affordable only to households above 120 percent of AMI.

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[5] Although no consensus has been reached regarding how to measure affordability, convention among government officials, mortgage lenders, and property managers has been to gauge affordability based on rent-to-income ratios. Glaeser and Gyourko (2008) have suggested an alternate standard based on the convergence (or divergence) of marginal cost (construction cost) and price. This approach is subject to significant measurement challenges for rental housing because new rental production is low and variation in operating expenses is difficult to capture empirically. Similarly, some in academia have advocated for a residual income approach to measuring housing affordability; this is a desirable approach, but some data limitations present a challenge to adopting such a measure.

[6] Hotdeck imputation randomly selects a value for missing variables among similar cases with no missing variables. This method preserves the distribution of the variable. In this instance, utility payments are allocated based on structure type, number of bedrooms, tenure, and census division using the hotdeckvar command in Stata. See appendix exhibit A-2 for details.

[7] See appendix exhibit A-1 for the bedroom number adjustments.

6. Nonmarket-Rent Unit: (Subsidized) Units self-reporting rental housing assistance, with no cash rent, or rent < $5 per month.[8]

Although the total rental housing stock grew from 2007 to 2009, the number of rental units in the three most affordable rental housing stock segments actually shrunk (exhibit 14). The number of unsubsidized rental housing units that are affordable to households earning less than 30 percent of AMI decreased by an estimated 650,000 units. The number of nonmarket rent units—those re-porting subsidy or offering de minimis rents—decreased by approximately 522,000. The number of very low-rent units also decreased; however, this reduction was not statistically significant. Contrasting the contraction of the lowest rental housing stock segments was an apparent swelling of the moderate rent units. Rental housing units that are affordable to renters at 80 percent of AMI grew by more than 1.2 million units, and the number of rental housing units affordable at 120 per-cent of AMI increased by nearly 600,000 units—both statistically significant increases.

These results are surprising; at a time of prevailing downward pressure on rents from rising va-cancy rates, the AHS shows a shrinking of the most affordable rental housing stock segments. Given the AHS results run counter to industry expectations, it is worth examining whether similar trends could be detected in other data sources, such as the ACS. The AHS and ACS differ in several important ways: different sample timeframes, different collection design, different response meth-ods, and different survey instruments, to name just a few. Perhaps most importantly, the ACS and AHS tend to differ in tenure, occupancy, and vacancy counts. According to the Census Bureau, oc-cupancy, tenure, and vacancy counts will differ in the AHS and ACS primarily due to the 3-month data collection period used in the ACS (Schwartz, 2009). Whereas the assessment of vacancy rates in the AHS is made at the point of initial interview, the ACS assesses vacancy rates in the final month of a 3-month collection period, which means that rental housing units may be reoccupied within that 3-month window (Schwartz, 2009). This explains, in part, why occupied ACS rental housing unit counts are higher than AHS rates. Also the AHS is purposively tied to the CPS Hous-ing Vacancy Survey (HVS), such that tabulations of ownership and vacancy rates converge with those estimates. The AHS is longitudinal but the ACS is a repeated cross-section. Both surveys are

Exhibit 14

Estimate of Rental Housing Stock Change American Housing Survey, 2007 and 2009

(Affordability Range % of AMI)	Rental Housing Units in 2007	Rental Housing Units in 2009	Change
Nonmarket rent	8,198,000	7,676,000	– 522,000*
Extremely low rent (0–30%)	2,262,000	1,612,000	– 650,000*
Very low rent (30–50%)	9,460,000	9,326,000	– 134,000
Low to moderate rent (50–80%)	13,941,000	15,200,000	1,259,000*
Moderate to high rent (80–120%)	4,275,000	4,872,000	597,000*
Extremely high rent (>120%)	1,190,000	1,074,000	– 116,000
Total	39,326,000	39,760,000	434,000

AMI = Area Median Income.
*Statistically significant at the 5-percent significance level.
Source: Census Bureau, American Housing Survey, 2007 and 2009

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[8] Although efforts have been made to improve rental-assistance reporting in the AHS, historically it has been shown to be unreliable (Shroder, 1996).

nationally representative, however: the AHS representative of U.S. housing stock, and the ACS representative of U.S. population and household statistics. In addition, both surveys collect data on household income and both contract and gross rent levels, which makes both surveys suitable for use in a rental housing affordability analysis. The advantages of the AHS are the detailed housing variables (including questions about rent subsidies) and its longitudinal design. The ACS is the key resource for local data on demographic and economic characteristics, and has the advantage of very large sample sizes (more than 20 times as large as the AHS) and it is conducted annually (opposed to biannually as with the AHS).

Although the AHS microdata files include data on local HUD income limits, the ACS microdata contains no such information. Developing a comparable file requires adding in additional income limit data. IPUMS provides geographic identifiers for a number of metropolitan areas based on 2000 Census Geography. Using the ACS microdata from IPUMS along with HUD published income limits from 2007 and 2009, it is possible to construct a data file with the rental housing affordability variables found in the AHS Housing Affordability Data Systems (HADS) files that were originally developed for the Millennial Housing Commission. Constructing these HADS ACS files allows for greater comparability with previous HUD housing affordability research and consistency with HUD program definitions and regulations.

With a few exceptions, HUD income limits are unique to counties and metropolitan areas. The county identifiers in the IPUMS data enable easy matching of HUD income limits to the microdata observations for counties that collectively contain nearly 70 percent of U.S. households. The implication is that it is possible to construct a data file that applies the most granular income limit data to a significant majority of sample observations using publicly available microdata. For the remainder of observations, HUD's state-level income limits are applied to the sample rental housing units. Renters are categorized based on their income relative to the HUD AMI with adjustments for household size.[9] Rental housing units are categorized based on the same HUD-published income limits, except in rural areas where the AHS may have the exact county-specific income limits, and the ACS file features the state income. The same bedroom- and person-size adjustments are made for the ACS data as are made in the AHS HADS data. Also the imputation of utilities in vacant rental housing units is similar in both (see appendix B for details).

Initial tabulations of the renter population by income category suggest that the 2007 and 2009 ACS and the 2007 and 2009 AHS yield similar national estimates. Exhibit 15 shows the estimate of renter households earning less than 30 percent of AMI, 30 to 50 percent of AMI, and 50 to 80 percent of AMI. With the exception of the low-income count in 2009, the ACS and AHS counts generally differ by 1 to 3 percent.

This result is encouraging; it affirms that the number of renter households with incomes less than 30 percent of AMI and between 30 and 50 percent of AMI increased amidst the worst economic downturn in recent history. Trend differences within the housing stock are larger, however. Because the ACS does not ask about rental housing assistance, it is not possible to compare the nonmarket rent category. Therefore, nonmarket rental housing units are included in both ACS and AHS tabulations

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[9] See appendix exhibit A-1 for the household size adjustments.

in exhibit 15 for ease of comparison. These nonmarket rental housing units are categorized based on gross rent, noncash rental housing units are captured in the extremely low-rent category, and rental housing units reporting subsidy are placed in the appropriate rental housing affordability category. Exhibit 16 shows comparison between the 2007 and 2009 ACS and AHS rental housing unit counts by affordability category.

The difference in the estimates of the rental housing stock that was affordable to households at 30 percent of AMI in 2007 is only about 6 percent between the two samples—but the estimated percentage of units with rents above the 30 percent of AMI affordable rent, but at or below the 50 percent of AMI rent, is roughly 20 percent. As noted earlier, the different data collection periods for categorizing rental housing units as vacant or occupied create differences in counts between the AHS and ACS. The estimated trends for the 30 percent of AMI affordable rental housing units and 30 to 50 percent of AMI affordable rental housing units, however, are considerably different across the two samples. Although the AHS shows a contraction in the size of both rental housing stock segments totaling more than 1.1 million units, the ACS show an expansion of these segments

Exhibit 15

Renter Households by Income Category

	ACS			AHS		
	< 30% AMI	30–50% AMI	50–80% AMI	< 30% AMI	30–50% AMI	50–80% AMI
2007	9,452,000 (35,686)	6,713,000 (31,500)	7,724,000 (33,480)	9,594,000 (165,571)	6,723,000 (140,742)	7,635,000 (148,972)
2009	10,600,000 (37,339)	7,241,000 (32,334)	8,004,000 (33,888)	10,300,000 (162,833)	7,158,000 (138,214)	7,173,000 (140,167)

ACS = American Community Survey. AHS = American Housing Survey. AMI = Area Median Income.
Sources: AHS, 2007 and 2009; ACS, Integrated Public Use Microdata Series, 2007 and 2009

Exhibit 16

AHS/ACS Rental Housing Stock Comparison (counts)

ACS	Rent Affordable % of AMI		
	30%	30–50%	50–80%
2007	7,769,000 (32,642)	9,045,000 (36,250)	16,613,000 (42,242)
2009	7,871,000 (32,659)	9,479,000 (36,800)	18,000,000 (43,190)
Change, 2007–2009	102,000	434,000	1,387,000
AHS	Rent Affordable % of AMI		
	30%	30–50%	50–80%
2007	7,351,000 (147,695)	11,100,000 (173,672)	15,080,000 (199,527)
2009	6,272,000 (128,566)	10,952,000 (167,024)	16,229,000 (196,337)
Change, 2007–2009	– 1,079,000	– 148,000	1,148,000

ACS = American Community Survey. AHS = American Housing Survey. AMI = Area Median Income.
Sources: AHS, 2007 and 2009; ACS, Integrated Public Use Microdata Series, 2007 and 2009

by roughly 0.5 million units. Both samples suggest an increase in the moderately affordable rental housing stock (50 to 80 percent of AMI) of nearly 1 million units. Although the ACS shows increases in the size of the affordable rental housing stock, this appears primarily driven by an overall increase in the total rental housing stock. Exhibit 17 shows the share of affordable rental housing units within the total rental housing stock. As a percentage of the total rental housing stock, the number of 30 percent of AMI and 30 to 50 percent of AMI affordable units actually decreased. Percentages are arguably less useful if the concern is rental housing affordability, because additional affordable rental housing supply should ease overall affordability stresses regardless of its share of the overall distribution.

Due to the timing differences in the assessment of vacancy status, the differences in counts are not surprising. Still somewhat puzzling, however, is that trends in the affordable rental housing stock segments are so different. Although the differences in occupancy and vacancy rates can explain why levels diverge, this does not explain the direction of the change in rental housing affordability. One possible theory is that the 3-month period of data collection in the ACS allowed for the reoccupancy of vacant rental housing units at rents lower than initial asking rents, which could have contributed to increased rental housing affordability.

Exhibit 17

ACS/AHS Rental Housing Stock Comparison (percent)

ACS	Rent Affordable % of AMI		
	30%	**30–50%**	**50–80%**
2007	0.191	0.222	0.409
	(0.0008)	(0.0009)	(0.0010)
2009	0.184	0.221	0.420
	(0.0008)	(0.0009)	(0.0010)
Change, 2007–2009	– 0.007	– 0.001	0.011

AHS	Rent Affordable % of AMI		
	30%	**30–50%**	**50–80%**
2007	0.187	0.282	0.383
	0.0035	(0.0039)	(0.0043)
2009	0.158	0.276	0.408
	(0.0030)	(0.0037)	(0.0041)
Change, 2007–2009	– 0.029	– 0.007	0.025

ACS = American Community Survey. AHS = American Housing Survey. AMI = Area Median Income.
Sources: AHS, 2007 and 2009; ACS, Integrated Public Use Microdata Series, 2007 and 2009

Summary

From 2007 to 2009, the ACS and AHS show large growth in the number of affordable rental housing units for renters with low- to moderate-incomes (affordable to households at 80 percent of AMI), and substantial increases in the number of extremely low-income renters. For the most affordable rental housing stock segments the data is mixed. During a period of rising rental housing vacancy rates, the AHS suggests a shrinking of the affordable rental housing stock. Categorizing rental housing units based on rents relative to local incomes, means that falling incomes could reduce the

local rental housing affordability threshold causing the number of units appearing as unaffordable to increase without a commensurate increase in rents. Appendix C explores the sources of the AHS increase in rental housing affordability, and suggests that the loss of affordability was largely driven by rent increases. The conflicting rental housing affordability trends in the ACS and AHS cannot be easily explained. Important differences in the assessment of occupancy and vacancy rates between the two surveys complicate comparisons. The inconsistency in trends across data sources underscores the need for more robust and granular data on rental housing, and additional public guidance from the Census Bureau regarding comparisons of housing estimates across surveys.

Affordable Supply Gap and Rent Burdens

This section examines rental housing affordability using two approaches: the affordable rental housing supply gap and changes in household rent burdens. The first subsection describes the affordable rental housing supply gap at the national level before and during the recession, the second subsection estimates the supply gap at the metropolitan level, and the final section explores the change in rent burden for low-income renters.

Affordable Supply Gap at the National Level

To provide a more complete picture of rental housing affordability at both a national and metropolitan level, the analysis relies heavily on the Census Bureau's ACS PUMS. Relatively few representative data sources exist that allow for national and cross-metropolitan comparisons of renter incomes and rents. With the introduction of the ACS and IPUMS data from the Minnesota Population Center, it is possible to analyze cross-sectional differences in rental housing market conditions across large metropolitan areas because of the robust sample sizes.

Exhibit 18 shows the national estimates based on 2007 ACS microdata. The affordable supply gap variables are in the last two rows. The ACS tabulations suggest that under optimal sorting—where all the lowest rent units are filled with the lowest income renters—roughly 82 affordable rental housing units exist for households at 30 percent of AMI for every 100 renter households that were at or below 30 percent of AMI. This method may understate the severity of rental housing affordability, because units are classified as affordable if they have gross rents affordable at the top of each income threshold. Furthermore, optimal sorting is only a conceptual construct; an extremely low-rent

Exhibit 18

ACS Rental Housing Affordability, 2007

	30% AMI	30–50% AMI	50–80% AMI
Affordable unit	7,770,000	9,050,000	16,600,000
Affordable and available unit	4,090,000	5,090,000	10,800,000
Vacant	495,000	966,000	1,580,000
Vacancy rate	6.37%	10.67%	9.52%
Renters	9,450,000	6,710,000	7,720,000
Affordable per 100 renters	82	135	215
Affordable and available per 100 renters	43	76	140

ACS = American Community Survey. AMI = Area Median Income.
Source: ACS, Integrated Public Use Microdata Series, 2007

unit in rural Arkansas is not a reasonable housing option for an extremely low-income household in San Francisco. In addition, higher income households are more likely to be selected over lower income tenants when competing for the same affordable unit, so affordable units occupied by higher income households may not be truly available to low-income households. When the availability dimension is applied—where available is defined as vacant or occupied by a household at or below the income threshold—only 43 affordable and available rental housing units exist per 100 extremely low-income renters (30 percent of AMI). Rental housing units with rents affordable at 30 percent of AMI have such low contract rents that the amount is likely to narrowly cover the landlord's operating expenses in many housing markets, which requires a significant share of the rents to be subsidized. Although it is not possible to identify rental assistance in the ACS data, tabulations of the 2007 AHS find that 35 percent of rental housing units at this affordability level are subsidized. For renter households earning 30 to 50 percent of AMI, only 76 affordable and available rental housing units exist per 100 renters. Renter households at 80 percent of AMI have far more affordable rental options, but this analysis does not capture the physical adequacy or the neighborhood quality associated with these affordable rental housing units.

Exhibit 19 shows the tabulations from the 2009 survey. The effect of the recession on the income of renters is clear. From 2007 to 2009, the number of renter households reporting incomes below 30 percent of AMI increased by more than 1 million households, and the number of household reporting incomes between 30 to 50 percent of AMI increased by another 0.5 million households. ACS estimates suggest that the most affordable rental housing stock segment—extremely low-rent units—grew modestly. This growth was more than offset by the swelling ranks of extremely low-income renters, however. As a result, only 41 affordable and available extremely low-rent units existed per 100 extremely low-income renters in 2009. The number of very low-rent units, affordable at 50 percent of AMI grew slightly, but was offset by the increase in renters with income less than 50 percent of AMI. The overall increase in low-income households had the effect of increasing the availability of very low-rent units, thus reducing the affordable and available supply gap to 78 rental housing units per 100 renters. Substantial additions of low- to moderate-rent rental housing units eased the burden for households at 80 percent of AMI.

Exhibit 19

ACS Rental Housing Affordability, 2009

	30% AMI	30–50% AMI	50–80% AMI
Affordable unit	7,870,000	9,480,000	18,000,000
Affordable and available unit	4,300,000	5,620,000	12,200,000
Vacant	480,000	1,010,000	1,910,000
Vacancy rate	6.13%	10.70%	10.62%
Renters	10,600,000	7,240,000	8,000,000
Affordable per 100 renters	74	131	225
Affordable and available per 100 renters	41	78	152

ACS = American Community Survey. AMI = Area Median Income.
Source: ACS, Integrated Public Use Microdata Series, 2009

Affordable Supply Gap at the Metropolitan Level

The divergent trends in rents described in the Rent Trends section should lead to different rental housing affordability levels at the subnational level. The results of the metropolitan level analysis appear in exhibit 20. Some of the metropolitan areas listed are not fully identified in the public use microdata; as a result, population estimates are slightly lower when using the PUMS data than published census estimates. In addition, with a single-year sample, a nontrivial amount of sampling error exists.

The exhibit focuses on two levels of incomes and rents, households earning at or below (and units affordable at) 30 percent of AMI, and households earning between 30 and 50 percent of AMI (and units affordable at 50 percent of AMI). As with the national level analysis, this metropolitan level analysis reveals that in every housing market too few rental housing units exist that have rents that are affordable to extremely low-income households. This is not to suggest that every housing market needs more housing—a look at the vacancy rates confirms that some markets have more than adequate supply—rather it indicates that the number of households with incomes too low to affordably support local rents far exceeds the few rental housing units with rents affordable to this group. If a goal of housing policy is to ensure that low-income households do not expend enormous shares of their budget towards housing, then additional rental assistance is needed to affordably house these families.

For renter households that are very low-income (30 to 50 percent of AMI), but not likely to be living below the poverty line, the picture is more nuanced. Some housing markets exhibit significant rental housing affordability stresses for households at 50 percent of AMI. Miami, Florida; San Diego, California; Boston, Massachusetts; New York, New York; Los Angeles, California; Tampa, Florida; and Honolulu, Hawaii are extremely tough places to find affordable units at 50 percent of AMI with fewer than 50 units per 100 renters. Several of these cities have significant rental housing supply constraints because the amount of developable land is limited or because of the presence of regulatory barriers, which keep vacancy rates low and create upward pressure on rents (Glaeser and Gyourko, 2008). In several Midwest cities where housing values are low, land is cheap, and the population has shrunk, an apparent surplus of rental housing units that are affordable to households at 50 percent of AMI exists. In these more affordable metropolitan areas, the estimated vacancy rate for units with rents affordable at 50 percent of AMI exceeds 11 percent in each of the metropolitan areas (except Minneapolis) suggesting an adequate supply of affordable rental housing for households earning 50 percent of AMI. These housing markets are where rehabilitation and tenant-based rental assistance may be a more market sensitive intervention than additional new construction. It is important to note that this analysis does not parse out substandard rental housing units, and does not incorporate the geographic distribution of these units within a metropolitan area. For instance, an affordable rental housing unit in a high-poverty central city neighborhood would be classified as available and affordable even if the renter is in a distant suburb.

Exhibit 20

Rental Housing Affordability by Metropolitan Area (1 of 2)

Metropolitan Area	30 % AMI				30–50 % AMI				0–50 % AMI	
	Affordable Units	Affordable and Available Units	Renter House-holds	Affordable and Available Units Per 100 Renter Households	Affordable Units	Affordable and Available Units	Renter House-holds	Affordable and Available Units Per 100 Renter Households	Affordable Rental Vacancy Rate (%)	Total Rental Vacancy Rate (%)
Atlanta, GA*	62,000	37,000	124,000	30	144,000	90,000	105,000	85	17.7	15.4
Boston, MA-NH	131,000	87,000	163,000	53	73,000	43,000	89,000	49	5.0	6.8
Chicago, IL*	172,000	111,000	306,000	36	289,000	173,000	184,000	94	8.6	9.8
Cincinnati, OH-KY-IN*	62000	35000	57000	62	71000	41000	37000	111	13.8	12.7
Cleveland, OH	63,000	36,000	84,000	43	99,000	56,000	53,000	106	11.8	11.5
Dallas-Fort Worth, TX*	80,000	43,000	154,000	28	181,000	113,000	135,000	83	13.7	13.6
Denver-Boulder, CO*	41,000	24,000	80,000	30	81,000	48,000	54,000	90	10.3	8.9
Detroit, MI	109,000	65,000	150,000	43	166,000	108,000	79,000	136	12.1	12.9
Honolulu, HI	21,000	9,000	21,000	43	12000	7000	21000	31	2.0	5.6
Houston-Brazoria, TX	76,000	40,000	141,000	29	158,000	105,000	122,000	86	15.6	14.0
Kansas City, MO-KS*	41000	23000	51000	45	66000	34000	39000	89	12.1	11.9
Los Angeles-Long Beach, CA	213,000	124,000	501,000	25	211,000	136,000	374,000	36	3.3	6.1
Miami-Hialeah, FL*	41,000	27,000	76,000	35	17,000	11,000	60,000	17	8.1	13.1
Milwaukee, WI	32,000	19,000	58,000	32	64000	35000	41000	85	6.7	6.1
Minneapolis-St. Paul, MN*	63,000	39,000	90,000	44	119,000	65,000	57,000	115	5.3	6.9
New York-Northeastern New Jersey	544,000	333,000	798,000	42	412,000	220,000	479,000	46	4.8	6.1
Philadelphia, PA-NJ	121,000	74,000	170,000	43	144,000	87,000	100,000	87	8.2	9.8
Phoenix, AZ*	35,000	18,000	82,000	22	53,000	31,000	72,000	43	18.5	15.1
Pittsburgh, PA*	78,000	44,000	77,000	57	85,000	44,000	47,000	93	6.5	6.9
Portland, OR-WA*	27,000	15,000	57,000	26	44,000	22,000	44,000	51	3.2	6.3

Exhibit 20

Rental Housing Affordability by Metropolitan Area (2 of 2)

Metropolitan Area	30 % AMI				30–50 % AMI				0–50 % AMI	
	Affordable Units	Affordable and Available Units	Renter Households	Affordable and Available Units Per 100 Renter Households	Affordable Units	Affordable and Available Units	Renter Households	Affordable and Available Units Per 100 Renter Households	Affordable Rental Vacancy Rate (%)	Total Rental Vacancy Rate (%)
San Diego, CA	39,000	21,000	90,000	23	26,000	18,000	74,000	24	3.2	7.1
San Francisco-Oakland, CA	137,000	87,000	195,000	45	117,000	66,000	108,000	61	5.4	6.5
Seattle-Everett, WA	56,000	34,000	89,000	38	87,000	46,000	56,000	82	5.4	6.3
St. Louis, MO-IL	77,000	45,000	87,000	52	106,000	57,000	59,000	97	7.7	7.5
Tampa-St. Petersburg, FL	32,000	15,000	55,000	28	29,000	17,000	51,000	32	9.2	15.4
Washington, DC-MD-VA*	103,000	56,000	127,000	44	111,000	63,000	100,000	63	6.2	8.8

AMI = Area Median Income.

*Partially identified, counts will be 1 to 10 percent lower than full sample American Community Survey tabulations.

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2007

Rent Burdens

The supply gap approach to describing affordability dynamics is useful because it directly accounts for changes in the rental housing stock, however, it may fail to capture nuances of low-income households' housing options. Important considerations such as geography or the physical adequacy of housing may further limit options to the poor. Therefore it is also critical to examine observed rent burdens. Exhibit 21 shows the trend of rent burdens from 1990 through 2009. In 2009 the median rent burden was 16.6 percent higher than in 1990. More startling, the percentage of renters paying more than one-half of their income for housing increased nearly 38 percent since 1990.

Although rental housing affordability is difficult to disentangle from economic recessionary trends, the overall level of affordability—as measured by rent burden—is quite clear. From 2007 to 2009 the number of households paying more than one-half of their income for housing (severely burdened) increased by roughly 1 million (exhibits 22 and 23). Severe rent burdens are most concentrated among renters with incomes below 30 percent of AMI. Housing decisions are typically made in relation to permanent income, rather than point-in-time income, therefore, income volatility among households reporting poverty incomes may overstate the number of households that require housing assistance. In addition, some of the severely burdened households are already receiving rental assistance, but have little or no income, and are required to pay a minimum rent. Still the trend and magnitude are significant. Even with rental housing markets exhibiting signs of softness, the dominating effect of falling incomes has placed increased strains on the household budgets of low-income renters, while the number of unassisted very low-income renter households paying more than 50 percent of their income for housing or living in substandard housing rose to 7.09 million households or 20 percent of renter households in the AHS 2009—the highest total ever recorded in the AHS (exhibits 24 and 25).

Exhibit 21

Rent Burden, 1990–2009

Year	Median Gross Rent as % of Income	Percent of Monthly Income for Housing	
		Greater Than 30%	Greater Than 50%
1990	26.4	37.24	17.66
2000	25.5	35.93	17.33
2005	29.8	45.20	23.05
2009	30.8	47.15	24.35

Sources: Census Bureau, 5-Percent Public Use Microdata Sample (PUMS), 1990, 2000; Census Bureau, American Community Survey, Integrated PUMS, 2005, 2009

Exhibit 22

American Community Survey, Rent Burden, 2007

	30% AMI	30–50% AMI	50–80% AMI
Renters	9,450,000	6,710,000	7,720,000
Rent burden 30–50 percent of income	1,410,000	3,072,000	2,729,000
Rent burden 50 percent or more of income	5,826,000	1,893,000	482,000

AMI = Area Median Income.

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2007

Exhibit 23

American Community Survey, Rent Burden, 2009

	30% AMI	30–50% AMI	50–80% AMI
Renters	10,600,000	7,240,000	8,000,000
Rent burden 30–50 percent of income	1,499,000	3,312,000	2,920,000
Rent burden 50 percent or more of income	6,700,000	2,098,000	491,000

AMI = Area Median Income.

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2009

Exhibit 24

Number of Unassisted Very Low-Income Renters With Severe Rent Burden or in
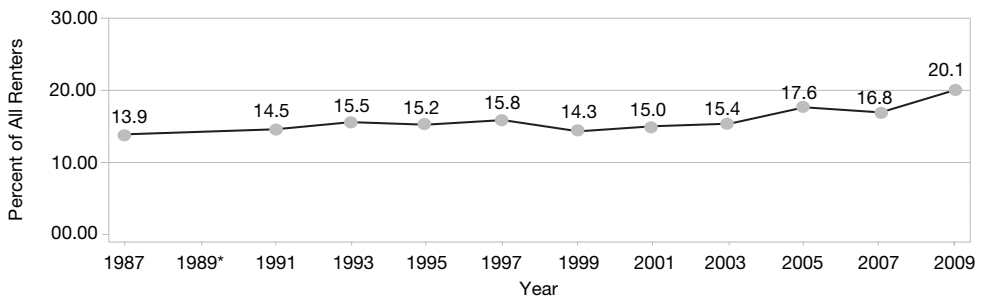Severely Inadequate Housing
Worst Case Housing Needs
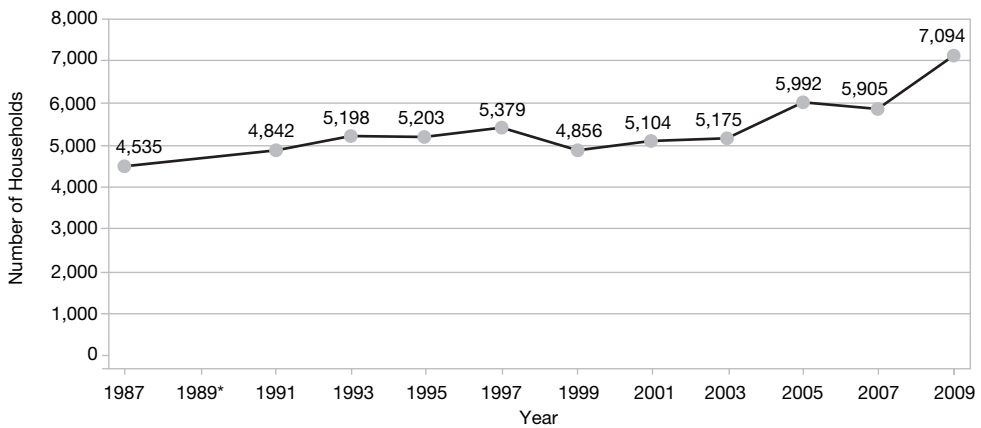
* Survey definition changes do not allow for a comparable number for 1989.

Source: Census Bureau, American Housing Survey, 1987–2009

Exhibit 25

Percent of Unassisted Very Low-Income Renters With Severe Rent Burden or in
Severely Inadequate Housing
Worst Case Housing Needs

* Survey definition changes do not allow for a comparable number for 1989.

Source: Census Bureau, American Housing Survey, 1987–2009

Summary and Findings

This article attempted to provide an update of rental housing affordability trends and levels since 1990, including an exploration of how rental housing affordability has been affected by the recession of 2007 through 2009. In the first half of the 1990s real rents declined or were stagnant, when the economy took off in the second half of the decade real rents rose in most housing markets, but these increases were married with increasing real renter incomes, leaving rent burdens slightly lower by the end of the decade. The 2000s have been a far more trying time period for renters.

Real renter incomes declined in nearly every housing market in the first half of the 2000s, and ended the decade below 2000 levels in 25 of 25 markets in large part due to a historic recession.

Even with downward rent pressure through the recession, real rent levels ended with 2009 above 2000 levels in 19 of 26 housing markets. These trends combined to drive rent burdens to historic highs. For renters at 50 percent of AMI, rental housing affordability varies significantly across metropolitan areas.

In 2009, the number of extremely low-income renter households paying more than 50 percent of their income for housing increased to more than 6.7 million households, and only 41 affordable and available units existed per 100 extremely low-income renters.

During the recession, the moderately affordable rental housing stock with rents affordable to households at 80 percent of AMI increased sizably, but the data is less clear on the changes at the bottom of the rental housing stock.
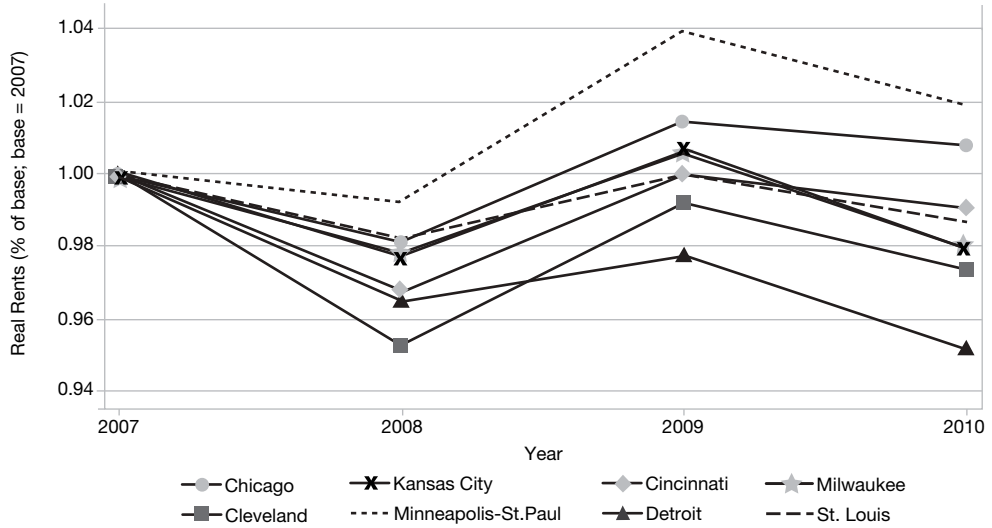
Future rent pressures will depend on the extent to which the current rental housing stock can absorb expected future demand increases for rental housing. Multifamily rental production slowed significantly during the past 2.5 years, meaning that few new rental housing completions will come online in 2011 and 2012. Given the incredible heterogeneity in rental housing affordability dynamics presented in this article, different housing markets are likely to absorb these demand changes very differently. Communities with persistently high vacancy rates, whether from elastic supply or historic population loss, should be able to accommodate future rental demand fairly easily, although communities with low vacancy rates and inelastic supply may face steep upward pressure on rents as demand increases.

Finally, although the sources of rental housing data have improved over the years, development of detailed, timely, representative data still lags the collection of ownership data. This study demonstrates that additional data is needed to understand time series dynamics in rental housing affordability. Particularly, the collection of data on rent concessions, which are the primary method of nominal rent cuts, but are rarely collected in public surveys.

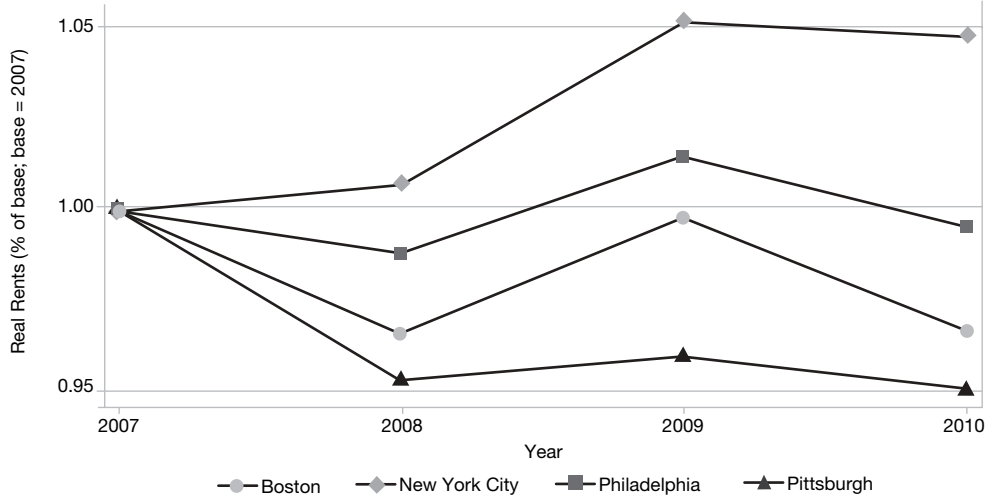# Appendix A. Metropolitan Rents Since 2007

Exhibit A-1

Midwest: Real Rents Since 2007 by Metropolitan Area

Legend: Chicago, Kansas City, Cincinnati, Milwaukee, Cleveland, Minneapolis-St.Paul, Detroit, St. Louis

Source: Consumer Price Index (Rent Index/Less Shelter Index), 2007–2010

Exhibit A-2

Northeast: Real Rents Since 2007 by Metropolitan Area

Legend: Boston, New York City, Philadelphia, Pittsburgh

Source: Consumer Price Index (Rent Index/Less Shelter Index), 2007–2010

Exhibit A-3

South: Real Rents Since 2007 by Metropolitan Area
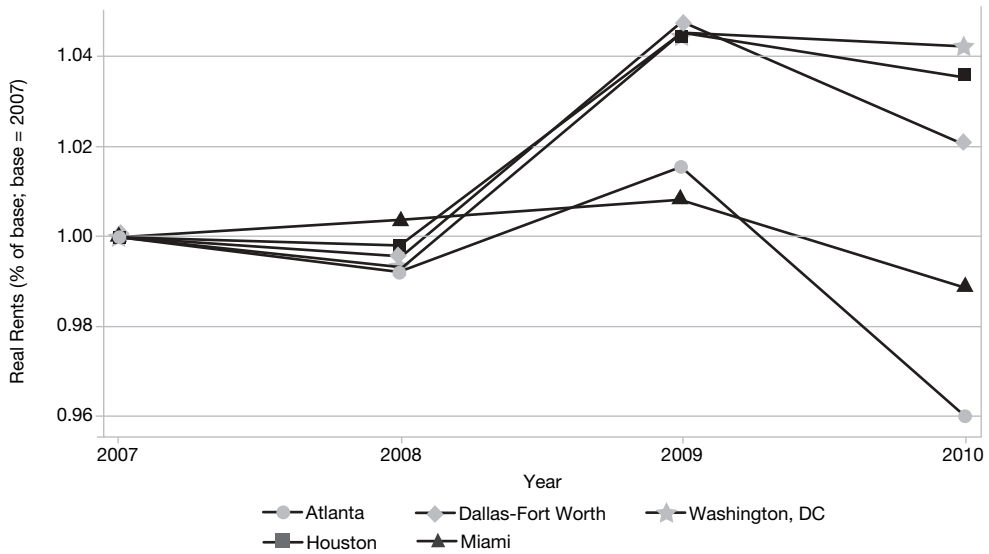
Exhibit A-4

West: Real Rents Since 2007 by Metropolitan Area
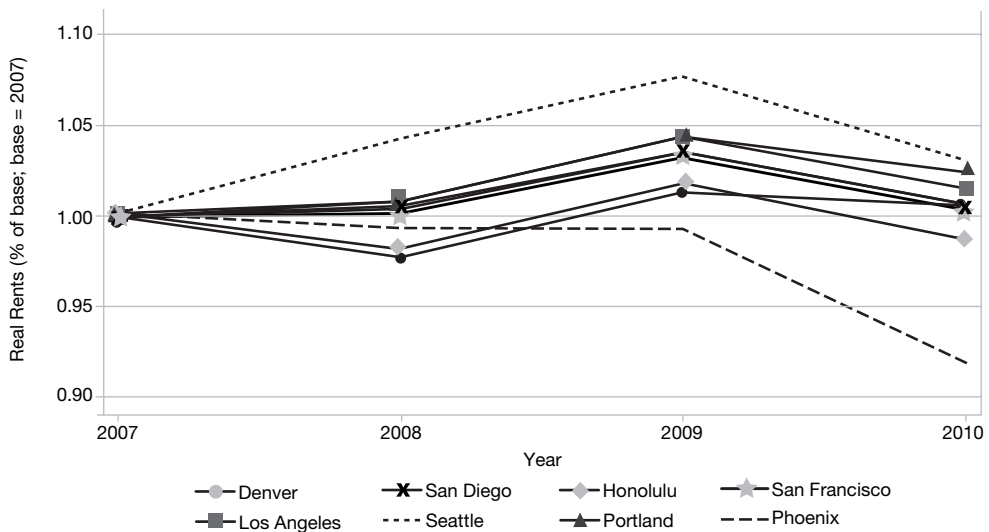
Appendix B. Data Adjustments and Imputations

Exhibit B-1

Household Size and Bedroom Number Adjustments

Household Size Adjustments to Income		Number of Bedrooms Adjustments	
People (N)	**Adjustment**	**Bedrooms (N)**	**Adjustment**
1	0.70	0	0.70
2	0.80	1	0.75
3	0.90	2	0.90
4	1.00	3	1.04
5	0.08	4	1.16
6	1.16	5	1.28
7+	(1.16 + 0.08 [persons–6])	6	1.40
		7+	(1.40 + 0.12 [bedrooms–6])

Source: Author imputation using Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2007

Exhibit B-2

Hotdeck Imputed Utility Comparison

ACS Utilities for Occupied Rental Units (2007)					
Mean	124.319				
Standard deviation	119.833				
Percentiles	10%	25%	50%	75%	90%
Dollar utility amount	0	40	100	180	280
ACS Imputed Utilities for Vacant Rental Units (2007)					
Mean	121.484				
Standard deviation	119.953				
Percentiles	10%	25%	50%	75%	90%
Dollar utility amount	0	40	93	170	270
ACS Imputed and Observed—Vacant and Occupied Units (2007)					
Mean	124.122				
Standard deviation	119.598				
Percentiles	10%	25%	50%	75%	90%
Dollar utility amount	0	40	100	180	280

ACS = American Community Survey.

Source: Author imputation using Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2007

Appendix C. Exploring Rental Housing Affordability Declines AHS 2007 to 2009

To examine the extent to which falling local incomes may be driving the reduction in rental housing affordability, a decomposition of the rent distributions was constructed using a model similar to one used by Quigley and Raphael (2004). The basic formula for the composition follows:

CDF Rents 2009– CDF Rents 2007

$$= [CDF(Rents\ 2009)_{Incomes\ 2009} - CDF(Rents\ 2007)_{Incomes\ 2009}]$$
$$- [CDF(Rents\ 2007)_{Incomes\ 2007} - CDF(Rents\ 2007)_{Incomes\ 2009}]$$

where the overall change in the percentage of rental housing units that are affordable to renters at the income threshold can be decomposed into the first term: the cumulative distribution function (CDF) of the 2009 rent distribution evaluated at the 2009 income limits less the 2007 rent distribution also evaluated at the 2009 income limits provides the percentage change in rental housing affordability due to changing rents, and the second term is the CDF of 2007 rent distribution evaluated at the 2007 income levels less the CDF of 2007 rents evaluated at the 2009 income level—interpreted as the change in rental housing affordability due to changing income. The first term is operationalized with an estimate of the portion of rental housing units in 2009 with rents below the 2009 income threshold, minus the portion of rental housing units in 2009 with rents below the 2007 income threshold. All rents and the rental housing affordability income thresholds are adjusted to be in constant 2009 dollars. This analysis requires having a specified income limit for each rental housing unit, so only units that existed in both 2007 and 2009 could be included. The slightly narrowed samples represent roughly 34 million rental housing units in 2007 and 32 million units in 2009 (this difference arises primarily to sample adjustment in 2009). HUD is required to publish income limits annually by a specified date, which does not allow for use of the most up-to-date data. The 2009 income limits are in fact based on 2007 data with adjustments for inflation, so income limits have not fallen commensurate with the real income declines. This is apparent in the data, with 71 percent of the sample rental housing units that were rented in either 2007 or 2009 being located in local jurisdictions where the AMI increased in real terms from 2007 to2009. Exhibit C-1 displays the results of the decomposition above.

The decomposition reveals that for low-income renter households, rental housing affordability worsened between 2007 and 2009, and the reduction in affordability appears driven by increases in reported gross rents. Exhibit C-2 shows the percentage of rental housing units that were affordable in 2007, but changed affordability status in 2009 and experienced either a real rent increase or decrease from 2007 to 2009. About 93 percent of the sample units were affordable at 30 percent of AMI in 2007. These same units were not affordable at 30 percent of AMI in 2009 because of increases in real rents. These increases also suggest that changes in rental housing affordability shown in the AHS between 2007 and 2009 were driven primarily by rent increases.

Exhibit C-1

Rental Housing Affordability Change Decomposition by Income Threshold, 2007–2009

2007 to 2009	Overall	Due to Rents	Due to Income
30% AMI	– 2.62%	– 2.71%	0.08%
50% AMI	– 2.53%	– 3.53%	1.00%
80% AMI	0.00%	– 1.58%	1.59%
100% AMI	0.54%	0.03%	0.51%

AMI = Area Median Income.

Source: Census Bureau, American Community Survey, Integrated Public Use Microdata Series, 2007 and 2009

Exhibit C-2

Affordable Units in 2007 That Changed Rental Housing Affordability Status in 2009*

	Reported Rent Change (in 2009 dollars)	
	Decrease (%)	Increase (%)
Affordable at 30% AMI	6.59	93.41
Affordable at 50% AMI	22.56	77.44
Nonmarket units	28.00	72.00

AMI = Area Median Income.

* Percent of unweighted sample housing units that were rental units in 2007 and 2009 that fell out of their 2007 affordability status.

Source: Census Bureau, American Housing Survey, 2007 and 2009

Longitudinal Estimates of Rental Housing Stock Changes, AHS 2007 to 2009

This appendix features estimates of the movements of rental housing units between affordability categories and to and from other rental housing stock segments (that is, owned, vacant, and so on) using estimated longitudinal weights for 2007 through 2009 following an approach taken in the HUD Components of Inventory Change (CINCH) reports. This analysis suggests that 1.1 million extremely low-rent units in 2007 moved to a less affordable category, which was only partially off-set by 700,000 rental housing units moving into the extremely low-rent category from higher rent categories. The other primary source of this loss is the movement of rental units either to owner-ship or a permanent loss category. Roughly 400,000 extremely low-rent units in 2007 were either lost or moved to owner-occupied units, which was only partially recouped through 240,000 new rental units.

Exhibit C-3 presents estimates of the change in the rental housing stock by affordability category. The changes are separated into a forward-looking component and backward-looking component. A description of the weighting methodology is provided in text that follows. Note that when adjusting the weights, the 2007 and 2009 data no longer perfectly mirror the cross sectional analysis. See description of the weighting methodology following exhibit C-3.

Exhibit C-3

Sources of Rental Housing Stock Changes, 2007–2009

| | In 2007 | Forward-Looking Component | | | Backward-Looking Component | | | Net | In 2009 |
		To More Affordable	To Less Affordable	Loss of Rental Housing Stock	From Less Affordable	From more Affordable	Additions to Rental Housing Stock		
Nonmarket unit	8,243		(2,763)	(946)	2,311		981	(418)	7,825
Extremely low-rent unit	2,242	(240)	(1,230)	(400)	720	225	243	(682)	1,559
Very low-rent unit	9,192	(946)	(2,482)	(950)	2,159	1,263	1,084	127	9,320
Low- to moderate-rent unit	13,800	(3,254)	(940)	(1,206)	1,302	3,685	1,828	1,414	15,214
High-rent unit	4,348	(1,825)	(107)	(476)	237	1,602	1,011	443	4,791
Extremely high-rent unit	1,259	(566)		(209)		409	244	(121)	1,138

Source: Census Bureau, American Housing Survey, 2007 and 2009, using adjusted longitudinal weights

Weighting Methodology

The AHS provides cross-sectional weights with each sample that are applied to provide a snapshot of the nation's housing market at a given time. To understand how a trend among unweighted sample rental housing units corresponds to a weighted total for the nation, it is necessary to construct longitudinal weights. This article takes an approach that parallels the methods in HUD's CINCH reports. Due to sample adjustments, new construction, losses, tenure changes, and noninterviews, the weights for particular AHS sampled rental housing unit change between survey years. Following the approach taken in the CINCH reports, two separate sets of weights are developed: one for a forward-looking analysis to describe how the status of units in the 2007 rental housing stock changed in 2009, and one for a backward-looking analysis to describe the status of the 2009 rental housing stock in 2007.

For the forward-looking analysis, rental housing units are categorized as either existing in both 2007 and 2009 or existing in 2007 and lost in 2009. The basic weighting approach is to estimate the weighted count of losses in 2009 from the 2007 rental housing stock, and then adjust the pure weights for the units existing in both 2007 and 2009 so that they sum to the base 2007 count, net of losses:

$$ForwardLooking\ Weight =\ 2007\ Non-lost\ Unit\ Pure\ Weight * \frac{\sum\ 2007\ Units - \sum Losses\ in\ 2009}{\sum 2007\ Units\ in\ 2009}$$

Additional adjustments are made so that the revised 2007 weights sum to the corresponding published totals, distinguishing between tenure and occupancy status, and between mobile homes and all other rental housing units.

For the backward-looking analysis, rental housing units are categorized as existing in both 2007 and 2009, new construction in 2009 or other additions in 2009 (added from nonresidential use, made habitable from correction of deficiency, or added through merger or conversion). Similar to the forward-looking analysis, the pure weights are adjusted based on the changes to the rental housing stock. Estimates of new construction and other additions from the 2009 AHS are used to adjust the 2009 pure weights for rental housing units that existed in both 2007 and 2009 so that they sum to 2009 count net of new additions:

$$\begin{aligned} BackwardLooking\ &Weight \\ &= 2009\ Non-lost\ Unit\ Pure\ Weight \\ &* \frac{\sum\ 2009\ Units - (\sum New\ Construction\ in\ 2009 + \sum Other\ Additions\ in\ 2009)}{\sum 2009\ Units\ in\ 2007} \end{aligned}$$

If the weighting is done properly, the backward-looking and forward-looking weights should produce similar estimates of the number of rental housing units that existed in both 2007 and 2009. Exhibit C-4 shows that the estimate differs by slightly more than 0.5 percent.

Exhibit C-4

Rental Housing Units Existing in 2007 and 2009

Forward-looking weights	126,118,895
Backward-looking weights	125,303,451
Percent difference	– 0.65%

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Author

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