American Housing Survey

Components of Inventory Change and Rental Dynamics Analysis: Cincinnati, 1998–2011

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Executive Summary

Components of Inventory Change (CINCH) is a tool used by housing analysts to study how the housing inventory changes over time. One typically thinks of the housing stock as evolving through two mechanisms—the construction of new units and the demolition of old units. While new construction and losses through demolition and natural disasters are the primary means by which the housing stock changes, CINCH shows that there are other important engines of change.

This report describes how the housing stock in the Cincinnati metropolitan area changed between 1998 and 2011, with particular emphasis on affordable rental housing. The study uses data from the American Housing Survey, which collected detailed information on housing units in Cincinnati and on their occupants in both 1998 and 2011.

In 1998 the Cincinnati metropolitan area contained 647,500 housing units, including vacant units. By 2011 the number of housing units had increased to 921,700. Part of this increase was due to a redefinition of the metropolitan area, which added eight counties. We estimate that the 2011 count of housing units for the metropolitan area as defined in 1998 would be 715,300. This represents an overall increase of 10.5 percent, which translates to an average annual increase of only 0.8 percent over the 13-year period.

Between 1998 and 2011, only 4,900 units left the housing stock. Of these, 3,800 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 400 units that left the housing stock either permanently or temporarily for "other" reasons, a category that encompasses a wide variety of situations.

In the period between the 1998 and 2011 AHS surveys, 231,400 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did not track move-ins of mobile homes in Cincinnati. Also, 600 new units were formed from the conversion or merger of 1998 units. We classified 5,600 units as recovered because these units had been in the housing stock at some point but were classified in 1998 as nonresidential (2,200) or uninhabitable (3,400). Finally, 3,300 units were added in other unclassified ways.

The Cincinnati metropolitan area lost 0.8 percent of all 1998 housing units by 2011; additions between 2002 and 2011 represent 25.1 percent of the 2011 housing stock. Losses and additions varied across portions of the Cincinnati housing market defined by the characteristics of the unit or its occupants. We observed the following patterns, which were both atypical of the overall housing stock and statistically significant:

- Units with 4 or more bedrooms had low loss rates.
- Owner-occupied units whose households earned $100,000 or more in 1998 had low loss rates.

- The rate of addition among units vacant in 2011 was lower than that of all units, but the rate of addition among units used for seasonal purposes in 2011 was higher than average.

- The rate of addition varied by structure type. Single-family attached units had a very high rate of addition. As a group, multifamily units had a low rate of addition, and lower-than-average rates were seen among units in small multifamily buildings (whether measured by number units in the building or number of floors). An exception was the class of units in multifamily buildings with 7 or more floors. Manufactured houses had a low rate of addition.

- Unit size mattered. Units with fewer than 7 rooms or fewer than 4 bedrooms had lower-than-average rates of addition; those with 8 or more rooms or 4 or more bedrooms had high rates of addition. The exception was a small group of 1-room units built during the 1998 to 2011 period.

- The rates of addition were low among units reporting physical problems in 2011, specifically lack of exclusive use of bathroom facilities or lack of complete kitchen facilities. The plumbing deficiencies show up also as severe physical problems, while the kitchen deficiencies show up also as moderate physical problems. Units with moderate upkeep problems in 2011 also had a low rate of addition.

- Units occupied in 2011 by households with elderly householders (65 or older) had low rates of addition. Units occupied by households with children had an above-average rate of addition, while those without children had a below-average rate.

- Units with Black or Hispanic householders in 2011 or with householders who identified themselves as being multiracial experienced lower-than-average rates of addition.

- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those with low monthly housing costs (less than $800). Additions were higher than normal among high-cost rentals ($1,250 or more).

- The rate of addition among units that were owner-occupied in 2011 was higher than that of all occupied units. Among owner-occupied units, those occupied by lower income owners ($15,000 to $29,999) and those with lower monthly housing costs ($350 to $1,249) had lower-than-average rates of addition, while those occupied by high-income owners ($100,000 or more) and those with high monthly housing cost ($1,250 or more) had very high rates of addition.

The 1998 rental stock in Cincinnati was affordable. Of the 225,400 rental units in 1998, 112,400 were extremely low rent or very low rent units. In addition, 35,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 65.6 percent of the 1998 rental stock. The three highest rent categories comprised only 4 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) and moves to a more affordable category (sometimes called filtration) were virtually even—23.3 percent of all 1998 units compared to 21.5 percent. By 2011, 13.7 percent of the 225,400 rental units in

1998 were no longer in the rental stock. The largest proportion of these losses was due to changes in tenure.

The rental stock in Cincinnati was still affordable in 2011. Of the 299,500 rental units in 2011, 138,500 were extremely low rent or very low rent units. In addition, 47,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 62.1 percent of the 2011 rental stock. The three highest rent categories comprised 7.7 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) were virtually equal to moves from a less affordable category (sometimes called filtration)—18.1 percent of all 2011 units compared to 16.7 percent. Of the 299,500 rental units in 2011, 35.0 percent were not rental in 1998. Changes in tenure and new construction account for most of the gain.

Components of Inventory Change and Rental Dynamics Analysis: Cincinnati, 1998–2011

1. Introduction

This report describes how the housing stock in the Cincinnati metropolitan area changed between 1998 and 2011, with particular emphasis on affordable rental housing. The study uses data from the American Housing Survey (AHS), which collected detailed information on housing units in Cincinnati and on their occupants in both 1998 and 2011.[1]

As part of its Components of Inventory Change (CINCH) program, the U.S. Department of Housing and Urban Development (HUD) has funded, for a number of years, similar studies of metropolitan areas to document changes in the American housing stock. These studies have traditionally included an assessment of changes in the rental housing market called rental dynamics. This paper is one of 29 metropolitan CINCH studies based on the information provided by the 2011 AHS.[2]

CINCH reports present both forward-looking analysis (what happened to the 1998 units by 2011) and backward-looking analysis (where the 2011 units came from in terms of 1998).[3] This paper repeats the analysis contained in the most recent CINCH and rental dynamics studies, but its organization differs from that of previous reports.

- Section 2 discusses data and related issues that affect the CINCH and rental dynamics analysis for Cincinnati.

- Section 3 explains the changes in the housing stock between 1998 and 2011 in terms of losses to the housing stock through demolitions or the other ways units can leave the housing stock and additions through new construction and other means.

- Section 4 looks at components of the housing stock that experienced losses or additions markedly different from the overall patterns of losses and additions.

- Section 5 breaks the rental housing stock into eight affordability categories and tracks what happened to units in each of those categories between 1998 and 2011.

[1] Since 1973, the U.S. Department of Housing and Urban Development (HUD) and the Census Bureau have conducted an extensive survey of the American housing stock called the American Housing Survey (AHS). The AHS has two components: a national survey that, since 1985, has collected data every 2 years on the entire U.S. housing stock and a metropolitan component that, since 1985, has collected data at various times on the housing stock of 45 metropolitan areas. Both the national and metropolitan components use the same sample of housing units in successive surveys, making it possible to observe changes in units over time. The initial samples have been augmented in later years to account for units added by new construction or other means.

[2] HUD also funds CINCH studies of survey-to-survey changes in the national stock. At the national level, the Rental Dynamics studies are published separately. For a complete list of all CINCH studies, see http://www.huduser.org/portal/datasets/cinch.html.

[3] The forward-looking analysis was previously presented to HUD in December 2013. The data needed to produce the backward-looking analysis did not become available until after the allowed period of performance of the contract under which the previous report was completed.

- Section 6 summarizes the changes to the housing stock of the Cincinnati metropolitan area between 1998 and 2011.

The paper concludes with two appendices that contain analyses and data found in the body of previous CINCH reports.

- Appendix A explains the CINCH and rental dynamics methodologies.

- Appendix B contains the detailed CINCH and rental dynamics tables found in previous reports.

National economic conditions shaped in important ways the changes observed in this report. The 1998–2011 period began toward the end of the longest recorded business cycle (March 1991 to November 2001), encompassed a vigorous expansion (November 2001 to December 2007), included the recent harsh recession (December 2007 to June 2009), and ended with a period of lackluster recovery.

2. Special Issues: Cincinnati

Metropolitan areas are composed of counties or townships that are interrelated economically. The Office of Management and Budget periodically adjusts the composition of metropolitan areas as the economic relationships among counties change. In some cases, the AHS retains the metropolitan boundaries in effect when the original metropolitan sample was drawn; in other cases, the AHS will adjust the original sample to correspond to the new definition of the metropolitan area. A change in sample boundaries will affect the interpretation of CINCH analysis and its precision. The absolute sample size available to study changes between surveys determines how reliably the observed changes are measured.

Geography

In 1998 the Cincinnati metropolitan area contained 647,500 housing units, including vacant units. By 2011 the number of housing units had increased to 921,700. Part of this increase was due to a redefinition of the metropolitan area that added eight counties (Franklin and Ohio in Indiana; Bracken, Gallatin, Grant, and Pendleton in Kentucky; and Brown and Butler in Ohio). Using the American Community Survey (2011, 5-year data) at the county level, we estimate that the 2011 count of housing units for the metropolitan area as defined in 1998 would be 715,300. This represents an overall increase of 10.5 percent, which translates to an average annual increase of only 0.8 percent over the 13-year period.

The change in the geographical definition of Cincinnati affects the interpretation of the information presented in this report. Our analysis applies only to that portion of the metropolitan area that was common to the Cincinnati metropolitan area as defined in both 1998 and 2011, but the application to the common area is not precise, as explained in Appendix A.

Sample size

Both CINCH and rental dynamics require that, if a sample unit is in both the 1998 and 2011 housing stock, it must be interviewed in both surveys to be included in the analysis. Other analytical requirements also limit effective sample size. There are 1,336 sample units that were common to the 1998 and 2011 AHS Cincinnati surveys and satisfied all the analytical requirements.[4] Between 1998 and 2011, 27 sample units in the common area meeting the analytical requirements were lost to the stock; thus, the forward-looking analysis is based on a maximum of 1,363 sample units. Between 1998 and 2011, 451 sample units meeting the analytical requirements were added to the AHS to represent additions to the stock throughout the metropolitan area as defined in 2011; thus, the backward-looking analysis is based on a maximum of 1,787 sample units. In the forward-looking analysis, the average weight of a sample unit is approximately 475 units; in the backward-looking analysis, the average weight of a sample unit is approximately 516 units.

Data reliability

All CINCH analysis relies on two AHS variables: NOINT (why there was no interview), which, among other things, explains why a unit is temporarily or permanently out of the stock, and REUAD (why unit added), which explains why a sample unit entered the sample. Both variables require some detective work on the part of Census Bureau staff, and the longer the period between surveys, the more difficult the detective work. At the national level, the AHS data are collected every 2 years, so it is relatively easy to determine why a unit has been removed from or added to the sample. In the case of Cincinnati, 13 years separate the 2011 sample from the 1998 sample. As a result, explaining the loss or addition of sample units is very challenging. This report is part of a series that compares the housing stock in 2011 to the housing stock of 7 metropolitan areas in 1998, 12 metropolitan areas in 2002, 8 metropolitan areas in 2004, and 2 metropolitan areas in 2009. We compared the pattern of changes across the 29 areas studied in these reports to the changes recorded between 2009 and 2011 at the national level. With respect to losses, the patterns are reasonably similar except for the role played by the movement of mobile homes. Mobile home move-outs are much more important in explaining losses at the national level. At both the national and metropolitan levels, the "other" category accounts for one-fifth to one-quarter of the losses. With respect to additions, new construction accounts for 72 percent of all additions at the national level but 94 percent at the metropolitan level. We suspect that data issues downplay the importance of "means other than new construction" at the metropolitan level.

[4] The 1998 AHS surveyed 5,041 units in the Cincinnati metropolitan area; 1,676 of these units were in the 2011 AHS public use file (PUF). Of the 3,365 sample units no longer in the survey, 102 were legitimate temporary or permanent losses to the housing stock and were considered for the analysis. The remaining 3,263 cases are coded as "sample reduction for the current survey year" with no further explanation.

3. Changes to the Housing Stock: 1998–2011

Losses between 1998 and 2011

One typically thinks of the housing stock evolving through two mechanisms: the construction of new units and the demolition of old units. While new construction and losses through demolition and natural disasters are the primary means by which the housing stock changes, CINCH shows that there are other important engines of change.

Table 1 reports that between 1998 and 2011, only 4,900 units left the housing stock.[5] Of these, 3,800 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 400 units that left the housing stock either permanently or temporarily for "other" reasons, a category that encompasses a wide variety of situations.

Table 1: Disposition of 1998 Cincinnati Housing Units in 2011[6]

Present in 1998	647,500
1998 units present in 2011	642,600
Units no longer in the stock	**4,900**
1998 units lost due to conversion/merger	700
1998 house or mobile home moved out	0
1998 units lost through demolition or disaster	3,200
Permanent losses	**3,800**
1998 units changed to nonresidential use	300
1998 units badly damaged or condemned	300
Temporary losses	**700**
1998 units lost in other ways	**400**

Demolitions and natural disasters accounted for 3,200 of the permanent losses, while mergers and conversions contributed another 700 permanent losses. "Conversion" is the terminology used in the AHS for the splitting of a unit into two or more units. The movement of a mobile home or house is considered a permanent loss because a housing unit is the combination of land and capital. While movement preserves the capital, it dissolves the union of capital and land that formed the original unit; therefore, the movement of a mobile home is considered a permanent loss. Unfortunately, the 2011 AHS survey in Cincinnati did not track mobile home move-outs, probably because the long time between surveys makes it difficult to determine whether the current mobile home was the same mobile home as in 1998.

Sometimes houses are used for business purposes. Such commercial use or the use of a house for a group home is considered a change to a nonresidential use. Badly damaged units may be repaired, left in an unusable state, or demolished.

[5] With the caveats noted in Appendix A, this analysis applies to the area common to both the 1998 and 2011 definitions of the metropolitan area.

[6] Numbers may not add consistently due to rounding. Counts were rounded to the nearest hundred.

Appendix B contains four forward-looking tables that break the overall stock into more than 100 subgroups, such as single-family detached houses or units occupied by Black householders in 1998. For each subgroup, these tables detail how many of the 1998 units in that subgroup are in the same subgroup in 2011, have moved into another subgroup, or have left the stock and how they left the stock. Section 4 looks across the Appendix B forward-looking tables and focuses on those subgroups that lost an unusually high or an unusually low number of units over the 1998–2011 period.

Additions between 1998 and 2011

Table 2, together with the backward-looking Appendix B tables, provides a great deal of information on additions to the housing stock between 1998 and 2011.[7]

Table 2: Sources for 2011 Cincinnati Housing Stock[8]

2011 housing stock	921,600
2011 units present in 1998	690,200
Total additions to stock	**231,400**
Units added by new construction	222,000
House or mobile home moved in	0
Units added by conversion/merger	600
New or reconstructed units	**222,600**
Units added from nonresidential use	2,200
Units added from temporary losses	3,400
Recovered units	**5,600**
Units added in other ways	**3,300**

In the period between the 1998 and 2011 AHS surveys, 231,400 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did not track move-ins of mobile homes in Cincinnati. Also, 600 new units were formed from the conversion or merger of 1998 units.

We classified 5,600 units as recovered because these units had been in the housing stock at some point but were classified in 1998 as nonresidential (2,200) or uninhabitable (3,400). Finally, 3,300 units were added in other unclassified ways.

Appendix B contains four backward-looking tables that break the overall stock into more than 100 subgroups. For each subgroup, these tables detail how many of the 2011 units in that subgroup were in the same subgroup in 2011, have moved from another subgroup, or are new additions to the stock. Section 4 looks across the Appendix B backward-looking tables and

[7] With the caveats noted in Appendix A, this analysis applies to the area common to both the 1998 and 2011 definitions of the metropolitan area. Inconsistencies between Tables 1 and 2 result from a combination of (1) changes in metropolitan boundaries, (2) changes in control housing counts between censuses, and (3) different weights.

[8] Numbers may not add consistently due to rounding. Counts were rounded to the nearest hundred.

focuses on those subgroups that gained an unusually high or an unusually low number of units over the 1998–2011 period.

4. Components With Atypical Losses or Additions

The Cincinnati metropolitan area lost 0.8 percent of all 1998 housing units by 2011, but the loss rate varied across sectors of the stock. For example, the occupied housing stock lost 0.6 percent of its units between 1998 and 2011.

We examined all of the components of the 1998 Cincinnati housing stock contained in the four forward-looking tables in Appendix B to identify subgroups with unusual loss rates. Forward-Looking Table A reports information on all units in the stock; Table 3 lists subgroups from Table A with loss rates statistically different than the loss rate of the overall stock. Forward-Looking Tables B, C, and D describe important characteristics of occupied units and their residents; Table 3 lists subgroups from those tables with loss rates statistically different than the loss rate of occupied units. We also employed judgment in selecting among components with statistically different loss rates. In general, we looked for subgroups with loss rates less than half or more than double the benchmark rate, but we listed other subgroups if their inclusion illustrated interesting patterns within loss rates. Finally, Table 3 includes the loss rates for four key segments of the housing market—occupied units, vacant units, owner-occupied units, and renter-occupied units—even if their loss rates are not statistically different.

Table 3: Sectors Experiencing Atypical Loss Rates in Cincinnati, 1998–2011[9]

Characteristics	Present in 1998	Total lost	Percent lost
Housing stock	647,500	4,900	0.8%
Occupancy status			
Occupied	592,400	3,300	0.6%
Vacant	52,800	1,400	2.6%
Bedrooms			
4 or more	133,200	300	0.2%*
Tenure			
Owner-occupied	396,300	800	0.2%
Renter-occupied	196,100	2,400	1.2%
Owner household income			
$100,000 or more	71,100	100	0.1%**

* Statistically different from either all units or all occupied units, as appropriate, at the 10-percent level.
** Statistically different from either all units or all occupied units, as appropriate, at the 5-percent level.
*** Statistically different from either all units or all occupied units, as appropriate, at the 1-percent level.

Because of the very low overall loss rate and the small sample, Table 3 identified only two loss rates that were both atypical of the overall housing stock and statistically significant:

- Units with 4 or more bedrooms had low loss rates.

[9] Two conditions were necessary for a housing sector to appear in Table 3, one mathematical and one judgmental: (1) the difference between the sector's loss rate and the benchmark rate had to have been statistically significant at the 10-percent level, and (2) the difference had to be interesting. Counts are rounded to the nearest hundred.

- Owner-occupied units whose households earned $100,000 or more in 1998 had low loss rates.

The 231,400 additions reported in Table 2 represent 25.1 percent of the 2011 housing stock. The rate of addition varied by the characteristics of the housing. Additions represented 26.1 percent of occupied units.

We examined all of the components of the 1998 Cincinnati housing stock contained in the four backward-looking tables in Appendix B to identify subgroups with unusual addition rates. Backward-Looking Table A reports information on all units in the stock; Table 4 lists subgroups from Table A with addition rates statistically different than the addition rate of the overall stock. Backward-Looking Tables B, C, and D describe important characteristics of occupied units and their residents; Table 4 lists subgroups from those tables with addition rates statistically different than the addition rate of occupied units. We also employed judgment in selecting among components with statistically different addition rates. In general, we looked for subgroups with addition rates less than half or more than double the benchmark rate, but we listed other subgroups if their inclusion illustrated interesting patterns within addition rates. Finally, Table 4 includes the addition rates for four key segments of the housing market—occupied units, vacant units, owner-occupied units, and renter-occupied units—even if their addition rates are not statistically different.

Table 4: Sectors Experiencing Atypical Rates of Addition in Cincinnati, 1998–2011[10]

Characteristics	Present in 2011	Total additions	Percent additions
Housing stock	921,600	231,400	25.1%
Occupancy status			
Occupied	815,600	212,700	26.1%
Vacant	103,800	17,500	16.9%***
Seasonal	2,200	1,200	56.4%*
Units in structure			
1, attached	45,300	25,600	56.6%***
2 to 4	99,300	9,700	9.8%***
5 to 9	66,200	11,300	17.0%**
Manufactured/mobile home	30,000	3,300	10.9%***
Rooms			
1	900	900	100.0%***
3	73,600	7,700	10.4%***
4	149,900	26,300	17.5%***
5	189,800	35,300	18.6%***
8	88,800	28,300	31.9%**
9	56,800	21,400	37.7%***
10 or more	41,900	18,400	43.9%***
Bedrooms			
1	95,300	12,000	12.6%***

[10] Two conditions were necessary for a housing sector to appear in Table 4, one mathematical and one judgmental: (1) the difference between the sector's addition rate and the benchmark rate had to have been statistically significant at the 10-percent level, and (2) the difference had to be interesting. Counts are rounded to the nearest hundred.

Characteristics	Present in 2011	Total additions	Percent additions
2	245,100	40,700	16.6%***
4 or more	228,800	85,400	37.3%***
Multiunit structures	248,500	39,200	15.8%***
Stories in structure			
2	95,300	12,100	12.7%***
3	114,200	13,600	11.9%***
7 or more	2,300	2,300	100.0%***
Lacking complete kitchen facilities	22,500	3,100	13.7%*
Lacking some plumbing	6,800	400	6.2%***
No exclusive use	6,800	400	6.2%***
Severe problems			
Plumbing	6,800	400	6.2%***
Moderate problems	31,700	4,100	12.9%***
Kitchen	22,500	3,100	13.7%*
Upkeep	9,000	400	4.7%***
Age of householder			
65 to 74	91,700	18,600	20.3%*
75 or older	72,100	13,600	18.8%**
Children in household			
Some	317,500	100,400	31.6%***
None	498,100	112,200	22.5%**
Race and ethnicity			
White Hispanic	21,500	1,800	8.6%***
Black alone	59,600	10,300	17.3%**
Black Non-Hispanic	58,600	10,300	17.6%***
Two or more races	8,400	800	9.6%**
Hispanic or Latino (any race)	23,000	1,800	8.0%***
Income sources of families and primary individuals			
Public assistance or public welfare	13,900	1,000	7.3%***
Tenure			
Owner-occupied	559,000	167,500	30.0%**
Renter-occupied	256,600	45,100	17.6%***
Renter monthly housing costs			
Less than $350	20,400	3,000	14.5%*
$350 to $599	51,100	4,000	7.8%***
$600 to $799	80,500	10,200	12.7%***
$1,250 or more	23,500	9,800	41.5%**
Renter household income			
Less than $15,000	65,800	8,800	13.4%***
$30,000 to $49,999	56,000	6,700	11.9%***
Owner monthly housing costs			
$350 to $599	80,000	13,300	16.6%***
$600 to $799	58,600	9,500	16.2%***
$800 to $1,249	138,500	27,800	20.1%**
$1,250 or more	255,700	111,900	43.8%***
Owner household income			
$15,000 to $29,999	67,600	11,000	16.3%***
$100,000 or more	176,900	71,600	40.5%***

* Statistically different from either all units or all occupied units, as appropriate, at the 10-percent level.
** Statistically different from either all units or all occupied units, as appropriate, at the 5-percent level.
*** Statistically different from either all units or all occupied units, as appropriate, at the 1-percent level.

Table 4 identifies rates of addition that were both atypical of the overall housing stock and statistically significant:

- The rate of addition among units vacant in 2011 was lower than that of all units, but the rate of addition among units used for seasonal purposes in 2011 was higher than average.

- The rate of addition varied by structure type. Single-family attached units had a very high rate of addition. As a group, multifamily units had a low rate of addition, and lower-than-average rates were seen among units in small multifamily buildings, whether measured by number of units in the building or number of floors. An exception was the class of units in multifamily buildings with 7 or more floors. Manufactured houses had a low rate of addition.

- Unit size mattered. Units with fewer than 7 rooms or with fewer than 4 bedrooms had lower-than-average rates of addition; those with 8 or more rooms or 4 or more bedrooms had high rates of addition. The exception was a small group of 1-room units built during the 1998 to 2011 period.

- The rates of addition were low among units reporting physical problems in 2011, specifically lack of exclusive use of bathroom facilities or lack of complete kitchen facilities. The plumbing deficiencies show up also as severe physical problems, while the kitchen deficiencies show up also as moderate physical problems. Units with moderate upkeep problems in 2011 also had a low rate of addition.

- Units occupied in 2011 by households with elderly householders (65 or older) had low rates of addition. Units occupied by households with children had an above-average rate of addition, while those without children had a below-average rate.

- Units with Black or Hispanic householders in 2011 or with householders who identified themselves as being multiracial experienced lower-than-average rates of addition.

- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those with low monthly housing costs (less than $800). Additions were higher than normal among high cost rentals ($1,250 or more).

- The rate of addition among units that were owner-occupied in 2011 was higher than that of all occupied units. Among owner-occupied units, those occupied by lower income owners ($15,000 to $29,999) and those with lower monthly housing costs ($350 to $1,249) had lower-than-average rates of addition, while those occupied by high-income owners ($100,000 or more) and those with high monthly housing cost ($1,250 or more) had very high rates of addition.

5. Rental Market Dynamics: 1998–2011

Rental market dynamics focuses on the supply of rental housing and how that supply changes over time. Rental dynamics analysis has many of the features of CINCH analysis. A key step in rental dynamics analysis is to separate the rental stock into classes or strata based on how affordable the units are. This paper uses eight categories:

- Non-market: Either no cash rent or a subsidized rent.
- Extremely low rent: Affordable to renters with incomes less than or equal to 30 percent of local area median income.
- Very low rent: Affordable to renters with incomes greater than 30 percent but less than or equal to 50 percent of local area median income.
- Low rent: Affordable to renters with incomes greater than 50 percent but less than or equal to 60 percent of local area median income.
- Moderate rent: Affordable to renters with incomes greater than 60 percent but less than or equal to 80 percent of local area median income.
- High rent: Affordable to renters with incomes greater than 80 percent but less than or equal to 100 percent of local area median income.
- Very high rent: Affordable to renters with incomes greater than 100 percent but less than or equal to 120 percent of local area median income.
- Extremely high rent: Affordable to renters with incomes greater than 120 percent of local area median income.

For each category, "affordable" is defined as a gross-rent-to-income ratio of 30 percent or less for the higher of the incomes that define the boundaries for that category.[11] The categories are defined relative to area median income; therefore, the boundaries of the categories will change as area median income changes.

Table 5 summarizes what happened to the 1998 rental units by how affordable they were in 1998. It is based on Forward-Looking Rental Dynamics Table 1 in Appendix B, which traces in more detail where these units wound up in 2011.

[11] Gross rent is equal to rent plus utilities.

Table 5: Summary of Forward-Looking Rental Dynamics for Cincinnati

Affordability categories	1998 rental units	To more affordable categories in 2011	In same affordability category in both years	To less affordable categories in 2011	1998 rental units non-rental in 2011
Non-market	35,400	NA	50.4%	41.2%	8.4%
Extremely low rent	17,000	4.5%	0.0%	56.3%	39.2%
Very low rent	95,400	8.9%	61.4%	18.8%	10.8%
Low rent	36,200	59.2%	17.2%	13.2%	10.4%
Moderate rent	31,700	42.1%	30.4%	10.4%	17.0%
High rent	8,700	49.2%	12.7%	16.9%	21.2%
Very high rent	1,000	0.0%	0.0%	100.0%	0.0%
Extremely high rent	0	0.0%	0.0%	NA	0.0%
Total	225,400	21.5%	41.5%	23.3%	13.7%

The 1998 rental stock in Cincinnati was affordable. Of the 225,400 rental units in 1998, 112,400 were extremely low rent or very low rent units. In addition, 35,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 65.6 percent of the 1998 rental stock. The three highest rent categories comprised only 4 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) and moves to a more affordable category (sometimes called filtration) were virtually even—23.3 percent of all 1998 units compared to 21.5 percent.

By 2011, 13.7 percent of the 225,400 rental units in 1998 were no longer in the rental stock (30,900 units). The largest proportion of these losses was due to changes in tenure, with 17,400 rental units becoming owner-occupied or vacant for sale in 2011. Another 10,900 units became seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 2,800 rental units were no longer in the housing stock in 2011. Some of these losses were permanent; that is, the units were demolished or destroyed. Some losses were potentially reversible, such as units being used for nonresidential purposes. Forward-Looking Rental Dynamics Table 2 shows how the movement out of the rental stock varied across the affordability categories.

Table 6 summarizes where the 2011 rental units came from, with respect to 1998, by how affordable they were in 2011. It is based on Backward-Looking Rental Dynamics Table 1 in Appendix B, which traces in more detail the origin of these units.

The rental stock in Cincinnati was still affordable in 2011. Of the 299,500 rental units in 2011, 138,500 were extremely low rent or very low rent units. In addition, 47,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 62.1 percent of the 2011 rental stock. The three highest rent categories comprised 7.7 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) were virtually equal to moves from a less affordable category (sometimes called filtration)—18.1 percent of all 2011 units compared to 16.7 percent.

Table 6: Summary of Backward-Looking Rental Dynamics for Cincinnati

Affordability categories	2011 rental units	From more affordable categories in 1998	In same affordability category in both years	From less affordable categories in 1998	2011 rental units non-rental in 1998
Non-market	47,400	NA	36.2%	26.1%	37.7%
Extremely low rent	10,200	6.0%	0.0%	29.6%	64.4%
Very low rent	128,300	14.5%	44.7%	18.7%	22.1%
Low rent	56,800	33.5%	9.6%	16.1%	40.8%
Moderate rent	33,600	22.7%	26.8%	4.6%	45.9%
High rent	12,000	7.9%	12.6%	0.0%	79.5%
Very high rent	2,100	49.4%	0.0%	0.0%	50.6%
Extremely high rent	9,000	70.2%	0.0%	NA	29.8%
Total	299,500	18.1%	30.2%	16.7%	35.0%

Of the 299,500 rental units in 2011, 35.0 percent were not rental in 1998 (104,800 units). A large proportion of these gains was due to changes in tenure, with 47,900 rental units having been owner-occupied or vacant for sale in 1998. Another 8,200 units had been seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 48,700 rental units had not been in the housing stock in 1998. Of these, 43,600 were added by new construction and 5,100 by other means. Backward-Looking Rental Dynamics Table 2 shows how the movement into the rental stock varied across the affordability categories.

6. Summary of Housing Market Changes: Cincinnati Metropolitan Area, 1998–2011

In 1998 the Cincinnati metropolitan area contained 647,500 housing units, including vacant units. By 2011 the number of housing units had increased to 921,700. Part of this increase was due to a redefinition of the metropolitan area that added eight counties. We estimate that the 2011 count of housing units for the metropolitan area as defined in 1998 would be 715,300. This represents an overall increase of 10.5 percent, which translates to an average annual increase of only 0.8 percent over the 13-year period.

The change in the geographical definition of Cincinnati affects the interpretation of the information presented in this report. Our analysis applies only to that portion of the metropolitan area that was common to the Cincinnati metropolitan area as defined in both 1998 and 2011.

Between 1998 and 2011, only 4,900 units left the housing stock. Of these, 3,800 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 700 are temporary losses—the original unit needs repairs or is being used for other purposes. These units may or may not return to the housing stock. Finally, there were 400 units that left the housing stock either permanently or temporarily for "other" reasons, a category that encompasses a wide variety of situations. Demolitions and natural disasters accounted for 3,200 of the permanent losses, while mergers and conversions contributed another 700 permanent losses. The 2011 AHS survey in Cincinnati did not track mobile home move-outs.

In the period between the 1998 and 2011AHS surveys, 231,400 units were added to the housing stock. Ninety-six percent of these additions were newly constructed units. The 2011 AHS did not track move-ins of mobile homes in Cincinnati. Also, 600 new units were formed from the conversion or merger of 1998 units. We classified 5,600 units as recovered because these units had been in the housing stock at some point but were classified in 1998 as nonresidential (2,200) or uninhabitable (3,400). Finally, 3,300 units were added in other unclassified ways.

The Cincinnati metropolitan area lost 0.8 percent of all 1998 housing units by 2011; additions between 2002 and 2011 represent 25.1 percent of the 2011 housing stock. Losses and additions varied across portions of the Cincinnati housing market defined by the characteristics of the unit or its occupants. We observed the following patterns, which were both atypical of the overall housing stock and statistically significant:

- Units with 4 or more bedrooms had low loss rates.

- Owner-occupied units whose households earned $100,000 or more in 1998 had low loss rates.

- The rate of addition among units vacant in 2011 was lower than that of all units, but the rate of addition among units used for seasonal purposes in 2011 was higher than average.

- The rate of addition varied by structure type. Single-family attached units had a very high rate of addition. As a group, multifamily units had a low rate of addition, and lower-than-average rates were seen among units in small multifamily buildings, whether measured by number units in the building or number of floors. An exception was the class of units in multifamily buildings with 7 or more floors. Manufactured houses had a low rate of addition.

- Unit size mattered. Units with fewer than 7 rooms or fewer than 4 bedrooms had lower-than-average rates of addition; those with 8 or more rooms or 4 or more bedrooms had high rates of addition. The exception was a small group of 1-room units built during the 1998 to 2011 period.

- The rates of addition were low among units reporting physical problems in 2011, specifically lack of exclusive use of bathroom facilities or lack of complete kitchen facilities. The plumbing deficiencies show up also as severe physical problems, while the kitchen deficiencies show up also as moderate physical problems. Units with moderate upkeep problems in 2011 also had a low rate of addition.

- Units occupied in 2011 by households with elderly householders (65 or older) had low rates of addition. Units occupied by households with children had an above-average rate of addition, while those without children had a below-average rate.

- Units with Black or Hispanic householders in 2011 or with householders who identified themselves as being multiracial experienced lower-than-average rates of addition.

- The rate of addition was low among units that were renter-occupied in 2011 and, among rental units, particularly low for those with low monthly housing costs (less than $800). Additions were higher than normal among high-cost rentals ($1,250 or more).

- The rate of addition among units that were owner-occupied in 2011 was higher than that of all occupied units. Among owner-occupied units, those occupied by lower income owners ($15,000 to $29,999) and those with lower monthly housing costs ($350 to $1,249) had lower-than-average rates of addition, while those occupied by high-income owners ($100,000 or more) and those with high monthly housing cost ($1,250 or more) had very high rates of addition.

The 1998 rental stock in Cincinnati was affordable. Of the 225,400 rental units in 1998, 112,400 were extremely low rent or very low rent units. In addition, 35,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 65.6 percent of the 1998 rental stock. The three highest rent categories comprised only 4 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) and moves to a more affordable category (sometimes called filtration) were virtually even—23.3 percent of all 1998 units compared to 21.5 percent. By 2011, 13.7 percent of the 225,400 rental units in 1998 were no longer in the rental stock (30,900 units). The largest proportion of these losses was due to changes in tenure, with 17,400 rental units becoming owner-occupied or vacant for sale in 2011.

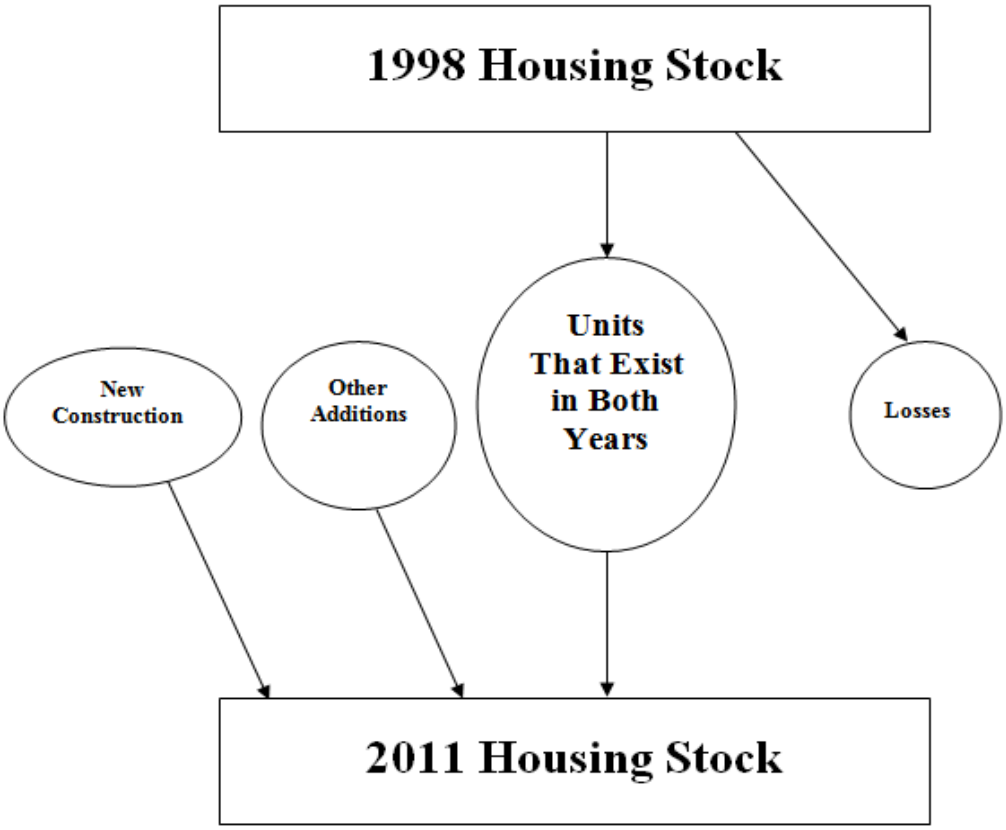
The rental stock in Cincinnati was still affordable in 2011. Of the 299,500 rental units in 2011, 138,500 were extremely low rent or very low rent units. In addition, 47,400 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 62.1 percent of the 2011 rental stock. The three highest rent categories comprised 7.7 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) were virtually equal to moves from a less affordable category (sometimes called filtration)—18.1 percent of all 2011 units compared to 16.7 percent. Of the 299,500 rental units in 2011, 35.0 percent were not rental in 1998 (104,800 units). A large proportion of these gains was due to changes in tenure, with 47,900 rental units having been owner-occupied or vacant for sale in 1998; another 43,600 were added by new construction.

Appendix A: CINCH and Rental Dynamics Methodology

Overview

Components of Inventory Change (CINCH) is a tool used by housing analysts to study how the housing inventory changes over time. Figure 1 illustrates how the inventory evolves.

Figure A-1: How the Housing Inventory Changes



In the context of Figure A-1, the U.S. Census Bureau provides estimates for both rectangles (the 1998 and 2011 housing stocks) and one oval (units added through new construction between 1998 and 2011). No one estimates the other three ovals: the number of units that belong to both the 1998 and 2011 housing stock, units lost to the housing stock between 1998 and 2011, and other additions to the housing stock between 1998 and 2011.

While losses and other additions are small relative to the overall stock, they encompass important features of how housing markets evolve. Housing units are "clumps" of physical capital associated with specific plots of land, and the housing inventory is the aggregation of these capital-land combinations. New construction creates new clumps, and—like all capital—some "clumps" depreciate and disappear. However, housing units undergo other interesting changes. Losses can be either permanent or temporary. Units destroyed by natural disasters or intentionally demolished are permanent losses. Temporary losses include units that are used for

nonresidential purposes and units that are uninhabitable because of structural defects that can be repaired. Additions can result from restoring units that were uninhabitable or converting nonresidential structures into residential structures.

In addition to determining the size of each oval, housing analysts find information about the characteristics of the units in the different ovals useful. Interesting characteristics include structure type, age of the unit, size of the unit, location by region, location by metropolitan status, tenure, household size and composition, resident income, and resident race and ethnicity.

CINCH analysis has three goals:[12]

- To provide an estimate for all six components of Figure A-1.
- To disaggregate losses and other additions into relevant component parts.
- To characterize the units that survive from one period to the next and the units that are added or lost between periods.

The AHS has four features that make CINCH analysis possible:

- Each unit has weights that can be used to estimate its share of the overall stock.
- The AHS tracks new construction and the various types of losses and other additions.
- The AHS has detailed information about the characteristics of each unit and its occupants.
- The AHS tracks the same unit from one period to the next so that changes in status and characteristics can be observed directly.

Housing analysts and policymakers are particularly interested in what happens to affordable rental housing units. Rental dynamics is a form of CINCH analysis that classifies the rental housing stock by affordability level and tracks the evolution of the rental housing stock by affordability class.

[12] Previous CINCH analyses have distinguished between the "status" of a unit with respect to the housing stock (e.g., existing as a nonresidential structure) and the "characteristics" of the unit or its occupants (e.g., rental vs. owner-occupied, or race of householder). This report uses this same distinction. Also adopting previous CINCH terminology, Appendix A will refer to the more recent AHS survey year, 2011, as the current year and the previous AHS survey year, 1998, as the base year.

Why the analysis needs to be separated into two components

It would be possible to list for every AHS sample unit its status and characteristics in both 1998 and 2011. In some cases, there may be no status, (e.g., not yet constructed in 1998) or no characteristics (e.g., no race of householder for vacant units), but with this understanding such a listing would still be possible. From the listing, one could construct an exact accounting of the movement of units among the various statuses and characteristics between 1998 and 2011.

The exact accounting would apply only to AHS sample observations, roughly a 1-in-500 picture of the housing stock at the metropolitan level. To obtain estimates of the magnitude of actual changes in the housing stock, one needs to apply weights to the sampled units. When weights are applied, the accounting will no longer be exact because units have different weights in different years.[13] For example, the exact accounting might show that 2,500 sample units that were rental in 1998 became owner-occupied or vacant for sale in 2011. To estimate the number of units in the national housing stock that were rental in 1998 and became owner-occupied in 2011, one would need to apply weights. However, using 1998 weights would produce a different estimate than using 2011 weights. There is no conceptual reason to favor the answer using 1998 weights over the answer using 2011 weights. The choice of weights depends upon how the intended analysis will be used.

For this reason, previous CINCH analyses have distinguished between:

1. *Forward-looking analysis;* that is, starting with the base-year stock (1998) and determining the status and characteristics of *those* units in the current year (2011). The goal is to explain what happened to the units comprising the housing stock in the base year. Forward-looking analysis takes the housing stock as given in the base year and looks at the destination of these units in the current year.

2. *Backward-looking analysis;* that is, starting from the current year (2011) stock and determining the status and characteristics of *those* units in the base year (1998). The goal here is to explain where the units comprising the current year housing stock came from. Backward-looking analysis takes the current-year housing stock as given and looks at the source of these units, either in the base year or in new construction or other additions.

[13] The Census Bureau assigns both a pure weight (the inverse of the probability of selection) and a final weight to each AHS observation. The final weights are designed to sum up to independent estimates of the total housing stock. The pure weights will vary over observations within a given AHS survey because of stratification in drawing the sample. Generally, pure weights do not vary across survey years. The final weights will differ over observations within a given AHS because the Census Bureau makes adjustments for various factors affecting the sample. The final weights of a given observation will also vary between AHS surveys because of changes in the housing stock.

Why changes in geography boundaries affect CINCH analysis

The analysis in this report applies only to that portion of the metropolitan area that was common to the metropolitan area as defined in both 1998 and 2011, and the application to the common area is not precise for the following reasons:

- For forward-looking analysis (1998 to 2011), we observe only those sample units in the geography common to both 1998 and 2011. Thus the observed changes correctly apply only to the common area. However, the forward-looking weights are based by necessity on the entire 1998 geography. Since the common area is smaller than the 1998 geography, the counts are overestimates for the common area.

- For the backward-looking analysis (2011 from 1998), we observe (a) sample units that were in the common area in 1998 and are still in the stock in 2011, (b) sample units representing additions to the stock throughout the metropolitan area as newly defined, and (c) sample units that represent housing existing in 1998 in the added portion of the metropolitan area. We can eliminate (c) and try to focus the analysis on the common area, but there are two problems. The backward-looking weights are based by necessity on the entire 2011 geography. Since the common area is smaller than the 2011 geography, the counts are overestimates for the common area. Moreover, we cannot determine which newly added sample units in (b) represent the common area and which represent the added portion of the metropolitan area. Therefore, additions are overestimated with respect to the common area.

Appendix B: CINCH and Rental Dynamics Tables

Contents

This appendix contains 12 detailed CINCH and rental dynamics tables that have been featured in previous reports. There are:

- Four forward-looking CINCH tables that track changes to the 1998 housing stock in 2011 by various characteristics of the units or their occupants.

- Four backward-looking CINCH tables that track where the 2011 housing stock originated by various characteristics of the units or their occupants.

- Two forward-looking rental dynamics tables (one with counts and one with percentages) that track by affordability category what happened to the 1998 rental stock by 2011.

- Two backward-looking rental dynamics tables (one with counts and one with percentages) that track by affordability category where the 2011 rental stock came from with respect to 1998.

Appendix B begins with an explanation of how to read the tables.

How to read CINCH tables

Rows and columns serve different purposes in CINCH tables. The rows identify classes of units to be analyzed. The columns trace those units either forward or backward. All counts are rounded to the nearest hundred.

The forward-looking tables report what happened to the 1998 housing stock by 2011. There are three possible dispositions of 1998 units:

- Units that continue to exist in 2011 with the same characteristics (or serving the same market).

- Units that continue to exist in 2011 but with different characteristics (or serving a different market).

- Units that were lost to the stock in 2011.

The backward-looking tables report where the 2011 housing stock came from in reference to 1998. There are three possible sources of 2011 units:

- Units that existed in 1998 with the same characteristics (or serving the same market).

- Units that existed in 1998 but with different characteristics (or serving a different market).

- Units that are additions to the housing stock between 1998 and 2011.

Since the essence of the CINCH analysis is in the columns, we will explain the columns in detail.

Columns Common to Both Forward-Looking and Backward-Looking Tables

The first and last columns contain the row numbers, which are identical for the same tables in the forward-looking and backward-looking sets. Columns A through D set up the analysis and track units that exist in both periods.

- Column A specifies the characteristic that defines the subset of the stock that is being tracked forward or backward in a particular row, for example, occupied units or units built from 1990 through 1994.

- Column B gives the CINCH estimate of the number of units that satisfy two conditions: (a) being part of the housing stock in the relevant year (1998 for the forward-looking tables and 2011 for the backward-looking tables) and (b) satisfying the condition in column A.

- Column C is the CINCH estimate of the number of units from column B that (a) are also part of the housing stock in the other year and (b) continue to belong to the subset defined by column A.

- Column D is the CINCH estimate of the number of units from column B that (a) are also part of the housing stock in the other year but (b) no longer belong to the subset defined by column A. In some cases, the analysis will not allow a unit to change characteristics between the base year and the other year. Examples include type of structure, year built, and number of stories; these characteristics are considered impossible or unlikely to change.

Columns Unique to Forward-Looking Tables

In the forward-looking tables, columns E through J track what happened to units that were lost from 1998 to 2011.

- Column E is the CINCH estimate of the number of units from column B that are not in the 2011 housing stock because they were merged with other units or converted into multiple units.

- Column F is the CINCH estimate of the number of houses or manufactured homes from column B that were moved out during the period. In most cases, these units were relocated rather than destroyed. The AHS considers them “losses” because a housing unit is a combination of land and capital, and a move breaks that specific combination to

create a new combination at a different location. For this reason, manufactured houses that move from one lot to another are treated as both losses and additions.[14]

- Column G is the CINCH estimate of the number of units from column B that became nonresidential at the end of the period. For example, a real estate firm, a tax preparation office, a palm reader, or some other business might buy or rent a house to use for business rather than residential purposes.[15]

- Column H is the CINCH estimate of the number of units from column B that were demolished or were destroyed by fires or natural disasters by 2011.

- Column I is the CINCH estimate of the number of units from column B that in 2011 were condemned or were no longer usable for housing because of extensive damage.

- Column J is the CINCH estimate of the number of units from column B that were lost by 2011 for other reasons.

The columns form a closed system. Column B counts the number of units tracked; columns C through J account for all the possible outcomes. Therefore, column B minus the sum of columns C through J always equals zero, except for rounding.

Columns Unique to Backward-Looking Tables

In backward-looking tables, columns E through J track where units came from that are part of the housing stock in 2011 but were not part of the 1998 housing stock.

- Column E is the CINCH estimate of the number of units from column B that were created by the merger or conversion of other units.

- Column F estimates the number of houses or mobile homes from column B that were moved in during the period. For many of the metropolitan areas in the 2011 AHS survey, information on movements was not collected.

- Column G is the CINCH estimate of the number of units from column B that had been nonresidential in 1998.

- Column H is the CINCH estimate of the number of units from column B that were newly constructed between 1998 and 2011. Note: Generally, in Backward-Looking Table A, there will be units in column H with year-built data substantially earlier than the survey year. There are three explanations for this apparent inconsistency. (1) With the exception of manufactured houses, presence in column H is determined by information from the

[14] The AHS does not track what happens to a house or mobile home that is moved off of a lot that is part of the AHS sample, and does not inquire about the previous history of a unit that is moved on to a lot that is part of the AHS sample.

[15] If the owner or tenant both lives in a unit and conducts business out of the unit, the AHS considers the unit to be residential. Nonresidential, therefore, means strictly no residential use.

Census Bureau indicating that the unit entered the sample from a listing of new construction; the Census Bureau may be mistaken. (2) Year built is based on information from the respondent; the respondent may be mistaken. (3) An older unit may have undergone substation renovation that required a new construction permit, but the respondent may have given the original construction date rather than the renovation date. The extent of major renovation occurring in many established neighborhoods throughout the country makes (3) a likely possibility.

- Column I is the CINCH estimate of the number of units from column B that were added by 2011 from units that were structurally unsound in 1998.[16]

- Column J is the CINCH estimate of the number of units from column B that were added by 2011 from units that had been temporarily lost to the stock in 1998 for reasons "not classified" or were newly added by "other" means.

In some metropolitan areas, the AHS surveys do not report data for all the rows in the tables in this appendix. The columns for those rows are left blank.

How to read rental dynamics tables

Forward-Looking Rental Dynamics Table 1 details by affordability category how the rental units in the 1998 housing stock relate to the 2011 housing stock. Column A estimates the number of units in each affordability category in 1998. Columns B through L explain where the 1998 rental units fit into the 2011 housing stock.

- If the units are still rental in 2011, they will be counted in columns B through I, depending upon how affordable they are in 2011.

- If the units have become owner-occupied or for vacant for sale, they will be counted in column J.

- Seasonal units, units that are not the primary residence of their occupants, units used for migratory workers, and units that are vacant but not for rent or sale are counted in column K.

- Column L counts 1998 units that are not in the 2011 housing stock; these can be either temporary or permanent losses to the stock.

The sum of columns B through L equals column A, except for rounding.

Forward-Looking Rental Dynamics Table 2 presents the same information as Table 1, but columns B through L are now percentages of column A. Columns B through L sum to 100 percent in each row.

[16] These units had codes that identified them as "occupancy prohibited" or "interior exposed to the elements."

Backward-Looking Rental Dynamics Table 1 details by affordability category where the rental units in the 2011 housing stock came from with respect to the 1998 housing stock. Column A estimates the number of units in each affordability category in 2011. Columns B through L explain where the 2011 rental units originated.

- If the units were rental in 1998, they will be counted in columns B through I, depending upon how affordable they are in 1998.
- If the units were owner-occupied or for vacant for sale, they will be counted in column J.
- Seasonal units, units that are not the primary residence of their occupants, units used for migratory workers, and units that are vacant but not for rent or sale in 1998 are counted in column K.
- Column L counts rental units that were newly constructed between 1998 and 2011.
- Column M counts rental units that were added to the housing stock after 1998 by other means.

The sum of columns B through M equals column A, except for rounding.

Backward-Looking Rental Dynamics Table 2 presents the same information as Table 1, but columns B through M are now percentages of column A. Columns B through M sum to 100 percent in each row.

These four Rental Dynamics Tables look only at the endpoints of the 13-year period; for example, a unit that is low rent in 1998 and moderate rent in 2011 might have been high rent, owned, or out of the stock at points in between the two surveys. These tables do not track the path of rental units between 1998 and 2011.

Forward-Looking Table A: Housing Characteristics, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
1	Housing stock	647,500	642,600	0	700	0	300	3,200	300	400	1
	Occupancy status										
2	Occupied	592,400	522,400	66,800	400	0	100	2,600	0	100	2
3	Vacant	52,800	11,000	40,500	0	0	200	500	300	300	3
4	Seasonal	2,300	500	1,600	300	0	0	0	0	0	4
	Units in structure										
5	1, detached	404,900	403,000	0	100	0	100	1,200	300	100	5
6	1, attached	19,600	19,600	0	0	0	0	0	0	0	6
7	2 to 4	69,600	68,100	0	500	0	0	700	0	300	7
8	5 to 9	54,700	54,700	0	0	0	0	0	0	0	8
9	10 to 19	51,700	50,400	0	0	0	0	1,300	0	0	9
10	20 to 49	26,200	26,000	0	0	0	200	0	0	0	10
11	50 or more										11
12	Manufactured/mobile home	20,700	20,700	0	0	0	0	0	0	0	12

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
	Year built										
16	1995–1999	38,300	38,300	0	0	0	0	0	0	0	16
17	1990–1994	61,200	61,200	0	0	0	0	0	0	0	17
18	1985–1989	66,000	65,800	0	0	0	200	0	0	0	18
19	1980–1984	52,300	52,200	0	0	0	0	100	0	0	19
20	1975–1979	62,300	61,600	0	0	0	0	600	0	0	20
21	1970–1974	70,100	69,500	0	0	0	0	600	0	0	21
22	1960–1969	81,500	81,400	0	0	0	100	0	0	0	22
23	1950–1959	80,500	79,900	0	0	0	0	600	0	0	23
24	1940–1949	49,300	49,300	0	0	0	0	0	0	0	24
25	1930–1939	25,300	24,100	0	500	0	0	300	200	300	25
26	1920–1929	23,600	23,100	0	100	0	0	400	0	0	26
27	1919 or earlier	37,000	36,100	0	0	0	0	500	200	100	27
	Rooms										
28	1	2,000	0	1,700	0	0	200	0	0	0	28
29	2	2,500	700	1,800	0	0	0	0	0	0	29
30	3	70,400	55,200	13,900	500	0	0	600	0	100	30
31	4	123,100	82,100	40,200	0	0	0	800	0	0	31
32	5	123,300	70,000	52,000	100	0	0	1,000	200	0	32
33	6	113,200	53,800	58,500	0	0	100	400	200	300	33
34	7	77,800	35,100	42,500	0	0	0	200	0	0	34
35	8	68,100	25,500	42,500	0	0	0	100	0	0	35
36	9	39,100	12,400	26,700	0	0	0	0	0	0	36
37	10 or more	28,100	11,700	16,400	0	0	0	0	0	0	37

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
	Bedrooms										
38	None	2,000	0	1,700	0	0	200	0	0	0	38
39	1	87,600	70,700	15,500	500	0	0	800	0	100	39
40	2	193,600	158,800	32,500	100	0	100	1,600	200	300	40
41	3	231,200	184,400	46,100	0	0	0	500	200	0	41
42	4 or more	133,200	100,500	32,400	0	0	0	300	0	0	42
43	Multiunit structures	202,200	199,200	0	500	0	200	2,000	0	300	43
	Stories in structure										
44	1	77,800	77,200	0	0	0	0	500	0	0	44
45	2	97,400	96,500	0	0	0	200	600	0	0	45
46	3	15,400	14,300	0	0	0	0	800	0	300	46
47	4 to 6										47
48	7 or more										48

Forward-Looking Table B: Unit Quality, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
1	Occupied units	592,400	522,400	66,800	400	0	100	2,600	0	100	1
2	With complete kitchen	576,700	495,900	77,500	400	0	100	2,600	0	100	2
3	Lacking complete kitchen facilities	15,700	2,100	13,600	0	0	0	0	0	0	3
4	With complete plumbing	588,000	514,300	70,400	400	0	100	2,600	0	100	4
5	Lack some plumbing	4,400	0	4,400	0	0	0	0	0	0	5
6	No hot piped water										6
7	No bathtub/shower										7
8	No flush toilet										8
9	No exclusive use	4,400	0	4,400	0	0	0	0	0	0	9
	Water										
10	Public/private water	570,900	504,500	63,400	400	0	100	2,400	0	100	10
11	Well serving 1 to 5 units	6,900	6,100	800	0	0	0	0	0	0	11
12	Other water source	14,600	5,500	8,900	0	0	0	300	0	0	12
	Sewer										
13	Public sewer	481,800	418,400	60,700	400	0	0	2,100	0	100	13
14	Septic tank/cesspool	110,600	78,000	32,000	0	0	100	500	0	0	14
15	Other										15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
16	Severe problems	6,400	0	6,400	0	0	0	0	0	0	16
17	Plumbing	4,400	0	4,400	0	0	0	0	0	0	17
18	Heating	2,000	0	2,000	0	0	0	0	0	0	18
19	Electric										19
20	Upkeep										20
21	Moderate problems	25,700	3,800	21,900	0	0	0	0	0	0	21
22	Plumbing	2,100	0	2,100	0	0	0	0	0	0	22
23	Heating	1,300	0	1,300	0	0	0	0	0	0	23
24	Kitchen	15,700	2,100	13,600	0	0	0	0	0	0	24
25	Upkeep	9,000	900	8,200	0	0	0	0	0	0	25

Forward-Looking Table C: Occupant Characteristics, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
1	Occupied units	592,400	522,400	66,800	400	0	100	2,600	0	100	1
	Age of householder										
2	Under 65	475,300	349,300	123,900	400	0	100	1,400	0	100	2
3	65 to 74	64,600	2,300	61,500	0	0	0	800	0	0	3
4	75 or older	52,600	13,000	39,200	0	0	0	400	0	0	4
	Children in household										
5	Some	225,400	98,300	126,000	400	0	0	700	0	0	5
6	None	367,000	233,500	131,200	0	0	100	2,000	0	100	6
	Race and ethnicity										
7	White	542,100	448,900	90,700	400	0	100	1,900	0	100	7
8	Hispanic	5,700	900	4,900	0	0	0	0	0	0	8
9	Non-Hispanic	536,400	431,900	101,900	400	0	100	1,900	0	100	9
10	Black	34,400	22,400	11,900	0	0	0	100	0	0	10
11	Hispanic	400	0	400	0	0	0	0	0	0	11
12	Non-Hispanic	34,000	21,600	12,300	0	0	0	100	0	0	12
13	American Indian or Alaska Native alone	800	0	800	0	0	0	0	0	0	13
14	Asian or Pacific Islander	11,700	900	10,200	0	0	0	600	0	0	14
16	Other	3,400	500	2,900	0	0	0	0	0	0	16
17	Hispanic or Latino (any race)	7,400	2,100	5,300	0	0	0	0	0	0	17

	A	B	C	D	E	F	G	H	I	J	
Row	**Characteristics**	**Present in 1998**	**1998 units present in 2011**	**Change in characteristics**	**1998 units lost due to conversion/ merger**	**1998 house or mobile home moved out**	**1998 units changed to nonresidential use**	**1998 units lost through demolition or disaster**	**1998 units badly damaged or condemned**	**1998 units lost in other ways**	**Row**
	Income sources of families and primary individuals										
18	Wages and salaries	457,000	312,400	142,600	100	0	100	1,700	0	100	18
20	Dividends, interest, or rent	267,900	78,600	186,900	300	0	100	1,900	0	100	20
21	Public assistance or public welfare	23,200	1,400	21,800	0	0	0	0	0	0	21

Forward-Looking Table D: Income and Housing Cost, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
1	Occupied units	592,400	522,400	66,800	400	0	100	2,600	0	100	1
	Tenure										
2	Owner-occupied	396,300	334,800	60,700	0	0	100	700	0	0	2
3	Homeownership rate	66.9%									3
4	Renter-occupied	196,100	141,100	52,500	400	0	0	1,900	0	100	4
	Renter monthly housing costs										
5	No cash rent	3,700	500	3,200	0	0	0	0	0	0	5
6	Less than $350	28,100	5,500	22,200	300	0	0	100	0	0	6
7	$350 to $599	99,800	15,400	83,400	100	0	0	800	0	100	7
8	$600 to $799	42,800	9,400	32,300	0	0	0	1,100	0	0	8
9	$800 to $1,249	21,700	5,900	15,800	0	0	0	0	0	0	9
10	$1,250 or more	0	0	0	0	0	0	0	0	0	10
	Renter household income										
11	Less than $15,000	61,300	20,100	41,000	0	0	0	200	0	0	11
12	$15,000 to $29,999	62,300	12,600	49,100	0	0	0	600	0	0	12
13	$30,000 to $49,999	43,000	9,900	32,700	300	0	0	100	0	0	13
14	$50,000 to $99,999	27,200	6,000	19,900	100	0	0	1,000	0	100	14
15	$100,000 or more	2,200	0	2,200	0	0	0	0	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 1998	1998 units present in 2011	Change in characteristics	1998 units lost due to conversion/ merger	1998 house or mobile home moved out	1998 units changed to nonresidential use	1998 units lost through demolition or disaster	1998 units badly damaged or condemned	1998 units lost in other ways	Row
	Owner monthly housing costs										
16	Less than $350	90,700	11,200	79,300	0	0	0	100	0	0	16
17	$350 to $599	80,300	14,800	65,600	0	0	0	0	0	0	17
18	$600 to $799	63,300	5,700	57,400	0	0	0	100	0	0	18
19	$800 to $1,249	99,900	30,100	69,300	0	0	100	500	0	0	19
20	$1,250 or more	62,100	40,300	21,700	0	0	0	0	0	0	20
	Owner household income										
21	Less than $15,000	48,900	5,300	43,400	0	0	0	100	0	0	21
22	$15,000 to $29,999	52,500	10,500	42,100	0	0	0	0	0	0	22
23	$30,000 to $49,999	76,100	15,900	60,300	0	0	0	0	0	0	23
24	$50,000 to $99,999	147,700	48,900	98,200	0	0	100	500	0	0	24
25	$100,000 or more	71,100	29,800	41,200	0	0	0	100	0	0	25

Backward-Looking Table A: Housing Characteristics, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 1998**	**Change in characteristics**	**2011 units added by conversion/ merger**	**2011 house or mobile home moved in**	**2011 units added from nonresidential use**	**2011 units added by new construction**	**2011 units added from temporary losses in 1998 stock**	**2011 units added in other ways**	**Row**
1	Housing stock	921,600	690,200	0	600	0	2,200	222,000	3,400	3,300	1
	Occupancy status										
2	Occupied	815,600	565,000	37,900	600	0	1,700	205,300	2,400	2,700	2
3	Vacant	103,800	11,100	75,200	0	0	500	15,500	1,000	600	3
4	Seasonal	2,200	300	600	0	0	0	1,200	0	0	4
	Units in structure										
5	1, detached	597,800	434,500	0	0	0	500	162,500	400	0	5
6	1, attached	45,300	19,600	0	0	0	0	25,600	0	0	6
7	2 to 4	99,300	89,500	0	0	0	0	6,900	1,900	900	7
8	5 to 9	66,200	54,900	0	0	0	600	9,500	0	1,200	8
9	10 to 19	53,400	40,700	0	600	0	0	12,100	0	0	9
10	20 to 49	13,200	13,200	0	0	0	0	0	0	0	10
11	50 or more	16,400	10,900	0	0	0	1,100	3,200	0	1,200	11
12	Manufactured/mobile home	30,000	26,700	0	0	0	0	2,300	1,000	0	12

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 1998**	**Change in characteristics**	**2011 units added by conversion/ merger**	**2011 house or mobile home moved in**	**2011 units added from nonresidential use**	**2011 units added by new construction**	**2011 units added from temporary losses in 1998 stock**	**2011 units added in other ways**	**Row**
	Year built										
13	2010–2014	9,000	0	0	0	0	0	9,000	0	0	13
14	2005–2009	88,800	0	0	0	0	0	88,800	0	0	14
15	2000–2004	94,700	0	0	0	0	500	94,200	0	0	15
16	1995–1999	69,600	39,600	0	0	0	0	30,000	0	0	16
17	1990–1994	66,200	66,200	0	0	0	0	0	0	0	17
18	1985–1989	70,200	69,200	0	0	0	0	0	1,000	0	18
19	1980–1984	53,600	53,600	0	0	0	0	0	0	0	19
20	1975–1979	67,900	66,300	0	0	0	600	0	1,000	0	20
21	1970–1974	72,600	71,500	0	0	0	1,100	0	0	0	21
22	1960–1969	90,200	88,900	0	0	0	0	0	400	900	22
23	1950–1959	90,600	90,600	0	0	0	0	0	0	0	23
24	1940–1949	53,100	53,000	0	0	0	0	0	0	0	24
25	1930–1939	26,200	26,200	0	0	0	0	0	0	0	25
26	1920–1929	25,000	25,000	0	0	0	0	0	0	0	26
27	1919 or earlier	44,100	40,200	0	600	0	0	0	1,000	2,400	27

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
	Rooms										
28	1	900	0	0	0	0	0	300	0	600	28
29	2	4,600	1,000	1,800	0	0	1,100	0	0	600	29
30	3	73,600	52,300	13,600	0	0	600	5,000	1,000	1,200	30
31	4	149,900	85,200	38,400	600	0	0	24,700	1,000	0	31
32	5	189,800	76,000	78,500	0	0	0	33,300	1,000	900	32
33	6	172,300	59,700	63,100	0	0	0	49,400	0	0	33
34	7	143,100	38,700	62,300	0	0	0	42,100	0	0	34
35	8	88,800	27,900	32,600	0	0	0	28,300	0	0	35
36	9	56,800	13,600	21,800	0	0	500	20,900	0	0	36
37	10 or more	41,900	12,800	10,700	0	0	0	18,000	400	0	37
	Bedrooms										
38	None	2,100	0	1,200	0	0	0	300	0	600	38
39	1	95,300	69,000	14,300	600	0	1,700	7,000	1,000	1,800	39
40	2	245,100	167,500	36,900	0	0	0	38,700	2,000	0	40
41	3	350,300	203,100	54,700	0	0	0	91,500	0	900	41
42	4 or more	228,800	110,300	33,100	0	0	500	84,500	400	0	42
43	Multiunit structures	248,500	209,300	0	600	0	1,700	31,700	1,900	3,300	43
	Stories in structure										
44	1	15,600	10,300	0	0	0	600	4,700	0	0	44
45	2	95,300	83,200	0	0	0	0	12,100	0	0	45
46	3	114,200	100,700	0	0	0	0	11,100	1,000	1,500	46
47	4 to 6	21,000	15,100	0	600	0	1,100	2,100	1,000	1,200	47
48	7 or more	2,300	0	0	0	0	0	1,700	0	600	48

Backward-Looking Table B: Unit Quality, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
1	Occupied units	815,600	565,000	37,900	600	0	1,700	205,300	2,400	2,700	1
2	With complete kitchen	793,100	536,600	46,900	600	0	600	203,300	2,400	2,700	2
3	Lacking complete kitchen facilities	22,500	2,200	17,200	0	0	1,100	2,000	0	0	3
4	With complete plumbing	808,800	557,000	39,600	600	0	1,700	204,900	2,400	2,700	4
5	Lack some plumbing	6,800	0	6,400	0	0	0	400	0	0	5
6	No hot piped water										6
7	No bathtub/shower										7
8	No flush toilet										8
9	No exclusive use	6,800	0	6,400	0	0	0	400	0	0	9
	Water										
10	Public/private water	795,500	545,400	43,500	600	0	1,700	200,200	1,400	2,700	10
11	Well serving 1 to 5 units	11,000	6,600	500	0	0	0	2,900	1,000	0	11
12	Other water source										12
	Sewer										
13	Public sewer	688,300	448,800	59,800	600	0	1,700	173,300	1,400	2,700	13
14	Septic tank/cesspool	127,300	87,500	6,800	0	0	0	31,900	1,000	0	14
15	Other										15

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
16	Severe problems	10,400	0	10,000	0	0	0	400	0	0	16
17	Plumbing	6,800	0	6,400	0	0	0	400	0	0	17
18	Heating	3,600	0	3,600	0	0	0	0	0	0	18
19	Electric										19
20	Upkeep										20
21	Moderate problems	31,700	3,700	23,900	0	0	1,100	3,000	0	0	21
22	Plumbing	400	0	400	0	0	0	0	0	0	22
23	Heating	600	0	0	0	0	0	600	0	0	23
24	Kitchen	22,500	2,200	17,200	0	0	1,100	2,000	0	0	24
25	Upkeep	9,000	1,000	7,500	0	0	0	400	0	0	25

Backward-Looking Table C: Occupant Characteristics, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
1	Occupied units	815,600	565,000	37,900	600	0	1,700	205,300	2,400	2,700	1
	Age of householder										
2	Under 65	651,800	376,400	94,900	600	0	600	175,900	1,400	2,100	2
3	65 to 74	91,700	2,300	70,800	0	0	0	17,600	1,000	0	3
4	75 or older	72,100	14,100	44,400	0	0	1,100	11,800	0	600	4
	Children in household										
5	Some	317,500	107,800	109,300	0	0	0	100,400	0	0	5
6	None	498,100	250,500	135,300	600	0	1,700	104,900	2,400	2,700	6
	Race and ethnicity										
7	White	735,200	486,200	51,200	600	0	1,700	192,600	1,400	1,500	7
8	Hispanic	21,500	900	18,800	0	0	0	1,800	0	0	8
9	Non-Hispanic	713,700	469,000	48,700	600	0	1,700	190,800	1,400	1,500	9
10	Black	59,600	25,100	24,200	0	0	0	8,100	1,000	1,200	10
11	Hispanic	1,000	0	1,000	0	0	0	0	0	0	11
12	Non-Hispanic	58,600	23,600	24,600	0	0	0	8,100	1,000	1,200	12
13	American Indian or Alaska Native alone	1,900	0	1,500	0	0	0	400	0	0	13
14	Asian or Pacific Islander	10,500	1,000	6,200	0	0	0	3,300	0	0	14
16	Other	8,400	0	7,600	0	0	0	800	0	0	16
17	Hispanic or Latino (any race)	23,000	2,200	19,000	0	0	0	1,800	0	0	17

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
	Income sources of families and primary individuals										
18	Wages and salaries	605,300	338,100	96,800	600	0	0	167,300	1,000	1,500	18
20	Dividends, interest, or rent	198,400	86,700	52,300	0	0	600	57,300	0	1,500	20
21	Public assistance or public welfare	13,900	1,200	11,600	0	0	0	0	1,000	0	21

Backward-Looking Table D: Income and Housing Cost, Cincinnati

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
1	Occupied units	815,600	565,000	37,900	600	0	1,700	205,300	2,400	2,700	1
	Tenure										
2	Owner-occupied	559,000	369,300	22,100	0	0	0	165,200	1,400	900	2
3	Homeownership rate	68.5%									3
4	Renter-occupied	256,600	143,400	68,100	600	0	1,700	40,100	1,000	1,800	4
	Renter monthly housing costs										
5	No cash rent	11,700	500	8,000	0	0	0	3,200	0	0	5
6	Less than $350	20,400	4,800	12,600	0	0	0	1,800	0	1,200	6
7	$350 to $599	51,100	15,900	31,100	0	0	0	2,400	1,000	600	7
8	$600 to $799	80,500	9,300	60,900	0	0	1,100	9,000	0	0	8
9	$800 to $1,249	69,400	6,100	48,400	600	0	0	14,300	0	0	9
10	$1,250 or more	23,500	0	13,800	0	0	600	9,200	0	0	10
	Renter household income										
11	Less than $15,000	65,800	19,900	37,000	0	0	1,100	7,100	0	600	11
12	$15,000 to $29,999	66,600	13,200	39,900	0	0	600	10,800	1,000	1,200	12
13	$30,000 to $49,999	56,000	10,400	38,900	600	0	0	6,100	0	0	13
14	$50,000 to $99,999	54,700	6,100	36,800	0	0	0	11,800	0	0	14
15	$100,000 or more	13,500	0	9,200	0	0	0	4,300	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 1998	Change in characteristics	2011 units added by conversion/ merger	2011 house or mobile home moved in	2011 units added from nonresidential use	2011 units added by new construction	2011 units added from temporary losses in 1998 stock	2011 units added in other ways	Row
	Owner monthly housing costs										
16	Less than $350	26,200	12,300	8,900	0	0	0	5,100	0	0	16
17	$350 to $599	80,000	16,500	50,300	0	0	0	12,300	1,000	0	17
18	$600 to $799	58,600	6,300	42,800	0	0	0	9,500	0	0	18
19	$800 to $1,249	138,500	33,000	77,700	0	0	0	26,500	400	900	19
20	$1,250 or more	255,700	44,300	99,600	0	0	0	111,900	0	0	20
	Owner household income										
21	Less than $15,000	36,800	5,800	23,000	0	0	0	7,100	1,000	0	21
22	$15,000 to $29,999	67,600	11,500	45,100	0	0	0	11,000	0	0	22
23	$30,000 to $49,999	80,300	17,500	44,200	0	0	0	18,200	400	0	23
24	$50,000 to $99,999	197,300	54,600	84,400	0	0	0	57,400	0	900	24
25	$100,000 or more	176,900	32,600	72,700	0	0	0	71,600	0	0	25

Forward-Looking Rental Dynamics Table 1: Counts, 1998–2011, Cincinnati

Affordability categories	A Total in 1998	B Non-market in 2011	C Extremely low rent in 2011	D Very low rent in 2011	E Low rent in 2011	F Moderate rent in 2011	G High rent in 2011	H Very high rent in 2011	I Extremely high rent in 2011	J Owner-occupied in 2011	K Seasonal or related vacant in 2011	L Lost to stock in 2011
Non-market	35,400	17,800	700	9,700	2,800	900	500	0	0	1,400	1,600	0
Extremely low rent	17,000	800	0	7,900	1,200	500	0	0	0	2,700	3,600	400
Very low rent	95,400	6,700	1,800	58,600	14,100	2,500	0	0	1,400	5,400	3,600	1,300
Low rent	36,200	2,600	0	18,800	6,200	4,000	0	800	0	1,400	1,600	800
Moderate rent	31,700	1,100	0	4,500	7,700	9,700	500	0	2,800	5,100	0	300
High rent	8,700	700	900	0	1,100	1,600	1,100	0	1,500	1,400	500	0
Very high rent	1,000	0	0	0	0	0	0	0	1,000	0	0	0
Extremely high rent	0	0	0	0	0	0	0	0	0	0	0	0
Total	225,400	29,700	3,400	99,500	33,100	19,200	2,100	800	6,700	17,400	10,900	2,800

Forward-Looking Rental Dynamics Table 2: Row Percentages, 1998–2011, Cincinnati

Affordability categories	A Total in 1998	B Non-market in 2011	C Extremely low rent in 2011	D Very low rent in 2011	E Low rent in 2011	F Moderate rent in 2011	G High rent in 2011	H Very high rent in 2011	I Extremely high rent in 2011	J Owner-occupied in 2011	K Seasonal or related vacant in 2011	L Lost to stock in 2011
Non-market	35,400	50.4%	1.9%	27.4%	8.0%	2.6%	1.3%	0.0%	0.0%	3.9%	4.5%	0.0%
Extremely low rent	17,000	4.5%	0.0%	46.3%	7.2%	2.7%	0.0%	0.0%	0.0%	15.9%	21.0%	2.3%
Very low rent	95,400	7.1%	1.9%	61.4%	14.8%	2.6%	0.0%	0.0%	1.4%	5.7%	3.7%	1.4%
Low rent	36,200	7.2%	0.0%	52.0%	17.2%	11.1%	0.0%	2.1%	0.0%	3.8%	4.4%	2.1%
Moderate rent	31,700	3.6%	0.0%	14.2%	24.3%	30.4%	1.4%	0.0%	9.0%	15.9%	0.0%	1.1%
High rent	8,700	7.9%	10.0%	0.0%	12.7%	18.5%	12.7%	0.0%	16.9%	15.9%	5.3%	0.0%
Very high rent	1,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%
Extremely high rent	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	225,400	13.2%	1.5%	44.2%	14.7%	8.5%	0.9%	0.3%	3.0%	7.7%	4.8%	1.3%

Backward-Looking Rental Dynamics Table 1: Counts, 1998–2011, Cincinnati

Affordability categories	A Total in 2011	B Non-market in 1998	C Extremely low rent in 1998	D Very low rent in 1998	E Low rent in 1998	F Moderate rent in 1998	G High rent in 1998	H Very high rent in 1998	I Extremely high rent in 1998	J Owner-occupied in 1998	K Seasonal or related vacant in 1998	L New construction	M Added in other ways
Non-market	47,400	17,200	600	7,000	2,700	1,100	1,000	0	0	6,000	2,000	8,100	1,800
Extremely low rent	10,200	600	0	2,000	0	0	1,000	0	0	4,000	1,000	600	1,000
Very low rent	128,300	10,400	8,200	57,300	19,600	4,400	0	0	0	14,000	4,700	9,100	600
Low rent	56,800	3,200	1,100	14,800	5,500	7,800	1,300	0	0	11,900	500	9,600	1,100
Moderate rent	33,600	1,000	500	2,700	3,500	9,000	1,600	0	0	7,300	0	7,600	600
High rent	12,000	500	0	0	0	500	1,500	0	0	3,000	0	6,600	0
Very high rent	2,100	0	0	0	1,000	0	0	0	0	500	0	600	0
Extremely high rent	9,000	0	0	1,200	0	2,800	1,200	1,000	0	1,100	0	1,600	0
Total	299,500	32,800	10,300	85,100	32,300	25,600	7,600	1,000	0	47,900	8,200	43,600	5,100

Backward-Looking Rental Dynamics Table 2: Row Percentages, 1998–2011, Cincinnati

Affordability categories	A Total in 2011	B Non-market in 1998	C Extremely low rent in 1998	D Very low rent in 1998	E Low rent in 1998	F Moderate rent in 1998	G High rent in 1998	H Very high rent in 1998	I Extremely high rent in 1998	J Owner-occupied in 1998	K Seasonal or related vacant in 1998	L New construction	M Added in other ways
Non-market	47,400	36.2%	1.3%	14.8%	5.6%	2.3%	2.2%	0.0%	0.0%	12.7%	4.2%	17.0%	3.8%
Extremely low rent	10,200	6.0%	0.0%	19.6%	0.0%	0.0%	10.0%	0.0%	0.0%	39.3%	10.0%	5.7%	9.4%
Very low rent	128,300	8.1%	6.4%	44.7%	15.3%	3.4%	0.0%	0.0%	0.0%	10.9%	3.7%	7.1%	0.5%
Low rent	56,800	5.6%	1.9%	26.0%	9.6%	13.8%	2.3%	0.0%	0.0%	21.0%	0.9%	16.9%	2.0%
Moderate rent	33,600	2.8%	1.4%	8.0%	10.4%	26.8%	4.6%	0.0%	0.0%	21.6%	0.0%	22.5%	1.8%
High rent	12,000	4.0%	0.0%	0.0%	0.0%	4.0%	12.6%	0.0%	0.0%	25.0%	0.0%	54.5%	0.0%
Very high rent	2,100	0.0%	0.0%	0.0%	49.4%	0.0%	0.0%	0.0%	0.0%	23.0%	0.0%	27.6%	0.0%
Extremely high rent	9,000	0.0%	0.0%	13.4%	0.0%	31.6%	13.4%	11.7%	0.0%	12.2%	0.0%	17.7%	0.0%
Total	299,500	10.9%	3.4%	28.4%	10.8%	8.6%	2.6%	0.3%	0.0%	16.0%	2.7%	14.6%	1.7%