American Housing Survey

Components of Inventory Change and Rental Dynamics Analysis: Charlotte, 2002–2011

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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 Charlotte metropolitan area changed between 2002 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 Charlotte and on their occupants in both 2002 and 2011.

In 2002 the Charlotte metropolitan area contained 667,800 housing units, including vacant units. By 2011 the number of housing units had increased to 747,500. This change was due in part to a redefinition of the metropolitan area that added Anson County and eliminated Rowan County. We estimate that the 2011 count of housing units for the metropolitan area as defined in 2002 would be 796,500. This represents an overall increase of 19.3 percent, which translates to an average annual increase of 2.0 percent over the 9-year period.

Between 2002 and 2011, only 9,800 units left the housing stock. Of these, 7,400 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 2,000 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 2002 and the 2011 AHS surveys, 163,200 units were added to the housing stock. Ninety-seven percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Charlotte, a factor that contributed 1,700 units. No new units were formed from the conversion or merger of 2002 units. We classified 2,500 units as recovered because these units had been in the housing stock at some point but were classified in 2002 as nonresidential (2,100) or uninhabitable (400). Finally, no units were added in other unclassified ways.

The Charlotte metropolitan area lost 1.5 percent of all 2002 housing units by 2011; additions reported between 2002 and 2011 represented 21.8 percent of the 2011 housing stock. Losses and additions varied across portions of the Charlotte 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:

- The loss rate was lower among more recently built units (1995–2002) and higher among older units (1940–1959).

- In general, units in multifamily buildings, including those in 2-story buildings, had a higher-than-average loss rate. Units in 2- to 4-unit structures experienced much higher losses than normal.

- Smaller units (1 bedroom) had a high loss rate, whereas larger units (10 or more rooms) had lower rates.

- Loss rates were high among units with moderate heating problems in 2002.

- Units that were owner-occupied in 2002 had a lower-than-average loss rate, and units that were renter-occupied had a higher-than-average loss rate. Both of these loss rates were strongly statistically different than the average rate for occupied units.

- Among owner-occupied units, there was little variation across subgroups defined by household income or monthly housing costs, but the loss rates of several of these subgroups were statistically different than the rate for all (owner and renter) occupied units.

- Among 2002 rental units, those with low rents (less than $600) and those occupied by low-income households (less than $15,000) had high loss rates, 5 percent or greater.

- One interesting result is the failure of three of the four key market segments to have rates of addition different from their benchmarks. The rate of addition among units that were occupied in 2011 and the rate of addition among units that were vacant in 2011 are within 0.5 percentage points of the overall rate of addition. Similarly, the rate of addition among units that were owner-occupied in 2011 is almost identical to the rate of addition of all occupied units. Units that were rental in 2011 had a lower rate of addition that is statistically different than the rate for all occupied units. Despite the limited variation across these key dimensions, there is substantial variation among subgroups within these dimensions.

- Units in small multifamily buildings (less than 20 units or 1 or 2 stories) had low rates of addition. Units in large multifamily buildings (20+ units or 3 or more stories) had much higher rates of addition.

- The rate of addition was high among single-family attached units and low among manufactured housing.

- The rate of addition also varied sharply by unit size. As measured by the number of rooms, 7 rooms was the dividing line. Units with fewer than 7 rooms had below-average rates of addition; units with 7 or more rooms had above-average rates. Two-bedroom units had a low rate of addition, while units with 4 or more bedrooms had a high rate of addition.

- The rate of addition was lower than average among units with wells or septic tanks.

- Units occupied by households with elderly householders (65 years 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.

- As separate groups, households in 2011 with Hispanic householders had low rates of addition, whereas those with Black or Asian householders had higher-than-average rates.

- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. However, among owner-occupied units, addition rates clearly varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income owners (less than $15,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income owners ($50,000 or more) had higher-than-average rates of addition.

- The rate of addition among units that were renter-occupied in 2011 was lower than that of all occupied units and statistically different. Among renter-occupied units, addition rates varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income renters (less than $30,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income renters ($100,000 or more) had higher-than-average rates of addition.

The 2002 rental stock in Charlotte was affordable. Of the 205,800 rental units in 2002, 129,900 were extremely low rent or very low rent units. In addition, 40,100 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 92.6 percent of the 2002 rental stock. The three highest rent categories comprised only 2.1 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2002 units compared to 10.7 percent. By 2011, 16.5 percent of the 205,800 rental units in 2002 were no longer in the rental stock. The largest proportion of these losses was due to changes in tenure.

The rental stock in Charlotte was less affordable in 2011 than in 2002. Of the 267,100 rental units in 2011, 100,200 were extremely low rent or very low rent units. In addition, 29,700 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 48.6 percent of the 2011 rental stock. The three highest rent categories comprised 8.3 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—28.8 percent of all 2011 units compared to 7.2 percent. Of the 267,100 rental units in 2011, 42.3 percent were not rental in 2002. The largest proportion of these gains was due to changes in tenure.

Components of Inventory Change and Rental Dynamics Analysis: Charlotte, 2002–2011

1. Introduction

This report describes how the housing stock in the Charlotte metropolitan area changed between 2002 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 Charlotte and on their occupants in both 2002 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 2002 units by 2011) and backward-looking analysis (where the 2011 units came from in terms of 2002). [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 Charlotte.

- Section 3 explains the changes in the housing stock between 2002 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 2002 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 Charlotte metropolitan area between 2002 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 2002–2011 period 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: Charlotte

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 2002 the Charlotte metropolitan area contained 667,800 housing units, including vacant units. By 2011 the number of housing units had increased to 747,500. This change was due in part to a redefinition of the metropolitan area that added Anson County and eliminated Rowan County. 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 2002 would be 796,500. This represents an overall increase of 19.3 percent, which translates to an average annual increase of 2.0 percent over the 9-year period.

The change in the geographical definition of Charlotte 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 Charlotte metropolitan area as defined in both 2002 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 2002 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 2,337 sample units that were common to the 2002 and 2011 AHS Charlotte surveys and satisfied all the analytical requirements.[4] Between 2002 and 2011, 69 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 2,406 sample units. Between 2002 and 2011, 693 sample units meeting the analytical requirements were added to the AHS survey 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 3,030 sample units. In the forward-looking analysis, the average weight of a sample unit is approximately 278 units; in the backward-looking analysis, the average weight of a sample unit is approximately 247 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 Charlotte, 9 years separate the 2011 sample from the 2002 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.

3. Changes to the Housing Stock: 2002–2011

Losses between 2002 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

[4] The 2002 AHS surveyed 5,119 units in the Charlotte metropolitan area; 3,017 of these units were in the 2011 AHS public use file (PUF). Of the 2,102 sample units no longer in the survey, 274 were legitimate temporary or permanent losses to the housing stock and were considered for the analysis. The remaining 1,828 cases are coded as "sample reduction for the current survey year" with no further explanation. Some, but certainly not all, of the missing cases can be attributed to the dropped county.

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 2002 and 2011, only 9,800 units left the housing stock.[5] Of these, 7,400 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 2,000 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 2002 Charlotte Housing Units in 2011[6]

Present in 2002	667,800
2002 units present in 2011	658,000
Units no longer in the stock	**9,800**
2002 units lost due to conversion/merger	300
2002 house or mobile home moved out	100
2002 units lost through demolition or disaster	7,000
Permanent losses	**7,400**
2002 units changed to nonresidential use	1,200
2002 units badly damaged or condemned	700
Temporary losses	**2,000**
2002 units lost in other ways	**400**

Demolitions and natural disasters accounted for 7,000 of the permanent losses, while mergers and conversions contributed another 300 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. The 2011 AHS survey in Charlotte recorded 100 mobile home move-outs.

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.

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 2002. For each subgroup, these tables detail how many of the 2002 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 2002–2011 period.

[5] With the caveats noted in Appendix A, this analysis applies to the area common to both the 2002 and 2011 definitions of the metropolitan area.

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

Additions between 2002 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 2002 and 2011.[7]

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

2011 housing stock	747,500
2011 units present in 2002	584,300
Total additions to stock	**163,200**
Units added by new construction	159,000
House or mobile home moved in	1,700
Units added by conversion/merger	0
New or reconstructed units	**160,700**
Units added from nonresidential use	2,100
Units added from temporary losses	400
Recovered units	**2,500**
Units added in other ways	**0**

In the period between the 2002 and the 2011 AHS surveys, 163,200 units were added to the housing stock. Ninety-seven percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Charlotte, a factor that contributed 1,700 units. No new units were formed from the conversion or merger of 2002 units.

We classified 2,500 units as recovered because these units had been in the housing stock at some point but were classified in 2002 as nonresidential (2,100) or uninhabitable (400). Finally, no 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 focuses on those subgroups that gained an unusually high or an unusually low number of units over the 2002–2011 period.

4. Components With Atypical Losses or Additions

The Charlotte metropolitan area lost 1.5 percent of all 2002 housing units by 2011, but the loss rate varied across sectors of the stock. For example, the occupied housing stock lost 1.2 percent of its units between 2002 and 2011.

[7] With the caveats noted in Appendix A, this analysis applies to the area common to both the 2002 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.

We examined all of the components of the 2002 Charlotte 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 Charlotte, 2002–2011[9]

Characteristics	Present in 2002	Total lost	Percent lost
Housing stock	667,800	9,800	1.5%
Occupancy status			
Occupied	593,700	7,300	1.2%
Vacant	72,000	2,200	3.0%
Units in structure			
2 to 4	22,800	1,700	7.5%**
Year built			
2000–2004	56,000	100	0.2%***
1995–1999	90,400	300	0.3%***
1950–1959	59,700	2,200	3.7%*
1940–1949	36,000	1,700	4.7%*
Rooms			
10 or more	42,900	100	0.3%**
Bedrooms			
1	49,300	1,900	3.8%*
Multiunit structures	95,600	3,200	3.4%**
Stories in structure			
2	52,600	2,300	4.3%**
Moderate problems			
Heating	6,400	900	14.4%*
Tenure			
Owner-occupied	424,200	1,700	0.4%***
Renter-occupied	169,500	5,500	3.2%***
Renter monthly housing costs			
Less than $350	10,300	1,100	10.7%*
$350 to $599	52,200	2,900	5.6%**
Renter household income			
Less than $15,000	37,400	1,900	5.1%**
Owner monthly housing costs			
$350 to $599	49,100	100	0.2%**
$800 to $1,249	118,600	500	0.4%**
$1,250 or more	108,000	300	0.3%***
Owner household income			
$30,000 to $49,999	85,100	200	0.2%***
$50,000 to $99,999	157,200	600	0.4%**
$100,000 or more	86,100	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.

[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.

Table 3 shows the following variation in loss rates across subgroups.

- The loss rate was lower among more recently built units (1995–2002) and higher among older units (1940–1959).

- In general, units in multifamily buildings, including those in 2-story buildings, had a higher-than-average loss rate. Units in 2- to 4-unit structures experienced much higher losses than normal.

- Smaller units (1 bedroom) had a high loss rate, whereas larger units (10 or more rooms) had lower rates.

- Loss rates were high among units with moderate heating problems in 2002.

- Units that were owner-occupied in 2002 had a lower-than-average loss rate, and units that were renter-occupied had a higher-than-average loss rate. Both of these loss rates were strongly statistically different than the average rate for occupied units.

- Among owner-occupied units, there was little variation across subgroups defined by household income or monthly housing costs, but the loss rates of several of these subgroups were statistically different than the rate for all (owner and renter) occupied units.

- Among 2002 rental units, those with low rents (less than $600) and those occupied by low-income households (less than $15,000) had high loss rates, 5 percent or greater.

The 163,200 additions reported in Table 2 represented 21.8 percent of the 2011 housing stock. The rate of addition varied by the characteristics of the housing. Additions represented 21.7 percent of occupied units.

We examined all of the components of the 2002 Charlotte 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 Charlotte, 2002–2011[10]

Characteristics	Present in 2011	Total additions	Percent additions
Housing stock	747,500	163,200	21.8%
Occupancy status			
Occupied	665,800	144,800	21.7%
Vacant	76,700	16,400	21.3%
Units in structure			
1, attached	48,000	19,400	40.4%***
2 to 4	31,300	4,300	13.9%***
5 to 9	36,600	4,400	12.0%***
10 to 19	44,200	6,700	15.1%**
20 to 49	25,600	9,600	37.7%***
50 or more	10,700	6,600	61.8%***
Manufactured/mobile home	41,800	2,700	6.4%***
Rooms			
4	126,700	17,500	13.8%***
5	176,600	26,300	14.9%***
7	106,300	28,800	27.1%**
8	69,000	23,500	34.1%***
9	40,800	13,000	31.8%***
10 or more	32,300	13,000	40.3%***
Bedrooms			
2	190,600	26,000	13.6%***
4 or more	175,500	61,600	35.1%***
Stories in structure (multifamily)			
1	25,000	2,900	11.6%***
2	62,100	6,000	9.6%***
3	51,400	16,600	32.2%***
4 to 6	6,100	3,200	53.4%***
7 or more	3,800	3,000	79.8%***
Water			
Public/private water	572,600	136,100	23.8%*
Well serving 1 to 5 units	92,700	8,700	9.4%***
Sewer			
Public sewer	548,000	130,700	23.9%*
Septic tank/cesspool	117,800	14,100	11.9%***
Age of householder			
65 to 74	68,700	10,100	14.7%***
75 or older	46,300	4,700	10.2%***
Children in household			
Some	231,700	62,000	26.8%***
None	434,100	82,700	19.1%**

[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
Race and ethnicity			
White Hispanic	42,000	5,700	13.5%***
Black alone	171,800	43,300	25.2%*
Black Non-Hispanic	164,900	41,600	25.2%*
Asian alone	15,400	5,300	34.4%**
Hispanic or Latino (any race)	50,800	8,600	16.9%*
Tenure			
Owner-occupied	432,800	101,800	23.5%
Renter-occupied	233,000	43,000	18.4%**
Renter monthly housing costs			
No cash rent	10,200	700	6.8%***
$350 to $599	33,300	3,600	10.7%***
$600 to $799	66,700	6,400	9.5%***
$1,250 or more	27,300	11,900	43.6%***
Renter household income			
Less than $15,000	59,000	8,500	14.5%***
$15,000 to $29,999	57,600	6,300	11.0%***
$100,000 or more	16,700	5,400	32.3%*
Owner monthly housing costs			
Less than $350	43,700	2,500	5.7%***
$350 to $599	63,900	8,000	12.5%***
$600 to $799	30,300	2,600	***
$1,250 or more	185,000	66,900	36.2%***
Owner household income			
Less than $15,000	44,100	4,900	11.2%***
$50,000 to $99,999	139,800	39,900	28.5%***
$100,000 or more	115,300	32,800	28.4%***

*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.

The results reported in Table 4 tell a clear story about changes in the Charlotte metropolitan area. The high rate of addition for the overall stock, combined with a large sample size, makes it easy to discern not only general patterns, but also the dividing lines between below-average and above-average growth.

- One interesting result is the failure of three of the four key market segments to have rates of addition different from their benchmarks. The rate of addition among units that were occupied in 2011 and the rate of addition among units that were vacant in 2011 are within 0.5 percentage points of the overall rate of addition. Similarly, the rate of addition among units that were owner-occupied in 2011 is almost identical to the rate of addition of all occupied units. Units that were rental in 2011 had a lower rate of addition that is statistically different than the rate for all occupied units. Despite the limited variation across these key dimensions, there is substantial variation among subgroups within these dimensions.

- Units in small multifamily buildings (less than 20 units or 1 or 2 stories) had low rates of addition. Units in large multifamily buildings (20+ units or 3 or more stories) had much higher rates of addition.

- The rate of addition was high among single-family attached units and low among manufactured housing.

- The rate of addition also varied sharply by unit size. As measured by the number of rooms, 7 rooms was the dividing line. Units with fewer than 7 rooms had below-average rates of addition; units with 7 or more rooms had above-average rates. Two-bedroom units had a low rate of addition, while units with 4 or more bedrooms had a high rate of addition.

- The rate of addition was lower than average among units with wells or septic tanks.

- Units occupied 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.

- As separate groups, households in 2011 with Hispanic householders had low rates of addition, whereas those with Black or Asian householders had higher-than-average rates.

- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. However, among owner-occupied units, addition rates clearly varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income owners (less than $15,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income owners ($50,000 or more) had higher-than-average rates of addition.

- The rate of addition among units that were renter-occupied in 2011 was lower than that of all occupied units and statistically different. Among renter-occupied units, addition rates varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income renters (less than $30,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income renters ($100,000 or more) had higher-than-average rates of addition.

5. Rental Market Dynamics: 2002–2011

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 2002 rental units by how affordable they were in 2002. 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.

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

Affordability categories	2002 rental units	To more affordable categories in 2011	In same affordability category in both years	To less affordable categories in 2011	2002 rental units non-rental in 2011
Non-market	40,100	NA	19.9%	58.4%	21.8%
Extremely low rent	26,300	15.1%	6.4%	56.9%	21.6%
Very low rent	103,600	8.5%	42.5%	37.1%	11.8%
Low rent	20,800	20.1%	27.1%	40.9%	11.9%
Moderate rent	10,600	24.4%	33.8%	9.6%	32.2%
High rent	2,700	28.3%	10.9%	10.9%	50.0%
Very high rent	1,200	88.1%	0.0%	0.0%	11.9%
Extremely high rent	500	100.0%	0.0%	NA	0.0%
Total	205,800	10.7%	30.7%	42.1%	16.6%

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

The 2002 rental stock in Charlotte was affordable. Of the 205,800 rental units in 2002, 129,900 were extremely low rent or very low rent units. In addition, 40,100 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 92.6 percent of the 2002 rental stock. The three highest rent categories comprised only 2.1 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2002 units compared to 10.7 percent.

By 2011, 16.5 percent of the 205,800 rental units in 2002 were no longer in the rental stock (33,800 units). The largest proportion of these losses was due to changes in tenure, with 20,500 rental units becoming owner-occupied or vacant for sale in 2011. Another 7,200 units became seasonal units, units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 6,100 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 2002, 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 Charlotte was less affordable in 2011 than in 2002. Of the 267,100 rental units in 2011, 100,200 were extremely low rent or very low rent units. In addition, 29,700 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 48.6 percent of the 2011 rental stock. The three highest rent categories comprised 8.3 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—28.8 percent of all 2011 units compared to 7.2 percent.

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

Affordability categories	2011 rental units	From more affordable categories in 2002	In same affordability category in both years	From less affordable categories in 200	2011 rental units non-rental in 2002
Non-market	29,700	NA	24.6%	29.4%	46.0%
Extremely low rent	10,400	6.3%	14.5%	35.0%	44.2%
Very low rent	89,800	24.8%	44.6%	4.6%	26.1%
Low rent	56,000	53.4%	9.2%	3.6%	33.8%
Moderate rent	58,900	33.7%	5.9%	1.3%	59.1%
High rent	13,100	23.6%	2.1%	0.0%	74.3%
Very high rent	5,100	9.7%	0.0%	0.0%	90.3%
Extremely high rent	4,100	18.0%	0.0%	NA	82.0%
Total	267,100	28.8%	21.6%	7.2%	42.3%

Of the 267,100 rental units in 2011, 42.3 percent were not rental in 2002 (113,100 units). The largest proportion of these gains was due to changes in tenure, with 58,800 rental units having been owner-occupied or vacant for sale in 2002. Another 6,800 units had been seasonal units,

units occupied by persons with usual residence elsewhere, or units used for migratory workers. Finally, 47,700 rental units had not been in the housing stock in 2002. Of these, 45,800 were added by new construction and 1,900 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: Charlotte Metropolitan Area, 2002–2011

In 2002 the Charlotte metropolitan area contained 667,800 housing units, including vacant units. By 2011 the number of housing units had increased to 747,500. This change was due in part to a redefinition of the metropolitan area that added Anson County and eliminated Rowan County. We estimate that the 2011 count of housing units for the metropolitan area as defined in 2002 would be 796,500. This represents an overall increase of 19.3 percent, which translates to an average annual increase of 2.0 percent over the 9-year period.

The change in the geographical definition of Charlotte 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 Charlotte metropolitan area as defined in both 2002 and 2011.

Between 2002 and 2011, only 9,800 units left the housing stock. Of these, 7,400 are clearly permanent losses—the original unit is gone, and major construction would be required to replace it with a new unit. Another 2,000 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 7,000 of the permanent losses, while mergers and conversions contributed another 300 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. The 2011 AHS survey in Charlotte recorded 100 mobile home move-outs.

In the period between the 2002 and the 2011 AHS surveys, 163,200 units were added to the housing stock. Ninety-seven percent of these additions were newly constructed units. The 2011 AHS did track move-ins of mobile homes in Charlotte, a factor that contributed 1,700 units. No new units were formed from the conversion or merger of 2002 units. We classified 2,500 units as recovered because these units had been in the housing stock at some point but were classified in 2002 as nonresidential (2,100) or uninhabitable (400). Finally, no units were added in other unclassified ways.

The Charlotte metropolitan area lost 1.5 percent of all 2002 housing units by 2011; additions reported between 2002 and 2011 represented 21.8 percent of the 2011 housing stock. Losses and additions varied across portions of the Charlotte 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:

- The loss rate was lower among more recently built units (1995–2002) and higher among older units (1940–1959).

- In general, units in multifamily buildings, including those in 2-story buildings, had a higher-than-average loss rate. Units in 2- to 4-unit structures experienced much higher losses than normal.

- Smaller units (1 bedroom) had a high loss rate, whereas larger units (10 or more rooms) had lower rates.

- Loss rates were high among units with moderate heating problems in 2002.

- Units that were owner-occupied in 2002 had a lower-than-average loss rate, and units that were renter-occupied had a higher-than-average loss rate. Both of these loss rates were strongly statistically different than the average rate for occupied units.

- Among owner-occupied units, there was little variation across subgroups defined by household income or monthly housing costs, but the loss rates of several of these subgroups were statistically different than the rate for all (owner and renter) occupied units.

- Among 2002 rental units, those with low rents (less than $600) and those occupied by low-income households (less than $15,000) had high loss rates, 5 percent or greater.

- One interesting result is the failure of three of the four key market segments to have rates of addition different from their benchmarks. The rate of addition among units that were occupied in 2011 and the rate of addition among units that were vacant in 2011 are within 0.5 percentage points of the overall rate of addition. Similarly, the rate of addition among units that were owner-occupied in 2011 is almost identical to the rate of addition of all occupied units. Units that were rental in 2011 had a lower rate of addition that is statistically different than the rate for all occupied units. Despite the limited variation across these key dimensions, there is substantial variation among subgroups within these dimensions.

- Units in small multifamily buildings (less than 20 units or 1 or 2 stories) had low rates of addition. Units in large multifamily buildings (20+ units or 3 or more stories) had much higher rates of addition.

- The rate of addition was high among single-family attached units and low among manufactured housing.

- The rate of addition also varied sharply by unit size. As measured by the number of rooms, 7 rooms was the dividing line. Units with fewer than 7 rooms had below-average

rates of addition; units with 7 or more rooms had above-average rates. Two-bedroom units had a low rate of addition, while units with 4 or more bedrooms had a high rate of addition.

- The rate of addition was lower than average among units with wells or septic tanks.

- Units occupied by households with elderly householders (65 years 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.

- As separate groups, households in 2011 with Hispanic householders had low rates of addition, whereas those with Black or Asian householders had higher-than-average rates.

- The rate of addition among units that were owner-occupied in 2011 was slightly higher than that of all occupied units but not statistically different. However, among owner-occupied units, addition rates clearly varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income owners (less than $15,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income owners ($50,000 or more) had higher-than-average rates of addition.

- The rate of addition among units that were renter-occupied in 2011 was lower than that of all occupied units and statistically different. Among renter-occupied units, addition rates varied by monthly housing costs and household income in 2011. Those units with low housing costs (less than $800) or occupied by lower income renters (less than $30,000) had lower rates of addition, while those with high housing costs ($1,250 or more) and those occupied by high-income renters ($100,000 or more) had higher-than-average rates of addition.

The 2002 rental stock in Charlotte was affordable. Of the 205,800 rental units in 2002, 129,900 were extremely low rent or very low rent units. In addition, 40,100 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 92.6 percent of the 2002 rental stock. The three highest rent categories comprised only 2.1 percent of the rental stock. Moves to a less affordable category (sometimes called gentrification) exceeded moves to a more affordable category (sometimes called filtration)—42.1 percent of all 2002 units compared to 10.7 percent. By 2011, 16.5 percent of the 205,800 rental units in 2002 were no longer in the rental stock (33,800 units). The largest proportion of these losses was due to changes in tenure, with 20,500 rental units becoming owner-occupied or vacant for sale in 2011.

The rental stock in Charlotte was less affordable in 2011 than in 2002. Of the 267,100 rental units in 2011, 100,200 were extremely low rent or very low rent units. In addition, 29,700 units were non-market; that is, they were either assisted or offered for no cash rent. These three categories accounted for 48.6 percent of the 2011 rental stock. The three highest rent categories comprised 8.3 percent of the rental stock. Moves from a more affordable category (sometimes called gentrification) exceeded moves from a less affordable category (sometimes called filtration)—28.8 percent of all 2011 units compared to 7.2 percent. Of the 267,100 rental units in

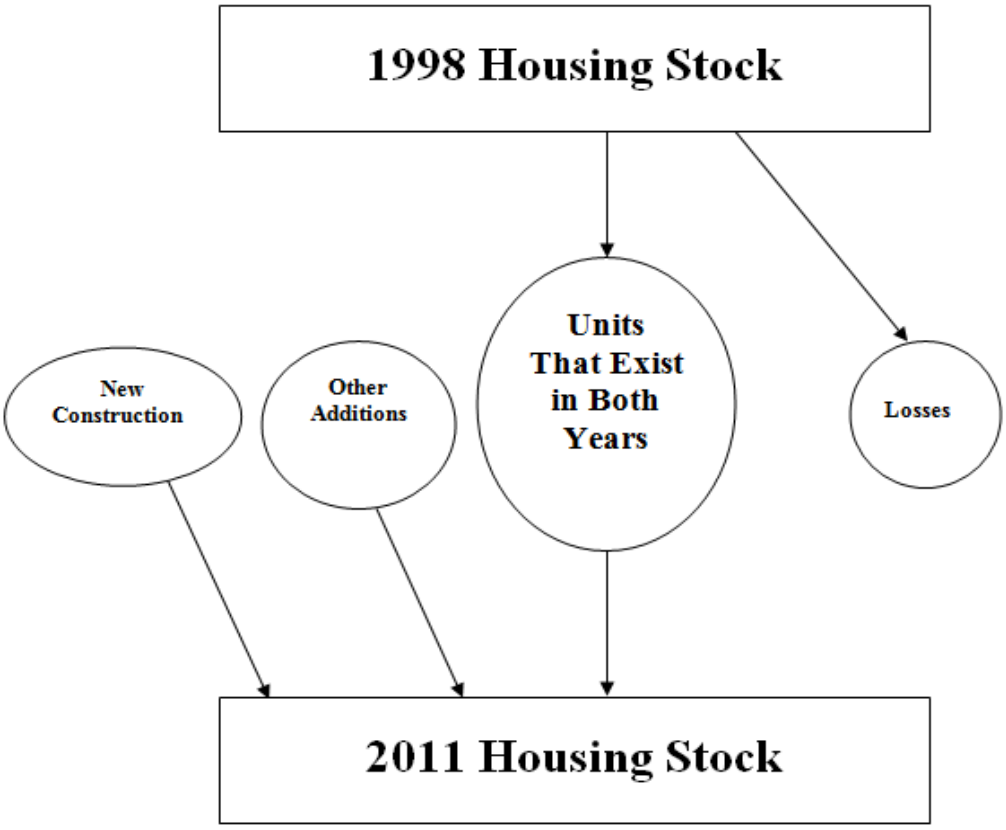
2011, 42.3 percent were not rental in 2002 (113,100 units). The largest proportion of these gains was due to changes in tenure, with 58,800 rental units having been owner-occupied or vacant for sale in 2002.

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 2002 and 2011 housing stocks) and one oval (units added through new construction between 2002 and 2011). No one estimates the other three ovals: the number of units that belong to both the 2002 and 2011 housing stock, units lost to the housing stock between 2002 and 2011, and other additions to the housing stock between 2002 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, 2002, 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 2002 and 2011. In some cases, there may be no status, (e.g., not yet constructed in 2002) 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 2002 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 2002 became owner-occupied or vacant for sale in 2011. To estimate the number of units in the national housing stock that were rental in 2002 and became owner-occupied in 2011, one would need to apply weights. However, using 2002 weights would produce a different estimate than using 2011 weights. There is no conceptual reason to favor the answer using 2002 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 (2002) 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 (2002). 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 2002 and 2011, and the application to the common area is not precise for the following reasons:

- For forward-looking analysis (2002 to 2011), we observe only those sample units in the geography common to both 2002 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 2002 geography. Since the common area is smaller than the 2002 geography, the counts are overestimates for the common area.

- For the backward-looking analysis (2011 from 2002), we observe (a) sample units that were in the common area in 2002 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 2002 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 2002 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 2002 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 2002.

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 2002 housing stock by 2011. There are three possible dispositions of 2002 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 2002. There are three possible sources of 2011 units:

- Units that existed in 2002 with the same characteristics (or serving the same market).

- Units that existed in 2002 but with different characteristics (or serving a different market).

- Units that are additions to the housing stock between 2002 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 (2002 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 2002 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 2002 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 2002.

- Column H is the CINCH estimate of the number of units from column B that were newly constructed between 2002 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 2002.[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 2002 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 2002 housing stock relate to the 2011 housing stock. Column A estimates the number of units in each affordability category in 2002. Columns B through L explain where the 2002 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 2002 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 2002 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 2002, they will be counted in columns B through I, depending upon how affordable they are in 2002.

- 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 2002 are counted in column K.

- Column L counts rental units that were newly constructed between 2002 and 2011.

- Column M counts rental units that were added to the housing stock after 2002 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 9-year period; for example, a unit that is low rent in 2002 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 2002 and 2011.

Forward-Looking Table A: Housing Characteristics, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
1	Housing stock	667,800	658,000	0	300	100	1,200	7,000	700	400	1
	Occupancy status										
2	Occupied	593,700	528,300	58,200	300	100	900	5,000	700	300	2
3	Vacant	72,000	13,800	56,100	0	0	300	1,900	0	0	3
4	Seasonal	2,100	200	1,500	0	0	100	100	0	100	4
	Units in structure										
5	1, detached	447,100	441,600	0	100	100	1,100	3,100	600	400	5
6	1, attached	67,100	66,100	0	0	0	0	1,000	0	0	6
7	2 to 4	22,800	21,100	0	0	0	0	1,700	0	0	7
8	5 to 9	29,200	28,300	0	0	0	0	700	100	0	8
9	10 to 19	27,500	27,100	0	100	0	0	300	0	0	9
10	20 to 49	12,200	12,100	0	0	0	100	0	0	0	10
11	50 or more	3,900	3,800	0	0	0	0	100	0	0	11
12	Manufactured/mobile home	58,000	58,000	0	0	0	0	0	0	0	12

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
	Year built										
15	2000–2004	56,000	55,900	0	0	0	0	100	0	0	15
16	1995–1999	90,400	90,100	0	0	0	0	300	0	0	16
17	1990–1994	65,400	65,400	0	0	0	0	0	0	0	17
18	1985–1989	79,800	78,600	0	0	0	100	800	100	100	18
19	1980–1984	48,400	48,400	0	0	0	0	0	0	0	19
20	1975–1979	60,300	59,500	0	100	0	100	400	100	0	20
21	1970–1974	54,500	53,900	0	0	0	100	100	100	200	21
22	1960–1969	83,800	82,200	0	0	0	0	1,100	300	100	22
23	1950–1959	59,700	57,500	0	0	0	400	1,800	0	0	23
24	1940–1949	36,000	34,300	0	100	100	300	1,100	0	0	24
25	1930–1939	16,300	16,000	0	0	0	0	300	0	0	25
26	1920–1929	7,800	7,700	0	0	0	0	100	0	0	26
27	1919 or earlier	9,300	8,500	0	0	0	100	700	0	0	27
	Rooms										
28	1	1,000	0	1,000	0	0	0	0	0	0	28
29	2	1,600	700	800	0	0	0	100	0	0	29
30	3	35,600	23,800	10,500	0	0	0	1,300	0	0	30
31	4	120,800	75,200	42,200	0	0	600	2,200	400	100	31
32	5	182,400	97,500	82,800	100	100	100	1,600	0	100	32
33	6	137,200	64,800	70,800	100	0	300	1,200	0	0	33
34	7	74,000	32,900	40,500	0	0	300	0	100	200	34
35	8	44,800	20,700	23,800	0	0	0	400	0	0	35
36	9	27,600	10,600	16,900	0	0	0	100	0	0	36
37	10 or more	42,900	11,100	31,600	0	0	0	0	100	0	37

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
	Bedrooms										
38	None	1,200	200	1,000	0	0	0	0	0	0	38
39	1	49,300	39,600	7,800	100	0	200	1,600	0	0	39
40	2	192,000	157,200	30,700	0	100	600	2,700	400	300	40
41	3	303,300	255,400	45,100	100	0	400	2,000	100	200	41
42	4 or more	122,000	103,700	17,300	0	0	100	700	100	0	42
43	Multiunit structures	95,600	92,300	0	100	0	100	2,800	100	0	43
	Stories in structure										
44	1	13,900	13,300	0	0	0	0	600	0	0	44
45	2	52,600	50,400	0	0	0	0	2,100	100	0	45
46	3	22,200	22,100	0	0	0	0	100	0	0	46
47	4 to 6	5,000	4,700	0	100	0	100	0	0	0	47
48	7 or more	1,800	1,800	0	0	0	0	0	0	0	48

Forward-Looking Table B: Unit Quality, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
1	Occupied units	593,700	528,300	58,200	300	100	900	5,000	700	300	1
2	With complete kitchen	587,900	514,600	66,300	300	100	900	4,700	700	300	2
3	Lacking complete kitchen facilities	5,800	500	4,900	0	0	0	300	0	0	3
4	With complete plumbing	585,300	519,000	59,500	300	100	900	4,500	700	300	4
5	Lack some plumbing	8,400	300	7,700	0	0	0	400	0	0	5
6	No hot piped water										6
7	No bathtub/shower										7
8	No flush toilet	200	0	0	0	0	0	200	0	0	8
9	No exclusive use	8,200	300	7,700	0	0	0	300	0	0	9
	Water										
10	Public/private water	486,300	426,100	54,100	100	100	600	4,800	400	0	10
11	Well serving 1 to 5 units	107,100	92,400	13,500	100	0	300	200	300	300	11
12	Other water source	300	300	0	0	0	0	0	0	0	12
	Sewer										
13	Public sewer	453,700	393,100	54,300	100	100	600	5,000	400	0	13
14	Septic tank/cesspool	140,000	108,700	30,400	100	0	300	0	300	300	14
15	Other										15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
16	Severe problems	9,500	300	8,800	0	0	0	400	0	0	16
17	Plumbing	8,400	300	7,700	0	0	0	400	0	0	17
18	Heating	800	0	800	0	0	0	0	0	0	18
19	Electric										19
20	Upkeep	300	0	300	0	0	0	0	0	0	20
21	Moderate problems	14,300	3,500	9,700	0	0	0	900	200	0	21
22	Plumbing	300	0	300	0	0	0	0	0	0	22
23	Heating	6,400	3,000	2,500	0	0	0	800	200	0	23
24	Kitchen	5,800	500	4,900	0	0	0	300	0	0	24
25	Upkeep	2,500	0	2,500	0	0	0	0	0	0	25

Forward-Looking Table C: Occupant Characteristics, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
1	Occupied units	593,700	528,300	58,200	300	100	900	5,000	700	300	1
	Age of householder										
2	Under 65	504,400	388,200	109,500	300	0	900	4,700	600	300	2
3	65 to 74	47,600	5,400	41,800	0	0	0	300	0	0	3
4	75 or older	41,800	15,600	25,900	0	100	0	0	100	0	4
	Children in household										
5	Some	224,800	102,600	119,500	0	0	400	2,000	300	0	5
6	None	368,900	259,500	104,800	300	100	400	2,900	400	300	6
	Race and ethnicity										
7	White	442,500	355,800	82,700	100	100	500	2,600	300	300	7
8	Hispanic	16,800	6,600	9,900	0	0	0	400	0	0	8
9	Non-Hispanic	425,600	328,100	94,000	100	100	500	2,200	300	300	9
10	Black	129,700	82,800	44,000	100	0	100	2,200	400	0	10
11	Hispanic	1,300	1,100	300	0	0	0	0	0	0	11
12	Non-Hispanic	128,400	79,000	46,500	100	0	100	2,200	400	0	12
13	American Indian or Alaska Native alone	500	300	300	0	0	0	0	0	0	13
14	Asian or Pacific Islander	9,800	4,300	5,400	0	0	100	0	0	0	14
16	Other	11,100	0	10,900	0	0	100	100	0	0	16
17	Hispanic or Latino (any race)	25,500	10,600	14,200	0	0	100	600	0	0	17

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
	Income sources of families and primary individuals										
18	Wages and salaries	498,900	341,500	151,900	0	0	900	3,900	400	300	18
20	Dividends, interest, or rent	209,500	64,600	143,700	0	100	300	300	300	300	20
21	Public assistance or public welfare	12,200	300	11,300	0	0	100	300	100	0	21

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

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
1	Occupied units	593,700	528,300	58,200	300	100	900	5,000	700	300	1
	Tenure										
2	Owner-occupied	424,200	340,500	81,900	100	100	400	600	400	100	2
3	Homeownership rate	71.5%									3
4	Renter-occupied	169,500	119,900	44,200	100	0	500	4,400	300	200	4
	Renter monthly housing costs										
5	No cash rent	9,900	1,200	8,800	0	0	0	0	0	0	5
6	Less than $350	10,300	2,800	6,500	100	0	200	600	200	0	6
7	$350 to $599	52,200	12,000	37,300	0	0	0	2,800	100	0	7
8	$600 to $799	63,400	22,600	39,600	0	0	300	800	0	200	8
9	$800 to $1,249	27,600	13,400	14,200	0	0	0	0	0	0	9
10	$1,250 or more	6,100	1,700	4,100	0	0	0	300	0	0	10
	Renter household income										
11	Less than $15,000	37,400	10,300	25,200	100	0	200	1,300	300	0	11
12	$15,000 to $29,999	48,400	11,100	35,800	0	0	0	1,600	0	0	12
13	$30,000 to $49,999	46,000	8,100	36,900	0	0	200	700	0	200	13
14	$50,000 to $99,999	32,700	3,000	29,200	0	0	100	300	0	0	14
15	$100,000 or more	5,000	0	4,600	0	0	0	500	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	Characteristics	Present in 2002	2002 units present in 2011	Change in characteristics	2002 units lost due to conversion/ merger	2002 house or mobile home moved out	2002 units changed to nonresidential use	2002 units lost through demolition or disaster	2002 units badly damaged or condemned	2002 units lost in other ways	Row
	Owner monthly housing costs										
16	Less than $350	105,000	31,200	72,900	0	100	100	300	300	0	16
17	$350 to $599	49,100	13,400	35,600	0	0	0	0	0	100	17
18	$600 to $799	43,600	4,400	39,200	0	0	0	0	0	0	18
19	$800 to $1,249	118,600	42,200	75,800	100	0	300	0	100	0	19
20	$1,250 or more	108,000	67,000	40,700	0	0	0	300	0	0	20
	Owner household income										
21	Less than $15,000	40,800	7,800	32,700	100	0	0	0	100	0	21
22	$15,000 to $29,999	55,100	13,800	40,900	0	100	0	100	100	0	22
23	$30,000 to $49,999	85,100	18,000	66,800	0	0	100	100	0	0	23
24	$50,000 to $99,999	157,200	50,300	106,100	0	0	100	300	100	100	24
25	$100,000 or more	86,100	41,000	44,900	0	0	100	0	0	0	25

Backward-Looking Table A: Housing Characteristics, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 2002**	**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 2002 stock**	**2011 units added in other ways**	**Row**
1	Housing stock	747,500	584,300	0	0	1,700	2,100	159,000	400	0	1
	Occupancy status										
2	Occupied	665,800	465,300	55,700	0	1,700	1,700	141,200	200	0	2
3	Vacant	76,700	12,500	47,800	0	0	400	15,800	200	0	3
4	Seasonal	5,000	400	2,600	0	0	0	2,000	0	0	4
	Units in structure										
5	1, detached	509,400	399,900	0	0	0	1,100	108,000	400	0	5
6	1, attached	48,000	28,600	0	0	0	0	19,400	0	0	6
7	2 to 4	31,300	26,900	0	0	0	200	4,200	0	0	7
8	5 to 9	36,600	32,200	0	0	0	0	4,400	0	0	8
9	10 to 19	44,200	37,600	0	0	0	200	6,500	0	0	9
10	20 to 49	25,600	15,900	0	0	0	0	9,600	0	0	10
11	50 or more	10,700	4,100	0	0	0	0	6,600	0	0	11
12	Manufactured/mobile home	41,800	39,100	0	0	1,700	600	400	0	0	12

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 2002**	**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 2002 stock**	**2011 units added in other ways**	**Row**
	Year built										
13	2010–2014	11,800	0	0	0	0	0	11,800	0	0	13
14	2005–2009	106,100	200	0	0	0	0	105,900	0	0	14
15	2000–2004	87,000	51,600	0	0	0	200	35,200	0	0	15
16	1995–1999	88,300	82,000	0	0	0	400	5,900	0	0	16
17	1990–1994	58,000	57,800	0	0	0	0	200	0	0	17
18	1985–1989	68,400	67,000	0	0	1,100	200	0	0	0	18
19	1980–1984	42,300	41,500	0	0	0	800	0	0	0	19
20	1975–1979	51,300	51,300	0	0	0	0	0	0	0	20
21	1970–1974	47,800	47,100	0	0	500	200	0	0	0	21
22	1960–1969	72,700	72,500	0	0	0	0	0	200	0	22
23	1950–1959	53,300	53,100	0	0	0	200	0	0	0	23
24	1940–1949	30,700	30,700	0	0	0	0	0	0	0	24
25	1930–1939	14,800	14,500	0	0	0	0	0	200	0	25
26	1920–1929	7,200	7,200	0	0	0	0	0	0	0	26
27	1919 or earlier	7,800	7,800	0	0	0	0	0	0	0	27

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 2002**	**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 2002 stock**	**2011 units added in other ways**	**Row**
	Rooms										
28	1	0	0	0	0	0	0	0	0	0	28
29	2	1,900	700	700	0	0	0	400	0	0	29
30	3	39,900	21,800	10,900	0	0	200	6,900	0	0	30
31	4	126,700	66,600	42,600	0	500	200	16,500	200	0	31
32	5	176,600	86,200	64,200	0	600	400	25,100	200	0	32
33	6	154,000	58,400	62,000	0	0	600	32,900	0	0	33
34	7	106,300	29,000	48,500	0	500	200	28,000	0	0	34
35	8	69,000	19,100	26,400	0	0	200	23,300	0	0	35
36	9	40,800	9,600	18,300	0	0	0	13,000	0	0	36
37	10 or more	32,300	10,000	9,200	0	0	200	12,800	0	0	37
	Bedrooms										
38	None	1,100	200	900	0	0	0	0	0	0	38
39	1	54,100	36,500	7,500	0	0	200	9,900	0	0	39
40	2	190,600	136,300	28,300	0	1,100	200	24,400	200	0	40
41	3	326,100	227,200	33,400	0	0	1,200	64,100	200	0	41
42	4 or more	175,500	94,000	20,000	0	500	400	60,600	0	0	42
43	Multiunit structures	148,400	116,700	0	0	0	400	31,300	0	0	43
	Stories in structure										
44	1	25,000	22,100	0	0	0	0	2,900	0	0	44
45	2	62,100	56,100	0	0	0	400	5,600	0	0	45
46	3	51,400	34,900	0	0	0	0	16,600	0	0	46
47	4 to 6	6,100	2,800	0	0	0	0	3,200	0	0	47
48	7 or more	3,800	800	0	0	0	0	3,000	0	0	48

Backward-Looking Table B: Unit Quality, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2002	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 2002 stock	2011 units added in other ways	Row
1	Occupied units	665,800	465,300	55,700	0	1,700	1,700	141,200	200	0	1
2	With complete kitchen	654,600	453,700	58,400	0	1,700	1,700	138,800	200	0	2
3	Lacking complete kitchen facilities	11,200	500	8,300	0	0	0	2,300	0	0	3
4	With complete plumbing	663,300	457,500	60,900	0	1,700	1,700	141,200	200	0	4
5	Lack some plumbing	2,500	200	2,300	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	2,500	200	2,300	0	0	0	0	0	0	9
	Water										
10	Public/private water	572,600	380,000	56,500	0	1,100	1,700	133,000	200	0	10
11	Well serving 1 to 5 units	92,700	76,300	7,700	0	600	0	8,100	0	0	11
12	Other water source	500	200	200	0	0	0	0	0	0	12
	Sewer										
13	Public sewer	548,000	352,500	64,800	0	500	1,700	128,500	0	0	13
14	Septic tank/cesspool	117,800	89,700	14,000	0	1,100	0	12,700	200	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 2002	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 2002 stock	2011 units added in other ways	Row
16	Severe problems	7,200	200	6,200	0	0	0	700	0	0	16
17	Plumbing	2,500	200	2,300	0	0	0	0	0	0	17
18	Heating	4,100	0	3,400	0	0	0	700	0	0	18
19	Electric	300	0	300	0	0	0	0	0	0	19
20	Upkeep	300	0	300	0	0	0	0	0	0	20
21	Moderate problems	19,000	2,500	13,700	0	0	0	2,800	0	0	21
22	Plumbing	1,000	0	700	0	0	0	200	0	0	22
23	Heating	2,200	2,000	200	0	0	0	0	0	0	23
24	Kitchen	11,200	500	8,300	0	0	0	2,300	0	0	24
25	Upkeep	6,800	0	6,300	0	0	0	500	0	0	25

Backward-Looking Table C: Occupant Characteristics, Charlotte

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2002	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 2002 stock	2011 units added in other ways	Row
1	Occupied units	665,800	465,300	55,700	0	1,700	1,700	141,200	200	0	1
	Age of householder										
2	Under 65	550,700	342,700	78,000	0	1,700	1,700	126,400	200	0	2
3	65 to 74	68,700	4,900	53,800	0	0	0	10,100	0	0	3
4	75 or older	46,300	13,800	27,800	0	0	0	4,700	0	0	4
	Children in household										
5	Some	231,700	92,100	77,500	0	0	1,000	61,000	0	0	5
6	None	434,100	226,500	124,900	0	1,700	700	80,200	200	0	6
	Race and ethnicity										
7	White	470,800	308,700	68,500	0	1,700	1,100	90,800	0	0	7
8	Hispanic	42,000	5,100	31,200	0	0	200	5,500	0	0	8
9	Non-Hispanic	428,700	285,600	55,200	0	1,700	800	85,400	0	0	9
10	Black	171,800	75,000	53,400	0	0	700	42,500	200	0	10
11	Hispanic	6,900	600	4,500	0	0	0	1,700	0	0	11
12	Non-Hispanic	164,900	71,900	51,400	0	0	700	40,800	200	0	12
13	American Indian or Alaska Native alone	1,500	200	500	0	0	0	700	0	0	13
14	Asian or Pacific Islander	16,400	3,900	7,000	0	0	0	5,500	0	0	14
16	Other	5,400	3,800	0	0	0	0	1,700	0	0	16
17	Hispanic or Latino (any race)	50,800	8,400	33,800	0	0	200	8,400	0	0	17

	A	B	C	D	E	F	G	H	I	J	
Row	**2011 characteristics**	**Present in 2011**	**2011 units present in 2002**	**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 2002 stock**	**2011 units added in other ways**	**Row**
	Income sources of families and primary individuals										
18	Wages and salaries	493,700	302,100	71,700	0	1,700	1,300	116,700	200	0	18
20	Dividends, interest, or rent	142,300	57,400	53,100	0	0	0	31,700	0	0	20
21	Public assistance or public welfare	9,700	300	8,000	0	0	200	1,200	0	0	21

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

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2002	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 2002 stock	2011 units added in other ways	Row
1	Occupied units	665,800	465,300	55,700	0	1,700	1,700	141,200	200	0	1
	Tenure										
2	Owner-occupied	432,800	297,300	33,600	0	1,100	400	100,100	200	0	2
3	Homeownership rate	65.0%									3
4	Renter-occupied	233,000	105,900	84,200	0	600	1,300	41,100	0	0	4
	Renter monthly housing costs										
5	No cash rent	10,200	1,100	8,400	0	0	0	700	0	0	5
6	Less than $350	8,900	2,500	4,900	0	0	0	1,500	0	0	6
7	$350 to $599	33,300	10,100	19,600	0	600	200	2,700	0	0	7
8	$600 to $799	66,700	20,300	40,100	0	0	200	6,100	0	0	8
9	$800 to $1,249	86,600	12,200	55,500	0	0	600	18,300	0	0	9
10	$1,250 or more	27,300	1,600	13,800	0	0	200	11,700	0	0	10
	Renter household income										
11	Less than $15,000	59,000	9,300	41,200	0	0	700	7,900	0	0	11
12	$15,000 to $29,999	57,600	10,000	41,300	0	0	0	6,300	0	0	12
13	$30,000 to $49,999	53,400	7,300	36,000	0	0	0	10,200	0	0	13
14	$50,000 to $99,999	46,200	2,800	30,900	0	600	600	11,300	0	0	14
15	$100,000 or more	16,700	0	11,300	0	0	0	5,400	0	0	15

	A	B	C	D	E	F	G	H	I	J	
Row	2011 characteristics	Present in 2011	2011 units present in 2002	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 2002 stock	2011 units added in other ways	Row
	Owner monthly housing costs										
16	Less than $350	43,700	25,500	15,700	0	0	0	2,500	0	0	16
17	$350 to $599	63,900	11,000	44,900	0	1,100	0	6,900	0	0	17
18	$600 to $799	30,300	4,000	23,700	0	0	0	2,600	0	0	18
19	$800 to $1,249	110,000	37,000	51,200	0	0	0	21,600	200	0	19
20	$1,250 or more	185,000	60,100	57,900	0	0	400	66,500	0	0	20
	Owner household income										
21	Less than $15,000	44,100	6,700	32,500	0	0	200	4,700	0	0	21
22	$15,000 to $29,999	57,700	11,400	36,000	0	500	0	9,800	0	0	22
23	$30,000 to $49,999	75,900	16,000	46,100	0	0	0	13,800	0	0	23
24	$50,000 to $99,999	139,800	44,200	55,600	0	500	0	39,100	200	0	24
25	$100,000 or more	115,300	36,800	45,700	0	0	200	32,600	0	0	25

Forward-Looking Rental Dynamics Table 1: Counts, 2002–2011, Charlotte

Affordability categories	A Total in 2002	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	40,100	8,000	800	12,600	5,600	3,300	800	0	300	5,500	2,300	800
Extremely low rent	26,300	4,000	1,700	14,000	300	700	0	0	0	2,600	1,400	1,600
Very low rent	103,600	5,200	3,700	44,000	26,700	10,300	900	300	300	6,800	2,200	3,300
Low rent	20,800	1,100	300	2,800	5,600	7,400	1,100	0	0	1,900	500	0
Moderate rent	10,600	0	500	800	1,300	3,600	700	300	0	2,800	500	200
High rent	2,700	0	0	0	500	300	300	0	300	900	300	100
Very high rent	1,200	0	0	500	0	500	0	0	0	0	0	100
Extremely high rent	500	0	0	300	200	0	0	0	0	0	0	0
Total	205,800	18,300	7,000	75,000	40,200	26,100	3,800	600	900	20,500	7,200	6,100

Forward-Looking Rental Dynamics Table 2: Row Percentages, 2002–2011, Charlotte

Affordability categories	A Total in 2002	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	40,100	19.9%	2.1%	31.4%	13.9%	8.2%	2.1%	0.0%	0.7%	13.8%	5.8%	2.1%
Extremely low rent	26,300	15.1%	6.4%	53.3%	1.1%	2.5%	0.0%	0.0%	0.0%	9.9%	5.4%	6.2%
Very low rent	103,600	5.0%	3.5%	42.5%	25.8%	10.0%	0.8%	0.3%	0.3%	6.5%	2.1%	3.2%
Low rent	20,800	5.3%	1.4%	13.3%	27.1%	35.7%	5.2%	0.0%	0.0%	9.4%	2.5%	0.0%
Moderate rent	10,600	0.0%	4.9%	7.3%	12.2%	33.8%	6.8%	2.8%	0.0%	26.4%	4.4%	1.5%
High rent	2,700	0.0%	0.0%	0.0%	17.4%	10.9%	10.9%	0.0%	10.9%	34.4%	10.9%	4.7%
Very high rent	1,200	0.0%	0.0%	42.5%	0.0%	45.7%	0.0%	0.0%	0.0%	0.0%	0.0%	11.9%
Extremely high rent	500	0.0%	0.0%	52.8%	47.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	205,800	8.9%	3.4%	36.4%	19.6%	12.7%	1.8%	0.3%	0.4%	10.0%	3.5%	3.0%

Backward-Looking Rental Dynamics Table 1: Counts, 2002–2011, Charlotte

Affordability categories	A Total in 2011	B Non-market in 2002	C Extremely low rent in 2002	D Very low rent in 2002	E Low rent in 2002	F Moderate rent in 2002	G High rent in 2002	H Very high rent in 2002	I Extremely high rent in 2002	J Owner-occupied in 2002	K Seasonal or related vacant in 2002	L New construction	M Added in other ways
Non-market	29,700	7,300	2,900	4,800	1,000	0	0	0	0	7,300	1,600	4,700	0
Extremely low rent	10,400	700	1,500	2,900	200	500	0	0	0	2,700	1,000	900	0
Very low rent	89,800	11,400	10,800	40,000	2,700	700	0	500	200	14,600	1,900	5,300	1,700
Low rent	56,000	5,000	300	24,700	5,200	1,200	500	0	300	12,200	1,000	5,700	0
Moderate rent	58,900	2,900	600	9,300	7,100	3,500	300	500	0	15,000	600	19,300	0
High rent	13,100	800	0	800	900	700	300	0	0	4,400	300	4,800	200
Very high rent	5,100	0	0	200	0	300	0	0	0	1,500	200	2,900	0
Extremely high rent	4,100	300	0	300	0	0	200	0	0	1,100	0	2,200	0
Total	267,100	28,300	16,100	82,900	17,100	6,900	1,300	1,000	500	58,800	6,600	45,800	1,900

Backward-Looking Rental Dynamics Table 2: Row Percentages, 2002–2011, Charlotte

Affordability categories	A Total in 2011	B Non-market in 2002	C Extremely low rent in 2002	D Very low rent in 2002	E Low rent in 2002	F Moderate rent in 2002	G High rent in 2002	H Very high rent in 2002	I Extremely high rent in 2002	J Owner-occupied in 2002	K Seasonal or related vacant in 2002	L New construction	M Added in other ways
Non-market	29,700	24.6%	9.7%	16.3%	3.4%	0.0%	0.0%	0.0%	0.0%	24.6%	5.5%	15.9%	0.0%
Extremely low rent	10,400	6.3%	14.5%	28.0%	2.3%	4.7%	0.0%	0.0%	0.0%	26.3%	9.1%	8.8%	0.0%
Very low rent	89,800	12.7%	12.0%	44.6%	3.0%	0.8%	0.0%	0.5%	0.2%	16.2%	2.2%	5.9%	1.8%
Low rent	56,000	8.8%	0.5%	44.1%	9.2%	2.2%	0.9%	0.0%	0.5%	21.8%	1.8%	10.1%	0.0%
Moderate rent	58,900	5.0%	1.0%	15.7%	12.0%	5.9%	0.5%	0.9%	0.0%	25.4%	1.0%	32.7%	0.0%
High rent	13,100	5.8%	0.0%	5.8%	6.7%	5.3%	2.1%	0.0%	0.0%	33.5%	2.1%	37.0%	1.8%
Very high rent	5,100	0.0%	0.0%	4.4%	0.0%	5.3%	0.0%	0.0%	0.0%	29.4%	3.8%	57.1%	0.0%
Extremely high rent	4,100	6.1%	0.0%	6.1%	0.0%	0.0%	5.7%	0.0%	0.0%	27.8%	0.0%	54.2%	0.0%
Total	267,100	10.6%	6.0%	31.1%	6.4%	2.6%	0.5%	0.4%	0.2%	22.0%	2.5%	17.1%	0.7%