

American Housing Survey

**Components of
Inventory Change
And Rental Dynamics:
Seattle
2004–2009**

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Executive Summary

Components of Inventory Change (CINCH) and rental market dynamics are two techniques for explaining how changes that take place in a housing market over time came about in physical (bricks and mortar) terms. CINCH focuses first on the overall number and then the characteristics of units at different times and on the movement of units out of (losses) and into (additions) the housing stock. Rental market dynamics, which is really a type of CINCH analysis, focuses on the rental market with particular emphasis on the affordability of rental housing. In recent years, HUD has commissioned CINCH and rental dynamics studies with each new national American Housing Survey (AHS) and each new set of metropolitan AHSs. This report focuses on the Seattle metropolitan housing market over the period between 2004 and 2009. It is based on local AHS surveys conducted in 2004 and 2009; a companion report examines changes in the New Orleans housing stock over the same period.

While this report adopts the techniques and follows the structure of previous reports, two factors significantly reduce the richness of the output. First, the Census Bureau enlarged the geographic boundaries of the area around Seattle included in the AHS survey. In 2004, the AHS survey for Seattle covered three counties—King, Island, and Snohomish—and this area was called the Seattle-Everett metropolitan area. In 2009, the Census Bureau added Pierce County, which includes Tacoma, and changed the name of the area to the Seattle-Everett-Tacoma metropolitan area. This change affects the interpretation of some of the CINCH and rental dynamics results. In addition, HUD and the Census Bureau reduced the size of the overall sample and, in particular, the number of sample units that were in both surveys.¹ This combination of new boundaries and a reduction in sample size seriously affected the ability to track units from one survey year to the next.

Our examination of units that were lost to the housing stock applies only to units that were in the three-county area in 2004, and it was seriously affected by the reduction in sample size. We estimate that 0.8 percent of the 2004 housing units in the three-county area were no longer in the stock in 2009. Forward-Looking Tables A through D detail these losses by type of loss and type of unit, but we do not discuss these numbers in the text because they are based on only 11 sample units.

Our examination of units added to the stock applies to the four-county area and was based on a reasonable sample of 200 units. This sample allowed for analysis of additions by type of addition and by type of unit. The key findings were as follows:

- The rate of additions among vacant units is over 20 percent, suggesting that momentum of the building boom of the mid-2000s carried through to the recession.

¹ The sample size reduction was budget-driven, and its impact was compounded by the change in boundaries. Once an affordable sample size was determined, approximately 25 percent of those units had to be eliminated from the 2004 sample to allow for the addition of units to represent Pierce County.

- The rate of new construction was very high for single-family attached units and units in buildings with 50 or more units but very low among other multiunit structures.
- The rate of total additions and new construction was very high among larger units (for example, approximately 14 percent of four-bedroom units were newly constructed) and very low among smaller units (for example, only 3.5 percent of units with no bedrooms were newly constructed).
- The rate of new construction among units occupied by households with householders over 65 and households receiving Social Security or pension income was below the rate of new construction for all occupied units.
- The rate of total additions was particularly high among high-cost rental units, and the rate of new construction was particularly high among high-cost owner units. The rate of new construction was particularly low among units occupied by owner households with incomes between \$15,000 and \$29,999.

There were 1,067,200 housing units in the three-county area in 2004 that were still in the housing stock in 2009. The following discussion of changes in the characteristics of units between 2004 and 2009 applies only to the three-county area:

- Most units occupied in 2004 were occupied again in 2009, while most units vacant in 2004 were not vacant in 2009. Seattle had a small seasonal stock in 2004, only 5,600 units. Of these, only 2,800 were still seasonal in 2009.
- CINCH analysis typically finds a high percentage of units for which the count of rooms changes between surveys. As in past CINCH studies, we partially attribute this anomaly to confusion on the part of respondents as to what constitutes a room. The count of bedrooms is more stable and probably a much better indication of actual changes in either the size of a unit or the use of rooms. Table A shows that except for the units with no bedrooms in 2004, approximately 85 percent of units had the same bedroom count in 2009 as in 2004.
- As seen in past CINCH analyses, very few units that have severe or moderate physical problems in 2004 had severe or moderate physical problems in 2009.
- Of the units in the stock in both 2004 and 2009, 88.5 percent of the owner-occupied units in 2004 were owner-occupied in 2009, and 79.3 percent of the renter-occupied units in 2004 were renter-occupied in 2009.

The Rental Dynamics analysis followed 344,000 units in the three-county area that were rental in both 2004 and 2009. The analysis shows a clear decline in affordability of these units. In 2004, 73.9 percent of these units were affordable to very low-income renters; by 2009, only 55.4 percent were.

Components of Inventory Change and Rental Market Dynamics: Seattle 2004–2009

Introduction

Components of Inventory Change (CINCH) and rental market dynamics are two techniques for explaining how changes that take place in a housing market over time came about in physical (bricks and mortar) terms. CINCH focuses first on the overall number and then the characteristics of units at different times. Using CINCH methods, analysts answer such questions as: “What happened to the x units that disappeared from the housing stock between the beginning and the end of the period?” or “Where did the increase in owner-occupied units come from?” Rental market dynamics, which is really a type of CINCH analysis, focuses on the rental market with particular emphasis on the affordability of rental housing. Using rental market dynamics techniques, analysts answer such questions as: “Have the number of rental units affordable to households with very low incomes increased or decreased over the period?” or “What happened to the rental units that were affordable to low-income households at the beginning of the period?”

In recent years, the U.S. Department of Housing and Urban Development (HUD) has commissioned CINCH and rental dynamics studies with each new national American Housing Survey (AHS) and each new set of metropolitan AHSs.² This report focuses on the Seattle metropolitan housing market over the period between 2004 and 2009. It is based on local AHS surveys conducted in 2004 and 2009; a companion report examines changes in the New Orleans housing stock over the same period.³

While this report adopts the techniques and follows the structure of previous reports, two factors significantly reduce the richness of the output. First, the Census Bureau enlarged the geographic boundaries of the area around Seattle included in AHS survey. This change affects the interpretation of some of the CINCH and rental dynamics results. In addition, HUD and the Census Bureau reduced the size of the overall sample and, in particular, the number of sample units that were in both surveys. This combination of new boundaries and a reduction in sample size seriously affected the ability to track units from one survey year to the next.

We will explain these changes and their implications more fully after we provide a general overview of CINCH and rental dynamics analysis.

² See <http://www.huduser.org/datasets/cinch.html> for examples of previous CINCH and rental dynamics studies.

³ HUD and the Census Bureau surveyed an additional five metropolitan areas in 2009: Chicago, Detroit, New York, Northern New Jersey, and Philadelphia. These areas were surveyed using a combination of data from the 2009 national AHS survey and special supplemental surveys. In 2009, new supplemental samples were drawn in each of these five areas to replace the supplement samples that had been used in 1995, 1999, and 2003. The inability to track the old supplement samples forward from 2003 to 2009 and the inability to track the new supplement samples backwards from 2009 to 2003 made it impossible to do CINCH and rental dynamics analyses for these five areas for the 2003–09 period.

Overview of CINCH and Rental Dynamics Techniques

CINCH and rental market dynamics have both forward-looking and backward-looking components. The forward-looking component starts with the housing stock available at the beginning of the period (2004) and then, looking at the end of the period, attempts to explain what happened to those units (by 2009). Possible answers include: some units still exist and serve the same market, some units still exist but serve a different market, some units have been demolished or destroyed in natural disasters, or some units are being used for nonresidential purposes. The backward-looking component starts with the housing stock available at the end of the period (2009) and, looking at the beginning of the period, attempts to explain where those units came from. Possible answers include: some units existed at the beginning of the period (2004) and served the same market, some units existed at the beginning of the period but served a different market, some units were newly constructed over the period, or some units were being used for nonresidential purposes at the beginning of the period. Neither CINCH nor rental market dynamics tries to track the experience of a unit over the entire period; both are interested only in the beginning and the end of the period. For example, a housing unit in 2004 may have become a medical office in 2005 but returned to being a housing unit in 2008. CINCH would record this unit as having undergone no change over the period from 2004 to 2009. In research jargon, CINCH and rental market dynamics are *comparative static* analyses.

Ideally, one would want to combine the forward-looking and backward-looking analyses to produce a complete accounting that can explain the beginning and the end consistently in terms of units that existed in both periods, losses from the stock over the period, and additions to the stock over the period. The research in this report uses the AHS, which is a sample of units at both points in time, and previous efforts have learned that creating sample weights that take both periods into account can generate some inconsistent or inaccurate results. For this reason, recent CINCH and rental market dynamics studies have separated the forward-looking and backward-looking components. This paper will do the same. (Weighting is explained in a separate paper.)

The remainder of this report consists of the following five sections:

- A discussion of some issues that complicate the 2004–09 comparisons for the Seattle metropolitan area.
- An explanation of how to read the CINCH tables.
- Two sets of four tables each: a set of forward-looking tables tracing the movement of units from 2004 to 2009 and identifying how units were lost to the housing stock, and a set of backward-looking tables tracing where 2009 units came from and distinguishing between units that were part of the stock in 2004 and units that were additions to the stock since 2004.
- A discussion of interesting changes in the Seattle housing stock between 2004 and 2009.
- A brief discussion of the rental market dynamics results, using CINCH-like tables.

There are two appendices:

- Appendix A explains how the results were tested.
- Appendix B provides a brief overview of the weighting.

Issues Affecting the 2004/2009 Seattle Analyses

Change in Geography

In 2004, the AHS survey for Seattle covered three counties—King, Island, and Snohomish—and this area was called the Seattle-Everett metropolitan area. In 2009, the Census Bureau added Pierce County, which includes Tacoma, and changed the name of the area to the Seattle-Everett-Tacoma metropolitan area. Table 1 compares the areas surveyed in 2004 and 2009 using Census Bureau data and estimates.

Table 1: Coverage of the Seattle American Housing Survey in 2004 and 2009

AHS Seattle	Population	Housing units	Land area in square miles*
2004 (King, Island, Snohomish counties)	2,501,693	1,075,179	4,424
2009 (King, Island, Snohomish, Pierce counties)	3,488,902	1,481,505	6,102
Percent change	39.5%	37.8%	38.0%

* Omits area covered by water.

The addition of Pierce County resulted in a substantial increase in population, number of housing units, and land area covered by the AHS survey. If the geography is held constant between 2004 and 2009, using either the three-county or the four-county definition, the growth rates of population and housing units range between 7.4 and 7.9 percent. But when the 2009 geography is compared to the 2004 geography, the rates of change approach 40 percent.

The change in geography affects the interpretation of the CINCH and rental dynamics estimates in complicated ways.

The forward-looking CINCH analysis presents the simplest case. It follows sample units from 2004 to 2009 and adjusts the weights to represent the housing stock in 2004. Two issues comprise the core of the forward-looking analysis: *How many 2004 units were lost from the housing stock, and how were they lost?* and *How many of the 2004 units that remained in the housing stock changed their characteristics, and what types of changes took place?* The answers presented in the forward-looking tables apply only to the three counties in the 2004 definition.

The change in geography affects the two corresponding issues in the backward-looking CINCH analysis differently. The backward-looking analysis traces the origin of the units in the 2009 sample back to 2004 and adjusts the weights to represent the housing stock in 2009. For the first issue—*How many units were added to the housing stock, and how were they added?*—the results

reported in the backward-looking tables apply to the four-county area. For the second issue—*How many units that were in both surveys changed their characteristics between 2004 and 2009, and how did characteristics change?*—the results reported in the backward-looking tables apply only to the three-county metropolitan area because the analysis has to use units interviewed in both surveys. The interpretation of this part of the backward-looking analysis is further complicated by the fact that the weights adjust the counts (in both years) to represent the four-county area.

The rental dynamics analysis involves two steps. In the first step, the analysis follows the 2004 rental stock forward to 2009 to see what has happened to those rental units. This analysis applies only to the three counties in the 2004 AHS survey. In the second step, the analysis traces the 2009 rental stock backwards to 2004. Four alternatives comprise the origins of 2009 rental units: (a) rental units in 2004 with the same affordability characteristics, (b) rental units in 2004 with different affordability characteristics, (c) units owned in 2004 or units used for seasonal purposes or as second homes, and (d) rental units added to the stock after 2004. The (a), (b), and (c) parts of this second step apply only to the three-county area because the analysis can use only units interviewed in both surveys. The (d) part applies to the four-county area. Weights based on the four-county areas are used for all four parts of this second step.

Reduction in Sample Size

In 2009, HUD reduced the sample sizes of both the national and metropolitan AHS surveys to accommodate a reduced research budget. The impact of the budget reductions on the Seattle survey was magnified by the change in geography. The budget reduction decreased the total number of sample units available for Seattle; the change in geography meant that additional units had to be dropped from the 2004 survey in order to allow for additional units to represent Pierce County. Since 23 percent of the housing units in the four-county area are located in Pierce County, roughly 23 percent of the 2009 sample have to be new units from Pierce County.

Table 2 portrays the combined effects of the budget reductions and change in geography. The left panel traces out how the AHS sample changed, while the right panel shows the size and composition of the samples used for the CINCH analysis. The CINCH samples are smaller than the samples left in the AHS files because of various adjustments that filter out units prior to the CINCH analysis. The most binding constraint is the requirement that a unit can be used in the CINCH analysis only if it was interviewed in the year or years in which it was in the housing stock.^{4,5}

⁴ CINCH analysis focuses on specific characteristics of units, such as owner-occupied vs. renter-occupied or having a Hispanic householder, and most of these characteristics are available only for units that were interviewed.

⁵ Another constraint limited the number of mobile homes available for analysis. In 2005, the Census Bureau replaced approximately half of the manufactured housing units (mobile homes) in the AHS samples—both national and metropolitan—with newly sampled units to improve the coverage of mobile homes constructed before 2000. The dropping and adding of mobile home units to the sample reduced the number of mobile homes interviewed in both 2004 and 2009.

Table 2: AHS Sample Counts and Sample Available for CINCH Analysis

AHS sample counts		CINCH counts—after CINCH filters	
2004 sample	4,731	Sample units in both surveys	1,292
Dropped from 2009 Public Use File	2,879	In 2004 but lost	11
Left for CINCH analysis	1,852	Added after 2004	200
Not in housing stock either year ⁶	182	Available for forward-looking analysis (1,292 +11)	1,303
Left for forward-looking analysis (1,852 – 182)	1,670	Available for backward-looking analysis (1,292 + 200)	1,492
Legitimate additions to sample (not Pierce County sample units)	225		
Left for backward-looking analysis (1,852 – 182 + 225)	1,895		

The samples used in the CINCH analysis for Seattle are small, 1,303 cases in the forward-looking analysis and 1,492 cases in the backward-looking analysis. In particular, the analysis of losses is based on only 11 sample units.

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.

The forward-looking tables are concerned with what happened to the 2004 housing stock by 2009. There are three basic dispositions of 2004 units: (1) units that continued to exist in 2009 with the same characteristics (or serving the same market), (2) units that continued to exist in 2009 but with different characteristics (or serving a different market), or (3) units that were lost to the stock.

The backward-looking tables are concerned with where the 2009 housing stock came from in reference to 2004. There are three basic sources of 2009 units: (1) units that existed in 2004 with the same characteristics (or serving the same market), (2) units that existed in 2004 but with different characteristics (or serving a different market), or (3) units that were additions to the housing stock.

The essence of the CINCH analysis lies in the columns because they specify the state of a unit in the other time period.

⁶ These are sample units, carried over from early surveys, that were not in the stock in either 2004 or 2009 because they were either temporary losses (e.g., used for residential purposes) or permanent losses (e.g., destroyed by fire or natural disaster).

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

- The first and last columns contain the row numbers—the row numbers are identical for the same tables in the forward-looking and backward-looking sets.

Columns A through E 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, row 2 of Forward-Looking Table A focuses on occupied units; row 15 focuses on units built in 1995 through 1999.
- Column B gives the estimate published in the AHS report for the number of units that satisfy the conditions specified in column A. For example, the 2004 AHS report for Seattle counted 991,900 occupied units (row 2, column B, Forward-Looking Table A) in the three-county area; the 2009 AHS report counted 1,331,700 occupied units (row 2, column B, Backward-Looking Table A) in the four-county area.
- Column C gives the CINCH estimate of the number of units that satisfy two conditions: (a) being part of the housing stock in the relevant year (2004 for the forward-looking tables and 2009 for the backward-looking tables), and (b) satisfying the condition in column A. CINCH uses different weights than those used in preparing the published AHS reports. Therefore, CINCH estimates can differ from AHS estimates for particular subsets of the housing stock. The weights were created to match AHS-published totals for rows 2 through 4 of Table A and rows 2 and 4 of Table D. This perfect match will not be true of other rows.⁷
- Column D is the CINCH estimate of the number of units from column C 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. For example, column D of row 2 of Forward-Looking Table A estimates that 912,300 of the occupied units from 2004 were also occupied in 2009.
- Column E is the CINCH estimate of the number of units from column C 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. Column E of row 2 of Forward-Looking Table A indicates that 74,000 units that were occupied in 2004 are still part of the housing stock in 2009 but no longer occupied. 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 are characteristics that are considered impossible or unlikely to change.

⁷ Columns B and C will also match, except for rounding, in row 1 of Table A because row 1 is defined as the sum of rows 2 through 4. Categories for which the CINCH weights seem to have trouble matching the published numbers for Seattle were (a) in the forward-looking analysis (units in structures with 10 to 19 units or 50 or more units, small units, units with severe physical problems, households receiving welfare assistance, rental units with no cash rent, rental units occupied by households with incomes of \$100,000 or more, and owner-occupied units with housing costs between \$600 and \$799), and (b) in the backward-looking analysis (single-family attached structures, small units, units with severe problems, rental units with no cash rent, rentals with housing costs between \$350 and \$599, rental units occupied by households with incomes of \$100,000 or more, and owners with housing costs less than \$800).

Columns Unique to Forward-Looking Tables

In forward-looking tables, columns F through K track what happened to units that were lost from 2004 to 2009. In explaining the various columns, we use the numbers in row 1 in Table A as examples. Because all the numbers reported in these six columns are based on only 11 sample cases, one should not ascribe precision to these estimates.

- Column F is the CINCH estimate of the number of units from column C that are not in the 2009 housing stock because they were merged with other units or converted into multiple units. In the Seattle metropolitan area, 800 units were lost to mergers or conversions between 2004 and 2009.
- Column G is the CINCH estimate of the number of mobile homes or houses from column C that were moved out during the period. In the Seattle metropolitan area, no houses or mobile homes were moved out between 2004 and 2009.
- Column H is the CINCH estimate of the number of units from column C 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.⁸ No units were recorded as lost to nonresidential use between 2004 and 2009.
- Column I is the CINCH estimate of the number of units from column C that were demolished or were destroyed by fires or natural disasters by 2009. In Seattle, 2,400 units were demolished or destroyed from the total housing stock.
- Column J is the CINCH estimate of the number of units from column C that by 2009 were condemned or that were no longer usable for housing because of extensive damage. In the Seattle metropolitan area, 800 units are recorded as having been temporarily lost because of damage or similar cause.
- Column K is the CINCH estimate of the number of units from column C that were lost by 2009 for other reasons. In the Seattle metropolitan area, 4,500 units were lost for these miscellaneous reasons. Of the 11 sample cases that were lost to the stock, 6 were classified in this “other” category. This category has also been large in previous CINCH studies, but one has to wonder whether some of the eliminated units were misclassified as other losses.

Columns C through K form a closed system. Column C counts the number of units tracked; columns D through K account for all the possible outcomes. Therefore, column C minus the sum of columns D through K always equals zero, except for rounding.⁹

⁸ 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 means strictly no residential use.

⁹ The weighted numbers are rounded to the nearest 100 to match practices used by the Census Bureau in the AHS publications.

Columns Unique to Backward-Looking Tables

In backward-looking tables, columns F through K track where units came from that are part of the housing stock in 2009 but were not part of the 2004 housing stock. The estimates in backward-looking columns F through K are based on 200 sample cases, and the estimates in row 1 of each table should be treated as reasonably precise.

- Column F is the CINCH estimate of the number of units created through mergers and conversions (splitting one unit into multiple units). Of the entire housing stock in the Seattle metropolitan area, 9,500 units were created through mergers or splits.
- Column G is the CINCH estimate of the number of mobile homes included in the count in column C that were moved in during the period. Of the housing units in the 2009 housing stock, 2,600 were mobile homes moved in after 2004.
- Column H is the CINCH estimate of the number of units from column C that had been nonresidential in 2004. Among all units, 1,400 had been nonresidential.
- Column I is the CINCH estimate of the number of units from column C that were newly constructed between 2004 and 2009. Among all units, 132,000 units were newly constructed.
- Column J is the CINCH estimate of the number of units from column C that were added by 2009 due to the recovery of units that had been temporarily lost to the housing stock because occupancy was prohibited in 2004, or the interior of the unit was exposed to the elements, or for reasons “not classified.” The 2009 housing stock included no recovered units.
- Column K includes units added by the Census Bureau for other reasons. Of the entire housing stock in the Seattle metropolitan area, 700 were added for other reasons.

Table A

Table A focuses on the general housing characteristics of the stock. Row 1 provides the highest level CINCH overview of the stock. For this row, column A specifies no conditions other than being part of the stock in the relevant year.

Rows 2–4 divide the housing stock by use. By Census Bureau definition, the number of occupied nonseasonal units equals the number of households. Because households are the basis for all the analyses in Tables B through D, it is important to get a good starting point for these estimates. For this reason, the weights are designed to match published AHS totals for occupied units (by owner-occupied and renter-occupied), vacant units, and seasonal units.

Rows 5–12 divide the housing stock by type of structure to see what type of structures account for losses and additions. Column E is forced to be zero on the grounds that changes in structure types are extremely rare and that any observed changes are most likely data errors.

Rows 13–26 divide the housing stock by year built.¹⁰ Column E is forced to be zero because units cannot change year built. The reader will note that in Backward-Looking Table A there is an apparent anomaly, namely units reported as newly constructed (column I) that have year-built dates that are inconsistent with being newly constructed. Backward-Looking Table A calls a unit newly constructed if the unit was added to the sample in 2009 from a listing of new construction permits. The Table bases year built on information provided by the surveyed household.¹¹ In some cases, the apparent anomaly is the result of an error—either the respondent answered the question incorrectly or the Census Bureau recorded the answer incorrectly. However, in many cases, the apparent anomaly is not really an anomaly. The most likely explanation for Seattle is that for a large number of units, permits were drawn before 2004, but construction was not completed until 2005 or later. A possible explanation also exists for the 1,500 “new construction” units built in the 1960–69 period. If an existing housing unit is remodeled to the extent that the local jurisdiction requires the contractor to draw a “new construction” permit, then the unit becomes eligible for inclusion in the AHS as a “newly constructed” unit. In these cases, when the Census Bureau questions the household about the age of the unit, the respondent may very well give the date of construction of the original unit and not the date of the remodeling. In recent years, there have been a substantial number of existing units that have been gutted and totally remodeled, often with a substantial increase in the area of the ground floor, the so-called unit “footprint.” Sometimes local jurisdictions base the decision on whether a “new construction” permit is required on changes in the footprint.

Rows 27–36 and 37–41 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms.

Rows 42–47 focus on multiunit structures only and divide them by number of stories. Column E is forced to be zero.

Table B

This table looks at issues related to the physical quality of units. Row 1 repeats the analysis from row 2 in Table A. All the subsequent rows are based on row 1.

Rows 2–3 look at whether the units have complete kitchens, that is, an installed sink with piped water, a mechanical refrigerator, and built-in burners for the exclusive use of the occupants. Rows 4–6 look at whether the units have complete plumbing facilities, that is, hot-and-cold piped water, a flush toilet, and a bathtub or shower inside the structure for the exclusive use of the occupants.

¹⁰ Row 13 is not included in Forward-Looking Table A because the 2004 housing stock cannot contain units built after 2004.

¹¹ New construction is based on a value of “3” for the variable REUAD (reason unit added), whereas year built is based on answers to the variable BUILT.

Rows 7–11 look at how units obtain water and dispose of sewage.

Rows 12–15 look at units with severe physical problems. Rows 13–15 identify specific types of serious deficiencies. Row 12 counts the units having one or more of these deficiencies. Rows 16–20 look at units with moderate problems. Rows 17–20 identify specific types of deficiencies. Row 16 counts the units having one or more of these deficiencies.¹² These rows are in the analysis to answer two questions: (1) whether poor-quality units in one year were also poor-quality units in the other year, and (2) whether poorer-quality units were more likely to be lost.

Table C

This table studies the characteristics of occupants. Row 1 repeats the analysis from row 2 in Table A. All the subsequent rows are based on row 1. In all cases, the analysis seeks to find out how stable occupancy characteristics are over time and what part of the market was served by units that were lost or added between 2004 and 2009.

Rows 2–4 look at the age of the householder. Rows 5–6 look at whether or not the household included children. Rows 7–15 look at the race or ethnicity of the householder. Rows 16–19 look at three possible sources of household income.

Table D

Table D studies tenure, income, and housing costs. Row 1 repeats the analysis from row 2 in Table A. All the subsequent rows are based on row 1.

Rows 2–4 focus on tenure to see the extent to which units change tenure characteristics and whether rental or owner-occupied units were more likely to be lost or added.

Rows 5–10 analyze the rental stock using six categories based on monthly housing costs. Row 10 identifies units provided to tenants for no cash rents, e.g., units provided to maintenance or management personnel or units provided to relatives. Rows 16–20 identify owner-occupied units by total monthly housing costs.

Rows 11–15 track rental units by household income; rows 21–25 track owner-occupied units by household income.¹³

¹² For definitions of severe and moderate problems, see pages 1,084 and 1,085 of the AHS Codebook, version 2.0, at http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/AHS_Codebook.pdf.

¹³ The published reports list more categories for both monthly housing costs and household income. This report combined categories for two reasons. First, the sample size in each metropolitan area is small, and therefore larger categories provide more stable measurement of the various types of losses and additions. Second, columns D and E track whether the units in each category remain occupied and stay in the same cost or income category. The combined categories create more interesting analysis because bigger changes in monthly housing costs or income are needed to move between broader categories.

Forward-Looking Table A: Unit and Structure Characteristics – All Housing Units

Row	A Characteristics	B Published numbers	C In 2004 stock	D In 2009, same characteristic	E In 2009, different characteristic	F Units lost by conversion or merger	G Mobile home move out	H Units to other use	I Units destroyed or demolished	J Units damaged or condemned	K Units lost in other ways	Row
1	Total Housing Stock	1,075,600	1,075,700	1,067,200	0	800	0	0	2,400	800	4,500	1
	Occupancy Status											
2	Occupied	991,900	991,900	912,300	74,000	800	0	0	1,600	800	2,400	2
3	Vacant	78,200	78,200	15,800	60,200	0	0	0	700	0	1,400	3
4	Seasonal	5,600	5,600	2,800	2,100	0	0	0	0	0	700	4
	Units in Structure											
5	1, detached	619,000	624,700	622,500	0	0	0	0	0	0	2,200	5
6	1, attached	36,500	34,100	33,300	0	0	0	0	800	0	0	6
7	2 to 4	70,300	75,000	71,800	0	800	0	0	1,500	0	800	7
8	5 to 9	68,700	68,100	68,100	0	0	0	0	0	0	0	8
9	10 to 19	87,200	72,300	72,300	0	0	0	0	0	0	0	9
10	20 to 49	72,600	78,100	77,400	0	0	0	0	0	0	700	10
11	50 or more	54,500	60,800	59,200	0	0	0	0	0	800	800	11
12	Mobile Home/trailer	66,900	62,700	62,700	0	0	0	0	0	0	0	12
	Year Built											
14	2000–04	91,800	84,200	83,300	0	0	0	0	0	0	800	14
15	1995–99	81,800	80,800	80,100	0	0	0	0	0	0	800	15
16	1990–94	90,900	86,500	86,500	0	0	0	0	0	0	0	16
17	1985–89	121,600	107,000	106,200	0	0	0	0	0	800	0	17
18	1980–84	87,200	78,400	78,400	0	0	0	0	0	0	0	18
19	1975–79	105,300	119,500	119,500	0	0	0	0	0	0	0	19
20	1970–74	77,700	84,200	83,500	0	0	0	0	0	0	700	20
21	1960–69	141,500	140,800	140,100	0	0	0	0	0	0	700	21
22	1950–59	85,500	102,100	101,400	0	0	0	0	700	0	0	22
23	1940–49	64,900	73,800	72,100	0	0	0	0	1,600	0	0	23
24	1930–39	29,000	26,400	25,600	0	800	0	0	0	0	0	24
25	1920–29	48,100	46,400	44,800	0	0	0	0	0	0	1,500	25
26	1919 or earlier	51,000	45,600	45,600	0	0	0	0	0	0	0	26

Forward-Looking Table A (continued): Unit and Structure Characteristics – All Housing Units

ROW	A Characteristics	B Published Numbers	C In 2004 stock	D In 2009, same characteristic	E In 2009, different characteristic	F Units lost by conversion or merger	G Mobile home move out	H Units to other use	I Units destroyed or demolished	J Units damaged or condemned	K Units lost in other ways	ROW
	Rooms											
27	1 room	6,500	9,000	1,500	6,700	0	0	0	0	0	800	27
28	2 rooms	19,900	25,200	13,400	11,800	0	0	0	0	0	0	28
29	3 rooms	117,700	123,200	86,400	35,400	0	0	0	800	0	700	29
30	4 rooms	200,600	186,900	123,400	61,300	0	0	0	0	0	2,300	30
31	5 rooms	187,400	162,900	79,200	80,500	800	0	0	1,500	800	0	31
32	6 rooms	171,100	186,300	83,100	102,400	0	0	0	0	0	800	32
33	7 rooms	136,600	137,800	61,700	76,000	0	0	0	0	0	0	33
34	8 rooms	118,300	124,200	51,100	73,100	0	0	0	0	0	0	34
35	9 rooms	64,200	68,400	21,200	47,200	0	0	0	0	0	0	35
36	10 rooms or more	53,300	51,800	21,100	30,700	0	0	0	0	0	0	36
	Bedrooms											
37	None	20,800	26,000	15,900	9,200	0	0	0	0	0	800	37
38	1	159,600	156,200	125,300	27,900	800	0	0	800	0	1,400	38
39	2	304,300	298,500	256,500	38,900	0	0	0	700	800	1,500	39
40	3	361,900	351,400	295,500	54,400	0	0	0	800	0	800	40
41	4 or more	229,000	243,600	205,800	37,800	0	0	0	0	0	0	41
42	Multiunit Structures	353,300	354,236	348,716	0	814	0	0	1538	814	2,353	42
	Stories in Structures											
43	1	NA	25,700	23,300	0	0	0	0	1,500	0	800	43
44	2	NA	119,500	119,500	0	0	0	0	0	0	0	44
45	3	NA	126,500	124,100	0	800	0	0	0	800	700	45
46	4 to 6	NA	57,700	57,700	0	0	0	0	0	0	0	46
47	7 or more	NA	24,900	24,100	0	0	0	0	0	0	800	47

Forward-Looking Table B: Condition of Unit – All Occupied Units

Row	A Characteristics	B Published Numbers	C In 2004 stock	D In 2009, same characteristic	E In 2009, different characteristic	F Units lost by conversion or merger	G Mobile home move out	H Units to other use	I Units destroyed or demolished	J Units damaged or condemned	K Units lost in other ways	Row
1	Occupied Units	991,900	991,900	912,300	74,000	800	0	0	1,600	800	2,400	1
	Kitchen											
2	With complete kitchen	967,200	969,400	875,200	88,600	800	0	0	1,600	800	2,400	2
3	Lack some kitchen facilities	24,600	22,500	3,800	18,700	0	0	0	0	0	0	3
	Plumbing											
4	With all plumbing facilities	983,100	986,000	884,700	95,700	800	0	0	1,600	800	2,400	4
5	Lack some plumbing	8,700	5,900	0	5,900	0	0	0	0	0	0	5
6	Lack exclusive use	7,600	5,900	0	5,900	0	0	0	0	0	0	6
	Water											
7	Public/private water	957,700	960,100	880,000	74,500	800	0	0	1,600	800	2,400	7
8	Well	33,100	29,400	23,200	6,200	0	0	0	0	0	0	8
9	Other water source	1,100	2,400	800	1,600	0	0	0	0	0	0	9
	Sewer											
10	Public sewer	833,500	829,100	752,400	71,800	0	0	0	1,600	800	2,400	10
11	Septic tank/cesspool	158,100	162,800	138,400	23,600	800	0	0	0	0	0	11
12	Severe Problems	15,000	7,600	0	7,600	0	0	0	0	0	0	12
13	Plumbing	8,700	5,900	0	5,900	0	0	0	0	0	0	13
14	Heating	6,000	1,700	0	1,700	0	0	0	0	0	0	14
16	Moderate problems	37,800	34,200	6,300	27,900	0	0	0	0	0	0	16
17	Plumbing	1,300	1,700	0	1,700	0	0	0	0	0	0	17
18	Heating	1,800	1,700	800	900	0	0	0	0	0	0	18
19	Kitchen	24,300	22,500	3,800	18,700	0	0	0	0	0	0	19
20	Upkeep	9,200	8,400	0	8,400	0	0	0	0	0	0	20

Forward-Looking Table C: Household Characteristics – All Occupied Units

Row	A Characteristics	B Published Numbers	C In 2004 stock	D In 2009, same characteristic	E In 2009, different characteristic	F Units lost by conversion or merger	G Mobile home move out	H Units to other use	I Units destroyed or demolished	J Units damaged or condemned	K Units lost in other ways	Row
1	Occupied units	991,900	991,900	912,300	74,000	800	0	0	1,600	800	2,400	1
	Age											
2	Under 65	825,900	826,900	706,300	116,600	0	0	0	800	800	2,400	2
3	65 to 74	77,900	68,500	27,500	40,200	0	0	0	800	0	0	3
4	75 or older	88,100	96,600	59,900	35,900	800	0	0	0	0	0	4
	Children											
5	Some	318,400	326,200	209,300	114,600	0	0	0	800	800	800	5
6	None	673,600	665,700	505,800	156,600	800	0	0	800	0	1,600	6
	Race/Origin											
7	White	821,800	824,900	708,200	112,600	800	0	0	0	800	2,400	7
8	Hispanic	44,100	41,800	20,600	21,100	0	0	0	0	0	0	8
9	Non-Hispanic	777,700	783,100	660,400	118,700	800	0	0	0	800	2,400	9
10	Black	37,200	40,100	15,800	23,400	0	0	0	800	0	0	10
11	American Indian, Eskimo, Aleut	11,400	12,600	8,400	4,200	0	0	0	0	0	0	11
12	Asian	83,000	74,300	49,000	24,500	0	0	0	800	0	0	12
13	Pacific Islander	11,300	11,900	5,600	6,400	0	0	0	0	0	0	13
14	Two or more races	27,200	28,200	9,700	18,500	0	0	0	0	0	0	14
15	Total Hispanics	55,700	54,100	27,800	26,300	0	0	0	0	0	0	15
	Income Source											
16	Wages and salaries	815,000	820,500	652,000	164,400	0	0	0	800	800	2,400	16
17	Social Security or pension	217,300	222,700	128,800	93,100	800	0	0	0	0	0	17
18	Dividend or interest	NA	425,100	200,400	222,300	800	0	0	0	0	1,600	18
19	Welfare	40,200	22,100	3,400	17,900	0	0	0	800	0	0	19

Forward-Looking Table D: Tenure, Housing Cost, and Income – All Occupied Units

Row	A Characteristics	B Published Numbers	C In 2004 stock	D In 2009, same characteristic	E In 2009, different characteristic	F Units lost by conversion or merger	G Mobile home move out	H Units to other use	I Units destroyed or demolished	J Units damaged or condemned	K Units lost in other ways	Row
1	Occupied units	991,900	991,900	912,300	74,000	800	0	0	1,600	800	2,400	1
	Tenure											
2	Owner-occupied	661,100	661,100	584,300	76,100	0	0	0	0	0	800	2
3	Percent owner-occupied	66.6%	66.6%									3
4	Renter-occupied	330,800	330,800	258,300	67,600	800	0	0	1,600	800	1,600	4
	Renter Monthly Housing Costs											
5	Less than \$350	26,500	29,100	10,300	18,000	0	0	0	800	0	0	5
6	\$350 to \$599	45,700	50,400	9,400	38,600	0	0	0	800	800	800	6
7	\$600 to \$799	93,400	97,500	24,000	72,700	800	0	0	0	0	0	7
8	\$800 to \$1,249	113,100	96,600	44,800	51,800	0	0	0	0	0	0	8
9	\$1,250 or more	43,400	53,700	35,300	17,600	0	0	0	0	0	800	9
10	No cash rent	8,800	3,400	1,700	1,700	0	0	0	0	0	0	10
	Renter Hsld Income											
11	Less than \$15,000	62,600	62,000	24,300	36,800	0	0	0	800	0	0	11
12	\$15,000 to \$29,999	79,300	81,500	21,500	58,400	0	0	0	800	800	0	12
13	\$30,000 to \$49,999	84,100	74,500	18,000	54,800	800	0	0	0	0	800	13
14	\$50,000 to \$99,999	84,100	87,600	26,800	60,000	0	0	0	0	0	800	14
15	\$100,000 or more	20,700	25,300	6,000	19,300	0	0	0	0	0	0	15
	Owner Monthly Housing Costs											
16	Less than \$350	53,000	47,800	11,000	36,800	0	0	0	0	0	0	16
17	\$350 to \$599	113,500	109,300	12,800	96,600	0	0	0	0	0	0	17
18	\$600 to \$799	55,500	70,300	7,000	63,300	0	0	0	0	0	0	18
19	\$800 to \$1,249	111,100	102,600	30,300	72,300	0	0	0	0	0	0	19
20	\$1,250 or more	327,900	331,100	270,000	60,300	0	0	0	0	0	800	20
	Owner Hsld Income											
21	Less than \$15,000	45,700	48,200	8,000	40,200	0	0	0	0	0	0	21
22	\$15,000 to \$29,999	61,900	60,800	15,500	45,200	0	0	0	0	0	0	22
23	\$30,000 to \$49,999	106,100	91,700	14,900	76,800	0	0	0	0	0	0	23
24	\$50,000 to \$99,999	237,200	237,800	104,200	132,900	0	0	0	0	0	800	24
25	\$100,000 or more	210,200	222,600	144,500	78,000	0	0	0	0	0	0	25

Backward-Looking Table A: Unit and Structure Characteristics – All Housing Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same character- istic	E In 2004 stock with different character- istic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
1	Total Housing Stock	1,457,800	1,457,800	1,311,600	0	9,500	2,600	1,400	132,000	0	700	1
	Occupancy Status											
2	Occupied	1,331,700	1,331,700	1,128,600	85,700	6,600	2,600	800	107,400	0	0	2
3	Vacant	121,500	121,600	17,600	75,700	2,900	0	0	24,700	0	700	3
4	Seasonal	4,500	4,500	3,100	800	0	0	600	0	0	0	4
	Units in Structure											
5	1, detached	882,200	868,900	782,800	0	3,700	0	0	82,400	0	0	5
6	1, attached	65,600	50,000	35,500	0	700	0	0	13,200	0	700	6
7	2 to 4	94,500	101,700	93,900	0	3,200	0	600	4,000	0	0	7
8	5 to 9	79,500	79,400	77,800	0	800	0	0	800	0	0	8
9	10 to 19	107,100	107,600	106,100	0	0	0	0	1,500	0	0	9
10	20 to 49	83,900	95,500	90,200	0	0	0	0	5,200	0	0	10
11	50 or more	92,000	101,700	76,400	0	1,200	0	800	23,400	0	0	11
12	Mobile Home/trailer	53,000	53,000	48,900	0	0	2,600	0	1,500	0	0	12
	Year Built											
13	2005–09	73,800	72,000	1,000	0	0	0	0	71,000	0	0	13
14	2000–04	148,800	165,600	104,100	0	0	1,100	800	59,600	0	0	14
15	1995–99	105,800	101,500	101,100	0	300	0	0	0	0	0	15
16	1990–94	120,200	107,600	107,600	0	0	0	0	0	0	0	16
17	1985–89	125,000	129,600	126,700	0	1,300	1,500	0	0	0	0	17
18	1980–84	90,100	94,200	92,800	0	1,500	0	0	0	0	0	18
19	1975–79	141,700	141,700	141,700	0	0	0	0	0	0	0	19
20	1970–74	115,600	105,400	104,600	0	800	0	0	0	0	0	20
21	1960–69	166,900	174,900	172,200	0	0	0	600	1,500	0	700	21
22	1950–59	126,100	127,600	125,300	0	2,300	0	0	0	0	0	22
23	1940–49	86,400	91,400	90,600	0	800	0	0	0	0	0	23
24	1930–39	38,500	35,000	33,500	0	1,500	0	0	0	0	0	24
25	1920–29	57,500	55,700	55,700	0	0	0	0	0	0	0	25
26	1919 or earlier	61,300	55,600	54,700	0	800	0	0	0	0	0	26

Backward-Looking Table A (continued): Unit and Structure Characteristics – All Housing Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same charact- eristic	E In 2004 stock with different charact- eristic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
	Rooms											
27	1 room	10,200	12,100	1,900	9,600	0	0	0	700	0	0	27
28	2 rooms	26,300	30,600	16,500	13,500	0	0	0	700	0	0	28
29	3 rooms	146,300	158,400	106,300	30,600	2,700	500	800	17,400	0	0	29
30	4 rooms	251,600	248,200	148,000	79,300	4,700	1,500	0	14,700	0	0	30
31	5 rooms	257,700	244,900	94,600	130,900	700	0	600	17,500	0	700	31
32	6 rooms	244,200	221,300	101,500	104,700	800	500	0	13,800	0	0	32
33	7 rooms	239,800	233,500	76,000	135,100	0	0	0	22,400	0	0	33
34	8 rooms	151,800	167,800	64,800	77,300	0	0	0	25,800	0	0	34
35	9 rooms	75,600	84,200	26,900	45,200	800	0	0	11,300	0	0	35
36	10 rooms or more	54,200	56,800	26,600	22,300	0	0	0	7,800	0	0	36
	Bedrooms											
37	None	33,700	37,500	19,900	16,200	0	0	0	1,300	0	0	37
38	1	188,500	203,100	154,600	21,200	5,000	500	800	21,000	0	0	38
39	2	372,500	362,000	311,400	29,700	3,000	1,500	0	16,300	0	0	39
40	3	524,300	490,500	363,700	81,800	800	500	0	43,000	0	700	40
41	4 or more	338,700	364,700	256,700	56,200	800	0	600	50,400	0	0	41
42	Multiunit Structures	457,000	485,900	444,400	0	5,200	0	1,400	34,900	0	0	42
	Stories in Structures											
43	1	NA	39,200	35,200	0	1,500	0	800	1,700	0	0	43
44	2	NA	159,700	154,800	0	1,700	0	600	2,600	0	0	44
45	3	NA	161,800	151,000	0	2,000	0	0	8,800	0	0	45
46	4 to 6	NA	79,100	69,000	0	0	0	0	10,200	0	0	46
47	7 or more	NA	46,100	34,400	0	0	0	0	11,700	0	0	47

Backward-Looking Table B: Condition of Unit – All Occupied Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same charact- eristic	E In 2004 stock with different charact- eristic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
1	Occupied Units	1,331,700	1,331,700	1,128,600	85,700	6,600	2,600	800	107,400	0	0	1
	Kitchen											
2	With complete kitchen	1,294,100	1,290,300	1,081,400	97,300	6,600	2,600	0	102,500	0	0	2
3	Lack some kitchen facilities	37,600	41,400	4,800	30,800	0	0	800	4,900	0	0	3
	Plumbing											
4	With all plumbing facilities	1,308,800	1,305,500	1,095,800	93,200	6,600	2,600	800	106,600	0	0	4
5	Lack some plumbing	22,900	26,200	0	25,400	0	0	0	800	0	0	5
6	Lack Exclusive use	22,900	26,200	0	25,400	0	0	0	800	0	0	6
	Water											
7	Public/private water	1,288,600	1,295,500	1,093,000	89,800	5,800	2,600	800	103,400	0	0	7
8	Well	42,300	35,200	26,200	4,300	800	0	0	3,900	0	0	8
9	Other water source	800	1,000	1,000	0	0	0	0	0	0	0	9
	Sewer											
10	Public sewer	1,121,700	1,148,700	940,200	103,700	5,800	2,600	800	95,500	0	0	10
11	Septic tank/cesspool	210,000	183,000	161,200	9,200	800	0	0	11,800	0	0	11
12	Severe Problems	29,800	34,900	0	33,300	0	0	0	1,600	0	0	12
13	Plumbing	22,900	26,200	0	25,400	0	0	0	800	0	0	13
14	Heating	6,900	8,800	0	7,900	0	0	0	800	0	0	14
15	Upkeep	700	1,000	0	1,000	0	0	0	0	0	0	15
16	Moderate problems	49,000	51,900	8,000	38,200	0	0	800	4,900	0	0	16
17	Plumbing	1,400	1,100	0	1,100	0	0	0	0	0	0	17
18	Heating	2,900	2,000	1,000	1,000	0	0	0	0	0	0	18
19	Kitchen	36,100	41,400	4,800	30,800	0	0	800	4,900	0	0	19
20	Upkeep	8,600	8,600	0	8,600	0	0	0	0	0	0	20

Backward-Looking Table C: Household Characteristics – All Occupied Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same charact- eristic	E In 2004 stock with different charact- eristic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
1	Occupied units	1,331,700	1,331,700	1,128,600	85,700	6,600	2,600	800	107,400	0	0	1
	Age											
2	Under 65	1,088,100	1,100,400	877,700	117,800	4,100	2,600	0	98,100	0	0	2
3	65 to 74	121,300	113,900	33,900	74,500	800	0	0	4,700	0	0	3
4	75 or older	122,400	117,500	71,800	38,600	1,700	0	800	4,500	0	0	4
	Children											
5	Some	439,300	463,200	256,900	158,800	0	1,500	0	45,900	0	0	5
6	None	892,400	868,500	623,300	175,300	6,600	1,100	800	61,400	0	0	6
	Race/Origin											
7	White	1,101,200	1,084,900	872,500	121,900	6,600	2,100	800	81,000	0	0	7
8	Hispanic	68,400	71,300	24,100	40,800	800	1,500	0	4,000	0	0	8
9	Non-Hispanic	1,032,800	1,013,600	814,400	115,000	5,700	500	800	77,100	0	0	9
10	Black	54,000	48,800	20,100	20,500	0	0	0	8,200	0	0	10
11	American Indian, Eskimo, Aleut	14,300	17,000	8,700	7,500	0	0	0	800	0	0	11
12	Asian	109,800	125,100	62,000	50,800	0	0	0	12,300	0	0	12
13	Pacific Islander	17,300	20,400	7,100	11,700	0	0	0	1,600	0	0	13
14	Two or more races	35,200	35,500	12,200	19,500	0	500	0	3,300	0	0	14
15	Total Hispanics	83,900	89,400	32,100	50,100	800	1,500	0	4,800	0	0	15
	Income Source											
16	Wages and salaries	1,018,100	1,038,300	809,300	132,600	5,000	2,600	0	88,900	0	0	16
17	Social Security or pension	NA	253,000	157,100	79,800	2,400	500	0	13,100	0	0	17
18	Dividend or interest	NA	484,000	248,900	198,400	4,100	0	800	31,800	0	0	18
19	Welfare	22,200	23,100	4,300	18,000	0	0	0	800	0	0	19

Backward-Looking Table D: Tenure, Housing Cost, and Income – All Occupied Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same charact- eristic	E In 2004 stock with different charact- eristic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
1	Occupied units	1,331,700	1,331,700	1,128,600	85,700	6,600	2,600	800	107,400	0	0	1
	Tenure											
2	Owner-occupied	842,300	842,200	714,100	51,100	1,500	2,600	0	72,800	0	0	2
3	Percent owner-occupied	63.2%	63.2%									3
4	Renter-occupied	489,400	489,500	324,800	124,300	5,000	0	800	34,600	0	0	4
	Renter Monthly Housing Costs											
5	Less than \$350	32,100	32,900	13,100	16,400	800	0	0	2,500	0	0	5
6	\$350 to \$599	33,700	22,900	12,000	10,900	0	0	0	0	0	0	6
7	\$600 to \$799	69,500	67,200	30,600	34,900	1,700	0	0	0	0	0	7
8	\$800 to \$1,249	183,100	187,200	57,100	119,100	2,500	0	800	7,600	0	0	8
9	\$1,250 or more	162,600	172,800	45,000	103,400	0	0	0	24,400	0	0	9
10	No cash rent	8,400	6,600	2,200	4,400	0	0	0	0	0	0	10
	Renter Hsld Income											
11	Less than \$15,000	90,400	93,500	31,000	56,100	800	0	800	4,700	0	0	11
12	\$15,000 to \$29,999	109,200	110,000	25,200	74,700	2,500	0	0	7,600	0	0	12
13	\$30,000 to \$49,999	109,500	102,900	22,900	72,800	800	0	0	6,400	0	0	13
14	\$50,000 to \$99,999	124,500	118,700	34,100	75,400	0	0	0	9,100	0	0	14
15	\$100,000 or more	55,800	64,400	7,600	49,100	800	0	0	6,800	0	0	15
	Owner Monthly Housing Costs											
16	Less than \$350	42,000	35,700	9,800	24,300	0	0	0	1,600	0	0	16
17	\$350 to \$599	84,200	60,500	16,100	39,900	0	0	0	4,500	0	0	17
18	\$600 to \$799	83,700	71,000	8,800	57,300	0	0	0	4,900	0	0	18
19	\$800 to \$1,249	104,800	114,100	35,300	71,700	1,500	2,600	0	2,900	0	0	19
20	\$1,250 or more	527,500	560,900	339,300	162,800	0	0	0	58,900	0	0	20

Backward-Looking Table D (continued): Tenure, Housing Cost, and Income – All Occupied Units

Row	A Characteristics	B Published numbers	C In 2009 stock	D In 2004 stock with same characteristic	E In 2004 stock with different characteristic	F Added by conversion or merger	G Added by house or mobile home move in	H Added from prior different use	I Added by new construction	J Added from temporary losses in 2004	K Added in other ways	Row
	Owner Hsd Income											
21	Less than \$15,000	44,700	42,400	7,100	32,400	0	0	0	2,900	0	0	21
22	\$15,000 to \$29,999	73,600	74,900	19,700	50,300	0	2,100	0	2,900	0	0	22
23	\$30,000 to \$49,999	109,600	94,300	17,800	70,200	800	0	0	5,500	0	0	23
24	\$50,000 to \$99,999	292,200	276,000	126,600	123,100	800	0	0	25,400	0	0	24
25	\$100,000 or more	322,100	354,600	182,700	135,400	0	500	0	36,000	0	0	25

Changes in the Seattle Housing Stock: 2004–2009

Forward-Looking Analysis

Forward-looking analysis focuses on two issues: losses and changes in characteristics. As noted, only 11 sample units were lost out of 1,303 cases. The overall loss rate was 0.8 percent. If this sample, after the deletions associated with budget reductions and changes in geography, still represents the three-county area, then this is an unbiased estimate of the percentage of the 2004 stock that was lost by 2009, and with 95-percent confidence, the actual loss rate would be between 0.3 and 1.3 percent. Because of the small number of sample cases lost, we will not discuss losses further.

The following discussion of changes in the characteristics of units between 2004 and 2009 applies only to the three-county area and is based on Forward-Looking Tables A through D.

- Most units occupied in 2004 were occupied again in 2009, while most units vacant in 2004 were not vacant in 2009. Seattle had a small seasonal stock in 2004, only 5,600 units. Of these, only 2,800 were still seasonal in 2009.
- CINCH analysis typically finds a high percentage of units for which the count of rooms changes between surveys. As in the past, we attribute this to confusion on the part of respondents as to what constitutes a room. The count of bedrooms is more stable and probably a much better indication of actual changes in either the size of a unit or the use of rooms. Table A shows that except for the units with no bedrooms in 2004, approximately 85 percent of units had the same bedroom count in 2009 as in 2004.
- As seen in past CINCH analyses, very few units that had severe or moderate physical problems in 2004 had severe or moderate physical problems in 2009.
- Of the units in the stock in both 2004 and 2009, 88.5 percent of the owner-occupied units in 2004 were owner-occupied in 2009, and 79.3 percent of the renter-occupied units in 2004 were renter-occupied in 2009.

Backward-looking Analysis

Backward-looking analysis focuses on two issues: additions and changes in characteristics. In the four-county area, 10.0 percent of the 2009 housing units had been added since 2004. This estimate is based on a sample of 1,492 sample units of which 200 were identified as additions. With 95-percent confidence, the actual rate of additions is between 8.5 and 11.5 percent. This estimate is consistent with published numbers, which show that the number of housing units in the four-county area grew (additions minus losses) by 7.9 percent.

Table 3 presents addition rates for selected segments of the Seattle housing stock. The rows were selected because one of the rates reported is at least two standard deviations different from the corresponding rate for the overall group, either all housing units or all occupied housing units. The two standard deviation criterion is designed to provide only a sense of how important

the difference is; it is not intended to be a test of statistical significance because repeated use of the same sample undercuts the usual statistical interpretation of a two standard deviation difference.¹⁴ Rates satisfying the two standard deviation requirement are noted by bold type.

Table 3: Segments of the Seattle Housing Market with Unusual Rates of Total Additions, Additions by New Construction, or Additions by Other Means

Characteristics	Percent of 2009 added since 2004 by characteristic*	Added by new construction*	Added by other means*
Total Housing Stock	10.0%	9.1%	1.0%
Occupancy Status			
Vacant	23.2%	20.3%	3.0%
Units in Structure			
1, attached	29.1%	26.5%	2.6%
2 to 4 units in structure	7.6%	3.9%	3.7%
5 to 9 units in structure	2.1%	1.1%	1.1%
10 to 19 units in structure	1.4%	1.4%	0.0%
20 to 49 units in structure	5.5%	5.5%	0.0%
50 or more units in structure	24.9%	23.0%	2.0%
Mobile Home/trailer	7.7%	2.8%	4.9%
Rooms			
2 rooms	2.1%	2.1%	0.0%
4 rooms	8.4%	5.9%	2.5%
6 rooms	6.8%	6.2%	0.6%
8 rooms	15.4%	15.4%	0.0%
Bedrooms			
No bedrooms	3.5%	3.5%	0.0%
2 bedrooms	5.8%	4.5%	1.2%
4 or more bedrooms	14.2%	13.8%	0.4%
Multiunit Structures			
Stories in Structures	8.6%	7.2%	1.4%
2 stories	3.1%	1.7%	1.4%
3 stories	6.7%	5.4%	1.2%
7 or more stories	25.3%	25.3%	0.0%

¹⁴ If there are no sample cases of a particular loss or gain, the two standard deviation test of the difference between two rates of loss or gain collapses to a test of whether the overall loss or gain is different from zero percent and is not reported as statistically different from the overall rate.

Characteristics	Percent of 2009 added since 2004 by characteristic*	Added by new construction*	Added by other means*
Occupied Units	8.8%	8.1%	0.8%
Age of Householder			
65 to 74	4.8%	4.1%	0.7%
75 or older	6.0%	3.9%	2.1%
Income Source			
Social Security or pension	6.4%	5.2%	1.2%
Renter Monthly Housing Costs			
\$600 to \$799	2.5%	0.0%	2.5%
\$800 to \$1,249	5.9%	4.1%	1.8%
\$1,250 or more	14.1%	14.1%	0.0%
Owner Monthly Housing Costs			
\$800 to \$1,249	6.2%	2.6%	3.6%
\$1,250 or more	10.5%	10.5%	0.0%
Owner Household Income			
\$15,000 to \$29,999	6.7%	3.9%	2.8%
\$100,000 or more	10.3%	10.2%	0.1%

* Percentages in bold type differ from the group rate—either the rate for all units or all occupied units—by two standard deviations.

Table 3 reveals several interesting facets about growth of the housing stock in the four-county area.

- The rate of additions among vacant units is over 20 percent, suggesting that momentum of the building boom of the mid-2000s carried through to the recession.
- The rate of new construction was very high for single-family attached units and units in buildings with 50 or more units but very low among other multiunit structures.
- The rate of total additions and new construction was very high among larger units (for example, approximately 14 percent of four-bedroom units were newly constructed) and very low among smaller units (for example, 3.5 percent of units with no bedrooms were newly constructed).
- The rate of new construction among units occupied by households with householders over 65 and households receiving Social Security or pension income was below the rate of new construction for all occupied units.

- The rate of total additions was particularly high among high-cost rental units, and the rate of new construction was particularly high among high-cost owner units. The rate of new construction was particularly low among units occupied by owner households with incomes between \$15,000 and \$29,999.

The backward-looking analysis of the characteristics in 2004 and 2009 of units that were in both housing stocks (columns D and E) applies only to the three-county area. The backward-looking analysis and the forward-looking analysis of this issue use the same sample units but with different weights. The backward-looking weights attempt to match counts from four counties using a sample drawn from three counties. We prefer the forward-looking analysis of changes in characteristics discussed above.

Rental Market Dynamics

Tables 4 through 7 present the rental market dynamics analysis. Rental market dynamics differs in two ways from the analysis in rows 5–10 in Table D of both the forward-looking and backward-looking tables. First, rental market dynamics uses categories (rows) based on affordability instead of absolute dollar amount. Affordability is defined relative to local area median income, measured at the same time that monthly housing costs are measured. Tables 4 through 7 use the following eight categories:

- Nonmarket (either no cash rent or a subsidized rent).
- Extremely low rent (monthly housing costs affordable to renters with incomes less than or equal to 30 percent of local area median income).
- Very low rent (monthly housing costs affordable to renters with incomes greater than 30 percent but less than or equal to 50 percent of local area median income).
- Low rent (monthly housing costs affordable to renters with incomes greater than 50 percent but less than or equal to 60 percent of local area median income).
- Moderate rent (monthly housing costs affordable to renters with incomes greater than 60 percent but less than or equal to 80 percent of local area median income).
- High rent (monthly housing costs 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 (monthly housing costs 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 (monthly housing costs affordable to renters with incomes greater than 120 percent of local area median income).

Table 4: Forward-Looking Rental Dynamics Analysis, Counts: 2004-2009

Affordability Groups	A Total in 2004	B Nonmarket in 2009	C Extremely Low Rent in 2009	D Very Low Rent in 2009	E Low Rent in 2009	F Moderate Rent in 2009	G High Rent in 2009	H Very High Rent in 2009	I Extremely High Rent in 2009	J Owner- Occupied in 2009	K Seasonal or Second Home in 2009	L Lost to Stock in 2009
Nonmarket	81,700	28,200	2,600	22,200	6,000	12,900	0	900	900	4,300	700	3,300
Extremely Low Rent	21,300	900	2,600	6,100	0	4,200	0	800	1,700	4,300	0	800
Very Low Rent	181,500	10,100	2,500	101,400	40,800	8,200	1,100	0	300	11,700	3,100	2,300
Low Rent	54,700	1,600	900	7,600	19,400	12,700	4,300	0	0	8,300	0	0
Moderate Rent	24,800	0	0	900	1,600	11,800	5,900	0	0	3,000	900	700
High Rent	15,400	0	0	2,500	900	3,300	4,200	0	1,200	3,300	0	0
Very High Rent	7,100	0	0	0	0	2,600	1,100	2,600	900	0	0	0
Extremely High Rent	5,800	0	900	0	0	0	0	1,700	1,600	1,600	0	0
Total	392,200	40,700	9,300	140,600	68,700	55,600	16,600	5,900	6,600	36,500	4,600	7,100

Table 5: Forward-Looking Rental Dynamics Analysis, Row Percentages: 2004-2009

Affordability Groups	A Total in 2004	B Nonmarket in 2009	C Extremely Low Rent in 2009	D Very Low Rent in 2009	E Low Rent in 2009	F Moderate Rent in 2009	G High Rent in 2009	H Very High Rent in 2009	I Extremely High Rent in 2009	J Owner- Occupied in 2009	K Seasonal or Second Home in 2009	L Lost to Stock in 2009
Nonmarket	100.0%	34.5%	3.1%	27.1%	7.3%	15.7%	0.0%	1.0%	1.0%	5.2%	0.9%	4.0%
Extremely Low Rent	100.0%	4.0%	12.1%	28.6%	0.0%	19.7%	0.0%	3.6%	8.1%	20.2%	0.0%	3.8%
Very Low Rent	100.0%	5.6%	1.4%	55.9%	22.5%	4.5%	0.6%	0.0%	0.2%	6.5%	1.7%	1.2%
Low Rent	100.0%	3.0%	1.6%	13.9%	35.5%	23.1%	7.8%	0.0%	0.0%	15.1%	0.0%	0.0%
Moderate Rent	100.0%	0.0%	0.0%	3.5%	6.5%	47.7%	23.8%	0.0%	0.0%	12.1%	3.5%	2.9%
High Rent	100.0%	0.0%	0.0%	16.1%	5.6%	21.7%	27.2%	0.0%	7.8%	21.7%	0.0%	0.0%
Very High Rent	100.0%	0.0%	0.0%	0.0%	0.0%	36.4%	15.2%	36.4%	12.1%	0.0%	0.0%	0.0%
Extremely High Rent	100.0%	0.0%	14.8%	0.0%	0.0%	0.0%	0.0%	29.5%	27.9%	27.9%	0.0%	0.0%
Total	100.0%	10.4%	2.4%	35.9%	17.5%	14.2%	4.2%	1.5%	1.7%	9.3%	1.2%	1.8%

Table 6: Backward-Looking Rental Dynamics Analysis, Counts: 2009-2004

Affordability Groups	A Total in 2009	B Nonmarket in 2004	C Extremely Low Rent in 2004	D Very Low Rent in 2004	E Low Rent in 2004	F Moderate Rent in 2004	G High Rent in 2004	H Very High Rent in 2004	I Extremely High Rent in 2004	J Owner- Occupied in 2004	K Seasonal or Second Home in 2004	L New Construc- tion	M Other Additions
Nonmarket	67,800	36,000	1,100	13,100	2,200	0	0	0	0	9,900	1,100	4,100	300
Extremely Low Rent	17,000	3,300	3,300	3,300	1,100	0	0	0	1,100	1,100	0	3,000	800
Very Low Rent	185,800	26,900	5,500	127,500	9,800	800	3,300	0	0	5,200	0	3,000	3,800
Low Rent	104,800	6,900	0	50,700	22,000	2,200	1,100	0	0	10,700	800	8,700	1,700
Moderate Rent	107,200	15,900	5,500	10,700	16,100	14,800	4,400	3,300	0	23,500	1,100	10,400	1,500
High Rent	46,000	0	0	1,500	5,000	7,600	5,200	1,400	0	16,400	400	8,500	0
Very High Rent	11,500	1,100	0	0	0	0	0	3,000	2,200	0	1,100	3,400	700
Extremely High Rent	15,200	800	1,900	400	0	0	1,400	800	2,200	1,800	400	5,500	0
Total	555,300	90,900	17,300	207,200	56,200	25,400	15,400	8,500	5,500	68,600	4,900	46,600	8,800

Table 7: Backward-Looking Rental Dynamics Analysis, Row Percentages: 2009-2004

Affordability Groups	A Total in 2009	B Nonmarket in 2004	C Extremely Low Rent in 2004	D Very Low Rent in 2004	E Low Rent in 2004	F Moderate Rent in 2004	G High Rent in 2004	H Very High Rent in 2004	I Extremely High Rent in 2004	J Owner- Occupied in 2004	K Seasonal or Second Home in 2004	L New Construc- tion	M Other Additions
Nonmarket	100.0%	53.2%	1.6%	19.3%	3.2%	0.0%	0.0%	0.0%	0.0%	14.6%	1.6%	6.0%	0.5%
Extremely Low Rent	100.0%	19.4%	19.4%	19.4%	6.5%	0.0%	0.0%	0.0%	6.5%	6.5%	0.0%	17.6%	5.0%
Very Low Rent	100.0%	14.5%	3.0%	68.6%	5.3%	0.5%	1.8%	0.0%	0.0%	2.8%	0.0%	1.6%	2.1%
Low Rent	100.0%	6.6%	0.0%	48.4%	21.0%	2.1%	1.0%	0.0%	0.0%	10.2%	0.8%	8.3%	1.6%
Moderate Rent	100.0%	14.8%	5.1%	10.0%	15.1%	13.8%	4.1%	3.1%	0.0%	22.0%	1.0%	9.7%	1.4%
High Rent	100.0%	0.0%	0.0%	3.3%	10.8%	16.6%	11.3%	3.0%	0.0%	35.6%	0.9%	18.5%	0.0%
Very High Rent	100.0%	9.5%	0.0%	0.0%	0.0%	0.0%	0.0%	26.5%	19.1%	0.0%	9.5%	29.6%	5.7%
Extremely High Rent	100.0%	5.5%	12.6%	2.8%	0.0%	0.0%	9.3%	5.5%	14.2%	11.5%	2.8%	35.5%	0.0%
Total	100.0%	16.4%	3.1%	37.3%	10.1%	4.6%	2.8%	1.5%	1.0%	12.3%	0.9%	8.4%	1.6%

The second difference is that rental market dynamics uses different columns in order to highlight changes in availability and affordability. Columns A through I duplicate the rows so that one can trace how rental units change their affordability status. Columns J and K track movement into or out of the owner-occupied stock or the seasonal or second-home stock, respectively. In Tables 4 and 5, the various types of losses are combined in column L, while in Tables 6 and 7, new construction is recorded in column L and all other additions in column M.

Table 4 shows that there were 392,200 rental units in the three-county Seattle metropolitan area in 2004. In 2009, 48,200 of these units were no longer rental; 36,500 were owner-occupied; 4,600 were either second homes or being used seasonally; and 7,100 had been lost to the stock. Taken as a proportion of the units in 2004 (see Table 5), movement into owner occupancy was concentrated among units in the extremely high-rent category, high-rent units, and extremely low-rent units, and losses to the stock were concentrated among nonmarket and extremely low-rent units.

Table 6 shows that there were 555,300 rental units in the four-county Seattle metropolitan area in 2009, of which almost one quarter (128,900) were not rental units in 2004. The new units came from units that had been owner-occupied (68,600), units that had been second homes or in seasonal use (4,900), newly constructed units (46,600), and other additions (8,800). Most of the formerly owner-occupied units went to the moderate- and high-rent categories (39,900 out of 68,600); most of the newly constructed rental units went to three middle categories—low-rent, moderate-rent and high-rent units (27,600 out of 46,600). Table 7 provides row percentages, that is, the percentage distribution by source of 2009 units, classified by affordability category.

Columns B through I in Tables 4 through 7 trace out the movement among affordability categories of units that were rental in both 2004 and 2009. The tables are based on the same 72 units drawn from the three-county area. Because all the units come from King, Island, and Snohomish counties, we examine the results reported in Table 4 that use weights designed to match these counties in 2004.

Table 8 follows 344,000 rental units in the three-county area from 2004 and 2009. The table shows a clear decline in affordability. In 2004, 73.9 percent of these units were affordable to very low-income renters; by 2009, only 55.4 percent were.

Table 8: Affordability History of Units That Were Rental in 2004 and 2009

Units rental in both years	2004	Cumulative Percent	2009	Cumulative Percent
Nonmarket rental unit	73,500	21.4%	40,700	11.8%
Extremely low-rent rental unit	16,200	26.1%	9,300	14.6%
Very low-rent rental unit	164,400	73.9%	140,600	55.4%
Low-rent rental unit	46,400	87.4%	68,700	75.4%
Moderate-rent rental unit	20,200	93.2%	55,600	91.6%
High-rent rental unit	12,100	96.7%	16,600	96.4%
Very high-rent rental unit	7,100	98.8%	5,900	98.1%
Extremely high-rent rental unit	4,200	100.0%	6,600	100.0%
Total	344,000		344,000	

Appendix A: Internal and External Checks

For the CINCH analysis, we performed the following two tests of internal consistency:

- For each row, we tested whether the sum of possible outcomes (columns D through K) equaled the number of units present in the base year (column C). In every case, exact equality was achieved prior to rounding.
- Throughout the tables, various sets of rows are related to each other. For example, the year-built rows (13–26) in Table A are a disaggregation of the total stock in row 1. Similarly, rows 7 (Whites), 10 (Blacks), and 11–14 (other races or more than one race) in Table C are a disaggregation of row 1 (occupied households). In these cases, there should be equality between the parent row and the sum of the breakout rows for all columns except D and E. The difference between column D in the parent row and the sum of column D for the breakout rows should equal the negative of the difference between column E in the parent row and the sum of column E for the breakout rows. In every case, exact equality was achieved prior to rounding.

Column B provides an external check of how well the CINCH weighting performed. As noted in the text, the backward-looking weights produced estimates closer to the published estimates.

Appendix B: Weighting

CINCH separates the AHS samples in 2004 and 2009 into three pieces: (1) units that exist and are part of the housing stock in both years (SAMES), (2) units that are part of the 2004 housing stock but are not part of the 2009 housing stock (LOSSES), and (3) units that are not part of the 2004 housing stock but are part of the 2009 housing stock (ADDITIONS). ADDITIONS are split into NEW CONSTRUCTION and RECOVERIES (structures that existed in 2004 but were not in the housing stock).

Because CINCH looks at various subsets of the housing stock, we need to know the characteristics of units and their occupants. Therefore, we can use only those SAMES observations that were interviewed in both years. For the same reason, we can use only those LOSSES that were interviewed in 2004 and those ADDITIONS that were interviewed in 2009.

For the forward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 2004 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted count in 2004 of LOSSES to create weights for interviewed LOSSES. We then adjusted the weights of SAMES and LOSSES to equal the AHS-published totals for owner-occupied units, renter-occupied units, vacant units, and seasonal units in 2004.

For the backward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 2009 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted counts in 2009 for NEW CONSTRUCTION and for RECOVERIES to create weights for interviewed NEW CONSTRUCTION and interviewed RECOVERIES. We then adjusted the weights for SAMES, NEW CONSTRUCTION, and RECOVERIES to equal AHS-published totals for owner-occupied units, renter-occupied units, vacant units, and seasonal units in 2009.

The logic behind the weighting and the procedures used to create the weights are explained in *Weighting Strategy for 2009 Seattle CINCH and Rental Dynamics Analysis*.