

American Housing Survey

**Components of
Inventory Change
And Rental Market Dynamics:
Miami-Ft. Lauderdale
1995-2002**

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Principal Authors: Frederick J. Eggers & Fouad Moumen

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Components of Inventory Change and Rental Market Dynamics: Miami-Ft. Lauderdale 1995-2002

Overview

Housing analysts use two techniques—Components of Inventory Change (CINCH) and rental market dynamics—to look at a housing market at two points in time and explain how the observed changes 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 question 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 units that were affordable to low-income households at the beginning of the period?”

Previously HUD commissioned CINCH and rental market dynamics analyses using the national American Housing Survey (AHS).¹ This report focuses on the Miami-Ft. Lauderdale metropolitan housing market over the period between 1995 and 2002. It is one of 13 reports based on local American Housing Surveys conducted in 2002; these 13 metropolitan areas were previously surveyed in either 1994 or 1995.

CINCH and rental market analysis have both forward-looking and backward-looking components. In the forward-looking components, analysts start with the housing stock available at the beginning of the period and then, looking at the end of the period, attempt to explain what happened to those units. 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. In the backward-looking component, analysts start with the housing stock available at the end of the period and, looking at the beginning of the period, attempt to explain where those units came from. Possible answers include some units existed at the beginning of the period 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 try 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 1995 may have become a medical office in 1997, but returned to being a housing unit in 2000. CINCH

¹ See <http://www.huduser.org/datasets/cinch.html> and <http://www.huduser.org/datasets/ahs/ahsReports.html#2>.

would record this unit as having undergone no change over the period from 1995 to 2002. In classical analytical 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 analysis in this report uses the AHS, which is a sample of units at both points in time; and, unfortunately, previous efforts using the AHS have demonstrated that creating sample weights that take both periods into account generates some inconsistent or inaccurate results. For this reason, the most recent analyses have separated the forward-looking and backward-looking components. This report will do the same. (Weighting is explained briefly in Appendix B and more fully in a separate paper cited in the Appendix.)

The remainder of this report consists of four sections:

- 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 1995 to 2002 and identifying how units were lost to the housing stock; and a set of backward-looking tables tracing where 2002 units came from and distinguishing between units that were part of the stock in 1995 and units that were additions to the stock since 1995.
- A brief discussion of the rental market dynamics.
- Two rental market dynamics tables, one forward-looking and one backward-looking.

At various places, the discussion points out some of the limitations of these analyses or of using the AHS metropolitan samples for these analyses.

Two appendixes explain how the results were tested and how the weights were created.

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 1995 housing stock by 2002. There are three basic dispositions of 1995 units: units that continue to exist in 2002 with the same characteristics (or serving the same market), units that continue to exist in 2002 but with different characteristics (or serving a different market), and units that were lost to the stock.

The backward-looking tables are concerned with where the 2002 housing stock came from in reference to 1995. There are three basic sources of 2002 units: units that existed in 1995 with the same characteristics (or serving the same market), units that existed in 1995 but with different characteristics (or serving a different market), and units that are additions to the housing stock.

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. 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 Table 1 focuses on occupied units; row 15 focuses on units built in 1985 through 1989.
- 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 1995 AHS report for Miami-Ft. Lauderdale counted 1,245,200 occupied units (column B, row 2, Forward-Looking Table 1); the 2002 AHS report counted 1,434,200 occupied units (column B, row 2, Backward-Looking Table 1).
- 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 (1995 for the forward-looking tables and 2002 for the backward-looking tables); and (b) satisfying the condition in column A. CINCH uses different weights than those used in preparing the published reports. Therefore, CINCH estimates can differ from AHS estimates for particular subsets of the housing stock. As explained in Appendix B, the weights were created to match AHS published totals for rows 2 through 4 of Table 1. This perfect match will not be true of other rows.² In the case of the Miami-Ft. Lauderdale metropolitan area, the CINCH weights produce estimates close to the published estimates with a few exceptions. Both Forward-Looking Table 1 and Backward-Looking Table 1 underestimate the number of units built after 1989, and Backward-Looking Table 4 underestimates the number of owner-occupied units with low housing costs.

² Columns B and C will also match, except for rounding, in row 1 of Table 1 because row 1 is defined as the sum of rows 2 through 4.

- 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 1 estimates that 1,123,310 of the occupied units were occupied in 2002.
- 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 indicates that 103,400 units that were occupied in 1995 are still part of the housing stock in 2002 but are 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—characteristics that are considered impossible or unlikely to change.

Columns Unique to Forward-Looking Tables

In forward-looking tables, columns F through K track what happened to units that were lost from 1995 to 2002.

- Column F is the CINCH estimate of the number of units from column C that are not in the 2002 housing stock because they were merged with other units or converted into multiple units. Among occupied units, 1,180 units were lost to mergers and conversions.
- Column G is the CINCH estimate of the number of mobile homes from column C that were moved out during the period. Among occupied units, no mobile homes were moved out.
- 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.³ Among occupied units, 3,150 became nonresidential.
- 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 2002. In this case, 7,080 units were demolished or destroyed.
- Column J is the CINCH estimate of the number of units from column C that by 2002 were condemned or that were no longer usable for housing because of extensive damage. Among occupied units, 1,180 units are no longer usable for housing.

³ 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. So nonresidential means strictly no residential use.

- Column K is the CINCH estimate of the number of units from column C that were lost by 2002 for other reasons. These include units that the Census Bureau eliminated for sampling purposes and other miscellaneous losses. Among occupied units, there were 5,900 units lost for these miscellaneous reasons.

The columns 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.⁴

Columns Unique to Backward-Looking Tables

In backward-looking tables, columns F through I track where units came from that are part of the housing stock in 2002, but were not part of the housing stock in 1995.⁵

- Column F is the CINCH estimate of the number of mobile homes from column C that were moved in during the period. Among occupied units, 2,240 mobile homes were moved in (column F, row 2 of Backward-Looking Table 1).⁶ Move-ins are treated as additions to balance the treatment of move-outs as losses.
- Column G is the CINCH estimate of the number of units from column C that had been nonresidential in 1995. Among occupied units, 750 had been nonresidential.
- Column H is the CINCH estimate of the number of units from column C that were newly constructed between 1995 and 2002. Among occupied units, 116,910 units were newly constructed.
- Column I is the CINCH estimate of the number of units from column C that were added by 2002 for other reasons. These include units that were considered temporary losses because occupancy was prohibited in 1995 or the interior of the unit was exposed to the elements, and also units that the Census Bureau considered temporarily lost to the housing stock for reasons “not classified.” Among occupied units, 3,360 had been temporarily lost to the stock in 1995.

⁴ The weighted numbers are rounded to the nearest 10. The AHS publication rounds to the nearest 100. We found that rounding to the nearest 10 worked better for the metropolitan sites. The weights were typically in the range of 100 to 300 and in many rows the numbers in columns F through K were small. With a weight of 149, rounding to the nearest hundred would mean that one sample observation would be rounded to 100, two sample observations to 300, and three sample observations to 400. Rounding to the nearest ten results in weighted totals of 150, 300, and 450 for these cases.

⁵ This list does not contain a column for units added through mergers and conversions. The Census Bureau did not code the variable that would normally identify mergers and conversions in 2002 (REUAD=7 or 8).

⁶ The Census Bureau did not code the variable that would normally identify mobile home move-ins in 2002 (REUAD=4). We estimated these from another variable (NOINT=13).

Table 1

Table 1 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 non-seasonal units equals the number of households. Because households are the basis for all the analyses in Tables 2 through 4, 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, vacant units, and seasonal units.

Rows 5-12 divide the housing stock by type of structure to identify what type of units account for losses.⁷ The Census Bureau sometimes suppresses data to protect the confidentiality of respondents. For some metropolitan areas, suppression results in zero estimates for certain multiunit structures in the public data file, whereas the published tables contain estimates for these multiunit classes.

Rows 13-23 divide the housing stock by year built.⁸ The published reports use the categories 1990-1994, 1995-1999, and 2000-2004; we use 1990-1995 and 1996-2002 to isolate units newly constructed since the previous AHS survey.⁹ While only 0.6 percent of all units were demolished or destroyed between 1995 and 2002, 5.6 percent of those built in the 1920s were demolished or destroyed.

Rows 24-30 and 31-35 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms.¹⁰

Rows 36-41 focus on multiunit structures only and divide them by number of stories. Column E is forced to be zero and, depending on the metropolitan area, the Census Bureau may suppress information, forcing some rows to be zero.

Rows 42-43 divide the housing stock between central cities units and suburban residences to determine how the observed changes vary by location. Approximately 95 percent of all new construction between 1995 and 2002 took place in the suburb areas of Miami-Ft. Lauderdale. Rows 44-45 divide the housing stock by whether the occupants have moved in within the last two calendar years to determine if certain units consistently have high turnover and to see if high turnover units are more susceptible to loss.

⁷ In general, the CINCH estimates exceed published AHS estimates for single-family detached units and fall short of the published AHS estimates for manufactured homes by roughly equal amounts.

⁸ Row 13 is not included in the forward-looking tables, because the 1995 housing stock cannot contain units built after 1995.

⁹ We use REUAD=3 and not year built to identify new construction. For this reason, there are units built after 1995 that are not considered new construction. In addition, year built is obtained from the respondent interview and may be inaccurate.

¹⁰ Because of small sample sizes in the losses and additions columns, we combined room categories that the published reports list separately.

Table 2

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

Rows 2-3 look at whether the units have complete kitchens; that is, have an installed sink with piped water, a mechanical refrigerator, and built-in burners for the exclusive use of the occupants. Rows 4-5 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. Rows 6-8 look at each of these requirements separately. In the 1995 AHS, the published reports separate out the “exclusive use” category; in the data used for this report, these units show up in row 8. Rows 2-3, 4-5, and 6-8 attempted to separate out good units from the least desirable units, based on kitchen and bath equipment, to compare how they changed over the period.

Rows 9-13 pertain to how units obtain water and dispose of sewage.

Rows 14-19 look at units with serious problems. Rows 15-19 identify specific types of serious deficiencies. Row 14 counts the units having one or more of these deficiencies. Rows 20-25 look at units with moderate problems. Rows 21-25 identify specific types of deficiencies. Row 20 counts the units having one or more of these deficiencies.¹¹ These rows are in the analysis to answer two questions: whether poor-quality units in one year are also poor-quality units in the other year, and whether poorer quality units are more likely to be lost. Both the forward-looking and backward-looking analyses clearly indicate that there is little continuity over the 7 years with respect to having serious or moderate physical problems. Fewer than 10 percent of the units with serious problems in 1995 had serious problems in 2002, and fewer than 5 percent of the units with serious problems in 2002 had had serious problems in 1995. The same is true for moderate problems, with fewer than 10 percent of units with moderate problems in one survey year having moderate problems in the other survey year. Approximately 5 percent of the occupied units had either serious or moderate problems in both years. The number of units with serious problems more than doubled between 1995 and 2002 (column C, row 15 in Forward-Looking Table 2 and Backward-Looking Table 2).

Table 3

This table pertains to the characteristics of occupants. Row 1 repeats the analysis from row 2 in Table 1. All the subsequent rows are based on row 1.

Rows 2-3 look at the age of the householder. Rows 4-5 look at whether the household includes children. Rows 6-11 look at the race or ethnicity of the householder. Rows 12-14 look at three possible sources of household income. In all cases, the analysis seeks to

¹¹ For definitions of serious and moderate problems see pages 998 and 999 of the AHS Codebook, version 1.77, at http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/AHS_Codebook.pdf.

determine how stable the occupancy characteristics are over time, and what part of the market was served by units that lost between 1995 and 2002. In general, the CINCH weights tend to overestimate the number of units with Hispanic householders. Miami is one of the few sites where the CINCH weights underestimated the number of Hispanic householders. The number of units with Hispanic householders in Miami grew by almost 150,000 between 1995 and 2002. While Hispanic households account for approximately 40 percent of all households, they accounted for half of the newly constructed occupied units.

Table 4

Table 4 pertains to tenure, income, and housing costs. Row 1 repeats the analysis from row 2 in Table 1. All the subsequent rows are based on row 1.

Rows 2-4 focus on tenure to determine the extent to which units change tenure characteristics and whether rental or owner-occupied units are more likely to be lost. Rental units in Miami were four times as likely to be lost due to demolition or disasters as owner-occupied units (1.1 percent versus 0.3 percent).

Rows 5-11 contain a partial rental dynamics analysis.¹² Row 5 identifies non-market units, a class that includes subsidized units and units provided for no cash rents; for example, units given to maintenance or management personnel or to relatives. The remaining rows divide market rental units into affordability classes. In defining affordability, the analysis sets boundaries for each class based on the highest rent a household in an income group could afford without spending more than 30 percent of its monthly income on rent. Ideally there would be six categories in each metropolitan area:

- Extremely-low-rent units (rents affordable to households with incomes equal to 35 percent of area median family income).
- Very-low-rent units (rents not affordable at 35 percent, but affordable at 50 percent of area median family income).
- Low-rent units (rents not affordable at 50 percent, but affordable at 65 percent of area median family income).
- Moderate-rent units (rents not affordable at 65 percent, but affordable at 80 percent of area median family income).
- High-rent units (rents not affordable at 80 percent, but affordable at 100 percent of area median family income).
- Very-high-rent units (rents not affordable at 100 percent of area median family income).

¹² The rental dynamics analysis is partial because it traces movement out of, but not into, particular rental classes. Tables A and B in the final section of this report contain a complete rental dynamics analysis.

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

For most metropolitan areas studied, the number of categories is fewer than six, because the Census Bureau had to place an upper limit on the rents reported in the public-use data to protect the confidentiality of respondents. Miami-Ft. Lauderdale has all six classes.

Rows 12-16 track rental units by household income; rows 22-26 track owner-occupied units by household income.¹³

Rows 17-21 identify owner-occupied units by total monthly housing costs.¹⁴

There appears to be a significant movement among units in both the costs to residents and the income of households. From Forward-Looking Table 4, only one of the rent categories (very low rents) has as many as 40 percent of its 1995 units in 2002, and only two of the monthly housing costs categories for owner-occupied units has as many as 40 percent of its 1995 units. Considering both renters and owners, only one of the income categories has as many as 40 percent. Backward-Looking Table 4 confirms this observation.

This movement is not surprising for four reasons: the categories are defined in nominal dollars not real dollars; there was substantial growth in nominal income over the 8-year period; while inflation was modest, there was some rental inflation over the period; and movement could be the result of units changing tenure or occupancy status. The rental dynamics analysis will look at the movement of units across tenure and occupancy statuses.

¹³ Because of small sample sizes in the losses and additions columns, we combined income categories that the published reports list separately.

¹⁴ Because of small sample sizes in the losses and additions columns, we combined cost categories that the published reports list separately.

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Forward-Looking Table 1: Structural and Location Characteristics – All Housing Units

	A Characteristics	B Published numbers	C Present in 1995	D 1995 units present in 2002	E Change in character- istics	F '95 units affected by conversion /merger	G '95 mobile homes moved out	H '95 units changed to nonresidential use	I '95 units lost through demolition or disaster	J '95 units badly damaged or condemned	K '95 units lost in other ways	
1	Total Housing Stock	1,483,800	1,483,900	1,456,460	0	1,930	0	5,020	8,950	1,930	9,630	1
	Occupancy Status											
2	Occupied	1,245,200	1,245,200	1,123,310	103,400	1,180	0	3,150	7,080	1,180	5,900	2
3	Vacant	210,600	210,600	50,960	151,810	750	0	1,120	1,860	750	3,350	3
4	Seasonal	28,100	28,100	4,690	22,280	0	0	750	0	0	370	4
	Units in Structure											
5	1, detached	614,800	620,340	616,080	0	0	0	1,180	1,950	770	370	5
6	1, attached	126,000	125,270	123,720	0	1,180	0	0	0	0	370	6
7	2 to 4	101,600	100,310	97,250	0	370	0	390	1,160	370	770	7
8	5 to 9	71,000	72,440	71,300	0	0	0	0	750	0	390	8
9	10 to 19	94,200	95,600	92,870	0	0	0	390	790	0	1,550	9
10	20 to 49	186,700	190,990	187,100	0	0	0	1,160	790	390	1,550	10
11	50 or more	237,200	237,380	230,100	0	370	0	1,890	1,950	0	3,060	11
12	Mobile Home/trailer	52,300	41,570	38,040	0	0	0	0	1,570	390	1,560	12
	Year Built											
14	1990-1995	113,200	104,340	103,950	0	0	0	390	0	0	0	14
15	1985-1989	137,000	138,910	137,340	0	0	0	390	1,180	0	0	15
16	1980-1984	105,200	103,130	101,970	0	0	0	0	790	0	370	16
17	1970-1979	556,300	561,650	554,300	0	1,550	0	770	2,320	770	1,950	17
18	1960-1969	250,500	250,950	243,600	0	0	0	770	1,180	1,160	4,250	18
19	1950-1959	204,600	208,150	202,750	0	370	0	1,930	2,340	0	770	19
20	1940-1949	61,800	63,150	60,500	0	0	0	370	750	0	1,530	20
21	1930-1939	25,800	26,140	25,380	0	0	0	390	0	0	370	21
22	1920-1929	7,600	6,940	6,550	0	0	0	0	390	0	0	22
23	1919 or earlier	21,700	20,520	20,130	0	0	0	0	0	0	390	23

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Forward-Looking Table 1 (continued): Structural and Location Characteristics – All Housing Units

	A Characteristics	B Published numbers	C Present in 1995	D 1995 units present in 2002	E Change in character- istics	F '95 units affected by conversion /merger	G '95 mobile homes moved out	H '95 units changed to nonresidential use	I '95 units lost through demolition or disaster	J '95 units badly damaged or condemned	K '95 units lost in other ways	
	Rooms											
24	1 – 4 rooms	665,600	665,270	523,720	119,510	1,930	0	3,830	7,020	1,160	8,100	24
25	5 rooms	308,200	307,760	134,730	169,950	0	0	0	1,160	390	1,530	25
26	6 rooms	228,400	229,410	95,970	133,070	0	0	0	370	0	0	26
27	7 rooms	152,100	152,190	56,380	94,650	0	0	390	390	370	0	27
28	8 rooms	92,100	92,340	37,740	54,590	0	0	0	0	0	0	28
29	9 rooms	23,100	22,220	4,110	17,720	0	0	390	0	0	0	29
30	10 rooms or more	14,200	14,700	5,320	8,990	0	0	390	0	0	0	30
	Bedrooms											
31	None	31,200	31,440	10,980	16,620	0	0	750	1,160	0	1,930	31
32	1	293,700	293,650	244,690	39,290	770	0	2,340	2,320	770	3,480	32
33	2	554,100	550,860	466,760	73,270	1,160	0	750	4,310	790	3,830	33
34	3	431,600	434,870	356,700	76,630	0	0	0	770	370	390	34
35	4 or more	173,200	173,080	145,100	26,410	0	0	1,180	390	0	0	35
36	Multiunit Structures	690,700	696,720	678,610	0	750	0	3,830	5,430	770	7,330	36
	Stories in Structures											
37	1	87,900	88,500	86,220	0	0	0	370	1,140	0	770	37
38	2		230,270	223,350	0	750	0	1,540	1,530	370	2,730	38
39	3		117,850	114,350	0	0	0	1,160	1,180	390	770	39
40	4 to 6		140,140	138,590	0	0	0	390	390	0	770	40
41	7 or more		119,950	116,100	0	0	0	370	1,180	0	2,300	41
	Metro Status											
42	In central cities		286,630	276,960	0	390	0	2,320	3,090	1,140	2,730	42
43	In suburbs		1,197,270	1,179,500	0	1,530	0	2,700	5,860	790	6,900	43
	Mover Status											
44	Moved in last 2 years		313,240	87,310	218,060	790	0	790	3,150	390	2,750	44
45	Not a recent mover		931,960	766,500	154,840	390	0	2,360	3,930	790	3,150	45

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Forward-Looking Table 2: Condition of Unit – All Occupied Units

	A Characteristics	B Published numbers	C Present in 1995	D 1995 units present in 2002	E Change in character- istics	F '95 units affected by conversion /merger	G '95 mobile homes moved out	H '95 units changed to nonresidential use	I '95 units lost through demolition or disaster	J '95 units badly damaged or condemned	K '95 units lost in other ways	
1	Occupied Units	1,245,200	1,245,200	1,123,310	103,400	1,180	0	3,150	7,080	1,180	5,900	1
	Kitchen											
2	With complete kitchen	1,227,300	1,231,680	1,092,500	121,470	790	0	2,750	7,080	1,180	5,900	2
3	Lacking complete kitchen facilities	17,900	13,520	1,640	11,090	390	0	390	0	0	0	3
	Plumbing											
4	With all plumbing facilities	1,241,800	1,242,320	1,110,990	112,840	1,180	0	3,150	7,080	1,180	5,900	4
5	Lack some plumbing	3,400	2,880	410	2,460	0	0	0	0	0	0	5
6	No hot piped water	0	0	0	0	0	0	0	0	0	0	6
7	No bathtub/shower	0	0	0	0	0	0	0	0	0	0	7
8	No flush toilet	0	2,880	410	2,460	0	0	0	0	0	0	8
	Water											
9	Public/private water	1,233,500	1,232,500	1,109,340	105,450	1,180	0	3,150	6,690	1,180	5,510	9
10	Well	11,300	12,300	8,210	3,700	0	0	0	390	0	0	10
11	Other water source	400	390	0	0	0	0	0	0	0	390	11
	Sewer											
12	Public sewer	1,118,100	1,112,810	982,230	113,670	1,180	0	3,150	6,300	790	5,510	12
13	Septic tank/cesspool	127,100	132,390	60,890	69,920	0	0	0	790	390	390	13
14	Severe Problems	9,600	9,020	820	7,800	390	0	0	0	0	0	14
15	Plumbing	3,400	2,880	410	2,460	0	0	0	0	0	0	15
16	Heating	400	410	0	410	0	0	0	0	0	0	16
17	Electric	400	0	0	0	0	0	0	0	0	0	17
18	Upkeep	5,800	5,730	410	4,930	390	0	0	0	0	0	18
19	Hallways	0	0	0	0	0	0	0	0	0	0	19
20	Moderate problems	49,600	50,810	4,520	43,540	390	0	390	1,180	390	390	20
21	Plumbing	5,800	0	0	0	0	0	0	0	0	0	21
22	Heating	5,800	6,570	0	6,570	0	0	0	0	0	0	22
23	Kitchen	12,900	13,520	1,640	11,090	390	0	390	0	0	0	23
24	Upkeep	26,600	28,240	2,050	23,820	390	0	0	1,180	390	390	24
25	Hallways	0	0	0	0	0	0	0	0	0	0	25

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Forward-Looking Table 3: Household Characteristics – All Occupied Units

	A Characteristics	B Published numbers	C Present in 1995	D 1995 units present in 2002	E Change in character- istics	F '95 units affected by conversion /merger	G '95 mobile homes moved out	H '95 units changed to nonresidential use	I '95 units lost through demolition or disaster	J '95 units badly damaged or condemned	K '95 units lost in other ways	
1	Occupied units	1,245,200	1,245,200	1,123,310	103,400	1,180	0	3,150	7,080	1,180	5,900	1
	Age											
2	Under 65	937,000	931,470	754,010	164,870	1,180	0	2,360	5,510	790	2,750	2
3	65 or older	308,300	313,730	174,350	133,480	0	0	790	1,570	390	3,150	3
	Children											
4	Some	440,800	439,690	253,040	181,540	0	0	1,180	2,360	790	790	4
5	None	804,300	805,510	551,250	240,880	1,180	0	1,970	4,720	390	5,120	5
	Race/Origin											
6	White	1,008,300	1,005,510	813,730	179,590	790	0	2,360	4,330	790	3,930	6
7	Hispanic	417,400	411,420	319,330	86,970	390	0	1,570	1,970	0	1,180	7
8	Non-Hispanic	590,900	594,100	397,060	189,960	390	0	790	2,360	790	2,750	8
9	Black	204,200	207,650	152,480	48,880	390	0	790	2,750	390	1,970	9
10	Other	32,700	32,040	13,140	18,890	0	0	0	0	0	0	10
11	Total Hispanics	438,200	431,520	347,260	78,750	390	0	1,970	1,970	0	1,180	11
	Income Source											
12	Wages and salaries	910,400	907,730	738,670	158,430	790	0	2,360	3,540	790	3,150	12
13	Welfare or SSI	86,600	87,740	16,020	68,180	0	0	0	2,360	0	1,180	13
14	Social security or pension	375,800	381,350	197,140	177,120	0	0	1,180	2,360	390	3,150	14

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Forward-Looking Table 4: Market Dynamics and Affordability – All Occupied Units

	A Characteristics	B Published numbers	C Present in 1995	D 1995 units present in 2002	E Change in character- istics	F '95 units affected by conversion /merger	G '95 mobile homes moved out	H '95 units changed to nonresidential use	I '95 units lost through demolition or disaster	J '95 units badly damaged or condemned	K '95 units lost in other ways	
1	Occupied units	1,245,200	1,245,200	1,123,310	103,400	1,180	0	3,150	7,080	1,180	5,900	1
	Tenure											
2	Owner occupied	773,300	774,900	665,460	105,900	0	0	790	1,970	390	390	2
3	Percent own occupied	62.1%	62.2%	59.2%	102.4%	0.0%	NA	25.0%	27.8%	33.3%	6.7%	3
4	Renter occupied	471,900	470,300	322,070	133,280	1,180	0	2,360	5,120	790	5,510	4
	Rental Affordability											
5	Non-market		72,150	26,700	42,300	390	0	0	790	390	1,570	5
6	Extremely low rent		28,650	8,630	17,660	0	0	0	1,970	390	0	6
7	Very low rent		74,650	36,140	36,140	0	0	390	790	0	1,180	7
8	Low rent		123,860	36,960	82,960	390	0	790	790	0	1,970	8
9	Moderate rent		96,430	21,670	73,590	390	0	790	0	0	0	9
10	High rent		46,260	7,700	37,380	0	0	0	790	0	390	10
11	Very high rent		28,300	5,750	21,770	0	0	390	0	0	390	11
	Renter Hsd Income											
12	Less than \$20,000	236,800	236,310	94,050	131,630	1,180	0	1,180	3,930	390	3,930	12
13	\$20,000 to \$34,999	129,800	129,440	29,980	96,310	0	0	790	390	390	1,570	13
14	\$35,000 to \$59,999	79,600	78,690	14,380	63,520	0	0	390	390	0	0	14
15	\$60,000 to \$99,999	20,400	20,110	1,640	18,070	0	0	0	390	0	0	15
16	\$100,000 or more	5,400	5,750	0	5,750	0	0	0	0	0	0	16
	Owner Monthly Housing Costs											
17	Less than \$499	262,000	268,250	115,000	152,070	0	0	0	790	0	390	17
18	\$500 to \$699	109,400	108,990	22,080	86,520	0	0	0	390	0	0	18
19	\$700 to \$999	174,600	178,180	44,080	133,310	0	0	0	390	390	0	19
20	\$1,000 to \$1,499	147,400	147,810	48,360	98,260	0	0	790	390	0	0	20
21	\$1,500 or more	79,900	71,670	42,510	29,160	0	0	0	0	0	0	21
	Owner Hsd Income											
22	Less than \$20,000	167,600	170,050	54,420	113,670	0	0	0	1,180	390	390	22
23	\$20,000 to \$34,999	205,500	204,350	44,770	159,190	0	0	0	390	0	0	23
24	\$35,000 to \$59,999	191,800	196,490	52,640	143,070	0	0	790	0	0	0	24
25	\$60,000 to \$99,999	140,800	137,470	36,350	100,730	0	0	0	390	0	0	25
26	\$100,000 or more	67,600	66,540	31,320	35,220	0	0	0	0	0	0	26

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Backward-Looking Table 1: Structural and Location Characteristics – All Housing Units

	A Characteristics	B Published numbers	C Present in 2002	D 2002 units present in 1995	E Change in character- istics	F '02 mobile homes moved in	G '02 units derived from nonresidential use	H '02 units added by new construction	I '02 units added from temporary losses	
1	Total	1,638,700	1,638,700	1,494,660	0	2,240	1,770	134,290	5,750	1
	Occupancy Status									
2	Occupied	1,434,200	1,434,200	1,155,750	155,190	2,240	750	116,910	3,360	2
3	Vacant	168,600	168,600	50,960	99,100	0	690	15,790	2,060	3
4	Seasonal	35,900	35,900	4,540	29,110	0	330	1,580	330	4
	Units in Structure									
5	1, detached	712,700	722,450	647,270	0	0	680	72,400	2,110	5
6	1, attached	363,200	361,750	329,010	0	0	340	30,910	1,490	6
7	2 to 4	63,400	61,060	59,940	0	0	370	370	370	7
8	5 to 9	48,700	49,310	47,100	0	0	0	1,460	750	8
9	10 to 19	74,400	73,250	67,780	0	0	0	5,480	0	9
10	20 to 49	127,900	131,500	120,810	0	0	0	10,700	0	10
11	50 or more	195,400	194,520	180,510	0	0	0	12,980	1,030	11
12	Mobile Home/trailer	53,000	44,860	42,250	0	2,240	370	0	0	12
	Year Built									
13	1996-2002	Included in 14	134,660	15,910	0	1,490	0	116,570	690	13
14	1990-1995	298,900	133,820	114,980	0	370	0	17,720	750	14
15	1985-1989	151,200	153,690	151,550	0	0	710	0	1,430	15
16	1980-1984	124,800	123,280	122,190	0	370	720	0	0	16
17	1970-1979	488,300	500,910	499,470	0	0	340	0	1,090	17
18	1960-1969	257,000	265,430	265,050	0	0	0	0	370	18
19	1950-1959	214,000	221,880	221,130	0	0	0	0	750	19
20	1940-1949	67,300	67,750	67,420	0	0	0	0	330	20
21	1930-1939	28,400	28,870	28,520	0	0	0	0	340	21
22	1920-1929	6,800	7,150	7,150	0	0	0	0	0	22
23	1919 or earlier	1,900	1,270	1,270	0	0	0	0	0	23

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Backward-Looking Table 1 (continued): Structural and Location Characteristics – All Housing Units

	A Characteristics	B Published numbers	C Present in 2002	D 2002 units present in 1995	E Change in character- istics	F '02 mobile homes moved in	G '02 units derived from nonresidential use	H '02 units added by new construction	I '02 units added from temporary losses	
	Rooms									
24	1 – 4 rooms	691,300	684,550	536,350	110,670	370	1,050	33,220	2,890	24
25	5 rooms	344,800	349,580	138,500	186,310	0	370	23,350	1,050	25
26	6 rooms	260,900	260,340	98,630	136,780	1,120	340	22,750	720	26
27	7 rooms	174,700	176,930	58,020	95,470	370	0	23,070	0	27
28	8 rooms	109,800	110,610	38,810	54,520	370	0	16,190	720	28
29	9 rooms	32,900	32,000	4,190	17,850	0	0	9,590	370	29
30	10 rooms or more	24,100	24,670	5,490	13,060	0	0	6,120	0	30
	Bedrooms									
31	None	20,500	20,020	11,070	8,230	0	0	0	720	31
32	1	320,300	311,830	250,880	47,120	370	370	11,960	1,120	32
33	2	575,700	579,230	478,270	68,130	0	1,050	30,350	1,430	33
34	3	484,000	489,100	366,920	69,780	1,120	340	49,550	1,390	34
35	4 or more	238,200	238,530	149,520	44,730	750	0	42,440	1,090	35
36	Multiunit Structures	509,800	509,640	476,140	0	0	370	30,980	2,150	36
	Stories in Structures									
37	1		51,610	50,490	0	0	0	750	370	37
38	2		154,600	142,780	0	0	370	11,070	370	38
39	3		90,700	82,330	0	0	0	7,650	720	39
40	4 to 6		108,700	103,950	0	0	0	4,750	0	40
41	7 or more		104,040	96,590	0	0	0	6,760	690	41
	Metro Status									
42	In central cities		294,710	283,840	0	0	690	8,690	1,490	42
43	In suburbs		1,343,990	1,210,820	0	2,240	1,080	125,600	4,260	43
	Mover Status									
44	Moved in last 2 years		343,280	89,830	206,640	370	370	44,560	1,490	44
45	Not a recent mover		1,090,920	823,820	190,650	1,860	370	72,350	1,860	45

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Backward-Looking Table 2: Condition of Unit – All Occupied Units

	A Characteristics	B Published numbers	C Present in 2002	D 2002 units present in 1995	E Change in character- istics	F '02 mobile homes moved in	G '02 units derived from nonresidential use	H '02 units added by new construction	I '02 units added from temporary losses	
1	Occupied Units	1,434,200	1,434,200	1,155,750	155,190	2,240	750	116,910	3,360	1
	Kitchen									
2	With complete kitchen	1,405,200	1,406,090	1,124,060	160,260	2,240	750	115,420	3,360	2
3	Lacking complete kitchen facilities	29,100	28,110	1,690	24,930	0	0	1,490	0	3
	Plumbing									
4	With all plumbing facilities	1,421,500	1,421,570	1,143,080	155,610	2,240	750	116,540	3,360	4
5	Lack some plumbing	12,800	12,630	420	11,830	0	0	370	0	5
6	No hot piped water		3,380	0	3,380	0	0	0	0	6
7	No bathtub/shower		420	0	420	0	0	0	0	7
8	No flush toilet		420	420	0	0	0	0	0	8
	Water									
9	Public/private water	1,420,100	1,419,610	1,141,390	157,310	2,240	750	114,580	3,360	9
10	Well	12,600	13,320	8,450	2,540	0	0	2,330	0	10
11	Other water source	1,600	420	0	420	0	0	0	0	11
	Sewer									
12	Public sewer	1,352,000	1,349,320	1,010,600	218,260	2,240	750	114,120	3,360	12
13	Septic tank/cesspool	82,300	84,880	62,650	19,440	0	0	2,800	0	13
	Severe Problems									
14	Severe Problems	19,600	19,810	850	18,590	0	0	370	0	14
15	Plumbing	12,800	12,630	420	11,830	0	0	370	0	15
16	Heating	5,700	5,920	0	5,920	0	0	0	0	16
17	Electric	0	0	0	0	0	0	0	0	17
18	Upkeep	1,600	1,690	420	1,270	0	0	0	0	18
19	Hallways	0	0	0	0	0	0	0	0	19
	Moderate problems									
20	Moderate problems	54,900	53,330	4,650	47,190	0	0	1,490	0	20
21	Plumbing	10,300	11,410	420	10,990	0	0	0	0	21
22	Heating	2,700	3,380	0	3,380	0	0	0	0	22
23	Kitchen	28,300	28,110	1,690	24,930	0	0	1,490	0	23
24	Upkeep	16,300	17,610	2,110	15,490	0	0	0	0	24
25	Hallways	400	420	0	420	0	0	0	0	25

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Backward-Looking Table 3: Household Characteristics – All Occupied Units

	A Characteristics	B Published numbers	C Present in 2002	D 2002 units present in 1995	E Change in character- istics	F '02 mobile homes moved in	G '02 units derived from nonresidential use	H '02 units added by new construction	I '02 units added from temporary losses	
1	Occupied units	1,434,200	1,434,200	1,155,750	155,190	2,240	750	116,910	3,360	1
	Age									
2	Under 65	1,120,600	1,110,750	775,790	223,650	1,860	750	105,350	3,360	2
3	65 or older	313,600	323,450	179,380	132,130	370	0	11,560	0	3
	Children									
4	Some	533,100	537,500	260,340	214,040	750	370	60,510	1,490	4
5	None	901,200	896,700	567,170	269,390	1,490	370	56,410	1,860	5
	Race/Origin									
6	White	1,095,200	1,092,990	837,240	158,890	2,240	370	92,770	1,490	6
7	Hispanic	521,500	517,350	328,560	133,320	370	370	54,350	370	7
8	Non-Hispanic	573,700	575,640	408,530	125,720	1,860	0	38,410	1,120	8
9	Black	261,800	266,090	156,880	90,750	0	370	16,600	1,490	9
10	Other	77,300	75,110	13,520	53,670	0	0	7,550	370	10
11	Total Hispanics	580,000	573,480	357,290	156,140	370	370	58,550	750	11
	Income Source									
12	Wages and salaries	1,145,000	1,139,540	760,010	269,610	1,490	750	104,700	2,980	12
13	Welfare or SSI	73,900	72,520	16,480	52,680	0	0	3,360	0	13
14	Social security or pension	372,800	381,510	202,840	158,260	750	0	19,670	0	14

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Backward-Looking Table 4: Market Dynamics and Affordability – All Occupied Units

	A Characteristics	B Published numbers	C Present in 2002	D 2002 units present in 1995	E Change in character- istics	F '02 mobile homes moved in	G '02 units derived from nonresidential use	H '02 units added by new construction	I '02 units added from temporary losses	
1	Occupied units	1,434,200	1,434,200	1,155,750	155,190	2,240	750	116,910	3,360	1
	Tenure									
2	Owner occupied	927,200	939,890	684,680	166,920	1,490	0	86,050	750	2
3	Percent own occupied	64.6%	65.5%	59.2%	NA	66.7%	0.0%	73.6%	22.2%	3
4	Renter occupied	507,100	494,310	331,370	127,970	750	750	30,860	2,610	4
	Rental Affordability									
5	Non-market		58,530	27,890	24,300	370	0	5,590	370	5
6	Extremely low rent		47,180	8,870	37,190	0	370	0	750	6
7	Very low rent		133,710	37,190	88,320	0	0	7,460	750	7
8	Low rent		117,610	38,030	75,850	370	370	2,610	370	8
9	Moderate rent		74,840	22,290	48,910	0	0	3,260	370	9
10	High rent		38,720	7,920	24,090	0	0	6,710	0	10
11	Very high rent		23,710	5,920	12,570	0	0	5,220	0	11
	Renter Hsd Income									
12	Less than \$20,000	204,200	197,910	96,770	85,850	370	370	13,050	1,490	12
13	\$20,000 to \$34,999	129,900	128,550	30,850	91,740	370	370	4,100	1,120	13
14	\$35,000 to \$59,999	113,000	110,460	14,790	88,210	0	0	7,460	0	14
15	\$60,000 to \$99,999	36,100	34,210	1,690	30,000	0	0	2,520	0	15
16	\$100,000 or more	23,800	23,170	0	19,440	0	0	3,730	0	16
	Owner Monthly Housing Costs									
17	Less than \$499	250,400	236,030	118,320	109,130	0	0	8,580	0	17
18	\$500 to \$699	124,300	123,070	22,710	94,760	370	0	5,220	0	18
19	\$700 to \$999	163,300	160,920	45,360	104,380	370	0	10,810	0	19
20	\$1,000 to \$1,499	220,200	225,300	49,760	150,930	370	0	23,490	750	20
21	\$1,500 or more	169,100	194,570	43,740	112,510	370	0	37,950	0	21
	Owner Hsd Income									
22	Less than \$20,000	168,900	174,710	55,990	114,800	370	0	3,540	0	22
23	\$20,000 to \$34,999	178,700	178,850	46,060	122,440	1,120	0	8,860	370	23
24	\$35,000 to \$59,999	231,000	231,230	54,160	154,420	0	0	22,660	0	24
25	\$60,000 to \$99,999	183,700	185,260	37,400	122,970	0	0	24,890	0	25
26	\$100,000 or more	165,000	169,840	32,220	111,140	0	0	26,110	370	26

Rental Market Dynamics

Table A expands the analysis in rows 5-11 in Forward-Looking Table 4 into a full rental dynamics analysis by examining in more detail what happened to the units in each row. In particular, the “present in 2002” and “change in characteristics” columns (column D and E in the CINCH tables) are disaggregated into the following options: each of the other rent affordability columns (new columns *D* through *J*), owner-occupancy (new column *K*), and vacant or seasonal status (new column *L*). The remaining columns (columns F through K in the CINCH tables) are collapsed into a “Lost to stock” column (new column *M*). Table B does the same for the analysis of rows 5-11 in Backward-Looking Table 4.

From Table A, there were 470,300 rental units in Miami-Ft. Lauderdale in 1995. Of these, 28,650 had extremely low rents, 74,650 had very low rents, and 30,330 had low rents. From the 1995 rental stock, 148,220 were no longer rental in 2002; 77,930 were owner-occupied, 55,340 were vacant or seasonal, and 14,950 were out of the housing stock. Taken as a proportion of the units in 1995, movement into owner-occupancy was heaviest among the high-rent and very-high-rent categories, and losses to the stock were heaviest among extremely-low-rent units.

Table B shows there were 494,310 rental units in the Miami-Ft. Lauderdale metropolitan area in 2002, of which 162,930 were not rental units in 1995. The new units came from units that had been owner-occupied (59,510), units that had been vacant or in seasonal use (68,460), newly constructed units (30,860), and other additions (4,100). Most of the formerly owner-occupied units were spread fairly evenly over the rent categories, and most of the newly constructed rental units went to the very-low-rent and the high-rent categories.

Looking at both tables, we see that the overall number of rental units increased by approximately 25,000 units between 1995 and 2002. The number of extremely-low-rent and very-low-rent units combined grew from approximately 105,000 in 1995 to approximately 180,000 in 2002.

Components of Inventory Change and Rental Market Dynamics:
Miami-Ft. Lauderdale 1995–2002

Table A: Forward-Looking Rental Dynamics Analysis

Forward looking	<i>C</i> Number in 1995	<i>D</i> Non- market in 2002	<i>E</i> Extremely low rent in 2002	<i>F</i> Very low rent in 2002	<i>G</i> Low rent in 2002	<i>H</i> Moderate rent in 2002	<i>I</i> High rent in 2002	<i>J</i> Very high rent in 2002	<i>K</i> Owner- occupied in 2002	<i>L</i> Vacant or seasonal in 2002	<i>M</i> Lost to stock
Non-market	72,150	27,110	6,980	6,980	7,800	820	410	0	10,270	8,630	3,150
Extremely low rent	28,650	1,640	8,630	6,160	2,460	0	0	0	4,520	2,880	2,360
Very low rent	74,650	2,880	11,500	36,140	5,750	820	0	0	8,210	6,980	2,360
Low rent	123,860	4,110	1,230	40,660	36,960	4,930	2,050	0	16,430	13,550	3,930
Moderate rent	96,430	820	2,050	6,570	26,970	21,670	2,460	1,230	19,200	14,270	1,180
High rent	46,260	410	820	1,640	1,230	18,480	7,700	820	9,860	4,110	1,180
Very high rent	28,300	820	0	0	410	1,640	4,520	5,750	9,450	4,930	790
Column sum	470,300	37,790	31,210	98,160	81,600	48,360	17,150	7,800	77,930	55,340	14,950

Table B: Backward-Looking Rental Dynamics Analysis

Backward looking	<i>C</i> Number in 2002	<i>D</i> Non- market in 1995	<i>E</i> Extremely low rent in 1995	<i>F</i> Very low rent in 1995	<i>G</i> Low rent in 1995	<i>H</i> Moderate rent in 1995	<i>I</i> High rent in 1995	<i>J</i> Very high rent in 1995	<i>K</i> Owner- occupied in 1995	<i>L</i> Vacant or seasonal in 1995	<i>M</i> New construc- tion	<i>N</i> Other additions
Non-market	58,530	27,890	1,690	2,960	4,230	850	420	850	5,920	7,400	5,590	750
Extremely low rent	47,180	7,180	8,870	11,830	1,270	2,110	850	0	5,490	8,450	0	1,120
Very low rent	133,710	7,180	6,340	37,190	41,840	6,760	1,690	0	9,300	15,210	7,460	750
Low rent	117,610	8,030	2,540	5,920	38,030	27,750	1,270	420	11,760	18,170	2,610	1,120
Moderate rent	74,840	850	0	850	5,070	22,290	19,020	1,690	10,560	10,880	3,260	370
High rent	38,720	420	0	0	2,110	2,540	7,920	4,650	9,720	4,650	6,710	0
Very high rent	23,710	0	0	0	0	1,270	850	5,920	6,760	3,700	5,220	0
Column sum	494,310	51,550	19,440	58,740	92,540	63,560	32,010	13,520	59,510	68,460	30,860	4,100

Appendix A – Internal and External Checks

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

- For each row, we tested whether the sum of possible outcomes (columns D through K in the forward-looking analysis and columns D through I in the backward-looking analysis) equaled the number of units present in the base year. In every case, equality was achieved except for differences created by rounding.
- Throughout the tables, various sets of rows are related to each other. For example, the year-built rows (13-23) in Table 1 are a disaggregation of the total stock in row 1. Similarly, rows 6 (Whites), 9 (Blacks), and 10 (Other race) in Table 3 are a disaggregation of row 1 (occupied households). In these cases, there should be equality between the parent row and the sum of the break-out 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 break-out rows should equal the negative of the difference between column E in the parent row and the sum of column E for the break-out rows. In every case, equality was achieved except for differences created by rounding.

Column B provides an external check of how well the CINCH weighting performed. In general, the CINCH estimates are within 5 percent of the AHS published totals and many of the CINCH estimates are very close to the AHS estimates. We have footnoted two places where our coding does not seem to produce the same results as the published estimates. We observed that the correspondence between the CINCH and published estimates were closer in the slower growing metropolitan areas. We also noticed that the CINCH weighting tends to underestimate the number of units built since 1989 and the number of Hispanic households.

Appendix B – Weighting

CINCH separates the AHS samples in 1995 and 2002 into three components: units that exist and are part of the housing stock in both years (SAMES), units that are part of the 1995 housing stock but are not part of the 2002 housing stock (LOSSES), and units that are not part of the 1995 housing stock but are part of the 2002 housing stock (ADDITIONS). ADDITIONS are split into NEW CONSTRUCTION and RECOVERIES (structures that existed in 1995 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 1995 and those ADDITIONS that were interviewed in 2002.

For the forward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 1995 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted count in 1995 of LOSSES to create weights for interviewed LOSSES. We then adjusted the weights of SAMES and LOSSES to equal the AHS published totals for occupied units, vacant units, and seasonal units in 1995.

For the backward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 2002 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted counts in 2002 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 occupied units, vacant units, and seasonal units in 2002.

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