

American Housing Survey

**Components of
Inventory Change
And Rental Dynamics:
Pittsburgh
1995-2004**

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Components of Inventory Change and Rental Market Dynamics: Pittsburgh 1995-2004

Overview

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 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 rental units that were affordable to low-income households at the beginning of the period?”

This report focuses on the Pittsburgh metropolitan housing market over the period between 1995 and 2004. It is one of 13 reports based on local American Housing Surveys conducted in 2004; these 13 metropolitan areas were previously surveyed in either 1995 or 1996.¹

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 and then, looking at the end of the period, attempts 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. The backward-looking component starts with the housing stock available at the end of the period 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 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 would record this unit as having

¹ See <http://www.huduser.org/datasets/cinch.html> for examples of previous CINCH and rental dynamics studies.

undergone no change over the period from 1995 to 2004. 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 research has shown 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 briefly in Appendix B and more fully in a separate paper referenced in that 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 2004 and identifying how units were lost to the housing stock; and a set of backward-looking tables tracing where 2004 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.
- Two tables and accompanying discussion that highlight interesting changes in the Pittsburgh housing stock between 1995 and 2004.
- A brief discussion of the rental market dynamics results using CINCH-like tables.

Two appendices 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 2004. There are three basic dispositions of 1995 units: units that continue to exist in 2004 with the same characteristics (or serving the same market), units that continue to exist in 2004 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 2004 housing stock came from in reference to 1995. There are three basic sources of 2004 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.

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

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 Pittsburgh counted 969,900 occupied units (row 2, column B, forward-looking Table 1); the 2004 AHS report counted 1,069,200 occupied units (row 2, column B, 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 2004 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. As explained in the appendix, the weights were created to match AHS published totals for rows 2 through 4 of Table 1 and rows 2 and 4 of Table 4. This perfect match will not be true of other rows.²
- 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-

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. Categories for which the CINCH weights seem consistently to have trouble matching the published numbers were: the number of mobile homes, units built between 2000-2004, units built between 1995-1999, rental units that do not have a cash rent, and monthly housing costs less than \$350 for owners. In a few other cases, the weighted numbers consistently fail to match the published totals, but the authors believe the differences result because the Census Bureau created the published totals using information not available on the public use files or because of coding differences. These cases are: the reasons for incomplete plumbing and households receiving welfare or SSI payment.

looking Table 1 estimates that 847,900 of the occupied units from 1995 were also occupied in 2004.

- 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 93,800 units that were occupied in 1995 are still part of the housing stock in 2004 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; these are 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 2004.

- Column F is the CINCH estimate of the number of units from column C that are not in the 2004 housing stock because they were merged with other units or converted into multiple units. Among occupied units, 2,500 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, 500 mobile homes were moved out.³
- Column H is the CINCH estimate of the number of units that 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.⁴ Among occupied units, 4,900 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 2004. In this case, 15,800 units were demolished or destroyed.
- Column J is the CINCH estimate of the number of units from column C that by 2004 were condemned or that were no longer usable for housing because of extensive damage. In Pittsburgh, 1,500 occupied units were lost because of damage or similar cause.

³ The AHS does not trace where the mobile home is moved to. The move may be within the metropolitan area or outside the metropolitan area. Similarly, column G in the backward-looking tables does not distinguish between move-ins from within or from outside the metropolitan area.

⁴ 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.

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- Column K is the CINCH estimate of the number of units from column C that were lost by 2004 for other reasons. These include units that the Census Bureau eliminated for sampling purposes and other miscellaneous losses. Among occupied units, there were 2,700 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.⁵

Columns Unique to Backward-Looking Tables

In backward-looking tables, columns G through K track where units came from that are part of the housing stock in 2004 but were not part of the 1995 housing stock.⁶

- Column G is the CINCH estimate of the number of mobile homes from column C that were moved in during the period. Among occupied units, no mobile homes were moved in (row 2, column G, of backward-looking Table 1).⁷
- Column H is the CINCH estimate of the number of units from column C that had been nonresidential in 1995. Among occupied units, 2,000 had been nonresidential.
- Column I is the CINCH estimate of the number of units from column C that were newly constructed between 1995 and 2004. Among occupied units, 38,400 units were newly constructed.
- Column J is the CINCH estimate of the number of units from column C that were added by 2004 by the recovery of units that had been temporarily lost to the housing stock because occupancy was prohibited in 1995, or the interior of the unit was exposed to the elements, or for reasons “not classified.” The 2004 occupied housing stock includes 500 recovered units.
- Column K includes units added by the Census Bureau as sample adjustments. Sample adjustments represent 3,800 occupied units in 2004.

⁵ The weighted numbers are rounded to the nearest 100 to match practices used by the Census Bureau in the AHS publications.

⁶ The backward-looking tables do not contain a column F for units added through mergers and conversions. In 2004, the Census Bureau did not code the variable that would normally identify units created from mergers and conversions (REUAD=7 or 8).

⁷ In 2004, the Census Bureau did not code the variable that would normally identify mobile home move-ins (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 (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 units account for losses.⁸ 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 13-24 divide the housing stock by year built.⁹ The published reports use the categories 1990-1994, 1995-1999, and 2000-2004; this report uses 1990-1995 and 1995-1999, and 2000-2004 to isolate units newly constructed since the previous AHS survey.¹⁰ Column E is again forced to be zero.

Rows 25-31 and 32-36 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms.¹¹

Rows 37-42 focus on multiunit structures only and divide them by number of stories. Column E is forced to be zero. The published reports contain matching data for row 37 only.

Rows 43-44 divide the housing stock between central cities units and suburban residences to see how the observed changes vary by location. Rows 45-46 divide the housing stock by whether or not the occupants have moved in within the last 2 calendar years to see if certain units consistently have high turnover, and to see if high turnover units are more susceptible to loss.

⁸ 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.

⁹ Rows 13 and 14 are not included in Forward-Looking Table 1, because the 1995 housing stock cannot contain units built after 1995.

¹⁰ 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. Year built is obtained from the respondent and may be inaccurate.

¹¹ 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 looks at 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 6-9 look at each of these requirements separately.¹² 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 6-9 separate out good units from the least desirable units based on kitchen and bath equipment.

Rows 10-15 look at how units obtain water and dispose of sewage.

Rows 16-21 look at units with severe physical problems. Rows 17-21 identify specific types of serious deficiencies. Row 16 counts the units having one or more of these deficiencies. Rows 22-27 look at units with moderate problems. Rows 23-27 identify specific types of deficiencies. Row 22 counts the units having one or more of these deficiencies.¹³ 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.

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. 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 between 1995 and 2004.

Rows 2-3 look at the age of the householder. Rows 4-5 look at whether or not the household includes children. Rows 6-11 look at the race or ethnicity of the householder.¹⁴ Rows 12-14 look at three possible sources of household income.

¹² Row 9 is not included in Forward-Looking Table 2, because the public use file does not contain the information needed to identify facilities available “for exclusive use” of the household.

¹³ For definitions of serious and moderate problems, see pages 990 and 991 of the AHS Codebook, version 1.78, at http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/AHS_Codebook.pdf.

¹⁴ In compliance with new federal guidelines, the 2004 AHS used different categories for recording race. For 2004, this paper defined “White” as “White only”; Black as “Black only”; and “other” as all other answers.

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 see the extent to which units change tenure characteristics and whether rental or owner-occupied units are more likely to be lost.

Rows 5-10 characterize the rental stock using 6 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.¹⁵

¹⁵ 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.

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

	A Characteristics	B Published Numbers	C Present in 95	D 95 units present in 2004	E Changed in characteristics	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	1,051,700	1,051,700	1,013,300	0	3,200	500	6,400	21,800	2,700	3,900	1
	Occupancy Status											
2	Occupied	969,600	969,700	847,900	93,800	2,500	500	4,900	15,800	1,500	2,700	2
3	Vacant	80,800	80,800	19,200	51,500	700	0	1,400	5,800	1,200	1,000	3
4	Seasonal	1,200	1,200	200	600	0	0	0	200	0	200	4
	Units in Structure											
5	1, detached	687,900	702,700	686,600	0	700	0	2,700	10,500	1,000	1,200	5
6	1, attached	89,100	87,800	84,500	0	200	0	200	2,100	500	200	6
7	2 to 4	102,000	104,600	98,000	0	1,200	0	700	3,400	500	700	7
8	5 to 9	37,000	37,500	33,100	0	200	0	500	3,400	200	0	8
9	10 to 19	28,000	27,200	25,800	0	500	0	200	500	0	200	9
10	20 to 49	21,100	20,500	19,300	0	200	0	500	200	0	200	10
11	50 or more	37,500	37,300	34,800	0	0	0	1,500	700	0	200	11
12	Mobile Home/Trailer	49,100	34,100	31,300	0	0	500	0	700	500	1,000	12
	Year Built											
15	1990-1995	35,100	35,400	35,100	0	0	0	0	200	0	0	15
16	1985-1989	39,300	38,300	37,800	0	0	200	0	0	0	200	16
17	1980-1984	35,800	34,900	34,400	0	0	200	200	0	0	0	17
18	1970-1979	192,100	187,800	180,400	0	700	0	2,200	2,500	700	1,200	18
19	1960-1969	122,100	119,000	116,000	0	0	0	500	2,200	0	200	19
20	1950-1959	159,800	158,400	155,500	0	500	0	500	1,200	0	700	20
21	1940-1949	126,400	128,300	122,200	0	1,000	0	200	4,700	0	200	21
22	1930-1939	80,300	83,600	79,900	0	200	0	700	2,700	0	0	22
23	1920-1929	95,600	98,800	93,200	0	500	0	1,000	3,400	200	500	23
24	1919 or earlier	165,200	167,300	158,800	0	200	0	1,000	4,800	1,700	700	24

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

	A Characteristics	B Published Numbers	C Present in 95	D 95 units present in 2004	E Changed in characteristics	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											
25	1 – 4 rooms	282,600	276,500	201,300	55,600	2,500	200	3,700	10,500	700	1,900	25
26	5 rooms	197,500	195,200	100,800	86,800	200	200	1,000	4,700	500	1,000	26
27	6 rooms	247,300	252,900	125,300	120,300	200	0	700	4,400	1,000	1,000	27
28	7 rooms	164,400	165,500	69,900	92,600	0	0	700	1,700	500	0	28
29	8 rooms	88,300	89,600	38,200	50,900	0	0	200	200	0	0	29
30	9 rooms	44,300	44,100	12,600	31,200	0	0	0	200	0	0	30
31	10 rooms or more	27,300	28,000	11,300	16,500	200	0	0	0	0	0	31
	Bedrooms											
32	None	8,900	9,200	4,100	4,400	200	0	200	200	0	0	32
33	1	136,400	136,200	94,100	31,800	1,500	0	3,200	4,200	500	1,000	33
34	2	309,100	304,900	218,500	72,000	1,000	200	1,000	10,000	1,000	1,200	34
35	3	441,100	444,300	347,100	87,600	0	200	1,500	5,200	1,000	1,700	35
36	4 or more	156,200	157,100	120,600	33,000	500	0	500	2,200	200	0	36
37	Multiunit Structures	225,600	227,100	210,900	0	2,200	0	3,400	8,300	700	1,500	37
	Stories in Structures											
38	1	NA	6,500	6,100	0	0	0	0	200	200	0	38
39	2	NA	28,700	26,500	0	0	0	700	1,500	0	0	39
40	3	NA	93,600	87,700	0	700	0	700	4,200	200	0	40
41	4 to 6	NA	66,500	61,400	0	1,500	0	500	2,000	200	1,000	41
42	7 or more	NA	31,700	29,200	0	0	0	1,500	500	0	500	42
	Metro Status											
43	In central cities	NA	159,800	147,100	0	1,200	0	1,700	8,300	700	700	43
44	In suburbs	NA	891,900	866,200	0	2,000	500	4,700	13,500	2,000	3,100	44
	Mover Status											
45	Moved in last 2 years	NA	131,200	29,900	95,400	1,000	200	1,200	3,000	200	200	45
46	Not a Recent Mover	NA	838,500	816,500	0	1,500	200	3,700	12,900	1,200	2,500	46

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

	A Characteristics	B Published Numbers	C Present in 95	D 95 units present in 2004	E Changed in characteristics	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	969,600	969,700	847,900	93,800	2,500	500	4,900	15,800	1,500	2,700	1
	Kitchen											
2	With complete kitchen	960,800	961,500	833,500	100,700	2,500	500	4,900	15,100	1,500	2,700	2
3	Lacking complete kitchen facilities	8,800	8,200	0	7,500	0	0	0	700	0	0	3
	Plumbing											
4	With all plumbing facilities	963,100	963,000	837,000	98,500	2,200	500	4,700	15,800	1,500	2,700	4
5	Lack some plumbing	700	6,700	0	6,200	200	0	200	0	0	0	5
6	No hot piped water	0	0	0	0	0	0	0	0	0	0	6
7	No bathtub/shower	500	600	0	600	0	0	0	0	0	0	7
8	No flush toilet	5,900	6,700	0	6,200	200	0	200	0	0	0	8
	Water											
10	Public/private water	871,500	861,000	740,800	94,000	2,200	500	4,700	14,800	1,500	2,500	10
11	Well	86,300	95,300	76,200	17,600	200	0	200	700	0	200	11
12	Other water source	11,800	13,400	8,100	5,000	0	0	0	200	0	0	12
	Sewer											
13	Public sewer	797,100	784,900	674,800	85,600	2,200	200	4,400	13,800	1,200	2,500	13
14	Septic tank/cesspool	172,600	184,800	147,900	33,500	200	200	500	2,000	200	200	14
15	Other or none	0	0	0	0	0	0	0	0	0	0	15
16	Severe Problems	11,400	11,700	0	10,700	200	0	200	200	0	200	16
17	Plumbing	6,600	6,700	0	6,200	200	0	200	0	0	0	17
18	Heating	4,000	4,400	0	3,900	0	0	0	200	0	200	18
19	Electric	200	600	0	600	0	0	0	0	0	0	19
20	Upkeep	500	300	0	300	0	0	0	0	0	0	20
21	Hallways	0	0	0	0	0	0	0	0	0	0	21
22	Moderate problems	20,900	19,800	1,700	16,600	0	0	0	1,500	0	0	22
23	Plumbing	0	0	0	0	0	0	0	0	0	0	23
24	Heating	700	800	0	800	0	0	0	0	0	0	24
25	Kitchen	8,100	8,200	0	7,500	0	0	0	700	0	0	25
26	Upkeep	12,600	12,100	1,100	10,300	0	0	0	700	0	0	26
27	Hallways	0	0	0	0	0	0	0	0	0	0	27

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

	A Characteristics	B Published Numbers	C Present in 95	D 95 units present in 2004	E Changed in characteristics	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	969,600	969,700	847,900	93,800	2,500	500	4,900	15,800	1,500	2,700	1
	Age of Householder											
2	Under 65	685,800	682,600	513,600	149,400	1,500	500	2,200	11,900	1,000	2,500	2
3	65 or older	283,800	287,100	156,500	122,200	1,000	0	2,700	4,000	500	200	3
	Children											
4	Some	307,700	305,800	146,600	150,600	500	200	200	6,700	500	500	4
5	None	662,000	663,900	478,700	165,800	2,000	200	4,700	9,100	1,000	2,200	5
	Race/Origin of Householder											
6	White	886,900	887,700	759,700	107,700	1,500	500	4,200	10,900	700	2,500	6
7	Hispanic	5,300	5,300	1,700	3,600	0	0	0	0	0	0	7
8	NonHispanic	881,600	882,400	746,100	116,000	1,500	500	4,200	10,900	700	2,500	8
9	Black	69,800	69,200	35,200	27,100	700	0	500	4,700	700	200	9
10	Other	12,900	12,800	2,800	9,300	200	0	200	200	0	0	10
11	Total Hispanics	6,600	6,600	1,900	4,200	0	0	200	200	0	0	11
	Income Source											
12	Wages and salaries	682,800	678,000	501,700	160,800	1,200	500	2,000	8,400	1,000	2,500	12
13	Welfare or SSI	371,000	374,400	212,300	152,500	1,200	0	3,000	4,700	500	200	13
14	Social security or pension	65,200	66,300	6,600	53,500	200	0	1,000	4,400	200	200	14

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 95	D 95 units present in 2004	E Changed in characteristics	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	969,600	969,700	847,900	93,800	2,500	500	4,900	15,800	1,500	2,700	1
	Tenure											
2	Owner occupied	699,400	699,400	610,800	78,600	500	200	1,700	5,500	500	1,500	2
3	Percent own occpd	72.1%	72.1%									3
4	Renter occupied	270,300	270,300	169,700	82,600	2,000	200	3,200	10,400	1,000	1,200	4
	Renter Monthly Housing Costs											
5	Less than \$350	89,000	95,400	31,100	55,200	1,000	200	1,200	5,900	200	500	5
6	\$350 to \$599	114,600	113,100	39,200	68,200	700	0	1,000	3,200	200	500	6
7	\$600 to \$799	32,800	31,000	10,200	19,300	0	0	700	200	200	200	7
8	\$800 to \$1,249	11,100	12,900	4,400	8,000	200	0	200	0	0	0	8
9	\$1,250 or more	1,300	0	0	0	0	0	0	0	0	0	9
10	No cash rent	21,400	17,800	3,600	13,000	0	0	0	1,000	200	0	10
	Renter Hsd Income											
11	Less than \$15,000	119,700	120,900	37,400	72,400	700	0	1,700	7,900	500	200	11
12	\$15,000 to \$29,999	72,400	71,000	14,600	52,200	500	200	1,000	1,500	200	700	12
13	\$30,000 to \$49,999	52,500	52,800	8,300	42,800	500	0	200	700	200	0	13
14	\$50,000 to \$99,999	23,200	22,800	3,300	18,500	200	0	200	200	0	200	14
15	\$100,000 or more	2,500	2,800	600	2,200	0	0	0	0	0	0	15
	Owner Monthly Housing Costs											
16	Less than \$350	289,100	291,500	93,700	192,400	200	0	1,500	2,700	200	700	16
17	\$350 to \$599	172,300	170,300	55,700	111,600	200	200	200	1,500	200	500	17
18	\$600 to \$799	79,600	83,400	12,400	70,500	0	0	0	200	0	200	18
19	\$800 to \$1,249	100,900	100,900	37,400	62,500	0	0	0	1,000	0	0	19
20	\$1,250 or more	57,500	53,200	34,200	19,000	0	0	0	0	0	0	20
	Owner Hsd Income											
21	Less than \$15,000	108,200	107,600	28,700	77,200	200	0	200	1,000	200	0	21
22	\$15,000 to \$29,999	178,200	177,300	49,200	124,100	0	0	700	2,700	0	500	22
23	\$30,000 to \$49,999	177,200	177,500	41,100	133,400	0	200	500	1,200	200	700	23
24	\$50,000 to \$99,999	184,700	185,400	71,600	112,800	0	0	200	500	0	200	24
25	\$100,000 or more	51,100	51,700	26,400	25,000	200	0	0	0	0	0	25

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 2004	D 04 units present in 95	E Changed in characteristics	G 04 mobile homes moved in	H 04 units derived from nonresidential use	I 04 units added through new construction	J 04 units added from temporary losses	K 04 units added by other means	
1	Total	1,069,200	1,069,200	1,018,100	0	0	2,800	42,200	700	5,400	1
	Occupancy Status										
2	Occupied	953,800	953,900	856,300	52,900	0	2,000	38,400	500	3,800	2
3	Vacant	111,800	111,800	18,700	87,700	0	500	3,500	200	1,200	3
4	Seasonal	3,500	3,500	200	2,300	0	400	300	0	400	4
	Units in Structure										
5	1, detached	709,200	727,300	697,500	0	0	1,400	27,400	200	700	5
6	1, attached	86,800	83,800	75,500	0	0	500	7,300	0	500	6
7	2 to 4	96,000	99,600	95,800	0	0	300	700	200	2,600	7
8	5 to 9	38,500	38,000	36,100	0	0	200	700	300	700	8
9	10 to 19	28,900	29,200	27,400	0	0	0	1,900	0	0	9
10	20 to 49	17,600	17,600	15,900	0	0	200	1,500	0	0	10
11	50 or more	35,700	36,100	34,500	0	0	300	600	0	800	11
12	Mobile Home/Trailer	56,500	37,600	35,400	0	0	0	2,200	0	0	12
	Year Built										
13	2000-2004	29,100	27,400	5,000	0	0	0	22,400	0	0	13
14	1995-1999	28,600	25,800	8,400	0	0	300	17,200	0	0	14
15	1990-1994	42,200	39,500	35,900	0	0	300	2,300	0	1,000	15
16	1985-1989	44,900	42,000	41,700	0	0	300	0	0	0	16
17	1980-1984	37,700	37,100	36,600	0	0	0	200	0	300	17
18	1970-1979	139,300	137,000	136,100	0	0	400	0	200	200	18
19	1960-1969	119,200	118,400	118,200	0	0	0	0	0	300	19
20	1950-1959	160,000	163,900	162,900	0	0	200	0	0	800	20
21	1940-1949	124,500	128,100	127,600	0	0	300	0	0	300	21
22	1930-1939	87,500	88,800	87,300	0	0	700	0	0	700	22
23	1920-1929	102,400	103,000	102,300	0	0	0	0	0	700	23
24	1919 or earlier	153,800	158,200	156,100	0	0	400	0	500	1,200	24

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 2004	D 04 units present in 95	E Changed in characteristics	G 04 mobile homes moved in	H 04 units derived from nonresidential use	I 04 units added through new construction	J 04 units added from temporary losses	K 04 units added by other means	
	Rooms										
25	1 – 4 rooms	275,100	270,700	203,000	57,400	0	1,100	6,300	300	2,700	25
26	5 rooms	207,900	206,000	101,500	95,400	0	500	7,100	200	1,200	26
27	6 rooms	243,300	244,400	125,700	111,200	0	300	5,900	0	1,200	27
28	7 rooms	167,400	170,600	70,100	95,000	0	200	5,200	0	0	28
29	8 rooms	96,800	97,500	38,300	50,200	0	500	8,100	0	200	29
30	9 rooms	37,500	37,900	12,700	20,900	0	0	4,300	0	0	30
31	10 rooms or more	41,300	42,300	11,300	25,200	0	200	5,300	200	0	31
	Bedrooms										
32	None	10,900	9,500	4,200	4,300	0	0	300	0	800	32
33	1	125,400	126,700	95,200	25,700	0	600	3,500	200	1,400	33
34	2	296,700	293,700	220,100	65,200	0	500	5,600	300	2,000	34
35	3	449,100	449,800	348,300	82,700	0	1,200	16,800	0	700	35
36	4 or more	187,000	189,500	121,100	51,200	0	500	15,900	200	500	36
37	Multiunit Structures	216,700	220,500	209,700	0	0	900	5,300	500	4,100	37
	Stories in Structures										
38	1	NA	6,100	5,600	0	0	0	500	0	0	38
39	2	NA	60,400	58,300	0	0	0	600	200	1,200	39
40	3	NA	88,500	83,700	0	0	200	2,700	0	1,900	40
41	4 to 6	NA	34,800	32,100	0	0	400	1,200	0	1,000	41
42	7 or more	NA	30,800	30,000	0	0	300	300	300	0	42
	Metro Status										
43	In central cities	NA	150,800	147,700	0	0	900	1,200	200	700	43
44	In suburbs	NA	918,400	870,400	0	0	1,900	41,000	500	4,600	44
	Mover Status										
45	Moved in last 2 years	NA	153,100	30,600	106,600	0	700	12,600	300	2,300	45
46	Not a Recent Mover	NA	800,800	660,300	111,700	0	1,300	25,800	200	1,500	46

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 2004	D 04 units present in 95	E Changed in characteristics	G 04 mobile homes moved in	H 04 units derived from nonresidential use	I 04 units added through new construction	J 04 units added from temporary losses	K 04 units added by other means	
1	Occupied Units	953,800	953,900	856,300	52,900	0	2,000	38,400	500	3,800	1
	Kitchen										
2	With complete kitchen	941,300	942,600	841,700	57,100	0	2,000	38,100	500	3,300	2
3	Lacking complete kitchen facilities	12,600	11,300	0	10,500	0	0	300	0	600	3
	Plumbing										
4	With all plumbing facilities	945,700	945,500	845,200	55,500	0	2,000	38,400	500	3,800	4
5	Lack some plumbing	8,200	8,400	0	8,400	0	0	0	0	0	5
6	No hot piped water	1,800	2,000	0	2,000	0	0	0	0	0	6
7	No bathtub/shower	800	800	0	800	0	0	0	0	0	7
8	No flush toilet	500	600	0	600	0	0	0	0	0	8
9	No exclusive use	6,100	6,200	0	6,200	0	0	0	0	0	9
	Water										
10	Public/private water	864,700	848,900	748,600	60,900	0	2,000	33,100	500	3,800	10
11	Well	79,000	92,500	76,600	10,700	0	0	5,100	0	0	11
12	Other water source	10,100	12,600	8,200	4,200	0	0	200	0	0	12
	Sewer										
13	Public sewer	795,100	788,300	682,100	68,800	0	2,000	31,400	500	3,600	13
14	Septic tank/cesspool	158,200	165,100	148,800	9,100	0	0	7,000	0	300	14
15	Other	500	600	0	600	0	0	0	0	0	15
	Severe Problems										
16	Severe Problems	14,200	13,900	0	13,800	0	0	100	0	0	16
17	Plumbing	8,200	8,400	0	8,400	0	0	0	0	0	17
18	Heating	4,600	4,000	0	4,000	0	0	100	0	0	18
19	Electric	800	800	0	800	0	0	0	0	0	19
20	Upkeep	1,400	1,100	0	1,100	0	0	0	0	0	20
21	Hallways	0	0	0	0	0	0	0	0	0	21
	Moderate problems										
22	Moderate problems	29,800	28,600	1,700	25,900	0	0	300	0	800	22
23	Plumbing	1,400	1,400	0	1,400	0	0	0	0	0	23
24	Heating	1,000	1,400	0	1,400	0	0	0	0	0	24
25	Kitchen	11,500	11,300	0	10,500	0	0	300	0	600	25
26	Upkeep	15,800	18,200	1,100	16,900	0	0	0	0	300	26
27	Hallways	0	300	0	300	0	0	0	0	0	27

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 2004	D 04 units present in 95	E Changed in characteristics	G 04 mobile homes moved in	H 04 units derived from nonresidential use	I 04 units added through new construction	J 04 units added from temporary losses	K 04 units added by other means	
1	Occupied units	953,800	953,900	856,300	52,900	0	2,000	38,400	500	3,800	1
	Age of Householder										
2	Under 65	693,400	692,200	519,000	136,700	0	1,300	31,900	500	2,800	2
3	65 or older	260,400	261,700	157,900	95,600	0	700	6,500	0	1,000	3
	Children										
4	Some	279,000	280,600	147,900	114,700	0	500	17,100	0	500	4
5	None	674,900	673,300	483,700	163,000	0	1,500	21,300	500	3,300	5
	Race/Origin of Householder										
6	White	864,600	867,000	766,600	59,800	0	1,700	36,300	500	2,000	6
7	Hispanic	11,800	12,400	1,700	10,400	0	0	0	0	300	7
8	Non-Hispanic	852,700	854,600	752,800	61,500	0	1,700	36,300	500	1,800	8
9	Black	68,600	66,800	35,800	28,600	0	300	600	0	1,600	9
10	Other	20,800	20,200	3,400	15,100	0	0	1,400	0	300	10
11	Total Hispanics	13,800	14,300	2,000	11,800	0	300	0	0	300	11
	Income Source										
12	Wages and salaries	689,500	689,700	434,600	218,000	0	1,700	32,500	500	2,300	12
13	Welfare or SSI	338,900	339,600	214,000	113,000	0	1,200	10,000	0	1,300	13
14	Social security or pension	58,200	24,300	6,800	16,600	0	0	600	0	300	14

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

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

	A Characteristics	B Published Numbers	C Present in 2004	D 04 units present in 95	E Changed in characteristics	G 04 mobile homes moved in	H 04 units derived from nonresidential use	I 04 units added through new construction	J 04 units added from temporary losses	K 04 units added by other means	
1	Occupied units	953,800	953,900	856,300	52,900	0	2,000	38,400	500	3,800	1
	Tenure										
2	Owner occupied	705,800	705,800	613,000	57,900	0	500	33,600	200	500	2
3	Percent own occpd	74.0%	74.0%								3
4	Renter occupied	248,100	248,100	174,800	63,400	0	1,500	4,800	300	3,300	4
	Renter Monthly Housing Costs										
5	Less than \$350	46,700	48,200	32,000	14,200	0	0	1,300	0	800	5
6	\$350 to \$599	87,700	89,200	40,400	46,100	0	300	800	0	1,800	6
7	\$600 to \$799	60,400	60,600	10,500	48,400	0	300	1,300	300	0	7
8	\$800 to \$1,249	27,600	28,700	4,600	23,000	0	500	600	0	0	8
9	\$1,250 or more	6,200	6,100	0	5,100	0	300	800	0	0	9
10	No cash rent	19,300	15,200	3,700	10,200	0	300	200	0	800	10
	Renter Hsd Income										
11	Less than \$15,000	87,100	86,700	38,500	43,500	0	500	2,600	0	1,600	11
12	\$15,000 to \$29,999	66,100	66,100	15,100	49,500	0	500	500	0	500	12
13	\$30,000 to \$49,999	56,600	56,400	8,500	46,100	0	300	300	300	1,000	13
14	\$50,000 to \$99,999	31,300	32,000	3,400	27,600	0	0	700	0	300	14
15	\$100,000 or more	7,000	7,000	600	5,400	0	300	800	0	0	15
	Owner Monthly Housing Costs										
16	Less than \$350	170,000	144,100	94,000	47,100	0	0	2,700	0	200	16
17	\$350 to \$599	177,100	185,400	55,900	126,200	0	200	2,800	200	0	17
18	\$600 to \$799	87,000	83,800	12,400	69,500	0	0	1,800	0	0	18
19	\$800 to \$1,249	153,300	162,000	37,500	116,600	0	200	7,400	0	200	19
20	\$1,250 or more	118,400	130,500	34,400	77,300	0	0	18,900	0	0	20
	Owner Hsd Income										
21	Less than \$15,000	100,600	96,300	28,800	65,800	0	0	1,500	0	200	21
22	\$15,000 to \$29,999	132,000	130,200	49,400	78,500	0	0	2,400	0	0	22
23	\$30,000 to \$49,999	135,700	138,000	41,300	92,700	0	0	4,000	0	0	23
24	\$50,000 to \$99,999	216,500	218,500	71,800	133,800	0	500	11,800	200	200	24
25	\$100,000 or more	120,800	122,800	26,500	82,400	0	0	13,900	0	0	25

Changes in the Pittsburgh Housing Stock: 1995-2004

Forward-looking Table 5 looks at how losses affected certain portions of the Pittsburgh housing stock. The rows were selected because of their inherent interest or because an examination of losses in all 13 metropolitan areas showed that these categories typically had high loss rates. In most cases, if a category had a high loss rate, then a category with the opposite characteristic would have a low loss rate, e.g., units with 1-4 rooms and units with 10 or more rooms.

Forward-Looking Table 5: Selected Loss Rates

Category	Based on Columns in Tables 1-4		
	All Losses 1995-2004 (F+G+H+I+J+K)/C	Permanent Losses (I/C)	Potentially Reversible Losses (F+G+H+J+K)/C
All units ¹⁶	3.7%	2.1%	1.6%
Vacant units	12.5%	7.2%	5.3%
Units in structures with 2-4 units	6.2%	3.3%	3.0%
Units in structures with 5-9 units	11.5%	9.1%	2.4%
Mobile homes/trailers	7.9%	2.1%	5.9%
Units built 1930-1939	4.3%	3.2%	1.1%
Units built 1920-1929	5.7%	3.4%	2.2%
Units built in 1919 or earlier	5.0%	2.9%	2.2%
Units with 1-4 rooms	7.1%	3.8%	3.3%
Units with no bedrooms	6.5%	2.2%	4.3%
Units in central cities	7.9%	5.2%	2.7%
Units outside of central city	2.9%	1.5%	1.4%
Occupied units ¹⁷	2.9%	1.6%	1.2%
Units with severe problems	6.8%	1.7%	5.1%
Units with moderate problems	7.6%	7.6%	0.0%
Units with a White householder	2.3%	1.2%	1.1%
Units with a Black householder	9.8%	6.8%	3.0%
Units with Hispanic householder	6.1%	3.0%	3.0%
Household receives welfare/SSI	9.0%	6.6%	2.4%
Owner-occupied units	1.4%	0.8%	0.6%
Renter-occupied units	6.7%	3.8%	2.8%
Renter-occupied – monthly housing costs less than \$350	9.4%	6.2%	3.2%
Renter-occupied – household income less than \$15,000	9.1%	6.5%	2.6%

¹⁶ All the rows above “Occupied units” refer to portions of the entire housing stock.

¹⁷ All the rows below “Occupied units” refer to portions of the occupied housing stock.

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

By 2004, 3.7 percent of the units in the 1995 housing stock was no longer part of the housing stock; 2.1 percent were permanent losses—that is, the units had either been demolished or destroyed by fire or natural disasters—while 1.6 percent were lost in ways that could be reversed, such as nonresidential use.

Units that were vacant in 1995 had a loss rate more than 3 times greater than the overall loss rate. Units in small structures and mobile homes also had high loss rates. About three-quarters of the overall loss rate for mobile homes and trailers was potentially reversible. Units built prior to 1930 had high loss rates. Small units had higher loss rates. The central city loss rate was more than twice the loss rate in the rest of the metropolitan area.

Among units occupied in 1995, 2.9 percent were lost by 2004. The loss rate was higher for units with physical problems; all of the losses among those with moderate physical problems were permanent losses. The loss rates for units occupied by Black or Hispanic householders were substantially higher than the rate of those units occupied by White householders. Units with households on welfare or SSI had high loss rates.

The loss rate among rental units was almost 5 times the loss rate among owner-occupied units. Low-cost rental units and rental units occupied by the lowest income households had high loss rates.

Backward-looking Table 5 presents addition rates for selected areas of the Pittsburgh housing stock. The rows were selected because of their inherent interest or because an examination of additions in all 13 metropolitan areas showed that these categories typically had high addition rates. In most cases, if a category had a high addition rate, then a category with the opposite characteristic would have a low addition rate, e.g., units with 10 or more rooms and units with no bedrooms.

Of all the units in the Pittsburgh housing stock in 2004, 4.8 percent were not in the 1995 housing stock. Most of the new units came from new construction; the return to the housing stock of units that were not available in 1995 accounted for less than 1 percent of the total units in 2004.

Single units in attached structures had an addition rate that was substantially higher than average, while mobile homes and trailers had an addition rate only slightly higher than average. All the mobile home additions recorded by the AHS were newly manufactured units. Large units had high addition rates, based on high rates of new construction. Units with no bedrooms also had a high addition rate, but most of the additions came from sources other than new construction. The addition rate in central cities was less than 40 percent of the addition rate in the rest of the metropolitan area, while the rate of new construction in central cities was less than 20 percent of that in the rest of the metropolitan area.

New construction formed a higher proportion of the units occupied by White householders than the proportions occupied by Black or Hispanic householders. There

Components of Inventory Change and Rental Market Dynamics:
Pittsburgh 1995–2004

was a higher rate of additions among the owner-occupied stock than among the renter-occupied stock. The addition rates were high for owner-occupied units with monthly housing costs greater than \$1,250 and owner-occupied units with households with income of \$100,000 or more.

Backward-Looking Table 5: Selected Addition Rates

Category	Based on Columns in Tables 1-4		
	All Additions (G+H+I+J+K)/C	New Construction I/C	Other Additions G+H+J+K/C
All units ¹⁸	4.8%	3.9%	0.8%
Single-unit, attached structure	9.9%	8.7%	1.2%
Mobile homes/trailers	5.9%	5.9%	0.0%
Units with 9 rooms	11.3%	11.3%	0.0%
Units with 10 or more rooms	13.5%	12.5%	0.9%
Units with no bedrooms	11.6%	3.2%	8.4%
Units in central cities	2.0%	0.8%	1.2%
Units outside of central city	5.2%	4.5%	0.8%
Occupied units ¹⁹	4.7%	4.0%	0.7%
Units with a white householder	4.7%	4.2%	0.5%
Units with a Black householder	3.7%	0.9%	2.8%
Units with Hispanic householder	4.2%	0.0%	4.2%
Owner-occupied units	4.9%	4.8%	0.2%
Renter-occupied units	4.0%	1.9%	2.1%
Renter-occupied – monthly housing costs \$800 to \$1,249	3.8%	2.1%	1.7%
Owner-occupied – monthly housing costs \$1,250 or more	14.5%	14.5%	0.0%
Owner-occupied – household income \$100,000 or more	11.3%	11.3%	0.0%

Rental Market Dynamics

Tables A and B present the rental market dynamics analysis. Rental market dynamics differs from the analysis in rows 5-10 in the forward-looking and backward-looking tables in two ways. 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 A and B use the following seven categories:

¹⁸ All the rows above “Occupied units” refer to portions of the entire housing stock.

¹⁹ All the rows below “Occupied units” refer to portions of the occupied housing stock.

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Table A: Forward-Looking Rental Dynamics Analysis, Counts: 1995-2004

Affordability Groups	A Total in 1995	B Non- Market 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 or Extremely High Rent in 2004	I Owner Occupied in 2004	J Seasonal or Vacant in 2004	K Lost to Stock in 2004
Non-market	69,600	24,600	7,900	6,400	1,700	1,100	600	300	9,900	9,700	7,600
Extremely Low Rent	20,000	1,400	7,500	2,200	300	300	300	0	2,200	4,700	1,200
Very Low Rent	88,200	3,600	11,600	33,400	2,800	1,400	0	300	8,000	21,300	5,900
Low Rent	38,500	1,400	800	21,500	3,300	800	0	0	3,600	5,200	1,700
Moderate Rent	35,800	1,100	800	9,100	11,000	1,400	600	600	3,900	6,600	700
High Rent	13,500	0	0	600	1,400	3,600	1,900	1,100	2,200	2,200	500
Very or Extremely High Rent	4,700	0	0	0	300	600	300	300	2,800	300	200
Total	270,300	32,000	28,600	73,200	20,700	9,100	3,600	2,500	32,600	50,000	18,000

Table B: Backward-Looking Rental Dynamics Analysis, Counts: 2004-1995

Affordability Groups	A Total in 2004	B Non- Market in 1995	C Extremely Low Rent in 1995	D Very Low Rent in 1995	E Low Rent in 1995	F Moderate Rent in 1995	G High Rent in 1995	H Very or Extremely High Rent in 1995	I Owner Occupied in 1995	J Seasonal or Vacant in 1995	K New Construc- tion	L Other Additions
Non-market	47,300	25,300	1,400	3,700	1,400	1,100	0	0	9,700	3,100	400	1,100
Extremely Low Rent	39,900	8,100	7,700	11,900	900	900	0	0	3,100	4,800	1,500	1,000
Very Low Rent	101,500	6,500	2,300	34,400	22,200	9,400	600	0	10,800	13,100	500	1,800
Low Rent	30,500	1,700	300	2,800	3,400	11,400	1,400	300	4,000	3,400	1,000	800
Moderate Rent	17,600	1,100	300	1,400	900	1,400	3,700	600	5,100	2,300	600	300
High Rent	5,900	600	300	0	0	600	2,000	300	1,100	600	300	300
Very or Extremely High Rent	5,300	300	0	300	0	600	1,100	300	1,700	600	500	0
Total	248,100	43,700	12,200	54,600	28,700	25,300	8,800	1,400	35,600	27,900	4,800	5,100

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- Non-market (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).²⁰
- 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 or extremely high rent (monthly housing costs affordable to renters with incomes greater than 100 percent of local area median income).²¹

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

Table A shows that there were 270,300 rental units in the Pittsburgh metropolitan area in 1995. In 2004, 100,600 of those units were no longer rental; 32,600 were owner-occupied, 50,000 were either vacant or being used seasonally, and 18,000 had been lost to the stock. Taken as a proportion of the units in 1995, losses to the stock were highest among non-market units.

Table B shows there were 248,100 rental units in the Pittsburgh metropolitan area in 2004, of which 73,400 were not rental units in 1995. The new units came from units that had been owner-occupied (35,600), units that had been vacant or in seasonal use (27,900), newly constructed units (4,800), and other additions (5,100). Most of the formerly owner-occupied units went to the non-market and very low rent categories; most

²⁰ “Affordable” is defined as monthly housing costs less than or equal to 30 percent of the highest income in the category.

²¹ Ideally this final category would be two separate categories with a boundary of 120 percent of local area median income. However, the Census Bureau uses top coding of variables to prevent data users from being able to identify specific units. At the metropolitan area level, top coding of the variables used to calculate housing costs results in monthly housing costs never exceeding the 120-percent boundary in one or both years.

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of the limited amount of newly constructed rental units went to extremely low rent and low rent categories.

Looking at both tables, we see that the overall number of rental units declined by approximately 20,000 units. The number of extremely low rent and very low rent units increased by approximately 40,000 in 2004.

Tables A and B paint an interesting picture of the evolution of the rental market in Pittsburgh between 1995 and 2004. Overall, the number of rental units declined by over 8 percent, but the totals conceal considerable movement into and out of the rental market. The gross flows sum to almost 174,000 units. Tables A and B also show that there was considerable movement by individual units across the affordability categories. The net effect of the gross flows into and out of the rental stock and the movement across rental categories was a substantial increase in the number of units affordable to the lowest income renters despite the decline in the total number of rental units.

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) 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 (13-24) 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, exact equality was achieved prior to 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. Footnote 2 indicates where the CINCH weights or coding used for individual rows does not seem to produce the same results as the published estimates.

Appendix B – Weighting

CINCH separates the AHS samples in 1995 and 2004 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 2004 housing stock (LOSSES), and units that are not part of the 1995 housing stock but are part of the 2004 housing stock (ADDITIONS). ADDITIONS are segmented 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 2004.

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 owner-occupied units, renter-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 2004 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted counts in 2004 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 2004.

The logic behind the weighting and the procedures used to create the weights are explained in *Weighting Strategy for 2004 Metropolitan CINCH and Rental Dynamics Analysis*.