American Housing Survey

Components of Inventory Change And Rental Dynamics: Indianapolis 1996-2004

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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 Indianapolis metropolitan housing market over the period between 1996 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 1996 may have become a medical office in 1997 but returned to being a housing unit in 2000. CINCH would record this unit as having

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[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 1996 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 1996 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 1996 and units that were additions to the stock since 1996.

- Two tables and accompanying discussion that highlight interesting changes in the Indianapolis housing stock between 1996 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 1996 housing stock by 2004. There are three basic dispositions of 1996 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 1996. There are three basic sources of 2004 units: units that existed in 1996 with the same characteristics (or serving the same market),

units that existed in 1996 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 1996 AHS report for Indianapolis counted 592,000 occupied units (row 2, column B, forward-looking Table 1); the 2004 AHS report counted 657,600 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 (1996 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-

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[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 506,400 of the occupied units from 1996 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 70,200 units that were occupied in 1996 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 1996 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, 1,000 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, 200 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, 1,500 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, 6,800 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 Indianapolis, 1,700 occupied units were lost because of damage or similar cause.

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[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.

- 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 4,100 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 1996 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, 300 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 1996. Among occupied units, 900 had been nonresidential.

- Column I is the CINCH estimate of the number of units from column C that were newly constructed between 1996 and 2004. Among occupied units, 92,900 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 1996, or the interior of the unit was exposed to the elements, or for reasons "not classified." The 2004 occupied housing stock includes 1,200 recovered units.

- Column K includes units added by the Census Bureau as sample adjustments. Sample adjustments represent no occupied units in 2004.

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[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. 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. In Indianapolis, units in structures with 50 or more units are listed in row 10 instead of row 11 in forward-looking Table 1 because of suppression.

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 the same categories in Backward-Looking Table 1 but uses 1990-1996 for row 15 in Forward-Looking Table 1.[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 and, depending on the metropolitan area, the Census Bureau may suppress information, forcing some rows to be zero. For the 1996 Indianapolis AHS public use file, the Census Bureau reported all units in structures with 4 or more stories in row 40 and reported no units in rows 41 and 42. The published reports contain matching data for row 37 only.

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[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 1996 housing stock cannot contain units built after 1996.

[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.

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.

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 1996 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 1996 and 2004.

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[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.

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.

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]

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[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.

[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.

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**	640,800	640,700	619,700	0	2,000	300	1,900	8,800	2,700	5,400	1
	Occupancy Status											
2	Occupied	592,000	591,900	506,400	70,200	1,000	200	1,500	6,800	1,700	4,100	2
3	Vacant	47,300	47,300	13,700	28,200	1,000	200	300	2,000	1,000	900	3
4	Seasonal	1,500	1,500	0	1,200	0	0	0	0	0	300	4
	Units in Structure											
5	1, detached	425,200	433,300	426,900	0	0	0	700	3,600	1,400	900	5
6	1, attached	45,300	45,000	43,600	0	200	0	0	800	0	400	6
7	2 to 4	50,000	50,300	46,100	0	800	0	200	2,500	200	500	7
8	5 to 9	44,800	45,300	43,700	0	300	0	0	500	700	200	8
9	10 to 19	26,600	25,900	24,800	0	200	0	200	700	0	200	9
10	20 to 49	9,200	22,200	19,300	0	500	0	700	300	500	800	10
11	50 or more	13,900	0	0	0	0	0	0	0	0	0	11
12	Mobile Home/Trailer	25,800	18,600	15,300	0	0	300	200	300	0	2,400	12
	Year Built											
15	1990-1996	70,000	68,000	66,900	0	0	0	0	200	0	1,000	15
16	1985-1989	47,500	47,500	46,500	0	0	0	0	0	200	900	16
17	1980-1984	32,200	30,700	30,000	0	0	0	500	0	0	200	17
18	1970-1979	146,200	144,700	140,700	0	300	200	500	1,900	0	1,000	18
19	1960-1969	107,200	108,300	105,800	0	300	200	200	500	500	800	19
20	1950-1959	76,800	78,300	76,800	0	0	0	0	900	500	200	20
21	1940-1949	45,200	46,300	44,300	0	200	0	200	1,000	300	300	21
22	1930-1939	26,000	25,700	23,600	0	0	0	0	1,500	200	400	22
23	1920-1929	29,800	29,000	27,800	0	200	0	200	200	200	500	23
24	1919 or earlier	59,700	62,200	57,200	0	1,000	0	300	2,700	800	200	24

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	168,500	166,900	116,600	38,600	2,000	300	1,200	4,000	1,200	3,000	25
26	5 rooms	150,700	149,400	75,200	69,500	0	0	200	2,500	700	1,400	26
27	6 rooms	132,100	132,300	59,600	70,100	0	0	200	1,200	500	700	27
28	7 rooms	82,600	85,600	30,500	54,300	0	0	200	300	200	200	28
29	8 rooms	57,800	58,000	20,800	36,800	0	0	0	200	200	0	29
30	9 rooms	29,500	29,700	6,700	22,700	0	0	0	200	0	200	30
31	10 rooms or more	19,500	18,800	6,700	11,600	0	0	200	300	0	0	31
	Bedrooms											
32	None	9,000	7,700	3,700	2,500	200	0	200	700	0	500	32
33	1	79,200	80,000	61,600	11,700	1,700	0	700	2,000	1,000	1,300	33
34	2	195,600	195,000	151,800	35,800	200	300	700	3,200	700	2,300	34
35	3	260,500	261,400	214,500	42,700	0	0	300	1,900	800	1,000	35
36	4 or more	96,400	96,600	75,500	19,800	0	0	0	1,000	200	200	36
37	**Multiunit Structures**	144,500	143,700	133,800	0	1,800	0	1,000	4,000	1,300	1,700	37
	Stories in Structures											
38	1	NA	11,000	10,500	0	0	0	0	0	200	300	38
39	2	NA	80,200	77,200	0	500	0	0	2,200	0	300	39
40	3	NA	52,500	46,100	0	1,300	0	1,000	1,800	1,200	1,000	40
41	4 to 6	NA	0	0	0	0	0	0	0	0	0	41
42	7 or more	NA	0	0	0	0	0	0	0	0	0	42
	Metro Status											
43	In central cities	NA	319,700	307,700	0	1,700	0	1,300	4,200	2,000	2,900	43
44	In suburbs	NA	321,000	312,000	0	300	300	500	4,600	700	2,500	44
	Mover Status											
45	Moved in last 2 years	NA	141,500	45,800	90,000	500	0	200	2,700	500	1,700	45
46	Not a Recent Mover	NA	450,400	440,700	0	500	200	1,400	4,100	1,200	2,400	46

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**	592,000	591,900	506,400	70,200	1,000	200	1,500	6,800	1,700	4,100	1
	Kitchen											
2	With complete kitchen	586,700	587,300	496,100	76,100	1,000	200	1,500	6,800	1,700	3,900	2
3	Lacking complete kitchen facilities	5,200	4,600	0	4,400	0	0	0	0	0	200	3
	Plumbing											
4	With all plumbing facilities	588,100	586,900	498,200	73,700	1,000	200	1,500	6,500	1,700	4,100	4
5	Lack some plumbing	300	5,000	200	4,500	0	0	0	300	0	0	5
6	No hot piped water	0	0	0	0	0	0	0	0	0	0	6
7	No bathtub/shower	300	300	0	0	0	0	0	300	0	0	7
8	No flush toilet	3,600	5,000	0	4,600	0	0	0	300	0	0	8
	Water											
10	Public/private water	486,200	474,300	395,800	66,100	1,000	0	1,400	4,600	1,700	3,800	10
11	Well	105,000	117,000	92,100	22,200	0	0	200	2,200	0	300	11
12	Other water source	700	500	200	200	0	200	0	0	0	0	12
	Sewer											
13	Public sewer	473,700	464,600	385,000	67,000	1,000	0	1,400	4,700	1,700	3,800	13
14	Septic tank/cesspool	118,200	127,300	101,500	23,100	0	200	200	2,000	0	300	14
15	Other or none	0	0	0	0	0	0	0	0	0	0	15
16	**Severe Problems**	7,000	8,300	200	7,600	0	0	0	300	200	0	16
17	Plumbing	3,900	5,000	200	4,500	0	0	0	300	0	0	17
18	Heating	2,500	2,800	0	2,600	0	0	0	0	200	0	18
19	Electric	100	200	0	200	0	0	0	0	0	0	19
20	Upkeep	600	400	0	400	0	0	0	0	0	0	20
21	Hallways	0	0	0	0	0	0	0	0	0	0	21
22	**Moderate problems**	17,400	18,600	600	17,200	200	0	0	300	200	200	22
23	Plumbing	2,000	3,100	0	3,100	0	0	0	0	0	0	23
24	Heating	400	700	0	700	0	0	0	0	0	0	24
25	Kitchen	4,600	4,600	0	4,400	0	0	0	0	0	200	25
26	Upkeep	11,400	12,500	400	11,400	200	0	0	300	200	0	26
27	Hallways	0	0	0	0	0	0	0	0	0	0	27

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**	592,000	591,900	506,400	70,200	1,000	200	1,500	6,800	1,700	4,100	1
	Age of Householder											
2	Under 65	484,100	484,300	365,100	107,000	800	200	700	5,900	1,400	3,300	2
3	65 or older	107,800	107,600	58,100	46,400	200	0	900	900	300	900	3
	Children											
4	Some	220,700	220,000	103,400	111,000	200	0	0	3,400	700	1,400	4
5	None	371,200	371,900	254,700	107,500	800	200	1,500	3,400	1,000	2,700	5
	Race/Origin of Householder											
6	White	512,400	510,600	409,400	89,300	300	200	1,200	5,100	1,200	3,900	6
7	Hispanic	5,200	5,400	900	4,300	0	0	0	200	0	0	7
8	NonHispanic	507,300	505,300	389,800	103,700	300	200	1,200	4,900	1,200	3,900	8
9	Black	70,200	71,400	39,400	28,900	700	0	300	1,400	500	200	9
10	Other	9,300	9,900	1,700	7,900	0	0	0	300	0	0	10
11	Total Hispanics	7,700	7,900	1,700	5,700	0	0	0	500	0	0	11
	Income Source											
12	Wages and salaries	475,000	475,800	357,200	106,800	700	200	700	5,400	1,400	3,400	12
13	Welfare or SSI	155,400	154,900	85,200	66,200	200	0	1,000	1,200	300	700	13
14	Social security or pension	24,500	25,200	1,100	21,900	300	0	200	1,400	300	0	14

Components of Inventory Change and Rental Market Dynamics: Indianapolis 1996–2004

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**	592,000	591,900	506,400	70,200	1,000	200	1,500	6,800	1,700	4,100	1
	Tenure											
2	Owner occupied	398,300	398,300	336,900	55,500	0	200	500	1,900	700	2,600	2
3	Percent own occpd	67.3%	67.3%									3
4	Renter occupied	193,600	193,600	121,000	63,100	1,000	0	1,000	4,900	1,000	1,500	4
	Renter Monthly Housing Costs											
5	Less than $350	29,200	32,000	7,600	19,900	700	0	200	2,500	1,000	0	5
6	$350 to $599	102,000	100,800	39,900	58,200	300	0	200	1,200	0	1,000	6
7	$600 to $799	40,000	40,900	17,100	22,700	0	0	300	700	0	200	7
8	$800 to $1,249	11,700	11,500	3,500	7,700	0	0	300	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	9,400	8,400	900	6,700	0	0	0	500	0	300	10
	Renter Hsd Income											
11	Less than $15,000	50,400	52,200	13,400	34,200	800	0	300	2,200	800	300	11
12	$15,000 to $29,999	64,800	63,200	15,200	44,600	200	0	300	2,000	200	700	12
13	$30,000 to $49,999	51,000	50,600	8,800	41,000	0	0	300	300	0	200	13
14	$50,000 to $99,999	24,600	25,400	5,700	19,100	0	0	0	300	0	300	14
15	$100,000 or more	2,800	2,200	0	2,200	0	0	0	0	0	0	15
	Owner Monthly Housing Costs											
16	Less than $350	116,100	119,100	46,100	71,900	0	200	200	500	0	200	16
17	$350 to $599	82,300	82,700	19,000	61,000	0	0	0	500	300	1,900	17
18	$600 to $799	59,800	59,700	10,500	47,800	0	0	0	700	200	500	18
19	$800 to $1,249	95,700	94,100	36,400	57,200	0	0	200	200	200	0	19
20	$1,250 or more	44,500	42,800	24,800	17,800	0	0	200	0	0	0	20
	Owner Hsd Income											
21	Less than $15,000	37,500	35,900	9,700	24,900	0	0	200	0	0	1,000	21
22	$15,000 to $29,999	75,100	73,900	15,900	56,800	0	200	0	500	0	500	22
23	$30,000 to $49,999	99,300	100,300	23,500	75,300	0	0	0	300	300	900	23
24	$50,000 to $99,999	138,500	140,600	58,000	81,300	0	0	200	900	200	200	24
25	$100,000 or more	47,900	47,600	21,000	26,100	0	0	200	200	200	0	25

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**	744,900	745,000	641,200	0	300	1,200	100,400	1,800	100	1
	Occupancy Status										
2	Occupied	657,600	657,700	531,600	30,800	300	900	92,900	1,200	0	2
3	Vacant	86,100	86,100	13,200	64,500	0	300	7,500	500	100	3
4	Seasonal	1,200	1,200	0	1,100	0	0	100	0	0	4
	Units in Structure										
5	1, detached	520,200	526,300	446,600	0	0	400	78,000	1,100	100	5
6	1, attached	38,800	38,900	31,800	0	0	0	6,900	100	0	6
7	2 to 4	43,300	44,300	42,300	0	0	300	1,500	300	0	7
8	5 to 9	49,900	50,300	46,400	0	0	100	3,700	0	0	8
9	10 to 19	37,200	36,900	31,600	0	0	0	5,200	0	0	9
10	20 to 49	16,800	16,400	12,800	0	0	100	3,200	300	0	10
11	50 or more	11,400	11,500	10,500	0	0	100	900	0	0	11
12	Mobile Home/Trailer	27,300	20,400	19,200	0	300	0	900	0	0	12
	Year Built										
13	2000-2004	80,200	65,600	3,100	0	0	100	62,400	0	0	13
14	1995-1999	67,200	58,800	23,800	0	0	300	34,600	200	0	14
15	1990-1994	58,300	58,400	55,000	0	0	0	3,100	300	0	15
16	1985-1989	51,700	52,500	52,200	0	0	100	0	200	0	16
17	1980-1984	31,900	33,000	32,700	0	200	0	100	0	0	17
18	1970-1979	109,700	112,900	112,500	0	200	100	0	100	0	18
19	1960-1969	110,800	114,700	114,300	0	0	0	100	300	0	19
20	1950-1959	77,800	81,800	81,800	0	0	0	0	0	0	20
21	1940-1949	46,900	49,000	48,700	0	0	0	0	100	100	21
22	1930-1939	26,000	27,500	27,400	0	0	0	0	100	0	22
23	1920-1929	30,400	32,500	32,100	0	0	300	0	100	0	23
24	1919 or earlier	54,200	58,200	57,700	0	0	100	0	300	0	24

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	178,700	176,600	118,200	43,500	0	900	13,700	400	0	25
26	5 rooms	178,400	179,300	77,500	79,100	300	0	22,000	200	100	26
27	6 rooms	152,100	152,900	62,400	72,100	0	200	17,700	400	0	27
28	7 rooms	101,300	103,000	31,900	54,400	0	200	16,400	200	0	28
29	8 rooms	67,700	67,500	22,000	30,900	0	0	14,400	200	0	29
30	9 rooms	33,000	32,400	7,000	17,200	0	0	8,100	100	0	30
31	10 rooms or more	33,800	33,400	7,100	17,900	0	0	8,100	300	0	31
	Bedrooms										
32	None	6,200	6,500	3,600	2,300	0	0	400	100	0	32
33	1	79,500	79,800	62,300	11,400	0	400	5,400	300	0	33
34	2	205,500	204,700	155,500	31,700	200	400	16,800	200	0	34
35	3	314,500	316,400	224,600	44,200	200	300	46,600	400	100	35
36	4 or more	139,300	137,600	79,300	26,300	0	0	31,300	700	0	36
37	**Multiunit Structures**	158,600	159,500	143,600	0	0	700	14,600	600	0	37
	Stories in Structures										
38	1	NA	18,200	16,800	0	0	0	1,500	0	0	38
39	2	NA	97,000	87,800	0	0	300	8,600	300	0	39
40	3	NA	37,100	32,300	0	0	100	4,300	300	0	40
41	4 to 6	NA	4,300	4,000	0	0	300	0	0	0	41
42	7 or more	NA	2,900	2,700	0	0	0	100	0	0	42
	Metro Status										
43	In central cities	NA	364,800	335,100	0	0	900	27,400	1,300	0	43
44	In suburbs	NA	380,200	306,000	0	300	300	73,000	400	100	44
	Mover Status										
45	Moved in last 2 years	NA	160,900	40,500	83,700	0	400	35,600	600	0	45
46	Not a Recent Mover	NA	496,800	338,600	99,600	300	500	57,200	600	0	46

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**	657,600	657,700	531,600	30,800	300	900	92,900	1,200	0	1
	Kitchen										
2	With complete kitchen	649,000	648,700	520,800	33,000	300	900	92,400	1,200	0	2
3	Lacking complete kitchen facilities	8,700	9,000	0	8,600	0	0	400	0	0	3
	Plumbing										
4	With all plumbing facilities	652,800	652,500	523,000	34,300	300	900	92,800	1,200	0	4
5	Lack some plumbing	4,900	5,200	200	4,800	0	0	100	0	0	5
6	No hot piped water	1,400	1,600	0	1,600	0	0	0	0	0	6
7	No bathtub/shower	500	600	0	600	0	0	0	0	0	7
8	No flush toilet	500	600	0	600	0	0	0	0	0	8
9	No exclusive use	3,500	3,600	0	3,500	0	0	100	0	0	9
	Water										
10	Public/private water	568,700	548,500	414,700	44,700	300	900	87,000	900	0	10
11	Well	88,000	108,100	97,300	4,700	0	0	5,700	300	0	11
12	Other water source	900	1,100	200	800	0	0	100	0	0	12
	Sewer										
13	Public sewer	543,600	536,400	403,400	44,600	300	900	86,000	1,200	0	13
14	Septic tank/cesspool	113,700	120,900	107,300	6,800	0	0	6,800	0	0	14
15	Other	300	400	0	400	0	0	0	0	0	15
16	**Severe Problems**	7,100	7,400	200	7,000	0	0	300	0	0	16
17	Plumbing	4,900	5,200	200	4,800	0	0	100	0	0	17
18	Heating	2,200	2,300	0	2,100	0	0	100	0	0	18
19	Electric	200	200	0	200	0	0	0	0	0	19
20	Upkeep	0	0	0	0	0	0	0	0	0	20
21	Hallways	0	0	0	0	0	0	0	0	0	21
22	**Moderate problems**	17,900	18,400	600	16,500	0	0	1,200	0	0	22
23	Plumbing	2,800	3,000	0	2,900	0	0	100	0	0	23
24	Heating	400	800	0	800	0	0	0	0	0	24
25	Kitchen	8,000	9,000	0	8,600	0	0	400	0	0	25
26	Upkeep	7,600	8,200	400	7,200	0	0	700	0	0	26
27	Hallways	500	800	0	800	0	0	0	0	0	27

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**	657,600	657,700	531,600	30,800	300	900	92,900	1,200	0	1
	Age of Householder										
2	Under 65	532,300	529,100	382,900	60,800	200	600	83,400	1,200	0	2
3	65 or older	125,300	128,600	61,100	57,500	200	300	9,400	0	0	3
	Children										
4	Some	231,700	228,900	108,500	74,700	0	0	44,900	800	0	4
5	None	425,900	428,800	267,300	111,900	300	900	47,900	500	0	5
	Race/Origin of Householder										
6	White	553,200	552,100	430,600	38,800	300	900	80,800	800	0	6
7	Hispanic	27,400	27,200	1,000	22,100	0	100	4,000	0	0	7
8	Non-Hispanic	525,800	524,900	410,100	36,200	300	800	76,800	800	0	8
9	Black	83,000	84,400	41,200	34,200	0	0	8,500	500	0	9
10	Other	21,500	21,200	1,800	15,800	0	0	3,600	0	0	10
11	Total Hispanics	31,500	31,100	1,800	24,900	0	100	4,300	0	0	11
	Income Source										
12	Wages and salaries	535,800	533,600	347,900	100,800	0	300	83,600	1,100	0	12
13	Welfare or SSI	170,400	175,200	89,800	71,400	300	300	13,400	0	0	13
14	Social security or pension	34,500	12,700	1,100	11,300	0	0	300	0	0	14

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**	657,600	657,700	531,600	30,800	300	900	92,900	1,200	0	1
	Tenure										
2	Owner occupied	469,800	469,800	356,900	34,300	300	300	77,200	800	0	2
3	Percent own occpd	71.4%	71.4%								3
4	Renter occupied	187,900	187,900	124,300	46,900	0	600	15,700	400	0	4
	Renter Monthly Housing Costs										
5	Less than $350	14,400	15,700	7,800	6,800	0	100	1,000	0	0	5
6	$350 to $599	63,700	65,000	41,000	22,500	0	100	1,200	100	0	6
7	$600 to $799	59,400	60,100	17,500	37,300	0	100	4,800	300	0	7
8	$800 to $1,249	36,200	34,900	3,600	24,900	0	0	6,400	0	0	8
9	$1,250 or more	5,800	6,200	0	4,700	0	100	1,400	0	0	9
10	No cash rent	8,300	5,900	900	4,100	0	0	900	0	0	10
	Renter Hsd Income										
11	Less than $15,000	48,300	49,400	13,800	32,500	0	100	2,700	300	0	11
12	$15,000 to $29,999	55,900	55,800	15,600	38,000	0	100	2,100	0	0	12
13	$30,000 to $49,999	44,300	44,500	9,000	30,600	0	100	4,800	0	0	13
14	$50,000 to $99,999	34,200	33,000	5,800	22,200	0	0	4,900	100	0	14
15	$100,000 or more	5,300	5,200	0	3,800	0	100	1,300	0	0	15
	Owner Monthly Housing Costs										
16	Less than $350	98,000	91,900	48,800	35,300	0	0	7,300	500	0	16
17	$350 to $599	77,300	77,600	20,100	51,200	200	0	6,100	0	0	17
18	$600 to $799	55,300	57,000	11,100	41,100	200	0	4,500	200	0	18
19	$800 to $1,249	137,400	133,500	38,500	69,800	0	200	25,100	0	0	19
20	$1,250 or more	101,700	109,800	26,200	49,000	0	200	34,200	200	0	20
	Owner Hsd Income										
21	Less than $15,000	39,900	40,100	10,300	26,400	200	200	2,800	300	0	21
22	$15,000 to $29,999	60,900	60,900	16,800	38,800	0	0	5,200	0	0	22
23	$30,000 to $49,999	92,100	92,900	24,900	56,200	0	0	11,800	0	0	23
24	$50,000 to $99,999	176,000	175,600	61,400	81,900	0	200	31,800	300	0	24
25	$100,000 or more	100,900	100,300	22,200	52,300	200	0	25,500	200	0	25

Changes in the Indianapolis Housing Stock: 1996-2004

Forward-looking Table 5 looks at how losses affected certain portions of the Indianapolis 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 1996-2004 (F+G+H+I+J+K)/C	**Permanent Losses** (I/C)	**Potentially Reversible Losses** (F+G+H+J+K)/C
All units[16]	3.3%	1.4%	1.9%
Vacant units	11.4%	4.2%	7.2%
Units in structures with 2-4 units	8.3%	5.0%	3.4%
Units in structures with 5-9 units	3.8%	1.1%	2.6%
Mobile homes/trailers	17.2%	1.6%	15.6%
Units built 1930-1939	8.2%	5.8%	2.3%
Units built 1920-1929	4.5%	0.7%	3.8%
Units built in 1919 or earlier	8.0%	4.3%	3.7%
Units with 1-4 rooms	7.0%	2.4%	4.6%
Units with no bedrooms	20.8%	9.1%	11.7%
Units in central cities	3.8%	1.3%	2.5%
Units outside of central city	2.8%	1.4%	1.3%
Occupied units[17]	2.6%	1.1%	1.4%
Units with severe problems	6.0%	3.6%	2.4%
Units with moderate problems	4.8%	1.6%	3.2%
Units with a White householder	2.3%	1.0%	1.3%
Units with a Black householder	4.3%	2.0%	2.4%
Units with Hispanic householder	6.3%	6.3%	0.0%
Household receives welfare/SSI	8.7%	5.6%	3.2%
Owner-occupied units	1.5%	0.5%	1.0%
Renter-occupied units	4.9%	2.5%	2.3%
Renter-occupied – monthly housing costs less than $350	13.8%	7.8%	5.9%
Renter-occupied – household income less than $15,000	8.4%	4.2%	4.2%

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[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.

By 2004, 3.3 percent of the units in the 1996 housing stock were no longer part of the
housing stock; 1.4 percent were permanent losses—that is, the units had either been
demolished or destroyed by fire or natural disasters—while 1.9 percent were lost in ways
that could be reversed, such as nonresidential use.

Units that were vacant in 1996 had a loss rate more than 3 times greater than the overall
loss rate. Units in small structures and mobile homes also had higher than average loss
rates. Units built prior to 1940 had higher than average loss rates, particularly units built
between 1930 and 1939 and units built in 1919 or earlier. Small units, especially units
with no bedrooms, had higher than average loss rates. The central city loss rate was
greater than the loss rate in the rest of the metropolitan area.

Among units occupied in 1996, 2.6 percent were lost by 2004. The loss rate was higher
for units with physical problems, particularly units with severe physical problems. The
loss rate for units occupied by Black householders was greater than the loss rate of those
occupied by White householders. Units with households on welfare or SSI had high loss
rates.

The loss rate among rental units was more than 3 times the loss rate among owner-
occupied units. Rental units occupied by the lowest income households had high loss
rates.

Backward-looking Table 5 presents addition rates for selected areas of the Indianapolis
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 Indianapolis housing stock in 2004, 13.9 percent were not in the
1996 housing stock. Most of the new units came from new construction; the return to the
housing stock of units that were not available in 1996 accounted for less than 1 percent of
the total units in 2004.

Single units in attached structures had a higher than average addition rate, but mobile
homes had a below average addition rate. Large units had higher than average addition
rates, while units with no bedrooms had a lower than average addition rate. The addition
rate among units outside of the central city was more than twice the addition rate of units
in the central city.

The rate of new construction was substantially higher outside of the central city than in
the central city and among owner-occupied units than among renter-occupied units.
Units occupied by White householders accounted for 80,800 of the 92,900 newly
constructed units. The addition rates were higher than average for renter-occupied units
with monthly housing costs between $800 and $1,249, 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]	13.9%	13.5%	0.5%
Single-unit, attached structure	18.0%	17.7%	0.3%
Mobile homes/trailers	5.9%	4.4%	1.5%
Units with 9 rooms	25.3%	25.0%	0.3%
Units with 10 or more rooms	25.1%	24.3%	0.9%
Units with no bedrooms	7.7%	6.2%	1.5%
Units in central cities	8.1%	7.5%	0.6%
Units outside of central city	19.5%	19.2%	0.3%
Occupied units[19]	14.5%	14.1%	0.4%
Units with a white householder	15.0%	14.6%	0.4%
Units with a Black householder	10.7%	10.1%	0.6%
Units with Hispanic householder	14.1%	13.8%	0.3%
Owner-occupied units	16.7%	16.4%	0.3%
Renter-occupied units	8.9%	8.4%	0.5%
Renter-occupied – monthly housing costs $800 to $1,249	18.3%	18.3%	0.0%
Owner-occupied – monthly housing costs $1,250 or more	31.5%	31.1%	0.4%
Owner-occupied – household income $100,000 or more	25.8%	25.4%	0.4%

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 six categories:

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[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.

Components of Inventory Change and Rental Market Dynamics:
Indianapolis 1996–2004

Table A: Forward-Looking Rental Dynamics Analysis, Counts: 1996-2004

Affordability Groups	A Total in 1996	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, Very High, 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	23,300	5,600	3,700	2,600	900	500	0	3,100	4,600	2,400
Extremely Low Rent	20,400	400	5,700	3,700	400	700	0	2,400	4,400	2,900
Very Low Rent	93,500	3,800	11,300	45,700	2,600	700	200	7,500	19,000	2,500
Low Rent	31,300	200	700	15,600	1,800	700	700	3,500	7,300	700
Moderate Rent	23,500	0	200	5,100	4,400	1,800	900	3,700	6,400	1,000
High, Very High, or Extremely High Rent	1,600	0	0	0	200	200	0	700	500	0
Total	193,600	10,000	21,600	72,700	10,200	4,700	1,800	20,900	42,300	9,500

Table B: Backward-Looking Rental Dynamics Analysis, Counts: 2004-1996

Affordability Groups	A Total in 2004	B Non-Market in 1996	C Extremely Low Rent in 1996	D Very Low Rent in 1996	E Low Rent in 1996	F Moderate Rent in 1996	G High, Very High, or Extremely High Rent in 1996	I Owner Occupied in 1996	J Seasonal or Vacant in 1996	K New Construc-tion	L Other Additions
Non-market	17,800	5,800	400	3,900	200	0	0	3,800	1,900	1,800	0
Extremely Low Rent	29,100	3,800	5,800	11,600	800	200	0	2,300	3,600	700	400
Very Low Rent	100,900	2,600	3,800	47,000	16,000	5,300	0	9,400	10,900	5,500	400
Low Rent	22,200	900	400	2,600	1,900	4,500	200	5,600	1,700	4,400	0
Moderate Rent	12,200	500	800	800	800	1,900	200	4,900	600	1,900	0
High, Very High, or Extremely High Rent	5,800	0	0	200	800	900	0	1,800	600	1,400	100
Total	187,900	13,600	11,100	66,100	20,300	12,800	400	27,800	19,100	15,700	1,000

- 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, very high rent, or extremely high rent (monthly housing costs affordable to renters with incomes greater than 80 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 G 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 193,600 rental units in the Indianapolis metropolitan area in 1996. In 2004, 72,700 of those units were no longer rental; 20,900 were owner-occupied, 42,300 were either vacant or being used seasonally, and 9,500 had been lost to the stock.   Taken as a proportion of the units in 1996, movement into owner-occupancy was fairly even across the different affordability categories. Losses to the stock were highest among non-market units and extremely low rent units.

Table B shows there were 187,900 rental units in the Indianapolis metropolitan area in 2004, of which 63,600 were not rental units in 1996. The new units came from units that had been owner-occupied (27,800), units that had been vacant or in seasonal use (19,100), newly constructed units (15,700), and other additions (1,000).   The majority of the formerly owner-occupied units went to the very low rent and low rent categories; most of the newly constructed units also went to the very low rent and low rent categories.

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[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.

Looking at both tables, we see that the overall number of rental units decreased by approximately 5,000 units. The number of extremely low rent and very low rent units combined grew from approximately 115,000 in 1996 to 130,000 in 2004.

Tables A and B paint an interesting picture of the evolution of the rental market in Indianapolis between 1996 and 2004. Overall, the number of rental units decreased by approximately 5 percent. The totals conceal considerable movement into and out of the rental market; the gross flows sum to over 136,000 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 affordability categories was a substantial increase in the number of units affordable to the lowest income renters.

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 though 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 1996 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 1996 housing stock but are not part of the 2004 housing stock (LOSSES), and units that are not part of the 1996 housing stock but are part of the 2004 housing stock (ADDITIONS). ADDITIONS are segmented into NEW CONSTRUCTION and RECOVERIES (structures that existed in 1996 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 1996 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 1996 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted count in 1996 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 1996.

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*.