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American Housing Survey

Components of Inventory Change and Rental Dynamics: Baltimore 1998-2007

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American Housing Survey

**Components of Inventory Change
and Rental Dynamics:
Baltimore 1998–2007**

Prepared for:
U.S. Department of Housing & Urban Development
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Prepared by:
Frederick J. Eggers & Fouad Mouden
Econometrica, Inc.
Bethesda, Maryland

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Components of Inventory Change and Rental Market Dynamics: Baltimore 1998–2007

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?”¹

This report focuses on the Baltimore metropolitan housing market over the period between 1998 and 2007. It is one of seven reports based on local American Housing Surveys (AHS) conducted in 2007; these seven metropolitan areas were previously surveyed in either 1998 or 2002.

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 using 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 1998 may have become a medical office in 2003 but returned to being a housing unit in 2006. CINCH would record this unit as having undergone no change over the period from 1998 to 2007. In research jargon, CINCH and rental market dynamics are *comparative static* analyses.

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

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

The remainder of this report consists of five sections:

- A discussion of some data issues that complicate the 1998–2007 comparisons for the Baltimore metropolitan area.
- An explanation of how to read the CINCH tables.
- Two sets of four tables each: a set of forward-looking tables tracing the movement of units from 1998 to 2007 and identifying how units were lost to the housing stock, and a set of backward-looking tables tracing where 2007 units came from and distinguishing between units that were part of the stock in 1998 and units that were additions to the stock since 1998.
- Two tables, and accompanying discussion, that highlight interesting changes in the Baltimore housing stock between 1998 and 2007.
- A brief discussion of the rental market dynamics results, using CINCH-like tables.

There are two appendices:

- Appendix A explains how the results were tested.
- Appendix B explains how the weights were created.

Data Issues Affecting the Analyses

The AHS underwent three changes between 1998 and 2007 that complicate the CINCH and rental dynamics analyses in this paper:

- In 2007, the U.S. Department of Housing and Urban Development (HUD) reduced the sample sizes of both the national and metropolitan AHS surveys because of its reduced research budget. In 1998, the AHS sample for Baltimore contained 4,741 housing units; the 2007 sample contained only 2,733 housing units.
- In 2005, the Census Bureau replaced approximately half of the manufactured housing units (mobile homes) in the AHS samples—both national and metropolitan—with newly sampled units to improve the coverage of mobile homes constructed before 2000.
- In the 1998 survey for Baltimore, units that should have been classified as “renter occupied” were coded as either “vacant for rent” or “other vacant,” with most probably being classified as “vacant for rent.” Because the problem occurred during data collection, the Census Bureau could not correct the error, as would be possible if this had

been a processing error. The Census Bureau believes that the extent of the misclassification is large, because the 1998 AHS rental vacancy rate for the Baltimore Central City was 29.3 percent compared with a 1998 Housing Vacancy Survey rate of 3.8 percent and a Census 2000 rate of 7.6 percent. The error affects only units that were rental in 1998. The effect on the CINCH estimates will be overestimates of vacant units in 1998 and an overestimate of the movement out of vacant units between 1998 and 2007. It is not clear how this problem will affect the rental dynamics analysis, because the techniques used for this analysis lumps together renter-occupied units and units vacant for rent.

The small sample sizes, particularly the paucity of mobile homes, limited the extent to which the weighting algorithms could be controlled to published counts of important segments of the Baltimore housing stock. In particular, comparisons between forward-looking estimates and counts published in the 1998 AHS report are much less accurate than similar comparisons between estimates based on the backward-looking weights and counts published in the 2007 AHS report. Additionally, these limitations resulted in particularly poor estimates involving the mobile home component of the housing stock.

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 1998 housing stock by 2007. There are three basic dispositions of 1998 units: (1) units that continue to exist in 2007 with the same characteristics (or serving the same market); (2) units that continue to exist in 2007, but with different characteristics (or serving a different market); or (3) units that were lost to the stock.

The backward-looking tables are concerned with where the 2007 housing stock came from in reference to 1998. There are three basic sources of 2007 units: (1) units that existed in 1998 with the same characteristics (or serving the same market); (2) units that existed in 1998 but with different characteristics (or serving a different market); or (3) 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 Forward-Looking Table 1 focuses on occupied units; row 15 focuses on units built in 1995 through 2000.
- 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 1998 AHS report for Baltimore counted 920,100 occupied units (row 2, column B, Forward-Looking Table 1); the 2007 AHS report counted 1,012,300 occupied units (row 2, column B, Backward-Looking Table 1).²
- 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 (1998 for the forward-looking tables and 2007 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.³
- Column D is the CINCH estimate of the number of units from column C that (a) are also part of the housing stock in the *other* year, and (b) continue to belong to the subset defined by column A. For example, column D of row 2 of Forward-Looking Table 1 estimates that 828,300 of the occupied units from 1998 were also occupied in 2007.
- 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 3 indicates that 64,600 units that were vacant in 1998 are still part of the housing stock in 2007 but are no longer vacant.⁴ 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.

² The decline in the number of occupied units results from the change in the geography covered in the published reports.

³ 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 to have trouble matching the published numbers for most of the seven metropolitan areas were: the number of mobile homes, units built after 2007, rental units that do not have a cash rent, and monthly housing costs less than \$350 for owners.

⁴ The large movement of units from vacant in 1998 to non-vacant in 2007 is the result of the overestimate of the vacant stock by the 1998 Baltimore AHS.

Columns Unique to Forward-Looking Tables

In forward-looking tables, columns F through K track what happened to units that were lost from 1998 to 2007.

- Column F is the CINCH estimate of the number of units from column C that are not in the 2007 housing stock because they were merged with other units or converted into multiple units. In the Baltimore metropolitan area, 1,600 units were lost to mergers or conversions between 1998 and 2007.
- Column G is the CINCH estimate of the number of mobile homes or houses from column C that were moved out during the period. In the Baltimore metropolitan area, 500 houses or mobile homes were moved out between 1998 and 2007.
- Column H is the CINCH estimate of the number of units from column C that became nonresidential at the end of the period. For example, a real estate firm, a tax preparation office, a palm reader, or some other business might buy or rent a house to use for business rather than residential purposes.⁵ Among occupied units, 2,200 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 2007. In this case, 5,900 units were demolished or destroyed from the total housing stock.
- Column J is the CINCH estimate of the number of units from column C that by 2007 were condemned or that were no longer usable for housing because of extensive damage. In the Baltimore metropolitan area, 11,200 units are recorded as having been temporarily lost because of damage or similar cause.
- Column K is the CINCH estimate of the number of units from column C that were lost by 2007 for other reasons. Among occupied units, there were 5,900 units lost for these miscellaneous reasons.

The columns form a closed system. Column C counts the number of units tracked; columns D through K account for all the possible outcomes. Therefore, column C minus the sum of columns D through K always equals zero, except for rounding.⁶

Columns Unique to Backward-Looking Tables

In backward-looking tables, Columns F through K track where units came from that are part of the housing stock in 2007 but were not part of the 1998 housing stock.

- Column F is the CINCH estimate of the number of units created through mergers and conversions (splitting one unit into multiple units). Of the entire housing stock in the Baltimore metropolitan area, 10,900 units were created through mergers or splits.

⁵ 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.

⁶ The weighted numbers are rounded to the nearest 100 to match practices used by the Census Bureau in the AHS publications.

- Column G is the CINCH estimate of the number of mobile homes included in the count in column C that were moved in during the period. Of the 2007 housing stock, 1,600 units were mobile homes moved in after 1998.⁷
- Column H is the CINCH estimate of the number of units from column C that had been nonresidential in 1998. Among occupied units, 1,900 had been nonresidential.
- Column I is the CINCH estimate of the number of units from column C that were newly constructed between 1998 and 2007. Among occupied units, 88,400 units were newly constructed.
- Column J is the CINCH estimate of the number of units from column C that were added by 2007 due to the recovery of units that had been temporarily lost to the housing stock because occupancy was prohibited in 1998, or the interior of the unit was exposed to the elements, or for reasons “not classified.” The 2007 occupied housing stock includes 500 recovered units.
- Column K includes units added by the Census Bureau for other reasons. Of the entire housing stock in the Baltimore metropolitan area, 22,100 were added for other reasons.

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 nonseasonal 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. 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 use file, whereas the published tables contain estimates for these multiunit classes. In Baltimore, 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. Column E is forced to be zero on the grounds that changes in structure types are extremely rare and that any observed changes are most likely data errors.

Rows 13–26 divide the housing stock by year built.⁸ Column E is forced to be zero because units cannot change year built. The reader will note that in Backward-Looking Table 1 there is an apparent anomaly, namely units reported as newly constructed (Column I) that have year-built dates that are inconsistent with being newly constructed. Backward-Looking Table 1 calls a unit

⁷ There is a problem in the 2007 AHS public use file with the variable for “reason unit added” (REUAD), and therefore it is not possible to determine whether any houses were moved in during this period.

⁸ Rows 13 and 14 are not included in Forward-Looking Table 1 because the 1998 housing stock cannot contain units built after 1998.

newly constructed if the unit was added to the sample in 2007 from a listing of new construction permits. The table bases year built on information provided by the surveyed household.⁹ In some cases, the apparent anomaly is the result of an error—either the respondent answered the question incorrectly or the Census Bureau recorded the answer incorrectly. However, in many cases, the apparent anomaly is not really an anomaly. If an existing housing unit is remodeled to the extent that the local jurisdiction requires the contractor to draw a “new construction” permit, then the unit becomes eligible for inclusion in the AHS as a “newly constructed” unit. In these cases, when the Census Bureau questions the household about the age of the unit, the respondent may very well give the date of construction of the original unit and not the date of the remodeling. In recent years, there has been a substantial number of existing units that have been gutted and totally remodeled, often with a substantial increase in the area of the ground floor, the so-called unit “footprint.” Sometimes local jurisdictions base the decision on whether a “new construction” permit is required on changes in the footprint.

Rows 27–33 and 34–38 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms.¹⁰

Rows 39–44 focus on multiunit structures only and divide them by number of stories. Column E is forced to be zero. In the 1998 Baltimore AHS public use file, the Census Bureau reported all units in structures with 7 or more stories in row 43 and reported no units in row 44 of Forward-Looking Table 1; this was done to protect confidentiality of respondents.

Rows 45–46 divide the housing stock between central cities units and suburban residences to see how the observed changes vary by location. Rows 47–48 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, 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. 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.¹¹

⁹ New construction is based on a value of “3” for the variable REUAD (reason unit added), whereas year built is based on answers to the variable BUILT.

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

¹¹ Row 15 (sewage disposal = other or none) is omitted in the backward-looking tables because the 2007 AHS publications report no housing units with this characteristic in any of the metropolitan areas.

Rows 16–20 look at units with severe physical problems. Rows 17–20 identify specific types of serious deficiencies. Row 16 counts the units having one or more of these deficiencies.¹² Rows 21–25 look at units with moderate problems. Rows 22–25 identify specific types of deficiencies. Row 21 counts the units having one or more of these deficiencies.¹³ These rows are in the analysis to answer two questions: (1) whether poor quality units in one year are also poor quality units in the other year; and (2) whether poorer quality units are more likely to be lost.

Table 3

This table studies 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 or added between 1998 and 2007.

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 studies 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 or added.

Rows 5–10 analyze the rental stock using 6 categories based on monthly housing costs. Row 5 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

¹² Row 19 (severe electrical problems) is omitted from the backward-looking tables because the 2007 AHS publications report no housing units with this characteristic in any of the metropolitan areas.

¹³ For definitions of severe and moderate problems see pages 1042 and 1043 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 2007 AHS used different categories for recording race. For 2007, “white” was defined as “white only”; Black as “Black only”; and “other” as all other answers, including householders of more than one race.

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 98	D 98 units present in 2007	E Changed in characteristics	F 98 units affected by conversion /merger	G 98 units moved out	H 98 units changed to nonresidential use	I 98 units lost through demolition or disaster	J 98 units badly damaged or condemned	K 98 units lost in other ways	
1	Total	1,028,200	1,028,100	997,400	0	1,600	500	2,700	5,900	11,200	8,600	1
	Occupancy Status											
2	Occupied	920,100	920,100	828,300	74,200	600	0	2,200	2,700	6,400	5,900	2
3	Vacant	105,500	105,500	27,900	64,600	1,100	500	500	3,300	4,900	2,700	3
4	Seasonal	2,500	2,500	2,500	0	0	0	0	0	0	0	4
	Units in Structure											
5	1, detached	520,000	529,400	523,500	0	0	500	1,000	1,600	1,600	1,100	5
6	1, attached	290,500	288,400	276,200	0	0	0	0	1,000	8,500	2,600	6
7	2 to 4	59,200	52,100	46,600	0	600	0	600	1,100	600	2,700	7
8	5 to 9	41,100	39,300	35,500	0	1,100	0	0	600	600	1,600	8
9	10 to 19	66,800	73,200	71,500	0	0	0	1,100	500	0	0	9
10	20 to 49	7,600	31,700	30,000	0	0	0	0	1,100	0	600	10
11	50 or more	26,800										11
12	Mobile Home/Trailer	16,200	14,100	14,100	0	0	0	0	0	0	0	12
	Year Built											
15	1995-2000	42,500	47,000	47,000	0	0	0	0	0	0	0	15
16	1990-1994	74,500	77,200	76,600	0	0	0	0	0	0	600	16
17	1985-1989	91,100	103,600	103,000	0	0	0	0	0	600	0	17
18	1980-1985	61,000	62,000	62,000	0	0	0	0	0	0	0	18
19	1975-1979	72,800	81,500	81,000	0	0	0	0	0	0	600	19
20	1970-1974	91,500	99,700	98,600	0	0	0	600	500	0	0	20
21	1960-1969	156,600	159,100	156,400	0	0	0	600	1,600	0	600	21
22	1950-1959	142,800	126,600	122,900	0	0	0	500	500	1,600	1,100	22
23	1940-1949	117,300	103,500	95,400	0	0	0	0	1,600	4,300	2,200	23
24	1930-1939	69,000	62,100	57,200	0	600	0	600	500	1,600	1,600	24
25	1920-1929	46,500	44,600	39,800	0	1,100	0	0	0	1,600	2,100	25
26	1919 or earlier	62,800	61,200	57,500	0	0	500	500	1,000	1,600	0	26

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

	A Characteristics	B Published Numbers	C Present in 98	D 98 units present in 2007	E Changed in characteristics	F 98 units affected by conversion /merger	G 98 units moved out	H 98 units changed to nonresidential use	I 98 units lost through demolition or disaster	J 98 units badly damaged or condemned	K 98 units lost in other ways	
	Rooms											
27	1 - 4 rooms	230,200	216,300	148,200	56,600	1,100	0	1,100	2,200	2,700	4,400	27
28	5 rooms	163,900	167,900	80,500	82,500	600	0	600	600	2,100	1,100	28
29	6 rooms	215,500	200,900	89,500	102,400	0	500	500	2,700	4,700	600	29
30	7 rooms	178,600	188,300	75,900	110,300	0	0	0	500	500	1,000	30
31	8 rooms	115,300	127,300	44,300	81,500	0	0	0	0	500	1,100	31
32	9 rooms	64,100	66,200	14,000	51,700	0	0	0	0	500	0	32
33	10 rooms or more	60,500	61,200	17,100	43,000	0	0	500	0	0	500	33
	Bedrooms											
34	None	900	1,900	700	700	0	0	0	0	0	500	34
35	1	123,400	112,500	74,900	31,000	1,100	0	600	0	1,100	3,800	35
36	2	258,100	259,100	169,200	82,300	600	0	1,100	2,700	2,100	1,100	36
37	3	425,100	426,000	310,200	103,000	0	500	1,000	3,200	5,800	2,100	37
38	4 or more	220,500	228,600	177,700	47,700	0	0	0	0	2,200	1,000	38
39	Multiunit Structures Stories in Structures	201,500	196,300	183,700	0	1,600	0	1,700	3,300	1,100	4,900	39
40	1	NA	8,500	8,000	0	0	0	0	0	0	600	40
41	2	NA	30,000	27,800	0	0	0	600	1,100	0	500	41
42	3	NA	113,500	108,000	0	600	0	1,100	1,100	600	2,200	42
43	4 to 6	NA	44,300	39,900	0	1,100	0	0	1,100	600	1,600	43
44	7 or more	NA										44
	Metropolitan status											
45	In central cities	NA	210,300	192,600	0	1,600	0	0	1,600	9,600	4,800	45
46	In suburbs	NA	817,800	804,800	0	0	500	2,700	4,300	1,600	3,800	46
	Mover status											
47	Moved in last 2 years	NA	162,700	43,100	116,300	0	0	600	1,100	1,100	600	47
48	Not a Recent Mover	NA	757,400	589,300	153,800	600	0	1,600	1,500	5,300	5,400	48

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

	A Characteristics	B Published Numbers	C Present in 98	D 98 units present in 2007	E Changed in characteristics	F 98 units affected by conversion /merger	G 98 units moved out	H 98 units changed to nonresidential use	I 98 units lost through demolition or disaster	J 98 units badly damaged or condemned	K 98 units lost in other ways	
1	Occupied Units	920,100	920,100	828,300	74,200	600	0	2,200	2,700	6,400	5,900	1
	Kitchen											
2	Complete kitchen	906,400	909,600	811,800	80,200	600	0	2,200	2,700	6,400	5,900	2
3	Not complete kitchen	13,700	10,500	0	10,500	0	0	0	0	0	0	3
	Plumbing											
4	With all plumbing	913,300	910,700	810,100	82,900	600	0	2,200	2,700	6,400	5,900	4
5	Lack some plumbing	6,900	9,400	0	9,400	0	0	0	0	0	0	5
6	No hot piped water	300	0	0	0	0	0	0	0	0	0	6
7	No bathtub/shower	300	0	0	0	0	0	0	0	0	0	7
8	No flush toilet	300	0	0	0	0	0	0	0	0	0	8
9	No exclusive use	6,300	9,400	0	9,400	0	0	0	0	0	0	9
	Water											
10	Public/private water	809,000	769,400	682,300	71,000	600	0	1,600	2,200	5,900	5,900	10
11	Well	110,400	149,400	135,200	12,700	0	0	600	500	500	0	11
12	Other water source	700	1,200	600	600	0	0	0	0	0	0	12
	Sewer											
13	Public sewer	784,700	764,600	676,400	72,100	600	0	1,700	2,200	5,900	5,900	13
14	Septic tank/cesspool	135,200	155,500	124,300	29,700	0	0	500	500	500	0	14
15	Other or none	300	0	0	0	0	0	0	0	0	0	15
16	Severe Problems	14,400	15,800	1,300	13,900	0	0	0	0	600	0	16
17	Plumbing	6,900	9,400	0	9,400	0	0	0	0	0	0	17
18	Heating	6,500	6,400	1,300	4,600	0	0	0	0	600	0	18
19	Electric	500	600	0	600	0	0	0	0	0	0	19
20	Upkeep	1,600	0	0	0	0	0	0	0	0	0	20
21	Moderate problems	32,500	25,700	0	25,200	0	0	0	0	500	0	21
22	Plumbing	2,700	700	0	700	0	0	0	0	0	0	22
23	Heating	500	0	0	0	0	0	0	0	0	0	23
24	Kitchen	13,400	10,500	0	10,500	0	0	0	0	0	0	24
25	Upkeep	16,200	15,200	0	14,700	0	0	0	0	500	0	25

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

	A Characteristics	B Published Numbers	C Present in 98	D 98 units present in 2007	E Changed in characteristics	F 98 units affected by conversion /merger	G 98 units moved out	H 98 units changed to nonresidential use	I 98 units lost through demolition or disaster	J 98 units badly damaged or condemned	K 98 units lost in other ways	
1	Occupied units	920,100	920,100	828,300	74,200	600	0	2,200	2,700	6,400	5,900	1
	Age of Householder											
2	Under 65	722,800	731,000	583,400	133,500	600	0	2,200	1,700	5,400	4,300	2
3	65 or older	197,500	189,100	108,600	76,900	0	0	0	1,000	1,000	1,600	3
	Children											
4	Some	324,000	334,700	159,600	167,600	600	0	1,100	1,700	2,100	2,200	4
5	None	596,200	585,400	405,700	169,700	0	0	1,100	1,000	4,300	3,800	5
	Race/Origin of Householder											
6	White	669,300	670,100	563,500	97,000	600	0	1,600	1,500	3,100	2,800	6
7	Hispanic	15,400	20,200	8,100	12,200	0	0	0	0	0	0	7
8	NonHispanic	653,900	649,800	534,600	105,700	600	0	1,600	1,500	3,100	2,800	8
9	Black	221,200	217,600	162,500	48,700	0	0	0	600	2,700	3,200	9
10	Other	29,500	32,400	10,800	20,000	0	0	600	600	600	0	10
11	Total Hispanics	22,100	29,000	11,200	16,700	0	0	600	600	0	0	11
	Income Source											
12	Wages and salaries	718,100	663,200	508,700	141,100	600	0	2,200	1,100	5,400	4,300	12
13	Social security or pension	250,500	236,000	123,700	107,600	0	0	0	1,000	1,500	2,100	13
14	Welfare or SSI	36,800	36,800	2,000	32,700	0	0	0	600	1,100	500	14

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

	A Characteristics	B Published Numbers	C Present in 98	D 98 units present in 2007	E Changed in characteristics	F 98 units affected by conversion /merger	G 98 units moved out	H 98 units changed to nonresidential use	I 98 units lost through demolition or disaster	J 98 units badly damaged or condemned	K 98 units lost in other ways	
1	Occupied units	920,100	920,100	828,300	74,200	600	0	2,200	2,700	6,400	5,900	1
	Tenure											
2	Owner occupied	634,500	634,500	554,000	75,100	0	0	500	1,000	2,500	1,500	2
3	Pct owner-occupied	69.0%	69.0%									3
4	Renter occupied	285,600	285,600	185,800	87,700	600	0	1,700	1,700	3,900	4,400	4
	Renter Monthly Housing Costs											
5	No cash rent	12,000	11,600	0	9,400	0	0	0	1,100	0	1,100	5
6	Less than \$350	44,500	45,200	15,500	26,900	0	0	0	0	1,700	1,100	6
7	\$350 to \$599	97,300	85,600	5,400	77,400	600	0	600	0	600	1,100	7
8	\$600 to \$799	71,000	73,200	5,400	64,000	0	0	1,100	600	1,700	600	8
9	\$800 to \$1249	50,600	64,000	15,500	48,000	0	0	0	0	0	600	9
10	\$1,250 or more	10,200	6,100	0	6,100	0	0	0	0	0	0	10
	Renter Hsd Income											
11	Less than \$15,000	100,200	88,700	24,900	59,900	0	0	0	600	2,200	1,100	11
12	\$15,000 to \$29,999	82,900	81,800	8,800	68,700	600	0	600	600	1,700	1,100	12
13	\$30,000 to \$49,999	57,400	58,100	9,400	46,400	0	0	600	600	0	1,100	13
14	\$50,000 to \$99,999	39,200	51,100	15,500	34,500	0	0	600	0	0	600	14
15	\$100,000 or more	6,000	5,900	0	5,400	0	0	0	0	0	600	15
	Owner Monthly Housing Costs											
16	Less than \$350	171,400	137,000	16,800	117,200	0	0	0	500	1,500	1,000	16
17	\$350 to \$599	94,100	108,900	33,000	74,500	0	0	0	500	500	500	17
18	\$600 to \$799	76,100	60,600	4,900	55,700	0	0	0	0	0	0	18
19	\$800 to \$1249	151,700	144,000	29,500	114,600	0	0	0	0	0	0	19
20	\$1,250 or more	141,200	184,000	123,700	59,400	0	0	500	0	500	0	20
	Owner Hsd Income											
21	Less than \$15,000	85,700	70,100	13,000	55,100	0	0	0	500	1,500	0	21
22	\$15,000 to \$29,999	83,100	78,800	17,100	60,700	0	0	0	0	500	500	22
23	\$30,000 to \$49,999	129,200	122,100	18,300	102,800	0	0	0	500	0	500	23
24	\$50,000 to \$99,999	224,900	235,900	89,400	145,500	0	0	0	0	500	500	24
25	\$100,000 or more	111,700	127,500	80,200	46,800	0	0	500	0	0	0	25

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

	A Characteristics	B Published Numbers	C Present in 2007	D 2007 units present in 1998	E Changed in characteristics	F Units from mergers & splits	G Units moved in	H Units derived from nonresidential use	I Units added through new construction	J Units added from temporary losses	K Units added by other means	
1	Total	1,109,600	1,109,600	976,900	0	10,900	1,600	2,700	94,600	900	22,100	1
	Occupancy Status											
2	Occupied	1,012,300	1,012,300	831,100	61,400	8,200	1,600	1,900	88,400	500	19,400	2
3	Vacant	93,000	93,000	22,400	58,100	2,400	0	800	6,200	400	2,800	3
4	Seasonal	4,300	4,300	900	3,000	300	0	0	0	0	0	4
	Units in Structure											
5	1, detached	545,800	573,600	517,500	0	0	900	1,400	47,400	0	6,400	5
6	1, attached	309,000	293,900	256,900	0	2,600	0	300	28,400	900	4,900	6
7	2 to 4	51,000	47,800	38,300	0	3,200	0	400	2,300	0	3,700	7
8	5 to 9	46,000	47,200	39,300	0	2,200	0	400	3,600	0	1,800	8
9	10 to 19	88,200	86,000	78,800	0	1,000	0	0	4,700	0	1,500	9
10	20 to 49	8,700	8,400	6,300	0	0	0	0	1,700	0	500	10
11	50 or more	41,600	39,900	27,700	0	2,100	0	300	6,600	0	3,300	11
12	Mobile Home/Trailer	19,400	12,700	12,000	0	0	600	0	0	0	0	12
	Year Built											
13	2005-2007	21,600	16,100	0	0	0	0	0	16,100	0	0	13
14	2000-2005	45,700	35,000	600	0	0	0	0	33,500	0	900	14
15	1995-2000	66,400	65,400	48,000	0	400	600	900	14,400	0	1,100	15
16	1990-1994	69,500	77,300	75,200	0	0	500	300	900	500	0	16
17	1985-1989	100,200	105,600	102,400	0	800	0	0	1,900	0	500	17
18	1980-1985	69,800	67,400	62,600	0	700	0	0	2,400	0	1,700	18
19	1970-1979	167,700	180,000	175,000	0	500	0	0	2,200	0	2,400	19
21	1960-1969	148,400	156,800	151,800	0	900	0	400	1,800	0	1,800	21
22	1950-1959	145,900	137,200	124,000	0	2,100	0	0	6,900	0	4,200	22
23	1940-1949	96,500	100,800	92,100	0	1,800	0	500	4,200	400	1,800	23
24	1930-1939	64,900	60,800	54,900	0	500	500	400	3,200	0	1,300	24
25	1920-1929	50,100	46,500	38,100	0	1,300	0	0	3,800	0	3,300	25
26	1919 or earlier	62,900	60,800	52,200	0	1,900	0	300	3,300	0	3,100	26

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

	A Characteristics	B Published Numbers	C Present in 2007	D 2007 units present in 1998	E Changed in characteristics	F Units from mergers & splits	G Units moved in	H Units derived from nonresidential use	I Units added through new construction	J Units added from temporary losses	K Units added by other means	
	Rooms											
27	1 - 4 rooms	223,600	213,100	136,800	44,800	7,500	0	1,300	14,000	0	8,700	27
28	5 rooms	199,200	201,300	76,400	107,800	1,100	900	0	10,000	500	4,600	28
29	6 rooms	258,600	252,800	88,300	133,400	1,800	600	0	24,100	400	4,200	29
30	7 rooms	189,400	193,300	76,500	103,700	0	0	0	10,800	0	2,300	30
31	8 rooms	122,500	128,200	45,100	66,300	0	0	0	15,900	0	900	31
32	9 rooms	63,600	69,700	14,400	45,600	0	0	500	8,700	0	500	32
33	10 rooms or more	52,700	51,300	17,500	20,400	500	0	900	11,100	0	900	33
	Bedrooms											
34	None	6,400	5,200	600	3,000	700	0	400	0	0	500	34
35	1	113,500	105,800	70,100	13,500	5,500	0	500	8,900	0	7,400	35
36	2	254,100	249,600	159,700	65,500	3,400	500	400	14,500	0	5,600	36
37	3	455,200	457,000	308,900	103,100	900	1,100	0	36,200	900	5,900	37
38	4 or more	280,400	292,000	181,300	71,100	500	0	1,400	34,900	0	2,800	38
39	Multiunit Structures	235,500	229,400	190,400	0	8,300	0	1,000	18,800	0	10,800	39
	Stories in Structures											
40	1	NA	10,800	8,900	0	400	0	0	400	0	1,200	40
41	2	NA	38,900	32,900	0	2,800	0	400	1,900	0	900	41
42	3	NA	125,100	109,200	0	3,300	0	0	8,200	0	4,400	42
43	4 to 6	NA	31,100	20,500	0	900	0	700	6,400	0	2,700	43
44	7 or more	NA	23,500	19,000	0	1,000	0	0	1,900	0	1,600	44
	Metropolitan status											
45	In central cities	NA	243,200	181,800	0	8,900	500	800	30,000	400	20,900	45
46	In suburbs	NA	866,400	795,100	0	2,000	1,100	1,900	64,600	500	1,300	46
	Mover status											
47	Moved in last 2 years	NA	183,700	41,800	117,100	2,400	0	700	19,800	0	1,900	47
48	Not a Recent Mover	NA	828,600	595,900	137,600	5,800	1,600	1,200	68,600	500	17,500	48

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

	A Characteristics	B Published Numbers	C Present in 2007	D 2007 units present in 1998	E Changed in characteristics	F Units from mergers & splits	G Units moved in	H Units derived from nonresidential use	I Units added through new construction	J Units added from temporary losses	K Units added by other means	
1	Occupied Units	1,012,300	1,012,300	831,100	61,400	8,200	1,600	1,900	88,400	500	19,400	1
	Kitchen											
2	Complete kitchen	1,004,400	1,004,500	815,100	70,300	7,500	1,600	1,900	88,400	500	19,400	2
3	No complete kitchen	8,000	7,800	0	7,100	700	0	0	0	0	0	3
	Plumbing											
4	With all plumbing	1,003,300	1,002,300	812,700	70,200	7,700	1,600	1,900	88,400	500	19,400	4
5	Lack some plumbing	9,100	10,000	0	9,500	500	0	0	0	0	0	5
6	No hot piped water	500	600	0	600	0	0	0	0	0	0	6
7	No bathtub/shower	0	0	0	0	0	0	0	0	0	0	7
8	No flush toilet	0	0	0	0	0	0	0	0	0	0	8
9	No exclusive use	8,600	9,300	0	8,900	500	0	0	0	0	0	9
	Water											
10	Public/private water	872,400	850,700	682,700	60,200	8,200	900	1,500	77,400	500	19,400	10
11	Well	137,700	159,300	137,900	10,100	0	0	500	10,900	0	0	11
12	Other water source	2,300	2,200	600	1,000	0	600	0	0	0	0	12
	Sewer											
13	Public sewer	876,000	862,500	676,500	77,100	8,200	1,600	1,500	77,900	500	19,400	13
14	Septic tank/cesspool	136,400	149,800	126,300	12,600	0	0	500	10,500	0	0	14
	Severe Problems											
16	Severe Problems	17,500	17,900	1,300	15,200	1,400	0	0	0	0	0	16
17	Plumbing	9,100	10,000	0	9,500	500	0	0	0	0	0	17
18	Heating	6,600	6,400	1,300	5,100	0	0	0	0	0	0	18
20	Upkeep	2,500	1,600	0	600	1,000	0	0	0	0	0	20
	Moderate problems											
21	Moderate problems	26,800	23,600	0	19,100	700	500	0	2,400	0	1,000	21
22	Plumbing	2,200	3,000	0	2,600	500	0	0	0	0	0	22
23	Heating	0	0	0	0	0	0	0	0	0	0	23
24	Kitchen	8,000	7,800	0	7,100	700	0	0	0	0	0	24
25	Upkeep	17,200	15,800	0	12,000	0	500	0	2,400	0	1,000	25

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

	A Characteristics	B Published Numbers	C Present in 2007	D 2007 units present in 1998	E Changed in characteristics	F Units from mergers & splits	G Units moved in	H Units derived from nonresidential use	I Units added through new construction	J Units added from temporary losses	K Units added by other means	
1	Occupied units	1,012,300	1,012,300	831,100	61,400	8,200	1,600	1,900	88,400	500	19,400	1
	Age											
2	Under 65	808,900	802,700	584,900	119,600	6,400	1,100	1,400	75,100	500	13,600	2
3	65 or older	203,700	209,600	109,000	78,900	1,800	500	500	13,200	0	5,800	3
	Children											
4	Some	334,500	339,600	161,000	135,200	1,400	500	1,400	36,500	0	3,700	4
5	None	677,800	672,700	406,300	190,000	6,800	1,100	500	51,900	500	15,600	5
	Race/Origin											
6	White	686,800	707,000	568,100	62,200	5,100	500	1,000	60,000	0	10,200	6
7	Hispanic	32,100	33,700	8,200	22,200	0	0	0	2,100	0	1,200	7
8	NonHispanic	654,700	673,200	539,000	60,800	5,100	500	1,000	57,900	0	9,000	8
9	Black	287,200	266,600	161,700	68,100	3,100	1,100	500	22,800	500	8,700	9
10	Other	38,300	38,800	10,700	21,600	0	0	500	5,500	0	500	10
11	Total Hispanics	41,900	42,000	11,400	27,300	0	0	0	2,100	0	1,200	11
	Income Source											
12	Wages and salaries	776,900	777,500	558,400	123,100	5,500	1,100	1,400	74,500	500	13,100	12
13	Social security or pension	231,500	239,900	124,800	94,200	1,800	500	300	13,800	0	4,600	13
14	Welfare or SSI	17,500	18,600	1,900	14,300	500	500	0	900	0	500	14

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

	A Characteristics	B Published Numbers	C Present in 2007	D 2007 units present in 1998	E Changed in characteristics	F Units from mergers & splits	G Units moved in	H Units derived from nonresidential use	I Units added through new construction	J Units added from temporary losses	K Units added by other means	
1	Occupied units	1,012,300	1,012,300	831,100	61,400	8,200	1,600	1,900	88,400	500	19,400	1
	Tenure											
2	Owner occupied	721,600	721,600	566,900	67,200	1,900	1,600	1,700	71,500	500	10,500	2
3	Percent owner-occupied	71.3%	71.3%									3
4	Renter occupied	290,700	290,700	177,200	81,100	6,300	0	300	16,900	0	8,900	4
	Renter Monthly Housing Costs											
5	No cash rent	13,500	11,100	0	9,600	300	0	0	700	0	500	5
6	Less than \$350	29,500	28,200	14,800	10,300	0	0	0	1,400	0	1,700	6
7	\$350 to \$599	28,500	29,900	5,100	20,500	2,000	0	0	1,300	0	1,000	7
8	\$600 to \$799	45,800	43,300	5,100	32,300	2,200	0	0	2,200	0	1,400	8
9	\$800 to \$1,249	117,300	120,100	14,800	96,300	1,000	0	0	4,300	0	3,800	9
10	\$1,250 or more	56,200	58,100	0	49,400	1,000	0	300	6,900	0	500	10
	Renter Hsd Income											
11	Less than \$15,000	65,500	62,200	23,800	30,200	1,000	0	0	3,800	0	3,400	11
12	\$15,000 to \$29,999	65,000	61,300	8,300	48,400	1,300	0	300	1,300	0	1,700	12
13	\$30,000 to \$49,999	59,100	62,600	9,000	46,900	1,200	0	0	3,600	0	1,900	13
14	\$50,000 to \$99,999	77,700	80,800	14,800	57,100	2,900	0	0	4,100	0	1,900	14
15	\$100,000 or more	23,500	23,900	0	19,900	0	0	0	4,000	0	0	15
	Owner Monthly Housing Costs											
16	Less than \$350	56,800	38,200	16,400	18,300	0	500	0	2,900	0	300	16
17	\$350 to \$599	140,400	132,600	33,900	91,300	500	500	0	4,700	0	1,900	17
18	\$600 to \$799	57,200	69,400	5,000	58,700	500	0	0	2,000	0	3,300	18
19	\$800 to \$1,249	129,300	117,100	29,800	72,700	500	600	0	10,700	0	2,800	19
20	\$1,250 or more	338,000	364,200	127,200	180,900	500	0	1,700	51,200	500	2,300	20
	Owner Hsd Income											
21	Less than \$15,000	53,000	49,100	12,900	31,500	500	0	300	2,100	0	1,900	21
22	\$15,000 to \$29,999	82,200	80,600	17,600	55,800	0	500	0	5,600	0	1,200	22
23	\$30,000 to \$49,999	88,200	86,200	18,800	58,600	0	500	0	6,500	0	1,900	23
24	\$50,000 to \$99,999	234,400	231,700	91,500	116,300	1,400	600	0	18,700	500	2,800	24
25	\$100,000 or more	263,800	273,900	82,500	148,700	0	0	1,400	38,600	0	2,800	25

Changes in the Baltimore Housing Stock: 1998–2007

Forward-Looking Table 5 looks at how losses affected certain portions of the Baltimore housing stock. The rows were selected because of their inherent interest or because an examination of losses in all seven metropolitan areas showed that these categories typically had high loss rates or rates that varied substantially across the metropolitan areas. 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 in central cities compared to units in the remainder of the metropolitan area.

Forward-Looking Table 5: Selected Loss Rates

Category	Based on columns in Tables 1-4		
	All losses 1998-2007 (F+G+H+I+J+K)/C	Permanent losses (I/C)	Potentially reversible losses (F+G+H+J+K)/C
All units¹⁶	3.0%	0.6%	2.4%
Vacant units	12.4%	3.1%	9.3%
Units in structures with 2-4 units	10.5%	2.1%	8.4%
Units in structures with 5-9 units	9.8%	1.4%	8.4%
Units built 1930-1939	7.9%	0.9%	7.0%
Units built 1920-1929	10.8%	0.0%	10.8%
Units built in 1919 or earlier	6.0%	1.7%	4.3%
Units with 1-4 rooms	5.3%	1.0%	4.3%
Units with no bedrooms	28.8%	0.0%	28.8%
Units in central cities	8.4%	0.8%	7.6%
Units outside of central city	1.6%	0.5%	1.1%
Occupied units¹⁷	1.9%	0.3%	1.6%
Units with severe problems	3.5%	0.0%	3.5%
Units with moderate problems	1.9%	0.0%	1.9%
Units with a white householder	1.4%	0.2%	1.2%
Units with a Black householder	2.9%	0.3%	2.7%
Units with Hispanic householder	3.8%	1.9%	1.9%
Household receives welfare/SSI	2.0%	0.2%	1.9%
Owner-occupied units	0.9%	0.2%	0.7%
Renter-occupied units	4.2%	0.6%	3.7%
Renter-occupied – monthly housing costs less than \$350	6.1%	0.0%	6.1%
Renter-occupied – household income less than \$15,000	4.3%	0.6%	3.7%

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 2007, 3.0 percent of the units in the 1998 housing stock were no longer part of the housing stock; 0.6 percent were permanent losses—for example, the units had either been demolished or destroyed by fire or natural disasters—while 2.4 percent were lost in ways that could be reversed, such as nonresidential use.

Units that were vacant in 1998 had a higher loss rate, as did units in structures containing 2 to 4 units and buildings containing 5 to 9 units. Units built prior to 1940 also had higher than average loss rates. The central city loss rate was almost five times the loss rate in the rest of the metropolitan area.

Among units occupied in 1998, 1.9 percent were lost by 2007. The loss rate was higher for units with severe physical problems. Units with Black or Hispanic householders had higher than average loss rates.

The loss rate among rental units was more than four times the loss rate among owner-occupied units. Low rent units and rental units occupied by the lowest income households had high loss rates.

Permanent losses were particularly high among vacant units and units in structures with 2 to 4 or with 5 to 9 units, and in units built before 1919. Potentially reversible losses were high in units in small structures, among units built between 1920 and 1939, and in low rent units.

Backward-Looking Table 5 presents addition rates for selected segments of the Baltimore housing stock. The rows were selected because of their inherent interest or because an examination of additions in all seven metropolitan areas showed that these categories typically had high addition rates or rates that varied substantially across the metropolitan areas. 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 in central cities compared to units in the remainder of the metropolitan area.

Of all the units in the Baltimore housing stock in 2007, 12.0 percent were not in the 1998 housing stock. The majority of the new units came from new construction, but the return to the housing stock of units that were not available in 1998 accounted for 3.4 percent of the total units in 2007.

Vacant units had higher than average rates of overall additions, particularly additions other than by new construction. Perhaps owners of units returning to the housing stock have had a difficult time finding tenants for these units in the slower housing market in 2007 and immediately preceding 2007. Units in structures containing 50 or more units had a high rate of total additions. Surprisingly, both units with 10 or more rooms and units with no bedrooms had a higher than average rate. The addition rate in central cities was slightly less than one-third the addition rate in the rest of the metropolitan area. New construction was stronger outside of the central cities than in the central cities, while the rate of other additions was much higher in central cities.

Backward-Looking Table 5: Selected Addition Rates

Category	Based on columns in Tables 1-4		
	All additions (F+G+H+I+J+K)/C	New construction I/C	Other additions (F+G+H+J+K)/C
All units ¹⁸	12.0%	8.5%	3.4%
Vacant units	13.5%	6.7%	6.8%
Single-unit, attached structure	12.6%	9.7%	2.9%
Units in structures with 50 or more units	30.5%	16.5%	14.0%
Units with 10 or more rooms	26.2%	21.7%	4.5%
Units with no bedrooms	30.8%	0.0%	30.8%
Units in central cities	25.3%	12.3%	12.9%
Units outside of central city	8.2%	7.5%	0.8%
Occupied units ¹⁹	11.8%	8.7%	3.1%
Owner-occupied units	12.1%	9.9%	2.2%
Renter-occupied units	11.1%	5.8%	5.3%
Renter-occupied - no cash rent	13.2%	6.5%	6.7%
Renter-occupied - monthly housing costs less than \$350	11.1%	5.1%	6.0%
Renter-occupied - monthly housing costs \$1,250 or more	15.0%	11.9%	3.1%
Owner-occupied - monthly housing costs \$1,250 or more	15.4%	14.1%	1.3%
Owner-occupied - household income \$100,000 or more	15.6%	14.1%	1.5%

The rate of new additions was slightly higher for owner-occupied units than for renter-occupied units, but the rate of new construction was lower for owner-occupied units than for renter-occupied units. Addition rates were high for units renting for more than \$1,250 per month. Total additions and new construction were also high for owner-occupied units with monthly housing costs greater than \$1,250 and owner-occupied units with households that had income of \$100,000 or more.

Rental Market Dynamics

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

- 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)

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.

- very low rent (monthly housing costs affordable to renters with incomes greater than 30 percent but less than or equal to 50 percent of local area median income)
- low rent (monthly housing costs affordable to renters with incomes greater than 50 percent but less than or equal to 60 percent of local area median income)
- moderate rent (monthly housing costs affordable to renters with incomes greater than 60 percent but less than or equal to 80 percent of local area median income)
- high rent (monthly housing costs affordable to renters with incomes greater than 80 percent but less than or equal to 100 percent of local area median income)
- very high rent (monthly housing costs affordable to renters with incomes greater than 100 percent but less than or equal to 120 percent of local area median income)
- extremely high rent (monthly housing costs affordable to renters with incomes greater than 120 percent of local area median income)

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

Table A shows that there were 353,300 rental units in the Baltimore metropolitan area in 1998. In 2007, 95,300 of these units were no longer rental; 57,200 were owner-occupied; 16,700 were either vacant or being used seasonally; and 21,400 had been lost to the stock. Taken as a proportion of the units in 1998, movement into owner-occupancy was concentrated among units in the moderate and high rent categories, and losses to the stock were concentrated among non-market units and extremely low rent units.

Table A: Forward-Looking Rental Dynamics Analysis, Counts: 1998-2007

Affordability groups	A Total in 1998	B Non- Market in 2007	C Extremely Low Rent in 2007	D Very Low Rent in 2007	E Low Rent in 2007	F Moderate Rent in 2007	G High Rent in 2007	H Very High Rent in 2007	I Extremely High Rent in 2007	J Owner Occupied in 2007	K Seasonal or Vacant in 2007	L Lost to Stock in 2007
Non-market	54,500	29,600	1,300	5,400	4,000	1,300	700	0	0	6,000	0	6,100
Extremely Low Rent	41,900	7,400	3,400	6,000	3,300	2,700	0	0	0	7,400	7,300	4,400
Very Low Rent	138,800	14,800	10,100	40,300	26,900	11,400	700	0	0	16,800	8,700	9,300
Low Rent	56,300	2,700	4,700	8,100	16,100	14,800	1,300	700	0	7,400	0	600
Moderate Rent	49,800	1,300	1,300	3,300	5,400	14,100	6,700	0	700	15,600	700	600
High Rent	11,300	0	700	0	0	2,000	2,700	0	1,300	4,000	0	600
Very High Rent	0	0	0	0	0	0	0	0	0	0	0	0
Extremely High Rent	700	0	0	0	0	700	0	0	0	0	0	0
Total	353,300	55,800	21,500	63,100	55,700	47,100	12,100	700	2,000	57,200	16,700	21,400

Table B: Backward-Looking Rental Dynamics Analysis, Counts: 2007-1998

Affordability groups	A Total in 2007	B Non- Market in 1998	C Extremely Low Rent in 1998	D Very Low Rent in 1998	E Low Rent in 1998	F Moderate Rent in 1998	G High Rent in 1998	H Very High Rent in 1998	I Extremely High Rent in 1998	J Owner Occupied in 1998	K Seasonal or Vacant in 1998	L New Construc- tion	M Other Additions
Non-market	70,300	28,100	7,100	14,000	2,600	1,300	0	0	0	9,500	600	4,400	2,700
Extremely Low Rent	26,700	1,200	3,000	9,000	4,300	1,300	600	0	0	3,700	1,200	800	1,600
Very Low Rent	85,900	5,000	6,200	37,500	7,500	3,100	0	0	0	12,900	1,200	4,000	8,500
Low Rent	68,300	3,600	2,900	24,900	15,100	5,000	0	0	0	11,100	1,200	1,400	3,000
Moderate Rent	60,100	1,300	2,400	11,500	14,000	12,700	1,900	0	600	9,400	600	3,800	1,800
High Rent	22,100	600	0	600	1,200	6,200	2,500	0	0	7,600	0	2,500	800
Very High Rent	2,200	0	0	0	600	0	0	0	0	600	0	1,000	0
Extremely High Rent	5,400	0	0	0	0	600	1,300	0	0	1,200	0	1,800	500
Total	341,000	39,900	21,500	97,600	45,200	30,300	6,300	0	600	56,100	4,800	19,700	19,000

Table B shows there were 341,000 rental units in the Baltimore metropolitan area in 2007, of which 99,600 were not rental units in 1998. The new units came from units that had been owner-occupied (56,100), units that had been vacant or in seasonal use (4,800), newly constructed units (19,700), and other additions (19,000).²⁰ Most of the formerly owner-occupied units went to the very low rent and low rent categories; most of the newly constructed rental units went to non-market, very low rent, and moderate rent categories.

There was an absolute decline in both the number of rental units and the number of affordable rental units between 1998 and 2007. The number of rental units declined by 3.5 percent. The number of units that were non-market, affordable to extremely low income persons, or affordable to very low income persons declined from 235,200 to 182,900, a decrease of 22 percent. The extremely low rent units in 2007 came from a variety of sources; the three largest contributors accounted for 64 percent of the 2007 stock. In order of importance, they were very low rent units in 1998 (34 percent), low rent units in 1998 (16 percent), and units that were owner-occupied in 1998 (14 percent). There were two major sources of very low rent units: very low rent units in 1998 (44 percent) and units that were owner-occupied in 1998 (15 percent).

Concluding Cautions

Readers should use caution in interpreting the results of the CINCH and rental dynamics analysis for Baltimore over the period between 1998 and 2007. Small sample sizes reduce the reliability of estimates for a number of segments of the housing stocks, particularly for the forward-looking analyses. In particular, counts of mobile homes are substantially in error. In addition, row 3 of Table 1 in the forward-looking CINCH analysis and row 2 in Table 1 of the backward-looking CINCH analysis were affected by the misclassification of rental units in the 1998 Baltimore survey. The misclassification of units appears to have had little effect on the rental dynamics analysis.

²⁰ The misclassification of rental units in the 1998 Baltimore survey apparently had little impact on the rental dynamics analysis work, because this analysis groups together rental units and units vacant for rent.

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 (13-26) 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. As noted in the text, the backward-looking weights produced estimates closer to the published estimates.

Appendix B: Weighting

CINCH separates the AHS samples in 1998 and 2007 into three pieces: (1) units that exist and are part of the housing stock in both years (SAMES); (2) units that are part of the 1998 housing stock but are not part of the 2007 housing stock (LOSSES); and (3) units that are not part of the 1998 housing stock but are part of the 2007 housing stock (ADDITIONS). ADDITIONS are split into NEW CONSTRUCTION and RECOVERIES (structures that existed in 1998 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 1998 and those ADDITIONS that were interviewed in 2007.

For the forward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 1998 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted count in 1998 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 1998.

For the backward-looking analysis, we started with the AHS pure weights and used the AHS weighted count in 2007 of SAMES to create weights for the interviewed SAMES. We used the AHS weighted counts in 2007 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 2007.

The logic behind the weighting and the procedures used to create the weights are explained in *Weighting Strategy for 2007 Metropolitan CINCH and Rental Dynamics Analysis*.