American Housing Survey

Components of Inventory Change: 2001-2003

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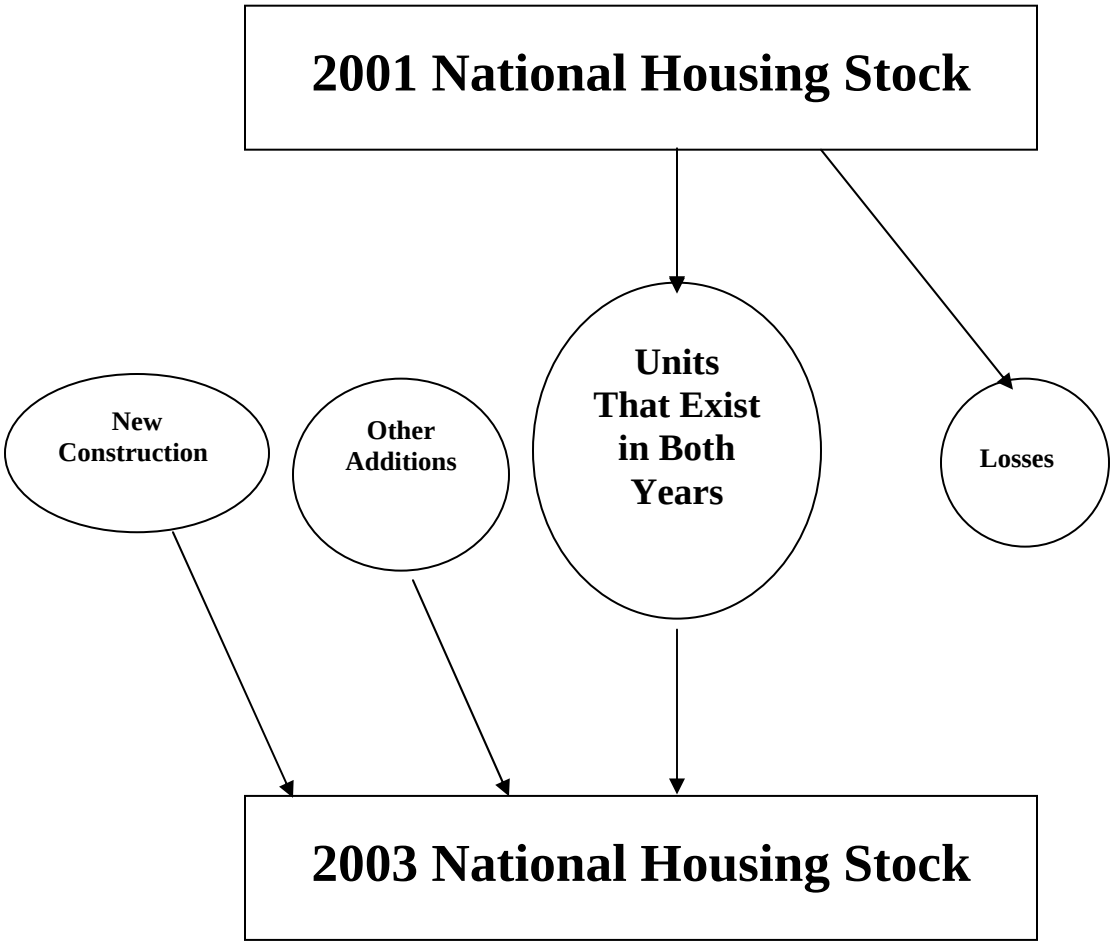
Principal Authors: Frederick J. Eggers & Fouad Moumen

Components of Inventory Change: 2001-2003

Overview

Components of Inventory Change (CINCH) is a tool used by housing analysts to study how the housing inventory changes over time. Figure 1 illustrates how the inventory evolves.

Figure 1: How the Housing Inventory Changes



According to the American Housing Survey (AHS), the 2001 housing stock contained 118,196,000 housing units.[1] Most of these units continued to be part of the 2003 housing

[1] The Census Bureau provides two sets of estimates for the 2001 housing stock, one using weights based on totals from the 1990 census and one using weights based on totals from the 2000 census. Because the 2003 AHS uses weights based on the 2000 census, this report contains the estimates for 2001 that use weights based on the 2000 census. The published report for 2001 AHS contains the estimates using weights based

stock, but some units disappeared from the housing stock between 2001 and 2003. The AHS estimated that the 2003 housing stock contained 120,777,000 housing units. Simple arithmetic shows that new construction and other additions had to provide a sufficient number of units to overcome any losses between 2001 and 2003 and to increase the overall stock by 2,581,000 units.

In the context of Figure 1, the Census Bureau provides estimates for both rectangles (the 2001 and 2003 housing stocks) and one oval (units added through new construction between 2001 and 2003). No one estimates the other three ovals: the number of units that belong to both the 2001 and 2003 housing stock, units lost to the housing stock between 2001 and 2003, and other additions to the housing stock between 2001 and 2003.

While losses and other additions are small relative to the overall stock, they encompass important features of how housing markets evolve. Housing units are "clumps" of physical capital and the housing inventory is the aggregation of these clumps. New construction creates new clumps and, like all capital, some "clumps" depreciate and disappear. But housing units undergo other interesting changes. Losses can be either permanent or temporary. Units destroyed by natural disasters or intentionally demolished are permanent losses. Temporary losses include units that are merged into other units or units that are used for nonresidential purposes. Additions can include units resulting from splitting up larger units, mobile home move-ins, and units that had been used formerly for nonresidential purposes.

In addition to determining the size of each oval, housing analysts find information about the characteristics of the units in the different ovals useful. Interesting characteristics include: structure type, age of the unit, size of the unit, location by region, location by metropolitan status, tenure, household size and composition, resident income, and resident race and ethnicity.

CINCH analysis has three goals:[2]

- To provide estimate for all six components of Figure 1.
- To disaggregate losses and other additions into relevant component parts.
- To characterize the units that survive from one period to the next and the units that are added or lost between periods.

The AHS has four features that make CINCH analysis possible:

- Each unit has weights that can be used to estimate its share of the overall stock.
- The AHS tracks new construction and the various types of losses and other additions.

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on the 1990 census. The estimates using weights based on the 2000 census can be found at Census Bureau web site: http://www.census.gov/hhes/www/housing/ahs/ahs01_2000wts/ahs01_2000wts.html.

[2] Previous CINCH analyses have distinguished between the status of a unit with respect to the housing stock, e.g., existing as a nonresidential structure, and the characteristics of the unit or its occupants, e.g., rental vs. owner-occupied or the race of the householder. This report will use this same distinction. Also adopting previous CINCH terminology, the report will refer to the more recent AHS survey, 2003, as the current year and the previous AHS survey year, 2001, as the base year.

- The AHS has detailed information about the characteristics of each unit and its occupants.
- The AHS tracks the same unit from one period to the next so that changes in status and characteristics can be observed directly.

Weighting Issues Involved in Using the AHS

It would be possible to list for every AHS unit its status and characteristics in both 2001 and 2003. In some cases, there may be no status, e.g., not yet constructed in 2001, or no characteristics, e.g., no race of householder for vacant units; but, with this understanding, such a listing would still be possible. From the listing, one could construct an exact accounting of the movement of units among the various statuses and characteristics between 2001 and 2003.

The exact accounting would apply only to AHS sample observations, roughly a 1-in-2,200 picture of the housing stock at the national level. To obtain estimates of the magnitude of actual changes in the housing stock, one needs to apply weights to the sampled units. When weights are applied, the accounting will no longer be exact because units have different weights in different years.[3] For example, the exact accounting might show that 2,500 sample units that were rental in 2001 became owner-occupied in 2003. To estimate the number of units in the national housing stock that were rental in 2001 and became owner-occupied in 2003, one would need to apply weights. But using 2001 weights will produce a different estimate than using 2003 weights. There is no conceptual reason to favor the answer using 2001 weights over the answer using 2003 weights. The choice of weights depends upon how the intended analysis will be used.[4]

For this reason, previous CINCH analyses have distinguished between:

> (A) *Forward-looking analysis*, that is, starting with the base year stock (2001) and determining the status and characteristics of *those* units in the current year (2003). The goal is to explain what happened to the 118,196,000 units comprising the housing stock in the base year. Forward-looking analysis takes the housing stock as given in the base year and looks at the destination of these units in the current year.

[3] The Census Bureau assigns both a pure weight (the inverse of the probability of selection) and a final weight to each AHS observation. The final weights are designed to sum up to independent estimates of the total housing stock. The pure weights will vary over observations within a given AHS because of stratification in drawing the sample. The pure weight of a given observation will vary between surveys if the sample size changes. (Some limited variation in pure weights of given units has been observed over time independent of any change in sample size. These are generally errors.) The final weights will differ over observations within a given AHS because the Census Bureau makes adjustments for various factors affecting the sample. The final weights of a given observation will vary between AHS surveys because of changes in the housing stock.

[4] Weighting issues are explained in greater detail in a separate paper, *Weighting Strategy For 2001-2003 CINCH Analysis*.

(B) *Backward-looking analysis*, that is, starting from the current year (2003) stock and determining the status and characteristics of *those* units in the base year (2001). The goal here is to explain where the 120,777,000 units comprising the current year housing stock came from. Backward-looking analysis takes the current year housing stock as given and looks at the source of these units, either in the base year or in new construction.

We will follow the same procedure.

The remainder of this report consists of three 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 2001 to 2003 and identifying how units were lost to the housing stock, and a set of backward-looking tables tracing where 2003 units came from and distinguishing between units that were part of the stock in 2001 and units that were additions to the stock since 2001.
- A limited discussion of the results in the forward- and backward-looking 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 2001 housing stock by 2003. There are three basic dispositions of 2001 units:

- units that continue to exist in 2003 with the same characteristics (or serving the same market)
- units that continue to exist in 2003 but with different characteristics (or serving a different market)
- units that were lost to the stock.

The backward-looking tables are concerned with where the 2003 housing stock came from in reference to 2001. There are three basic sources of 2003 units:

- units that existed in 2001 with the same characteristics (or serving the same market)
- units that existed in 2001 but with different characteristics (or serving a different market)
- units that are additions to the housing stock.

Since the essence of the CINCH analysis is in the columns, we will explain the columns in detail.

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

- The first and last columns contain the row numbers – the row numbers are identical for the same tables in the forward-looking and backward-looking sets.[5]

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 16 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 2001 AHS report counted 105,435,000 occupied units in 2001 (column B, row 2, forward-looking Table 1); the 2003 AHS report counted 105,842,000 occupied units (column B, row 2, backward-looking Table 1).

- Column C gives the CINCH estimate of the number of units that satisfy two conditions: (a) being part of the housing stock in the relevant year (2001 for the forward-looking tables and 2003 for the backward-looking tables), and (b) satisfying the condition in Column A. CINCH uses different weights than those used in preparing the published reports. Therefore, CINCH estimates can differ from AHS estimates for particular subsets of the housing stock. As explained in the appendix, the weights were created to match certain AHS published totals; for this reason, rows 2 through 4 of Table 1 are perfect matches. This perfect match will not be true for most other rows.[6]

- 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 96,424,000 of the occupied units in 2001 were occupied in 2003.

- 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

[5] Because the Census Bureau changed the way it collects data on race, forward-looking Table 3 contains a row (#15, other races) not found in backward-looking Table 3, and backward-looking Table 3 contains a row (#16, two or more races) not found in forward-looking Table 3.

[6] 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.

subset defined by column A. Column E of row 2 indicates that 7,947,000 units that were occupied in 2001 are still part of the housing stock in 2003 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 characteristics 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 2001 to 2003.

- Column F is the CINCH estimate of the number of units from column C that are not in the 2003 housing stock because they were merged with other units or converted into multiple units. Among occupied units, 79,000 units were lost to mergers and conversions.

- Column G is the CINCH estimate of the number of mobile homes from Column C that were moved out during the period. In many cases, these were not units that left the stock in 2002 or 2003. The AHS does not track what happens when a mobile home is moved off of a lot that is part of the AHS sample, and does not inquire about the previous history of a unit that is moved on to a lot that is part of the AHS sample. Because the AHS does not know the history of these units, mobile homes that move from one lot to another are treated as both losses and additions. Among occupied units, 146,000 mobile homes were moved out.[7]

- Column H is the CINCH estimate of the number of units from Column C that became nonresidential at the end of the period. For example, a real estate firm, a tax preparation office, a palm reader, or some other business might buy or rent a house to use for business rather than residential purposes.[8] Among occupied units, 132,000 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 2003. In this case, 220,000 units were demolished or destroyed.

- Column J is the CINCH estimate of the number of units from Column C that by 2003 were condemned or were no longer usable for housing because of extensive damage. Among occupied units, 132,000 units are no longer usable for housing.

[7] This column also includes houses, other than mobile homes, that were moved from the lots they occupied in 2001.

[8] If the owner or tenant both lives in a unit and conducts business out of the unit, the AHS considers the unit to be residential. 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 2003 for other reasons. These include units for which permits had been granted in 2001 or earlier but where construction never started, where construction had not been completed by 2003, or where the permit was abandoned. Also included are unoccupied sites for mobile homes and losses not otherwise classified. Among occupied units, there were 355,000 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.

Columns Unique to Backward Looking Tables

In backward-looking tables, Columns F through J track where units came from that are part of the housing stock in 2003 but were not part of the 2001 housing stock.

- Column F is the CINCH estimate of the number of units from column C that were created by the merger or conversion of other units. Among occupied units in 2003, 57,000 were additions to the stock since 2001 that were created by mergers or conversions (column F, row 2 of backward-looking Table 1).

- Column G estimates the number of mobile homes from Column C that were moved in during the period. Among occupied units, 377,000 mobile homes were moved in. In many cases, these were not units that left the stock at an earlier time and returned to the stock in 2002 or 2003. The AHS does not track what happens when a mobile home is moved off of a lot that is part of the AHS sample, and does not inquire about the previous history of a unit that is moved on to a lot that is part of the AHS sample. Because the AHS does not know the history of these units, mobile homes that move from one lot to another are treated as both losses and additions.

- Column H is the CINCH estimate of the number of units from Column C that had been nonresidential in 2001. Among occupied units, 116,000 had been nonresidential in 2001.

- Column I is the CINCH estimate of the number of units from Column C that were newly constructed between 2001 and 2003. Among occupied units, 2,535,000 units were newly constructed.

- Column J is the CINCH estimate of the number of units from Column C that were added by 2003 for other reasons. These include units that were considered temporary losses because occupancy was prohibited in 2001 or the interior of the unit was exposed to the elements, and also units that the Census Bureau

considered temporarily lost to the housing stock for reasons "not classified." Among occupied units, 240,000 had been temporarily lost to the stock in 2001.

Now the report turns to a discussion of the forward-looking and backward-looking tables. The discussion uses four terms:

- Loss rate – the sum of columns F through K in the forward-looking tables divided by column C.

- Rate of total additions – the sum of columns F through J in the backward-looking tables divided by column C.

- New construction rate – column I in the backward-looking tables divided by column C.

- Other additions rate – the sum of columns F, G, H, and J in the backward-looking tables divided by column C.

The rate of total additions equals the new construction rate plus the other additions rate.

The discussion will also compare the rate at which selected events occur for certain parts of the housing stock with the rate at which they occur for either the entire stock (Table 1) or the occupied stock (Tables 2, 3, and 4). For example, among all units in the 2001 housing stock, 0.2 percent were lost by 2003 because they had been condemned or were seriously damaged. The ratio for vacant units was one percent. Therefore, vacant units were five times more likely to be lost because of severe damage than the typical unit.

Finally, the report will occasionally look at *persistence*, the tendency for a characteristic to appear in the same unit in both survey years.

- For the forward-looking tables, persistence is the ratio of the units with a given characteristic in 2001 that survive to 2003 and have the same characteristic in 2003 to the number of units with that characteristic in 2001 that survived to 2003, with or without that characteristic in 2003.

- For the backward-looking tables, persistence is the ratio of the number of units with a given characteristic in 2003 that existed in 2001 and had the same characteristic in 2001 to the number of units in 2003 with that characteristic and that existed in 2001, with or without that characteristic.

In both cases, the ratio is calculated as column D divided by the sum of columns D and E.

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

	A Characteristics	B Published numbers	C Present in 2001	D 2001 units present in 2003	E Change in character-istics	F '01 units affected by conversion /merger	G '01 house or mobile home moved out	H '01 units changed to nonresidential use	I '01 units lost through demolition or disaster	J '01 units badly damaged or condemned	K '01 units lost in other ways	
1	**Total Housing Stock**	118,196	118,195	116,337	NA	131	231	354	382	253	508	1
	Occupancy Status											
2	Occupied	105,435	105,435	96,424	7,947	79	146	132	220	132	355	2
3	Vacant	9,705	9,705	3,494	5,624	46	62	131	134	95	119	3
4	Seasonal	3,055	3,055	1,674	1,174	5	23	92	28	26	33	4
	Units in Structure											
5	1, detached	72,796	74,218	73,571	NA	36	39	82	227	128	135	5
6	1, attached	8,382	8,668	8,516	NA	28	0	54	24	18	27	6
7	2 to 4	9,280	9,315	9,067	NA	46	0	63	49	32	57	7
8	5 to 9	5,641	5,376	5,287	NA	9	0	21	12	18	30	8
9	10 to 19	5,334	4,931	4,870	NA	2	0	24	26	3	7	9
10	20 to 49	3,870	3,682	3,635	NA	3	0	25	9	5	6	10
11	50 or more	4,062	4,113	4,025	NA	5	0	67	3	7	7	11
12	Mobile Home/trailer	8,831	7,892	7,366	NA	3	192	18	33	42	238	12
	Year Built											
13	2000-2004	3,119	2,439	2,418	NA	0	3	8	0	2	8	13
14	1995-1999	8,883	9,306	9,097	NA	3	61	14	8	0	123	14
15	1990-1994	7,203	6,989	6,911	NA	0	29	5	4	3	37	15
16	1985-1989	8,878	8,641	8,548	NA	3	27	15	8	5	36	16
17	1980-1984	7,664	7,570	7,516	NA	2	18	9	5	3	17	17
18	1975-1979	11,855	11,982	11,749	NA	19	28	60	40	23	64	18
19	1970-1974	11,383	11,424	11,280	NA	10	21	23	45	24	21	19
20	1960-1969	15,709	15,960	15,725	NA	5	20	87	45	32	46	20
21	1950-1959	13,623	13,642	13,472	NA	12	12	33	55	34	23	21
22	1940-1949	8,195	8,304	8,164	NA	17	0	15	57	18	32	22
23	1930-1939	6,524	6,573	6,431	NA	9	7	21	40	35	30	23
24	1920-1929	5,412	5,433	5,334	NA	7	3	21	25	25	19	24
25	1919 or earlier	9,749	9,933	9,691	NA	45	2	44	51	49	51	25
26	**Median**	1969	1970	1970	NA	1943	1986	1965	1953	1950	1977	26

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

	A Characteristics	B Published numbers	C Present in 2001	D 2001 units present in 2003	E Change in character-istics	F '01 units affected by conversion /merger	G '01 mobile homes moved out	H '01 units changed to nonresidential use	I '01 units lost through demolition or disaster	J '01 units badly damaged or condemned	K '01 units lost in other ways	
	Rooms											
27	1 room	615	649	292	281	10	0	43	2	7	14	27
28	2 rooms	1,391	1,413	573	712	12	7	60	10	12	28	28
29	3 rooms	10,612	10,493	7,353	2,853	32	19	84	49	44	59	29
30	4 rooms	22,905	22,534	14,455	7,574	26	96	76	124	82	101	30
31	5 rooms	27,687	27,459	15,019	12,068	20	56	33	78	41	144	31
32	6 rooms	24,448	24,390	12,458	11,657	17	28	33	79	36	81	32
33	7 rooms	14,591	14,814	6,439	8,270	5	15	3	17	12	54	33
34	8 rooms	8,388	8,670	3,524	5,098	4	0	9	16	10	10	34
35	9 rooms	3,870	3,973	1,417	2,530	5	2	3	5	3	10	35
36	10 rooms or more	3,690	3,799	1,490	2,276	0	8	11	3	5	7	36
	Bedrooms											
37	None	1,209	1,252	620	497	15	5	70	7	12	26	37
38	1	14,327	14,176	11,421	2,358	46	25	110	58	62	95	38
39	2	34,425	34,223	27,990	5,626	32	112	97	159	91	115	39
40	3	47,986	47,852	40,354	6,929	28	70	59	117	56	238	40
41	4 or more	20,249	20,692	17,196	3,346	10	18	18	41	31	34	41
42	**Multiunit Structures**	28,187	27,417	26,884	NA	64	0	200	98	64	108	42
	Stories in Structures											
43	1		3,202	3,120	NA	15	0	24	17	8	19	43
44	2		11,434	11,268	NA	20	0	60	50	23	13	44
45	3		7,160	7,003	NA	20	0	45	22	26	45	45
46	4 to 6		3,928	3,854	NA	8	0	32	5	5	24	46
47	7 or more		1,694	1,639	NA	2	0	39	5	3	7	47
	Region											
48	Northeast	22,382	22,476	22,196	NA	53	5	60	38	44	80	48
49	Midwest	27,396	27,914	27,545	NA	26	34	55	117	47	91	49
50	South	43,466	43,514	42,548	NA	32	173	163	188	138	271	50
51	West	24,953	24,291	24,048	NA	19	19	76	39	23	67	51
	Metro Status											
52	Inside metro area	92,345	88,936	87,845	NA	95	92	259	228	148	270	52
53	In central cities	34,760	33,835	33,294	NA	54	3	161	128	80	116	53
54	In suburbs	57,584	55,100	54,552	NA	41	89	98	100	68	154	54
55	Outside metro area	25,851	29,259	28,492	NA	36	139	95	154	105	238	55

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

	Mover Status												
56	Moved in last 2 years		23,475	6,942	16,173	30	42	74	70	33	111	56
57	Not a recent mover		81,960	73,050	8,205	49	104	58	150	99	244	57

Forward-Looking Table 2: Condition of Unit – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2001	D 2001 units present in 2003	E Change in character-istics	F '01 units affected by conversion /merger	G '01 mobile homes moved out	H '01 units changed to nonresidential use	I '01 units lost through demolition or disaster	J '01 units badly damaged or condemned	K '01 units lost in other ways	
1	**Occupied Units**	105,435	105,435	96,424	7,947	79	146	132	220	132	355	1
	Kitchen											
2	With complete kitchen	103,804	103,817	94,211	8,626	68	143	101	213	114	341	2
3	Lacking complete kitchen facilities	1,632	1,618	188	1,346	12	3	31	8	18	15	3
	Plumbing											
4	With all plumbing facilities	104,071	104,032	94,108	8,903	75	146	110	220	119	350	4
5	Lack some plumbing	1,364	1,403	148	1,211	4	0	22	0	13	5	5
6	No hot piped water	289	316	70	216	0	0	14	0	10	5	6
7	No bathtub/shower	275	298	102	168	4	0	14	0	5	5	7
8	No flush toilet	261	280	89	164	1	0	14	0	8	5	8
9	No exclusive use	1,013	1,012	18	983	0	0	8	0	3	0	9
	Water											
10	Public/private water	91,836	90,836	82,563	7,479	74	96	123	176	111	214	10
11	Well	13,162	14,079	12,705	1,118	5	50	5	41	13	141	11
12	Other water source	437	520	394	111	0	0	4	3	9	0	12
	Sewer											
13	Public sewer	83,178	82,452	73,558	8,241	69	31	122	156	93	182	13
14	Septic tank/cesspool	22,194	22,905	18,771	3,731	10	115	10	64	31	173	14
15	Other	63	78	42	29	0	0	0	0	8	0	15
16	**Severe Problems**	2,108	2,129	245	1,825	4	3	24	3	18	8	16
17	Plumbing	1,364	1,403	148	1,211	4	0	22	0	13	5	17
18	Heating	609	594	39	547	0	3	0	0	3	3	18
19	Electric	79	76	34	40	0	0	0	0	3	0	19
20	Upkeep	110	105	10	87	0	0	3	3	3	0	20
21	Hallways	7	8	0	8	0	0	0	0	0	0	21
22	**Moderate problems**	4,503	4,541	1,448	2,967	15	13	16	25	25	32	22
23	Plumbing	260	194	5	183	0	0	0	3	0	3	23
24	Heating	1,506	1,638	1,215	388	5	5	0	10	10	5	24
25	Kitchen	1,430	1,618	188	1,346	12	3	31	8	18	15	25
26	Upkeep	1,440	1,540	162	1,345	3	5	3	10	8	5	26
27	Hallways	98	113	3	103	0	0	0	5	3	0	27

Forward-Looking Table 3: Household Characteristics – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2001	D 2001 units present in 2003	E Change in character-istics	F '01 units affected by conversion /merger	G '01 mobile homes moved out	H '01 units changed to nonresidential use	I '01 units lost through demolition or disaster	J '01 units badly damaged or condemned	K '01 units lost in other ways	
1	**Occupied units**	105,435	105,435	96,424	7,947	79	146	132	220	132	355	1
	Age											
2	Under 65	83,779	82,644	72,415	9,328	66	128	109	182	103	313	2
3	65 to 74	10,680	11,219	7,974	3,172	8	10	10	13	8	25	3
4	75 or older	10,975	11,572	9,062	2,420	6	8	13	25	21	18	4
	Children											
5	Some	38,372	38,219	28,526	9,328	10	65	31	84	48	128	5
6	None	67,063	67,216	55,532	10,986	69	81	101	136	84	228	6
	Race/Ethnicity											
7	White	84,612	85,762	76,180	8,741	58	130	107	160	87	299	7
8	Hispanic	6,443	6,740	4,759	1,894	5	8	5	13	8	48	8
9	Non-Hispanic	78,169	79,022	68,427	9,840	53	122	102	147	79	251	9
10	Black	13,223	11,905	8,925	2,809	11	16	10	50	38	46	10
11	Hispanic		248	29	216	3	0	0	0	0	0	11
12	Non-Hispanic		11,657	8,708	2,781	8	16	10	50	38	46	12
13	American Indian, Eskimo, Aleut	610	614	217	394	0	0	0	3	0	0	13
14	Asian & Pacific Island	3,294	3,323	2,147	1,160	0	0	4	5	0	8	14
15	Other	3,696	3,832	NA	3,799	10	0	10	3	8	3	15
17	Total Hispanics	9,720	10,150	7,243	2,793	16	8	13	15	13	51	17
	Income Source											
18	Wages and salaries	82,972	82,189	68,077	13,311	54	91	85	172	103	297	18
19	Business or farm	10,348	10,535	4,360	6,112	3	16	8	15	8	15	19
20	Social security or pension	28,608	29,993	22,267	7,478	11	30	23	48	34	103	20
21	Dividend or interest		36,948	19,139	17,650	15	25	25	33	15	46	21
22	Welfare or SSI	5,082	5,176	1,778	3,326	3	10	10	15	18	16	22

Forward-Looking Table 4: Tenure, Housing Cost, and Income – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2001	D 2001 units present in 2003	E Change in character-istics	F '01 units affected by conversion /merger	G '01 mobile homes moved out	H '01 units changed to nonresidential use	I '01 units lost through demolition or disaster	J '01 units badly damaged or condemned	K '01 units lost in other ways	
1	**Occupied units**	105,435	105,435	96,424	7,947	79	146	132	220	132	355	1
	Tenure											
2	Owner occupied	71,708	71,708	65,558	5,625	22	116	23	97	55	212	2
3	Percent own occupied	68.0%	68.0%	68.0%	70.8%	27.8%	79.5%	17.4%	44.1%	41.7%	59.7%	3
4	Renter occupied	33,727	33,727	26,083	7,106	57	30	109	123	77	143	4
	Renter Monthly Housing Costs											
5	Less than $350	6,580	6,570	3,232	3,169	20	5	47	43	25	29	5
6	$350 to $599	9,898	10,213	5,111	4,934	22	18	20	43	24	42	6
7	$600 to $799	8,178	7,974	3,642	4,247	8	7	15	15	20	20	7
8	$800 to $1,249	6,838	6,750	3,446	3,228	3	0	22	15	5	33	8
9	$1,250 or more	2,234	2,220	1,064	1,117	5	0	5	8	3	20	9
	Renter Hsd Income											
10	Less than $15,000	9,747	9,802	4,184	5,410	18	12	60	43	36	38	10
11	$15,000 to $29,999	8,843	8,883	2,722	5,979	21	8	28	50	15	61	11
12	$30,000 to $49,999	8,057	7,932	2,331	5,506	8	5	11	20	20	31	12
13	$50,000 to $99,999	5,798	5,835	1,820	3,974	5	5	8	5	5	13	13
14	$100,000 or more	1,281	1,275	246	1,017	5	0	3	5	0	0	14
	Owner Monthly Housing Costs											
15	Less than $350	19,232	17,422	9,775	7,463	3	42	5	48	23	63	15
16	$350 to $599	13,008	13,081	5,098	7,859	6	35	5	20	28	31	16
17	$600 to $799	8,305	8,317	2,531	5,759	6	5	0	0	3	13	17
18	$800 to $1,249	14,911	14,938	6,934	7,872	0	18	5	20	0	88	18
19	$1,250 or more	16,254	17,950	12,311	5,580	8	15	8	9	3	17	19
	Owner Hsd Income											
20	Less than $15,000	9,513	9,548	3,593	5,828	8	38	3	38	18	23	20
21	$15,000 to $29,999	11,764	11,657	3,922	7,628	2	30	3	17	13	43	21
22	$30,000 to $49,999	14,270	14,217	4,794	9,301	3	28	5	20	15	51	22
23	$50,000 to $99,999	23,353	23,301	11,953	11,213	8	20	8	19	5	76	23
24	$100,000 or more	12,808	12,985	7,023	5,927	3	0	5	3	5	20	24

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

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
1	**Total Housing Stock**	120,777	120,777	116,328	NA	66	519	291	3,137	436	1
	Occupancy Status										
2	Occupied	105,842	105,842	96,353	6,164	57	377	116	2,535	240	2
3	Vacant	11,369	11,369	3,590	6,907	9	75	120	541	128	3
4	Seasonal	3,566	3,566	1,669	1,645	0	67	55	61	69	4
	Units in Structure										
5	1, detached	74,916	75,793	73,247	NA	11	35	83	2,228	189	5
6	1, attached	7,227	7,113	6,752	NA	6	13	21	279	42	6
7	2 to 4	9,965	10,025	9,793	NA	28	2	29	112	60	7
8	5 to 9	6,012	5,954	5,836	NA	2	0	25	75	15	8
9	10 to 19	5,433	5,452	5,300	NA	0	0	12	121	19	9
10	20 to 49	3,964	4,013	3,848	NA	0	0	11	149	4	10
11	50 or more	4,289	4,503	4,301	NA	0	0	72	111	19	11
12	Mobile Home/trailer	8,971	7,925	7,250	NA	18	469	38	61	89	12
	Year Built										
13	2000-2004	6,237	5,643	2,647	NA	2	115	8	2,810	61	13
14	1995-1999	8,851	9,538	9,181	NA	11	141	18	132	56	14
15	1990-1994	7,155	7,209	6,957	NA	9	59	17	130	37	15
16	1985-1989	8,865	8,587	8,530	NA	4	35	6	12	0	16
17	1980-1984	7,584	7,591	7,530	NA	0	25	15	6	15	17
18	1975-1979	12,314	11,969	11,814	NA	0	44	46	2	63	18
19	1970-1974	11,188	11,337	11,216	NA	0	74	17	13	17	19
20	1960-1969	15,482	15,725	15,619	NA	5	18	37	8	38	20
21	1950-1959	13,433	13,482	13,398	NA	9	2	44	4	24	21
22	1940-1949	8,152	8,141	8,087	NA	0	0	11	2	40	22
23	1930-1939	6,362	6,411	6,375	NA	11	0	2	0	23	23
24	1920-1929	5,479	5,397	5,332	NA	3	2	29	7	24	24
25	1919 or earlier	9,672	9,748	9,640	NA	12	5	41	11	39	25
26	**Median**	1971	1971	1970	NA	1958	1995	1965	2002	1976	26

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

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
	Rooms										
27	1 room	520	608	301	247	0	2	48	2	9	27
28	2 rooms	1,432	1,391	575	740	5	16	30	6	19	28
29	3 rooms	10,939	10,866	7,470	3,082	8	26	55	169	56	29
30	4 rooms	23,360	23,169	14,558	7,851	22	160	46	380	152	30
31	5 rooms	27,961	27,795	15,008	11,731	18	182	25	742	90	31
32	6 rooms	24,657	24,569	12,398	11,399	7	47	47	599	72	32
33	7 rooms	14,662	14,777	6,390	7,839	2	43	27	454	21	33
34	8 rooms	8,283	8,476	3,496	4,602	0	32	2	338	7	34
35	9 rooms	3,921	4,008	1,406	2,399	2	5	0	192	5	35
36	10 rooms or more	5,042	5,119	1,480	3,356	2	7	12	257	6	36
	Bedrooms										
37	None	1,216	1,255	634	512	2	15	63	9	20	37
38	1	14,389	14,287	11,589	2,300	29	29	58	209	73	38
39	2	34,810	34,683	28,126	5,476	20	189	63	636	173	39
40	3	48,819	48,646	40,171	6,711	9	212	73	1,333	137	40
41	4 or more	21,543	21,906	17,071	3,738	6	74	34	949	33	41
42	**Multiunit Structures**	29,663	29,946	29,079	NA	31	2	149	569	116	42
	Stories in Structures										
43	1		3,528	3,454	NA	7	0	4	46	17	43
44	2		12,829	12,549	NA	11	2	39	182	45	44
45	3		7,612	7,306	NA	14	0	43	221	28	45
46	4 to 6		4,095	3,937	NA	0	0	42	95	20	46
47	7 or more		1,882	1,833	NA	0	0	20	24	6	47
	Region										
48	Northeast	22,602	22,759	22,206	NA	14	19	104	343	73	48
49	Midwest	27,893	28,411	27,513	NA	32	98	58	630	79	49
50	South	44,659	44,579	42,498	NA	10	352	68	1,424	227	50
51	West	25,623	25,028	24,111	NA	11	50	61	740	56	51
	Metro Status										
52	Inside metro area	94,488	90,823	87,836	NA	26	124	194	2,400	243	52
53	In central cities	35,217	34,220	33,395	NA	8	6	129	582	100	53
54	In suburbs	59,271	56,604	54,442	NA	18	118	65	1,818	143	54
55	Outside metro area	26,289	29,954	28,492	NA	40	395	97	737	193	55

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

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
	Mover Status										
56	Moved in last 2 years		21,120	7,058	11,903	25	108	62	1,834	131	56
57	Not a recent mover		84,722	67,943	15,613	32	270	54	701	109	57

Backward-Looking Table 2: Condition of Unit – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
1	**Occupied Units**	105,842	105,842	96,353	6,164	57	377	116	2,535	240	1
	Kitchen										
2	With complete kitchen	104,289	104,424	94,107	7,051	56	364	106	2,512	228	2
3	Lacking complete kitchen facilities	1,553	1,418	191	1,168	1	14	10	23	12	3
	Plumbing										
4	With all plumbing facilities	104,487	104,462	94,027	7,139	55	366	114	2,527	235	4
5	Lack some plumbing	1,355	1,380	150	1,202	2	12	2	8	5	5
6	No hot piped water	225	233	70	147	0	12	0	2	2	6
7	No bathtub/shower	166	176	102	65	0	7	0	0	2	7
8	No flush toilet	139	148	89	51	0	7	0	0	0	8
9	No exclusive use	1,063	1,070	18	1,042	2	0	2	6	0	9
	Water										
10	Public/private water	92,324	91,277	82,577	6,018	35	212	101	2,157	176	10
11	Well	13,097	14,084	12,624	834	22	161	15	371	57	11
12	Other water source	422	482	392	72	0	5	0	7	7	12
	Sewer										
13	Public sewer	84,064	83,569	73,628	7,674	48	85	89	1,919	126	13
14	Septic tank/cesspool	21,697	22,186	18,647	2,490	9	286	27	616	111	14
15	Other	81	87	42	36	0	7	0	0	2	15
16	**Severe Problems**	1,970	1,991	248	1,702	2	14	2	10	14	16
17	Plumbing	1,355	1,380	150	1,202	2	12	2	8	5	17
18	Heating	495	498	39	452	0	2	0	0	5	18
19	Electric	93	93	34	45	0	9	0	2	2	19
20	Upkeep	87	89	11	74	0	0	0	0	5	20
21	Hallways	7	5	0	5	0	0	0	0	0	21
22	**Moderate problems**	4,320	4,151	1,451	2,596	1	43	10	32	18	22
23	Plumbing	195	224	5	212	0	0	0	7	0	23
24	Heating	1,447	1,550	1,214	290	0	39	0	0	7	24
25	Kitchen	1,410	1,418	191	1,168	1	14	10	23	12	25
26	Upkeep	1,303	1,359	163	1,186	0	7	0	0	2	26
27	Hallways	148	153	3	146	0	0	0	2	2	27

Backward-Looking Table 3: Household Characteristics – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
1	**Occupied units**	105,842	105,842	96,353	6,164	57	377	116	2,535	240	1
	Age										
2	Under 25	84,215	82,902	72,427	7,542	39	327	95	2,270	201	2
3	65 to 74	10,782	11,358	7,932	3,184	13	25	10	166	27	3
4	75 or older	10,845	11,582	9,031	2,401	5	25	11	98	11	4
	Children										
5	Some	38,158	37,802	28,480	7,844	11	182	33	1,161	91	5
6	None	67,864	68,040	55,461	10,733	46	195	83	1,373	149	6
	Race/Ethnicity										
7	White	87,483	88,558	75,996	9,771	49	329	93	2,118	201	7
8	Hispanic	10,125	10,138	4,776	5,059	4	35	10	224	31	8
9	Non-Hispanic	77,358	78,419	68,214	7,718	45	295	83	1,894	170	9
10	Black	13,004	11,923	8,957	2,641	5	43	16	235	25	10
11	Hispanic	456	402	29	366	0	0	0	4	2	11
12	Non-Hispanic	12,548	11,521	8,739	2,464	5	43	16	231	23	12
13	American Indian, Eskimo, Aleut	664	657	218	395	2	2	6	27	7	13
14	Asian & Pacific Island	3,478	3,525	2,151	1,246	0	0	1	125	2	14
16	Two or more races	1,215	1,179	NA	1,143	0	2	0	30	5	16
17	Total Hispanics	11,038	10,960	7,280	3,354	4	35	10	244	33	17
	Income Source										
18	Wages and salaries	83,070	82,318	68,013	11,456	32	307	92	2,235	183	18
19	Business or farm	10,062	10,165	4,327	5,452	7	18	14	318	28	19
20	Social security or pension	28,485	29,885	22,167	7,123	25	70	26	408	66	20
21	Dividend or interest		32,463	19,004	12,416	19	49	28	888	59	21
22	Welfare or SSI	4,975	5,073	1,798	3,176	2	23	7	36	32	22

Backward-Looking Table 4: Tenure, Housing Cost, and Income – All Occupied Units (counts in thousands)

	A Characteristics	B Published numbers	C Present in 2003	D 2003 units present in 2001	E Change in character-istics	F '03 units created by conversion /merger	G '03 house or mobile home moved in	H '03 units derived from nonresidential use	I '03 units added by new construction	J '03 units added from temporary losses or other	
1	**Occupied units**	105,842	105,842	96,353	6,164	57	377	116	2,535	240	1
	Tenure										
2	Owner occupied	72,238	72,238	64,914	4,787	32	291	45	2,053	116	2
3	Percent own occupied	68.3%	68.3%	67.4%	77.7%	56.1%	77.2%	38.8%	81.0%	48.3%	3
4	Renter occupied	33,604	33,604	26,628	6,188	25	86	71	482	124	4
	Renter Monthly Housing Costs										
5	Less than $350	6,368	6,234	3,307	2,756	5	42	23	54	47	5
6	$350 to $599	9,366	9,469	5,218	4,072	12	35	13	83	37	6
7	$600 to $799	8,014	7,983	3,715	4,116	2	9	14	105	21	7
8	$800 to $1,249	7,399	7,432	3,518	3,743	7	0	14	141	10	8
9	$1,250 or more	2,458	2,487	1,086	1,285	0	0	8	99	9	9
	Renter Hsd Income										
10	Less than $15,000	9,425	9,515	4,272	5,014	7	28	25	118	52	10
11	$15,000 to $29,999	9,016	8,905	2,779	5,946	6	26	14	92	42	11
12	$30,000 to $49,999	8,054	7,997	2,379	5,438	9	28	10	116	17	12
13	$50,000 to $99,999	5,810	5,891	1,858	3,887	3	5	20	112	7	13
14	$100,000 or more	1,300	1,296	251	992	0	0	2	45	6	14
	Owner Monthly Housing Costs										
15	Less than $350	18,658	16,790	9,679	6,728	14	124	7	191	47	15
16	$350 to $599	12,507	12,893	5,048	7,585	5	59	9	169	18	16
17	$600 to $799	8,340	8,218	2,507	5,458	11	47	5	181	9	17
18	$800 to $1,249	14,780	14,736	6,866	7,264	2	41	13	535	14	18
19	$1,250 or more	17,954	19,602	12,190	6,376	0	20	12	978	27	19
	Owner Hsd Income										
20	Less than $15,000	8,481	8,431	3,558	4,722	0	45	2	85	18	20
21	$15,000 to $29,999	11,381	11,386	3,884	7,193	20	104	9	149	27	21
22	$30,000 to $49,999	14,513	14,403	4,747	9,193	11	77	11	345	18	22
23	$50,000 to $99,999	23,692	23,739	11,836	10,964	0	45	14	858	21	23
24	$100,000 or more	14,171	14,280	6,954	6,652	0	20	8	614	32	24

Discussion of CINCH Results

Forward-Looking Analysis – 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. Overall the loss rate was 1.6 percent, that is, on average 16 out of every 1,000 units were lost to the stock between 2001 and 2003. The largest source of losses is "other losses," a category that includes units still under construction or abandoned while under construction, and losses for unclassified reasons. Demolitions and disaster losses are the second highest category of losses, followed by losses to nonresidential uses.

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 owner-occupied units, renter-occupied units, vacant units, and seasonal units. Occupied units is the sum of owner-occupied units and renter-occupied units.

The loss rate was substantially higher among vacant and seasonal units (6.0 and 6.8 percent respectively) than among occupied units (1.0 percent). Seasonal units were 10 times more likely to be converted to nonresidential use than the typical unit in the stock. Vacant units were 4 times as likely to be destroyed as the typical unit.

Rows 5-12 divide the housing stock by type of structure to see what type of units account for losses.[9] Mobile homes had the highest loss rate, almost 7 percent. The "lost in other ways" category accounted for the largest number of mobile home losses, followed by the mobile home moved out category. Units in structures containing two to four units were over 4 times more likely to be lost through conversions and mergers than the typical unit. Units in structures containing 50 or more units were over 5 times more likely to be lost to nonresidential use than the typical unit.

Rows 13-25 divide the housing stock by year built. Column I shows that losses due to demolition or disasters were heavily concentrated in the older units, but the percent of units lost to this cause never exceeds 0.7 percent for any of the age brackets. Units built before 1920 were 4 times more likely to be lost through conversions and mergers than the typical unit. The median age estimates attest to the tendency of older units to be lost, particularly through conversions and mergers, through condemnation or serious physical damage, and through demolition or disasters.

[9] In both the forward-looking and backward-looking analyses, the CINCH estimates exceed published AHS estimates for single-family detached units and fall short of the published AHS estimates for manufactured homes.

Rows 27-36 and 37-41 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms. Smaller units are more likely to be lost to conversions and mergers and to nonresidential use. One-room units were 14 times more likely to be lost to conversions and mergers and 22 times more likely to be lost to nonresidential use than the typical unit.

Rows 42-47 focus on multiunit structures only and separate them by number of stories. Multiunit structures have a slightly higher loss rate than the typical unit, 1.9 percent vs. 1.6 percent. The highest loss rate (3.2 percent) belonged to units in buildings with four to six stories. These units were 8 times more likely to be lost to nonresidential use than the typical unit.

Rows 48-51 divide the housing stock by the four Census regions. The South had the highest loss rate (2.2 percent), while the West had the lowest rate (1.0 percent).

Rows 52-55 divide the housing stock between central city, suburban, and non-metropolitan residences. The CINCH weights overestimate the number of units located outside metropolitan areas by 13 percent. Units outside metropolitan areas had the highest loss rate (2.6 percent). The mobile home move-out rate in these areas was twice as high as the overall rate.

Rows 56-57 identify units housing recent movers in 2001 from those with longer term occupants. The only large deviation from the behavior of typical units occurred in the loss rate due to conversion to nonresidential use. Units whose occupants moved in prior to 2000 had one-fifth the typical loss rate for this category.

Forward-Looking Analysis – Table 2

This table looks at issues related to the physical quality of units that raise two housing market concerns. One concern is the extent of problems, that is, what percentage of occupied units has the problem. A second concern is failure to correct problems, that is, what percentage of units that have a problem in 2001 and remain in the stock still have the same problem in 2003. This report uses the term “persistence” for the second percentage. Row 1 repeats the analysis from Row 2 in Table 1. All the subsequent rows are subsets of row 1. The loss rate for occupied units was 1.0 percent.

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 plumbing requirements separately. Rows 2-3, 4-5, and 6-9 attempted to separate out good units from the least desirable units based on kitchen and bath equipment to compare how they changed over the period.

Units that lack a complete kitchen and units that lack complete plumbing have higher loss rates, 5.2 percent and 3.1 percent respectively. These units are more likely to be converted to nonresidential use (15 times more likely for those without a complete kitchen and 12 times more likely for those without a complete bathroom); more likely to be lost because they have been condemned or are uninhabitable due to severe physical damage (9 times more likely for units without a complete kitchen and 7 times more likely for units without a complete bathroom); and more likely to be lost due to conversions or mergers (9 times more likely for units without a complete kitchen and 4 times more likely for units without a complete bath). Column C in rows 5 though 9 shows that while there is overlap among the four reasons that units are designated as lacking complete plumbing, the most common reason is not having exclusive use of the bathroom fixtures. The loss rate for units without exclusive use is identical to the loss rate for all occupied units (1.0 percent), while the loss rates for units lacking hot piped water, a bathtub or shower, or a flush toilet are much higher (9 to 10 percent).

Rows 10-15 look at how units obtain water and dispose of sewage. Loss rates are higher for units that use a well for water or that use a septic tank or cesspool, 1.8 percent in both cases.

Rows 16-21 look at units with serious problems.[10] Rows 17-21 identify specific types of serious deficiencies. Row 16 counts the units having one or more of these deficiencies. In 2001, 2.0 percent of the units had serious deficiencies. By 2003, 85.7 percent of these units were still in the stock but no longer had serious deficiencies, 11.5 percent were still in the stock and were still suffering from serious deficiencies, and 2.7 percent were no longer in the stock. Units with serious upkeep problems had the highest loss rate, 7.2 percent. Except for units with serious upkeep problems, none of the units with serious physical problems were demolished between 2001 and 2003. Units with serious physical problems were 9 times more likely to be lost to nonresidential use than the typical occupied unit, and 6 times more likely to be lost because they were condemned or were uninhabitable due to serious physical problems.

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. In 2001, 4.3 percent of the units had moderate deficiencies. By 2003, 65.3 percent of these units were still in the stock but no longer had moderate deficiencies,[11] 31.9 percent were still in the stock and were still suffering from moderate deficiencies, and 2.8 percent were no longer in the stock. Units with moderate hallway problems and moderate kitchen problems (lacking a complete kitchen) had the highest loss rates, 6.7 percent and 5.2 percent respectively.

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

[11] These units may have had no moderate or severe physical problems in 2003 or they may have had severe physical problems in 2003, with or without moderate problems. If a unit has one severe deficiency, it is classified as having severe physical problems. A unit with both severe and moderate deficiencies is included among units with severe physical problems, but is not included among units with moderate physical problems.

Table 2 shows that there is some persistence with physical problems over a two-year period. Among the units that had severe physical problems in 2001 *and* survived to 2003, 11.8 percent had severe physical problems in 2003.[12] Among the units that had moderate physical problems in 2001 *and* survived to 2003, 32.8 percent had moderate physical problems in 2003. As noted in the discussion of rows 5-9, "no exclusive" use was the most common reason that units were designated as lacking some plumbing. There was virtually no persistence in this characteristic. Only 1.8 percent of the units where there was no exclusive use of plumbing facilities in 2001 and that survived to 2003 were determined to have no exclusive use in 2003. In contrast, 37.8 percent of the units where there was no bathtub or shower in 2001 and that survived to 2003 were determined to have no bathtub or shower in 2003.

Forward-Looking Analysis – 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 subsets of row 1 where the loss rate is 1.0 percent for occupied units.

Rows 2-4 look at the age of the householder. Rows 5-6 look at whether or not the household includes children. Rows 7-17 look at the race or ethnicity of the householder.[13] Rows 18-22 look at five possible sources of household income. There was general consistency in loss rates across categories defined by the characteristic of the householder or household. The highest loss rates were experienced by units with Black householders and units where the household received welfare or SSI payments, 1.4 percent in both cases. The lowest loss rates were experienced by units occupied by householders who were American Indian, Eskimo, or Aluet and units whose households received dividend or interest income, 0.4 percent in both cases.

Forward-Looking Analysis – 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 subsets of row 1 where the loss rate is 1.0 percent for occupied units.

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. Rental units had a loss rate of 1.6 percent compared to 0.7 percent for owner-occupied units.

Rows 5-9 classify rental units by total monthly housing costs, while rows 10-14 track rental units by household income. Rows 15-19 classify owner-occupied units by total

[12] Column D divided by the sum of columns D and E.

[13] Because the 2003 survey did not contain an "other" race category, it was impossible to find units that were occupied by "other" race in 2001 and occupied by "other" race in 2003. For this reason, column D is labeled Not Applicable for row 15.

monthly housing costs, while rows 20-24 track owner-occupied units by household income.[14]

Lower costs units and units occupied by lower income households have higher loss rates. The loss rate for rental units with monthly housing costs less than $350 was 2.6 percent compared to 1.6 percent for all rental units. The loss rate for owner-occupied units with monthly housing costs less than $350 was 1.1 percent compared to 0.7 percent for all owner-occupied units. Rental units occupied by households with incomes less than $15,000 had a 2.1 percent loss rate. Owner-occupied units occupied by households with incomes less than $15,000 had a 1.3 percent loss rate.

Backward-Looking Analysis – 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. Overall the rate of total additions was 3.7 percent, the new construction rate was 2.6 percent, and the other additions rate was 1.1 percent. On average 37 out of every 1,000 units in the 2003 stock were not part of the stock in 2001, 26 of the 37 were newly constructed, and 11 of the 37 were units that returned to the stock. The rate of other additions in 2003 is smaller than the loss rate in 2001; therefore, without new construction, the housing stock would have declined between 2001 and 2003. Taken together new construction, losses, and other additions resulted in an increase in the stock of 2,581,000 units.[15]

The largest source of other additions was mobile homes moved in. The second largest source of other additions was the "added from temporary losses or other" category that includes (a) units were listed in 2001 as condemned or uninhabitable because of physical problems or as lost for unclassified reasons, and (b) units that were added for unclassified reasons or as sample adjustments.

Rows 2-4 divide the housing stock by use. The rate of total additions was substantially higher among vacant and seasonal units (7.7 and 7.1 percent respectively) than among occupied units (3.1 percent). Seasonal units were 6 times more likely to be converted from nonresidential use than the typical unit in the stock; vacant units were 4 times as

[14] This report contains fewer cost and income categories than the published Census Bureau reports: 5 cost categories compared to 16 in the published reports, and 5 income categories compared to 14 in the published reports. Columns D and E track whether units that exist in both periods serve the same or different types of households in 2001 and 2003. It seemed desirable to track only large changes in the types of households served, that is, putting a unit into column E should represent a substantial change in either housing costs or income. Having fewer categories tends to increase the percent of units that fall into column D (serving the same type of households) and decrease the percent that fall into column E (serving different types of households).

[15] The estimate of net change to the stock from new construction, other additions, and losses is at best approximate. The new construction and other additions elements were computed using weights designed to equal key components of the 2003 stock, while the losses element was computed using weights designed to equal key components of the 2001 stock.

likely. Seasonal units were 5 times more likely to be added from temporary losses or other reasons than the typical unit.

Rows 5-12 divide the housing stock by type of structure to see what type of units account for additions. Mobile homes had the highest rate of total additions, 8.5 percent. The "mobile home moved in" category accounted for the largest number of mobile home additions. Units in structures containing five to nine units had the lowest rate of total additions, 2.0 percent, followed by units in structures containing two to four units, 2.3 percent. Units in structures containing two to four units were 5 times more likely to be added through conversions and mergers than the typical unit. Units in structures containing 50 or more units were almost 7 times more likely to be added from nonresidential use than the typical unit. These patterns are the mirror image of the patterns for losses in forward-looking Table 1.

Rows 13-25 divide the housing stock by year built. Column I shows a few newly constructed units in every year-built period, probably because of errors by respondents.[16] The median age estimates attest to the tendency of additions from nonresidential use and from conversions and mergers to occur more often among older units.

Rows 27-36 and 37-41 divide the housing stock by two different measures of interior space, the number of rooms and the number of bedrooms. One- and two-room units and one-bedroom units have high rates of total additions (10.0 percent, 5.5 percent, and 8.7 percent respectively), mainly because of high rates of other additions (9.7 percent, 5.0 percent, and 8.0 percent respectively). One-room units were 33 times more likely to be added from nonresidential use than the typical unit. Two-room units were 7 times more likely to be added from conversions and mergers. The highest rates of new construction were in 8-, 9-, and 10-units, 4.0 percent, 4.8 percent, and 5.0 percent respectively.

Rows 42-47 focus on multiunit structures only, and divide them by number of stories. Multiunit structures have a lower rate of total additions than the typical unit (2.9 percent vs. 3.7 percent), mainly because of a lower rate of new construction (1.9 percent vs. 2.6 percent). Only units in structures with three stories had a rate of new construction (2.9 percent) higher than the overall rate. Units in buildings with four to six stories and in buildings with seven or more stories were 4 times more likely to have additions from nonresidential use than the typical unit.

Rows 48-51 divide the housing stock by the four Census regions. The South had the highest rate of new construction (3.2 percent) and the highest rate of other additions (1.5 percent). The Northeast had the lowest rate of total additions, 2.4 percent.

[16] This report uses REUAD=3 and 10≤NOINT≤11, not year built, to identify new construction. REUAD is the AHS variable for "reason unit got added to sample"; REUAD=3 is "new construction." NOINT is the AHS variable for reason unit not interviewed; NOINT=10 is "permit granted, construction not started," and NOINT=11 is "under construction, not ready." REUAD and NOINT are variables entered by the Census Bureau; they are not based on information provided from respondents.

Rows 52-55 divide the housing stock between central city, suburban, and non-metropolitan residences. The CINCH weights overestimate the number of units located outside metropolitan areas by 14 percent. Units outside metropolitan areas had the highest rate of total additions (4.9 percent), due to an above average rate of new construction (2.5 percent) plus a very high rate of other additions (2.4 percent). The mobile home move-in rate in these areas was 3 times as high as the overall rate.

Rows 56-57 identify units housing recent movers in 2003 from those with longer term occupants. As expected, units with occupants who moved in during 2002 or 2003 had a high rate of new construction, 8.7 percent.

Backward-Looking Analysis – 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 subsets of row 1 where the rate of total additions was 3.1 percent, the new construction rate was 2.4 percent, and the other additions rate was 0.7 percent. This discussion will start with the incidence and persistence of problems and then look at the role of additions in perpetuating the problem.

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 plumbing requirements separately. Rows 2-3, 4-5, and 6-9 attempted to separate out good units from the least desirable units based on kitchen and bath equipment to compare how they changed over the period.

In 2003, 98.7 percent of occupied units have complete kitchens. Of the 1,418,000 units without complete kitchens in 2003, 23,000 were newly constructed and another 37,000 were other additions. Only 191,000 units lacked a complete kitchen in both 2001 and 2003, a persistence percentage of 14.1 percent. Most (82.3 percent) of the units without complete kitchens in 2003 had complete kitchens in 2001. Respondent errors and equipment failures probably account for this surprisingly large percentage.

In 2003, 98.7 percent of occupied units have complete plumbing. Of the 1,380,000 units without complete plumbing in 2003, 8,000 were newly constructed and another 21,000 were other additions. Only 150,000 units lacked complete plumbing in both 2001 and 2003, a persistence percentage of 11.1 percent. Most (87.1 percent) of the units without complete plumbing in 2003 had complete plumbing in 2001. Respondent errors and equipment failures probably account for this surprisingly large percentage.

Rows 10-15 look at how units obtain water and dispose of sewage. The rates of total additions are higher for units that use a well for water or that use a septic tank or cesspool

due to somewhat higher than average rates of new construction (2.6 percent and 2.8 percent respectively, compared to 2.4 percent for all occupied units), and substantially higher than average rates of other additions (1.8 percent and 2.0 percent respectively, compared to 0.7 percent).

Rows 16-21 look at units with serious problems. Rows 17-21 identify specific types of serious deficiencies. Row 16 counts the units having one or more of these deficiencies. In 2003, 1.9 percent of the units had serious deficiencies. Of these, 12.7 percent were in the stock in 2001 and had severe physical problems in that year as well. Severe electrical problems were minor but persistent. Only 0.1 percent of the 2003 housing stock had severe electrical problems, but 43.0 percent of the units were in the 2001 stock and had serious electrical deficiencies in 2001 as well. Except for severe plumbing problems, none of newly constructed units had severe deficiencies. Mobile home move-ins were 27 times more likely to have severe electrical problems than the typical occupied unit.

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. In 2003, 3.9 percent of the units had moderate deficiencies. Of these, 35.9 percent were in the stock in 2001 and had moderate physical problems in that year as well. Moderate heating problems were the most persistent. Of the 2003 housing stock, 1.5 percent had moderate heating problems, and 80.7 percent of the units were in the 2001 stock and had moderate heating deficiencies in 2001 as well. Except for lacking a complete kitchen, none of newly constructed units had moderate deficiencies.

Backward-Looking Analysis – 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 subsets of row 1 where the rate of total additions was 3.1 percent, the new construction rate was 2.4 percent, and the other additions rate was 0.7 percent.

Rows 2-4 look at the age of the householder. Rows 5-6 look at whether or not the household includes children. Rows 7-17 look at the race or ethnicity of the householder.[17] Rows 18-22 look at five possible sources of household income. There was general consistency in rate of total additions across all categories defined by the characteristic of the householder or household with three exceptions. Units occupied in 2003 by American Indians, Eskimos, and Aleuts had the highest rate of total additions (6.7 percent), the highest rate of new construction (4.1 percent), and the highest rate of other additions (2.6 percent). Units occupied by households with householders 75 years old or older or by households who are Black and Hispanic had the lowest rates of total additions, 1.3 percent and 1.5 percent respectively.

[17] Because the 2001 survey did not contain a "two or more races" category, it was impossible to find units that were occupied by "two or more races" in 2001 and occupied by "two or more races" in 2003. For this reason, column D is labeled Not Applicable for row 16.

Persistence levels were high for the rows defined by race and ethnicity. Of the units that were occupied by White householders in 2003 and that were part of the 2001 housing stock, 88.6 percent were occupied by White householders in 2003. The percentage for Black householders was 77.2 percent; the percentage for Hispanic householders was 68.5 percent.

Backward-Looking Analysis – 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 subsets of row 1 where the rate of total additions was 3.1 percent, the new construction rate was 2.4 percent, and the other additions rate was 0.7 percent.

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 augmented by additions. Rental units had a new construction rate of 1.4 percent compared to 2.8 percent for owner-occupied units.

Rows 5-9 classify rental units by total monthly housing costs while rows 10-14 track rental units by household income. Rows 15-19 classify owner-occupied units by total monthly housing costs while rows 20-24 track owner-occupied units by household income.

Higher costs units and units occupied by higher income households have higher rates of new construction. The new construction rate for rental units with monthly housing costs of $1,250 or more was 4.0 percent. The new construction rate for owner-occupied units with monthly housing costs of $1,250 or more was 5.0 percent. Rental units occupied by households with incomes of $100,000 or more had a 3.5 percent new construction rate. Owner-occupied units occupied by households with incomes of $100,000 or more had a 4.3 percent new construction rate.

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 in the forward-looking analysis and columns D through I in the backward-looking analysis) equaled the number of units present in the base year (column C). In every case, equality was achieved except for differences created by rounding.

- Throughout the tables, various sets of rows are related to each other. For example, the year-built rows (13-25) in Table 1 are a disaggregation of the total stock in row 1. Similarly, rows 7 (Whites), 10 (Blacks), 13 (American Indians, Eskimos, & Aleuts), 14 (Asian and Pacific Islanders), and 15 (Other race) in forward-looking table 3 are a disaggregation of row 1 (occupied households). In these cases, there should be equality between the parent row and the sum of the break-out rows for all columns except D and E. The difference between column D in the parent row and the sum of column D for the break-out rows should equal the negative of the difference between column E in the parent row and the sum of column E for the break-out rows. In every case, equality was achieved except for differences created by rounding.

Column B provides an external check of how well the CINCH weighting performed. In general, the CINCH estimates are within 5 percent of the AHS published totals and many of the CINCH estimates are very close to the AHS estimates. There are some important exceptions. The CINCH weights tend to underestimate mobile homes and trailers, units built between 2000 and 2004, units with Black householders, and owner-occupied units with monthly housing costs of less than $350. The CINCH weights tend to overestimate units outside metropolitan areas and owner-occupied units with monthly housing costs of $1,250 or more. In the cited cases, the forward-looking analysis and the backward-looking analysis either both overestimated or underestimated. In general, there was some tendency for the forward-looking and backward-looking analyses to err in the same direction. The correlation between the errors was 0.35. There were cases, however, in which the analyses erred in opposite directions, for example, units with moderate plumbing problems.

Appendix B – Weighting

CINCH separates the AHS samples in 2001 and 2003 into three pieces: units that exist and are part of the housing stock in both years (SAMES), units that are part of the 2001 housing stock but are not part of the 2003 housing stock (LOSSES), and units that are not part of the 2001 housing stock but are part of the 2003 housing stock (ADDITIONS). ADDITIONS are split into NEW CONSTRUCTION and OTHER ADDITIONS (structures that existed in 2001 but were not in the housing stock and other cases).

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 2001 and those ADDITIONS that were interviewed in 2003.

For the forward-looking analysis, we started with the AHS pure weights. We used the AHS weighted count in 2003 of LOSSES to create new pure weights for interviewed LOSSES. We used the AHS weighted count in 2001 of the stock and our estimate of LOSSES to create new pure weights for the interviewed SAMES. 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 2001.

For the backward-looking analysis, we started with the AHS pure weights. We used the AHS weighted counts in 2003 for NEW CONSTRUCTION and for OTHER ADDITION to create new pure weights for interviewed NEW CONSTRUCTION and interviewed OTHER ADDITIONS. We used the AHS weighted count of the stock in 2003 and our estimates on NEW CONSTRUCTION and OTHER ADDITIONS to create new pure weights for the interviewed SAMES. We then adjusted the weights for SAMES, NEW CONSTRUCTION, and OTHER ADDITIONS to equal AHS published totals for owner-occupied units, renter-occupied units, vacant units, and seasonal units in 2003.

The logic behind the weighting and the procedures used to create the weights is explained in *Weighting Strategy For 2001-2003 Cinch Analysis*.