

Analysis of Housing Square Footage Estimates Reported by the American Housing Survey and the Survey of Construction



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Why Analyze Housing Square Footage Estimates?

- The size, or square footage, of a housing unit and the corresponding change of this measurement over time plays an important role in costs associated with:
 - Buying residential homes
 - Heating residential homes
- This research will analyze housing square footage estimates reported by two U.S. Census Bureau conducted surveys:
 - American Housing Survey (AHS)
 - Survey of Construction (SOC)

AHS Background

- Provides national and regional data on topics related to the quality of U.S. housing:
 - Characteristics (bedrooms, bathrooms, square footage, etc.)
 - Physical conditions
 - Occupant demographics
 - Financial data (home improvements, costs, mortgages, etc.)
- Longitudinal housing unit survey conducted between May and September of odd-numbered years
 - Once selected, survey returns to same housing unit every other year for data collection
 - Respondents are occupants and property owners

SOC Background

- Provides national and regional data on topics related to new, privately-owned, residential U.S. housing:
 - Start and completion dates
 - Characteristics (bedrooms, bathrooms, square footage, etc.)
 - Sales data (date, price, financing)
- Monthly housing unit survey
 - Monthly sample of building permits from predefined permit issuing areas
 - Canvassing operation for new construction in predefined non-permit issuing areas
 - Once selected, survey returns to same housing unit approximately every month until completion and/or sale
 - Respondents are builders, owners, and sales agents

Data Sources

- Data sources:
 - 2011 AHS National/Metropolitan Public Use File (version 1.2)
 - 2001-2013 SOC Internal Microdata Files
- Data analyzed represent:
 - Single-family houses
 - Detached
 - Built between years 2002-2011
 - Size between 100-13,000 square feet
 - Exclude houses with missing data
- Wilcoxon Rank Sum non-parametric testing procedures used for statistical significance (90% confidence level)

Housing Square Footage Estimates Reported by the AHS

Mean Square Footage Reported by AHS¹ in Detached Single-Family Houses

Year Built	Cases Analyzed					Square Footage					Standard Errors				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
2002	1,283	69	307	484	423	2,942	3,952	3,076	2,811	2,760	2.2%	10.0%	4.5%	3.7%	3.7%
2003	1,336	80	294	546	416	2,849	3,045	2,905	2,876	2,676	2.1%	8.5%	4.6%	3.5%	2.7%
2004	1,386	79	311	543	453	2,736	3,480	3,021	2,676	2,398	1.9%	8.4%	4.4%	3.1%	2.7%
2005	1,693	91	318	727	557	2,854	3,031	3,186	2,697	2,826	1.9%	8.9%	4.5%	2.8%	3.0%
2006	1,510	81	279	710	440	2,900	3,356	3,130	2,799	2,827	1.9%	9.4%	4.8%	2.7%	3.5%
2007	1,171	54	208	572	337	2,970	4,087	3,531	2,679	3,009	2.4%	10.8%	5.8%	3.2%	4.5%
2008	793	64	129	367	233	2,995	2,783	2,885	3,050	3,043	2.8%	10.4%	7.6%	4.0%	4.7%
2009	465	38	97	204	126	2,958	3,882	2,785	3,044	2,591	3.8%	14.0%	8.6%	5.1%	8.2%
2010	424	30	96	199	99	2,502	2,752	2,055	2,624	2,523	3.8%	16.3%	4.8%	5.7%	8.0%
2011	151	6	39	68	38	3,281	3,106	3,985	3,190	2,802	6.0%	16.8%	12.8%	8.2%	12.5%
02-11	10,212	592	2,078	4,420	3,122	2,887	3,356	3,071	2,790	2,755	0.8%	3.4%	1.8%	1.1%	1.3%

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

Housing Square Footage Estimates Reported by the AHS

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2003	1,336	80	294	546	416	2,849	3,045	2,905	2,876	2,676	2.1%	8.5%	4.6%	3.5%	2.7%
2004	1,386	79	311	543	453	2,736	3,480	3,021	2,676	2,398	1.9%	8.4%	4.4%	3.1%	2.7%
2005	1,693	91	318	727	557	2,854	3,031	3,186	2,697	2,826	1.9%	8.9%	4.5%	2.8%	3.0%
2006	1,510	81	279	710	440	2,900	3,356	3,130	2,799	2,827	1.9%	9.4%	4.8%	2.7%	3.5%
2007	1,171	54	208	572	337	2,970	4,087	3,531	2,679	3,009	2.4%	10.8%	5.8%	3.2%	4.5%
2008	793	64	129	367	233	2,995	2,783	2,885	3,050	3,043	2.8%	10.4%	7.6%	4.0%	4.7%
2009	465	38	97	204	126	2,958	3,882	2,785	3,044	2,591	3.8%	14.0%	8.6%	5.1%	8.2%
2010	424	30	96	199	99	2,502	2,752	2,055	2,624	2,523	3.8%	16.3%	4.8%	5.7%	8.0%
2011	151	6	39	68	38	3,281	3,106	3,985	3,190	2,802	6.0%	16.8%	12.8%	8.2%	12.5%
02-11	10,212	592	2,078	4,420	3,122	2,887	3,356	3,071	2,790	2,755	0.8%	3.4%	1.8%	1.1%	1.3%

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

Housing Square Footage Estimates Reported by the SOC

Mean Square Footage Reported by SOC¹ in Detached Single-Family Houses

Year Built	Cases Analyzed					Square Footage					Standard Errors				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
2002	24,029	2,931	4,792	10,575	5,731	2,392	2,676	2,330	2,370	2,389	0.3%	0.7%	0.6%	0.4%	0.5%
2003	23,584	2,658	4,616	10,416	5,894	2,406	2,617	2,338	2,402	2,406	0.2%	0.8%	0.6%	0.4%	0.5%
2004	24,383	2,785	5,020	10,624	5,954	2,422	2,684	2,352	2,414	2,418	0.2%	0.7%	0.6%	0.4%	0.5%
2005	23,714	2,541	4,797	10,677	5,699	2,519	2,718	2,438	2,534	2,498	0.3%	0.8%	0.7%	0.4%	0.6%
2006	22,854	2,036	4,229	10,932	5,657	2,569	2,850	2,419	2,578	2,576	0.3%	1.0%	0.7%	0.4%	0.5%
2007	20,144	1,652	3,411	10,087	4,994	2,627	2,777	2,451	2,655	2,629	0.3%	1.2%	0.8%	0.5%	0.6%
2008	15,816	1,255	2,763	8,084	3,714	2,635	2,847	2,404	2,673	2,649	0.4%	1.4%	1.0%	0.5%	0.8%
2009	11,556	1,014	2,009	5,939	2,594	2,548	2,761	2,355	2,565	2,569	0.5%	1.6%	1.1%	0.6%	0.9%
2010	12,621	1,070	2,362	6,515	2,674	2,451	2,778	2,327	2,438	2,452	0.4%	1.6%	1.0%	0.5%	0.9%
2011	11,532	980	2,096	5,923	2,533	2,566	2,728	2,409	2,612	2,505	0.4%	1.6%	1.0%	0.6%	0.8%
02-11	190,233	18,922	36,095	89,772	45,444	2,506	2,736	2,384	2,519	2,500	0.1%	0.3%	0.3%	0.2%	0.2%

¹Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

Housing Square Footage Estimates Reported by the AHS and SOC

Percent Difference in Mean Square Footage Reported by AHS¹ and SOC² in Detached Single-Family Houses

Year Built	Percent Difference (AHS/SOC)					Statistical Significance Probabilities				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
2002	23%	48%	32%	19%	16%	0.0001*	0.5890	0.0001*	0.6688	0.0724*
2003	18%	16%	24%	20%	11%	0.0208*	0.9566	0.0001*	0.9028	0.0656*
2004	13%	30%	28%	11%	-1%	0.0001*	0.1954	0.0001*	0.0074*	0.0881*
2005	13%	12%	31%	6%	13%	0.0840*	0.1886	0.0001*	0.5475	0.4971
2006	13%	18%	29%	9%	10%	0.6327	0.3874	0.0001*	0.0989*	0.7870
2007	13%	47%	44%	1%	14%	0.3750	0.2690	0.0001*	0.0010*	0.2474
2008	14%	-2%	20%	14%	15%	0.8933	0.0553*	0.0068*	0.0493*	0.2580
2009	16%	41%	18%	19%	1%	0.4338	0.9168	0.0039*	0.7406	0.1631
2010	2%	-1%	-12%	8%	3%	0.8308	0.3519	0.2298	0.8253	0.5046
2011	28%	14%	65%	22%	12%	0.0981*	0.8337	0.0145*	0.8734	0.3485
02-11	15%	23%	29%	11%	10%	0.0001*	0.6033	0.0001*	0.2407	0.0389*

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

²Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

* Statistically significant differences in underlying square footage distributions of the AHS and SOC at a 90% conf. level

Housing Square Footage Issues

- Why are there more statistically significant differences between these surveys in earlier years as opposed to recent years?
- To address this one must be aware of issues associated with housing square footage estimates:
 - Sample sizes
 - Survey designs
 - Square footage definitions
 - Square footage conversions

Sample Size Issue

Cases Analyzed for Mean Square Footage Reported in Detached Single-Family Houses

Year Built	Cases Analyzed for AHS ¹					Cases Analyzed for SOC ²				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
2002	1,283	69	307	484	423	24,029	2,931	4,792	10,575	5,731
2003	1,336	80	294	546	416	23,584	2,658	4,616	10,416	5,894
2004	1,386	79	311	543	453	24,383	2,785	5,020	10,624	5,954
2005	1,693	91	318	727	557	23,714	2,541	4,797	10,677	5,699
2006	1,510	81	279	710	440	22,854	2,036	4,229	10,932	5,657
2007	1,171	54	208	572	337	20,144	1,652	3,411	10,087	4,994
2008	793	64	129	367	233	15,816	1,255	2,763	8,084	3,714
2009	465	38	97	204	126	11,556	1,014	2,009	5,939	2,594
2010	424	30	96	199	99	12,621	1,070	2,362	6,515	2,674
2011	151	6	39	68	38	11,532	980	2,096	5,923	2,533
02-11	10,212	592	2,078	4,420	3,122	190,233	18,922	36,095	89,772	45,444

- AHS sample size smaller than SOC
- Small AHS sample of houses built in 2011

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

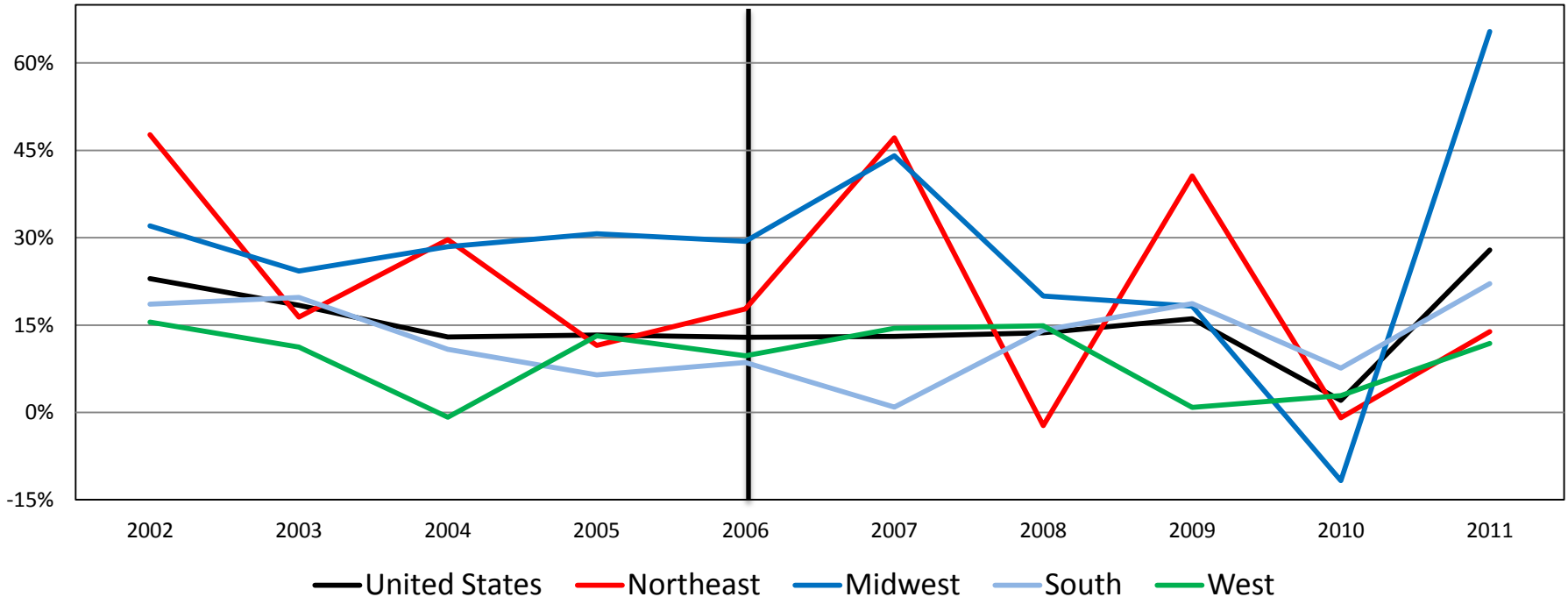
²Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

Sample Size Issue

- Key takeaways:
 - It takes a while for new construction to be represented in AHS
 - Comparisons over recent years will be limited
- Updated analysis will remove houses built in 2011

Survey Design Issue

Mean Square Footage Percent Differences (AHS¹/SOC²) in Detached Single-Family Houses Built 2002-2011

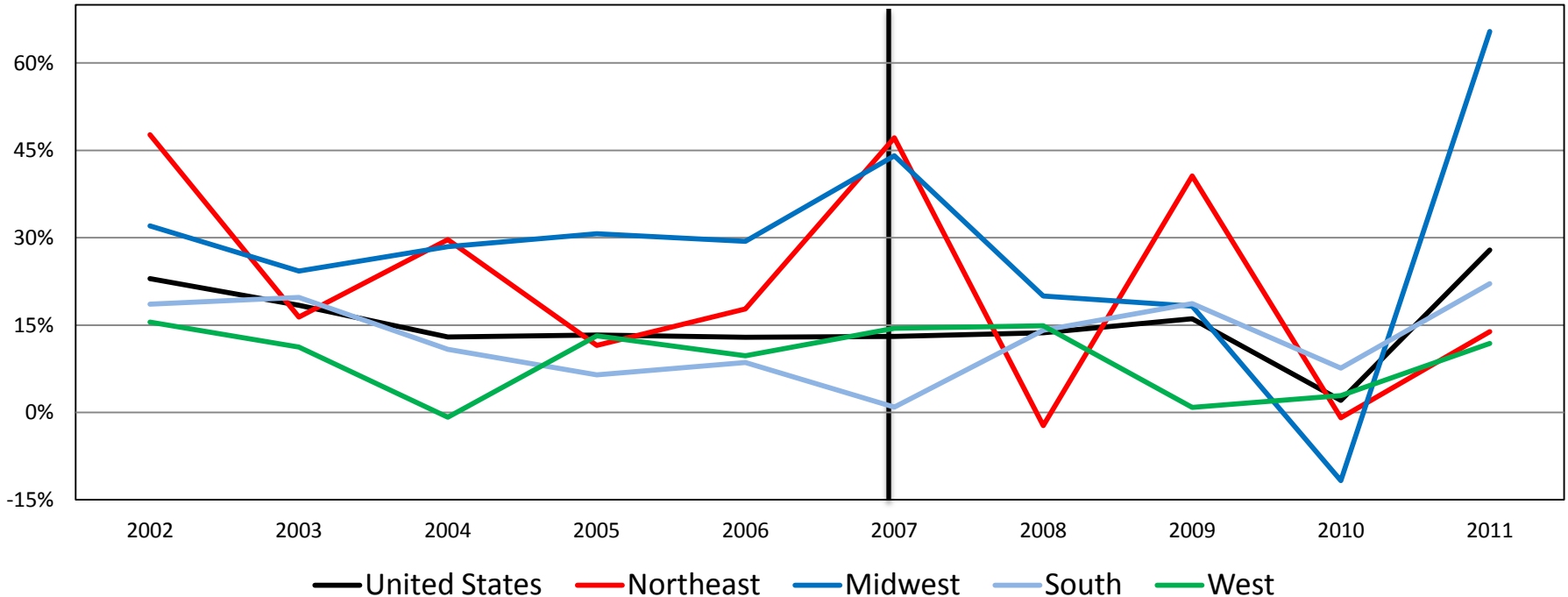


¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

²Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

Survey Design Issue

Mean Square Footage Percent Difference (AHS¹/SOC²) in Detached Single-Family Houses Built 2002-2011



¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

²Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

Survey Design Issue

- Key takeaways:
 - AHS is a longitudinal survey; square footage changes over time due to additions
 - SOC is a monthly survey; square footage is a snapshot at completion
 - Comparisons over earlier years will also be limited
- Updated analysis will:
 - Limit to houses built 2007-2010
 - Obtain original AHS square footage where applicable

Square Footage Definition Issue

- AHS defines square footage as:
 - ...excluded from the calculation of square footage are unfinished attics, carports, attached garages, porches that are not protected from weather (such as screened porches), and mobile home hitches; Both finished and unfinished basements are included; Square footage is based on respondent's estimate of the size of the unit
- SOC defines square footage as:
 - Square footage of floor area, defined as all completely finished floor space, including space in basements and attics with finished walls, floors, and ceilings; This does not include a garage, carport, porch, unfinished attic or utility room; Unfinished areas of the basement are excluded

Square Footage Definition Issue

- AHS captures presence of a basement as part of the physical structure
 - Whether the basement is finished does not influence collection of the square footage
 - Both finished and unfinished areas of the basement are included
- SOC also captures presence of a basement as part of the physical structure
 - Where a basement is identified, information on whether basement is finished (all or part) or unfinished is captured
 - Only finished areas of a basement should be included

Survey Design Issue

- Key takeaways:
 - AHS is capturing living space; all areas of basement included
 - SOC is capturing floor space; only finished areas of basement included
 - SOC is also capturing more detailed basement information
 - Comparison depends on the presence and type of basement
- Updated analysis will:
 - Assume unfinished housing square footage is primarily located in the basement
 - Break out structures based upon presence and type of basement

Square Footage Conversion Issue

- AHS collects and estimates square footage based on the respondent estimate
- SOC also collects square footage based on respondent estimate
 - Includes whether estimate is based on exterior or interior dimensions, or if the type of dimensions is unknown
- For estimating, SOC converts all reported square footages to exterior dimensions:
 - Square footage based on exterior dimensions not converted
 - Square footage based on interior dimensions increased 8%
 - Square footage based on unknown dimensions increased 4%

Square Footage Conversion Issue

Cases Analyzed for Mean Square Footage Reported in Detached Single-Family Houses

Year	Cases Analyzed for SOC ¹					Cases Reporting Exterior Dimensions					Percent Cases Converting to Exterior Dimensions				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
2002	24,029	2,931	4,792	10,575	5,731	9,011	1,074	2,152	3,973	1,812	62%	63%	55%	62%	68%
2003	23,584	2,658	4,616	10,416	5,894	8,510	1,025	2,063	3,610	1,812	64%	61%	55%	65%	69%
2004	24,383	2,785	5,020	10,624	5,954	9,146	1,167	2,282	3,959	1,738	62%	58%	55%	63%	71%
2005	23,714	2,541	4,797	10,677	5,699	8,232	1,039	2,055	3,642	1,496	65%	59%	57%	66%	74%
2006	22,854	2,036	4,229	10,932	5,657	6,775	689	1,405	3,467	1,214	70%	66%	67%	68%	79%
2007	20,144	1,652	3,411	10,087	4,994	5,345	512	966	2,857	1,010	73%	69%	72%	72%	80%
2008	15,816	1,255	2,763	8,084	3,714	4,323	425	765	2,246	887	73%	66%	72%	72%	76%
2009	11,556	1,014	2,009	5,939	2,594	3,002	283	527	1,642	550	74%	72%	74%	72%	79%
2010	12,621	1,070	2,362	6,519	2,674	3,421	311	584	1,847	679	73%	71%	75%	72%	75%
2011	11,532	980	2,096	5,923	2,533	3,194	296	565	1,634	699	72%	70%	73%	72%	72%
02-11	190,233	18,922	36,095	89,776	45,444	60,959	6,821	13,364	28,877	11,897	68%	64%	63%	68%	74%

¹Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

Square Footage Conversion Issue

- Key takeaway:
 - This conversion process is in effect increasing housing square footage estimates from SOC
 - Comparisons may potentially be altered
- Updated analysis will assume SOC housing square footage collected directly from respondent (similarly to AHS) with no conversion to exterior dimensions applied

Updated Analysis

- Rerun analysis taking issues discussed into account:
 - Removing comparisons in recent years due to small sample
 - Removing comparisons in earlier years due to square footage changes over time
 - Breaking out basement presence and type
 - Removing external square footage conversion

Updated Analysis - AHS

Mean Square Footage Reported by AHS¹ in Detached Single-Family Houses by Basement

Year	Cases Analyzed					Square Footage					Standard Errors				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
With Basement															
2007	307	48	156	61	42	3,186	3,641	3,357	3,856	3,836	6%	14%	6%	10%	16%
2008	239	57	102	44	36	3,699	3,727	3,253	4,171	3,930	5%	9%	8%	11%	13%
2009	148	35	73	28	12	3,642	3,615	3,235	4,265	3,717	6%	14%	9%	11%	26%
2010	133	26	76	19	12	3,404	3,429	3,281	3,588	3,443	7%	15%	4%	25%	26%
07-10	827	166	407	152	102	3,616	3,626	3,293	3,976	3,781	3%	6%	4%	6%	9%
No Basement															
2007	864	6	52	511	295	2,411	2,420	1,815	2,448	2,406	3%	14%	27%	3%	5%
2008	554	7	27	323	197	2,403	2,568	1,828	2,446	2,369	3%	12%	8%	5%	6%
2009	317	3	24	176	114	2,305	2,385	1,736	2,347	2,309	5%	138%	12%	6%	9%
2010	291	4	20	180	87	2,217	2,548	1,643	2,262	2,191	4%	4%	5%	5%	8%
07-10	2,026	20	123	1,190	693	2,361	2,475	1,770	2,401	2,352	2%	21%	14%	2%	3%

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

First interview square footage determined where applicable

Updated Analysis - AHS

Mean Square Footage Reported by AHS¹ in Detached Single-Family Houses by Basement

Year	Cases Analyzed					Square Footage					Standard Errors				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
With Basement															
2007	307	48	156	61	42	3,186	3,641	3,357	3,856	3,836	6%	14%	6%	10%	16%
2008	239	57	102	44	36	3,699	3,727	3,253	4,171	3,930	5%	9%	8%	11%	13%
2009	148	35	73	28	12	3,642	3,615	3,235	4,265	3,717	6%	14%	9%	11%	26%
2010	133	26	76	19	12	3,404	3,429	3,281	3,588	3,443	7%	15%	4%	25%	26%
07-10	827	166	407	152	102	3,616	3,626	3,293	3,976	3,781	3%	6%	4%	6%	9%
No Basement															
2007	864	6	52	511	295	2,411	2,420	1,815	2,448	2,406	3%	14%	27%	3%	5%
2008	554	7	27	323	197	2,403	2,568	1,828	2,446	2,369	3%	12%	8%	5%	6%
2009	317	3	24	176	114	2,305	2,385	1,736	2,347	2,309	5%	138%	12%	6%	9%
2010	291	4	20	180	87	2,217	2,548	1,643	2,262	2,191	4%	4%	5%	5%	8%
07-10	2,026	20	123	1,190	693	2,361	2,475	1,770	2,401	2,352	2%	21%	14%	2%	3%

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis

First interview square footage determined where applicable

Updated Analysis - SOC

Mean Square Footage Reported by SOC¹ in Detached Single-Family Houses by Basement

Year	Square Footage Reported by AHS ¹					Square Footage Reported by SOC ²					Percent Difference (AHS/SOC)				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
Part/All Finished Basement															
2007	1,423	180	587	320	336	3,633	3,641	3,357	3,856	3,836	1%	3%	2%	3%	2%
2008	1,252	121	504	311	316	3,699	3,727	3,253	4,171	3,930	1%	5%	2%	2%	3%
2009	849	105	333	205	206	3,642	3,615	3,235	4,265	3,717	2%	5%	2%	3%	3%
2010	880	85	420	201	174	3,404	3,429	3,281	3,588	3,443	2%	6%	2%	3%	3%
07-10	4,404	491	1,844	1,037	1,032	3,616	3,626	3,293	3,976	3,781	1%	2%	1%	1%	1%
Unfinished Basement															
2007	4,888	1,172	2,184	839	693	2,410	2,527	2,213	2,855	2,232	1%	1%	1%	2%	1%
2008	3,789	888	1,771	617	513	2,397	2,590	2,148	2,902	2,326	1%	2%	1%	2%	2%
2009	2,732	705	1,245	416	366	2,342	2,535	2,137	2,700	2,193	1%	2%	1%	2%	2%
2010	3,139	808	1,455	470	406	2,303	2,543	2,104	2,478	2,248	1%	1%	1%	2%	2%
07-10	14,548	3,573	6,655	2,342	1,978	2,378	2,547	2,164	2,789	2,253	0%	1%	1%	1%	1%
No Basement															
2007	13,833	300	640	8,928	3,965	2,411	2,420	1,815	2,448	2,406	0%	3%	1%	0%	1%
2008	10,775	246	488	7,156	2,885	2,403	2,568	1,828	2,446	2,369	0%	3%	2%	1%	1%
2009	7,975	204	431	5,318	2,022	2,305	2,385	1,736	2,347	2,309	1%	4%	2%	1%	1%
2010	8,602	177	487	5,844	2,094	2,217	2,548	1,643	2,262	2,191	0%	5%	2%	1%	1%
07-10	41,185	927	2,046	27,246	10,966	2,361	2,475	1,770	2,401	2,352	0%	2%	1%	0%	0%

¹Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

No external square footage conversion factor applied.

Updated Analysis - SOC

Mean Square Footage Reported by SOC¹ in Detached Single-Family Houses by Basement

Year	Square Footage Reported by AHS ¹					Square Footage Reported by SOC ²					Percent Difference (AHS/SOC)				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
Part/All Finished Basement															
2007	1,423	180	587	320	336	3,633	3,641	3,357	3,856	3,836	1%	3%	2%	3%	2%
2008	1,252	121	504	311	316	3,699	3,727	3,253	4,171	3,930	1%	5%	2%	2%	3%
2009	849	105	333	205	206	3,642	3,615	3,235	4,265	3,717	2%	5%	2%	3%	3%
2010	880	85	420	201	174	3,404	3,429	3,281	3,588	3,443	2%	6%	2%	3%	3%
07-10	4,404	491	1,844	1,037	1,032	3,616	3,626	3,293	3,976	3,781	1%	2%	1%	1%	1%
Unfinished Basement															
2007	4,888	1,172	2,184	839	693	2,410	2,527	2,213	2,855	2,232	1%	1%	1%	2%	1%
2008	3,789	888	1,771	617	513	2,397	2,590	2,148	2,902	2,326	1%	2%	1%	2%	2%
2009	2,732	705	1,245	416	366	2,342	2,535	2,137	2,700	2,193	1%	2%	1%	2%	2%
2010	3,139	808	1,455	470	406	2,303	2,543	2,104	2,478	2,248	1%	1%	1%	2%	2%
07-10	14,548	3,573	6,655	2,342	1,978	2,378	2,547	2,164	2,789	2,253	0%	1%	1%	1%	1%
No Basement															
2007	13,833	300	640	8,928	3,965	2,411	2,420	1,815	2,448	2,406	0%	3%	1%	0%	1%
2008	10,775	246	488	7,156	2,885	2,403	2,568	1,828	2,446	2,369	0%	3%	2%	1%	1%
2009	7,975	204	431	5,318	2,022	2,305	2,385	1,736	2,347	2,309	1%	4%	2%	1%	1%
2010	8,602	177	487	5,844	2,094	2,217	2,548	1,643	2,262	2,191	0%	5%	2%	1%	1%
07-10	41,185	927	2,046	27,246	10,966	2,361	2,475	1,770	2,401	2,352	0%	2%	1%	0%	0%

¹Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

No external square footage conversion factor applied.

Updated Analysis - SOC

Mean Square Footage Reported by SOC¹ in Detached Single-Family Houses by Basement

Year	Square Footage Reported by AHS ¹					Square Footage Reported by SOC ²					Percent Difference (AHS/SOC)				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
Part/All Finished Basement															
2007	1,423	180	587	320	336	3,633	3,641	3,357	3,856	3,836	1%	3%	2%	3%	2%
2008	1,252	121	504	311	316	3,699	3,727	3,253	4,171	3,930	1%	5%	2%	2%	3%
2009	849	105	333	205	206	3,642	3,615	3,235	4,265	3,717	2%	5%	2%	3%	3%
2010	880	85	420	201	174	3,404	3,429	3,281	3,588	3,443	2%	6%	2%	3%	3%
07-10	4,404	491	1,844	1,037	1,032	3,616	3,626	3,293	3,976	3,781	1%	2%	1%	1%	1%
Unfinished Basement															
2007	4,888	1,172	2,184	839	693	2,410	2,527	2,213	2,855	2,232	1%	1%	1%	2%	1%
2008	3,789	888	1,771	617	513	2,397	2,590	2,148	2,902	2,326	1%	2%	1%	2%	2%
2009	2,732	705	1,245	416	366	2,342	2,535	2,137	2,700	2,193	1%	2%	1%	2%	2%
2010	3,139	808	1,455	470	406	2,303	2,543	2,104	2,478	2,248	1%	1%	1%	2%	2%
07-10	14,548	3,573	6,655	2,342	1,978	2,378	2,547	2,164	2,789	2,253	0%	1%	1%	1%	1%
No Basement															
2007	13,833	300	640	8,928	3,965	2,411	2,420	1,815	2,448	2,406	0%	3%	1%	0%	1%
2008	10,775	246	488	7,156	2,885	2,403	2,568	1,828	2,446	2,369	0%	3%	2%	1%	1%
2009	7,975	204	431	5,318	2,022	2,305	2,385	1,736	2,347	2,309	1%	4%	2%	1%	1%
2010	8,602	177	487	5,844	2,094	2,217	2,548	1,643	2,262	2,191	0%	5%	2%	1%	1%
07-10	41,185	927	2,046	27,246	10,966	2,361	2,475	1,770	2,401	2,352	0%	2%	1%	0%	0%

¹Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis

No external square footage conversion factor applied.

Updated Analysis – AHS & SOC

Percent Difference in Mean Square Footage Reported by AHS¹ and SOC² in Detached Single-Family Houses by Basement

Year Built	Percent Difference (AHS/SOC)					Statistical Significance Probabilities				
	United States	North-east	Mid-west	South	West	United States	North-east	Mid-west	South	West
With Basement (SOC Part/All Finished)										
2007	9%	20%	5%	1%	32%	0.0001*	0.0362*	0.0848*	0.0351*	0.2067
2008	-2%	-18%	-2%	5%	16%	0.0001*	0.0001*	0.0483*	0.0280*	0.2148
2009	2%	1%	1%	-1%	5%	0.0001*	0.0474*	0.4163	0.0026*	0.1450
2010	-11%	-10%	-32%	28%	3%	0.0001*	0.0775*	0.0001*	0.0795*	0.3389
07-10	2%	-1%	-4%	5%	19%	0.0001*	0.0001*	0.0001*	0.0001*	0.0233*
No Basement										
2007	9%	0%	97%	1%	13%	0.9057	0.8686	0.0909*	0.5422	0.5638
2008	12%	-47%	-5%	13%	18%	0.2209	0.0235*	0.7675	0.9783	0.0135*
2009	12%	155%	-7%	16%	5%	0.2798	0.5766	0.7443	0.0895*	0.9364
2010	3%	-45%	-10%	5%	3%	0.0766*	0.0142*	0.1913	0.0867*	0.1133
07-10	10%	-8%	50%	7%	12%	0.0094*	0.0126*	0.0408*	0.1381	0.0059*

¹Source: 2011 AHS National/Metropolitan Public Use File (v 1.2); Cases with missing data or square footage outside 100-13,000 removed from analysis; First interview square footage determined where applicable

²Source: 2001-2013 SOC Internal Microdata Files; Cases with missing data or square footage outside 100-13,000 removed from analysis; No external square footage conversion applied

* Statistically significant differences in underlying square footage distributions of AHS and SOC at a 90% conf. level

Next Steps

- Improvements to SOC
 - Further investigation of converting square footages to exterior dimensions
 - Are the 4% and 8% increases appropriate?
- Improvements to AHS
 - Capture of additional information regarding basement type (finished, unfinished)
 - Would assist with comparison to SOC

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