



Lower Operating Costs Mean Buyers Can Afford a Higher-Priced Home—If It's New
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Economics and Housing Policy

If you own a home, the annual costs of operating it include utilities, maintenance, property taxes, and insurance. This article investigates these operating expenses by using data from the 2011 the American Housing Survey (AHS), sponsored by HUD and conducted by the Census Bureau. The article also looks at how these costs vary depending on the age of the structure. Findings include the following:

- Operating costs per home average just over \$6,900 a year.
- The largest components of operating costs are fuels and property taxes, at a little under \$2,500 each.
- Narrowly defined maintenance costs average \$547 a year but decline as the structure becomes newer—from \$564 a year for homes built before 1960 to only \$241 for homes built after 2008.
- Overall operating costs average \$3.77 per square foot.
- Operating costs per square foot decline regularly as the structure becomes newer, from \$4.26 per square foot for homes built before 1960 to \$2.92 for homes built after 2008.
- Overall, annual operating costs average 4.24 percent of the home's value.
- Operating costs as a fraction of value also decline regularly as the structure becomes newer, from nearly 5 percent of the home's value for structures built before 1960 to just under 3 percent for homes built after 2008.

The difference in operating costs imply that buyers can purchase a higher-priced home and achieve the same annual operating costs if the home is newer. The article provides an example that takes mortgage payments and income tax savings for a typical buyer of a \$200,000 new home into account. The example shows that, if annual costs during the first year of ownership are the constraint, this buyer can afford to pay \$37,655—or 23 percent—more for a new house than for one built before 1960. The difference is a little more than enough to cover the price of an extra full bathroom.

Operating Costs in the AHS

As noted above, the cost data for this article come from the [AHS](#), which is conducted in odd-numbered years by the Census Bureau for HUD. In the years when it's conducted, the AHS collects extensive data on each home in the survey, including considerable detail on different categories of housing costs. This article is based on data from the most recent (2011) AHS, which was released to the public in October of 2012.

The 2012 AHS data show that, across all owner-occupied single-family detached homes, total operating costs average a little over \$6,900 per year (Table 1). This includes property taxes, insurance and utilities, but not mortgage payments (which are treated separately below). Defined this way, the largest components of operating costs are property taxes and fuel expenses, accounting for just under \$2,500 each, followed by property insurance (\$820), other utilities (\$604) and maintenance.

Table 1. Average Operating Costs by Year the Home Was Built
(Based on Owner-Occupied, Single-Family Detached Homes)

	Before 1960	1960s	1970s	1980s	1990s	2000-'04	2005-'08	After 2008	All Homes
A. Operating Costs per House (\$)									
Fuels	2,502	2,446	2,421	2,452	2,521	2,529	2,489	2,240	2,478
Other utilities	473	515	532	652	755	881	912	747	604
Maintenance	564	549	547	633	589	463	351	241	547
Insurance	744	780	832	882	912	891	892	780	820
Property tax	2,310	2,248	2,172	2,520	2,804	3,093	3,103	2,447	2,476
Total	6,592	6,538	6,506	7,139	7,580	7,857	7,747	6,455	6,925
B. Operating Costs per Square Foot (\$)									
Fuels	1.62	1.47	1.33	1.28	1.18	1.12	1.03	1.04	1.38
Other utilities	0.33	0.32	0.30	0.37	0.37	0.40	0.38	0.33	0.34
Maintenance	0.37	0.33	0.30	0.34	0.28	0.21	0.15	0.12	0.31
Insurance	0.48	0.46	0.45	0.46	0.42	0.39	0.37	0.35	0.45
Property tax	1.46	1.28	1.13	1.23	1.26	1.29	1.20	1.07	1.30
Total	4.26	3.86	3.51	3.67	3.51	3.41	3.13	2.92	3.77
C. Operating Costs as a Percent of Value									
Fuels	2.05%	1.80%	1.68%	1.51%	1.37%	1.30%	1.19%	1.12%	1.69%
Other utilities	0.42%	0.40%	0.38%	0.41%	0.40%	0.44%	0.44%	0.36%	0.41%
Maintenance	0.42%	0.37%	0.36%	0.35%	0.30%	0.23%	0.16%	0.11%	0.35%
Insurance	0.54%	0.51%	0.54%	0.50%	0.45%	0.42%	0.39%	0.36%	0.50%
Property tax	1.40%	1.25%	1.16%	1.22%	1.25%	1.32%	1.27%	1.02%	1.28%
Total	4.83%	4.34%	4.11%	3.99%	3.78%	3.72%	3.45%	2.97%	4.24%

Source: NAHB tabulation of data from the 2011 American Housing Survey, HUD / U.S. Census Bureau.

Fuels include the annual costs of electricity, gas, oil or other fuels (in the AHS, the “other fuels” question is worded as “total ANNUAL cost for wood, coal, kerosene or any other fuel).

Other utilities include annual costs of water & sewer service, garbage & trash collection and, if they exist, homeowner’s association or condo fees.¹

The AHS also collects information on when the home was built. The variation in average operating costs by vintage is relatively modest: \$6,592 for homes built before 1960 compared to \$6,455 for homes built after 2008 (although above \$7,000 at some points in between).

Among the components of operating costs, the clearest trend is for maintenance costs to decline as the structure becomes newer—from \$564 a year for homes built before 1960 to only \$241 for homes built after 2008. Many maintenance expenses are likely to grow as a home ages and components begin to wear, but it’s also possible that newer homes incorporate newer materials and components specifically designed for low maintenance.

The definition of maintenance is rather narrow here. It includes items such as painting, and minor repairs to plumbing, HVAC equipment, fences, etc. It doesn’t include replacing components of a home like flooring or roofing or fixtures. Although components like these undoubtedly need to be replaced sometimes because of obsolescence or accumulated wear and tear, it’s difficult to distinguish cases like these from replacements motivated purely or partly by aesthetic sensibilities, so attempt is made to add necessary replacements of major components to the cost of maintenance in this article.

In this sense, the new vs. old cost differences shown in Table 1 are somewhat conservative.

If replacements out of necessity could be identified and added to maintenance, it would increase the spread between the costs of newer and older homes.²

Cost per Square Foot & Dollar of Value

Table 1 also shows operating costs per square foot of living area and as a fraction of the home’s value.³

Overall, operating costs average \$3.77 per square foot and 4.24 percent of the home’s value.

Maintenance and fuel costs, and to a lesser degree insurance and property taxes, tend to be lower for

newer homes, so that operating costs decline regularly as the structure becomes newer from \$4.26 per square foot for homes built before 1960 to \$2.92 for homes built after 2008.

The same is true if these items are measured as a fraction of the home's value. For every cost component, except possibly non-fuel utilities, costs per dollar of value decline as the homes become newer. For example, fuels on average cost 2.05 percent of the value of the home per year for homes built before 1960, but only 1.12 percent for homes built after 2008.

In newer homes, lower cost per dollar of value for fuels is relatively easy to explain as the result of factors like more efficient appliances and HVAC equipment in the homes, and increased insulation due to both buyer preferences and changes in building codes. Lower cost per dollar of value for maintenance in newer homes is also intuitively plausible. The reasons property taxes and insurance show the same pattern is less obvious, as payments for these items are often set as a function of the home's value.

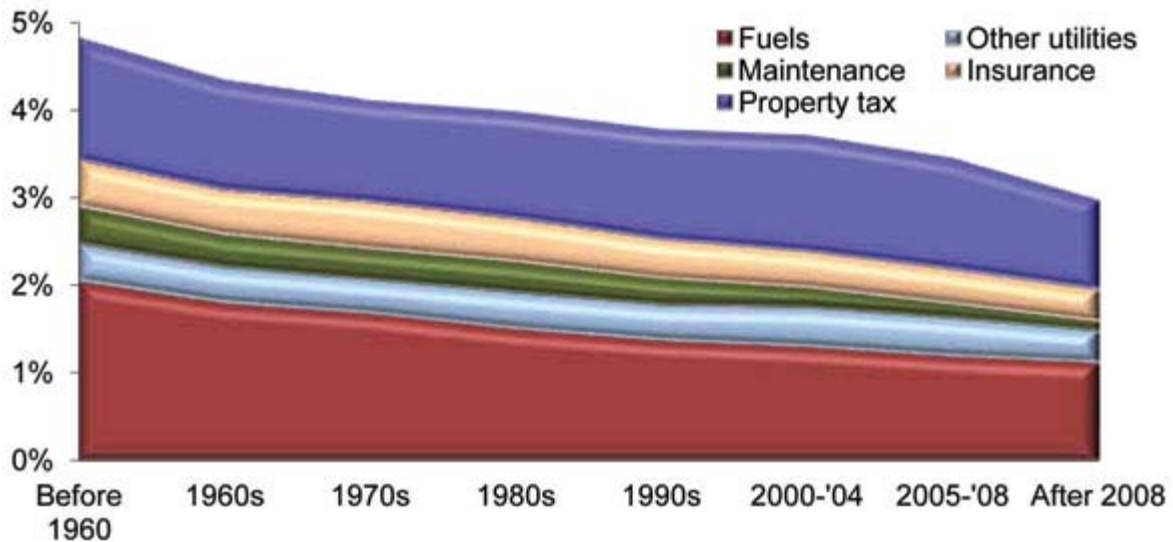
Reasons the effective property tax rate may be lower in new homes include rules in some jurisdictions that limit annual increases in property taxes for existing homes, declining values for older homes that haven't been completely incorporated into the assessed value, and a concentration of new construction in low-tax jurisdictions—due either to a concentration of newer and relatively higher-valued housing in fast growing areas that are able to raise the same amount of revenue with a lower effective tax rate.

There are several reasons rates on insurance premiums may be lower in new homes. Insurance premiums are usually based on estimated replacement cost, which may diverge from the value of the home for older structures that have depreciated substantially, or been built with older techniques and materials no longer in common use. Insurance companies may judge that newer homes are less likely to generate losses due to faulty wiring or plumbing. Even were this not the case, most insurance claims are relatively small ones that don't involve replacing a large fraction of the entire home, and are likely to rise less than proportionately with the home's value.

The tendency for at least four of the five major components of operating costs to decline per dollar of value as the home becomes newer adds up to a significant difference in annual operating costs, from

nearly 5 percent of the home’s value for structures built before 1960 to just under 3 percent for homes built after 2008 (Figure 1).

Figure 1. Average Operating Costs as a Percent of Value by Year the Home Was Built



Source: NAHB tabulation of data from the 2011 American Housing Survey, HUD / U.S. Census Bureau.

Adding Mortgage Payments and Tax Savings

Most homes are purchased by buyers who take out a mortgage to help pay for it, and who are subject to state and federal income taxes. Mortgage payments, typically offset by some income tax savings, also generate ongoing annual costs for the buyer. Taking them into account requires some reasonable assumptions about the characteristics of the mortgage and the buyer.

In Table 2, the last column shows an example for a typical buyer of a new home priced at \$200,000. The basic assumptions used in this example include a purchase financed with a \$20,000 downpayment and a 30-year fixed rate mortgage at the approximate current interest rate of 3.5 percent. A mortgage of this nature would typically require private mortgage insurance at a cost of 45 basis points. Given these assumptions, the buyer would have to make \$10,250 a year in mortgage payments after acquiring the new home.⁴ Based on the average of just under 3 percent from the previous section, the buyer would

also incur \$5,950 in costs per year to cover items such as property taxes, insurance, maintenance and utility expenses.

Table 2. First Year After Tax Cost of Owning a Home by Year the Home Was Built

	Before 1960	1960s	1970s	1980s	1990s	2000-'04	2005-'08	After 2008
House price	162,345	170,586	174,652	177,544	181,989	183,825	189,549	200,000
Downpayment	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Mortgage rate	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Private mortgage insurance	0.45%	0.45%	0.45%	0.45%	0.45%	0.45%	0.45%	0.45%
Annual mortgage payments	8,106	8,575	8,807	8,971	9,224	9,329	9,655	10,250
Annual operating costs	7,843	7,410	7,185	7,077	6,886	6,833	6,546	5,950
Income tax savings:								
1st year mortgage interest	4,939	5,224	5,366	5,466	5,620	5,684	5,882	6,245
Property taxes	2,270	2,137	2,024	2,165	2,279	2,432	2,402	2,033
Other deductions	6,812	6,812	6,812	6,812	6,812	6,812	6,812	6,812
Marginal income tax rate	23.4%	23.4%	23.4%	23.4%	23.4%	23.4%	23.4%	23.4%
Standard deduction	11,400	11,400	11,400	11,400	11,400	11,400	11,400	11,400
1st year income tax savings	613	649	656	712	775	825	865	864
1st year cost after taxes	15,336	15,336	15,336	15,336	15,336	15,336	15,336	15,336
New house price compared to price of home built..								
	Before '60	in the 60s	in the 70s	in the 80s	in the 90s	2000-'04	2005-'08	After 2008
	123%	117%	115%	113%	110%	109%	106%	100%

Some of these costs will be partly offset by reduced income taxes, as mortgage interest and property taxes are generally deductible, and itemized deductions above the standard deduction will reduce the tax payment. To calculate the size of the reduction, Table 2 assumes that the buyer has a marginal federal income tax rate equal to the average marginal federal income tax rate for a typical taxpayer claiming the mortgage interest deduction with \$50K to \$75K in adjusted gross income (i.e., income minus deductions) plus a 6 percent marginal state income tax rate.

Table 2 also assumes that the 2009 standard deduction for married taxpayers filing a joint return applies, and that the buyer has other deductions equal to the 2009 estimated Schedule A total, excluding mortgage interest and real estate taxes, for a typical married taxpayer filing a joint return who claims the mortgage interest deduction. These assumptions are based on an article by Rob Dietz and Natalia Siniavskaia on

[A Tax Profile of a Typical Mortgage Interest Deduction Beneficiary](#) that NAHB published two months ago.

Under these assumptions, the buyer of the new \$200,000 would save \$864 in income taxes the first year after the purchase. Adding together the mortgage payment and operating costs, the first-year after-tax cost of owning the home would be \$15,336.

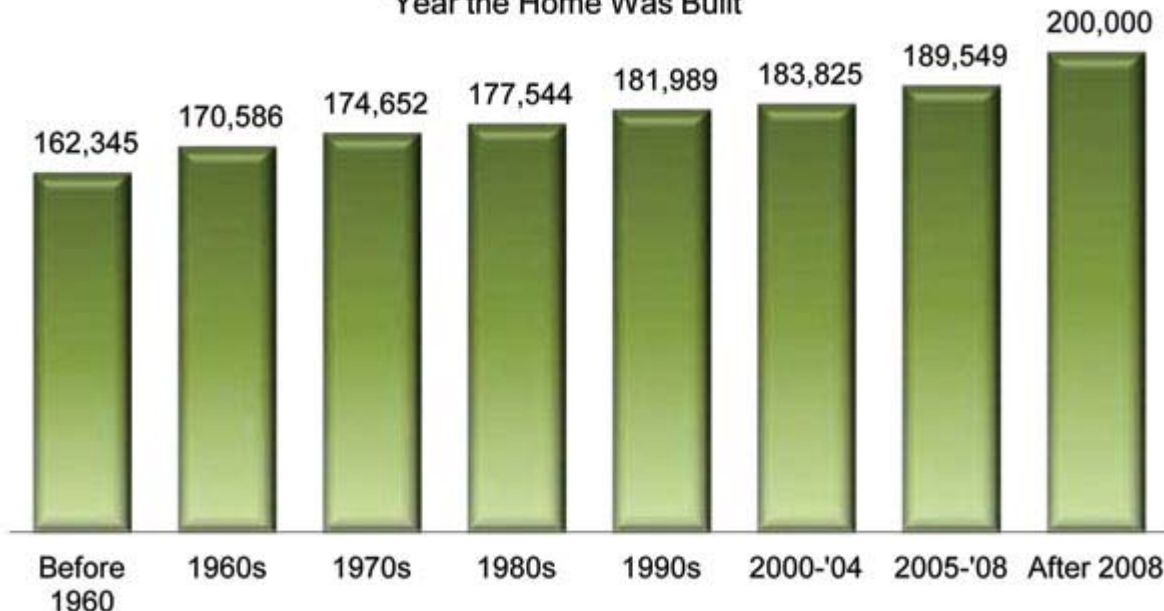
The New Home Premium

Using the numbers from the previous sections, it's possible to undertake an exercise first suggested by Michael Carliner in 1993, when he was a Staff Vice President in NAHB's Economics, Mortgage Finance, and Housing Policy Division. Once we have established that operating costs per dollar value are lower for newer homes, how much more can a buyer pay for a newer home and still keep the same first-year after-tax costs of ownership? In short, how much more can a buyer afford to pay for a house simply because it's new?

Table 2 investigates this by repeating the cost calculations for homes of different vintages, keeping all the assumptions and formulas from Table 1 the same, but varying the price of the home to keep the first-year after-tax cost of ownership the same. For example, if the same buyer purchases a home built from 2005 through 2008 for \$189,549, the annual mortgage payments will be a few hundred dollars less than for a \$200,000 brand new home; but, based on the share of value averages from Table 1, operating costs for the older home will be a few hundred dollars higher. The income tax savings are approximately the same (because the average effective property tax rate is a little higher for the slightly older home compensating for a lower mortgage interest deduction), so the \$189,549 home built in 2005-2008 also generates a first-year after-tax cost of \$15,336.

The calculations are repeated for each vintage category, and the trend is consistent: the older the home, the higher the operating costs per dollar of value. So the price of the home has to keep falling to keep the first-year after-tax costs constant (Figure 2). At the extreme, a home built before 1960 can cost no more than \$162,345 to keep first-year after-tax costs at \$15,336.

Figure 2. Home Prices that Yield Same First-Year Cost by Year the Home Was Built



Source: NAHB calculations based on information described in the text and shown in Table 2.

In other words, if first-year cost is the constraint, the buyer can afford to pay a 23 percent premium for a new house (compared to one built before 1960), simply because it's new. Based on results from NAHB's [House Price Estimator](#), that's enough to put an additional full bathroom in a new home, with a couple thousand dollars left over (see example, Figure 3, at the end of this article).


¹ To preserve respondent confidentiality, the AHS truncates extreme values of each expense item. Such cases are deleted before computing any of the averages shown in Table 1.

² Some information on differences in property alterations by vintage in recently purchased homes is available in a previous article written by Natalia Siniavskaia: [Spending Patterns of Home Buyers](#).

³ Before calculating the relevant averages, extreme cases where the Census Bureau truncated square footage or value were deleted. Also deleted were cases where the estimated value of the home was less than \$29,000—a conventional assumption that has often been used by NAHB, for example, when computing the NAHB/Wells Fargo [Housing Opportunity Index](#).

⁴ In economic terms, not all of the mortgage payment is a true cost to the home owner, as some of the payment goes to paying down principal thereby increasing the owner's equity (i.e., the owner is trading one form of wealth for another). Nevertheless, a home buyer must make the full mortgage payment and take the cash flow into account when planning his or her annual housing budget.

Figure 3. Results from NAHB's [House Price Estimator](#)



Average Single-Family Detached House Price Estimator

Characteristics of the home and its location: Click square brown buttons for more detailed descriptions.

<input type="checkbox"/> Region	South	<input type="checkbox"/> Is the property located on a waterfront?	No
<input type="checkbox"/> Metropolitan status	Suburb	<input type="checkbox"/> Is the property near water, but not on the waterfront?	No
<input type="checkbox"/> Year the home was built	After 2007	<input type="checkbox"/> Is the home in a gated community?	No
<input type="checkbox"/> Size of the home in square feet	1994	<input type="checkbox"/> Does the community have recreational amenities such as a clubhouse or walking trails?	No
<input type="checkbox"/> Number of full bathrooms	1	<input type="checkbox"/> Is there a park or other open space within 1/2 block?	No
<input type="checkbox"/> Number of half bathrooms	1	<input type="checkbox"/> Is public transportation available?	No
<input type="checkbox"/> Number of bedrooms	3	<input type="checkbox"/> Are stores available within 1 mile?	Yes
<input type="checkbox"/> Number of dining rooms	1	<input type="checkbox"/> Is there a factory/industrial structure within 1/2 block?	No
<input type="checkbox"/> Number of family rooms	0	<input type="checkbox"/> Is there an abandoned building within 1/2 block?	No
<input type="checkbox"/> Number of rooms not included above	3	<input type="checkbox"/> Is there bothersome trash or litter within 1/2 block?	No
<input type="checkbox"/> Central air conditioning	Yes	<input type="checkbox"/> Are some roads in the area in need of repair?	No
<input type="checkbox"/> Fireplace	Yes	<input type="checkbox"/> Does the neighborhood have smoke, gas or odors ?	No
<input type="checkbox"/> Basement under at least part of the home	No	<input type="checkbox"/> Metal bars on windows of buildings within 1/2 block?	No
<input type="checkbox"/> Does the home have a garage or carport?	Yes		


[Click Here to See House Price Estimate](#)

Estimated Price: \$165,169

11/6/2012

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Average Single-Family Detached House Price Estimator

Characteristics of the home and its location: Click square brown buttons for more detailed descriptions.

<input type="checkbox"/> Region	South	<input type="checkbox"/> Is the property located on a waterfront?	No
<input type="checkbox"/> Metropolitan status	Suburb	<input type="checkbox"/> Is the property near water, but not on the waterfront?	No
<input type="checkbox"/> Year the home was built	After 2007	<input type="checkbox"/> Is the home in a gated community?	No
<input type="checkbox"/> Size of the home in square feet	1994	<input type="checkbox"/> Does the community have recreational amenities such as a clubhouse or walking trails?	No
<input type="checkbox"/> Number of full bathrooms	2	<input type="checkbox"/> Is there a park or other open space within 1/2 block?	No
<input type="checkbox"/> Number of half bathrooms	1	<input type="checkbox"/> Is public transportation available?	No
<input type="checkbox"/> Number of bedrooms	3	<input type="checkbox"/> Are stores available within 1 mile?	Yes
<input type="checkbox"/> Number of dining rooms	1	<input type="checkbox"/> Is there a factory/industrial structure within 1/2 block?	No
<input type="checkbox"/> Number of family rooms	0	<input type="checkbox"/> Is there an abandoned building within 1/2 block?	No
<input type="checkbox"/> Number of rooms not included above	3	<input type="checkbox"/> Is there bothersome trash or litter within 1/2 block?	No
<input type="checkbox"/> Central air conditioning	Yes	<input type="checkbox"/> Are some roads in the area in need of repair?	No
<input type="checkbox"/> Fireplace	Yes	<input type="checkbox"/> Does the neighborhood have smoke, gas or odors ?	No
<input type="checkbox"/> Basement under at least part of the home	No	<input type="checkbox"/> Metal bars on windows of buildings within 1/2 block?	No
<input type="checkbox"/> Does the home have a garage or carport?	Yes		

[Click Here to See House Price Estimate](#)

Estimated Price: \$200,008

11/6/2012

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