

Home Vintage and Operating Costs

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How much does it cost to own a new home versus an older one? Newer homes tend to have higher prices, so that capital expenses (the down payment and monthly mortgage payments) of acquiring them will generally be higher. However, certain factors may partially offset the apparent difference. Income tax savings, increased amenities associated with homes of more recent vintage, and possible differences in appreciation are all such factors.

In addition, homes of different vintages may show differences in operating costs including utilities,

maintenance, property taxes, and insurance. Information about these costs is available from the American Housing Survey (AHS), conducted in odd-numbered years by the U.S. Bureau of the Census. This article analyzes the 1995 AHS, but also draws on the Energy Information Administration's 1993 Residential Energy Consumption Survey (RECS) for additional detail about energy costs.

Utilities

Average operating costs computed from the 1995 AHS for owner-occupied, single-family detached housing are shown in Table 1. Homes built in

1994 or 1995 include only new home purchases, where the owner is the home's first occupant. Per house, average annual fuel expenses are \$1,472, making this the largest individual component of operating expenses. Expenses for other utilities (water, sewer, trash removal, and home owner association fees) are smaller, averaging \$399 per house. Fuel costs vary only modestly with the age of the structure, falling below the overall average for homes built in the 1990s. The cost of other utilities is higher for newer homes.¹

In order to control for differences in home size, Table 1 also

Table 1 Vintage and Annual Costs: Owner-Occupied Single-Family Detached Homes

	Year Built								Total
	Before 1960	1960 to 1969	1970 to 1979	1980 to 1984	1985 to 1989	1990 to 1991	1992 to 1993	1994 to 1995	
Costs per House									
Fuels	\$1,453	\$1,473	\$1,516	\$1,478	\$1,531	\$1,446	\$1,388	\$1,343	\$1,472
Other utilities	\$340	\$383	\$412	\$478	\$501	\$531	\$510	\$561	\$399
Maintenance and repairs	\$445	\$460	\$496	\$476	\$491	\$358	\$302	\$299	\$453
Property insurance	\$416	\$447	\$474	\$522	\$516	\$503	\$504	\$498	\$455
Property taxes	\$1,319	\$1,424	\$1,447	\$1,619	\$1,956	\$1,950	\$2,012	\$1,745	\$1,482
Total	\$3,973	\$4,187	\$4,345	\$4,572	\$4,994	\$4,787	\$4,716	\$4,446	\$4,261
Replacements	\$131	\$179	\$180	\$152	\$78	\$23	\$18	\$2	\$135
Costs per Square Foot of Living Space									
Fuels	\$0.85	\$0.83	\$0.79	\$0.75	\$0.76	\$0.70	\$0.65	\$0.64	\$0.80
Other utilities	\$0.21	\$0.22	\$0.22	\$0.24	\$0.25	\$0.25	\$0.25	\$0.26	\$0.22
Maintenance and repairs	\$0.25	\$0.26	\$0.24	\$0.24	\$0.22	\$0.16	\$0.15	\$0.12	\$0.24
Property insurance	\$0.23	\$0.24	\$0.24	\$0.25	\$0.25	\$0.23	\$0.23	\$0.22	\$0.24
Property taxes	\$0.68	\$0.71	\$0.67	\$0.73	\$0.86	\$0.84	\$0.85	\$0.72	\$0.71
Total	\$2.22	\$2.26	\$2.16	\$2.20	\$2.33	\$2.19	\$2.12	\$1.96	\$2.21
Replacements	\$0.08	\$0.09	\$0.09	\$0.07	\$0.04	\$0.01	\$0.01	\$0.00	\$0.07
Costs as a Percent of Value									
Fuels	2.26%	1.68%	1.59%	1.36%	1.21%	1.13%	0.96%	0.91%	1.78%
Other utilities	0.54%	0.42%	0.41%	0.41%	0.38%	0.37%	0.36%	0.35%	0.46%
Maintenance and repairs	0.62%	0.48%	0.47%	0.44%	0.35%	0.25%	0.23%	0.17%	0.50%
Property insurance	0.55%	0.46%	0.46%	0.45%	0.39%	0.35%	0.33%	0.31%	0.48%
Property taxes	1.41%	1.23%	1.19%	1.21%	1.26%	1.18%	1.16%	1.00%	1.29%
Total	5.38%	4.26%	4.12%	3.88%	3.58%	3.29%	3.04%	2.73%	4.51%
Replacements	0.20%	0.18%	0.18%	0.13%	0.06%	0.01%	0.02%	0.00%	0.16%

Source: NAHB calculations based on data from the 1995 American Housing Survey (AHS), U.S. Census Bureau. All numbers are averages. Because the AHS truncates values reported by the respondents with the highest expenditures, the average costs per home will be understated. Cases with truncated costs or unit size were excluded in calculations of costs per square foot. Cases with truncated costs or value were excluded from the calculation of costs as a percent of value. Also deleted are cases where the AHS imputed values to unanswered questions for any of the variables used in the calculations.

shows operating costs per square foot of living area. On this basis, fuel costs are substantially lower for newer homes. Expenses for other utilities are still higher for newer homes, but the trend is much more gradual.

Measured as a fraction of a home's value, the costs of both fuel and other utilities noticeably decline as the vintage becomes more recent. This is most dramatically true for fuels, where average annual costs fall from 2.26 percent of value for homes built before 1960 to 0.91 percent for homes built in 1994 or 1995.

In recent years, among the four principal census regions, home building activity has been most strongly concentrated in the South. In 1996, for example, 45 percent of all single-family starts—24,000 out of 1.16 million—were in the South. The West was a distant second with 271,000.² This suggests that fuel costs may be lower for newer homes simply because production

has shifted toward milder climates. However, the trend of lower fuel costs per dollar of value in newer homes is essentially the same for each of the four principal census regions. One possible reason is the trend toward cheaper gas heat.² In 1986, only 47 percent of new single-family homes were built with gas heating, compared with 69 percent in 1996.³

The trend toward lower fuel costs is also consistent with the notion that newer homes and appliances are more energy efficient. New standards for furnaces, put in place in 1992, represented an estimated 20 percent increase in efficiency over previous building code standards.⁴ Manufacturers of doors and windows now routinely measure leakage rates for their products, and these rates have been drifting downward. Vinyl windows have emerged as a viable low-maintenance alternative to the less energy efficient

metal windows, and argon-filled windows are becoming more common.

Additional detail about energy use is available from the Energy Information Administration's 1993 Residential Energy Consumption Survey (RECS), shown in Table 2. Given the difference in years, survey design and definitions, and the practice of truncating certain values, the AHS and RECS agree with each other more closely than expected. The pattern of lower fuel expenditures per square foot for newer homes is again apparent in the RECS data, especially for space heating. This is probably due to a combination of newer, more efficient heating equipment and tighter thermal shells in newer homes.

Although new homes are more energy efficient than older homes, older homes are more energy efficient than when they were first built. Of the single-family detached homes that were in the AHS in both

Table 2 Fuel Costs by Use: Owner-Occupied Single-Family Detached Homes

	Year Built								Total
	Before 1950	1950 to 1959	1960 to 1969	1970 to 1979	1980 to 1984	1985 to 1989	1990 to 1991	1992 to 1993	
Costs per House									
Space heating	\$606	\$501	\$494	\$434	\$368	\$401	\$386	\$414	\$495
Air conditioning	\$432	\$441	\$472	\$344	\$369	\$396	\$353	\$427	\$415
Other	\$435	\$596	\$549	\$743	\$794	\$730	\$605	\$582	\$591
All uses	\$1,473	\$1,538	\$1,515	\$1,521	\$1,531	\$1,526	\$1,344	\$1,422	\$1,501
Costs per Square Foot of Heated Area									
Space heating	\$0.34	\$0.29	\$0.27	\$0.23	\$0.20	\$0.19	\$0.19	\$0.17	\$0.27
Air conditioning	\$0.24	\$0.25	\$0.26	\$0.18	\$0.20	\$0.19	\$0.17	\$0.18	\$0.22
Other	\$0.26	\$0.37	\$0.32	\$0.41	\$0.44	\$0.37	\$0.33	\$0.28	\$0.34
All uses	\$0.84	\$0.92	\$0.85	\$0.81	\$0.83	\$0.74	\$0.69	\$0.63	\$0.83
Percent Using Various Appliances									
Microwave	86.7%	87.0%	93.6%	94.1%	94.8%	94.5%	97.7%	95.3%	90.9%
Clothes washer	91.8%	97.2%	97.2%	98.2%	99.9%	97.5%	99.2%	99.7%	96.2%
Clothes dryer	84.7%	92.7%	93.2%	96.6%	95.9%	96.1%	98.8%	98.9%	92.0%
Dishwasher	37.3%	53.3%	55.6%	64.5%	70.3%	81.5%	83.4%	86.3%	56.5%
Exhaust fan	47.1%	58.1%	69.2%	72.6%	75.0%	81.9%	85.4%	91.0%	64.2%
Computer	19.3%	25.9%	25.4%	30.5%	37.4%	44.0%	42.8%	36.0%	27.9%
Separate freezer	54.8%	49.0%	50.6%	55.1%	41.6%	42.9%	40.2%	39.8%	50.3%
Refrigerators (2 or more)	23.3%	23.9%	26.0%	24.6%	18.5%	22.6%	12.5%	14.0%	23.0%
Extra large refrigerator	3.1%	5.8%	6.5%	7.4%	8.4%	8.2%	10.7%	13.0%	6.2%

Source: NAHB calculations based on data from the 1993 Residential Energy Consumption Survey, U.S. Energy Information Administration. All cost numbers are averages. Extra large refrigerators are those with at least 23 cubic feet of space.

1985 and 1995, 34 percent added insulation between the years 1983 and 1995. This suggests that the older homes would exhibit even higher fuel costs had they not at some point incurred the additional expense of paying for energy-efficiency improvements.

Although, in aggregate, residential buildings use more energy than commercial buildings, commercial structures use about twice as much per square foot (about 189,000 Btu per square foot in 1989, compared with 91,000 for residential buildings in 1990).⁵

Table 2 also shows slightly lower air conditioning costs per square foot for newer homes, despite the tendencies of newer homes to be built in the South and with central air conditioning. Between 1976 and 1996 the percentage of new homes built with central air steadily increased from 69 percent to 81 percent. This trend was present in all census regions except the West.⁶

Energy expenses for uses other than heating and air conditioning follow an arch-shaped pattern: highest for homes built in the early 1980s and lower for homes of either newer or older vintage. The lower figures for older homes may be due to a lack of appliances. Some appliances are less prevalent in older homes, although other appliances that use substantial amounts of energy, such as separate freezers and second refrigerators, are actually more common in older homes. In recent years, the government has mandated energy ratings on refrigerators, water heaters, and dishwashers; and these appliances have become more efficient. The lower costs for homes built after 1985 may be the result of newer appliances in these homes. Not only are appliances often included with new homes, but NAHB

research has demonstrated that families moving into new homes often purchase new appliances.⁷

Maintenance

As measured in the AHS, routine maintenance and repairs consists of items such as painting, fixing water pipes, replacing parts of major equipment, such as furnaces, repairing fences, pest control, and other expenses necessary for the preventive care of property and fixed equipment. Where differences in energy costs are likely to reflect the types of materials and equipment in the home, maintenance expenses are more likely to simply grow as a home ages, regardless of when it was built. For this reason, it's no surprise that the newer homes have the lowest maintenance costs whether measured per house, per square foot, or as a percent of value (Table 1). This same trend is evident in all four census regions.

Like routine maintenance and repairs, replacement costs are much lower for homes of more recent vintage. In 1995, partly in response to NAHB suggestions, the AHS was altered to incorporate much more detail about additions and replacements, collecting information for 70 distinct categories. The cost of replacements shown in Table 1 is based on that information. Expenditures not explicitly identified as replacements by respondents are not included, nor are some items such as moving walls, even when identified as replacements. These exclusions account for the low \$135 average replacement spending compared with the approximately \$250 per unit in spending on replacements reported in the Census Current Construction Reports, series C50. Even with added detail in the AHS, it's impossible to perfectly distinguish replacements

that are necessary (for example, replacing a roof that has worn out) from those motivated by taste (such as buying new kitchen cabinets when the owner tires of the way the old ones looked). For this reason, replacement spending is reported as the last item in Table 1, and not included in total operating costs.

Taxes and Insurance

The relationship between vintage and expenses such as property taxes and property insurance is most clear when these costs are measured as percent of value. Because both taxes and insurance are typically set by formula as a fraction of value, these numbers might be expected to remain fairly constant among vintages. This is approximately the case for property taxes in the South and West. In the Northeast and Midwest, however, as well as in the U.S. overall, owners of newer homes clearly pay less per dollar of value for taxes. Moreover, owners of newer homes also pay less per dollar of value for insurance, and this is true in all four regions.

Part of the property tax differential results from the shift in construction away from the high-tax Northeast and Midwest in favor of the low-tax South and West.⁸ Other reasons for the lower tax rates associated with new construction were discussed in a previous article.⁹ They include a concentration of new construction in low-tax jurisdictions due either to a desire to avoid central cities with high costs of public services and high tax rates, or to a substantial tax base in suburban growth areas created by high-priced housing that requires a lower effective tax rate. Also, impact fees are used as a substitute for property taxes in some areas where there are a large number of new homes.

Compared with property taxes, insurance costs are relatively small.

Table 3 New Home Premium Justified by Cost Difference

	New Home	Existing Home	New Minus Existing
House price	\$150,000	\$124,635	\$25,365
Down payment	\$30,000	\$30,000	\$0.00
Mortgage rate	7.50%	7.50%	0.00%
Annual mortgage payments	\$10,069	\$7,940	\$2,128
Marginal income tax rate	34%	34%	0%
First year income tax savings	(\$3,557)	(\$2,949)	(\$608)
Annual operating costs	\$4,098	\$5,618	(\$1,520)
Annual cost (initial year)	\$10,609	\$10,609	(\$0)

Note: The 34 percent marginal tax rate assumes that the buyer's income is such that they are paying 28 percent federal and the median 6 percent state income tax rates. The table also assumes that the buyer has other deductions that meet or exceed the standard deduction. Although this may not always be true, the existing home by itself provides deductions beyond the standard one, so the new-old tax savings difference would be the same in any event.

Previous articles have explored geographic differences in insurance costs and explained why, per dollar of value, they tend to be lower in new homes.¹⁰ The reasons include new home discounts offered by insurance companies, reduced fire hazard associated with newer electric wiring, reduced insurance costs associated with better police and fire protection in the suburbs where most new construction takes place, changes in technology that render older homes more difficult to repair, and the small size of most claims resulting in insurance costs that rise less than proportionately with property replacement cost.

As a percent of value, most types of operating costs are lower where values are high: in the Northeast and West. Property taxes are the only factor large and variable enough to significantly counteract this tendency. Thus, it's no accident that the lowest average annual operating costs as a percent of value (2.99 percent) occur in the low-tax high-priced West, and the highest (5.24 percent) occur in the high-tax low-priced Midwest. The Northeast (where house prices and property taxes are both high) and the South (where house prices and property taxes are both low) lie somewhere

in between, with operating costs of 4.82 percent of value in the Northeast, and 4.59 percent in the South.

New Home Premium

In the marketplace, reduced operating costs should enable a new home to command a higher price than an older home. How big should this new-home premium be? Table 3 shows initial annual costs for a \$150,000 new home and examines how much lower the price of an existing home of average vintage would have to be in order to equate the costs. The example is presented from the point of view of a prospective buyer who has \$30,000 in savings to use for a down payment and therefore doesn't need mortgage insurance.

In this scenario, mortgage payments for a \$124,635 existing home would be \$2,128 lower than for the new home, but income tax savings and the lower operating costs perfectly offset this. On the basis of operating costs and tax savings in the initial year, the existing home should be priced more than \$25,000 below the new home.

And this is irrespective of other advantages the new home may offer, such as a reduced risk that

major replacements will be necessary, and the additional amenities that are likely to be found in a home of more recent vintage.

Appreciation can also have a powerful effect on the total cost of home ownership, as shown in a previous article.¹¹ That article found that relatively new homes built in the late 1980s increased in value more quickly than existing homes that were several years older (the result did not hold for existing homes more than about 15 years old), raising the possibility that, in addition to accumulating appreciation on a larger base, the new home in Table 3 might appreciate at a faster rate.

¹The AHS has various procedures in place to adjust utility expenses to annual rates when a full year of information is not available.

²U.S. Census Bureau, Current Construction Reports, C20.

³U.S. Census Bureau, Current Construction Reports, C25.

⁴Estimate provided by the NAHB Research Center.

⁵U.S. Energy Information Administration, *Buildings and Energy in the 1980's*, p. 37.

⁶U.S. Census Bureau, Current Construction Reports, C25.

⁷Paul Emrath, "Consumption Spending of New Home Buyers," *Housing Economics*, July 1994.

⁸For tax differences among metro areas, see Paul Emrath and Elliott Dubin, "Variation in Residential Property Tax Rates," *Housing Economics*, November 1994.

⁹Paul Emrath, "Cost of Finance and Taxes for New and Old Homes," *Housing Economics*, September 1993.

¹⁰Paul Emrath, "Operating Costs of New and Existing Homes," *Housing Economics*, July 1993; and Andrew Kochera, "Home Characteristics and Property Insurance," *Housing Economics*, December 1994.

¹¹Paul Emrath, "Appreciation and the Cost of New and Old Homes," *Housing Economics*, November 1993.