



Economic Environment

Construction Markets & Building Material Prices: How Strong Is the Relationship?

by Al Schuler

The building components industry has no doubt reaped the benefits of the U.S. housing boom. But how do new home prices and building material costs correlate?

Building materials account for about one-third of the sale price of a new home and materials and labor combine for about half the price. Thus, for component manufacturers serving residential markets, it is important to understand the relationship between home prices and building material prices.

In this article, we shed light on that relationship as well as an underlying issue—with the rapid rise in home prices during the past five years, are component manufacturers (CM) sharing in this boom? We also compare construction cost trends across construction types—residential, nonresidential buildings and non-building construction (e.g., highway and street construction).

There are two significant differences between residential and nonresidential construction: (1) Residential markets are heavy wood users while nonresidential sectors favor concrete and steel; and (2) Inflation in basic inputs, such as oil, natural gas, iron and scrap steel, and copper ores, have increased costs for nonresidential construction faster than residential construction (see Ken Simonsen, Associated General Contractors of America, Table 1).

Analysis

As shown in Figure 1, material costs, including wood (plywood, lumber, engineered wood products [EWP], trusses, OSB), and non-wood materials (cement, plastic, brick) account for about one-third of the sale price of a new home (NAHB).

Increases in material prices will increase the cost of building a home and consequently will usually impact the sale price. But the reverse is not necessarily so (sales price can often be more sensitive to the demand-supply balance of homes for sale). Between December 2003 and December 2005 (U.S. Bureau of Labor Statistics started publishing price indexes for EWP and wood trusses in December 2003), there were strong, positive correlations between house prices and EWP, trusses, and a composite index representing all building materials used in residential construction (Figure 2). Due to the volatility of framing lumber prices, the correlations were not relevant. Over this period, price increases for building materials were similar to increases in house prices. Trusses were up 20 percent; EWP up 22 percent; all building materials used in residential construction up 18 percent; framing lumber composite prices were up 12 percent; and house prices were up 14 percent.

Wood typically used in a house (OSB, plywood, lumber) accounts for only about 6.3 percent of total cost (Henry Spelter, USDA Forest Products Laboratory):

- Lumber: \$600/mbf (x 15 = \$9,000)
- Plywood: \$550/msf (x 3.5 = \$1,925)
- OSB: \$475/msf (x 7.5 = \$3,575)

The average cost for lumber and panels in a new house would be \$14,500, which represents about 6.3 percent of median price (\$231,000) of new single family homes in 2005 (U.S. Bureau of Census).

The most important cost factor for home ownership is financing. As seen in Figure 3, mortgage rates are about five times as important as wood costs in the price of

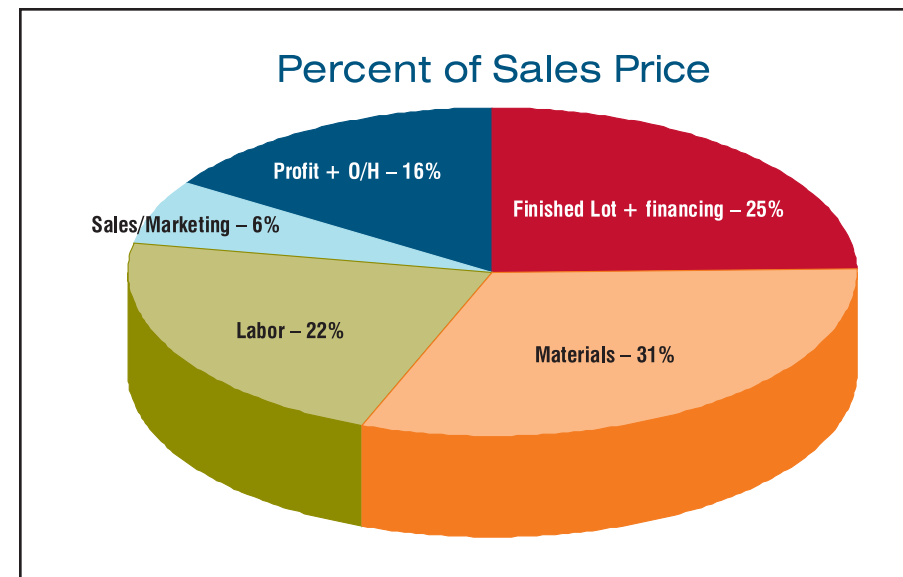


Figure 1. Large Homebuilders - Price breakdown. (Source: Professional Builder and NAHB, March 2003)

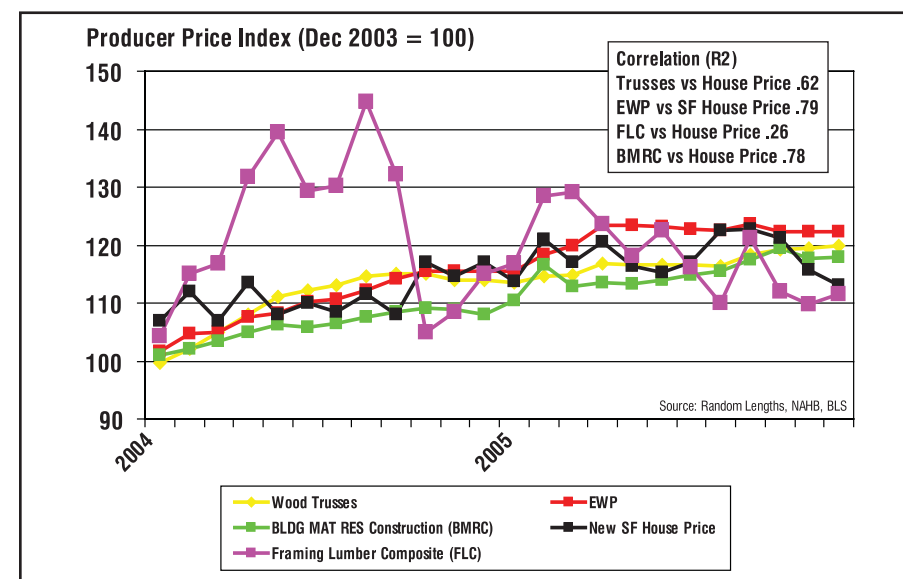


Figure 2. Building materials and new SF home prices. (Source: NAHB, Random Lengths, BLS)

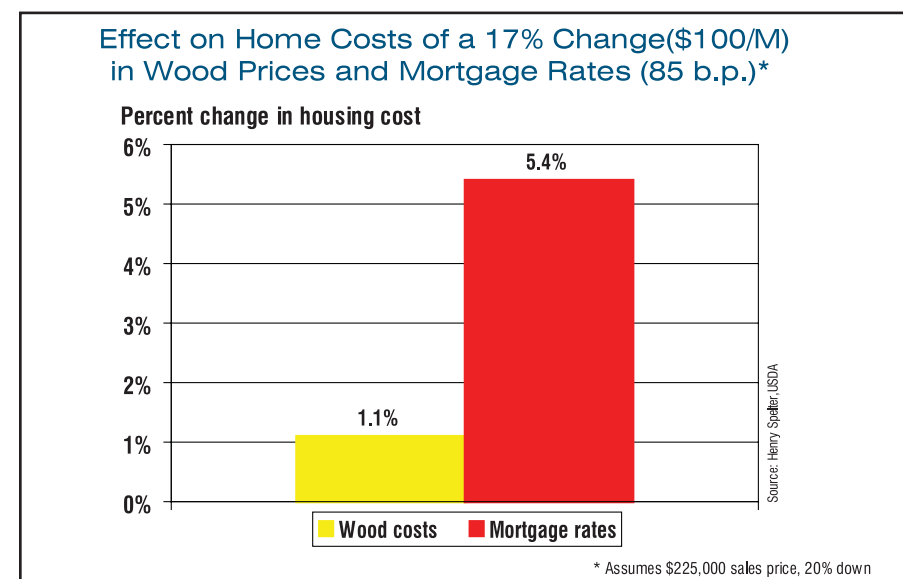


Figure 3. Home costs and changes in wood costs and mortgage rates.

a new home. Henry Spelter, a colleague at USDA Forest Products Laboratory, compared the impact of a 17 percent increase in wood costs and mortgage rates on the cost of a new home. This increase affected home construction costs by 1.1 percent, while an 85 basis point increase (i.e., an increase in the 30-year mortgage from five percent to 5.85 percent) in mortgage rates (17 percent increase) increased the financing cost by 5.4 percent. Although we are comparing apples and oranges (i.e., construction costs versus financing costs), mortgage rates are clearly more important than wood product prices in determining the "cost" of a home.

Comparison of Costs Among Construction Types

Residential construction costs have not increased as much as other types of construction (see Table 1 on page 22). This is primarily due to greater cost increases in steel, concrete, and gypsum products when compared with wood products. The rapid rise in prices for non-wood products is being influenced by escalating cost increases for basic inputs such as oil, natural gas, cement, iron ore and copper. Globalization trends, including rapid economic growth in China, India and other developing nations, are driving demand for construction materials and straining some supply chains. Currently, globalization trends have more inflation impact on non-wood construction materials; most analysts don't expect these trends to change in the near future. For example, China now consumes 47 percent of the world's cement production and 26 percent of the crude steel production, thus competing with the U.S. for available supply. In fact, globalization has resulted in an increase in the supply of wood products to the U.S. market (e.g., more lumber from Europe) while straining supply of steel and concrete.

Discussion

In the past 50 years, land costs have increased the most, from 11 percent of

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at a glance

- Price increases for building materials have been very similar to increases in house prices in the last several years.
- Mortgage rates are more important than wood prices in determining the cost of a home.
- With the rapid rise in home prices during the past five years, it appears that most component manufacturers are sharing in the housing boom.

	Percentage change in 12 months ending:				
	12/01	12/02	12/03	9/04	9/05
Construction Types					
Nonresidential buildings	-0.5	0.7	2.4	9.3	7.7
Highway and street construction	-3.6	1.0	2.6	11.0	16.0
Other heavy construction	-2.6	1.0	2.6	13.3	9.2
Multi-unit residential	-0.1	0.4	2.7	9.0	7.2
Single-unit residential	-0.4	0.6	3.5	7.3	5.2
Construction Inputs					
Concrete products	2.5	-0.3	1.5	7.9	10.0
Gypsum products	0.4	3.4	2.8	20.8	12.7
Steel mill products	-6.1	11.1	1.7	48.2	-5.5
Copper and brass mill shapes	-9.5	-1.6	11.6	32.2	19.2
Lumber & plywood	-2.9	1.4	3.1	16.5	-8.5
Basic Inputs					
Oil	-42.4	60.6	14.3	57.7	44.6
Natural gas	-36.7	12.2	20.3	7.9	39.7
Iron & steel scrap	-5.6	27.8	64.9	75.0	-4.0
Copper ores	-19.6	3.6	27.4	78.9	31.8

Table 1. Changes in Costs Among Construction Types and Specific Inputs. (Source: Ken Simonsen's (<http://www.agc.org/page.ww?name=Construction+Inflation+Alert§ion=Construction+Economics>)

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the sale price of a new home in 1949 to about 24 percent today. In the same period, construction costs (as percent of total sale price of a new home) have decreased significantly (see Table 2).

Developed land costs are increasing for a number of reasons: higher spec roads (better quality and higher design standards), wetlands protection, conservation easements sometimes required, larger lot size, underground utilities often required and increased drainage considerations. However, if we look at the recent past (1995-2002), the other major categories affecting cost have remained relatively constant. Construction and labor costs are about half; finished lot costs are about one-quarter, while financing, marketing, profit and sales commissions make up the remainder.

Related NAHB studies also suggest that during the past three decades the builder's gross profit has remained between 15 and 20 percent and operating expenses between 11 and 17 percent. This leaves a net income before taxes between 2.7 to seven percent. The conclusion from this study is that builders were not collecting exorbitant profits during this period (we don't have data for the 2003-2005 period).

What does this suggest for component manufacturers?

1. Wood building materials are expected to experience less cost price pressures in 2006 as weaker market conditions

	1949	1969	1982	1995	1998	2002
Sale Price Breakdown (Percent of Total Sale Price)						
Finished Lot	11.00	21.00	24.00	24.40	23.60	23.48
Total Construction	69.00	55.00	45.00	53.30	54.80	50.83
Financing	5.00	7.00	15.00	2.00	1.90	2.13
Other Costs*	15.00	17.00	16.00	20.40	19.70	23.56
a. General Overhead				5.80	5.70	5.53
b. Marketing				2.20	1.40	2.39
c. Sales Commission				3.30	3.40	3.67
d. Profit					9.10	9.20
Total	100.00	100.00	100.00	100.00	100.00	100.00
Sale Price	\$9,500	\$26,000	\$70,000	\$183,585	\$226,680	\$298,412

Table 2. Cost Breakdown of Single-Family Home (National). (Source: NAHB Surveys of Builder Members)

reflect lower housing demand and increased wood product supply.

2. Steel and concrete are expected to experience raw material price pressures in 2006 due primarily to rising energy costs and strong world demand for these commodities.
3. At the national level, EWP and truss prices have increased as much or more than house prices between 2004 and 2005, so it would appear that most CMs are indeed participating in the housing boom.
4. Median house prices in the U.S. have increased 73 percent in the last eight years (see *SBC Magazine*, November 2005), while lumber prices during this period (framing lumber composite) were flat, and the structural panel composite prices (blended OSB and plywood price) were up 83 percent. Lumber prices were flat because lumber was abundant; however, OSB, a growing commodity, went through periods of relative shortages while capacity caught up to needs, as in 2004-2005. Historically, a key driver for commodity wood prices has been availability or supply.

The issue of rapidly increasing house prices (and potential bubbles) during the past five years was discussed at length in the November issue of *SBC*. We concluded that the growth in the demand for housing and relatively large price increases were due to a host of influences including cheap money, innovative mortgages, some speculation, shortages of developed land in some regions and strong demographic demand.

Summary

From this admittedly "quick and dirty" analysis, there are several conclusions that can be drawn:

1. Truss and EWP prices have participated in the housing boom as prices for these two product categories actually

increased more than housing prices over the past two years.

2. Prices for commodity products, such as lumber, structural panels, steel and concrete, are influenced by house prices and housing demand, but another major economic influence is supply.
3. It appears that while material prices impact house prices via construction cost linkages, the more important factor in determining the "carrying" cost of a new home is mortgage rates.
4. Although material and labor still account for about half of the sale price of a new home, there are other costs that are becoming increasingly important. For example, the cost of a finished lot is now 25 percent of the sale price (national basis); but, in some larger metropolitan regions, a shortage of developable land is pushing this percentage higher. And, as stated in the November 2005 issue, housing markets are regional in nature, so there can be significant differences in housing prices between regions. Therefore, regional building material prices will be impacted by regional demand/supply conditions. *SBC*

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