

# Revealed Preferences For Building Materials: A Survey of Low and Moderate Income Households

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*Preferences for interior and exterior building materials were ascertained for a sample of 1624 low and moderate income households living in single family homes in rural areas of Tennessee. Analysis of preferences revealed differences in preferences for the different income groups. In general, brick was the preferred exterior material, wood paneling the preferred interior wall material, and resilient tile was preferred for kitchen and bathroom floors. While no strong general preferences emerged for floor coverings of the other rooms, respondents in the higher income categories were more likely to indicate a preference for wall-to-wall carpeting and those in lower income groups were more likely to choose resilient tile.*

The materials used in a dwelling affect its appearance, desirability, durability and cost. Individuals vary in their response to and preference for materials available for use in the home. Knowledge of consumer preferences is of value for those involved in the housing delivery system. Although preferences for some materials might seem apparent, evaluation of preference data would provide a more solid basis for educational programs as well as for decision making by housing officials and home builders.

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The economic theory of revealed preferences helps explain consumer behavior in the marketplace. The essence of the approach is to observe consumer behavior and deduce consumer tastes and preferences (Samuelson, 1948:243). Each person spends in order to derive maximum satisfaction from the expenditures. "The ideal consumer chooses that alternative, out of the various alternatives open to him which he most prefers, or ranks most highly" (Hicks, 1956:18). The consumer is thus considered rational when making buying decisions that bring the greatest satisfaction.

Revealed preference theory is based on certain assumptions: that the consumer is consistent in preferences; the consumer chooses from among

choices available, not from a range of all possible choices; and budget constraints exist that induce the consumer to buy a particular combination of goods purchasable within income limitations (Bilas, 1967:83-85).

Preferences, however, cannot always be correctly inferred from the housing currently occupied, especially among lower income persons. Montgomery (1976) found that among low income persons, the materials of the home currently occupied may differ from the materials desired. Of the people surveyed, 14.1 percent lived in dwellings with a brick or stone exterior, while 82.7 percent desired a brick or stone exterior.

Preferences may also vary according to region or market area. In a study of preferences for floor foundations, in different market areas (Fresno, Los Angeles, Oakland — Martinez, Sacramento and San Diego, California and Phoenix, Arizona), Harpole and Dickerhoof (1971) found the preferences to vary between the different markets.

### The Study

The analytical framework for this study of building materials was based on revealed preference theory. The respondents in this survey were assumed to express preferences consistent with choices that would have been exhibited in the marketplace. It was assumed also that the respondents expressed their preferences considering their respective incomes.

The objectives of this study were to identify preferences of low and moderate income rural Tennessee residents for specified exterior wall materials, interior wall materials, and floor materials and to determine the relationship of family income and other household characteristics to preferences.

Data were obtained from personal interviews with household heads in rural Tennessee. Houses which had an estimated value of \$17,500 or less at the time of interview were included in the study.<sup>1</sup> Because of this restriction, primarily low and moderate income families were included in the study, with over 90 percent having family incomes

less than \$10,000. The counties included in the study were those having 60 percent or more of their population classified as rural in the 1970 census. All urban areas (population over 2,500), public lands, and uninhabitable areas were excluded from the areas sampled in each selected county. A sample of 1,624 households occupying single-family detached houses was selected by a random block sampling technique from 68 rural counties.

### Findings

#### *Exterior Wall Materials*

Respondents were asked to choose a preferred exterior wall material from among brick, wood siding, prefinished metal siding, or other materials (Table 1). Brick was preferred most frequently (by 64 percent of the respondents), with wood, prefinished metal and other having about equal, but fairly low levels of preference (12, 11, and 13 percent respectively).

There was strong positive relationship between income and the likelihood of choosing brick. Wood siding, although less preferred than brick by respondents in every income category, was more often chosen by respondents in the lower income categories than by those in the upper income categories.

#### *Interior Wall Materials*

Respondents were asked to choose interior wall materials for bedrooms, kitchen, bathroom, living and dining room, and den or family room (Table 2). Wood paneling was the material most often preferred for interior walls in every room of the house, except the bathroom. Wood paneling was preferred in the bedrooms by 65 percent of the respondents and was preferred for kitchens by 69 percent. Sheetrock was preferred for bedrooms by 31 percent, and for kitchens by 26 percent. For the bathroom, a high percentage of those interviewed (32 percent) reported having no preference for a particular type of wall material. However, more persons (35 percent) preferred tile type material on the bathroom walls than any other

**TABLE 1. — Preferences for Exterior Wall Materials Relative to Family Income for Low and Moderate Income Rural Tennessee Residents, 1972**

Exterior Wall Material Preferred	Family Income						Total
	Less than \$2,000	\$2,000 to \$3,999	\$4,000 to \$5,999	\$6,000 to \$7,999	\$8,000 to \$9,999	\$10,000 or more	
Brick	47	59	68	72	80	91	64
Wood Siding	25	10	7	4	5	3	12
Prefinished metal siding	14	15	11	12	5	2	11
Other*	14	16	14	12	10	4	13
Total	100 (n=339)	100 (n=292)	100 (n=235)	100 (n=162)	100 (n=151)	100 (n=110)	100 (n=1289)

$X^2=152, 15df, p \leq .01$

\*"Other" includes asbestos siding, stone and other masonry units, asphalt composition products, concrete block, and other materials specified by the respondents.

**TABLE 2. — Preferences for Interior Wall Materials Relative to Family Income for Low and Moderate Income Rural Tennessee Residents, 1972**

Interior Wall Material Preferred	Family Income						Total
	Less than \$2,000	\$2,000 to \$3,999	\$4,000 to \$5,999	\$6,000 to \$7,999	\$8,000 to \$9,999	\$10,000 or more	
Bedroom							
Wood paneling	53	69	71	70	67	61	65
Sheetrock	40	27	28	28	29	32	31
Other*	7	4	1	2	4	7	4
Total	100 (n=328)	100 (n=290)	100 (n=236)	100 (n=157)	100 (n=146)	100 (n=108)	100 (n=1265)

$X^2=35, 10df, p \leq .01$

(continued)

Table 2 (continued)

<b>Kitchen</b>							
Wood paneling	55	69	76	75	81	76	69
Sheetrock	40	26	19	23	16	16	26
Other*	5	5	5	2	3	8	5
Total	100	100	100	100	100	100	100
	(n=322)	(n=288)	(n=235)	(n=156)	(n=146)	(n=108)	(n=1255)
X <sup>2</sup> =60, 10df, p≤.01							
<b>Bathroom</b>							
Wood paneling	18	13	11	11	11	12	13
Sheetrock	23	10	9	13	7	9	13
Resilient or ceramic tile	21	34	38	43	38	50	35
Other*	6	7	7	8	8	10	7
No preference	32	36	35	25	36	19	32
Total	100	100	100	100	100	100	100
	(n=325)	(n=290)	(n=235)	(n=158)	(n=146)	(n=108)	(n=1262)
X <sup>2</sup> =85, 20df, p≤.01							
<b>Living and Dining rooms</b>							
Wood paneling	61	77	84	81	85	82	76
Sheetrock	39	23	16	19	15	18	24
Total	100	100	100	100	100	100	100
	(n=304)	(n=278)	(n=231)	(n=153)	(n=143)	(n=99)	(n=1208)
X <sup>2</sup> =56, 5df, p≤.01							
<b>Den or Family Room</b>							
Wood paneling	53	74	83	84	88	89	75
Sheetrock	34	20	14	11	8	6	19
Other	5	2	1	1	1	2	2
No preference	8	4	2	4	3	3	4
Total	100	100	100	100	100	100	100
	(n=319)	(n=285)	(n=229)	(n=156)	(n=147)	(n=105)	(n=1241)
X <sup>2</sup> =126, 15df, p≤.01							

\* "Other" included wallpaper, plaster, painted fiberboard or smooth surface material, masonry products, or other materials specified by the respondents.

\*\* Tile type material as used here means ceramic, vinyl, vinyl-asbestos, rubber or metal.

material. In the living and dining rooms, wood paneling (76 percent) and sheetrock (24 percent) were the materials preferred. For the den or family room, the choices were 75 percent for wood paneling and 19 percent for sheetrock.

Older persons with less education and lower incomes exhibited a tendency to prefer sheetrock while younger persons with more education and higher incomes showed a preference for wood paneling. Persons with more education, higher incomes, and preferences for higher priced houses had a tendency to prefer a tile type material on bathroom walls.<sup>2</sup>

#### *Floor Materials*

Each household head was asked to express a preference for floor covering in each room of the house. Finished hardwood, wall-to-wall carpet, resilient or ceramic tile, concrete, and other floor materials were the categories from which selections were made (Table 3).

Finished hardwood (36 percent) and wall-to-wall carpet (34 percent) were the two floor materials most often preferred on bedroom floors.

A majority of those interviewed (83 percent) preferred a resilient type tile in the kitchen, and resilient or ceramic tile was also the predominant choice (85 percent) for bathroom floors.

For the living or dining room, finished hardwood was preferred by 35 percent, wall-to-wall carpet, by 32 percent and resilient type tile by 32 percent. For the den or family room, resilient type tile, finished hardwood, and wall-to-wall carpet were preferred by 36 percent, 30 percent, and 27 percent respectively.

Those persons expressing preferences for resilient type tile had a tendency to be older, less educated, and had indicated preferences for lower priced houses.<sup>3</sup> Younger persons with more education, higher incomes, and expressed preference to build higher priced houses showed a tendency to select carpet for den and bedroom floors.

**TABLE 3. — Preferences for Floor Materials Relative to Family Income for Low and Moderate Income Rural Tennessee Residents, 1972**

Floor Material Preferred	Family Income						Total
	Less than \$2,000	\$2,000 to \$3,999	\$4,000 to \$5,999	\$6,000 to \$7,999	\$8,000 to \$9,999	\$10,000 or more	
<i>Percent Distribution</i>							
Bedroom							
Finished hardwood	39	44	31	35	33	26	36
Wall-to-wall carpet	14	20	36	51	54	69	34
Resilient tile	45	36	31	12	13	4	29
Other	2	0	2	2	0	1	1
Total	100	100	100	100	100	100	100
	(n=330)	(n=293)	(n=236)	(n=162)	(n=150)	(n=111)	(n=1282)

$X^2=236, 15df, p \leq .01$

(continued)

Table 3 (continued)

<b>Kitchen</b>							
Resilient or ceramic tile	78	84	85	87	88	82	83
Finished hardwood floor	16	13	8	7	5	4	11
Other	6	3	7	6	7	14	6
Total	100	100	100	100	100	100	100
	(n=328)	(n=291)	(n=236)	(n=161)	(n=150)	(n=111)	(n=1277)
$X^2=43, 10df, p \leq .01$							
<b>Bathroom</b>							
Resilient or ceramic tile	82	89	87	88	87	76	85
Other	10	4	8	7	9	22	9
No preference	8	7	5	5	4	2	6
Total	100	100	100	100	100	100	100
	(n=331)	(n=291)	(n=236)	(n=160)	(n=150)	(n=111)	(n=1279)
$X^2=39, 10df, p \leq .01$							
<b>Living and Dining Room</b>							
Finished hardwood Wall-to-wall	35	39	33	33	34	26	35
carpet	14	20	34	49	50	67	32
Resilient tile	49	41	32	16	15	6	32
Other	2	0	1	2	1	1	1
Total	100	100	100	100	100	100	100
	(n=327)	(n=290)	(n=236)	(n=159)	(n=150)	(n=111)	(n=1273)
$X^2=214, 15df, p \leq .01$							
<b>Den or Family Room</b>							
Resilient Tile	47	41	38	26	25	20	36
Finished hardwood Wall-to-wall	31	36	31	27	26	22	30
carpet	11	18	26	42	44	52	27
Other	3	0	2	3	2	1	2
No preference	8	5	3	2	3	5	5
Total	100	100	100	100	100	100	100
	(n=318)	(n=285)	(n=228)	(n=158)	(n=149)	(n=110)	(n=1248)
$X^2=153, 20df, p \leq .01$							

## Summary And Implications

Brick was the exterior material preferred by two thirds of those interviewed. A possible key factor in the preference for brick is its durability and low cost of upkeep. Although brick is relatively more expensive than other exterior materials, the cost is incorporated into the house mortgage, whereas maintenance costs are not.

Wood paneling was extremely popular as the preferred material for interior walls for all rooms other than the bathroom.

Resilient or ceramic tile was preferred by over 80 percent of the families as the material for floor covering in the kitchen and bathroom. Preferences for floor coverings for the bedrooms, living or dining rooms, and den or family room were approximately equally divided among finished hardwood, resilient tile, and wall-to-wall carpet.

As income increased, the proportion of respondents expressing a preference for brick increased. For interior wall materials, older persons, those with less education and with lower incomes, had a tendency to prefer sheetrock, whereas younger persons, those with more education and with higher incomes, showed a preference for wood paneling. In floor coverings, older persons, those with less education and those who had indicated preferences for lower priced houses, had a tendency to select resilient type tile.

The data on revealed preferences for building materials among rural Tennessee residents should be considered by housing officials and builders in conjunction with analyses of performance characteristics, costs, care requirements, and maintenance costs. Incorporation of preference information could lead to better choices available to consumers and result in increased satisfaction on the part of consumers.

## References

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### Notes

1. The *1970 Census of Housing* data showed that 78.8% of rural one-family homes on less than 10 acres and no business on property had values less than \$17,500. Source: *1970 Census of Housing: Detailed Housing Characteristics*, Tennessee. U.S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census. Table 34.
2. Chi-square values for contingency tables reflecting wall material preferences relating to age, to education, and to income were significant at the .01 level.
3. Chi-square values for contingency tables reflecting floor covering preferences relating to age, to education, and to income were significant at the .01 level.