WOOD MATERIALS USE IN THE U.S. CABINET INDUSTRY: 1991-1993

by

John W. Punches

Thesis to be submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Wood Science and Forest Products

APPROVED:

R. J. Bush, Chairman

F. M. Lamb

J. Muench

September, 1993
Blacksburg, Virginia

WOOD MATERIALS USE IN THE U.S. CABINET INDUSTRY: 1991-1993

by

John W. Punches

Committee Chairman: Robert J. Bush
Forest Products Marketing

(ABSTRACT)

Professional buyers of wood materials at 2,751 cabinet producing companies throughout the United States were questioned regarding their use of wood materials in 1991 and predicted use in 1993. Producers of both stock cabinets (Standard Industrial Classification 2434) and custom cabinets (Standard Industrial Classification 571202) were included. Using stratification based on three firm size categories and the two Standard Industrial Classification (SIC) categories, results were extrapolated to the industry. The study estimated that nearly 12,500 firms were involved in the production of cabinets in 1991. Industry employment was estimated at over 116,300 persons and total industry sales at $8.8 billion. Companies in SIC 2434 with annual sales of two million dollars or more (three percent of the total estimated number of cabinet producers) accounted for approximately 60 percent of the industry's sales and nearly 43 percent of the industry's employment. Hardwood lumber, particleboard, and hardwood plywood were the materials most heavily utilized for wood cabinet production. Softwood lumber, softwood plywood, and oriented strandboard were used in limited volumes. Of lumber used for cabinet production, red oak was the most popular species. High grades of hardwood lumber were preferred by both stock and custom cabinet manufacturers. Wholesalers provided the majority (80 to 85%) of the industry's lumber and panel purchases. Stock cabinets were distributed primarily through independent

stocking distributors (26.9%) and builders / remodelers (24.1%), while custom cabinets were sold through builders / remodelers (47.9%) or went directly to the homeowner (38.7%).

Acknowledgements

Just as no man is an island unto himself, no undertaking of the magnitude of a thesis is the work of just one. I take this opportunity, therefore, to thank several persons who played a key role in my success at this endeavor. These include my wife, Michelle, for her patience and support, typing assistance, and "project management"; my advisor, Dr. Robert Bush, for his guidance and council; my committee members for their comments and insight; and finally, the late Dr. Steven Sinclair, who cared not only about research and education but about people as well. He is missed.

Table of Contents

Index to Figures

Index to Tables

Introduction and Literature Review

Wood Product Market Conditions

Economic and market conditions in 1991 were, in general, relatively unfavorable. Gross National Product (GNP) was down, as were housing starts. Uncertain economic conditions, an excess of available housing, and restricted availability of financing all contributed to a general slowing of market activity in 1991 (Phelps 1992). These factors undoubtedly impacted the state of wood product markets at the time of this study. A general overview of factors influential to wood products trade follows.

Gross National Product rose 2.4% (annual rate) to $4,143.1 billion (1982 dollars) in the third quarter of 1991 (Phelps 1992). While this represented an improvement over the 2.8 and 0.5 percent declines exhibited in the previous two quarters, GNP through the third quarter of 1991 was below the 1990 average for that period. Estimates for the final 1991 GNP varied from $4,137 billion (1982 dollars) to $4,240 billion (Phelps 1992), indicating at best only marginal improvement. Gross Domestic Product was down as well, measuring $4,821 billion (1987 dollars) in 1991 versus $4877.5 billion in 1990 (Tyson 1993). These broad indicators of economic activity reflect the general sluggishness of the U. S. economy during 1991.

New housing units represent one-third of U. S. consumption of softwood lumber and plywood and account for significant consumption of other softwood and hardwood products

(Phelps 1992). They are, as such, one of the more common indicators of market activity for the wood products industry. Construction of new single family houses in 1988 consumed 3.23 billion square feet (3/8 inch basis) of nonstructural panels, 9.15 billion square feet (3/8 inch basis) of structural panels, and 17.17 billion board feet of structural lumber (McKeever 1992). Approximately 1.0 million new private housing starts were made in 1991, down 15% from 1990 (Franklin et al. 1993). The decrease was attributable mainly to weak multi-family housing starts, although single family housing starts also decreased (by 12%) between 1990 and 1991 (Phelps 1992). The weakness of the housing industry was a result of many factors, the most prominent being high vacancy rates in existing housing (7.4% in 1991), difficult to obtain financing (both for builders and purchasers), and an uncertain economic outlook (Tyson 1993, Phelps 1992).

Expenditures for improvements, another significant market for wood products, were down 14 percent in 1991, totaling $42.3 billion (1987 dollars) (Franklin et al. 1993). Residential improvements were expected to grow in the long run, but in the short term economic constraints were expected to limit growth in this segment (Phelps 1992).

Non-residential construction in 1991 was below its level for 1990. This included a 20 percent decline (from 1990) in private non-residential building construction (Tyson 1993). Once again, factors included slow economic growth, high vacancy rates, and difficulty in obtaining construction loans and non-residential mortgages. Construction in this segment was not expected to pick up until late 1992 (Phelps 1992).

Wood Product Market Size

The wood products market is large; incorporating not only cabinets but also pallets and containers, furniture, flooring, structural lumber and panels, railroad ties, and innumerable other wood products. To facilitate a comparison of the general importance of the cabinet industry within the total timber market, the following overview of the timber market is provided.

In 1990 the United States consumed 44.9 billion board feet of softwood lumber, 10.0 billion board feet of hardwood lumber, 19.1 billion square feet of softwood plywood (3/8 inch basis) and 2.3 billion square feet (3/8 inch basis) of hardwood plywood (Phelps 1992). Consumption of particleboard and medium density fiberboard totaled 4.8 billion square feet (3/4 inch basis) in 1990, and 1.7 million tons of hardboard were consumed (Phelps 1992). In addition, over 5 billion square feet (3/8 inch basis) of oriented strandboard were produced in the United States in 1989, with the domestic market consuming over 95 percent of production (Kurpiel 1990). Table 1 illustrates production of these timber products for 1988 through 1991.

Wood Products Industry Employment

Employment in the forest products industries is significant. Some of the more prominent industries are summarized in Table 2. As can be seen, the wood household furniture industry is one of the largest employers in the wood products industry. The cabinet industry employs roughly one third as many employees.

Table 1. U. S. Wood Products Production

Product	Domestic Production by Year			
	1988	1989	1990	1991
Softwood Lumber (billion BF)	38.1	37.5	35.8	34.0
Hardwood Lumber (billion BF)	11.4	11.0	10.7	9.8
Softwood Plywood (billion sq. ft. 3/8 inch basis)	22.2	22.4	20.7	19.4
Hardwood Plywood (billion sq. ft. 3/8 inch basis)	1.0	1.0	.9	.8
Particleboard (billion sq. ft. 3/4 inch basis)	3.8	3.9	3.8	3.6
Medium Density Fiberboard (billion sq. ft. 3/4 inch basis)	.94	.97	.95	.94
Hardboard (billion sq. ft. 1/8 inch basis)	5.1	5.2	5.0	4.9
Oriented Strandboard (billion sq. ft. 3/8 inch basis)	5.0	na	na	na

(Source: Phelps 1992, Kurpiel 1990, Anonymous 1992)

Table 2. Employment in Selected Hardwood Using Industries: 1978-1990

Year	Employment in thousands				
	Wood Kitchen Cabinets (SIC 2434)	Wood Pallets and Containers (SIC 244)	Upholstered Household Furniture (SIC 2512)	Wood Household Furniture (SIC 2511)	Hardwood Dimension and Flooring (SIC 2426)
1978	50.0	44.4	102.0	147.9	33.7
1979	54.1	46.9	101.7	147.4	34.3
1980	48.4	42.5	92.3	135.0	30.8
1981	47.0	41.2	89.4	133.5	29.5
1982	42.0	37.6	82.2	121.6	25.5
1983	48.7	37.8	86.2	125.7	28.3
1984	57.0	41.0	91.6	132.8	31.9
1985	60.4	40.9	91.6	132.3	31.4
1986	65.4	40.8	93.4	132.0	32.1
1987	70.9	41.9	98.4	137.2	34.0
1988	72.3	43.4	100.4	138.7	35.1
1989	71.8	42.7	102.0	136.9	35.5
1990, 2nd Quarter	72.6	43.8	102.8	130.5	34.8

(Source: Nolley 1990.)

The U. S. Cabinet Industry

Timber product demand results ultimately from demand for end use products made from remanufactured timber products (Phelps 1992). Thus, any meaningful exploration of total materials use in the United States must examine the materials use characteristics of the end markets for wood products. The cabinet industry is one such market.

Demographics

The U. S. wood cabinet industry represents a significant market for primary wood products. Dempsey and Luppold (1992) estimated that the industry consumed 573 million board feet of hardwood lumber in 1991, making it roughly equal in consumption to the hardwood flooring, millwork, and railroad tie and timber industries, and roughly two-thirds the size of the wood household furniture industry. The Census of Manufactures (Darney 1992) states that the cabinet industry consumed over $49 million worth of veneer core hardwood plywood and over $106 million worth of particleboard in 1987, numbers which are comparable to those reported for the wood household furniture industry. In 1988, *Wood and Wood Products* estimated the market for wood cabinets to be in excess of $6 billion (Hall 1988). The Bureau of the Census reported 3,446 establishments in SIC 2434 (stock cabinets) alone, and estimated employment at 67,300 persons in 1988 (Darney 1992).

The cabinet industry is dominated by a few large companies. *Kitchen and Bath Business's* 1991 cabinet industry report (Hart 1991) revealed that companies with $5 million or more in annual sales were responsible for 91% of domestically produced cabinet sales. Companies with

less than 5 million in sales accounted for roughly 9% of domestic cabinet sales (Hart 1991). A study by Cassens (1986) indicated that 13% of cabinet companies had annual sales of $5 million or more. While these two isolated studies should not be considered definitive, they do suggest that 13% of the companies producing cabinets may be responsible for 91% of the industry's total domestic production.

Market Size

United States demand for cabinets is large, and except for periods of recession, has experienced relatively stable growth. F.W. Dodge, a division of McGraw Hill, reported the following sales for the decade prior to 1990: 37.0 million units in 1980, 30.9 million in 1981, 32.6 million in 1982, 38.8 million in 1983, 39.3 million in 1984, 43 million in 1985, 42.2 million in 1986, 42.6 million in 1987, 46.7 million in 1988, and 48.0 million in 1989 (Kaiser 1990). A later Dodge study indicated that 47.1 million units were used in 1990 and predicted demand for 45.8 million units in 1991 (Adams 1992a). These numbers correspond well with estimates from other sources. Arkush (1988a) estimated that over 44 million cabinets were produced in 1987. An article in *Wood and Wood Products* stated that the U.S. was expected to require 43 million cabinets in 1988 (Anonymous 1988). Demand for 48.3 million cabinets was predicted for 1989 (Hart 1989). Predictions made early in 1990 indicated total residential demand for kitchen and vanity cabinets was expected to be 49 million units in 1990 (Kuhl 1990a).

Sources of Demand

Ackerman (1987) pointed out that the extent of the cabinet industry's growth depends primarily on the number of new housing starts and the repair and remodeling market. The repair

and remodeling market is less sensitive to housing and economic cycles, tending to remain fairly constant, and the general aging of American homes contributes to the desire to remodel and install new cabinets (Ackerman 1987).

The new construction market for cabinets peaked in 1986, and has declined steadily since then (Christianson 1991a). The repair and remodeling market for cabinets, in contrast, increased by 12 million units between 1986 and 1992 (Adams 1992b). This has resulted in an increasing share of the cabinet market going to repair and remodeling.

The National Kitchen Cabinet Association (now the Kitchen Cabinet Manufacturers Association) reported that in 1988, new home construction accounted for 49% of cabinet sales and repair and remodeling for 46.1% (Anonymous 1988). A 1989 survey of America's top 25 cabinet producers indicated that nearly 50% of cabinet sales were for remodeling and new construction was expected to be down for the next five years (Kuhl 1989). Predictions were that 54% of cabinet sales would be for repair and remodeling, 43% for new construction and 3% for mobile homes in 1990 (Kuhl 1990a). The home building market was soft in 1990 and the remodeling market again expanded (Christianson 1991a) resulting in demand for 17.5 million units for new construction and 29.6 million for repair and remodeling (Adams 1992a). Thus, repair and remodeling accounted for nearly 63% of total demand in 1990 (Christianson 1991a) and 61% in 1992 (Adams 1992a). This combination of markets has helped stabilize the overall demand for cabinets.

Economic Conditions: 1988 - 1991

While cabinet makers were on strong footing in 1988, with repair and remodeling offsetting declines in new construction (Arkush 1988a); the cabinet industry was entering a period of change. Competition has increased since then and is expected to continue to do so (Kuhl 1990a). The marketplace has become increasingly diverse (Arkush 1988a), and while the industry as a whole was healthy in 1989, demands on individual firms were increasing (Kuhl 1990b). Consolidations, plant closings, and bankruptcies were the norm for 1990 (Kuhl 1990). According to Kitchen Cabinet Manufacturers Association president Tony Bour, the industry had been in recession for the past year or year and a half (Kaiser 1990). New construction was down and remodeling was soft. Companies were adjusting to overcapacity developed in the boom years of the late 1980s, and further consolidations were expected in the future, but unlikely to occur while the recession persisted (Kaiser 1990). The cabinet industry continued to suffer from tough economic conditions in 1991 (Adams 1992b).

New Product Lines

Companies, especially large companies, began to target the home center market in the late 1980s (Hart 1991). Ready-to-assemble (RTA) furniture has been an area of growth for over a decade, but RTA cabinets have yet to claim a significant share of the market. This may change as the influence of home centers increases (RTA cabinets have significantly reduced inventory space requirements) (Christianson 1991b). The NKCA (KCMA) reported 20 manufacturers producing RTA cabinets in 1988 (Anonymous 1988). Packaging requirements may be a discouraging factor to some potential producers (Christianson 1991b).

Species Use

Of the lumber species used in cabinet production, oak has long been, and remains, a favorite. Oak has been credited with up to 80% of wood use in studies by various authors (Anonymous 1988, Arkush 1988b, Cassens and Urban 1986, Hart 1991). Cherry, maple and birch are often noted as distant runners up, averaging between 4% and 8% of total wood use for cabinets. Pine use is generally less than 2% (Anonymous 1988, Cassens and Urban 1986, Hart 1991). Less than 3% of cabinetry is metal and more than 80% is solid wood (Anonymous 1988).

Production by Type

In 1990, 54.4% (by value) of cabinet production was stock, 21.7% semi-custom, and 24% custom (Hart 1991). Large firms tended to emphasize stock and semi-custom cabinets (64% and 23% of production, respectively), while medium-sized and small firms tended to produce custom cabinets (54% and 64% of production, respectively) (Hart 1991).

Imports

Imports have no real advantage in the cabinet industry. Labor is not a large factor in cabinet production and the U.S. has an advantage in lower distribution costs and turn-around times (Kaiser 1990). In addition, the competitive position of U.S. firms was augmented by significant advances in technology made during the 1980s (Kaiser 1990).

Wood Materials Use

Despite the industry's size, available information concerning the cabinet industry's use of wood materials provides limited detail. Trade magazines, such as *Wood and Wood Products* and *Kitchen and Bath Business* commonly report on other industry aspects, but do not examine materials use volumes. A study of Pennsylvania's cabinet industry reported 83.5 million board feet of hardwood lumber use and nearly 223 million square feet (basis unspecified) of panel use in 1987 (Doud et al. 1992); however, no attempt was made to estimate total industry use. Dempsey and Luppold (1992) estimated hardwood lumber use for the industry but did not estimate use of other wood materials.

Justification

The information outlined in the previous section, while useful, fails to meet primary wood product producers' need for detailed materials use estimates. Consequently, this study was undertaken with the intent of building a database, specific to the U.S. cabinet industry, in which estimates of wood materials use are made.

Objectives

1) To estimate the total volumes of wood and wood-based materials utilized for cabinet production,
2) to provide breakdowns of materials use by species, grade, region, firm size, and SIC,
3) to determine the channels of distribution used by the industry, and,
4) to determine the relative importance of various sources of materials.

Methods

Population and Sample Frame

The population of interest in this study consisted of all stock and custom wood cabinet manufacturers in the United States (Standard Industrial Classification 2434 and 571202, respectively). The 1988 Survey of Manufactures lists 3,446 establishments with a total employment of 67,300 in SIC 2434 (Darney 1992). This study's sample frame, compiled from various commercial mailing lists, was considerably larger. It included an estimated 6522 firms producing stock cabinets and nearly 6000 firms involved in the production of custom cabinets.

Bureau of the Census data (Darney 1992) indicate a lower number of firms and employees than do other sources. Most commercial mailing lists include nearly twice the number of companies reported by Census; for example, *Wood and Wood Products* had 8,928 companies listed as cabinet producers on their mailing list in 1986 (Cassens 1986). Our compiled list contained nearly 13,000. Discrepancies between census data and other sources may be attributed to several factors. First, Census data for cabinet production is available only for SIC 2434, stock cabinets. Custom cabinet manufacturers are listed under SIC 5712 and are grouped with other retail trade firms. Second, the Census does not directly sample or measure the characteristics of companies with five or fewer employees. Data for this segment are estimated from other government sources (Bratkovich and Passewitz 1991). Third, companies that produce more than

one type of product may be classified under a different Census category than cabinet production. (Doud et al. 1992).

Sampling Method

Limited resources precluded a census of all known wood cabinet manufacturers. Therefore, stratified sampling (breaking the population into subgroups and sampling each separately) was utilized. The method was carefully devised to minimize variance within each group. Each of the two manufacturing categories (stock and custom) was divided into three groups based on annual sales (Table 3). Firms with greater than two million dollars in annual sales were identified as having the greatest potential variation and as being responsible for the majority of the industry's wood material consumption. For these reasons, each firm within this group was included in the sample, with the hopes of procuring, as nearly as possible, a census of these manufacturers. Twenty-five percent of the firms having sales of less than two million dollars in sales, but more than 260 thousand dollars, were sampled. The remaining firms, those with less than 260 thousand dollars in annual sales, were sampled at a rate of 10%. This method reduced the sample size to a workable, although still large, 2751 firms.

Data Collection

Mail surveys were used as the primary data collection method. Mail surveys have proven to be an efficient and effective method of securing data in previous studies and are well suited to geographically dispersed populations (Dillman 1978).

A questionnaire was developed to measure the industry's material purchases, distribution channels, and supply channels, as well as to procure demographic information. The questionnaire was reviewed extensively by Virginia Tech faculty members and later pretested and reviewed by representatives of two of the largest cabinet manufacturers in the United States.

Questionnaires, along with cover letters explaining the study, were mailed in early March, 1992. They were followed up approximately one week later by a postcard designed to encourage participation. Second and third mailings to the group of larger companies were made during the month of April, 1992. The response rates for each group were as shown in Table 3.

Table 3. Strata Descriptions and Response Rates

Group	Description		Response Rate
	Standard Industrial Classification	Annual Sales (thousand $)	
1	2434	2,000 +	27%
2	2434	260 to 2,000	15%
3	2434	< 260	13%
4	571202	2,000 +	11%
5	571202	260 to 2,000	14%
6	571202	< 260	13%
Overall			**16%**

Estimation Procedures

Material Use Estimates

Material use estimates were arrived at by calculating an adjusted total of the respondents' reported material use. Each group of respondents had an associated response rate (the number of data points for the material in question divided by the total number of surveys mailed to cabinet producers), sampling ratio (the proportion of the population to which surveys were mailed), and coverage ratio (the degree to which our sample frame encompassed the population). Factoring each response by its appropriate response rate, sampling ratio and coverage ratio allowed an adjusted material use volume to be calculated. Summing adjusted material use volumes yielded the industry's total estimated material use. The procedure was as follows:

1) Sampling Ratio

It was beyond the researchers' abilities to contact all known cabinet manufacturers. The costs associated with such a measure, both monetary and in terms of time, were deemed too great. For this reason, the sample frame was divided into six groups, each of which was sampled separately using a method that placed greater emphasis on the strata with higher potential variation.

As information from companies was received, it was coded with reference to the sampling group to which it belonged. This allowed the information to be extrapolated to the population (i.e., information from a responding company in a 25% sampling group was assumed to represent itself and three companies not contacted).

2) Response Rate

Companies contacted for this study were in no way compelled to respond. This made necessary a correction factor (response rate) to account for non-responding companies within the sample.

The response rate was defined as the ratio of usable responses to surveys mailed to cabinet producers. It was calculated for each material category, as some companies responded only partially, providing information for specific materials.

Of the two portions of the response rate calculation, only the number of usable responses could be arrived at directly. The number of cabinet firms in the sample was derived by adjusting the original sample to account for misclassified or out-of-business firms. The adjustment was made by subtracting any firms who responded stating they were no longer or had never been cabinet producers, and by contacting, by telephone, a sample of non-respondents to determine what proportion thereof was involved in cabinet production.

Example Response Rate:

Given: a sample containing 100 firms,

- 45 firms return questionnaires
- 10 of the firms returning questionnaires did not produce cabinets
- 5 firms are not reachable and are assumed to be out of business

This leaves 50 non-responding firms.

- A phone survey reveals that 10% of the non-respondents do not produce cabinets (i.e. 5 non-respondents that are non-producers).

$$\textit{Response Rate} = \frac{\textit{Number of Usable Returns}}{\textit{Total Number of Cabinet Producers within Sample}}$$

Where:

$$\textit{Total Number of Cabinet Producers within Sample} = \textit{Sample Size} - \textit{Non-producing Respondents} - \textit{Unreachable Firms} - \textit{Non-producing Non-respondents}$$

Thus, in our example:

$$\textit{Response Rate} = \frac{35\ \textit{Usable Returns}}{100-10-5-5} = 43.75\%$$

3) Coverage Ratio

The mailing list used as the basis for the sampling groups in this study was purchased from Dun & Bradstreet, a commercial information service. The list covered manufacturers who produced cabinets as a primary or secondary product. When compared to other lists of manufacturers, the Dun's list was estimated to be 90% complete, (i.e. 90% of the firms producing cabinets were listed by Dun & Bradstreet). This number was used in the material use calculations to account for companies who should have been included in the sample but were not. The group of largest SIC 2434 companies were examined and some companies added to the list where needed. This brought the coverage ratio up to approximately 95% for this group.

Material use volumes were calculated for each stratum by adjusting each response (for individual materials) by the factors previously discussed. The adjusted materials use volumes were then summed to arrive at the total estimated volume used for each material. Thus:

$$Material\ Use = \sum_{j=1}^{6} \sum_{i=1}^{n} \frac{Respondents'\ Volume}{Sampling\ Ratio * Response\ Rate * Coverage\ Ratio}$$

where: j represents strata 1 through 6, and i the respondents within each stratum.

Population Estimate

A population estimate (number of firms) was derived by weighting the total number of respondents by the factors outlined above. This was necessary to provide a more accurate representation of the industry's size. Once again, estimates were made for each of the six strata, and these were summed to arrive at the estimated total. Thus:

$$\textit{Number of Firms} = \sum_{j=1}^{6} \sum_{i=1}^{n} \frac{\textit{Number of Respondents}}{\textit{Sampling Ratio} * \textit{Response Rate} * \textit{Coverage Ratio}}$$

where: j represents strata 1 through 6, and i the respondents within each stratum.

Species Use Estimates

Species use breakdowns were calculated by weighting each respondent's reported percent use by that respondent's adjusted lumber use volume. This allowed the total estimated lumber use to be divided into species categories. Various divisions were then made (regions, firm size, SIC) and species use calculated.

Other Percentage Estimates

Other percentages reported within this report were calculated similarly, using the appropriate base variables (i.e. total sales, panel use, etc.) to arrive at the estimated breakdowns.

Incidence Rate Estimates

Incidence rates were calculated for each strata by determining the proportion of non-zero responses to each of the materials use questions.

Non-response Bias

One of the concerns associated with sampling techniques, especially in conjunction with data collected by survey, is that of non-response bias. In this study, where the subjects were not forced to answer, the possibility existed that respondents' characteristics would somehow differ from those of non-respondents.

The presence of non-response bias was tested for directly. A sample of 70 non-respondents from the two highest producing groups was contacted by telephone. Non-respondents were questioned about their use of hardwood lumber, hardwood plywood, and particleboard, and also asked the number of employees participating in their cabinet production operations. This allowed a comparison of material use on a per employee basis to be made between respondents and non-respondents. Invoking the Central Limit Theorem, the distribution (a sampling distribution) from which our compared items (means) were drawn was, by definition, normal. Thus, the t-test of independent means was applicable. At a 95% confidence level this test failed to distinguish any significant differences between respondents and non-respondents for mean use of the materials in question. Non-response bias was, therefore, not considered to play a significant role in this analysis. Table 4 displays the t-test results.

Table 4. Non-Response Bias Check - t-Tests for Equality of Means

Variable	Number of Cases	Mean	Standard Deviation	SE of Mean	
Hardwood Lumber per Employee					
Respondents	175	3.1489	4.306	.325	
Non-Respondents	70	3.0981	3.882	.464	
Levene's Test for Equality of Variances: F=.142 P=.707					
t-test for Equality of Means					
Variances	t-Value	df	2-Tail Significance	SE of Difference	95% CI for Difference
Equal	.09	243	.932	.593	(-1.117, 1.218)

Variable	Number of Cases	Mean	Standard Deviation	SE of Mean	
Particleboard per Employee					
Respondents	176	5.7116	10.597	.799	
Non-Respondents	70	11.4918	23.491	2.808	
Levene's Test for Equality of Variances: F=16.612 P=.000					
t-test for Equality of Means					
Variances	t-Value	df	2-Tail Significance	SE of Difference	95% CI for Difference
Unequal	-1.98	80.41	.051	2.919	(-11.591, .030)

Variable	Number of Cases	Mean	Standard Deviation	SE of Mean	
Hardwood Plywood per Employee					
Respondents	169	2.2807	3.356	.258	
Non-Respondents	69	10.9855	40.230	4.843	
Levene's Test for Equality of Variances: F=13.007 P=.000					
t-test for Equality of Means					
Variances	t-Value	df	2-Tail Significance	SE of Difference	95% CI for Difference
Unequal	-1.79	68.39	.077	4.850	(-18.385, .975)

Results and Discussion

Respondent Profile

Sixty-seven percent of this study's respondents were producers of stock cabinetry (SIC 2434). They averaged 81 employees and had sales in 1991 of $6,296,879 per firm. Respondents producing custom cabinets (SIC 571202) averaged seven employees and 1991 sales per firm of $402,400.

Stock cabinet manufacturers responding to this study produced 70% (by sales) face frame kitchen cabinets, 13% frameless kitchen cabinets, 13% bath cabinets and 4% other products. Custom cabinet manufacturers averaged 48% face frame kitchen cabinets, 15% frameless kitchen cabinets, 14% bath cabinets and 23% other products.

Respondents' production facilities were relatively evenly distributed among the four continental U. S. Census regions (Bureau of the Census 1990). The North Central region accounted for 28.7% of the production facilities of responding companies, while the South held 28.1%, the West 23.3%, and the Northeast 19.3%. Only 0.6% of the respondents indicated that the majority of their production locations were outside the continental United States.

Population Estimates

The wood cabinet industry was estimated to contain nearly 12,500 firms (Table 5). These firms were divided nearly equally between stock cabinet manufacturers (SIC 2434) and custom cabinet manufacturers (SIC 571202). The highest sales categories in each SIC contained relatively few companies.

Table 5. Strata Descriptions and Population Estimates for the Cabinet Industry

Group (Strata)	Description		Estimated Segment Population
	Standard Industrial Classification	Annual Sales (thousand $)	
1	2434	2,000 +	407
2	2434	260 to 2,000	2293
3	2434	< 260	3822
4	571202	2,000 +	67
5	571202	260 to 2,000	1764
6	571202	< 260	4144
Overall			**12497**

The industry had total estimated sales in 1991 of over $8.8 billion (Table 6). Stock cabinets accounted for $7.3 billion and custom cabinets for $1.5 billion. The high sales stock cabinet group (Stratum 1) had mean sales of nearly $13 million, while the largest custom cabinet manufacturers averaged slightly less than $2 million. The large stock manufacturers (Stratum 1)

accounted for 60 percent of the industry's total sales, but only three percent of its total number of firms.

Table 6. Estimated Mean and Total Sales by Strata: 1991

Strata (description)		Mean Sales (thousands)	Estimated Total Sales (billions)
Standard Industrial Classification	**Annual Sales Category (thousand $)**		
2434	2,000 +	$12,931	$5.26
2434	260 to 2,000	$593	$1.44
2434	< 260	$179	$0.69
571202	2,000 +	$1,964	$0.13
571202	260 to 2,000	$413	$0.73
571202	< 260	$157	$0.65
Estimated Total Stock Cabinet Sales			**$7.3**
Estimated Total Custom Cabinet Sales			**$1.5**
Estimated Total Industry Sales			**$8.8**

The industry employed an estimated 116,302 persons (including full-time production, maintenance, management and sales employees, but excluding part-time employees) in 1991. As shown in Table 7, the high sales stock cabinet group (Stratum 1) employed the highest average number of employees and the largest total number of employees of any single group (43% of the cabinet work force). In all, stock cabinet manufacturers (Strata 1-3) employed 75 percent of the work force.

Table 7. Estimated Mean and Total Employment by Strata: 1991

Strata (description)		Mean Employment	Estimated Total Employment
Standard Industrial Classification	Annual Sales Category (thousand $)		
2434	2,000 +	105.3	49,551
2434	260 to 2,000	10.1	23,045
2434	< 260	3.9	14,829
571202	2,000 +	34.6	2,316
571202	260 to 2,000	7.1	12,471
571202	< 260	3.4	14,090
Estimated Total Stock Cabinet Employment			**87,425**
Estimated Total Custom Cabinet Employment			**28,877**
Estimated Total Industry Employment			**116,302**

Incidence of use (the percentage of respondents indicating purchases of the material in question for cabinet production) is displayed in Table 8. As can be seen, nearly all (86% to 98%) of the companies indicated having purchased some hardwood lumber for the production of cabinets in 1991. Approximately 80 percent of the responding companies purchased softwood lumber, except for the large stock companies, of which only 54 percent purchased the material. Particleboard was used by roughly 80 percent of companies, while medium density fiberboard (MDF) use ranged from 43 to 86 percent, with the small custom cabinet producers being least likely to purchase this material. Hardboard was used by 35 to 71 percent of companies, and once again the small custom cabinet producers were least likely to purchase the material. Oriented

strandboard (OSB) was used by less than six percent of the respondents in any group. Hardwood plywood was used by 79 to 99 percent of companies, with large stock producers being least likely to use it. Softwood plywood was purchased by 35 to 62 percent of companies and its use trend was nearly identical to that exhibited for hardwood plywood. Cabinet doors were most likely to be purchased by medium-sized firms. Other lineally purchased cabinet parts were purchased by 20 to 26 percent of companies, except for those in strata three and four (small stock manufacturers and large custom manufacturers), where few companies purchased the material. Veneer was purchased by 29 to 53 percent of respondents, with the highest incidence by the medium-sized stock group and the lowest by the medium-sized custom group.

Table 8. Respondents' Incidence Rates for the Cabinet Industry

Material	Strata					
	SIC 2434 $2 Million + Annual Sales	SIC 2434 $260 Thousand to $2 Million Annual Sales	SIC 2434 <$260 Thousand Annual Sales	SIC 571202 $2 Million + Annual Sales	SIC 571202 $260 Thousand to $2 Million Annual Sales	SIC 571202 <$260 Thousand Annual Sales
Hardwood Lumber	92.9%	97.4%	97.6%	85.7%	94.5%	98.0%
Softwood Lumber	53.9%	80.0%	80.5%	85.7%	81.1%	78.4%
Particleboard	84.3%	88.0%	80.5%	85.7%	81.1%	78.4%
MDF	73.0%	79.7%	59.5%	85.7%	71.7%	42.9%
Hardboard	58.0%	42.5%	46.3%	71.4%	44.2%	34.7%
OSB	3.8%	2.5%	2.2%	0.0%	1.7%	5.9%
Hardwood Plywood	79.4%	98.6%	95.1%	85.7%	81.5%	96.0%
Softwood Plywood	35.0%	62.2%	56.4%	42.9%	50.9%	58.7%
Cabinet Doors	53.5%	61.9%	51.3%	28.6%	51.9%	45.8%
Edge-glued Panels	31.4%	2.6%	4.8%	14.3%	5.4%	2.0%
Other Cabinet Parts	26.4%	23.9%	5.4%	0.0%	23.9%	19.5%
Veneer	44.9%	52.9%	34.1%	40.0%	29.4%	46.7%

Material Use

Figure 1 illustrates estimated cabinet industry use of lumber and other non-panel wood products. As can be seen, the industry utilized approximately 523 million board feet of hardwood lumber in 1991. This volume was expected to rise by approximately 25% in 1993 (Figure 2). Softwood lumber was less heavily utilized, with roughly 72 million board feet used in 1991 and no appreciable change predicted for 1993.

The industry used roughly 26 million board feet of edge-glued panels in 1991, most likely for the production of doors and drawer fronts. A slight increase (4.1%) was predicted for 1993. Nearly 23 million premanufactured doors were purchased in 1991 and the industry's use of this product was expected to rise by nearly 34% in 1993. Use of cabinet parts purchased lineally, such as face frame components and mullions, was reported at 98 million lineal feet in 1991 and was expected to increase by nearly 25% in 1993. Veneer use was approximately 93 million square feet and was expected to increase to over 112 million square feet in 1993, an increase of over 21%.

Considerable volumes of panel products were utilized by the industry in 1991, as is illustrated by Figure 3. Particleboard was by far the most heavily used panel, with over 846 million square feet (1/2" basis) in 1991. Use of this product was predicted to increase 27% in 1993, to over 1 billion square feet. Use of medium density fiberboard was 114 million square feet (1/2" basis) in 1991 and its use was expected to increase substantially in 1993, reaching almost

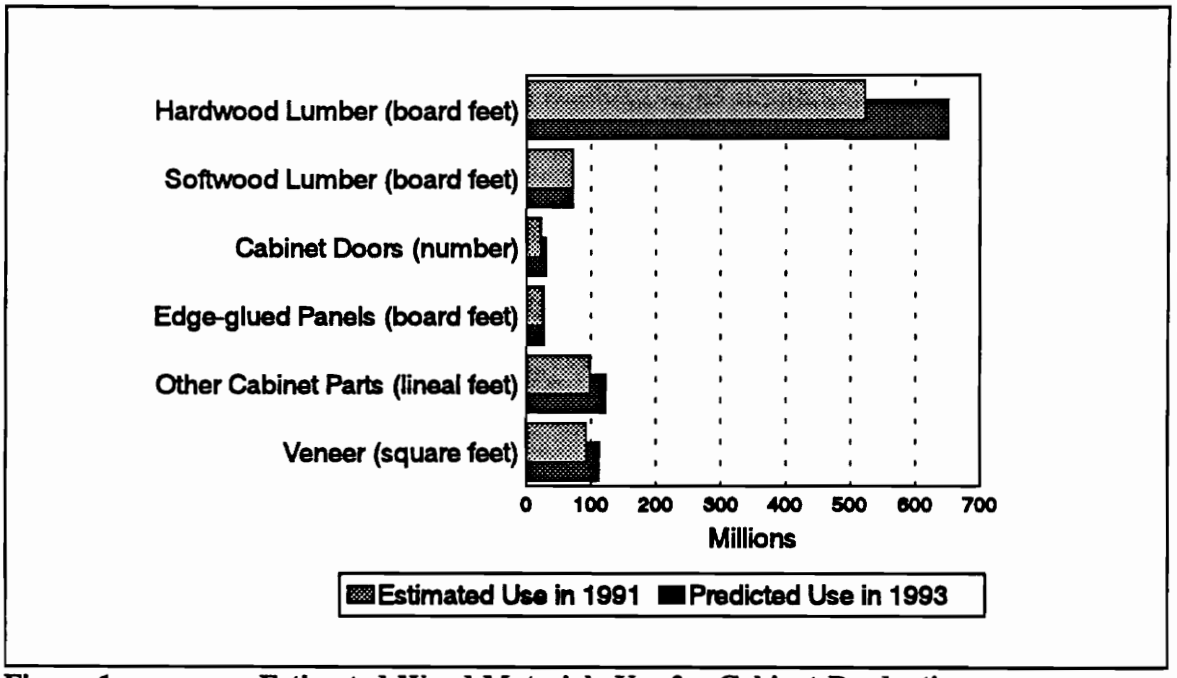


Figure 1. **Estimated Wood Materials Use for Cabinet Production: Lumber and Other Non-Panel Wood Products (1991 and 1993)**

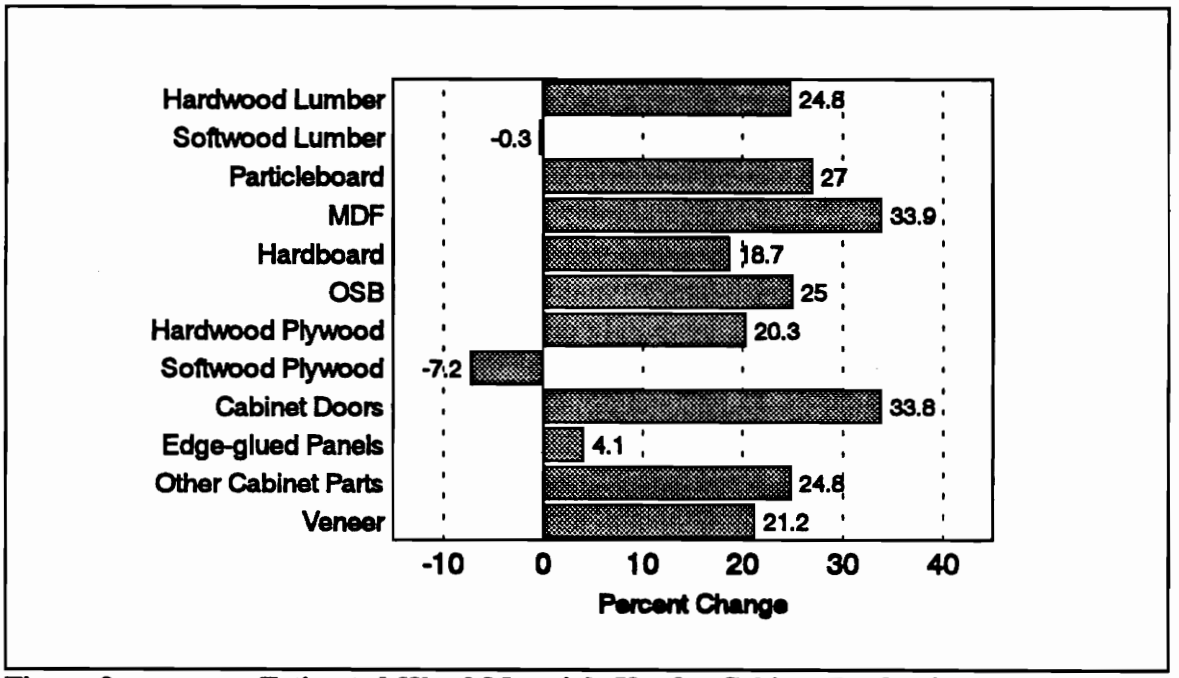


Figure 2. **Estimated Wood Materials Use for Cabinet Production: Percent Change from 1991 through 1993**

153 million square feet. Hardboard, typically used as thin panels, was reported in this study on an 1/8" inch basis. Nearly 163 million square feet were used in 1991 and use was expected to increase by almost 19% in 1993, to 193 million square feet. Use of OSB in the cabinet industry was minimal, with less than 1.2 million square feet (1/2" basis) used in 1991. A 30% increase was predicted for 1993, but this will still leave OSB far down on the materials use list (1.5 million square feet).

Hardwood plywood, typically employed in thicknesses ranging from 1/4" to 3/4", was reported in this study on a 3/8" basis. Use in 1991 was estimated at 294 million square feet, making it second only to particleboard in the panel products category. Use was expected to rise by 20% in 1993, to 358 million square feet. Softwood plywood was used to a much lesser extent.

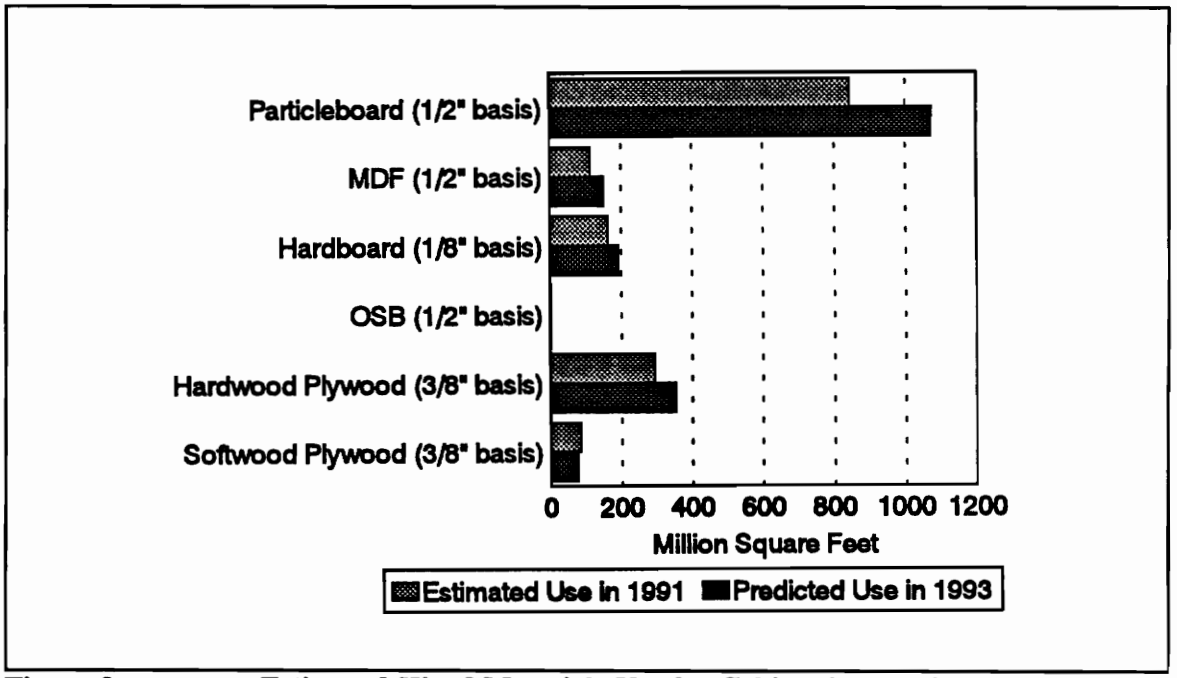


Figure 3. **Estimated Wood Materials Use for Cabinet Production: Panel Products (1991 and 1993)**

Less than 85 million square feet (3/8" basis) were used in 1991, and its use was predicted to drop slightly in 1993, to 78 million square feet.

Figure 4 illustrates panel product use on an equivalent volume basis (all thicknesses converted to one-half inch). As can be seen, particleboard was the most heavily utilized panel product, followed in order of decreasing use by hardwood plywood, MDF, softwood plywood, hardboard, and OSB.

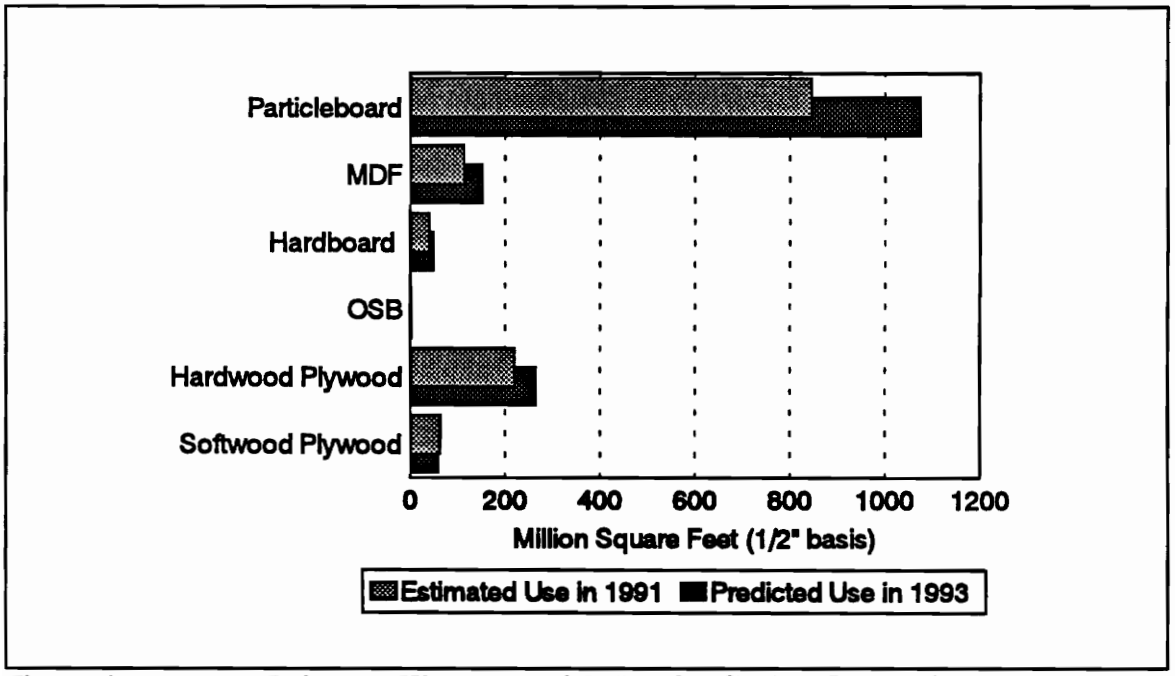


Figure 4. **Estimated Wood Materials Use for Cabinet Production: Panel Products (1991 and 1993)** ***Equivalent Basis***

Most companies indicated that they were at a low in production during 1991, a result of the depressed economy. Many were predicting increases of 20 to 30% by 1993 out of necessity,

stating that if poor economic conditions persisted they would be out of business. It is worthwhile to note that the roughly 25% increases predicted in most material categories were probably a result of predicted increases in cabinet production, rather than in changes to the volume of material used in a cabinet. The decline predicted for softwood plywood may indicate a change in materials preference, or may be the result of lessening demand for military specification cabinets, which are typically produced almost entirely of softwood plywood. Table A1 provides additional details of wood materials use.

Materials Use by Manufacturer Type

Cabinet manufacturers can be classified into two categories: producers of stock cabinets (SIC 2434) and producers of custom cabinets (SIC 571202). As is shown in Figures 5 and 6, stock cabinet manufacturers accounted for a large majority of the industry's materials use. Stock cabinet manufacturers used nearly eight times as much hardwood lumber as custom cabinet manufacturers and two and one-half times as much softwood lumber. Stock manufacturers used nearly 10 times as much particleboard, three times as much MDF, and fifteen times as much hardboard as did their custom counterparts. Hardwood plywood use was two and one-half times greater for stock manufacturers. Veneer use was also much greater for stock cabinets (roughly 12 times that of custom manufacturers). Table A2 illustrates these relationships in greater detail.

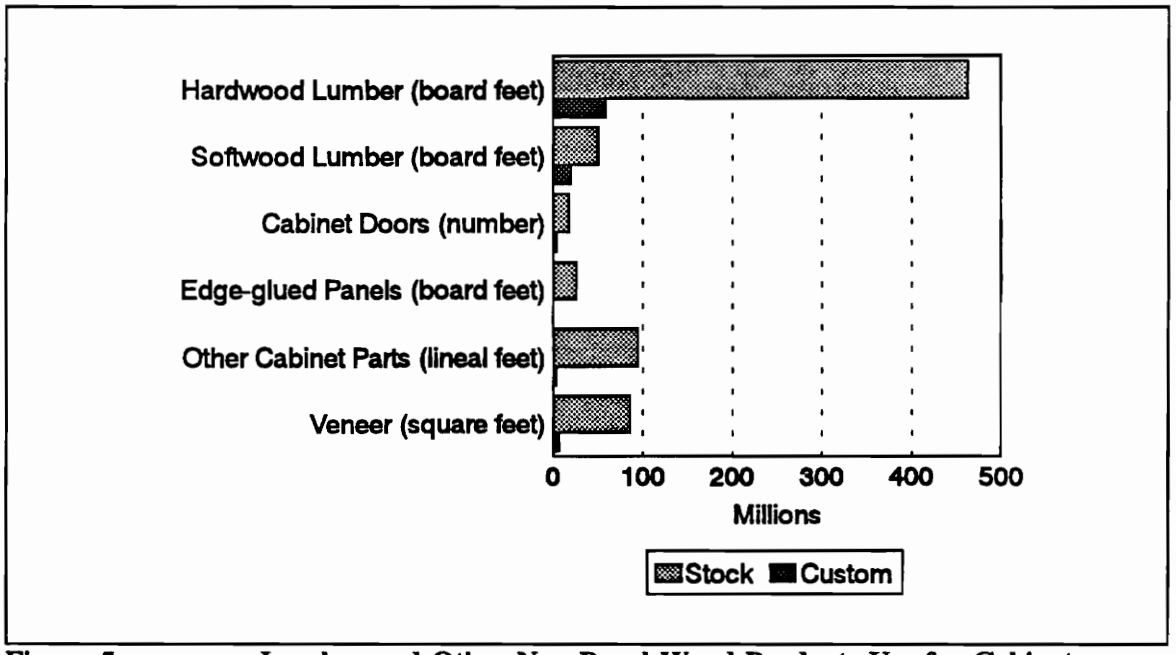


Figure 5. **Lumber and Other Non-Panel Wood Products Use for Cabinet Production: Stock versus Custom Cabinet Manufacturers (1991)**

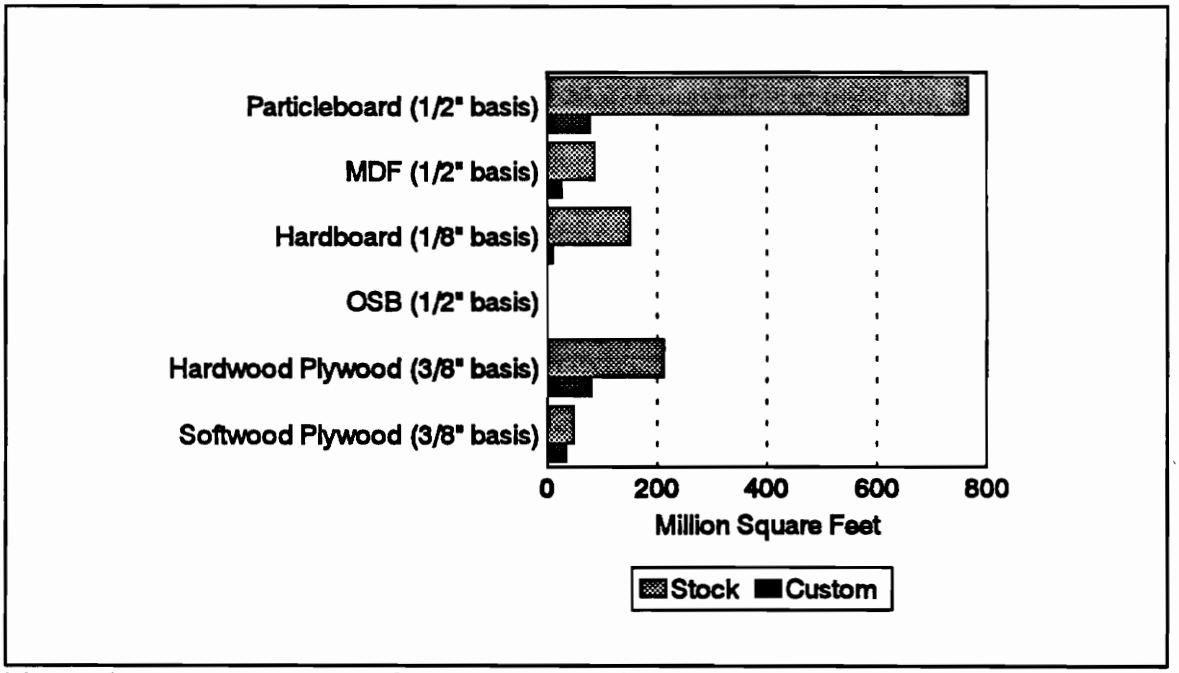


Figure 6. **Panel Products Use for Cabinet Production: Stock versus Custom Cabinet Manufacturers (1991)**

Materials Use by Firm Size

Large companies (those with 100 or more employees) used the greatest proportions of many materials. They were not, however, the largest user in all categories (Figures 7 and 8). Large firms used much more hardwood lumber, particleboard, hardboard, lineal wood cabinet parts, and veneer than did smaller companies. The smallest companies (those with less than 20 employees) used the most softwood lumber, MDF, and plywood (both hardwood and softwood). Medium-sized companies (20 to 99 employees) used the lowest volumes of hardwood lumber, MDF, and hardwood plywood. They rated in the middle for most other wood material use categories. Tables A3 and A4 contains complete results for 1991 and 1993, respectively.

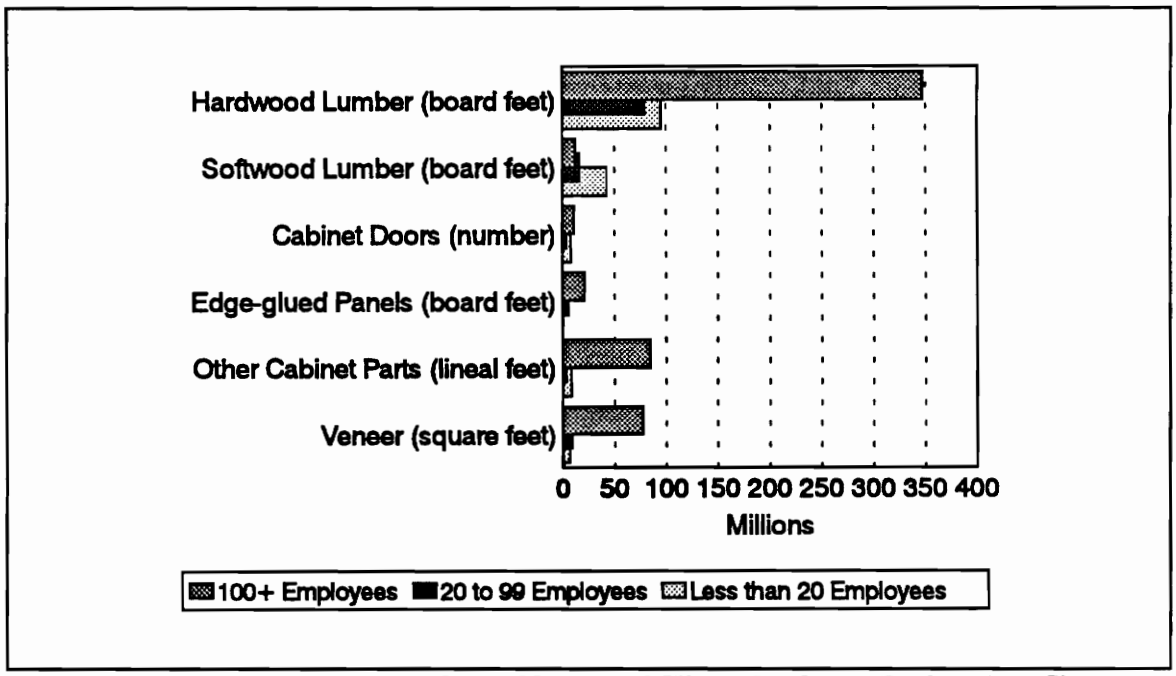


Figure 7. Lumber and Other Non-Panel Wood Products Use by Firm Size: 1991

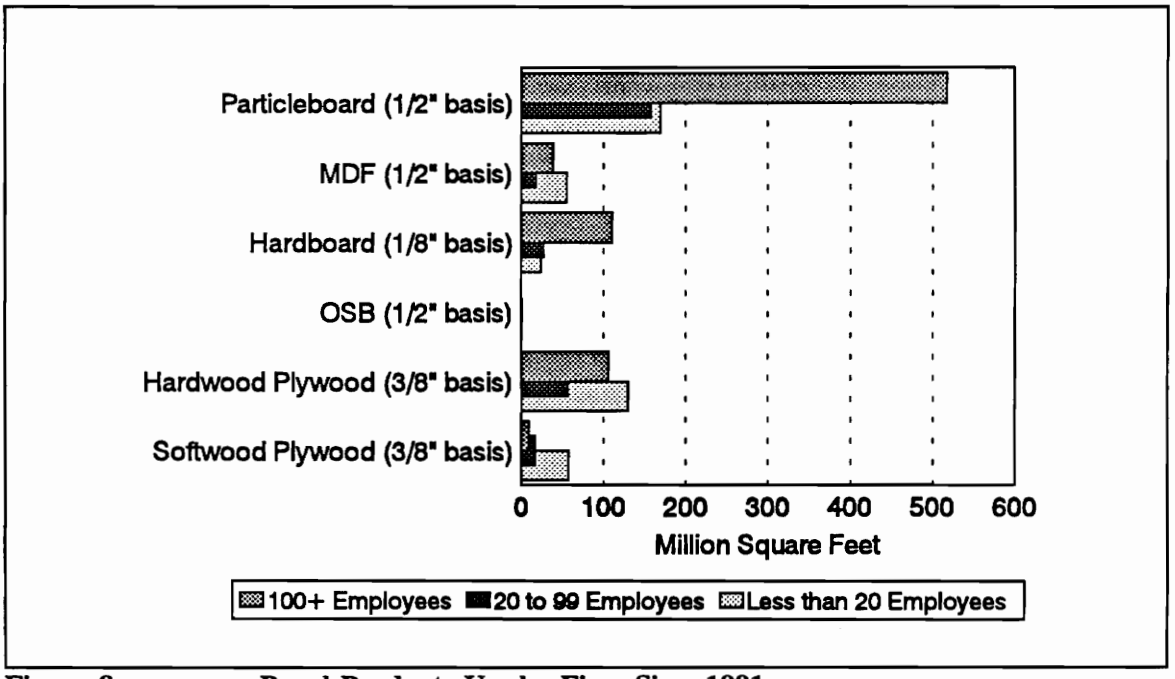


Figure 8. Panel Products Use by Firm Size: 1991

When examined by manufacturing category (SIC) and firm size, some differences became apparent. Large stock cabinet manufacturers were responsible for using the highest volumes of hardwood lumber, particleboard, MDF, hardboard, hardwood plywood, cabinet doors, edge-glued panels, lineal parts, and veneer. Small stock companies used more softwood lumber than other stock manufacturers and medium-sized companies used the largest volume of OSB. Tables A5 and A6 illustrate these breakdowns for stock producers for 1991 and 1993.

The custom cabinet segment was characterized by numerous small companies. No custom cabinet companies with 100 or more employees were located. Small custom manufacturers accounted for the majority of use in all material categories except edge-glued panels. Tables A7 and A8 detail this information for 1991 and 1993.

Materials Use by Region

Table A9 provides estimates of 1991 materials use by region. As is shown in Figure 9, the largest proportion of the cabinet producing firms (respondents) were located in the Midwest, followed closely by the South. The South, however, accounted for the largest proportion of hardwood lumber and softwood lumber use, with the Midwest following a distant second (Figure 10). Figure 11 illustrates that the Midwest was the largest user of hardwood plywood, while the South was the largest user of softwood plywood and the largest user of plywood in general. Use of particleboard and other wood composite panels was greatest in the South (Figure 12). The Midwest was the second largest user of particleboard. Table A10 presents similar information for 1993.

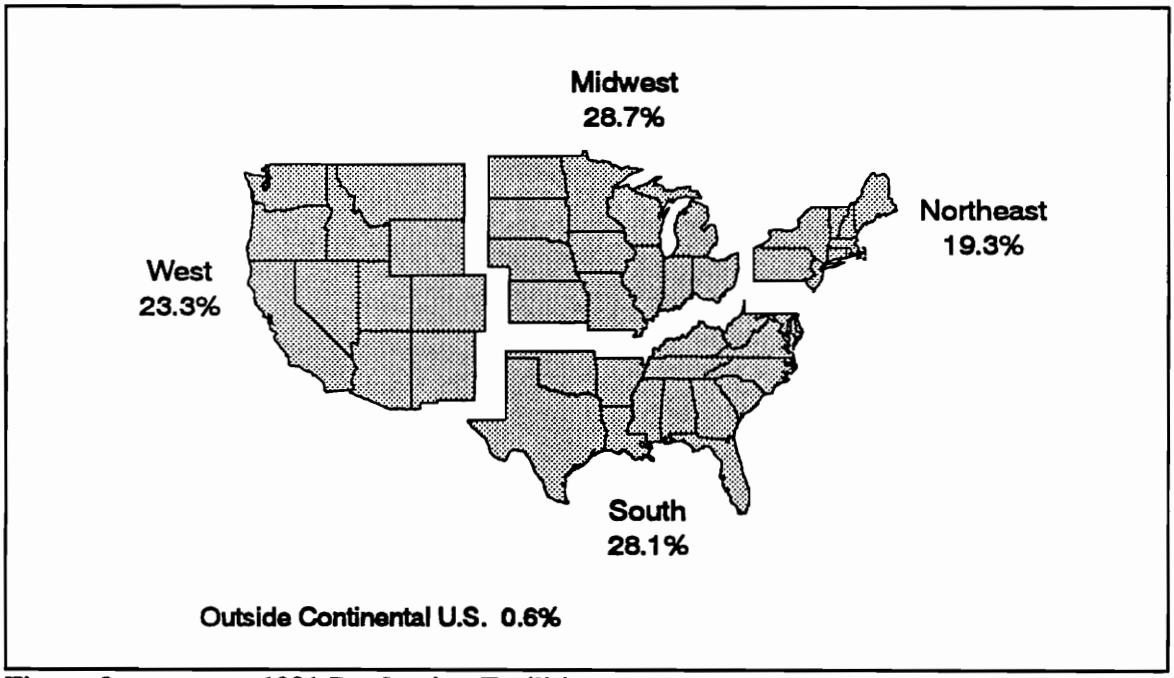


Figure 9. 1991 Production Facilities: Percent of Total Number by Region

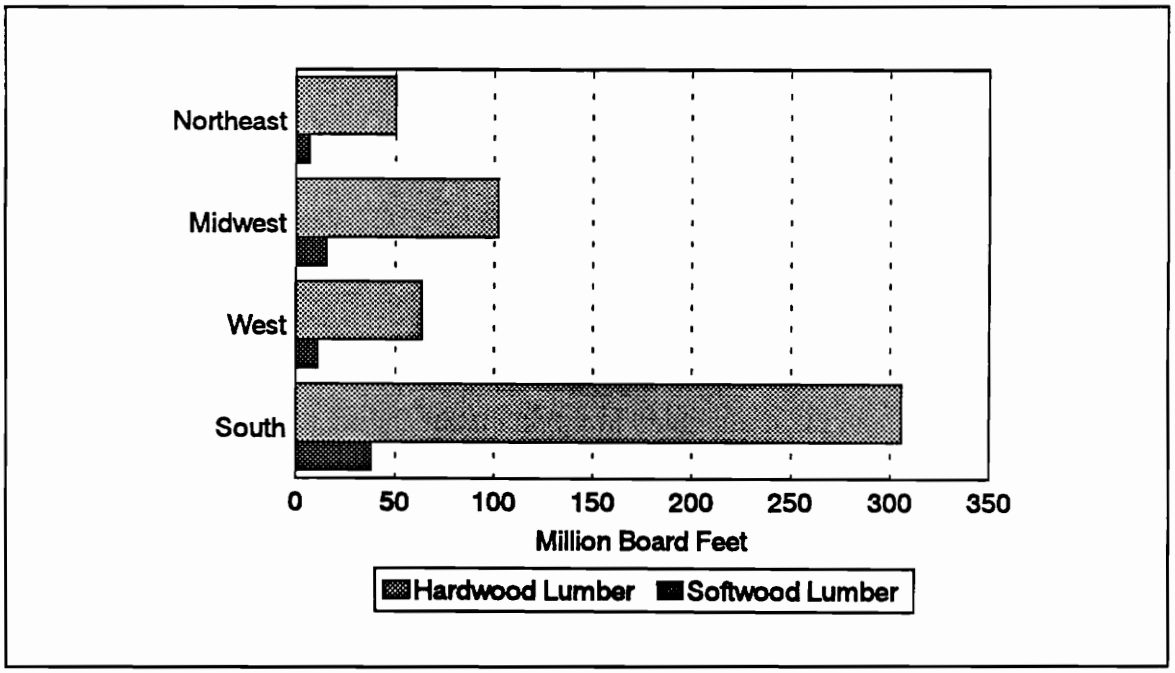


Figure 10. Estimated Lumber Use by Region: 1991

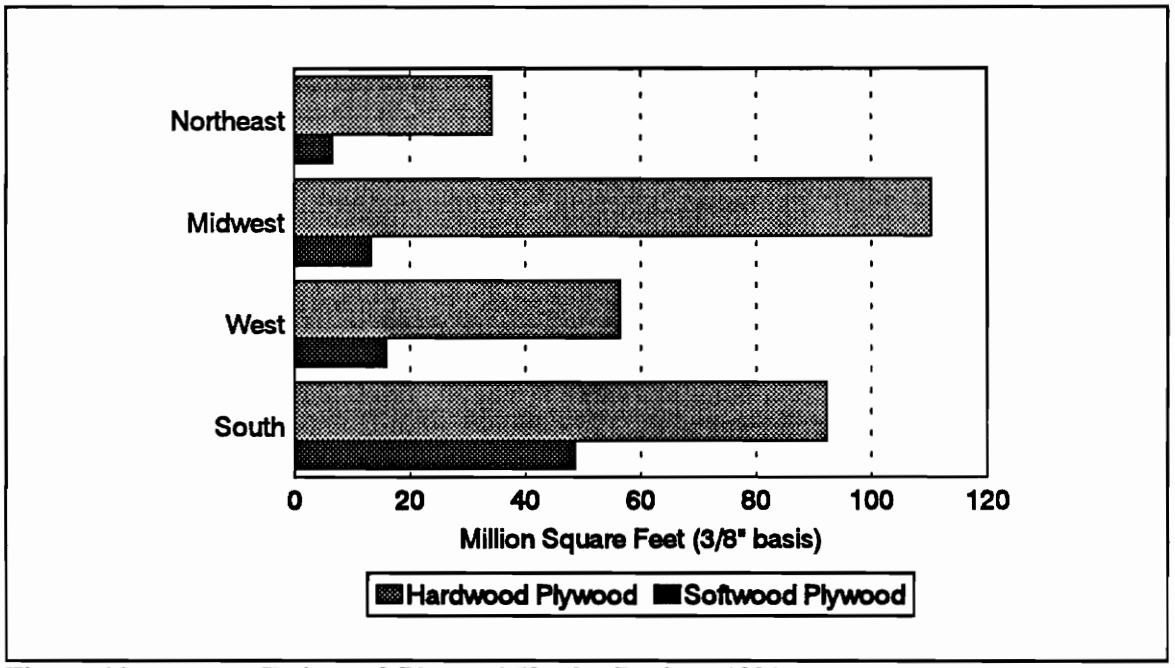


Figure 11. Estimated Plywood Use by Region: 1991

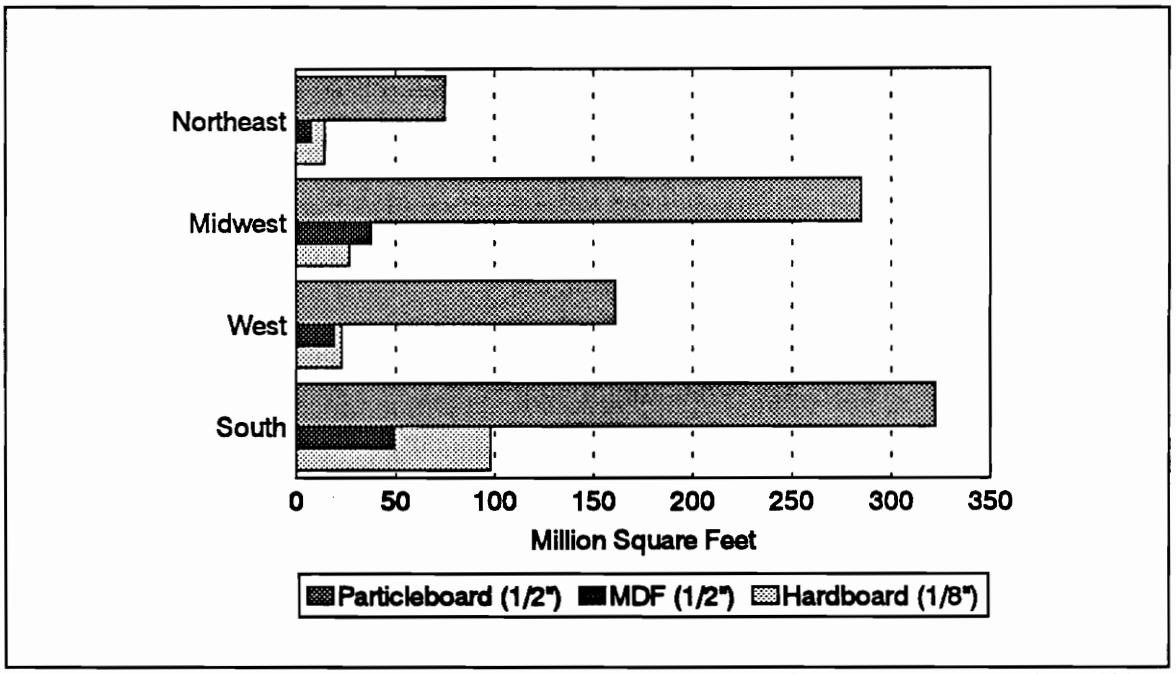


Figure 12. Estimated Particleboard, MDF, and Hardboard Use by Region: 1991

Table A11 examines regional use for stock cabinet manufacturers. As can be seen, the South accounted for the largest volume of use in all materials categories with four exceptions: OSB, hardwood plywood, edge-glued panels, and lineal parts. For stock production, OSB use was highest the West. The Midwest accounted for the highest volumes of the remaining three materials. The predictions for 1993 followed an identical pattern (Table A12).

The South was also the dominant materials use region in the custom cabinet category for both 1991 and 1993 (Tables A13 and A14). It accounted for the highest volumes of hardwood lumber, softwood lumber, hardboard, hardwood plywood, softwood plywood, cabinet doors, and veneer. The Midwest was highest for particleboard, MDF, OSB, and lineal parts. The West was highest for edge-glued panels.

Lumber Use by Species

Red oak was the predominant lumber species used for cabinet production in 1991. It accounted for nearly 64% of the industry's total volume of lumber (Figure 13). Hard maple was second in total volume used (8.3%), followed by cherry (4.3%), birch (3.9%), and ash (3.4%). White pine was the most heavily used softwood, but accounted for only 3.5% of the total lumber use. Combined, softwood species accounted for less than five percent of the total lumber used in 1991. Only minor changes in species use were predicted for 1993. Table A15 contains a complete breakdown of species use for 1991 and 1993.

Table A16 examines species use by stock and custom manufacturers for 1991. Red oak remained the predominantly utilized species for both stock and custom cabinet production, representing 65.7% and 52.0% of each category's total lumber use, respectively. The next most preferred species were hard maple (9.0%) and cherry (4.3%) for stock cabinets, while birch (11.2%) and ash (7.1%) filled these positions for custom cabinet production. No changes in this order were predicted within either category for 1993 (Table A17).

Tables A18 and A19 examine species use on a regional basis for 1991 and 1993. Note that red oak dominates in all regions, followed distantly by hard maple, birch, cherry and ash. It should come as no surprise that alder use was highest in the West and southern yellow pine use highest in the South.

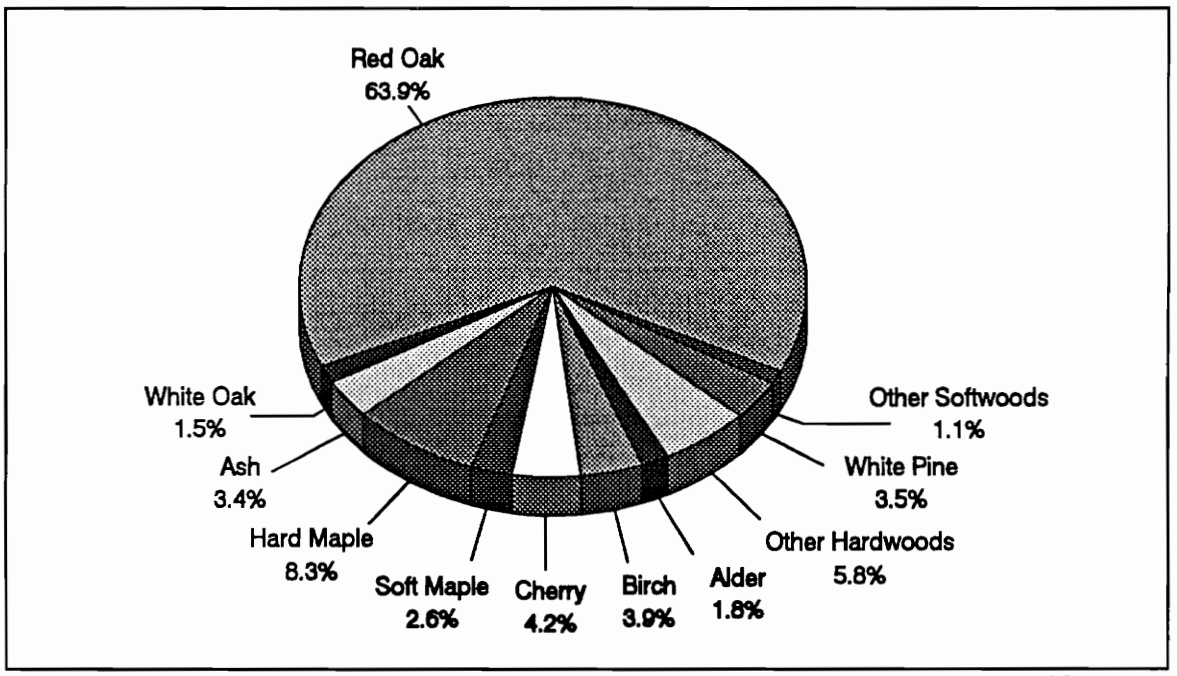


Figure 13. Estimated Lumber Use for Cabinet Production by Species: 1991

Hardwood Lumber Use by Grade

Stock and custom cabinet manufacturers differed in the grades of hardwood lumber they purchased for cabinet production during 1991 (Figure 14 and Table A20). Stock manufacturers used mostly No. 1 Common (55.6% by volume), followed by FAS and Select (30.8%). They used 13.3% No. 2 Common, but almost no lumber of lower grades.

As shown in Figure 15, custom cabinet manufacturers used a greater proportion of FAS and Select lumber (66.3%). No. 1 Common made up 32.1% of their lumber use. They used almost no hardwood lumber in grades lower than No. 1 Common (Table A20).

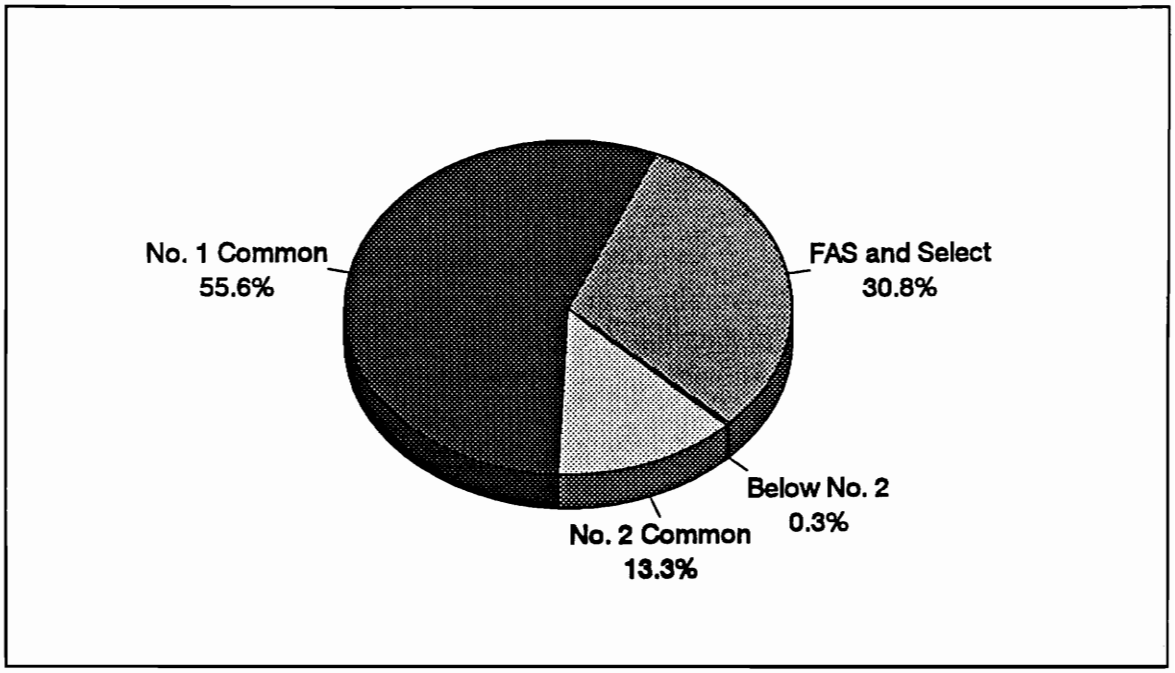


Figure 14. **Estimated 1991 Hardwood Lumber Use by Grade: Stock Cabinet Manufacturers**

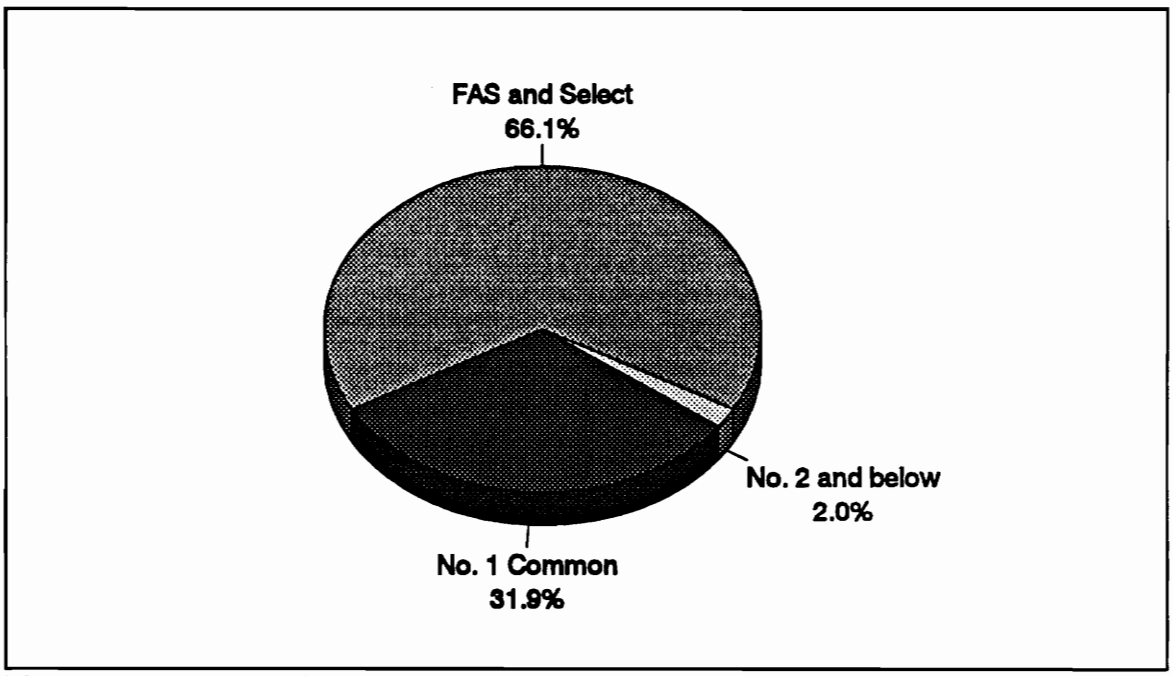


Figure 15. **Estimated 1991 Hardwood Lumber Use by Grade: Custom Cabinet Manufacturers**

Materials Sources

Little difference was exhibited between stock and custom cabinet manufacturers' sources of lumber during 1991 (Table A21). As shown in Figures 16 and 17, companies reported that slightly over 80% of their lumber purchases were made through a lumber wholesaler. Significant proportions of their lumber needs were filled by retailers, or through direct dealings with the sawmill. Other sources accounted for only one to two percent of their material needs.

Wholesalers also provided the largest proportion (over 85%) of cabinet manufacturers' panel needs (Table A21). Retailers and direct dealings with panel manufacturers were also significant. Other sources were used only minimally. (See Figures 18 and 19.)

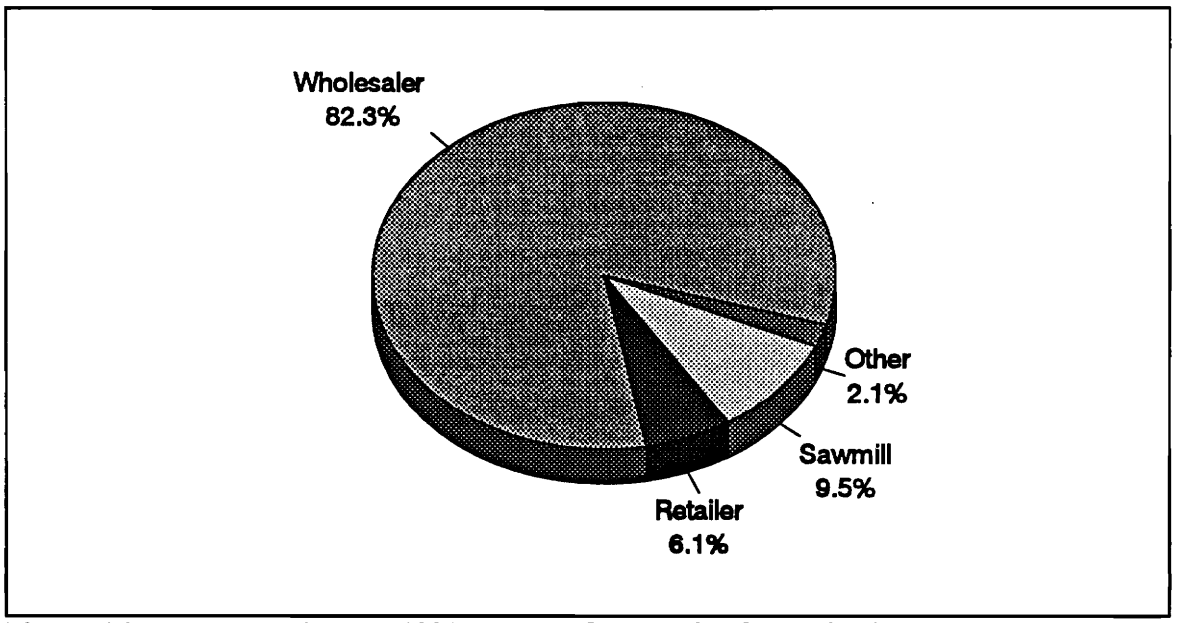


Figure 16. **Estimated 1991 Lumber Sources for Stock Cabinets: Average Distribution Among Sources**

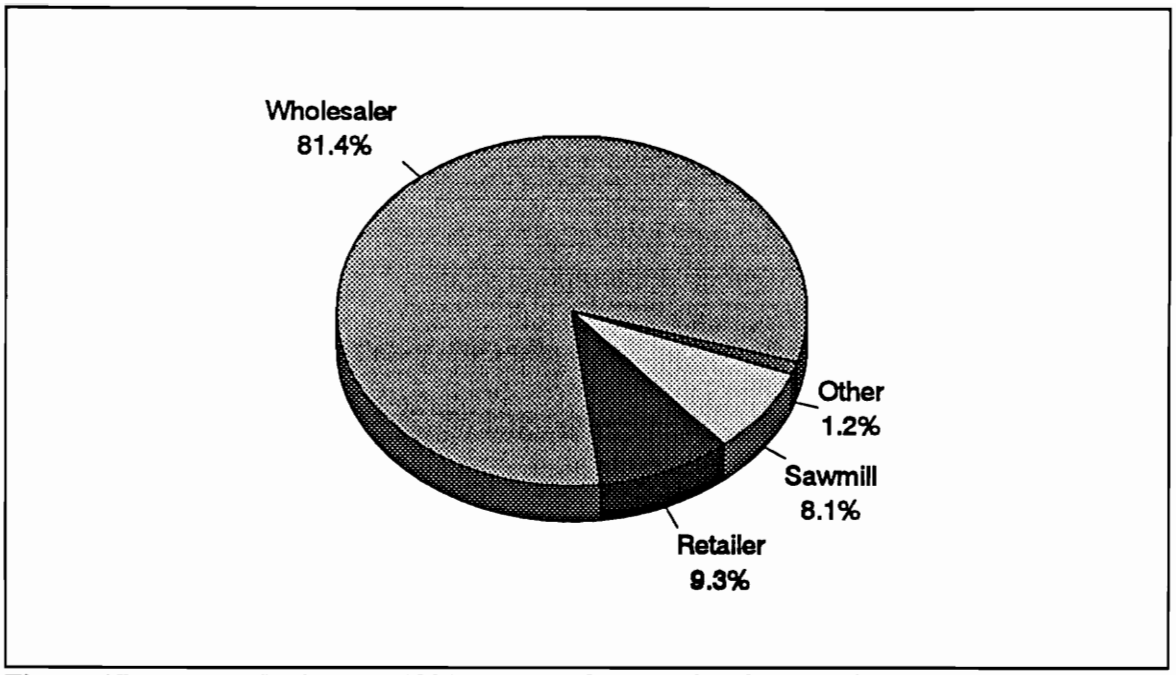


Figure 17. **Estimated 1991 Lumber Sources for Custom Cabinets: Average Distribution Among Sources**

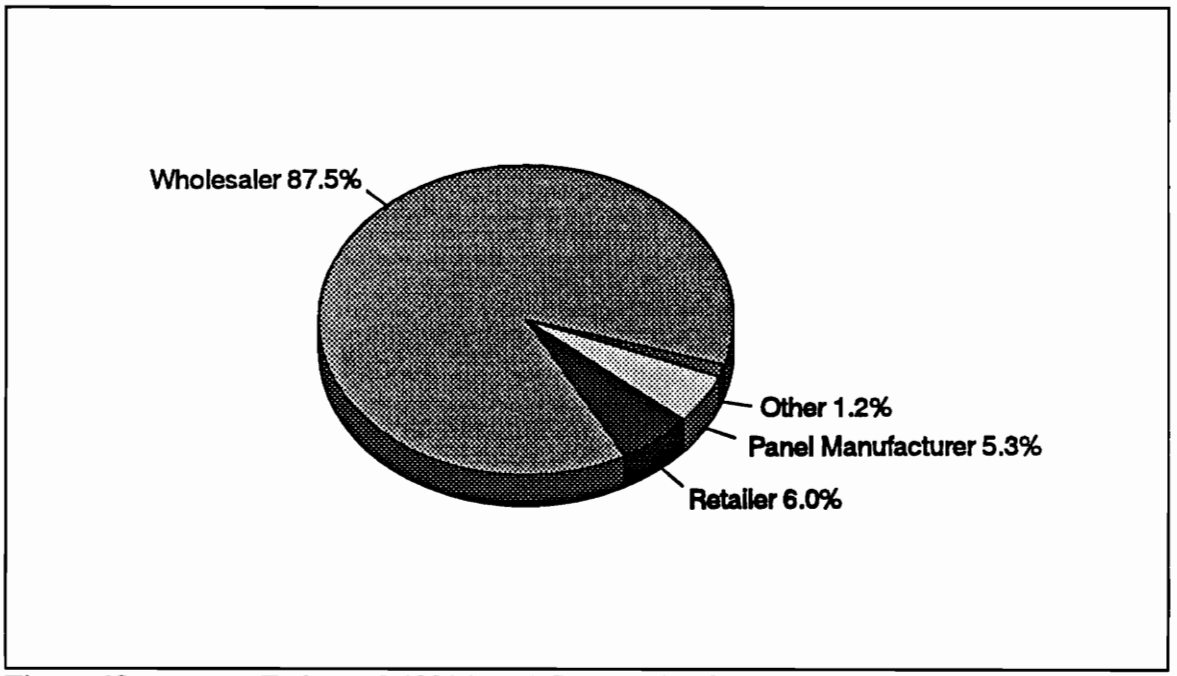


Figure 18. **Estimated 1991 Panel Sources for Stock Cabinets: Average Distribution Among Sources**

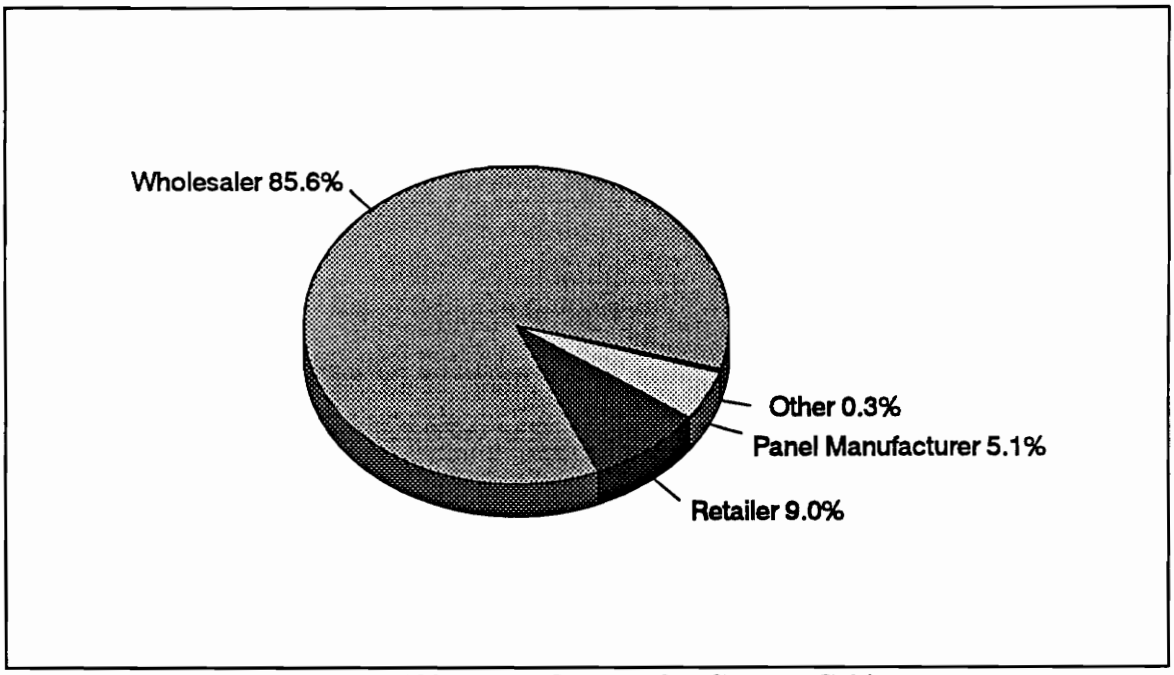


Figure 19. **Estimated 1991 Panel Sources for Custom Cabinets: Average Distribution Among Sources**

Cabinet Distribution Channels

As shown in Figures 20 and 21, stock and custom cabinet manufacturers employed different distribution channels for their products. Nearly 27% of the 1991 production of stock cabinets was distributed through independent stocking distributors, roughly 24% through builders and remodelers, and over 19% through dealers (Figure 20). More than 11% of the total sales of stock cabinets was made through home improvement centers, and slightly less than 11% went directly to homeowners. Other channels combined carried less than seven percent of the 1991 stock cabinet sales. Custom cabinets (Figure 21) were sold primarily through builders and remodelers (47.9%), or directly to the homeowner (38.7%). Dealers accounted for only 6.1% of

the 1991 custom cabinet sales, and other channels for only slightly more than seven percent. Table A22 details distribution channels for both custom and stock cabinets.

Cabinet Production by Type

Face frame kitchen cabinets accounted for the majority of production for both stock and custom manufacturers in 1991 (Table A23). As shown in Figures 22 and 23, this cabinet type was 62.6% (based on sales) of stock cabinet production and 50.3% of custom cabinet production. Frameless kitchen cabinets accounted for 18% of stock and 21% of custom cabinet production. Other cabinets, such as commercial cabinets or other-room cabinets accounted for only slightly over six percent of stock cabinet production but nearly 15% of custom production.

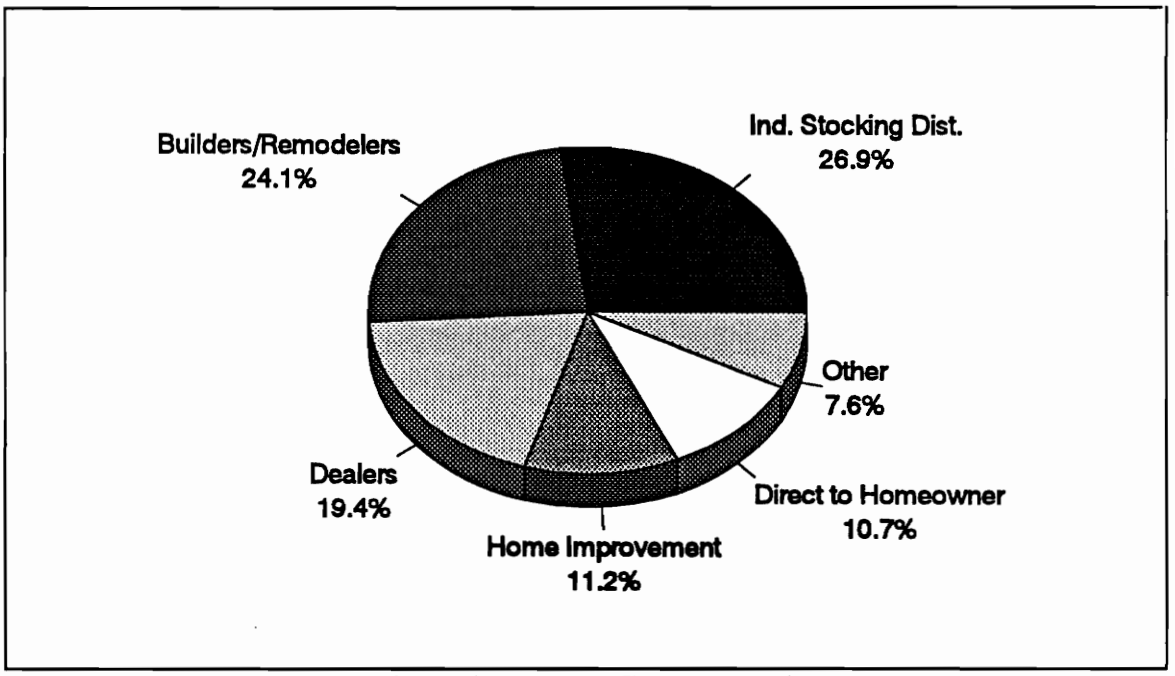


Figure 20. Stock Cabinet Distribution Channels: 1991

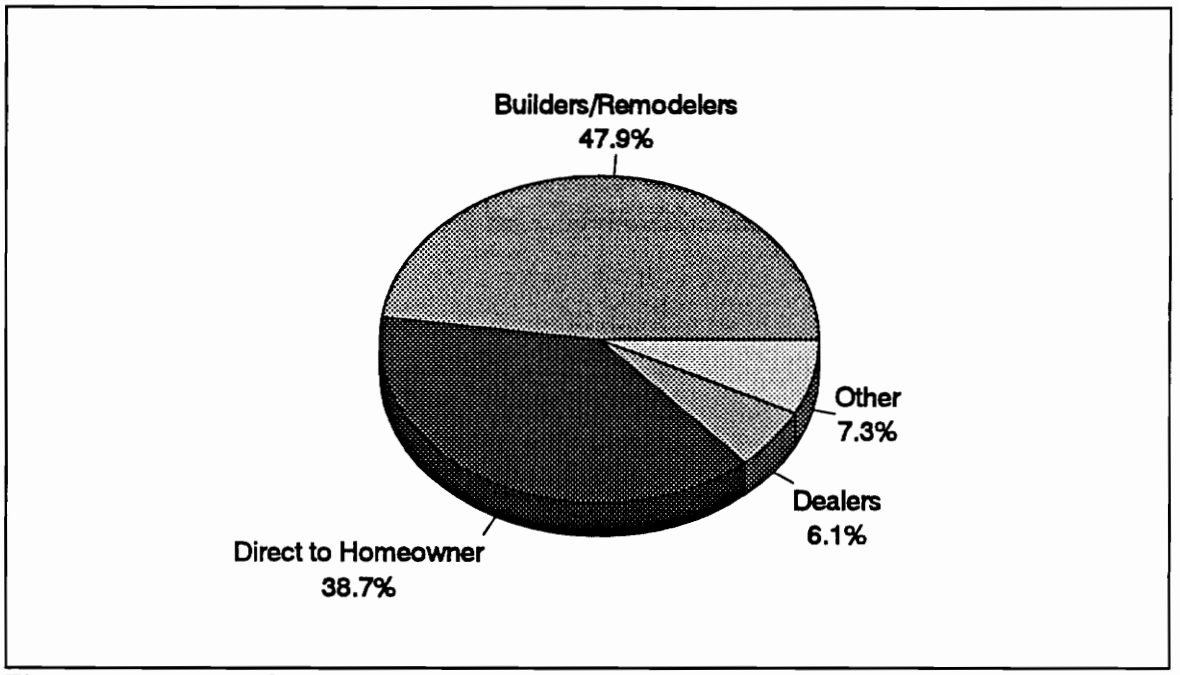


Figure 21. Custom Cabinet Distribution Channels: 1991

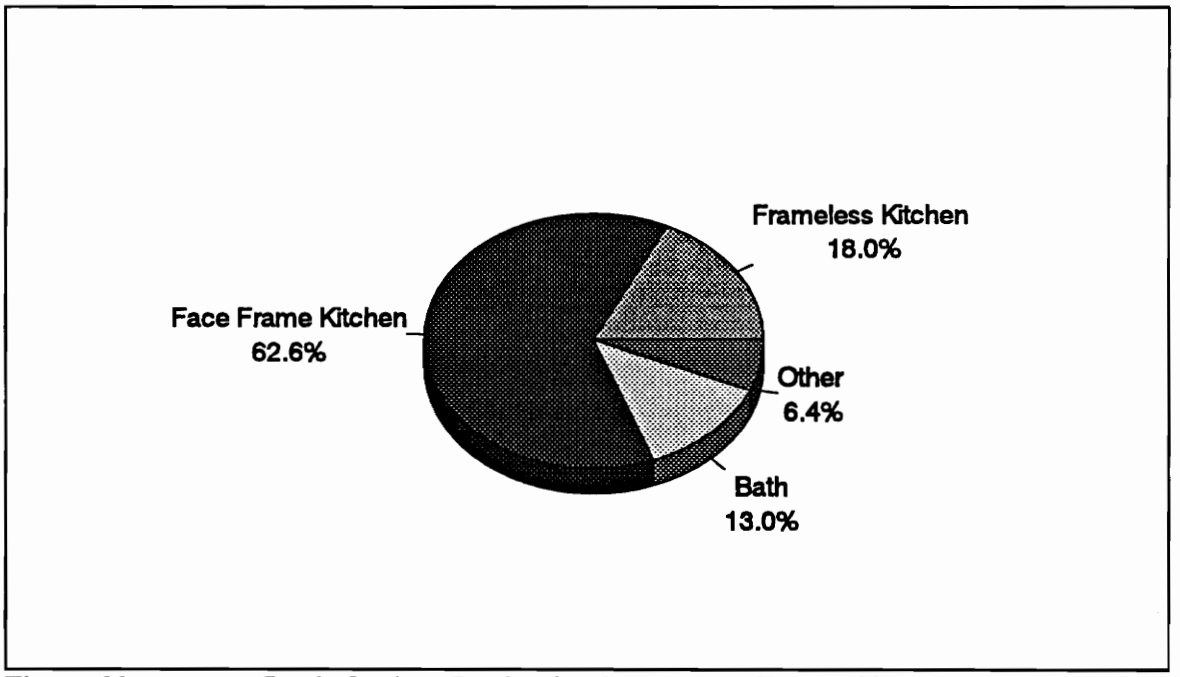


Figure 22. Stock Cabinet Production by Product Type: 1991

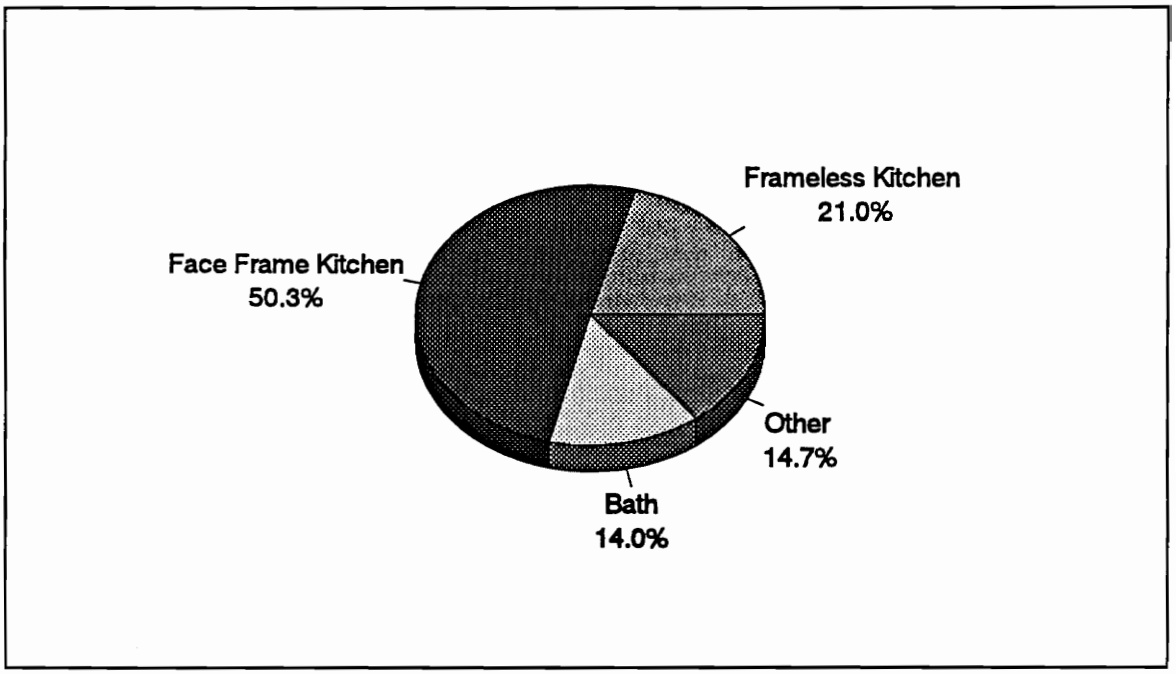


Figure 23. Custom Cabinet Production by Product Type: 1991

Conclusions

Nearly 12,500 firms were involved in wood cabinet production in 1991. This included 6,522 firms considered stock cabinet manufacturers (SIC 2434) and 5,975 firms considered custom cabinet manufacturers (SIC 571202). This study's estimate of the number of firms producing stock cabinets is 89 percent higher than the most recent number proposed by the Bureau of the Census (Darney 1992). The discrepancy in estimates is most likely attributable to differences in sampling procedure (Bratkovich and Passewitz 1991).

This study estimated that the cabinet industry had $8.8 billion in sales in 1991. Stock cabinet manufacturers accounted for $7.3 billion of the total, and custom for $1.5 billion. In comparison, Hall (1988) reported $6 billion in sales for the industry during 1988; however, it was not clear if this estimate included custom cabinet producers.

Total employment within the wood cabinet industry was estimated at 116,302 for 1991. Of the total, 87,425 were employed by stock cabinet manufacturers and 28,877 by custom manufacturers. The number estimated for stock manufacturers is 20 percent higher than that reported by the Department of Labor Statistics (Nolley 1990) and 30 percent higher than the latest Census estimate (Darney 1992). The differences are most likely attributable to differences in sampling methods (Bratkovich and Passewitz 1991).

Hardwood lumber was purchased by nearly all of the study's respondents in 1991. It was estimated that 523 million board feet of this material were used. Hardwood plywood and particleboard were also utilized by a majority of firms. The industry used an estimated 294 million square feet of hardwood plywood (1/2 inch basis) and 846 million square feet of particleboard (1/2 inch basis). It also used sizeable volumes of MDF, hardboard, softwood lumber, and veneer. OSB use was extremely limited. No more than six percent of the respondents in any segment purchased the material, and its total estimated use was 1.2 million square feet (1/2 inch basis) in 1991.

The mix of materials used to produce cabinets varied between stock and custom cabinet manufacturers. Both segments relied heavily on hardwood lumber, particleboard and hardwood plywood; however, custom cabinets contained relatively higher proportions of hardwood lumber, softwood lumber, hardwood plywood, softwood plywood, and MDF than did stock cabinets. Stock cabinets were produced utilizing higher proportions of particleboard, veneer, and hardboard.

During 1991, cabinet producers purchased hardwood lumber primarily in the higher grades, with some differences in preference noted between manufacturers of stock and custom cabinets. Custom cabinet manufacturers were more likely to have purchased FAS and Select lumber, while stock cabinet manufacturers purchased Number 1 Common lumber most often. Both types of manufacturer used more red oak than all other hardwood species.

Most of the industry's materials were purchased from wholesalers, although significant proportions were purchased from retailers or directly from the manufacturer. Distribution was

mainly through independent stocking distributors and builder/remodelers for stock cabinets, while custom cabinet manufacturers preferred to distribute their products through builder/remodelers or sell directly to homeowners. Face frame cabinets represented the largest proportion of production for stock and custom cabinet manufacturers. Frameless cabinet production accounted for approximately 20% of total cabinet sales.

In light of the rather discouraging market conditions present at the time of this study, one would expect the cabinet industry to have exhibited decreased sales and lower than normal materials use. Indeed, cabinet sales were reported to be down by 20 to 30% by many companies during 1991. Most companies predicted that conditions would soon become more favorable, however, and that sales would regain much lost ground by the end of 1993. Materials use predictions for 1993 reflect the positive attitude of the industry as a whole.

Literature Cited

Ackerman, John C. 1987. Markets for solid and composite wood products for furniture and cabinets. Forest Products Journal. 37(10):11-15.

Anonymous. 1988. U. S. will require 43 million cabinets in 1988: NKCA. Wood and Wood Products. 93(6):68.

Anonymous. 1992. Panels slide again; upturn seen for 1992. Forest Industries. March/April 1992.

Adams, Larry. 1992a. 1992 cabinet projection highest in 13 years. Wood and Wood Products. 97(3):14.

Adams, Larry. 1992b. Cabinet industry on the rebound. Wood and Wood Products. 97(6):58-63.

Arkush, Dan. 1988a. Cabinets branch out as remodeling boom grows. Wood and Wood Products. 93(12):64-67.

Arkush, Dan. 1988b. NKBA promotion swings into high gear. Wood and Wood Products. 93(6): 70-78.

Bratkovich, Stephen M. and Gregory R. Passewitz. 1991. Estimating the size of hardwood industries: an Ohio case study. Forest Products Journal. 41(10):69-72.

Bureau of the Census. 1990. Guide to the 1987 Economic Censuses and Related Statistics. U.S. Department of Commerce. EC87-R-2. Washington, D.C.

Cassens, Daniel and Harry Urban. 1986. Cabinet manufacturing and marketing survey. Wood and Wood Products. 91(6):83-84 & 114-116.

Christianson, Rich. 1991a. Cashing in on the remodelling market. Wood and Wood Products. 96(6):51-54.

Christianson, Rich. 1991b. RTA cabinetmakers eye DIY market. Wood and Wood Products. 96(6):57-63.

Darney, Arsen J. (editor). 1992. Manufacturing USA: Industry Analysis, Statistics, and Leading Companies. 2nd edition. Gale Research Inc., Detroit, Mich.

Dempsey, Gilbert P. and William G. Luppold. 1992. The state of hardwood lumber markets. The Northern Logger and Timber Processor. 40(9):22-23, 30.

Dillman, D. A. 1978. Mail and Telephone Surveys: The Total Design Method. John Wiley & Sons, Inc. New York, New York.

Doud, Lynn F., Johnson, Walter W., Blankenhorn, Paul R., Stover, Lee R., and William G. Luppold. 1991. A description of the 1987 kitchen cabinet industry in Pennsylvania. Forest Products Journal. 42(4):33-39.

Franklin, Barbara Hackman, Hauser, Timothy J., and James D. Jameson. 1993. U. S. Industrial Outlook 1993. U. S. Department of Commerce. International Trade Administration. U. S. Government Printing Office. Washington, D. C.

Hall, Dick. 1988. An invitation to a $9 billion feast. Wood and Wood Products. 93(11):78-80.

Hart, B. Leslie. 1989. 1989 market outlook: 3.45 million kitchens and 5.65 baths in nation's remodeling. Kitchen and Bath Business. January. p. 54-59.

Hart, B. Leslie. 1991. Cabinet industry report. Kitchen and Bath Business. July. p. 32-34.

Kaiser, Jo-Ann. 1990. Tough times for cabinet makers. Wood and Wood Products. 95(12):77-80.

Kuhl, Helen. 1989. Top 25 cabinet makers show steady growth in 1988. Wood and Wood Products. 94(6):81-84.

Kuhl, Helen. 1990a. Cabinet demand expected to rise in 1990. Wood and Wood Products. 95(8): 51-52.

Kuhl, Helen. 1990b. Tight market puts the pressure on cabinet makers. Wood and Wood Products. 95(6):41-50.

Kurpiel, Fred. 1990. Structural panel product markets and demand. Present and Future Timber and Non-Commodity Demands on Eastern Hardwood Forests in the 1990s. Proceedings: Eighteenth Annual Hardwood Symposium of the Hardwood Research Council. May. p. 45-49.

McKeever, David B. and Robert G. Anderson. 1992. Timber products used to build U. S. single-family houses in 1988. Forest Products Journal. 42(4):11-18.

Nolley, Jean W. 1990. Bulletin of Hardwood Market Statistics: Summer 1990. U. S. Department of Agriculture, Forest Service, Northeast Forest Experiment Station. Research Note NE-342.

Phelps, Robert B. 1992. Outlook for timber products. Proceedings: Annual Agricultural Outlook Conference, USDA. 161-171.

Tyson, Laura D. and Alan S. Blinder. 1993. Economic Indicators. Report to the Joint Economic Committee by the Council of Economic Advisors. United States Government Printing Office. Washington, DC.

Appendix A

Material Use and Other Cabinet Industry Information - Tabulated

Table A1. Estimated Wood Materials Use for Cabinet Production: 1991 and 1993

Wood Material	Unit of Measure	Use in 1991	Predicted use in 1993	Percent Change
Hardwood Lumber	MMBF	523.0	652.7	+24.8%
Softwood Lumber[1]	MMBF	71.6	71.4	-0.2%
Particleboard	MMSF 1/2"[2]	846.6	1075.2	+27.0%
MDF	MMSF 1/2"	114.1	152.8	+33.9%
Hardboard	MMSF 1/8"	162.7	193.1	+18.7%
OSB	MMSF 1/2"	1.2	1.5	+30.5%
Hardwood Plywood	MMSF 3/8"	294.0	353.7	+20.3%
Softwood Plywood	MMSF 3/8"	84.7	78.6	-7.2%
Cabinet Doors	Million Doors	22.8	30.5	+33.9%
Edge-glued Panels	MMBF	26.4	27.5	+4.1%
Other Cabinet Parts	Million Lineal Feet	98.2	122.6	+24.8%
Veneer	MMSF	93.1	112.8	+21.1%

[1] Some soft hardwoods such as aspen, basswood or yellow poplar may have been reported under this category.

[2] The fraction represents the base thickness to which reported values were converted, allowing them to be compiled on an equal volume basis.

Table A2. **Estimated Wood Materials Use for Cabinet Production by Standard Industrial Classification: 1991 and 1993**

Wood Material	Unit of Measure	SIC 2434 Wood Kitchen Cabinets		SIC 571202 Custom Furniture and Cabinets	
		Use in 1991	Predicted Use in 1993	Use in 1991	Predicted Use in 1993
Hardwood Lumber	MMBF	463.7	575.7	59.3	77.0
Softwood Lumber	MMBF	51.0	46.5	20.5	24.9
Particleboard	MMSF 1/2"	767.0	970.4	79.6	104.9
MDF	MMSF 1/2"	87.0	115.8	27.1	37.0
Hardboard	MMSF 1/8"	151.7	181.4	11.0	11.8
OSB	MMSF 1/2"	0.5	0.5	0.7	1.1
Hardwood Plywood	MMSF 3/8"	212.8	264.4	81.2	89.3
Softwood Plywood	MMSF 3/8"	48.8	49.0	35.9	29.5
Cabinet Doors	Million Doors	18.1	24.8	4.6	5.6
Edge-glued Panels	MMBF	25.9	26.9	0.5	0.5
Other Cabinet Parts	Million Lineal Feet	94.7	118.5	3.6	4.1
Veneer	MMSF	86.3	103.7	6.8	9.1

Table A3. **Estimated 1991 Wood Materials Use for Cabinet Production by Firm Size**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	347.5	79.8	95.7
Softwood Lumber	MMBF	12.4	16.5	42.7
Particleboard	MMSF 1/2"	518.4	158.3	169.9
MDF	MMSF 1/2"	39.6	18.3	56.1
Hardboard	MMSF 1/8"	110.7	27.4	24.7
OSB	MMSF 1/2"	0	0.4	0.8
Hardwood Plywood	MMSF 3/8"	106.0	57.3	130.6
Softwood Plywood	MMSF 3/8"	9.3	17.4	58.0
Cabinet Doors	Million Doors	11.4	3.7	7.7
Edge-glued Panels	MMBF	20.8	5.3	0.3
Other Cabinet Parts	Million Lineal Feet	85.5	3.8	8.9
Veneer	MMSF	77.1	9.5	6.6

Table A4. **Predicted 1993 Wood Materials Use for Cabinet Production by Firm Size**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	434.1	96.0	122.6
Softwood Lumber	MMBF	11.9	15.9	43.5
Particleboard	MMSF 1/2"	644.1	221.4	209.8
MDF	MMSF 1/2"	56.9	20.3	75.6
Hardboard	MMSF 1/8"	130.9	34.1	28.1
OSB	MMSF 1/2"	0	0.3	1.2
Hardwood Plywood	MMSF 3/8"	129.8	64.8	159.1
Softwood Plywood	MMSF 3/8"	5.8	19.6	53.1
Cabinet Doors	Million Doors	16.3	4.9	9.8
Edge-glued Panels	MMBF	20.6	6.4	0.5
Other Cabinet Parts	Million Lineal Feet	108.2	3.4	11.1
Veneer	MMSF	90.4	13.7	8.7

Table A5. **Estimated 1991 Wood Materials Use for Cabinet Production by Firm Size: Standard Industrial Classification 2434**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	347.5	60.4	55.8
Softwood Lumber	MMBF	12.4	13.7	24.9
Particleboard	MMSF 1/2"	518.4	142.1	106.5
MDF	MMSF 1/2"	39.6	15.6	31.9
Hardboard	MMSF 1/8"	110.7	24.8	16.3
OSB	MMSF 1/2"	0	0.4	0.1
Hardwood Plywood	MMSF 3/8"	106.0	43.6	63.2
Softwood Plywood	MMSF 3/8"	9.3	15.1	24.4
Cabinet Doors	Million Doors	11.4	3.0	3.8
Edge-glued Panels	MMBF	20.8	5.0	0.2
Other Cabinet Parts	Million Lineal Feet	85.5	3.8	5.4
Veneer	MMSF	77.1	6.2	3.0

Table A6. **Predicted 1993 Wood Materials Use for Cabinet Production by Firm Size: Standard Industrial Classification 2434**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	434.1	70.3	71.3
Softwood Lumber	MMBF	11.9	12.7	21.9
Particleboard	MMSF 1/2"	644.1	201.3	125.0
MDF	MMSF 1/2"	56.9	17.0	41.9
Hardboard	MMSF 1/8"	130.9	31.3	19.1
OSB	MMSF 1/2"	0	0.3	0.1
Hardwood Plywood	MMSF 3/8"	129.8	49.1	85.5
Softwood Plywood	MMSF 3/8"	5.8	17.0	26.2
Cabinet Doors	Million Doors	16.3	3.6	4.9
Edge-glued Panels	MMBF	20.6	6.0	0.3
Other Cabinet Parts	Million Lineal Feet	108.2	3.4	7.0
Veneer	MMSF	90.4	9.6	3.7

Table A7. **Estimated 1991 Wood Materials Use for Cabinet Production by Firm Size: Standard Industrial Classification 571202**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	0	19.4	39.9
Softwood Lumber	MMBF	0	2.7	17.8
Particleboard	MMSF 1/2"	0	16.2	63.4
MDF	MMSF 1/2"	0	2.8	24.3
Hardboard	MMSF 1/8"	0	2.65	8.4
OSB	MMSF 1/2"	0	0	0.7
Hardwood Plywood	MMSF 3/8"	0	13.7	67.5
Softwood Plywood	MMSF 3/8"	0	2.3	33.6
Cabinet Doors	Million Doors	0	0.7	3.9
Edge-glued Panels	MMBF	0	0.3	0.1
Other Cabinet Parts	Million Lineal Feet	0	0	3.6
Veneer	MMSF	0	3.3	3.6

Table A8. **Predicted 1993 Wood Materials Use for Cabinet Production by Firm Size: Standard Industrial Classification 571202**

Wood Material	Unit of Measure	Firm Size		
		100+ Employees	20 to 99 Employees	Less than 20 Employees
Hardwood Lumber	MMBF	0	25.7	51.3
Softwood Lumber	MMBF	0	3.3	21.6
Particleboard	MMSF 1/2"	0	20.1	84.7
MDF	MMSF 1/2"	0	3.3	33.7
Hardboard	MMSF 1/8"	0	2.8	9.0
OSB	MMSF 1/2"	0	0	1.1
Hardwood Plywood	MMSF 3/8"	0	15.7	73.6
Softwood Plywood	MMSF 3/8"	0	2.6	27.0
Cabinet Doors	Million Doors	0	0.8	4.8
Edge-glued Panels	MMBF	0	0.4	0.1
Other Cabinet Parts	Million Lineal Feet	0	0	4.1
Veneer	MMSF	0	4.1	5.0

Table A9. **Estimated 1991 Wood Materials Use for Cabinet Production by Region**

Wood Material	Unit of Measure	Region				
		Northeast	Midwest	West	South	Other
Hardwood Lumber	MMBF	50.5	102.4	63.3	305.8	0.9
Softwood Lumber	MMBF	6.7	15.5	11.0	38.4	0
Particleboard	MMSF 1/2"	75.1	285.1	161.1	322.6	2.7
MDF	MMSF 1/2"	7.7	38.0	19.0	49.3	0
Hardboard	MMSF 1/8"	14.4	26.8	23.1	97.9	0.5
OSB	MMSF 1/2"	0.1	0.8	0.3	0.0	0
Hardwood Plywood	MMSF 3/8"	34.3	110.4	56.4	92.3	0.6
Softwood Plywood	MMSF 3/8"	6.6	13.4	15.9	48.7	0.1
Cabinet Doors	Million Doors	3.2	6.2	4.5	9.0	0.0
Edge-glued Panels	MMBF	0.5	16.1	1.4	8.3	0
Other Cabinet Parts	Million Lineal Feet	10.3	50.0	22.7	15.2	0
Veneer	MMSF	2.8	22.5	1.6	66.2	0

Table A10. **Predicted 1993 Wood Materials Use for Cabinet Production by Region**

Wood Material	Unit of Measure	Region				
		Northeast	Midwest	West	South	Other
Hardwood Lumber	MMBF	64.2	128.2	74.1	384.9	1.3
Softwood Lumber	MMBF	7.4	16.5	9.9	37.6	0
Particleboard	MMSF 1/2"	107.6	346.1	207.2	411.6	2.8
MDF	MMSF 1/2"	12.1	47.3	23.1	70.3	0
Hardboard	MMSF 1/8"	19.0	26.3	28.2	119.0	0.5
OSB	MMSF 1/2"	0.1	1.1	0.3	0.1	0
Hardwood Plywood	MMSF 3/8"	37.1	140.0	65.8	110.1	0.8
Softwood Plywood	MMSF 3/8"	11.6	16.6	17.6	32.6	0.2
Cabinet Doors	Million Doors	4.0	7.9	5.5	13.0	0
Edge-glued Panels	MMBF	0.7	18.5	2.0	6.3	0
Other Cabinet Parts	Million Lineal Feet	7.7	64.3	26.8	23.8	0
Veneer	MMSF	3.8	31.2	2.2	75.6	0

Table A11. **Estimated 1991 Wood Materials Use for Cabinet Production by Region: Standard Industrial Classification 2434**

Wood Material	Unit of Measure	Region				
		Northeast	Midwest	West	South	Other
Hardwood Lumber	MMBF	46.1	85.9	49.7	281.4	0.946
Softwood Lumber	MMBF	5.2	11.1	8.5	26.4	0
Particleboard	MMSF 1/2"	69.7	250.8	143.9	299.8	2.3
MDF	MMSF 1/2"	7.0	23.6	15.5	41.0	0
Hardboard	MMSF 1/8"	14.3	23.6	20.9	92.5	0.4
OSB	MMSF 1/2"	0.0	0.2	0.3	0.0	0
Hardwood Plywood	MMSF 3/8"	26.4	96.3	35.4	54.3	0.7
Softwood Plywood	MMSF 3/8"	5.1	10.2	12.4	21.2	0.0
Cabinet Doors	Million Doors	2.7	5.4	3.0	7.0	6
Edge-glued Panels	MMBF	0.5	16.1	1.0	8.3	0
Other Cabinet Parts	Million Lineal Feet	9.9	48.3	22.4	14.1	0
Veneer	MMSF	1.8	20.6	0.8	63.1	0

Table A12. **Predicted 1993 Wood Materials Use for Cabinet Production by Region: Standard Industrial Classification 2434**

Wood Material	Unit of Measure	Region				
		Northeast	Midwest	West	South	Other
Hardwood Lumber	MMBF	61.3	105.4	57.9	350.2	1.3
Softwood Lumber	MMBF	6.3	10.5	7.0	22.8	0
Particleboard	MMSF 1/2"	99.2	295.6	186.9	386.0	2.8
MDF	MMSF 1/2"	11.6	26.8	18.8	58.7	0
Hardboard	MMSF 1/8"	18.9	23.5	25.5	113.0	0.5
OSB	MMSF 1/2"	0.0	0.1	0.3	0.0	0
Hardwood Plywood	MMSF 3/8"	30.6	121.0	40.0	72.3	0.8
Softwood Plywood	MMSF 3/8"	7.7	12.8	13.5	15.1	0.2
Cabinet Doors	Million Doors	3.5	6.8	3.9	10.6	0
Edge-glued Panels	MMBF	0.7	18.5	1.5	6.3	0
Other Cabinet Parts	Million Lineal Feet	7.1	62.3	26.5	22.6	0
Veneer	MMSF	2.6	28.8	1.2	71.2	0

Table A13. **Estimated 1991 Wood Materials Use for Cabinet Production by Region: Standard Industrial Classification 571202**

Wood Material	Unit of Measure	Region			
		Northeast	Midwest	West	South
Hardwood Lumber	MMBF	4.5	16.8	13.6	24.4
Softwood Lumber	MMBF	1.5	4.5	2.5	12.0
Particleboard	MMSF 1/2"	5.4	34.3	17.2	22.7
MDF	MMSF 1/2"	0.8	14.5	3.6	8.2
Hardboard	MMSF 1/8"	0.1	3.3	2.2	5.4
OSB	MMSF 1/2"	0.1	0.6	0	0
Hardwood Plywood	MMSF 3/8"	7.9	14.3	21.0	38.1
Softwood Plywood	MMSF 3/8"	1.5	3.5	3.4	27.5
Cabinet Doors	Million Doors	0.5	0.8	1.4	1.9
Edge-glued Panels	MMBF	0	0.0	0.4	0.0
Other Cabinet Parts	Million Lineal Feet	0.4	1.7	0.3	1.2
Veneer	MMSF	1.0	1.9	0.8	3.2

Table A14. **Predicted 1993 Wood Materials Use for Cabinet Production by Region: Standard Industrial Classification 571202**

Wood Material	Unit of Measure	Region			
		Northeast	Midwest	West	South
Hardwood Lumber	MMBF	2.9	23.1	16.2	34.8
Softwood Lumber	MMBF	1.1	6.1	2.9	14.8
Particleboard	MMSF 1/2"	8.4	50.6	20.3	25.6
MDF	MMSF 1/2"	0.5	20.5	4.3	11.6
Hardboard	MMSF 1/8"	0.1	2.9	2.7	6.0
OSB	MMSF 1/2"	0.1	1.0	0	0.0
Hardwood Plywood	MMSF 3/8"	6.5	19.2	25.8	37.9
Softwood Plywood	MMSF 3/8"	3.9	4.0	4.1	17.5
Cabinet Doors	Million Doors	0.5	1.1	1.6	2.4
Edge-glued Panels	MMBF	0	0	0.5	0.0
Other Cabinet Parts	Million Lineal Feet	0.6	2.0	0.3	1.2
Veneer	MMSF	1.2	2.4	1.0	4.4

Table A15. Estimated Lumber Use for Cabinet Production by Species

Species	Estimated Use in 1991		Predicted Use in 1993	
	Volume (MMBF)	% of Total	Volume (MMBF)	% of Total
Red Oak	379.7	63.9	463.3	64.0
White Oak	8.8	1.5	10.5	1.4
Ash	20.4	3.4	23.5	3.3
Hard Maple	49.1	8.3	74.6	10.3
Soft Maple	15.3	2.6	20.6	2.9
Cherry	25.3	4.3	31.6	4.4
Birch	22.9	3.9	26.4	3.6
Hickory/Pecan	7.6	1.3	9.6	1.3
Walnut	1.5	0.3	1.8	0.3
Alder	11.0	1.9	8.1	1.1
Imported Hardwoods	3.7	0.6	4.4	0.6
Southern Yellow Pine	5.6	0.9	6.4	0.9
White Pine	20.6	3.5	18.5	2.6
Imported Softwoods	0.8	0.1	0.7	0.1
Other Hardwoods	21.4	3.6	23.2	3.2
Other Softwoods	0.8	0.1	0.7	0.1
Total	594.6	100	724.1	100

Table A16. **Estimated 1991 Lumber Use for Cabinet Production by Species and Standard Industrial Classification**

Species	SIC 2434		SIC 571202	
	Volume (MMBF)	% of Total	Volume (MMBF)	% of Total
Red Oak	337.9	65.7	41.5	52.0
White Oak	8.2	1.6	0.6	0.8
Ash	14.8	2.9	5.7	7.1
Hard Maple	46.3	9.0	2.6	3.3
Soft Maple	12.6	2.4	2.8	3.6
Cherry	22.0	4.3	3.3	4.1
Birch	14.1	2.7	8.9	11.2
Hickory/Pecan	6.9	1.3	0.6	0.8
Walnut	1.1	0.2	0.4	0.6
Alder	9.3	1.8	1.7	2.1
Imported Hardwoods	3.5	0.7	0.2	0.3
Southern Yellow Pine	4.6	0.9	0.9	1.2
White Pine	16.3	3.2	4.4	5.5
Imported Softwoods	0.6	0.1	0.2	0.3
Other Hardwoods	15.7	3.0	5.9	7.3
Other Softwoods	0.8	0.2	0	0
Total	514.7	100	79.9	100

Table A17. **Predicted 1993 Lumber Use for Cabinet Production by Species and Standard Industrial Classification**

Species	SIC 2434		SIC 571202	
	Volume (MMBF)	% of Total	Volume (MMBF)	% of Total
Red Oak	409.7	65.9	53.3	52.3
White Oak	9.2	1.5	1.2	1.2
Ash	17.6	2.8	6.1	6.0
Hard Maple	70.5	11.3	4.0	3.9
Soft Maple	16.8	2.7	3.9	3.8
Cherry	27.1	4.3	4.6	4.5
Birch	16.2	2.6	10.3	10.1
Hickory/Pecan	8.5	1.4	1.1	1.1
Walnut	0.9	0.2	0.9	0.9
Alder	6.0	1.0	2.2	2.1
Imported Hardwoods	3.9	0.6	0.5	0.5
Southern Yellow Pine	5.3	0.9	1.1	1.1
White Pine	12.8	2.1	5.7	5.6
Imported Softwoods	0.6	0.1	0.1	0.1
Other Hardwoods	16.5	2.7	6.8	6.6
Other Softwoods	0.7	0.1	0	0
Total	622.2	100	101.9	100

Table A18. **Estimated 1991 Lumber Use for Cabinet Production by Species and Region**

Species	Volume Used per Region (MMBF)				
	Northeast	Midwest	West	South	Other
Red Oak	28.3	65.6	50.1	235.2	0.4
White Oak	1.8	2.7	2.2	2.3	0
Ash	1.3	2.6	1.4	15.0	0
Hard Maple	8.5	7.2	2.8	30.7	0
Soft Maple	0.7	3.2	0.5	10.9	0
Cherry	5.2	7.8	0.8	11.4	0
Birch	3.8	12.0	1.3	5.9	0
Hickory/Pecan	0.5	3.8	0	3.1	0.1
Walnut	0.3	0.5	0.4	0.3	0
Alder	0	0.6	7.1	2.9	0.5
Imported Hardwoods	0.6	1.0	0.4	1.7	0
Southern Yellow Pine	0	0.6	1.4	3.5	0
White Pine	2.2	6.7	1.3	10.4	0
Imported Softwoods	0	0.3	0	0.5	0
Other Hardwoods	3.4	3.3	4.4	10.5	0
Other Softwoods	0.6	0	0.2	0	0
Total	57.2	117.9	74.3	344.3	0.9

Table A19. **Predicted 1993 Lumber Use for Cabinet Production by Species and Region**

Species	Volume Used per Region (MMBF)				
	Northeast	Midwest	West	South	Other
Red Oak	33.6	78.7	57.2	292.5	0.5
White Oak	2.0	3.1	2.2	3.2	0
Ash	1.5	3.2	1.3	17.4	0
Hard Maple	13.8	13.1	4.3	43.6	0
Soft Maple	0.8	4.2	0.8	14.7	0.1
Cherry	6.7	10.2	1.3	13.5	0
Birch	3.9	13.9	1.4	7.3	0
Hickory/Pecan	1.2	4.5	0	3.8	0.1
Walnut	0.5	0.7	0.3	0.4	0
Alder	0	0.6	4.8	2.3	0.6
Imported Hardwoods	1.0	1.0	0.4	2.0	0
Southern Yellow Pine	0	0.9	1.7	3.8	0
White Pine	2.6	7.1	1.3	7.6	0
Imported Softwoods	0	0.4	0	0.4	0
Other Hardwoods	3.6	3.2	6.6	10.1	0
Other Softwoods	0.4	0	0.3	0	0
Total	71.6	144.8	84.0	422.5	1.3

Table A20. **Estimated 1991 Hardwood Lumber Use for Cabinet Production by Grade and Standard Industrial Classification**

Lumber Grade	SIC 2434		SIC 571202	
	Volume (MMBF)	% of Total	Volume (MMBF)	% of Total
FAS and Select	142.9	30.8%	39.3	66.3%
No. 1 Common	257.9	55.6%	19.0	32.1%
No. 2 Common	61.5	13.3%	0.5	0.9%
Below No. 2 Common	1.4	0.3%	0.5	0.8%
Total	463.7	100	59.3	100

Table A21. **Estimated Breakdown of Wood Material Purchases for Cabinet Production by Channel and Standard Industrial Classification: 1991**

Channel	Lumber Purchases (% of total)		Panel Purchases (% of total)	
	SIC 2434	SIC 571202	SIC 2434	SIC 571202
Wholesaler / Distributor	82.4%	81.4%	87.6%	85.5%
Retailer	6.1%	9.3%	6.0%	9.0%
Broker	1.4%	1.2%	0.6%	0.1%
Direct from Manufacturer	9.5%	8.1%	5.3%	5.1%
Importer	0.6%	0	0.6%	0
Other	0.1%	0	0	0.2%

Table A22. Estimated Breakdown of Cabinet Sales by Distribution Channel and Standard Industrial Classification: 1991

Channel	All Firms (% of total sales)	SIC 2434 (% of total sales)	SIC 571202 (% of total sales)
Home Improvement / Building Supply Centers	9.3%	11.2%	0.2%
Independent Stocking Distributors	22.3%	26.9%	0.1%
Dealers	17.1%	19.4%	6.1%
Interior Designers	2.1%	1.8%	3.3%
Builders and Remodelers	28.2%	24.1%	47.9%
Direct to Homeowners	15.6%	10.7%	38.7%
Mass Merchants	0.8%	0.9%	0
Discount Mass Merchants	0.9%	1.1%	0
Company Owned Store or Factory Outlet	3.2%	3.3%	3.0%
Other	0.5%	0.5%	0.7%
Total %[1]	100%	99.9%	100%
Total Sales $	$8.8 billion	$7.3 billion	$1.5 billion

[1] Column total may not equal 100% as a result of rounding.

Table A23. Estimated Breakdown of Cabinet Industry Sales by Product Type, Year and Standard Industrial Classification

Product Category	1991		1993	
	SIC 2434	SIC 571202	SIC 2434	SIC 571202
Frameless Kitchen Cabinets	18.0%	21.0%	18.1%	23.6%
Face Frame Kitchen Cabinets	62.6%	50.3%	62.0%	47.0%
Bath Cabinets	13.0%	14.0%	13.7%	14.5%
Other Cabinets[1]	6.4%	14.7%	6.2%	14.9%
Total %	100.0%	100.0%	100.0%	100.0%

[1] Some firms reported non-cabinet items in this category. Volumes were insignificant.

Appendix B

Questionnaire and Other Correspondence

11071

Cabinet Manufacturer Study

Center for Forest Products Marketing

Virginia Polytechnic Institute and State University
Department of Wood Science and Forest Products
Blacksburg, VA 24061-0503

Questions? Contact John Punches
703/231-8835

Fax: 703/231-8868

Virginia Tech
Center for Forest Products Marketing

Cabinet Manufacturer Study

This questionnaire asks about your company's purchases of wood materials. It is designed to help suppliers better understand and serve your wood material needs, and to illustrate the importance of the cabinet industry to local economies. Please answer for your company as a whole, not just for your location. If you are not responsible for ordering, purchasing, or tracking WOOD MATERIALS please pass this questionnaire on to the appropriate person.

Thank you!

1. **Does your company produce wood kitchen or bath cabinets?**
(please check one box)

☐ No ⇨ Please return this questionnaire even if your company does not produce wood cabinets. Just fold and staple. Postage is prepaid. **Thank you!**

☐ Yes ⇩

2. **Which of the following materials did your company purchase (from outside sources) for the production of cabinets in 1991?** (Please check all that apply.)

☐ Hardwood Lumber
☐ Softwood Lumber
☐ Particleboard
☐ Medium Density Fiberboard (MDF)
☐ Hardboard
☐ Veneer
☐ Oriented Strandboard (OSB)
☐ Hardwood Plywood (veneer core)
☐ Softwood Plywood
☐ Cabinet Doors
☐ Edge-Glued Panels/Cut-to-Size Blanks
☐ Other Cabinet Parts

3. **How much wood material do you purchase from outside sources? Please estimate the volumes of the following materials purchased by your company *for the manufacture of cabinets* in 1991, and predict those volumes for 1993.** (Please treat laminated products as their substrates, i.e. list laminated particleboard as particleboard.)

If you do not have access to this information, please contact the person within your firm who can provide it. This is the most important part of the study! Thank you.

Wood Material	Purchased in 1991		Predicted purchases in 1993
Hardwood Lumber	_____	MBF (1000 board feet)	_____
Softwood Lumber	_____	MBF	_____
Particleboard	_____	MSF (1000 square feet) 1/2" basis*	_____
Medium Density Fiberboard (MDF)	_____	MSF 1/2" basis	_____
Hardboard	_____	MSF 1/8" basis	_____
Oriented Strandboard (OSB)	_____	MSF 1/2" basis	_____
Hardwood Plywood	_____	MSF 3/8" basis	_____
Softwood Plywood	_____	MSF 3/8" basis	_____
Cabinet Doors	_____	Thousand Doors	_____
Edge-Glued Panels or Cut-to-Size Blanks	_____	MBF	_____
Other Cabinet Parts	_____	Thousand Lineal Feet	_____
Veneer	_____	MSF (any thickness)	_____

* Basis refers to the thickness of the material. If the material you purchase does not match the basis shown, please indicate the basis you are using.

4. **Of the LUMBER purchased by your company *for the production of cabinets* during 1991, what percentage of total lumber volume was each of the following species? What percentage of each species do you expect to purchase in 1993?**

Purchased in 1991		Expected purchases in 1993	
_____%	Red Oak	_____%	Red Oak
_____%	White Oak	_____%	White Oak
_____%	Ash	_____%	Ash
_____%	Hard Maple	_____%	Hard Maple
_____%	Soft Maple	_____%	Soft Maple
_____%	Cherry	_____%	Cherry
_____%	Birch	_____%	Birch
_____%	Hickory/Pecan	_____%	Hickory/Pecan
_____%	Walnut	_____%	Walnut
_____%	Alder	_____%	Alder
_____%	Imported Hardwoods	_____%	Imported Hardwoods
_____%	Southern Yellow Pine	_____%	Southern Yellow Pine
_____%	White Pine	_____%	White Pine
_____%	Imported Softwoods	_____%	Imported Softwoods
_____%	Other:_____	_____%	Other:_____
_____%	Other:_____	_____%	Other:_____
Total = 100%		Total = 100%	

5. **What was the grade mix of the HARDWOOD LUMBER you purchased *for cabinet production* in 1991? Please indicate the percentage (by volume) purchases in each of the N.H.L.A. grades listed below.** (If your purchases were not based on N.H.L.A. grades, please allocate them to the closest grade listed.)

_____% FAS & Selects

_____% No. 1 Common

_____% No. 2 Common

_____% Below No. 2 Common

Total = 100%

6. **To whom do you sell your cabinets? Please estimate the percentage of your company's total cabinet sales (dollars) made to each of the following.**

_____% Home Improvement / Building Supply Centers

_____% Independent Stocking Distributors

_____% Dealers

_____% Interior Designers

_____% Builders and Remodelers

_____% Direct to Homeowners (Mail order, Phone order, etc.)

_____% Mass Merchants (Sears, J.C. Penny's, etc.)

_____% Discount Mass Merchants (K-Mart, Wal-Mart, etc.)

_____% Company Owned Store or Factory Outlet

_____% Other:_____

Total = 100%

7. **What types of sales people are involved in marketing your cabinets from the factory to the next step in the distribution channel? Please estimate the percentage of your total cabinet sales (dollars) made through each of the following.**

_____% Factory Sales-People

_____% Manufacturer's Representatives

_____% Other:_____

Total = 100%

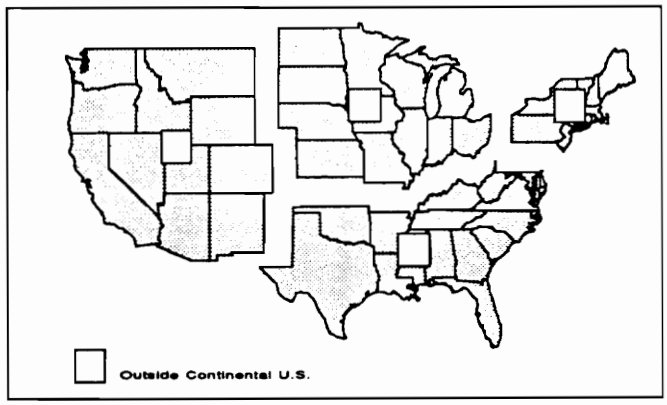
8. **From whom do you purchase your wood materials? Please indicate the percentage of your wood materials purchases (dollars) made through each of the following sources.**

Lumber Purchases	Panel Product Purchases
_____% Lumber Wholesaler/Distributor	_____% Panel Products Wholesaler/Distributor
_____% Lumber Retailer	_____% Panel Retailer
_____% Lumber Broker	_____% Panel Products Broker
_____% Direct from Sawmill	_____% Direct from Manufacturer
_____% Lumber Importer	_____% Panel Products Importer
_____% Other:_____	_____% Other:_____
Total = 100%	Total = 100%

9. **What percentage of your company's total 1991 sales (dollars) was in each of the following categories? What do you predict your company's sales mix will be in 1993?**

1991 Sales		Estimated 1993 Sales	
_____%	Frameless Kitchen Cabinets	_____%	Frameless Kitchen Cabinets
_____%	Face Frame Kitchen Cabinets	_____%	Face Frame Kitchen Cabinets
_____%	Bath Cabinets	_____%	Bath Cabinets
_____%	Other:_____	_____%	Other:_____
_____%	Other:_____	_____%	Other:_____
Total = 100%		Total = 100%	

10. **Where are your cabinets produced? Please indicate the region where the majority of your company's cabinet manufacturing (rather than assembly) facilities are located.** (Please check only one region.)



11. **What was the total number of full-time employees in your company's cabinet operations during 1991?** (Please include yourself and all full-time production, maintenance, management and sales employees; but exclude any part-time employees.)

_____ Full-time employees

12. **What was your company's total sales of cabinets in 1991?**

$_____

Thank you for completing this questionnaire. Please fold, staple (with the address on the back page showing), and return by mail. The postage is prepaid.

Once again, **Thank you!**

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 10 BLACKSBURG, VA 24060

POSTAGE WILL BE PAID BY ADDRESSEE

VIRGINIA TECH
WOOD SCIENCE & FOREST PRODUCTS
ATTN.: JOHN PUNCHES
PO BOX 850
BLACKSBURG VA 24063-9985

Fold Along Dotted Line

Please return this questionnaire. Just fold at the dotted line and staple once, with the return address showing. Postage is prepaid.

THANK YOU!

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

CENTER FOR FOREST PRODUCTS MARKETING
Department of Wood Science and Forest Products
1650 Ramble Rd., Blacksburg, Virginia 24061-0503
Phone: (703) 231-5876 Fax: (703) 231-8868

March 9, 1992

John Doe
Wood Materials Procurement Manager
Wood Cabinet Company
Cabinet Street
Cabinettown, USA 11111

Dear Mr. Doe:

As a cabinet producer your company plays an important role in supporting your local economy. Unfortunately, few people recognize the importance of the cabinet industry. Even U.S. government statistics underestimate the volumes of materials utilized and the number of persons employed within your industry.

The Center for Forest Products Marketing at Virginia Tech is working to remedy this lack of understanding. The enclosed questionnaire is part of a study that will demonstrate the importance of cabinet producers in local economies and in the nation's economy as a whole. Our goal is to ensure that the cabinet industry receives the consideration it deserves. In addition, an improved understanding of the industry's material requirements will enable suppliers to better meet your needs.

As we can contact only a limited number of producers, your response is very important to the success of this study. Please complete the questionnaire and return it as soon as possible. We ask that you answer for all your company's manufacturing locations.

Let me assure you that the information you provide will be held in strict confidence. The number on the questionnaire is for administrative purposes and will allow us to remove your company from the mailing list upon receipt of your response. The published report will contain only group averages and totals; no information will be released about individual companies.

Thank you very much for your help. If you have any questions please contact me at (703) 231-8835. If you would like a summary of the results, please write your name and address on the blank page at the end of the questionnaire, or request it under separate cover. Results should be available in late Fall of 1992.

Sincerely,

John Punches
Graduate Student
Center for Forest Products Marketing

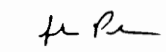
Dear Manufacturer:

The Center for Forest Products Marketing is working hard to serve the forest products industries. Please help us by completing and returning the questionnaire we mailed to you last week. It is part of our study of the cabinet industry's material use and distribution characteristics, and will help cabinet producers as well as the forest products industries in general.

Your response is extremely important, so we hope to hear from you soon.

If you have already returned the questionnaire, please accept our thanks (we don't require the information a second time). If you did not receive a questionnaire, or have any questions, please contact me at (703) 231-8835 or FAX (703) 231-8868.

Sincerely,



John Punches
Graduate Student

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

CENTER FOR FOREST PRODUCTS MARKETING
Department of Wood Science and Forest Products
1650 Ramble Rd., Blacksburg, Virginia 24061-0503
Phone: (703) 231-5876 Fax: (703) 231-8868

April 3, 1992

John Doe
Wood Materials Procurement Manager
Wood Cabinet Company
Cabinet Street
Cabinettown, USA 11111

Dear Mr. Doe:

The Center for Forest Products Marketing is conducting a study that will characterize the Wood Cabinet Industry. The information it provides will help primary wood products producers develop sound marketing strategies. This can directly benefit your firm by allowing suppliers to better serve your wood materials needs. A second benefit will be the study's ability to demonstrate the industry's impact on local and regional economies. Wood cabinet manufacturers employ sizeable work forces and use substantial quantities of wood and wood products. Most people fail to recognize the importance of the industry. Consequently, economic planners do not give the industry the consideration it deserves in government policy.

As a part of this study, you should have received a questionnaire in mid-March. I have not yet received your reply, so I am enclosing a second copy in case the first was misplaced or has not reached you. Please consider completing the questionnaire and returning it to us. As your company is listed as a major producer of wood cabinets, your response is extremely important.

Let me assure you that your response will be treated with the utmost confidentiality. The number on the survey is for administrative purposes only. *No company names will be released and information will be reported as group averages only.*

Thank you for your help. If you would like a summary of the study results, please write your name and address on the blank page at the end of the questionnaire. Should you have any questions, please contact me at (703) 231-8835 or FAX (703) 231-8868.

Sincerely,

John Punches
Graduate Student
Center for Forest Products Marketing

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

CENTER FOR FOREST PRODUCTS MARKETING
Department of Wood Science and Forest Products
1650 Ramble Rd., Blacksburg, Virginia 24061-0503
Phone: (703) 231-5876 Fax: (703) 231-8868

April 3, 1992

John Doe
Wood Materials Procurement Manager
Wood Cabinet Company
Cabinet Street
Cabinettown, USA 11111

Dear Mr. Doe:

The Center for Forest Products Marketing is conducting a study that will characterize the Wood Cabinet Industry. The information it provides will help primary wood products producers develop sound marketing strategies. This can directly benefit your firm by allowing suppliers to better serve your wood materials needs. A second benefit will be the study's ability to demonstrate the industry's impact on local and regional economies. Wood cabinet manufacturers employ sizeable work forces and use substantial quantities of wood and wood products. Most people fail to recognize the importance of the industry. Consequently, economic planners do not give the industry the consideration it deserves in government policy.

As a part of this study, you should have received a questionnaire in mid-March. I have not yet received your reply, so I am enclosing a second copy in case the first was misplaced or has not reached you. If you have not already responded, please consider completing the questionnaire and returning it to us. We ask that you answer for all of the manufacturing locations operated by Wood Cabinet Company. As one of the largest producers of wood cabinets, your company's response is extremely important.

Let me assure you that your response will be treated with the utmost confidentiality. The number on the survey is for administrative purposes only. *No company names will be released and information will be reported as group averages only.*

Thank you for your help. If you would like a summary of the study results, please write your name and address on the blank page at the end of the questionnaire, or request one under separate cover. Should you have any questions, please contact me at (703) 231-8835 or FAX (703) 231-8868.

Sincerely,

John Punches
Graduate Student
Center for Forest Products Marketing

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

CENTER FOR FOREST PRODUCTS MARKETING
Department of Wood Science and Forest Products
1650 Ramble Rd., Blacksburg, Virginia 24061-0503
Phone: (703) 231-5876 Fax: (703) 231-8868

May 16, 1992

John Doe
Wood Materials Procurement Manager
Wood Cabinet Company
Cabinet Street
Cabinettown, USA 11111

Dear Mr. Doe:

Please help!

Over the last couple of months the Center for Forest Products Marketing has been conducting a study that will help the cabinet industry. The study involves determining the material needs of cabinet producers. The information will allow primary producers to better serve the needs of the cabinet industry. It will also allow us to provide the cabinet industry with better representation at the governmental planning level.

As your company is listed as a major producer of wood cabinets, we are asking for your help. Please complete and return the enclosed postage-paid questionnaire. (If you have already returned a copy of the questionnaire, please accept our thanks. We do not require the information a second time.) Your response is extremely important to this study's success -- to date we do not have sufficient returns to ensure reliable results.

The information you provide will be held in strict confidence. No company or contact names will be divulged and only group averages will be reported. The number on the questionnaire is for administrative purposes only, allowing us to avoid further mailings to companies that have already responded.

If you have any questions please contact me at (703) 231-8835 or Fax (703) 231-8868. A summary of the study's results will be available in late Fall and may be requested by writing your name and address on the blank page at the end of the questionnaire, or by dropping us a note under separate cover.

Please accept the enclosed veneer bookmark as a token of our appreciation for your time and effort.

Sincerely,

John Punches
Graduate Student
Center for Forest Products Marketing

P.S. If you are not a cabinet producer, please check "no" for question one and return the questionnaire. It is important that we identify the misclassifications on our records.

Vita

John Punches, born September 2nd, 1966, received his Bachelor's of Science in Forestry from Michigan Technological University in 1990, graduating cum laude. During his undergraduate he spent two summers performing research for the U. S. D. A. Forest Service, Intermountain Research Station. He is currently employed as a market analyst by the Center for Forest Products Marketing at Virginia Tech.