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# Wood Use By Ohio's Amish Furniture Cluster

THE NATURAL RESOURCE FOR THE FOREST PRODUCTS INDUSTRY

# Wood Use By Ohio's Amish

By Matthew Bumgardner, Robert Romig, and William Luppold

Much has been reported regarding the decline of the U.S. wood furniture manufacturing industry. One segment that seems to be maintaining its competitiveness is the Amish-made furniture sector. The Amish traditionally have undertaken agriculture-related occupations (Stinner et al. 1989); however, as farmland has become increasingly scarce and expensive, and as the Amish population has grown, more are seeking opportunities in nonfarming occupations such as manufacturing (Lowery and Noble 2000, Amish.Net n.d. *b*). Amish-made furniture is an example of an emerging manufacturing sector, but like many Amish industries, one for which a dearth of information is available.

A large concentration of Amish furniture manufacturers operates in and around Holmes County, Ohio (Fig. 1). Holmes County includes the largest Amish settlement in the world; the Amish comprise nearly half of the county's total population (Lowery and Noble 2000). In 1973, only 3 percent of Amish heads of household in Holmes County were employed in the secondary wood sector; by 1997, this number had increased to 14 percent. These likely are conservative estimates as several furniture manufacturers were included in a broader manufacturing category. When combining overall manufacturing with primary and secondary wood manufacturing, nearly 35 percent of the heads of household in Holmes County were employed in these sectors in 1997, up from 16 percent in 1973. Agriculture-related occupations declined from 48 percent to 21 percent of Amish occupations in the county over the same period (Lowery and Noble 2000).

On the surface, the Amish furniture sector employs many aspects of competitiveness frequently listed as critical for the survival of domestic manufacturers (Bumgardner et al. 2004, Buehlmann et al. 2006). Amish furniture often is associated with quality craftsmanship and solid wood construction. The Amish label serves as a form of brand name with wide familiarity among consumers as a domestically made product. There also are dedicated Amish-made furniture retail stores located throughout the United States (Amish.Net n.d. *a*). In most of these stores, semi-customization is possible, allowing consumers to choose from different species (primarily oak and cherry, but also hickory, maple, pine, and walnut), finishes, and hardware for a given piece and design. The products are often locally or regionally sourced, and thus the customized requests are available with relatively short lead times.

It is evident that aspects of "clustering" are present with the concentration of Amish furniture manufacturers in Holmes County. Clusters can be defined as industries (manufacturers, suppliers, services, etc.) related to the same product existing in close proximity. But clusters are something more than mere concentrations of firms. Clusters also often include research and educational institutions, consultants, and other entities that help support the core industry. Clusters can be characterized as having well-developed supply chains, wide use of current technology, and intense competition among local firms (Schuler and Buehlmann 2003). In spite of the local competition, each cluster element reinforces the others and helps create a competitive advantage for all. For the Amish, competition is tempered by a sense of cooperation (National Hardwood Lumber Association 2007). For example, one reason Amish farms tend to be relatively small is that it makes more land available to other Amish farmers (Stinner et al. 1989). With furniture, cooperation can come from jointly designing and producing an entire furniture collection by individual manufacturers that specialize in chairs, or tables, or hutches, etc.

One example of a competitive advantage arising from furniture clustering in Holmes County is *Ohio Certified Stains*, a group of manufacturers that has worked with local suppliers to establish a collection of standardized stains. Each of the 15 colors within the system matches if bought from a participating supplier (Anonymous 2005). Thus manufacturers can offer consumers several stain options on retail floors and then conveniently source the colors selected. It also enables consumers to buy matching pieces at a later date.

Another example of clustering is found in distribution, as many of the dedicated Amish retail stores are located near the manufacturing centers in Pennsylvania, Ohio, and Indiana (Amish.Net n.d. *a*). Porter (1998) claims that cluster effects can extend downstream to channels and customers; i.e., distribution becomes part of the cluster and can generate competitive advantage. The Amish clusters of manufacturing and retail are proximate to several major population centers and, thus, potential markets. This is in contrast to other notable competitive furniture clusters (e.g., northern Italy and Denmark) where most of the production is export oriented (Schuler and Buehlmann 2003). To date, most consumption of Amish-made furniture has been domestic; conversations

# Furniture Cluster

with local manufacturers suggest distribution from the Holmes County cluster reaches nearly all 50 states.

As the domestic furniture manufacturing industry continues to decline as a market for hardwood lumber, the Amish-based sector might become an increasingly important component. The question arises as to what influence this segment has on regional and national hardwood use. Little is known about the size of this industry segment or its impact on hardwood lumber demand. This study is a preliminary assessment of wood use by Ohio's Amish furniture industry in Holmes and surrounding counties.

## Methods

Data were collected from several secondary sources, including the 2005-2006 edition of *The Furniture Book: A Complete Guide to the Furniture Manufacturers and Wholesalers in Ohio's Amish Country* (Anonymous 2005). This guide (referred to hereafter as *The Furniture Book*) covers all known Amish establishments in Holmes County and portions of five surrounding counties. Data of primary interest included number of employees, year of establishment, and product descriptions. A meeting with four representatives from three Amish furniture manufacturers in Holmes County also was held to discuss the project and the assumptions made in determining wood use estimates; these manufacturers were larger in size and older in establishment age than the average Holmes County Amish furniture firm.

### Determining the number of firms

Each of the nearly 600 entries in *The Furniture Book* was analyzed. A total of 153 entries were removed because they were finishing and distribution firms, or manufacturers of lawn/outdoor furniture, bedding, upholstery, and crafts. Thus, 429 establishments were identified as manufacturers of household furniture, components, and related products such as grandfather clocks and jewelry cabinets. There also were some millwork and cabinet products included, but these were only occasionally listed compared to household furniture products. Discussion with local manufacturers indicated that a few firms listed in *The Furniture Book* had gone out of business; conversely, a few existing firms were not listed.

*Amish furniture shop & homestead near Mt. Hope, Holmes County, Ohio*

*Figure 1. — Location of Holmes County, Ohio.*

Consequently, the figures reported above reflect adjustments for unlisted firms and those no longer in business.

As a cross-reference to the listings in *The Furniture Book*, the *Secondary Directory of Ohio Wood Manufacturing Companies, 2002* (Romig et al. 2002), a directory compiled by Ohio State University and the Ohio Department of Natural Resources, was analyzed (referred to hereafter as the *Directory*). For Holmes County, 80 firms were listed that produced household furniture and related products. Of those, 67 firms, or 84 percent, also were listed in *The Furniture Book*. This suggests general agreement between the sources, although it is apparent that the number of listings in *The Furniture Book* was much larger than those in the *Directory*. It also can be noted that across a 3-year differential in reporting years, 63 percent of the firms with employment figures reported in both *The Furniture Book* and the *Directory* were within five employees (the average size from the *Directory* of the 19 firms with employment figures reported in both sources was 25.7).

## Development of employment figures

Employment data were available from *The Furniture Book* for 271 of the firms. For the 158 firms not reporting number of employees (including a small number added through discussion with local manufacturers but with unknown employment information), data were imputed. It was noted that many firms advertised in *The Furniture Book*. For firms with one, two, or three employees, the advertisement rate was about 25 percent. For firms with four employees, this figure jumped to near 50 percent, and was over 80 percent for firms with five employees. Very few of the firms with missing employment data were advertisers (n=1), so it was assumed that these firms tended to be small based on the advertising rates just described. These firms therefore were assigned employment values of one, two, or three employees in proportion to the prevalence of these figures among reporting firms. Given that the overall employment mean for reporting firms was 7.3 and the median was 4.0 (discussed more in the results section), these estimates seemed reasonable.

The cross-reference with the *Directory* provided employment figures for six nonreporting firms in *The Furniture Book*. For these firms, assigned employment (as described above) was replaced with the figure reported in the *Directory*. The range in reported employment for these firms was 8-65, somewhat higher than the assigned values (range 1-3). While it was believed that most nonreporting firms were small, obviously some were larger companies; thus, the overall employment figure might be slightly conservative. Also, discussion with local manufacturers provided estimates for 26 additional *Furniture Book* entries with missing employment data; and again these tended to be higher than the imputed values.

## Development of wood use ratios

Once a total number of employees was established, this figure was multiplied by an estimate of hardwood lumber use per employee as found in other furniture industry data sources. Employment in the wood household furniture industry, according to U.S. Department of Labor (2006) data, was divided by hardwood lumber use by the furniture industry, according to the Hardwood Market Report (2004, 2005, 2006) for the 5-year period of 2000-2004 (the latest year for which hardwood lumber use data were available). Using this method, the average wood use per employee per year over the period was 17,433 board feet (BF). The range was a maximum of 19,275 BF per employee in 2000 to a minimum of 15,012 BF per employee in 2004. The average figure (17,433 BF) was used in subsequent analysis; discussion with local manufacturers suggested this was a reasonable estimate. In considering the appropriateness of this ratio, the generally small and sometimes less mechanized nature of Amish firms (which might seem to make this ratio too large) must be balanced with the fact that most Amish furniture is constructed of nearly all solid wood, which is uncommon in the broader domestic furniture industry, where veneered surfaces and composite materials are frequently used and reduce lumber use per employee.

To generate a second ratio from a different source, data from a recent study of wood use in the furniture industry (for the year 2000) conducted at Mississippi State University (Seale et al. undated) was utilized. By estimating an average firm size (386 employees) from the reported distribution of responding firms and determining average lumber use per employee by combining reported average lumber use per firm (5,114 thousand board feet or MBF) and a conversion of average dimension use per firm (1,787 MBF) to lumber volume (2 x 1,787 MBF = 3,574 MBF, assuming a 50 percent conversion rate from lumber to dimension parts), a total of 22,508 BF per employee was derived. While slightly larger than the estimate reported above, the study was based predominately on larger furniture manufacturers and included both softwood and hardwood lumber and dimension. This second ratio thus was viewed as lending credence to the first.

# Results and Discussion

## Firm size and establishment

Ohio Amish furniture manufacturing firms employed an average 7.2 employees in 2005, (n=271, median=4.0) (Table 1). The average year of establishment was 1994.1 (n=278, median=1996.0). These figures suggest that the typical Amish

furniture manufacturer in Ohio is small and relatively new. An illustration of the small nature of firms is found by observing advertising behavior. The average size of firms running full-page color ads in *The Furniture Book* was only 11.6 employees (n=27, median=8.5). The number of employees ranged from 1 to 105. Figure 2 shows the distribution of firm size, with an obvious skew to the right. The difference in the mean and median values for employment (median being smaller) also suggests a concentration of firms in the smaller employment categories. As described later, the small size of the typical Amish firm is offset by the shear number of establishments: 429 firms in an approximately 1000 sq. mile area, or roughly the size of two counties in Ohio.

The 1990s generally were favorable times for the overall U.S. wood household furniture industry, as shipments increased in real terms (constant 1982 dollars) from $6.3 billion in 1990 to $7.7 billion in 1999 (Luppold and Bumgardner, in press). Many Amish producers in Ohio entered the market around this time, based on the median establishment year of 1996. As shown in Figure 3, a plurality of the Amish firms present in 2005 were established in 1999, which also was the peak year for value of domestic furniture shipments. Since 1999, furniture imports have increasingly captured market share from domestic manufacturers; it seems this rise in imports negatively influenced the establishment rate of Amish furniture firms as well. On the other hand, 27 percent of the Amish furniture manufacturers operating in Ohio in 2005 were established since 2000. Porter (1998) claims that it takes about a decade for a cluster to establish depth and to realize a competitive advantage; from Figure 3 it appears that the majority of firms were established between 1989 and 1999; the cumulative distribution curve by establishment date also suggests a maturing cluster (Fig. 4). In sum, the Amish furniture cluster in Holmes County arose from an economic transition away from locally oriented agricultural occupations, due in part to an increasing population and decreasing land base for farming. As such, it increasingly operates within the parameters of the broader U.S. economy.

## Employment, wood use, and value of shipments

The total number of employees of reporting firms was 1,959; the total number of employees including imputed employment was 2,723 (Table 1). However, these figures included some known component manufacturers that supplied local furniture manufacturers. Their inclusion would inflate wood use estimates since the same wood would be double-counted — once for the employee at the component firm and once for the employee at the furniture firm. Discussion with local manufacturers identified several such firms, which were removed for generation of wood use estimates. The adjusted figures were 1,911 employees for reporting firms and 2,497 employees including assigned estimates. The latter figure, multiplied by the average consumption per employee for the overall furniture industry (17,433 BF) results in hardwood lumber use of 43,530,201 BF annually by the Amish furniture industry in Holmes and surrounding counties in Ohio.

As Ohio was listed by the USDC Census Bureau (2006) as producing 401 million BF (MMBF) of hardwood lumber in 2005, these results suggest that the Amish furniture industry consumes the equivalent of about 11 percent of the hardwood lumber produced in Ohio. Including only appearance-based uses (58 percent of total production excluding pallets

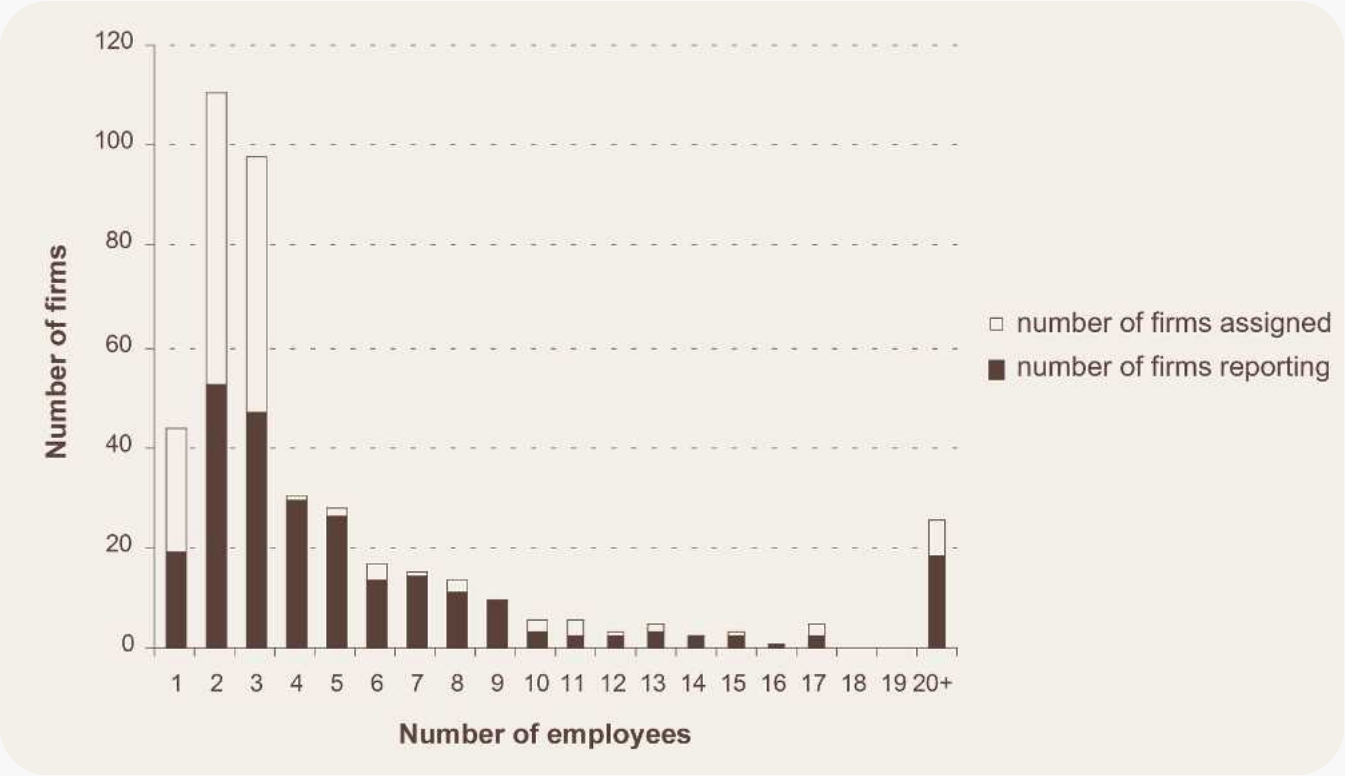


*Figure 2. — Distribution of establishment size for Amish furniture manufacturers in Ohio's Holmes County cluster. Solid bars represent reported employment figures (various sources); clear bars represent assigned employment.*

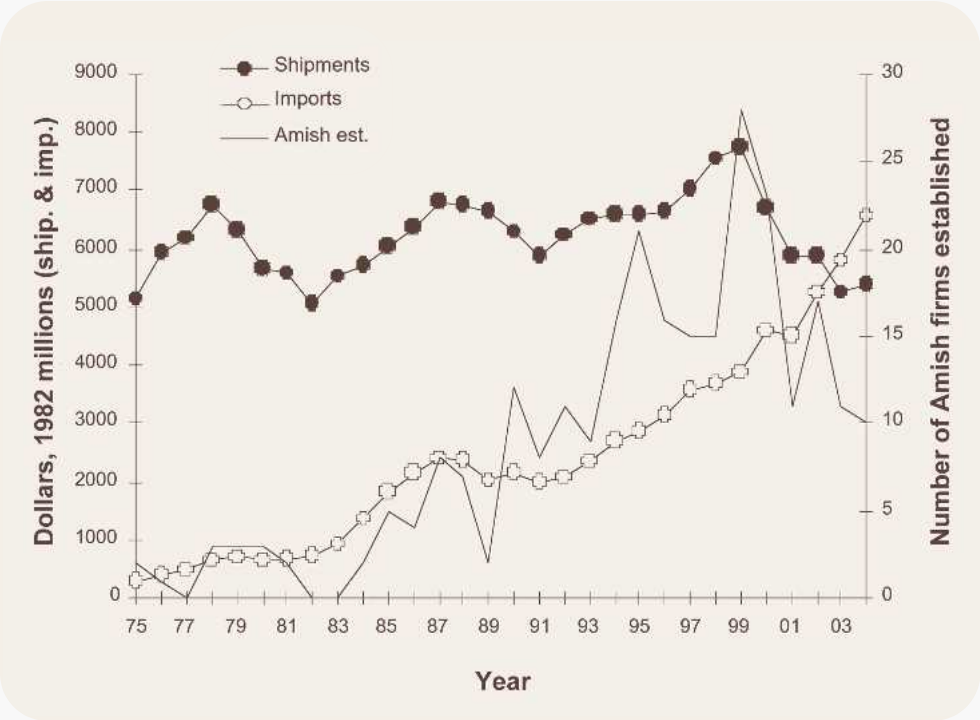


*Figure 3. — Value of overall U.S. wood household furniture shipments and imports by year (Luppold and Bumgardner, in press), and year of establishment for Ohio Amish furniture manufacturers in operation in 2005 (Anonymous 2005).*

and railway ties) (Hardwood Market Report 2006) results in consumption of the equivalent of nearly 19 percent of Ohio's grade lumber production. According to Census figures, Ohio ranked 13th nationally in hardwood lumber production in 2005, falling just behind Wisconsin, Michigan, and New York.

Value can be considered as another measure of impact. According to U.S. Department of Commerce data (Akers 2006), the value of shipments of wood household furniture in the United States in 2004 was $9,736.3 million. According to U.S. Department of Labor data (USDL Bureau of Labor Statistics 2006) employment in the wood household furniture industry was 86,600 in 2004, for a ratio of $112,428 per employee (a figure supported as reasonable based on discussion with local manufacturers). Multiplying this ratio by the employment estimate generated in this paper (2,497) results in shipment value of $280,732,716 from the Holmes County Amish furniture cluster, or nearly 3 percent of the national total. These estimates of the wood use and value of shipments generated by the cluster are summarized in Table 2.

Donnermeyer (2004) suggests that Ohio is home to 30 percent of all known Amish; extrapolating the wood use estimate for Ohio's Amish furniture sector from this figure would result in total hardwood lumber consumption of approximately 147 MMBF by Amish furniture manufacturers in the United States, or 1.3 percent of the national production total based on Census figures. This estimate would be higher (about 2.3 percent) if considering only lumber used for appearance-based products by excluding pallets and railway ties; and about 11 percent if including only the hardwood lumber used by the furniture industry (Hardwood Market Report 2006). Similar extrapolation for value suggests that nationally, Amish-made furniture accounts for about 10 percent of the value of all domestic furniture shipments. However, these extrapolations beyond the two-county area comprising the cluster should be viewed with caution, as it is not known if Amish furniture manufacturing density in Ohio is similar to other areas.

## Formation and size of associated businesses in the cluster

Data also were available in *The Furniture Book* for two prominent service sectors for Amish furniture: finishing and wholesale distribution.

Fifty finishing establishments were listed. Both the average and median number of employees per firm was 4.0 (n=31). Average year of establishment was 1996.9 (n=32, median = 2000.0) (Table 1). These results suggest that the finishing portion of the cluster was established later than (i.e., as a result of) the manufacturing portion, and that they are of a similar size as the manufacturers. New business formation is a characteristic of successful clusters and increases the collective pool of competitive resources that gives companies in the cluster competitive advantage over firms in other locations (Porter 1998). The total of employees by reporting firms was 124; by assigning to those with missing employment data the mean/median of 4.0 (very few finishers advertised, so there was no basis for assigning employment as was done with manufacturers; the range in reported employment was 1 to 10 and the standard deviation was 1.8), there were a total of 197 employees in wholesale finishing in Ohio's Amish furniture cluster.

For wholesale distributors, 13 establishments were listed. Of these, 10 provided employment and year of establishment data. The average number of employees per firm was 6.2 (median = 5.5). Average year of establishment was 1996.6 (median = 1997.0) (Table 1). Similar to finishing firms, these results suggest that the distribution portion of the cluster was established slightly later than the manufacturing firms (e.g., new business formation), and they are similar in size to the manufacturers and finishers. The sum of employees by reporting firms was 62. To assign employment figures to firms with missing values, it was noted that the rate of advertising went up substantially for firms with greater than three employees; since none of the firms with missing values advertised, an employment number of 3 was assigned to the four missing values. As the range in employment among the distribution firms with known values was 3 to 14, this seemed like a suitable estimate. As a result, there is an estimated 71 employees in wholesale distribution in Ohio's Amish furniture cluster, although a majority of distribution employment is non-Amish as indicated through discussion with local manufacturers.

# Conclusion

When combining wood household furniture manufacturers, finishers, and distributors, there are approximately 2,991

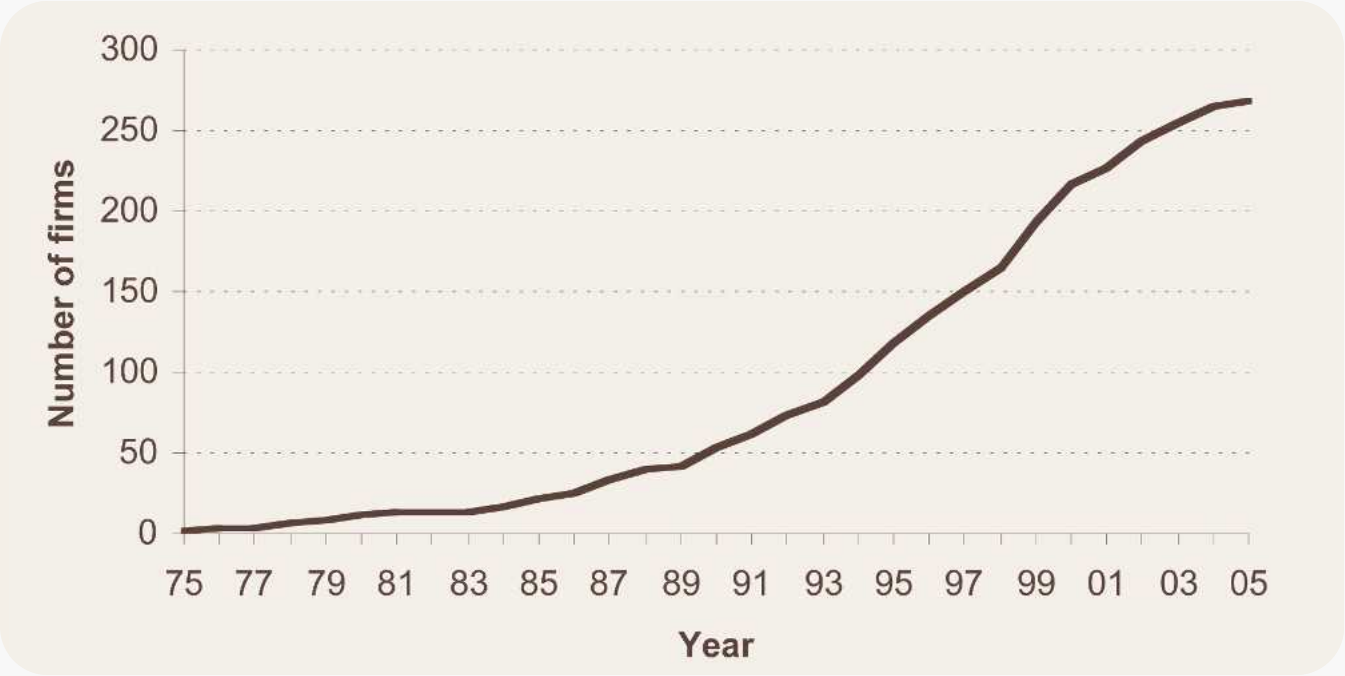


*Figure 4. — Cumulative distribution of Amish furniture firms in the Holmes County, Ohio cluster, based on firms reporting an establishment year (Anonymous 2005).*

persons estimated to be employed in Ohio's Amish furniture cluster. This represents nearly 6 percent of Ohio's entire Amish population of 52,000 persons (Donnermeyer 2004), and excludes a small number of lawn/outdoor furniture, bedding, upholstery, and crafts manufacturers, as well as other suppliers and service providers in the cluster. This employment corresponds to nearly 500 establishments in an approximately 1000 sq. mile area, or roughly the size of two Ohio counties. In sum, it is a concentrated cluster of many small firms. This cluster reasonably could be consuming nearly 44 MMBF of hardwood lumber per year, or the equivalent of about 11 percent of Ohio's total hardwood lumber output and 19 percent of the hardwood lumber used in appearance-based applications in Ohio. As the Amish manufacturing and distribution model employs many of the competitiveness factors discussed in the literature, and has fared relatively well during a very volatile time in domestic furniture manufacturing, this segment likely will continue to be an important regional market for hardwood lumber. Perhaps similar conditions exist in other areas with Amish concentrations (e.g., portions of Pennsylvania and Indiana). Collectively, Amish furniture manufacturing could be making a measurable impact on U.S. hardwood lumber demand.

Can the Amish model work elsewhere in the United States? Portions seemingly could be implemented (e.g., development of supply chains that can offer semi-customized pieces, more emphasis on brand image); however, other features might be more difficult to replicate, such as the cooperative aspects of the society and the commitment to furniture manufacturing as a way of life as farming becomes less viable. Firms operating within the Amish cluster are positioned to take advantage of niche opportunities by cooperating with others to source components and services not easily produced in-house, especially given their typically small size. The clustering dynamic thus seems paramount to the success of the Amish model, even as firms seek to be individually profitable. More research is needed to confirm and expand upon this preliminary assessment of the wood use and competitive attributes of Amish furniture manufacturing.

*Table 1. — Number of firms and employees, median firm size, and median year of establishment for furniture manufacturers, finishers, and wholesale distributors in Ohio's Amish furniture cluster.*

| Firm category | Number of firms | Total employment[1] | Employees per firm (median)[2] | Year established (median)[2] |
|---|---|---|---|---|
| Manufacturers | 429 | 2,723 | 4.0 | 1996.0 |
| Finishers | 50 | 197 | 4.0 | 2000.0 |
| Wholesale Distributors | 13 | 71 | 5.5 | 1997.0 |

[1] Based on the sum of reported (various sources) and assigned employment figures.
[2] Based on reporting firms only (Anonymous 2005).

*Table 2. — Estimates of hardwood lumber use and value of shipments for the Holmes County furniture manufacturing cluster.*

| | |
|---|---|
| Hardwood lumber use: | 43.5 MMBF |
| as a % of Ohio's total production: | 11% |
| as a % of Ohio's total grade production: | 19% |
| Value of shipments: | $280.7 million |

## Limitations

The majority of firms and associated data used in this analysis came from *The Furniture Book*. However, the figures used in this paper include both reported and assigned employment numbers, and other secondary data sources were utilized. The procedures also were discussed with local manufacturers, which resulted in changes to some employment assignments and firms included in the analysis. The firms included in the wood use analysis likely included some that produce components supplied to local furniture manufacturers; where this may have occurred, estimates of wood use might be slightly inflated. Although all known components firms that supplied local firms *exclusively* were removed from the analysis, some could have been missed and some supplied a combination of local and nonlocal secondary manufacturers. Lastly, although the terminology used throughout the report used the name "Amish" to describe all firms, some were non-Amish owned but located within the cluster. Discussion with local manufacturers suggested the non-Amish proportion was about 15 percent, but even among these firms most employees were Amish. It also should be noted that the "furniture" terminology used throughout the paper included some cabinet and millwork firms, but this proportion was small.


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*Bending oak chair backs, Amish furniture maker*

## Literature cited


Akers, M. 2006. Bulletin of hardwood markets statistics: 2005. Res. Note NE-387. Newtown Square, Pennsylvania. USDA For. Serv. Northeast. Res. Stn. 23 pp.

Amish.Net. (n.d.*a*) Directory of Beds, Cribs, China Cabinets, Tables, Chairs, Rockers, Desks; and Directory of Chests, Armoires, Quilt Racks. Retrieved Nov. 7, 2006, from www.amish.net/default.asp.

Amish.Net. (n.d.*b*) The Amish Lifestyle. Retrieved Nov. 16, 2006, from www.amish.net/lifestyle4.asp.

Anonymous. 2005. The Furniture Book: A Complete Guide to the Furniture Manufacturers and Wholesalers in Ohio's Amish Country. 2005-2006 ed. Overland Publishing Inc., Orrville, Ohio. 168 pp.

Buehlmann, U., M. Bumgardner, T. Lihra, and M. Frye. 2006. Attitudes of U.S. retailers toward China, Canada, and the United States as manufacturing sources for furniture: an assessment of competitive priorities. J. of Global Marketing 20(1):61-73.

Bumgardner, M.S., U. Buehlmann, A. Schuler, and R. Christianson. 2004. Domestic competitiveness in secondary wood industries. Forest Prod. J. 54(10):21-28.

Donnermeyer, J. F. 2004. Amish population estimates for Ohio counties. Ohio State University, Department of Human and Community Resources Development. *In*: Graham, G.W. 2005. Analysis of production practices and demographic characteristics of the Ohio maple syrup industry. Columbus: Ohio State Univ. Ph.D. dissertation. 121 pp.

Hardwood Market Report. 2004. 2003: The year at a glance. 7th annual statistical analysis of the North American hardwood marketplace. Memphis, Tennessee. 87 pp.

Hardwood Market Report. 2005. 2004: The year at a glance. 8th annual statistical analysis of the North American hardwood marketplace. Memphis, Tennessee. 130 pp.

Hardwood Market Report. 2006. 2005: The year at a glance. 9th annual statistical analysis of the North American hardwood marketplace. Memphis, Tennessee. 168 pp.

Lowery, S. and A.G. Noble. 2000. The changing occupational structure of the Amish of the Holmes County, Ohio, settlement. The Great Lakes Geographer 7(1):26-37.

Luppold, W.G. and M.S. Bumgardner. [In press.] Two eras of globalization and hardwood sawtimber demand. *In* Proc. of the 2006 Southern Forest Economics Workshop, March 23-24, Knoxville, Tennessee.

National Hardwood Lumber Association. 2007. Old-fashioned values: no barrier to success. Hardwood Matters. Feb.:14-17.

Porter, M.E. 1998. Clusters and the new economics of competition. Harvard Business Review. Nov.-Dec.:77-90.

Romig, R.L., A. Sabula, C.L. Capek, and E. Mitchem. 2002. Secondary Directory of Ohio Wood Manufacturing Companies, 2002. Ohio State Univ Extension and the Ohio Agricultural Research and Development Center. 306 pp.

Schuler, A. and U. Buehlmann. 2003. Identifying future competitive business strategies for the U.S. furniture industry: benchmarking and paradigm shifts. Gen. Tech. Rep. NE-304. Newtown Square, Pennsylvania. USDA For. Serv. Northeastern Res. Stn. 15 pp.

Seale, R.D., Garrard, A.W., Leng, J.H. undated. Change in wood use patterns by the furniture industry. Unpublished report. Mississippi State Univ., Forest and Wildlife Research Center. 13 pp.

Stinner, D.H., M.G. Paoletti, and B.R. Stinner. 1989. In search of traditional farm wisdom for a more sustainable agriculture: a study of Amish farming and society. Agriculture, Ecosystems and Environment. 27:77-90.

USDC Census Bureau. 2006. Lumber production and mill stocks: 2005. US Dept. of Comm. Bur. of Census. MA321T(05)-1. Washington, D.C.

USDL Bureau of Labor Statistics. 2006. Series ID: ceu3133712201. Retrieved Dec. 19, 2006, from data.bls.gov/cgi-bin/srgate.