Joint Center for Housing Studies

Harvard University

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N03-2

December 2003

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Consolidation in the Distribution of Residential Building Products

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Abstract

The United States Economic Census of Retail Trade provides evidence of the increase in concentration in the distribution sector of the building materials and supplies industry from 1972 to 1997. Between these years, the share of sales by the top 50 firms in the category increased from 18.5% to 58.4%. The net increase in concentration is due to a tremendous increase in the concentration of do-it-yourself (D-I-Y) retailers combined with a minimal increase in concentration of professional (pro) distributors. Reasons for the ongoing consolidation trend include:

- Product Proliferation
- Technology's Response to Product Proliferation
- Economies of Scale
- Shortening of the Distribution Chain
- Low Inflation Environment
- Concentration in Customer Base

Several of the above theories of consolidation will be examined through the Harvard Distribution Study, a collaborative effort between the Joint Center for Housing Studies and the Harvard Center for Textile and Apparel Research that seeks to understand the changes that are occurring in the residential supply chain. The first phase of the study looks at companies distributing building products while further phases will examine the industry from the perspectives of both builders and manufacturers.

Introduction

The Joint Center for Housing Studies has been working with the Harvard Center for Textile and Apparel Research on a study investigating the changes that are occurring or will occur in the residential building materials supply chain. To better understand changing demands both "forward" to final customers and "backward" to suppliers and manufacturers, the research team is first investigating the distribution channel. This research is henceforth in this paper referred to as the Harvard Distribution Study.

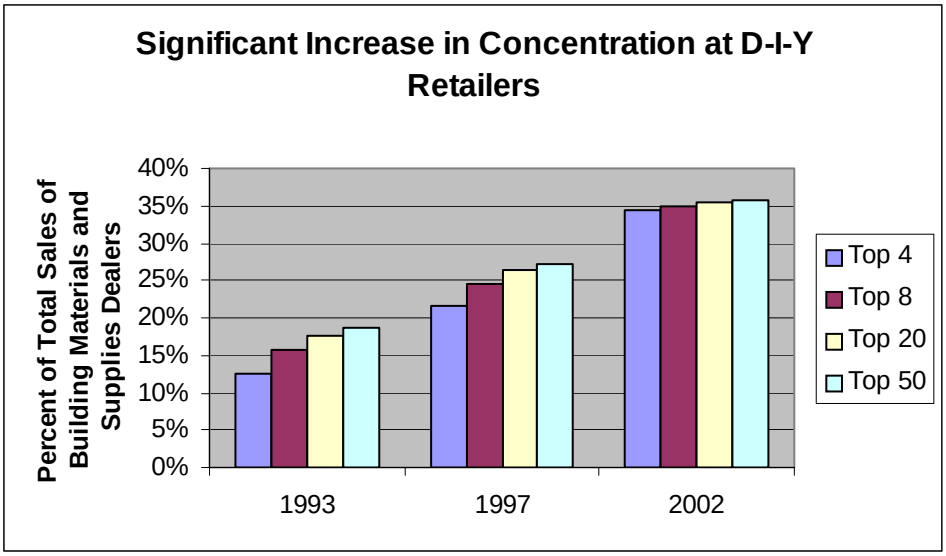
According to the U.S. Census Bureau retail sales figures, sales of residential building supplies and related products at building material and supplies dealers totaled $265 billion dollars in 2002. In fact, in the past decade, sales of building material and supplies dealers have almost doubled from $135.5 to $264.8 billion dollars and building materials as a share of all retail sales increased from 6.5% of all retail sales ten years ago, to close to 8% today. This growth, accompanied by pressures to improve efficiencies and reduce costs, creates the need for distributors to make significant changes in their structure and focus. In particular, the past decade has seen much consolidation in this industry. This paper provides initial evidence of and examines factors that may be encouraging this trend. While many of these factors can explain consolidation across the economy, other factors are unique to the building material sector.

Evidence

The entrance of Home Depot into the marketplace in 1978 revolutionized the lumber and building materials distribution industry by providing an unparalleled supply of goods and services under one roof. As of 2002, sales at Home Depot and Lowe's totaled $84.7 billion or 32% of all sales of building products to final customers (Home Channel News, US Census). While initially affecting more consumer-oriented building material retailers, in recent years, big box presence, combined with the continued consolidation of many professional lumber and building material distributors, has increased the competitive pressures on small and medium sized professional dealers. A significant disparity, however, still exists in the extent of consolidation among professional and Do-It-Yourself (D-I-Y) distributors. Exhibits 1 and 2 reveal that the net increase in concentration of the top firms in the industry is due to a significant increase in the concentration of D-I-Y retailers combined with a minimal increase in concentration of pro distributors. In 2002, the difference between the share of sales of the top 50

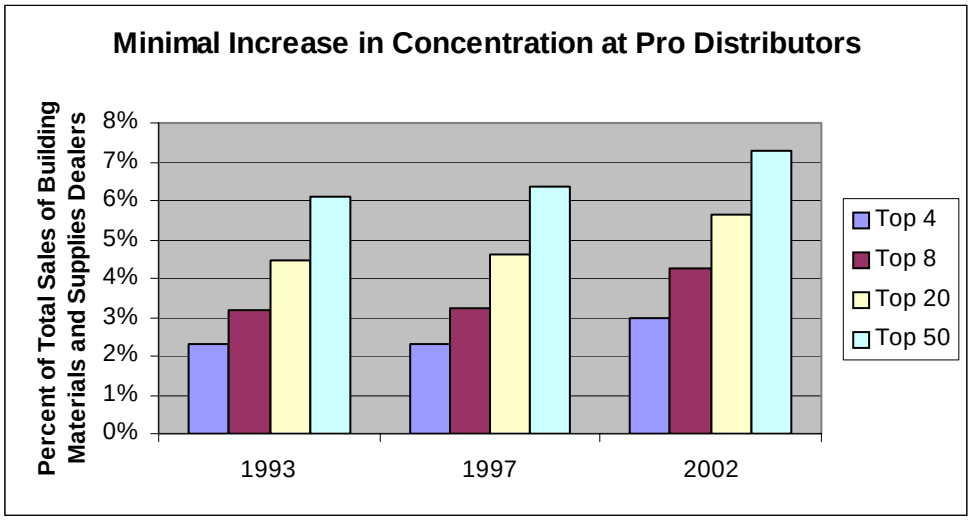
D-I-Y retailers and the top 4 D-I-Y retailers is 1.4%, indicating that while the top 4 retailers accounted for 34.4% of industry sales, numbers 5 through 50 accounted for only 1.4% when aggregated. This is compared to a 3.3% difference in the share of the top 50 pro distributors and the top 4 pro distributors. While the top 4 pro distributors accounted for 3.0% of industry sales, the next 46 accounted for 3.3%.

Exhibit 1



Source: U.S. Department of Commerce Retail Trade Reports and Home Channel News

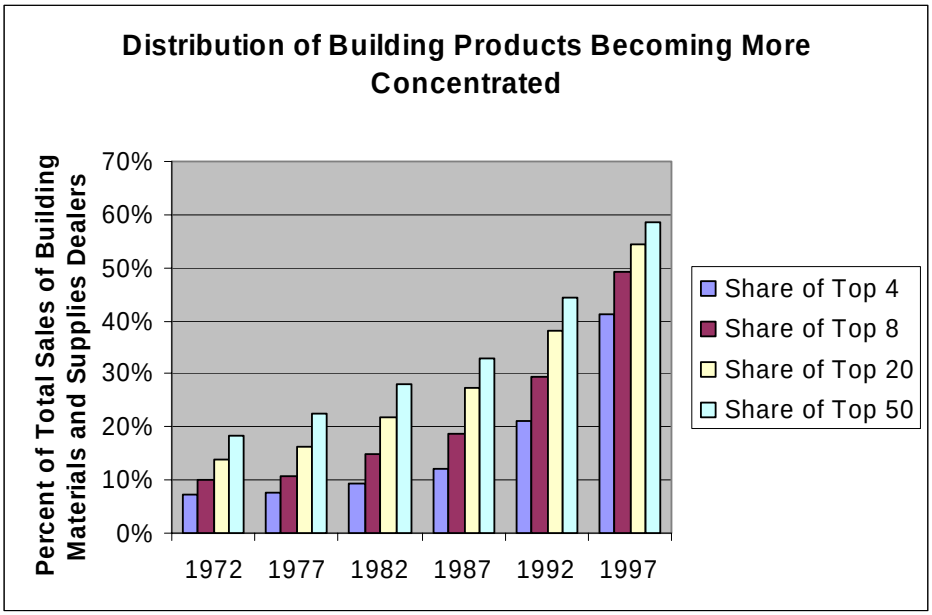
Exhibit 2



Source: U.S. Department of Commerce Retail Trade Reports and Home Channel News

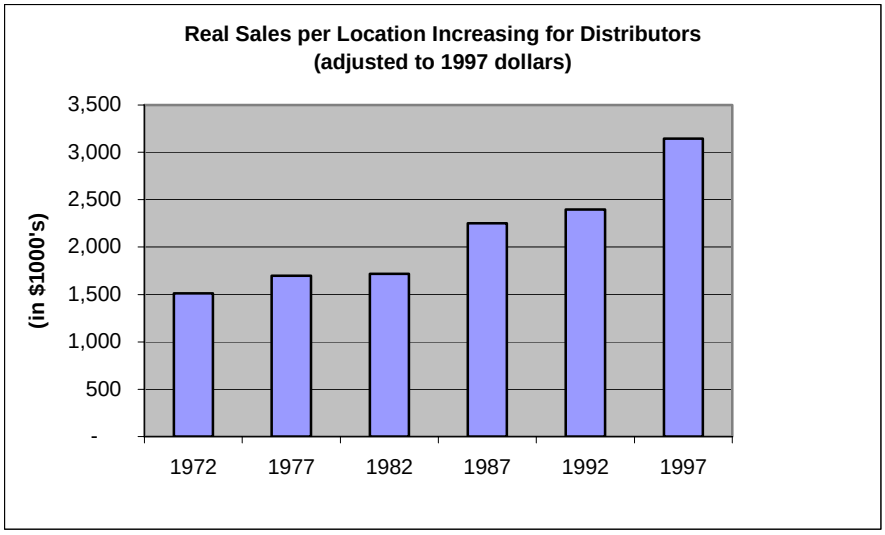
Exhibit 3, featuring the overall increase in concentration in the building materials and supplies industry from 1972 to 1997, further depicts the impact of Home Depot and Lowe's on the consolidation of the industry. Between 1972 and 1997, the share of sales by the top 50 firms in the category increased by 39.9 percentage points from 18.5% to 58.4% and the share of sales by the top 4 firms increased by 33.9 percentage points from 7.4% to 41.3%. Sales per location also more than doubled from $1.5 million in 1972 to $3.1 million in 1997 even after adjusting for inflation (Exhibit 4). It is important to note, however, that growth in both sales per location and in the share of the top 4 firms occurs considerably more dramatically from 1987 to 1997, in coincidence with the rise to success of Lowe's and Home Depot. Between 1987 and 1997, sales per location increased by $1.0 million from $2.1 million to $3.1 million and share of sales by the top 4 firms increased by 29.1 percentage points from 12.2% to 41.3%.

Exhibit 3



Source: Source: Census of Retail Trade

Exhibit 4



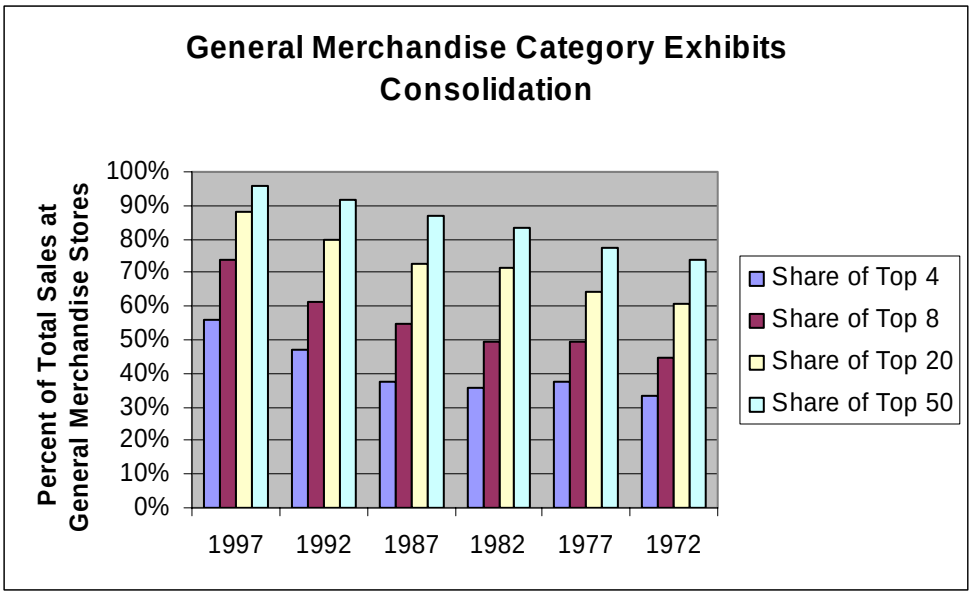
Source: Census of Retail Trade

In addition to the increasing concentration of DIY retailers and pro distributors, the building products industry has seen a minimization of the function of wholesale distributors. The traditional channel of distribution, where manufacturers sell to wholesalers, who in turn distribute products to dealers, who resell them to builders and contractors, is changing. Traditional two-step distribution (two steps between manufacturer and customer) is decreasing, giving way to a single step in the distribution process. Wholesale distributors like Huttig Building Products, ABC supply, and Cameron Ashley, for instance, are among the growing number of distributors that have begun to sell directly to customers (Larson).

Other Sectors

Many other sectors of US retailing are also experiencing consolidation. Driven by the growth of discount super stores such as Wal-Mart, K Mart, and Target, the concentration of the top general merchandise firms has increased in the past two decades. In 1972, the top 4 general merchandise firms controlled 33.0% of the market, while in 1997 the top 4 firms controlled 55.9% of the market.

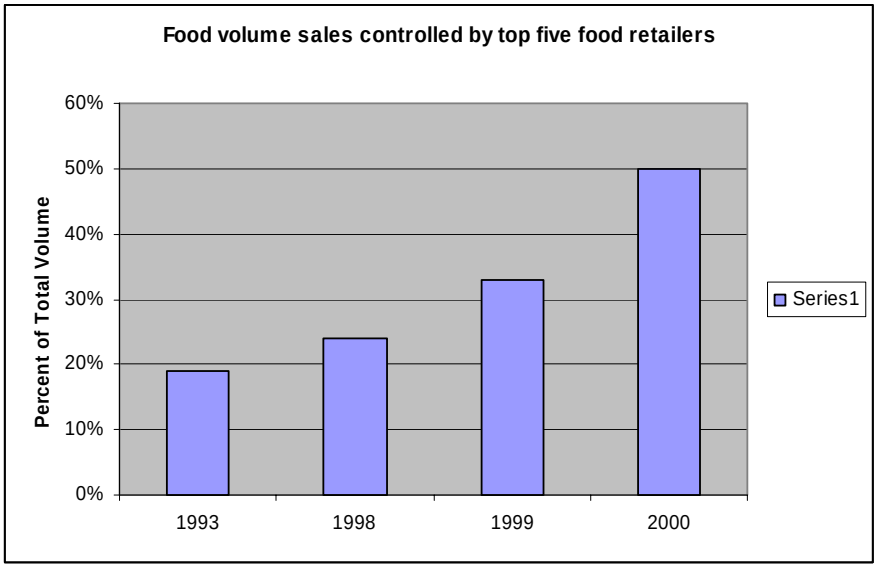
Exhibit 5



Source: Census of Retail Trade

Competition from Wal-Mart, more than any other discount store, has contributed to consolidation among both food retailers and department stores. In the food retail industry from the late 1950s to the early 1990s, concentration remained virtually static, increasing by only 4% when measured in terms of the market share of the top 20 United States chains (Wrigley). Since then, however, this industry experienced a huge wave of consolidation, due not only to competition from Wal-Mart, but also to the regulatory history of the food industry and an intense period of financial re-engineering during the 1980s. From 1993 to 2000, the percentage of food volume sales controlled by the top five retailers increased from 19% to 50% (Datamonitor 2000) (Exhibit 6).

Exhibit 6



Source: Datamonitor

Size of the Market

According to the United States Economic Census, firms classified as building material retailers distribute building materials and supplies such as lumber, plumbing goods, electrical goods, tools, house wares, hardware, paint and wallpaper, and lawn and garden supplies. The Harvard Distribution Study, however, focuses on lumber, building materials, and millwork to simplify the investigation. Firms distributing these product lines can be classified as Pro, Retail, Specialty, or Wholesale.

1. Pro (Building material dealer/lumberyard): The firms in this group sell a broad line of products in the lumber, building material, and millwork categories. Over 50% of their sales are to pros (i.e. builders, remodelers, subcontractors).
2. Retail: The firms in this group also sell a broad line of products in the lumber, building material, and millwork categories. Over 50% of their sales are to consumers (do it yourself/buy it yourself).
3. Specialty: The firms in this group sell a focused line of products in the lumber, building material and millwork categories to pros or consumers such as windows or doors.
4. Wholesale: The firms in this group sell products in the lumber, building material, and millwork categories to pros and consumers, as well as to other distributors.

Table 1: Estimated Universe of Residential Building Products[1]

	Pro	Retail	Specialty	Wholesale
Firms	3313	3604	3785	3785
Establishments	5639	7041	6318	6318
1997 Sales (in $bil.)	28.0	64.4	22.9	22.9

Source: Source: Harvard Distribution Study extrapolations from 1997 Census of Retail Trade and the Home Channel News list of the top 500 building material distributors

Reasons for Consolidation

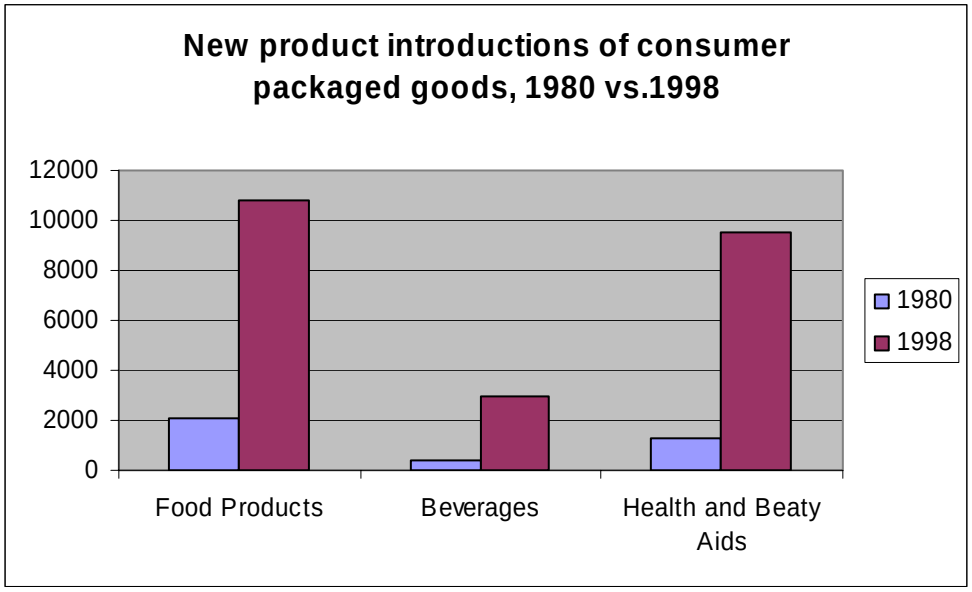
While a number of factors influence the rising level of concentration in the industry, profitability is perhaps the greatest driver. Larger companies have easier access to lower cost capital, greater leverage over suppliers, more attractive career opportunities for employees, and economies of scale that allow for centralized administrative functions and investments in both manufacturing equipment and state-of-the-art information technologies. Other influences of consolidation among professional dealers range from product proliferation to consolidation among homebuilders to the low inflation environment of the 1990s.

Product Proliferation

The number of products available to consumers has dramatically proliferated in recent decades. As firms market closer and closer to customers' individuals tastes, mass customization replaces mass production. Instead of standardized, Henry Ford- like products designed and manufactured for the general population, products now reflect the full array of preferences and prices. For example, from the early 1970s to the late 1990s, the assortment of new vehicle models has risen from 140 to 260, the number of soft drinks from 20 to more than 87, TV channels from 5 to 185, and over-the-counter pain relievers from 17 to 141. Currently, the U.S. market offers over 7,563 prescription drugs, 3,000 beers, 340 kinds of breakfast cereal, 50 brands of bottled water, and even nineteen types of milk (Federal Reserve Bank of Dallas). A typical food store has gone from offering about 6,000 stock keeping units (SKUs) to customers in the 1960s, to about 25,000 in the 1990s, to almost 40,000 today (Abernathy et al 2000, 7).

[1] An establishment is a single physical location at which business is conducted and/or services are provided while a firm is a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control.

Exhibit 7



Source: Dallas Federal Reserve Board, 1999

Product proliferation even is prominent in the lumber and building materials industry. In the late 1990s, the top two building products distributors (based on total sales) Home Depot and Lowe's, carried an estimated 45,000 SKUs while Menards, the distributor with the third highest sales figure, carried approximately 60,000 (Home Channel News). In the late 1980s, these numbers were substantially lower with Home Depot and Lowe's carrying an estimated 30,000 SKUs and Menards carrying 50,000 SKUs (Home Channel News). Much of this increase in products carried by distributors is the result of manufacturers increasing the product lines that they produce. The number of SKUs available for sale by Andersen Windows and Doors, for instance, has increased by approximately 60,000 from over 36,000 in 1993 to over 96,000 in 2003 (email correspondence with Brian Gunderson of Anderson Corporation). The number of SKUs shipped at least once a year at Kohler also increased by approximately 60,000 from over 53,000 in 1993 to over 110,000 in 2003 (email correspondence with Manuel Gutierrez of Kohler).

Technology's Response to Product Proliferation

In the past, "product proliferation, coupled with the enormous number of daily sales transactions, [made] timely capture of sales information using manual techniques not practicable" (Abernathy et. al 2000, 7). Now, however, new technologies enable retailers to

process vast amounts of information and efficiently and effectively manage product proliferation. These new practices, called lean retailing by Abernathy et al, lower the retailer's exposure to inventory risk by allowing them to balance supply and demand continuously. Bar codes and uniform product codes are fundamental to this process of inventory management. Viewing the UPC as a way to automate the check out process and subsequently reduce labors costs and cash register error, top executives in the grocery sector first adopted barcodes in the early 1970's. By 1976, 75 percent of the items in the typical supermarket carried a U.P.C. symbol but it was not until the period between 1983 and 1987 that mass merchants such as K-Mart and Wal-Mart began using uniform product coding. These retailers, who operated high-volume checkout counters and carried some grocery items, viewed the bar code as the basis for new methods of inventory management (Abernathy et. al 2000, 9). Large retail distributors of building products such as Lowe's and Home Depot also use electronic bar code scanning systems. The scanning of the barcode both provides the retailer with immediate and precise knowledge of what is selling and what is not and triggers a process of replenishing the stock of a particular good. Two additional building blocks of lean retailing, electronic data interchange (EDI) and automated distribution centers, assist in this process of inventory replenishment.

EDI, the direct computer-to-computer transmission of common business documents (such as orders, invoices, and payments), permits retailers and vendors to efficiently communicate purchasing, sales, and billing information while automated distribution centers ensure that products move rapidly and smoothly through a retailers distribution network. EDI "requires hardware and software systems capable of capturing and moving information efficiently in an electronic format" (Abernathy et. al 2000, 9). By the 1980s, the falling costs of computing, combined with the development of software, made EDI practical. After information is exchanged between the retailer and the supplier, the modern distribution center assures the efficient processing and delivery of goods. Unlike a warehouse, large inventories of goods do not remain stored in a distribution center. A conveyer network and a sophisticated information system transfer goods from inbound to outbound trucks. These practices, by lowering the inventory requirement and by automating the record-keeping tasks associated with the variety, have enabled the product proliferation described above.

Benefits of Economies of Scale

In addition to facilitating product proliferation, new technological systems associated with lean retailing have contributed to the pattern of increasing concentration in the distribution sector. Allowing for the efficient, accurate, and speedy movement of products through the supply chain, these innovations have also "permitted retail managers to monitor consumer tastes, learn from buying behavior, and respond to actual demand in a manner that would have been impossible in earlier time" (Dunlop 13). Distributors that have made large investments in these state-of-the-art information and distribution systems benefit from lower marginal costs, which in turn allow managers to reduce price in pursuit of greater volume. Low prices, combined with high volume and low costs have led to a cycle of concentration: "high volume and low marginal costs produce profits, profits are reinvested to fuel expansion, and expansion leads to yet higher volume and lower marginal costs" (Dunlop 13). Greater economies of scale associated with new retail technologies "appear to have contributed to the striking pattern of increased concentration" (Dunlop 13)[2].

Wal-Mart, for example, has reduced its prices with large investments in state-of-the-art information and distribution systems, including scanners, satellites, trucks, and warehouses. Bar code scanning was introduced in more than 200 Wal-Mart stores by 1985 and by the end of the decade scanning was used throughout Wal-Mart's entire operation. Wal-Mart also introduced EDI in the late 1980s to form a linkage with vendors. Efficiently coordinating the flow of materials and information, these technologies allow Wal-Mart to "track consumer sales at the checkout counter, monitor its inventory of goods within and across stores, and then supply its stores on an ongoing basis via highly efficient, centralized distribution methods" (Abernathy et. al 1999, 49). Instead of making large orders and "pushing" customers with price reductions and sales promotions, Wal-Mart began to let consumer demand "pull" its orders (Abernathy et. al 1999, 49). Automated distribution centers then served to facilitate the efficient processing of

[2] Bagwell, Ramey, and Spulber (1997) emphasize the importance of scale economies in the adoption of new information technologies. Firms with larger sales volume tend to be especially attracted to investments in new technology since the cost reduction applies to a larger output (208). Bagwell, et al. envision a model in which several identical firms enter a market. They assume that consumers are imperfectly informed about firms' current price selections. Some firms then "exploit consumers' imperfect current-price information and adopt high-price strategies that lead to large short-term profits", while others select low prices in order to develop a reputation for low prices. Because the low-price firms foresee an increase in sales volume, they find large investments in cost reductions more attractive. Scale economies allow them to confirm their reputation for low prices. Eventually, high-price, high-cost firms will be forced to pull out of the industry and the market will evolve towards consolidation.

incoming goods and ensure that incoming deliveries matched purchase orders. The process of cross docking, where merchandise is continuously delivered to distribution centers, where it is rapidly repacked and sent to stores stands as the foundation of Wal-Mart's distribution system (Vance 92). Home Depot also uses EDI to attain greater efficiency. Most high volume vendors participate in the EDI program, which represents more than 70% of their transactional volume.

Shortening of Distribution Chain

These advances in technology allow Wal-Mart and other lean retailers to receive frequent, rather than large bulk, shipments from manufacturers. Using data on apparel, Abernathy et. al (1995) and Hwang and Weil (1997) examine the relationship between short lead times and frequent delivery. Both studies find that new information technology increases the likelihood that suppliers were making more frequent deliveries to their retailers. Hwang and Weil (1998) report that in 1988, 70% of suppliers making frequent deliveries were putting bar codes on their products, while only 38% of suppliers making infrequent deliveries were doing so. Distributors that are able to use technology to increase both the frequency of delivery as well as store size will benefit even more (Holmes). Holmes maintains that an increase in delivery frequency may produce an increase in optimal store size in order to maximize the load of the trucks making the deliveries and economize on delivery costs. While there is little evidence of this hypothesis, the growth of superstores such as Home Depot and Wal-Mart is consistent with this link. Retailers who lack technological development will have difficulty surviving "in a retail environment characterized by over-capacity, ever-growing exposure to risk from product proliferation, and continuing pressure to lower prices" (*Stitch in Time* 75).

Low Inflation Environment

In the 1990s, the United States experienced a period of low inflation that further stimulated concentration within the building materials distribution industry. Inflation interferes with the effective allocation of resources by confusing price signals (making it difficult for firms to determine whether a price increase reflects a general increase in the overall price level or an increase in their price relative to all other prices). Sustained low inflation, therefore, may fuel investment by reducing this uncertainty, making it easier for firms to finance entrepreneurial projects, as well as by providing firms with an incentive to "increase profit margins through

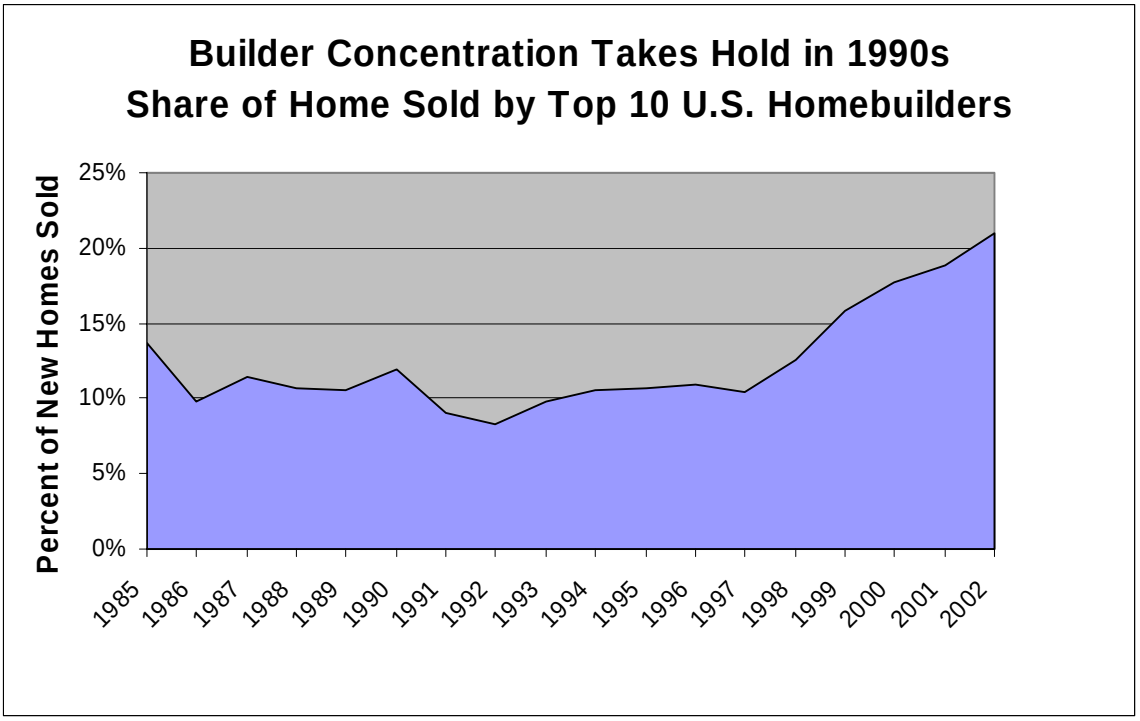
innovation and greater efficiency" (Greenspan). Improvements in efficiency, in addition to increasing productivity and profit, allow major retailers to release large amounts of working capital into business areas, such as information technology and regional distribution centers that further drive consolidation.

Not only does a low inflation environment improve efficiency, it also increases the demand for housing. A UBS Warburg report on the homebuilding industry maintains that that the decline in inflation in the 1990s created a more stable housing demand and a higher level of demand for single-family homes. The greater stability stemmed from smaller swings in interest rates while the increased housing demand was the result of lower interest rates. Lower interest rates drive households to buy rather than rent, and "to buy more homes as they have to pay out less to the mortgagor" (Stanley 11). A greater demand for housing increases the need for the efficient distribution of building products.

Concentration in Customer Base

In the 1990s, the United States saw an increase in the concentration of production among homebuilders. In 1990, the top 10 homebuilders accounted for 12.0% of total single-family home sales while in 2000, the top 10 homebuilders accounted for 17.7% of total single-family home sales (See Exhibit 8). In 2002, builders who sold 100 or more homes per year account for more than two out of every three homes built (Brooks). Because big builders presumably seek out big suppliers, the current consolidation trend in homebuilding has helped to drive consolidation among pro-dealers. In fact, the heavy involvement of many large homebuilders in property development and marketing drives them to seek out more cost-effective methods of homebuilding, including the purchase of more pre-constructed housing components from their suppliers. Distributors therefore, must increase their operating capacity in order to meet the needs of these large homebuilders. ProSales magazine reported that 68 of the top 100 construction suppliers in 2003 classified themselves as lumberyards with manufacturing capabilities (Wood, 30). The nine specialty distributors and four wholesalers in the ProSales 100 also reported engaging in value-added services such as roof truss, wall panel, and stair production.

Exhibit 8



Source: Professional Builder Magazine 1986-2002

Initial analysis from the Harvard Distribution Study reveals that the consolidation of the homebuilding industry over the past decade has changed the customer base of building product distributors. While retailers still principally focus on the DIY homeowner, the customer base of the pro dealers has increasingly shifted to the large volume homebuilder. With greater purchasing power, these large builder customers can negotiate lower margins and additional services from distributors, and influence the product lines that a distributor carries. As a result, distributors are changing the package of services that they offer their customers, toward preassembly of components and product installation, and away from traditional uncharged services like product advice, take-offs, and disputes between customers and suppliers. Additionally, increased demands are placed on distributors as to product lines and inventory levels carried.

Conclusion

The pro-oriented building products distribution sector is being pushed towards consolidation by a myriad of related factors. Advances in technology have enabled retailers to efficiently and accurately process information regarding the sales of a vast number of products. Lower marginal costs, a result of this timely capture of information, produce profits and stimulate expansion. Both by driving business owners to invest and by increasing the demand for housing, a low inflation environment also fuels expansion. Finally, a greater demand for housing, combined with concentration among the distributor's customer base, increases the need for the efficient distribution of building products.

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