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**Residential Supply Chain in Transition:
Summary of Findings from Survey of Dealers**
Harvard University: Building Products Distribution Study

Research Team: Frederick Abernathy, John T. Dunlop,
David Weil, William Apgar, Kermit Baker, and Rachel Roth

February 2004

W04-3

Graduate School
of Design

John F. Kennedy
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H A R V A R D U N I V E R S I T Y

Joint Center for Housing Studies

Harvard University

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Overview

The past several years have seen dramatic changes in the distribution of residential building products, particularly as it relates to dealers serving homebuilders, remodeling contractors and others in the building trades (pro dealers). Whereas consolidation among retailers serving do-it-yourself (D-I-Y) homeowners and smaller remodeling contractors began two decades ago and has resulted in just a few major players today, consolidation among pro dealers is a more recent phenomenon, and is just recently gathering momentum. The rise of the large national homebuilder appears to be giving rise to changes in the distribution channel for residential building products.

The goal of the *Residential Supply Chain in Transition* research is to understand the changes that are occurring and that are likely to occur over the next decade in the residential supply channel. This report summarizes our survey of building product dealers, which has produced the following initial conclusions:

1. The customer base of building product dealers has significantly changed in recent years.

While retailers still principally focus on the D-I-Y homeowner, the customer base of the pro dealers has increasingly shifted to the large volume homebuilder. Over half of sales by large pro dealers (annual revenue over \$50 million) is to homebuilders who buy materials for at least 25 homes a year from that dealer, and 20% of revenue is from builders purchasing materials for over 500 homes a year. Even smaller pro dealers have increased their share of sales to these larger homebuilder customers, as consolidation within the industry means that high volume builders account for a larger share of residential construction activity.

With greater purchasing power, these large builder customers can negotiate lower margins and additional services from dealers, and influence the product lines that a dealer carries. As a result, dealers 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 dealers as to product lines and inventory levels carried.

2. With a changing customer base, managing products and inventories is an area of growing concern for dealers.

Building product manufacturers have dramatically increased their product offerings, particularly for branded product lines. On average, large pro dealers were offering 50% more stock keeping units (skus) in 2002 than in 1997 in the product categories studied. For branded products, the increase typically has been even more dramatic: they were offering 80% more window skus in 2002 than in 1997, and 130% more siding skus. The increase in skus is only part of the story of product proliferation. New product introductions and product discontinuations have also picked up their pace in recent years, making forecasting of customer demand more difficult, and causing even further inventory management issues for dealers.

Some dealers segments been adjusting to the product proliferation issue over the past decade by relying on special orders to supplement their inventoried products. Pro dealers report that a large share of their sales in product categories where branded products dominate are special orders. Additionally, their supplier base is becoming more concentrated. For large pro dealers, generally about 70% of sales in any product category are from their top three suppliers, a share that typically increased between 1997 and 2002. For small pro dealers, without the purchasing power of larger dealers, the share of sales within a product category to the top three suppliers is even higher and became more concentrated between 1997 and 2002.

3. Given the increased inventory risk that dealers have had to assume, they are improving their inventory management capabilities.

Retail dealers of building products that historically have served more competitive market segments have been forced to become leaders in implementing enhanced information technologies and logistics practices. However, pro dealers also have taken actions to improve their inventory management. Electronic inventory management is close to becoming universal at large pro dealers, and even small pro dealers have largely embraced these systems. Most large pro dealers are applying bar codes to at least some product lines.

Additionally, consolidation within the distribution industry has created larger business entities operating out of more locations, which in turn has increased the need for communication between facilities. Ease of access to the Internet has encouraged most pro dealers to establish Internet-based systems to manage inventories.

4. Dealers have adopted distinctive strategies to deal with pressures from homebuilders and suppliers.

These strategies encompass: focusing the product offerings within product categories; expanding services offered to customers, including preassembly and installation services whereby dealers are selling products packaged with services; methods of managing inventory risk via expanded use of special orders; and implementing information technology systems

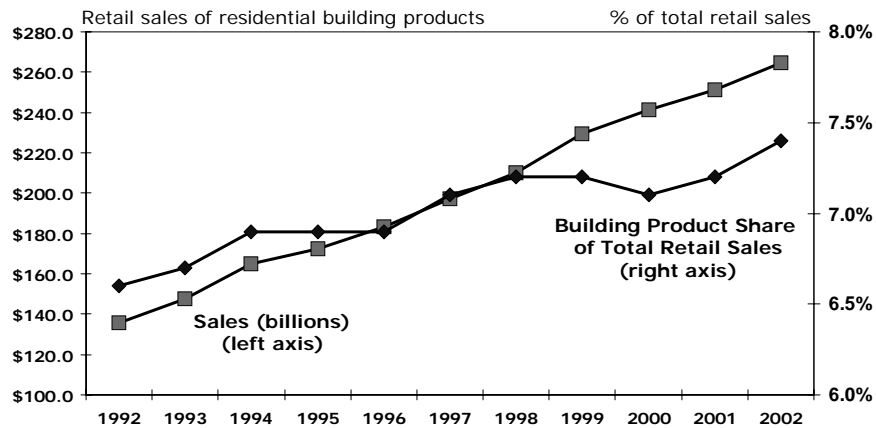
Study Background

Recent trends

Sales of residential building supplies and related products at building material and supplies dealers totaled \$265 billion dollars in 2002 according to U.S. Census Bureau retail sales figures. These figures include not only lumber, building materials and millwork—the product lines covered in this research effort—but also hardware, electrical and plumbing products, paints and sundries, lawn and garden supplies, and other product lines carried by businesses whose principal activity is the distribution of residential building materials and supplies directly to end market customers.

Over the past decade, dollar sales at these outlets have almost doubled, increasing their share of all retail sales in our economy from about 6.5% a decade ago to close to 7.5% today. (Figure 1) Critical to this growth has been the underlying strength in the industries that these dealers serve: home building and home improvements and repairs. Spending on private new housing units totaled almost \$300 billion in 2002 (calculated as the value of construction costs net of land value), up 120% over the past decade. Spending on home improvements and repairs is less precisely measured in government figures. However, the Joint Center for Housing Studies estimates that total spending on these activities totaled \$214 billion in 2001, up 40% from their of 1995 spending levels.

Figure 1:
Sales of Building Products: \$265 Billion

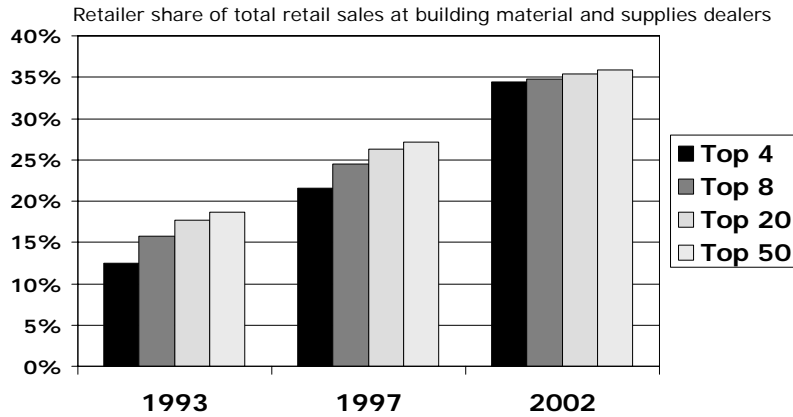


Source: U.S. Department of Commerce.

Accompanying this growth have been significant changes in the structure and focus of building product dealers. The past decade has seen considerable consolidation in these businesses. As of the 1997 Census of Retail Trade (the most recent available economic census), there were almost 51,000 dealers selling building products to builders, remodeling contractors, homeowners, and rental property owners and managers. However, industry trade publications report that as of 2002, the 50 largest businesses accounted for 48% of total sales, while the four largest accounted for 36%. Indeed, the two largest dealers -- Home Depot and Lowe's -- reported sales of almost \$85 billion in 2002, which accounted for 32% of total market revenue.

The extent and pace of consolidation has proceeded differently in the key industry segments. Dealers that primarily serve homeowners (hereafter referred to as Do-It-Yourself or D-I-Y retailers) have seen tremendous consolidation in their segment of the industry. As of 2002, the top four dealers in this category accounted for about 35% of all industry sales, whereas in 1993 the top four in this category accounted for about 14% of total sales. Additionally, sales by the remainder of the top 50 businesses in this segment saw a significant decline as a share of total industry sales between 1993 and 2002. (Figure 2)

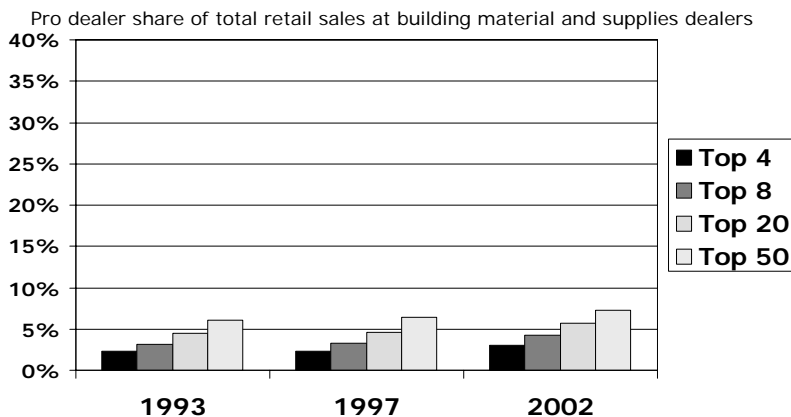
**Figure 2:
Significant Increase in Concentration at
D-I-Y Retailers**



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

For dealers primarily serving the builder, remodeling contractor, and residential subcontractors (hereafter referred to as pro dealers), the degree of consolidation, as well as the pace of that consolidation, has been much less dramatic. The top four pro dealers accounted for just over 3% of total sales at building material and supplies dealers in 2002 according to leading trade publications, up from just over 2% in 1993. The remainder of the top 50 pro dealers accounted for over 4% of total sales, largely unchanged from their 1993 share. To date, therefore, there has been significantly less consolidation among pro dealers as compared to D-I-Y retailers, although it does seem to be picking up pace. (Figure 3)

**Figure 3:
Minimal Increase in Concentration at Pro
Distributors**



Source: U.S. Department of Commerce, Retail Trade Repots; and Home Channel News.

There are several theories of the reasons for the extent of consolidation that has occurred within building products distribution that are being examined through this study. Some explanations deal with broader economic developments, others focus on specific developments within the residential construction sector.

- **Benefits of economies of scale:** The infrastructure necessary to run any profitable business (e.g. production systems, information technology systems, distribution systems) has increased in recent years for many sectors of our economy. That raises the cost of entry into that sector and often reduces the marginal cost of expanding operations once those investments are in place.
- **Low inflation environment:** During the 1990s, business conditions were ideal for many industries. Our economy saw strong stable growth with low inflation and strong profits. That environment encouraged investment and growth for many businesses, and encouraged the flow of capital to the most efficient operations. Low and stable inflation is particularly critical for the home building industry, where minor changes in mortgage rates can mean big changes in the share of households who can afford to purchase a home, and in the amount of money that they can afford to spend on that home. Low inflation also meant low operating margins for dealers of commodity building materials.

While low margins put pressure on profits, they also encouraged greater productivity and efficiency in distributor operations, conditions that typically lead to increased consolidation to spread the investments to achieve these improvements over a larger base.

- **Product proliferation:** In an effort to attract new consumers while continuing to meet the needs of current customers, residential building product manufacturers are constantly increasing their product offerings. Andersen Windows and Doors, for example, reported to a Joint Center inquiry that the number of skus that they produce and are available for sale increased by more than 60,000 between 1993 and 2003, from 36,000 in early 1993 to 97,000 in early 2003. As a result, there is pressure on dealers to carry more products. Both Home Depot and Lowe's stock approximately 45,000 skus in a typical store, up from about 30,000 in the late 1980s according to information from trade publication Home Channel News. Again, consolidation is a natural response to having to negotiate with more suppliers, and having to carry more products.
- **Shortening the distribution chain:** In an effort to reduce costs in the distribution system, many building product manufacturers are shipping directly to dealers, who in turn are investing in sophisticated internal distribution systems. Some traditional two-step wholesalers are selling directly to end-market customers, thereby offering both one-step and two-step distribution.
- **Concentration in customer base:** Given the favorable business environment for home building in the 1990s, there was an unprecedented level of consolidation among residential builders. The top 10 national builders accounted for 12% of all new homes sold in 1990. By 2002, that share had climbed to 21%. According to analysis by UBS Warburg LLC, in local markets the share of homes built by top 10 builders is often much greater than national figures would suggest. Larger customers put different demands on dealers, and consolidation among dealers was one response to better meet the needs of national builders.
- **Improved technology:** Having to manage greater levels of inventories and numbers of products has provided dealers with incentives to invest in information technology systems. More and more dealers rely on electronic rather than visual methods for tracking inventories, use scanners at point of sale, enter sales information directly into their inventory management systems, and are able to access this information in real time.

However, scale economies are important to support this level of investment. Additionally, dealers are being asked to more efficiently provide building products to their customers. Kitchen cabinets, for example, need to be delivered to the job site on a different schedule than framing materials, and dealers are being asked to deliver the right products to the right location at the right time. To be successful, dealers need access to more information about the status of the construction process.

Purpose of Distributor Study

The objective of the residential building materials distribution research is to understand the changes that are occurring or are likely to occur in the businesses that stretch from the final customers of residential building products, through the web of distributors and dealers of products, and back to the manufacturers and material suppliers. A key goal is to develop the empirical analysis to test the theories of changes within residential building product distribution presented in the previous section. This report summarizes the first phase of research: a survey of building product dealers. Subsequent phases of this research will survey builders and remodelers, and building product manufacturers--the other principal elements of the supply chain for this industry.

Dealers feel the pressures in the residential sector toward improving efficiencies and reducing costs. Particularly for dealers serving large-scale home builders, where large quantities of commodity products need to be transported through the distribution channel from manufacturing facility to the jobsite, and where they need to arrive at the site in a just-in-time manner, the distribution function is facing increasing demands from customer and supplier alike. Firms distributing building products to builders often are operating under a scale disadvantage relative to their suppliers and customers. But by first focusing on this part of the channel, it will allow us to better understand changing demands both “forward” and “backward.”

Major Survey Findings

Overview of Survey

Information contained in this summary is from a survey of building product dealers undertaken by the Harvard Center for Textiles and Apparel Research and the Joint Center for Housing Studies at Harvard University during the spring of 2003. Over 100 firms that distribute lumber, building materials, or millwork directly to builders, remodelers and homeowners participated in the study. Dealers included traditional pro yards, retailers serving D-I-Y homeowners, specialty dealers, and wholesalers that sell directly to the trades or to homeowners.

For most of the analysis in this summary report, respondents are grouped into three categories: large pro dealers; small pro dealers; and D-I-Y retailers and other dealers serving a mixed customer base. **Large pro dealers** are distributors that carry one or more product lines from the lumber, building material and millwork categories, had at least \$50 million in sales in 2002, and report that at least 75% of their sales are to the building trades (e.g. builders, remodeling contractors, subcontractors). Distributors generally classified as wholesalers were included in this category if a significant portion of their sales are directly to the building trades. Additionally, specialty dealers that carried product lines covered by this survey were included in this category if 75% of their sales were to the building trades.

Small pro dealers follow the same criteria as large pro dealers, except that their sales were \$50 million or less in 2002. **Retail/mixed dealers** encompass a broad range of traditional retailers who sell primarily to D-I-Y homeowners, as well as dealers that have a mixed customer base. If less than 75% of a dealers sales were to the building trades and they carried product lines covered by this survey, they were included in this category.

The product lines covered by the survey included:

- softwood lumber;
- engineered lumber;
- plywood, under flooring, sheathing, sub roofing, and oriented strand board (OSB);
- insulation and house wrap;
- windows, roof windows, and skylights;
- roofing, flashing;
- siding products;

- entry, exterior, and sliding doors;
- wallboard;
- kitchen/bath cabinets;
- interior doors, decorative millwork, molding, and other millwork;
- panels, trusses, staircases, and other preassembled components.

Together, respondents to the survey accounted for over \$46 billion in sales in 1997 (total sales, not only for these product lines) and almost \$105 billion in 2002. Estimates developed for this research indicate that dealers that carry lumber, building materials, or millwork generated \$203 billion in total retail sales in 2002. This figure differs from the \$265 billion figure presented in the Recent Trends section because that figure includes sales at outlets like hardware stores and paint and wallpaper stores that are classified as building material and supplies retailers, but that generally don't carry products in the lumber, building materials and millwork categories. Survey participants represent over half of the estimated 2002 retail sales of residential building products nationally by dealers that carry one or more of these product lines. (Figure 4)

**Figure 4:
Survey of Dealers Covers Over Half of
Market Activity**

Sales at dealers completing survey forms, weighted by sales volume

# Businesses Completing Survey		Average Sales		Total Sales		Share of Market	
		1997	2002	1997	2002	1997	2002
Large Pro	51	\$210M	\$400M	\$10.9B	\$20.1B	43%	59%
Small Pro	34	\$16M	\$20M	\$540M	\$680M	1%	1%
Retail/Mixed	14	\$2.5B	\$6B	\$35.1B	\$84.1B	55%	81%
Total				\$46.5B	\$104.9B	34%	52%

Source: Harvard University Building Products Distribution Study.

Dealers were asked to complete a detailed questionnaire covering general company information, services to customers, products carried, inventory management, and supplier relations. For many of the questions, respondents were asked to supply information for 2002 and

1997. For 2002, products carried by large pro dealers in these product categories averaged almost 11,000 skus; about 2,600 skus for small pro dealers, and almost 14,000 skus for retail/mixed dealers. Generalist dealers, defined for this research project as dealers who carry at least 10 of the 12 product categories covered by this survey, carry larger numbers of skus than do specialty dealers, defined as dealers carrying 3 or fewer of the target product categories. (Figure 5.) However, as reported later in this report, specialty dealers average a significantly larger number of skus within a given product category that they carry than do generalist dealers.

**Figure 5:
Large Pro Dealers Carry More Lumber,
Building Materials and Millwork SKUs**

Average across all dealers weighted by dollar volume

	<u>1997</u>	<u>2002</u>
Large Pro	7,200	11,000
Small Pro	1,700	2,600
Retail / Mixed	N/A	13,700
Large Pro – Generalist	8,900	10,500
Small Pro – Generalist	2,700	4,600
Specialty - Pro	1,400	1,200

Source: Harvard University Building Products Distribution Study.

Industry Consolidation has Pressured Dealers

According to our survey results, with the increased consolidation in the homebuilding industry over the past decade, the customer base of building product dealers has changed. The change has been most apparent for pro dealers. Large pro dealers have seen a dramatic increase in their share of sales to builders that buy materials from them for at least 500 homes a year, as well as in builders buying materials for between 25 and 500 homes a year. These share gains principally have come at the expense of small builders (that buy materials for fewer than 25 homes a year from that dealer), as well as from remodeling contractors.

Figure 6: Customer Base Shifting Toward Large Builders

Share of residential sales, average for companies, weighted by sales volume

	Large Pro		Small Pro		Retail /Mixed	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
Homebuilders: 500+ homes	11.6%	19.8%	6.8%	8.6%	0.3%	1.0%
25 – 499 homes	24.2%	32.3%	25.9%	27.4%	1.7%	1.7%
1 – 25 homes	27.8%	20.6%	37.1%	36.3%	2.8%	2.1%
Multifamily builders	6.2%	5.9%	9.1%	9.7%	3.7%	3.8%
Remodeling contractors	24.1%	18.1%	14.8%	13.4%	10.6%	14.1%
Homeowners	6.0%	3.2%	6.5%	4.8%	80.8%	77.3%

Source: Harvard University Building Products Distribution Study.

Pro dealers with sales under \$50 million a year have seen an increased share of sales to these bigger and midsize builder customers, but the increase has been less dramatic. They also have seen share losses to smaller builders and remodeling contractors. (Figure 6)

Though pro dealers have shifted their sales focus toward large homebuilders, this customer segment presents challenges in terms of margins that these dealers have achieved. Large pro dealers report that average gross margins from sales to larger homebuilders are below their margins from sales to other customer segments with the exception of multifamily builders. Furthermore, while gross margins increased between 1997 and 2002 for all customer segments, the increase was the smallest for multifamily builders and larger volume homebuilders. (Figure 7)

Figure 7: Dealer Margins for Large Builders – Low and Stable

Average gross margin across all customers, large pro dealers, weighted by sales volume

	<u>1997</u>	<u>2002</u>	<u>Change</u>
Homebuilders: 500+ homes	15.7%	16.5%	+0.8%
25 – 499 homes	17.9%	19.5%	+1.6%
1- 25 homes	19.8%	22.2%	+2.4%
Multifamily builders	14.1%	14.5%	+0.4%
Remodeling contractors	22.1%	24.0%	+1.9%
Homeowners	22.6%	24.2%	+1.6%

Source: Harvard University Building Products Distribution Study.

A shifting customer base and lower gross margins for their fastest growing customer segment have forced pro dealers to rethink the services that they offer their customers. Pro dealers often describe their market as a “relationship business” where customer loyalty often is dependent on the personal relationship between dealer and customer, as well as the services provided by the dealer. Pro dealers generally are quick to point out that services that they provide to their core customer base help ensure a loyal customer base, even though these services typically may not be profitable in and of themselves.

Traditionally, services provided by the dealer have been provided without any additional direct costs. When asked if they charge separately for any general services provided to their customers (the general services list included: advice on project design and material selection; direct take-offs from building plans; next day delivery of services; materials delivery to the job site; and helping to resolve product disputes with customers), two-thirds of all dealers and almost three-quarters of large pro dealers indicated that they did not charge separately for any of these services. Delivery of materials to the job site was the only general service where over 10% of respondents indicated a separate charge.

However, dealers are increasingly providing other valued-added services. Some of these services cover prefabrication of building systems: manufactured panels; roofing or flooring engineering; or complete on-site framing of the house. Other services relate to product

installation: manufactured panels; stairs; roof trusses; window and doors. These services are priced at a premium from the base material costs, allowing dealers to increase their revenue and potentially their margins compared to traditional materials sales.

Large pro dealers are less likely to offer traditional uncharged services to larger builders than they are to offer them to smaller builders that offer larger gross margins. This may be because large builders do not value these services. On the other hand, large pro dealers are more likely to offer prefabrication and installation services to large builders than to small builders, either due to customer demand or due to the dealer feeling that there is more potential margin (and less competition) in offering services than in merely distributing products. (Figure 8)

**Figure 8:
Pro Dealers Provide More Revenue-Producing
Services to Large Customers**

Percent of large pro dealers offering service, averages (not weighted)

	Builders – 500+ Units		Builders – 1-25 Units	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
General Services				
Advice: Design/Materials	59.1%	70.0%	81.8%	84.4%
Take-offs	63.6%	53.3%	81.8%	86.7%
Resolve Disputes	<u>81.8%</u>	<u>86.7%</u>	<u>81.8%</u>	<u>95.6%</u>
Avg. - All Gen. Services	63.6%	66.2%	73.4%	79.1%
Prefabrication/Preassembly Services				
Framing	0%	16.7%	0%	6.7%
Manuf. Panels	22.7%	43.3%	11.4%	33.3%
Whole House Design	<u>9.1%</u>	<u>16.7%</u>	<u>13.6%</u>	<u>15.6%</u>
Avg. – All Spec. Services	29.6%	40.0%	23.3%	37.8%
Installation Services				
Panels	9.1%	26.7%	4.5%	20.0%
Doors/Windows	13.6%	53.3%	15.9%	37.8%
Roofing	<u>9.1%</u>	<u>10.0%</u>	<u>4.5%</u>	<u>8.9%</u>
Avg. – All Install Services	9.7%	25.0%	8.0%	18.1%

Note: The purpose of this table was to investigate practices across the range of distributors, so responses were weighted by businesses, not sales revenue.

Source: Harvard University Building Products Distribution Study.

The shift in the customer base of large pro dealers – and the resulting shift in services offered to customers – has coincided with a shift in the composition of sales and profits. Between 1997 and 2002, large pro dealers have seen a shift in their composition of sales away from product sales (declining from 92.7% to 86.3% of total sales), and toward sales of preassembled components and product installation.

The composition of their profit has just about matched the changing composition of sales at large pro dealers. As of 2002, neither sales of preassembled components nor sales of installation services was reported as leveraging greater profits for the distributor. (Figure 9)

Figure 9: Preassembled Components and Installation, Growing Share of Sales

Share of sales and profits for large pro dealers, weighted by sales volume

	<u>1997</u>		<u>2002</u>	
	<u>% of Sales</u>	<u>% of Profits</u>	<u>% of Sales</u>	<u>% of Profits</u>
Product sales	92.7%	92.6%	86.3%	87.7%
Preassembled components	6.3%	6.4%	10.7%	9.2%
Installation	1.0%	0.8%	3.0%	3.0%

Source: Harvard University Building Products Distribution Study.

Product Proliferation had Forced Dealers to Reevaluate Their Business Strategy

In addition to consolidation among both suppliers and customers, there has been a dramatic increase in the number of building products available to consumers. While many of the new products offer greater margins for manufacturers and dealers, they do present significant inventory management challenges.

There are three dimensions of product inventory levels and product proliferation that were considered in this analysis. The first is the differential levels of skus within a given product line across the dealers surveyed. Second is the differential in average skus between product categories where commodities dominate, and product categories where branded products dominate. The third dimension is product proliferation within a product category between 1997 and 2002.

Within a given product category, large pro dealers carried significantly more skus than did small pro dealers. So, within a given product line, inventory management is a greater issue for large pro dealers, as is the potential for benefit from technology investments. Retail/mixed dealers generally carry more skus than large pro dealers, although it varies from product category to product category. Typical sku levels were much higher for product categories where branded products dominate than for product categories where commodities dominate.

Small pro dealers tend to offer limited product offerings for commodity lines, and broader offerings for branded lines. Since builders buying products for fewer than 25 homes a year (many undoubtedly are custom home builders) are the largest customer category for these dealers, product selection in branded lines is evidently deemed to be critical. Large pro dealers carry a broader range of product offerings in branded product lines; typically three to four times the sku levels carried for commodity lines.

Large pro dealers serve a more balanced builder customer base than do small pro dealers (more evenly split between large, medium and small builders) so they need to carry a broader range of products. However, their base of larger production builders often builds for the entry-level market, offering limited options among branded products to their entry-level customer. Therefore, the ratio between skus for branded products and commodity products is lower for large pro dealers than for small pro dealers. (Figure 10)

**Figure 10:
Product Proliferation Greatest for
Branded Products**

Average number of SKUs for product category, weighted by sales volume

	Large Pro		Small Pro		Retail/Mixed*	
	1997	2002	1997	2002	1997	2002
Plywood	307	473	39	42	N/A	243
Wallboard	211	184	36	40	N/A	560
Insulation	141	132	57	61	N/A	263
Windows	847	1,515	567	1,165	N/A	2,030
Siding	546	1,253	240	337	N/A	565
Exterior Doors	609	1,178	130	228	N/A	1,687

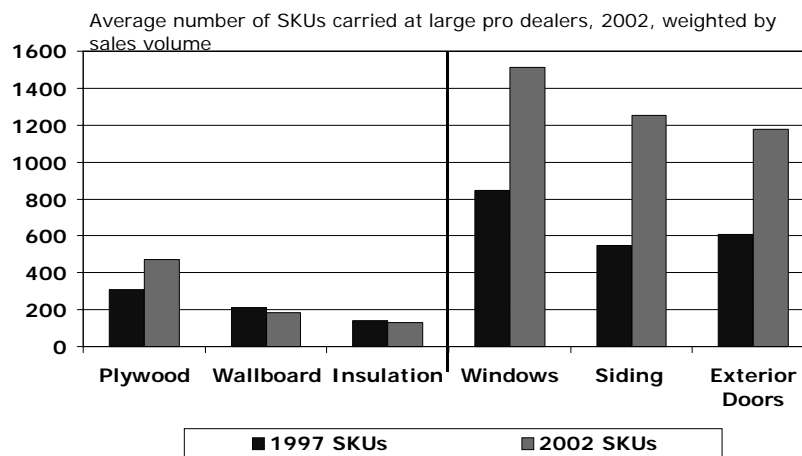
*Some companies in this category did not respond.

Source: Harvard University Building Products Distribution Study.

Product proliferation between 1997 and 2002 is another dimension of inventory management challenges. Among product categories covered in this study, product proliferation is a significant challenge for some product lines, and a minor concern for others. In general, product proliferation is much more common among branded product lines than among

commodity lines. For larger pro dealers, the number of skus virtually doubled for window and siding categories between 1997 and 2002. For commodity product categories, however, there was minimal increase in skus. In other retail markets, manufacturers have been able to increase margins and market share by converting commodities to branded products. If this were to occur with commodities in the residential products market (as it already has with siding and roofing to some extent), the challenge of product proliferation will grow. (Figure 11)

Figure 11:
Branded Products Create Greater Inventory Management Issues

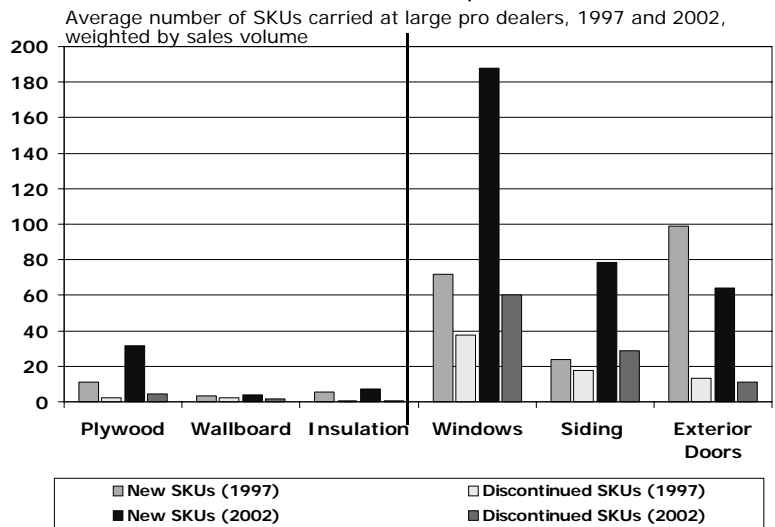


Source: Harvard University Building Products Distribution Study.

However, issues created by product proliferation (the net change in the number of skus carried) for a dealer are compounded by the number of new skus and the number of discontinued skus, which affects the gross change in products carried and presents challenges in forecasting product demand. With high levels of new and discontinued skus, dealers need to manage not only current inventory levels, but also factor in lines that won't be carried in the future.

For branded product categories at pro dealers, not only is the number of skus large, but the churning of skus in these categories presents inventory management challenges. For example, the growth in window skus at large pro dealers is produced by the almost 200 new skus that are added to their inventory each year. However, this doesn't factor in the 60 or so skus that are discontinued each year by these dealers. A dealer needs to manage not only the skus remaining from the previous year and the new introductions, but also the skus that are discontinued. This situation provides extra incentives for information technology solutions. (Figure 12)

Figure 12:
Inventory Management Issues Expanding Due to Product Introductions, Discontinuations



Source: Harvard University Building Products Distribution Study.

Even with dramatic increases in skus carried by most pro dealers, inventory turns (annual sales for a product category as a multiple of average inventory levels for products in that product category) have been rising across the board. While inventory turns generally run higher for commodity product lines, pro dealers report surprisingly high turns for branded product lines. (Figure 13)

Figure 13: In Spite of Product Proliferation, Inventory Turns Increasing

Average number of inventory turns per year for product category, weighted by sales volume

	Large Pro		Small Pro	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
Plywood	10.6	11.1	9.9	12.7
Wallboard	11.1	14.0	13.3	14.4
Insulation	6.8	8.3	6.8	6.8
Windows	11.4	13.7	15.1	17.3
Siding	6.9	7.4	7.0	7.3
Exterior Doors	7.2	8.6	15.6	14.1

Source: Harvard University Building Products Distribution Study.

Pro dealers have been able to increase inventory turns in product lines with large and growing numbers of skus in large part due to a growing reliance on special orders. In this way fewer products need to be inventoried, which reduces the exposure to inventory risk. For windows, 60% to 90% of sales are special orders, while for siding, less than 30% of sales are special orders. In the commodity product categories, special orders account for less than 10% of sales. (Figure 14)

Figure 14: Growing Reliance on Special Orders for Branded Products

Percent of sales in product category that were special orders, weighted by sales volume

	Large Pro		Small Pro	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
Plywood	3%	3%	4%	4%
Wallboard	10%	9%	5%	6%
Insulation	6%	4%	5%	5%
Windows	69%	65%	78%	90%
Siding	25%	19%	27%	27%
Exterior Doors	39%	38%	71%	69%

Source: Harvard University Building Products Distribution Study.

With increasing skus and growing reliance on special orders, pro dealers are dependent on servicing from suppliers. Pro dealers concentrate their purchases on a few suppliers, in part to ensure this level of service. For both commodity and branded product categories, between 50% and 90% of sales in that category are from their top three suppliers. For small pro dealers, who don't have the same level of purchasing power, and therefore may need to concentrate their purchases, over 80% of sales in each product category are with their top three suppliers, even though their reported total number of suppliers within a product category didn't change much between 1997 and 2002.

Retail/ mixed dealers also have concentrated their sales to maximize their purchasing power. This concentration in sales on average has increased marginally between 1997 and 2002. Dealers also may be concentrating their sales due to consolidation among their suppliers, and because manufacturers typically are carrying a broader range of products, limiting the need to use multiple suppliers to cover the range of price points for a product category. (Figure 15)

**Figure 15:
Top Suppliers Account for Growing
Share of Sales for Most Pro Dealers**

Percent of sales in product category from top 3 suppliers, weighted by sales volume

	Large Pro		Small Pro		Retail/Mixed	
	1997	2002	1997	2002	1997	2002
Plywood	67	49	73	90	66	68
Wallboard	72	76	97	91	99	99
Insulation	86	92	88	95	97	99
Windows	65	66	80	89	82	83
Siding	67	79	58	84	76	75
Exterior Doors	67	68	85	88	99	100

Source: Harvard University Building Products Distribution Study.

Specialty dealers are able to avoid some inventory risk issues faced by general pro dealers in that they carry fewer product categories. However, they are forced to deal with others. For roofing products, for example, specialty dealers carried about three times the number of skus as larger pro generalists, and 15 to 20 times more skus than small pro generalist dealers. While their inventory turns are marginally higher, they must deal with a far larger number of suppliers, so their share sales from their top three suppliers is lower. They rely less on special orders than generalist dealers, which exposes them to greater inventory risk. (Figure 16)

Customer mix also influences the depth of product lines that pro dealers carry. Pro dealers that specialize in serving large builders often can carry fewer skus within a product category, and turn that inventory faster because of the volume sales to their customer base.

**Figure 16:
Specialist Distributors of Roofing Products
Carry Greater Inventory Risk**

Average characteristics, weighted by sales volume

	Large Pro Generalist		Small Pro Generalist		Pro Specialist	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
No. SKUs	596	524	82	86	2447	1457
No. Inventory Turns	6.9	7.7	7.4	6.1	6.7	7.8
No. Suppliers	11	9	5	4	40	78
% Sales – Top 3 Suppliers	64%	75%	77%	87%	71%	64%
% Special Orders	15%	15%	14%	22%	9%	7%

Source: Harvard University Building Products Distribution Study.

For example, in looking at larger pro dealers that carry siding products, those that specialize in serving high volume builders carry fewer siding skus and achieve higher inventory turns than those principally serving smaller builders or remodeling contractors. They have a slightly higher share of sales to their top three suppliers, and rely less on special orders. In contrast, pro dealers that concentrate on serving remodeling contractors have a higher number of skus and lower turns. Dealers that primarily serve larger builders also rely less on special orders to meet their customers' needs. These varied competitive strategies undoubtedly have different effects on financial performance and therefore sustainability. We will examine this issued in greater depth in future reports. (Figure 17)

**Figure 17:
For Siding Products, Large Pro Dealers
Concentrating on Serving Larger Builders
Carry Less Inventory, Turn it Faster**

Averages by customer specialty (specialty defined as 50% of sales or more to customer groups), weighted by sales volume

	Builders: 500+ Homes		Builders: 1-25 Homes		Remodeling Contractors	
	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>	<u>1997</u>	<u>2002</u>
No SKUs	64	85	54	158	300	500
No. Inventory Turns	9.3	10.6	7.6	7.5	4.4	5.7
% Sales – Top 3 Suppliers	67%	77%	62%	66%	66%	75%
% Special Orders	10%	7%	12%	12%	13%	13%

Source: Harvard University Building Products Distribution Study.

Changes in Product Distribution Have Encouraged Dealers to Adopt More Sophisticated Inventory Management Systems

The use of electronic inventory management systems has significantly increased in recent years. In 1997, about two-thirds of products sold by pro dealers were sold at yards that used electronic inventory management systems as the principal means of tracking inventory levels. By 2002, this share was approaching 80% for small pro dealers and 90% for large pro dealers. For dealers with a mixed customer base, virtually all of the products sold in 1997 and 2002 were sold at dealers that relied principally on electronic management procedures. (Figure 18) Adopting modern retailing practices was one of the hallmarks of the “big box” revolution, and the resulting concentration of the D-I-Y sector in the 1980s and 1990s. Retailers/mixed practice dealers, due to their volume of operation, have been leaders in adopting electronic inventory management practices, and can be considered a benchmark for measuring progress among pro dealers.

Large pro dealers have increased their use of electronic management systems as their scale of operations have increased. In 1997, the average volume of business at a large pro distributor was just over \$200 million, almost doubling to \$400 million by 2002. In comparison, sales at an average small pro dealer increased an average of only 25%. (Previously presented in Figure 4)

Figure 18:
**Electronic Inventory Management Universal
 at Retailers, Growing at Large Pro Dealers**

Electronic tracking cited as main method for tracking inventory levels,
 % of distributors weighted by sales volume

	<u>1997</u>	<u>2002</u>
Large Pro	69%	90%
Small Pro	64%	77%
Retail/Mixed	100%	100%

Source: Harvard University Building Products Distribution Study.

To support their electronic management systems, distributors are increasingly applying bar codes to products and using bar code scanners at the point of sale. Virtually all sales by retailers and mixed distributors in 2002 used bar codes. Over 90% of products sold at these distributors were bar coded in 1997, and by 2002 virtually all products sold were bar coded.

Most larger pro dealers are using bar codes, whereas less than half of small pro dealers used them in 2002. Even among those dealers using bar codes, the use is not universal across product lines. Among the larger pro dealers using bar codes, less than 40% of products sold had bar codes in 2002, up from 23% in 1997. Among small pro dealers, even though the adoption of bar codes is much less prevalent, for those using them the share of products bar coded is high; 67% in 1997 and rising to 80% by 2002. (Figure 19)

**Figure 19:
Barcode Use Increasing, Especially at Large
Pro Dealers**

Products marked with barcodes of SKU level, percent of distributors weighted by sales volume

	<u>% Using Barcodes</u>	<u>% of Products with Barcodes</u>	
		<u>1997</u>	<u>2002</u>
Large Pro	91%	23%	39%
Small Pro	43%	67%	80%
Retail/Mixed	100%	93%	100%

Source: Harvard University Building Products Distribution Study.

The use of scanners at the point of sale has been following a similar pattern to bar codes in that adoption has been much higher at retail/mixed customer base . Virtually universal at retailers/mixed dealers as of 1997, just over a quarter of large pro dealers and only 13% small pro dealers used them in 1997. Utilization has increased somewhat at small pro dealers but hardly at all at large pro dealers since 1997. By 2002, use of scanners was still fairly limited at pro dealers. (Figure 20)

As consolidation has created more multi-location dealers, the need has arisen for better communication among facilities. Given the ease of internet access, most of the gains in yard-to-yard or store-to-store communication has been through the internet, a company intranet, or local area network. Retailers/mixed customer distributor reported the greatest increase in communication. With only about a quarter of stores communicating in 1997, by 2002 virtually all stores were linked.

**Figure 20:
Use of Scanners at Point of Sale
Increasing Slowly**

% of stores/yards using scanners at point of sale weighted by sales volume

	<u>1997</u>	<u>2002</u>
Large Pro	27%	28%
Small Pro	13%	22%
Retail/Mixed	100%	100%

Source: Harvard University Building Products Distribution Study.

As of 2002, large pro dealers had most of their yards linked through intranets, etc., and about half through enterprise computing/EDI. Small pro dealers saw a doubling of yard linked through internets, etc. Use of enterprise computing/EDI was higher at small pro dealers than at larger pro dealers in 1997, and did not increase much between 1997 and 2002. (Figure 21)

**Figure 21:
Communication Between Stores/Yards Via
Internet Increased Rapidly Between 1997
and 2002**

% of stores/yards linked by technology weighted by sales volume

	Large Pro		Small Pro		Retail/Mixed	
	1997	2002	1997	2002	1997	2002
Enterprise Computing / EDI	35%	49%	67%	73%	28%	100%
Intranet/ Internet/LAN	41%	83%	30%	63%	16%	100%

Source: Harvard University Building Products Distribution Study.

Concluding Remarks

The results in this preliminary report indicate that the pro sector of residential distribution is experiencing change across many dimensions. Driven by consolidation in home building, increasing product proliferation, and competitive pressure from both suppliers and customers, dealers are exploring diverse strategies to maintain profitability and manage risk. It is not clear that all of the strategies that emerge from this analysis are sustainable. In the next phase of research, the research team will investigate the connection between different competitive responses and measures of business performance such as sales growth and profitability. This will provide us with insights into the shape of the residential product distribution channel in the future.