

## Productivity trends in the mobile homes industry

*From 1977 to 1994, the industry experienced modest, long-term productivity growth reflecting wide fluctuations in demand and limited investment in new capital; however, output has grown significantly in the past few years, along with consumer demand*

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**D**eclining demand for new housing, low capital expenditures per employee, and a largely inexperienced work force have contributed to only modest long-term productivity gains in the mobile homes industry.<sup>1</sup> A new measure of industry productivity from the Bureau of Labor Statistics shows that output per hour increased at an average annual rate of 0.6 percent between 1977 and 1994.

To put this figure in perspective, a comparison was made between the mobile homes industry and other manufacturing industries for which the Bureau measures productivity. The years 1979 and 1990 were chosen for comparison because these were peak years in the business cycle, as measured by the National Bureau of Economic Research. Between 1979 and 1990, productivity in the mobile homes industry rose 0.4 percent annually. More than 80 percent of the manufacturing industries examined showed higher rates of increase in productivity during that same period.<sup>2</sup>

The productivity indexes presented in this article represent the change over time in the ratio of the weighted output of a specified composite of products to the employee hours expended on that output. The output and employee hour series that underlie the productivity measures for the mobile homes industry are based on data from the Bureau of Labor Statistics and the Bureau of the Census.

### Trends in productivity

The industry's annual average 0.6-percent growth

in productivity between 1977 and 1994 reflects a 0.8-percent rise in output and a smaller increase in employee hours, 0.2 percent. (See table 1.) Over this period, annual increases in productivity, ranging from 0.1 percent to 8.3 percent, occurred in 11 years. Productivity declined in the other 6 years, with the largest drop, 11.6 percent, occurring from 1983 to 1984. In 1983, output per hour had reached its peak for the period. (See table 2.)

Year-to-year changes in industry output and productivity have generally shown similar movements. Large increases in output have been associated with above-average gains in productivity. For example, from 1982 to 1983, output increased 32.1 percent and productivity jumped 8.3 percent. Similarly, output advanced 8.1 percent, 8.2 percent, and 22.2 percent in 1977-78, 1980-81, and 1992-93, respectively, while productivity gained 5.4 percent, 6.3 percent, and 1.4 percent for those years. In 4 of the 10 years that output declined, productivity also fell. By contrast, despite declines in output during the other 6 years, productivity advanced as manufacturers were able to adjust their work force hours to meet changes in demand.

### Output and demand

The demand for mobile homes was sluggish during most of 1977-94, but it picked up significantly toward the end of the period. In 1991, output in the industry was almost 27 percent below the 1977 level. After reaching its lowest point for

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**Table 1.** Percent changes in productivity, output, hours, and all employees in the mobile homes industry, sic 2451, 1977-94

| Years   | Productivity<br>(output per<br>employee<br>hour) | Output | All<br>employee<br>hours | All<br>employees |
|---|--|--------|--------------------------|------------------|
| 1977-78 .....                                   | 5.4  | 8.1    | 2.6                      | 5.1              |
| 1978-79 .....                                   | 2.4  | -1.1   | -3.5                     | -3.5             |
| 1979-80 .....                                   | 1.4  | -20.7  | -21.9                    | -19.7            |
| 1980-81 .....                                   | 6.3  | 8.2    | 1.9                      | 1.4              |
| 1981-82 .....                                   | -5.9   | -11.8  | -6.4                     | -7.5             |
| 1982-83 .....                                   | 8.3  | 32.1   | 22.0                     | 16.6             |
| 1983-84 .....                                   | -11.6  | -10.3  | 1.6                      | 4.5              |
| 1984-85 .....                                   | -.1  | -2.5   | -2.3                     | -2.8             |
| 1985-86 .....                                   | .1   | -5.9   | -6.1                     | -6.7             |
| 1986-87 .....                                   | 5.9  | .4     | -5.2                     | -4.9             |
| 1987-88 .....                                   | .6   | -1.7   | -2.3                     | -2.9             |
| 1988-89 .....                                   | -1.8   | -6.5   | -4.7                     | -3.1             |
| 1989-90 .....                                   | 2.4  | -1.5   | -3.9                     | -4.9             |
| 1990-91 .....                                   | 1.3  | -8.6   | -9.8                     | -8.2             |
| 1991-92 .....                                   | -.1  | 13.8   | 13.8                     | 8.5              |
| 1992-93 .....                                   | 1.4  | 22.2   | 20.7                     | 18.3             |
| 1993-94 .....                                   | -4.1   | 12.1   | 17.0                     | 15.0             |
| <b>Average annual rates of change (percent)</b> |  |        |                          |                  |
| 1977-94 .....                                   | .6   | .8     | .2                       | -.2              |
| 1979-90 .....                                   | .4   | -2.6   | -2.9                     | -3.1             |
| 1990-94 .....                                   | -.4  | 9.2    | 9.7                      | 7.9              |

the period in 1991, output expanded rapidly during the next 3 years. By 1994, output was 14 percent above the 1977 level.

From 1977 through 1991, output in the mobile homes industry fell in 10 out of the 14 years, declining at an annual rate of 2.2 percent. One factor contributing to this decline was the drop in energy prices in the mid-1980s, which adversely affected the economies of the oil States in the Southwest. The region, particularly Texas, is one of the primary markets for the mobile homes industry. A rise in unemployment in the Southwest led to a sharp increase in delinquencies and a high level of defaults on loans, as well as to repossessions of mobile homes. Some financial institutions, hurt by repossessions, cut back or withdrew from financing mobile homes. Another factor behind the decline in industry output was competition from other types of lower cost housing. During much of the 1980s, an excess of rental housing and new condominiums provided strong competition for mobile homes in traditional market areas. As a result, the industry went through a severe contraction as the number of companies and plants declined.<sup>3</sup>

From 1991 to 1994, output soared in the industry, growing at an annual rate of 15.9 percent. Factors contributing to this performance included a pent-up demand for affordable housing; population growth in traditional consumer groups, such as retirees; employment growth in the Southeast, which is a major market for mobile homes; and a shift in the industry's product mix to larger, more customized homes, which has broadened the consumer base for the industry.<sup>4</sup>

The mobile homes industry is a part of the market for new housing, in which wide seasonal fluctuations have been common. Between 1977 and 1994, mobile homes contributed from 12 percent to 18 percent of new additions to the U.S. housing stock—that is, private housing starts plus mobile home shipments.<sup>5</sup> Over this same period, new additions fell in 10 of the 17 years, declining at an average annual rate of 1.5 percent. Mobile home builders face competition in the market for new housing from conventional on-site contractors, as well as other manufacturers of factory-produced homes.

Industry output and privately owned new-housing starts have generally moved in the same direction. Large changes in housing starts have been associated with above-average changes in output. For example, in 1983, housing starts increased 60.3 percent, and output jumped 32.1 percent.<sup>6</sup> Similarly, housing starts fell at an annual average rate of 14.8 percent between 1978 and 1982 and at 10.9 percent per year, on average, from 1986 to 1991, while industry output dropped at average annual rates of 7.0 percent and 3.7 percent, respectively, over the two periods.

The industry's products have been a low- and moderate-income housing option, providing housing for first-time buyers, people of moderate income in the mid-20 to mid-40 age bracket, rural residents, the elderly, and nontraditional households, including single parents. Mobile homes also are used for vacation or second homes. Compared with an average sales price of \$154,100 for new single-family houses sold, the average sales price for mobile homes placed in 1994, excluding land costs, was \$33,500.<sup>7</sup> In addition to the housing market, a small portion of industry demand comes from the

**Table 2.** Indexes of productivity, output, hours, and all employees in the mobile homes industry, sic 2451, 1977-94

| Years      | Productivity<br>(output per<br>employee<br>hour) | Output | All<br>employee<br>hours | All<br>employees |
|------------|--|--------|--------------------------|------------------|
| 1977 ..... | 90.0   | 113.1  | 125.6                    | 124.6            |
| 1978 ..... | 94.9   | 122.3  | 128.9                    | 131.0            |
| 1979 ..... | 97.2   | 120.9  | 124.4                    | 126.4            |
| 1980 ..... | 98.6   | 95.9   | 97.2                     | 101.5            |
| 1981 ..... | 104.8  | 103.8  | 99.0                     | 102.9            |
| 1982 ..... | 98.6   | 91.5   | 92.7                     | 95.2             |
| 1983 ..... | 106.8  | 120.9  | 113.1                    | 111.0            |
| 1984 ..... | 94.4   | 108.5  | 114.9                    | 116.0            |
| 1985 ..... | 94.3   | 105.8  | 112.3                    | 112.7            |
| 1986 ..... | 94.4   | 99.6   | 105.5                    | 105.1            |
| 1987 ..... | 100.0  | 100.0  | 100.0                    | 100.0            |
| 1988 ..... | 100.6  | 98.3   | 97.7                     | 97.1             |
| 1989 ..... | 98.8   | 91.9   | 93.1                     | 94.1             |
| 1990 ..... | 101.2  | 90.5   | 89.5                     | 89.5             |
| 1991 ..... | 102.5  | 82.7   | 80.7                     | 82.2             |
| 1992 ..... | 102.4  | 94.1   | 91.8                     | 89.2             |
| 1993 ..... | 103.8  | 115.0  | 110.8                    | 105.5            |
| 1994 ..... | 99.5   | 128.9  | 129.6                    | 121.3            |

nonresidential building sector. From 1977 to 1994, between 2 percent and 7 percent of the value of annual industry shipments were used for nonresidential buildings, such as offices, banks, and classrooms.

### Industry structure

The mobile homes industry is the most concentrated portion of the homebuilding industry.<sup>8</sup> The top 10 firms produced about 64 percent of the industry's output in 1994.<sup>9</sup> In 1992, there were 286 establishments in this industry, a 52-percent decline from 1977, when there were 597.<sup>10</sup> Over the same period, the number of employees per establishment increased from 85 to 129, a rise in average establishment size of about 53 percent. Approximately three-fifths of establishments employed 100 or more workers in 1992.

The highly concentrated structure of the industry has resulted, in part, from a series of mergers and acquisitions that have occurred since the mid-1970s. In June of 1976, the Federal Mobile Home Construction and Safety Act of 1974 went into effect. This national building code for mobile homes established minimum standards for durability, wind and fire safety, and energy conservation.<sup>11</sup> Beginning in 1976, many of the industry's leading manufacturers significantly raised the quality and safety of their mobile homes, offering safer electrical wiring, more insulation, stronger walls, more fire-resistant paneling, and smoke detectors. Numerous small companies that could not profitably meet the U.S. Department of Housing and Urban Development's (HUD) standards for mobile homes were acquired by larger producers or went out of business.

Most mobile home plants are located in small, rural communities, particularly in the South and Southwest. Because of high transportation costs, plants are located close to suppliers and the market. The principal consumer markets are found outside metropolitan areas, in small towns and rural communities. About 61 percent of new mobile homes placed for residential use during 1994 were located in the South.

Compared with those who build conventional houses, builders of mobile homes enjoy a number of economic advantages, including relatively low labor costs, because the industry can employ less skilled workers; freedom from the effects of inclement weather; the ability to purchase materials in large volumes; better conditions for scheduling and materials handling; and the ability to control waste through the use of standardized building techniques and precision machinery, such as power nailers and automated hoist systems.

### The product

Mobile homes are classified into two major categories: single wide, in which the house is a single unit, and multiwide,

wherein two or more units are joined together on-site to make up the final house. The single-wide category includes single-wide units with expandable sections. Within the two categories, mobile homes are produced in a variety of series, sizes, and options. The series are differentiated by price, reflecting different amenities offered with each unit. As the price of a unit rises, the product usually has more standard features and may include some changes in structural integrity. Each of the series also is produced in a variety of models. The sizes and options of mobile home units vary somewhat by geographic region and State because of different State regulations and climatic conditions. The mobile home industry is similar to the automobile industry in the variety of models and options that are produced.

Reflecting increased demand for large, well-equipped mobile homes, the product mix of mobile home manufacturers has shifted toward the production of larger units. In the late 1960s, 12-foot-wide units replaced 10-foot-wides in popularity. Mass production of 14-foot-wide units began in 1969 after legislatures in several States amended laws permitting such units to move on their highways. During the 1970s, single-wide unit production shifted from exclusively 12-foot-wides to predominantly 14-foot-wides. In the 1980s, even wider single-wide units began to be produced. Currently, 28 States permit shipment of 16-foot-wide mobile homes, and 7 States allow transport of 18-foot-wide units on certain highways. Since the early 1980s, the average sizes of new single-wide and multiwide mobile home units placed for residential use have risen nearly 20 percent, from 905 and 1,320 square feet, respectively, in 1982 to 1,085 and 1,565 square feet in 1994.<sup>12</sup>

Multiwide units, which add an average of about 45 percent more floor space to the single-wide model, were introduced in 1969. Multiwides have captured a substantial share of the market, growing from less than 22 percent of new mobile home placements in 1982 to around 48 percent of such placements in 1994.<sup>13</sup> As a proportion of total industry shipments, multiwide homes have increased during rising and peak homebuilding years and fallen during troughs in the business cycle. The introduction in the 1980s of the larger multiwides, with more customized features, has made mobile homes more comparable to conventional single-family housing.

Because of zoning ordinances and other regulatory controls to prohibit their use in residential areas, mobile homes traditionally have been located in rental communities or on privately owned land in small towns or rural areas. In 1993, about 35 percent of all manufactured homes were placed in rental communities, in which owners of the units rent the lots on which the homes reside.<sup>14</sup> These units typically consist of smaller single-section homes. While it is still common for buyers of mobile homes to rent a lot for placement of their

units, there is a growing trend toward placing smaller homes in cooperative or condominium developments and permanently sited multiwide homes in subdivisions. Since 1980, legislation in 20 States has been enacted to remove outdated zoning practices that limit the placement of mobile homes.

### Manufacturing process

Mobile homes are manufactured in factories on a steel chassis and must satisfy HUD regulations.<sup>15</sup> Generally, manufacturers construct the mobile home from the bottom up and the inside out, starting with the chassis frame and moving to the floor assembly, wall system, and, finally, the roof. On-site, the mobile homes rest on a foundation and are connected to the local utilities.

While the mobile home is designed to meet the requirements of assembly line production, the manufacturing process, in general, is not highly mechanized. Manufacturers rely on the availability of unskilled and semiskilled labor to perform repetitive, short-term tasks. Mobile home production, therefore, is a labor-intensive, assembly line operation.

### Employment and earnings

Between 1977 and 1994, the number of employees engaged in mobile home production decreased at an average annual rate of 0.2 percent, falling from 56,700 to 55,200. Yearly employment levels ranged from a high of 59,600 in 1978 to a low of 37,400 in 1991, reflecting the wide fluctuation in industry output over the period. Total hours of all employees working in the mobile homes industry rose slightly, at an average rate of 0.2 percent per year.

Production worker hourly earnings for the mobile homes industry, which are around 80 percent of the average for all manufacturing industries, grew at about the same rate, 4.4 percent per year, as the rate for all manufacturing, 4.5 percent per year, between 1977 and 1994. Average hourly earnings, in current dollars, for production workers in the industry rose from \$4.69 in 1977 to \$9.79 in 1994. In comparison, hourly production worker wages for all manufacturing averaged \$5.68 in 1977 and \$12.06 in 1994.

One employment characteristic that affects an industry's productivity growth is the experience level of the work force. Located primarily in nonmetropolitan areas, the mobile homes industry provides job opportunities for young and unskilled workers. The production process is organized, in large part, around crews of workers who perform the simple assembly of cut-to-size parts. A 1986 survey of mobile home producers by the Office of Technology Assessment found that about 80 percent of the work force had less than 12 months' experience.<sup>16</sup> In addition, data collected for a 1989 BLS study of safety and health in the mobile homes industry suggested

that a correlation exists between the high incidence of workplace injuries and illnesses in mobile home plants and the young age and the relative inexperience of the work force employed in the industry.<sup>17</sup> The mobile home industry's work force, as indicated by these studies, is largely inexperienced and may have contributed to the low productivity growth in the industry over the 1977-94 period.

### Capital expenditures

From 1977 to 1994, capital expenditures for the mobile homes industry ranged from a low of \$18.6 million in 1991 to a high of \$118.2 million in 1994. Capital expenditures per employee (in current dollars) increased in 7 of the 8 years between 1978 and 1986, rising from \$698 in 1977 to \$1,624 in 1986. Between 1986 and 1991, this ratio declined, falling to a low of \$536 in 1991. From 1991 to 1994, capital expenditures per employee increased each year, reaching a peak of \$2,437 in 1994. The large increase in capital expenditures during the early 1990s reflected the construction of new manufacturing facilities and the expansion of production capabilities at existing plants. New capital expenditures per employee for the industry, however, remained below the average for all operating manufacturing establishments, which grew from \$2,563 in 1977 to \$6,558 in 1994.

Wide fluctuations in the demand for new housing, resulting from the business cycle, seasonal variations in home construction rates, and changes in mortgage rates, as well as the small size of an average plant, make it difficult for mobile home producers to justify any sizable investment in capital equipment, worker training, and long-term technological research. Between 1977 and 1994, the industry usually adjusted to declining market conditions by laying off workers during periods of falling demand. Low capital expenditures per employee limited productivity growth for the mobile homes industry during much of this period.

### Outlook

According to a private research group, mobile home shipments are projected to grow between 5 and 7 percent per year from the mid-1990s through the year 2000.<sup>18</sup> Among the factors contributing to this output growth are favorable demographic and economic trends and a more attractive product mix.

Favorable demographic trends that support continued demand for mobile homes include employment growth in regions, such as the South, with key growth States for mobile homes. New-household formation in the 1990s is projected to grow at the same rate as in the 1980s. Total population growth during the next 15 years in the United States is expected to be concentrated in the South and West. Population

growth also is expected among traditional consumers of mobile homes, such as retirees and empty nesters.

Economic trends favorable to the industry include more widely available home financing and lower interest rates, compared to historical levels. Mobile homes are expected to remain much less expensive than conventional housing. At

the same time, the shift in product mix to higher end, larger, and more customized homes has made these products more attractive to moderate-income consumers. The industry's long-run growth likely will be led by multiwide homes, because of their greater comparability with lower end, conventional single-family housing. □

## Footnotes

<sup>1</sup> The mobile homes industry is designated by the Office of Management and Budget as SIC 2451 in the 1987 edition of the *Standard Industrial Classification Manual*. The industry comprises establishments primarily engaged in manufacturing mobile homes and nonresidential mobile buildings, such as offices, banks, and classrooms. These units are generally more than 35 feet long and at least 8 feet wide, do not have facilities for storage of water or waste, and are equipped with wheels. The industry also is referred to in trade publications as the manufactured-housing industry.

The average annual rates of change presented in this article are computed using the compound rate formula. These rates reflect the average rate of growth between beginning and ending years. For comparisons of periods, peak years in the business cycle were chosen as the beginning and ending years.

Extensions of the BLS productivity indexes will appear annually in the BLS bulletin, *Productivity Measures for Selected Industries*. A technical note describing the methods used to develop the indexes is available from the Office of Productivity and Technology, Division of Industry Productivity Studies.

<sup>2</sup> See *Monthly Labor Review*, December 1996, table 41, "Annual indexes of output per hour for selected industries," pp. 128–29.

<sup>3</sup> Merrill Lynch & Co., *The Manufactured Housing and Recreational Vehicle Industries*, May 1996.

<sup>4</sup> Goldman Sachs, *Manufactured Housing: Goldman Sachs U.S. Research*, June 21, 1996.

<sup>5</sup> *Current Construction Reports*, Series C20, Housing Starts (U.S. Bureau of the Census, various years), tables 1 and 5.

<sup>6</sup> *Ibid.*, table 1.

<sup>7</sup> *Ibid.*, table S-3; see also *Current Construction Reports*, Series C25, New One-Family Homes Sold (U.S. Bureau of the Census, various years), table 4.

<sup>8</sup> *Technology, Trade, and the U.S. Residential Construction Industry—Special Report*, OTA-TET-315 (U.S. Congress, Office of Technology Assessment, September 1986), p. 27.

<sup>9</sup> Merrill Lynch & Co., *Manufactured Housing and Recreational Vehicles*, table 14, p. 17.

<sup>10</sup> *Census of Manufactures* (U.S. Department of Commerce, 1977, 1982, 1987, 1992).

<sup>11</sup> In 1994, the Housing and Urban Development building code for mobile homes was revised to strengthen energy efficiency and improve wind resistance in regions subject to hurricane-force winds.

<sup>12</sup> See, for example, *Current Construction Reports*, Series C25, Characteristics of New Housing (Washington, U.S. Bureau of the Census, 1991), table 27.

<sup>13</sup> *Current Construction Reports*, Series C20, table S-1.

<sup>14</sup> Goldman Sachs, "Manufactured Housing," Figure 44, p. 43.

<sup>15</sup> For a detailed account of industry organization, see Arthur D. Bernhardt, *Building Tomorrow: The Mobile/Manufactured Housing Industry* (Boston, Massachusetts Institute of Technology Press, 1980).

<sup>16</sup> See *Technology, Trade, and the Construction Industry*, p. 34.

<sup>17</sup> See Martin E. Personick and Judy R. Daley, "Profiles in safety and health: work hazards of mobile homes," *Monthly Labor Review*, July 1989, pp. 15–20.

<sup>18</sup> Goldman Sachs, "Manufactured Housing," p. 1.