



# ERS Research Briefs

## Food Manufacturing Productivity and Its Economic Implications

Kuo Huang

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### *Productivity Growth Lags in Food Manufacturing*

The food processing and beverage industry accounts for about one-sixth of the U.S. manufacturing sector's activity and has contributed significantly to the Nation's economic growth. This important sector is materials-intensive, with raw and semi-processed agricultural products and packaging materials accounting for 60 percent or more of the value of output. Measuring productivity—how effectively inputs (materials, labor, capital, and energy) are turned into output (food products)—provides a good indication of the economic efficiency of the food manufacturing sector. Productivity measures capture the effects of more efficient techniques, technologies, or equipment on the manufacturing process, such as a labor-saving technology that allows a food company to make more corn chips per shift with fewer employees.

*Food Manufacturing Productivity and Its Economic Implications*, a new study from the USDA's Economic Research Service (ERS), examines productivity trends in the food manufacturing sector and the relationship between inputs and outputs.

#### *What Is the Issue?*

Productivity in U.S. food manufacturing has been growing slower than productivity in U.S. manufacturing overall. Between 1975 and 1997, productivity growth for U.S. food manufacturers averaged 0.19 percent per year, versus 1.25 percent for all U.S. manufacturers. Identifying trends in productivity, and understanding the reasons for these trends, provides insight into the overall health of the food manufacturing sector, and the Nation's economy as a whole. Often, increases in productivity result from investments in research and development (R&D) into new production methods that lead to improved efficiencies.

#### *How Was the Study Conducted?*

Most agricultural productivity studies in the United States are focused at the farm level. Considerably less attention has been devoted to research on productivity beyond the farm-gate, such as food manufacturing. *Food Manufacturing Productivity and Its Economic Implications* attempts to close this research gap by measuring the productivity indexes of both gross and net outputs in food manufacturing, realizing that food manufacturing is material input-intensive in relation to other industries.

The producer price of processed foods deflated by the consumer price index declined an average 2.13-percent per year over the period 1975-97. This study looks at whether food



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manufacturing productivity has influenced this trend. This study also compares productivity growth across types of food manufacturing, including meats, dairy products, preserved fruits and vegetables, grain mill products, bakery products, sugar and confections, fats and oils, beverages, and miscellaneous foods.

### *What Did the Study Find?*

Between 1975 and 1997, productivity growth for U.S. food manufacturers averaged 0.19 percent per year, versus 1.25 percent for all U.S. manufacturers. Food manufacturing industries ranged in annual productivity growth from -0.42 percent to 1.12 percent. In general, less processed food industries like meatpacking and fluid milk showed little productivity growth. These industries use relatively expensive raw materials to make highly standardized products. On the other hand, the beverage and bakery industries—which rely more on labor, elaborate packaging, and sophisticated extrusion technologies—had productivity gains of around 1 percent each year.

Labor's not to blame: output per labor hour in food manufacturing increased steadily over the 22-year period. Food manufacturing's sluggish productivity growth may be due to modest expenditures in research and development (R&D) of late. According to ERS data, R&D spending by food manufacturers grew an average of 2.22 percent per year (adjusted for inflation) during 1975-97. Over the same period, the National Science Foundation estimates that private R&D expenditures by all U.S. manufacturing companies grew 5.78 percent yearly.

The efficiencies associated with higher productivity often lead to lower prices or smaller price increases. Given the findings of this study, one might expect to find prices increasing in the food manufacturing industry. In fact, inflation-adjusted wholesale prices for processed foods declined an average of 2.13 percent per year over 1975-97. Given this industry's low productivity growth and its materials-intensive nature, these lower prices more likely resulted from a decrease in the prices of raw agricultural products (3 percent yearly during 1975-97).

This study also found that a 10-percent increase in both capital and labor inputs would increase the food manufacturing sector's net output by \$4.3 billion. In addition, a 10-percent increase in capital input alone would increase the sector's capital intensity, and consequently its labor productivity (net output per unit of labor), by \$1.43 per worker-hour. A 10-percent increase in labor input alone would reduce the sector's capital intensity and reduce its labor productivity by \$1.58 per worker-hour.