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going to fishermen and foreign producers, processors, and distributors.

The beneficiaries range in importance from transportation with 5 percent of the total increase in food expenditures to farmers with 29 percent. While food stamps cannot generally be used for restaurant meals, restaurants capture about 8 percent of the total increase in expenditures for food. This occurs because, for many recipients, the food stamp is similar to an increase in income. As such, other income which may previously have been used for purchase of food for at-home use can now be used for other purposes, including restaurant meals. ■

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Labor Productivity and Labor Force Growth

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The "productivity problem" in the U.S. economy has attracted widespread attention. Declining productivity is generally cited by economists, business leaders, and public policy makers as one of the factors contributing to our falling growth rate of disposable income and real Gross National Product (GNP). The growth rate of labor productivity in the whole U.S. economy fell from 3.2 percent per year in the 1947-65 interval to 2.4 percent annually in 1965-73. In the 1973-79 period, U.S. labor productivity growth had declined to an average annual rate of .8 percent. In U.S. food manufacturing, labor productivity grew at an annual rate of 4.2 percent from 1947 to 1965. It declined to 3.6 percent annually in the 1965-73 period and decreased again during 1973-80 to 3.3 percent.

From 1973-78, labor productivity for food stores fell at a rate of 1.4 percent per year after rising at an annual rate of 2.7 percent from 1958 to 1973. Declining labor productivity growth is not isolated to food industries.

Productivity Factors

Labor productivity measures the amount of output per labor-hour. High levels of labor productivity represent more products and services provided by each person in the work force. High rates of growth of labor productivity are usually accompanied by higher real—uninflated—wages and rising standards of living.

Increases in labor productivity are due to several factors. The output of a worker increases as the amount of physical capital (plant and equipment) that he has to work with expands. A simple example is the greater amount of land a farmer can till using a tractor, compared with the amount he can till using a horse. Therefore, increases in physical capital per worker should lead to increases in output per worker. Secondly, a worker will be more productive, the more skilled he is. The quality of the workforce improves with higher levels of experience, educational attainment, training, and health of the labor force. Technological advances and improvements in methods of production also increase labor productivity.

Effects of a Growing Labor Force

Many causes of lagging productivity growth have been suggested in recent years. Often mentioned are declines in spending for new capital goods, perceived declines in work effort innovation, and increases in Government taxation and regulation. It is far less common to see attention devoted to the dramatic changes in the size and composition of the labor force.

The size of the U.S. labor force has grown steadily since 1945, and the rate of growth has been increasing since 1965. This growth came from two sources: the postwar "baby boom" and the entry of increasing numbers of women into the labor force. From 1945 until 1960 the birth rate averaged 25 births per 1,000 individuals per year. This was 37 percent higher than the average rate through the Depression years of the 1930's, and 60 percent higher than average birth rates in the 1970's. The labor force started to grow rapidly in the late 1960's and 1970's as the members of the baby boom generation matured. The decline in the birth rate of the last 20 years will be mirrored in slower labor force growth in the 1980's and 1990's.

The second source of unusual labor force growth is the entry of women. From 1950 through 1979, the proportion of the female population in the labor force increased by 52 percent. The entry of women led to a sharp change in the demographic characteristics of the workforce. From 1950 to 1979, while total employment in food manufacturing fell by 100,000, the number of women employees rose by 80,000. Women may not continue entering the labor force at the same rate. It is chiefly this uncertainty which makes it hard to forecast labor force growth in the next 20 years. However, the declining birth rate should cause the labor force to grow more slowly, at least until the turn of the century.

Changes in the growth rate of the labor force have, over time, clearly affected labor usage in food manufacturing. The interval 1947 to 1965, was a period of slow overall labor force growth. During this time total employee hours worked in food manufacturing industries fell by 20 percent, as physical capital was substituted for labor.

In 1965, this trend stopped and total hours worked have remained nearly constant since then.

These labor force developments affect productivity growth in two ways. First, the entering workers have been relatively young and inexperienced. This change in the composition of the labor force is illustrated in Table 3, which shows the proportion of the labor force made up of males who are at least 25 years old. Historically, this group has had greater experience and a more permanent attachment to the labor force than others. More experience and permanent labor force attachment are associated with greater skills and training and therefore greater productivity. As relatively inexperienced groups make up larger proportions of the labor force, the average skill level of the labor force declines. As new workers remain in the labor force their work experience and training will rise.

Table 1—Growth in Labor Productivity and Labor Force

Year	Percent change, per year: Labor productivity	Labor force
1948-65	3.2	1.3
1965-73	2.4	2.0
1973-79	.8	2.5

Source: Economic Report of the President, 1981 pp. 69, 264.

Table 2—Female Labor Force Participation Rate

Year	Percent of Female Population in the Labor Force: Percent
1950	33.9
1965	39.3
1973	44.7
1979	51.6

Source: Bureau of Labor Statistics, *1980 Handbook of Labor Statistics* p. 13, 14.

Table 3—Shifts in the Composition of the Labor Force

Year	Proportion of the labor force that is male and at least 25 years old
1950	58.6
1965	53.7
1973	47.9
1979	44.9

Source: Bureau Labor Statistics, *1980 Handbook of Labor Statistics*, p. 7, 8.

The second way in which labor force growth affects labor productivity is by changing the relative cost of labor and altering the physical capital to labor ratio. Large increases in the supply of labor should reduce the cost of labor relative to capital and should lead producers to substitute labor for plant and equipment. Even if the

amount of capital grows at a constant rate, an increase in the growth rate of the labor force will reduce the growth of the capital to labor ratio. A decrease in the growth of capital per worker will reduce the growth of labor productivity.

To illustrate these effects, Table 4 presents data on the growth of capital costs relative to labor costs, investment spending per worker, and the capital labor ratio for the United States in general. From 1948 to 1965, capital costs rose only 69 percent as fast as labor costs. From 1965 to 1973 capital costs rose 76 percent as fast as labor costs, and by the mid-1970's, capital costs were rising faster than labor costs. Precisely the same pattern of recent declines in labor costs relative to capital costs has occurred within food manufacturing.

Rising energy prices and inflation-induced tax increases on capital made significant contributions to the rise in capital costs. Environmental and worker safety regulations may also have contributed to the rise in capital costs of production in the 1970's. At the same time, the labor force was growing rapidly, constraining labor costs. As a result, producers faced a strong incentive to reduce the rate of growth of capital per worker.

These labor force developments may not have had an important direct effect on agriculture. The agricultural labor force is of a different composition than the national labor force. The proportion of female agricultural employment is less than half the national average, and prime age (25+ years) men still make up 60 percent of agricultural employment. In addition, there has been a long-term decline in the importance of labor in agricultural production, so that labor market changes have rather muted effects on most of agriculture.

While agriculture has been relatively unaffected by recent labor force trends, other portions of the food system have reacted in the same way as the economy at large. Production methods in the food system have been affected by changes in the characteristics of the work force and the relative costs of capital and labor. Input suppliers, food processors, and firms in food distribution and the food service sector have faced strong incentives to increase their use of labor and to reduce the growth of capital per worker. Employment in grocery stores grew 22 percent from 1973 to 1979, while employment in eating and drinking places expanded 62 percent in the same period.

Future Labor Productivity

How are future labor force developments likely to affect labor productivity? Fewer young workers will be entering the labor force between now and the turn of the century. The extent to which women will continue to enter the labor force is difficult to forecast. In Table 5, several projections of labor force growth are presented, assuming high, medium, and low rates of future entry of women into the labor force. Each growth path projects a steadily declining rate of labor force growth over time. This alone should increase capital to labor ratios and labor productivity. In addition, as the average age of the labor force increases and as the experience, job attachment, and skill levels of recently entered women rise, labor force quality should also increase. This should also enhance labor productivity.

These labor force developments have been unique to the United States and Canada among the industrialized countries of Western Europe, North America, and Japan. Canada's labor force has actually grown more rapidly than that of the U.S., while the labor forces of France, Germany, Great Britain, Italy, and Japan have grown less than half as fast (the German labor force has declined). Labor productivity in the latter five countries has grown faster than that in Canada and the U.S. Given the rapid growth of labor forces in the North American countries, the United States and Canada would have needed a much higher growth in their capital stocks to match the productivity growth performance of Western Europe and Japan.

This simple international comparison also indicates, however, that labor force trends are not the only important factor affecting productivity trends. All seven countries, even those with no labor force growth, have had declining rates of productivity growth since 1973. An important factor faced by all seven since 1973 has been rising real energy prices. If a rising price of energy has increased the cost of new capital and decreased effectiveness of old capital stocks, then this too could be an important factor in the post-1973 decline in productivity growth rates among industrial countries. ■

Table 4—Growth Rates of Capital Costs

Year	Growth Rates (annual averages) Capital Costs Labor Costs	Investment Spending per Worker (1972 dollars)	Capital/ Labor ratio
1948-65	.69	3.2	2.99
1965-73	.76	2.2	2.20
1973-79	1.05	.3	1.06

Sources: 1981 Economic Report of the President. pp. 234, 265, 276, 295, and Bureau of Economic Analysis, Dept. of Commerce.

Table 5-Civilian Labor Force Growth Rates

Growth Path	Annual Percent Change 1979 to 1985	1985 to 1990	1990 to 1995
High Growth	2.4	1.6	1.0
Middle Growth	1.9	1.3	.8
Low Growth	1.4	1.0	.7

Source: Howard N. Fullerton, Jr. "The 1995 Labor Force: A First Look" Monthly Labor Review, Dec. 80, p. 12, Table 1.