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Behind Surging Productivity: The Service Sector Delivers Firms Once Thought Immune To Boosting Worker Output Are Now Big Part of Trend

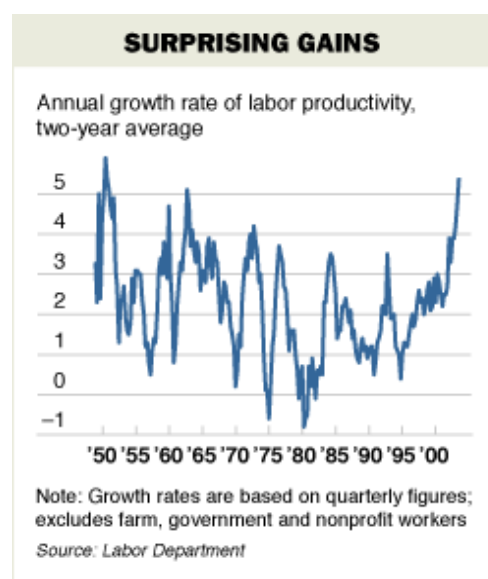
By JON E. HILSENATH
Staff Reporter of THE WALL STREET JOURNAL

For more than 200 years, "The Marriage of Figaro" has been performed with a full orchestra. But when the Opera Company of Brooklyn stages the Mozart opera in January, the pit will be occupied by only 12 musicians -- and one technician overseeing a computer program that plays all the other parts.

As the U.S. enjoys explosive growth in productivity, with an 8.1% third-quarter gain reported Thursday, the effects are reaching into far corners of the economy. The low-budget opera company in Brooklyn saves enough money on musician salaries with its high-tech orchestra that it can offer more performances per season.

Once confined to the computer sector and a few technologically savvy companies, productivity gains have spread into the nation's vast service sector, from airports to pet stores and package deliverers. Moreover, companies now are reaping the benefits of not just their technology investments in the 1990s but of organizational changes that made the technology work for them.

"It took a while for businesses to learn not only how to use information technology, but how they needed to organize themselves," says Robert Solow, a Nobel Prize-winning economist at the Massachusetts Institute of Technology known for his work on productivity.



The upturn has defied the pessimism of many economists who, when the recession hit in 2001, expected the productivity boom of the late 1990s to fizzle. Instead, productivity appears to have accelerated to rates rarely seen in the modern era.

The Labor Department reported Thursday that the productivity of the nation's labor force -- defined as output per hour worked by the average U.S. worker in the nonfarm business sector -- rose at a breathtaking annual rate of 8.1% during the third quarter, following a 7% growth rate in the second quarter.

That's just the latest in an astonishing run. Since the economic recovery began in the fourth quarter of 2001, productivity has expanded at an annual rate of more than 5%, the fastest pace for a two-year period in more than

50 years and more than twice the rate that many economists believed sustainable at the height of the economic boom in the late 1990s. By contrast, during a long productivity slump between 1973 and 1995, productivity grew at a rate of just 1.4% annually.

In comments to the Securities Industry Association Thursday, Federal Reserve Chairman Alan Greenspan described the run of productivity growth as "startlingly large." Mr. Greenspan said that while some of the factors that have driven productivity higher probably were temporary, some were likely related to long-term changes in the economy that would continue to bolster productivity in the future.

Strong productivity growth means companies are producing more with less, which helps to explain why millions have been locked out of the job market even as the economy recovers. This recovery is the only one in postwar history that has gone so long -- at least 23 months -- without producing a sustained rise in employment.

But in a sign that the pressure on the job market may be starting to wane, the Labor Department also reported Thursday that the number of U.S. workers filing first-time applications for unemployment benefits dropped to a 34-month low last week. Initial jobless claims fell by a larger-than-expected 43,000 to 348,000 in the week that ended Nov. 1. The new-claims figure marked the lowest level since the week President Bush took office.

Despite the near-term pain of a weak job market, most economists agree that rising productivity serves as the bedrock for living standards in the long run. The faster productivity grows, the faster the economy can grow without creating inflation. Faster economic growth means more-rapid growth in real household incomes over time. Higher incomes, of course, allow consumers to buy higher-quality products -- including fancier homes and cars -- and pay for services that enhance their lives. Eventually, as demand and economic growth accelerate, economists expect companies to start hiring again to keep up with a faster pace of output.

Of course, productivity almost always grows fastest in the early stages of a recovery -- while companies catch up to a rise in demand -- and then typically slows. Government statisticians also have a history of subsequently lowering initial estimates of productivity growth. Some economists believe that might happen as early as December, when estimates of national output are revamped by the Commerce Department. And with profits now rising, executives might feel less pressure to find new sources of productivity growth.

As a result, few economists believe productivity growth can stay anywhere near the lofty levels reached in recent months. Yet even longtime skeptics expect some elements of the most-recent gains to endure and have an important impact on the economic outlook.

One is Robert Gordon of Northwestern University, who recently concluded that productivity has momentum to grow at a 3% rate in the near term and could grow at a 2.5% rate during the next 20 years. That's an upward revision from his estimate of 2% three years ago and far stronger than the 1.4% productivity growth rate that prevailed between 1972 and 1995.

"All of a sudden I turn out to be the optimist and not the pessimist," Mr. Gordon says. "The trend

is so incredibly high." Economists surveyed by WSJ.com last month put the long-term trend at 2.7%.

If the long-run trend of productivity growth is even just a half percentage point faster than the 2% many thought possible after the 1990s revival, the impact on the economy would be enormous. Mr. Solow of M.I.T. figures that living standards would double in 28 years with productivity growth at 2.5%. At 2%, it would take seven additional years to double living standards.

Economists at the Congressional Budget Office estimate that an extra half percentage point of productivity growth would boost total federal tax revenue -- because incomes would be rising more swiftly -- by nearly \$780 billion between 2004 and 2013.

It would also allow Fed policy makers to keep interest rates lower for longer because productivity growth holds down inflation. When a company can produce more widgets with fewer workers, it is able to hold down its costs and boost its profit margin, diminishing the incentive to raise prices. Indeed, in the most productive sectors, such as computers and semiconductors, prices keep falling.

Broader Boom

Far more industries are benefiting from the productivity boom than most economists expected. Some had long argued that productivity growth was confined largely to the manufacturing sector, which could harness innovation to achieve greater efficiency in factories. And even within manufacturing -- which makes up just 14% of the nation's output -- it was thought that technology-producing companies were responsible for much of the nationwide gains in productivity. Behind this view: the ability of the semiconductor industry to double the processing speed of computer chips every 18 months.

Much of the service sector, in contrast, was thought to be ailing from a condition called "Baumol's Disease," named after economist William Baumol. When he first wrote about the subject in the late 1960s, Mr. Baumol argued that productivity in large chunks of the service sector tended to rise more slowly than in manufacturing because services required more hands-on activity that machines couldn't replace.

Mr. Baumol noted that a Mozart quartet would always require four musicians to perform and it would always last about as long as the composer originally intended. Lagging productivity, in turn, tended to push costs in services up faster than overall inflation.

While that was certainly true in the late 1960s, it's starting to change now as technological advances allow service companies to do what electricity allowed manufacturers to do nearly a century ago -- wring costs out of their operations by automating processes that used to require time and people.

Delivery giant FedEx Corp., of Memphis, Tenn., recently finished a \$150 million project arming drivers with new handheld package-tracking devices. The wireless devices will help them cut out

about 10 seconds per pick-up per stop, and will help the company save at least \$20 million each year.

PetsMart Inc., a Phoenix-based retailer, began a reorganization in 1999 in which it reduced inventory levels from an average of \$867,000 per store to \$442,000 at the end of 2002. With less inventory per store, the company has fewer employees operating forklifts and more employees grooming pets and attending to customers.



Jay Meetze

Countrywide Financial Corp., a large mortgage lender based in Calabasas, Calif., says it has reduced the time required to originate a loan to about 10 days from nearly 60 days a decade ago. Richard Jones, the company's chief technology officer, says Countrywide aims to reduce the underwriting time to just 20 minutes in the months ahead. "We're not very far from being able to do that," he says.

Jay Meetze, director of the Opera Company of Brooklyn, says using virtual players reduces his cost of hiring musicians to a little bit more than \$5,000 for each performance, compared with a typical rate of \$15,000. The savings will allow him to begin a 24-performance tour of another Mozart piece, "The Magic Flute," in April. The high-tech music system was donated by a small New York company called Realtime Music Solutions.

Reasons for Caution

There are important reasons for caution about the latest productivity gains in the service sector. It is notoriously hard to measure output and the number of hours worked in the service sector. Some economists, such as Morgan Stanley's Stephen Roach, argue that workers in the service sector aren't more productive, they are simply working longer hours that don't get counted in official statistics.

Still, several recent studies suggest that the sector's productivity is indeed improving. In one completed in September, Brookings Institution economists Jack Triplett and Barry Bosworth found that service industries ranging from security brokerages to transportation services to law firms experienced sharply improved productivity-growth rates during the late 1990s. Even the health-care sector -- a long and notable laggard -- went from declining productivity between 1987 and 1995 to slight improvement between 1995 and 2001.

"It is the end of Baumol's disease," says Dale Jorgenson, a Harvard economist whose own work has found productivity trends improving in services. He says service companies in finance, retailing and trade have "become much more like factories" in search of inefficiencies that they can use information technology to eliminate. Mr. Baumol himself says computers may be helping services "more than the remainder of the economy," though he adds education and health are still lagging behind.

Why is this all happening now? Erik Brynjolfsson, an economist at M.I.T. who has studied the

behavior of individual firms, says U.S. companies made large investments during the 1990s, not only in technology, but also in a search for ways to reorganize themselves and adapt to a changing technological environment. Then, after the profit collapse, he says, executives intensified their efforts to harvest gains from those reorganization efforts. "We are getting the benefits of past investments," he says.

The now-widespread efforts of airlines to install automated check-in kiosks at airports demonstrate how long it can take for companies to adapt. Since 1997, Northwest Airlines Corp. has installed 755 such kiosks at 188 locations. Two-thirds of Northwest's passengers -- up from 20% in 2001 -- now use either the kiosks or a separate feature that allows them to check in at home via the Internet.

The kiosk check-in process might look simple to customers, but it is in fact the culmination of a decade of experimentation and technological advance across a wide number of fields. Ten years ago, early experiments with kiosks resulted in bulky machines that were more than 6 feet tall and 2 feet deep. Today, because of shrinking computer components, kiosks can be housed in a box 1 cubic foot in size, says David Melnik, chief executive of Kinetics, Inc., which makes the software and kiosks for Northwest and nine other airlines.

Software was another big limitation for older kiosks. Old models had problems communicating with a central database, because they used different programming languages. The development of Internet-based networks changed that. An Internet programming standard known as XML, extensible markup language, has become a lingua franca for the new kiosks and mainframes to which they connect. It means that the software that checks in fliers is the same software used on the airline Web site and by the airline gate agents. A customer whose flight has been canceled can book the next departure on a laptop at the airport, rather than waiting in line for human assistance.

The way all these systems speak to one another has also been greatly enhanced by the technology-investing boom of the late 1990s. The declining cost of bandwidth -- the capacity to carry digital information -- has enabled airlines to shuttle more information around their networks.

Mr. Melnik says on average one kiosk has the capacity to replace 2½ employees. The cost of maintaining a kiosk is one-fourth the annual cost of compensating a single employee.

Workers aren't happy about the development. The kiosks "are very impersonal. They can't answer questions and can't give directions," says Robert Roach, general vice president of the International Association of Machinists and Aerospace Workers, a union representing 35,000 gate agents at airlines across the U.S. "The most important thing in the service industry is that one-to-one, person-to-person handling."

--Dennis K. Berman contributed to this article.