The 1990's acceleration in labor productivity: causes and measurement

As the dot-com boom waned, "new economy" became more the butt of jokes than a description of real, permanent changes in the economy.

"The 1990s Acceleration in Labor Productivity: Causes and Measurement" (Federal Reserve Bank of St. Louis *Review*, May/June 2006) by Richard G. Anderson and Kevin L. Kliesen shows that something really did change in the 1990s, though economists had trouble seeing it then. This real change was fueled not by speculation on dot-com IPOs, but rather corporate investment in information and communications technology (ICT).

Labor productivity is defined as the ratio of the economy's real output to total labor input. The trend rate of growth of labor productivity seems to have gone through three phases in the post-World War II era: rapid growth until 1973, slower growth from 1973 to 1994, and a partial return to rapid growth since 1995. For the 1949–72 period, annual labor productivity growth in the business sector was about 3.2 percent; from 1973 through 1994 it was slightly more than 1.5 percent; and for the 1995–2005 period, almost 2.5 percent. In other words, productivity growth was roughly 1 percentage point higher in the most recent 10-year period than in the 20-year period that preceded it.

The authors make three important points about the acceleration of labor productivity growth that began in the 1990s. First, it was a surprise; indeed, it was not even recognized as it was occurring. Second, it resulted from increased investment in information and communications technology. And third, it occurred mostly in services-providing industries and much less in goods-producing industries.

In the mid-1990s, at just the time 20/20 hindsight shows that labor productivity was about to increase, no economists were heralding higher labor productivity to come. The consensus view was that the rate of increase in labor productivity for the remainder of the 1990s would be about the same as its rate since the 1970s—something around 1.2 percent to 1.4 percent. Some especially dismal scientists maintained that little increase in labor productivity was possible in the services sector and that as that sector grew the economy as a whole was doomed to perpetual slow growth.

Significant revisions to productivity estimates hampered economists' ability to discern increasing labor productivity even as the increase was underway. "Output" is harder to measure in the services sector; therefore productivity measurements in that sector are more difficult than in manufacturing. Measures of the economy's outputs and inputs are often revised, necessitating revisions to productivity measures. Sometimes the revisions to published estimates were large enough to change economists' understanding of recent economic history.

Increased investment. By the 1990s, businesses of every sort had been making substantial investments in computers and other high-tech capital goods for years. Economists had begun to wonder, *Where was the payoff?* Finding the best way to use information and communications technology takes time; there are significant and variable lags between the time an ICT investment is made and when a benefit is observed. By the 1990s, many businesses had found ways to use ICT equipment to increase productivity and profits. For example: cash registers linked to inventory control systems in warehouses and communications equipment connected to offices on different floors or continents. Then, during the last half of the 1990s, the final piece of the productivity puzzle fell into place: the price of semiconductors, the essential part of every ICT product, fell steeply. Not only did prices decline in the mid 1990s, the rate of decrease actually increased in the late 1990s. The new technology that businesses had learned to use became dramatically more affordable in just a few years. "Make everything digital" became the mantra of the day.

Services dominate. Although the overall increase in productivity growth that began in the 1990s was significant, it was not evenly distributed throughout the economy. Starting in the mid-1990s, productivity in the services-providing sector has increased sharply, while productivity in manufacturing has continued at about the same level as earlier. Because three-quarters of the private-sector gross national product comes from firms in the services sector, changes in productivity in that sector have a large effect on productivity for the economy as a whole. Information technology has been widely used in the services sector for decades. Improved ICT business practices, combined with decreasing price of semiconductors, caused businesses to increase their investments in ICT capital goods. The level of ICT capital per worker increased, which led to increased labor productivity both in services and in the entire economy.

What's next? ITC-induced increased labor productivity will not cause continuous growth, permanent low unemployment, and the repeal of the boom-and-bust business cycle—all of which were once lauded as features of the "new economy." The authors note that economists cannot predict future gains in productivity; they have a hard enough time recognizing present gains. □