Productivity in real time

Worker productivity is an important economic measure. Economists have long agreed that increased productivity is the principal factor leading to increased living standards for the overall population. As workers become more efficient at producing output, they can be compensated accordingly. In addition, monetary policy officials analyze trends in labor productivity—defined as output per hour worked—to predict gross domestic product (GDP) growth and set interest rates. Because productivity growth rates can vary markedly from quarter to quarter, however, it has proved difficult for policymakers and analysts to distinguish between long-term trends and short-term cyclical trends. In a recent article published in the Federal Reserve Bank of New York's Current Issues in Economics and Finance, bank officials James A. Kahn and Robert W. Rich present a methodology "designed to distinguish between permanent and transitory movements" in productivity growth.

Kahn and Rich apply their methodology to historical productivity data from 1948 to 2005. They note that while productivity increased at an average annual rate of 2.3 percent over that entire period, there were times when it grew slower than that and times when it grew faster. From 1948 to 1973, for example, the average growth rate of nonfarm output per hour was nearly 3 percent per year. From 1973 to 1995, by contrast, the average growth rate was just 1.5 percent annually. Then, from 1995 to 2005, the growth rate returned to about 3 percent per year. But these changes in productivity growth were difficult to detect when they occurred. Misunderstanding long-term trends can have major policy implications. Kahn and Rich argue that because policymakers were not able to recognize the slowdown in productivity growth in the early 1970s, they overestimated GDP growth and set interest rates too low, which in turn contributed to the high inflation of the next several years.

The authors construct a statistical model to analyze productivity growth during the 1948–2005 period. They include not only productivity as a variable in their model, but real (inflation-adjusted) consumption expenditures and real labor compensation costs as well. Economic theory predicts that these three series will track similarly over the long term, and the model allows the common trend in these three variables "to shift periodically between high-growth and low-growth states." Kahn and Rich look at how well their model would have predicted the change in the common trend that occurred in the 1990s. They find that the model would have detected the change within 2 years of when it actually occurred. In general, the model provides a useful tool for policymakers to distinguish between short- and long-term trends in productivity growth and thus make more informed decisions regarding macroeconomic policy.

Analyzing individual worker productivity

When workers produce more output and the amount of labor stays the same, they are more valuable to their employers and can be compensated accordingly. As productivity increases, both wages and profits tend to rise. Most productivity measures (including those produced by BLS) focus on the workers as a group and thus do not capture the differences in productivity among individual workers. But in a recent study published by the National Bureau of Economic Research ("Peers at Work," NBER Working Paper 12508), economists Alexandre Mas and Enrico Moretti analyze individual, "worker-level" productivity and reach some interesting conclusions.

Mas and Moretti begin by asking the following question: In a group production process, how and why does an individual worker's productivity vary as a function of the productivity of his or her co-workers? Theoretically, when a high-productivity worker is introduced, incumbent workers might exert greater effort due to "peer effects" (socialization or learning, for example); alternatively, the introduction of a more productive worker might result in less effort by incumbents due to what economists call free riding. The study looks at individual productivity by analyzing scanner data for workers at a large grocery store chain. Because of the nature of the work, the precise quantity of "output" produced by each individual worker (the number of items scanned) can be measured precisely. Thus, the authors are able to compare the productivity differences among individual workers and quantify the changes in individual productivity when a highly efficient worker is introduced.

In their investigation of these changes, Mas and Moretti find strong evidence of "positive productivity spillovers." In other words, they find that the introduction of a more productive worker into a given shift results in increased effort by the incumbent workers due to peer effects. The authors then examine whether the increased effort is due primarily to the workers being in close proximity to one another ("spatial arrangement") or if it is more connected to them having worked together previously. Interestingly, they find that an individual worker's effort is positively related to the efforts of more productive co-workers when such co-workers face the individual, but not when the individual faces the more productive workers. They also find that employees tend to work harder when working with people they've worked with before in the same or another area of the store.

As a result of these findings, the authors conclude that individual workers "are motivated by social pressure and mutual monitoring," which suggests that social preferences play an important role in encouraging greater worker effort, even in the absence of economic incentives. Moreover, Mas and Moretti conclude that overall worker efficiency in a given shift is maximized when the various skills of workers are most diverse. □