

# Low Unemployment: Old Dogs or New Tricks?



By Abbigail J. Chiodo and Michael T. Owyang

In March 2001, financial markets reeled at the news of an increase in the unemployment rate to 4.5 percent, its highest level in more than two years. Not long ago, such an unemployment rate would have been greeted with elation rather than alarm. Low unemployment rates, however, have become the norm following the longest period of sustained growth in the postwar period. Until recently, an unemployment rate below 6 percent was thought to be impossible without inducing rampant inflation.

In 1992, early in the most recent expansion, the unemployment rate averaged 7.5 percent. It has been below 6 percent since 1994 and below 5 percent since 1997. Despite predictions to the contrary, the inflation rate over the same period remained below 3.5 percent (with an average inflation rate of about 2.3 percent).

How did this so-called New Economy continually reduce unemployment without succumbing to inflationary pressures? The most common conjecture was that the sustainable level of unemployment had fallen because the integration of computers and other technologies had increased worker productivity. Improvements in technology, once embodied, can increase the productivity of workers, making them more

valuable to firms, thus increasing the demand for labor.

A second theory, which has received much less attention, is that demographic changes would have led to a lower unemployment rate and higher productivity growth even without the new technologies. In particular, the aging of the baby-boom generation may have meant that: (1) relatively more workers are matched to the jobs where they are most productive, and (2) relatively fewer workers are at the beginning of their work lives, when spells of unemployment are most common. The resulting increase in job stability would lower the unemployment rate for the entire economy.

This article compares the extent to which these factors—technology and demographics—have contributed to the lower unemployment rate.

## Embodied Technology: New Tricks

Computers were around long before anyone began talking about the New Economy. Why, then, did they take so long to have an effect on productivity and unemployment? The answer revolves around the diffusion of technology, especially to nonmanagement workers. Early studies of the effects of computer investment found little or no correlation between information technology investment and productivity.<sup>1</sup>

More recent studies, however, indicate that computers and information technology may indeed be affecting the productivity of nonmanagement workers.<sup>2</sup> Technology, it seems, requires time for workers to incorporate it into their tasks; productivity only rises when new technology is fully embodied.<sup>3</sup> A study last year by economists Erik Brynjolfsson and Lorin Hitt contends that technology's value is mostly in its "ability to enable complementary organizational investments, such as business processes and work practices." These investments, they suggest, lead to an increase in productivity by decreasing costs and allowing firms to increase output. For example, the use of e-mail can decrease the cost of both inter- and intra-office communication. However, to have an effect on aggregate productivity, e-mail use must be widespread, filtering down from those specializing in information technology to secretaries, analysts and other nonmanagement personnel.

Despite this conventional wisdom, technology is not necessarily the benefactor it might appear to be. For example, in a 1999 study, economists Susanto Basu, John Fernald and Miles Kimball found that an improvement in a firm's technology tends to reduce employment in the first year and that employment may rise only two years later. In addition, new technology creates new problems as firms either have to replace their current workers with workers who are trained to use the new technology or they have to retrain their existing workers. It is possible, then, that as new technology is introduced, workers are replaced and productivity falls because workers and firms may need to learn how to use the new technology.<sup>4</sup>

## Demographics: Old Dogs

A 1998 article by economist Robert Shimer argues that a significant amount of the decline in the unemployment rate can be accounted for by the aging of the work force. Shimer proposes that young workers often move in and out of jobs as they search for the career that best matches their skill levels and interests. They, therefore, tend to experience more job changes and suffer more unemployment spells than older workers do. In addition, older workers tend to be more productive; in general, they have acquired more skills over time and are better matched to their jobs than their younger cohorts are.

U.S. data are consistent with Shimer's assumptions. The unemployment rate for young workers is typically about twice as high as the unemployment rate for workers older than 35. What makes this fact

important to today's economy? Aging baby boomers. As the large group of people born from 1946 through 1964 moves into an age group that changes jobs less frequently, the total unemployment rate should decline.

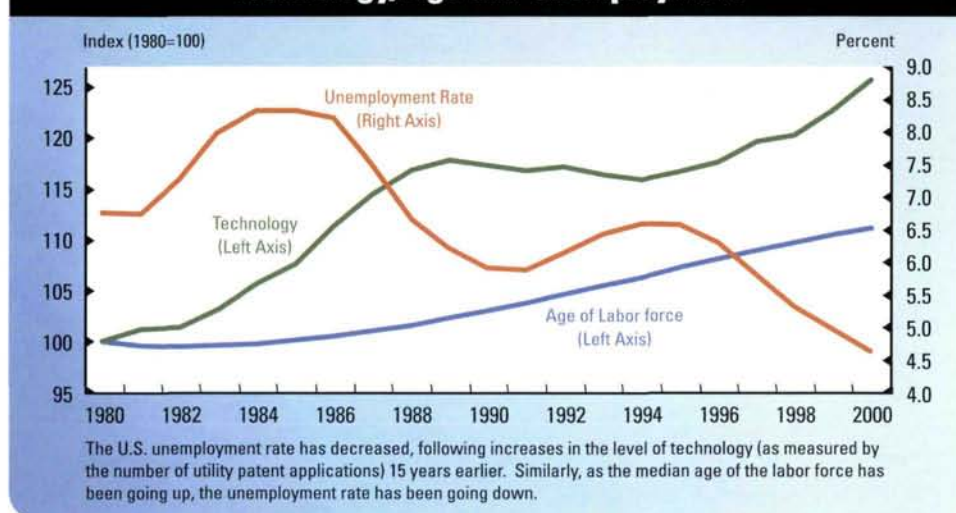
During the 1970s, as baby boomers started working, the median age of the labor force fell and the unemployment rate rose. Since 1980, however, the opposite has occurred: The median age of the labor force has risen while the unemployment rate has fallen.

The aging of the labor force should continue over the next few years.<sup>5</sup> According to the projection of the Current Population Survey of the Bureau of Labor Statistics, the labor force age group 45 to 64 will grow faster than that of any other age group. However, the survey also predicts that the share of workers age 16 to

percentage points) can be explained by the difference in the median age of the labor force, which was two years higher by 2000. We also find that the overall effect of technology was to increase the unemployment rate by 0.5 percentage points. (This is a net figure. The difference in the rate of technology accounted for a 2.1 percentage-point increase. However, much of this was offset by the difference in past technological improvements, which accounted for a 1.6 percentage-point decrease.) This leaves 2.2 percentage points of the decline in the unemployment rate that is not explained by either technology or the aging of the labor force.

The accompanying graph reveals the relationships between age, technology and the unemployment rate. While the level of technological improvements increased from 1965 through 1985, the

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24, the "baby-boom echo," will grow in that time, after two decades of declining. Thus, an age group with a typically high rate of unemployment will be growing in size, which could cause a subsequent rise in the aggregate unemployment rate.

### Findings

We performed some simple statistical analyses to evaluate the relative importance of improved technology and the aging population on the unemployment rate. In doing so, we account for the fact that current and past technological improvements can have an effect on the current unemployment rate.<sup>6</sup> Details of this exercise can be downloaded from a web site of the Federal Reserve Bank of St. Louis.<sup>7</sup> While these results are by no means definitive, they are strongly suggestive of the role that demographic changes have played.

In 2000, the average unemployment rate was 3.5 percentage points below the rate for 1992. Our results indicate that just over one-half of this drop (1.8 per-

centage points) can be explained by the decrease in the unemployment rate can be seen from 1980 through 2000, allowing 15 years for the embodiment of technology. It can also be seen that the unemployment rate went down over the past 20 years at the same time the median age of the labor force went up.

### Conclusions

The unemployment rate has fallen in the last decade while inflation has remained stable. Technological advances may not be the only cause. There is strong evidence that part of it can be explained by the aging baby-boom generation. In fact, we find that past improvements in technology and the rising median age of the labor force have played roughly similar roles in reducing the unemployment rate between 1992 and 2000.

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### ENDNOTES

- Black and Lynch (2000) review these studies.
- Brynjolfsson and Hitt (2000) find a positive correlation between productivity and computer use, and Black and Lynch (2000) use firm level data to reveal this relationship.
- Kliesen and Wheelock (2001) offer a historical perspective of technology embodiment.
- See Caballero and Hammour (1996) and Friedberg and Owyang (2001) for more detailed analysis of the effect of the spread of technology on the labor market.
- Current Population Survey, *Monthly Labor Review*, November 1999.
- We measure the rate of technological improvement by the number of utility patent applications. We measure past technological improvements by the number of patents 15 years earlier.
- www.stls.frb.org/publications/re/2001/d/data/regression.pdf

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