

## **Remarks by Vice Chairman Roger W. Ferguson, Jr.**

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### **Productivity Growth: A Realistic Assessment**

I want to thank Laura Tyson and the other members of the London Business School for inviting me to participate in your Stockton lecture series. As Laura requested several months ago, my topic this evening will be the "new economy" and more specifically the growth of labor productivity. This issue is one of the most studied in macroeconomics, yet it is an area in which obviously far too many puzzles remain. Of course, the usual disclaimer applies to my remarks: I will express my own views, and you should not interpret them as the position of the Federal Open Market Committee or of the Board of Governors.

How--you might reasonably ask--could so many questions remain after so much research on this key topic? The answer--I submit--is not that the productivity of my fellow economists is low or that the economics profession has failed in a key mission. Rather, it is that the underlying sources of productivity growth are very complex. On the surface, the determinants of productivity growth might seem straightforward: factors such as technological progress, capital deepening, and the changing institutional structure of labor and product markets. However, these fundamental determinants shift in importance over time and often do not lend themselves to measurement in the real world. As you know, to measure the hours worked of a lawyer, a doctor, a business school dean, or even a governor of a central bank is easy. But evaluating the quantity of our collective output is much more difficult. Thus, before embarking on any serious discussion of productivity growth, one must recognize the very difficult measurement challenges that we face. Different methods of data construction will yield different answers to important questions. But if we are consistent in our methods, I believe both our aggregate statistics and also microeconomic studies of productivity growth at the firm and industry level can yield important insights.

With that caveat about productivity measurement aside, let me state right from the outset of this lecture that I continue to be cautiously optimistic about productivity growth in the United States. Based on my reading of the data and my understanding of numerous business case studies, I believe that trend labor productivity in the United States accelerated in the mid-1990s. That acceleration reflected several factors not tied to the strong business expansion: notably, an apparent pickup in the pace of technological progress--especially in the so-called high-tech sector--as well as a surge in capital spending by businesses. But other factors were also at work, including well-aligned monetary and fiscal policies that created an economic environment conducive to noninflationary economic growth. In addition, our economy continued to benefit from past actions by the government to deregulate industries. The removal of unnecessary government regulation began more than twenty years ago, during the administration of President Ford, and gathered momentum during the Carter years. It has altered the business landscape. Deregulation allowed, indeed forced, businesses to focus more clearly on a marketplace that had become more competitive, with fewer constraints and increased flexibility.

## **The Statistical Evidence**

I think it would be useful at this point to review what the data actually tell us about the pattern of productivity growth in the United States. From the beginning of 1960 until the fall of 1973, labor productivity in the nonfarm business sector grew about 3 percent per year. Productivity growth then fell to an annual pace of 1-1/2 percent, likely in response to the supply shocks that hit the world economy during that period, higher inflation, a rise in uncertainty about the prospects for future economic growth, and public policy decisions that diverted resources from activities that would have generated more measured output. I should stress that, although I have listed several likely contributors, the ultimate cause or causes of this post-1973 productivity slowdown have eluded researchers. Productivity continued to grow at an annual pace of about 1-1/2 percent from 1973 to 1995. We can divide this period into several subperiods, yet the results are essentially the same: continued gains in labor productivity but well below the pre-1973 pace.

From 1995 to 2001, labor productivity grew at an annual pace of 2-1/4 percent. Research by my colleagues at the Federal Reserve--Steve Oliner and Dan Sichel--sheds some light on the sources of this faster productivity growth. Using a growth accounting methodology, they find that about half the acceleration in productivity can be attributed to capital deepening. As you know, providing workers with more equipment improves their efficiency. At the aggregate level, the high levels of business investment raised the amount of capital per worker and thereby boosted productivity. Also, most of the faster capital deepening reflected spending by businesses on high-tech equipment, mainly computer hardware and software. The other half of the pickup in productivity growth reflected technological innovations in the actual production of computer hardware and semiconductors as well as better management--perhaps assisted by these high-tech investments--of the nation's capital and labor. Oliner and Sichel estimate that, if one consolidates all the influences of high-tech investments, they fully account for the acceleration in productivity over the 1995-2001 period.

The Oliner-Sichel estimates are broadly consistent with the results of most other researchers in this field. I should also note that their conclusions have not changed in any fundamental way since they were first published in 2000. I mention this fact to address the concerns of some observers that recent revisions to the national income and product accounts have changed the evidence on post-1995 productivity growth. The last two annual revisions have indeed lowered output growth, but these adjustments followed several years of upward revisions. To focus on the most recent revisions is natural, but we should not lose sight of the complete record of historical revisions. Research by Board economists--Karen Dynan and Doug Elmendorf--clearly shows that we initially overestimate growth during recessions and periods of economic weakness. But we also initially underestimate growth in recovery periods. Thus, based on the revisions to growth over the past three years, I do not believe that one should presume that future data revisions will whittle away the post-1995 acceleration in productivity.

Microeconomic studies provide corroborating information to the macroeconomic evidence of a post-1995 acceleration in productivity growth. Industry studies indicate a pattern of greater efficiency gains after 1995, and one clearly gets that impression from talking to business leaders. These executives consistently say that, when they have little leverage to raise their prices, the key to boosting profits is productivity growth. Many corporate CEOs cite the more efficient use of information technology as one vehicle for cost saving, and I doubt that anyone would question the assertion that all of us are working "smarter and

faster" than we were in 1995. Researchers can and will debate the exact magnitude of that increment to our efficiency, but it was doubtless a key economic development of the past decade and one that will continue to pay dividends in future years.

Having said that I think the post-1995 productivity acceleration was real, let me also assert that we should constantly challenge our assumptions. With the passage of time and the acquisition of more information, we are better able to distinguish between events that have true long-run significance and those whose effects prove fleeting. In that spirit, I am the first to admit that we do not fully understand the boom and subsequent bust that has occurred worldwide in the high-tech sector--especially in the telecommunications area. There apparently was overinvestment in the late 1990s, but we do not yet know the exact magnitude. Furthermore, we don't understand how this overinvestment should be factored into our analysis of productivity growth over this period. It seems straightforward not to count nonproductive capital as part of the productive capital stock. But should we also exclude the value of such equipment from our measures of output as well? These tricky questions are important for us to resolve.

Similarly, I don't think we yet fully understand the role of Year 2000 preparations in either the late 1990s investment boom or the acceleration in productivity. Billions of dollars were invested to fix the Y2K bug, and we don't know how much of that spending was for the replacement of obsolete systems (and hence should be considered as depreciation in measuring the stock of available capital) or for the expansion and upgrading of systems (which, parenthetically, is the assumption we use in all our growth accounting exercises). But although these Y2K remediation efforts were costly and at times painful, virtually all the business leaders I know would assert that the efforts produced significant efficiency gains in the use and management of their information systems. Thus, the net effect of Y2K on our economy is still very much an unanswered question, and I'd like to see the research community systematically assess it.

### **Current and Prospective Productivity Growth**

The cyclical slowing in 2001 and gradual expansion in 2002 have raised a critical issue. That question is: Will productivity growth in the years ahead more closely resemble the substantial gains over the 1960-73 period or the weaker performance of the 1973-95 slowdown? I tend to believe that future growth will most likely follow the 1960-73 pattern, and the most recent record of productivity growth reinforces that view. Productivity is a cyclical variable that typically falls in recessions. However, during the most recent downturn, productivity never declined and instead continued to grow at a fairly strong pace. Moreover, after the tragic events of September 11, many economists feared that the U.S. economy would weaken substantially and that productivity growth would suffer a severe setback as well. In the event, output per hour in the nonfarm business sector has grown in excess of 5 percent over the last four quarters.

How should we interpret this truly extraordinary performance? Cyclical forces probably played some role. After September 11, many businesses sharply reduced their payrolls in anticipation of a slump in demand. But demand continued to grow briskly, and these companies learned to squeeze more output out of a smaller workforce. These efficiency gains likely were facilitated by the capital investments of recent years. Adjusting to new technologies takes time, and it is plausible that such an adjustment process has continued to boost productivity growth in recent years. Although cyclical forces and lags in the assimilation of new technologies have been important, their influence is likely to be transitory. More fundamentally, I believe that the trend in productivity growth has ratcheted

up, and this development has been the driving force behind the recent extraordinary productivity growth.

What might be wrong with this assessment? Some analysts have cited the low level of business confidence today and the possibility that it could inhibit economic growth. But sentiment rises and falls, and this period of pessimism, too, will pass. Others contend that productivity growth itself can be a problem because efficiency gains are achieved by a reduction in payrolls, which tends to deflate aggregate demand. I do not want to dismiss the notion that "downsizing" or "rightsizing" can be painful in the short run. It can be. But, this pain is transitory, and ultimately, the faster productivity growth raises real wages, stimulates growth in real incomes, and contributes to an increase in our standard of living.

A third risk, however, is that we will not get a meaningful recovery in profitability. Without such renewed corporate profits, firms will be reluctant to invest in research and development or to purchase new efficiency-improving equipment. In many cases, new technologies are introduced into our economy through capital investment, and the important productivity gains of recent years will not be repeated unless businesses continue to invest in new plant and equipment. Increases in business fixed investment, particularly equipment and software, are unlikely to return to the extraordinary levels experienced in the period immediately prior to the recent slowdown. However, a period of inadequate corporate investment that results in "capital shallowing" rather than capital deepening would almost surely hurt our productivity performance.

I do not attach a high probability to this latter scenario. Although some industries have suffered severe losses and have sharply curtailed their capital expenditures, other sectors have posted growth in earnings and have continued to invest. Thus, in the aggregate, the underlying picture of both corporate profits and capital spending is not as bleak as the experiences of some industries might suggest. Indeed, as measured in the national income and product accounts, economic profits in the second quarter--the latest available data--were 8-3/4 percent above year-earlier levels. And ultimately, if I'm right about the stronger underlying pace of productivity growth, aggregate profits will continue to recover once the sectoral imbalances are eliminated.

That brings me to the current state of the high-tech sector and its future prospects. To understand what is happening in that sector, we may find it helpful to put recent developments into a longer-term historical perspective. In the 1990s, the high-tech boom appears to have been sparked by the confluence of three key trends: the rapid growth in computing power generated by explosive advances in semiconductor technology; the advent of new networking technologies that permitted computers to communicate more easily with each other in private networks and through the public Internet; and the development of software programs that facilitated these interactions and greatly expanded the uses of personal computers. During such a period of rapid change, the rate of return to investing in these new technologies and applications seemed to be very high. The spectacular financial returns from investing in leading-edge technology companies induced new firms to enter these markets, supported by investors eager for windfall financial gains. As these new firms set up or expanded their operations, capital spending surged. For a time, investors seemed to think that high-tech companies were low-risk, high-return investments. But, as we all now know, they were wrong.

Ultimately, more businesses entered the high-tech field than could be supported by the substantial growth in demand in this sector. Businesses overinvested in high-tech equipment,

and when profits failed to materialize, many of these firms went bankrupt. In the end, the economy was left with an overhang of high-tech capital, which is exerting a drag on economic activity to this day.

Does this experience call into question the economic potential of these new information technologies? I don't think so. In the exigencies of the moment, one can easily lose sight of how much progress has been made over the past decade as a result of these new technologies. It is true that rates of return to high-tech investments were not as high as the most optimistic once thought. However, these technologies have truly changed the way businesses operate, and I believe that they will continue to do so in the future. The progress that is occurring today may not seem as *revolutionary* as it did five or six years ago. Nonetheless, the ongoing *evolution* of these technologies is continuing to generate productivity gains. We all have a natural tendency to look for the next "killer application" that will once again revolutionize the high-tech marketplace. This is the high-tech equivalent of "waiting for Godot," and we should not ignore the many, smaller changes to business practices that are continuing to yield real efficiency gains.

When will the high-tech sector recover? I can't give you an exact time or date, but I will assert that its economic prospects still seem positive over the long run. The capital overhang--especially in the telecommunications industry--obviously must be eliminated before any meaningful expansion can occur, and some additional consolidation may be necessary if businesses are to be profitable in the long run. But I, like many other observers, think such change is occurring and is likely to bear fruit in the years to come.

### **Conclusion**

To sum up, none of us, obviously, can see the future, and instead we shall have to monitor incoming data closely for evidence of any shifts in recent productivity trends. Nonetheless, I remain cautiously optimistic that the U.S. economy can continue to enjoy strong productivity-led growth that will raise living standards in the years to come. I believe this based on analyses at the firm, the industry, and the macroeconomic levels. The unbelievable stories of high-tech revolution were proven to be just that, unbelievable. But the more moderate and credible explanations remain.

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