

ECONOMIC COMMENTARY

Federal Reserve Bank of Cleveland

Unbalanced Growth and the U.S. Productivity Slowdown

by Paul W. Bauer

The single most important factor in determining a nation's standard of living in the long run is the productivity of its resources (primarily labor and capital). If maintained over time, even relatively small productivity growth rates can have large effects on living standards. For example, if productivity grew at a moderate 2.0 percent each year, the overall standard of living would double in only 35 years.

Private business productivity, though increasing in the postwar years, has slowed over time (see figure 1). The deceleration is especially easy to detect after 1970. Obviously, productivity growth displays a great deal of cyclical variation, tending to rise during expansions and fall during recessions. Of concern is the trend productivity growth rate, which is estimated by the fitted curve in figure 1. Its gradual arc over the past two decades indicates a dramatic drop-off in the growth of private business productivity.

Given its large potential impact on the quality of life, this slower trend rate of productivity growth in recent years is a serious concern. Indeed, if the rate had been only half a percent higher from 1970 to the present, GNP would have been \$600 billion more in 1991 alone—roughly twice the current defense budget.

Understanding why the productivity growth rate has been decreasing is crucial in order to formulate public policy to attempt to reverse the trend. The standard

explanations attribute the slowdown to a failure of U.S. resource management. Examples include declines in labor quality, slower capital accumulation (due in part to a historically low personal saving rate), expanded government regulation, a decline in the rate of investment in public infrastructure, and shortcomings by both private and public managers (for example, failure to implement new manufacturing techniques such as just-in-time inventories at a sufficiently rapid pace). The slower accumulation of new capital is considered particularly important, because technological advances are often embodied in new capital goods. In short, these explanations argue that some economic institutions, in either the public or private arenas, are performing worse now than they were in previous years.

Instead of blaming the downturn on some institutional failure, this *Economic Commentary* presents the case that at least some of the long-run U.S. productivity growth slowdown is a natural response to unbalanced growth. This explanation contends that structural issues are at the root of slower productivity growth as the economy evolves. Specifically, unbalanced growth appears to be shifting resources from sectors in which the productivity growth rate is higher (such as farming and manufacturing) to sectors in which that rate is lower (such as services), thus driving down overall productivity gains.

The trend rate of U.S. productivity growth has slowed dramatically over the past two decades, leading to a slower improvement in our standard of living. Although many would attribute this trend to failed resource management, some of the slowdown may be a natural response to unbalanced growth. In this scenario, resources are shifted from sectors with higher productivity growth rates to those with lower rates—such as the rapidly expanding service sector—thus slowing overall productivity gains.

■ What Causes Growth to Be Unbalanced?

Although the downturn in private business productivity growth over time is clearly evident, not all sectors of the economy have shared in the decline. Specifically, manufacturing productivity growth has been fairly steady in the long run despite its short-run cyclical variability (see figure 2).¹ This suggests that the problem is not economy-wide, but is instead related to the changing composition of the economy.

To illustrate how unbalanced growth can lead to an overall productivity slowdown, consider an economy in which there are only two sectors, a progressive one that experiences productivity growth and a stagnant one that does not.² (We can simplify this

analysis without any loss if we further assume that labor is the only resource.) As productivity gains accrue, workers in the progressive sector achieve greater output, while workers in the stagnant sector continue to produce the same amount of output. In such an economy, the cost of output in the stagnant sector must rise relative to that in the progressive sector over time.

If the demand for goods produced in the stagnant sector falls as the prices of the goods increase, then output and employment in the stagnant sector will recede. Eventually, the stagnant sector will disappear and productivity growth for the economy as a whole (now just the progressive sector) will continue unabated. Many services that were once commonplace have followed this process. How many milkmen have you seen lately?

Another outcome is possible, though. The demand for the goods produced in the stagnant sector might not diminish much as the costs of the goods rise. Moreover, if the demand for goods produced in the stagnant sector increases as the economy grows and incomes rise, then this demand will actually tend to grow over time. In such a case, an increasing share of the economy's workers will be absorbed by the stagnant sector. As this happens, the overall productivity growth rate of the economy will slow. As an example, compare the fate of the nearly extinct milkman to the proliferation of the pizza delivery industry in the past several years. Delivered pizza appears to be a product whose demand increases with income by an amount that is more than enough to compensate for its relatively higher price.

Unbalanced growth offers an intriguing interpretation of the productivity slowdown: It is not due to U.S. institutions' failure in areas where they used to succeed, but is instead merely a reflection of the nation's success in achieving productivity growth in a slowly growing sector of the economy, which has freed resources required to expand production in the more stagnant (but faster growing) sector. If unbalanced growth is part of the

FIGURE 1 PRIVATE BUSINESS PRODUCTIVITY GROWTH, 1948-1989

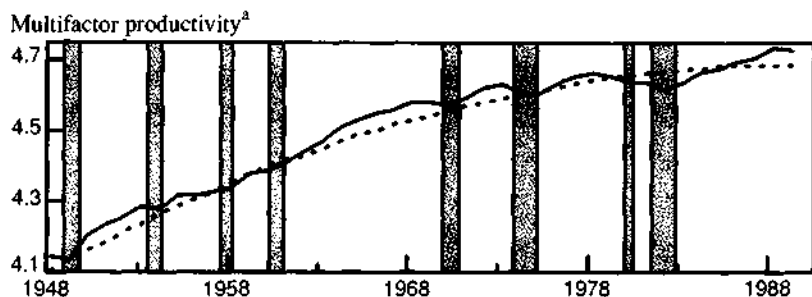
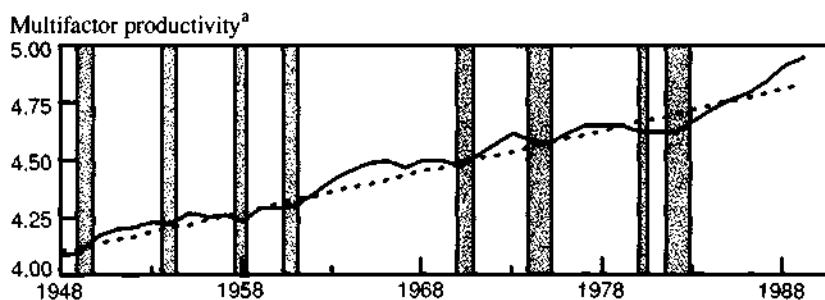


FIGURE 2 MANUFACTURING PRODUCTIVITY GROWTH, 1948-1989



a. Natural log of the multifactor productivity index, with base year of 1982.

NOTE: Fitted curve is represented by dashed line. Shaded areas indicate recessions.

SOURCE: U.S. Department of Labor, Bureau of Labor Statistics, Office of Productivity and Technology.

explanation for the productivity slowdown, then there must be some inherently stagnant economic sectors with price-insensitive demand for output. Not only would productivity growth in these sectors be slower than in others, but employment and output prices would increase faster than in other sectors, because of the price insensitivity of the stagnant sectors' output.

■ Evidence

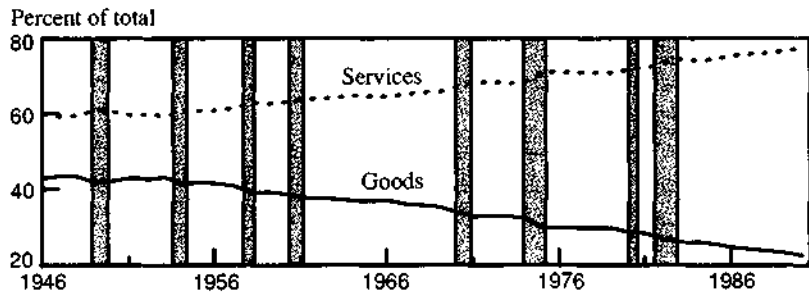
It has been suggested that the most likely candidates for stagnant sectors are services in which the labor is an end in itself—that is, where quality is judged directly in terms of the amount of labor.³ In particular, government, education, retail trade, hospital services, and entertainment are likely to have relatively stagnant productivity growth rates. For these services, personal attention is a key component of the product, making it difficult to substitute capital for labor. These stagnant sectors are similar to those cited in the late nine-

teenth century by Alfred Marshall, who emphasized that these are areas in which "...the improvements of machinery help us but little."⁴

Support for the unbalanced growth view can be found by dividing the U.S. economy into two sectors, a goods-producing sector and a service-producing sector. Services, which include the activities mentioned above, have historically had a much slower rate of productivity growth than the goods-producing sector. Multifactor productivity growth, which is a measure of the joint productivity of labor and capital, averaged only 1.4 percent in the service sector from 1948 to 1987, but in the goods-producing sector it averaged more than 2.1 percent.

Although not all services can be considered stagnant (graphics services have clearly experienced rapid technological progress since the introduction of computers) and not all goods can be considered progressive (the production of hand-

FIGURE 3 EMPLOYMENT SHARES, 1946-1990



NOTE: Shaded areas indicate recessions.

SOURCE: Council of Economic Advisers, *Economic Report of the President*. Washington, D.C.: U.S. Government Printing Office, February 1991.

blown crystal has experienced relatively little productivity growth), the conjecture about services' inherent poor prospects for productivity growth appears to hold in the postwar U.S. economy.⁵

These examples suggest the importance of an industry's capital-labor ratio in its prospects for productivity growth. While in general the service sector is less capital intensive than the goods sector, there are many counterexamples. Telephone services experienced rapid multifactor productivity growth (2.9 percent between 1948 and 1979) as the industry became increasingly capital intensive.⁶ Given the advances in computer and related technologies, it is likely that further capital deepening will continue to boost productivity growth for this and similar services.

Further evidence of the unbalanced growth view is that services' employment share has increased greatly relative to goods' employment share since the 1950s (see figure 3), having grown to 77 percent of the labor force in 1990 from 59 percent in 1948. The increasing use of outsourcing in manufacturing has contributed to the growth in service employment, but it is not the major cause.⁷

Finally, although not strictly comparable to the sector definitions used above, components of the Consumer Price Index indicate that the prices of services have increased more rapidly than those for commodities over this same period: 5.3 percent versus 3.9 percent. Again, this is consistent with the unbalanced growth explanation that the

stagnant sector's prices will increase relatively faster than those of the progressive sector.⁸

■ Conclusion and Policy Implications

Clearly, part of the U.S. productivity slowdown is the result of unbalanced growth—a rapidly expanding service sector with relatively small productivity gains combined with a slow-growing manufacturing sector, where productivity growth is stronger. The relatively stagnant growth of service-sector productivity partly reflects the fact that many services are inherently labor intensive, making it difficult to achieve productivity gains by substituting capital for labor.

If the prospects for technological change in the service sector remain limited, then the overall rate of productivity growth will continue to languish. However, given the labor intensiveness of many service-sector jobs, investment in human capital through education and training may help to improve productivity. If new technology tends to be embodied in new capital equipment in industries where physical capital is important (such as manufacturing), it is reasonable to infer that new technology may be embodied in new human capital in the service sector.⁹ The spillover benefits from investing in education and training are probably large enough to justify public policies directed at promoting these activities. In fact, there is reason to believe that the average job today requires a higher

level of education and training than in the past, so that public investment in education should expand even faster than it has already done.

Also, the prospects for productivity gains in the service sector may not be as meager in the future as they have been in the past. One reason for this suspicion is that computers have yet to be fully integrated into the service sector (or into the manufacturing sector, for that matter). Computers are used in almost every office in America, but business practices are only beginning to be refashioned to utilize their capabilities fully. It took 30 years for firms to exploit the advantages of electric over steam power in the manufacturing process by redesigning the flow of work on the manufacturing line and by employing a separate electric motor for each machine rather than relying on a single power source, as had been the case in plants driven by steam and water power.¹⁰ If the service sector follows this pattern of development, the greatest productivity gains from the computer revolution remain ahead.

Because the productivity slowdown is not economywide (being concentrated in the nonfarm, nonmanufacturing sectors of the economy), there appears to be little reason to suspect that our economic institutions are performing any worse now than in the past. The United States continues to have the highest productivity levels in the world. Real gross domestic product per U.S. worker is about a third higher than in Japan or the OECD, our chief economic competitors.¹¹ The higher productivity growth rates in these nations partly reflect the fact that it is easier to acquire advanced techniques from others than to develop them from scratch.

However, this does not mean that the United States can be complacent about its current rate of productivity growth. All feasible measures for boosting productivity should be considered. But there is no reason to suspect that the profit motive is any less powerful now than in the past, or that we as a nation are any less clever.

■ Footnotes

1. Some researchers have argued that productivity in manufacturing has been overestimated because manufacturing output is overstated. (See Lawrence Mishel, "Manufacturing Numbers: How Inaccurate Statistics Conceal U.S. Industrial Decline," Washington, D.C.: Economic Policy Institute, 1988.) Without a detailed study, it is impossible to determine whether these potential problems outweigh other measurement errors, such as product innovation omissions, that work in the opposite direction.

2. Although the idea was most fully developed by William J. Baumol ("Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis," *American Economic Review*, vol. 57, no. 3 [June 1967], pp. 414-26), it has a long history. Alfred Marshall discusses why the labor released by productivity gains in agriculture was going to the service sector rather than to the more technologically progressive manufacturing sector in his *Principles of Economics*, first published in 1890 (London: Macmillan and Co., 1961, eighth edition).

3. See Baumol, "Macroeconomics of Unbalanced Growth."

4. Of course, machines have boosted productivity for at least some of these activities. For example, technology has increased the productivity of string quartets by enabling them to produce recordings in addition to live concerts. However, this is a one-time boost to productivity that cannot be repeated. Although the quality of the recordings may improve marginally and the cost of the equipment to record the music may diminish somewhat, no similar large jump in productivity is possible for these groups.

5. In fact, the whole stone/clay/glass products sector experienced multifactor productivity growth of only 0.07 percent between 1948 and 1979. See Dale Jorgenson, Frank Gollop, and Barbara Fraumeni, *Productivity and U.S. Economic Growth*. Cambridge, Mass.: Harvard University Press, 1987.

6. *Ibid.*

7. See Patricia E. Beeson and Michael F. Bryan, "The Emerging Service Economy," Federal Reserve Bank of Cleveland, *Economic Commentary*, June 15, 1986.

8. Another explanation for the faster increase in service-sector prices argues that accelerated demand for services relative to commodities caused the wages of service workers to increase more rapidly than those of manufacturing workers. Although this can account for differential price increases of a cyclical length, it is a less-convincing explanation of the long-run differential considered here. For more details, see Peter Rappoport, "Inflation in the Service Sector," Federal Reserve Bank of New York, *Quarterly Review*, vol. 11, no. 4 (Winter 1986-87), pp. 35-45.

9. Investment in education is also important because, in general, workers in the service sector require two more years of education to match the age-earnings profile of manufacturing workers (see Randall Eberts and Erica Groshen, "Do the Earnings of Manufacturing and Service Workers Grow at the Same Rate over Their Careers?" Federal Reserve Bank of Cleveland, *Economic Review*, vol. 24, no. 4 (Quarter 4 1988), pp. 2-10.

10. For details, see P.A. David, "Computer and Dynamo: The Modern Productivity Paradox in a Not-Too-Distant Mirror," *Technology and Productivity: The Challenge for Economic Policy*. Paris: Organisation for Economic Co-operation and Development, 1991, pp. 315-47.

11. See John W. Kendrick, "U.S. Productivity Performance in Perspective," *Business Economics*, vol. 26, no. 4 (October 1991), pp. 7-11.

Paul W. Bauer is an economist at the Federal Reserve Bank of Cleveland. The author would like to thank Patricia Beeson, Michael Bryan, Randall Eberts, and Erica Groshen for their helpful comments. Kristin Priscak provided valuable research assistance.

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**Federal Reserve Bank of Cleveland
Research Department
P.O. Box 6387
Cleveland, OH 44101**

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