

But in view of the Oxford findings on streptokinase, physicians and health insurers are already adopting a cautious attitude about TPA because of its expense. The reason for the vast price difference between streptokinase and TPA is that the patent on streptokinase expired decades ago. Meanwhile, Genentech is trying to recoup the \$220 million it invested to develop TPA and make a profit, too, Bannister says.

Analysts say that the results have put Genentech on the defensive, pressuring it to drop TPA's price. As yet, however, the company is holding the line on the charge.

Last month, it was widely reported that Medicare officials had decided not to cover the expense of TPA at all. In fact, the agency said that the cost of TPA can be reimbursed under current limits of reimbursement for overall heart attack treatment, but decided that it would not make a special adjustment to cover TPA's high price alone, says William Winkenwerder, of the Health Care Financing Administration.

Winkenwerder points out that the net costs of treating a heart attack patient might be the same or less if, for example, TPA cuts the length of a patient's hospital stay. But it is too soon to tell, he says. A study by University of Michigan researchers suggests that TPA does lower medical costs by shortening patients' hospital stays, but the researchers themselves say that the findings are only preliminary.

The recent Oxford findings on streptokinase and press reports that Medicare had decided not to cover TPA have made Genentech investors skittish. The company's stock prices have been dropping this spring, starting from a high of about \$44 at the beginning of the year, falling to around \$35 in April and closed at about \$26 in late May. "A whole lot of things have put pressure on the stock," says Linda Miller, an analyst with PaineWebber. "Today people can't tolerate uncertainty."

Meanwhile, Bannister says that TPA sales have not changed and that the drug is outselling streptokinase about 2 to 1. Nevertheless, stock analysts have been lowering their projections of earnings per share for 1988. M. Kathleen Behrens of Robertson, Colman & Stephens says that company officials themselves "are more cautious in its outlook."

Braunwald says, "I maintain that TPA is at this time the agent of choice but I don't think this is the last word. We'll see different thrombolytics. We're likely to end up with a cocktail of a thrombolytic and an anti-platelet-like aspirin or others. Now we're off to the races in that there are many thrombolytics. The next few years will be as exciting as the past few."

■ MARJORIE SUN

A Prod to Productivity

For more than a decade, economists and policy-makers have been concerned about the sluggish growth in economic productivity in the United States. The problem affects perhaps two-thirds of the nation's industries and if not reversed will pave the way for the country to become a second-rate economic power. Understanding the problem and finding a cure has been difficult. Hundreds of industries are involved and productivity is affected by their interdependencies as well by swings in foreign exchange rates, and other economic factors.

Many economists, however, have long postulated that underinvestment by industry in research and in manufacturing processes is a key cause. This view is supported by two economists at the Brookings Institution, Martin Neil Bailly and Alok K. Chakrabarti, who have attempted to analyze this long-standing problem in *Innovation and the Productivity Crisis*. They conclude that federal support for applied R&D as well as for basic research must rise and federal tax credits should be continued.

Growth in productivity in the United States has been depressed to an extent by stiffer health and safety regulations and inflation. But the authors argue that to a large degree low productivity has resulted from slow innovation, missed opportunities, and poorly invested capital. For now, the country's competitive posture in overseas markets is improving, the economists note, because of declining currency values. But this reprieve, they say, will prove short-lived without improvements in productivity because foreign competitors are winning the efficiency race on many fronts.

The behavior of the business sector must change, the authors assert, if productivity is to grow at a faster pace. To do this, Bailly and Chakrabarti contend that a climate must be created for expanding private investment in applied research to produce new technology. Federal assistance is needed, they say, to give industry sufficient incentive to conduct applied research that otherwise would not be done because the economic return is not readily apparent or sufficient for a private company to undertake alone.

The failure to realize substantial productivity gains involves not just industry, but extends to the white-collar service sector. While the United States has had steady productivity improvements in the manufacturing of computers, the computerization of the American workplace has not yielded similar results, the authors say. There may be multiple explanations for this "productivity paradox": difficulty in measuring gains; a delayed response related to learning how to utilize the equipment efficiently; or findings that staffing cannot be reduced because equipment is not readily substitutable for labor in the information sector.

A fundamental weakness affecting much of American industry, according to Bailly and Chakrabarti, is the failure to diffuse new knowledge quickly and to refine existing technology. The slowdown in productivity in the United States, they say, occurred because we "failed to incorporate new technology effectively into production. . . ." The blame must be shared by the technical community for failing to make their innovations widely known and by industry executives who chose not to employ available technology that would have raised productivity.

In the machine tool industry, for example, innovation slowed between 1970 and 1977—long enough to allow foreign competitors to close the technology gap. As a result, Japanese, German, and Italian firms were able to take market share from the U.S. manufacturers in overseas and domestic markets.

Although a collapse in demand for machine tools and an overvalued dollar had adverse effects on the U.S. machine tool manufacturers, the authors say, "exports could have been sustained more effectively if [they] had retained their technological edge." The U.S. textile industry, Bailly and Chakrabarti note, was able to remain competitive because it retooled and it also closed inefficient plants.

Industry must increase its spending on research and utilize its capital more wisely. Costly marketing campaigns often yield only transitory results in what are finite markets. Companies might have been better off, the authors suggest, to have funded more research to enable them to produce superior products at lower costs.

Even with reforms, Bailly and Chakrabarti emphasize that additional federal support for R&D will be required to increase productivity. This research, the economists say, should be conducted by private companies that provide more than 50% in matching funds. Unless the nation makes a greater effort to improve productivity, they say, America's standard of living will continue to erode.

■ MARK CRAWFORD