

The NBER Digest

NATIONAL BUREAU OF
ECONOMIC RESEARCH, INC.

July 1994

Why We Can't Count on Budget Deficit Forecasts

The debate about the size and persistence of the U.S. budget deficit that dominated economic policy throughout much of the last decade has subsided, at least temporarily. Two major deficit reduction packages—each designed to restrain spending and increase taxes by \$500 billion over five years—were enacted in 1990 and 1993. Recent projections by the Congressional Budget Office (CBO) show the deficit stabilizing in dollar terms and shrinking as a percentage of GDP in the near future. But in a new NBER study, **Alan Auerbach** warns that forecasts of budget deficits have been consistently wrong in the past, and that U.S. fiscal policy—on a long-term basis—continues to be unsustainable.

In **The U.S. Fiscal Problem: Where We Are, How We Got Here, and Where We're Going** (*NBER Working Paper No. 4709*), Auerbach reviews recent U.S. fiscal performance, including the forecasts of future deficits made by the CBO from 1983 to 1993. In each year, fiscal policy was expected to reduce the budget deficit relative to the initial budget baseline. For 1988 to 1993—for which the most data exist—the average deficit reduction expected over the six years

was \$154 billion. Had these forecasts been correct, the U.S. budget would have moved solidly into surplus in the early 1990s. Instead, the budget deficit in 1992 was \$290 billion, equal to nearly 5 percent of GDP.

“Even if such optimistic forecasts prove correct, longer-run projections suggest that current fiscal policy is unsustainable.”

Auerbach shows that there were large errors in these forecasts, both because of changes in projected macroeconomic behavior and because of “technical” errors (changes in revenues and spending that could not be explained by policy or macroeconomic changes). For fiscal years between 1990 and 1993, technical errors alone accounted for an average \$132 billion per year. Auerbach finds no single explanation for these large and systematic forecasting errors. He concludes that the budget rules that legislators have developed to control deficits, including those now in effect, are ill-designed for

their apparent purpose. They fail to compensate for forecasting errors, and they encourage shifts in the timing of revenues and expenditures.

The inaccuracy of past deficit projections raises concerns about the current, optimistic forecasts. The CBO now projects that the deficit will fall to 2.2 percent of GDP by 1998. The deficit for 2003, which had been projected to rise to 6.9 percent of GDP before the most recent deficit reduction legislation, is now forecast to rise only to 3.1 percent of GDP. Another key measure of fiscal policy—the primary deficit (the deficit excluding interest paid)—will be only 0.4 percent of GDP in fiscal 1994, according to the CBO, and is projected to pass into surplus in fiscal 1995 and stay there through 2003.

Even if such optimistic forecasts prove correct, longer-run projections suggest that current fiscal policy is unsustainable. Auerbach forms projections of federal deficits after the year 2004 using conservative assumptions (noninterest government spending other than Medicare, Medicaid, and Social Security, for instance, assumed to remain constant at its 2004 share of GDP). He concludes that the primary deficit, which excludes interest on the national debt, will continue to grow over the next several decades to 3.2 percent of GDP by 2030, even if the relative price of medical care is stabilized by 2004. These large projected deficits, combined with the initial stock of outstanding U.S. debt (currently 51 percent of GDP), would cause the full deficit, including interest, to grow explosively relative to GDP. If real interest rates exceeded real GDP growth by one percentage point, for example, debt as a percentage of GDP would grow from 55 percent in 2004 to 131 percent at the end of 2030 and 410 percent at the end of 2070. RN

CEOs of Diversified Firms Earn More, and They're Worth It!

The chief executive officers, or CEOs, of diversified corporations are paid better than CEOs of single-business companies. During the late 1980s, for example, the CEOs of firms with two

distinct lines of business earned 10 to 12 percent more on average in salary and bonus than the CEOs of similar but undiversified firms. This corresponds to an additional \$115,000 to \$145,000 per year. Compensation increases further, but in smaller increments, with diversification into additional business segments.

Also, according to NBER Research Associate **Nancy Rose** and Faculty Research Fellow **Andrea Shepard**, the amount of extra compensation is as large for first-year CEOs as it is for those who have been on the job three or more years. "This suggests that the diversification premium is a characteristic of the job and its demands, and not a result of changes instituted by incumbent managers to increase their value to the firm or to pursue their own agendas." In other words, the CEOs of diversified companies are paid more because of their ability to manage the more complex companies, they write in **Firm Diversification and CEO Compensation: Managerial Ability or Executive Entrenchment?** (NBER Working Paper No. 4723).

"The diversification premium is a characteristic of the job and its demands."

The usual justification for diversification is that there are potential synergies or spillovers across lines of business. But these potential gains may be offset by an increased load on limited managerial inputs: operating in more than one industry requires the CEO to understand several, potentially quite disparate, product markets. The CEO may need to evaluate competitive strategies for product lines that have different customers, different industry structures, and different competitors.

Given all of these factors, Rose and Shepard conclude, the firm's marginal return to executive talent should increase with diversification. In an efficient market for managerial talent, this higher return will lead to higher compensation at more diversified firms. These results also may provide some clues as to the source of the disappointing performance of many diversified firms. "If ability-matching is a critical determinant of compensation patterns across firms, . . . diversified firms may simply be more difficult to manage successfully," the authors speculate.

Other analysts have argued that self-serving entrenched CEOs diversify in order to increase

the size of their companies and thus their pay, even when diversification reduces the value of the firm for shareholders. Diversification is seen as an easy way to increase firm size when anti-trust constraints restrict acquisitions within a firm's existing lines of business. Or, some argue, top executives change the scope of the firm to match their particular talents and thus show that they deserve more compensation.

However, Rose and Shepard find that those executives who diversified their companies during 1985–90, and whose firms did not grow, saw their compensation decline rather than increase. "While it is difficult to falsify the hypothesis that CEOs diversify because they have a taste for diversification, indulging this taste may be costly for the CEO," Rose and Shepard observe.

This study uses information on 558 CEOs in 418 companies from *Forbes* magazine's annual CEO compensation survey, together with information on firm characteristics from Standard & Poor's Annual and Industry Segment COMPU-STAT files, and data from the Center for Research on Security Prices. DRF

Energy Taxes Reduce Output

For some time now, there has been discussion in Washington of levying a broad-based energy tax on the BTU content of fuel. But a recent study by **Julio Rotemberg** and **Michael Woodford** for the National Bureau of Economic Research demonstrates that the output loss from such a tax is even higher than we previously had thought. If there is not perfect competition among energy-using firms—that is, even if there exists a modest markup of prices over marginal cost—then national output will fall by more than the revenue raised by an energy tax. If the tax is phased in, less output will be lost. Also, taxes that affect only household consumption of energy have much smaller effects on national output, Rotemberg and Woodford find, and no effect at all on employment or output outside of the energy sector.

In **Energy Taxes and Aggregate Economic Activity** (*NBER Working Paper No. 4576*), Rotemberg and Woodford report that, since the share of total energy expenditure in GDP is 0.066, a 1 percent increase in the tax on energy raises government revenues by only 0.066 percent of GDP. But in the long run, GDP will be reduced by 0.071 percent as a result of the tax, they estimate. If the tax is levied only on industrial uses of energy, the loss is even more severe: a 1 percent energy tax of that type raises government revenues by only 0.04 percent of GDP, while GDP is reduced by 0.05 percent.

"If there is not perfect competition among energy-using firms . . . national output will fall by more than the revenue raised by an energy tax."

If the tax increase is not expected to be permanent, then nonenergy output will contract more than if the tax were expected to continue forever. Rotemberg and Woodford estimate that, in the case of immediate implementation of a 1 percent energy tax that is expected to be reversed with a 20 percent probability each year, the revenues raised in the first year of the tax will be 0.066 percent of GDP, while GDP is reduced by somewhere between 0.11 percent and 0.14 percent. Five years later, if the tax is still in place, the GDP reduction will be between 0.10 percent and 0.13 percent.

Gradual phase-in of a 1 percent energy tax involves a revenue loss of 0.03 percent of GDP in the first year relative to the revenues from immediate implementation. But GDP also will fall by less than if the tax were levied all at once.

There's No Magic Link Between Downsizing and Productivity

"The conventional wisdom is that the rising productivity in the U.S. manufacturing sector in

the 1980s has been driven by the apparently pervasive downsizing over this period," begins a new study for the National Bureau of Economic Research by **Martin Neil Baily**, **Eric Bartelsman**, and **John Haltiwanger**. But the trio of economists find instead that plants that increased employment as well as productivity contributed almost as much to overall productivity growth in the 1980s as the plants that increased productivity at the expense of employment. Further, the authors uncover striking differences by sector. Yet despite these differences, most of the variance in productivity and employment growth is accounted for by idiosyncratic factors, they conclude.

In **Downsizing and Productivity Growth: Myth or Reality?** (*NBER Working Paper No. 4741*), Baily, Bartelsman, and Haltiwanger analyze data on about 140,000 manufacturing plants that were in operation in both 1977 and 1987, along with data on some plants that came into being, or disappeared, during the same period. They use plant-level data because aggregate data can be misleading, and they consider both gross output and value-added measures of labor productivity in this study.

The authors show first that productivity grew by about 39 percent for the manufacturing sector as a whole over the 10 years, while plants they call "continuers" had productivity growth of around 34 percent. That means that plants that entered between 1977 and 1987 had higher average labor productivity than the plants that exited. Thus, "the increased productivity of the new entrants accounts for approximately 30 percent of the overall increase in productivity in 1977-87."

"Plants that increased employment as well as productivity contributed almost as much to overall productivity growth in the 1980s as the plants that increased productivity at the expense of employment."

The authors point out that plants in mature industries, for example steel, were more likely to follow the conventional wisdom: they disproportionately fell into the downsizing-increasing productivity group. Plants in the Sunbelt were disproportionately represented in the upsize-increase productivity group, as were plants in New

England. The smallest plants were represented disproportionately in the group of plants that increased employment and decreased productivity, and the largest plants fell into the group that increased both employment and productivity.

In conclusion, however, they find that observable plant characteristics explain little of whether a growing or shrinking plant will have increasing or decreasing productivity. It may well be that plant management or worker skills are the key to linking productivity and employment. Thus, "it is possible to raise productivity and employment even within an industry that on average is lowering productivity and employment," they write.

How Fast Does Computer Technology Spread?

Over 40 percent of the mainframe computer systems in use in 1970 were IBM 360s, first introduced in 1965. These mainframes represented more than 20 percent of the systems in use up to 1974, by which time the IBM system 3 and 370 had entered the market. By year-end 1974, more than one-quarter of the installed systems in use were IBM 3 or 370s.

In **Did Computer Technology Diffuse Quickly? Best and Average Practice in Mainframe Computers, 1968-83** (*NBER Working Paper No. 4647*), **Shane Greenstein** asks whether this pattern of upgrading mainframe computer systems was as rapid as the spread of earlier innovations and inventions. He uses the term "best practice" to mean newest and best available technology at the lowest cost. He uses the term "average practice" to mean the typical technology in use, in terms or both type and cost.

Greenstein finds that, between 1968 and 1983, average practice technology in computing "underwent rapid improvement," virtually as rapid as the changes in best practice technology in the United States. "In most years, average practice advanced at a rate comparable to best practice," he estimates, never lagging best practice by more than six to seven years, and usually by less. A "diffusion lag" is measured by how many

years average practice is behind best practice. On that basis, and compared with other historical innovations, this diffusion was extraordinarily fast, he concludes.

“The diffusion of hardware did not markedly slow the absorption of new computing technologies into the general economy.”

Greenstein finds that the diffusion lag grows over the early part of the sample, but that it grows slowly or not at all over the middle and later parts of the sample. He also finds considerable variation in the experience of individual users. In each year, most users possess systems less than seven years old. However, “a substantial minority continued to possess old equipment, much of it representing generations that were easily 10 years old or older.” That minority is largest in the last five years of the sample.

He concludes that a diffusion lag of six to seven years (for mainframe systems) seems quick when compared with historically important innovations, most of which take longer than 10 years to be fully adopted. Consequently, the diffusion of hardware did not markedly slow the absorption of new computing technologies into the general economy. Nor was the speed of diffusion responsible for the observed lag between technical improvements in computing and realizing economic benefits from those improvements.

Higher Tax Costs Lower Foreign Direct Investment

As multinational corporations play a larger role in the business activities of the global economy, there is increased interest in international aspects of capital income taxation. In the United States, debate has centered on the competitive position of U.S. firms in international product and capital markets. This concern is accompanied by

complaints that U.S. international tax rules have become more complex and more distorting in the past several years, particularly since the passage of the Tax Reform Act of 1986.

Discussions in the Congress and the administration since 1992 indicate a willingness to at least consider significant reforms. Policy developments in the United States and around the world, of course, raise a deeper question of whether the current system of taxing international income is viable in a world of significant capital market integration and global commercial competition. These discussions focus on how sensitive foreign direct investment (FDI) by multinational firms is to changes in the cost of capital for FDI. That cost of capital will be affected not only by the pretax financial cost of capital, but also by tax parameters in the “home” (residence) and “host” (source) countries.

In **The Tax Sensitivity of Foreign Direct Investment: Evidence from Firm-Level Panel Data** (*NBER Working Paper No. 4703*), **Jason Cummins** and **R. Glenn Hubbard** use previously unexplored (for this purpose) panel data on outbound FDI by several hundred subsidiaries of U.S. multinational firms during 1980–91 to measure more precisely the tax influences on FDI, and to analyze subsidiaries’ decisions on new investment. Tax considerations can affect subsidiaries’ decisions about new capital investment through two channels. First, corporate income tax rates, investment incentives, and depreciation rules in the host country affect the cost of capital for foreign investors.

“Changes in foreign corporate tax rates and depreciation rules have a significant impact on overseas investment by U.S. subsidiaries.”

Second, tax policy affects FDI from countries with residence-based tax systems, such as the United States, through variation (over time and across firms) in the “tax price” of subsidiaries’ dividend repatriations to their parent firms. In addition to variation over time in statutory tax rates, there is variation in the foreign tax credit status, both across firms and over time, for a given firm. Parent firms in an “excess limit” position owe residual U.S. corporate tax if the U.S. corporate tax rate exceeds the applicable foreign tax rate.

Parents in an "excess credit" position owe no residual U.S. corporate tax. In the approach used by Cummins and Hubbard, temporary changes in the "tax price" can affect both repatriations and FDI.

To analyze the effects of changes in pretax returns to investing, and in the tax parameters on FDI by individual U.S. multinationals, the authors use data drawn from companies' reports of information about foreign operations. In these data, both U.S.- and foreign-incorporated firms report sales, operating income, and fixed assets. Their tests conclusively reject the simple notion that "taxes don't matter." Both host country and U.S. tax parameters should be included in the correct specification of the subsidiary's investment de-

cision, they find.

Moreover, they estimate that each percentage point increase in the cost of capital leads to a 1–2 percentage point decrease in the annual rate of investment (investment during the year divided by the beginning-of-year capital stock). This effect is similar to what recently was estimated for domestic investment by U.S. and European firms. This implies that changes in foreign corporate tax rates and depreciation rules have a significant impact on overseas investment by U.S. subsidiaries. For example, for a U.S. parent, a shift from an "excess limit" to an "excess credit" position raises the cost of capital for firms operating in high-tax foreign jurisdictions, reducing their overseas investment in those jurisdictions.

NBER

The National Bureau of Economic Research is a private non-profit research organization founded in 1920 and devoted to objective quantitative analysis of the American economy. Its officers are:

*President and Chief Executive Officer—Martin Feldstein
Executive Director—Geoffrey Carliner
Director of Finance and Administration—Sam Parker*

*Chairman—Paul W. McCracken
Vice Chairman—John H. Biggs
Treasurer—Gerald A. Polansky*

Contributions to the National Bureau are tax deductible. Inquiries concerning the contributions may be addressed to Martin Feldstein, President, NBER, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398.

The NBER Digest summarizes selected Working Papers recently produced as part of the Bureau's program of research. Working Papers are intended to make preliminary research results available to economists in the hope of encouraging discussion and suggestions for revision. The Digest is issued for similar informational purposes and to stimulate discussion of Working Papers before their final publication. Neither the Working Papers nor the Digest has been reviewed by the Board of Directors of the NBER.

The Digest is not copyrighted and may be reproduced freely with appropriate attribution of source. Please provide the NBER's Public Information Department with copies of anything reproduced.

Preparation of the Digest is under the supervision of Donna Zerwitz, Director of Public Information. The articles indicated by RN and DRF were prepared with the assistance of Rob Norton and David R. Francis, respectively.

Abstracts of all current NBER Working Papers appear in the NBER Reporter. Individual copies of the NBER Working Papers summarized here (and others) are available free of charge to Corporate Associates. For all others, there is a charge of \$5.00 per paper requested. (Outside of the United States, add \$10.00 per order for postage and handling.) Advance payment is required on all orders. MasterCard and Visa are accepted. Please do not send cash.

Subscriptions to the full NBER Working Paper series include all 300 or more papers published each year. Subscriptions are free to Corporate Associates. For others within the United States, the standard rate for a full subscription is \$1300; for academic libraries and faculty members, \$650. Higher rates apply for foreign orders.

Partial Working Paper subscriptions, delineated by program, are also available. For further information or to order, please write: National Bureau of Economic Research, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398. Or call the Publications Department at (617) 868-3900. Please have the Working Paper Number(s) ready.

Requests for Digest subscriptions, changes of address, and cancellations should be sent to Digest, NBER, 1050 Massachusetts Avenue, Cambridge, MA 02138-5398. Please include the current mailing label.