

Research Department
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The Mystery

Edward Denison's path-breaking work, *Accounting for United States Economic Growth, 1929-69*, will soon have a timely sequel in *Accounting for Slower Economic Growth: The United States in the 1970's*. In an excerpt from his forthcoming book in the August issue of the *Survey of Current Business*, Denison tries to explain why the nation has become so unproductive during this frustrating decade, but confesses that the causes of the downtrend remain largely a mystery. In this situation, it might be useful to examine some of the explanations Denison puts forward, to see which (if any) might clear up the mystery he describes.

Apparently, 1973 marks the watershed year, although some slackening in productivity was apparent even earlier. Over a quarter-century, 1948-73, national income per person employed in the private sector increased by an average of 2.4 percent a year. (This sector includes the entire economy except government and housing.) Overall, productivity increased 82 percent in that 25-year period. But by mid-1979, productivity was actually below the 1973 level, reflecting the ups and (mostly) downs of the past half-dozen years. In contrast, productivity today would be roughly 16 percent above the 1973 level if the earlier trend had continued.

Whatever the reason for the slowdown, it apparently has pervaded the entire economy. Citing an alternative productivity measure, real GNP per hours worked, Denison finds that growth rates declined substantially in the post-1973 period for 10 of 11 major industries—including durable manufacturing, nondurable manufacturing, trade, services and the like. The only exception was communications (mainly the telephone industry). International comparisons provide similar evidence. The growth rate of real output per worker declined for seven major industrial countries in the post-1973 period, and not only for this country.

Indeed, all other countries except Germany showed even larger declines than the United States.

Accounting for growth

Denison views economic growth as the result of changes in a large number of determinants that govern the size of a nation's output. He thus estimates the contributions, positive or negative, made to the growth rate by all quantifiable determinants. The combined contribution of the remaining determinants is obtained as a residual—which is where most of the present problem resides.

Growth of output may be obtained by using more labor and property resources in production, or else by increasing the output obtained from the same quantity of resources. Contributions of the former type would result from changes in employment, working hours, and personal attributes of employed persons, and also from changes in the amount of capital or the amount of land employed. Contributions of the latter type would result from changes in the state of knowledge, efficiency of resource allocation, size of markets, and other conditions that alter the amount of output obtainable from a given amount of input.

A substantial rise in many of these factors helped generate the 2.43-percent average growth rate of output per worker over the 1948-73 period (see chart). Increased education of employed persons, increased capital per worker, improved resource allocation, and economies of scale all contributed to the strong overall productivity growth. The growth rate would have been even larger but for reductions in average hours of work and shifts in age-sex composition toward younger and less experienced workers.

In contrast, many of these factors turned unfavorable in the post-1973 period, so that

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productivity actually declined at a 0.54-percent annual average rate in the 1973-76 period—and apparently continued to decline in the subsequent period, for which detailed data are not yet available. The overall negative swing in productivity amounted to 2.97 percentage points (annual average) between the 1948-73 period and the 1973-76 period. Several factors remained positive during the 1973-76 period, such as increased education, increased capital per worker, and economies of scale. But other factors were strongly negative, such as a sharp reduction in hours worked and a significant increase in costs associated with anti-pollution and health-and-safety legislation.

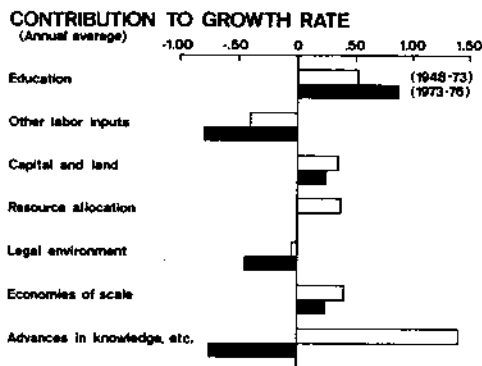
Accounting for no-growth

But the most important reason for the break in the growth pattern was a major—and largely unexplainable—shift in a catch-all collection of other factors. This residual category accounted for most of the 1948-73 growth but also for most of the later decline in growth; indeed, it accounted for more than two-thirds of the entire decline in the growth rate between the two periods. In Denison's view, growth in this category relies mainly on "advances in knowledge"—the gains in measured output that result from the incorporation into production of new knowledge of any type, managerial and organizational as well as technological. Quality changes are left out of consideration, because only the advances in knowledge that reduce the unit costs of already existing final products contribute to measured growth.

The residual showed a nearly constant growth rate between 1948 and 1973, because those determinants whose effects could be directly estimated accounted for most of the irregularities in the productivity-growth trend up to that point. But the series then departed abruptly from past experience, much to Denison's puzzlement. He reviews a number of possible reasons—17 in all—that might account for the abrupt shifts in this residual measure of productivity growth, but he finds most of them unsatisfactory. The basic problem is that nearly all the possible reasons advanced for the slowdown would be much more likely to affect growth trends gradually rather than suddenly, as actually happened.

Denison tends to dismiss the popular explanation, especially favored by elderly commentators—"People don't want to work any more." (After Denison first reported his puzzlement about the productivity decline, many long-distance phone callers reminded him, "usually with the patronizing air used in speaking to children and the simple-minded," of this "obvious" explanation.) But that explanation may not be relevant to the present situation. After all, that argument has been heard for generations (nay, millennia) and indeed, it is heard today in such unlikely places as Japan and Germany as well as the United States.

Because of the strong importance of "advances in knowledge" to past productivity growth, Denison examines several possible underlying factors—such as a decline in research-and-development spending or the aging of the capital stock—to see if they could account for the recent decline. While not denying the existence of these phenomena, Denison argues that they have exerted only a modest negative impact to date on productivity growth. Similarly, he notes the existence of regulatory impedi-



ments to growth, but argues that much of this impact is already measured by such disincentives as anti-pollution and health-and-safety regulations.

Post-1973 factors

Since the key mystery is why productivity weakened so badly after 1973, it seems logical to search for factors which became apparent after that date. An obvious explanation would seem to be the energy crisis—except that that factor's measurable impact has been less than commonly supposed. For example, George Perry states in a Brookings study, "It seems unlikely that higher energy prices have caused more than a 0.2-percent loss of labor productivity and potential output between 1973 and 1976." Other studies have come up with higher figures, but few suggest that the energy crisis is a major cause of the sharp break in the productivity trend.

A more relevant explanation may be inflation. Of course, the nation was beset by inflationary pressures prior to 1973, but the persistence of the problem—and the public's anticipation of further inflation—may have been the catalyst behind the recent shift. Denison lists inflation as only one of the 17 possible explanatory factors, but its pervasive influence can be seen behind other factors that he cites, such as major data miscalculations. For example, output data in the post-1973 period were probably subject to greater errors than usual because of inflation, since major price swings significantly affect data adjustments, such as the inventory valuation adjustment.

Still, inflation's major impact has been felt more directly through its debilitating impact on productivity. As described by Milton Friedman in his Nobel lecture, "A fundamental function of a price system . . . is to transmit compactly, efficiently, and at low cost the information that economic agents need in order to decide what to produce and

how to produce it, or how to employ owned resources. The relevant information is about *relative* prices—of one product relative to another, of the services of one factor of production relative to another, of products relative to factor services, of prices now relative to prices in the future. But the information in practice is transmitted in the form of *absolute* prices—prices in dollars or pounds or kronor.

"If the price level is on the average stable or changing at a steady rate, it is relatively easy to extract the signal about relative prices from the observed absolute prices. The more volatile the rate of general inflation, the harder it becomes to extract the signal about relative prices from the absolute prices: the broadcast about relative prices is, as it were, being jammed by the noise coming from the inflation broadcast . . . At the extreme, the system of absolute prices becomes nearly useless, and economic agents resort either to an alternative currency or to barter, with disastrous effects on productivity."

There may be no all-encompassing explanation of the post-1973 productivity downtrend, but persistent inflation may help explain away a significant share of the mystery which Denison cites. Obviously further research is needed. This suggests, at least, that more job opportunities will be created for economists as the search widens into the mystery of growth and no-growth.

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