

# Causes of Declining Growth

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From 1979 to 1989, growth in U.S. real gross domestic product (GDP) slowed to only 2.5 percent per year. From 1989 through the first half of 1992, growth has slowed further to only 0.5 percent, with growth reduced about 2 percent below normal due to transitory cyclical factors. Thus, either way you look at it, what is alternately termed trend, secular, steady-state, or capacity growth has slowed to about 2.5 percent. This growth is very slow compared to the trend growth of nearly 4 percent experienced in 1948-65 or even the 3.1 percent of 1965-79. In the perspective of this century, recent U.S. growth is slow but not unprecedented: for example, trend real GNP growth was only about 2.25 percent during 1929-48 as the capital stock fell due to the Depression and World War II.

This observation provides part of the explanation for slower recent growth compared to 1948-65: the earlier postwar period was dominated by a catch-up in the capital stock to levels consistent with the equilibrium labor-output ratio, and growth averaged only about 3.1 percent over the years 1929-65, the same as this century taken as a whole. I believe that many other countries also experienced rapid growth in the decades immediately following World War II as they restored their capital stock and adopted not only American technology but many American institutions. As they converged to a new equilibrium, these countries, too, would naturally experience a slower trend growth rate. However, my role is to concentrate on the United States and leave it to those who follow to see whether the catch-up framework or the remainder of my remarks can be applied to other

countries.

Granted that the United States cannot expect normal growth much above 3 percent, 2.5 percent falls short of 3 percent. Indeed, it can be argued that the period since 1979 should have been better than average both because of more rapid labor-force quality improvements and because increases in average hours worked roughly offset slower growth in employment. Thus it is not surprising that an important question for central bankers and other economic policymakers is "Why has growth declined and what can we do to increase it?" Once again the organizers of the Jackson Hole Symposium have confronted us with a question whose difficulty is exceeded only by its importance.

Having managed until this January the agency responsible for creating our GDP and related measures, I am a frank agnostic as to whether this shortfall in measured trend growth relative to our expectations reflects problems of measurement or a real economic phenomenon. In these remarks, I shall first consider measurement problems as an explanation of the apparent slow growth. Although I believe it possible that we ultimately shall find that these problems explain much or all of the shortfall in measured normal growth, we must confront the possibility that the decline is real. Accordingly, I shall then set mismeasurement aside and consider some explanations for a real decline in secular growth. Regardless of whether or not secular growth has really declined, cost-effective policies to promote growth are important goals for the United States or any economy.

### **Problems of measurement**

It has always been difficult to measure real GDP because it is very difficult to divide nominal revenue reported in firms' accounts into its price and output components. This is a relatively simple task for basic commodities but becomes progressively more difficult for the more high-tech goods and for services for which even the units of output are far from obvious: a pound of computers or a billion floating-point operations? A hospital day or days of healthy life saved? An hour of a grocery clerk's time or pounds of potatoes sold at retail? With the notable exception of computers where a hedonic price index has been introduced, there seem to be large net downward biases in estimates

of output growth for high-tech goods and services. Indeed, for many services, output is measured by hours of input with productivity growth simply assumed zero. Some areas such as banking or air travel are even worse. Malabre and Clark (1992) recently produced a remarkable *Wall Street Journal* article on just this issue.

Many economists have spent a great deal of time thinking about the implications of mismeasurement of quality change on measured real GDP growth and reached a rough consensus that the net bias is downward and, more controversially, on the order of anywhere from 0.5 to 2 percent.

Working-stiff macroeconomists as well as real-world policymakers have generally thrown up our hands and tried not to think about these messy issues since we can live with a downward bias as long as it seems to be pretty much constant. Unfortunately for us economists—although it would be fortunate for the economy if true—there is some reason to believe that the downward bias has increased significantly over the last 12 years or so and this may mean that the shortfall in secular growth is more apparent than real. The main reason that the downward bias may have increased significantly is sharply accelerated growth in the broadly-defined service sector compared to the goods sector.

As Table 1 illustrates for the normal-employment years 1965, 1979, and 1989, what has occurred is not an increase in payroll employment growth in the services sector of the economy, but a shift from slower growth to an actual decline in the goods sector—a net swing of one and three-quarters points. I worked through the arithmetic to find that this sectoral shift could reasonably account for an increase in the downward bias in real GDP growth of about 0.6 percentage point.' Therefore, measured trend growth since 1979 may have been reduced from about 3.1 to 2.5 percent due to the interaction of the accelerated shift toward the services sector and the much greater downward bias there. This more rapid shift toward services from goods may reflect the shift toward nontradable goods as a result of the dollar appreciation which had persistent effects throughout much of this period. A shift back toward tradable goods could thus cause more rapid measured output growth over the coming decade.

**Table 1**  
**Growth Rates of Nonfarm Private Employment**  
 Establishment Data

Period	All Sectors	Goods Sector	Services Sector	Services - Goods Sectors
1965 - 79	2.691	1.343	3.571	2.228
1979 - 89	2.035	-.440	3.189	3.629

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Notes:

1 All rates calculated as continuously compounded annual rates.

2 "All sectors" includes goods, services, and structures sectors.

I should note that I have taken care to compute average growth rates of output, inputs, and productivity between normal-employment years not affected by price-control measurement problems. Given the strong procyclical movement in productivity, the apparent overstatement of real output and productivity levels during price-control periods, and the very small normal productivity growth rate, failure to do so can greatly distort comparisons. For example, during a recession, measured productivity may fall by 3 or 4 percent. When periods like decades are compared, ending one period during a recession would reduce measured average productivity growth during that period by nearly half a percentage point and add it to the next period's growth, thus producing a spurious swing on the order of 0.8 percentage point.

In addition to this pure bias problem, there is also a price-index problem. This problem arises because the fastest growing sectors—especially computers—tend to have the fastest falling relative prices. The shift from 1982 to 1987 as the base for calculating real output very slightly increased output growth in 1965-79 but reduced real GNP growth significantly during 1979-89. The net effect of the base-year change on measures of relative output and productivity growth between the two periods amounts to 0.3 percentage points. The combination of the estimated increase in downward bias plus the price-index effect on recent growth thus comes to just about a full percentage point of doubt about the measured 0.6 point output growth decline.

I do want to pursue the possibility of changing mismeasurement further because we really will not have a good idea of how significant it is until further progress on the economic statistics is made under the Boskin initiative—if ever, given current Congressional threats to gut the statistical agencies' budgets. So let us turn to real explanations of the decline in real GDP growth.

### Real explanations

The years 1948-64 were a period of slow labor growth and rapid labor-productivity growth while 1965-79 was a period of rapid labor growth and slow labor-productivity growth. In a 1984 *American Economic Review* article, I showed that these differences in labor-productivity growth could be explained primarily by changes in the quality or human-capital content of the labor force and secondarily by rapid growth in the capital-labor ratio over the 1948-65 period. The labor-quality index was based on education, age-sex distribution, and acculturation of immigrants. During the baby-bust/low-immigration 1948-65 period, labor quality grew 0.4 percentage points faster than the 1900-79 average while during the baby-boom/high-immigration 1965-79 period, labor quality grew 0.4 percentage points less than that average. Robert Barro will demonstrate tomorrow the importance of human capital in understanding variation in economic growth across countries.

Since my labor-quality index worked well earlier, I conducted a preliminary analysis for this conference, and found that the labor-quality index for 1979-89—the years for which I had sufficient data—grew about 0.1 percentage point faster than in 1900-79 or 0.5 percentage point faster than in 1965-79. Holding other factors constant then, we should have seen the 0.7 percentage-point decline in private employment noted in Table 1 largely offset by a 0.5 percentage-point increase in labor-productivity growth. However, gross private product (GPP) growth fell by the full 0.7 percentage point with productivity growth unchanged; so we need to identify other factors which were not constant to explain an approximate shortfall of one-half percent in both output and labor-productivity growth.

Things get even messier if we consider alternative measures of labor input. For example, while the establishment data indicate that growth

in GPP per employee is virtually constant comparing 1965-79 to 1979-89, growth in GPP per hour declined by 0.3 percentage point in the latter period because average hours worked declined by only 0.3 instead of the 0.6 percentage point reduction measured in the earlier period. That is, GPP per hour declines by 0.3 percentage point when human-capital factors would predict a half point rise. In my 1984 study I had linked interpolated census data to extend the household-survey data back over the century. In Table 2, I illustrate that the household data indicate a 0.8 percentage point drop in GPP per hour growth in 1979-89 versus 1965-79. It seems that one lesson is that the input series may be measured every bit as imprecisely as the output series.

**Table 2**  
**Growth Rates of Private Employment and**  
**Labor Productivity**  
 Comparison of Establishment and Household Survey Data

Period	Private Employment		GPP Per Employee		GPP
	Estab- lishment data	Household data	Estab- lishment data	Household data	
1965-79	2.691	2.188	.522	1.025	3.212
1979-89	2.035	1.834	.511	.713	2.547

  

Period	Average Hours		GPP Per Hour	
	Estab- lishment data	Household data	Estab- lishment data	Household data
1965-79	-.595	-.281	1.117	1.306
1979-89	-.313	.177	.824	.536

Notes:

1 All rates calculated as continuously compounded annual rates.

Since it is very important to maintain a long-run perspective with respect to output and productivity trends, I want to concentrate, with all due caveats, on the linked census-household data in Table 3. The post-1979 productivity growth which seemed low in the previous table here appears extraordinarily low relative to 1900-79 as a whole—some 1.2 percentage points below normal after accounting for labor

quality. Things are even worse if one believes the average hours worked numbers—1.6 percentage points below the 1900-79 norm. I conclude that looking carefully at the measures of labor input cannot explain why growth has declined, but rather only deepens the mystery.

**Table 3**  
**Growth Rates of Private-Sector Labor Productivity**  
**Measures**  
Linked Census-Household Data

Period	GPP	Growth Rates of					
		Private Emplmt.	$\frac{\text{GPP}}{\text{PE}}$	Quality Index	$\frac{\text{GPP}}{\text{QAPE}}$	Average Hours	$\frac{\text{GPP}}{\text{QATHWP}}$
1900-79	3.23	1.40	1.82	.31	1.54	-.23	1.74
1900-29	3.42	1.77	1.65	.12	1.51	-.22	1.76
1929-65	2.98	.87	2.10	.60	1.51	-.27	1.78
1965-79	3.21	2.19	1.02	-.07	1.10	-.28	1.38
1979-89	2.55	1.83	.72	.39	.32	.18	.15

Definitions:

<b>GPP/PE</b>	Gross Private Product/Private Employment
<b>GPP/QAPE</b>	Gross Private Product/Quality-adjusted PE
<b>GPP/QATHWP</b>	Gross Private Product/Quality-adjusted Hours Worked
Quality Index	Darby (1984) Index which adjusts labor force for age, sex, education, and immigrant acculturation

Notes:

- 1 All rates calculated as continuously compounded annual rates.
- 2 The first three lines are from or as implied in Darby (1984). The last two lines update and extend Darby (1984) using later data.

Neoclassical growth theory tells us that output per quality-adjusted hour of labor should grow as the sum of the product of the capital coefficient and capital-labor ratio growth and a trend or residual factor normally termed something like technical progress or total-factor productivity growth. "Technical progress" in this sense reflects not only technology change but any other changes in the efficiency with

which the geometrically-weighted average of inputs is converted into output. I particularly have in mind here such factors as changes in regulation. Standard measures of capital investment do not seem to indicate any dramatic movement in the capital-labor ratio and it is too easy to conclude that growth has slowed because of declining technical progress since that merely labels our ignorance. Both the DeLong and Summers and Auerbach papers explore the important issue of whether different forms of investment have different growth implications because of spillover effects. I would also like to raise the issue of the effects of rapid increases in regulation on the aggregate production function and, hence, productivity and growth. We economists frequently talk about making rational tradeoffs between growth and the environment or other social values, but I know of no systematic attempt to quantify those tradeoffs as an explanation of changes in technical progress.

## Conclusions

Many commentators, not all of whom are running for elective office, give a very alarming picture of disappearing growth: 4 percent in the 20 years after World War II, then just over 3 percent in the next 15 years, then 2.5 percent in the next 10 years, and only half a percent lately. I have explained why I think that nihilistic view is simply wrong. Indeed, there is a substantive argument that increased downward bias alone has lowered measured trend growth since 1979 from 3.1 or 3.2—3.5 using 1982 dollars—to about 2.5 percent. On this view, recent growth—transitory cyclical effects aside—is at least comparable to the measured growth experienced in the first 80 years of this century, and maybe a bit stronger.

While the glass may be half full, it also seems to me that there is a very real sense in which it remains at least half empty. The baby boom is maturing and immigrants are acculturating. We should be experiencing strong growth in output per employee from both the human-capital and average-hours viewpoints. Thus, even normal trend growth or a bit above would seem too low. Economists are a clever bunch and all may be explained over the next few years if not the next few days. I certainly am eager to begin that process and shall not delay it by saying any more.



## Endnotes

<sup>1</sup>There is no unique way to quantify the effects of the drop in goods-sector labor on measured real GDP that actually occurred with what would have been recorded if the 1965-79 growth in goods-sector labor had continued with a corresponding reduction in service-sector labor growth:

Year	Goods Output	Services Output	Total Output	Average Growth Rate from 1979
1979	1532	1389	2921	n/a
1989	1959	1906	3865	2.80%
1989-hypoth	2341	1762	4103	3.40%

Thus the estimate of a 0.6 percentage point increase in the downward bias in real GDP growth assumes that the 3 percentage point difference in productivity growth between the two sectors reflects differences in measurement biases and not reality.

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