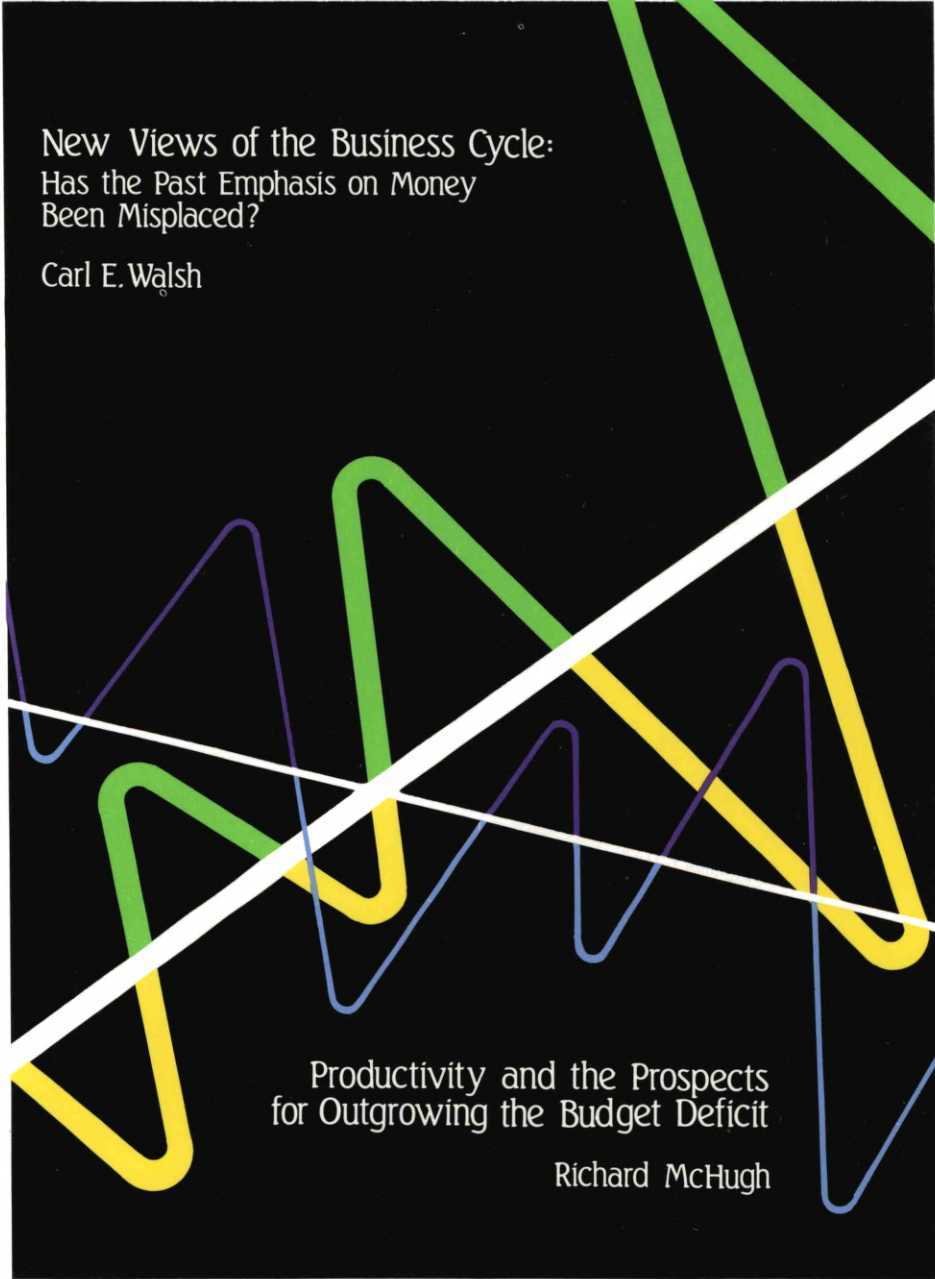


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for Outgrowing the Budget Deficit

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Ten Independence Mall
Philadelphia, Pennsylvania 19106

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**NEW VIEWS OF THE BUSINESS CYCLE:
HAS THE PAST EMPHASIS ON MONEY BEEN MISPLACED? 3**

Carl E. Walsh

What causes the national economy to “shift gears” and swing from months or years of expansion to sustained periods of contraction, and vice versa? For some time, the close link between money and GNP has been the cornerstone of the theory that changes in the money stock—monetary shocks—cause business cycles. Recently, however, an alternative theory has been proposed. It argues that “real” economic events, such as oil supply shocks, or changes in productivity trends, cause business cycles, implying that the money-GNP link is not a cause, but an effect. Empirical tests reveal that each theory has some strong points—and some weak points. And, perhaps, the theories may not be exclusive explanations of business cycles, but, rather, complements.

**PRODUCTIVITY AND THE PROSPECTS
FOR OUTGROWING THE BUDGET DEFICIT 15**

Richard McHugh

Some analysts claim that the U.S. economy is poised for a productivity upsurge, resuming or even surpassing the trend established in the 1960s. The rationale is that the factors that may have driven productivity down in the 1970s, such as the makeup of the labor force, heavy regulation of business, energy price shocks, and so on, are not likely to recur. But is the upsurge going to be strong enough to outgrow the budget deficit? Estimates suggest that even productivity growth as high as in the 1960s is not enough to reach that goal in the next ten years. Moreover, consensus forecasts about productivity for the next few years are well below the 1960s levels.

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New Views of the Business Cycle: Has the Past Emphasis on Money Been Misplaced?

Carl E. Walsh*

Monetary policy has been a central element in virtually all analyses of business cycles during the past twenty years. Many analysts claim that fluctuations in the growth rates of monetary aggregates are the dominant factor causing cycles in real economic activity and in the rate of inflation. Recently, however, economists have seen a

revival of interest in the role played by non-monetary events in causing business cycles. This revival has led to the development of *real business cycle theories*. Real business cycle theories take the view that historical cycles in the U.S. have been caused largely by “real”—rather than monetary—shocks, such as sharp changes in supplies of raw materials, shifts in productivity, or technological changes. These theories show how such “real” shocks, whether striking the economy as a whole or confined initially to one sector, can cause a business cycle.

A major impetus to the development of real business cycle theories was the general agreement that oil and food supply shocks, rather

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than monetary shocks, were the primary causes of the 1974-75 recession. Another is that monetary theories' predictions about some key economic quantities—like real wages—do not mesh with empirical observations. Real business cycle theories, unlike their monetary counterparts, offer a simple explanation of the observed behavior of real wages over the cycle. At the same time they offer a consistent explanation of the cyclical behavior of monetary aggregates and many other key economic quantities. In their current form, real business cycle theories suggest that most of the cyclical movement of U.S. real output can be explained by nonmonetary factors, and that money has played predominantly a passive role in past business cycles.

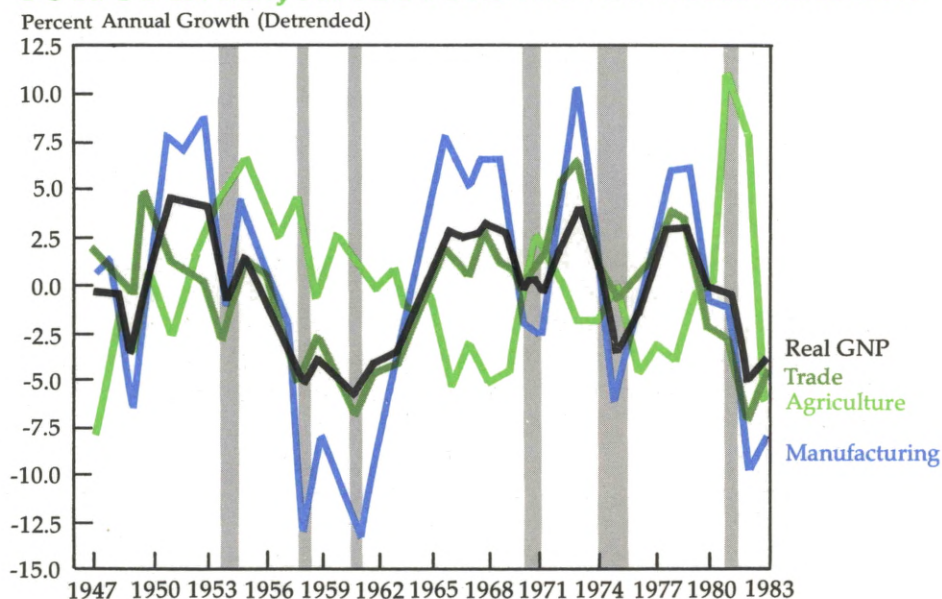
The investigation of modern real business cycle theories is in its infancy. At this stage the formal models that are being developed do not allow any role for monetary shocks. There are, however, good reasons to believe that *both* "real"

shocks and monetary shocks have a role in business cycles (see A CASE HISTORY OF A REAL BUSINESS CYCLE? p. 13) The hope is that the continuing investigation and the development of these theories will sharpen our understanding of U.S. business cycles, and that this understanding will lead to better economic policies.

WHAT IS A BUSINESS CYCLE?

A simple definition of a business cycle is that it consists of parallel and persistent expansions and contractions in output across most sectors of the economy. The National Bureau of Economic Research, for example, identifies a recession in a business cycle as a *widespread* contraction in the output of goods and services (real GNP) that *persists* for two or more consecutive quarters. Fluctuations in the level of output that occur only in a single sector of the economy do not constitute a business cycle. Figure 1 illustrates this feature of business cycles in the U.S.; it

FIGURE 1
OUTPUT IN MAJOR SECTORS MOVES WITH REAL GNP



NOTE: Shaded regions denote business cycle contractions as dated by the National Bureau of Economic Research. In order to bring out clearly the cyclical behavior of each series, an estimate of trend growth rate has been subtracted from each series. The trend growth is estimated by regressing the log of real GNP on time and time squared.

shows fluctuations of real output in agriculture, manufacturing, and wholesale and retail trade from 1948 to 1983. While the movements are similar, different sectors do not move in exactly the same way. For example, wholesale and retail trade conforms much more closely to the movement in real GNP than does agricultural output.

In addition to being widespread, the rise and the fall of both aggregate and sectoral output persists over time in a business cycle. During an upturn, real output typically expands for several quarters before reaching a peak and reversing direction. For example, the average expansion (trough to peak) during the period from October 1949 to November 1984 was 15 quarters. Similarly, contractions are characterized by several consecutive quarters of very slow or negative growth. Contractions historically tend to be shorter than expansions; contractions averaged 3.6 quarters over this same period. Of course, these averages can hide much of the variation that distinguishes one cycle from another. For example, the shortest complete cycle during this period lasted only 18 months (January 1980 - July 1981), while the longest lasted 116 months (April 1960 - December 1969).

The behavior of real GNP is the criterion by which business cycles are measured, but many other important economic quantities move with the business cycle. For example, the money stock (as measured either by M1 or M2) tends to grow faster than average during expansions and slower than average during recessions—that is, it behaves *procyclically*. Also, employment, inflation, investment, and capacity utilization behave *procyclically*. Real wages (wages expressed in terms of their purchasing power) and the size of the labor force are generally *procyclical*, but their relation to real GNP is not as obvious. Unemployment, on the other hand, rises above its average value during recessions and falls below it during expansions—it behaves *countercyclically*.

Any theory of business cycles is an attempt to explain the essence of how some economic

events—often referred to as shocks—can initiate cycles, and how such shocks can lead to the parallel and persistent movements in real GNP that characterize business cycles. Monetary theories of business cycles, and the more recent real business cycle theories, describe this cyclical behavior according to two different perspectives on how the economy works. These perspectives have different implications not only for the causes of cyclical behavior of real GNP, but also for other important economic quantities, such as the monetary aggregates, real wages, and the labor force.

A MONETARY PERSPECTIVE ON BUSINESS CYCLES

The standard monetary theories of business cycles argue that changes in the money stock are a major cause of fluctuations in real economic activity. A recession, for example, would be explained by a decline in money growth—a monetary shock. Such a fall in money growth could be policy-induced, or it could result from events affecting the banking industry, such as major regulatory changes. The slowdown in money growth results in a temporary shortage of money and credit, which causes interest rates to rise. The rise in interest rates slows real spending, particularly investment spending and purchases of durable goods. Initially firms respond to the slowdown in spending on their products by cutting back production and laying off some workers. The laid-off workers also reduce their spending, which causes further drops in the demand for goods and services and spreads the decline throughout the economy. As demand drops, firms slow the rise in their prices, and they accept lower profit margins in an attempt to maintain their sales; in some sectors prices may even fall.

According to these monetary theories, wage rates do not decline immediately along with prices, however. Rather, wages adjust slowly because of the existence of multi-year contracts which often have built-in raises, and because of the general practice of adjusting noncontract

wages infrequently, usually once a year. Therefore, as inflation slows, real wages rise, and with them the real labor costs to firms. Employment falls further and the recession worsens. Unemployment rises because the laid-off workers cannot find work elsewhere at the going wages, since wages fall only slowly in response to the decline in the demand for labor. This is a key feature of these monetary theories, because it is the sluggish wage adjustment that is responsible for the rise in unemployment. If nominal wages and other prices adjusted readily, then monetary shocks would not cause business cycles in these theories.¹

If no other shocks occur, the higher unemployment and lower inflation associated with the recession eventually will lead to smaller wage increases, or to wage concessions, as new labor contracts are negotiated and noncontract wages and salaries gradually adjust. Firms start hiring more labor as real wage costs moderate. Output, employment, real wages, and the labor force return gradually to their trend growth rates. These trend growth rates are determined by such fundamental factors as the population growth rate, the rate of technological change, and people's attitudes towards work, leisure, and saving.

Different economists have emphasized differ-

ent aspects of this general story, and they often differ over how long a monetary expansion or contraction affects real activity. However, most economists share this general view of how monetary fluctuations would cause business cycles. Most economists also would agree that such money-induced business cycles have been common in the U.S. To assess how well monetary theories account for business cycles it is useful to see how they stand up to the evidence from U.S. business cycles. If they describe business cycles accurately, then two of the fundamental features of their mechanism should be apparent in economic data. First, fluctuations in the rate of growth of the money supply should be related closely to cyclical fluctuations in real GNP. Second, real wages should tend to be countercyclical, rising after the onset of the recession—which worsens the recession—and falling during the early part of expansions—which allows the return to trend growth.²

Money and Real GNP Behave As Predicted . . . Over the period from 1960 to 1984 there is, on the whole, a close relation between the growth rate in real GNP and the growth rate of M1 (see Figure 2). Thus, M1's cyclical pattern is roughly consistent with monetary theories of the business cycle.³ While the relation between money and real output is prominent, it is not characterized by any rigid link; rather, as Milton Friedman has claimed frequently, the relation is characterized by "long and variable lags."

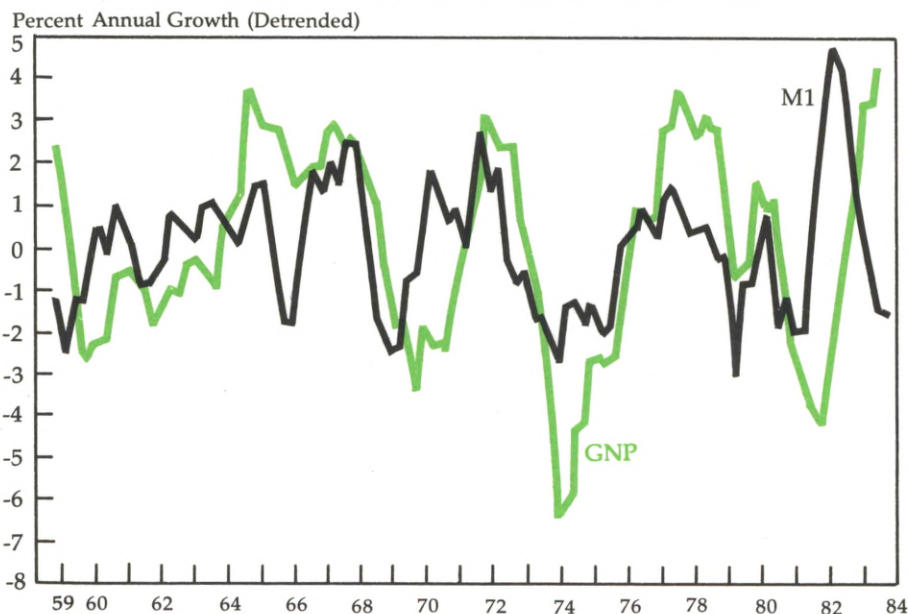
. . . But Real Wages Do Not. Over the period from 1950 to 1982 real wages do not show the

¹The widely accepted version of the "monetary theory" discussed here requires that goods prices and/or wages adjust slowly to economic events. In this sense the monetary theory of business cycles depends on temporary disequilibria in some markets. More recent monetary theories of business cycles do away with the assumption of slow price and wage adjustment, and instead attribute cyclical behavior to incomplete information. In these theories, only unanticipated changes in the money supply matter. The empirical evidence on the success of these new monetary theories is mixed, at best. See R. Barro, "Unanticipated Money, Output and the Price Level in the United States," *Journal of Political Economy*, (August 1978), pp. 549-580; F. Mishkin, *A Rational Expectations Approach to Macroeconomics*, (Chicago: University of Chicago Press, 1983); R. McGee and R. Stasiak, "Does Anticipated Monetary Policy Matter?" *Journal of Money, Credit, and Banking*, (February 1985), pp. 16-27.

²Naturally, monetary theories predict the behavior of most other important economic variables as well, such as real interest rates, investment, and so forth. The discussion here focuses on real wages because real wage behavior is a crucial aspect of the workings of both monetary and real business cycle theories, and because the two theories differ in their predictions of real wage behavior.

³Taking an even longer perspective, Milton Friedman and Anna Schwartz, in *A Monetary History of the U.S. 1867-1960* (Princeton University Press, 1963), document a similar relation between money growth and real GNP for over a century.

FIGURE 2
THE GROWTH RATES OF M1 AND OF REAL GNP FOLLOW EACH OTHER CLOSELY



NOTE: In order to bring out clearly the cyclical behavior of each series, an estimate of its trend growth rate has been subtracted from each series. The trend growth is estimated by regressing the log of each variable on time and time squared.

countercyclical movement that monetary theories predict. For instance, the real hourly earnings index of the Bureau of Labor Statistics is procyclical (see Figure 3, p. 8). During each recession since 1950 (except the 1981-82 recession), this index fell relative to its trend. Also, many studies find procyclical behavior in sector-by-sector real wage data.⁴ This discrepancy between the mone-

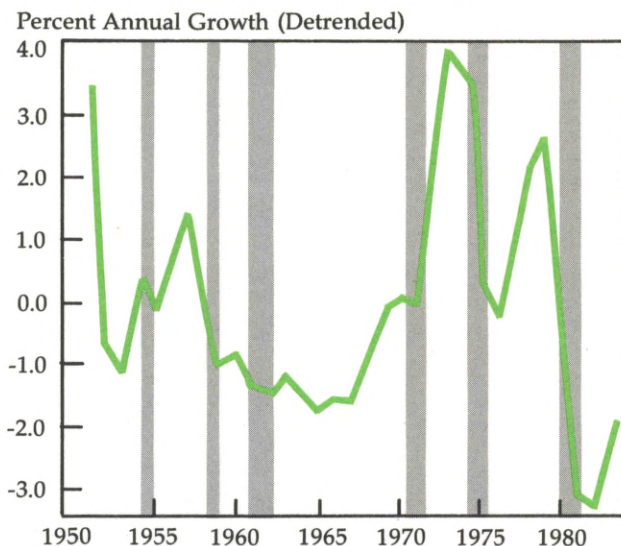
tary theories' predictions and the actual behavior of real wages over cycles represents a serious weak point in monetary models.

Some attempts have been made to modify monetary theories to account for the procyclical behavior of real wages. These attempts show that the cost to employers of laying off and rehiring

⁴R. Bodkin, "Real Wages and Cyclical Variations in Employment: A Re-examination of the Evidence," *Canadian Journal of Economics*, (August 1964), pp. 353-374, finds real wages to be procyclical. J. Altonji and O. Ashenfelter, "Wage Movements and the Labor Market Equilibrium Hypothesis," *Economica*, (August 1980), pp. 217-245, argue that changes in the average manufacturing real wage are not cyclical in nature at all. However, J. Heckman, in "Comment on Ashenfelter and Kydland," in *Essays on Macroeconomic Implications of Financial and Labor Markets and Political Processes*, (Carnegie-

Rochester Conference Series on Public Policy, Volume 21, Autumn 1984) pp. 209-224, points out that industry-by-industry data do reveal procyclical behavior of real wages. Also see M. Mitchell, M. Wallace, and J. Warner, "Real Wages Over the Business Cycle: Some Further Evidence," *Southern Economic Journal* 51,4 (April 1985), pp. 1162-1173. S. Neftci, in "A Time-Series Analysis of the Real Wages-Employment Relationship," *Journal of Political Economy* (April 1978), pp. 281-291, suggests that real wages and employment are negatively related if account is taken of the dynamic aspects of their relationship.

FIGURE 3
THE INDEX OF REAL MONTHLY EARNINGS
IS PROCYCLICAL



NOTE: In order to bring out clearly its cyclical behavior, this series is adjusted by subtracting the estimated trend growth from the growth rate. The trend growth is estimated by regressing the log of the index on time and time squared.

workers, and the ability of employers to offer overtime, may make measured real wages procyclical, while the underlying straight-time hourly rate may be countercyclical. For instance, if a temporary rise in the real hourly wage reduces the firm's demand for labor, it may respond by cutting back overtime employment first. Since firms have to pay a premium for overtime, this reduction in overtime may cause the *average* wage paid by the firm to fall, while the underlying straight-time hourly rate is rising.⁵ However,

real wage measures—such as the earnings index in Figure 3—which correct for this shift between overtime and straight-time pay, still reveal a procyclical pattern.

A more conspicuous weakness of monetary theories has been their inability to account for the 1974-1975 recession, the most severe since World War II. This shortcoming helped encourage the formulation of real business cycle theories which look for "real" shocks as the source of protracted upturns or downturns in real GNP from trend. Real business cycle theories suggest that business cycles are caused primarily by the ripple effect of "real" shocks as they work their way through the economy. Indeed, the procyclical behavior of real wages is an integral part of real business cycle theories, and, at the same time, these theories offer a possible explanation for the close relation between money growth and real GNP.

⁵See R.E. Lucas, Jr. "Capacity, Overtime, and Empirical Production Functions," *American Economic Review* (May 1970), pp. 23-27, T. J. Sargent and N. Wallace, "The Elasticity of Substitution and Cyclical Behavior of Productivity, Wages, and Labor's Share," *American Economic Review*, (May 1974), pp. 257-263, and T. J. Sargent, "Estimation of Dynamic Labor Demand Schedules under Rational Expectations," *Journal of Political Economy*, (December 1978), pp. 1009-1055.

THE REAL BUSINESS CYCLE PERSPECTIVE

Real business cycle theories, like monetary theories, emphasize that the economy's trend real growth rate is determined by nonmonetary factors (population growth, technological innovation, consumer preferences, and so forth). Prices and wages constantly adjust if shortages or surpluses occur in any of the markets. These adjustments serve to keep the economy close to its trend growth. In the view of real business cycle theorists, any apparent sluggishness of some prices and wages is not of sufficient importance to prevent the economy from remaining close to its trend growth. From this perspective, then, fluctuations in real economic activity are attributed to changes in the real, nonmonetary factors, which determine this trend growth.⁶

Business cycles arise in these theories when "real" shocks change the economy's real productivity or wealth, and upset the economy's equilibrium. "Real" shocks can take a variety of forms, such as the disruption in oil supplies in the 1970s, shifts in demand from one sector of the economy to another, or a technological change like the development of computer microchips. Strikes and productivity shifts in specific industries are further examples, as are shifts in household attitudes towards saving or working.⁷ These changes then set in motion economy-wide adjustments in consumption, production, labor supply, and saving that ultimately re-establish a new equilibrium. The important contribution of

real business cycle theories has been to explain how these adjustments to "real" shocks can generate business cycles.

To understand better how "real" shocks can cause business cycles, suppose there is a temporary decline in one sector's productivity that reduces real income in that sector. Initially, this reduction in real income leads individuals who earn their living in that sector to decrease their consumption of goods and services from their own and all the other sectors. However, people generally do not reduce immediately their current consumption by the full amount of the temporary decline in their real income. Instead, they want to spread over time the effect of the real income reduction by decreasing both their planned consumption and their planned saving. This response of consumer demand not only causes the initial real income shock to spread to other sectors of the economy, but it also means that it takes time before the economy can work its way out of the repercussions of the initial shock. Thus, real business cycle theories can explain both the parallel and the persistent movement in economic activity that marks a business cycle.

The decline in output induced by the initial "real" productivity shock leads firms to want fewer workers at the going wage. The developing slackness in the labor market causes workers to lower their wage demands promptly in an effort to get the relatively scarce jobs. Since, according to real business cycle models, wages adjust readily in response to market pressures, real wages fall temporarily. Thus real business cycle theories predict that real wages move in the same direction as real GNP—that is, procyclically—which accords well with observed behavior.⁸

⁸Strictly speaking, this prediction is true because real business cycle models emphasize supply shocks. However, certain "real" disturbances could lead to countercyclical real wage movements. Shifts in workers' tastes for leisure would cause real wages to fall (rise) as output rose (fell). Such disturbances, however, have not been emphasized in the literature on real business cycles.

⁶The recent work on real business cycles has its roots in earlier nonmonetary theories of the cycle. For a survey of the older theories, see Gottfried Haberler, *Prosperity and Depression* (Harvard University Press, 1960). Recent contributions include J. Long and C. Plosser, "Real Business Cycles," *Journal of Political Economy* (February 1983), pp. 39-69, and R. King and C. Plosser, "Money, Credit, and Prices in a Real Business Cycle," *American Economic Review*, (June 1984), pp. 363-380.

⁷Recent empirical studies of the role of real shocks include D. Lilien, "Sectoral Shifts and Cyclical Unemployment," *Journal of Political Economy* (August 1982), pp. 777-793, and J. Hamilton, "Oil and the Macroeconomy since World War II," *Journal of Political Economy* (April 1983), pp. 228-248.

A key mechanism that causes cyclical variations in employment in these models is the response of individuals to temporary fluctuations in real wages. The real wage earned by an individual represents the return to working. So, if the real wage is perceived to be low relative to its average level, the return to working is low temporarily, and workers will work fewer hours and have more leisure and lower incomes. This type of substitution between work and leisure can take a variety of forms. Employed workers might reduce their hours of work by limiting overtime hours or quitting second jobs. Individuals who had been unemployed and are looking for work may, in response to lower real wages, spend more time searching before taking a job, or they may stop searching altogether and drop out of the labor force. Such individuals perceive the benefits from more extensive job search, or from leisure, to outweigh the net gain from working at the temporarily lower real wage.⁹ Thus, according to these real business cycle models, the supply of labor falls in response to temporary real wage declines. One interesting aspect of the existing real business cycle models is that they do not allow for *involuntary* unemployment, because wages are assumed to respond readily to changes in labor supply and demand. Each individual is either working, does not wish to work, or else is in the process of searching for the best possible job, that is, voluntarily unemployed.¹⁰ Real business cycle theories

⁹Households may also respond to *permanent* changes in real wages. However, since business cycle theories attempt to explain the factors leading to *temporary* deviations of output from its trend growth path, the focus has been on the role of temporary movements in real wages. Factors that might produce a permanent change in real wages would influence the economy's trend growth path. For a discussion of the responses of primary and secondary workers to real wage changes, see B. Horrigan, "The Flat-Tax Rate Controversy: A Guide for the Perplexed," this *Business Review*, (May/June 1985), pp. 3-15.

¹⁰See R. E. Lucas and L. E. Rapping, "Real Wages, Employment, and Inflation," in E. Phelps, et al., *Microeconomic Foundations of Employment and Inflation Theory*, (NY: W. W. Norton

then predict that, just like real GNP and real wages, labor supply will fall (or rise) in response to an adverse (or favorable) "real" shock.

Labor Supply is Procyclical . . . Current empirical research finds that generally labor supply varies procyclically, in accordance with real business cycle theories.¹¹ However, the response of labor supply to real wages varies greatly across different demographic groups in the population. For example, working, married males respond only slightly to real wage changes. In contrast, the supply of labor by married females varies a great deal more with real wages. Much of this greater responsiveness is due to the effect real wages have on the decisions to enter or leave the labor force.¹²

. . . But It Is Not the Whole Story. Real business cycle theories hold that the cyclical variation in employment comes from cyclical variation in labor supply. Unfortunately, it is not clear whether this last prediction is consistent with observation.

1970), pp. 257-305. However, economists have developed models of labor markets that generate *involuntary* unemployment in equilibrium, even though prices and wages are fully flexible. Involuntary unemployment in these models is generated because firms use high wages to induce workers to perform well on the job. This type of behavior has not been incorporated into real business cycle models as yet. For a survey of this literature, see Janet Yellen, "Efficiency Wage Models of Unemployment," *American Economic Review* (May 1984), pp. 200-205.

¹¹The supply of labor, or the labor force, conventionally is defined as those individuals currently employed plus those who have actively sought work during the previous four weeks. That is, labor supply, or the labor force, consists of those employed plus those who declare themselves unemployed regardless of the reason.

¹²Orley Ashenfelter summarizes recent evidence in "Macroeconomic Analysis and Microeconomic Analysis of Labor Supply," in *Essays on Macroeconomic Implications of Financial and Labor Markets and Political Processes* (Carnegie-Rochester Conference Series on Public Policy, Volume 21, Autumn 1984) pp. 117-156. See also Joseph Altonji, "The Intertemporal Substitution Model of Labour Market Fluctuations: An Empirical Analysis," *The Review of Economic Studies*, Special Issue, (1982), pp. 783-824, and J. Heckman and T. McCurdy, "A Life-Cycle Model of Female Labor Supply," *Review of Economic Studies*, (January 1980), pp. 47-74.

U.S. experience shows that most of the cyclical variation in employment is accounted for by changes in the employment rate, rather than by changes in the supply of labor—the number of individuals seeking work or the number of hours each of these individuals wants to work. For example, only a relatively small fraction of the variation in total hours of employment in the U.S. private business sector is due to changes in hours per worker. Most is due to variation in the number of employed workers.¹³ Also, most of the variation in the number of employed workers is due not to variations in the number of individuals in the labor force, but to variations in the fraction of the labor force which is employed. Particularly during recession years, very little of the decline in total employment is explained by declines in the measured labor force. For example, in the recent recession year of 1982, only about 3 percent of the decline in employment was attributable to reductions in the labor force.¹⁴ While real wage movements may affect some individuals' decisions about whether to work at all and, if so, how many hours, variation from this source seems to account for little of the fluctuation in total employment that characterizes a business cycle.

Real business cycle theorists do have an explanation for this observation that changes in unemployment (rather than changes in the labor force) account for changes in employment. They claim that the collected unemployment statistics do not correspond correctly to the economic concept of unemployment—involuntary unemployment. They claim that many workers now counted as unemployed should not be counted in the labor force at all. These are workers who are not willing to work at the *going* wages and in *available* jobs, though they may want to work at their previous (higher) wages in their

former jobs. Also, there are some workers counted as unemployed who are spending their time searching the job market. These workers are employed in job search, which is a useful activity, and they are not unemployed in an economic sense. According to real business cycle theorists, if the unemployment and labor force statistics are adjusted to measure only involuntary unemployment, it would become clear that the bulk of changes in employment come from changes in the labor force, in accordance with the predictions of real business cycle models. Unfortunately, sufficient data are not available to make such adjustments to the statistics on unemployment and the labor force. Thus, the extent to which real business cycle theories fully account for movements in employment remains an open issue.¹⁵

An important challenge for real business cycle theorists is to give a consistent explanation of the cyclical behavior of money. Money's close relation to GNP during a cycle is the cornerstone of monetary theories, which view changes in the stock of money as the *cause* of cycles. Real business cycle theories, which posit nonmonetary shocks as the causes of cycles, have to show that the close relation between money and GNP is, instead, an *effect*.

REAL BUSINESS CYCLES: WHY IS MONEY PROCYCLICAL?

Real business cycle models explain the close relation between monetary aggregates and real output by focusing on the connection between the level of output and the demand for the transaction services money provides. Money is demanded because of its usefulness in lowering the transaction costs involved in transferring goods from their producers to their consumers. As output expands or contracts during a business

¹³BLS *Handbook of Labor Statistics*, Table 96. See also Heckman's comment on Ashenfelter and Kydland, footnote 4, above.

¹⁴BLS *Handbook*, Table 1.

¹⁵Most economists, however, would attribute this apparent inability to explain the magnitude of observed employment fluctuations to the real business cycle models' assumption that wages are flexible and can adjust quickly to equilibrate labor supply and demand.

cycle, so does the volume of transactions. Thus, the demand for money will tend to expand and contract along with real output.

Furthermore, according to real business cycle theories, an increase (or decrease) in the *demand* for money elicits an increase (or decrease) in the *supply* of money. A rise in output causes both the demand for money and interest rates to rise. As rates rise, banks attempt to reduce their holdings of excess reserves, which earn no interest, by purchasing interest-earning assets, such as government securities, or by making new private loans. Since all such new loans end up as demand deposits (or their close substitutes) at some bank, the money supply expands in response to a rise in market interest rates. This expansion occurs even if monetary authorities keep the total reserves supplied to the banking system unchanged.¹⁶ Consequently, broadly similar movements in the monetary aggregates and real GNP can result even if reserves supplied by the monetary authority to the banking system do not vary over the business cycle.

Real business cycle theorists also cite the Federal Reserve's operating procedures to help explain the close relation between money growth and real GNP after World War II. In most of this period, the Federal Reserve set short-term interest rate targets as a means of managing money growth. Under such a policy, if the demand for money increases, then the monetary authority attempts to counter the resulting higher interest rates by increasing reserves to the banking system, thus increasing the money supply. Given such an operating procedure, any disturbance that causes real output to vary would also cause the

money stock to change in the same direction.

The parallel movement of money and output, then, is consistent with both monetary theories and real business cycle theories, even though in real business cycle theories, fluctuations in money growth do not cause business cycles.

CONCLUSION

Real business cycle theories explain how "real" shocks in one or more sectors of the economy can generate output and employment movements across all sectors and through time—the hallmarks of business cycles. Thus real business cycle theories can account for recessions not obviously generated by monetary shocks. Real business cycle theorists, however, go further and argue that most observed business cycles in the U.S. have been caused by nonmonetary factors. Real business cycle theories also can account for the observed close correlation between monetary aggregates and real GNP—the observation that traditionally has provided the key support for monetary business cycle theories. In contrast to monetary theories, real business cycle theories also imply that real wages are procyclical, which seems consistent with the U.S. experience.

An apparent weakness of real business cycle theories, however, is that they rely on labor supply movements to explain the fluctuations in employment over a business cycle. It is not clear whether movements in the labor force can explain the actual fluctuations in employment that occur during a business cycle.

Perhaps the most important contribution of real business cycle models at this stage of their development lies in the reminder they provide that monetary shocks are not the only cause of business cycles. A more complete understanding of business cycles almost surely will require a broader theory that incorporates the key elements of both monetary and real business cycle theories.

¹⁶For extensive discussions of the money supply process, see S. Goldfeld and L. Chandler, *The Economics of Money and Banking*, 8th ed. (New York: Harper & Row, 1981) Chapter 6, or C. Henning, W. Pigott, and R. Scott, *Financial Markets and the Economy*, 3rd ed. (NY: Prentice-Hall, 1981), Chapter 4.

THE CASE HISTORY OF A REAL BUSINESS CYCLE? NOVEMBER 1973 - MARCH 1975

The recession that began in November 1973 and ended in March 1975 was the most severe since the end of World War II. From the fourth quarter of 1973 to the first quarter of 1975, real GNP fell by 4.8 percent, and the unemployment rate averaged 8.5 percent in 1975—up from 4.9 percent in 1973. Is it possible to identify “real” shocks to the economy that might account for this recession?

Two such shocks were much in the news at the time. First, 1972 marked the beginning of a series of bad harvests worldwide which continued into 1973. As a result, food prices rose dramatically. From December 1972 to December 1973, the food component of the Consumer Price Index (CPI) rose 20.1 percent. The second real shock was associated with the OPEC oil embargo and the energy price increases resulting from the Arab-Israeli War that started in October 1973. The energy component of the CPI rose 16.8 percent from December 1972 to December 1973, and another 21.6 percent from December 1973 to December 1974. In contrast, the CPI for all items other than food and energy rose only 4.7 percent from December 1972 to December 1973, and 11.3 percent from December 1973 to December 1974.^a The energy price increases and the resulting supply distribution difficulties reduced consumer real income and, since energy is a factor of production, reduced aggregate supply.

Real business cycle models predict that both current consumption and saving would fall as consumers attempted to spread the impact of such an income reduction over time. Consumption of food and autos did fall in the fourth quarter of 1973. Total consumption then rose slightly over the first three quarters of 1974 before collapsing in the last quarter. This large decline in the last quarter of 1974 is what made the recession so severe. But it is difficult to explain the timing of this decline as a response to any perceived new “real” shock to the economy.

As real business cycle models would predict, average real wages and the labor force both fell relative to trend during the recession. The average real wage in the private nonagricultural sector declined by 0.1 percent in 1973, by 2.8 percent in 1974, and by 0.7 percent in 1975. The labor force, as a fraction of the civilian population, fell by 0.2 percent in 1975. However, employment relative to the population fell by 3.1 percent.^b Hence, almost all of the fall in employment was due to a rise in the fraction of the labor force that was unemployed, and not to worker withdrawal from the labor force in response to the decline in real wages. Total labor hours in the private business sector did fall about 4 percent in 1975. However, only about one-eighth of this decline can be attributed to a fall in hours per worker. Almost all the reduction took the form of a decline in the number of employed workers.

While bad harvests and oil supply disruptions were shocks of the type emphasized in real business cycle models, there is evidence to suggest that monetary factors contributed to the onset of the recession in late 1973. M1 grew at an average rate of 8.3 percent during 1972, and it declined slightly in the first quarter of 1973 to 8.2 percent. It then decelerated, and averaged only a 4.7 percent annual growth rate during the last three quarters of 1973. Given the pattern of real GNP, the mechanism postulated by real business cycle models cannot explain fully these large changes in the growth rate of M1. Coinciding with this monetary deceleration was the removal of the remaining price controls during late 1973 and early 1974. The removal of price controls produced a rapid rise in all prices, and the real quantity of money fell 8 percent from the first quarter of 1973 to the first quarter of 1975. This analysis suggests that, while real disturbances played an important role in the recession, so did monetary factors.^c

^aData on the CPI are from the *Economic Report of the President*, (February 1985), Tables B55 and B56.

^bThe average growth rates for these series for 1962-1982 are .5 percent for real wages, .4 percent for the ratio of the labor force to civilian population, and .2 percent for the ratio of employment to civilian population.

^cA detailed discussion of this recession can be found in Alan S. Blinder, *Economic Policy and the Great Stagflation*, (NY: Academic Press, 1981).

Working Papers

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1985

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Productivity and the Prospects for Outgrowing the Budget Deficit

*Richard McHugh**

INTRODUCTION

The federal government has been running budget deficits of unprecedented proportions, totaling \$211 billion in fiscal year 1985 (FY85), and amounting to 5.5 percent of gross national product (GNP). By comparison, in the 1970s the federal government deficit averaged 1.8 percent of GNP, and in the 1960s only 0.3 percent of GNP. Moreover, official forecasts from Congress

and the Administration are for continued high deficits for at least the next five years, unless Congress cuts spending programs, raises taxes, or both.

The size of both the current and the projected federal deficits has heightened the pitch of the fiscal policy debate. Many analysts argue that deficits of this magnitude will be detrimental to the U.S. economy because the growing federal demands in the credit markets could keep real interest rates high and "crowd out" private investment. High real interest rates are likely to keep the value of the dollar high. A high dollar makes imports relatively less expensive, and it

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increases the demand for foreign-made goods at the expense of those produced at home. And this means slower growth for industries that rely heavily on export markets and for those that compete with imports.

Because the federal deficit is so large, these analysts argue that the economy would benefit from a deficit reduction.¹ They believe that the needed reductions in the deficit can be accomplished only with both expenditure cuts and tax increases. Indeed, legislators apparently take as given the need for fiscal initiatives, while debating the details of the various plans.

Other analysts, however, deny the need for such fiscal action. They claim instead that the economic climate is now much better for economic growth, and that robust productivity growth will be strong enough to reduce budget deficits automatically to acceptable levels.² The argument is that tax revenues rise more quickly than expenditures in response to real growth, and that real growth—particularly productivity growth—will be high enough to make the deficit shrink dramatically; in other words, the economy will outgrow the deficit. Indeed, substantial fiscal action is not only unnecessary, in their minds, it is also detrimental. According to their view, fiscal initiatives, especially tax increases, would actually

aggravate the longer-term budgetary problem by dampening economic growth.

The claim that productivity growth will be high enough to reduce deficits to acceptable levels, if true, has obvious and important policy implications. But before policymakers can act on such claims, they need to form clear ideas of exactly what it means to outgrow the deficit, as well as the time frame in which this would occur. Unfortunately, those who deny the need for fiscal action do not always detail these goals. But, to help pin these down, we can propose a scenario that falls within the bounds of historical possibility. Suppose that the deficit goal is the average deficit-to-GNP ratio for the years 1954-1980—which is 1.3 percent—and that the time frame is ten years.³ How likely is the economy to outgrow the deficit, in this sense, by 1995?

OUTPUT GROWTH AND DEFICIT PROSPECTS

Current consensus economic forecasts do not support the claim that the economy will outgrow the deficit any time soon. A typical forecast is that of Data Resources, Inc. (DRI), which recently published projections of the course of economic activity through 1995 (see Table 1).⁴ Based on their assumptions of what fiscal initiatives Congress will probably enact, and on their judgment about other important economic variables, the deficit falls gradually as a fraction of GNP

¹Some economists have argued that in an economy with a growing level of nominal GNP, deficits do not cause a problem unless the ratio of outstanding debt to GNP rises. Since 1981, the ratio of gross federal debt held by the public to GNP has grown from 27.5 percent to 39.1 percent, its highest level since 1965. For a discussion of alternative views on the appropriate goals for budget policy, see Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1986-1990*, Chapter III, (CBO, February 1985), and B. Horrigan, "Federal Budget Deficits: An Efficient Tax Perspective," *this Business Review* (May/June 1984) pp. 15-25.

²For example, Pierre Rinfret and Paul Craig Roberts, prominent supply-side economists, argue that real GNP could grow in excess of the President's Office of Management and Budget's optimistic forecast, and that it would be strong enough to balance the federal budget. (See *Business Week*, January 9, 1984 and *Business Week*, September 24, 1984.)

³Of course, this scenario is arbitrary to some degree, and it is open to debate; the assumptions used here are by no means the only reasonable interpretation of what it means to outgrow the deficit. Rather, these assumptions provide *one* reasonable interpretation. In any case, the goal of a 1.3 percent deficit-to-GNP ratio to be achieved in ten years can be regarded as a yardstick with which to evaluate the impact of alternative productivity growth scenarios.

⁴The DRI figures used in this article come from the DRI "U.S. Long-Term Review," Summer 1985. The forecast refers to the so-called "Trendlong" projection. There is no claim here that this forecast is in some sense better than others. Rather, the economic assumptions used broadly represent a consensus, and the econometric model used in the computations is state-of-the-art.

TABLE 1
THE LONG-TERM
PROJECTION

	Average Annual Growth Rate for 1985-1995
Real GNP	2.9%
Labor Productivity	1.9%
Employment	1.0%
	Average Annual Level for 1985-1995
Inflation (GNP deflator)	5.0%
Unemployment	7.2%

SOURCE: DRI "U.S. Long-Term Review", Summer 1985.

over the coming decade. At present, the deficit represents about 5.5 percent of GNP. According to DRI, by 1995 that ratio will fall to 2.7 percent, which is more than twice the post-war average ratio of 1.3 percent.

Not surprisingly, those who believe that high deficits will disappear take issue with the consensus predictions. In particular, they argue that the real growth assumptions underlying these projections are unduly pessimistic, and that underestimating prospective real growth overestimates likely future deficits. DRI foresees average real growth of 2.9 percent each year from now until 1995. Does this forecast understate the economy's long-run growth potential, that is, its ability to increase output? And if so, where will faster growth come from? To answer these questions, it is necessary first to understand what determines the economy's long-run growth capability.

One way to analyze the economy's long-run growth potential is to focus on the amount of labor available to produce output and on the

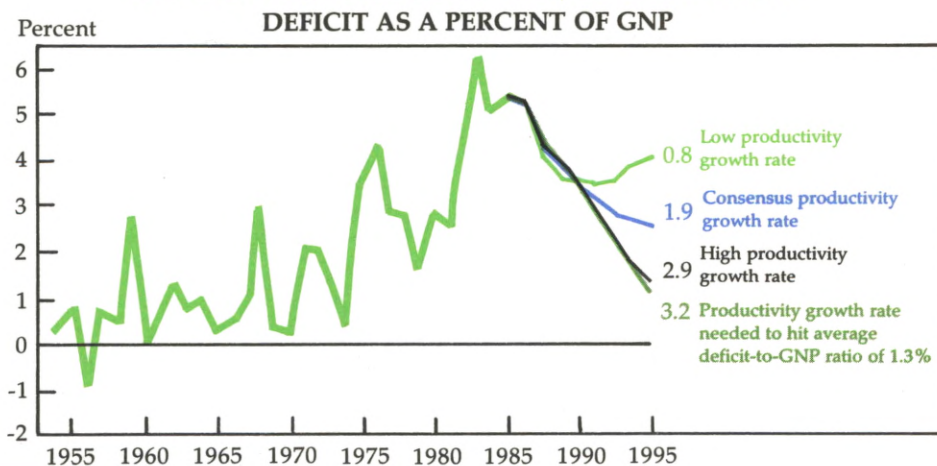
productivity of that labor. Total output in an economy can be expressed as the total hours of labor employed times output per man-hour of labor, or labor productivity. Hence, output growth is determined by the growth rate of the labor force and by the growth rate of labor productivity. The DRI forecast of 2.9 percent average annual real GNP growth, for instance, comes from a 1 percent average annual growth in employment and a 1.9 percent average annual growth in productivity.

Productivity Growth is the Key. While a surge in employment growth can permit faster real GNP growth, those who look for strong economic growth typically stress labor productivity growth. Basically, they believe that the consensus forecast of 1.9 percent annual growth in productivity is unduly pessimistic. They feel that it is reasonable to expect higher productivity growth and, hence, stronger real GNP growth and lower deficits.⁵

According to the DRI estimates, in order to reach our hypothetical deficit goal, productivity must grow at a 3.2 percent annual average rate over the next 10 years (Figure 1, p. 18). Such productivity growth not only exceeds the consensus forecast by more than a percentage point, but it also appears high by historical comparison. A review of our post-war economic experience reveals no extended period with productivity growth as high as 3.2 percent per year (Table 2, p. 19). During two periods, however, productivity growth did average 2.9 percent per year, quite close to the required rate. Thus, the needed productivity growth, while extreme, may not be out of the question.

⁵Although emphasis here is placed on higher productivity growth, higher employment growth also would raise long-run real GNP growth and lower the deficit. However, employment growth over any long period depends primarily on growth in the labor force, which in turn depends heavily on demographic factors, such as the existing population and its social attitudes. Thus, average employment growth is unlikely to deviate a great deal from the consensus projections.

FIGURE 1
**HIGHER PRODUCTIVITY LEADS
 TO LOWER DEFICIT-TO-GNP RATIOS**



NOTE: The deficit-GNP data shown in this figure were obtained by simulating the DRI model of the U.S. economy with the various productivity growth assumptions. For each assumed productivity growth, the simulation is performed so that the annual productivity growth is approximately the same as the average productivity growth.

But is this rate of productivity growth *likely*? This is an especially crucial question in light of the productivity growth the U.S. experienced during the two most recent business cycles. Table 2 reveals that labor productivity growth during the last two business cycles not only was far below the 2.9 percent post-war peak growth, but it also fell short of 1.9 percent annual growth, the consensus prediction for the coming decade. Therefore, the optimistic deficit reduction scenarios for the next ten years rely on a rapid acceleration of trend productivity growth relative to the 1970s and early 1980s.

WERE THE 1970s AN ANOMALY?

Analysts broadly agree on some of the economic forces that determine productivity trend growth, though there are important disagreements on the relative importance of these forces, and on how they interact with each other. Most everyone agrees that improvements in labor quality, that is, general education, skill levels, and so forth, increase productivity. Increases in

the quantity or quality of capital equipment and in technological innovation also improve productivity. Finally, lower raw materials prices and less regulation are likely to improve productivity.

The analysts who feel confident that labor productivity growth will accelerate soon believe that the experience of the 1970s is an anomaly. They maintain that temporarily poor performances of the forces that determine productivity growth combined to slow productivity to a level far below its long-run trend growth rate. The forces that depressed labor productivity include a lack of growth in labor quality, large increases in energy prices, lack of technological innovation, and increased business regulation. The productivity optimists contend that the outlook for these forces has improved substantially in the 1980s, and that it will continue to improve in the coming years, making a return to the more rapid productivity growth rates of the 1960s likely.

Some Negative Forces Have Abated . . .

Declines in Labor Quality. In the late 1960s and

TABLE 2
PRODUCTIVITY GROWTH

Peak-to-Peak Period (year:quarter)	Growth Rate in Trend Productivity ^a
1948:4 - 1953:3	2.7%
1953:3 - 1957:3	2.1%
1957:3 - 1960:2	2.9%
1960:2 - 1969:4	2.9%
1969:4 - 1973:4	2.6%
1973:4 - 1980:1	0.8%
1980:1 - 1981:3	1.4%

^aMeasured as the annual rate of change from one business cycle peak to the next and excluding farm productivity. The technique of measuring labor productivity peak-to-peak is commonly used as a way of abstracting from cyclical variations in productivity growth when trying to measure trend productivity growth.

into the 1970s, the labor force contained a relatively large share of new entrants. The post-World War II baby-boom generation had reached working age and there was a large increase in women's participation rate in the labor force. This "double-barreled" influx of new entrants pulled down the average age and the experience level of the labor force. Because they lack experience, new workers generally are less productive than those who have held jobs. As a result, the average "quality" of the labor force stopped growing, and it may have even declined. In a recent study, Michael Darby calculates an index of labor quality growth and estimates that the quality of the labor force increased at a rate of 0.5 percent per year from 1948 to 1965, but remained essentially unchanged from 1965 through 1979.⁶

The outlook for labor quality growth has improved. The baby-boom generation has already made its debut in the workplace, and the disproportionate growth of women in the labor

force is not likely to happen again. Over the next few years, as the proportion of the labor force made up of new entrants declines, the average age and experience level of the labor force will increase.⁷ Everything else equal, the average growth rate of productivity attributable to this factor should increase.

Energy Price Increases. One of the most dramatic economic events of the past two decades was the extraordinary increase in the relative price of crude oil and other energy prices. From 1973 to the end of the decade, energy prices nearly tripled, while prices for all goods and services rose 85 percent. These huge energy price increases reduced labor productivity through two channels. First, as the relative price of energy increased, firms economized on the use of energy. The attempt to economize on energy pulled down the output produced by existing factories as energy usage declined. And this decline in output reduced labor productivity during that period. Second, the higher relative price of energy induced firms to invest in new plant and equipment that saved energy rather than labor. But this investment substituted energy-efficient capital for existing capital, without increasing the quantity of capital. As a result, this type of investment did not lead to any growth in labor productivity.

The odds of energy price increases in the 1980s even remotely approaching those of the 1970s are slim. In the last few years, the price of oil has fallen, in part as a result of the efforts of business and households to economize on en-

⁷In 1970, the labor force participation rate of women (43.3 percent) was just over half of that for men (79.7 percent). By 1982, the participation rate for women had risen to nearly 70 percent of that for men (52.6 percent to 76.6 percent). The Bureau of Labor Statistics (BLS) sees this ratio of participation rates of women to men rising to 76 percent by 1990—only a small increase. In the same labor force projections, the BLS forecasts that the percentage of the labor force made up of people between the ages of 16 and 24 will fall from 22.3 percent in 1982 to 17.7 percent by 1990. See Howard Fullerton and John Ischetter, "The 1995 Labor Force: A Second Look," *Monthly Labor Review*, (November 1983) pp. 3-10.

⁶See Michael Darby, "The U.S. Productivity Slowdown: A Case of Statistical Myopia," *American Economic Review* (June 1984) pp. 301-321.

ergy use and in part because of the emergence of new suppliers of oil and of other sources of energy. Since it is likely that the adjustments to high energy prices made in the 1970s are mostly complete, and since oil prices have currently been weak, productivity growth is not likely to be as adversely affected by energy costs in the near future as it has been.

Lack of Innovation. Labor productivity can be affected favorably by technological innovations, such as inventions of new production processes, improvements in the operation of existing production processes, or enhancements in the quality (reliability, speed, and flexibility) of capital equipment. Many argue that the pace of pure technological innovation slowed considerably in the 1970s—that Americans simply ran out of ideas.

Ideas and innovations are hard to measure. However, some indication of the rate of change in this intangible “technology” can be gleaned from the Labor Department’s measure of Multifactor Productivity (MFP) growth. MFP growth is defined as the growth rate of total output that cannot be accounted for by the growth rate of the inputs.⁸ The magnitude of the MFP growth is attributed to the degree of technological innovation. The Labor Department’s calculations confirm the view that growth of technological innovation slowed in the 1970s. The MFP grew

at an average annual rate of 1.7 percent during the period 1948 to 1973, but fell at a 0.1 percent annual rate from 1973 to 1981.⁹ This evidence seems to support the view that the productivity decline may simply reflect a decline in technological innovation.

Causes of a slowdown in technological innovation are hard to identify, but some economists argue that the slowdown in technological innovation was presaged by an earlier slowdown in spending on research and development (R&D). The level of total R&D expenditures as a proportion of GNP fell from 3.0 percent in 1962, to only 2.2 percent of GNP by 1978.

To the extent that R&D spending determines technological innovation, the outlook for growth in technology is much improved. A 25 percent incremental R&D tax credit was authorized under the Economic Recovery Tax Act in 1981. Partly because of this, R&D expenditures have grown to 2.7 percent of GNP in 1984. The National Science Foundation, chief monitor of national R&D activity, anticipates that R&D spending once again will reach 3.0 percent of GNP by 1990.

Confidence that an increase in technological innovation is imminent does not come simply from the belief that if you rub more lanterns, the odds of finding a genie will increase. A genie is already on the loose—the microcomputer and robotics revolution. It is probably this, more than anything else, which accounts for the very favorable productivity outlook held by some analysts. As a wider share of industry adopts these fast, efficient, labor-saving robots and microcomputers, they should increase output per man-hour, which will increase real GNP as long as employment levels are maintained.

Increased Regulation of Business. In the 1960s and 1970s the perception grew that the physical environment had deteriorated and workplace health

⁸The concept and measurement of multifactor productivity (MFP) growth is similar to that of labor productivity growth in that they are both computed as the difference between the growth rate of output and the growth rate of one or more inputs. The general method to compute productivity growth is to find the difference between the growth rates of output and the growth rates of inputs. This difference is attributed to changes in the productivity of the inputs. In the calculation of labor productivity growth, total man-hours of labor is the measure of input. In calculating multifactor productivity growth, the input is measured as a weighted index of the capital and labor inputs, where the weights are set equal to the cost share of each factor in the total cost of production. The difference between output growth and the growth of this input index is attributed to technological innovation.

⁹See U.S. Department of Labor, Bureau of Labor Statistics, *Trends in Multifactor Productivity, 1948-1981*, Bulletin 2178, (September 1983).

hazards had increased in the process of achieving rapid economic growth. Congress enacted legislation, such as the Clean Air Act, the Clean Water Act, and the Occupational Safety and Health Act, which were intended to deal with these issues. The way these laws typically work is by “command and control,” with the government specifying acceptable methods of production. This frequently required firms to change their methods of production and to invest in so-called “nonproductive” capital that improved the environment but did not increase the output of marketable goods. Because it diverted investment away from “productive” projects, this social regulation was unfavorable from the vantage point of labor productivity.

No major new pieces of regulatory legislation have been passed in recent years. Moreover, legislative debates over the renewal of the Clean Air Act and Clean Water Act concern mostly relaxation of their requirements versus the status quo, in contrast to the tightening versus status quo battles of the 1970s. It is unlikely that productivity will suffer for the sake of the environment in the next few years, as it may have in the past.

In sum, the case for an imminent productivity upsurge is built upon the belief that the factors causing low productivity growth in the 1970s have abated and are not likely to re-emerge. This observation suggests that productivity growth will return to its normal, higher level, making it more likely that the economy will outgrow the deficit without substantial fiscal policy action.

. . . But the Surge in Productivity Is Not Evident. Despite the likelihood that many negative forces have abated, the case for a resurgence in productivity growth is far from complete. Careful productivity growth studies, which take into consideration all of the forces mentioned and more, still find a disconcerting proportion of the productivity decline a mystery.¹⁰ Because of

this, one must approach the qualitative forecasts of a productivity growth reversal from the 1970s with caution. This is especially true of forecasts of record-breaking gains in productivity growth.

The case for a surge in productivity growth based on the factors cited above would be greatly strengthened if there were evidence that productivity is growing rapidly now. Unfortunately, the behavior of labor productivity growth in the current recovery does not support the view that productivity growth is returning to previous highs.

Labor productivity growth behaves cyclically; generally it is high early in a recovery and it falls as the recovery matures. Therefore, it is misleading to look at any single quarterly—or even annual—growth rate, and to compare that number to the long-term average growth, which is itself difficult to measure (see PITFALLS IN MEASURING PRODUCTIVITY GROWTH p. 22). The growth rate of productivity depends not only on its long-term trend but also on the point in the business cycle at which it is being measured. One way of assessing relative productivity growth while controlling for cyclical influences is to compare the current productivity growth to past experience on a “quarter-after-trough” basis.

Brookings Institution, 1979), and John W. Kendrick “Long Term Economic Projection: Stronger U.S. Growth Ahead,” *Southern Economic Journal*, 50(4) April 1984, pp. 945-964, reach a similar conclusion. Kendrick finds that at least 40 percent of the productivity decline cannot be explained. That the decline has not been explained adequately by the factors mentioned in the text is not surprising to some. To illustrate, energy price increases may have adversely affected labor productivity, but energy costs are too a small a component of the total cost of production to have had a substantial impact on productivity growth, as many have claimed. Denison shows that, as a result, energy price increases explain no more than 5 percent of the productivity decline. Regulatory policy may have diverted investment funds toward “non-productive” capital, but the ratio of pollution abatement capital investment to total capital investment never exceeded 3 percent in any year. Total R&D spending may have fallen during the 1970s, but the bulk of the decline was in military R&D. Private R&D as a percentage of GNP actually rose in the 1970s.

¹⁰Two important studies, E. Denison, *Accounting for Slower Growth: The United States in the 1970s*, (Washington, DC:

Figure 2 compares the change in nonfarm labor productivity in the current recovery to the change during the average of all previous recoveries and to the best productivity growth episode, which started with the recovery that began in the first quarter of 1960. It is clear from Figure 2 that productivity in the current cycle is growing at below average rates, and certainly below the rates enjoyed during the productivity boom of the 1960s.¹¹

The current behavior of productivity provides no indication that we are in the throes of a labor productivity boom. Several studies that look carefully at recent experience also find little support for an ongoing productivity surge. Peter Clark and Robert Gordon examine the behavior of labor productivity in the 1980s and, after accounting for the purely cyclical changes in productivity, find no evidence that trend productivity growth has accelerated at all from the rates experienced in the 1970s.¹² In a longer-term analysis of labor productivity growth trends, Darby finds that, once adequate account is taken

¹¹One way to get a rough estimate of the underlying trend growth of productivity in this recovery is to assume that we are at a peak now, and to calculate the peak-to-peak growth rate using the last two peaks (1981:3 and 1980:1). This calculation makes sense only when the recovery is mature, since it is only in that case that the cyclical behavior of productivity will not distort seriously the result of such a calculation. It turns out that the average growth of productivity is 2.3 percent per year for 1981:3-1985:2, and it is 1.8 percent per year for 1980:1-1985:2.

The reason to use 1980:1 as a starting point is that the four-quarter recovery ending in 1981:3 was the shortest since 1919, and the second shortest in recorded American economic history. The rate of capacity utilization remained at only 80 percent during that peak. A measure of trend productivity growth, using as a reference point a quarter before the peak, will be biased upward since some of the purely cyclical productivity gains would be measured as trend productivity. Thus, it may make more sense to use the next-to-the-last peak as a basis for comparison.

¹²Peter Clark, "Productivity and Profits in the 1980s: Are They Really Improving?" *Brookings Papers on Economic Activity* (1), 1984, pp. 136-167; Robert Gordon, "Unemployment and Potential Output in the 1980s," *Brookings Papers on Economic Activity*, (2), 1984, pp. 537-564.

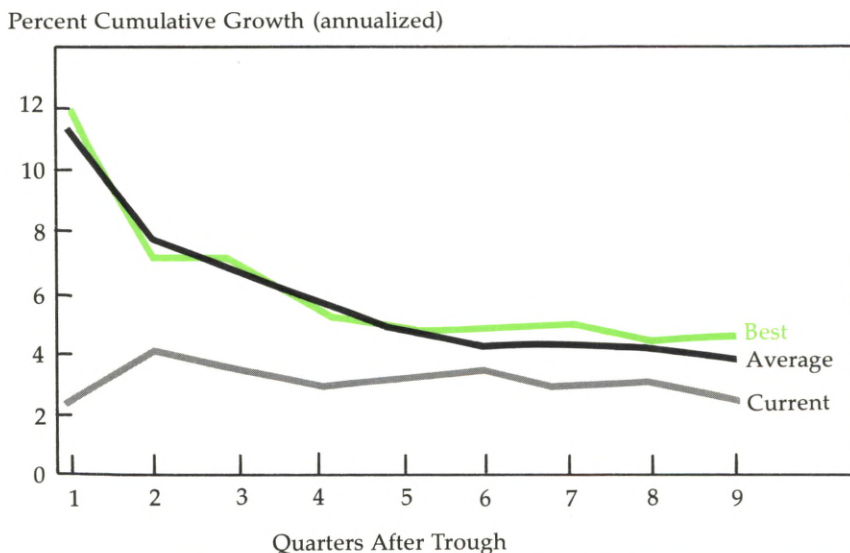
PITFALLS IN MEASURING PRODUCTIVITY GROWTH

One must be careful when trying to estimate the underlying trend growth of labor productivity based upon measured changes in output per manhour from one period to the next. The reason is that productivity tends to rise and fall with the business cycle. In times of economic slack, employers tend to delay laying off more employees than necessary, and during recoveries they delay hiring new workers. As a result, productivity falls below its trend during the early part of a recession, but once the recovery is underway, productivity rises because existing employees are utilized more fully. Therefore measured labor productivity grows faster—sometimes much faster—than its trend during the early stages of a recovery. As the recovery matures, measured labor productivity slows to its trend growth. To get good estimates of trend growth in labor productivity, it is important to account for its cyclical behavior. One way to measure the historic productivity growth is to measure its trend growth as the annual rate of change from one business cycle peak to the next. Another way is to compare the period-by-period behavior of productivity growth to the typical (and maybe the extreme) behavior of past productivity growth, taking as reference the beginning of the business cycle.

of changes in labor quality and of the measurement problems caused by the 1971-1974 price-controls period, there is little evidence of a dramatic downward shift in trend labor productivity during the 1970s.¹³ If correct, Darby's analysis suggests that only the improvement in labor quality is likely to boost productivity growth, and that the abatement of all the other negative forces is unlikely to add to growth. The overall conclusion that emerges from careful evaluation of the recent evidence is that the behavior of productivity growth in the current recovery probably represents an improvement over the experience of the 1970s. But it does not warrant the

¹³Darby, "The U.S. Productivity Slowdown."

FIGURE 2
**NONFARM PRODUCTIVITY
GROWTH DURING RECOVERIES**



presumption that labor productivity growth will be sufficiently high to allow the economy to outgrow the deficit.

CONCLUSION

In the world of economic policy, where consensus is one of the scarcest of commodities, most analysts argue that the federal government deficits, at their current and prospective levels, pose a risk to the health of the economy. Since 1981, the deficit figures have grown by leaps and bounds. In fiscal year 1985, after three years of economic growth, current tax receipts paid for only 78 percent of federal expenditures. The outlook for the immediate future is not much better.

There are two perspectives on what is to be done. One side views deficits as a chronic problem indicating the need for a shift in fiscal policy, namely, expenditure cuts and tax increases to control the deficit and to ensure future economic growth. The other side sees the deficits as a short-run problem that will be resolved not by

government action but by healthy long-run economic growth that will result largely from strong productivity growth.

Whether the deficits will decline substantially as the economy grows depends very much upon whether productivity growth will resurge from its low rates of the 1970s to reach or even surpass its post-war highs. Research on the decline in labor productivity in the 1970s provides some information on future trends in labor productivity; and that literature does lead to expectations that productivity growth will not remain as low as it was during the 1970s. But the case made for a surge in labor productivity growth is speculative; there is little evidence to support it. Not only is the economics profession not satisfied that the experience of the 1970s has been adequately explained, but also the economy's recent productivity performance has been lackluster. So while a strong theoretical case for a snap-back in productivity growth can be made, more empirical meat must be put on that conceptual skeleton before such a scenario appears probable.



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Address Correction Requested