

Supply-Side Economics: What Chance for Success?

*By Aris Protopapadakis**

The economic success of the 1960s gave way to unfulfilled expectations in the 1970s. The U.S. economy failed to deliver the price stability and the generally high growth of real income that had come to be expected. Perceiving this as the failure of Keynesian economic policies, some economists have advocated tax cuts and reductions in government regulations as the solution to the economic malaise that threatens to dominate the 1980s. These supply-side prescriptions represent a resurfacing of economic thinking dominant before the Great Depression.

The likely impact and success of supply-

side economics were an important feature of the tax reform debate in the 1980 Presidential campaign. The emphasis on tax cuts in the campaign as well as the tax proposals of the new Administration reflect inroads of supply-side economics on the policymaking process. Whether this approach will work, however, is not clear.

THE 1970s: INFLATION AND SLOW GROWTH

During the 1970s, the U.S. economy experienced a high rate of inflation and a low growth rate of output. The growth rate of productivity (output per hour worked) came to a halt in the later 1970s, in contrast to the 1950s and 1960s. Furthermore, the share of income that the Federal, state, and local

*Aris Protopapadakis is Research Officer and Economist at the Philadelphia Fed. He received his Ph.D. from the University of Chicago.

governments took through various taxes was higher in this decade than at any other time (Figure 1), resulting in a decline in the per capita real income that goes to the private sector in the latter part of the decade. The average rate of inflation as measured by the CPI also was higher in this decade, and it increased alarmingly in 1977-79.

Inflation has been viewed both as a direct source of the economic malaise and as the reason for the poor output performance of the economy. Most economists and businessmen believe that at least in the short run the performance of the economy is not independent of the rate of inflation. Inflation is viewed as causing increased uncertainty in the business environment, higher and more volatile interest rates, automatic increases in taxes, and depreciation of the dollar vis-à-vis other currencies.

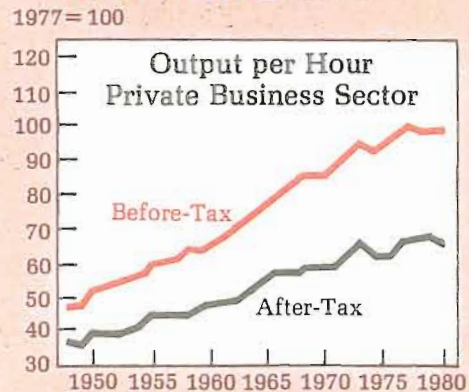
Though most people agree that stagnating productivity and high inflation are undesirable, there is much less agreement about their causes and cures. Some argue that the low and falling investment rate causes productivity to stagnate, which worsens inflation. Others contend that the high inflation rates reduce incentives to save while the accompanying uncertainty reduces incentives to invest, sapping productivity growth. Causes and consequences are hard to sort out.

One school of thought, generally referred to as supply-side economics, recently has gained attention with tax and expenditure cut proposals. The basic claim is that the economic stagnation of the 1970s is a result of increasing taxes on all forms of income that have reduced incentives to produce and invest, and that reducing these taxes will restore productivity growth.

DEMAND MANAGEMENT VS SUPPLY-SIDE ECONOMICS

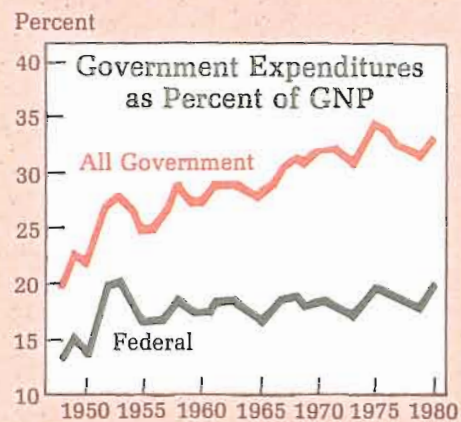
Supply-side economics is firmly rooted in classical economic theory. Until the Great Depression, economists believed that gov-

**FIGURE 1
PRODUCTIVITY GROWTH
FLATTENS OUT . . .**



SOURCE: Survey of Current Business.

**. . . AS GOVERNMENT
TAKES MORE IN TAXES**



SOURCE: Calculated at the Federal Reserve Bank of Philadelphia.

ernment could increase the level of output only by implementing policies that increase financial incentives to produce. But economists were unable to reconcile the high and persistent unemployment of the Great Depression with the teachings of classical economic theory. They eventually came to conclude that a slowdown of the growth of output was evidence that labor and capital were not being fully utilized because they were involuntarily idle, so that increasing financial rewards to production would not increase output or reduce unemployment. The policy prescriptions of classical economics were viewed as bankrupt and demand management was born.

Demand Management. Economic policy since World War II has been dominated by demand management policies. Demand management (often referred to as Keynesian economics) is the attempt to increase output by increasing demand for it, through government policies. There are two fundamental premises of demand management. One is that the level of economic activity can be affected in predictable and persistent ways by fiscal and monetary policies. The other is that the economy often experiences underutilization of labor (unemployment) and capital as a result of the failure of markets to work satisfactorily. Since these underutilized resources could be put to work if more demand were forthcoming, Keynesians argue that it is up to the government to design policies aimed at increasing aggregate demand.

The two traditional tools of demand management are monetary and fiscal policy. To expand aggregate demand through monetary policy, the Federal Reserve increases the growth rate of the money supply above its longer term trend. This temporarily decreases the cost of borrowing to firms, which spurs investment and increases consumption demand as consumers try to spend the excess money. To expand aggregate demand through fiscal policy, the govern-

ment can increase expenditures or reduce taxes. Demand increases directly, as government buys more goods and services or leaves more disposable income with consumers, part of which they choose to spend.

These traditional economic policies appeared to work reasonably well until the late 1960s. Since that time, it has become increasingly clear that the economy does not consistently respond in the way Keynesian economists predict; indeed, sometimes the response seems opposite to what they expect, as during periods when inflation and unemployment have risen simultaneously. This suggests that low productivity growth and high inflation might persist in spite of—some say because of—demand management policies.

The Supply-Side View. The main claim of supply-side economics is that aggregate economic behavior will respond measurably to changes in financial incentives, and in particular to those incentives that are affected by the economic policies of the government. Why? Because all the goods and services in the economy are produced by people. People are hired by firms or are self-employed; in either case they use tools, machines, computers, and communication systems to produce those goods and services. In a decentralized economic system the number and kinds of tools, machines, computers built, and how much each person works are a result of individual decisions in response to financial incentives in the markets. The cost of borrowing to finance investment, wages earned from employment, and the tax rates on income are three examples of financial incentives. As any of these incentives is changed, individuals may change their decisions about what kinds of jobs they want and how hard they want to work, while firms may change their investment and employment plans.

Recent economic research has shown some reasons why the level of output is not likely to respond to demand management

policies in predictable ways.¹ It argues that increased production requires the perception of higher rewards for working and investing—that output does not respond automatically to higher demand. If no additional incentives to produce are generated, increased demand is more likely to lead to higher prices than to more output. Proponents of supply-side policies therefore argue that the obvious remedy to stagnating growth is to concentrate economic policies on restoring the incentives to work and save, since it would be the only reliable way to increase aggregate output and productivity.

The principal supply-side policies that are currently advocated are reductions in tax rates on labor and capital income. Supply-siders claim that lower tax rates on wages, interest, dividends, and corporate income will increase output by increasing the incentives to work, increasing the supply of labor, and by increasing the incentives to save and invest. They also argue that the rapid increase in tax rates since the 1964 tax cut is largely responsible for the fall in the growth rate of productivity because it has diminished incentives to work and save. Thus, decreasing taxes will restore these incentives and cause an expansion of output.

Many economists are skeptical about these supply-side prescriptions. They believe that cutting taxes will significantly increase neither the supply of labor nor the supply of saving. What is the evidence? What, for example, have economists found out about the effect of taxes on labor?

REDUCING TAXES ON LABOR INCOME

There are many economic studies of how the work force in the U.S. has behaved as

wages have changed.² Since a tax cut results in an after-tax increase in wages, these studies may offer a guide to how the labor force will respond to a tax cut.

Studies to date generally agree that prime-age males do not measurably alter the number of hours they work in response to changes in their wages over time. But other groups, which comprise an increasing share of the work force, appear more responsive to wage changes.³ One recent study, for instance, shows evidence that married women vary their work habits in response to changing wages: a 10-percent increase in the wage rate increases the number of hours they work by more than 10 percent. The number of workers also appears to respond differentially to tax rate changes. One estimate suggests that a percentage-point reduction in personal income taxes will increase the primary labor force by only 0.05 percent, but the secondary labor force rises 0.37 percent.⁴ The net increase in employment hours (stemming from more workers and some people working more) from the same tax reduction is estimated at 0.5 percent.

There are other points to consider. The decision about when to retire appears to depend on after-tax income. If the tax rates are high, take-home pay is low relative to retirement pay and people choose to retire early. Thus a decline in the tax rates may

²Harvey Rosen, "What is Labor Supply and Do Taxes Affect It?" *American Economic Review* 70, 2 (May 1980), pp. 171-176, and Jerry Hausman, "Income and Payroll Tax Policy and Labor Supply," paper presented at a conference on "The Supply Side Effects of Economic Policy," Washington University and the Federal Reserve Bank of St. Louis, October 24-25, 1980.

³Prime-age males made up almost 70 percent of the work force in 1964 but only 56 percent of the work force in 1977.

⁴Michael Evans, "An Econometric Model Incorporating the Supply Side Effects of Economic Policy," paper presented at a conference on "The Supply Side Effects of Economic Policy," Washington University and the Federal Reserve Bank of St. Louis, October 24-25, 1980.

¹See Donald J. Mullineaux, "On Active and Passive Monetary Policies: What Have We Learned from the Rational Expectations Debate?" *Business Review*, Federal Reserve Bank of Philadelphia, November/December 1979.

expand the supply of labor by postponing retirement plans. Also, evidence from a study done on self-employed individuals shows that both their hours worked and their intensity of work are highly sensitive to after-tax income and therefore to tax rate cuts.⁵

To put things in rough perspective, a tax cut that would induce a 10-percent increase in the supply of labor would result in a 7-percent to 10-percent increase in output, spread over the time period necessary for the adjustment to be completed (which could take several years).⁶ In current dollars, this represents only a \$190-billion to \$270-billion increase in the full-employment GNP. Under optimistic assumptions, such an increase could be obtained through a decrease of roughly 14 percentage points (roughly a 40-percent reduction in the marginal tax rates on labor income).⁷ These estimates are subject to a large margin of error. It is also the case, however, that if the percentage of the secondary labor force in the total labor force continues to increase, the responsiveness of the total labor supply to tax cuts may well rise beyond the level assumed in this calculation.

⁵Terrance Wales, "Estimation of a Labor Supply Curve for Self-Employed Business Proprietors," *International Economic Review* 14 (February 1973), pp. 69-80.

⁶The 7-percent increase in output will be a result of the increase in the supply of labor. The additional 3 percent will be because as additional savings get converted into physical capital the capital-to-labor ratio will return to its original value (K/L will initially fall as the labor force increases).

⁷This calculation relies on a simple Cobb-Douglas production function [$Y = K^{0.3}L^{0.7}$], where Y is real income, K is capital, and L is labor. The increase in output would be 7 percent if capital remains fixed but 10 percent if the capital-to-labor ratio remains fixed. The primary labor force (55 percent of the total) is assumed to increase its work hours by .5 percent in response to a 10-percent increase in wages, while the secondary labor force responds with a 10-percent increase. The average marginal tax rate is taken to be 33 percent.

What Kind of a Tax Cut? Taxes on labor income can be cut either by reducing the average taxes collected on income (the average tax rate), or by reducing the marginal tax rate on income—the tax a person pays on a dollar of *additional* income. Will these different ways of cutting taxes have different effects? To answer this question it is necessary to find out how changes in the wage rate affect the supply of labor.

A measure of the incentive that most affects people's willingness to work is the hourly take-home pay. Increasing the hourly pay has two separate and opposite effects on individuals. First, it results in more income for the same work, and this induces people to work fewer hours. But since the wage rate is higher, the income in additional wages people give up by not working more is higher. This induces them to work more hours. These two forces (the income effect and the substitution effect) work against one another.⁸ Whether an increase in the hourly take-home pay will induce people to work more or less depends on which effect dominates.

Both the marginal and average tax rates on labor income affect how much people decide to work. (Progressive income tax schedules assure that the marginal tax rate is always higher than the average tax rate.) People will respond differently to changes in their

⁸Since work is the opposite of leisure, working reduces an individual's utility, everything else remaining equal. More income from increased wages for the same amount of leisure, therefore, will cause an individual to increase his leisure and utility. This is the income effect. The increase in wage rate, however, makes the opportunity cost of leisure (income forgone to obtain leisure) higher. If his income is kept the same, an individual will prefer to work more. This is the substitution effect. Whether an increase in the average wage rate results in an increase in the supply of labor depends on people's preferences and incomes. It is obvious that with sufficiently high incomes the utility of additional income will be sufficiently small so that an increase in the wage rate will decrease the supply of labor.

marginal tax rates than in their average tax rates, because of the way in which the income and substitution effects operate. To see how this works, take a fictitious example of an individual who earns \$25,000 a year, and whose total deductions come to \$5,000. Also suppose that the tax rate for income between \$15,000 and \$25,000 is 30 percent, while for below \$15,000 the rate is 20 percent. This taxpayer computes her taxes to be \$4,500.⁹ Her marginal tax rate is 30 percent while her average tax rate is only 18 percent.

Reducing her average tax rate but not her marginal tax rate can be accomplished by increasing her allowable personal deductions. If she were allowed to deduct \$4,000 more, her total taxes would be only \$3,300, her average tax rate would drop to 13.2 percent, but her marginal tax rate would remain at 30 percent. How would she respond to this tax cut? Since she has a higher income for the same hours worked, she will be likely to work less (income effect). Since her marginal tax rate hasn't changed, the substitution effect will not operate to counteract the income effect.

By contrast, a widening of the tax brackets will decrease her marginal tax rate but not her average tax rate—for instance income up to \$25,000 may now be taxed at 18 percent. In this case, her average tax rate will remain at 18 percent but her marginal tax rate will drop to 18 percent. How would she respond? Since she will earn the same income as before by working the same number of hours, she has no incentive to reduce her hours worked. In other words, the income effect does not operate. But since her marginal tax rate has fallen, it is more lucrative to work more hours than it used to be (substitution effect), and she would be likely

to work more.

The response of labor supply to a tax reform package is not easy to predict. If both marginal and average tax rates are reduced, then the overall effect on the supply of labor will come from the interaction of the income and substitution effects which is difficult to gauge. But if, as a result of the revenue loss, government services are reduced along with the tax cut, the aggregate labor supply will respond much as it would to a cut in marginal tax rates alone. The reason is that individuals will have to pay directly for services they are receiving through their tax dollars, so that the combination of the tax cuts and the reduction in government services will leave them with roughly the same income as before. Since the income effect is severely limited, the response of labor will reflect mainly the substitution effect, which should mean an increase in hours worked.

Most labor studies have not measured the income and substitution effects separately. Thus, we know very little about the magnitude of each effect alone. It is clear, however, that a tax cut that primarily reduces marginal tax rates rather than average rates will have the most impact, and almost certainly increase the supply of labor.

REDUCING TAXES ON CAPITAL INCOME

An additional way in which incentives to produce can be increased is to reduce taxes levied on the return to capital, or capital income. These are taxes collected directly from corporations via the corporate income tax and from consumers via taxes on dividends, interest income, and capital gains. The claim of supply-siders is that a reduction in taxes on capital income will increase the incentives to save by increasing the after-tax return to capital.

Taxes on the returns to capital have been growing steadily for two separate reasons. One is that income tax rates have been rising. The other is the way the tax code

⁹She pays $0.2 \times \$15,000 = \$3,000$ on the first \$15,000 reported income and $0.3 \times \$5,000 = \$1,500$ on the remaining \$5,000. Her average tax rate is $4,500/25,000 = 18$ percent.

interacts with inflation. The existing tax code does not distinguish real capital gains (which occur only when the value of an asset changes relative to that of goods and services) from the rise in the dollar value of an asset caused by inflation. If the price of a share goes up by 6 percent while inflation is 10 percent, the real value of the asset has declined by 4 percent, but the tax system treats the 6-percent increase as a capital gain. The tax code affects interest receipts in roughly the same way. Interest receipts usually are treated as taxable income (interest on state and local securities is tax exempt), even though most if not all of them simply offset the rate of inflation. In an economic environment where the inflation rate is rising, as it was in the 1970s, the current tax code ensures that the tax rates on capital income will rise and the after-tax return to its owners will fall, for the same quantity of installed capital—plant and machinery (see Appendix).

Taxes on capital income reduce the return to the owners of the claims to this capital (stocks, bonds, and business loans). And this is equally true whether these taxes are collected from individuals in the form of income and capital gain taxes or from businesses in the form of profits taxes. Increasing the returns to capital may induce people to save more or less; the outcome again depends on a balancing of the income and substitution effects. A higher return to capital will make the future rewards from saving higher, which will encourage saving. This is the substitution effect once again. But higher returns mean that the future income from accumulated savings will be higher, so that people don't have to save as much or as long to get the same future consumption. This is the income effect, and it works to discourage saving.

While economists disagree about the impact of higher rates of return on savings, there is a consensus that the economy needs to generate more saving. Since gross saving represents the difference between what is

produced and what is consumed in the economy, saving a higher proportion of income will make more resources available for the production of capital goods, increasing the amount of physical capital and research and development, both of which lead to higher per capita output in the future.

Economists have tried to find out how saving is likely to respond to higher rates of return by analyzing historical evidence. Early studies of consumption and saving found saving behavior to be insensitive to rates of return. A recent study by Boskin, however, has documented a substantial impact of after-tax returns on gross saving.¹⁰ He found that a 10-percent increase in the real (actual returns adjusted for inflation) after-tax rate of return will result in an increase of approximately 2 percent to 4 percent in available savings each year, which would result in an overall increase in the full-employment GNP of 1 to 2 percent.¹¹ This means that halving of the tax levied on the returns to capital could result in a permanent increase in saving of 31 percent and an eventual increase in GNP of 10 to 17 percent (250 to 420 billion current dollars).¹² Evans also finds a significant correlation between saving and the after-tax real rate of return. He calculates that a one-percentage-

¹⁰This study has come under some criticism and has been discussed extensively. For a good summary of the issues and criticisms, see Charles McClure, Jr., "Taxes, Saving and Welfare: Theory and Evidence," *National Tax Journal* 33, 3 (September 1980), pp. 311-320.

¹¹This value is calculated from the same production function as before, but assuming that labor supply does not respond to the higher wages that will result from the increased productivity.

¹²This calculation is meant to be illustrative, because it is very difficult to take into account all the complexities of the tax laws. It is assumed that all returns to capital are taxed at a 35-percent average tax rate, that the inflation rate is 10 percent, and that the average return is 17 percent before tax. This implies an after-tax real return of 1.05 percent at 35-percent tax and 4.025 percent at 17.5-percent tax.

point increase in this return would raise saving by \$12 billion or by 2 to 3 percent.

Economists are far from agreeing on the magnitude of the impact of a tax cut aimed at stimulating saving. The estimates discussed here must be viewed as preliminary and probably optimistic. Changes in marginal tax rates again have a different effect on saving than changes in average tax rates. A decrease in the marginal tax rate will trigger the substitution effect response and will increase the supply of saving, while a decrease in the average tax rate only will operate through the income effect and will reduce the supply of saving. A tax reform designed primarily to reduce the marginal tax rates on capital income seems likely to result in moderate increases in the saving rate and in

the full-employment GNP.

Can tax cuts increase the growth rate of productivity? How quickly will tax cuts work? How will they affect inflation? What will be the impact on the Federal deficit (see CAN TAX CUTS PAY FOR THEMSELVES?)? These are the questions most often asked about supply-side economics. The answers are neither simple nor precise.

CAN SUPPLY-SIDE ECONOMICS WORK?

The supply-side logic and a small body of evidence suggest that reducing marginal tax rates on labor income will increase the supply of labor somewhat, while the same kind of reduction in taxes on capital income will increase the supply of saving and allow investment to rise. As a result of either type

CAN TAX CUTS PAY FOR THEMSELVES?

Some supply-siders maintain that tax cuts will generate enough additional economic activity so that total tax receipts will not decline. A reduction in tax rates obviously will result in lower receipts to the Treasury at a given level of national income. But more tax revenue will be forthcoming if national income increases. If tax incentives increase income by enough, the new receipts will offset the losses from the tax cut, and the government budget will not show any additional deficits. This idea dates back to eighteenth-century economists, and has recently been revived by Professor Laffer as the "Laffer Curve."

There is no doubt that at sufficiently high tax levels this scenario can take place. But most economists are very skeptical that, at current tax rates, supplies of labor and saving will respond strongly enough to tax cuts to prevent an increase in the deficit. Fullerton, for example, calculates that even with optimistic assumptions about the response of labor, the average tax rate on wages would have to be well above 40 percent before tax cuts would pay for themselves.* And even if the deficit created by the tax cuts turned out to be small following all adjustments of labor and capital decisions, the deficits would be much larger in the beginning while the adjustment process gets under way, creating an interim need for large deficit financing.

There are some offsetting considerations, however. Some economists estimate the underground economy—that area of activity where transactions go unrecorded—to be as large as 33 percent of reported GNP. † If the reduction in the tax rates causes a significant portion of this economy to become legitimate, a tax cut might well pay for itself. In addition, individuals and corporations should find it less worthwhile to employ tax shelters at lower tax rates; if they report higher taxable income, Treasury revenues will increase. On balance, it doesn't seem likely that tax cuts will pay for themselves, though the resulting deficits are unlikely to be as disastrous as some opponents of supply-siders predict.

* Don Fullerton, "On the Possibility of an Inverse Relationship Between Tax Rates and Government Revenues," *National Bureau of Economic Research, Working Paper No. 467*, April 1980.

† Edgar Feige, "How Big Is the Irregular Economy?" *Challenge*, November-December 1979.

of tax cut, output will be higher in the future than it would be without the tax cuts. During the transition, as workers adjust their work habits and increased investment builds up the physical capital stock, the growth rate of output will be higher than it otherwise would be. For instance, it was noted above that a 14-percentage-point decrease in the marginal tax rates on labor income might result in as much as \$270-billion total increase in output. In this scenario, output would grow by 3.5 percentage points more a year if the adjustment took as little as 3 years but by 1.5 additional percentage points if the adjustment took as long as 7 years. Once the adjustment was complete, however, the growth rates of GNP and productivity would return to their longer term trend, though their level would always be higher.

The total marginal income tax rate has been climbing since 1964, in spite of periodic tax rate cuts (see Figure 2).¹³ The principal reason is that as dollar incomes rise, individuals are pushed into higher tax brackets. This phenomenon, called bracket creep, will cause tax rates to continue rising automatically as long as inflation persists. Supply-siders argue that this continually growing disincentive is responsible for the low productivity growth in recent years. A tax reform that would reduce taxes, and more importantly keep them at the new rates, would allow productivity to grow permanently faster than it has in the recent past.

How quickly labor supply may respond to the tax cuts is hard to know. There are severe technical problems that make it difficult to measure accurately how quickly labor supply has responded to shifts in financial incentives in the past, as well as how quickly the U.S. economy has adjusted to the resulting

¹³Michael Evans, "Reagan Plan Hinges on Tax Brackets," *The New York Times*, December 23, 1980, calculates that a 10-percent increase in personal income results in a 15-percent increase in personal income taxes.



changes in the supply of labor. The last question is important, because output will rise not because the supply of labor has increased but because more labor is employed. The circumstances surrounding the tax cut will affect the adjustment process and will determine whether and how output will respond in the short run. For instance, if people believe that tax cuts are likely to be reversed in the future, they will not significantly change their work habits or substantially change their consumption and saving patterns. Nor are firms likely to undertake major additional investments if they perceive the tax cuts as transitory. Unless tax reductions are viewed as permanent, there will be only a small response to the tax cuts at best.

Another important element in the adjustment process is the type of policy that accompanies a tax cut. The short-term impact of tax reductions is not likely to be the same as their long-term impact. Because the

supply-side effects of tax cuts will appear slowly, the policies that accompany the tax cuts will, to a large extent, determine the economy's response in the short term. All tax cuts have demand-side implications. A cut in taxes without a similar cut in government expenditures will probably cause an increase in the demand for goods and services, with higher prices and interest rates over the short term. This will facilitate the output adjustment by increasing the demand for labor and physical capital, but it will also likely mean a higher inflation rate and lower investment during the transition. If, on the other hand, government expenditures are reduced by roughly the same amount (to keep the deficit from growing), demand in the sectors that depend on government financed programs will fall, while demand in the sectors dealing with consumers and business firms will rise. This will mean imbalances in employment throughout the economy that may take a while to work out, masking the supply-side effects of the tax cuts. But inflation during the adjustment would likely be lower than in the case where government spending is not reduced.

Can the supply-side effects of tax cuts help reduce the rate of inflation? The answer is disappointing: not by much. Over the long haul, inflation is basically the result of two economic forces. One is the demand for money (in terms of its purchasing power) and the other is the supply of money in dollars. If the real demand for money increases at 3 percent as a result of growth in output, stable prices require that the supply of money increase roughly by 3 percent. If, however, the supply of money increases by 12 percent, then prices will increase by about 9 percent. It follows that tax cuts will reduce inflation at a given rate of money supply growth only if they increase the growth in the demand for money by increasing output growth. The consensus estimate from current studies is that a 10-percent increase in output will cause about a 6-percent increase in the real

demand for money. Thus, if supply-side initiatives were to increase output by, say, 10 percent over a six-year period, money demand would increase one percentage point a year and inflation would be reduced by about one percentage point a year, but only during the adjustment process. Once the adjustment is complete, money demand will grow at the rate dictated by the long-run growth rate of output. Thus, supply-side policies cannot substitute for restraining growth in the money supply as a means to combat inflation.

Finally, supply-side policies should not be looked at to replace countercyclical demand-management policies. Demand management may be the appropriate policy response to recessions that periodically are brought about by special sequences of economic events. But these policies are ill suited to improving long-term growth in productivity and output, because they don't necessarily increase incentives to produce, save, and invest. Supply-side policies do precisely that, but they are likely to work slowly and therefore can't be used to combat recessions.

To sum up, the major claim of supply-side economics is that increasing incentives to produce and save by cutting taxes will increase the level of output and labor productivity and may temporarily reduce the rate of inflation. The available evidence indicates that such cuts, if properly designed, are likely to yield moderate gains in output and productivity. But once-and-for-all tax cuts should increase the growth rate of income and productivity only while the economy is adjusting to the new conditions. It is less likely that inflation can be significantly reduced through supply-side policies because the temporary increases in the growth rate of output are likely to be small and because they will have an even smaller impact on the demand for money. Money supply growth more in line with growth in real output is an unavoidable part of a viable anti-inflation policy.

APPENDIX

HOW TAXES ON RETURNS TO CAPITAL INTERACT WITH INFLATION

The economic difficulties created by the interaction of the tax code and inflation have been discussed extensively at all levels of sophistication. Different rates of inflation can result in different tax burdens without any explicit tax law changes, and the distribution of these burdens can vary, depending on the rate of inflation.

In the economist's mind, pure inflation is when all prices and wages rise simultaneously, continuously, and by the same amount. If prices rise at 10 percent a year, then all prices rise together at 10 percent, all wages, stock prices, and housing prices rise at 10 percent. Owners of bonds (Treasury bills, corporate bonds) are compensated for the inflation by a sufficiently higher interest rate, while owners of stocks are similarly compensated by a combination of dividends and capital gains. Any price shifts that would take place without inflation would still take place and would be superimposed on this rise in prices and wages. Suppose food constitutes one-quarter of the consumer budget. If food prices were to rise by 4 percent relative to other prices with no inflation, with a 10-percent overall inflation rate food would rise by 13 percent while other prices would rise by 9 percent. With pure inflation, the purchasing power of the ever increasing dollar value of a worker's income does not change. (The purchasing power of income or of an asset is the *real* value of that income or asset, while the dollar value is the *nominal* value.)

The reason the U.S. tax code interacts with the rate of inflation to increase and alter the tax burdens is because it does not explicitly recognize the difference between nominal and real values.

Income Taxes on Capital Income. Individuals pay the regular income tax rates on interest and dividend income and almost half that rate on capital gains.* Therefore, the impact of the current tax system on interest and dividend payments and on capital gains varies with the inflation rate.

Interest payments are made to bond holders. Bonds are nominal assets and their value at maturity is fixed in dollar terms. This means that the real value of such a bond will decline over time if there is inflation. Suppose the inflation rate were expected to average 10 percent over the interval, and did.

* Michael Evans, "Reagan Plan Hinges on Tax Brackets," *The New York Times*, December 23, 1980.

An investor that owns a \$1,000 10-year bond would at maturity be able to purchase goods with it that are only worth \$368 now. The interest rate on the bond compensates the bondholder for this loss of purchasing power to the extent that it is anticipated by the market. If the interest rate on such a bond would have been 5 percent with no anticipated inflation, it would be 15 percent if inflation was anticipated to be 10 percent. The reason is that since the nominal asset cannot appreciate in dollar value, the interest rate compensates the investor for the expected real loss. If there are no taxes, both the holder and the issuer of the bond remain equally well off, whether there is inflation or not. But the U.S. tax system treats the 15-percent interest payment the same way it treats the 5-percent interest payment. The part of the interest payment that compensates the bondholder for the expected loss is taxed as if it were regular income. As the inflation rate increases, the taxes bondholders pay increase, and the after-tax returns decline. The first panel of the accompanying table illustrates the effect of increased anticipated inflation on the real value of the principal and interest after one year, with an example. To see how the table is constructed, look at the fourth line of the first panel. Here the tax rate on interest income is 40 percent, the anticipated inflation is 10 percent, and the interest rate is 15 percent (5 percent + 10 percent). The investor purchases a bond with a face value of \$100 (column 4). The interest from the bond is \$15 (15-percent interest), and after taxes are subtracted he is left with \$9. There are no capital gains by assumption (column 6). When the bond is redeemed, the total dollar value of the interest and principal comes to \$109. To find the real value of this sum, it must be divided by the new price level. If prices were taken to be 1.00 when the investor purchases the bond, they are now 1.1 and his real wealth is only 99 (\$109 now buys what $109/1.1 = \$99$ bought when the bond was purchased; see column 8). In the example given, the investor realizes a loss in the purchasing power of his wealth when there is inflation, even though the interest rate was higher by the rate of inflation.

Similarly with stocks. The only difference is that since part of the return to stockholders is in the form of capital gains, the overall tax ends up being lower. This is illustrated in the second panel of the table. The example is chosen so that without taxes, the returns from the stock and bond are identical. Furthermore, it is assumed that the firm distributes all its economic profits (after economic depreciation) to its shareholders in the form of dividends, so that ignoring the business cycle and secondary impacts of inflation on profitability, the price of the shares will grow at the rate of inflation. Finally, the last panel shows that if taxes were indexed to inflation, the tax burden would not rise as inflation increases.

This example is not to suggest that the situation will persist as shown over a long time, since investors will sell assets with the lower after-tax returns in favor of those with higher after-tax returns, adjusted for risk. Also, the interest rate, dividends, and the size of the capital stock will adjust to conditions of higher inflation. It is only meant to illustrate the increase in taxes and the nature of the distortion introduced by the interaction of the tax system with inflation.

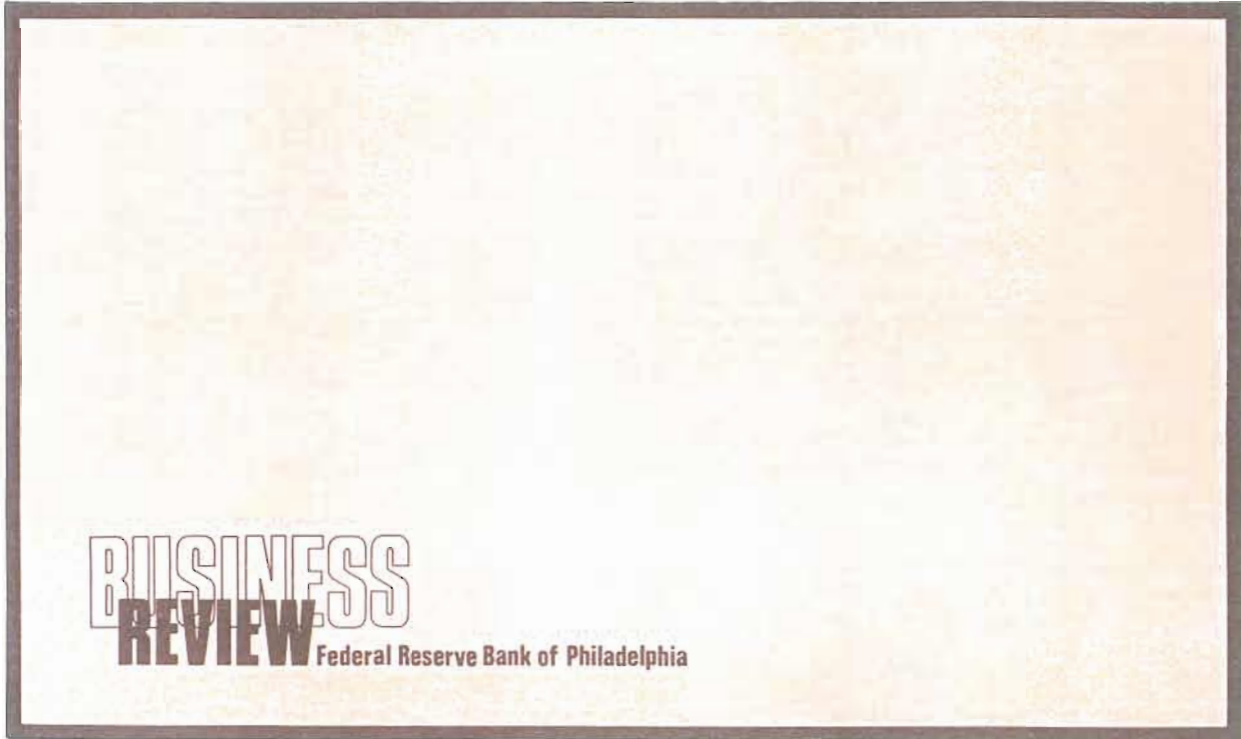
Corporate Income Taxes. Corporations pay Federal and state taxes on their reported profits. Since they do not pay taxes on the increases in the dollar value of the physical capital they own, such as land, buildings, and machinery, it would seem that the taxes they pay would not depend on the underlying inflation rate. This is not so, because depreciation allowances for plant and equipment are calculated based on historic costs. To see the effect of inflation, take a simple example of a company that has just purchased a car for \$10,000 which it plans to replace in one year. Suppose that the car loses 50 percent of its real value during the year. If there is no inflation, the company will sell the car for \$5,000 at the end of the year and deduct \$5,000 from its reported profits, saving \$2,300 in taxes.* If the inflation rate is 100 percent instead, the used car will sell for

* Assuming a three-year straight line depreciation, the firm takes the allowed $33\frac{1}{3}$ depreciation rate and the additional $16\frac{2}{3}$ percent as a business loss.

\$10,000, and the allowable depreciation deduction (\$5,000) will be offset by the apparent capital gain. Thus, though the new car will now cost \$20,000, the firm gets no depreciation allowance at all and pays \$2,300 more in taxes.

National Income Accounts reported in the Survey of Current Business show that the accounting methods used for inventory and depreciation together resulted, in 1970, in almost \$3 billion overstatement of total corporate profits (and almost \$1.5 billion more in taxes paid), while in 1978 they resulted in almost \$43 billion overstatement of corporate profits (and almost \$20 billion more in taxes paid).

Tax Rate	Inflation Rate	Interest Rate	Initial \$ Investment	After-tax Interest or Dividend Payments	\$ Capital Gain	Total \$ Value	Total Real Value
<u>Bonds</u>							
(A)							
0	0	5	100	5	0	105	105
0	10	15	100	15	0	115	105
40	0	5	100	3	0	103	103
40	10	15	100	9	0	109	99
<u>Stocks</u>							
(B)	Capital Gains Tax = 20 Percent						
0	0	—	100	5	5	105	105
0	10	—	100	5	10	115	105
40	0	—	100	3	0	103	103
40	10	—	100	3	8	111	101
(C)	Taxes Indexed to Inflation						
0	0	—	100	5	0	105	105
0	10	—	100	5	10	115	105
40	0	—	100	3	0	103	103
40	10	—	100	3	10	113	103



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