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Supply-Side Economics

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# Supply-Side Economics

Demand analysis, which has dominated American economic policies over the past 30 years, basically assumes that people work because they have jobs, not because they are paid, and that people save because their incomes are high, not because they earn an after-tax yield on their savings; incentives on an individual basis do not play a substantive role. The essential tenet of classical economics is that people alter their behavior when economic incentives change. Government, through taxes, regulations and restrictions, and by the composition of its spending, can significantly alter those incentives, hence the economy's behavior.

The difference between what it costs a firm to employ a worker or acquire a unit of capital and what the worker or saver receives net is the tax wedge. An increase in the wedge on, say, labor, will raise the cost to the employer in the form of higher wages paid, causing firms to employ fewer workers, and reduce the net wages workers receive, causing them to work less. With fewer workers employed, the value of each unit of capital is lessened. As the demand for capital falls, less capital will be employed and both yields paid and yields received will fall. An increase in the tax on labor is thus associated with less employment, less investment and lower output. Furthermore, it will increase total tax revenues by less, possibly by much less, than one might figure by applying the percentage increase to the original revenues from the tax on labor, since the increase in revenues collected per worker will be offset by a decrease in revenues resulting from the fact that less workers and less capital are employed.

Similarly, an increase in the tax wedge on the returns to capital will raise the yields paid for capital while lowering the yields received by the owners of capital, the amount of both capital and labor employed, wages received and paid and overall economic output. A reduction in the tax wedge on capital would result in more investment, which would ultimately increase employment and raise wages. Reducing tax rates on wages would increase employment and thereby cause profits to rise. Lowering tax rates on either factor of production will lower total revenues by less than the initial tax base times the change in rate.

As well as the level of taxation (or government spending) the way taxes are collected is important. In particular, of all the pairings of tax rates on labor and capital that will yield the same level of tax revenues, there exists only one that will maximize output. Diverging from this pairing—shifting taxes from labor to capital, or vice versa—will prove counterproductive. How government spends the money it collects also influences economic behavior; different types of government spending have different effects on people's income and on their incentives to work.

**W**ITH the Employment Act of 1946 and subsequent legislation, active management of the U.S. economy has fallen more and more into the purview of the federal government. Within Congress alone, numerous committees such as the Joint Economic Committee, Senate and House Budget Committees, the Joint Committee on Taxation, as well as more narrowly defined committee structures, monitor the economy and examine legislation, the express purpose of which is to alter the economy in some prespecified manner. An equally impressive expansion of activities has occurred within the administrative branch. Here and abroad, the explicit management of the overall economy is considered an increasingly important function of government. State and local governments are no exceptions to this pervasive trend.

Government spending on the federal, state and local levels (Figure A) is one manifestation of the growing tendency toward a government-controlled economy. But to stop here would grossly understate the magnitude of government's incursion into the economy. Regulations, restrictions, controls and mandated expenditures all reflect the expanded role of government. While these latter incursions are difficult to quantify, their effects on the economy could well be as significant as those of the explicit spending items.

The emergence of this trend coincided with the major conversion of the academic profession from a general classical perspective to the perspective of aggregate demand management. This conversion began in 1936 with the publication of *The General Theory* by John Maynard Keynes and, by the early 1950s, was nearly complete.<sup>1</sup> Virtually every major academic institution in America was dominated by economists with a distinct orientation toward aggregate demand as the most appropriate form of economic analysis to explain, diagnose and thus prescribe for the behavior of macroeconomic variables. Classical thought had all but disappeared and once eminent classical economists were held in disrepute.<sup>2</sup>

### **Keynesians, Monetarists and Classicists**

The Keynesian income-expenditure approach distinguishes two forms of aggregate demand. Demand can be either induced or autonomous. Induced expenditures are those expenditures that depend on income, while autonomous ex-

penditures depend upon factors other than income. In simple terms, investment, government spending and exports are representative categories of autonomous expenditures. Imports and consumption, on the other hand, represent induced expenditures. Whether induced or autonomous, each of these categories represents demand. Supply demarcations are omitted in their entirety.

Within the framework of Keynesian economics, the level of output, hence total employment, hinges upon the magnitude of autonomous expenditures, the magnitude of induced spending for consumption and imports per unit of income, and the increase in tax payments per unit of income. The higher autonomous expenditures are, the greater will be output and employment. Likewise, a high marginal propensity to consume will also result in high output and employment. For imports and tax payments, the reverse is true: High tax payments and imports result in low income and employment.

Government policies that have the effect of increasing investment, exports or government spending will, *pari passu*, increase output and employment. Likewise, government policies that increase consumption at the expense of savings or imports or tax payments will also increase output and employment. It follows directly that the Keynesian prescription for alleviating either slow growth or a low level of output would include the following types of policy measures:

- (1) increase government spending or lower taxes;
- (2) lower interest rates via increases in the money supply to entice greater investment;
- (3) depreciate currency to expand exports and discourage imports;
- (4) raise taxes on savings and imports to discourage those activities and thereby increase consumption.

In the early stages of its development, the Keynesian framework basically dismissed the inflationary consequences of government policies as being of little consequence. As the postwar era unfolded, however, inflation rates increased, and inflation itself became an increasingly more important target of government policy. The ad-

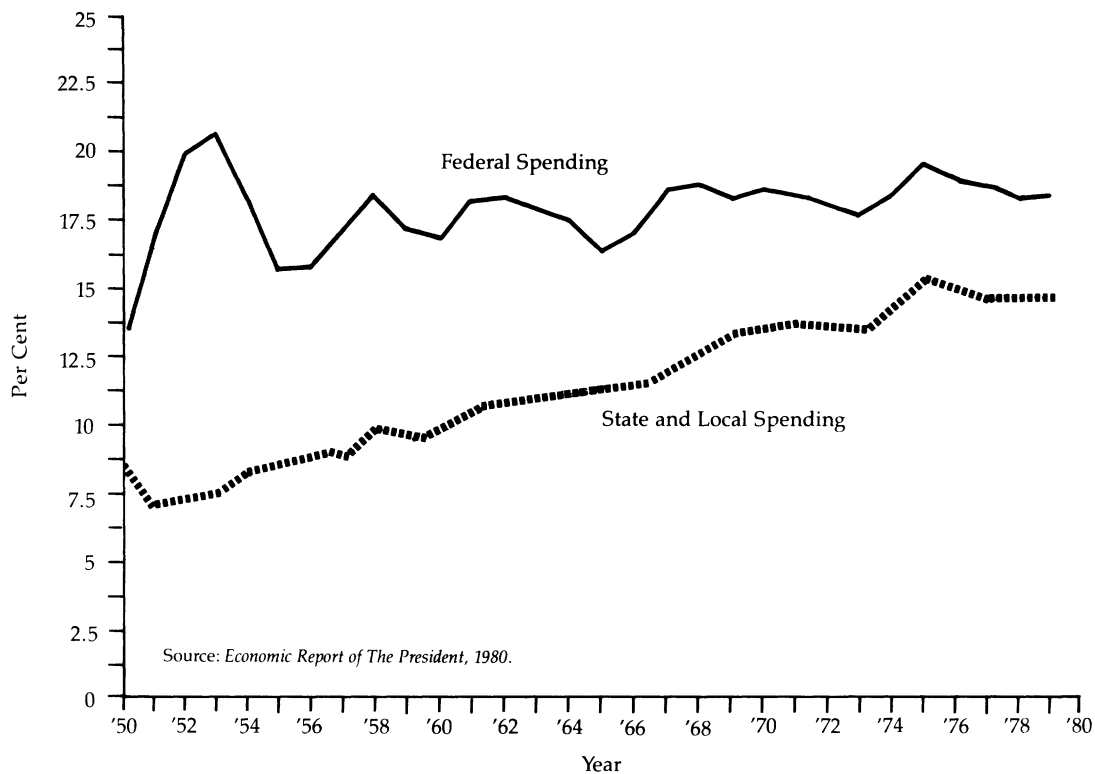
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<sup>1</sup>. Footnotes appear at end of article.

Figure A: Federal, State and Local Spending as a Percentage of GNP



adaptation of inflation into the general Keynesian framework was based on the work of a British economist named Phillips, who discovered a close and persistent inverse relation between rates of inflation and rates of unemployment in 19th century United Kingdom data. The formulation of this relation, called the Phillips Curve, postulates that increased demand resulting in lessened unemployment will heighten inflationary pressures. As a consequence, there is a drawback, or tradeoff, to stimulative monetary and fiscal policies such as increased government spending, increased money growth, reduced taxes, or even currency devaluation in the form of higher inflation.

A policy conflict or frustration emerged. To some of the most preeminent economists, the conflict was a sham; they argued that inflation itself had little, if any, social consequence, and that any attempt to halt inflation would place great burdens on the economy. In the words of Yale Professor James Tobin:

"What are they [the social costs of inflation]? Economists' answers have been remarkably vague . . . Seldom has a society made such large immediate tangible sacrifices to avert an ill-defined,

uncertain, eventual evil . . . certainly inflation does not merit the cliché that it is the 'cruellest tax'."<sup>3</sup> Nonetheless, inflation has become an ever increasing source of political concern. The range of policy prescriptions extends from all those fiscal policies that have the effect of reducing aggregate demand to specific incomes policies such as wage and price controls.

### Monetarism

Almost at its inception, Keynesian demand-oriented income-expenditure analysis faced intellectual opposition from yet another demand-oriented framework — monetarism. The central feature of monetarism, as in Keynesian fiscalism, is the exclusive focus on aggregate demand. The supply of goods and services is presumed to accommodate itself to any and all changes in aggregate demand. The only exception is found in the analysis of the very long run, where supply does come to the fore.

The earliest champion of the monetarist school of thought was an economist named Clark Warburton. The recent popularity of monetarism, however, must be attributed to the indefatigable efforts of Professor Milton Friedman. In his pres-

idential address to the American Economic Association, he presented as clear an exposition of the basic tenets of monetarism as can be found.<sup>4</sup>

Following Friedman's delineations, the immediate effect of an increase in the supply of money is an increase in the dollar price of bonds and a commensurate fall in interest rates. The fall in interest rates stimulates investment demand, as is also the case in Keynesian analysis. Because it takes time for investment spending to increase, the actual increase in demand does not occur at the moment the supply of money is increased. For the monetarist, the stimulus to demand takes on a second aspect as well: Consumption demand is augmented through the direct effect of excessive money balances in the hands of consumers. This effect, too, takes time to materialize.

Given sufficient time, the combined effects on aggregate demand of an increase in the supply of money will elicit an increase in output and employment. The supply of goods and services will merely accommodate the increase in aggregate demand. In due course, however, increased production of goods and services will lead to heightened wage demands and tendencies on the part of goods and service producers to raise prices. Inflation is the end result. Therefore, in the shortest of runs, an increase in the supply of money reduces interest rates and sets the stage for an increase in aggregate demand. In the intermediate term, output increases. Finally, the price level rises and output falls back to where it otherwise would have been.

While the controversies between the monetarists and the Keynesians have often been heated, their domination of postwar economic thought has virtually precluded classical economics. Public policy has increasingly turned to demand analysis. On the federal level, and on the level of state and local governments, whenever the economy appears sluggish, policymakers' minds turn to increased government spending, increased money growth, reduced taxation or currency depreciation. For state and local governments, several of these avenues are proscribed. They cannot, for example, depreciate the U.S. currency, nor can they effectuate a change in the growth rate of the supply of money. As a result, state and local governments look to the output and employment effects of increased spending or reduced taxation. In some instances, these policies are placed in concert with specific forms of price controls. Often these

price controls are centered on items that cannot, without considerable difficulty, leave the jurisdiction of the governing body; rent controls are a favorite target for state and local governments.

Whether one concentrates on the Keynesian or monetarist form of demand analysis, nowhere in the explicit formulations does one find a distinction between the wages paid by the firm for a worker and the wages a worker receives net after tax. Likewise, the distinction between pretax and post-tax yields on capital is nonexistent. Basically, in demand analyses, people work because there are jobs, not because they are paid. Similarly, people save because their incomes are high, not because they earn an after-tax yield on their savings. Incentives on an individual basis do not play a substantive role, at least not in the short run. As a result, macroeconomic analysis cannot be integrated with the theory of the firm or individual behavior.

### A Classical Approach

The essential tenet of classical economic analysis is that *people alter their behavior when economic incentives change*. If the incentives for doing an activity increase relative to alternative activities, more of the attractive activity will be done. Likewise, if impediments are imposed upon an activity, less of the activity will be forthcoming.

Basically, people face both time and resource constraints in their quest for self-fulfillment. With limited resources and time, the attainment of objectives necessitates prudent management within the structure of constraints imposed by nature and man. Government, with its full power of enforcement, has the ability to alter the constraints encountered by the vast array of economic factors. Changes in the structure of governmentally imposed constraints alter the economy's behavior.

The forms of constraint emanating from government are virtually unlimited. Taxes, subsidies, regulations, restrictions and requirements are but a few of the endless series of possible government actions in the area of economics. The composition, as well as the magnitude, of government spending will also affect private activity, as will the methods of government financing. The general precepts of classical economics are founded on the role played by incentives, and the effect government actions have on those incentives.

Firms base their decisions to employ workers or acquire capital assets, in part, on the total cost

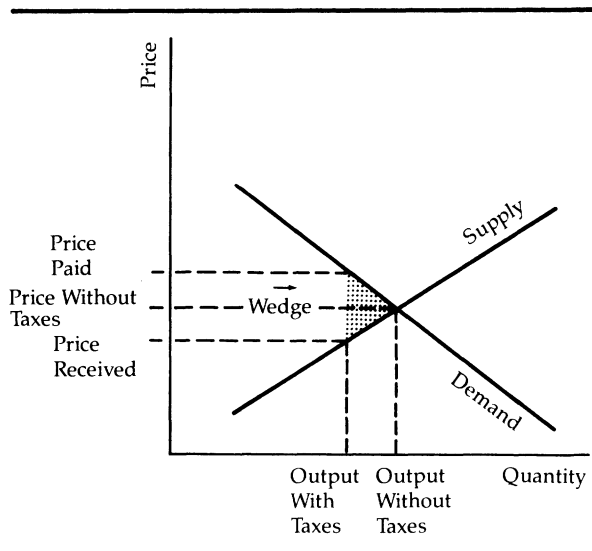


to the firm of employing workers or acquiring capital, always with an eye to enhancing the value of the firm for its owners. All else equal, the greater the cost to the firm of employing each worker, the less workers the firm will employ. Conversely, the lower the cost per worker, the more workers the firm will hire. The decision-making process incorporates gross wages paid—all costs associated with each worker's employment, including filing requirements, payroll taxes, rest facilities and fringe benefits. A comparable set of criteria applies when the firm contemplates acquiring capital. From the firm's perspective, the explicit objective is to garner surplus value from each decision and thereby enhance the value of the firm.

The worker and the saver, on the other hand, care little about the cost to the firm of employing each worker, or acquiring each unit of capital. Of far greater concern from the worker's standpoint is how much he receives for providing his work effort, net of all deductions and taxes. Similarly, savers do not save as a matter of social conscience. Savers basically abstain from consuming in order to earn an after-tax return on their savings. Within the classical framework, workers concentrate on net wages received, while savers are preoccupied with their yields on savings after taxes. The greater net wages received, the more willing the worker is to work; the higher the net yield on savings, the greater will be total savings. Conversely, if net wages received fall, workers will find work effort less attractive and they will do less of it. Savers will also save less if the net yield on savings declines.

The difference between what it costs a firm to employ a worker or acquire a unit of capital and what the worker or saver receives net is the tax wedge, illustrated in Figure B. From the standpoint of a single worker or a single unit of capital, an increase in the wedge has two effects. An increase in the wedge raises the cost to the employer in the form of higher wages paid or higher yields paid for capital. Clearly, firms will employ fewer workers and acquire less capital. On the supply side, an increase in the wedge reduces the net wages workers receive and the net yields savers receive. Less work effort and less savings will be supplied. In sum, an increase in the wedge reduces the demand for, and the supply of, productive factors. An increase in the wedge, therefore, is associated with less employment, less investment and lower output. In dynamic formulations, as the wedge grows, output

**Figure B:** The "Wedge"



growth falls, and vice versa. Within the context of classical economics, regulations, restrictions and requirements, along with explicit taxes, are all parts of the wedge.

### **Demand vs. Classical Economics: The Kennedy and Nixon Periods**

Classical economics has recently experienced a marked resurgence and now presents a formidable challenge to the hegemony of demand-side economics. This challenge results as much from the perceived failure of current economic policies as it does from the logical elegance of the classical structure.

A review of the postwar period in the United States reveals a number of experiments that have put the various models to the test. Ironically, the image people have of many of these experiments is diametrically opposed to the facts. The economic posture of the Kennedy administration and its aftermath in the first few years of Lyndon Johnson's Presidency are characterized as liberal and oriented toward Keynesian demand management. The Nixon administration's policies, on the other hand, are depicted as being hardnosed pro-business and private enterprise. The economic record belies these perceptions. In fact, the Kennedy era was the last era in which classical prescriptions were applied to the overall U.S. economy; it stands in stark relief to what had preceded and what was to follow. The data for the Nixon era depict an archetypal demand management administration that utilized explicit government intervention and behavior modification by direction.

Despite crosscurrents and contradictions, there is little doubt that the Kennedy era was classical. Kennedy employed private incentives to further economic progress. Kennedy's *Economic Report of the President* in 1963 enunciated in a clear fashion his economic game plan:

"To raise the Nation's capacity to produce — to expand the quantity, quality, and variety of our output — we must not merely replace but continually expand, improve, modernize, and rebuild our productive capital. That is, we must invest, and we must grow . . . . As a first step, we have already provided important new tax incentives for productive investment. Last year the Congress enacted a 7-percent tax credit for business expenditure on major kinds of equipment. And the Treasury, at my direction, revised its depreciation rules to reflect today's condition. Together, these measures are saving business over \$2 billion a year in taxes and significantly increasing the net rate of return on capital investments . . . . The second step in my program to lift investment incentives is to reduce the corporate tax rate from 52 percent to 46 percent . . . . the resulting increase in profitability will encourage risk-taking and enlarge the flow of internal funds which typically finance a major share of corporate investment . . . . as the total impact of the tax program takes hold and generates pressures on existing capacity, more and more companies will find the lower taxes a welcome source of finance for plant expansion . . . . the third step toward higher levels of capital spending is a combination of structural changes to remove barriers to the full flow of investment funds, to sharpen the incentives for creative investment, and to remove tax-induced distortions in resource flow . . . . fourth . . . the tax program will go to the heart of the main deterrent to investment today, namely, inadequate markets. Once the sovereign incentive of high and rising sales is restored, and the businessman is convinced that today's new plant and equipment will find profitable use tomorrow, the effects of the directly stimulative measures will be doubled and redoubled. Thus — and it is no contradiction — the most important single thing we can do to stimulate investment in today's economy is to raise consumption by major reduction of individual income tax rates . . . fifth . . . the Federal Reserve and the Treasury will continue to maintain . . . monetary and credit conditions favorable to the flow of savings into long-term investment in the productive strength of the country."<sup>5</sup>

The game plan that emerged under the Nixon Presidency was different indeed. In 1969, the tax rate on capital gains was increased. Inflation elicited illusory capital gains, illusory personal income increases and illusory business profits, each of which incurred real tax liabilities. In 1971, the dollar was devalued and a wage and price freeze was imposed. Simultaneously, a 10 per cent import surcharge was placed on goods com-

ing into the United States; gold was officially demonetized; money growth was high and government spending relative to the overall economic base grew inordinately.

To avoid complications introduced by the rapid expansion of defense expenditures for the Vietnam war, we'll compare the 1961-66 period with that of 1969-75, avoiding 1967 and 1968, when the bulk of the military expansion occurred. The 1961-66 period generally reflects the Kennedy era and its aftermath, while the 1969-75 period is basically the Nixon era. Each and every fiscal policy variable from a demand management point of view was more stimulative during the Nixon era than during the Kennedy era; just the reverse was true from a classical policy point of view. On the issue of inflation, the Kennedy administration maintained gold convertibility, which is the essence of classical monetary policy; the Nixon administration relied on wage and price controls.

As Table I shows, the Kennedy era's policies, if one uses a demand management framework, were theoretically contractionary, while Nixon's were highly expansionary. Money growth during the Nixon era averaged almost 60 per cent more than money growth during the Kennedy era. Government spending and the deficit both declined relative to GNP during the Kennedy era; they ballooned during the Nixon Presidency. During Nixon's administration the dollar's value relative to other currencies was reduced substantially by what seemed a never-ending sequence of official devaluations; Kennedy maintained the fixed dollar price of gold and dollar convertibility for official institutions.

From a classical point of view, two of the relevant fiscal policy variables — marginal tax rates on labor and capital — provide a much different picture of the Kennedy and Nixon eras. As Table II shows, between 1961 and 1966, the weighted marginal tax rate on labor rose just 0.085 percentage points — half as much as during the 1969-75

**Table I** Demand Management Policy Variables for the Periods 1961-1966 and 1969-1975

<i>Policy Variable</i>	1961-1966	1969-1975
Average M <sub>1</sub> Money Growth	3.5% p.a.	5.6% p.a.
Total Change in		
Government Spending/GNP	-0.1%	4.4%
Total Change in Deficit/GNP	-0.6%	5.3%
Devaluation of Dollar in Terms of Gold	0.0% p.a.	22.8% p.a.

Source: *Economic Report of the President*, January 1980.

**Table II** Classical Policy Variables for the Periods 1961-1966 and 1969-1975

Policy Variable	1961-1966	1969-1975
Absolute Change in average marginal tax rates on:		
Labor	0.085%	1.671%
Capital	-1.990%	3.794%

Source: "Prototype Wedge Model"<sup>TM</sup>. Tool for Supply-Side Economics.

**Table III** Objective Economic Indicators for the Periods 1961-1966 and 1969-1975

Policy Variable	1961-1966	1969-1975
Average Real GNP Growth	5.2% p.a.	1.8% p.a.
Average Inflation in GNP Price Deflator	2.1% p.a.	6.4% p.a.
Total Change in Unemployment Rate	-2.9%	5.0%
Average Nominal Change in S&P 500 Stock Index	5.0% p.a.	-2.1% p.a.
Average 90-Day Treasury Bill Rate	3.451%	6.00%

Source: *Economic Report of the President*, January 1980.

period. Between 1963 and 1965 the weighted marginal tax rate on labor actually declined 0.176 percentage points. Similarly, the weighted marginal tax rate on capital declined in the Kennedy era but increased during the Nixon era.

Whether the focus is on the goods market or inflation, the performance achieved during the period 1961-66 stands far above comparable intervals in the U.S. annals. Kennedy relied on modest fiscal and monetary policies and a trade policy of gold convertibility and tariff reductions; incomes policies were limited. As Table III indicates, during his tenure income growth was high, unemployment fell and inflation and interest rates were low. By contrast, the 1969-75 period turned in a record of subnormal performance. In spite of wage and price controls, and the ensuing incomes policy apparatus, inflation and interest rates were high during the Nixon era. Despite stimulative demand-side fiscal, monetary and trade policies, real growth was low while unemployment rose.

This comparison of objective economic indicators during the Kennedy and Nixon eras directly challenges the demand management framework and corroborates the precepts of classical economics. While stark, the comparison is not out of step with the evidence generated during the rest of the postwar era. The evidence of the Carter administration up through mid-1980 also sup-

ports the classical model and stands at odds with the demand management school of thought. Carter devalued the dollar and the economy witnessed a rapid monetary expansion; the price of gold rose. Fiscal policy, from a demand management perspective, was somewhat contractionary. The economy in the second quarter of 1980 underwent a contraction as severe as that experienced in 1975; unemployment rates rose and inflation hit new highs.

The most telling variable during Carter's administration was the surge in tax rates. Carter explicitly raised tax rates to balance his 1981 budget. The federal deficit, however, continued to hemorrhage red ink: The fiscal 1980 deficit was projected at something on the order of \$60 billion — an increase of \$24 billion over the administration's March projections. The budget for fiscal 1981, which had been projected to be in surplus by \$16 billion, was expected to be \$30 billion in the red.

The fiscal policies back in February of 1963 could not have been more different. In his testimony before the House Ways and Means Committee, then Secretary of the Treasury Douglas Dillon stated:

"By increasing the reward for effort, enterprise, risk-taking, and investment, the program [of tax reduction and reform] will strengthen individual initiative and stimulate investment, thus propelling our economy toward a faster rate of growth, and a stronger future . . . while a temporary revenue loss will be incurred at the outset, the stimulating effects of tax reduction and reform on the economy will give rise to subsequent revenue gains, and in the longer run the revenue producing power of our tax structure will be raised substantially."<sup>6</sup>

In 1977, Walter Heller, President Kennedy's Chairman of the Council of Economic Advisors, summed it all up:

"What happened to the tax cut in 1965 is difficult to pin down, but insofar as we are able to isolate it, it did seem to have a tremendously stimulative effect, a multiplied effect on the economy. It was the major factor that led to our running a \$3 billion surplus by the middle of 1965 before escalation in Vietnam struck us. It was a \$12 billion tax cut, which would be about \$33 or \$34 billion in today's terms, and within one year the revenues into the Federal Treasury were already above what they had been before the tax cut.

"Did it [the tax cut] pay for itself in increased revenues? I think the evidence is very strong that it did."<sup>7</sup>

## A Two-Factor Model: Labor and Capital

A comprehensive perspective on the impact of



fiscal policy on economic activity from a classical point of view can be gained by including two factors of production in the analysis. For discussion purposes, these will be characterized as capital and labor.

The results derived with only one factor, of course, are still applicable: An increase in the wedge increases the price paid for and reduces the price received by a factor of production, reducing both the demand for and supply of that factor. A lower level of economic activity ensues. For example, an increase in the tax wedge on labor will raise wages paid, lower wages received and reduce the amount of labor employed.<sup>8</sup>

In a two-factor model, the process does not stop here. With fewer workers employed, the value of each unit of capital, from the employer's perspective, is lessened. Thus the demand for capital falls; less capital will be employed and both yields paid and yields received will fall. Taking the process to its final state, an increase in the tax wedge on labor will lower output, the quantities of both capital and labor employed, wages received, and yields to capital, both paid and received. It will also raise wages paid. Similarly, an increase in the tax wedge on the returns to capital will lower output, the amount of both capital and labor employed, wages received and paid, and yields received by the owners of capital. Yields paid for capital will rise.

Within this two-factor model, containing both capital and labor as well as one market output, the effect on total tax receipts of an increase in the tax on either factor of production has conflicting influences. For example, an increase in the tax wedge on labor will elicit the following revenue responses:

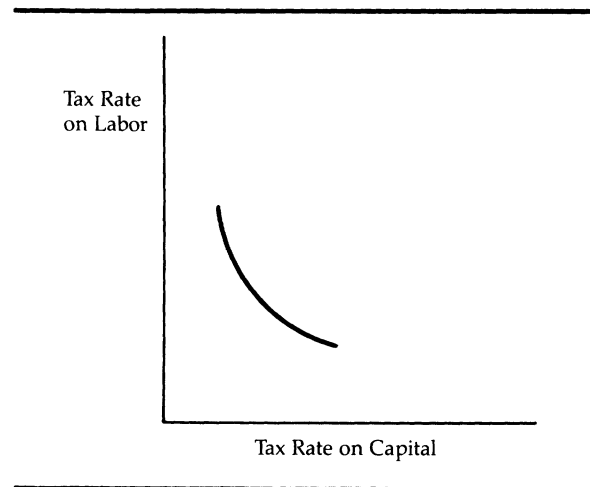
- (1) more revenue will be collected per worker employed, thus tending to increase revenues;
- (2) less workers will be employed, thus lowering revenue;
- (3) less capital will be employed, thus lowering revenue.

An increase in the tax wedge on labor will increase total tax revenues by less than one might figure by applying the percentage increase to the original revenues from the tax on labor. Possibly by much less. The same set of conditions pertains to changes in the tax wedge on capital.

### Tax Rates, Revenues and Output

One way to analyze the effects of tax rate

Figure C: Iso-Revenue Line



changes is to specify the combinations of tax rate changes on capital and labor that leave total revenues unchanged. Thus if the taxes on labor and capital are both in the normal range, a tax rate reduction on labor will be accompanied by a tax rate increase on capital, or *vice versa*. This framework distinguishes between total spending and specific tax policies.

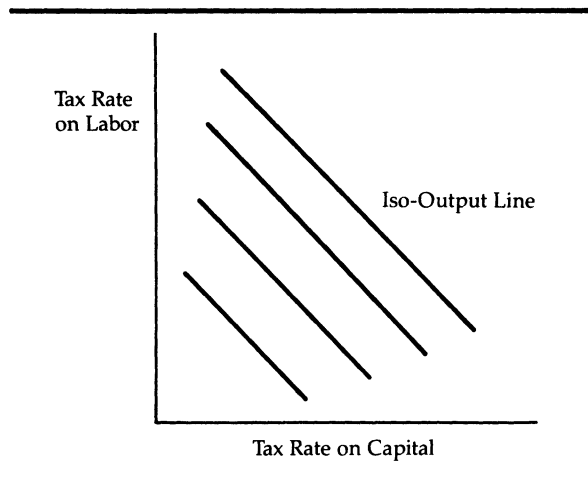
A representation of such tax rate pairings can be depicted on a two-axis graph where the horizontal axis represents the tax on capital,  $t_k$ , and the vertical axis the tax on labor,  $t_l$ . The locus of points describing the different pairings that yield the same amount of tax revenue is named the iso-revenue line. Figure C illustrates one such line. The location and angle of the line are purely arbitrary, the diagram being for illustrative purposes only.<sup>9</sup>

A higher level of tax revenues can be represented by a new curve inside the one described; a lower level of revenues would be described by an outside curve. A whole family of iso-revenue lines exists, one for each level of revenue. These lines allow for a separation of the effects of tax rates *per se* and total tax revenues.

Levels of output can also be depicted graphically by axes representing tax rates on capital and labor. Here, however, the level of output, rather than total revenues, is held constant.

A cut in the tax rate on either factor of production will, if the other factor's tax rate is left unaltered, raise output. In order to hold output constant, then, a reduction in one tax rate will require an increase in the other. Thus the locus of points linking the pairs of tax rates that hold output constant must be downward sloping to

Figure D: Iso-Output Line



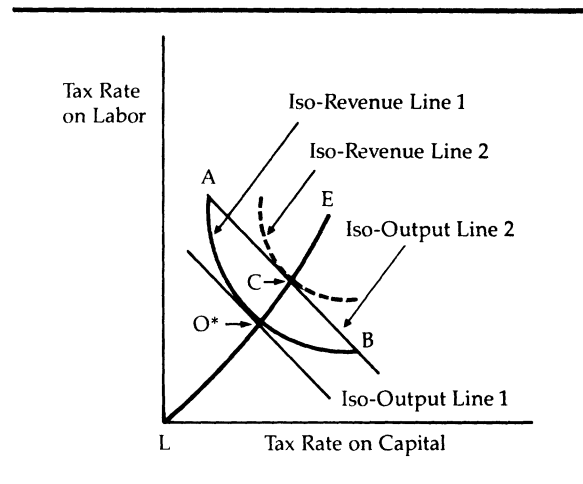
the right. It is named the iso-output line. Figure D shows a family of these iso-output lines. The further away an iso-output line is from the origin (zero tax rates), the higher the respective tax rates on capital and labor, and the lower the level of output.

A number of general propositions and derivations emerge when one combines iso-revenue with iso-output lines. It is apparent that, for each level of revenue, there exists only one pairing of tax rates that maximizes output. This optimal pairing,  $O^*$ , will occur at the point of tangency between the iso-revenue line and the iso-output line—i.e., at the intersection point closest to the axis.

In Figure E, a pairing of tax rates at either point A or B would be consistent with the level of output depicted by iso-output line 2. In this case, more revenues could be raised without a loss in output by adjusting tax rates so that the paired tax rates were tangent to iso-output line 2 at point C. Such a pairing would, of course, imply a new iso-revenue line (line 2); the pairing would thus result in more revenue at the same level of output. Alternatively, output could be expanded while holding revenue constant by shifting the paired tax rates to point  $O^*$  on iso-revenue line 1. This pairing implies output at the higher level depicted by iso-output line 1.

Taking the tax rate pairings that maximize output for every given level of revenue yields the output efficiency line EL. This output efficiency line designates for any level of government spending that precise pairing of tax rates under which output will be least diminished. In Figure E, the output efficiency line traverses points  $O^*$  and C, ending where tax rates equal zero, L, and

Figure E: The Optimal Tax Mix



where tax rates yield the maximum possible amount of revenue, E.

The 19th century American economist, Henry George, summarized the point of these diagrams in his book *Progress and Poverty*:

“The mode of taxation is, in fact, quite as important as the amount. As a small burden badly placed may distress a horse that could carry with ease a much larger one properly adjusted, so a people may be impoverished and their power of producing wealth destroyed by taxation, which, if levied in another way, could be borne with ease.”<sup>10</sup>

### Incidence and Burden of a Tax

Tax rate pairings explicitly depict the tax rate on each factor of production individually—i.e., the *incidence* of the tax. The actual change in net wages and net yields received due to a tax change is the *burden* of a tax; it must be derived. The incidence of a tax structure is very different from the burden of that tax structure. In the words of Nobel Laureate Paul Samuelson:

“Even if the electorate has made up its mind about how the tax burden shall be borne by individuals, the following difficult problems remain:

“Who ultimately pays a particular tax? Does its burden stay on the person on whom it is first levied? One cannot assume that the person Congress says a tax is levied on will end up paying that tax. He may be able to shift the tax; shift it ‘forward’ on his customers by raising his price as much as the tax; or shift it ‘backward’ on his suppliers (wage earners, rent and interest receivers) who end up being able to charge him less than they would have done had there been no tax.

“Economists therefore say: We must study the final incidence of the tax, the totality of its effects on commodity prices, factor prices, resource allocations, efforts, and composition of production and consumption. Tax incidence . . . is no easy problem

and requires all the advanced tools of economics to help towards its solution."<sup>11</sup>

The iso-revenue line may be used to explore conceptually the ultimate effects of different tax pairings on the net wages and net yields received by each factor of production. Along an iso-revenue curve, an increase in the tax on capital must be accompanied by a reduction in the tax on labor; this is the condition that holds revenues constant. The increase in the tax on capital will, however, reduce the amount of capital employed. This reduction in the demand for capital will shift back the demand for labor. Labor will thus end up paying less taxes, but the reduction in demand for its services will reduce the gross wages it receives. The benefit to labor of a shift in taxes to capital will thus amount to less than the change in the tax rate on labor would imply.

In terms of the graphic depiction in Figure E, the farther away the tax pairing moves from the point O\*, the greater the reduction in overall output will be. As output falls, the net gains to labor from its tax rate cuts (offset by an increase in the tax on capital) will be reduced. At some point, a reduction in the tax rate on labor, holding revenues constant, may actually leave labor worse off.

The age-old notion that there is an inherent conflict between wages and employment on the one hand and profits and capital formation on the other is merely one example of so-called "Robin Hood" economics that becomes senseless when viewed from the perspective of our model. Many people have the distinct feeling that workers and capitalists are hostile entities within the economic universe. To the extent that reason exists, it is widely thought that workers' ability to raise real wages comes directly out of capitalists' pool of profits. Likewise, if capitalists gain an increase in real profits, the gain must have come at the expense of the real wages of workers. The vitriolic debates between national labor leaders and big business executives point up this perception: One group warns that the salvation of America depends entirely on the containment of labor unions; the other points to the exorbitant profits enjoyed by the undeserving robber barons at the expense of the working man in America. This monotonous brace of diatribes describes a world where profits and wages are mutually exclusive and inimical. Such arguments are the essence of static analysis.

Profits and wages are not, of course, mutually exclusive. Since 1948, the positive relation be-

tween real after-tax economic profits and average weekly spendable earnings is unmistakable. As Figure F shows, higher profits, more often than not, are associated with higher wages. Higher wages are also consistent with higher profits.

What would the wages of a labor group such as truck drivers be if there were no trucks? In order to earn a living, truck drivers need trucks to drive. Now, the only way there will ever be enough trucks around for truck drivers to drive is to provide people—savers and investors—with an after-tax rate of return on savings. Saving must be profitable enough—provide an incentive—to entice people either to abstain from consuming or to work harder in order to provide the requisite real resources to acquire a capital stock of trucks.

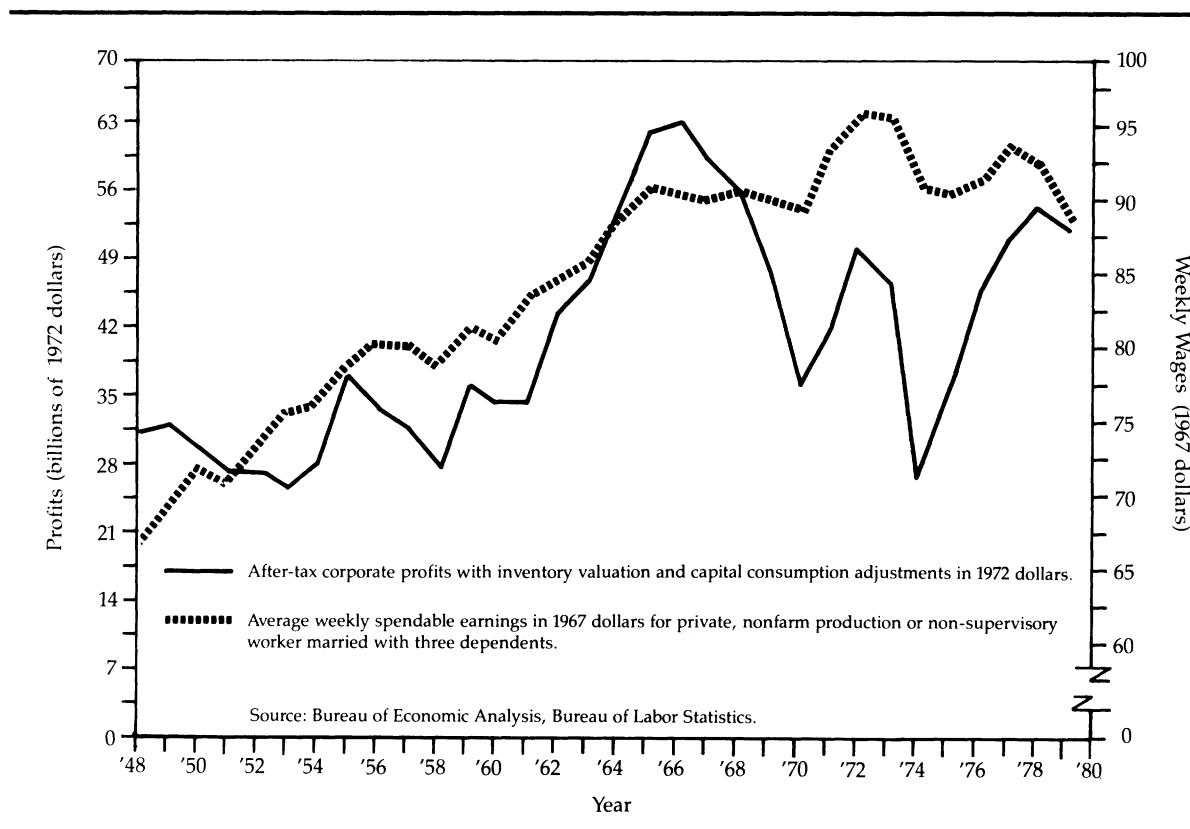
If capital is overtaxed, there will be less capital formation, fewer trucks and lower wages for truck drivers. Reducing tax rates on capital will increase the capital stock and, more important, raise the wages of truck drivers and other workers. High wages and high profits are hardly conflicting objectives. Returns to capital and returns to labor are, in fact, complements.

A reduction in the rate of taxation on the earnings from capital would result in more investment, which would raise wages. Lower tax rates on wages would increase employment and thereby cause profits to rise. Capitalists and workers alike would thus be helped by lower rates of taxation on either capital or income (ignoring, for the moment, the government services that tax revenues pay for).

In summary, our model leads to the following conclusions.

1. Changes in tax rates affect output in a direct fashion; lower tax rates correspond to higher output.
2. Changes in tax rates affect the employment of both factors directly; lower tax rates on either factor of production increase employment for both factors.
3. The constellation of tax rates, holding government spending constant, affects output; how taxes are collected is important, as is the total amount of taxation and spending.
4. Lowering tax rates on any one factor will lower total revenues by less, and possibly by far less, than the initial tax base times the change in rate; lowering tax rates will also reduce the indirect costs of taxation.

**Figure F:** Profits and Wages (1948–1979)



### Some Additional Factors

The precise responses of particular factors to tax rates and total taxation or spending, and the specific shapes of revenue curves, will depend upon the innate characteristics of the factors and the production processes involved. Figure G shows, for example, how elasticities of supply and demand can shift the burden of a tax wedge. The price received for factors that are elastic in supply (sensitive to price changes) will fall very little with the imposition of a tax wedge, since a small decrease in the price received will yield a large change in the quantity supplied (Figure Ga). These factors will bear progressively less of the burden of taxation irrespective of the incidence.

The burden will be passed to those factors that are inelastic in supply. By definition, these factors have the fewest alternatives to providing their services, even if there is a reduction in the price received (Figure Gb). Thus a reduction in the tax rates on inelastic factors will mean a decline in tax revenues. The more elastic the supply of a factor's services with respect to net returns received, the less overall revenue loss will be for any given reduction in tax rate.

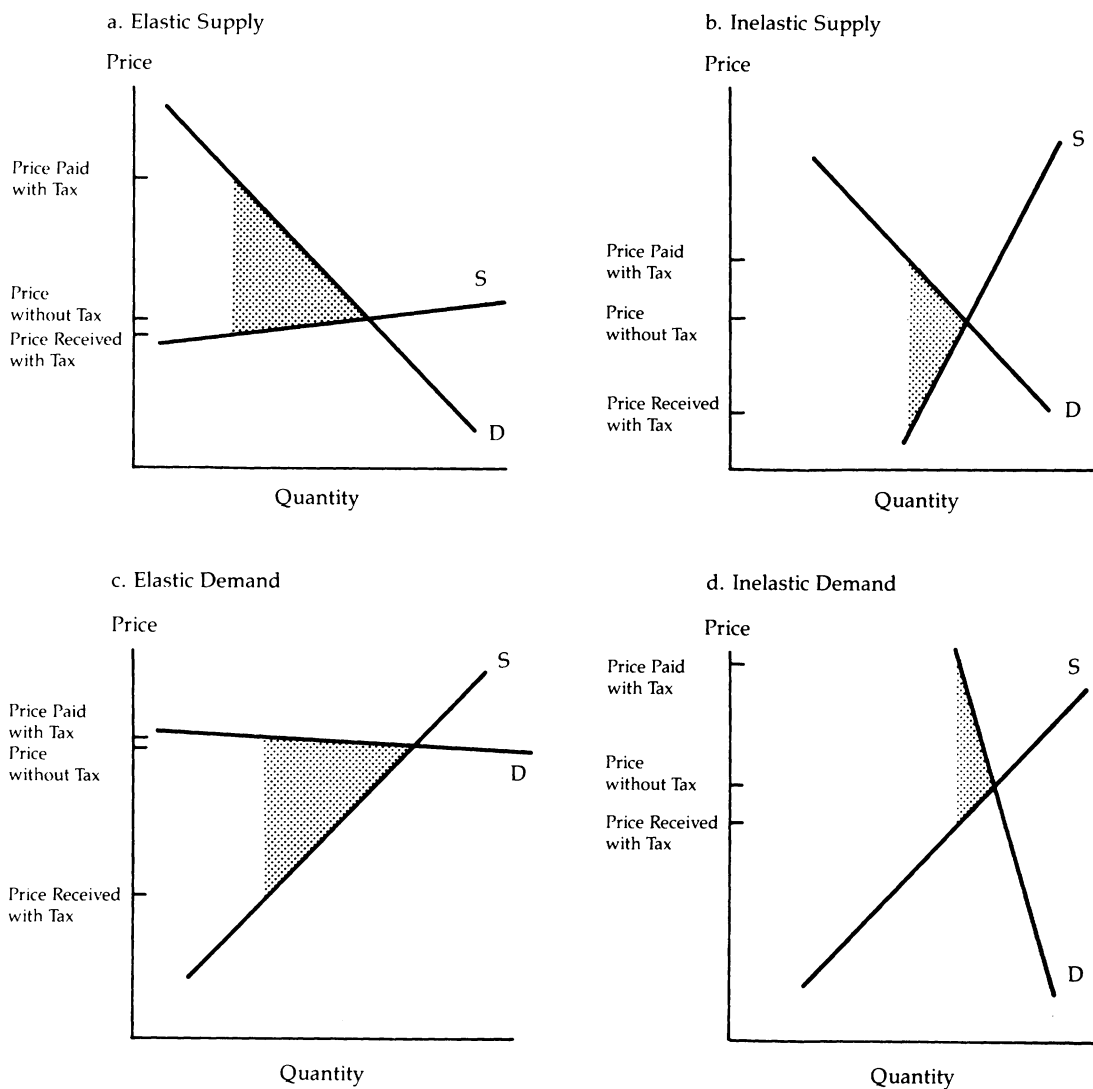
The more elastic the demand for a factor's services, on the other hand, the greater will be the burden placed on it by any and all taxes. Any change in its price will lead to a large change in the quantity demanded (Figure Gc). Factors that are inelastic in supply but that face elastic demand bear the tax burden disproportionately, even when the taxes fall on other factors (Figure Gd).

Time can also be a significant input to the model. Over time, any economy becomes more sensitive to the imposition of a tax wedge, since the elasticity of both supply and demand for factor services tends to increase over time. The mobility of most factors of production will increase, for example. Machinery will not be repaired or replaced. Emerging job opportunities will lure labor out of the taxing district, while a lack of opportunities will lead to below average growth in employment. In general, the longer the time horizon, the smaller the revenue gains from tax rate increases will be. Revenue increases realized in the very short term may well be largely undone over distant horizons.

Obviously the potential inputs to the model are virtually unlimited. More elaborate models



**Figure G:** Incidence versus Burden of a Wedge



will provide additional enrichment, but only at the cost of complexity.

### Government Spending

Up to now, the discussion has focused on the roles played by the constellation of tax rates and the level of total taxation or spending. But the composition of government spending also has fiscal effects on the overall economy. There are four separate types of government spending — (1) transfer payments, (2) public goods, (3) nationalized goods and (4) what is euphemistically referred to as “garbage” goods. These four categories of public spending have different income and substitution effects.

### Transfer Payments

Transfer payments represent perhaps the least complex spending category. If taxes are raised and the proceeds distributed in lump sum transfer payments, then taxpayers face both higher tax rates and a diminution of incentives. The reduction in the incentives to work and produce will tend to make the workers supply less work effort. The other effect that comes into play results from the fact that the workers will now have less after-tax income. In order to maintain a semblance of their previous living standards they must work more, not less. Therefore, for any one taxpayer, an increase in tax rates will bring about two effects that work in opposite

directions: The substitution effect will lead the taxpayer to work less, while the income effect will tend to make him work more.

In the words of Alice Rivlin, head of the Congressional Budget Office: "The economic theory of household behavior leaves it unclear whether lowering tax rates will increase or reduce work effort. . . . it is a question that cannot be answered by theory alone." This view is widely held by economists and non-economists alike.<sup>12</sup> But it ignores an entire set of effects that comes out of a general equilibrium analysis.

Theory does indicate what the net effects of an increase or decrease in tax rates will be on work effort. The *Wall Street Journal* of April 16, 1976, gave one of the best simple illustrations of the correct general equilibrium statement:

"MIT economist Lester C. Thurow also speaks favorably of a net-wealth tax and the full taxation of capital gains.

"He argues that private capital would still be formed because every tax has an income effect and a substitution effect, and he says the former dominates the latter. If you boost the tax on wealth, people will work harder to achieve their desired level of wealth (the income effect), even as the higher tax discourages them from more work (the substitution effect). But by our reckoning, if you tax \$100 from Jones, thus forcing him to work harder, and give the \$100 to Smith, Smith is required to work less to achieve his desired level of wealth.

"The income effect washes out, and all that's left is substitution."<sup>13</sup>

It is clear that at zero or negative take-home wages an individual will work less than he will at any positive take-home wages. Therefore, over the entire range of possible wages, the supply of work effort is unambiguously increased by a total increase in take-home wages. On the other hand, within a certain range of take-home wages, an individual may choose to work less as take-home wages rise. In such a case the income effect of higher total take-home wages more than offsets the substitution effect of more take-home pay for the last unit of work.

Consider, for example, a person who earns a pretax wage of \$4,000 per month and pays a flat 50 per cent tax on all wages. He takes one month per year in unpaid vacation, so that his take-home pay is \$22,000 for the 11-month year. Now compare what happens if (a) he wins a one-time lottery that gives him \$11,000 per year after taxes as opposed to (b) his tax rates are permanently reduced to 25 per cent.

If he continues to work the same 11 months per year, he will receive \$33,000 ( $0.50 \times \$44,000 +$

\$11,000) after taxes under condition (a). Under condition (b), he will also receive \$33,000 ( $0.75 \times \$44,000$ ). If he only works 10 months a year, he will take home \$31,000 ( $0.50 \times \$40,000 + \$11,000$ ) under condition (a) but only \$30,000 ( $0.75 \times \$40,000$ ) under condition (b). However, if he decides to work the full 12 months of the year he will take home \$36,000 ( $0.75 \times \$48,000$ ) under condition (b) but only \$35,000 ( $0.50 \times \$48,000 + \$11,000$ ) under condition (a).

Under condition (a), the yearly stipend, the general result will be some reduction in the number of months worked; part of this person's increased income will go into more leisure consumption in place of work. Under condition (b), on the other hand, he will have more incentive to work more and more disincentive to work less. His lost income will be greater if he takes one more month of leisure time when tax rates are cut as opposed to when he receives a windfall lottery; by the same token, he will gain more if he works an extra month when tax rates are cut. Therefore, if we neutralize the income effect of a tax rate reduction, the substitution effect will lead to more total work.

We cannot be sure whether, for any one person in a take-home wage range, the income effect will dominate the substitution effect. Clearly, the income effect of a tax rate reduction will reduce work effort while the substitution effect will raise it. For the economy as a whole, however, the effect of a tax rate cut can be presumed to lead to more work. If income effects across individuals are roughly similar, then the work impact of the income effect can be expected to net to zero; the higher income accorded the worker whose tax rates are cut must be matched by a negative impact on the income of the spending recipient.

If worker output remained unchanged, then a tax rate cut would lead to a spending cut or a negative income lottery (usually referred to as a poll tax). In terms of our example, this would be equivalent to imposing a \$11,000 yearly poll tax simultaneously with a reduction of the income tax rate from 50 to 25 per cent. Eleven months of work would raise \$22,000 ( $0.75 \times \$44,000 - \$11,000$ ), but an additional month's work would yield \$3,000 net, as opposed to \$2,000. Except in obviously perverse cases, more work, not less, would be forthcoming.<sup>14</sup>

It is important to note that determination of net changes in income must not be confused with the incidence of the transfer payments nor with the incidence of the tax rates. Reliance must be

placed solely on the burden of the program. Even if we knew the relative responsiveness of different groups to income effects, and also knew the incidence of transfer payments and tax rate hikes, we still would be no closer to the net income effect. It could just as easily be positive, negative or even zero.

In all, therefore, transfer payments financed by increases in tax rates result in no net expected income effects; they do result in substitution effects that cumulate over all taxpayers and potential taxpayers. Furthermore, another set of substitution effects will occur because of so-called "needs, means, retirement and incomes" tests. In order to receive transfer payments such as unemployment compensation, food stamps, Aid for Dependent Children, Social Security benefits, housing and rent subsidies, agricultural relief, etc., it is necessary to demonstrate need. The higher one's income, the less one can receive, and vice versa. Therefore an additional disincentive is placed in the path of work effort: Not only is a person taxed if he works, but he is also paid if he doesn't. Both the tax increase used to finance transfer payments and the specific requirements for receiving transfer payments will lower output.<sup>15</sup>

### Other Types of Government Spending

Examples of *public goods* might include the national highway system and perhaps some government research and development efforts. Taxation provides the real wherewithal to acquire the public goods, which are distributed *gratis* to the recipients. By definition, however, the value of a public good will exceed the value of the resources exacted from the population.

Both the income and substitution effects of government spending on public goods lead to lessened production. The taxation *per se* reduces incentives to work. The spending raises the total well-being of the recipients of the public goods, leading them to choose more leisure time instead of work. While the opposite effect will be in force for the taxpayers, it will have a smaller impact because the value of the resources exacted from them is less than the value to the recipients of the public goods received. Relative to transfer payments, public goods will result in higher consumption or welfare on the part of the overall population, while simultaneously yielding lower work effort, since part of the increase in total income will be used to consume more leisure.

*Nationalized goods* constitute those goods the

government produces and sells at market prices. The government production unit also pays market wages and returns on capital. If the government's operation is precisely as efficient as private production, there will be no difference between private and government production, hence no substitution or income effects.

*Garbage goods* are those products the government produces less efficiently than the private sector. In the extreme case, the government may really be throwing the product away. For instance, John Maynard Keynes once recommended that the government hire people to dig ditches and then fill them up again. But the negative connotation is not always appropriate. Basically, any good the private sector would not produce or purchase on its own accord is a garbage good, regardless of its total value to society at large.

Garbage goods will produce a negative income effect along with the substitution effects of higher tax rates. Thus garbage goods will result in lower consumption or welfare and greater work effort than transfer payments.

### Taxes, Spending and the Deficit

A tax rate reduction will

- (1) lessen the amount of revenue collected per unit of the lower taxed factor;
- (2) increase the employment of the lower taxed factor;
- (3) increase the employment of other factors, hence increase their tax payments; and
- (4) reduce total spending as the number of unemployed and the number of welfare recipients declines.

Of course, this general outline neglects many potentially important feedback effects. For instance, higher tax rates imply more tax evasion and avoidance. The more people avoid or evade taxes, the less revenue the government will collect per unit of the taxable base and the more money it will have to spend to monitor and enforce tax codes. Conversely, lower tax rates may be expected to reduce tax evasion and avoidance; this enhances the beneficial fiscal effects of tax rate cuts. What the full effect of changes in tax rates will be on the fiscal solvency of the relevant government unit remains, however, an empirical question.

In any case, the most important feature of any tax system is the conceptual framework upon which it is based. Henry George has enumerated

as well as anyone the criteria by which tax policy should be analyzed:

"The best tax by which public revenues can be raised is evidently that which will closest conform to the following conditions:

- "1. That it bear as lightly as possible upon production — so as least to check the increase of the general fund from which taxes must be paid and the community maintained.
- "2. That it be easily and cheaply collected, and fall as directly as may be upon the ultimate payers — so as to take from the people as little as possible in addition to what it yields the government.
- "3. That it be certain—so as to give the least opportunity for tyranny or corruption on the part of officials, and the least temptation to lawbreaking and evasion on the part of the taxpayers.
- "4. That it bear equally—so as to give no citizen an advantage or put any at a disadvantage, as compared with others."<sup>16</sup> ■

### Footnotes

1. John Maynard Keynes, *The General Theory of Employment, Interest, and Money* (New York: Harcourt, Brace and Company, 1936).
2. As striking as any example can be was the total reversal of Harvard Professor Alvin Hansen. When *The General Theory* first appeared, Professor Hansen wrote a review that effectively dismissed the book as not being economics; within a few years, however, he had become Keynes' most ardent advocate in the U.S. and his book, *A Guide to Keynes*, was *de rigueur* in any classroom where macroeconomics was taught. Alvin Hansen, *A Guide to Keynes* (New York: McGraw-Hill, 1953).
3. James Tobin, "Inflation and Unemployment," *American Economic Review*, March 1982, pp. 1-18.
4. Milton Friedman, "Presidential Address at 80th meeting of the American Economic Association, December 29, 1967," *American Economic Review*, March 1968, pp. 1-17.
5. John F. Kennedy, *Economic Report of the President*, 1963, pp. xvi-xviii.
6. Douglas Dillon, "Statement Before the Committee on Ways and Means of the U.S. House of Representatives, On the Special Message on Tax Reduction and Reform, 6 February 1963.
7. Walter Heller, in testimony before the Joint Economic Committee of Congress, 1977, quoted by Bruce Bartlett in *The National Review*, 27 October 1978.
8. Balanced against these costs, of course, will be the benefits of the services that government tax revenues make possible.
9. For a mathematical derivation of the ellipse, see Victor A. Canto, Douglas H. Joines and Arthur B. Laffer, "Taxation, G.N.P. and Potential G.N.P." (Presentation to the American Statistical Association, San Diego, California, August 14-17, 1978).
10. Henry George, *Progress and Poverty* (New York: Robert Schalkenbach Foundation, 1979, p. 409).
11. Paul Samuelson, *Economics* (New York: McGraw-Hill, 1973).
12. See, for example, Joseph A. Pechman, *What Should Be Taxed?* (Brookings, 1980).
13. "Review and Outlook," *Wall Street Journal*, 16 April 1976.
14. The theoretical analysis underlying this example can be found in John R. Hicks, *Value and Capital, An Inquiry Into Some Fundamental Principles of Economic Theory* (Oxford: Clarendon Press, 1939) or perhaps Arnold C. Harberger, *Taxation and Welfare* (Boston: Little Brown, 1974).
15. Arthur B. Laffer, "Prohibitive Tax Rates and the Inner-City: A Rational Explanation of the Poverty Trap," H.C. Wainwright & Co., 27 June 1978.
16. Henry George, *Progress and Poverty*, p. 408.