"Supply-Side" Economics and Public Policy

Testimony Presented

to the

Joint Economic Committee
Congress of the United States

by

Norman B. Ture, President
Norman B. Ture, Inc.,
and
Institute for Research on the Economics of Taxation

May 21, 1980

Summary

My discussion today focuses on the distinguishing characterisitics of "supply-side" economics, the basic attributes of a model which embodies the "supply-side" hypotheses, and some of the implications for public policy goals and procedures of the application of the "supply-side" analysis.

I. Distinguishing Characteristics of the "Supply-Side" Analysis

"Supply-side" economics entails a fundamentally different anlysis of the way in which government actions affect the economy from the demand-or . nted approach. It is not merely the addition of supply equations to aggregate demand formulations; it is not a companion piece to the demand-oriented approach.

The distinctive characteristic of the "supply-side" analysis is that it identifies the initial effects of tax or other fiscal actions in terms of the changes in relative prices these actions entail and seeks to describe and measure how households and businesses respond to these relative price changes. These responses are likely to take the form of changes in the total amount supplied of one or another production input, hence changes in total output and income. These second-level income effects are also likely to be powerful influences on the level and composition of economic activity. The "supply-side" analysis doesn't exclude income as a determinant of economic behavior, but it does hold that the initial effects of fiscal actions cannot be identified as changes in income. In summary terms, the "supply-side" analysis (1) ascribes to fiscal actions a first-level effect on (explicit or implicit) relative prices, (2) rejects the view that fiscal actions can have a first-level effect on total income, and (3) holds that changes in income result from the responses by households and businesses to the relative price changes generated by fiscal actions.

In contrast, the aggregate demand approach identifies (incorrectly) the first-level effects of fiscal actions as changes in (disposable) income, most of which goes to increase spending. No such effect can result for the economy as a whole. To see this, consider an income tax cut, starting from a balanced budget. At the outset, the inital increase in disposable income must be exactly matched by the deficit resulting from the loss in income tax revenues. Hence, the additional disposable income must, in the aggregate, be allocated to purchase of the additional government debt issues. If some people use their additional disposable incomes for additional spending, others will have to reduce their spending. No change in aggregate outlays can result at the outset from the increase in disposable income.

More fundamentally, a tax cut does not itself directly increase the amount or productivity of production inputs without which no increase in output or income can be obtained. If an increase in income is forthcoming it is only because the tax reduction, by lowering the cost of work and saving, induces people to supply more labor and capital services.

II. Attributes of a "Supply-Side" Model

An econometric model which embodies the "supply-side" analysis differs in fundamental respects from an aggregate demand model. A demand-oriented model cannot capture the "supply-side" economics merely by the addition of supply equations. So long as a model retains first-level income effects of fiscal changes as determinants of the amount and composition of spending, it is at odds with the basic conceptual content of "supply-side" economics.

As a device for analyzing and measuring the aggregate economic response to fiscal changes, the supply side model must be actuated by the relative price attributes of the fiscal system and by the relative price effects of fiscal changes.

This requires inclusion of pertinent price terms in the specification of household and business behavior. Consumption (or saving), for example, must be represented as determined not only by permanent income or wealth but as well by its cost relative to that of its alternative -- saving (or consumption), where the cost includes the effects of taxes or government outlays. As a corollary, desired stocks of capital must be represented as responsive not only to levels of aggregate income or wealth, but also to the net-of-tax cost of the future income produced by capital relative to the cost of current consumption. The specification of the supply of labor services must include as a major determinant the real wage rate, net of tax and of government transfer payments which represent payments for not working. None of the equations can specify fiscal actions as having first-level income effects. The inclusions of any such first-level income effect invalidates the model as a "supply-side" formulation.

Conceptually as well as mechanically, the "supply-side" analysis rejects any demand-impelled multiplicative effect of fiscal changes on total income. Exclusion of first-level income effects accordingly, eliminates any "multiplier" manipulation.

Fiscal variables in a supply-side" model's specifications of behavioral functions must be in their marginal rather than average or effective rate dimension. This is in keeping with the principle that taxes enter into household and business decisions at the margin. The aggregate demand analysis, on the other hand, by virtue of its reliance on first-level income effects, focuses on effective rates, since these measure the effect of fiscal actions on disposable income.

In the "supply-side" analysis there is no conceptual distinction between the act of saving and investment. The "supply-side" model, accordingly, does not specify separate behavioral functions for saving and investment. The policy

implication is that there is no occasion for distinguishing tax proposals intended to encourage saving from those aimed at promoting investment. A "10-5-3" tax proposal is as much a pro-individual saving measure as it is a pro-business capital formation device.

III. Embodying "Supply-Side" Economics in Public Policy

The specific questions addressed by the Chairman of this panel provide a useful framework for discussing the policy implications of "supply-side" economics.

1. Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

The dependence of demand-oriented econometric models on first-level income effects accounts for their failure to analyze, describe, and measure adequately the effects of taxes, inflation, etc., on factor supplies, output, and income. These models, for example, fail to show the effect of inflation in raising the real cost of providing labor and capital services, hence the constriction on output growth which is a major effect of inflation. Similarly, by focusing principally on the disposable income effects of the tax changes, demand-oriented models cannot pick up the effects of tax policy on factor supply conditions and, therefore, total output and income.

2. What areas on the supply side offer the most intriguing prospects for investigation and research?

Since the "supply-side" analysis and models embodying it depend on the relative price effects of fiscal actions, the most urgent research concerns are improving knowledge of the nature and magnitude of response in the private sector to these effects. In particular, research should focus on the relative strength of income and price effects on the supply of labor services. It should be noted, however, that changes in the marginal rates of tax on labor income involve only relative

price effects at the outset, since, as stressed earlier, tax changes do not have first-level income effects. Similarly, the elasticity of saving response to the price effects of tax changes requires additional investigation.

3. What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

One of the major casualties of adopting "supply-side" policies is the effort to control aggregate demand by fiscal policy. Neither government spending totals nor total tax revenues should be targeted by reference to their supposed contribution to aggregate demand. As a corollary, the multiplier analysis should be scrapped.

The "supply-side" analysis, in sharp contrast with the demand-oriented approach, urges that appropriately designed tax reductions, by spurring increases in supplies of capital and labor services, will reduce, not increase, inflationary pressures. Tax cuts to curb inflation must have the effect of reducing marginal income tax rates.

4. Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis?

The "supply-side" analysis shows that policies aimed at enhancing productivity, expanding output, and curbing inflation are not at odds with each other but are, rather, mutually reinforcing. Fiscal actions which remove impediments to employment, saving and capital formation, by reducing their relative costs, will constrain, not augment, inflationary pressures. A tight monetary policy which curbs inflation will enhance expansion of supplies of capital and labor services, hence lead to higher levels of output and income than otherwise.

The "supply-side" analysis also shows that tax policies to promote private saving and capital formation principally benefit suppliers of labor services by augmenting the advance of labor's productivity, hence increasing the demand for labor services, employment, and real wage rates.

"Supply-Side" Economics and Public Policy

I am very pleased to have the opportunity to present to the Joint Economic Committee some observations on so-called "supply-side" economics and its applications for public economic policy purposes. The Committee deserves great credit for the highly innovative approach it has taken to the long-standing problems of determining how public policies affect the performance of the total economy. More particularly, the Committee is to be highly commended for having recognized the severe limitations on effective public policy, given the objectives of the Employment Act of 1946, resulting from relying on the aggregate demand-oriented analysis.

There is an inclination among public policy makers, as well as among economists, to blame the inadequacies of public economic policy on the deficencies of econometric models and to give too little attention to the conceptual sources of these deficiencies. To be sure, there is abundant occasion for dissatisfaction with the standard econometric models; public policy will be well served by junking them outright. But more than better models are needed to improve public economic policy. The basic requirement is a change in the fundamental concepts about how tax, government spending, monetary, and regulatory policies affect the economic behavior of households and businesses. Models which implement and embody this different conceptual framework will be far more useful tools for policy makers in quantitatively assessing the likely effects of policy changes. But since econometric models can't be better than the concepts they embody, the conceptual revisions are the top priority.

The Joint Economic Committee has given major impetus for the innovative work which is now being done in the universities and in research organizations in the field of "supply-side" economics. One must hope that the Committee will inspire the same sort of innovations in the work of the professional staff community of the Congress.

In the discussion which follows, I shall attempt first to present the basic distinguishing characteristics of "supply-side" economics, second to delineate the attributes of an econometric model which is built in the "supply-side" conceptual framework, and third to explore the public policy implications of the "supply-side" analysis in contrast with those of the aggregate demand approach, by reference to the specific questions, Mr. Chairman, on which you have asked this panel to focus:

(1) Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adquately captured in recent years by demand-oriented econometric models?

(2) What areas on the supply side offer the most intriguing prospects for investigation and research?

(3) What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

(4) Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis?

I. The Distinguishing Characteristics of the "Supply-Side" Analysis

Distinguishing the "supply side" analysis from the aggregate demand approach is essential for understanding why some public policy strategies are consistent with policy objectives while others are either unsuccessful or counterproductive. With these conceptual differences in mind, it is clear that "supply-side" policies are not merely addenda to the long-standing efforts to control aggregate demand by government actions. By the same token, econometric modeling of the supply-side analysis precludes merely adding supply equations to the neo-Keynesian aggregate

demand models. More fundamentally, the supply-side analysis urges that public policy should not focus at all on control of aggregate demand. The implications of rejecting that policy focus for the work of the Congressional Budget Committees and of the Congressional Budget Office will be suggested at a later point in this discussion.

To begin with, it should be noted that the phrase "supply-side economics" really is a misnomer. It suggests, incorrectly, that this analytical approach is distinguished from the more conventional analysis by its focus on the effects of fiscal actions on supply rather than on demand conditions. In fact, however, the actual distinction is that the "supply-side" analysis identifies the initial effects of a tax or other fiscal action in terms of what it does to one or another relative price and seeks to describe and measure the responses of households and businesses to such relative price changes. These responses are very likely to entail changes in the total amount of one or another production input, hence changes in total output and income. These changes in income will, in turn, lead to further changes in economic activity, but this income effect is secondary in sequence, even though it may be very large indeed. In contrast, the aggregate demand approach identifies tax and other fiscal changes principally in terms of effects on aggregate disposable income the changes in which lead to changes in the spending of the private sector. While relative prices are not ignored in this approach, they are given a secondary role.

In summary terms, the "supply-side" analysis

- ascribes a first-level relative price effect to fiscal actions;
- rejects the view that fiscal actions can have a first-level effect on total income; and
- posits that changes in income result from household and business responses to changes in relative prices generated by fiscal actions,

while the aggregate demand approach identifies first-level income effects of fiscal actions which are deemed to be the principal way in which these actions affect economic activity.

Since its distinctive attribute is its focus on the relative price effects of fiscal actions, one might well ask why the label "supply-side" has been given to this analysis. One reason is that its application to the appraisal of fiscal actions leads quickly to the effects of these actions on the relative costs of working in market-oriented jobs vs. "leisure" and of saving and investing vs. consuming. Changes in these relative costs affect the supply of labor and capital services which in turn affect the volume of production. The other reason, far more widely publicized, is that these supply responses are deemed by some to be sufficiently large to offset -- or more than to offset -- the effects of fiscal actions on the net budget position of the government. Indeed, "supply-side economics", so depicted, has elicited derision from economists, on both the right and left of the political economic spectrum, as a kind of fiscal alchemy which transforms deficits into surpluses or which provides a fiscal"free lunch." There is, however, nothing in the basic "supply-side" analysis which holds that tax cuts, say, will so expand output, hence tax bases, as to provide more revenue than would otherwise be generated. The broadest generalization that can be derived from this analysis is that the net effect on government revenues, when account is taken of the changes in economic activity the tax cut generates, will differ from that which is estimated when these economic effects are ignored. But this generalization is not unique to the "supply-side" analysis, hence is <u>not</u> its distinguishing feature.

To repeat, the distinctive attribute of this analysis is that it identifies fiscal actions in terms of initial effects on relative prices. This is best illustrated in the case of tax policy. Every tax has this attribute of altering relative prices or costs. This is obvious in the case of selective excises: an excise on gasoline

is seen by virtually everyone as raising the price the motorist must pay for gasoline compared with the prices he or she must pay for other things. This price or cost effect, however, is not limited to thoses taxes we call excises. Every tax has some "excise effect." A perfectly neutral tax, if one could be devised, would have no excise effect; it would increase in the same proportion all of the prices confronting any entity in the private sector. It would increase the cost of effort in the same proportion as the cost of leisure, of saving in the same proportion as the cost of consumption, of any one consumption good or service in the same proportion as all others, of using labor services in the same proportion as capital services, of any one kind of labor or capital service in the same proportion as any other, etc.

The present tax system very thoroughly violates this neutrality criterion. For example, the individual income and payroll taxes greatly increase the cost of working as opposed to non-market uses of one's time and resources. The income taxes on both individuals and corporations, along with estate and gift taxes, at both the Federal and other levels of government, entail multiple levels of tax on saving compared with consumption uses of income.

While every tax affects some one or more relative price, no tax has any initial effect on income. This, one must concede, is the most difficult conceptual hurdle the supply-side analysis must overcome, since it is intuitively appealing to each of us that a decrease in one's income tax liability, other things equal, leaves one with more income to use as one wishes. But upon reflection it must be evident that this can't be true for the economy as a whole.

To see this, let us track out (admittedly, in oversimplified terms) the treatment of a tax cut in the aggregate-demand approach and show why it cannot be correct.

Starting from a position of budget balance, assume a reduction in income taxes, say, with no reduction in government spending. This, according to the

aggregate demand approach, results immediately in an increase in disposable income, the largest part of which will go to increase consumption demand. This creates an increase in business demands for production inputs -- both labor and capital -which results in additional employment of labor and capital services and as a result, an increase in total output.

What invalidates this scenario is that since the tax cut, by assumption, is not matched by a government spending cut, the loss in tax revenues must result in an equal deficit. But then the additional disposable income resulting from the tax cut must be used to buy the additional government debt. If some people use their additional disposable income to finance additional spending for goods and services, then others will have to reduce their spending in order to buy the additional debt instruments. Some redistribution of spending will occur in this case, but there is no increase in the total amount.

A variant of this view, advanced by the so-called "rational expectations" school, is that people generally will perceive the deficit resulting from the tax cut as the present value of the additional future tax liabilities which will be needed to service the additional debt. Accordingly, they will perceive no increase in their permanent income or wealth, hence will have no impetus to increase their spending.

In broader terms, the tax reduction unmatched by a government spending cut results initially in a decrease in gross national saving. Since gross national saving necessarily is equal to gross investment, the tax cut could at most exchange additional consumption spending for reduced investment. Again, a change in the composition of outlays, but no change in the total, would result.

More fundamentally, a tax cut can not, in and of itself, increase the economy's aggregate income because it does not, in and of itself increase the amount or productivity of production inputs. Unless one believes in magic, therefore, the

tax cut doesn't itself result directly in any increase in output or income. If an increase in income is to be forthcoming, it can only result from the tax cuts inducing an increase in the supply of labor and capital services. And to have this result, the tax cut must reduce the relative cost of market-directed effort and of saving.

The supply-side analysis seeks to explain the effects of fiscal actions by delineating the ways in which households and businesses respond to the changes in relative prices and costs, implicit or explicit, which are the first-level effects of fiscal actions. Without going into detailed specifications of these behavioral responses, the analysis holds that at any given income level, people will save more of that income if the cost of saving -- the amount of current consumption which must be foregone to obtain the sources of any given amount of future income -- decreases. This analysis also holds that at any given cost of saving, the amount that will be saved will be greater the greater the total amount of real income. In the same context, this analysis posits that the quantity of labor services that will be offered at any given level of income will be greater the higher the real wage rate -- i.e., the higher the cost of not working -- but that at any given real wage rate, the amount of labor services supplied will be less the greater the total real income.

Clearly, the "supply-side" analysis does not exclude income as a determinant of economic behaviour. On the contrary, income effects are deemed to be extremely powerful. Indeed, a major focus of this analytical system is on the effects of fiscal actions on the growth of real income. This is to say, "supply-side" economics posits as the central issue of fiscal policy how income growth trends will differ with differences in the structure of the tax system and in the levels of real marginal tax rates, on the one hand, and in the level and composition of government spending, on the other. To address this issue effectively, analysis must begin with identification of the effects of alternative fiscal actions on relative costs and prices and with

delineation of private sector responses thereto at the initial income level. It is the way in which people respond to these relative price effects which determines the changes in composition and level of total income. These changes in income, in turn, will enter into decisions about working, saving, and investing, as indicated, leading to further changes in output and income.

It should also be clear that the "supply-side" analysis does not ignore the effects of fiscal actions on the composition or level of demand. There is nothing in this analytical framework that rules out a close functional relationship between the level of permanent income or wealth and the amount of consumption people want to undertake, the stocks of capital they wish to hold, and, therefore, the amount of investment they wish to engage in or have undertaken by business enterprises on their behalf. Indeed, an analysis which shows, for example, the effect of a tax change on the relative cost of saving and the response thereto is just as much concerned with changes in the composition of demand as it is with changes in supply. And as this analysis tracks the subsequent changes in income, saving and investment, it must, by that very token, also track the changes in the level as well as composition of aggregate demand. To repeat an earlier observation, it is not an exclusive or even predominant interest in the effects of fiscal actions on conditions of supply which distinguishes the "supply-side" analysis from the aggregate demand approach. It is instead, the identification of first level price rather than income effects of fiscal actions which is the hallmark of the "supply-side" economics.

II. Attributes of a "Supply-Side" Model[1/]

The preceding discussion should make clear that the "supply-side" economics differs from the aggregate demand approach in fundamental conceptual terms.

1/ A brief nontechnical description of the Analysis of Tax Impacts Model (ATIM), a model built in the image of "supply-side" economics, is provided in the appendix to this discussion.

By the same token, an econometric model which embodies the "supply-side" analysis is fundamentally different from an aggregate demand model. An aggregate demand model cannot capture the "supply-side" economics merely by the addition of equations representing conditions of supply. So long as a model retains first-level income effects of fiscal changes as determinants of the amount and composition of spending it will be at odds with the basic conceptual content of "supply-side" economics.

The "supply-side" model is a price-theoretic, general equilibrium model, based on neoclassical theory about the economic behavior of households and business firms. Such a model might be constructed to serve a wide variety of purposes. As a device for analyzing the effects of fiscal actions on major economic magnitudes and government tax revenues, its focus will be primarily -- not exclusively --on the long-term trends of these magnitudes and the changes therein consequent to fiscal changes. There is, happily, an increasing consensus in the policy forum that public economic policy should be primarily concerned with the basic trends in the economy and with the basic forces determining and influencing them, rather than with short-term perturbations. Moreover, there is more and more agreement that the focus of public policy in the past on controlling the short-term performance of the economy has been unrewarding and, indeed, has been costly in terms of its longer-run adverse consequences. This Committee has performed a valuable service in pointing-out that the present sorry state of the economy reflects in major part an undue concern in the past with controlling short-run economic outcomes while ignoring the long-run consequences of doing so.[2/] This long-term focus of the "supply-side" model aimed at fiscal analysis reflects the uses to which

---

[2/] Joint Economic Committee, Congress of the United States, Joint Economic Report 1980, Senate Report No. 96-618, March 4, 1980, pages 1, 16.

it is to be put, not an inherent incapacity of this conceptual approach to analyze the short-run adjustments to economic disturbances.

As a device for analyzing and measuring how the economy responds to fiscal changes, the supply-side model must be actuated by the relative price attributes of the fiscal system and by the relative price effects of fiscal changes. This requires its specifications of household and business behavior to include as explanatory variables the various price relatives which may be affected by fiscal actions. For example, consumption must be represented as determined not merely by permanent income and wealth but as well by its cost relative to that of future income, where these costs include the effects of taxes and/or government expenditures. Similarly, the stock of capital -- the sources of future income -- which people want to hold must be represented as responsive not only to present and/or expected levels of income or wealth, but also to the net-of-tax cost of that future income relative to the cost of current consumption.[3/] Hence, the supply of capital services must be represented as determined by the amount of the sources of such services people want at differing net-of-tax unit returns. Similarly, the specification of the supply of labor services should include as a major explanatory variable the real wage rate, net of tax, relative to the real return to leisure uses of time and resources, inclusive of government transfer payments to those not working (e.g., unemployment insurance benefits, etc.).

The basic concepts of the "supply-side" analysis preclude specification of any of the behavioral functions of a "supply-side" model in such a fashion as

---

[3/] The basic determinants of the real cost of future income are the technical conditions of production as influenced by technological advances and the supply of labor services, which determine the marginal productivity of capital, hence the amount of future income which can be obtained by foregoing some stipulated amount of current consumption and allocating it to the holding or acquisition of capital instruments. These basic determinants, of course, must be appropriately specified in the supply-side model.

to pick up any first-level income effects of a fiscal change. No tax or government expenditure action may be allowed to enter any of the aggregate behavioral functions as a change in disposable income. The inclusion of any such specification invalidates the model as a "supply-side" formulation, irrespective of the inclusion of explicit supply equations.

By virtue of this constraint, the "supply-side" model does not lend itself to the "multiplier" manipulation which is a familiar device of the aggregate demand models. Indeed, the "supply-side" analysis rejects any demand-impelled multiplicative effect on total income or output. As stressed earlier, aggregate output and income depend on the amount of production services supplied and the technical conditions of production, and changes in the amount of production inputs respond to the initial relative price effects of fiscal actions, not to any first-level income effects thereof.

As a corollary to this basic set of requirements of the "supply-side" model, fiscal variables must be specified in the various equations in marginal, not in average, terms. In the case of tax variables, for example, this analysis incorporates the well-known, generally accepted but widely neglected principle that taxes enter into household and business decision-making at the margin -- it is the amount of tax associated with the incremental dollar of income or expense which affects the price or cost of alternatives and which is, therefore, the relevant decision-making variable. It is quite possible, of course, to change tax provisions and thereby to change marginal tax rates without changing, initially, total tax liabilities, hence average tax rates. To anticipate later discussion, the major policy implication of this proposition is that it is not the change in aggregate tax revenues, per se (or relative to government spending) which is operational in changing aggregate output and income, but changes in marginal tax rates, irrespective of whether there is any net budgetary change. The aggregate demand analysis, on the other

hand, by virtue of its emphasis on first-level income effects, stresses the change in average tax rates -- the change in the aggregate amount of taxes with respect to the given aggregate amount of income -- and largely neglects marginal tax rates.

In the "supply-side" specifications, no distinction is or may be drawn between investment and saving activity. This is in sharp contrast with the treatment in the aggregate demand models which include an investment function as an aggregate demand component and as, essentially, the exclusive province of business firms, and a separate, unrelated, individual saving function (more precisely, individual saving falls out as a residual from the consumption function). In the "supply-side" analysis, investment is delineated as the effort to implement changes in the desired stocks of capital; since the function representing the desired stock of capital does not pertain to the business entity but to the population as a whole, investment behavior is not a separate activity from saving. It has the same determinants and is identically influenced by fiscal actions. Accordingly, the "supply-side" analysis has no requirement for separate specification of business firms in an aggregate model. The business firm is implicitly an organization for mobilizing production inputs in ways which maximize the net worth of the owners of businesses, subject to the supply conditions of the production inputs. The demands for these production inputs are represented by their respective marginal value product schedules at any given level of aggregate income, derived from the technical condition of production.

In short, in a "supply-side" model, there is no analytical purpose served by separately specifying business investment functions and saving functions. The decisions to save and to invest are not separate. Businesses do not vie with households for the allocation of income between consumption and capital formation. Businesses act as the agents of their individual owners; as such, their decisions to distribute

savings or to retain and invest them or to seek to attract saving in the capital market is made in conformity with the owners' preferences.

It follows from this identity of saving and investment determinants that there is no distinction of substance between tax measures aimed at promoting saving and those intended to encourage investment. For example, the so-called 10-5-3 capital cost recovery proposal is just as much a pro-individual saving measure as it is a pro-business investment tax change. There is no relevant issue of tax policy to be drawn between reducing excessive tax burdens on individual saving and lightening the tax load on the returns to business capital.

This is not to say that all tax changes aimed at promoting saving and investment are equally effective. Choices are still to be made on the basis of relevant criteria. But whether the measure will help savers (individuals) vs. investors (business) is not a relevant criterion and should be eliminated from policy consideration.

III. Embodying "Supply-Side" Economics in Public Policy

The specific questions which the Chairman has addressed to this panel concern matters both of analysis and policy. The preceding discussion has addressed in broad terms some of the basic analytical issues on which the "supply-side" analysis and the aggregate demand approach differ. At this point, I want to address the Chairman's questions primarily in the policy context.

(1) Do taxes, inflation, and government regulation have effects on the supply of labor, capital, and production which have not been adequately captured in recent years by demand-oriented econometric models?

The demand-oriented econometric models embody a set of concepts giving primary -- indeed, virtually exclusive -- emphasis to aggregate demand as the principal determinant of the amount of production, hence the amount of labor and capital services employed, hence changes in the amount of capital through time. In turn, the level of aggregate demand and changes therein are related in these models primarily to the levels of total government spending and total

tax revenues and changes therein. This emphasis leads to ignoring or at the least, to minimizing the relative price effects of fiscal and regulatory policy actions.[4/] By the same token, it suppresses the effects of fiscal and regulatory policy on the conditions of supply of labor and capital services in the aggregate.

The public policy concern with social security financing well reflects the basic difference in analytical approach embodied in demand-oriented and "supply-side" models. In the former, the scheduled increases in payroll tax rates are treated primarily as reducing disposable income, leading to lower levels of consumption than would otherwise prevail, hence to a contraction of aggregate demand which is some multiple of the increase in payroll tax. One policy prescription offered by those relying on these models and concerned with the adverse effects of the payroll tax increases is to reduce income tax liabilities with the view to maintaining disposable income.

Nothing in these models directs the analytical focus to the effects of the payroll tax increase on the aggregate amount of labor services that will be offered at alternative nominal after-tax wage rates. For this purpose, the payroll tax and increases therein must be specified in terms of their contribution to the marginal rate of tax on labor income, hence the reduction in the wage rate, which is the principal determinant of the relative costs of effort and leisure. With this specification, the scheduled increases in payroll tax rates are perceived as having a negative effect on the supply of labor services, leading to an increase in pretax nominal wage rates and lower levels of employment than would otherwise prevail.

[4/] Most of the aggregate-demand econometric models include one or more variables pertaining to the implicit rental price of capital as an argument in their investment functions. Inclusion of this price term should be seen as an uneasy accomodation of price theory. It is often redundant. In any event, it does not act to shift the analytical focus of the determination of capital formation from aggregate demand to alteration of the conditions of supply.

The policy prescription which emerges from the "supply-side" model is that to be effective in offsetting payroll tax increases, individual marginal rates of tax must be reduced sufficiently to leave the overall marginal rate of tax on labor income unchanged. It does not follow that this policy focus on the marginal tax rate will leave aggregate tax liability initially unchanged. But this is not the relevant consideration if the concern of policy is -- as it should be -- with the effects of the payroll tax hike on the supply of labor services.

A similar case is provided by the treatment of unemployment insurance benefits in demand-oriented econometric models. These models focus on these benefits as government outlays enlarging disposable income compared to the amounts which would otherwise obtain. At the same time, they ignore entirely the fact that these payments reduce the cost of being "idle" compared with the cost of being employed, hence have an adverse effect on the supply of labor services -- artificially elevating the nominal pretax wage rate at which any given amount of labor services is offered. The consequence is, as one might expect, less employment.

These deficiencies in the demand-oriented models cannot be overcome merely by the addition of equations specifying the supplies of labor and capital services. To repeat an earlier assertion , the basic deficiency of these models is their inclusion of first-level income effects of fiscal changes. This deficiency is not corrected by adding (or removing) equations.

(2) What areas on the supply side offer the most intriguing prospects for investigation and research?

By virtue of its identification of the relative price effects as the critical attributes of fiscal actions, the "supply-side" analysis clearly depends on the adequacy of the measures of the elasticity of response to the price changes induced by fiscal actions. In particular, the view now gaining increasing acceptance in the policy forum that marginal income tax rate reductions will lead promptly to increases in saving, capital formation, employment, and output depends on verification

of two fundamental hypotheses. One is that the quantity of the labor services supplied will increase in response to the effect of the tax rate reduction in reducing the cost of work relative to the cost of "leisure." The other is that the amount of saving, hence capital formation, will increase in response to the effect of the tax rate decreases in reducing the real cost of future income (i.e., increasing the net-of-tax return which may be obtained per dollar of foregone current consumption). Both of these propositions are frequently disputed, primarily by those whose analytical apparatus depends on first-level income effects of fiscal changes. Thus, it is claimed by those adhering to the aggregate demand approach that the income effects of a tax rate cut are likely to offset its price effects so far as the supply of labor is concerned. This surmise, however, is based on the presumption that there is, contrary to fact, a first-level income effect of the tax rate reduction; it is, accordingly, faulty in logic. Those advancing this view often cite studies of the responsiveness of labor supply to real wage rate and real income changes; in general, the most that can be said for these studies is that they are inconclusive.

With respect to the responsiveness of saving to a reduction in its cost, critics of the "supply-side" analysis sometimes maintain that people are just as likely to reduce as to increase their saving when they can obtain any given amount of future income at a lower cost. But this view depends on the notion of target amounts of future income or wealth accumulation, a view which has no solid foundation in logic or fact.

Notwithstanding these observations, research on the question of the responsiveness of labor supply and saving to fiscal changes is likely to be highly productive. Simulations with our "supply-side" model, for example, show that the ultimate aggregate economic effects of tax changes are extremely sensitive to the elasticity of supply of labor services with respect to the real after-tax, after-government transfer wage rate. The policy implications herein should be clear.

Also of great importance is research concerning the relative price effects of government spending and regulatory policies and actions. These government activities no more than tax actions have first-level income effects. They impact on economic activity by altering relative prices. To date, very little investigation of these relative price effects has been undertaken. The returns on investment in such inquiries should be enormous.

(3) What traditional policy tools, approaches, or rules of thumb should be reassessed, modified, or even scrapped in view of new understanding of supply-side factors?

Acceptance of "supply-side" economics should materially change the basic thrust of public economic policy. A fundamental implication of the "supply-side" analysis is that there is no pay-off in focusing fiscal policy on the control of aggregate demand. A corollary conclusion is that there is no valid purpose to be served by attempting to set government spending targets by reference to the supposed contribution of these outlays to aggregate demand. Similarly, a policy focus on the total amount of tax revenues is inappropriate as a means of influencing the level or change in total economic activity. In the same connection, the size of the deficit should not be perceived as a relevant variable for policy manipulation in the interests of attaining designated levels -- or rates of growth in -- employment, output, income, etc.

In denying the possibility of first-level income effects of fiscal actions, the "supply-side" analysis also rejects the multiplier fiscal arithmetic as a basis for assessing the desirability of any given amount of taxes, government expenditures, or changes therein. Fiscal or budget policies predicated on the existence of a multiplicative relationship between changes in total taxes or total government outlays and total output and income are likely to fail of their explicit objectives -- or succeed only by peradventure -- and just as consequentially, are often likely to generate unintended and undesirable economic effects.

Rejection of the aggregate demand approach in favor of the "supply-side" analysis leads necessarily to a change in the appraisal of the effects of fiscal actions on the price level. In the aggregate demand analysis tax and expenditure changes generate changes in aggregate demand which, with conditions of supply unchanged by the fiscal actions, lead to increases or decreases in inflationary pressures. In contrast, the "supply-side" analysis delineates fiscal actions as impacting on aggregate demand in real terms only insofar as it first affects aggregate output by way of first-level price effects. Thus, an income tax rate reduction, by virtue of its relative price effects, generates increases in the supplies of labor and capital services and in output; increases in demand of equal magnitude are necessarily associated with the increase in output. In this analysis, accordingly, no increase in inflationary pressures results. Any such increase would have to be the consequence of an increase in the rate of expansion of the stock of money. Indeed, if the growth in the stock of money were maintained at the same rate as if the tax rate reductions were not enacted, the increase in output resulting from the tax reduction would lead to a reduction in any upward pressure on the price level.

A collateral directive for tax policy strategy which comes from adopting the "supply-side" analysis is to shift attention away from the level of tax liabilities in relation to income and toward marginal tax rates. In this connection, consider the prevailing policy concern with efforts to cancel or at least mitigate the effects of inflation on taxpayers' tax situations. The standard response of the Treasury and others opposing indexing of the tax system is that <u>effective</u> tax rates have been periodically reduced by discretionary tax changes, thereby cancelling the effects of inflation on real disposable income. Whether or not this is correct, it does not address the point which the "supply-side" analysis identifies as at issue: that inflation raises the real <u>marginal</u> rates of tax and thereby discourages work and saving. The appropriate policy question is whether the discretionary tax changes of recent years have, if fact, cancelled the effects of inflation on real marginal

tax rates.

In much the same vein, as discussed earlier, the policy focus with respect to scheduled payroll tax increases should be on the consequences for the real marginal rate of tax on labor income, not on the real disposable income effect. If compensatory income tax changes are to be made, for example, these should take the form of reductions in marginal tax rates, not increases in personal exemptions, "rebates", or other tax revisions aimed at reducing the average tax liabililty per se.

(4) Can the government use the economics of incentives more skillfully in the future to deal with problems of productivity, inflation, and employment simultaneously instead of on an either-or basis.

One of the principal analytical outputs of the "supply-side" economics is the rejection of the so-called "Phillips-curve" relationship between inflation and unemployment. By the same token, it rejects the view that price-level stability can be purchased only at the cost of unacceptably high levels of "unemployment" or that acceptable growth in employment depends on pursuit of fiscal and monetary policies likely to spur inflation.

On the contrary, the "supply-side" analysis shows that public policy actions which are correctly designed to remove the impediments to employment and to saving and capital formation will constrain, not enhance, inflationary pressures. The root cause of inflation -- increases in the overall level of prices -- always has been too fast a growth in the stock of money relative to the growth in real output. It should be obvious that with any given rate of increase in the stock of money, the more effective tax measures are in regard to increasing the supply of labor and in reducing the existing tax bias against saving and investment, the less will be the upward pressure on the price level.

The corollary is that a monetary policy which succeeds in curbing inflation will enhance expansion of supplies of labor and capital services and total output and income. Inflation augments the existing tax bias against effort and saving

by increasing the real marginal rates of income tax, thereby reducing the real after-tax returns for use of labor and capital services, hence constricting the expansion of labor and capital inputs and total output. Pursuit of a "tight" monetary policy, i.e., one which holds firmly to a steady, moderate rate of increase in the stock of money, accordingly, is not at odds with the Employment Act goals of high rates of growth in output and employment. On the contrary, an anti-inflationary monetary policy enhances the prospects for successful pursuit of those objectives.

Another major conclusion from the application of the "supply-side" analysis to fiscal policy is that tax measures to promote higher rates of saving and capital formation are not at the expense of advancing the productivity and real wage rates of labor. On the contrary, effective implementation of these "supply-side" tax policies would enrich the capital:labor ratio, hence accelerate labor's productivity advance and increase the demand for and supply of labor services. Simulations performed with our model show that labor would get some 75-80 percent of the gain in real GNP resulting from tax changes aimed at reducing present constraints on saving and capital formation. These findings are very much in line with the conclusions of the pioneering work done by the late distinguished economist and sometime chairman of this Committee, Paul H. Douglas.

Conclusion

The intellectual origins of "supply-side" economics are ancient, as the calender of economics would date it, to be found in the works of Adam Smith, J.B. Say, and Alfred Marshall, to name only a few of the titans of the discipline. Its newness is to be found only in its applications, beginning about a decade ago, to the fiscal, particularly, tax issues of contemporary American society. At this juncture, it affords a major addition to policy-makers' knowledge about how the fiscal system interacts with the economy. It offers great promise, therefore, for vastly improving public economic policies in the interests of more efficient functioning of the

private market system, more rapid and solid growth in the stock of capital, steadier and stronger advances in labor's productivity, and more rapidly expanding total output and income.

Appendix

The Analysis of Tax Impacts Model*

The Analysis of Tax Impacts Model (ATIM) is based on neoclassical theory about the economic behavior of individuals and business entities. As such, relative prices are treated as major variables, entering into individuals's decisions regarding the supply of their labor services and their uses of income for current consumption and for saving, i.e., the purchase of future income. Similarly, relative prices are included among the variables in business decisions regarding the amounts and composition of labor and capital services used in production activity. Tax provisions are identified in terms of their effects on these price variables; changes in tax provisions, accordingly, are identified in terms of how they alter price relationships, hence, these various individual and business decisions.

This is not to say that the model's specifications ignore or minimize income as a determinant of economic behavior. Both the labor and capital supply equations explicitly include income among their respective variables. In contrast with the standard macroeconomic models, however, tax changes are not input to the ATIM through their initial impacts on disposable income. In the real world, there can be no such aggregate impact in real terms except as a result of changes in real output, hence, changes in the amounts of productive services supplied or in the

---

* This model was developed by Norman B. Ture, Inc., initially under a contract with the National Association of Manufacturers. Their help and the complete independence of effort on which the NAM insisted is gratefully acknowledged.

rates of their use. The initial effects of tax changes are reflected in the model as changes in pertinent relative prices -- the supply prices of production inputs. The model then reflects the responses of the suppliers of these production inputs to the tax-induced changes in supply prices. As supplies of production inputs change, total output and the income claims it generates also change. These changes in real income enter importantly into the individual and business decisions delineated above.

The analytical focus of the model is on the long-term expansion path of the economy and on the effects of fiscal changes, particularly tax changes, on both the level and slope of that path. While the model presents estimates of annual changes in the amounts of various economic magnitudes in response to tax changes during the period of adjustment to a new equilibrium growth path, its focus is not on the short-term ups and downs which typify the course of the economy around a trend path through time. The model is intended, instead, to analyze and measure the effects of tax changes on the basic trends of the economy. The point has been widely and repeatedly made that tax policy should be concerned with its influence on these trends rather than with short-term perturbations, which are difficult to forecast with reasonable confidence. The model has the appropriate analytical focus in this respect.

Components of the Model

The model consists of three main parts. The first part specifies the basic functional relationships in the economy and a number of economic identities. Together, these equations estimate the equilibrium amounts of production inputs (labor and capital services), real output, the supply prices and aggregate payments for production inputs, and total real income.

The functional relationships specified in this part of the model include:

- a production function -- the technical relationship between total real output

and the quantities of labor and capital services, given the state of the industrial arts;

- a statement of the efficiency-maximizing condition with respect to the quantities of labor and capital services to be used at their respective real supply prices;
- the supply of labor service, relating aggregate annual hours of labor service to the population aged 16 and over, the real after-tax wage rate and the rate of selected government transfer payments, and total real income per person aged 16 and over; this function specifies hours per full-time equivalent employee as positively related to the real wage rate and negatively related to total income; and
- the total quantity of capital people want to hold, given total income, as a function of the real after-tax return per unit of capital.

The remaining equations in this section of the model define variables in the functional relations and specify additional relationships.

The second part of the model delineates and specifies annual flows representing the composition of real output and the uses of total income. Included are equations pertaining to consumption, saving, investment, government expenditures, exports and imports, and total tax liabilities and other government revenues. Also included are a set of equations relating the general level of prices to the stock of money, its velocity, and total real output, and the overall marginal tax rates on capital and labor income, given the tax laws, to the price level.

Some of the annual flows are treated as exogenous, i.e., determined outside the model. Government expenditures, for example, are projected as extrapolations of the trend in these outlays over the period 1954-1974. For the most part, however, the annual flows are either derived directly from the equilibrium values in the first part of the model or are specified as functionally related to one or more

such values. For example, gross private business investment is specified (in equilibrium) as the difference between the desired stocks of net business capital in the current and the preceding year plus the year's depreciation, including replacement. Desired stocks of capital are determined by the equilibrium equations in the first part of the model.

The third part of the model is used to analyze the tax system in terms of the marginal tax rates applicable to the income derived from various types of capital and to measure the effects of tax changes on the cost of capital. Changes in the marginal rate of tax on capital income affect the pretax rate of return required to justify acquiring or holding any given amount of capital. Changes in this pretax rate of return, in turn, lead to changes in the stock of capital, resulting in changes in output, employment, real wage rates, and tax revenues.

The basic logic of this part of the model is that for people to be willing to forego a dollar of consumption in order to have more income in the future, the present value of the future income stream, net of all taxes that will be paid on it, must be at least one dollar. By the same token, for people to hold one dollar's worth of capital now, the present value of the after-tax income it produces must be at least equal to one dollar. A reduction in the marginal tax rate applicable to the income from capital obviously means that less pretax income per dollar of capital is required to satisfy this condition (the "cost of capital" is lowered.) It also means that more future income, hence, more of the capital producing it, will be desired, since it now costs less in terms of foregone current consumption.

To capture the effect of tax laws and tax changes, this part of the model specifies a number of equations (28 currently) each representing a particular type of real capital held by corporations and by individuals. In each of these equations, the left-hand side is specified as a unit of the net stock of the particular type of capital. The right-hand side shows the various positive and negative items

of cash flow associated with that type of capital. Cash flow items include the gross return, depreciation and other deductions, the investment tax credit (where applicable) and various taxes applicable to the gross returns. These tax items are expressed in great detail, thereby permitting the identification and measurement of a diverse inventory of possible tax changes.

With the tax variables determined by the provisions of present law and adjusted for changes in the price level and in the growth of real GNP, this equation set is solved simultaneously to find the overall weighted marginal rate of tax on all capital income, the overall weighted gross return per dollar of capital, and the rate at which future income and expenses are discounted such that the present value of the net returns just equals the net stock of capital. This solution satisfies the condition that the after-tax return is the same per dollar of each type of capital. These values are then used in the first part of the model to find the equilibrium values of the various economic magnitudes therein under present law, and in the second part of the model, to project the year-to-year changes in annual flows associated with these present law equilibrium values.

Given a proposed tax change affecting capital, the tax variables for each type of capital immediately affected are modified to reflect the proposed change in law. Then the equations from each type of capital are simultaneously solved again to find new values for the overall marginal tax rate on capital income, gross return, and discount rate. These values are substituted for present-law values in the the first part of the model to find new equlibrium values of the various economic magnitudes. Since the economy cannot make the adjustment from the old to the new equilibrium instantaneously, a five-year transition path is specified. The second part of the model is used to measure the year-to-year changes in the relevant variables during this transitions period and on the new equilibrium growth path thereafter.