What Microeconomics Teaches Us about the Dynamic Macro Effects of Fiscal Policy

The analysis of fiscal policy based on neoclassical micro models has been an area of active research in recent years. The most recent research has extended earlier static and steady state analyses by also describing the transitional effects of policies. The need to understand how short-run responses differ from medium- and long-run responses is apparent from the fact that the half-lives of policy transition paths are likely to be decades long, rather than years long. The new research also uses a new technique, namely simulation analysis, to provide a sense of the magnitude and timing of policy effects. In contrast to simple models that can be examined with calculus and phase diagrams, the method of simulation permits one to consider large and simultaneous changes in a variety of fiscal instruments. Simulation models are also capable of handling much greater complexity. For example, the Auerbach and Kotlikoff (1987) dynamic life cycle simulation model considers the economic transition paths over a 150-year period of overlapping generations' economy in which adult agents live for 55 years (from age 20 to age 75). While a computer is needed to solve for the Auerbach-Kotlikoff model's 150-year transition path, the basic elements of the model are very simple, and the simulation results are highly intuitive.

The Auerbach-Kotlikoff (AK) model is capable of studying the simultaneous effects of tax cuts, changes in the tax base, changes in the degree of tax progressivity, changes in investment incentives, changes in the level of government con-
sumption, and changes in social security. The model can also analyze demographic swings such as baby booms and baby busts. Perhaps the main advantage, however, of the AK model, or for that matter any micro-based model of the macro economy, is that macro outcomes are not derived directly by assumption, but rather reflect the micro behavior of utility-maximizing individuals and profit-maximizing firms. Hence, all macro outcomes can be precisely traced to rational micro behavior.

This paper uses the Auerbach-Kotlikoff model to showcase many of the important lessons about macro fiscal policy arising from the study of essentially micro economic models. The fiscal policy predictions from these models are often dramatically different from those of the static Keynesian model which continues to dominate popular discussion of fiscal policy. As one example, consider the Reagan administration's first-term fiscal policy. While the Keynesian model suggests that the first-term Reagan policy was loose to an unprecedented (for peacetime) extent, an analysis of the Reagan policy based on the AK life cycle model suggests it was fairly tight, indeed, tighter than the fiscal policy of the 1970s.

The neoclassical perspective of the AK model indicates that popular Keynesian analyses systematically misread our fiscal policy by ignoring important policy changes, by not appreciating the duration of policy responses, by mistaking short-run responses for long-run responses, and by measuring the tightness of policy based on noneconomic, arbitrary accounting constructs, such as the deficit. In contrast to popular notions, the AK model suggests the following:

- Tax cuts are likely to crowd in capital and lower interest rates in the short run, although they crowd out capital and raise interest rates in the long run.
- The government can run any real economic policy while reporting any size deficit or surplus it wants, implying that the deficit bears no necessary relation to the stance of fiscal policy.
- Investment incentives can be self-financing.
- The half-life of the crowding out process is typically two or three decades, not several years.
- Depending on its method of finance, additional government consumption may crowd in capital.
- Investment incentives are bad for the stock market, but good for investment.
- The early announcement of policies may reverse their intended effects.
- Policies that stimulate more long-run capital formation, such as reductions in capital income tax rates, may, nonetheless, reduce economic efficiency.
- Demographic swings associated with baby booms followed by baby busts, while bad for Social Security, are likely to be good on net for the economy because of capital deepening and a decline in the number of young children supported per adult.

The paper proceeds in section 2 by briefly describing the AK model and its method of solution. Sections 3, 4, and 5 present simulation results on the choice of the tax base, investment incentives, and tax cuts. Section 4 describes why
conventional budget deficits are inherently arbitrary measures of the stance of fiscal policy. Section 5 examines the stance of fiscal policy in the first term of the Reagan administration by suggesting that for many younger Americans the first Reagan tax cuts were in large part offset by the first-term changes in Social Security legislation; for many older Americans the first-term tax cuts were, potentially, largely offset by changes in the effective tax structure from income toward consumption taxation. This section also uses the AK simulation model to examine the Reagan policy. The simulations demonstrate that very large deficits may arise under policies whose combined impact is to crowd in capital. Section 6 concludes the paper by suggesting the need to describe fiscal policy in ways that also make sense from the perspective of neoclassical economics, rather than simply from the perspective of static Keynesian and other fundamentally ad hoc models.

2. THE MODEL

There are three sectors in the model: households, firms, and the government. Households live for 55 periods and maximize an intertemporal CES utility function of consumption and leisure. Fiscal policies affect households through their lifetime budget constraints which require that the present value of after-tax consumption expenditures not exceed the present value of after-tax labor earnings plus the present value of transfers such as Social Security. In the case of progressive taxes, tax rates in the budget constraint are functions of the size of the tax base. A second constraint on the household maximization is that labor supply at each age be nonnegative. The model includes a relative age-wage profile based on estimates of Welch (1979).

The CES utility function parameters chosen for the base case simulations reported here include an intertemporal substitution elasticity of 0.25, a static elasticity of substitution of 0.8, and a time preference rate of 0.015. These and other preference parameters are conservative estimates based on empirical studies cited in Auerbach and Kotlikoff (1987). While some versions of the model include children, in the simulations presented here, children are ignored, and the number of adults is assumed to grow at a constant 1 percent rate.

The production sector consists of firms each of which produce the economy’s single good using a CES production function of capital and labor. In the simulations described below, the Cobb-Douglas version is used with capital’s income share equal to 0.25. Firms hire labor and capital competitively. The installation of new capital, however, imposes quadratic adjustment costs, which, as shown by Lucas and Prescott (1971) and subsequent writers, gives rise to the q theory of investment and provides a nontax explanation for divergences between the market value and replacement cost of capital.

The government sector consists of (i) a regular treasury that collects resources from the private sector to finance government consumption, (ii) an unfunded,
“pay-as-you-go” Social Security system, and (iii) a Lump Sum Redistribution Authority (LSRA), which is used in some simulations to separate Pareto efficiency gains from welfare changes due, in part, from various intergenerational redistributions.

Solving the Model

The solution of the model involves first solving for the economy’s initial steady state; second, solving, if possible, for the economy’s final steady state; and third, solving for the economy’s transition path. Algorithms to solve for steady states are common and straightforward; the algorithm used to solve for the transition path appears to be unique to this model. The solution to the transition path is based on iterative guesses. We first guess values of factor demands and fiscal variables in each year of the economy’s transition path. Next we determine the path of after-tax factor prices that these guesses imply. With knowledge of the time paths of after-tax factor prices, we can determine the amount that each household consumes, works, earns, and pays on net to the government in each year of household’s existence. These household choices imply, in turn, a time path of aggregate factor supplies. If the resulting time path of factor supplies equals the guessed time path of factor demands, we have found a fixed point solution to the equilibrium transition path; if the time path of factor supplies does not equal the guessed time path of factor demands, we formulate a new guess of the time path of factor demands by taking a weighted average of the previous guess and the resulting time path of factor supplies.\footnote{Previous analyses of uniqueness with overlapping generations models (e.g., Calvo 1978, Kehoe and Levine 1985) have provided examples in which there is a continuum of transition paths to the new equilibrium. The nonuniqueness problem arises if there are more stable roots to the linearized version of the system in the neighborhood of the final steady state equilibrium than initial conditions. The requirement of convergence eliminates only the unstable roots, leaving, in some cases, a continuum of feasible paths that satisfy the initial conditions. Recently John Laitner has calculated the roots of a linearized version of our model. For all but one extreme set of parameter values he found the transition path to be determinate, with the number of stable roots equal to the number of initial conditions. His results for the linear approximation to one model, together with our own findings that, in practice, the solution calculated by our model does not depend on the initial guesses chosen for the transition path, strongly suggest to us that indeterminacy is not a problem.}

3. EXAMPLES OF POLICY SIMULATIONS

A. Income versus Consumption Taxes

Since the careful studies produced by the Treasury (1977) in the United States and the Meade Committee (Institute for Fiscal Studies 1978) in the United Kingdom, the influential papers by Martin Feldstein (1978) and Michael Boskin (1978), and Lawrence Summers’ (1981) seminal study of the effects of changes in tax structure, economists have wondered whether reducing or removing capital income taxation’s discrimination against future consumption would increase economic efficiency. Because time-invariant proportional taxation of consump-
tion does not reduce the return available to household saving below the marginal productivity of capital, the discussion has often focused on switching from the income tax to a personal consumption tax rather than simply on removing capital income from the tax base (see, generally, Pechman 1980).

The basic efficiency argument is that the increased labor supply distortion of such a switch would be more than offset by the reduced saving distortion. As is well known, this is a question of “second-best” economics to which there is, in general, no simple answer, but the academic literature including papers mentioned above argued strongly that the efficiency gains from reducing capital income taxation would be quite large because of the relatively high elasticity of savings with respect to the interest rate.

Static efficiency calculations ignore what is probably the most important issue in the switch from income to consumption taxation: the intergenerational redistribution of the tax burden. Since consumption tends to occur later in life than income, a switch to consumption taxation shifts each year’s tax burden toward the elderly. The result is that the current elderly population pays more, while subsequent generations pay less by having their tax payments deferred to older age. This provides a substantial increase in the long-run utility of generations in the eventual steady state, equivalent, in our model, to a permanent increase in consumption and leisure of about 6 percent assuming an initial income tax rate of 30 percent.

Removing capital income taxation directly from the proportional income tax base, i.e., switching to a wage tax, while equivalent in a static model to adopting a proportional consumption tax, has quite different results in a dynamic model, since there is an opposite tax windfall. The existing elderly population gains from the shift in the tax burden onto wages, since they are in larger part retired. This makes them better off, but makes all subsequent generations worse off, by over 4 percent of lifetime consumption and leisure. The very different intergenerational transfer effects of the consumption tax and wage tax policies are shown in Figure 1.

Thus a dynamic analysis shows that the long-run impacts of switching to consumption versus wage taxation are quite different. So too are the efficiency impacts of the switches to consumption and wage taxation. By taxing the consumption financed by preexisting wealth owned by the initial set of older generations, the consumption tax base over time equals the initial stock of wealth plus the present value of all future wages, rather than just the latter as under a wage tax (Chamley 1983). This tax on initial wealth arising under the consumption tax is a lump sum tax and explains why the consumption tax is more efficient than the wage tax.

To analyze the efficiency gains of switching tax bases, the AK model includes a Lump Sum Redistribution Authority (LSRA) that transfers resources across generations in a lump sum fashion. In the efficiency transition calculations the LSRA maintains the preexisting utility levels of generations initially alive at the time of the tax change, and any efficiency gains (losses) are allocated across
subsequent generations in such a way that all subsequent generations enjoy a uniform increase (decrease) in utility. According to these LSRA transitions, switching from the 30 percent income tax to the equal revenue consumption tax permits an increase in utility for all subsequent generations, which is equivalent in the initial steady state to a permanent increase in lifetime consumption and leisure of 1.7 percent; in contrast, abolition of capital income taxes, i.e., switching to wage taxation, induced a decline of 2.3 percent. In other words, the wage tax is less efficient than the income tax. It appears that about 60 percent of the difference between the non-LSRA changes in long-run welfare under labor income taxation and consumption taxation is not due to efficiency gains, but rather is attributable to intergenerational transfers.

It should be emphasized that certain policies that appear to resemble the consumption tax, such as expanding the limits on contributions to individual retirement accounts, do not offer the efficiency gains of consumption taxation because they share with the repeal of capital income taxes the crucial feature of exempting from taxation the consumption of existing wealth.

The presence of progressivity reinforces these findings for two general reasons. First, since distortions are worse with higher marginal tax rates, any efficiency gains associated with a reduction in distortions will be magnified. Second, the fact that average as well as marginal tax rates under progressive taxation rise with the tax base reinforces the intergenerational shift in the tax burden onto the elderly in the case of a consumption tax, and onto the working population in the
case of a labor income tax. Hence, the distinction between these two “equivalent”
tax bases is even greater than indicated by the proportional tax simulations.

B. Investment Incentives

The increase in accelerated depreciation allowances under the Economic Re-
covery Tax Act of 1981 was viewed by many as a windfall to corporations and the
owners of corporate shares. More careful analysis suggests the opposite, and this
is confirmed by the simulation results. First, consider the theoretical impact of
investment incentives. The introduction or enhancement of investment incentives
not only encourages investment, it also lowers the present value of taxes on
new investment, while leaving unchanged the present value of taxes on old capi-
tal. Because old capital is at a tax disadvantage, its market value must fall. In the
case of an investment tax credit, for example, the effect will be to drive down the
value of old capital to the cost of new capital net of the investment tax credit, for
which only new capital qualifies. The short-run impact of adjustment costs, on
the other hand, will be to mitigate this fall in the stock market value of old capital;
with adjustment costs old capital earns rents on the installation of new capital.

Like a consumption tax, a drop in the value of old capital, combined with a cut
in the tax burden on new investment, is good for new savings but bad for old
people who are the primary owners of old capital. In fact, investment incentives
in the presence of an income tax are not only just like consumption taxes, they
effectively are consumption taxes. This equivalence in effective tax bases is most
easily seen for the ultimate acceleration of depreciation allowances, immediate
expensing. Allowing expensing in the presence of an income tax means that taxes
are levied on income less investment (since investment is deductible). Of course,
income less investment equals consumption; hence, allowing expensing in the
presence of proportional income tax is equivalent to switching from income to
consumption taxation. The only difference between the two tax regimes is
whether the tax is collected at the firm level and capitalized into the value of
existing capital goods, or whether paid by the individual upon consumption. It
thus represents a firm-level rather than an individual-level consumption tax.

Given this equivalence, it is somewhat surprising that a policy that in one form
is seen as so unfair to the owners of capital is seen as so unfair to everyone else
when presented in a different form. The fact that adjustment costs may offset the
windfall loss to existing capital caused by the introduction of investment incentives
does not change the equivalence. The identical changes in asset values due to
adjustment costs arise if one directly institutes a consumption tax.

Our simulations suggest that the windfalls associated with a move to invest-
ment expensing may be quite large. For an adjustment cost parameter of $b = 10$
(on the low end of empirical estimates, but by no means small), we find that a
move from a 15 percent income tax to the same tax with complete expensing (i.e.,
a consumption tax) reduces the value of the existing capital stock by nearly two-
thirds the size of the tax rate cut on new investment, or about 9.5 percent.
There are other results that may appear surprising, but become less so when the equivalence of investment incentives and consumption taxes is remembered. For example, it is quite possible for an increase in investment incentives to be self-financing without the economy being on the wrong side of the Laffer curve. In Auerbach and Kotlikoff (1983b) we present a simulation in which investment incentives are introduced and financed, in the short run, by issuing debt. In the simulation the income tax rate is held constant at 30 percent for a period of twenty years. During this time the increase in the tax base associated with the investment incentives leads to an increase in revenue which is sufficient to retire the government debt issued at the beginning of the transition. After year twenty the income tax rate must be reduced to prevent accumulating an infinite surplus. Thus, the crowding in from switching toward a consumption tax base exceeds the crowding out from the short-run deficits. While the investment incentives are cuts in business taxes, not everyone in the model experiences a tax cut, and the shift in the tax burden onto the initial elderly who own the initial capital stock leads to the observed outcome.

C. Deficits, Crowding Out, and Crowding In

As recent experience suggests, most students of fiscal policies appear to believe that deficits arising from tax cuts will be associated with short- and long-run crowding out of capital and short-and long-run increases in interest rates. While our simulation studies of deficit policies confirm these long-run predictions, we find that, except for tax cuts of very long duration, deficits arising from tax cuts will be associated with short-run crowding in of capital and short-run declines in interest rates. The simple explanation is that tax cuts have substitution as well as income effects. In the short-run, individuals take advantage of the temporarily low tax rate on wages and the return to capital by working and saving more. One response to this line of argument is that substitution elasticities are potentially small. While they may be true, the AK model assumes fairly small substitution elasticities. What is not, however, typically understood is that although substitution elasticities are small, the change in tax rates may be substantial and, therefore, have a substantial impact on relative prices of consumption versus leisure, and consumption today versus consumption tomorrow.

Table 1 reports the simulation results of 33 percent cuts in the income tax rate lasting 1 year, 5 years, and 20 years. The Table gives the saving rate, $S/Y$, the income tax rate, $T$, the wage rate, $W$, the pretax interest rate, $r$, the level of labor supply, $L$, and the stock of capital, $K$. Note that in the 1- and 10-year tax cuts, the saving rate is larger in year 1 and in years 1 to 10, respectively, than in the initial steady state; hence, crowding in occurs under these short-term tax cut policies until the tax rate is increased. After the tax rate is increased crowding out proceeds, but fairly slowly.
TABLE 1
ECONOMIC IMPACT OF DEFICIT FINANCING
CROWDING OUT UNDER ALTERNATIVE DEFICIT POLICIES

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1-Year Income Tax Reduction

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5-Year Income Tax Reduction

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<td>18.13</td>
<td>48.5</td>
<td></td>
</tr>
</tbody>
</table>

Notes: $S$ = national saving; $Y$ = national product; $r_y$ = income tax rate; $W$ = wage rate; $r$ = interest rate; $L$ = aggregate labor supply; $K$ = capital stock.

*This saving rate is below that in the initial steady state to the fourth decimal.

The example of short-run crowding in arising from tax cuts demonstrates that a policy that is ultimately detrimental to capital formation can appear, in the short run, to be increasing saving. Thus there is the very great potential to misread policy by focusing too strongly on the short-run impacts.
less tell us nothing useful about the true stance of fiscal policy. From that perspective, debating whether the measured “deficit” matters or, for that matter, whether we should pass a balanced budget amendment, is like asking whether the Emperor’s shoes match his new clothes.

If our official numbers on “taxes,” “spending,” and “deficits” are each inherently arbitrary accounting constructs, what numbers should one look at to gauge fiscal policy? The answer is that we need to construct generational accounts that indicate the present value of what each generation is expected to pay, or net, over its lifetime to the government. Such generational accounts would be unaffected by accounting labels and pure changes in the timing of government payments and receipts that leave present values unchanged. They also would have the virtue of not missing major aspects of the fiscal policy.

The total of these present value generational accounts, summed over all current and future generations, equals the present value of what the government is expected to consume now and in the future. In other words, these generational accounts would tell us how different generations will share the burden of paying for the government’s consumption. Tight fiscal policy would correspond to policy that placed a larger share of the burden of paying for the government’s consumption on current as opposed to future generations.

5. AN APPRAISAL OF THE FIRST-TERM REAGAN FISCAL POLICY

From the perspective of the AK model, the Reagan administration first-term fiscal policy was, on net, fairly tight, indeed, much tighter than the fiscal policy of the 1970s. This statement may strike many readers as ludicrous. Surely, anyone with eyes can see the enormous run-up in government debt between 1981 and 1985 which was unprecedented during peace time. Indeed, during those years the government debt in the hands of the public increased from $794 billion to $1.5 trillion, or from $3,452 to $6,310 per man, woman, and child in the country. How can one acknowledge this sea of debt and argue that the policy was anything but horrendously loose?

The answer is that in addition to the first-term tax cuts, there were two other very significant first-term fiscal policies which, by and large, have been totally overlooked in discussions of the general stance of fiscal policy. The first is the partial shift in the effective tax base from income taxation toward consumption taxation resulting from the introduction of the Accelerated Cost Recovery System.

The second overlooked first-term fiscal policy is the 1983 change in Social Security legislation that dramatically reduced the future benefits of members of the baby boom generation. This cut in the baby boomers’ benefits arises because of the scheduled increase in Social Security’s normal retirement age and the scheduled income taxation of essentially all of the baby boomers’ Social Security benefits.

Unfortunately, the generational accounts needed to assess fiscal policy have
and timing games with its receipts and payments without altering their present values, but, with some exceptions, it doesn’t. Furthermore, it basically uses the same labeling conventions through time.” But, how does one know? If labeling is entirely arbitrary, how does one know what the government’s labeling convention is? Return to the Social Security example. If one agrees that there really was nothing fundamental in the choice of labels, did the United States really run $600 billion deficits in the 1970s or did it really run rather small deficits in the 1970s? According to the life cycle model or any other neoclassical model, one is perfectly free to take one’s pick between these two or, indeed, any number.

The Arbitrary Choice of Timing of Government Receipts and Payments

In addition to choosing labels any way it wants, the government can choose the timing of its receipts and payments in ways that have no economic effect in the life cycle model, but that dramatically alter the measured deficit. For example, suppose the government announces a large tax increase this year coupled with a tax credit in the future equal to this year’s extra tax plus interest (and payable to the estates of anyone who dies prior to claiming the credit.) While not changing the present value of anyone’s taxes, the policy, depending on the size of the additional tax, could eliminate all outstanding government debt and permit the government to report an enormous surplus.

An excellent example of this choice of the timing of receipts and payments occurs in the case of a consumption tax. As indicated above, the government can implement a consumption tax by taxing consumption directly or by taxing income and allowing a deduction for investment. A third method is to combine a wage tax with an immediate one-time wealth tax on initial wealth holders. This third method of implementing a consumption tax would mean quite different cash flows for the government and, consequently, a totally different reported deficit. Indeed, under the third alternative while the government would be collecting the same present value of resources from initial older generations (initial wealth holders), it would be collecting these resources much earlier in time; hence, if it initially had no debt, implementing a switch to consumption taxation by imposing a wage tax coupled with a one-time wealth tax would produce a very large surplus.

The Eisner View, the Barro View, and What Should We Measure?

The argument here is quite different from suggestions by Eisner (1985) and others that we need to adjust the “deficit” for inflation, government assets, and unfunded liabilities of government retirement programs. Such a procedure would only yield another entirely arbitrary number and provide no better basis for assessing the stance of fiscal policy.

The point here is also quite different from the debate arising from Robert Barro’s (1974) provocative essay concerning whether “deficits” matter. As indicated by the AK model, fiscal policies can matter a lot, but deficits may nonethe-
less tell us nothing useful about the true stance of fiscal policy. From that perspective, debating whether the measured "deficit" matters or, for that matter, whether we should pass a balanced budget amendment, is like asking whether the Emperor's shoes match his new clothes.

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Unfortunately, the generational accounts needed to assess fiscal policy have
not yet been constructed. But one can use related information and analyses to consider how these accounts were affected by the first-term fiscal policy. First, the Economic Recovery Tax Act of 1981 provided for an across-the-board reduction in income tax rates of 23 percent over a three-year period. To get a sense of the importance of this provision, consider the level of income taxes per adult in 1985. This was $1,983. Had the 23 percent tax cut not been implemented, taxes per adult in 1985 would have been roughly $600 larger. Consider now what this $600 reduction would mean in present value to a typical middle income household, with a household head whose age is 30. If we assume no future offsetting increase in tax rates and use a 3 percent real interest rate, we arrive at a figure in the neighborhood of $18,000. Given the hysteria about the "deficit," a reasonable assumption is that most households in 1985 anticipated a future offsetting increase in income tax rates. If we assume that households believed that a third of the tax cut would be offset in the future, we arrive at $12,000 as an admittedly extremely rough measure of the reduction in the present value of net payments to the government arising from the tax cut policy in a typical 30-year-old's household.

This $12,000 figure can be compared with the reduction in the net present value of Social Security benefits arising from the 1983 Social Security amendments. According to estimates developed by Anthony Pellechio and Gordon Goodfellow (1984), for the typical 30-year-old's middle-income household the present value increase in net payments to the government resulting from the change in Social Security ranges between $10,000 and $15,000. Hence, it appears that the Social Security legislation roughly canceled the tax cut for the typical younger household.

For older households the present value gain from lower income taxes will be larger because they are more likely to avoid the future tax increase through death or retirement. On the other hand, since they are older the tax cut will apply for fewer years. Turning to Social Security, since the 1983 legislation pertains primarily to younger generations, the reduction in net present benefits to older households is much smaller. In sum, the income tax and Social Security policies probably reduced the lifetime net present value of payments of older households to the government.

While older generations may have been made better off by these two policies, the partial shift in the effective tax structure toward consumption taxation is an offsetting consideration. According to calculations reported in Auerbach and Kotlikoff (1983b) the predicted impact of ACRS is a $233 to $292 billion lower 1981 value of the business capital stock than would otherwise have been observed. If we use the $233 billion figure and divide by the population age 45 and older in 1981, we arrive at a capital loss per person over 45 of $3,291. Now clearly, not everyone over 45 owned business capital and many under age 45 did own business capital. But even this crude calculation gives a sense of the order of magnitude of the effect of the change in the tax structure on the present value of resources of older generations.

In sum, for younger Americans the gain from the income tax cut may have
been largely offset by the loss from the Social Security amendments, while for older Americans the gain from the income tax cut may have been largely offset by the loss due to the change in the tax structure.

**Simulation Analysis**

Another way to gauge the impact of these simultaneous fiscal measures is to simulate their joint impact in the AK model. To analyze the first-term Reagan policy I have simulated the model assuming an economy that initially has a 30 percent income tax, an unfunded Social Security system with a 40 percent benefit-wage replacement rate, and a zero rate of expensing of new investment. The initial effective tax rate on capital income in this economy is 30 percent. The policy that I simulated is an eight-year (two-term) 25 percent cut in the income tax rates, coupled with (1) a reduction from 40 percent to 30 percent in the Social Security benefit-replacement rate for all individuals younger than age 40 at the time the policy is enacted and for all generations born after the policy is enacted and (2) the introduction of a 40 percent rate of expensing. The cut in the replacement rate is intended to roughly approximate the change in retirement age. At a 30 percent income tax rate, a 40 percent expensing rate lowers the effective tax rate on capital income to 20.4 percent. In the simulation the changes in the Social Security replacement rate and the rate of expensing are permanent; but after the eighth year of the income tax cut, the income tax rate is raised to restore conventional budget balance.

In the first eight years of the simulation results the economy displays quite sizeable deficits as conventionally measured; the annual deficit during this period is over 6 percent of GNP. The debt to capital ratio which is initially zero ultimately rises to 0.27. The model also predicts an increase in short-term interest rates at the beginning of the policy transition; in the first year of the transition short rates jump from 9.5 percent to 11.0 percent. This increase in interest rates is not due to the deficit finance, but rather to the investment incentives; the firms in the model are forced by competition to pass on the investment incentives in the form of higher interest rates paid to their investors.

Notwithstanding the significant annual deficits and long-run increase in officially reported debt, the combined policy produces only very minor crowding out of capital in the long run! The long-run capital stock is only 1.6 percent smaller than its initial value. The reason is that the crowding in associated with reducing Social Security benefits and the crowding in associated with the effective change in the tax structure almost completely offset the crowding out arising from the 25 percent eight-year income tax cut.

Yes, future generations have a slightly smaller capital stock, and yes, they face a 35 percent, rather than a 30 percent income tax because of the need to meet interest payments. But the investment incentives lead to a 12 percent fall in the market value of capital at the beginning of the policy which hurts initial older generations. In addition, the cut in social security benefits of middle-age and
younger generations who are alive at the time of the policy change lowers, in the long run, the payroll tax by one fifth of its initial value, which benefits generations born after the initiation of the policy. Finally, the investment incentives mean a larger after-tax rate of return to saving than prevailed prior to the initiation of the policy. In the initial economy the after-tax return to saving was only 6.6 percent, but after the combined policy is fully implemented, the after-tax return is 7.2 percent.

On net the policy hurts somewhat initial older generations who lose more from the loss in the market value of their capital loss than they gain from the income tax cut. The policy is also slightly detrimental to generations born after the policy is enacted. Initial middle-age and young generations are slightly better off because of the policy; their loss in social security benefits is somewhat more than offset by their gain from the eight-year income tax cut and the reduction in the effective tax on capital income.

While the simulated policy does imply a very modest degree of crowding out, the use of a slightly higher rate of expensing would have produced crowding in, again coincident with very large official budget deficits. In considering these results it is important to recall that the AK simulation model uses conservation parameter estimates. The model certainly displays nothing akin to the whimsical Laffer curve. The crowding in rather than crowding out occurring in the simulation is not due to supply side magic, but rather to the inclusion in the analysis of two previously neglected, but very powerful policies, namely, the change in the effective tax structure associated with increased investment incentives and the change in Social Security.

6. SUMMARY AND CONCLUSION

Neoclassical micro-macro simulation models are now developed to the stage that they can usefully begin informing the formulation of fiscal policy. While these models have a variety of shortcomings, they have the advantage of not being subject to fiscal illusion; i.e., unlike the Keynesian model, their predictions would not be altered if the economics under consideration changed accountants. They also are able to provide a much sharper picture of the exact timing and magnitude of fiscal policies.

Whether these new models are incorporated into the policy discussion remains to be seen. Certainly, there is no single number, such as the deficit, that can easily be conveyed to the public that will summarize the stance of fiscal policy. Adequate description of fiscal policy requires much more than a single number; it requires describing changes in the intergenerational and intragenerational distribution of the burden of financing government consumption; it requires describing changes in marginal incentives; and it requires describing the likely future time path of government consumption. The public also needs to learn that the
short-run effects of policy and the long-run effects may be completely opposite and that any policy impacts are likely to occur extremely gradually.

The development of present value generational accounts would be one step in the direction of providing a better description of fiscal policy. Such accounts would, of course, be sensitive to the choice of interest rates and to projections of future fiscal policy as well as economic performance. Whether these accounts would provide more than a very rough road map remains to be seen. But even a rough road map of actual fiscal policy would be preferable to the quite precise road map of accounting whims that constitutes current descriptions of fiscal events.

LITERATURE CITED


Comment on What Microeconomics Teaches Us about the Dynamic Macro Effects of Fiscal Policy, by William Niskanen

Yesterday my phone rang and a lovely British voice at the other end of the line said, "Doctor Niskanen, would you and your wife get on a Concord to London? We'll put you up in a fine London hotel, and you can come back Sunday night, but you're pleased to stay longer; all you have to do is explain what's going on in American financial markets and U.S. economic policy." I responded by saying that I'd rather go to Cleveland. She expressed some regret, but also expressed some puzzlement about my preferences. Just before I left for Cleveland, I called my wife and I told her about this invitation and she said, "Next time, make sure you check with me first."

For 25 years, in various positions, I have been blessed by the opportunity to learn from younger, often brighter, economists on my staff. I would like to use the occasion of this conference to acknowledge how much I learned from Marvin Goodfriend, Tom Kneser, Larry Kotlikoff, Greg Mankiw, and Larry Summers when they served on the CEA staff during the first term.

My reaction to Larry's paper is best described by the title of an old Baptist hymn: "Almost Persuaded." Kotlikoff's paper reinforces the fundamental insight of supply-side economics—that the economic effects of fiscal policy depend importantly on the details of the budget and the tax code. A wide range of economic effects is consistent with the same level of reported outlays and receipts, and vice versa. This general insight of what has been called supply-side economics is now more widely shared—that it is important to look at the details of the budget and of the tax code to get an appreciation for the economic consequences of fiscal policy.

At issue is whether the reported level of outlays and receipts provides any useful information about the effects of fiscal policy on the economy. Kotlikoff asserts that the accounting definitions of outlays, receipts, and the deficit are "totally arbitrary." The issue is arbitrary for what purpose? These budget concepts were designed, remember, to help manage the government. They were not designed to provide the type of information that would be helpful in helping to manage the economy. Economists were not sufficiently careful in treating these

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Journal of Money, Credit, and Banking, Vol. 20, No. 3 (August 1988, Part 2)
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budget concepts, which were designed for quite a different purpose, in evaluating
the consequences on the economy.

The current and projected budgets, I contend, do provide useful information
to the Secretary of the Treasury about how much he’s going to have to raise in
financial markets. We basically have a cash budget, and it provides useful informa-
tion about how much borrowing he should schedule at which periods of time
in the financial markets. I think that the current definition of receipts and the
division of receipts between tax revenues, user fees, and asset sales provide useful
information about the relationship between citizens and the state, and, impor-
tantly, about the effect of the economy on government finances.

Kotlikoff contends that the budget totals, however, provide no useful informa-
tion about the effect of the government on the economy and this may be so. I
think that there is at least increasing skepticism about whether these totals are
useful for evaluating the economic effects of fiscal policy. At one time in late 1981
I observed in a public meeting that I couldn’t find, and nobody else for that
matter as far as I knew could find, any significant relationship between budget
deficits and inflation or between budget deficits and interest rates.

Within 24 hours, three conservative senators called for my immediate resigna-
tion, and I was publicly rebuked by the vice president and Murray Weidenbaum,
and privately chastised by the White House. There’s been a lot more work done
on these matters since that time, and the most careful econometric techniques
have failed to demonstrate that the conventional measures of the budget deficit
provide useful information about interest rates, exchange rates, or even the be-
behavior of the Federal Reserve Board in terms of how much of the public debt the
Fed monetizes. I think that there is more reason to believe that the deficit has
observable consequences on other economic magnitudes.

The central assumption of Larry’s model is that people are indifferent to dif-
ferent time distributions of taxes and transfers with the same present value.
That’s an enormously simplifying assumption, and, if it is correct, it makes eco-
nomic analysis far more simple and more powerful. But I’m not confident that
this is the case. Larry recognizes that some people are liquidity-constrained, but
he dismisses this effect as not very important. In addition, I think risk aversion
may lead people to discount future effects by more than their time preference
because of increased uncertainty about more distant effects. The economic anal-
ysis of lotteries, for example, suggests that people prefer lotteries with small fre-
cquent payoffs to lotteries with the same expected value with big lump-sum
payoffs, and they prefer slot machines with frequent payoffs to slot machines,
let’s say, with $100 payoffs with the same expected value. The line of argument is
that the time distribution of payments reinforces their confidence in what is the
expected value of this lottery machine. Liquidity constraints should not be dis-
missed casually—my own experience in dealing with bankers is that they are
perfectly happy to lend money to you when you don’t need it, and to lend money
to people in businesses, who basically don’t need it; but they’re prepared to exer-
cise all kinds of monitoring and collateral requirements and things like that when
it's quite clear that you need it. My impression is that liquidity constraints are
more important, and I suspect that the difference between present and future
effects of fiscal policies are not captured entirely by the present value of these
effects. So I'm not confident about how to interpret the assumption that people
are invariant to the time distribution of taxes and transfers with the same present
value. I think his model, however, reminds us that the more conventional cash
flow macro models are dependent upon some very strong implicit assumptions
about these effects of liquidity restraints and things like that, which are quite
clearly inconsistent with the world that we observe.

Larry and others, without using the type of complex Auerbach-Kotlikoff sim-
ulation model, have convinced me about the steady-state effects of each of the
types of policies addressed in section 3 of this paper. Among the more important
of those is to recognize the distributional consequences of investment taxation.
Investment incentives, as in 1981, basically involve a redistribution from the
owners of existing wealth to the American labor force. The reason for that is that
incentives on new investment reduce the value of old investment. We should
expect weakness in the stock market following announcement of such policies.
And they increase the capital stock to complement our labor force. So, in effect,
the distributional consequences of the investment incentives, like in 1981, are to
redistribute wealth from the owners of existing capital to labor; and that involves
a process in which stock markets will be weak for a while and the capital stock
will accumulate and real wage rates will increase.

The reversal of these investment incentives in the 1986 tax reform bill, by the
calculations of Fullerton and Henderson, suggest that the effective tax rate on
new business investment is now higher than it was in 1980. This redistributes
wealth from the labor force to the owners of existing capital and, following the
announcement of these policies, should be expected to be followed by weak in-
vestment, strong stock markets, and slow growth of real earnings. One of the
intriguing things about what's happened is that most liberal commentators op-
posed the redistribution of wealth from the owners of existing wealth to the labor
force, and they very strongly supported the 1986 measures which did just the
opposite.

I have become convinced about the general steady state effects of these poli-
cies; I am less convinced about the transition effects, because I don't understand
rational expectations. A shared belief, for example, that interest rates will be
higher in the future is likely to affect interest rates and other conditions in the
current period, which seem to me would be to pull forward the steady state effects
of the policy changes. And Larry's got unusually long adjustment processes in his
model with variations in real interest rates which he claims are fully anticipated at
the time. I don't understand that process.

I wish that Larry had elaborated on his conclusion that the early announce-
ment of policies may reverse their intended effects, because that conclusion early
in his paper was not developed later on. The simulation analysis presented late in
his paper replicates the unusual economic conditions of the 1980s quite well. I'm perplexed, however, by the apparent contradiction of two conclusions of this paper. On page 17 he concludes that the fiscal policy of the Reagan first term was relatively tight, by that he means increasing the net tax burden on the current generation. In the final simulation, however, he concludes that these policies would lead to a slightly lower capital stock, higher tax rates for future generations, and "will be slightly detrimental to generations born after the policy is enacted." These two conclusions appear to me to be slightly contradictory, and I think some clarification would be valuable. In addition, I don't know what Larry means by saying that fiscal policy is tight or loose, other than the intergenerational distribution of tax burdens. In other words, does the word "tight" in his use imply what is conventionally meant by a tight fiscal policy in the sense that it affects total demand in the current year in the way that the word is usually used? Does a tight fiscal policy by this definition, for example, reduce current domestic demand?

A word about simulation models. I'm intrigued by the development of this new technique, and excited about the prospect of rebuilding macroeconomic theory on a more precise microeconomic foundation. I don't understand, however, what we learn from this approach that is not made more clear by careful, partial analyses addressed to specific policy issues. Maybe its primary value is evaluating the combined effects of a package of policy proposals, for which the separate, partial analyses may not be adequate. Moreover, I'm perplexed about how to validate the results of these simulation models. The general approach of their promoters seems to be to explain their model in terms of the way they think the world works, to demonstrate that the key parameters are based on the best available estimates, and then to ask their readers to accept the results without any standard for independent validation. I did this kind of work for 13 years for the Defense Department, basically with models of how wars operate and then trying to get the best estimates of the key parameters and hoping against hope that we would never have an occasion to validate the results. I did enough of that work to be very cautious about this type of modeling exercise. Surely there must be some way to validate the results of these economic simulation models by careful econometrics, although the long lags that are characteristic effects on these models, I think, make this very difficult.

A final note, consistent with something that Larry Summers said this morning: some of Larry Kotlikoff's conclusions about the effects of fiscal policy may strike some of you as outrageous or ludicrous. I'm reminded about two general observations about most fields of knowledge: first, most statements that challenge the conventional wisdom are indeed ludicrous, and the second, most advances in knowledge are initially perceived as ludicrous by the established profession. My guess is that Larry's conclusions are probably more of the second type.
Comment on What Microeconomics Teaches Us about the Dynamic Macro Effects of Fiscal Policy, by Preston J. Miller

For this session on “Recent Developments in Analyzing Fiscal Policy” we can all thank the Reagan administration, which has provided us with so much raw material for analysis. Not only has there developed a rich source of policy changes to analyze, but there also have developed better tools with which to analyze them. In my remarks, I briefly summarize some major recent developments in analysis and then discuss where Kotlikoff’s work fits in. In discussing his work, I focus on the model Kotlikoff developed jointly with Alan Auerbach (abbreviated AK model and described in Auerbach and Kotlikoff 1987).

Recent Developments

To talk about recent developments, we need to describe from where we came. The farther back we go, the more impressive recent developments become. So, I decided to go back pretty far.

In the old days, the standard analytic framework used by economists had three main features. First, it was static (a feature, for example, of IS–LM models). Second, it was deterministic or, perhaps, a random term was added to an equation as an afterthought. And third, conjectures about economic behavior were made at the aggregate level, such as assumptions about the shape of the aggregate investment schedule.

Within that framework, policy analysis consisted of simple comparative statics applied to policy actions. Initially, the economy was assumed to be at an equilibrium point. Then a policy action, such as a one-time cut in taxes, was assumed to be taken. Assuming that the aggregate relationships in the model were invariant to the assumed policy change, the analysis sought to determine how the equilibrium point under the new policy compared to that under the old. Typical questions asked using this framework included the following:

— What would be the effect this year of an across-the-board tax cut?
— Is there a bigger bang-for-buck from raising defense purchases than from raising the investment tax credit?

The views expressed herein are those of the author and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

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Journal of Money, Credit, and Banking, Vol. 20, No. 3 (August 1988, Part 2)
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— Assuming complete independence of monetary and budget policies, what’s a desirable mix for the two?

Economists recognized problems associated with each of the three main features of the old framework. The static feature implied that decision makers need not—and do not—have a concern for the future. It implied, for instance, that policymakers could ignore the future and make policy one period at a time. Yet policy analysts recognized that a policy action taken in one period generally constrains what is attainable in future periods, and that policymakers must consider this dependency when setting current policy. The static feature also implied that the individual agents implicit in the model ignore the future when they consume or invest. However, much evidence was accumulated showing that agents respond to tax surcharges or rebates much differently than they do to permanent tax changes.

Several problems were associated with the deterministic feature. One is that when economic relationships in models are mistakenly assumed to be certain, policies derived from those models tend to be overly activist. A second problem is that deterministic models are difficult to test. The implications of such models are certain to be at variance with the data, but we have no way to determine whether the differences are statistically significant. A third problem is that, in a deterministic model, we can’t distinguish between some important concepts, such as anticipated policy changes versus unanticipated ones or a random drawing under a given policy rule versus a change in policy rules.

Finally, economists recognized two significant problems with aggregate, or macroeconomic, modeling. The first is the Lucas critique; that is, the relationships in a macroeconomic model can’t be expected to remain invariant under the types of fiscal policy interventions usually considered. The second is that aggregate modeling prevents policies from being evaluated in terms of a welfare criterion.

Many recent developments in fiscal policy analysis can be considered attempts to correct the problems of the old framework. The developments have occurred piecemeal over time, and some are not even that recent. Cumulatively, they have led to a new analytic framework whose roots are found primarily in three disciplines: growth theory, control theory, and rational expectations—equilibrium theory.

I would characterize the new framework as dynamic, stochastic, and general equilibrium. It is dynamic because individual agents must solve multiperiod decision problems in which their choice in one period affects their attainable sets in future periods. It is stochastic in the sense that sources of uncertainty are explicitly modeled and included in agents’ decision problems. And it is general equilibrium in that the behavior of agents is described by solutions to optimization problems in an explicitly described economic environment and the outcome

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1This result can be found in Brainard (1967) or Miller (1981), but it need not follow when there is learning by doing, as pointed out in Miller (1981).
from individual courses of action is a solution to a well-specified game. Rather than an equilibrium point, as in the old framework, the solution in general will be a stochastic process.

Within the new framework, policy analysis has changed in a number of ways. Policies must now be considered as rules that describe how policy actions will be determined in each period, based on available information. Rules can be analyzed and evaluated, but isolated actions cannot. (Larry couldn't use his model, for example, to investigate the effects of a tax cut today because he would also have to know how taxes were being set in future periods.) In the new framework, not only have the objects of analysis changed, but so has the method of analysis. Only primitives, such as utility and production functions, are assumed to remain invariant to policy changes. In contrast to the old framework, decision functions and aggregate relationships are allowed to vary. Policy analysis consists of changing the policy rule, re-solving each agent's maximization problem, recomputing the equilibrium process, and then comparing the new process with the old.

Along with this change in framework has come a change in the types of policy questions economists ask. They ask questions about the sustainability of policies, the coordination of policies—whether domestic monetary and budget policies or international macro policies—and the desirability of precommitting policies to deal with time inconsistency problems. Economists consider questions that would not have been considered earlier. For example, they now question to what extent government tax and transfer policies can be neutralized by the private sector's bequest behavior.

*Where Kotlikoff's Work Fits In*

Having summarized recent developments as background, I now turn to Kotlikoff's work—primarily his work with Auerbach. There is much that I like about this work. It improves upon the old framework by incorporating many of the recent developments I discussed. The AK model's overlapping generations structure is explicitly dynamic. It is a general equilibrium model. Policies are considered to be rules. Policy analysis is conducted by changing the rules and computing a new equilibrium time path under the assumption that only primitives are policy invariant. Policies are evaluated in terms of welfare criteria, and the types of policy questions that are posed seem very appropriate—questions about tax structure or tax/debt paths.

But, with this said, I'm very uneasy about the precise numerical answers that Kotlikoff gives based on his policy experiments. My uneasiness stems from what the model excludes. Of course, to get any answers all models must simplify by omitting some considerations. However, based on other recent developments, I wonder if some of the AK model's omissions might be crucial. My uneasiness then translates into a question of how much confidence we should attach to the results Kotlikoff reports.

Although there may be others, I focus on four important omissions, which can
be classified under the following headings: uncertainty, money, international trade, and private bequests.

1. **Uncertainty**

Because the AK model is deterministic, questions arise about verifying the model and interpreting results. Since it is deterministic, we can be sure that its implications don’t match up perfectly with the data. But are those differences statistically significant? We don’t know. Hansen and Sargent (1980) have a technique to test models, and so does Prescott (1986). But what technique could be used to test the AK model?

A similar question applies to the significance of the model’s results. If uncertainty about the fundamental parameters were incorporated into the model, my guess would be that some of the differences in outcomes due to changed policies would not be statistically significant. Thus, this uncertainty would lead to more caution in advocating policy changes.

A different type of uncertainty omitted from the model concerns the economic environment of its agents. I have in mind two sources of this type of uncertainty. The first is uncertainty about policy. The shorter-term effects of a policy change could be very different from its longer-term effects because it takes time for people to understand the new policies and make judgments about their permanency. This type of uncertainty is not the same as the AK transition to the steady state; yet the model’s transition paths give some indication of how important this uncertainty can be. We see in Kotlikoff’s Table 1 how the short-run path varies according to how long people expect a tax reduction to stay in effect.

Because of this uncertainty about policy, I am wary of Kotlikoff’s claim that Reagan’s policies were a shift to tightness. That assertion depends on what is assumed about future policies. Kotlikoff assumes that people viewed the corporate tax changes to be long-lived; yet from the initial Reagan tax cuts until tax reform, probably the biggest tax changes occurred in corporate income taxes. Did the business community really expect the initial tax changes to be long-lived? Kotlikoff also assumes that the Social Security plan adopted in 1983 will still be in place thirty years from now. I wouldn’t bet on it.²

Since the AK model is used to predict the effects of Reagan’s policy, there may be a check on the reasonableness of the results. In particular, Will Roberds and I found that the coefficients of a VAR model changed significantly following the Reagan budget policy change (Miller and Roberds 1987). Ours is, of course, a reduced-form model. It might be interesting to check whether the AK structural model implies changes in coefficients of aggregate relationships consistent with our findings.

²In fact, given these uncertainties about future policies, I’m driven to judge tightness or looseness based on projections of deficits under current policies. The CBO’s five-year projections of baseline deficits under Reagan’s initial policies implied that the debt-to-GNP ratio would steadily rise. Palmer (1987) estimated that if Reagan’s initial policies were still in force and the economy evolved just as it did, the deficit in fiscal 1987 would have been over $450 billion and still growing.
A second source of uncertainty that is omitted from the model's economic environment might be labeled *business cycles* or, perhaps, *technology shocks*. McCallum and Whitaker (1979) found that automatic stabilizers, such as a progressive income tax, could be effective even when people have rational expectations. In one of my own models (Miller 1984a), which has an overlapping generations structure like the AK model and technology shocks, I found that income taxes can serve an insurance role. The optimal income tax must weigh the efficiency concerns Kotlikoff discusses against the insurance services, which Auerbach and Kotlikoff ignore.

2. *Money*

In the AK model there can be no fiat debt (money or bonds) because it is an overlapping generations model that yields a positive real interest rate in equilibrium when fiat debt is absent. Models which do admit fiat money and fiat debt can have some very different implications. One is that the real interest rate resulting from a budget policy change depends on the monetary policy response (see, for example, Miller and Wallace 1985).

Another difference between models with and without fiat money is related to my comments on business cycle uncertainty. I took the identical structure of my overlapping generations model (Miller 1984a) and added to it money that had value in equilibrium (Miller 1984b). The existence of valued fiat money was able to change the shape of the optimal income tax structure. Without money, the optimal income tax structure was regressive; with it, the optimal structure was progressive. Without money, the tax-transfer scheme was the sole vehicle for intertemporal trades. This made the efficiency aspect of taxes—which favors a regressive tax—most important. When money was added, it handled most of the intertemporal trades. This made the insurance aspect of taxes—which favors a progressive tax—most important. The point is that the AK model does not have valued fiat money, and the tax implications might be different in a model that does.

3. *International Trade*

The AK model represents the United States as a closed economy. While that simplification may be necessary to make the model tractable, it could importantly affect the numerical results. One reason is that the effect of a U.S. policy change depends on how foreign governments respond to that change. In Kehoe (1987) and Miller and Wallace (1985), macro policies across countries are interdependent, and the authors assume that policies are set strategically. In their representations of a world economy, the effects of a U.S. policy change cannot be determined until the policy responses of all the other countries are specified.

Another reason to question the AK model's closed economy representation is that tax policies are likely to have very different effects depending on the nature
of the capital market. In an open economy with a world capital market, tax policies that increase U.S. savings will have a much smaller effect on the U.S. capital stock than would be true in the closed economy. For with a world capital market, the change in U.S. savings is small relative to the world’s supply, and the increase in savings generated through the tax change will be distributed worldwide. In contrast, an investment tax credit will be more potent when there is a world capital market because the higher return on investment resulting from the tax change attracts funds from all over the world.

4. Private Bequests

The AK model doesn’t allow for intergenerational altruism: there are no private bequests. Much of the real effects of the tax policies Kotlikoff considers stems from a reallocation of goods across generations, so the bequest assumption is crucial in limiting the private sector’s ability to undo the effects of tax-transfer policies.

To highlight the importance of the bequest assumption, suppose instead that all generations were linked through operative bequests. Under this assumption the model would basically reduce to an infinitely lived representative agent model. The model could be formulated to resemble Prescott’s (1986) real business cycle model, and it could be calibrated to fit the data quite well. But instead of the AK policy implications, this model would generate implications close to those of Bernheim and Bagwell (1988). Not only would there be Ricardian equivalence for lump-sum taxation, but there may be no distortionary taxes whatsoever. Thus, with fully operative bequests, all the tax changes considered in Kotlikoff’s paper could be neutral.

Neither zero bequests nor 100 percent bequests seems like a reasonable assumption. As Kotlikoff reports in “Intergenerational Transfers and Savings” (Kotlikoff 1987), he and Summers found that life-cycle wealth—what the AK model generates—accounts for only a little over 20 percent of total wealth. The rest they attribute to transfers, largely between different generations.

Modeling bequest behavior may be difficult when only a fraction of the population makes bequests. The point is, however, that the AK results depend very importantly on their assumption of no private bequests, and their assumption may not be very good approximation to reality.

Conclusion

While I believe some wariness should be attached to the precise results provided by the AK model, the model does make progress. Models can be criticized much more easily than they can be constructed, but advances in analysis come from constructing them. The AK model is reproducible and, therefore, can be improved upon. Moreover, I think the model already does what we want good models to do: it yields some very interesting and thought-provoking insights.
LITERATURE CITED


