National Savings and Economic Policy: The Efficacy of Investment vs. Savings Incentives

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Investment incentives, as distinct from savings incentives, treat newly produced capital more favorably than existing capital. In the United States, accelerated depreciation allowances and the investment tax credit (*ITC*) are the most important examples of investment incentives. In the case of the *ITC*, the tax code restricts repeated use of the credit, regardless of increases over time in the size of the credit. Increases in the *ITC* discriminate, therefore, against existing capital that received a lower credit in the past. Enhanced acceleration of depreciation allowances is also injurious to old capital. The tax law requires the sale of old capital and the payment of recapture taxes prior to depreciating old capital under a new, more generous depreciation schedule.

Since equally productive units of new and old capital must sell for the same price, tax provisions favoring new capital imply a lower price for existing capital. The new investment incentives included in the 1981 Economic Recovery Tax Act (ERTA) provide an illustration of the potential capital losses involved. Alan Auerbach and I (1982) estimate that the 1981 Act reduced the value of existing plant and equipment by roughly $290 billion, assuming no turnover of old capital. Under the assumption that all old capital was resold if the gain in investment incentives exceeded the recapture tax, the capital loss (inclusive of the recapture tax) equaled roughly $230 billion. For U.S. wealth holders, then, the 1981 Tax Act imposed an implicit tax, in the form of a capital loss, ranging from $230 to $290 billion. These estimates assume zero marginal costs of adjusting the economy's capital stock. The assumption of substantial adjustment costs reduces these values by roughly one quarter.

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Since the bulk of U.S. wealth is held by older age groups, the 1981 legislation transferred resources away from this segment of the population. The recipients of this transfer were the current young and future generations, since these generations can now acquire title to productive capital at a reduced price.

Investment incentives, like government surpluses, transfer resources from older to younger generations. It is this redistribution through the revaluation of old relative to new capital that distinguishes investment from savings incentives. While both investment and savings incentives alter household marginal incentives to accumulate more capital, the income affects associated with intergenerational transfers potentially make investment incentives much more powerful devices in promoting capital formation. These effects are particularly strong in nonaltruistic life cycle economies in which the old, with fewer remaining years to consume, have greater marginal propensities to consume out of lifetime resources than do the young.

The extent to which intergenerational transfers, whether associated with explicit budget deficits, implicit deficits, such as unfunded Social Security, or tax-induced recapitalizations, alter wealth accumulation remains a matter of considerable controversy (Martin Feldstein, 1974; Robert Barro, 1974). Lawrence Summers and I (1981) suggest a predominate role for altruistic private intergenerational transfers in explaining the current stock of U.S. wealth; longitudinal age-earnings and age-consumption profiles are far from consistent with predictions of the strict, non-altruistic life cycle model (Franco Modigliani and Richard Brumberg, 1954). This finding does not, however, preclude the possibility that the majority of households conform to the selfish life cycle model. The majority of households could have such preferences, but simply have very little "hump" savings. It may well be that we live in a mixed society consisting of a minority of quite wealthy, altruistic households, and a majority of rather poor, life cycle households. While life cycle households may be responsible for little if any of the current stock of wealth, their response to new government policies, in particular, intergenerational transfers, could well dictate the economy's short-run saving behavior.

Given our state of ignorance concerning the distribution of intertemporal preferences, exploring the implications of investment incentives in a strictly life cycle model can be justified as providing an upper-bound estimate on the potential response to investment policy. The life cycle model is also a convenient framework for expositing the hidden surpluses imbedded in "business tax cuts." Given the nation's current pre-occupation with projected budget deficits, understanding that the federal government in 1981 effectively collected \$230 to \$290 billion more in revenue than it reported seems quite important.

A verbal explanation of this last statement provides an intuitive introduction to the simple model presented below. In 1981, the official U.S. federal deficit equaled \$58 billion. During that year the government implicitly imposed a \$230 to \$290 billion tax on existing capital by enacting ERTA. Had the government explicitly imposed this wealth tax, reported government receipts would have risen by perhaps, \$260 billion, and the government would have reported a \$202 billion surplus for 1981. Levying an explicit rather than implicit \$260 billion tax on wealth would have left wealth holders no worse off and should have been a matter of indifference to them.

Younger generations could also have been made equally well off had the implicit tax been made explicit. Under the implicit tax, the young pay lower effective capital income taxes on their investment in capital because its acquisition price is subsidized if they buy new capital, or reduced if they buy old capital. Under the explicit tax scenario, the government retains the wealth tax revenues as a surplus, and the young purchase new and old capital at its previous value. However, if the government uses annual interest income earned on the wealth tax to reduce capital income taxes, the young end up facing the same effective lifetime capital income taxation as in the implicit tax case.

Unfortunately, conventional government accounting procedures fail to record such hidden surpluses or deficits, while making great moment of "official" budget deficits. The reality of postwar fiscal history is that implicit deficits and surpluses associated with unfunded government retirement programs and changes in investment incentives greatly swamp official reported deficits when measured by their potential affect on capital formation and real interest rates (1982 *Economic Report of the President*, Appendix to ch. 4; Auerbach's and my two forthcoming papers).

I. Investment Incentives

A simple two-period life cycle model of economic growth provides a convenient framework for examining the underlying nature of investment incentives. Consider such an economy with a tax $\tau_{r,t}$ on business profits, and an investment incentive, which, for simplicity, is an expensing rate for new capital of e_t. The subscript t denotes the period in which the two instruments are applied. To simplify the analysis further, assume individuals work only when young and that the depreciation rate, the rate of population growth, and the rate of technological change are zero.

Equations (1) and (2) characterize the economy's process of capital formation:

$$(1)\qquad K_t = (W_{y,t-1} - C_{y,t-1})/q_{t-1},$$

$$(2)\qquad C_{0,t} = q_{t-1}K_t(1+r_t).$$

In (1), $W_{y,t-1} - C_{y,t-1}$ is the saving of the young in period $t-1$, their after-tax wages in period $t-1$ less their consumption in period $t-1$. The net price of a unit of capital in period $t-1$ is given by q_{t-1}. Dividing the financial saving of the young by q_{t-1} determines their purchase of physical capital (assuming there is no government debt or other assets in the economy). The physical capital acquired by the young at the end of period $t-1$ equals the economy's capital stock at the beginning of period t, K_t; that is, the old generation in period t, those young in $t-1$, hold claims to all the economy's capital, since the young in period t have no beginning of period assets.

For the old in period t, consumption, $C_{0,t}$, equals the return of principal, $q_{t-1}K_t$, plus the after-tax return on the investment, $q_{t-1}K_t r_t$. The after-tax return, r_t, includes capital gains and losses:

$$(3) \qquad r_t = \frac{F_{K,t}(1-\tau_{r,t}) + q_t - q_{t-1}}{q_{t-1}}.$$

where $F_{K,t}(1-\tau_{r,t})$ equals marginal after-tax profits per unit of capital. In combination, (2) and (3) imply

$$(4) \qquad C_{0,t} = q_t K_t + K_t F_{K,t}(1-\tau_{r,t}).$$

This new expression is also intuitive: the consumption of the old in period t (the young of period $t-1$) equals after-tax business profits plus the value of the sale of their capital at the prevailing asset price q_t.

Equation (5) expresses q_t, the net price of purchasing a unit of capital, in terms of $\tau_{r,t}e_t$:

$$(5) \qquad q_t = 1 - \tau_{r,t}e_t.$$

For new capital, the net acquisition cost is 1, the price of new capital, less the tax rebate from expensing $\tau_{r,t}e_t$. Equation (5) also determines the price of old capital. Since old capital and new capital are perfect substitutes in production their net acquisition costs must be identical in equilibrium; hence, old capital sells for $\tau_{r,t}e_t$ less than new capital. Equations (1), (4), and (5) may now be combined to indicate the lifetime budget constraint of the young in period $t-1$,

$$(6) \quad C_{y,t-1} + C_{0,t}\frac{(1-\tau_{r,t-1}e_{t-1})}{(1-\tau_{r,t}e_t) + F_{K,t}(1-\tau_{r,t})} = W_{y,t-1}$$

and the old in period $t-1$:

$$(7) \quad C_{0,t-1} = K_{t-1}(1-\tau_{r,t-1}e_{t-1}) + K_{t-1}F_{K_{t-1}}(1-\tau_{r,t-1}).$$

The essential feature of investment incentives can be illustrated most simply by assuming permanent capital income taxation at rate τ_r, zero expensing prior to period $t-1$, and a permanent move to 100 percent expensing starting at time $t-1$. Under these assumptions, all tax terms drop out of equation (6); the young of period $t-1$ and all future generations face zero effective taxation over their lifetimes. While the young and future generations nominally pay business profits taxes in their old age, the reduced cost of purchasing capital when they are young exactly offsets the present value cost of this taxation. Stated differently, new generations starting in year $t-1$ are subsidized when young to purchase capital and taxed when old on its return. The subsidy and tax cancel in present value and the young face no net taxation on their capital investments.

While this new tax structure effectively exempts the young of period $t-1$ and all future generations from paying any taxes over their lifetime, elderly individuals at time $t-1$ suffer a capital loss on their assets equal to $K_{t-1}\tau_r$. According to (7), the consumption of the elderly falls by this amount; the $K_{t-1}\tau_r$ capital loss constitutes a one-time wealth tax on the old of period $t-1$. Considering the tax treatment of the young and old together, this new tax system is equivalent to the government's collecting K_{t-1} $(1+F_{K_{t-1}})$ τ_r in taxes from the old in period $t-1$ and abolishing taxation thereafter. If it so choose, the government could adjust its consumption expenditures each year to just equal interest earned on the government surplus. In this case, the government, according to standard accounting procedures, would report a surplus in period $t-1$, and a balanced budget thereafter. The alternative method of subsidizing the young to purchase capital and taxing them in their old age on its return is effectively equivalent to the government using each young generation as its savings account. In this case of an implicit wealth tax, the government reports budget balance in period $t-1$ as well as all future periods.

This model is also useful for describing savings incentives. By definition, such incentives leave the relative price of old to new capital unchanged. A simple example of a savings incentive is a switch from capital income to wage income taxation in a world in which the expensing rate is zero. Obviously there is a myriad of other savings incentive policies which leave this relative price unchanged. For example, reductions in capital income taxes could be temporary or permanent, and these reductions could be associated with short-term deficits, increases in alternative taxes, reductions in government consumption, etc.

A. *Investment vs. Savings Incentives — Illustrative Simulations*

Given the range of concommitant government policies that could and would be adjusted in response to either investment or savings incentives, unconditional statements such as "investment incentives stimulate more capital formation than savings incentives" are meaningless. Analysis of investment and savings incentives for explicitly specified policies of adjusting to the associated revenue changes do, however, permit meaningful conditional comparisons of these policies.

The Auerbach-Kotlikoff dynamic simulation model described in our 1983a paper and our paper with J. Skinner, provides a framework for analyzing conditional policy experiments. The model computes the perfect foresight equilibrium path of neoclassical economies during transitions between steady states. The life cycle version of the model used to study investment and savings incentives incorporates the following government policy instruments: expensing, capital income, consumption, and wage taxation, and the choice of a deficit policy. The household sector of the economy consists of fifty-five overlapping generations making life cycle consumption and labor supply decisions based on an intertemporally separable *CES* utility function. The simulations discussed here assume a 1 percent population growth rate, a static elasticity of substitution of .8 and an intertemporal elasticity of substitution of .25. The production function is Cobb-Douglas with capital's income share equal to .25. In the economy's initial steady state, government consumption per capita is financed by a uniform 30 percent proportional income tax, and there is no initial government debt.

The following is one example of a savings incentive: capital income taxes are permanently cut to zero; the short fall in revenue is financed by deficits for the first five years; after year five, wage tax rates are increased to preclude future growth in per capita debt as well as to finance the constant stream of precapital government consumption. As a result of this policy, the aggregate capital stock rises by almost 10 percent over the first five years and then declines. Eventually the capital stock declines some 6 percent below its initial level.

Consider a comparable investment incentive policy. The government switches immediately from zero to 100 percent expensing in the first year and finances this over a five-year period by increases in the national debt. Thereafter, income taxes are raised to hold constant the per capita stock of debt as well as to finance the same constant time path of government consumption as in the savings incentive policy.

The difference in the impact on capital accumulation is striking. In the first five years, the capital stock grows slightly faster than with the savings incentive policy and thereafter it continues to grow. After twenty years, the percentage rise is some 40 percent and the eventual increase exceeds 50 percent.

The two policies also have markedly different welfare implications. The investment policy results in a long-run welfare gain (measured as a compensating variation in full-time resources in the initial steady state) of 6 percent; the long-run welfare loss under the savings policy is 9 percent. Under the savings policy, the wage tax rate rises in the long run to 48 percent; in contrast, the increase in the tax base under the investment policy actually permits a long-run reduction in the rate of income taxation from 30 to 29 percent.

B. *Investment Incentives and Strategies for Dealing with Deficits*

Various strategies have been offered to reduce short-run deficits associated with business tax cut policies. One solution to short-run revenue losses is a phase-in of investment incentives. This characterized the Economic Recovery Tax Act of 1981, which called for the acceleration of depreciation allowances to increase in 1981 and again in 1985 and 1986. The problem with policies of this kind is that they induce capital losses gradually over the phase-in period (consider equation (5) for e_t increasing through time). Investor's projections of these future capital losses discourages investment in the short run, defeating the entire purpose of the legislation. As an example, consider the effects of a five-year phase-in of expensing without deficits, with the expensing fraction rising linearly from .2 in the first transition year to 1 in the fifth. Though investment eventually expands under this policy, the short-run impact is to discourage investment. Investment stays essentially flat until the fourth year of the policy.

A more successful way of avoiding deficits recognizes that investment incentives can often be achieved by raising rather than lowering capital income taxes. As indicated by equation (5), given a positive rate of expensing, the increase in the statutory capital income tax rate increases the implicit wealth tax on existing capital. This reduces the consumption of wealth holders, permitting an expansion of national saving and investment. In addition, the extra revenue from the capital income tax allows the government to lower other taxes. Starting from an initial steady state with full expensing and a 30 percent income tax, raising the capital income tax rate to 50 percent permits an immediate drop in the wage tax rate to 26.5 percent (falling eventually to 21.6 percent) to maintain budget balance and an eventual increase in capital per person of 34.6 percent.

Finally, investment incentives may be self-financing in the long run, requiring no current or future increase in statutory tax rates to achieve a more capital intensive long-run steady state. Consider a policy of moving directly from zero to 50 percent fractional expensing, with the income tax held constant at 30 percent for twenty years; while this policy generates short-run deficits, the expansion of the income tax base over time raises revenue sufficient to retire this debt. Indeed, in the twentieth year, the debt-capital ratio is $-.36$ percent. This surplus permits a slight decrease in the income tax rate thereafter (to avoid an expanding surplus), to 29.2 percent in the twenty-first year and 29.0 percent in the long run. The per capita capital stock increases by 25.9 percent in the long run.

While taxes on capital income and, eventually, labor income decline, existing capital owners do face increased implicit wealth taxation under "self-financing business tax cuts." Their welfare declines, thus distinguishing this policy from the "free lunch" promised by certain "supply-side theorists." Another reason that business tax cuts can be self-financing is that the economy has shifted to a more efficient tax structure, substituting lump sum taxes on initial wealth holders for distortionary income taxes on current and future generations. These efficiency gains, in addition to the implicit, but real transfers from the initial elderly, provide the economic resources to "cut taxes and raise revenues."

II. Summary

The key difference between savings and investment incentives in closed economies is the applicability of these incentives to old as well as new capital. Investment incentives discriminate against old capital; savings incentives do not. This discrimination reduces the market value of old capital and, therefore, the economic resources of owners of the existing capital stock. The reduction in the resources and welfare of initial wealth holders under investment policies are similiar, if not identical, to those arising from a one-time wealth tax.

In life cycle economies, the remaining resources of the elderly are held primarily in the form of nonhuman wealth. The wealth tax generated by investment incentives falls, therefore, most heavily on the elderly. Since the elderly, in life cycle models, have a greater marginal propensity to consume than young and future generations, this intergenerational redistribution of resources away from the elderly reduces current aggregate consumption. The reduction in the consumption of the elderly effectively finances the "crowding in" of investment, and explains the extra "bang for the buck."

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