

# Investment Policies to Promote Growth

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Investment in physical capital has been accorded several important roles in the economic drama: as a major source of business cycle instability, the primary channel through which monetary policy influences the real economy, the subject of public sector projects to foster economic development, and an engine of economic growth.

This conference emphasizes the last of these roles, reflecting developments in economic theory and concerns over recent macro-economic performance, notably in the United States. But in considering the design of investment policies to promote growth, and evaluating policies that have been tried in the past, it is helpful to keep investment's other "roles" in view. Policies alleged to promote growth may really be aimed at some other objective, such as providing economic stimulus; even if growth is a policy's main objective, its other effects should be kept in mind.

My goal in this paper is to review the arguments that we can stimulate economic growth through the accumulation of fixed capital, and to evaluate different policy options aimed at doing so, in terms of how well they achieve their aim, at what revenue cost, and with what undesirable (or desirable) economic side effects. Not all policies considered have been labeled as "investment incentives," but labeling is less relevant than the underlying effects a policy may have on capital accumulation. Some policies have been tried, in the United States or elsewhere, and have a record we can examine. Others exist, as yet, only in theory, and require careful inspection lest we assume they can

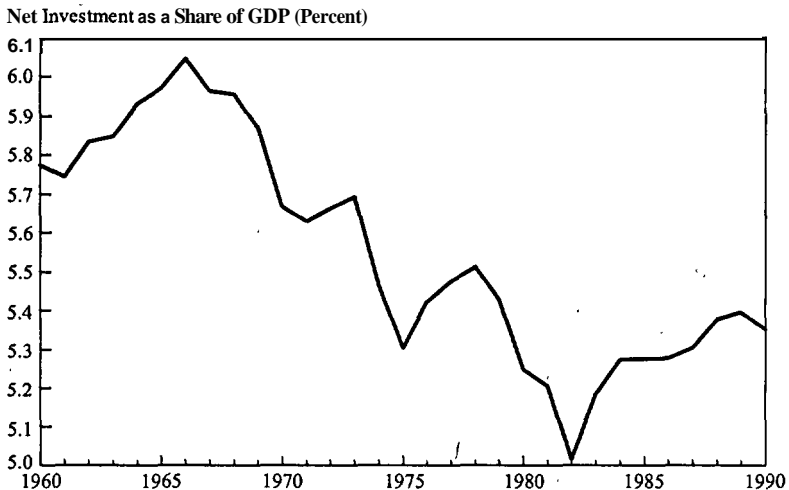
be introduced without the administrative difficulties often found in existing programs.

Because of the breadth of the topic, I will focus primarily on tax policy options, rather than financial market reforms and other complementary measures. Except where noted, the discussion relates to private, nonresidential fixed investment.

### Encouraging investment: Why do we care?

Since Keynes' *General Theory* and before, investment has been viewed as an important source of macroeconomic instability. More recently, emphasis has shifted toward the longer-run consequences of investment, as well as the difficulty in distinguishing long-run trends from short-run cycles. Chart 1 shows that net fixed investment in the United States, as a share of GDP, has been lower during recessions than expansions during the past three decades, but that this share has also generally fallen over the period. Current concern about investment reflects not only the relative weakness of investment during the recent recession, but also this downward trend.

**Chart 1**  
**Net U.S. Fixed Investment, Share of GDP (1960-1990)**



Beyond the issue of short-run stabilization, why should we be concerned about the level of domestic investment?

One answer is that the income tax discourages private saving by distorting household decisions regarding present versus future consumption. This distortion of private behavior reduces individual welfare. Therefore, policies aimed at alleviating the distortion can increase welfare.

This is a complex argument, for one must pay attention to the impact that such policies have on other distortions, as well as their distributional consequences. However, regardless of its merits, this is an argument for more saving, not necessarily more domestic fixed investment. While there is likely to be a relationship between private saving and domestic investment, even in an open economy, the argument offers no reason why we should be more interested in encouraging saving in the form of domestic fixed investment than, say, through purchases of foreign assets. We should simply make sure that domestic capital formation does not face a higher rate of tax than investment elsewhere. There must be more to the story, something different about domestic capital formation.

What is different? Domestic assets do increase labor productivity and, presumably, real wages. The traditional method of growth accounting<sup>1</sup> suggests that real income growth  $g_y$  equals the sum of three components: capital stock growth,  $g_k$ , multiplied by capital's share in production, say  $\alpha$ ; labor force growth,  $g_l$ , multiplied by labor's share  $(1-\alpha)$ ; and the growth rate of the level of technology, say  $e$ . That is,

$$g_y = \alpha g_k + (1-\alpha)g_l + e$$

Hence, an increase in the growth rate of the capital stock of one percentage point per year increases the growth rate of output by  $\alpha$ , or about 0.3 percentage points per year.

While this expression does identify a connection between investment and growth, the connection does not provide a strong argument for promoting domestic investment. First of all, the growth is of

*domestic* output, GDP, but not *national* output, GNP. The latter represents a better measure of the income of a nation's residents. If investment abroad yields the same rate of return to domestic residents as domestic investment does, then GNP would be no lower if a given level of saving were invested abroad, rather than at home—the added income would appear as a factor income earned abroad, rather than domestically. For that matter, even GDP would be unaffected if investment occurred in the form of inventories rather than fixed assets, as long as the projects were equally profitable. This leads us once again to the position of seeking more saving, rather than more domestic fixed investment.

From the viewpoint of particular groups of domestic residents, of course, domestic and foreign investment are different. Capital deepening domestic investment will tend to raise wages (perhaps producing "good jobs at good wages"), but to depress returns to the existing capital with which it competes. Overall, though, standard competitive analysis tells us that the level of national wealth accumulation will be the same regardless of the location of the new assets yielding the same rate of return.

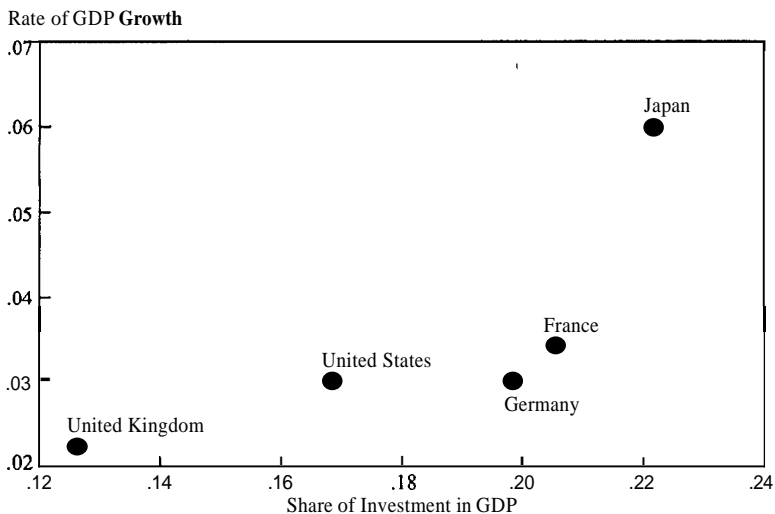
Beyond the fact that domestic investment may make no special contribution to GNP growth, even the increase in GDP growth predicted by the above equation is likely to be fairly modest. Increasing the growth rate of GDP by one percentage point per year seems like a reasonable goal. After all, real GDP in the United States grew annually by **3.84** percent in the 1960s, compared to just 2.68 percent during the 1970s and 1980s. Increasing the annual growth rate by one percentage point would not even recover this drop. But growth accounting suggests that it would not be easy to accomplish through domestic capital accumulation. An increase in  $g_y$  of one percentage point would require an increase in the capital-stock growth rate of about **3.3** percentage points. Given a capital-output ratio of about 2.5, this translates to an increase in the investment-GDP ratio of more than **8** percentage points—a roughly 50 percent increase in the investment-GDP ratio. Such a jump would be unprecedented even for a single year, not to mention a much longer period.

What sense, then, can we make of the argument that domestic fixed

investment is important for growth? The answer must lie in a relationship between capital accumulation and the growth of the technology residual term,  $e$ , in the above expression. Put simply, one must argue that capital accumulation leads not simply to increased worker productivity, but to increased total factor *productivity*—that investment induces innovation, or at least the more rapid adoption of new technology.

Even if investment and productivity growth are correlated, this need not represent an argument for government intervention. It may simply be the case that technological advances make capital deepening profitable—that capital and the level of technology are complementary factors in production.<sup>2</sup> If this is so, then the form of saving that occurs is largely irrelevant, as long as the highest rate of return is pursued.

**Chart 2**  
**GDP Growth Versus Investment (1963-1990)**



Ultimately, an emphasis on domestic investment to spur growth requires that such investment produce significant "spillovers," social returns to investment that are not captured by individual investors. This possibility has been explored in the recent "endogenous growth" literature.<sup>3</sup> As Chart 2 shows, there is a clear relationship across

countries between rates of economic growth and the share of GDP devoted to investment, a stronger one than would be predicted by simple growth accounting alone. More specifically, there is some suggestive evidence of an empirical association across countries between economic growth and investment in machinery and equipment.<sup>4</sup> However, these empirical relationships fall short of demonstrating a causal link from investment to growth. They demonstrate correlation more than causality, and alternative explanations exist for the strength of the correlation, such as the unmeasured effects of human capital accumulation.<sup>5</sup>

While a firm relationship between fixed investment and technological progress has yet to be demonstrated, this is the link one needs in order to make sense of pursuing more investment in a search for faster growth. We can posit such a relationship, but not knowing its precise form leaves us at a disadvantage in designing investment incentives. For example, does all investment contribute equally to growth, or are some types of investment (such as machinery and equipment) more productive than others (say, structures)? Are spillovers provided by increases in the capital stock, net investment, or additions of new capital, gross investment? Is equipment utilizing new technologies more important to the growth process than that which does not? These are not easy questions to answer. Without evidence of such externalities, we would generally expect to observe higher social returns to investments discouraged by unusually high tax burdens. Selective investment incentives might then be justified primarily to equalize tax burdens and make the allocation of capital efficient, perhaps to reduce the tax advantage currently enjoyed by owner-occupied housing—to "level the playing field," not increase growth.

### *Public versus private investment*

Although the preceding discussion relates to private investment, similar questions arise with respect to government investment. We are by now very familiar with arguments in favor of reducing government deficits—increasing government saving—to speed national wealth accumulation. Without addressing the question of how much we would benefit from reducing the deficit, one can still ask, again, whether it is saving or investment with which we should be concerned.

In this case, the issue is whether it matters if the government chooses to save more by investing in additional government capital, rather than repurchasing some of its national debt (or any other security). While the issue may be clouded by deficit calculations that ignore the contribution of such investments to national saving, the real issue is whether government capital yields a higher social rate of return than other potential investments.

As just discussed, one expects to find assets with high social rates of return in the private sector where investors have been denied a significant share of total investment returns, either because of unfavorable taxation or positive spillover benefits. In the case of government investment, the search for high social returns is more difficult. There is rarely a market-driven choice of investment, and in many cases the government's involvement occurs *because* of the absence of a private market, traditionally associated with public-good type spillovers.

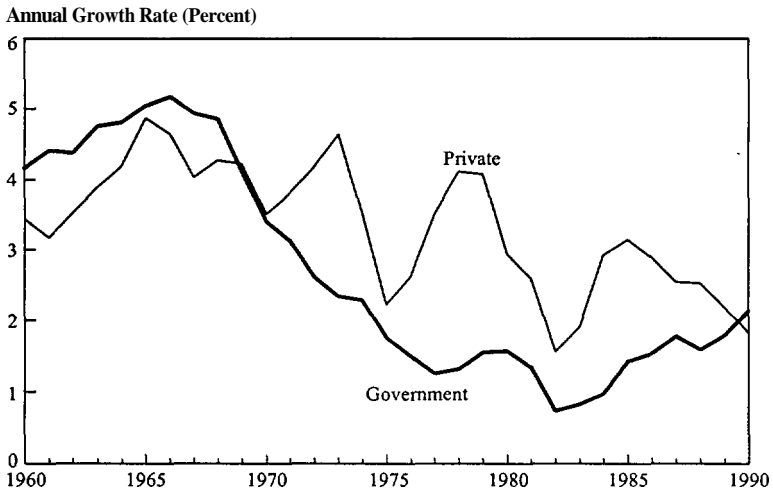
The existence of spillovers allows one to conceive of enormous social benefits arising from the procurement of public capital goods. But it is also easy to imagine the government investment process, not constrained by market forces, as being wasteful and misdirected.

Addressing the question empirically using the production function-growth accounting framework described above has led to some very large estimates of the productivity of public investment, suggesting that marginal U.S. public investment is much more productive than private investment, yielding a social return several times as large.<sup>6</sup> However, these findings are controversial, both because the results are so striking and the methodology relatively basic.<sup>7</sup> What is evident is the trend in U.S. public investment spending. Chart 3 shows the net investment-capital ratios for private and public (excluding military) capital in the United States since 1960.<sup>8</sup> Through 1968, public capital grew more quickly every year. From 1969 through 1989, the opposite was true. The cumulative effect is striking. Over the entire period 1960-90, the ratio of public to private capital fell from 0.28 to 0.23.<sup>9</sup>

As with private investment, we remain unsure of the importance of public capital in fostering growth. The significance of government

capital formation for growth undoubtedly depends on a country's stage of development and political structure, and the level of government of which we speak. But we do know that, at least in the United States, government capital has declined relative to other capital in recent years. Presumably, the evaluation of any program to encourage private investment should, at the very least, consider any effects that financing new tax expenditures has on the availability of funds for government investment. But beyond this, government capital spending may play a direct role in the program itself.

**Chart 3**  
**Real Growth Rates, Net Capital Stocks (1960-1990)**



### Relevant aspects of private investment behavior

Whatever the linkage between investment and growth, effective policy design also requires an understanding of how policy affects investment. Here, too, there is a degree of uncertainty about the economic relationship.



### ***The basic neoclassical model***

It is customary to analyze the impact of tax policy on investment with the *user cost of capital* or the *effective tax rate* facing that investment.<sup>10</sup> These measures reflect the impact of tax policy in a model of firms with access to capital markets. The investing firm invests until the marginal revenue product of capital equals the cost of capital,

$$c = q \left[ \frac{(r+\delta)(1-\Gamma)}{(1-\tau)} \right] = q \left[ \frac{r}{(1-t)} + \delta \right]$$

where  $q$  is the relative price of capital goods,  $r$  the real, required rate of return,  $\delta$  the rate of economic depreciation,  $\tau$  the corporate tax rate, and  $\Gamma$  the present value of investment tax credits and depreciation allowances. The effective tax rate,  $t$ , is defined implicitly in the above expression as the tax rate that, if applied to properly measured economic income, would produce the same user cost of capital as the combination of existing tax provisions.

While a helpful and widely-used concept, the user cost/effective tax rate framework has a number of limitations as a tool for predicting the impact of tax policy on investment.

### ***Adjustment to changes in the tax law***

Perhaps ironically (given their use in analyzing tax policy changes), these measures typically ignore changes in the tax system, applying only in the "long run" when the tax system is "in place" and investors have had time to adjust their capital stock to the desired level dictated by this tax system. In the shorter run, investors must take account of prospective changes in the tax system over a horizon dictated by the durability of their investment and the speed with which this investment responds to changes in taxation. Moreover, they will adjust only gradually to such changes.

Under such realistic circumstances, it is still possible to relate investment to a variant of the above user cost expression that incorporates anticipated changes in taxation over the relevant planning

horizon.<sup>11</sup> This revised measure may imply rather different incentives to invest than the basic ones. For example, just before the Tax Reform Act of 1986, investors in machinery and equipment anticipating a removal of the investment tax credit and a reduction in corporate tax rates had a much higher incentive to invest than the basic user cost formula implies.<sup>12</sup> As I will discuss further below when reviewing different types of incentives, current investment should depend not only on the tax treatment of investment today, but on how this treatment will evolve in the future, and whether prospective changes relate to capital already in place.

How investors react to the prospect of future tax changes is essentially an empirical matter. Some evidence suggests forward-looking behavior consistent with the extended user cost model,<sup>13</sup> but this issue is not clearly resolved. One might minimize the relevance of such effects to the design of long-run policy, but in truth there is no such thing as long-run policy. Investors will form their own judgments about the stability of the tax system, taking account of today's policy actions — regardless of whether they are deemed "permanent" or "temporary." This aspect of private behavior should, in turn, play a role in the design of tax policy to encourage investment. Not only can a lack of credibility make effective policy change difficult, but the climate of uncertainty associated with frequent tax changes can, itself, increase the risks and reduce the attractiveness of long-lived investment.

### Irreversibility

Even taking account of adjustment costs, the neoclassical investment model presumes that firms can alter investment in response to changes in the user cost of capital. But what if these desired changes are negative? Although investment is always positive in the aggregate, some firms may wish to disinvest in some types of capital. Used asset sales may in some cases be difficult, or the desire to unload assets may be quite general. Some economists have argued that this inability to disinvest — investment's irreversibility — could be a significant factor in determining aggregate investment behavior.<sup>14</sup>

If irreversibility played an important role (which really has yet to be demonstrated), how would this influence the impact of tax incentives

on investment? First of all, firms doing no investment at all are likely not to respond to minor tax incentives that simply reduce the amount they wish to disinvest. Second, even firms that do currently invest must take account of the possibility that future conditions may leave them at zero investment, wishing to disinvest but unable to do so. Unless the after-tax profitability of investment is sustained in the future, a current reduction in the user cost of capital may not have a very large effect on investment.

As just discussed, both of these effects (sluggish adjustment and the importance of future conditions) are also associated with general costs of adjustment. However, by its nature, irreversibility is likely to matter relatively more in recessions, when the capital stock may exceed its desired level, and more generally in environments of low capital stock growth in which assets are not easily marketed.

#### *Understanding the marginal impact of tax provisions*

The user-cost approach, even with account taken of tax changes, measures the *marginal* incentives faced by investors—the additional tax burden associated with new investment. But the interaction of different tax provisions can be so complicated as to make this measurement difficult. It is not always easy to determine the impact of a particular tax policy on the incentive to invest. The following examples are illustrative but not exhaustive.

*Asymmetries and parallel tax systems.* Measures of the tax burden on new investment are typically based on the assumption that a single corporate tax rate applies. While this may formally be true, additional provisions cause many companies to find themselves effectively subject to a different tax rate, and different tax rules, in certain years. The possibility of being subject to an alternative regime, and of switching among regimes, alters the incentives that firms face.

Two examples in the United States are the treatment of tax losses and the alternative minimum tax. As in most countries, companies generally pay taxes on their income but do not receive tax refunds for their losses, which must be carried forward without interest and subject to expiration. This asymmetry in the tax code has affected

many U.S. corporations in recent years, particularly smaller firms.<sup>15</sup> Constraints on losses may blunt the impact of certain types of investment incentives, such as investment credits and accelerated depreciation, if many firms must simply carry forward the right to receive these extra tax expenditures. Indeed, the firm not currently subject to tax may actually face a higher user cost of capital than its taxable counterpart.

In addition to its basic tax system, the United States also has an "alternative minimum tax" that businesses and individuals must pay if their tax burden calculated under this scheme is higher than under the primary tax system. Since changes were introduced in 1986, many U.S. firms have found themselves subject to the minimum tax. Its impact on investment incentives is similar, though less pronounced, than that of asymmetric loss treatment: when it is in force, it taxes income at a lower rate (but not zero) and permits less generous (but some) depreciation allowances.<sup>16</sup>

By their nature, the asymmetric treatment of losses and the minimum tax bind the most when profitability is low. Like irreversibility, this weakens the power of investment incentives during periods when investment may already be weak. To the extent that investment incentives are aimed not simply at increasing the level of investment but also dampening (or at least not contributing to) its volatility, one must take account of the limitations imposed by these tax system characteristics. One solution used in the past has been to encourage the transfer of tax benefits through leasing. But reliance on such indirect tax benefit transfer presents problems of its own, and begs the question of why the tax asymmetries are present in the first place, if they lead to tax policies aimed at circumventing them.

Abroad, one interesting example of the difficulty of calculating marginal incentives in the presence of alternative tax rules is the Swedish system of investment funds, under which firms are permitted to deduct from taxable income fund contributions earmarked for investment. Investments financed in this way essentially receive immediate expensing, normally thought to be equivalent to a zero effective tax rate. However, the actual incentive to invest depends on whether firms have reached the limit on the contributions they can make to the

funds, whether they can finance all their desired investment from existing balances of the funds, what the situation will be in the future regarding these two questions.<sup>17</sup> A broad range of effects is plausible and, as with the minimum tax and limited loss offset, not necessarily consistent with any rational government policy toward investment.

*Corporate financial policy.* The majority of U.S. business investment, and the preponderance of investment in machinery and equipment, is done by corporations. Unlike most other developed countries, the United States imposes a purely "classical" income tax system under which corporations and their shareholders are independently taxed. This results in the "double taxation" of corporate dividends, at the corporate level when earned and at the shareholder level when distributed. This double taxation is one of the arguments for corporate tax integration proposals.

Yet, there is considerable dispute over whether reducing the tax on dividends has a significant impact on the corporate cost of capital among mature firms using retained earnings as a primary source of equity capital. Under certain circumstances, one can view the tax on dividend distributions of funds already in corporate form as an unavoidable tax that must ultimately be paid when cash leaves corporations. This view suggests that the dividend tax is essentially a lump-sum tax that affects corporate values but not corporate retention and investment decisions.<sup>18</sup> It is interesting to note that for some countries this general analysis can extend beyond dividend taxation to the corporate tax itself.<sup>19</sup>

A related question concerns the advantages of debt finance under a classical system. Given the deductibility of interest payments and the double taxation of equity, one might think that debt is tax-favored. However, the "new view" of dividend taxation just discussed and the full taxation of interest payments to recipients (compared to the favorable treatment of capital gains) act in the opposite direction.

While some have argued that there is no net tax benefit to debt,<sup>20</sup> perhaps a more generally accepted view is that the tax advantages of interest deductibility are only partially offset, and that nontax costs of leverage (increased bankruptcy risk, loss of control by managers, and

so on) further limit borrowing. In the latter case, an important issue is whether the market environment allows some assets to be financed with a greater share of debt than others. Such assets would be indirectly tax-favored by the greater use of interest deductions. The example usually cited is commercial structures. Debates over whether structures investments receive tax benefits that are too generous or not generous enough relative to "neutral" treatment often hinge on assumptions about the use and advantages of debt finance.

### *The impact of cash flow*

The neoclassical model of investment assumes that firms have access to funds at some required rate of return,  $r$ , and invest as long as they can earn such a return. However, empirical investment studies suggest that investment, particularly by smaller firms, also relates to internal cash flow.<sup>21</sup> This has both tax and nontax explanations. Firms may find internal funds a cheaper source of finance than debt and new equity issues because retention avoids the dividend tax, or because information asymmetries make outside investors skeptical of firms seeking an outside infusion of funds. Either way, investment incentives that provide cash in the present rather than the future may reduce firms' effective user cost of capital more than simple discounting with a market rate of return suggests.

### *Summary*

Just as we are unsure what type of investment best stimulates growth, the literature leaves us with some uncertainty about the nature of the investment process in general and the role of tax policies in particular. Keeping these questions in mind, one can still draw certain conclusions about which policies are more likely to work, at least under certain circumstances, to achieve the goal of greater investment.

### **Tax policies to encourage investment**

The following discussion focuses on tax policies to reduce the user cost of capital by reducing the tax wedge between the return to savers and the marginal product of capital. There are, of course, other ways in which fiscal policy might reduce the user cost, most obviously

through a reduction in interest rates that might be associated with increased government saving.

The high real interest rates of the 1980s are often cited as an example of what a reduction in government saving can do to real interest rates, although the picture is clouded by several factors.<sup>22</sup> However, increasing government saving involves considerably more than shifting tax instruments. It requires a large-scale shift in the burden of taxation among generations. The question of whether such a shift is worthwhile extends beyond the scope of my discussion of how the tax structure can be altered to encourage private investment and growth. It is worth pointing out, though, that to whatever extent private capital accumulation is retarded by government dissaving, the costs to future generations will be that much higher if such accumulation would have generated positive growth spillovers.

Tax policies to promote capital accumulation vary in a number of ways. Exploring these differences through a series of questions provides a framework that is useful for comparing the policies themselves.

### ***Investment or saving?***

As I indicated in my initial comments, we must address the very basic question of why we wish to stimulate capital formation before deciding whether it is a particular type of domestic investment, rather than national saving, that we wish to encourage. It would appear that a sensible argument based on seeking increased growth must relate to domestic investment. Unless there are no capital flows at all, this points toward encouraging investment rather than saving; toward investment incentives that stimulate the demand for capital by firms, rather than saving incentives, that stimulate its supply, primarily by households.

In the user cost of capital discussed above, investment incentives work directly through the tax terms in the expression, while saving incentives work indirectly by increasing available funds and lowering the required return,  $r$ . The investment tax credit and accelerated depreciation allowances are examples of investment incentives, while

a reduced rate of tax on household interest income is one saving incentive.

Investment incentives, to the extent that they are available to foreign investors, will be enhanced by an economy's openness; the opposite will be true of saving incentives, as increased saving may leak abroad.<sup>23</sup> The distinction between saving and investment incentives can be reduced somewhat by provisions either limiting the availability of a saving incentive to funds not directed to domestic uses or restrictions facing foreign investors wishing to take advantage of our domestic investment incentives.

How much of a difference, in terms of domestic investment undertaken, does it ultimately make whether we choose investment or saving incentives? Possibly a lot, particularly if the desired increase in investment is of a particular type. Then, saving incentives are weakened not only by leakages abroad, but also by increased domestic investment in assets other than the type intended. Though we may, for example, wish to stimulate investment in machinery and equipment, a general saving incentive that increases funds for investment, and thereby reduces real interest rates and the user cost of capital, will be spread across all assets, including housing and nonresidential structures—recently about half of all U.S. fixed investment, and historically, even more than that.

In my initial discussion above, I noted that arguments for encouraging saving rather than investment relate to the intertemporal distortions imposed by existing tax systems. However, there are some distortions that increase, rather than decrease saving. Changes that alleviate these distortions would normally be viewed as a way to increase household welfare—but not if there are special reasons for wanting to encourage capital formation. If investment, itself, provides positive externalities, we might wish to keep saving (and presumably, the type of investment we desire) up, even at the expense of preserving the distortions of household behavior.

A classic example of this case is the provision of social security annuities. When private annuity markets are absent or do not work well, individuals must engage in precautionary saving, to have funds



available if they exceed their life expectancy. The lack of annuities is a distortion of their behavior, in that individuals are being prevented from concentrating their resources in the periods when they are alive, in most instances being forced to leave bequests even if they have no intended heirs. Government provision of social security retirement annuities may reduce or eliminate this distortion, but also reduces precautionary saving, even if the social security system itself is fully funded.<sup>24</sup> The same would be true of any government program aimed at providing insurance for which precautionary saving may be a surrogate, such as medical expenses.

Another example from the realm of more explicit saving incentives is a reduction in capital gains taxes, which would lessen the distortion of new saving by reducing the tax wedge imposed on some of the future income from that saving. A capital gains tax reduction would also decrease the distortionary "lock-in" effect that discourages individuals wishing to avoid or defer the capital gains tax from rebalancing their portfolios. While each of these effects represents a reduction in the distortion of household behavior, the first encourages saving, while the second discourages it. Being able to allocate its assets more efficiently allows the household to save less and still meet future contingencies.<sup>25</sup> If there is no reason for encouraging capital formation beyond the desire to alleviate tax-induced distortions, this second effect provides another reason for reducing capital gains taxes. If capital accumulation, itself, provides positive spillovers to growth, then distorting policies that increase saving, such as an increase in the lock-in effect or a reduction in the level of social security annuities, need not be welfare-reducing.

In conclusion, investment incentives are likely to be more useful than saving incentives for achieving growth through domestic capital formation. Reducing distortions of individual saving behavior need not even point in the right direction, if a higher level of domestic capital formation itself is the object of policy design.

### ***Targeted or broad?***

The same issue of distortions versus growth arises in choosing among investment incentives. Traditional analysis suggests that there

is a large deadweight loss from the differential tax treatment of assets (as measured by differences in effective tax rates), because investors will opt for lower social returns in order to qualify for the favorable treatment given certain assets. Such analysis during the 1980s provided support for the repeal of the investment tax credit by the Tax Reform Act of 1986,<sup>26</sup> and subsequent studies have confirmed that the act's gains from reduced interasset distortion were significant when measured against the losses from an increased cost of capital.<sup>27</sup>

However, these studies are subject to two types of criticisms. First, they typically do not take full account of all tax provisions relevant to calculating the marginal costs of funds. As I discussed above, one cannot incorporate minimum taxes, limited loss offsets and the tax advantages of debt in the calculation without considerable difficulty and dispute. Second, and perhaps more important, the distortions are measured based on the assumption that there are no externalities to different types of investment — none of the possible growth-inducing spillovers that might justify investment incentives.

If the social returns to particular types of investment are really 30 percent,<sup>28</sup> then the distortions caused by *not* favoring these investments would swamp the gains associated with achieving more neutral tax treatment. On the other hand, one can imagine each industry group being able to produce empirical evidence that the investment it undertakes generates unusually large social externalities. It is easy to envision a search for spillover effects — attempting to pick "winners" — turning into an orgy of rent-seeking.

### *Marginal or average?*

If one type of investment faces a higher effective tax rate, or provides more positive externalities, than another, it is a candidate for an investment incentive. But how should this incentive be provided, to achieve the greatest increase in investment for a given loss of tax revenue? In common parlance, what approach yields the greatest "bang for the buck?" Traditionally, the desire to minimize revenue losses has led to the crafting of more "marginal" investment incentives, those aimed primarily at reducing taxes faced by new investment, rather than simply lowering the tax rate on all existing sources

of income, the "average" tax rate.

The logic of this approach can be demonstrated by comparing the effects of an investment tax credit to those of a reduction in the corporate tax rate. Both reduce the user cost of capital facing new investment. But a cut in the corporate tax rate also reduces the tax on profits from existing capital, and from other sources as well (such as returns earned as the result of imperfect competition in an industry). This reduction in the taxes levied on income from existing sources does reduce the average tax rate faced by corporate income, and does lose tax revenue, but does not reduce the user cost of capital faced by marginal investment. Hence, for a given reduction in the user cost of capital, the investment tax credit loses less tax revenue overall. Thus, one could raise the corporate tax rate and the investment tax credit at the same time, keeping the user cost of capital the same through the offsetting effects of the two provisions, and raise revenue — essentially a capital levy on existing sources of income.

Why not? A one-time capital levy is nondistortionary—the first time. Even if it is used only once, the amount is so large — effectively the corporate tax rate multiplied by the stock of existing capital — that it can have a considerable impact on the economy's long run condition.<sup>29</sup> But its use might lead investors to expect its reuse. Once anticipated, a capital levy has the same dampening effect on investment as a capital income tax. In prospect, an investment tax credit represents a far less attractive alternative for current investment, which does not qualify, than does a cut in the corporate tax rate, which will benefit the income from investment made today. Still, one might expect each new government in need of some quick, nondistortionary cash to use the capital levy embodied in investment incentives "just once more," promising not to do so again.

However, the United States has shown no obvious pattern of relying on repeated capital levies using the investment tax credit, or other investment incentives limited to new capital, such as accelerated depreciation. If it had, we should have observed an upward drift in the combined after-tax value of the credit and depreciation allowances over time. Indeed, the most recent change, in 1986, was in the opposite direction. A reduction in the credit to zero coupled with a cut in the

corporate tax rate presented investors with a *negative* capital levy.<sup>30</sup>

Aside from the issue of investor expectations, some might argue that a reduced tax on existing profits provides immediate cash flow to business. To the extent that business investment depends on internal cash flow (as discussed above, an empirically plausible view), a reduction in taxes on existing income may itself provide an added impetus for investment, even though it does not affect the standard measure of the user cost of capital. Thus, the windfalls to existing capital do have some impact on investment.

However, providing windfalls is just one of the ways of increasing business cash flow. It is also possible to do so *without* giving windfalls, by speeding up the investor's receipt of a marginal tax incentive. The investment tax credit is the clearest example of this: the investor receives the entire tax benefit when the investment is made, much more than if the returns to new investment were taxed less heavily in the future. Indeed, an investment tax credit may lower current tax payments by even more than a corporate rate cut having the same impact on the user cost of capital.<sup>31</sup>

The advantage of marginal investment incentives also depends on the ability of firms to use them. The benefit that comes from the concentration of a tax reduction in the year of an investment is diluted if a taxpayer is in a situation of tax limitation. For example, providing accelerated depreciation allowances to a firm that currently is subject to the minimum tax or is not taxable at all forces that firm to wait until it transits to a fully taxable state to use the allowances, thus undoing the initial acceleration—the firm gets neither the tax benefit of deferred tax, nor the associated up-front cash flow. This represents an obstacle to generating growth through investment, particularly (as some believe) if smaller firms represent the channel through which new technology is introduced. As discussed above, solutions to this problem, such as leasing or even direct sale of benefits, beg the question of why such tax limitations exist.

*Tailoring marginal incentives: how marginal?* Policies may vary considerably in the extent to which they provide windfalls to existing assets. At one extreme are tax changes that do not affect marginal

decisions at all. While few investment or saving incentives are introduced with this intent, the outcome may still occur. As discussed above, it is sometimes difficult to know the marginal impact of particular tax schemes. For example, the integration of corporate and individual income taxes normally proceeds through a business deduction for dividends paid or a shareholder imputation credit for dividends received.<sup>32</sup> However, to the extent that investment is financed by retained earnings, integration may not reduce the user cost of capital it faces. Integration may provide an investment incentive only to the extent that new equity is issued.

A related question arises with respect to the design of saving incentives, such as the Individual Retirement Accounts (IRAs) in the United States. These accounts may provide a considerable reduction in the marginal tax rate on new saving—if such saving occurs through the accounts. For taxpayers saving considerably more than the maximum permitted (or borrowing to make the maximum contribution), the account provides nothing more than an income effect. As in the case of the investment funds system discussed above, one must know the regime a taxpayer is in to calculate that individual's marginal tax rate.

Why not alter policies to reduce the extent of windfalls? Indeed, there have been attempts to tailor investment incentives in this way. In the case of corporate dividends, for example, this would mean keeping track of new versus old equity.<sup>33</sup> An example from actual practice in the United States is the Research and Experimentation (R&E) Credit, which applies only to expenditures in excess of a base level determined by the firm's history of R&E expenditures prior to the legislation. The idea has also frequently been suggested for the investment tax credit itself.

The advantages of this approach are clear—even less revenue cost for a particular cost-of-capital reduction. But there are some additional problems, as well. A lesson from the experience is that designing a marginal incentive requires that we distinguish marginal investment from that which would have taken place without any special investment incentive, usually a difficult task. First, defining the base is difficult. One cannot use a firm's own past investment behavior as a

base without dampening the impact on that investment — firms will take account of the fact that current investment reduces future tax credits. This was a problem with the R&E credit's original design.<sup>34</sup> On the other hand, using a measure like sales as a predictor imperfectly identifies the "normal" level of a firm's investment for which a credit is unnecessary. The more of this "normal" investment we try to disqualify from the credit, the more firms will not qualify for the credit at all. This problem may be exacerbated during recessions, when investment drops more precipitously than other components of GDP. Rather than simply being constrained by tax limitations in their ability to use tax credits, firms may simply not qualify for the credits at all.

In addition to the problems of implementing a truly "marginal" investment incentive, there is another potential hazard to be confronted were we to succeed in doing so. In a competitive industry, firms will invest until their marginal investments yield zero profits, over and above a normal market rate of return. But what if only their marginal investments receive an investment incentive, say an investment tax credit? Then other, "normal" investment could very well produce a net loss, and the firm could find it more profitable simply not to invest at all.<sup>35</sup> As some firms choose not to invest, others already over the threshold might invest even more. By providing a reduction in costs only beyond a certain level of capital expansion, the marginal incentive simulates the effects of decreasing production costs, a standard case in which competitive markets may be difficult to sustain.

### *Temporary or permanent?*

Investment incentives are never really permanent. The U.S. investment credit was reinstated "permanently" in the mid-1970s. Its "permanent" repeal in 1986 has not prevented discussion of its being used again. Government may be limited in its ability to distinguish "permanent" incentives from "temporary" ones, but there is probably some content in the designation. There has been considerable political support for a temporary investment incentive, albeit a very modest one, during the current recession. Temporary investment incentives are normally viewed as a tool of stabilization policy, although there is little evidence that they have been used successfully toward that end in the United States.<sup>36</sup>

To the extent that credibility about the permanence of a government policy is weak, there are advantages to using investment incentives that deliver their entire package "up front." The prospect of the reversal of a corporate tax rate reduction will mute the current incentive to invest. However, the investor receiving an investment tax credit perceived to be of temporary duration not only gets his money before the government changes its mind, but has the added incentive to invest produced by the knowledge that subsequent, competing capital investment may be lower once the investment incentive is removed.

A different role of changes in tax policy could be the implicit provision of insurance, for example the smoothing of future after-tax returns from investments through variations in the corporate tax rate. However, it is difficult to see a role for fluctuating tax instruments in encouraging growth, unless the government were able to use them to absorb and spread investment risks more efficiently than private businesses. This might be an issue in less developed countries, or among risky new ventures in the United States, but does not seem relevant for most business investment that is financed through capital markets. Moreover, the nature of countercyclical marginal investment incentives is to increase, rather than dampen swings in after-tax profitability. If they are introduced during recessions, when profits are already low, their stimulus of new investment will simply lower the returns to existing capital, which do not directly benefit from the tax incentives, still further.

### *Summary*

If there really is some special connection between fixed capital and economic growth, then investment incentives are more suited to the task than saving incentives, which leak abroad and into other assets. The logic that investment drives growth through externalities also argues for targeting particular types of investment--once we know which type.

Even when we are concerned with long-run outcomes, marginal incentives seem more attractive than those that spend most of their initial revenue loss providing windfalls to existing assets. However, given the complicated nature of existing tax systems, it is not always

evident what effects a provision may have on the marginal incentive to invest. As incentives become more "marginal" in nature, they save tax revenue but introduce other problems.

Do the policies work? There are really two questions here: does capital lead to growth, and do tax incentives speed capital accumulation? I cited some preliminary evidence on the first question above. On the second question, there is considerably more evidence that tax provisions do affect the level and the allocation of business fixed investment,<sup>37</sup> though, even here, there are dissenting views.<sup>38</sup>

### **Concluding comments**

Policy discussions often connect capital to growth, but standard economic models provide little assistance in identifying the path from more investment to sustained higher growth. If the growth comes from positive spillover effects, we have just begun to consider how this comes about, and which types of investment deserve our attention.

The capital-growth connection does point toward investment incentives as opposed to saving incentives. The literature provides guidance with respect to the design of these incentives but offers us little as to which types of capital investment should be encouraged or, for that matter, whether first priority should be given to private rather than public capital, the latter of which has grown relatively slowly during the past two decades. While I have focused on changes in tax structure, rather than the burden of taxation, the logic that causes us to focus on investment as a vehicle for growth also suggests that the social costs of government dissaving to the welfare of future generations may be higher than is normally assumed.



## Endnotes

<sup>1</sup>As used by Solow (1957) and Denison (1967).

<sup>2</sup>See Jorgenson (1988).

<sup>3</sup>See, for example, Romer (1989).

<sup>4</sup>See DeLong and Summers (1991)

<sup>5</sup>Mankiw and others (1990).

<sup>6</sup>See Aschauer (1989) and Munnell (1990)

<sup>7</sup>See, for example, the comments of Henry Aaron in Munnell (1990). More recent empirical findings for the United States (Holtz-Eakin 1992) dispute claims of such high returns. A more general estimation approach applied to Sweden finds the opposite result, that the country has an excess of public capital. See Berndt and Hansson (1991).

<sup>8</sup>Some might think of military capital as playing an indirect role in the advancement of productivity, through the development of new technologies. Including military capital in the calculation simply reinforces the overall trend, since (despite the build-up during the 1980s), the stock of military capital grew proportionately less than other government capital between 1960 and 1990.

<sup>9</sup>Musgrave (1992). An even larger decline in the ratio occurs if residential capital is excluded from the private capital stock, from .59 in 1960 to .44 in 1990.

<sup>10</sup>For an early such application, see Hall and Jorgenson (1967). For further discussion of the cost of capital and effective tax rate concepts themselves, see Auerbach (1983) King and Fullerton (1984) provide an oft-cited effective tax rate analysis of four countries' tax systems.

<sup>11</sup>See Auerbach (1989b).

<sup>12</sup>See Auerbach and Hines (1988).

<sup>13</sup>Auerbach and Hassett (1992) find that a user cost based on expected future tax parameters is a superior predictor of investment behavior than one based on the "myopic expectations," the basic user cost formula

<sup>14</sup>See, for example, Bertola and Caballero (1991).

<sup>15</sup>See Altshuler and Auerbach (1990).

<sup>16</sup>See Lyon (1990)

<sup>17</sup>See Sodersten (1989).

<sup>18</sup>See Auerbach (1983) and Poterba and Summers (1985) for further discussion

<sup>19</sup>In Sweden and Finland, for example, firms have had various incentives available to reduce their taxable income, such as the investment funds discussed above. At the same time, they are

allowed under law to pay dividends only from income that has been declared for tax purposes. As a result, they are essentially in a position where **their** taxable income in any given year can be set at whatever level is necessary to meet the level of dividends chosen. See Kanninen (1986) and Sodersten (1989).

<sup>20</sup>See Miller (1977).

<sup>21</sup>See Fazzan, Hubbard and Peterson (1988).

<sup>22</sup>See Blanchard and Summers (1984)

<sup>23</sup>Since the work of Feldstein and Horioka (1980) finding a close relationship between domestic saving and investment across countries, there has been **considerable** debate about how closely connected these two aggregates are, and the **implications** concerning how much new domestic investment would result from an increase in domestic saving.

<sup>24</sup>See Abel (1985).

<sup>25</sup>In Auerbach (1992), I present simulations showing that delaying the **implementation** of a capital gains tax reduction may **simultaneously** increase national saving and reduce household welfare.

<sup>26</sup>See U.S. Treasury (1984).

<sup>27</sup>See, for example, Jorgenson and Yun (1991) and Auerbach (1989a).

<sup>28</sup>This number is suggested by DeLong and Summers (1991), based on **their** cross-country empirical investigation.

<sup>29</sup>For example, in a traditional growth model, Auerbach and Kotlikoff (1987) present simulations showing that a move from income taxation to consumption taxation may be **welfare-increasing**, while a shift from income taxation to labor income taxation may be welfare-decreasing. The difference between consumption taxation and labor **income** taxation is a tax on consumption financed from existing wealth:

<sup>30</sup> In an **empirical investigation**, Judd (1989) accepts the **hypothesis** that the capital levies implicit in the **relative** treatment of new and **existing** assets have had a zero mean and been **uncorrelated** over time in the United States.

<sup>31</sup>At the current U.S. corporate tax rate of 34 percent, a 1 percent investment tax **credit** would lower the user cost of capital by about the same amount as a .66 percentage point decline in the corporate tax rate. Hence, a firm that **reinvests** at least two-thirds of its profits will receive a larger increase in after-tax cash flow from the investment capital.

<sup>32</sup>The recent U.S. Treasury (1992) study **provides** a fuller discussion of these and other alternatives.

<sup>33</sup>For one such proposal. see American Law Institute (1982).

<sup>34</sup>See Altshuler (1988)

<sup>35</sup>See Gravelle (1992).

<sup>36</sup>Auerbach and Hassett (1992) find that variations in the user cost of capital attributable to changes in tax policy during the postwar period actually increased the variance of U.S. fixed nonresidential investment (relative to the capital stock). Taylor (1982) finds somewhat more positive evidence for the countercyclical use of investment funds in Sweden.

<sup>37</sup>See, for example, Hall and Jorgenson (1967), Feldstein (1982), or Auerbach and Hassett (1991).

<sup>38</sup>See, for example, Bosworth and Burtless (1992).

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