THE TAX REFORM ACT OF 1986 AND ECONOMIC GROWTH

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ABSTRACT

Early tax reform proposals listed economic growth as a major goal, and some even gave explicit estimates of the expected increase in the long run output path that would follow from enactment. The 1986 Tax Act does not mention growth, much less give estimates of the expected increase, for good reason. The 1986 Tax Act will likely reduce the long-run output path by two to four percent.

A revenue-neutral tax reform that raises the standard deduction and personal exemption cannot, in general, increase the bundle of goods one can purchase with an additional hour worked. Cuts in marginal personal tax rates can be achieved by broadening the tax base and shifting the tax burden to businesses. However, while the after-tax wage will increase, so will the after-tax cost of goods consumed, both currently and in the future, and thus work effort is unlikely to rise. Similarly, a tax reform that shifts the tax burden from labor and existing capital to new investments will likely lower saving and reallocate capital away from industrial uses. While the Tax Act will increase the efficiency of business investment, the potential efficiency gains are so small that actual gains will be swamped by the direct effect of a smaller business capital stock.

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Both economic and productivity growth declined sharply in the 1970s. For the 1959-73 period, real output and productivity growth averaged over four and two percent, respectively; since 1973, each has been one and a half percentage points less.[1] Productivity growth has rebounded in recent years, but substantial concern still exists regarding the long-run output path of the United States' economy. Major tax reform has the potential to alter that path significantly.

In the long run, the growth rate of an economy is determined by the rates of technological progress and of growth in labor supply. These rates are difficult to influence with tax policy. In the short run, however, economic growth depends on changes in both the capital/output ratio and the level of work effort, variables that can be affected by tax policy. Moreover, a higher growth rate for even a few years translates into a higher level of output, or output path, over time.

The 1986 Tax Act will have a negative impact on economic growth. A revenue-neutral tax reform that raises the standard deduction and personal exemption cannot, in general, increase the bundle of goods one can purchase with an additional hour worked. Cuts in marginal personal tax rates can be achieved by broadening the tax base and shifting the tax burden to businesses. However, while the after-tax wage will increase, so will the after-tax cost of goods consumed, both currently and in the future, and thus work effort is unlikely to rise. Similarly, a tax reform that shifts the tax burden from labor and existing capital to new investments will likely lower saving and reallocate capital away from industrial uses. While the Tax Act will increase

the efficiency of business investment, the potential efficiency gains are so small that actual gains will be swamped by the direct effect of a smaller business capital stock.

My analysis is divided into three basic parts and a conclusion. The basic parts discuss the likely impact of the 1986 Tax Act on work effort, saving, and the quantity and quality of business investment. I begin each part with an analysis of potential gains from tax changes and then examine the 1986 Tax Act.[2] The conclusion summarizes the earlier analyses and briefly discusses future policies to stimulate economic growth.

I. Tax Reform and Labor Supply

One touted benefit of tax reform is greater work effort in response to a reduction in marginal tax rates on labor income. While economists disagree on many issues, there is substantial consensus that labor supply, especially that of secondary workers, is highly responsive to increases in the return from work. Because greater labor supply expands national income, many advocated tax reform on this basis.

A. Potential Gains

A revenue-neutral, distributionally-neutral tax reform can lower marginal tax rates on labor income in just three ways: by broadening the tax base, by shifting the statutory tax burden from households to businesses, or by reducing the effective progressivity of the tax burden. However, an increase in labor supply is likely only if the tax rate reductions are achieved by reducing the system's effective progressivity because only in this case will most workers be able to purchase more goods for an extra hour of work (Browning and Browning, 1985, and Slemrod, 1987). In the other two cases, the price of some goods, as well as the after-tax wage rate, will rise, making an increase in the real return from work uncertain.

Base broadening consists of either taxing previously untaxed sources of income or disallowing existing deductions. If the previously untaxed sources are labor income, including them in the tax base and using the revenues to lower statutory tax rates doesn't lower effective marginal tax rates and won't increase labor supply. A change from a 50 percent tax rate applied to 50 percent of income to a 25 percent rate applied to all income reduces the incentive to take income in the previously nontaxed form but shouldn't affect labor supply. In either case, 25 percent of a marginal dollar of income goes to the Treasury and 75 percent is retained by the worker.

Disallowing existing deductions or taxing previously untaxed capital income and using the funds to lower tax rates also probably doesn't increase labor supply. The incentive to work depends on the amount of goods one can purchase with an additional hour of work, not just the after-tax wage rate. While a cut in marginal tax rates increases after-tax income from the hour of work (and thus the reward in terms of goods not included in the base broadening), disallowing deductions increases the "after-tax" prices of goods that were previously tax-favored, reducing the reward for work in terms of these goods. Thus the quantity of goods one can purchase with the greater after-tax wage does not necessarily increase, and no increase in hours worked should be expected.

To see this point more clearly, consider some specific deductions. The largest is that for home mortgage interest. The revenue raised from disallowing this deduction would allow a significant reduction in marginal tax rates and thus would increase the after-tax wage. But the annual cost of financing housing would rise from the after-tax mortgage rate, say three-quarters of 10 percent, to the full before-tax rate, 10 percent in our example.

Would people work harder in response to an increase in their after-tax marginal wage rate, even though the cost of a major component of their consumption has increased even more sharply? Probably not.

What about the deductibility of state and local income, sales or property taxes? First of all, loss of the state and local income tax deduction would not necessarily permit lower marginal total tax rates when federal, state and local taxes are considered. For example, a 30 percent federal rate along with a fully deductible 5 percent state rate gives a 33.5 percent total rate. Removing the deductibility and lowering the federal rate to 28.5 would leave the total rate unchanged. Second, while loss of the sales tax deduction would allow a reduction in marginal tax rates, for itemizers it would also raise the effective price of goods subject to the tax (and for nonitemizers it wouldn't raise any revenue). Third, loss of the property tax deduction would raise the effective price of municipally-provided services that property taxes finance. Because the prices of some goods and services rise, even a higher marginal after-tax wage rate need not trigger greater work effort.

But what if lower household tax rates are achieved by shifting the tax burden to business? This doesn't change the argument because business taxes are ultimately paid by households, either as lower wages (if an increase in profit taxes is shifted to workers) or higher prices. If excise taxes are increased (or become nondeductible), the price of current consumption rises; if profit taxes are increased and capital income (rents, dividends, interest, etc.) falls, the price of future consumption (the after-tax return to saving) increases. In either case, greater labor supply would not be likely to follow; a higher price would tend to offset the positive incentive of a higher after-tax marginal wage rate on work effort.

Browning and Browning (1985) make the case with a simple example. If the tax liability under both old and new law is $3,000 on an income of $30,000 and $5,000 on an income of $40,000 (the tax change is distributionally neutral), then the effective marginal tax rate applied when income rises from $30,000 to $40,000 is 20 percent for both laws. And work effort will likely be the same even if one law has low marginal rates applied to a broad base and the other has higher rates applied to a narrower base.

B. The 1986 Tax Act

Slemrod (1987) suggests two means by which the distribution of tax burdens within income classes could be altered so as to increase labor supply within the context of a revenue neutral reform: reductions in the minimum standard deduction and in the personal exemption. Both would increase marginal tax rates (from zero to the lowest marginal rate) for a subset of taxpayers who paid no taxes prior to the reductions but now would pay taxes. The revenue pick-up from these taxpayers would allow the marginal tax rates of all others to be cut. The positive labor response of the latter group should roughly offset the negative response of the former group. In addition, though, the reduction in standard deduction and/or personal exemptions of those who previously paid taxes would allow a further reduction in their marginal tax rates, and this should then lead to an increase in total labor supply.

Lowering the personal exemption has another advantage. Because the number of personal exemptions per tax return rises with income, marginal tax rates could be reduced without changing the distribution of the tax burden by income class.

The 1986 Tax Act will not provide labor supply incentives through either of these channels. In fact, the 1986 Act went in the opposite direction, raising the standard deduction and personal exemption in order to increase fairness. Moreover, partly because of these changes the Tax Act is likely not

distributionally neutral. In fact, if the increased corporate taxes are assumed to fall entirely on capital income recipients, then the tax burden is noticeably shifted from those earning under $50,000 to those earning over (Aaron, 1987). A reduction in labor supply should be expected from such a redistribution.

In a widely cited study (possibly because it seems to be the only one), Hausman and Poterba (1986) report that the Tax Reform Act would increase labor supply of the average married man by 0.9 percent, and they conjecture that this is a good estimate of the aggregate effect on male labor supply. They then consider the average married woman married to the average married man and compute a 2.6 percent increase in labor supply. Here they are reluctant to extrapolate to total female labor supply.

Slemrod (1987) contends that this analysis is flawed because the underlying model is based on a two-good world where the two goods are leisure and a non-tax-preferred consumption good. Thus the negative effect on labor supply of disallowing deductions -- the increase in after-tax prices of previously tax-favored consumption goods -- is ignored by definition. How the shift in the tax burden from households to business -- the increase in the price of future consumption -- is handled is unclear, but it too appears to be ignored. While the "average" married man may not hold large quantities of stock (although he must have stock in his retirement saving), one would not want to extrapolate from such an individual to the full population. Thus the Hausman-Poterba study does not really conflict with the prior argument that the 1986 Tax Act will not increase labor supply.

II. Saving

Another possible benefit of tax reform is greater saving in response to lower tax rates on capital income. Economists are in less agreement on the sensitivity of saving to increases in its net return than they are on the

responsiveness of labor supply to increases in the return to work. I begin with a general discussion of economists' views on this issue and then turn to the specifics of the 1986 Tax Act as it affects first personal saving and then corporate and foreign saving. Assuming the Tax Act is revenue neutral, changes in total saving will occur only if private or foreign saving change, and the change in total saving determines the change in total investment.

A. After-Tax Returns and Personal Saving

Most economists believe personal saving to be relatively insensitive to net returns to saving. While economists have constructed models in which saving is highly sensitive (Summers, 1981a), alternative models give a small sensitivity (Evans, 1983). Moreover, econometric studies generally report low responses. Boskin's (1978) widely cited study reports an interest-rate elasticity of 0.2 to 0.6; more recently, Hall (1985) finds virtually no response. A major difficult with all empirical studies is the measurement of the after-tax return (von Furstenburg, 1981). With so many alternative saving vehicles, with widely varying taxation and risk, how this return should be measured is far from obvious.

Because of the measurement problems, many economists look directly to historic periods where net rates of return clearly changed for evidence on the sensitivity. The first half of the 1980s is just such a period. The 1981 Tax Act both cut marginal tax rates and greatly expanded the scope of tax-preferred retirement accounts (which surged in response). Moreover, real pretax interest rates rose sharply. Thus many point to the post-1981 period as one where the saving rate should have risen noticeably if saving is interest sensitive. However, the officially reported personal saving rate has plummeted from 7.3 percent of income in 1980-81 to about 4.4 percent in 1985-86, a decline of 40 percent. On this basis, Blinder (1985) and Hausman and Poterba (1986) conclude that personal saving is not sensitive to net rates of return.

This conclusion rests on two premises: the official savings rate is a reasonable measure of household saving and other forces were not deterring saving in the 1980s. Both presumptions are incorrect. Hendershott and Peek (1988) have examined the official computation of this saving rate and found it lacking for three reasons: (1) purchases of durable goods are treated as pure consumption, (2) contributions to government retirement plans are counted as government, not household, saving, and (3) the inflation-generated premium in interest rates, which simply compensates for expected capital losses on fixed-dollar financial assets, is included in household income. When Hendershott and Peek recompute the personal saving rate in the 1980s, it is flat, not plunging.

Moreover, the rise in the stock market between the summer of 1982 and the end of 1986 added over a trillion dollars to household wealth. Such an increase would be expected to reduce saving out of current income. The constancy of the personal saving rate, correctly measured, in the face of this wealth increase, suggests a positive response to the net return on saving. The 1981 expansion in retirement saving incentives may have stimulated household saving in spite of the observed decline in the official saving rate.

B. The 1986 Tax Act and Personal Saving

Numerous provisions in the 1986 Tax Act affect the return to saving. These include changes in tax rates on dividends, interest and capital gains, changes in the taxation of tax shelter activities, and changes in the deductibility of IRA and 401(k) retirement contributions. I first discuss the tax rate changes and attacks on tax shelters and then turn to the changed deductibility of retirement saving.

Table 1 contains marginal tax rates (federal plus net state and local) under both 1985 tax law and the Tax Act of 1986 for homeowners with different incomes in 1988 and different household status. The after-tax incomes are for households if they rented; if they owned they would have lower tax liabilities.

The marginal tax rates are for owners and reflect substantial housing-related deductions; for renters the marginal rates would be higher. As can be seen, tax rates on marginal dividend and/or interest income are cut by 5 to 15 percentage points for married owners with incomes between $35,000 and $45,000 and above $65,000. For household heads and singles, respectively, such cuts occur for incomes above $50,000. This represents about 25 percent of married couples but only 10 percent of single and other household heads. Such rate declines tend to raise the after-tax return to savers. On the other hand, the statutory capital gains tax rate is increased by 8 to 15 percentage points for these same households.

Also acting to lower returns to savers are the anti-tax shelter provisions of the new law. For many years, different sources of income have been taxed differently under the federal tax code. For example, until 1981 "unearned" (nonlabor) income was subject to a far higher maximum tax rate than was "earned" or labor income. Also, capital gains have generally been taxed less heavily than other income, owing both to the gains exclusion and deferral until realization. Moreover, portfolio capital losses, while fully deductible against portfolio capital gains, have been deductible against only $3,000 of other income.

The 1986 Act introduces a new income class, passive income, with restrictions somewhat analogous to those on portfolio capital losses. Passive income is defined to include income generated from business and trade activities in which the taxpayer does not materially participate and from rental activities such as real estate. For individuals, partnerships, trusts, and personal service corporations, losses from passive activities can be used to offset income from other passive activities, but not other income (e.g., wages, interest, etc.). Losses that cannot be claimed in a particular year can

be "banked" and used to offset passive income in future years.[3] Also, cumulative losses are deductible in full at the time of sale of the property, irrespective of whether a gain or less is recognized.

The 1986 Act also strengthened the minimum tax considerably. Individuals must pay the higher of their regular tax liability or their minimum tax liability. Under the new law, the minimum tax liability is 21 percent (up from 20) of an individual's income base -- regular taxable income plus specified tax preferences less a $40,000 exemption for married taxpayers ($30,000 for singles or individual filers). The exemption is reduced 25 cents for each dollar by which the income base exceeds $150,000; during this phaseout the effective tax rate is 26.5 percent.[4]

The 1986 Act expands the list of tax preferences to include accelerated depreciation on equipment (the difference between 200 percent declining balance and 150 percent declining balance), tax-exempt interest on new private activity bonds, and the appreciation component of charitable contributions. These expansions will increase the likelihood of taxpayers paying the minimum tax.

On net, the anti-shelter provisions and increase in capital gains taxation would appear to more than offset the decline in marginal tax rates on interest and dividends. The declines are significant for only the fifth of households with the highest incomes, and these households are just those most likely to have been using tax shelters and paying capital gains. The net return to saving is probably decreased.

The 1986 Act also reduces the tax advantages of retirement saving. IRA contributions for those with established pensions will no longer be deductible for households with incomes above $35,000 (singles) or $50,000 (married couples, and they will be only partially deductible for singles with incomes between $25,000 and $35,000 and marrieds with incomes between $40,000 and $50,000.[5] Also, the maximum deductible annual contributions to supplemental

retirement accounts [401(k)s] has been lowered from $30,000 to $7,000. These changes certainly reduce the net return to savers, but many contend the reduction affects few on the margin. For high savers, IRA contributions are not the marginal dollars saved because the contributions are limited to $2000 a year. Moreover, previous saving can be transferred from taxable accounts to tax-exempt accounts.[6] Thus the surge in retirement contributions in the early 1980s (roughly $40 billion to IRAs and $20 billion to 401(k)'s in 1985 alone) may not have reflected an incentive-induced increase in saving, and removing these tax incentives may not reduce saving.

While these observations are relevant, a significant part of these contributions has likely affected behavior at the margin. Nearly 40 percent of IRA contributors made contributions below the maximum amount, and half of 401(k) contributions may have been by individuals contributing over the $7,000 limit (Hausman and Poterba, 1986). For these households, the reduced deductibility limits will lower the marginal return to saving.

Overall the marginal return to saving will decline. Higher taxation of returns on saving vehicles used by higher income households -- IRAs, 401(k)s, real estate tax shelters and capital gains generally -- will lower the net returns on these assets unless pretax returns rise sharply. In the absence of negative wealth effects of the tax changes, which would act to raise household saving, this saving will decline.

C. The 1986 Tax Act and Corporate and Foreign Saving

The effects on corporate and foreign saving are likely to be even more important than those on personal saving. The 1986 Act substantially increases the tax burden on corporations while lowering it on households. Over the 1987-92 period, the shift is $120 billion. This will certainly lower corporate

saving, at least until pretax corporate returns rise to offset the impact on after-tax earnings. The issue is whether household saving will rise to offset the decline in corporate saving.

If the greater corporate taxation were on existing capital, then we would expect stock prices to decline and thus household wealth to fall. In response, households would increase their saving. This increase, plus the normal saving owing to the $120 billion increase in disposable income, would likely offset the decrease in corporate saving. However, under the 1986 Tax Act existing capital is taxed more favorably; Summers (1987) estimates that taxes on old capital will be $70 billion less in the 1987-91 period, while taxes on new capital will be $190 billion more. With old capital less heavily taxed, stock prices will rise, not fall, and household saving should be depressed as a result.[7]

An alternative analysis of the impact of the increase in corporate taxation on household saving asks whether households "pierce the corporate veil" without specifying the process through which this piercing occurs. Using official personal and corporate saving data, Hendershott and Peek (1988), like von Furstenberg (1981), find nearly a 50 percent offset, i.e., the coefficient of corporate saving in a personal saving equation is -0.43. However, both personal and corporate saving are mismeasured during inflationary periods, and the measurement errors are negatively correlated because households are net creditors and corporations are net debtors. When the saving series are corrected -- when personal saving is lowered by the household inflation premium (and augmented by other adjustments) and corporate saving is raised by the corporate inflation premium, the coefficient of adjusted corporate saving switches to slightly positive. That is, changes in corporate saving do not affect household saving directly, but only indirectly through wealth changes.

To illustrate, if existing capital were taxed less heavily, corporate saving and stock prices would both rise. The increase in stock prices would, through a wealth effect, lower household saving.

Finally, a word or two on foreign saving is appropriate. If interest rates tend to decline, as model simulations that assume constant national saving suggest they will, then the returns to foreign investors in the U.S. will decline (these investors do not pay U.S. taxes). As a result, foreign saving will decrease, the decline in interest rates will be dampened, and the U.S. capital stock will grow less rapidly. Krugman (1985) suggests that half of the potential rate decline would be offset by reduced foreign saving, and Summer's (1985) analysis is consistent with this.

III. Investment

Probably the most widely-cited economic benefit of tax reform is the efficiency gain from a better allocation of capital. The double taxation of corporate capital, the zero (or low) taxation of owner-occupied housing and state and local capital, the investment-credit bias in favor of equipment over structures, all lead to misallocations. A more efficient capital stock would be a more productive capital stock.

A. Potential Benefits

A major conclusion of the extensive research in recent years on efficiency is that the potential gains from a more efficient allocation of capital are not nearly as large as once thought. More specifically, the potential gains are probably less than one percent of GNP (Fullerton and Henderson, 1988). A simple example will illustrate why the gains are so small. Say that the economy has equal amounts of two types of capital with equal depreciation rates earning gross returns of 11 percent at the margin in one case and 9 percent in the other owing to a tax preference. A productivity gain

can be achieved by equating returns in the two uses. Assuming Cobb-Douglas technology, roughly one-tenth of the currently tax-preferred capital earning between 9 and 10 percent would be shifted into the currently tax-discriminated capital. The shift is one-tenth because the marginal gross return is changing by one-tenth. The return on the shifted capital would rise from the 9 to 10 percent range to the 10 to 11 percent range. That is, the one-tenth of the capital stock reallocated would earn an additional percentage point. Thus, the initial 2 percentage point tax wedge reduced the average rate of return on the capital stock by only a tenth of a percentage point. With an average rate of return on capital of 10 percent and an output/capital ratio below unity, the output gain is less than one percent.

This is not an unrealistic example. While net returns on specific types of capital under old tax law may have differed by as much as four percentage points (as shown in Table 2), the average net returns on the higher-earning half of the capital stock was less than two percentage points more than that on the lower-earning half.

A second source of productivity enhancement is an increase in the rate of business investment owing to either greater total investment or a reallocation of a given investment level from housing to business outlays. Here, the potential output gains are more substantial.

Summers (1981b) provides some illustrative computations again assuming Cobb-Douglas technology. With exogenous technological growth, an increase in the share of output devoted to net business investment would temporarily raise the rate of productivity growth as the economy moves to a higher output level. Eventually, though, a new output/capital ratio will be achieved, and the rate of growth of output and capital will return to the long-run rate given by the growth rates of labor supply and technology. With a one-third increase in the business-investment share of output, the productivity growth rate increases by

only 0.1 percent per year in the first decade and lesser amounts thereafter. The long-run output path, however, is 7½ percent higher.[8] If instead technological progress is embodied in capital goods, the same increase in investment has a larger short-run impact because it accelerates the introduction of new technology. The increase in the productivity growth rate is nearly 0.2 percent per year during the first decade. However, the long-run output path is not any higher; the economy just gets there quicker (Phelps, 1962).

This output gain is not free. If an increase in saving is the source of the greater business investment, then consumption is reduced during the transition to the new equilibrium. If reduced housing investment is the source, then the consumption-of-housing-services path is lower forever.

B. 1986 Tax Act

The Tax Reform Act of 1986 has negative direct implications for virtually every type of capital good. Longer depreciation lives raise the investment hurdle rates (annual rental costs) for all structures except owner-occupied housing, the elimination of investment tax credits increases hurdle rates for equipment and public utility structures, the decrease in the corporate tax rate increases the hurdle rate for intangible capital (advertising and research and development), and the cut in personal tax rates lowers the demand for owner-occupied housing. Only inventories (and land) are unaffected. With the demand for all investment goods either falling or being unchanged, interest rates will certainly decline. The magnitude of the decline depends on the interest sensitivities of both the supply of domestic and foreign saving and of investment demand itself. Hendershott (1987) constructed a model in which total saving is independent of rates of return and the demands for capital are approximately unitary elastic with respect to the rental prices of capital goods. In this model, interest rates have to decline by well over a percentage

point to offset the negative capital provisions of the Act. That is, rates have to decline by this much to maintain the aggregate demand for capital at its pre-reform level.[9]

Of course, interest rates will decline less if the supply of saving is reduced, and a reduction should be anticipated. As discussed above, a decline in private saving should be expected owing to the reduction in retirement saving incentives and the shift of the tax burden from low saving households to higher saving corporations. Moreover, a tendency toward lower interest rates will be mitigated by decreased foreign saving.

Figure 1 illustrates the general impact of the Tax Act on interest rates (i) and net investment, both business (BUS) and the sum of business and other (SUM). The downward sloping solid schedules, BUS and SUM, are net investment demands under old law, and the solid SAV schedule is net saving under old law. For convenience SAV is drawn vertically. The level of net investment and net saving is SUM^0, the business component of investment is BUS^0, and the interest rate level is i^0.

The 1986 Tax Act shifts the SUM and BUS schedules leftward to SUM_{new} and BUS_{new}. If net saving were unchanged, i would decline to i_1^n, and $BUS_1^0 - BUS_1^n$ would be reallocated from business to other investment under the assumption that the Tax Act disfavors business investment more than other investment. Model simulations (see below) generally give estimates of this decline in rates and reallocation of investment. If, however, net saving is positively related to interest rates, owing either to domestic or foreign behavior, and the domestic component of saving shifts leftward (as argued above), then the net saving schedule under the 1986 Tax Act becomes SAV_{new}. The leftward shift and positive slope cushion the decline in interest rates to i_2^n, increase the decline in business investment to BUS_2^n, and lower total investment to SUM^n.

Hendershott

Table 2 contains estimates of the changes in investment incentives contained in the 1986 Tax Act. The first column reports net (of depreciation) pretax required annual returns (investment hurdle rates) for a variety of corporate and noncorporate investments under 1985 law. The next two pairs of columns report estimated changes in these returns under two assumptions regarding tax-induced changes in interest rates, a percentage point decline and no change (the appendix contains the specifics of these calculations). As can be seen, under 1985 tax law the especially tax-favored assets were owner-occupied housing of high-income households, equipment, and intangible capital; the especially tax-disadvantaged assets were corporate inventories and industrial structures. The investment tax credit gave equipment its advantage, the expensing of advertising and R&D outlays accounts for the intangible advantage, and the nontaxation of owner housing returns explains that large advantage for high tax bracket households. Corporate investments are generally disfavored by their "double" taxation -- taxation at both the business (corporate) and investor (personal) levels.

The 1986 Tax Act is effective in reducing disparities among hurdle rates within each broad sector. In every case, the hurdle rate of the previously most tax-favored asset rises the most (equipment and owner housing of high-income households) and that of the least tax-favored asset falls or rises the least (inventories and owner housing of low-income households). In fact, the investment hurdle rates for business capital under the 1986 Act are remarkably close, expect for intangible capital. In contrast, the Tax Act is perverse in terms of sectors. Hurdle rates for the most heavily taxed corporate sector are increased the most, while those for the least heavily taxed sector, owner-

occupied housing, decrease or increase the least. According to my calculations, the losses from less equal treatment of sectors exceed the gains from more equal treatment of assets.

Fullerton, Henderson and Mackie

Fullerton, Henderson and Mackie (1987) have made comparable calculations using a far more detailed general equilibrium model. The model contains 15 consumer goods produced by 19 producers goods which, in turn, have labor and 38 types of both corporate and noncorporate capital as imputs. The 38 capital goods include 20 types of equipment, 5 utility structures, 10 other structures, inventories, and 2 types of land. In contrast, all owner housing is presumed to be held by a single, average tax-bracket household.

The Fullerton-Henderson-Mackie (FHM) model gives results remarkedly similar to my simple model. Their average changes in hurdle rates for the investment aggregates under two model specifications for corporations are listed in column 4 of Table 2. The changes are generally in between those in columns 2 and 3, which is just as expected because their calculations presume a 30 basis point decline in interest rates.

The FHM model simulation actually computes a 60 basis point interest rate decline to maintain the aggregate demand for capital. Most of the difference between this and my larger estimated decline stems from their inclusion of land. Land constitutes 60 percent of noncorporate capital and 30 percent of all capital. Because land is not taxed more heavily under the 1986 Tax Act, including land in the model as an elastically supplied good greatly dampens the interest rate decline needed to maintain the aggregate demand for capital.

The inclusion of land is also important to FHM's capital stock and efficiency results. With no saving response, corporate capital decreases by 8 percent, noncorporate-nonhousing capital increases by 7 percent, and housing rises by 2 percent. Noncorporate capital rises because most land is in this

sector and the demand for land rises absolutely when interest rates decline. With land excluded, corporate and noncorporate-nonhousing capital decrease by 10 percent and 2 percent, respectively, giving a decline in total business capital of 8 percent.

If one views nonland business capital as the key total capital variable because one does not accept the assumption that land is as easily produced as plant and equipment (or because new technology is not embodied in land), then the Tax Act has a significantly negative effect. The decline in business capital, and thus the negative impact of the Tax Act, will be magnified by the anticipated decreases in private and foreign saving.

Fullerton, Henderson and Mackie find that the efficiency gains from better asset allocation within sectors outweigh the greater losses from poorer sectoral allocation.[10] One might expect the far more detailed asset treatment to lead to such a result if different classes of equipment or of structures were taxed far more differently under old law than new. In fact, though, different classes were not taxed all that differently under old law and do not seem to be taxed more evenly under the 1986 Tax Act (compare the differences in effective tax rates in FHM, Table 3). The greater FHM gains come from the inclusion of land which, with inventories, was the heaviest taxed asset under old law and is about averaged-taxed under the new 1986 Act.[11]

Galper, Lucke and Toder

Galper, Lucke and Toder (GLT) take an approach nearly opposite to FHM. GLT emphasize financial behavior, risk taking, and taxation at the personal, rather than, business level. All housing is assumed to be owner-occupied, and it and consumer durables are held by 400 different households, differentiated by income, wealth, marital and itemization status. In contrast only, single, conglomerated corporate and noncorporate business capital stocks, rather than 38 classes, are analyzed.

The GLT model computes a percentage point decline in interest rates to maintain the aggregate demand for capital. The major capital stock changes are a 12 percent decrease in state and local government capital and a roughly offsetting, in dollar amounts, 6 percent increase in consumer durables, two assets not included in the FHM model. Corporate and noncorporate capital each decline by a single percentage point. These declines could rise to as much as 5 percent when a decline in private saving and an endogenous fall in foreign saving in response to the decline in interest rates is incorporated.

Summary

All three models suggest five to ten percent declines in business investment. A ten percent decline, lowering the share of net business investment in net output from 0.045 to 0.04, would, from the growth calculations discussed earlier, lower the long-run output path by three percent.

IV. Conclusion

The Tax Reform Act of 1986 will lower the share of net output channeled into net investment and will tilt net investment from industrial to other uses. Both effects will reduce the long-run output path. On the other hand, the industrial investment made will be marginally more efficient. Labor supply will be largely unaffected. On net, the long-run output path will be reduced by two to four percent, and productivity growth will slow until this lower path is reached. That legislation shifting the tax burden from labor and existing capital to new investment would have this result should hardly come as a surprise.

Let me expand briefly on these conclusions. Interest and dividend income is generally taxed at a lower rate. On the other hand, capital gains are taxed more heavily, tax shelters are restricted (new passive loss rules and a more inclusive minimum income tax base), and deductible contributions to retirement

Table 2: Net Pretax Required Rates of Return (%)

	1985 Real After Tax	1986 Constant Real After Tax	1986 Constant Nominal	Change Constant Real After Tax	Change Constant Nominal	Change of Fullerton, Henderson and Mackie
Corporate Investments						
Inventories	6.8	5.9	6.9	-0.9	0.1	-1.3/-0.3
Industrial Structures	6.1	5.9	6.9	-0.2	0.8	0.1/0.6
Utility Structures	5.0	6.1	7.1	1.1	2.1	1.0/1.5
Intangibles	3.8	3.8	4.4	0.0	0.6	0.6
Equipment	3.4	5.6	6.5	2.2	3.1	2.3/2.7
Average (excl. intangibles)*	5.0	5.9	6.9	0.9	1.9	
Noncorporate Investments						
Inventories	5.2	4.3	5.1	-0.9	-0.1	-0.2
Commercial Structures	4.6	4.7	5.6	0.1	1.0	0.2
Residential Structures	4.3	4.6	5.5	0.3	1.2	0.2
Intangibles	2.8	2.8	3.4	0.0	0.6	
Equipment	2.2	4.4	5.2	2.2	3.0	2.3
Average (excl. intangibles)*	4.1	4.6	5.5	0.5	1.4	

Owner-Occupied Housing Income (000 of 1986$) — Marginal Tax Rates (1985 / 1986)

	Tax Rates 1985	Tax Rates 1986	1985 Real After Tax	1986 Constant Real After Tax	1986 Constant Nominal	Change Constant Real After Tax	Change Constant Nominal	Change of Fullerton, Henderson and Mackie
13-25	.166	.176	4.7	3.8	4.6	-0.9	-0.1	
25-30	.187	.180	4.5	3.7	4.5	-0.8	0.0	
30-50	.251	.184	3.9	3.7	4.5	-0.2	0.6	
50-100	.364	.316	2.9	2.6	3.3	-0.3	0.4	
100-200	.455	.370	2.1	2.3	2.9	0.2	0.8	
Average			3.5	3.2	3.9	-0.3	0.4	0.1
Change in Nominal Interest Rate			-1.0	0.0		-1.0	0.0	-0.3

*Intangibles are not included in the average because no data exit (or could even be approximated) on the stock of intangible capital (see Fullerton and Lyons, 1987).

advantages: remaining tax preferences will be worth less, the consumer durables and housing stocks will be allocated more efficiently among households (GLT, 1988), the taxation of capital income will be less sensitive to inflation (Henderson, 1986), and risk will be borne more efficiently (GLT, 1988). Keeping the enlarged standard deductions and personal exemptions and maintaining at least most of the lower/flatter tax rate schedule seems highly desirable.[12] What then could be done to increase saving and ensure that it is channelled into industrial capital?

Within the given constraints, a growth policy would be the following. First, additional tax revenues would be raised, either by increasing all tax rates a few points or introducing a new consumption tax.[13] Second, part of the revenues would be earmarked to reduce the federal deficit (increase national saving) and part would be used to reintroduce business investment incentives to ensure that most of the increased national saving flows into business investment, rather than being offset by a decline in foreign saving or being diverted into other capital.

Footnotes

[1] Data for 1959-79 are contained in the 1982 Economic Report of the President, Table 5-1, p. 113. The data pertain to private nonfarm nonhousing GNP.

[2] Bosworth (1984) contains a useful discussion of many of the general topics addressed in this paper.

[3] An exception applies to "small landlords." Taxpayers who actively manage residential rental investments may deduct up to $25,000 in losses against nonpassive income if their adjusted gross income computed without regard to the losses is less than $100,000. This amount is phased out one dollar for two dollars of income for taxpayers with incomes above $100,000 so that no losses are allowed for anyone who earns above $150,000.

[4] For a detailed discussion of both the individual and corporate minimum taxes, see Graetz and Sunley (1988).

[5] At an 8 percent interest rate and a 25 year investment horizon, elimination of the deductibility, but continuation of the tax deferral on interest earned, removes half of the tax benefit.

[6] Venti and Wise (1987) estimate that only 20 percent of contributions constitute transfers of assets.

[7] Downs and Hendershott (1987) estimate that the stock market should have increased by 10 to 15 percent.

[8] The output-labor ratio equals $(s/n)\exp[(1-a)/a]$, where s is the fraction of net output devoted to net investment, n is the rate of growth in labor, and a is the elasticity of output with respect to labor (Solow, 1956). The ratio of new output (based on s^*) to old output is then $(s^*/s)\exp[(1-a)/a]$. With $s = 0.045$, $s^* = 0.06$, and $a = 0.8$, the ratio is 1.075.

[9] Much of the rate decline should have occurred prior to enactment of the Tax Act. All tax reform plans considered in 1986 proposed elimination of the investment tax credit for equipment and public utility structures retroactive to the beginning of 1986, and the likelihood of some version of tax reform passing was high virtually all year. Thus the decline in interest rates and the weakness in equipment expenditures experienced in 1986 was partially attributable to the anticipated removal of this provision. Indeed, half of model-calculated decline in interest rates is due solely to the elimination of this credit.

[10] Their analysis (like Hendershott's) does not include intangible capital and does not reflect the negative impact of the various accounting and specific industry rule changes on investment demand. Inclusion of tangible capital and incorporation of these other impacts could easily reverse the FHM results.

[11] It is worth noting that both the FHM gain and Hendershott loss are small; the difference is important only when an undue emphasis is placed on the sign of the efficiency change.

[12] I would view extension of the current maximum rate of 33 percent to the highest income, or even a maximum rate of 35 percent at very high incomes, as being consistent with maintaining the lower schedule.

[13] Needless to say, most everyone would prefer to generate the increase in government saving by cutting spending. I will not burden the reader with my preferred spending cuts.

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Table 1
After-Tax Incomes as Renters and Marginal Tax Rates as Owners

| Adjusted Gross 1988 Income	Married (2 Children)		Single		Household Head (With 1 Child)	
	1985 Law	1988 Law	1985 Law	1988 Law	1985 Law	1988 Law
12,500						
After-Tax Income	11,791	12,500	11,103	11,094	11.489	11,844
Marginal Tax Rate	.1420	.0250	.1810	.1712	.1615	.1712
17,500						
After-Tax Income	15,919	16,344	14,936	15,144	15,457	15,894
Marginal Tax Rate	.1658	.1755	.2046	.1755	.1949	.1755
22,500						
After-Tax Income	19,950	20,368	18,711	18,824	19,403	19,918
Marginal Tax Rate	.1886	.1789	.2562	.3045	.2079	.1789
27,500						
After-Tax Income	23,799	24,377	22,303	22,182	23,183	23,927
Marginal Tax Rate	.2103	.1814	.2874	.3066	.2296	.1814
32,500						
After-Tax Income	27,572	28,448	25,839	25,653	26,903	27,660
Marginal Tax Rate	.2104	.1814	.2874	.3066	.2681	.1814
37,500						
After-Tax Income	31,306	32,521	29,321	29,181	30,475	31,083
Marginal Tax Rate	.2489	.1814	.3259	.3066	.2681	.3066
42,500						
After-Tax Income	34,891	35,898	32,526	32,670	33,862	34,446
Marginal Tax Rate	.2792	.1831	.3273	.3081	.3081	.3081
47,500						
After-Tax Income	38,450	39,272	35,685	36,167	37,213	37,979
Marginal Tax Rate	.2800	.3088	.3280	.3088	.3088	.3088
55,000						
After-Tax Income	43,473	44,435	40,339	41,102	42,109	43,245
Marginal Tax Rate	.3102	.3102	.4060	.3102	.3485	.3102
67,500						
After-Tax Income	51,506	53,160	47,636	49,265	49,743	51,970
Marginal Tax Rate	.3595	.3117	.4073	.3595	.3786	.3117
87,500						
After-Tax Income	63.919	67,088	58,803	62,484	61,556	65,335
Marginal Tax Rate	.4085	.3131	.4467	.3608	.4467	.3131
120,000						
After-Tax Income	83,428	88,561	76,613	84,278	80,143	86,808
Marginal Tax Rate	.4496	.3642	.5065	.3642	.4780	.3642

Source: Calculations performed by David Ling. For the assumptions underlying
the calculations, see Hendershott and Ling (1986).

Table 2: Net Pretax Required Rates of Return (%)

	1985	1986 Constant Real After Tax	1986 Constant Nominal	Change Constant Real After Tax	Change Constant Nominal	Change of Fullerton, Henderson and Mackie
Corporate Investments						
Inventories	6.8	5.9	6.9	-0.9	0.1	-1.3/-0.3
Industrial Structures	6.1	5.9	6.9	-0.2	0.8	0.1/0.6
Utility Structures	5.0	6.1	7.1	1.1	2.1	1.0/1.5
Intangibles	3.8	3.8	4.4	0.0	0.6	
Equipment	3.4	5.6	6.5	2.2	3.1	2.3/2.7
Average (excl. intangibles)*	5.0	5.9	6.9	0.9	1.9	
Noncorporate Investments						
Inventories	5.2	4.3	5.1	-0.9	-0.1	-0.2
Commercial Structures	4.6	4.7	5.6	0.1	1.0	0.2
Residential Structures	4.3	4.6	5.5	0.3	1.2	0.2
Intangibles	2.8	2.8	3.4	0.0	0.6	
Equipment	2.2	4.4	5.2	2.2	3.0	2.3
Average (excl. intangibles)*	4.1	4.6	5.5	0.5	1.4	
Owner-Occupied Housing						
13-25	4.7	3.8	4.6	-0.9	-0.1	
25-30	4.5	3.7	4.5	-0.8	0.0	
30-50	3.9	3.7	4.5	-0.2	0.6	
50-100	2.9	2.6	3.3	-0.3	0.4	
100-200	2.1	2.3	2.9	0.2	0.8	
Average	3.5	3.2	3.9	-0.3	0.4	0.1
Change in Nominal Interest Rate	-1.0	0.0	0.0	-1.0	0.0	-0.3

Owner-Occupied Housing Income (000 Marginal of 1986$) Tax Rates

Income (000 Marginal of 1986$)	Tax Rates 1985	Tax Rates 1986
13-25	.166	.176
25-30	.187	.180
30-50	.251	.184
50-100	.364	.316
100-200	.455	.370

*Intangibles are not included in the average because no data exit (or could even be approximated) on the stock of intangible capital (see Fullerton and Lyons, 1987).

Figure 1: Impact of 1986 Tax Act on Interest Rates and Net Investment Flows
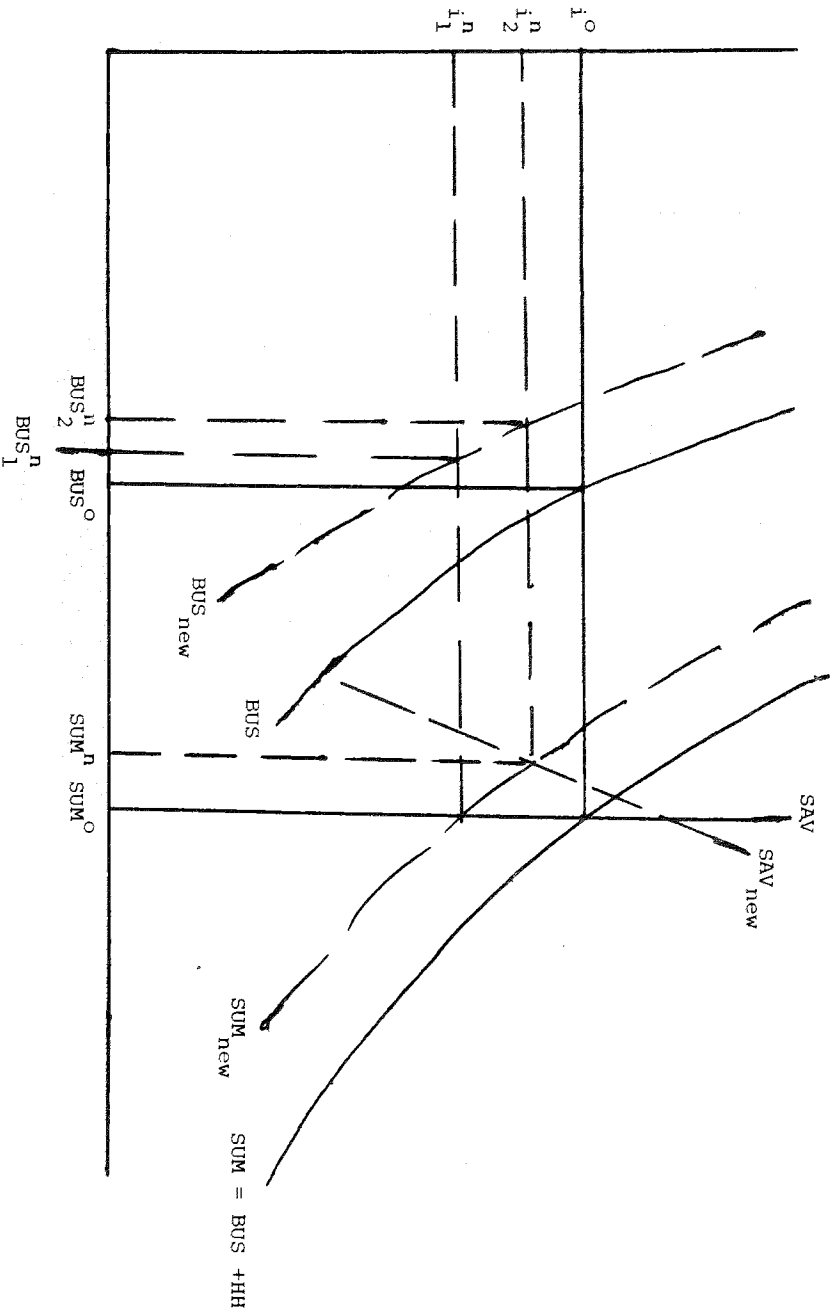
APPENDIX: THE CALCULATION OF PRETAX REQUIRED RETURNS

The decision to invest depends on whether the present value of the expected revenue from investment, net of direct operating expenses and indirect taxes, exceeds the outlay on the investment. On marginal investments, the present value will equal the outlay. Put another way, in the absence of taxes, the net operating income from an investment must cover the real interest rate plus depreciation. After allowance for taxation, the equilibrium condition for investment is

$$\rho = (r+d)\frac{1 - k - \tau z}{1-\tau},$$

(1)

where ρ is the marginal product of capital (initial net operating income), r is the real after-tax financing rate, d is the economic depreciation rate, k is the investment tax credit, τ is the business tax rate, and z is the present value of tax depreciation allowances. The right side of equation (1) is the "investment hurdle rate" for a particular asset. The lower the hurdle rate, the greater will be production of the asset and the lower will be the productivity of the marginal investment (ρ). In a "neutral" tax system, $\rho-d$ would be the same for all assets. That is, the net marginal productivity of all investments would be equal at the margin.

The real after-tax financing rate (r) depends on the pre-tax debt rate, the rate at which interest is deductible, the required return on equity (which depends on capital gains taxation), the loan-to-value ratio, and the inflation rate. In general, r is higher for industrial (corporate) structures than for nonconporate real estate because the required equity rate is higher owing to the double taxation of dividends. For noncorporate structures I assume a real after-tax interest rate of 0.0275 both before and after tax reform (the cut in tax rates tends to raise r but a decline in pretax interest rates lowers r); a real rate of 0.0375 is assumed for corporate investments.

The present value of tax depreciation, in the absence of trading, is simply the tax depreciation stream, with the basis adjusted for the tax credit received, discounted by nominal after-tax interest rates:

$$z = (1-kB) \sum_{t=1}^{L} \frac{TAXD_t}{[(1+r)(1+\pi)]^t}, \qquad (2)$$

where B is the fraction of the tax credit by which the basis is reduced, $TAXD_t$ is the depreciation in year t, and π is the expected inflation rate, assumed to be 0.045. Tax-based trading will occur if the tax benefits from the trade, τz, exceed the costs of reestablishing the depreciable base, $\beta + \tau_{cg}$, where β is the selling cost and τ_{cg} is the statutory capital gains tax. More formally, if trading every J periods $(J \geq L)$ is advantageous, up to T trades, the present value of tax depreciation becomes

$$z' = z + [z - (\beta + \tau_{cg})/\tau] \sum_{j=1}^{T} [(1-d)/(1-r)]^{jJ}. \qquad (2')$$

As it turns out, trading was advantageous under 1985 law but will not be under the Tax Reform Act of 1986.

In this analysis, we assume that the marginal tax rate of the marginal investor was 0.45 (including state and local income taxes) under old law and 0.36 under new. The 0.0275 real rate and 0.045 expected inflation rate are consistent with a 0.09 percent risk-free interest rate and a 0.023 percent risk premium under old law and a 0.08 percent risk-free rate under new law. With no decline in interest rates, the real rate is raised by (1-.36).01 to 0.0339 (0.0439 for corporations).

For owner-occupied housing, the τ's in equation (1) are zero (imputed rents are not taxed and no depreciation is deductible for tax purposes). Moreover, the real after-tax financing rate and the value of property tax

deductions vary with the household's tax bracket. To make the analysis comparable to that of depreciable properties, we compute the net (of depreciation) marginal product for owner-occupied housing as

$$\rho - d = (1-\tau)(i-.005) + p - \pi - \tau\tau_p = i + p - \pi - \tau(i+\tau_p) - (1-\tau).005, \quad (3)$$

where i is the nominal debt rate, p is the risk premium, π is the expected inflation rate, τ_p is the property tax rate, and the $(1-\tau).005$ is the interest rate subsidy received by households with incomes under \$100,000 because of mortgage pass-through programs of the Federal agencies (Lea, 1988). The same p and π values are used as above, and τ_p is set equal to 0.012. Net required pretax returns (ρ-d) are reported in Table 2 of the text for a variety of assets both before and after the 1986 Tax Act.