EFFECTS OF TAXES ON ECONOMIC BEHAVIOR*

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I AM PLEASED TO BE PART OF THIS *NATIONAL TAX Journal* forum celebrating the 100th anniversary of the National Tax Association and grateful for the invitation to discuss the effects of taxes on economic behavior, a subject that has been central in my research since my 1967 paper on the effects of tax rules on corporate dividends (Feldstein, 1967) . Over the years, my tax research has focused primarily on the ways that taxes affect household behavior and on the welfare implications of those changes. That will be the focus of this paper.

The effect of taxes on economic behavior is important for three distinct reasons. First, the behavioral response of taxpayers affects the *revenue* consequences of changes in tax rates and tax rules. Second, the effects on economic *efficiency* or deadweight loss depend on taxpayers' compensated behavioral responses (i.e., on the behavioral effects excluding pure income effects). And, third, behavior is important for understanding the *short-run macroeconomic* consequences of tax changes on aggregate demand and employment.

I have long been an advocate of reforming the *revenue* estimation process to reflect explicitly the impact of taxes on behavior and the implications of that behavior for tax revenue (e.g., Feldstein, 1997). I am pleased therefore that in recent years the revenue estimators of the Treasury and the Congress have been taking behavior into account more fully in their revenue estimates, going beyond the traditional so-called "static estimates" that assume that taxes have no effect on taxpayer behavior. But the very limited nature of the behavior that is taken into account means that official analyses of tax rate increases still overstate the resulting revenue gain, while official analyses of tax rate reductions overstate the resulting revenue losses. These revenue estimates therefore bias the political decision process to favor tax rate increases over tax cuts. Although much can be done to improve these

calculations, I am encouraged by the willingness of the revenue estimators to improve their earlier methods and by their participation in the annual meeting of the NBER group that focuses on these revenue estimation issues. I will return later in this paper to the issue of improving the revenue estimates.

Unfortunately, there is no reason to be pleased about the analysis in policy discussions of the *efficiency* effects of tax changes. Explicit estimates of the welfare consequences of proposed tax changes are completely absent in the Congressional and White House discussions of tax policy. Although policy makers understand that higher taxes hurt the economy by distorting behavior – reducing work effort, saving, and risk-taking – there is no attempt to quantify these adverse effects or translate them into reductions in economic efficiency. My own experience is that the concept of the deadweight loss of a tax increase (i.e., the amount that individuals would have to be paid to make them as well off as they would be without the proposed tax change) is much easier to teach in a classroom than to convey in a Congressional hearing. And yet any sensible policy analysis of alternative tax structures should involve comparing the revenue, deadweight loss, and distributional consequences of the alternative tax options. Later in this paper I will illustrate this with an example from the current debate about raising payroll tax revenue to fund future Social Security benefits. I will also comment on two common conceptual errors that economists make in assessing the deadweight losses of tax changes.

The short-run *macroeconomic consequences* of tax changes depend on how the Federal Reserve changes monetary policy in response to the tax change. If a tax change produces a fiscal stimulus that exceeds what the Fed believes to be prudent, it will neutralize it by raising interest rates. Alternatively, a fiscal stimulus may simply substitute for an easier monetary policy that the Fed would otherwise implement. As a general rule, it would seem best to assume that a change in fiscal stimulus would be offset by the induced change in monetary

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policy. One exception would occur when interest rates are so low that the Fed cannot lower rates any further. In such a liquidity trap, a fiscal stimulus would raise aggregate demand. A second exception would occur when financial market conditions, or the availability of bank capital, make it difficult for the Fed to stimulate economic activity. In this case, the Fed would welcome a fiscal stimulus and would not seek to offset it. Because of these exceptions to the general rule, the possible fiscal stimulus effect of a tax change must be considered on a case-by-case basis to assess the likely reaction of the Federal Reserve to the proposed change in tax rates or tax rules. Note that this discussion of the cyclical effects of tax policies is very different from the longer-term supply side effects of tax changes on GDP that cannot be offset or reversed by monetary policy.

REVENUE ESTIMATION

I turn now to the issue of revenue estimation, focusing on the effect of changes in tax rates on labor income. It would, of course, be desirable to have a fully specified dynamic microeconomic model that could trace out the revenue conse-quences through time of any proposed tax change, including the full general equilibrium effects. A variety of such models have been studied by aca-demic researchers (e.g., Golosov and Tsyvinsky, 2007) and by the staffs of the Joint Tax Committee and the Treasury Department (e.g., Carroll et al., 2006). In my judgement, they are helpful in shap-ing our understanding of the complex economic interactions but are not a suitable base for policy analysis now and will not be at any time in the foreseeable future. I will therefore concentrate my comments on the more practical estimates that focus on the direct first-order behavioral responses to tax changes.

When studying a proposed tax change it would also be desirable to know what current or future change in taxes or spending will be made to main-tain an unchanged level of the national debt. This would be easy if the purpose of the tax increase is to finance some particular program (e.g., a revenue increase to fund increased Social Security benefits or to allow the elimination of another tax like the alternative minimum tax). In general, however, major tax changes are not earmarked in this way. In such cases, I think we should follow the same ana-lytic approach that was done by Richard Musgrave

and others in their studies of tax incidence (i.e., to assume a concurrent budget balance achieved by a lump sum change in taxes or spending (Musgrave, 1959)).

In what follows I will focus first on the revenue and efficiency effects of changes in the general tax rates on labor income. I will then comment briefly on the efficiency effects of taxing the return to saving. I will not discuss the substantial amount of work that has been done on the impact of capital gains taxes on the realization of capital gains and the resulting changes in revenue (e.g., Feldstein and Yitzhaki, 1978). There has also been substantial work on the effect of dividend tax rules on corporate payout rates. The results of this research on capital gains and dividends have been adopted by the official revenue estimators because it does not violate their self-imposed rule that their estimates assume no change in GDP, a subject to which I return below. There has, however, been no work on quantifying the efficiency effects of these taxes. There is also relatively little work on the impact of taxes on the composition of individuals' portfolios (Feldstein, 1976).

TAXES ON LABOR INCOME

Labor economists have produced a large body of research estimating the effects of wages on labor force participation and total working hours. Public finance economists have contributed to this litera-ture by focusing on net-of-tax wages and showing that individuals respond to the tax component of the net-of-tax wage. But what matters for revenue estimation is not the change in working hours but the change in labor supply more broadly defined – including effort, occupation, human capital, etc. – and in the mix between taxable cash wages and untaxed fringe benefits and nice working condi-tions. Although it is not possible to estimate each of these two components separately, the public use files of individual tax returns that the Treasury makes available to researchers does permit estimat-ing their combined effect (i.e., how changes in tax rates affect tax revenue through the combination of changes in labor supply and in the form of compensation).

Changes in tax rates also affect taxpayers' behavior as consumers, altering the quantities of tax-favored consumption (including owner-occupied housing, charitable contributions, and local property taxes). The overall revenue effect

of a change in tax rates depends therefore on the extent to which the tax base is reduced, including the effects on labor supply broadly defined, on the form of compensation, and on the magnitude of tax deductions.

Several studies have now used the Treasury's public use files of individual tax returns to estimate the elasticity of taxable income with respect to the net-of-tax rate (i.e., one minus the marginal tax rate). My 1995 paper (Feldstein, 1995) used panel data that followed the same individuals before and after the major tax rate reductions of the 1987 Tax Reform Act in which the top tax rate fell from 50 percent to 28 percent. The difference in difference estimates based on comparing incomes in 1985 and in 1988 implied a compensated elasticity of about one. Subsequent work by others (e.g., Auten and Carroll, 1999; and Gruber and Saez, 2002) using different data sets and different estimating methods found a range of estimates from about 0.4 to 1.0 for middle- and upper-income taxpayers.

There are, of course, disputes about the interpretation of this behavioral response. Gordon and Slemrod (2000) have suggested that some of this reaction may reflect a shift between corporate and personal income. In the opposite direction, it should be noted that this relatively short-run response does not allow for the effect of the tax rate reduction on decisions about the choice of occupation and the accumulation of human capital.

A more fundamental issue in the estimation of behavioral response is that it assumes that the taxpaying unit is the decision making unit even when there are two working adults in the unit. This is of practical importance when the husband and wife face different marginal tax rates as they do in the United States, when one of them but not both of them is earning below the ceiling on Social Security taxable income. Because of the ceiling on the payroll tax base, some couples will have different marginal tax rates for the husband and wife. In a study of data on Swedish households Alex Gelber (2008) has shown that there are important differences between husbands and wives in their income and substitution elasticities and in cross-elasticities.

My judgment, based on the existing studies, is that an elasticity of 0.5 for middle- and upper-income taxpayers (who pay the overwhelming bulk of the taxes) is a reasonable estimate and probably a conservative one. It is substantially higher than the response implicit in the revenue estimates of the Treasury and the Joint Tax Committee. In presenting illustrative calculations of tax proposals, such as the ones discussed below, I have generally been cautious and assumed elasticities of 0.4 and 0.5.

The official estimates used by the Treasury and the Joint Tax Committee are generally depressed by the quite remarkable self-imposed restriction that the changes of behavior implied by changes in tax rates do not result in any change in GDP. In their analysis, a change in tax rates can change the form of compensation, can change the realization of capital gains, and can shift portfolios between taxable and tax exempt securities but it cannot alter the supply of labor or the level of real compensation. To the extent that any change is admitted that alters GDP, some offsetting assumption is made to keep GDP unchanged.

This "constant GDP" assumption eliminates the important effect of changes in labor supply broadly defined (i.e., changes in labor force participation rates, in hours worked, in the choice of jobs, in the degree of effort, etc.). Although the revenue estimators wish to allow for changes in the form of compensation, the restriction that there be no change in GDP makes it impossible to use the tax return data to estimate the change in the form of compensation. This occurs because the observed changes in taxable incomes reflect both the change in total labor supply (i.e., in potential labor income) and in the extent to which the resulting change in potential income is taken in the form of taxable cash. Since the changes in the form of compensation cannot be observed or estimated separately, the revenue estimators are forced to make a judgement based on their intuition, something very difficult for a civil servant whose working conditions and degree of discretion in the form of compensation are quite different from those in many private sector jobs.

The rationale for the "constant GDP" assumption is that the projected level of GDP is established by the administration or the Congressional Budget Office and must therefore be taken as a fixed parameter by the revenue estimators. In my judgement, this makes no sense at all. The GDP forecast can be taken as a baseline number on which the effects of proposed tax changes can be superimposed. I wonder how many members of Congress realize that the "revenue estimates" given by the Joint Tax Committee staff have made this arbitrary assumption of constant GDP.

Fortunately, the restricted nature of the estimated behavioral effects is beginning to change and the

official estimates of some proposed tax changes do attempt to use the accumulating evidence on behavioral responses. It would be good to have more transparent descriptions of these changes so that the economics profession could comment on the assumptions and the resulting estimates.

TWO EXAMPLES

Before turning to other aspects of taxpayer behavior, I will illustrate the importance of the behavioral response by looking at two examples. Consider first an across-the-board tax increase in which every tax rate is raised by 1 percent: the 10 percent marginal tax rate goes to 10.1 percent, the 25 percent to 25.25 percent, etc. My NBER colleague, Dan Feenberg, used the NBER's TAXSIM model to estimate how taxpayer behavior alters the estimated revenue effect of this tax change. The analysis, based on 100,000 random tax returns for 2001 adjusted to income levels of 2004, calculates that with no behavioral response (i.e., the so-called "static" estimate) tax revenue would rise by $7.5 billion.

Using a very conservative compensated elasticity of tax revenue with respect to the net of tax rate of 0.4 and an income elasticity of 0.15 (implying an uncompensated behavioral response elasticity of less than 0.4) implied that the additional personal income tax revenue would be only $5.0 billion or two-thirds of the "static" revenue estimate. The reduced taxable income would also lower the payroll tax revenue by some $400 million, bringing the total additional revenue to just $4.6 billion or 57 percent of the "static" revenue estimate.

The effect of taxpayer behavior on revenue can be even more dramatic when the proposed tax change is not simply proportional. A few years ago, I analyzed the proposal to raise the maximum taxable income for the Social Security payroll tax by 25 percent, from $87,900 to $110,000 (Feldstein, 2004). For someone with initial income at the top of the new range (i.e., of $110,000), the tax base would rise by $22,100 if there is no behavioral response. In that case, the tax revenue would rise by 12.4 percent (the payroll tax rate) of this increased tax base or $2,740. But with a behavioral elasticity of 0.5 with respect to the net-of-tax rate – a reasonable assumption for these high-income individuals – the taxpayer would reduce taxable earnings (by working less and taking more income as a fringe benefit) to $102,000. This lowers the

extra payroll tax and, more importantly, also lowers the personal income tax revenue and the Medicare payroll tax revenue. Calculations show that the reductions in the personal tax revenue and in the Medicare payroll revenue would actually exceed the extra Social Security payroll tax revenue. The total taxes paid by this high-income individual would actually decline if the payroll tax base were increased in this way.

Extending this type of calculation to the entire population of taxpayers with incomes over $87,900, Feenberg and I found that the rise in the payroll tax revenue would be $19 billion a year with no behavioral response but only $16 billion with the elasticity of 0.5. The lower tax base shrinks the Medicare and personal income tax revenue by a total of $11 billion, bringing the total revenue gain down to just $5 billion instead of the $19 billion "static" estimate, implying that some two-thirds of the extra Social Security funds would come as the result of a back door transfer from personal income taxes and Medicare taxes.

Although these examples show the importance of taking behavioral responses into account when calculating the revenue effects of major changes in tax rates, there are strong advocates of continuing to use the current "static" revenue estimates. They make two arguments. First, since the behavioral elasticity is only a rough estimate, it is inappropriate for use in revenue estimation. Second, there are a very large number of detailed and complex tax proposals for which revenue estimates must be produced. There would never be enough time to do the research on the needed behavioral elasticities for these many proposals. These arguments carry particular force because of the legislative requirement that any projected increase in the budget deficit (through a tax cut or spending increase) must be financed by a decrease in the projected deficit (by a tax increase or spending cut). In this context, revenue "scoring" must be "precise" and must apply to all proposals.

Although there is much to recommend the marginal self-financing rule that Congress has imposed on itself, it should not be an excuse for using grossly incorrect revenue estimates. As a minimum, for proposals with large revenue implications (e.g., static revenue effects of more than $10 billion a year), the members of Congress should see the revenue estimates based on plausible behavioral assumptions as well as the traditional static analysis. The budget committees should then

have the option to replace the traditional static revenue estimate with the more accurate (although imprecise) behavioral estimate.

CALCULATING DEAD WEIGHT LOSSES

Efficiency calculations are central to the analysis that public finance economists bring to tax policy. But introducing these ideas into the actual Congressional evaluation of tax policies involves three separate challenges. First, the politically responsible officials and their staffs must come to understand the basic idea of deadweight loss. Second, the nature of the distortion that gives rise to the deadweight loss must be correctly identified. And, third, the relevant parameters must be estimated.

In my experience, the concept of deadweight loss is difficult to explain because it does not correspond to any observable number. Perhaps that is why the staff of the Joint Tax Committee, even in its theoretical infinite horizon dynamic simulations, summarizes the economic effects of alternative tax systems by the change in GDP rather than by an estimated deadweight loss or gain. But a tax change could create deadweight losses even though it caused GDP to rise (e.g., because of income effects or even because of incentives that lead to more labor input than individuals would otherwise choose to supply). So economists have still not gotten across the notion that taxes distort choices and that the revenue that the government collects understates how much worse off an individual is because of a tax.

Perhaps an example would help noneconomists to grasp the idea. Consider a law that prevented people from buying apples. That law would not transfer money to the government but individuals would consider themselves worse off than in the absence of such a law. The amount that the government would have to give people to make them feel as well off as they would have been without the law is its deadweight loss (i.e., the loss to the individuals in excess of the revenue to the government). Now consider a less draconian law that merely reduces the number of apples that anyone can buy. That implies a smaller deadweight loss. But what if, instead of a law limiting the purchase of apples, the government levies a tax on apples that reduces the number of apples that the individual chooses to buy? The individual would then be worse off relative to no law for two reasons: he consumes fewer apples and he must pay a higher price per apple (which goes to the government as tax revenue). The extent to which the individual is worse off because of the tax can be divided into two parts – the revenue transferred to the government and the deadweight loss due to the reduced consumption of apples. Similarly, a tax that induces someone to work less not only transfers revenue to the government but also causes a distortion in the individual's behavior (reduces the extent to which the individual supplies labor and obtains money with which to buy goods and services) and therefore a deadweight loss.

More generally, the income tax causes a much broader set of distortions, reducing all aspects of labor supply, causing a shift in the form of compensation, and inducing individuals to substitute tax favored consumption (i.e., deductible expenditures) for other types of consumption. Fortunately, despite the multiple sources of deadweight loss, the total deadweight loss can be calculated easily by focusing on the elasticity of taxable income with respect to the net-of-tax rate. This simplification is appropriate because each of the three sources of distortion is based on the same marginal tax rate: the individual buys "leisure" at one minus the marginal tax rate, he buys fringe benefits at this rate, and he buys tax deductible consumption at this rate. The marginal deadweight loss is thus the same for any behavior that reduces the taxable income. More technically, the three forms of behavior that reduce taxable income constitute a Hicksian composite good and can therefore be treated as if they are one good for the purpose of welfare analysis (Feldstein, 1999).

Using an estimated compensated elasticity of 0.4 and the usual formula based on the square of the marginal tax rate for approximating the incremental deadweight loss implies that the 1 percent across-the-board increase in all tax rates that yielded incremental revenue of $4.6 billion would result in a deadweight loss of $3.5 billion. The deadweight loss is thus 76 percent of the incremental revenue. This means that the total cost of an additional billion dollars of government spending financed by an across-the-board increase in tax rates is $1.76 billion. Similarly, cutting government spending by a billion dollars and passing the funds back in the form of an across-the-board proportional tax cut would raise taxpayers real incomes – including the reduced deadweight losses – by $1.76 billion. Wouldn't the Congressional process of setting tax

rates and authorizing government spending be improved if this were better understood?

The implications of this analysis are even more striking when applied to a possible non-proportional change in the payroll tax. Recall that the proposal to raise the maximum income subject to the Social Security payroll tax from $87,900 to $110,000 would result in net revenue of $5 billion when the behavioral response is taken into account. The deadweight loss calculation in this case implies an increased deadweight loss of $9 billion. The total cost of the $5 billion of additional revenue is thus $14 billion, nearly three times as much as the revenue itself. It is useful to contrast this with the implications of the static revenue analysis that implies additional revenue of $19 billion and that ignores the deadweight loss.

An alternative way to raise payroll tax revenue by $5 billion would be to raise the payroll tax rate instead of increasing the ceiling on the taxable payroll. With a payroll tax base of approximately $5 trillion, the required increase in the tax rate is only 0.1 percent. The overall marginal tax rate -- including personal income tax, state income tax and payroll taxes -- would rise from about 45 percent to 45.1 percent, depending on the individual's particular situation. The resulting deadweight loss would only be about $1.6 billion, less than one-fifth of the deadweight loss that would result from increasing the ceiling on taxable payroll. I believe the political process should consider these two ways of raising the $5 billion, noting the difference in the distribution of the increased tax burden and the difference in the deadweight losses.

TAXES ON INVESTMENT INCOME

I turn briefly now to the taxation of investment income. Tax rules affect many types of behavior that influence investment income: the volume of saving, the allocation of that saving among alternative investments, the realization of capital gains, etc. I will focus on just one of these: the effect of taxes on household saving.

I want to make a single important point about the deadweight loss associated with taxing the return to saving. For a discussion of how taxes on the return to saving interacts with taxes on labor income (see Feldstein, 2006).

A common fallacy in discussing taxes on the return to saving is to note that the elasticity of saving with respect to the net-of-tax interest rate is very low and to conclude from that observation that taxing the return to saving has very little adverse efficiency effect (Feldstein, 1978). Even if one accepts the premise that the elasticity of saving with respect to the net-of-tax interest rate is very low, the conclusion about the deadweight loss does not follow.

Why? Because the deadweight loss in this case depends not on the change in the level of saving but on the distortion in the timing of consumption. It is consumption that matters for this because it is consumption that enters the individual's utility function. Even if saving is not changed at all in response to a higher rate of tax on investment income, the level of future consumption can fall substantially. It is that fall in future consumption that is the source of the deadweight loss.

An analogy may help to clarify this point. Consider a simple excise tax on the consumption of apples. If the pretax price of apples remains constant, an individual with a unit elasticity of demand for apples will consume fewer apples but spend the same total amount on the purchase of apples. It is clear in this case that the deadweight loss depends on the change in the number of apples consumed and not on the unchanged spending on apples. By analogy, saving is the "expenditure" today to purchase future consumption. The welfare loss depends on the change in that future consumption and not on the spending today to purchase that future consumption.

FUTURE RESEARCH

I will conclude by pointing to some fruitful directions for future research in the study of taxpayer behavior.

First, it would be good to reduce the uncertainty about the effect of the net-of-tax rate on taxable labor income. New research should distinguish the response by different income levels, marital status, and age/sex groups. More panel data from the Treasury would be enormously helpful in this research. The separate payroll and income taxes should be used to distinguish the own and cross elasticities of husbands and wives.

Second, we need better estimates of the income effect of changes in tax rates. These are needed to calculate the revenue effect of tax changes.

Third, we need to develop a better analysis of the welfare effects of different aspects of capital taxation, particularly the effect of changes in dividends and in capital gains and in outright tax evasion.

And finally we need to develop better ways of incorporating this research into the analysis done by the staffs of the Treasury and the Joint Tax Committee and into the thinking of the political decision makers.

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