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HOW BIG SHOULD GOVERNMENT BE?

Martin Feldstein

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Professor of Economics, Harvard University, and President of the National Bureau of Economic Research. These remarks were presented as the keynote address to the 1996 annual meeting of the National Tax Association in Boston, Massachusetts, on November 12, 1996. I am grateful to Daniel Feenberg and James Poterba for commenting on an earlier version. This paper is part of NBER's research program in Public Economics. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

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ABSTRACT

The appropriate size and role of government depends on the deadweight burden caused by incremental transfers of funds from the private sector. The magnitude of that burden depends on the increases in tax rates required to raise incremental revenue and on the deadweight loss that results from higher tax rates. Both components depend on the full range of behavioral responses of taxpayers to increases in tax rates. The first part of this paper explains why the official method of revenue estimation used by the Treasury and the Congress underestimates the tax rate increases required to raise additional revenue. This is closely related to the on-going debate about the use of "dynamic" revenue estimation. The second part of the paper emphasizes that the deadweight burden caused by a tax rate increase depends not just on the response of labor force participation and average working hours but also on other dimensions of labor supply, on the forms in which compensation is paid, on the individuals' spending on tax favored (deductible or excludable) forms of consumption, and on the intertemporal allocation of consumption. Recent econometric work implies that the deadweight burden caused by incremental taxation (the marginal excess burden) may exceed one dollar per dollar of revenue raised, making the cost of incremental government spending more than two dollars for each dollar of government spending.

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How Big Should Government Be?

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The central public finance question facing any country is the appropriate size of the government.[1] Although economics alone cannot provide an answer to that question, economists can help politicians and the public to analyze the question in the right way and can provide estimates of the key parameter values that they need to reach informed decisions. Unfortunately, we are not doing a very good job of that important task.

In the United States, the combined spending of the federal, state and local governments now represents more than one-third of gross domestic product. Since state and local spending is disciplined by the ability of taxpayers to migrate if they are unhappy, I will focus on the size of the federal government. In the year that I was born (1939), federal government outlays were 10 percent of GDP. That ratio almost doubled by 1962, reaching 19 percent of GDP. Although the total GDP share has remained relatively constant since then (rising to 21 percent of GDP), the composition has changed substantially. Defense spending fell from 9 percent of GDP in 1962 to only 3.5 percent in

[1]There are of course many ways of defining and measuring the size of government. Regulations and mandates can substitute for taxes and spending. Although I will not discuss this issue explicitly, everything I say about taxes and spending applies also to these indirect means of expanding government activity.

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1996 while nondefense outlays have increased from 10 percent to almost 18 percent. I think it's fair to say that we as public finance economists have not contributed much to helping policy makers and the public evaluate this significant evolution.

Looking ahead, the rapid aging of the population that is projected for the coming decades implies a substantial increase in government spending unless there are fundamental structural changes in major government programs. The social security pensions for retirees, dependents and the disabled and the Medicare program of health benefits for the aged now cost 8 percent of GDP. Federal government outlays for Medicaid add an additional 1 percent of GDP, almost half of which is spent for beneficiaries over age 65, primarily in nursing homes. The Congressional Budget Office projects that even if the rate of increase of medical costs slows to the rate of increase of wages, government spending on Medicare, Medicaid and Social Security pensions will increase over the next 35 years from 9 percent of GDP today to more than 17 percent of GDP in 2030. That expansion of nondefense outlays can no longer be financed by shrinking defense spending, but would require equal increases in tax revenue as government spending expands from 21 percent of GDP to 30 percent of GDP.

Should we as a nation continue with the existing program structures that imply such a large increase in government spending and taxes? Or should the programs be reformed so that they require less taxation? And what about the myriad of other government activities — including education, basic research, defense, and welfare — that are potential subjects for increased spending?

It is, of course, possible to argue that "we can afford" such increases in taxes and government spending. During the next 35 years, we can expect real GDP per capita to rise by about 40 percent. Increasing the federal government's share of GDP from 21 percent to 30 percent would only absorb

about half of this projected rise in per capita GDP, permitting individuals to enjoy higher disposable income as well. It can also be argued that governments in other industrial countries already spend a much larger share of their GDP than these projected amounts.

These are, of course, not the right criteria for deciding whether a higher level of spending and taxes is warranted. The appropriate comparison, as public finance economists have known at least since the time of Pigou (1928), is between the benefits that would flow from the increased spending and the cost of financing that spending, including the deadweight losses associated with raising that revenue and with the particular form of spending.[2] This is also the right comparison for deciding whether reducing the current level of spending and taxes would increase overall well-being. In principle, such information should be disaggregated to indicate how the proposed policies affect different income groups and perhaps other demographic groups as well.

Assessing the deadweight loss associated with changes in tax revenue is a very important part of this analysis. As I will explain in this lecture, there is good reason to believe that the deadweight loss of increased tax revenue is likely in many cases to be as large or larger than the direct revenue cost itself. A dollar of government outlays may have a total cost, including the deadweight loss (or marginal excess burden), that exceeds two dollars.

As economists we are likely to be better at quantifying these costs of alternative means of financing than we are at valuing the benefits of government spending. That need not be as much of a handicap in policy evaluation as it may seem. In some cases, even though neither economists nor policy officials can put an explicit value on the benefit of some program, the politically responsible

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[2]Some increases in government spending can reduce the deadweight loss of finance by causing an increase in tax revenue.

officials may be able to decide whether the benefits exceed an amount that economists tell them is the total cost (including the deadweight loss) of financing the program. In such cases, economists can make a very useful contribution simply by estimating that total cost. In other cases, economists' estimates of the high cost of financing a program might cause policy makers to seek other means of achieving the program's goals that involve less government financing.

Consider for example the projected increase in the outlays of the existing pension and health care programs for the aged, from 9 percent of GDP now to 17 percent of GDP 35 years from now. One alternative to the increase in tax rates implied by this would be to shift to a funded system based on mandatory individual retirement accounts that can be used to provide pension income as a substitute for the essentially unfunded social security pensions and to purchase both regular medical insurance for retirees and long-term nursing home insurance that would substitute for the unfunded Medicare and Medicaid programs. Calculations that Andrew Samwick and I have done suggest that the entire 17 percent of GDP that would be required for pensions and health care for the aged in an unfunded program could be financed in a funded system by mandatory contributions that are less than four percent of GDP if these funds are accumulated over each individual's entire working life (Feldstein and Samwick, 1996).[3] The large deadweight loss that would be caused with the existing unfunded structure by social security taxes that are equal to 17 percent of GDP on top of all other

[3]The estimates presented in Feldstein and Samwick (1996) apply only to replacing the unfunded pension benefits with mandatory IRA saving accounts. The logic of those calculations can however be extrapolated to health benefits for the aged as well, implying that the entire 17 percent of GDP to be spent on pensions and health insurance for the aged could be financed by a funded system with mandatory contributions that are less than four percent of GDP. These calculations assume that the funds accumulated in the mandatory IRA accounts receive the full pretax rate of return on nonfinancial corporate capital, estimated by Rippe (1995) and by Poterba and Samwick (1995) to be a real return of 9 percent. This requires the government to rebate the incremental corporate tax revenues to the retirement saving accounts.

taxes provides a strong incentive to shift to a fully funded system.

Estimating the deadweight loss that would result from financing an increased level of spending (or the reduction in deadweight loss that would be made possible by less spending) can usefully be decomposed into two conceptually separate parts. The first calculation is the change in the tax rate required to raise the necessary amount of revenue. This depends on the tax base, the type of tax, and the way that the increase in the tax rate alters taxpayers' behavior. The second part is going from the change in the tax rate to the resulting deadweight loss or marginal excess burden, taking into account all of the different ways that a tax change can alter taxpayer behavior.

This way of posing the question makes it clear that the cost of increasing the size of government (or the reduction in the cost that results from shrinking government spending) depends on the mix of taxes that are changed. It is also clear that the same framework can be used to evaluate tax reforms that substitute one type of tax for another. My remarks will focus on changes in the size of government, but everything that I say also applies to such piecemeal tax reforms.

Although there has been important work on estimating the deadweight loss of incremental tax revenue[4], I believe that much more needs to be done. I hope that my remarks today will convince you as well and will persuade many of you to devote some of your own research efforts to this important task.

1. Effects of Tax Rate Changes on Tax Revenue

To be specific, I will focus on the problem of estimating how large a proportional increase in tax rates would be needed with our current income tax to finance a given incremental amount of

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[4]See for example Ballard et al(1985), Browning (1987), Harberger (1964), Slemrod and Yitzhaki (1995), and Stuart (1984).

government spending. That is, of course, the same as estimating the impact of those rate changes on the amount of revenue collected.

Economists who are not specialists in public economics might well think that such estimation is a central research subject in public finance. After all, specialists in international trade devote considerable attention to estimating the effects of exchange rates on the levels of imports and exports. Similarly, specialists in monetary economics devote substantial attention to estimating the economic effects of changes in interest rates and in monetary aggregates. It is surprising therefore how little attention public finance specialists pay to the analogous issue of the effects of tax rates on tax revenue and therefore to the question of how much tax rates would have to increase in order to finance an increased level of government spending.

Before looking at those effects of tax rate changes on tax revenue that should be taken into account in evaluating the incremental cost of government finance, let me comment on one type of revenue effect that should be ignored: the traditional Keynesian demand effect. In the standard textbook analysis, raising the individual income tax rate reduces disposable income which lowers consumption spending and therefore GDP. This decrease in GDP reduces tax revenue. Most modern macroeconometric forecasting models embody a similar short run response to changes in tax rates.

I believe that such calculations are not appropriate for forecasting the revenue effect of tax rate changes because they ignore the response of the Federal Reserve to changes in tax rates and tax rules. A more realistic assessment of the economy's response to a tax rate change would start with the assumption that the Federal Reserve always has some desired short-run path of unemployment and inflation and that it adjusts monetary policy to try to achieve that desired path. While it does not

always achieve the path that it wants, it is safe to assume that it alters monetary policy in response to exogenous changes in demand. A legislated increase in tax rates that would depress economic activity would therefore induce the Federal Reserve to make an offsetting change in monetary policy aimed at keeping the economy on its originally desired path. While it may not succeed, it is as likely to expand demand by too much as it is to be too tight. Of course, the Federal Reserve would not want to neutralize changes in output that reflect changes in aggregate supply. It is therefore best to assume that the Federal Reserve neutralizes the demand effects of tax rate changes but not the supply effects.

Although the effects of tax policy on demand should therefore not be reflected in the revenue estimates, there are three types of behavioral effects on tax revenue that should be taken into account. Although without these behavioral effects a proportional increase in all income tax rates would raise revenue by the same proportion, the evidence shows that the combined behavioral effect results in substantially less revenue being raised.

First, higher tax rates may reduce the supply of labor and, in the longer run, the supply of capital, thereby reducing the taxable income from labor and capital. The supply of labor includes not only labor force participation and average working hours but also the choice of occupation, the accumulation of human capital both in school and on the job, the location and conditions of work, and the degrees of effort, risk and responsibility that individuals assume. The magnitudes of these responses depend on both income and substitution effects.

Second, higher tax rates change the forms in which individuals take their compensation. A higher marginal tax rate on labor income induces a substitution of untaxed fringe benefits and more pleasant working conditions for taxable cash income. The extent of these shifts reflects income as

well as substitution effects since a lower net income reduces the demand for fringe benefits. Even individuals who appear to have no discretion about the form of their compensation will be able to make such a substitution in practice because the invisible hand of the market induces employers to offer more tax-attractive forms of compensation. Similarly, a higher tax rate on interest income induces a shift in portfolios to lower taxed equity securities and to tax deferred forms like IRAs, 401k's and life insurance. A higher tax rate on dividend income induces more retained earnings which are reflected in accrued capital gains. And a higher tax rate on capital gains reduces the recognition of those gains.

In addition to these effects on factor supplies and on the forms of compensation, higher marginal tax rates reduce taxable income by inducing more spending on things that are tax deductible (including owner occupied real estate and other debt financed spending secured by real estate, charitable gifts, and health care) or that can be subtracted as a business expense or other adjustment in calculating gross incomes (home offices, investment advice, etc.) and, for the self-employed, all kinds of fringe benefits and improved working conditions.

As a practical matter, it is not possible to observe and quantify each of the three types of responses separately. It is, however, possible to estimate their combined effect and it is only that combined effect that matters for estimating how revenue responds to changes in tax rates.

Let me describe an example of how the response of taxable income can be estimated. In a paper published last year (Feldstein, 1995a), I analyzed the effects of the 1986 tax rate reductions. I used the panel of individual tax returns prepared by the Treasury Department to compare the 1985 tax returns of individuals with the tax returns of those same individuals in 1988. Taxable income was adjusted to reflect changes in the tax law in 1986, to eliminate capital gains and gross

partnership losses, and to remove the average increase in all incomes between 1985 and 1988. These adjustments permit the estimated changes in taxable income between the two years to be related to the changes in marginal tax rates between 1985 and 1988.

More specifically, I grouped taxpayers by their 1985 marginal tax rates and calculated the average change of the adjusted taxable income in each such group between 1985 and 1988. I compared these average changes in taxable income with the corresponding changes in the marginal net-of-tax share (i.e., one minus the marginal tax rate) of each group of taxpayers. For example, those taxpayers with 1985 marginal tax rates of 49 percent and 50 percent saw their marginal tax rates fall to 28 percent in 1988, implying a 42 percent rise in their net-of-tax share (from 50.5 percent to 72 percent.) Taxpayers in the next highest marginal tax rate group in 1985 experienced a 26 percent rise in their net-of-tax share. The corresponding increases in the adjusted taxable incomes for the two groups were 45 percent and 20 percent. Comparing these changes in taxable income to the changes in net-of-tax shares implied that the elasticity of taxable income with respect to the net-of-tax share was 1.48. Estimating this elasticity with this differences-in-differences approach avoids the identification problems of traditional cross-section regression estimates.

Applying the same pairwise comparison approach to other combinations of taxpayer groups implied elasticities of 1.25 and 1.04. The simple average of the estimated elasticities was 1.26. Because of the revenue neutral and distributionally neutral structure of the Tax Reform Act of 1986, these elasticities should be interpreted as estimates of a compensated elasticity.

Gerald Auten and Robert Carroll (1994a) of the Office of Tax Analysis at the Treasury Department replicated their analysis with the much larger panel of tax returns for 1985 and 1989 that is available only inside the Treasury Department. They reported an estimated elasticity of 1.33 with

a standard error of 0.15.

These elasticity values are also broadly consistent with the estimated effects of the 1981 tax rate reductions by Lawrence Lindsey (1987) based on independent cross sections of ranked taxpayers and by Navratil (1995) based on panel data. They are also in line with the preliminary study of the 1993 tax rate increases that Dan Feenberg and I have reported (Feldstein and Feenberg, 1996).

These estimated taxable income elasticities of between 1.0 and 1.5 with respect to the marginal net-of-tax share are much greater than the traditional elasticities of labor supply with respect to net-of-tax wages. That is not at all surprising since the change in taxable income reflects not only a much broader concept of labor supply than the traditional measure of hours and participation but also the induced changes in the forms of compensation and in the use of tax deductions and other adjustments and expenses.

I believe that this type of estimation work needs to be extended in a variety of ways to give us as a profession (and therefore the policy makers and their staffs) the kinds of information needed to analyze the relation between tax rates and tax revenue. Five such extensions seem particularly important: (1) The existing estimates relate to relatively high income taxpayers and ways should be found to extend the analysis as much as possible to those with lower incomes. (2) The estimates based on the personal income tax cannot be applied directly to changes in payroll tax rates or even to the effect of changes in the income tax rates on payroll tax revenue. (3) Reliable estimates of income effects need to be developed. (4) Additional work needs to be done on the long-run effects of tax changes. Over time, the magnitude of the response may increase as individuals have more opportunity to adjust the kinds of work that they do, their specific jobs, etc. but might also decrease to the extent that some of the observed short-run response reflects timing of receipts and

expenditures. (5) Evidence is needed on the extent to which corporate income tax liabilities are affected by the observed changes in personal tax liabilities.

It is nevertheless interesting to consider the implications of the current elasticity estimates. To be specific, let's look at a married couple with taxable income of $100,000. Under current tax law, such a couple would pay $22,100 in federal personal income tax and would face a marginal income tax rate of 31 percent. A ten percent increase in all income tax rates would raise that couple's income tax payment by $2,210 if their taxable income did not change. But this change in tax rates would reduce the couple's taxable income by an amount that depends on both the compensated elasticity and the income effect. The change in the net-of-tax share from 69 percent to 66 percent is a decline of 4.3 percent. Making the relatively conservative assumption of a compensated elasticity of one for the elasticity of taxable income with respect to the net of tax share (recall that the estimates based on the experience after the 1986 tax reform implied elasticities between 1.04 and 1.48) implies a decline in taxable income of $4300. There is less evidence on the income effect than on the compensated elasticity. The income effect in this context reflects the effect on behavior of the $2210 increase in tax liability that would occur with no behavioral response. This reduction in disposable income would increase labor supply, would shift the form of compensation to cash instead of fringe benefits, and would reduce spending on deductible forms of consumption. All of these things would raise taxable income. I have discussed the likely magnitude of this income effect in an earlier paper (Feldstein 1995b) and suggested that a reasonable estimate of the income effect would be 0.40. In the current context, this implies an increase in taxable income of $884. The combination of this income effect and the $4300 compensated decline in taxable income is a net decline of taxable income of $3416 with a resulting revenue loss (at a 34 percent marginal tax rate)

of $1161. This behavioral effect thus offsets slightly more than half of the $2210 revenue increase that would result if there were no behavioral response.

Stating this result somewhat differently, to raise $2000 of additional revenue from this taxpayer by an equiproportional rise in all tax rates requires an increase of more than 20 percent in that tax rates instead of the increase of less than 10 percent that would be implied if there were no behavioral response.

1.1 A Comparison to Official Revenue Estimates

It is instructive to compare these estimates based on the actual experience of taxable income in the 1980s with the official estimates of the revenue effects of tax rate changes that are prepared by the staffs of the Treasury's Office of Tax Analysis and of the Congressional Joint Tax Committee.[5] The government revenue estimators do not make the mistake of which they are sometimes accused of assuming that there is no behavioral response to tax rate changes. But the magnitude of the responses that they do assume is very much less than the magnitudes implied by the statistical estimates that are based on the experience of the 1980s.

One reason for this difference is that the official government estimates do not even claim to measure the full revenue consequences of proposed changes in tax rates and tax rules. Instead, they are conditional projections of the effect that those tax rate changes would have if there were no resulting change in real gross domestic product. The government's estimates of the effects of tax rate changes on tax revenue thus explicitly exclude the induced changes in labor income and the longer-term changes in capital income.

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[5]See Sunley and Weiss (1991), Joint Committee on Taxation (1992, 1995) and Congressional Budget Office (1995) for detailed descriptions of the official process of revenue estimation.

In principle, the government's estimates do take into account the induced changes in the forms of compensation and in the magnitude of deductions and other adjustments to income since such changes do not alter total GDP. But, as a practical matter, there is no reliable way for the government staffs to estimate the magnitude of those changes in taxable income in a way that is separate from the changes in taxable income that do represent changes in GDP. That I believe causes a major problem for the revenue estimators .

Let me explain why. Because the staffs of the Treasury and the Joint Tax Committee do not take changes in GDP into account, they cannot use the observed responses of revenue to past changes in tax rates as a basis for estimating how future changes in tax rates would alter taxable income and tax revenue. They must instead rely largely on their intuition and personal judgements. The result I believe is that the official estimates grossly underestimate the responsiveness of taxable income to changes in tax rates. The official estimates therefore underestimate the increase in the tax rates that would be needed to finance any given increase in government spending.

We are able to assess the magnitude and nature of this underestimate with the help of a very useful paper by Gerald Auten and Robert Carroll (1994b) of the Treasury Department's Office of Tax Analysis. Their analysis of the Treasury's revenue projections for the 1993 tax legislation allows us to look into the black box of Treasury revenue estimation and to see the extent to which those estimates take behavioral responses into account.

The 1993 legislation had three basic components that are relevant to the current analysis: (1) it raised marginal personal income tax rates from 31 percent to 36 percent for taxpayers with taxable incomes between $140,000 and $250,000 and to 39.6 percent for taxpayers with higher taxable incomes; (2) it increased the alternative minimum tax and changed other tax rules that increased the

tax paid by higher income taxpayers; and (3) it repealed the $135,000 ceiling on the 2.9 percent employer-employee Medicare component of the payroll tax.

Auten and Carroll report that the Treasury estimated that the income tax changes would raise $19.5 billion in 1993 if taxpayers did not change their behavior in any way. They also report that the Treasury revenue estimators projected an offsetting behavioral response that phases in over time, eventually reaching 16 per cent of the incremental revenue in 1997 and 1998, equivalent to a response of $3.2 billion at the 1993 level of income.

Daniel Feenberg and I used the NBER's Taxsim model to estimate the effect of the 1993 tax changes based on the behavioral elasticities implied by the actual experience with the 1986 tax changes. We found, first, that with no behavioral response, the 1993 tax changes would raise additional income tax revenue of $21.8 billion, quite close to the Treasury's estimate of $19.5 billion. (Feldstein and Feenberg, 1993) Of this $21.8 billion, $12.9 billion reflected the higher marginal tax rates and the remainder reflected other changes in tax rules (Feldstein, 1995b). Using the statistically estimated parameters (a compensated elasticity of 1.04 and an income effect of 0.4) reduces the $12.9 billion of additional revenue to only $4.4 billion, a decline of $8.5 billion or two-thirds of the no-behavioral-response revenue gain (Feldstein, 1995b).

The experience of the 1980s thus implies a behavioral response that was more than 2.5 times as large as the response assumed in the Treasury's revenue forecast. Stated differently, the Treasury's assumed behavioral response offset about one-fourth of the no-behavioral-response revenue gain from higher tax rates while the NBER Taxsim calculates that the experience of the 1980s indicates an offset of more than 65 percent of the no-behavioral-response revenue gain.

The Auten and Carrol study also helps us to understand <u>why</u> the Treasury calculations imply

so much smaller an overall behavioral response. They explain that the behavioral responses that the Treasury procedure took into account were primarily (1) shifts in portfolio assets away from those that produce taxable interest and dividends to those that produce capital gains and tax-free interest, (2) a shift between S-corporation and C-corporation status for small businesses, and (3) an increase in evasion. The Treasury procedure thus ignored not only the response of the labor supply and of the stock of capital but also the induced changes in the forms of compensation and in the use of tax deductions and other ways of reducing taxable income.

1.2 Dynamic Revenue Estimation

This brings me quite naturally to the broader issues involved in the controversy about "static vs. dynamic" revenue estimation. It should be clear that the terms "static" and "dynamic"in this context bear little resemblance to the way that we generally use those words in economics. Both the existing official method of revenue estimation and the alternative estimates that I have discussed would more properly be labeled as "comparative statics", i.e., they compare tax revenue with and without a change in tax rates (or tax rules). The fundamental differences between the official "static" revenue estimates and the alternative "dynamic" estimates that I have described are that the current official method, as a matter of principle, does not take into account any changes in behavior that affect GDP and, as a matter of fact, assume a much smaller overall behavioral response to changes in tax rates.

I believe that incorporating a correct assessment of the induced changes in labor supply would by itself imply a substantially greater response of taxable income. While the working hours of prime age males and single women may respond little to changes in tax rates, the hours of other groups including married women and those near retirement age are much more responsive. Probably

even more important, taxable income can respond even in the short-run to labor supply through changes in effort, job characteristics, and location. Over time, taxes also affect education and the accumulation of on-the-job training. All of these are now excluded by the official revenue estimators as a matter of estimating "principle" because they represent changes in GDP.

No one really knows just how big this omitted effect really is. Nor do we know the magnitude of the other effects on taxable income that reflect changes in the way in which compensation is paid and in the deductions and other income adjustments that individuals use. The biggest problem caused by the policy of excluding the behavior that changes GDP is that it prevents the government revenue estimators from using evidence on how taxable income as a whole has responded to past changes in tax rates.

The current official procedure thus has the double weakness of knowingly ignoring important effects (because they alter GDP) and of not being able to assess correctly those other effects that the revenue estimators claim that they do want to include (because the revenue estimators cannot measure them separately from the effects that alter GDP). Nevertheless, the current procedure has its strong defenders who regard it as better than the alternatives that are proposed under the label of "dynamic" estimation. Let me look briefly at their six most common arguments.[6]

(1) "Keynesian demand effects on GDP should not be taken into account." I agree. The GDP effects of changes in labor supply and in the capital stock should reflect changes in the supply of these factors. This is exactly what estimates based on the microeconomic offsetting behavioral responses that

[6]Auerbach (1995a, 1995b) , Feldstein (1994, 1995), Lyon (1995), Penner (1995), and Tyson (1995) discuss the pros and cons of dynamic estimation. See also the additional references in Auerbach (1995) and in Lyon (1995).

I have discussed would do.

(2) "It is too difficult to incorporate proposed tax changes in the government's macroeconometric forecasting model and to resimulate the forecast for a variety of different tax proposals." The difficulty of incorporating these changes into a large econometric forecasting model is irrelevant. There is no need to change the baseline macroeconomic forecast. The changes to be included are microeconomic effects that are generally marginal to the basic forecast. These feedback effects of tax rate changes are nevertheless frequently large relative to the official estimates of the revenue consequences of the proposed tax changes.

(3) "Evidence shows that the elasticity of labor supply is essentially zero." This may be true for the participation rate and hours of prime age males but not for other demographic groups. Even for the prime age males, a zero uncompensated elasticity of total hours with respect to a proportional change in the net wage would imply a decrease in labor supply when, as in 1993, marginal tax rates are raised proportionately much more than average tax rates. More generally, the labor supply response includes a much wider range of behavior than just participation and working hours, including effort, job characteristics, education, etc.

(4) "It is very difficult to estimate the way that tax rate changes will affect GDP and therefore inappropriate to give the revenue estimators so much discretion." I disagree for two very different reasons. First, the revenue

estimators already make very difficult estimates of how changes in tax rates and tax rules affect such things as IRA contributions and capital gains realizations. It is no more difficult to estimate changes in behavior that happen to change GDP. Second, in analyzing overall tax rate changes, it is not necessary to estimate the individual components of taxpayer responses -- the changes in labor supply, changes in deductions, changes in the form of compensation, etc. Revenue estimators can focus on the overall response of taxable income to tax rate changes.

(5) "Even if the current method of revenue estimation is wrong, the resulting errors are small relative to total tax revenue." This is irrelevant. While the accuracy with which total revenue is forecast is important for budget policy, it is not the relevant issue for piecemeal tax policy and for assessing the tax rate change needed to balance a change in government spending. Assessing the effect of changing a tax rule or tax rate requires estimating the corresponding incremental change in revenue. The error in that may be small relative to total revenue but large and important as a factor in deciding whether to make the change. For piecemeal policy, Congress needs accurate estimates of the revenue effects of small tax changes.

(6) "Ignoring GDP changes is better because it biases policy in a way that helps to reduce the budget deficit." That's not so. While underestimating the response to tax changes will cause Congress to overstate the cost of tax rate reductions (and therefore to do less of them), it will also cause Congress to

overestimate the revenue gain from tax rate increases. That will bias policies toward greater spending matched with tax changes that raise inadequate revenue.

As you can see, I remain totally unconvinced that there is a reason to ignore those tax-induced changes in behavior that alter GDP and therefore to disregard the historic evidence on how previous tax rate changes have altered tax revenue.

Let me conclude this discussion of static vs. dynamic revenue estimation with a comment on the effects on saving and capital accumulation. While the analysis of changes in labor supply, in the forms of compensation, and in the use of deductions can rightly be described as comparative statics, policies that change saving behavior require something that might more properly be called a dynamic analysis. But even in this context, it is not necessary to construct an elaborate model of the economy. The increase in the capital stock and the associated tax revenue should be seen as marginal changes around an existing forecast path. For example, policies like expanded IRAs and 401k's raise personal saving and add to the capital stock. Most of this incremental capital goes to the corporate sector where it generates additional profits that are subject to the corporate income tax.

Unfortunately, the current method of revenue estimation ignores this additional corporate income tax revenue because the increased corporate profits represent additional GDP. This causes traditional revenue estimates to overstate the revenue loss associated with pro-saving policies. In a recent paper (Feldstein, 1995c), I showed that it is relatively easy to estimate the path of incremental revenue effects of such prosaving policies. Plausible estimates based on actual experience imply that the long-term effect of such prosaving policies is not only to increase the private capital stock but may also be to reduce the size of the national debt because of the favorable

long-term effects on tax revenue. A further implication of this is that tax changes or benefit programs that reduce saving have a greater long-term revenue cost than the existing revenue estimation procedures recognize.

1.3 A Transition Option

I am fully aware of the strength of the current opposition to the idea of dynamic revenue estimation and recognize that neither the Treasury nor the Joint Tax Committee are likely to shift completely to such revenue estimation at this time. I am encouraged, however, by the gradual steps that have been made in this direction over the past two decades as the staffs have gradually begun to incorporate behavioral responses. In the late 1970s, when the Congress debated reducing taxes on capital gains, the staffs of the Treasury and of the Joint Tax Committee assumed no behavioral response at all. Because of the pressure from Senate Finance Committee Chairman Russell Long and others, the staffs changed their procedure and began to recognize the effect of capital gains taxation on the selling of assets and on the recognition of capital gains.

Looking ahead, I think it would be helpful if the staffs began to experiment with the more realistic behavioral estimates by preparing three sets of estimates for major tax proposals. The first, using their current method, might be labeled the "Revenue Score", to emphasize that it is an artificial number that is used for the budget process rather than a "best estimate" of the full revenue effect. The second estimate would be a completely static estimate that explicitly assumed no change in behavior at all. The purpose of having this "Static Estimate" would be to show how much (or little) behavioral response is built into the official Revenue Score.

Finally there would be the "Dynamic Estimate" that would take into account the changes in work, in the capital stock, and in the various other forms of behavior that affect taxable income. It

would not take into account induced demand side changes in GDP.

There are, of course, many revenue proposals for which the official staffs may judge the behavioral response to be too small to affect the revenue estimates. It would seem reasonable to have some kind of automatic exception to the principle of providing three estimates, e.g., that the staffs need not provide a Dynamic Estimate for any proposal for which they believe those measures would differ from the Revenue Score by less than 10 percent or less than $100 million a year.

To make these three sets of estimates a part of the legislative process, it would be necessary for all three estimates to be done by the staffs of the Joint Tax Committee or the Treasury Office of Tax Analysis rather than by outside analysts.

2. The Deadweight Loss of Financing Bigger Government

I turn now to the broader question of evaluating the welfare cost or marginal excess burden of an increase in the size of government. As I noted earlier, that depends both on the magnitude of the tax rate change that is required to raise the needed revenue and the deadweight loss associated with such changes.

Although we as economists accept this framework for evaluating the total cost of increased government spending, we have not done a good job of communicating this framework to policymakers and to the broader public. Nor have we done as well as we should in estimating the deadweight losses associated with financing incremental government spending.

Politicians and other non-economist opinion leaders who criticize high tax rates generally argue that they are bad because they "reduce economic growth." It is not even clear what such statements mean to noneconomists. While we economists interpret economic growth as a sustained

and long-term rise in income, the more general public may use the term to mean short-term changes in income. Thus their assertion of an adverse effect of higher tax rates on economic growth may refer to a Keynesian reduction in demand or to a decline in the level of output as labor supply is decreased. I have yet to meet a noneconomist outside a classroom who understands that it is the deadweight loss of resource misallocation that we economists think of as the true cost of raising taxes.

I suspect that one reason that we economists have not done a better job of educating the public is that many economists believe that an increase in tax rates would cause only a small deadweight loss. This view is based on thinking about the deadweight loss as a "small" triangle, the size of which reflects the "small" effect of a tax rate change on the supply of labor and on the rate of saving. That line of reasoning is wrong for four reasons:

First, the deadweight loss caused by a change in tax rates is not a "small triangle" but a much larger trapezoid because we start with an existing tax distortion. Raising an existing 30 percent marginal tax rate by five percentage points causes a deadweight loss that is more than ten times as large as the deadweight loss associated with introducing an initial five percentage point tax.

Second, the relevant labor supply elasticity is much larger than the traditional estimates imply. The relevant distortion to labor supply is not only the effect of tax rates on participation rates and hours but also their effect on education, occupational choice, effort, location, and all of the other aspects of behavior that affect the short-run and long-run productivity and income of the individual. Unfortunately, we still know very little about how taxes affect labor supply defined in this broad way.

Third, even if we ignore saving, the relevant distortion is not just in labor supply broadly

defined, but is also the distortions in the forms of compensation and in the demand for deductions and other ways of reducing taxable income. Higher tax rates cause individuals to substitute nicer working conditions and various fringe benefits for taxable compensation. If an employee's marginal tax rate rises to 40 percent, he will want to shift his compensation toward nicer working conditions and better fringe benefits until a dollar spent by his employer on those things is worth only 60 cents to him. The difference between that 60 cents and the dollar that it costs the company to provide the benefit is a substantial deadweight loss. Even if individual employees cannot design their own compensation packages, the invisible hand of the market will induce companies to shift their forms of compensation to optimize the net-of-tax value to employees in this way.

The same kind of wasteful distortion is also true for spending on things that are tax deductible. A forty percent marginal tax rate will induce individuals to spend on housing until the last dollar that they spend on mortgage interest and taxes has a value to them of only 60 cents.

While it is in principle possible to study the elasticity of demand for tax deductible forms of spending and to calculate the corresponding deadweight losses, it is not possible to observe the tax induced changes in the form of compensation. In fact, however, it is not necessary to do so in order to estimate the overall deadweight loss that results from increasing marginal tax rates to finance additional government spending.

The key to calculating the incremental deadweight loss (i.e., the marginal excess burden) is recognizing that the tax law divides all of the goods and services that we consume, including leisure and the characteristics of our working conditions, into two categories. Ordinary goods and services are purchased with after-tax dollars. Tax-favored goods and services are purchased with pre-tax dollars. The tax favored goods and services include fringe benefits of all kinds, money spent by

employers to make working conditions nicer, and things that are deductible in calculating taxable income. Changes in the marginal tax rate change the relative price of ordinary goods and tax-favored goods. With a zero marginal tax rate, the two classes of goods have equal relative prices. With a 50 percent marginal tax rate, the relative price of the ordinary goods is twice as high as the price of the tax-favored goods. But the relative prices of the different goods and services within each category are not affected by the marginal tax rate. The relative prices of ordinary goods like apples and oranges are just their market prices. And the relative prices of different fringe benefits and of different ways of improving working conditions are just the market prices faced by the firm.

We can therefore treat the two categories of goods as Hicksian composite goods and analyze the effect of changes in marginal tax rates as being a change in the relative price of these two composite goods. The deadweight loss of changes in the marginal tax rate therefore depends on the elasticity of demand for the tax-favored goods with respect to the net-of-tax relative price. Stated differently, the deadweight loss can be calculated with the traditional Harberger-Browning formula using the compensated elasticity of taxable income with respect to the net-of-tax rate.

I have applied this approach with the NBER Taxsim model to estimate the revenue and deadweight loss effects of increasing all personal income tax rates by 10 percent.[7] With no behavioral response, a 10 percent rate increase would raise $56 billion at 1994 income levels but only $26 billion when the behavioral response implied by the 1986 experience is taken into account.[8] The 10 percent increase in all marginal tax rates also raises the deadweight loss of the tax system

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[7]See Feldstein 1995b, section 6, for more details.

[8]This assumes a compensated elasticity of 1.04 and an income effect of 40 percent of the $56 billion of additional tax liability with no behavioral response. This ignores the reduction in payroll tax revenue that results from reduced taxable labor income.

by $43 billion. Thus, financing additional government spending of $26 billion by an across the board increase in all tax rates requires a 10 percent rate increase which causes a deadweight loss of $43 billion or 165 percent of the incremental revenue. The total cost per incremental dollar of government spending, including the revenue and the deadweight loss, is thus a very high $2.65. Equivalently, it implies that the marginal excess burden per dollar of revenue is $1.65.

This calculation clearly implies a much larger marginal excess burden than the traditional deadweight loss calculations that focus exclusively on labor force participation and working hours. It is also much larger than the marginal excess burden per dollar of revenue estimated by Ballard, Shoven and Whalley (1985) with a more complex general equilibrium model because that model also makes no allowance for the effect of tax rates on the broader aspects of labor supply, on the forms of compensation, or on deductible spending.

The fact the deadweight loss depends on the elasticity of taxable income with respect to the net-of-tax rate implies that much more work should be done to improve our measurement of this critical parameter. The work that I and others did on the 1986 experience should be extended to obtain estimates of longer-term responses and to learn more about the responses of lower income groups and possibly of other subgroups in the population. In addition, we need to know more about the ways in which taxpayers and companies respond to higher tax rates by deferring income and need to analyze how the Hicksian two-goods framework that I have just described can be extended to incorporate saving distortions and tax deferrals. Of course, other ways of raising additional revenue would involve different deadweight loss calculations. The theory and the associated parameter estimates are therefore important subjects for research.

The final misconception that I want to discuss is the view that taxes on saving do not create

deadweight losses because saving is not sensitive to the real rate of interest.[9] There is, of course, substantial controversy about the magnitude of the responsiveness of saving to the net rate of return. But even if an increase in the real rate of interest leaves saving unchanged, a higher tax on investment income can cause a substantial deadweight loss. The reason for this is that the deadweight loss in this context does not depend on the change in saving as such but on the distortion to the timing of lifetime consumption. The arguments of the individual's utility function are present and future consumption and not saving; saving is just expenditure on future consumption. Even if saving is unchanged, a higher tax on investment income implies a reduced level of retirement consumption. Thus, even with no observed response to the rate of interest, the deadweight loss caused by a capital income tax can be quite large.

3. Concluding Remarks

To conclude my remarks, I return to what I said at the beginning. The central public finance question facing any country is the appropriate level of public spending and therefore of taxes. As specialists in public finance, we have a particular responsibility to help the public and the politically responsible officials to deal with this question. There are three things that we can do to be helpful.

First, the idea of deadweight loss must be better understood by policy officials and opinion leaders. The desirability of incremental government spending depends on comparing the benefit of that spending to its total cost including the deadweight loss of raising the revenue.

Second, better estimates are needed of the relation between changes in tax rates (and tax rules more generally) and the resulting changes in revenue. The existing official revenue estimation procedure incorrectly precludes this by excluding changes in behavior that alter GDP. Past

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[9]For an earlier discussion stressing this point, see Feldstein (1978).

experience can provide useful evidence on the potential effects of future tax changes. More research is needed on the way that other tax changes would affect revenue.

Third, the deadweight loss of tax changes reflects not only changes in labor supply, but all changes in taxable income. Past experience suggests that financing additional government spending by across-the-board tax rate changes would involve a total cost of more than two dollars for every additional dollar of government spending. More research on the deadweight loss of tax rate changes and other ways of increasing revenue deserves high priority. This type of understanding and information would also provide the ingredients for assessing alternative tax reforms.

There are many fascinating theoretical and empirical issues to be addressed in public finance. But none is more important than measuring the effects of tax rate changes and the costs of incremental tax revenue. I hope that my remarks today will encourage more of you to join me in this important task.

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