Distributional Effects of the 2001 and 2003 Tax Cuts: How Do Financing and Behavioral Responses Matter?

Douglas W. Elmendorf
Jason Furman
William G. Gale
Benjamin H. Harris

Brookings Institution

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Introduction

Distributional analysis has long been a central element in discussions of tax policy. However, standard methods of estimating the distributional effects of tax changes omit two potentially important factors: the financing of the tax changes, and the implications of behavioral responses for economic growth, incomes, and well-being. In this paper we reexamine the distributional effects of the 2001 and 2003 tax cuts incorporating these two factors. Compared with the standard analysis, this "dynamic distributional analysis" shows that the benefits of these tax cuts were much smaller, on average, and much more skewed toward people with higher incomes.

There is no doubt that the 2001 and 2003 tax cuts will need to be financed in some manner. As the Congressional Budget Office (CBO, 2007) recently reminded policymakers, "… under any plausible scenario, the federal budget is on an unsustainable path." Therefore, the revenue loss from these tax cuts (after accounting for revenue increases due to feedback effects) will need to be offset by future tax increases or government spending reductions. Ignoring the burden of these financing choices overstates the aggregate benefits of the tax cuts and likely distorts the analysis of the distribution of those benefits as well.

There is also no doubt that the 2001 and 2003 tax cuts will affect economic behavior in ways that are not incorporated in the standard distributional analysis and revenue scoring of tax changes. Of course, there is considerable uncertainty about the magnitude of the behavioral responses and even, after allowing for higher near-term federal debt and future financing, whether the net effect is higher or lower total output and income. But ignoring these effects is not an adequate substitute for considering the sensitivity of estimated distributional effects to different plausible responses.

We present three sets of results regarding the distributional effects of the 2001 and 2003 tax cuts. First, we reproduce familiar tables based on the standard approach to distributional analysis. Using this approach, almost all households are at least as well off after the tax cut, and the biggest percentage and absolute increases in after-tax income go to households with the highest pre-tax incomes.

Second, we add the financing of the tax cuts under two alternative scenarios. In both scenarios, the total amount of financing exactly offsets the tax cuts when fully phased in, so the net effect on the budget is zero. The first scenario assumes that each household pays an equal dollar amount, while the second assumes that each household pays the same percentage of income. Under either scenario, about three-quarters of households are worse off because of the tax cuts, and after-tax income falls for the bottom four quintiles of the income distribution but increases for the top quintile. To be sure, if one assumes that the financing occurs entirely through spending reductions and that the foregone spending is worthless to individuals, then the standard distributional analysis applies. However, despite decades of stump speeches about unnecessary government spending, the political process has been persistently unable to identify significant outlays that voters will blithely forego.

Third, we incorporate behavioral responses, including not only the induced increase in

after-tax incomes but also the opportunity cost of the income gains. The central issue is that behaviorally-induced increases in taxable incomes overstate welfare gains because the lost leisure, foregone fringe benefits, and other concomitants of the rise in taxable incomes all generate some decline in well-being. We develop a novel methodology for undertaking welfare- based distributional analysis, beginning with an illustrative example to demonstrate the logic of our approach and then generalizing the formula for broad application. Our results show that the 2001 and 2003 tax cuts raised the well-being of only one-third of households and that more than half of those better-off households are in the top quintile of the income distribution.

These results strongly confirm the importance of undertaking dynamic distributional analysis—that is, of extending the distributional analysis of tax changes to include both the financing of the changes and the welfare consequences of behavioral responses to the changes. These financing and behavioral responses are unavoidable consequences of tax changes, and their incorporation in distributional analyses can significantly alter the results: Excluding these factors, the 2001 and 2003 tax cuts appear to have made most U.S. households better off, albeit with the largest percentage and absolute increases in after-tax income at the top of the income distribution. Including these factors, the 2001 and 2003 tax cuts made most U.S. households worse off, although large percentage and absolute increases in after-tax income are still apparent at the top of the income distribution.

The next section of the paper describes our approach to conducting dynamic distributional analysis, and the following section presents our results. A final section briefly concludes.

Methodology for Dynamic Distributional Analysis

We begin our discussion of methodology by briefly reviewing the 2001 and 2003 tax law changes and discussing alternative measures of the distributional effects of tax changes. Then we turn to the challenges of incorporating financing and making distributional analysis fully dynamic.

The 2001 and 2003 Tax Changes

The tax cuts enacted between 2001 and 2006 contain a host of large and small changes to the tax code. The tax cuts of 2001, 2003, 2004, 2005, and 2006 built on one another, with many of the bills passed after 2001 serving to extend provisions in earlier bills. The 2001 tax cut was especially sweeping; two of its most prominent changes were a phased-in reduction in income tax rates and a reduction and eventual repeal (for 2010 only) of the estate tax. It also provided a wide range of tax breaks for education, families with children, married couples, and contributions to certain kinds of savings accounts. The 2003 bill cut taxes on dividends and capital gains and accelerated the schedule for phasing in most of the other tax cuts enacted in 2001.

In this paper we examine the distributional effect of the most significant policies introduced in 2001 and 2003. The first of these policies is a reduction in the marginal tax rates

on individual income, including a cut in the top marginal tax rate from 39.6 percent to 35.0 percent and a 3 percentage point reduction in the 36 percent, 31 percent, and 28 percent marginal tax rates to 33 percent, 28 percent, and 25 percent. The 2001 and 2003 tax acts also created a new 10 percent tax bracket carved out of the 15 percent bracket.

These tax laws also repealed the estate tax and modified the gift tax. While current law allows for a one-year repeal of the estate tax, we assume full repeal in the simulations. The 2001 and 2003 cuts also doubled the child tax credit from $500 to $1,000 and made the credit refundable at a rate of 15 percent above an inflation-indexed threshold. The tax cuts included the elimination of the "marriage penalty," which involved raising the standard deduction for married couples and increasing the threshold on the 15 percent tax rate to be twice the level for single filers. The 2001 and 2003 tax cuts also implemented several smaller changes to the tax code, including an expansion of the child and dependent care credit, repeal of the PEP and Pease provisions (these provisions limited the ability of high-income taxpayers to take advantage of personal exemptions and itemized deductions), and an increase in the EITC phase-out range for married filers.

Moreover, the 2003 cuts lowered tax rates on dividends and capital gains. Tax rates on realized capital gains received by individual shareholders were reduced from 10 percent (in brackets where the ordinary income tax rate was 15 percent or below) and 20 percent (in brackets where the ordinary income tax was higher than 15 percent) to zero and 15 percent. Tax rates on dividends received by individual shareholders were reduced from the rates that apply to ordinary income to the rates that apply to capital gains.

Measuring the Distribution of Tax Changes

Our preferred measure of the distributional effect of tax changes is the percentage change in after-tax income (as recommended, for example, by Cronin, 1999, and Gravelle, 2001). By this measure, tax changes that give everyone the same percentage change in after-tax income are distributionally neutral. Tax changes that give larger percentage increases, or smaller percentage decreases, in after-tax income to higher-income people are regressive; those that give larger percentage increases or smaller percentage decreases to lower-income people are progressive.

Some analysts focus instead on percentage changes in taxes (Rosen, 2004, and Viard, 2007) or changes in the share of tax payments (OMB, 2004). However, these alternative measures do not give reasonable answers to questions about the distribution of the tax burden under a variety of common circumstances:

- For example, percentage changes in taxes cannot be calculated for households with negative net tax payments, so analysis using this measure cannot include refundable tax credits or transfer payments. In this paper, we study both filers and non-filers (including some with negative income), and we include as income unemployment benefits, social security benefits, and worker's compensation. Therefore, we must adopt a method of analysis that accounts for all changes in income, and does so for those tax units without positive income or positive net tax payments.

- As another example, percent changes in taxes can be misleading for households with small positive tax payments. If someone's tax burden is cut from $1,000 to $0 and someone else's is cut from $100,000 to $50,000, would anyone really argue that the first person received the larger benefit?

- For a further example, note that a country or era with greater pre-tax income inequality but the same tax code as another country or era would see a larger share of taxes paid by higher-income people. Clearly, this difference reflects the pre-tax income distribution rather than the tax code, which means that the share-of-taxes measure cannot be used to compare the distributional effects of taxes across time and space.

In sharp contrast, the percentage change in after-tax income provides sensible answers in all of the situations described above.

We measure distribution using annual income, but the results are unlikely to differ significantly if we used lifetime income instead. There is little doubt that the 2001 and 2003 tax cuts were regressive on a lifetime basis as well as an annual basis. Households' incomes vary over time because of both lifecycle effects and transitory shocks. Analyzing distributional effects within age groups is one way to control partially for lifecycle effects; such an analysis yields results that are similar to those presented below. One major source of transitory income is capital gains, but the vast majority of capital gains go to households with high non-capital-gains income (see Lyon and Haliassos, 1994). More generally, the cuts in taxes on dividends, capital gains, and estates provided the largest benefit to people with the greatest wealth, which of course is highly correlated with lifetime income (see Wolff, 2002). Many recipients of capital income who have low current income are retired, and their lifetime income exceeds their current income; classifying them by lifetime income would make the tax cuts look *more* regressive. The estate tax falls mainly on people with very high lifetime income, whether one looks at decedents or inheritors (see Joulfaian, 1998, and Gale and Slemrod, 2001).

Financing Tax Cuts[1]

Making the 2001 and 2003 tax cuts permanent with no offsetting budget changes is simply not feasible given the severe long-run fiscal imbalance.[2] Of course, the financing may be delayed—indeed, the tax cuts appear to have been financed so far entirely through additional government borrowing—but that strategy cannot be sustained indefinitely. Therefore, any coherent modeling of the economic effects of the tax cuts must specify a financing method. Because it is impossible to know what combination of tax increases and spending cuts will ultimately be used, we examine two alternative scenarios. In both scenarios, we assume that the total amount of financing exactly offsets the tax cuts so that the net effect on the budget is zero.

[1] This section draws on Gale, Orszag, and Shapiro (2004) and Furman (2006). See also Steuerle (2003).
[2] For example, Gale and Orszag (2004b) estimate that the extension of the 2001 and 2003 tax cuts, along with AMT relief, would require a 32 percent reduction in discretionary spending in order to be revenue-neutral.

Our first scenario assumes that each household pays the same dollar amount simultaneously with the receipt of the tax cut. This financing approach can be viewed as the hypothetical lump sum tax used for differential incidence analysis in academic research, as in Rosen (1995). Gale, Orszag, and Shapiro (2004) argue that this formula also provides a reasonable approximation of the burden from an across-the-board spending cut. In particular, they explain that entitlement programs provide larger benefits to lower-income households, and that public goods like infrastructure investment might be presumed to provide larger benefits to higher-income households. Plausible calculations then suggest that overall government spending provides close to equal-dollar value per household. Under this scenario, tax filing units receive direct tax cuts based on the 2001 and 2003 legislation but also give up $2,243 under static assumptions or $1,486 with behavioral responses to finance the tax cuts.

Our second scenario assumes that each household pays the same percentage of its income to finance the tax cuts. This formula provides a reasonable approximation of the burden from a combination of spending cuts and progressive tax increases. Under this scenario, tax filing units receive direct tax cuts based on the 2001 and 2003 legislation but pay an additional 2.7 percent of their cash income under static assumptions; to limit the number of alternative results in the paper, we do not use this scenario when studying behavioral responses.

Are our conclusions sensitive to the particular financing assumptions we made? Of course, the numerical results differ for alternative methods of financing, but the qualitative judgment that the 2001 and 2003 tax cuts were highly regressive appears to be quite robust. These tax cuts significantly scaled back or eliminated many of the most progressive features of the tax system, including the estate tax, dividend and capital gains taxes, the top income tax rates, and the phase-outs of certain exemptions and deductions for households with high incomes. Unless the tax cuts are financed through their own repeal or something close to it, high-income households are very likely to be better off and low- and middle-income households are likely to be worse off.

A Numerical Example of Behavioral Responses and the Change in Welfare

Consider a person who earns $100,000 and experiences a reduction in his tax rate from 30 percent to 24 percent. Suppose that the rate cut leads the person to work more hours, boosting his taxable income by $4,000, and to shift some tax-free fringe benefits into cash income, boosting his taxable income by another $4,000.

Standard distributional analysis would ignore the behavioral responses and show an increase in after-tax income of $6,000 = $100,000*(0.30-0.24). As we mentioned at the outset, this approach ignores both the financing of tax changes and behavioral responses to tax changes.

To allow for financing in this example, we assume that our hypothetical taxpayer is the “average” taxpayer. He needs to pay for the $6,000 tax cut through a corresponding increase in other tax payments, which we assume to be collected in a lump-sum fashion so

there is no further behavioral response. The net increase in after-tax income is then $0.

To incorporate behavioral responses correctly, we must keep track of both the changes in income and the opportunity cost of the responses. There are several aspects of the calculation for this individual:

- First is the direct $6,000 gain from the rate cut.

- Second is the loss from the lump-sum financing. Because of the induced increase in taxable income, the lump-sum amount will be less than $6,000—specifically, $4,080 = ($100,000*0.30)-($108,000*0.24).

- Third is the increment to well-being from the additional work. The extra pre-tax income is $4,000, and the after-tax income is $3,040 = $4,000*(1-0.24). What is the value of the lost leisure? He chooses to work those hours when he receives $3,040; he chose not to work those hours when he would have received $2,800 = $4,000*(1-0.30). The value of the leisure must lie somewhere between these figures. A simplistic approach is just to use the average of these extremes, or $2,920. A more sophisticated approach with the same answer is to realize that the first increment of lost leisure is worth 70 cents on the dollar, the next increment is worth a little more, and so on, until the last unit of leisure foregone is worth 76 cents on the dollar; this logic traces out the familiar deadweight-loss triangle. Alternatively, for an aggregate calculation, one can assume that people are evenly distributed in their preferences. All of these versions point to a net increment to welfare of $120 = $3,040-$2,920.

- Fourth is the increment to well-being from the substitution from fringe benefits to cash income. This calculation exactly mirrors the one just described. The extra after-tax income is $3,040. Revealed preference shows that the lost fringe benefits have a value between the after-tax cash income into which they can be transformed under the current tax rate and the after-tax cash income into which they could be transformed under the previous tax rate. This establishes a range of $2,800 to $3,040, with a midpoint of $2,920. The net increment to well-being is the extra income less than the forgone value, or $120.

The total change in well-being is then $2,160 = $6,000-$4,080+$120+$120.[3]

Note that the effect of the behavioral responses is small compared with the direct effect and the effect of financing. This result occurs *not* because the assumed elasticity is unusually small: Given the 20 percent drop in the tax rate, the assumed 8 percent increase in taxable income corresponds to a 0.4 elasticity, which is close to the estimates of Gruber and

[3] An alternative way to summarize the dynamic distributional analysis is to compare the person's total well-being before and after the tax change. Before the change, the person had $70,000 in after-tax income ($100,000-$30,000 in taxes), $2,920 worth of leisure ($4,000 market value*(1–0.27)), and $2,920 worth of fringe benefits ($4,000 market value*(1–0.27))—for a total of $75,840. After the tax change, the person has simply $78,000 in after-tax income ($108,000-$30,000 in taxes), which is an increase of $2,160.

Saez (2002) and Auten, Carroll, and Gee (2008), and exceeds the estimate of Saez (2004).[4] Instead, the behavioral responses have a small effect because the increase in after-tax income is nearly offset by the opportunity cost of the foregone leisure and tax-free fringe benefits. That arises in turn because the individual is working up to the point that the welfare gain from extra income matches the welfare loss from less leisure, so providing an incentive to shift that decision a little bit one way or the other does not make a big difference. Note also that the gain in well-being is substantially smaller than shown by the standard distributional analysis, because the welfare gain from plausible behavioral responses is dwarfed by the welfare loss attributable to the required financing.

A General Formula for Dynamic Welfare Effects

In the preceding example, the welfare effect of encouraging substitution from leisure to work or from fringe benefits to cash income is the increase in after-tax income less the value of whatever is given up in order to boost income. This gain is calculated as the change in after-tax income less one-half the difference between (the actual change in taxable income times the new tax rate) and (the actual change in taxable income times the old tax rate). Rearranging terms, the welfare effect equals one-half of the change in the tax rate times the change in taxable income: $\frac{1}{2} \Delta\tau \, \Delta Y$. This formula applies to each individual behavioral response and also to the set of behavioral responses taken together.[5]

Our approach is a natural extension of the logic described by Feldstein (1999). In that influential paper, Feldstein showed that the deadweight loss of a change in income taxes can be measured using the elasticity of taxable income, which incorporates not just the labor and saving responses but also shifts between taxed and tax-free compensation and between tax-favored and non-tax-favored consumption. Slemrod and Yitzhaki (2002) stated that this logic applies also to tax avoidance and tax evasion.

However, the use of taxable income to estimate deadweight loss has been challenged recently by Chetty (2008). Chetty argues that reducing taxable income relative to economic income through "sheltering" imposes two sorts of costs for the agents involved: resource costs (such as legal efforts) and transfer costs (such as fines paid to the government). If lower tax rates reduce only resource costs, then deadweight loss falls and Feldstein's logic applies. If lower tax rates reduce only transfer costs, then there is no gain to society as a whole but simply a rearrangement of surplus; in this case, deadweight loss is unchanged and Feldstein's logic is misleading. Unfortunately, little evidence exists about the relative importance of resource costs and transfer costs. Moreover, logical consistency would require analysts to allocate the transfers to other people's income, which is daunting. Therefore, implementing Chetty's distinction empirically is a challenge for future work.

[4] Several studies have found higher estimates for the responsiveness of high-income taxpayers. For example, Auten, Carroll, and Gee (2008) estimated the elasticity for taxpayers with incomes in excess of $200,000 (in 2004 dollars) to be 1.4.

[5] This formula applies even to an extreme hypothetical example of creating a $1,000 tax credit for filling out tax forms with a combination of purple and green ink. In a standard distribution table, the gain would be zero because (essentially) no one uses this combination today and behavioral responses are ignored. In a dynamic distribution table, the gain would be something like $999, which is the tax benefit less the welfare cost of using purple and green ink—a cost that is presumably a bit greater than zero because people are not doing it now.

More generally, responses to capital tax changes involve a variety of timing issues that we have not worked out but which would be a useful extension of our analysis. Similarly, the issues raised by shifting income between the individual and corporate tax systems lie beyond the scope of this paper.

To implement the preceding formula in a microsimulation model, two approaches are possible. One approach simply assumes that all incomes rise by x percent. One problem with this method is that the income change for a household is unrelated to the change in the marginal tax rate for that unit. Another approach assumes an elasticity—or an income-related elasticity—and derive the income change for each household. Specifically, $\Delta Y_i = \varepsilon (\Delta\tau_i/\tau_i\sim) Y_i$, where $\tau_i\sim$ is the average of the pre-change and post-change tax rates for household i. Substituting into the expression above yields a welfare gain of $\frac{1}{2} \varepsilon \Delta\tau_i^2 (1/\tau_i\sim) Y_i$ for each household. The relevant elasticity is a compensated elasticity that ignores income effects.

Magnitude and Sources of Behavioral Response

The behavioral response relevant for our analysis is the total elasticity of taxable income. As noted earlier, recent empirical estimates suggest that this elasticity is less than or equal to 0.4.[6] Applying the elasticity directly in our microsimulation model is difficult for technical reasons, so we approximate its effects by scaling up all components of taxable income for all tax- filing units by 3 percent. With this response, the lump-sum amount needed to finance the tax cuts is $1,486, compared with $2,243 in the static calculation. That is, the behavioral response pays for roughly one-third of the tax cuts (=1-$1,486/$2,243).

Feldstein showed that the decomposition of the taxable income response into the labor supply response, saving response, shifts between types of compensation, and so on, is not important for welfare analysis. However, it is useful more broadly to understand what sorts of behavior lie behind the estimates of the elasticity of taxable income.

Begin with the effects of the 2001 and 2003 tax cuts on labor supply, saving, and other aspects of behavior that affect total economic output.[7] Economists do not have reliable estimates of these responses, and they cannot reliably model the myriad interactions among sectors of the economy. Furthermore, the effects of tax changes depend crucially on the timing and method of financing those changes.[8] Research has generally found that tax cuts financed initially through borrowing and only later through spending cuts or tax increases

[6] Using these estimates for our purpose may overstate the benefits of tax cuts, because some of the taxable income response represents income shifted to individual tax returns from tax returns for Subchapter C corporations. The foregone corporate income taxes are not included in our analysis.

[7] For comprehensive summaries of the issues raised by so-called "dynamic scoring," see Diamond and Moomau (2003), Auerbach (2005), and Furman (2006). For discussion of some of the feedback effects mentioned in this paragraph, see Auerbach (2002), Leeper and Yan (2006), and Mankiw and Weinzierl (2006).

[8] Furman (2006) emphasizes that the financing method used in distributional analysis must be the same as that used in predicting economic effects. If predicted economic effects depend on financing a distortionary tax reduction through a lump-sum tax increase, that increase should be included in distribution tables.

reduce output in the long run because the deleterious impact of the lost national saving outweighs the favorable impact of lower tax rates. In contrast, tax cuts that are "paid for" contemporaneously are more likely to boost long-run economic activity. Even then, the nature of the financing can be important, with cuts in government funding for research and education possibly slowing growth and cuts in government assistance programs possibly spurring growth through positive labor supply effects.

Published estimates of the aggregate economic effects of the 2001 and 2003 tax cuts include a range of magnitudes and signs, depending on the models used and the assumptions made about financing:

- Gale and Potter (2002) estimated that EGTRRA will reduce GDP by 0.31 percent in 2011. They found that, although the tax cuts induce increases in labor supply, human capital, and private saving, these positive economic effects are more than offset by a decline in public saving. Gale and Potter also showed that EGTRRA could boost GDP by 0.38 percent in 2011 if behavioral elasticities are much larger than in their base scenario.

- The Joint Committee on Taxation (JCT, 2006**)** used an overlapping generations model to examine the economic impact of a hypothetical 10 percent reduction in individual income tax rates. Long-term output was lower in four of their five financing scenarios, with the bigger losses corresponding to the greater delays in financing. JCT found similar results using an equilibrium growth model.

- The Treasury Office of Tax Analysis (OTA, 2006) analyzed the economic impact of the tax cuts enacted in the early 2000s. They found that financing the tax cuts permanently by cutting domestic discretionary spending in half would raise national income 0.7 percent in the long run. Most of their other financing assumptions resulted in smaller boosts to economic growth. Indeed, if the tax cuts are ultimately financed by future income-tax increases, they will reduce output in the long run; this finding is simply a corollary of the basic economic finding that "smooth" tax rates minimize distortions (see Barro, 1979).

In sum, existing estimates suggest that the 2001 and 2003 tax cuts very likely increased aggregate output and incomes by a fraction of 1 percent. If all of the other behavioral responses together boost incomes by 2 percent or more, that would be consistent with the overall increase of 3 percent that we assume.

A more sophisticated treatment of the macroeconomic effects of the tax cuts would be interesting. Ideally, dynamic distributional analysis would predict the effect of tax changes separately on each component of pre-tax income. A flat across-the-board increase in incomes, as we did, is a plausible base case for aggregate economic effects but is not appropriate for all tax cuts or all economic circumstances:

- Suppose that a tax cut raises saving and ultimately boosts the amount of capital in the economy. In a closed economy with a Cobb-Douglas production function, the labor

and capital shares of income are unaffected by capital accumulation: More capital lowers the marginal product of capital and thus the return per unit of capital, which exactly balances the increased amount of capital so that total capital income rises in line with total output. If the new capital is owned by the same people who own existing capital, then scaling up all capital income is sensible. If the greater capital intensity is skill-neutral rather than favoring people with higher or lower skills and presumably higher or lower wages, then scaling up all labor income is also appropriate. Similarly, if a tax cut raises labor supply in this world, total labor income and total capital income increase by the same percentage.

- The analysis becomes more complicated, though, if capital and labor are more easily substitutable than in a Cobb-Douglas function, if the tax change benefits just corporate capital, if the tax change is skill-favoring, if the tax change encourages saving by people who do not currently own much capital, and so on. Moreover, dynamic analysis for our open economy requires tracking the effect of tax changes on international capital flows and thus the wedge between capital used by U.S. workers and capital owned by U.S. savers.[9]

Implementation

We calculate our results using the microsimulation model of the Urban-Brookings Tax Policy Center.[10] The model combines data from a public-use file of income tax returns with demographic information from the Current Population Survey to estimate the distribution of income, existing taxes, and proposed tax changes. The model uses the tax filing unit as the unit of analysis, and it classifies the units by various measures of current income. The model's incidence assumptions and the resulting distribution of tax burdens are similar to those in models used by the CBO, JCT, and OTA. In particular, we assign the burden of the income tax to the taxpayer, the burden of both the employee and employer portions of the payroll tax to the worker, the burden of the estate tax to decedents, and the burden of the corporate income tax in proportion to capital income received. Our results apply to the year 2010; they assume that the 2001 and 2003 tax cuts are made permanent and that the number of AMT taxpayers is held at the level that would have prevailed under previous law (as discussed by Gale and Orszag, 2004a).

We proceed in four steps. First, we calculate the static distributional effects of the tax cuts based on changes in each filing unit's taxes holding its reported income, deductions, credits, and other filing characteristics constant. Second, we calculate the lump-sum amount needed to pay for the tax cuts. As noted above, this amount is $2,243 under static assumptions

[9] A related question concerns the sensitivity of our conclusions to the assumed incidence of capital taxes. As we note below, the incidence assumptions in the Tax Policy Center model are similar to those in models used by the CBO, JCT, and OTA. In particular, capital income taxes are presumed to be borne by recipients of the income, and corporate income taxes are presumed to be borne by capital owners. This assumption is quite reasonable in the short run, but it may be less appropriate in the long run as the capital stock adjusts to the change in taxes (see Council of Economic Advisers, 2004). Again, more detailed modeling of the effects of tax changes on various income components would be useful in gauging the importance of this issue.

[10] For details of the model, see http://taxpolicycenter.org/TaxModel/tmdb/TMTemplate.cfm?DocID=299.

and $1,486 under dynamic assumptions. Third, we calculate the change in well-being for each household using the formula developed above. In cases where the marginal rate is negative, we assign a welfare effect of zero. Fourth, we calculate the total distributional effects by combining the static effects of the tax cuts with the lump sum financing amounts and the dynamic welfare effects.

Results

This section presents each of our sets of results in turn.

Standard Distributional Effects

We begin with standard estimates of distributional effects that ignore the financing of the tax cuts and the induced changes in overall economic activity. Thus, these results are comparable to results used in most public discussions of these issues, as in CBO (2004).

Table 1 presents a variety of measures of the distributional effects of the 2001 and 2003 tax cuts. As shown in the leftmost column, 75 percent of tax filing units would receive a tax cut, with the share rising from 25 percent in the bottom quintile to 99 percent in the top quintile.[11] The average percentage change in after-tax income, shown in the second column, would rise as income rises, from essentially zero in the bottom quintile to 4 percent in the top quintile. It would rise even further within the top quintile, with a nearly 8 percent increase for the top 1 percent of tax filing units. Thus, the tax cuts would boost after-tax income by a greater percentage for higher- income households, making them regressive under the definition put forward earlier.

Several other measures of distributional effects also demonstrate the concentration of the benefits on higher-income households. The average tax cut in dollars is roughly 8 times as large for the top quintile as for the middle quintile. The average tax rate would fall by 2.1 percentage points or less in each of the bottom three quintiles, but 3.2 percentage points in the top quintile and 5 percentage points in the top percentile. The share of after-tax income received by the top quintile would rise, and the shares received by each of the other four quintiles would fall.

The tax cuts do not look regressive according to the two alternative measures of distribution that we mentioned in the previous section. The percentage change in federal tax payments (not shown) is largest for households in the second quintile, and the change in the share of federal taxes paid (also not shown) is close to zero for all quintiles. However, as suggested by our earlier discussion, these results reflect the progressive distribution effects of the existing tax system rather the distributional effects of the tax changes. For example, the relatively large percentage decline in tax payments for the second quintile is due to the relatively small baseline tax burden for that group, which makes even small absolute tax changes appear large on a percentage basis.

[11] Many households that had been paying no tax before 2001 received no tax cut, and a very small share of households experienced a tax increase, due mostly to changes in saving incentives.

Distributional Effects Including Financing

Now we include the financing the 2001 and 2003 tax cuts. Table 2 presents results for the "equal-dollar financing" scenario. Now only 22 percent of tax filing units would receive a net tax cut. Compared with the analysis excluding financing effects, the biggest differences lie in the middle three quintiles: In table 2, just 0, 3, and 8 percent of tax filing units in those quintiles would receive net tax cuts versus 25, 81, and 95 percent in table 1. Despite the lump-sum tax, nearly 90 percent of tax filing units in the top quintile would receive a net tax cut, obviously reflecting the size of the direct cuts they would receive. As a result, the tax cuts and financing together would reduce after-tax income for the bottom three quintiles of the income distribution but increase it for the top two quintiles and proportionately more for the top percentile. The regressivity of the tax changes is striking.

Indeed, all of the other measures of distribution concur with this conclusion. Here both the percentage change in federal tax payments and the change in the share of federal taxes paid are largest for the poorest households and negative for the richest households. Although 78 percent of households would face net tax increases, households in the top 1 percent of the distribution would receive average benefits of almost $100,000.

Table 3 presents results for the "proportional financing" scenario. Here, 17 percent of tax filing units would receive a net tax cut. That share is essentially zero in the bottom quintile, close to 20 percent in the middle three quintiles, and 16 percent in the top quintile.[12] The tax cuts and financing together would reduce after-tax income for the bottom three quintiles of the income distribution, albeit much less dramatically than under equal-dollar financing. The top quintile again experiences higher income, and again the effect is most pronounced in the top percentile, which receives average benefits of $46,000. Thus, even with proportional financing, the tax changes are remarkably regressive.

Distributional Effects Including Financing and Behavioral Responses

At this point we incorporate both lump-sum financing and behavioral responses of the 2001 and 2003 tax cuts.[13] For simplicity we include results only for lump-sum financing. As described earlier, our methodology includes both the positive effects on well-being of the induced increases in incomes and the negative effects on well-being of the behavioral responses that raise incomes. Because the responses are voluntary, the latter effects only partly offset the former effects—but because people are assumed to be optimizing before the tax change, the latter effects will be nearly as large as the former effects for small changes in marginal tax rates. The negative effects are expressed in dollar terms, as described above, so they can be combined with the positive effects in a summary measure.

Table 4 parses the overall distributional effects into the static effect of the tax cut, the

[12] The share of the top quintile receiving a net tax cut is smaller than the shares of the middle quintiles because the AMT recovers more of the initial tax cut in this top group.

[13] Comparable results could be calculated for proportional financing and behavioral responses, but we do not report them here for simplicity.

effect of lump-sum financing, and the welfare effect of behavioral responses. The behavioral responses raise the well-being of people in each income quintile, but they matter more for people in higher quintiles. Even in the top quintile, though, the behavioral responses have less effect on well-being than does the financing of the tax cut. This result is consistent with the illustrative example we presented earlier and reflects the fact that the foregone leisure and fringe benefits had substantial value.

The right two columns of table 5 show that 34 percent of tax-filing units enjoy an increase in well-being, with the remaining 66 percent suffering a net loss. The tax cuts remain quite regressive, with a 12 percent drop in after-tax income for the bottom quintile, a 4 percent gain for the top quintile, and an 8 percent gain for the top percentile. Over 86 percent of tax-filing units in the bottom three quintiles experience a decline in after-tax income, and 96 percent of tax filers in the top quintile experience a rise in after-tax income.

Conclusion

The tax laws enacted at the beginning of this decade made sweeping changes in federal income and estate taxes. In this paper, we re-examine the distributional impacts of those changes to account not only for the direct effects on after-tax income, but also for the eventual need to finance the tax changes and for the impact of behavioral responses on both after-tax income and other aspects of well-being.

These analytical innovations substantially alter the estimated distributional effects of the tax cuts. In the standard approach, most people are made better off because of the tax cuts, with the biggest percentage and absolute gains in after-tax income received by high-income households. In the more complete analysis that incorporates financing and behavioral responses, a large majority of households are made worse off by the tax cuts, especially in the lower three income quintiles. Only in the top quintile, and especially in the top percentile, do people experience substantial gains.

More generally, the analytical innovations introduced in this paper build on and extend a large literature on behavioral responsive to taxes. Future research could apply these tools to study other tax changes and other dimensions of behavioral response.

References

Auerbach, Alan J. 2002. “The Bush Tax Cut and National Saving.” *National Tax Journal* 55:387-407. September.

Auerbach, Alan J. 2005. “Dynamic Scoring: An Introduction to the Issues.” *American Economic Review*, Vol 95(2), pp. 421-425. May.

Auten, Gerald, Robert Carroll, and Geoffrey Gee. 2008. “The 2001 and 2003 Tax Rate Reductions: Overview and a Look at the Taxable Income Response.” Presented at the 2008 Spring Symposium of the National Tax Association.

Barro, Robert J. 1979. "On the Determination of Public Debt." *Journal of Political Economy*, Vol 97(5), pp. 940-971. October.

Chetty, Raj. 2008. "Is the Taxable Income Elasticity Sufficient to Calculate Deadweight Loss? The Implications of Evasion and Avoidance." National Bureau of Economic Research Working Paper No. 13844. March.

Congressional Budget Office. 2004. 'Effective Federal Tax Rates Under Current Law: 2001-14." August.

Congressional Budget Office. 2007. "The Long-Term Budget Outlook." December.

Council of Economic Advisors. 2004. *Economic Report of the President*. Washington: Government Printing Office.

Cronin, Julie Ann. 1999. "U.S. Treasury Distributional Analysis Methodology." U.S. Department of Treasury Office of Tax Analysis Working Paper 85. September.

Diamond, John W. and Pamela H. Moomau. 2003. "Issues in Analyzing the Macroeconomic Effects of Tax Policy." *National Tax Journal*, Vol 56(3), pp. 447-462.

Feldstein, Martin. 1999. "Tax Avoidance and the Deadweight Loss of the Income Tax." *Review of Economics and Statistics*, Vol. 81(4), pp. 674-680. November.

Furman, Jason. 2006. "A Short Guide to Dynamic Scoring." Center for Budget and Policy Priorities. August.

Gale, William G. and Peter R. Orszag. 2004a. "Tax Policy in the Bush Administration: Introduction and Background." *Tax Notes*, Sept. 13, pp. 1291-1300.

Gale, William G. and Peter R. Orszag. 2004b. "Bush Administration Tax Policy: Revenue and Budget Effects." *Tax Notes*, October 4, pp. 105-118.

Gale, William G., Peter R. Orszag, and Isaac Shapiro. 2004. "The Distribution of the 2001 and 2003 Tax Cuts and Their Financing." *Tax Notes*, June 21, pp. 1539-1548.

Gale, William G., and Samara R. Potter. 2002. "An Economic Evaluation of the Economic Growth and Tax Relief Reconciliation Act of 2001." March.

Gale, William G. and Joel Slemrod. 2001. "Overview." In *Rethinking Estate and Gift Taxation*, edited by William G. Gale, James R. Hines Jr. and Joel Slemrod. Washington: Brookings.

Gravelle, Jane G. 2001. "Economic Issues Affecting Across-the-Board Tax Cuts." *Tax Notes*, Jan. 15, pp. 367-374.

Gruber, Jon and Emmanuel Saez 2002. "The Elasticity of Taxable Income: Evidence and Implications." *The Journal of Public Economics* 84(1): 1-32. April.

Joint Committee on Taxation. 2006. "Exploring Issues in the Development of Macroeconomic Models for Use in Tax Policy Analysis." June.

Joulfaian, David L. 1998. "The Federal Estate and Gift Tax: Description, Profile of Taxpayers, and Economic Consequences." Office of Tax Analysis Paper 80. December.

Leeper, Eric M. and Shu-Chun Susan Yang. 2006. "Dynamic Scoring: Alternative Financing Schemes." National Bureau of Economic Research Working Paper No. 12103. March.

Lyon, Andrew B. and Michael Haliassos. 1994. "Progressivity of Capital Gains Taxation with Optimal Portfolio Selection." In *Tax Progressivity and Income Inequality*, edited by Joel Slemrod. Cambridge: Cambridge University Press, pp. 275-304.

Mankiw, N. Gregory and Matthew Weinzierl. 2006. "Dynamic Scoring: A Back-of-the-Envelope Guide." *Journal of Public Economics*, Vol 90(8), pp. 1415-1433. September.

Office of Management and Budget. 2004. *Budget of the US Government, Analytical Perspectives.* Washington: Government Printing Office.

Office of Tax Analysis. 2006. "Dynamic Analysis of the Permanent Extension of the President's Tax Relief." U.S. Department of Treasury. July.

Rosen, Harvey S. 1995. *Public Finance*. Fourth Edition. Irwin.

Rosen, Harvey S. 2004. "The Case for Making the Tax Cuts Permanent." Remarks for the National Tax Association Spring Symposium. May 20.

Saez, Emmanuel. 2004. "Reported Incomes and Marginal Tax Rates, 1960-2000: Evidence and Policy Implications." National Bureau of Economic Research Working Paper No. 10273. February.

Slemrod, Joel and Shlomo Yitzhaki. 2002. "Tax Avoidance, Evasion, and Administration." In *Handbook of Public Economics*, edited by Alan J. Auerbach and Martin Feldstein, pp. 1423-1470.

Steuerle, C. Eugene. 2003. "Can the Progressivity of Tax Changes Be Measured in Isolation?" *Tax Notes*, September 1, pp. 1187-1188.

Viard, Alan D. 2007. "Testimony Submitted to the House Committee on Appropriations, Subcommittee on Financial Services and General Government," March 5, 2007.

Wolff, Edward. 2002. "Top Heavy: A Study of Increasing Inequality of Wealth in America." The New Press.

Table 1
Static Distributional Effects of the 2001 and 2003 Tax Cuts[a]

Cash Income Percentile	Percent With Increase in After-Tax Income	Change in After-Tax Income (Percent)	Change in Taxes (Dollars)	Change in Average Tax Rate (Percentage Points)	Change in Share of After-Tax Income (Percentage Points)
All	74.8	3.6	-2,243	-2.7	0.0
Lowest Quintile	25.3	0.7	-81	-0.7	-0.1
Second Quintile	80.8	2.4	-653	-2.1	-0.1
Middle Quintile	95.1	2.5	-1,160	-2.0	-0.2
Fourth Quintile	98.9	3.2	-2,445	-2.5	-0.1
Top Quintile	99.3	4.4	-9,672	-3.2	0.4
90-99 Percentile	99.1	3.0	-6,228	-2.2	-0.1
Top 1 Percent	99.1	7.5	-99,816	-5.0	0.6

Source : Urban-Brookings Tax Policy Center Microsimulation Model.

[a]Cash income percentiles for 2012 using the pre-EGTRRA law as baseline. Assumes that the tax cuts are permanent and that the AMT exemption is raised (to $54,000 for married couples filing joint $40,500 for single filers) to keep the number of AMT taxpayers equal to the number who would have been on the AMT under pre-EGTRRA law.

Table 2

Distributional Effects of the 2001 and 2003 Tax Cuts With Equal-Dollar Financing[a]

Cash Income Percentile	Percent With Increase in After-Tax Income	Change in After-Tax Income (Percent)	Change in Taxes (Dollars)	Change in Average Tax Rate (Percentage Points)	Change in Share of After-Tax Income (Percentage Points)
All	22.1	0.0	0	0.0	0.0
Lowest Quintile	0.0	-19.1	2,162	18.0	-0.9
Second Quintile	3.0	-5.9	1,590	5.1	-0.6
Middle Quintile	7.6	-2.3	1,083	1.9	-0.3
Fourth Quintile	39.7	0.3	-202	-0.2	0.1
Top Quintile	89.0	3.4	-7,429	-2.4	1.7
90-99 Percentile	89.1	1.9	-3,985	-1.4	0.4
Top 1 Percent	96.2	7.3	-97,573	-4.9	1.2

Source : Urban-Brookings Tax Policy Center Microsimulation Model.

[a]Cash income percentiles for 2012 using the pre-EGTRRA law as baseline. Assumes that the tax cuts are permanent and that the AMT exemption is raised (to $54,000 for married couples filing jointly, $40,500 for single filers) to keep the number of AMT taxpayers equal to the number who would have been on the AMT under pre-EGTRRA law. Financing equals $2,243 per tax unit.

Table 3

Distributional Effects of the 2001 and 2003 Tax Cuts With Proportional Financing[a]

Cash Income Percentile	Percent With Increase in After-Tax Income	Change in After-Tax Income (Percent)	Change in Taxes (Dollars)	Change in Average Tax Rate (Percentage Points)	Change in Share of After-Tax Income (Percentage Points)
All	16.8	0.0	0	0.0	0.0
Lowest Quintile	3.3	-2.1	241	2.0	-0.1
Second Quintile	25.3	-0.7	184	0.6	-0.1
Middle Quintile	19.1	-0.8	393	0.7	-0.1
Fourth Quintile	24.8	-0.3	209	0.2	-0.1
Top Quintile	15.6	0.7	-1,450	-0.5	0.3
90-99 Percentile	8.4	-0.7	1,523	0.5	-0.2
Top 1 Percent	68.3	3.5	-46,065	-2.3	0.5

Source : Urban-Brookings Tax Policy Center Microsimulation Model.

[a]Cash income percentiles for 2012 using the pre-EGTRRA law as baseline. Assumes that the tax cuts are permanent and that the AMT exemption is raised (to $54,000 for married couples filing jointly, $40,500 for single filers) to keep the number of AMT taxpayers equal to the number who would have been on the AMT under pre-EGTRRA law. Financing equals 2.7 percent of cash income.

Table 4

Composition of Distributional Effects of the 2001 and 2003 Tax Cuts with Equal-Dollar Financing and Behavioral Responses[a]

Cash Income Percentile	Static Effect of Tax Cut	Lump Sum Financing	Welfare Effect of Behavioral Responses	Total Effect of Tax Cut
All	2,243	-1,486	256	1,013
Lowest Quintile	81	-1,486	35	-1,369
Second Quintile	653	-1,486	131	-701
Middle Quintile	1,160	-1,486	160	-166
Fourth Quintile	2,445	-1,486	349	1,308
Top Quintile	9,672	-1,486	857	9,043
90-99 Percentile	6,228	-1,486	600	5,342
Top 1 Percent	99,816	-1,486	9,580	107,910

Source : Urban-Brookings Tax Policy Center Microsimulation Model.

[a]Cash income percentiles for 2012 using the pre-EGTRRA law as baseline. Assumes that the tax cuts are permanent and that the AMT exemption is raised (to $54,000 for married couples filing jointly, $40,500 for single filers) to keep the number of AMT taxpayers equal to the number who would have been on the AMT under pre-EGTRRA law.

Table 5

Comparison of the Standard and Dynamic Distributional Effects of the 2001 and 2003 Tax Cuts[a]

	Static Effects		Dynamic Effects with Equal-Dollar Financing and Behavioral Responses	
Cash Income Percentile	**Percent With Increase in After-Tax Income**	**Change in After-Tax Income (percent)**	**Percent With Increase in After-Tax Income**	**Change in After-Tax Income (percent)**
All	74.8	3.6	34.3	1.6
Lowest Quintile	25.3	0.7	1.0	-12.1
Second Quintile	80.8	2.4	15.1	-2.6
Middle Quintile	95.1	2.5	24.6	-0.4
Fourth Quintile	98.9	3.2	68.5	1.7
Top Quintile	99.3	4.4	96.4	4.2
90-99 Percentile	99.1	3.0	96.5	2.6
Top 1 Percent	99.1	7.5	97.7	8.1

Source : Urban-Brookings Tax Policy Center Microsimulation Model.

[a]Cash income percentiles for 2012 using the pre-EGTRRA law as baseline. Assumes that the tax cuts are permanent and that the AMT exemption is raised (to $54,000 for married couples filing jointly, $40,500 for single filers) to keep the number of AMT taxpayers equal to the number who would have been on the AMT under pre-EGTRRA law.