Evidence on Labor Supply and Taxes, and Implications for Tax Policy

Nada Eissa

By any measure, the last decade represents an especially active period in the modern history of the United States tax system. A series of tax acts—signed into law by President Bush in 2001, 2002, and 2003—has dramatically changed the federal income tax code. These tax acts all had important effects on the tax liabilities and incentives faced by taxpayers. In fact, a central motivation of the tax cuts was to improve incentives and thereby encourage long-term economic growth: policymakers held that “high individual income tax rates reduce incentives for taxpayers to work, to save and to invest,” and that they therefore “have a negative effect on the long-term health of the economy” (U.S. House of Representatives 2001).1

It is difficult to argue against improving incentives, since they do matter, both in fact and theory. The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) improved work incentives through a combination of provisions, including a doubling of the child tax credit,2 lower tax burdens for joint filers (marriage penalty relief), and a higher exemption for the Alternative Minimum Tax (AMT relief), but primarily through the reduction in statutory marginal income tax rates. These changes also matter for much more than “work” behavior (i.e., whether to participate in the labor market, and how many hours to work). They matter for choices about the form of compensation (as wages, fringe

The author would like to thank Steve Davis and Alan Viard for helpful comments, Dan Feenberg for help with TAXSIM, and Sam Easterly for research assistance.
benefits, or other income), for human capital accumulation (schooling and training), and occupational choice—all of which should be considered part of the labor supply response.

This chapter evaluates the effects of the Bush tax cuts on labor supply behavior. The impact of tax cuts on labor supply—broadly defined—can be gauged by evaluating the taxable income response, which has been the near-exclusive focus of recent evaluations of the behavioral response to tax reforms. Much about the full range of behavioral responses can be learned from the taxable income elasticity (see the chapter by Giertz in this volume); but it is also informative to separately evaluate different dimensions of labor supply, since they respond differently to taxes. This chapter will focus on the impact of tax cuts on labor force participation and hours worked. This is not entirely by choice, but rather forced by the relative lack of direct evidence on how tax cuts affect decisions such as compensation choice and human capital accumulation.

Several related literatures arguably provide indirect evidence on labor supply responsiveness, including analyses of cross-country differences in hours worked and marginal tax rates and of informal labor markets (see Steve Davis’s response to this chapter below). Much of that evidence is quite intriguing: for example, long-term differences in hours worked between Americans and Europeans can be explained by differences in tax rates on labor income (Prescott 2004; Ohanian, Raffo, and Rogerson 2006). But, in the context of cross-country comparisons, it can be highly misleading to abstract from the institutional details of a specific tax transfer program (or provision of social assistance benefits). European countries provide a very different set of transfer and social insurance programs than does the United States, and analyses that focus only on taxes miss a potentially critical element of the budget set. As a result, much of that work remains somewhat speculative and should be viewed as raising issues for further research rather than providing hard evidence for our current understanding of behavioral responses to taxes.

No studies have directly evaluated the effects of recent tax reforms on labor supply; therefore I review the relevant empirical literature and discuss its implications for labor supply effects. Recent empirical evidence largely confirms that labor supply (even narrowly defined) does respond to taxes, especially for some demographic groups—casting doubt on claims that labor
supply is inelastic with respect to taxes. Early empirical work (starting with Hall 1973) established that taxes have little effect on one dimension of labor supply, namely hours worked by males. What is interesting is that this small (intensive) elasticity of hours worked now characterizes the responsiveness of females as well, including married women. Yet evidence of responsiveness at the extensive margin of entry and exit from the labor market abounds, especially for less-skilled workers and for single and married mothers. In fact, this evidence is found consistently, using different estimation technique and over different time periods. The nature of this labor supply response—along the extensive but not the intensive margin—has important implications for the welfare evaluation of taxes (and of transfer programs).

The bulk of empirical work on taxes and labor supply has generally assumed a static model, but an important element of labor supply responses is dynamic. Over the life cycle, individuals choose when to enter the labor market (how much schooling to get) and when to retire. In addition, workers reallocate their work as wages fluctuate over time. A large parallel literature has attempted to estimate the intertemporal elasticity of labor supply, though only a few studies explicitly account for taxes and transfers. That work generally finds small to modest intertemporal responses, though substantial uncertainty about the magnitude of the response remains (Blundell and MaCurdy 1999; Ziliak and Kniesner 1999). Intertemporal responses are especially relevant for considering the effects of recent tax cuts, because so many of the changes were phased in and arguably anticipated. Perhaps the single most significant element is the legislated sunset of the entire set of tax cuts on December 31, 2010 (unless further legislation makes them permanent).

Below, I briefly review the main provisions in EGTRRA and JGTRRA, especially as they relate to work incentives, and I evaluate the size of the tax cuts for taxpayers in the March Current Population Survey (CPS).

I then address issues that arise in evaluating labor supply, focusing on the complexity of the budget set and basic identification concerns in the empirical literature. This section presents the budget set faced by most taxpayers before the tax cuts and argues that their complexity limits the potential responses.

The next section summarizes what is known about the impact of taxes on labor supply. This summary is structured to help place the extensive literature in context. It first reviews the evidence on male labor supply,
arguing that hours worked by men are nearly universally estimated to be inelastic to taxes. An intriguing result with males, found by Moffitt and Wilhelm (2000), is the sizable response of wage and salary income to the Tax Reform Act of 1986 (TRA86). Next, I evaluate female labor supply, focusing first on married women and then on female household heads. With the latter group, the distinction between two measures of labor supply—employment (extensive margin) and hours worked by labor force participants (intensive margin) becomes critical. Recent evaluations of tax cuts for single mothers (through the Earned Income Tax Credit [EITC]) consistently find a large positive impact on their employment, and interestingly no impact at all on their hours of work. Married women are generally found to be responsive to taxes, though recent research suggests they respond more like men once they enter the labor market.

I then look at what the evidence on labor supply suggests about the impacts of the Bush tax cuts. Using reasonable elasticities, I evaluate the likely impacts of the Bush tax cuts on labor supply (measured by labor force participation and hours worked). I also present unadjusted labor supply data from the March CPS showing that any response is likely to be very moderate. This section also examines the implications of discrete choice for the welfare evaluation of tax reform.

**Tax Policy Changes in the 2000s and Their Impact on Labor Supply Incentives**

The Bush tax cuts—passed in 2001, 2002, and 2003—lowered all federal marginal rates, but they also contained several other provisions relevant for earned income. To maintain the tax cuts within budget guidelines, just about all provisions were phased in over several years, and the entire legislation was to sunset after 2010. Table 3-1 summarizes the relevant provisions of the tax cuts.

The first tax legislation, EGTRRA, was passed on June 7, 2001, and was the most sweeping of the three. It reduced federal marginal rates for all taxpayers, doubled the child tax credit, temporarily raised the alternative minimum tax exemption, and reduced taxes on married couples filing jointly.
### Table 3-1
**Summary of Major Tax Cut Provisions for Labor Supply**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tax Schedule</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10% tax bracket</td>
<td>N/A</td>
<td>Up to $7,000 (single filers); $14,000 (joint filers); $10,000 (heads of household)</td>
</tr>
<tr>
<td>Higher tax brackets (%)</td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>28.0</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td>31.0</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>36.0</td>
<td>33.0</td>
<td></td>
</tr>
<tr>
<td>39.6</td>
<td>35.0</td>
<td></td>
</tr>
<tr>
<td><strong>Child Credit</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child credit</td>
<td>$500, limited refundability</td>
<td>$1000, refundable to a maximum of 15% of earned income above $10,000</td>
</tr>
<tr>
<td><strong>Relief from Marriage Penalties</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard deduction for joint filers</td>
<td>167% of that for single filers</td>
<td>200% of that for single filers</td>
</tr>
<tr>
<td>15% tax bracket for joint filers</td>
<td>Upper threshold is 167% of that for single filers</td>
<td>Upper threshold is 200% of that for single filers</td>
</tr>
<tr>
<td>Earned income tax credit for joint filers</td>
<td>Joint and head-of-household filers face the same credit schedule</td>
<td>Maximum credit region extended for joint filers; beginning of phaseout extended by $3,000 for joint filers</td>
</tr>
<tr>
<td><strong>Itemized Deductions and Personal Exemptions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limits on itemized deductions</td>
<td>Deductions are reduced by 3% of amount of income above a threshold (to a maximum reduction of 80%)</td>
<td>No reduction in deductions</td>
</tr>
<tr>
<td>Personal exemption phaseout</td>
<td>Value of personal exemptions is reduced by 2% for each $2,500 of adjusted gross income above a threshold</td>
<td>No phaseout of exemptions</td>
</tr>
<tr>
<td><strong>Alternative Minimum Tax</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exemption for the alternative minimum tax</td>
<td>$33,750 for single filers, $45,000 for joint filers</td>
<td>Temporarily increased exemption</td>
</tr>
</tbody>
</table>

**Source:** CBO 2007.
In 2000, the federal income tax schedule consisted of five brackets, ranging from 15 to 39.6 percent. The 2001 tax cut lowered the top federal marginal tax rate from 39.6 to 35 percent by 2006; and the 28, 31, and 36 percent rates by three percentage points, also by 2006. Rates were set to decline 0.5 percentage points in 2001 and 2002, and an additional percentage point at the beginning of 2004. For low-income filers, EGTRRA created a new 10 percent tax bracket; this applied to the first $12,000 of taxable income (for joint filers). All these legislated tax cuts were accelerated to the beginning of 2003 by JGTRRA.

In addition to reducing marginal rates, the 2001 bill increased gradually the maximum amount of the child credit, to $1,000 in 2010, and made it partly refundable. A household with no income tax liability could therefore receive a refund, though it would be subject to limits that depend on earnings. EGTRRA also eliminated the phaseout of deductions and exemptions for higher-income taxpayers, lowering their marginal tax rates and tax liabilities.

To alleviate the marriage penalty in the federal code, the 15 percent tax bracket for a married couple was increased from 167 percent to 200 percent of the single-filer bracket, as was the value of the standard deduction (phased in by 2008 and 2009, respectively). A marriage penalty, which occurs when a married couple faces a greater tax liability filing jointly than they would filing as unmarried individuals, is primarily the outcome of a progressive tax schedule on family (rather than individual) incomes. The legislated changes offset this penalty by ensuring that two single people keep their single-taxpayer standard deduction when they marry, and that their joint income continues to face the 15 percent tax rate. These provisions do not eliminate the marriage penalty for higher-income taxpayers or even for taxpayers with incomes in the 15 percent bracket—if they have children and are eligible for the EITC. The tax cuts did offset some of the marriage tax in the EITC by increasing the income at which the phaseout and loss of the credit begin for joint filers.

JGTRRA expanded on the 2001 tax cuts and accelerated the phase-in of many provisions that had been scheduled to take effect in 2003. It broadened the 10 percent bracket for 2003 and 2004, and lowered statutory rates for the top four brackets to levels that EGTRRA had set to begin in 2006. It widened the 15 percent bracket for joint filers so that the top income in this
bracket was double the top income in the 2003 single bracket, and it increased the child credit from $600 to $1,000 for 2003. JGTRRA also accelerated earlier provisions phasing in the elimination of limits on itemized deductions and personal exemptions for higher-income taxpayers.

Impact on Labor Supply Incentives. The remainder of this section reviews the changes in marginal and average tax rates between 2000 and 2006 using survey data and gauges the direct impact of the Bush tax cuts. The tax cuts had no impact on marginal rates for taxpayers in the 15 percent bracket, for those subject to the AMT, and for people without positive income tax liability; but they did have a moderate impact on marginal tax rates. Auten, Carroll, and Gee (2008) show that EGTRRA and JGTRRA shifted the distribution of taxpayers across the federal tax schedule, with an increase (decrease) in the number of taxpayers with marginal tax rates below 10 percent (above 40 percent). At the top of the distribution, the number of taxpayers with marginal tax rates of 40 percent or more decreased from 1.8 million in 2000 to only 546,000 in 2005 (far below the projected 2.3 million taxpayers in 2005).

To further examine the impact of the tax cuts on work incentives, I use data from the 2001, 2003, 2005, and 2007 March CPS. The March CPS includes detailed information on demographic characteristics and income for the previous calendar year, though it lacks information on various tax deductions. I define tax units and calculate marginal and average tax rates using the National Bureau of Economic Research (NBER) TAXSIM model. To simplify, tax calculations assume all married couples file jointly. All filers take the standard deduction unless their imputed state income taxes exceed the value of the deduction, in which case they itemize. Marginal tax rates are based on the tax owed on an additional ten cents of income earned by the tax-filing unit, and so are effective marginal tax rates. For this reason the range can extend well beyond the top statutory marginal rate in any year. In fact, the highest effective federal marginal rates for primary earners simulated by TAXSIM are well over 50 percent, though only 1 percent of taxpayers face marginal rates that exceed the statutory maximum in any year.

Figures 3-1a–3-1c show the distributions of effective federal marginal tax rates for primary earners, secondary earners, and female household heads in 2000, 2002, 2004, and 2006. The vertical lines are set at the 15 and 39.6 percent marginal tax rate. The data show very different
FIGURE 3-1a
MARGINAL TAX RATES, PRIME-AGE WORKERS

SOURCE: 2001–2007 March CPS.

FIGURE 3-1b
MARGINAL TAX RATES, WORKING MARRIED WOMEN

SOURCE: 2001–2007 March CPS.
distributions for the three groups, with married women more concentrated further up the rate distribution, and household heads facing some of the lowest and highest marginal rates at the federal level. This large variation in the tax rates of female household heads reflects the influence of the EITC. The EITC provides a refundable credit, so that even a taxpayer with no tax liability could receive a refund from the federal government for the credit’s full value. For the lowest-earning workers, the credit effectively creates a negative tax rate of up to 40 percent. Moreover, because the marginal rate declines substantially for taxpayers once they earn too much to qualify for the credit (from a high of 36 percent to 15 percent), it would be misleading to map the tax rate distribution to earnings. Nonetheless, the figures show a consistent decline in the share of taxpayers facing higher marginal rates and an increase in the share facing the 15 percent marginal rate. Notably, some taxpayers continue to face marginal tax rates in the 35–40 percent range, even after the tax cuts are fully phased in.

To measure more precisely the impact of the tax cuts, I simulate 2004 taxes for each individual in the 2000 sample. The impact of the tax cuts is the difference between the actual tax rate in 2000 and the tax rate in 2004.
Table 3-2 presents the findings: EGTRRA and JGTRRA lowered average tax rates for all taxpayers as a group and for different groups (classified by marital status and income). On average, marginal tax rates fell by about 2.6 percentage points, from 17.3 to 14.7 percent. This cut is primarily the result of changes in statutory tax rates and the tax schedule, and of provisions related to marriage penalty relief (CBO 2007).

Table 3-2 also shows that taxpayers with children and those with higher incomes gained the most from the tax cuts. Marginal rates fell by about 3.3 percentage points for secondary earners and head-of-household filers; and nearly five percentage points for taxpayers at the very top (ninety-ninth percentile) of the CPS income distribution. These rates include neither state income nor payroll taxes. Including state and payroll taxes to calculate the effective rate raises the level, to 34.1 percent in 2000, but does not affect the size of the tax cut. Applying 2004 tax law leads to a 2.3 percentage point cut in the marginal tax rate. This occurs because state income taxes (and payroll taxes) remained largely unchanged over this period.

Figure 3-2 presents the average federal marginal tax rate by income decile, and shows there was some variation in the size of the tax cuts across the income distribution. The largest decline in the sample was 4.1 percentage points for individuals with income in the third decile and 1.7 percentage points for those in the fifth decile.

Table 3-2
Effect of EGTRRA and JGTRRA on Marginal and Average Federal Income Tax Rates

<table>
<thead>
<tr>
<th></th>
<th>Marginal Tax Rate (2000 law)</th>
<th>Δ Marginal Rate (2004 law)</th>
<th>Average Tax Rate (2000 law)</th>
<th>Δ Average Rate (2004 law)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>17.3 (15.5)</td>
<td>–2.6 (4.6)</td>
<td>9.8 (12.0)</td>
<td>–2.8 (1.6)</td>
</tr>
<tr>
<td>Secondary earners</td>
<td>21.5 (12.4)</td>
<td>–3.3 (5.5)</td>
<td>10.9 (11.2)</td>
<td>–3.4 (1.5)</td>
</tr>
<tr>
<td>Household heads</td>
<td>3.8 (27.8)</td>
<td>–3.3 (7.0)</td>
<td>–5.5 (15.8)</td>
<td>–2.7 (2.1)</td>
</tr>
<tr>
<td>Top 1%</td>
<td>38.6 (0.9)</td>
<td>–4.9 (1.4)</td>
<td>41.0 (4.9)</td>
<td>–4.6 (0.8)</td>
</tr>
</tbody>
</table>

Source: Author’s calculations.
Over this period, average tax rates (tax liability as a share of total income) also declined, by an average of 2.8 percentage points for all taxpayers, from 9.8 percent to just below 7 percent of income (column 4 of table 3-2). For both secondary earners and the top 1 percent of tax-filing units, the decline was larger: 3.4 and 4.6 percentage points. As with marginal tax rates, the largest impacts are due to changes in statutory tax rates and brackets, with AMT and marriage penalty relief having a similar but smaller impact. The average tax rate is important for the distributional impact of the tax cuts, but also for the decision to enter the labor market.

The size of the tax cuts predicted in the 2001 CPS sample are consistent with findings in CBO’s (2007) analysis of eliminating the legislated sunset at the end of 2010, though the two methods are very different. CBO examines a policy change in 2011 but uses a representative sample of income tax returns filed in 2002, and so “ages” the data based on projected demographic trends. The effects of the tax cuts are then calculated for this “aged” sample of returns. CBO finds the Bush tax cuts, on average, would reduce marginal and average tax rates by about three percentage points each. CBO also examines the implied labor supply (and
earnings) effects of the tax cuts using elasticities from the literature. I use these elasticities in the next section to predict the labor supply effects for prime-age taxpayers in the CPS.

A Simple Framework for Evaluating the Impact of Tax Cuts in the 2000s?

In the standard model of labor supply, individuals value leisure and consumption of other goods. In the simplest static partial equilibrium model, the tax cuts influence hours of work through two effects that push in opposite directions. Lower marginal rates raise the price of leisure (relative to other goods) and encourage individuals to work more hours (substitution effect). The tax cuts also reduce overall tax burdens, however. The resulting increase in after-tax income leads individuals to consume more of all goods including leisure and so to work fewer hours (income effect). The net effect of the tax cuts on hours worked therefore depends on the relative size of these substitution and income effects, as well as on the magnitude of the reductions in marginal and average tax rates.

By expanding the budget set, the reduction in tax burdens also affects individuals’ decisions about entering the labor market. This latter effect is unambiguous in the case of a single individual with no unearned income. For secondary earners, a lower tax burden discourages entry into the labor market through the income effect.

One caveat is worth noting at this point. These predictions are substantially complicated by nonlinearities in the budget set. (Below I discuss more fully the implications for behavioral responses and for the empirics of labor supply models.) With a nonlinear budget set, the overall impact on hours worked and labor force participation depends in addition on the distribution and composition of tax changes and of taxpayers across the tax schedule. To show this dependence, figure 3-3 presents a simple illustration of how reducing the marginal rate along the first segment (and on unearned income) influences hours worked by different workers. The budget set before the tax is given by ABC with two rates: 15 percent (AB) and 28 percent (BC). After the tax cut, the budget set shifts to ADEFG, reflecting a higher net unearned income (AD) and the new 10 percent bracket (DE). All taxpayers beyond the 10 percent bracket benefit from the lower rate along the first bracket, even those whose marginal rate remains unchanged at 15 percent. This occurs because their disposable income
rises. As a result, they reduce their hours of work (if leisure is a normal good). Additionally, provisions that reduce taxes on unearned income cause some workers to drop out of the labor force.

I take a far simpler approach to predicting the labor supply response. I use the mean change in marginal and average tax rates and calculate the wage and income effects on annual hours worked (see table 3-3). These calculations miss the heterogeneity of the effects and responses at different points along the tax schedule, but they are meant to be purely illustrative.

The basic conclusion is that the effect of the tax cuts on labor supply (measured by annual hours worked) is likely to be very modest. At the average hourly wage of $20.55, the 2.6 percentage point decline in the average marginal tax rate leads to a 3.5 percent increase in the after-tax hourly wage. Applying a wage elasticity of 0.1 suggests an increase of less than 0.5 per-
cent in hours worked by all workers (or eleven hours per year). This positive substitution effect would be offset by the increase in disposable income resulting from the tax cut, and would result in an overall increase of just under nine hours per year. Though the overall effect on hours worked is small, there is substantial heterogeneity in the expected effects among different demographic groups. Among married women, for example, the impact is predicted to be much larger, because both their net wage increase and their behavioral response are greater. An uncompensated hours-of-work elasticity of 0.65 for married women with a 5 percent increase in their after-tax hourly wage would lead to 54 more hours worked per year due to the substitution effect, and a net increase of 43.5 hours worked ($750). For female household heads, the predicted impact is a mere 15 hours ($175) per year, less than 1 percent. These modest results for impact on hours worked are consistent with CBO’s (2007) findings on the effects of the expiration of the Bush tax cuts, which do account for the heterogeneous effects on individual taxpayers.

Figures 3-4a–3-4c present the unconditional distribution of hours worked by prime-age males, married women, and female household heads, respectively. All else equal, the tax cuts should have shifted the distributions

<table>
<thead>
<tr>
<th>% Δ Net Wage (Wage Elasticity)</th>
<th>Δ Hours Worked (% Level)</th>
<th>% Δ Net Income (Income Elasticity)</th>
<th>Δ Hours Worked (% Level)</th>
<th>Total Effect (Hours, Earned Income)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>+3.5% (0.20)</td>
<td>0.7% (14)</td>
<td>+2.8% (–0.10)</td>
<td>–0.3% (–5.2)</td>
</tr>
<tr>
<td>Secondary Earners</td>
<td>+5.0% (0.65)</td>
<td>3.2% (55)</td>
<td>+3.4% (–0.25)</td>
<td>–0.9% (–11.5)</td>
</tr>
<tr>
<td>Household Heads</td>
<td>+5.1% (0.20)</td>
<td>1.0% (19)</td>
<td>+2.7% (–0.10)</td>
<td>–0.3% (–4.0)</td>
</tr>
</tbody>
</table>

Source: Data come from the 2001 March CPS.
Notes: The sample includes all prime-age (23-59) individuals. Tax rates are calculated using the NBER TAXSIM model, and assume all married couples file jointly and all household heads take the standard deduction. The tax rates are calculated for 2000, and then again for 2004 (by inflating all income components using the CPI). Δ represents the difference between the actual rate and what it would have been under the 2004 tax law.
**Figure 3-4a**

**Annual Hours of Work, Kernel Density, Prime-Age Males**

![Graph showing annual hours of work for prime-age males, with kernel density for different years (2000, 2002, 2004, 2006)].

Source: 2001–2007 March CPS.

---

**Figure 3-4b**

**Annual Hours of Work, Kernel Density, Married Women**

![Graph showing annual hours of work for married women, with kernel density for different years (2000, 2002, 2004, 2006)].

Source: 2001–2007 March CPS.
to the right, and reduced the mass at zero hours worked. The data show, however, that hours worked by prime-age males remained effectively unchanged over this period, while the distributions for females generally shifted left, reflecting a decline in females’ employment population ratios and hours of work. To infer any tax effect here requires a counterfactual set of distributions, which would account for general economic trends during this period. That is beyond the scope of this chapter, but it is worth noting that economic growth is likely to have reinforced any tax effect after 2002. While the gross domestic product’s annual growth rate fell from 3.7 in 2000 to 0.8 in 2001, it rose back to 3.6 percent by 2004 and hovered around 3 percent through 2006.

Uncertainty about the labor supply effect of the tax cuts is substantial for several reasons, however, including uncertainty about the size (and composition) of the labor supply elasticity and the limited evidence on other margins of labor supply responsiveness (including occupational choice, human capital decisions, and compensation choices). The next section discusses issues in the evaluation of taxes and labor supply, and the section after that reviews the existing empirical evidence, including the evidence on intertemporal responsiveness.
Taxes and Labor Supply

Estimating the effects of taxes on labor supply is notoriously difficult, because of the joint determination of labor supply and taxes with nonproportional tax schedules, because of unobserved tastes for work, and because of measurement error in both the marginal tax rate and the wage. This difficulty explains the vast empirical literature on the subject and the divergent labor supply estimates that abound. Several extensive reviews of labor supply and taxation discuss the set of conceptual and methodological problems in the literature (Hausman 1985; Blundell and MaCurdy 1999). This section focuses on two issues central to evaluating the impact of the tax cuts: the budget set and identification.

The Budget Set. A worker filing a tax return in 2000 faced a federal income tax schedule with five brackets, with rates ranging from 15 to 39.6 percent. These rates applied to taxable income, so some earnings were shielded from federal income taxes by personal exemptions and the standard deduction (or itemized deductions). For a taxpayer with two children, the exemptions were $18,550 if filing jointly and $14,850 if filing as head of household. In addition, this taxpayer would face either no state income tax (in Florida or Texas) or as much as a 9 percent state income tax (in California, Oregon, and Iowa). This taxpayer would also have paid payroll taxes of 7.65 percent on her first dollar of earnings (and bear the burden of her employer's share).

Figures 3-5a–3-5c show the 2000 federal income tax schedule for three hypothetical taxpayers, each with two children: a primary earner filing jointly, a primary earner filing as head of household, and a secondary earner. Tax filers with children qualify for the child tax credit, a dependent-care deduction, and the Earned Income Tax Credit. The effective tax schedule accounts for the EITC, state taxes, and payroll taxes, but does not incorporate the child tax credit (which adds two other tax brackets at the bottom of the income distribution and an additional nonconvexity in the schedule for the head-of-household filers). For a married secondary earner with two children, the marginal tax rate on the first dollar of earnings is –26 percent (because of the EITC), but the rate then rises to +55 percent at $20,000 of earned income (because of the phaseout of the EITC and the 15 percent rate in the first bracket); it then falls to 34 percent at $35,000 of earned income.
Figure 3-5a
2000 Income Tax Schedule: Married Couple, Two Children

Source: Author’s diagram.

Figure 3-5b
2000 Income Tax Schedule: Head of Household, Two Children

Source: Author’s diagram.
(because of the end of the EITC). Tax-filing units with income below $115,000 therefore face numerous tax brackets, but notably those at the very bottom face some of the lowest and highest marginal tax rates in the tax code.

It is worth noting that for head-of-household tax filers (figure 3-5b), the budget set would be complicated even further by the transfer system, which adds implicit marginal tax rates on the order of 60–70 percent from the Temporary Assistance for Needy Families (TANF) program, 25 percent from food stamps, and a notch from loss of Medicaid. Even absent these features, the tax schedule shows the complexity of the budget set. In fact, the budget set faced by secondary earners further down the income distribution looks strikingly similar to that created by the tax-transfer system (figure 3-5c). The phaseout of the EITC, combined with federal income, payroll, and state income taxes, can easily lead to a 55 percent marginal tax rate for the first dollar of earnings. Marriage penalty tax relief lowers this rate for some—though far from all—secondary earners.

The budget sets for these hypothetical taxpayers are consistent with those in Kotlikoff and Rapson (2006). This study concludes that “the

**Figure 3-5c**

2000 Income Tax Schedule: Secondary Earners, Two Children

![Image of tax schedule]

*Source: Author’s diagram.*
patterns by age and [income] of marginal tax rates on earnings . . . can be summarized with one word— bizarre” (4).

The implication of such complicated budget constraints cannot be underestimated. Conceptually, they dramatically alter the behavioral response of taxpayers, including sticky responses at kink points and discrete jumps across budget segments. Recognition of this impact was the motivation for the nonlinear-budget set methods (see discussion below). But perhaps the more fundamental concern is that, in practice, they affect taxpayers’ ability to understand the incentives they face.

Evidence abounds that individuals have a limited understanding of the actual tax schedules they face (de Bartolome 1995; Liebman and Zeckhauser 2004; Feldman and Katuscak 2006). Most of this work shows that taxpayers typically perceive their actual tax schedules crudely, and respond to what Liebman and Zeckhauser refer to as a “schmedule.” De Bartolome shows, in an experimental setting, that people confuse actual and marginal rates, and often use the average tax rate as if it were the marginal tax rate. There is further evidence of such confusion in the context of labor supply: using variation in the child tax credit, both Liebman and Zeckhauser and Feldman and Katuscak present evidence that individuals respond to average income tax rates rather than marginal tax rates. In a different context, empirical evidence on the behavioral response to EITC expansions also suggests that taxpayers fail to recognize the marginal incentives in the tax schedule, since this evidence has failed to show any reduction in the hours worked by single mothers in the phaseout of the EITC (Eissa and Hoynes 2006), where effective marginal tax rates rise to as high as 55 percent.

Figure 3-6 shows that EGTRRA and JGTRRA did little to simplify the tax schedule. If anything, the addition of a new 10 percent bracket and the increase in the refundability of the child credit added to the complexity. The tax cuts also were unusual because they phased in different provisions at different rates and at different times. While the 10 percent bracket took effect immediately in 2002, other marginal rates were legislated to decline by one percentage point each year for three years, except for the top (39.6) percent rate, which was scheduled to decline by 2.6 percentage points in the third year. The child tax credit was scheduled to increase by $100 in 2006, remain constant in 2007, and then increase by $100 in each year
though 2010. These legislated changes are likely to have limited even further taxpayers’ understanding of their actual tax schedules over the period.

This discussion is not meant to suggest that the complexity of (or changes in) tax schedules leads workers to ignore taxes altogether. Workers do respond, but to a tax schedule that is inaccurately perceived. Two points are worth noting here. First, such misperceptions have implications for equilibrium tax rates (government spending) and the welfare effects of taxation (Chetty, Kroft, and Looney 2007; Finkelstein 2007). Second, there may be substantial differences in misperceptions across the income distributions. Higher income tax-filers (with incomes over $100,000) face a flatter and less complicated tax schedule than those with lower incomes (CBO 2007).

Identification of Labor Supply and Tax Effects. Estimating labor supply responses to taxation faces two main—and well-known—problems. The first problem results from the nonlinearity of the tax schedule, which causes the worker’s marginal tax rate to be jointly determined with her hours of
work. Moreover, identification of the tax effect is rendered tenuous because
the marginal tax rate is then a function of determinants of labor supply
behavior. The second problem is also related to nonlinearity of the budget
set, namely that tax changes can lead to unexpected and seemingly irra-
tional labor supply responses.

More recent work on labor supply and taxes has largely focused on the
former concern of identifying the tax effect with joint determination of
hours worked and taxes. This is partly because of difficulties that arose with
the estimation of (earlier) models that address nonlinear budget sets. I
review both methods of estimating labor supply responses briefly below,
and argue that both approaches involve tradeoffs; ultimately, a useful
avenue for empirical tax and labor supply research would be to marry the
focus on identification with careful modeling of the institutional features of
the tax system.

Nonlinear Budget Sets. The main advantage of the nonlinear budget set
approach is that it explicitly recognizes two things: institutional features of
tax transfer systems induce important nonlinearities in the tax schedule;
and these in turn complicate the analysis of the behavioral response. For
example, some taxpayers located in the 28 percent bracket will reduce their
hours of work and fall into the 15 percent bracket (even if the reduction to
25 percent would imply more hours worked). This occurs because of the
income effect induced by the five percentage point cut in the marginal tax
rate on earning in the 10 percent bracket. Therefore, the tax cut in the first
bracket induces an income effect beyond the first bracket and can reduce
total hours worked by taxpayers in higher brackets, even as their marginal
rates are declining. Tax changes with a nonlinear budget set can also lead
to “sticky” behavior at kink points—no behavioral response even if under-
lying elasticities are large—and to discrete jumps—large behavioral
responses when underlying elasticities are small.

Though this approach is conceptually attractive, empirical evaluation of
the EITC’s labor supply effects has generally shied away from it. The main
advantage of the nonlinear budget set approach has to be weighed against
shortcomings that cast doubt on the reliability of the estimates. These short-
comings include lack of knowledge of the exact budget constraint, restric-
tions on underlying preferences, and strong exogeneity assumptions
(Heckman 1983). Because survey data provide no information on taxes, the tax schedule has to be imputed using reported income and demographic information. Errors in self-reported income along with very limited information on itemized deductions can cause substantial errors in the imputed tax schedule. Early work using this approach that showed sizable compensated wage elasticities for males (Hausman 1981) was found to be highly sensitive to constraints imposed to make the empirical models tractable, namely that the income effect must be nonnegative. Triest (1990) and MaCurdy, Green, and Paarsch (1990) showed that this constraint was binding and that it heavily influenced the estimated elasticities for males.

More recent work has attempted to address these criticisms. Blomquist and Newey (1997) propose a nonparametric estimator that relaxes some of the restrictions imposed by parametric estimates. They model labor supply as a function of the entire tax schedule, and develop an estimator that includes the entire budget set in the regression. While they attempt to reduce the dimensionality, their approach does not readily generate a single elasticity of labor supply.

**Tax Reforms as Quasi-Experiments.** It is instructive to briefly clarify the different sources of variation in individual tax rates that identify the effects of taxes on labor supply. All individuals face the same statutory tax schedule at any point in time, though they face different tax rates based on their characteristics (family size, amount of nonlabor income, amount of earned income). In addition, multiple provisions in the code, such as phaseouts, phase-ins, and income tests for certain tax provisions, create deviations between effective and statutory marginal tax rates (Barthold, Koerner, and Navratil 1998). If the very social and economic characteristics that lead to variation in work incentives also have an independent effect on labor supply decisions, there is essentially no independent variation in tax rates left to identify the behavioral response to taxation.

To overcome this problem, researchers have relied on variation in tax schedules, and therefore rates, that arises over time with policy reforms. Typically, this quasi-experimental approach has focused on variation in tax rates at the group level (children in the case of the EITC; high-income spouses in the case of the Tax Reform Act of 1986). This approach assumes that all relevant wage and income changes are captured by group-level
variation in the grouping variable (presence and number of children; other household income) and time. To the extent that marginal tax rates, wages, and incomes are measured with error, a grouping approach also has the advantage of reducing measurement error bias in the coefficients of interest.

Clearly, policy reforms have nonneutral effects within groups and allow use of individual variation in wages, income, and federal personal income taxes. An alternative approach would therefore rely not only on cross-sectional variation in demographic characteristics and taxes but also on time variation to identify the effect of taxes on labor supply. This approach yields more efficient estimates by using all available information, and should yield the same behavioral response as the grouping estimate if the experiment is valid.

The quasi-experimental approach has been criticized for lacking structure and imposing strong assumptions for identification (Blundell and MaCurdy 1999), but it often represents a useful starting point and is appealing because of its simplicity and transparency. Recent work by Blundell, Duncan, and Meghir (1998) has attempted to apply this approach to estimate models that account for the nonlinearity of the budget set. This research estimates labor supply responses to tax reforms in the United Kingdom, extending the approach to account for the effects of changes in labor force composition and discontinuities in the British tax system. This approach is attractive because it accounts for the institutional features of the tax system, and because it tackles the identification problem seriously. Applying this approach to U.S. tax reforms would be a useful exercise, though likely far more complicated because of the U.S. tax transfer schedule.

What Do We Know about Taxes and Labor Supply?

The literature on the impact of taxation on labor supply is extensive, and spans different data, methods, and time periods. Table 3-4 summarizes selected empirical studies on the effect of taxation on male (3-4a) and female (3-4b) labor supply. The traditional empirical approach, followed in both the labor and public finance fields, was to posit a linear budget
constraint and estimate a structural labor supply equation. Generally, ordinary least squares and two-stage least squares were used. The empirical work through the early 1980s has been reviewed extensively elsewhere (see Hausman 1985). For the most part, this work suggested that male labor supply is insensitive to taxes, while the labor supply of married women is more responsive.

It is helpful to state up front the thought experiment behind “standard” analyses of taxes and labor supply. For the most part, the microeconometric literature does not account for the uses of government revenues (or the financing of tax cuts), and estimates the “partial” effect of a change in the after-tax wage and nonlabor income (an exception is Conway 1997). This partial effect is theoretically ambiguous, because income and substitution effects offset each other. Tax cuts can also be revenue neutral, however, in which case only the substitution effect operates. An example here (at least in design) is the Tax Reform of Act of 1986. More generally, the impact of taxes under budget balance can also be characterized by the substitution effect—under simplifying assumptions about preferences for public spending, private consumption, and labor supply. Conway (1997) estimates labor supply responses to income taxes that account for federal and state government spending. Her findings suggest that ignoring the spending side can bias downward the labor supply response to taxes, and that more attention should be paid to the interaction of public spending and private consumption in individual preferences.

**Male Labor Supply.** With the exception of a study by Hausman (1981), which found that male labor supply is sensitive to taxes, the literature has found consistently that hours worked by males do not show much of a response to taxes. In one respect, Hausman’s finding—of a very small (0.03) net-wage elasticity—was consistent with the literature. His large elasticity was a compensated elasticity and was driven by the large income effect (see table 3-4a). Both Triest (1990) and MaCurdy et al. (1990), however, found essentially no income effect.

Three exceptions to the low elasticity of response by men are worth noting. Moffitt and Wilhelm’s (2000) analysis of the effects of the 1986 Tax Reform Act on the labor supply decisions of high-income men presents an especially intriguing set of results. Using Survey of Consumer Finances
### Table 3-4a

**Empirical Studies on the Impact of Taxation on Male Labor Supply**

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Data (years)</th>
<th>Sample (men)</th>
</tr>
</thead>
</table>

**Sources:** Blundell and MacCurdy 1999, author’s summary.

### Table 3-4b

**Empirical Studies on the Impact of Taxation on Female Labor Supply**

<table>
<thead>
<tr>
<th>Author (date)</th>
<th>Data (years)</th>
<th>Sample (men)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cogan (1980)</td>
<td>PSID (1976)</td>
<td>Married</td>
</tr>
<tr>
<td>Heckman and MaCurdy (1980)</td>
<td>PSID (1968–75)</td>
<td>Married</td>
</tr>
</tbody>
</table>

**Sources:** Blundell and MacCurdy 1999, author’s summary.
## Labor Supply Elasticity

### Analysis

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Functional Form</th>
<th>Labor Supply Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Uncompensated wage</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Step Function</td>
<td>weak 0 (positive, small for black husbands)</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Linear, hours worked</td>
<td>0.03</td>
</tr>
<tr>
<td>Life cycle</td>
<td>Intertemporal labor supply</td>
<td>0.15</td>
</tr>
<tr>
<td>Life cycle</td>
<td>Intertemporal labor supply</td>
<td>0.17</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Linear Labor Supply (piece wise linear/differentiable constraints)</td>
<td>0</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Linear labor supply, hours</td>
<td>0.05</td>
</tr>
<tr>
<td>Panel</td>
<td>Linear labor supply, hours</td>
<td>0</td>
</tr>
</tbody>
</table>

## Labor Supply Elasticity

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Functional Form</th>
<th>Labor Supply Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Uncompensated wage</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Hours</td>
<td>2.3</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Hours</td>
<td>2.45</td>
</tr>
<tr>
<td>Life cycle</td>
<td>Leisure demand (hours worked)</td>
<td>-0.41 (1.61)</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Linear, labor supply</td>
<td>1</td>
</tr>
<tr>
<td>Cross-section</td>
<td>Linear labor supply, hours</td>
<td>1</td>
</tr>
<tr>
<td>TRA86</td>
<td>Participation Hours</td>
<td>0.4</td>
</tr>
<tr>
<td>EITC and welfare</td>
<td>Tax effects</td>
<td>Weekly employment up 4.4%; annual employment up 7%</td>
</tr>
<tr>
<td>EITC, federal and state taxes</td>
<td>Participation</td>
<td>0.27 (women) 0.032 (men) -0.04 (women) -0.01 (men)</td>
</tr>
</tbody>
</table>
(SCF) data from 1983 and 1989, they examine the response to the substantial tax cuts in TRA86 (which lowered the top federal marginal income tax rate from 50 to 28 percent), and find a dramatic surge in wage and salary income reported by high-income men. This is intriguing because Moffitt and Wilhelm find “essentially no evidence of any response” in the hours worked by these men over the period of the tax cuts, leaving a surge in hourly wages as the most likely explanation. More broadly, the evidence gathered on the effects of TRA86 suggests other aspects of labor supply (such as self-employment, employment at a job with different compensation schemes, etc.) are important elements of the behavioral response.

A second exception to the general finding of low elasticities by males is the evidence that entrepreneurial activity is sensitive to the marginal tax rate—and to the progressivity of the tax schedule (Gentry and Hubbard 2005). These results suggest that the negative effect of tax convexity is not limited to more educated individuals, but rather that it discourages entry into self-employment at all levels of education. Cullen and Gordon (2007) provide further evidence. They estimate the effects of taxes on entrepreneurial activity using IRS data from individual tax returns from 1964 to 1993. Their results imply that a drop of five percentage points in personal tax rates in each bracket would lead to over a 20 percent fall in entrepreneurial activity.

Yet another exception is the evidence on the labor supply behavior of less-skilled men. Data show the labor market participation rate of less-skilled males has been steadily declining over the past several decades: prime-age males with less than a high school education were a full twelve percentage points less likely to participate in the labor market in 2005 than in 1970. Even high-school graduates (with no college degree) reduced their participation by about ten percentage points over this period (Mosisa and Hipple 2006). Empirical evidence suggests that for most of this period, declining labor market opportunities (wages) are the primary reason for the decline in work (Juhn 1992).

**Female Labor Supply.** The empirical work on the impact of taxation of female labor supply is summarized in table 3-4b.

**Married Women.** Earlier surveys of married women’s labor supply response to taxes placed the range of elasticities between –0.2 and 2.3 (Hausman
Hausman (1981) uses data from the 1975 Panel Study of Income Dynamics (PSID) and estimates a net wage elasticity of approximately 1 for married women. Various studies have applied this methodology to data for the United States and different countries (see Moffitt 1990). Triest (1990) uses the 1984 PSID data to estimate a labor supply elasticity of 1.1 for married women. For working women, Triest estimates an elasticity of 0.2 for hours of work, suggesting that the participation decision is more responsive to changes in the net wage than are hours conditional on working. It is interesting to note that Mroz (1987) also finds similar results in his sensitivity analysis of married women’s labor supply.

Several studies evaluate the impact of tax reforms in the 1980s (Burtless 1991; Bosworth and Burtless 1992; Eissa 1995), and find that married women’s labor supply responded to the tax cuts. Burtless (1991) and Bosworth and Burtless (1992) both find a significant break in the labor supply trend of married women starting in 1981, which they attribute to the Economic Recovery and Tax Act of 1981. In addition, Burtless (1991) finds evidence that the impact of the tax reforms is on hours of work, rather than labor force participation, though his results are sensitive to the specification used. Eissa (1995) finds a sizable response by women married to very high-income men (in the ninety-ninth percentile of the CPS distribution) when compared to women further down the income distribution (at the seventy-fifth percentile) following TRA86. Her analysis suggests an overall elasticity of hours worked of around 0.8, half of which is due to participation. Recent work by Liebman and Saez (2006) evaluates the response of married women to the 1986 and 1993 tax acts using data from the Survey of Income and Program Participation matched to Social Security earnings records from 1981 to 1999, and comes to a different conclusion. This study finds wives of high earners having little to no behavioral response—and in fact finds a decline in labor force participation—to both the 1986 and 1993 tax changes, which we attribute to the surge in primary earnings at the top.

A related set of studies examining the response to expansions of the Earned Income Tax Credit suggests the response may be more specific to married mothers. Eissa and Hoynes (2004) estimate a difference-in-difference model comparing married mothers to married women without children and find that the 1993 EITC expansion led to a one percentage point
reduction in the participation rate of married mothers. A higher tax credit reduces labor force participation by married women through the income effect, as the husband’s employment generates more disposable income. These findings support earlier evidence in Ellwood (2000), which compares married mothers in high- and low-wage quartiles and also finds that expansion of the EITC is associated with reductions in the employment of married mothers.

EITC expansions have also been found to reduce hours worked by working married women, though the effect is small (Eissa and Hoynes 2007; Heim 2008). Eissa and Hoynes (2007) estimate standard hours-worked models, and instrument for the after-tax wage using tax parameters (in the spirit of Blomquist and Newey’s [1997] proposed estimator). They find that the increase in the maximum credit from $500 in 1984 to $3,556 in 1996 reduced hours worked by working married mothers by only 1 to 4 percent. Their analysis is comprehensive in that it incorporates all income tax changes over this period, but it suffers from changes in the composition of working women and of mothers over this period, as well as the endogeneity of work more generally.

Single Mothers. A related body of evidence has found overwhelmingly that the EITC encourages work among single mothers. Perhaps most striking about these findings is their consistency across different empirical methods—including quasi-experimental methods (Eissa and Liebman 1996; Ellwood 2000; Hotz, Mullin, and Scholz 2005; Meyer and Rosenbaum 2000; Rothstein 2008) and more structural methods (Dickert, Houser, and Scholz 1995; Meyer and Rosenbaum 2001)—and across different reforms evaluated. These findings are consistent with incentives created by the EITC, which transfers income conditional on work, thereby encouraging entry into the labor market.

Data show, however, that most workers are in regions of the credit that discourage hours worked, and so the credit is predicted to reduce hours for the majority of those already in the labor force. Evaluations of the large federal expansions in the credit in 1986, 1990, and 1993 typically use difference-in-difference models and compare changes for a treated group (e.g., single women with children) to a control group (e.g., single women without children). These models seem to work well and provide robust
estimates for the impact of the EITC on participation, but may be less well suited for estimating the impacts on hours worked. Analyzing the determinants of hours worked is more complicated due to the changes in the composition of the working sample and selection into work more generally.

Labor Force Participation. To illustrate the findings from the difference-in-difference literature, figure 3-7 presents annual employment rates for women by marital status and presence of children for 1983–2006. The figure shows the dramatic increase in employment rates for single women with children compared to single women without children. Most of this change occurred between 1992 and 1999, when employment rates for single women with children increased by sixteen percentage points. This is during the period of the largest expansion in the EITC due to the Omnibus Budget Reconciliation Act of 1993. Over this same period, there was little change in employment rates of single women without children. Others
have shown that the groups with the most to gain from EITC expansions (e.g., single women or women with lower wages, lower education levels, or more children) experienced larger gains in employment rates (Ellwood 2000; Meyer and Rosenbaum 2000; Rothstein 2008).

Overall, evaluations of the effects of the EITC suggest a strong positive relationship between taxes and the employment rates of single women with children. In terms of the magnitude of the effects, Eissa and Liebman (1996) find that the 1986 expansion of the EITC led to a 2.8 percentage point increase in participation for single mothers. Meyer and Rosenbaum (2001) find that 60 percent of the 8.7 percentage point increase in annual employment for single mothers between 1984 and 1996 is due to the EITC. They find that a smaller amount of the increase in participation between 1992 and 1996—35 percent—is due to the EITC (with the remainder due to welfare reform and other changes). Hotz and Scholz (2003) compare the implied elasticities of participation with respect to net income to these and other studies and find the range to be quite narrow—between 0.69 and 1.16.7

**Hours of Work.** While the EITC is expected to increase labor force participation, it is expected to reduce hours worked for those already in the labor force. But there is little evidence from the literature that is consistent with this prediction.

Very few papers have examined the impact of the EITC on the hours worked by single mothers. This is fundamentally a harder empirical problem because of the selectivity of those who are working. Eissa and Liebman (1996) apply their difference-in-difference model to annual hours worked (conditional on working) and find a small positive (and marginally significant) impact on all single mothers and a zero impact on single mothers with less education. Meyer and Rosenbaum (2001) find mixed (positive and negative) but insignificant impacts of the EITC on hours worked (conditional on working). Rothstein (2008) finds no difference between single mothers and childless single women in weekly hours worked (conditional on working) across the wage distribution. Keane and Moffitt (1998) estimate a structural model of labor supply choice and simulate the effect of the EITC on total hours but do not break down the estimate for those already working. Another source of evidence builds on the prediction from labor
supply theory that taxpayers should be bunched at the kinks in the EITC schedule (and should be less present at the end of the EITC schedule). Liebman (1998) and Saez (2002a) use tax return data and find no evidence consistent with these predictions.

Reasons for participation effect but no hours-worked effect. The finding of greater tax sensitivity of labor market entry and exit (relative to hours of work) is consistent with a wide set of estimates in the empirical literature (Triest 1990; Mroz 1987; Robins 1995). Yet few studies suggest that we should observe no hours-worked response to the phaseout of the EITC. Below, I seek to shed some light on why we observe a response by labor force participation but none by hours worked.

One possibility is that workers are bound by institutional restrictions or norms that push them either to part-time or full-time work, so they cannot freely choose their hours of work. Figure 3-8 presents the distribution of annual hours worked for our CPS sample of single mothers in 1986, 1990, 1993, and 2000. Two important observations emerge from this figure. First, annual hours of work are highly concentrated—while some workers are working part-time, the majority of workers have full-time full-year working hours. Second, the increase in employment at the end of this period (seen in the smaller mass at zero hours) is matched almost fully by an increase in full-time, full-year hours of work.

A second possibility is that the estimated effects are biased by measurement error in the survey data. Bound, Brown, and Mathiowetz (2001) find evidence suggesting measurement error for both annual hours of work—calculated as the product of weeks worked last year and usual hours worked per week—and hourly wages. Moreover, they find evidence that errors in the measurement of standard labor market variables are not “classical,” but are negatively correlated with their true values.

Third, taxpayers may not fully understand the EITC and income-tax schedules. A substantial share of EITC recipients use tax preparers and nearly all receive a lump-sum payment with their annual tax return. As a result, they have little opportunity to learn about the features of the credit that matter for the hours-worked response. This stands in contrast to the situation of workers in welfare programs, where there is monthly reporting, and to workers in low-wage jobs, where there are (bi)weekly pay periods;
these workers have more opportunities to learn about ordinary income taxes (which are still poorly understood). Further, the available evidence from informal and formal surveys suggests that the knowledge about the EITC is relatively high but certainly not universal among the eligible population (Liebman 1998; Phillips 2001; Smeeding, Phillips, and O’Connor 2000; Romich and Weisner 2000). For example, Phillips finds that about 66 percent of families nationally had heard of the EITC. There is scant evidence, however, on what is known about the structure of the EITC, such as the point at which the credit begins to be phased out.

Intertemporal Responses. The sunset of the Bush tax cuts brings front and center the question of workers’ willingness to substitute work over time. If workers fully expect taxes to rise in January 2011, they should be willing to substitute work to prior years (given the interest rate, impatience, habit formation, etc.). The elasticity relevant for evaluating the behavioral response to anticipated wage changes is the marginal-utility-of-wealth constant or the Frisch elasticity. Theory suggests that labor supply responses to such anticipated (evolutionary) changes in the after-tax returns
to work are larger than those implied by the Marshallian (income constant) elasticity (Blundell and MaCurdy 1999). It therefore represents an upper bound to the wage elasticity reviewed earlier, which keeps unearned income constant.

Most reforms of the tax (and transfer) system can arguably be characterized best as one-time unanticipated shifts in the life-cycle wage profile itself (Blundell 1998). Here, however, the Frisch elasticity would not be appropriate for evaluating effects on labor supply, because it ignores the wealth effect from the one-time shift in the net-wage profile and therefore overestimates the impact of tax changes. Yet a key difficulty in the empirical evaluation of intertemporal response is the distinction between anticipated and unanticipated changes in the wage profile. Card (1994) argues that the existing literature sheds little light on the very questions that motivated the life-cycle model, including how labor supply responds to tax-induced changes in the wage. This is in no small part due to the literature’s tendency “to concentrate on one aspect of intertemporal hours-of-work variation (the response to wage growth along a known lifetime trajectory) and to ignore another (the response to wage innovations that lead to revised expectations about future wage points)” (Card 1994, 1). For the most part, earlier reviews of empirical work dismissed intertemporal labor supply responses (MaCurdy 1985), though recent work has generally been more favorable to such responses. Still, it is notable that estimates of the Frisch elasticity, while larger than traditional estimates, remain fairly moderate for males (Mulligan 1995; Blundell, Meghir, and Neves 1993; Kimmel and Kniser 1998; Ziliak and Kniesner 1999; Kniesner and Ziliak 2005, 2006).

Mulligan (1995) presents an exhaustive review of the evidence on the intertemporal elasticity of substitution (from aggregate time-series and life-cycle patterns, individual panel data, time-diary studies, seasonal cycles, and other temporary episodes), and argues against the consensus that intertemporal responses are trivial. In fact, his preferred intertemporal elasticity of labor supply is 2.

Kniesner and Ziliak (2005) use a canonical life-cycle model of consumption and labor supply, with uncertainty and intertemporal separability. They estimate the model using PSID data on male household heads spanning the 1981, 1986, 1990, 1993, and 1997 tax acts that together lowered the number of tax brackets from sixteen to four, the top marginal tax
rate from 70 percent to 39.6 percent, and the lowest rate from –7.65 to –40 percent (due to the EITC). Their estimates suggest a Frisch-substitution elasticity of labor supply of 0.54, and fairly moderate intertemporal shifting of hours worked by male household heads to the anticipated increase in the real after-tax wage.

Overall, recent evidence suggests that intertemporal responses to the Bush tax cuts may be significant. The size of the elasticity suggests as well the potential for nontrivial welfare gains from higher after-tax wages resulting from revenue-neutral tax reform (Kniesner and Ziliak 2006). I explore the welfare effects of tax cuts in the next section, focusing exclusively on the impact of the prominence of discrete labor supply responses.

Implications for Welfare Evaluation of Tax Reform

The finding that labor force participation responses are more significant than hours-worked responses has several important implications for the design of tax transfer programs and for the welfare evaluation of taxation. Recent work by Saez (2002b) has shown that accounting for labor force participation responses can change the optimal transfer program. In particular, Saez shows that with sufficiently high participation elasticities, the optimal tax transfer scheme can be similar to the EITC—with negative marginal tax rates at the bottom of the earnings distribution. An EITC would, on the other hand, be inefficient in a standard model with only intensive (hours worked) responses.  

Liebman (2002) extends this work by examining more closely the optimal design of the EITC. He uses a microsimulation model calibrated to 1999 CPS data to illustrate the trade-offs in the design of an EITC—including the optimal maximum credit, and phase-in and phaseout rates—with fixed costs and participation effects. Liebman finds that the efficiency cost of transferring income through the EITC is substantially lower than previous studies have found, in large part because of the participation response of single mothers and the associated reduced welfare spending. His simulations suggest a cost of less than $2 to provide a transfer worth $1 to EITC recipients.

Eissa, Kleven, and Kreiner (2008) examine the impact of participation responses on the welfare evaluation of actual tax reforms. They extend the
standard framework for welfare evaluation of tax reforms to account for discrete labor market entry by way of nonconvexities in preferences and budget sets. Such nonconvexities are significant because they allow first-order welfare effects along the extensive (participation) margin. Eissa, Kleven, and Kreiner show that the marginal deadweight burden of tax reform is given by the effect that behavioral responses have on government revenue, where the behavioral revenue effect is related to the two different margins of labor supply response. The first effect captures the revenue effect from the change in the optimal hours of work for those who are working. The second effect captures the effect on revenue brought about by the tax-induced change in labor force participation. While the second effect on efficiency is related to the tax rate on labor force participation, the efficiency effect from changed working hours depends on the tax burden on the last dollar earned:

\[
\frac{\partial EB/\partial \theta}{\sum_{i=1}^{N} w_i h_i P_i(q_i)} = \sum_{i=1}^{N} \left[ \frac{m_i}{1-m_i} \frac{\partial m_i}{\partial \theta} \varepsilon_i + \frac{a_i}{1-a_i} \frac{\partial a_i}{\partial \theta} \eta_i \right] s_i
\]

Here \( w \) is the wage, \( h \) is hours, \( m \) is the marginal tax rate, \( a \) is the average tax rate, \( \varepsilon \) is the hours elasticity, \( \eta \) is the participation elasticity, \( \theta \) is the reform, and \( s \) is the wage share for individual \( i \).

Eissa, Kleven, and Kreiner (2008) simulate the effects of the 1986, 1990, 1993, and 2001 tax acts in the United States (incorporating all federal income tax changes, not just the EITC) and show that each had different effects on tax rates along the intensive and extensive margins (see figure 3-9). The 1993 expansion, for example, reduced the tax rates on labor force participation, but increased the marginal tax rates on hours worked for most workers. The authors show that conflating these two tax rates in welfare analysis can be fundamentally misleading. For tax reforms that change average tax rates differently from how they change marginal tax rates (such as the 1993 expansion of the EITC), ignoring the participation margin can lead even to the wrong sign of the welfare effect.

Their analysis shows that the 2001 tax cut generated substantial welfare gains (of $1.40 per dollar reduction in the tax burden for their central elasticity estimate of 0.5) due to the strong participation response. Their estimates suggest that the 2001 tax cuts have created pure efficiency gains,
such that the tax cuts could potentially be justified even with distortionary financing and without incorporating social welfare weights that are higher for single mothers than for the rest of the population. That is, if one were to finance the tax cuts through lump-sum taxation, which involves a marginal cost of funds less than or equal to 1, the reforms would increase aggregate utilitarian welfare.10

More recently, Eissa and Hoynes (2008) examine the welfare effects of changing EITC schedule parameters for single mothers. Table 3-5 presents their findings on expanding the EITC by reducing the phaseout (panel A) and then by raising the subsidy rates (panel B) from their current levels by one percentage point. The table shows that the welfare effects arise both on the extensive and intensive margins (columns 1 and 2), and that they can move in opposite directions (panel B). Eissa and Hoynes (2008) show that reducing the phaseout rate is welfare improving, and for high elasticities could be justified without appealing to any welfare weights for single mothers (column 4). Changing the subsidy rate, on the other
### Table 3-5

**Welfare Effects of Phase-out Rate Changes on Single Parents**

<table>
<thead>
<tr>
<th>Elasticity Composition</th>
<th>Intensive</th>
<th>Extensive</th>
<th>Total</th>
<th>Traditional</th>
<th>Welfare Gain per Dollar Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Marginal Reform 1: 2004 EITC with lower phaseout rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low $\varepsilon=0$, $\eta=0.2$</td>
<td>0.000</td>
<td>0.019</td>
<td>0.019</td>
<td>0.043</td>
<td>1.120</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.1$, $\eta=0.3$</td>
<td>0.022</td>
<td>0.029</td>
<td>0.050</td>
<td>0.086</td>
<td>1.391</td>
</tr>
<tr>
<td>High $\varepsilon=0.2$, $\eta=0.4$</td>
<td>0.043</td>
<td>0.039</td>
<td>0.082</td>
<td>0.129</td>
<td>1.834</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.3$, $\eta=0.1$ [reversed]</td>
<td>0.065</td>
<td>0.010</td>
<td>0.074</td>
<td>0.086</td>
<td>1.706</td>
</tr>
<tr>
<td><strong>B. Marginal Reform 2: 2004 EITC with higher phaseout rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low $\varepsilon=0$, $\eta=0.2$</td>
<td>0.000</td>
<td>–0.018</td>
<td>–0.018</td>
<td>0.100</td>
<td>1.118</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.1$, $\eta=0.3$</td>
<td>0.050</td>
<td>–0.026</td>
<td>0.023</td>
<td>0.199</td>
<td>0.877</td>
</tr>
<tr>
<td>High $\varepsilon=0.2$, $\eta=0.4$</td>
<td>0.100</td>
<td>–0.035</td>
<td>0.064</td>
<td>0.299</td>
<td>0.721</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.3$, $\eta=0.1$ [reversed]</td>
<td>0.149</td>
<td>–0.009</td>
<td>0.140</td>
<td>0.199</td>
<td>0.542</td>
</tr>
<tr>
<td><strong>C. Marginal Reform 3: 2004 EITC with lower subsidy rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low $\varepsilon=0$, $\eta=0.2$</td>
<td>0.000</td>
<td>–0.024</td>
<td>–0.024</td>
<td>0.129</td>
<td>1.080</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.1$, $\eta=0.3$</td>
<td>0.065</td>
<td>–0.035</td>
<td>0.029</td>
<td>0.258</td>
<td>0.916</td>
</tr>
<tr>
<td>High $\varepsilon=0.2$, $\eta=0.4$</td>
<td>0.129</td>
<td>–0.047</td>
<td>0.082</td>
<td>0.388</td>
<td>0.796</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.3$, $\eta=0.1$ [reversed]</td>
<td>0.194</td>
<td>–0.012</td>
<td>0.182</td>
<td>0.258</td>
<td>0.637</td>
</tr>
<tr>
<td><strong>D. Marginal Reform 4: 2004 EITC with higher subsidy rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low $\varepsilon=0$, $\eta=0.2$</td>
<td>0.000</td>
<td>0.024</td>
<td>0.024</td>
<td>–0.021</td>
<td>1.080</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.1$, $\eta=0.3$</td>
<td>–0.011</td>
<td>0.036</td>
<td>0.026</td>
<td>–0.043</td>
<td>1.086</td>
</tr>
<tr>
<td>High $\varepsilon=0.2$, $\eta=0.4$</td>
<td>–0.021</td>
<td>0.049</td>
<td>0.027</td>
<td>–0.064</td>
<td>1.091</td>
</tr>
<tr>
<td>Middle $\varepsilon=0.3$, $\eta=0.1$ [reversed]</td>
<td>–0.032</td>
<td>0.012</td>
<td>–0.020</td>
<td>–0.043</td>
<td>0.943</td>
</tr>
</tbody>
</table>

**Source:** Authors’ tabulations of the 2005 March CPS.

**Notes:** The participation elasticity is given by $\eta$ and the compensated hours of work elasticity is given by $\varepsilon$. The welfare gain is measured in percentage of wage income. The total welfare gain is calculated as the sum of the intensive and extensive gains. The “traditional” welfare gain is calculated assuming that the total labor supply elasticity is entirely along the intensive margin. The welfare gain per dollar spent equals $\text{RTB}/(\text{RTB}–\text{EG})$, where EG is the efficiency gain and RTB is the reduction in tax burden.
hand, generates smaller welfare gains, and so could be justified only with substantial weights on the welfare of single mothers. Workers in the subsidy region receive a lower marginal rate, but their gains are offset by the losses of workers further up the income distribution who now face the high marginal tax rates in the phaseout region.

Comparing the results for the two instruments, Eissa and Hoynes find welfare effects per dollar spent are more sensitive to the size of the labor supply elasticity when the phaseout rate is changed. More generally, even given its current size, expansions of the credit (lower phaseout/higher subsidy) generate greater welfare gains than contractions (characterized by higher phaseout/lower subsidy).

Conclusions

The overall effect of the Bush tax cuts on labor supply behavior depends in large part on which margins of labor supply are evaluated. An extensive body of work evaluating the effects of taxes on labor supply suggests hours worked by working taxpayers are not responsive to taxes, even for married women. A careful reading of the evidence, however, suggests that labor market entry and exit are very sensitive to taxes, especially for female household heads but also for married women. This finding is suggested by early work on the Negative Income Tax Experiments (Robins 1985), statistical models of labor supply (Mroz 1987), nonlinear estimation methods (Triest 1990), and quasi-experimental evaluation of behavioral responses to tax cuts (see reviews in Hotz and Scholz 2003 and Eissa and Hoynes 2006). Eissa and Hoynes (2006) point to two main lessons learned from evaluations of behavioral responses to EITC expansions: first, the evidence confirms that real responses to taxes are important, and second, it shows that the labor supply response is concentrated along the extensive (entry) margin. This evidence suggests that the effects of the tax cuts on this narrow measure of labor supply may be seen more in the participation decision of females.

The concentration of labor supply responses along the extensive margin has important implications for the welfare evaluation of tax reforms. Tax changes have different effects on the participation and hours margins that can move in opposite directions (for example, with an expansion of the
EITC). This distinction, along with the different behavioral responses along the two margins of labor supply, can lead to errors in estimates of the efficiency effects of tax changes. Eissa, Kleven, and Kreiner (2008) show that the 2001 tax cuts create pure efficiency gains for single mothers, and that most of the gains occurred along the participation margin.

Labor supply, however, is more than hours worked and labor force participation; it includes occupational choice and human capital formation. Direct evidence on broader measures of labor supply is limited, but several observations suggest that these measures are responsive to taxes. An especially interesting result that speaks to this point is the surge in reported wage and salary earnings of high-income men following TRA86 with no corresponding change in their hours of work (Moffitt and Wilhelm 2000). Another piece of evidence comes from findings that the marginal tax rate and the progressivity of the tax schedule reduce entry into self-employment and entrepreneurial activity (Gentry and Hubbard 2005).

An especially unusual feature of the tax cuts is their extensive use of phase-ins and the legislated sunset of all the tax cuts in 2010. On the one hand, gradual phase-in of small changes in tax rates may mute the response if taxpayers fail to perceive the changed incentives. Yet an intriguing question is to what extent the sunset of the tax cuts generates intertemporal responses that work in the opposite direction.
Notes

1. See the discussion in Romer and Romer (2008).
2. The child tax credit offsets federal income tax liability and encourages work; it therefore expands the returns to work for eligible parents.
3. The results are qualitatively similar if all tax-filing units are assigned the expected value of itemized deductions (by filing status and by income class).
4. These average rates are larger than expected because of the assumption that tax filers itemize only their state income taxes.
5. The increase in after-tax income could be interpreted as the change from its pretax cut level.
6. These tabulations are calculated using the 1984–2007 March Current Population Surveys. The sample includes all women aged nineteen to forty-four who are not in school or disabled. We also drop the relatively small number of women who report working positive hours but have zero earnings or report positive earnings but zero hours. For these calculations, employment is defined by any work over the (prior) calendar year.
7. This range excludes the estimates from Hotz, Mullin, and Scholz (2002). Their studies differ from the others in that their sample is limited to current or past welfare recipients.
8. An opposing view is that workers choose an hours-wage package and can choose to change jobs in response.
9. Saez (2002b) shows that the optimal program is instead a classical negative income tax program, with a substantial income guarantee that is phased out at a high rate.
10. The marginal cost of funds for lump-sum taxation is generally below 1 because, assuming that leisure is a normal good, such taxes make individuals work more (Ballard and Fullerton 1992). In the absence of income effects (quasi-linear utility), the marginal cost of funds is exactly 1.
References


Kniesner, Thomas, and James Ziliak. 2006. Evidence of tax-induced individual behavioral responses. Paper presented at conference on tax reform, James A. Baker III Institute for Public Policy, Rice University, Houston, TX.


Rosen, Harvey S. 1976. Taxes in a labor supply model with joint wage-hours deter-

princeton.edu/~jrothst/workingpapers/rothstein_eitc_may122008.pdf.

Saez, Emmanuel. 2002a. Do taxpayers bunch at kink points? Mimeo, University of

______. 2002b. Optimal income transfer programs: Intensive versus extensive labor

Smeeding, Timothy, Katherin Ross Phillips, and Michael O’Connor. 2000. The EITC:
Expectation, knowledge, use, and economic and social mobility. *National Tax

Triest, Robert 1990. The effect of income taxation on labor supply in the United

gov/cgi-bin/getdoc.cgi?dbname=107_cong_reports&doc d=f:hr007.107.pdf.

The chapter by Nada Eissa provides a timely evaluation of tax cuts on labor income during the presidency of George W. Bush. The cuts were moderate in size and extended across the income distribution. Eissa calculates that legislation enacted in 2001, 2002, and 2003 lowered marginal federal income tax rates by 2.6 percentage points on average across households, and lowered average income tax rates by 2.7 percentage points. One goal of the chapter is to gauge the likely impact of these tax cuts on labor supply.

Some of the evidence reviewed by Eissa suggests that the Bush tax cuts had a very modest effect on labor supply. According to the illustrative calculations in table 3-3, for example, the Bush tax cuts raised hours worked by a mere nine hours per person (twenty-three through fifty-nine years old) per year. These calculations neglect heterogeneity among workers in tax changes and response behavior, however, and they do not disentangle responses on the hours and employment margins. Whether—and how much—these simplifications understate the overall response of hours worked to the Bush tax cuts is unclear. The chapter acknowledges these issues but does not tackle them directly.

Other evidence suggests that labor supply is highly responsive to taxes for some demographic groups on some margins. Thus Eissa writes in her conclusion that a “careful reading of the evidence . . . suggests that labor market entry and exit are very sensitive to taxes, especially for female household heads but also for married women.” Eissa also notes that labor supply responses to taxes are not limited to decisions about how many hours to work and whether to get a job.
Micro and Macro Studies of Labor Supply Responses to Taxes

In her review of empirical evidence, Eissa focuses on studies of individual labor supply responses to tax changes. These studies typically find small elasticities of hours worked in response to tax rate changes for most demographic groups. Small elasticities multiplied by the moderate size of the Bush tax cuts yield the small overall hours effect reported in table 3-3.

Several recent studies find larger elasticities of hours worked with respect to country-level changes and differences in tax rates. Examples include Prescott (2004), Davis and Henrekson (2005), Rogerson (2006), and Gordon (2007). One reason these macro studies find bigger elasticities is that they capture government spending-side responses to tax changes, responses that are usually ignored in studies of individual labor supply. Spending-side responses matter for labor supply outcomes, perhaps as much as or more than the direct effects operating on the tax side.

To see the implications of spending-side responses, consider a hike in labor income tax rates that increases government revenues. It is helpful to distinguish three cases:

A. Use the extra revenues to fund government purchases of goods and services that are not substitutable with private spending. Military spending is the leading example that approximately satisfies this requirement.

B. Use the extra revenues to fund lump-sum transfers to households. “Lump sum” means that the transfers are not means tested or otherwise dependent on the recipient’s behavior or circumstances.

C. Use the extra revenues to fund government safety net and social insurance programs. Leading examples include government programs for Medicaid, food stamps, unemployment insurance, and disability payments.

In case A, the extra government spending has no effect on household resources or incentives, and not much is lost by ignoring spending-side responses. In this case, the tax hike affects labor supply through direct
effects of tax rates on individual work incentives and through general equilibrium responses. The individual work incentives involve the substitution and income effects that are staples of micro-oriented labor supply studies. Thus the basic approach taken by Eissa and other micro-oriented studies (CBO 2007, for example) captures the full effect of tax rate changes on aggregate hours worked when (a) the government spending-side response approximates the conditions of case A, and (b) there are no important general equilibrium effects on labor supply.

In case B, the extra government spending reduces individual work incentives through an income effect. The lump-sum transfer payments make households richer, so they work less. To a first approximation, this income effect on the spending side cancels out the income effect on the tax side. On net, we are left with a pure substitution response to the tax hike. According to table 2 in CBO (2007), the substitution elasticity is 78 percent greater than the total wage elasticity that captures both income and substitution effects.\(^1\) Thus, using CBO assumptions, the tax hike lowers aggregate hours by 78 percent more in case B than in case A.

In case C, the tax hike lowers aggregate hours by an even larger amount, because the benefit side of social insurance programs discourages work activity through means testing, other eligibility requirements, and phaseout provisions. The available evidence indicates that labor supply elasticities with respect to benefits for unemployment insurance, worker compensation, and disability insurance are substantially higher than those found in traditional labor supply studies (Krueger and Meyer 2002). If this pattern holds broadly for government transfer payments, then the effect of a tax hike on aggregate hours in case C may be more than twice as large as in case A.

Most government spending in the United States and other rich countries is for transfer payments to households. Differences among rich countries in the fraction of gross domestic product (GDP) devoted to government spending are also mainly the result of transfer payments. Likewise, transfer payments largely account for the more rapid growth of government spending relative to GDP in Western Europe than in the United States since the 1960s. These facts suggest that the data variation used in macro studies of rich-country tax responses is closer to case C than case A.

These observations lead me to three conclusions. First, spending-side responses to tax changes are an important determinant of the overall
response of hours worked. Second, macro-oriented studies find bigger labor supply responses to tax changes than micro-oriented studies, partly because the macro studies capture the spending-side responses of government behavior. Third, if future tax hikes lead to bigger government, they will discourage labor supply by substantially more than the micro-oriented studies suggest.

Longer-Run and Equilibrium Responses to Taxes

Traditional micro-oriented studies of labor supply behavior also understate the longer-run response to tax rate changes for another set of reasons. At the individual level, an adjustment in hours worked may require a job switch, a change in child-care arrangements, or other significant lifestyle changes. Bringing about such changes often involves large fixed costs and some time. As a result, the full response of hours worked to tax rate changes involves lumpy adjustments at the individual level, and unfolds slowly over time in the population. Most micro-oriented studies of labor supply behavior are not designed to effectively capture this type of dynamic response.

Equilibrium responses to tax changes are also likely to unfold slowly over time and to involve effects not captured by micro-oriented studies. Consider the example of underground economic activity motivated by a desire to evade taxes. High tax rates on labor income encourage households to supply labor and procure goods and services in the underground economy. Tax evasion of this sort requires cooperation between at least two persons, a buyer and a seller. A key point is that it becomes easier to find a willing accomplice for off-the-books exchange in a higher-tax environment. When taxes are high generally, more people seek accomplices to help evade taxes. In this respect, the underground economy is a network that becomes more attractive as more people participate. Such networks are slow to evolve and, once in place, can be difficult to eradicate.

Two conclusions follow from this brief discussion of taxes and the underground economy. First, micro-oriented studies do not capture the network effect sketched above, because they rely on individual-specific variation to identify the effect of taxes on labor supply. For this reason, they
understate the extent to which taxes lead to an expansion of the underground economy at the expense of the legal market economy. Second, because networks are slow to evolve and dissipate, taxes have a slow-working effect on the amount of labor supplied to the underground economy.

Schneider and Enste (2000) and Davis and Henrekson (2005) review evidence on taxes and the underground economy and provide references to the literature. Davis and Henrekson also stress that micro-oriented labor supply studies are unlikely to capture the full effect of taxes on substitution between market activity and home production, e.g., eating in a restaurant versus eating a meal prepared at home. Lindbeck (1995) discusses other reasons for delayed responses to the economic disincentives created by high tax rates and generous social insurance programs.

**Labor Supply Responses on Other Margins**

In her review of the evidence, Eissa focuses on the decision of whether to work, and how many hours to work when employed. This focus mirrors most of the literature and available evidence. Many, many studies investigate the response of employment and hours worked to taxes. As Eissa acknowledges, labor supply responses on other margins are harder to measure and, as a result, are much less studied. Of course, that does not mean that other response margins are small or unimportant, or that we can safely ignore them in forming judgments about tax policy.

A fundamental point is the following: the negative impact of income taxes on economic efficiency is potentially large even when hours and employment are not very responsive to taxes. What matters for efficiency under reasonable conditions is the elasticity of taxable income, as shown by Feldstein (1999). Chetty (2008) generalizes the Feldstein analysis to cover situations where part of the cost of tax evasion and tax avoidance involves a transfer of resources to other persons in the economy. The chapter by Giertz in this volume reviews what we know about the elasticity of taxable income.

The study of taxable income elasticities is attractive because of its promise to capture the full range of labor supply responses to tax changes without the need to identify and isolate every important response margin. However, the taxable income approach presents its own problems, and the
literature in this area has not reached anything approaching a consensus. For this reason, among others, it is important to directly investigate other labor supply response margins such as schooling and training, occupational choice, the form of compensation, immigration and emigration, the choice between market provision and home production, and the choice between legal activities subject to personal taxes and underground activities that evade taxes.

Eissa mentions two recent studies that investigate tax effects on entrepreneurial activity. Gentry and Hubbard (2005) stress the potential for high tax rates and a progressive tax schedule to discourage risk-taking activities by acting as a tax on “success.” Because of tax progressivity, a risk-neutral investor requires a higher pretax expected return to undertake a risky project or business enterprise. The effect is to discourage risk-taking business activities. Cullen and Gordon (2007) point out that the option to incorporate weakens or reverses this effect when the corporate income tax rate is lower than the personal tax rate. In this case, the option to incorporate effectively allows the entrepreneur to choose a lower tax rate ex post in the event that the enterprise succeeds. Cullen and Gordon also analyze other channels through which the tax system affects entrepreneurship and risk taking. The overall effect of tax changes on risk taking depends very much on the details. For example, a five percentage point across-the-board reduction in personal tax rates discourages risk-taking activity, according to their analysis, but a move to a Hall-Rabushka flat tax (Hall and Rabushka 1995) with a 20 percent tax rate encourages it.

A progressive income tax schedule also penalizes other types of “success.” I will give one example. Like many forms of human capital investment, attending college involves an important tradeoff between income now and income later. If the extra future income attributable to college pushes the individual into a higher tax bracket, then tax progressivity reduces the after-tax rate of return to a college education. In this way, a progressive tax schedule discourages investments in a college education. The same point applies to other human capital investments that involve a tradeoff between income now and income later. I am not aware of studies that directly examine the response of college enrollment rates to tax progressivity, but many studies find that college enrollment rates are sensitive to the rate of return to education. See, for
example, Fredriksson and Topel (2007), who document a close relationship between the returns to college and college enrollment rates.

**Summary**

The chapter by Eissa offers a useful discussion of how work hours respond to labor income tax rates. Like most of the literature, her discussion focuses on micro-oriented studies of individual labor supply behavior. These studies are highly useful, but they neglect several aspects of the broader labor supply response to taxes.

With respect to hours worked, the full impact of a change in labor income tax rates is bigger than suggested by micro-oriented studies for several reasons. First, the micro-oriented studies typically neglect government-spending responses to tax changes and the impact of government spending on labor supply. Second, most micro-oriented studies are not designed to effectively capture the longer-term effects of taxes on individual labor supply decisions. Third, studies of individual labor supply do not capture equilibrium responses to tax rate changes.
Notes

1. The figures in the top row of Eissa’s table 3-3 imply that the pure substitution response is 59 percent greater than the “total” response, where the 59 percent figure is computed as 100 (14-8.8) / 8.8.

2. My discussion here does not cover the full range of potentially important equilibrium labor supply responses to taxes.
References


