

**THE REDISTRIBUTIVE EFFECT OF SELECTED  
FEDERAL TRANSFER AND TAX PROVISIONS**

Thomas L. Hungerford

Congressional Research Service  
101 Independence Ave, SW  
Washington, DC  
[thungerford@crs.loc.gov](mailto:thungerford@crs.loc.gov)

September 21, 2009

The author would like to thank Jane Gravelle, Donald Marples, William Gale, and John Gist for their comments on a previous draft. The views expressed here do not reflect the views of the Congressional Research Service or the Library of Congress.

## **ABSTRACT**

Several policy makers have voiced concern, bordering on alarm, over federal budget deficits and growing federal debt over the past decade, and have advocated changes in spending and revenue policies to address their concerns. This study examines the redistributive effect of various federal tax provisions and transfer programs using methods that pick up important dimensions of redistribution often missed in analyses. Overall, the results are as expected—both U.S. taxes and transfers reduce income inequality. The redistributive effect, however, could be larger if the reranking effect were reduced or eliminated. The reranking effect tends to be relatively more important for transfers than for taxes.

## I. Introduction

Several policy makers and analysts have voiced concern, bordering on alarm, over federal budget deficits and growing federal debt over the past decade. For example, in 2009 Congressional testimony, Federal Reserve Chairman Ben Bernanke noted that “the country’s fiscal problems will require a willingness to make difficult choices.”<sup>1</sup> The depth of the fiscal problem can be seen in the projections of federal debt. Publicly held federal debt as a percent of GDP stood at 41 percent at the end of fiscal year 2008; the Congressional Budget Office’s (CBO) baseline projection has it growing to 62 percent by 2011.<sup>2</sup> CBO’s preliminary projection of the President’s budget has debt as a percentage of GDP growing to 82 percent by 2019. In response, several members of Congress have proposed empanelling a commission to examine the problem and propose concrete solutions, and the Obama Administration put forward a legislative proposal to return to pay-as-you-go (PAYGO) budget rules. Undoubtedly, these proposals could have a significant impact on income inequality in the U.S.

Arguments are offered for and against reducing income inequality. The classic argument against rising income inequality is the rich get richer and the poor get poorer. This can increase poverty, reduce well-being, and reduce social cohesion. Consequently, many argue that reducing income inequality may reduce various social ills. In contrast, there are those arguing that rising inequality is nothing to worry about and point out that average real income has been rising, so

---

<sup>1</sup> Ben S. Bernanke, “Current economic and financial conditions and the federal budget,” statement before the Committee on the Budget, U.S. House of Representatives, June 3, 2009.

<sup>2</sup> CBO’s baseline projection starts with Congress’s most recent budgetary decisions and then assumes that no policy changes will be made over the projection period. For entitlement programs CBO assumes that current laws will continue unchanged and by law assumes that discretionary spending will grow at the rate of inflation throughout the projection period. For revenues, CBO assumes that the provisions in the 2001 and 2003 tax cuts will expire on schedule, and that more individuals will be subject to the alternative minimum tax (AMT). CBO’s baseline is not intended to be a prediction of future budgetary outcomes.

while the rich are getting richer, the poor are not necessarily getting poorer. In addition, many argue that some income inequality is necessary to encourage innovation and entrepreneurship—the possibility of large rewards and high income are incentives to bear the risks of innovation and entrepreneurship. Therefore, they assert the economic costs of reducing or eliminating income inequality may be high.

Some researchers are concerned about the consequences of rising income inequality. Research has demonstrated that large income and class disparities adversely affect health and economic well-being. Marmot (2004) has studied health and social status disparities, concluding that health follows a social gradient—people higher in the social hierarchy tend to be in better health than people of lower status. Wilkinson (1996) provides evidence that high income inequality—large income disparities—and less social cohesion have a negative impact on the health of a country's citizens. Frank (2007) argues that even if all incomes are increasing and rising inequality is due solely to those at the top of the income distribution pulling away from the rest, the middle class can be hurt by the pressure to keep up with the upper class.

Several factors have been identified as possibly contributing to increasing income inequality. Some researchers have suggested the decline in unionization and a falling real minimum wage as the primary causes (see, for example, Lee 1999, and DiNardo, Fortin and Lemieux 1996). Others have argued that rising returns to education and skill-biased technological change are the important factors explaining rising inequality (see, for example, Bound and Johnson 1992, Autor, Katz and Kearney 2006, and Lemieux 2006). Tax policy, especially the Tax Reform Act of 1986, has also been identified as a possible cause for rising income inequality (Feenberg and Poterba 1993, and Gordon and Slemrod 2000). Most analysts agree that the likely explanation for rising income inequality is due to skill-biased technological

changes combined with slowed educational advancement as well as changes in institutions and norms of which a falling minimum wage and declining unionization are a part (Levy and Temin 2007, Autor, Katz and Kearney 2006, and Goldin and Katz 2008). Research suggests that tax policy, while having short-term effects on the *level* of inequality, does not appear to have had much impact on the longer-term *trend* in inequality (Slemrod and Bakija 2001, Levy and Temin 2007, Piketty and Saez 2003, Gramlich, Kasten and Sammartino 1993).

The tax system is used to meet various social and economic objectives such as encouraging certain behaviors, discouraging other behaviors, and reducing inequality. More fundamentally, however, a tax system is expected to meet several goals. Perhaps the most important is to raise revenue to fund government activities. Another goal is to be efficient by minimizing the excess burden of taxes. A third goal is for the tax system to be equitable and fair. Often these goals and objectives conflict with one another. Policy makers attempt to meet these goals and objectives through the choice of the parameters of the tax system (e.g., tax rates), and through the use of “loopholes” — those special deductions, exclusions and exemptions known as tax expenditures.

The Obama Administration has proposed several individual income tax changes. They want to let the Bush tax cuts expire on schedule in 2010 for the wealthy (by allowing the top two tax rates increase back to their pre-2001 levels), make the Making Work Pay tax credit permanent (thus permanently reducing taxes for about 95 percent of taxpayers), expand the earned income tax credit and the refundability of the child tax credit, and permanently extend the American Opportunity tax credit. Each of these proposals will affect federal revenues and the level of income inequality. Several policy analysts have also advocated broadening the tax base by eliminating many tax expenditures as a way to raise revenue. This could also help reduce the

growth in income inequality if the tax expenditures with the “upside-down” subsidy feature are the ones eliminated. At the same time, however, the President and many members of Congress have proposed additional tax expenditures as a means to achieving economic and social (and, often, political) goals. Each of these proposals will affect the equity of the tax system and income inequality.

This study focuses on the redistributive effect of government transfers and taxes, and, in particular, three transfer programs and nine selected federal tax provisions. The nine tax provisions are (1) the exclusion of Social Security benefits, (2) the phase-outs of personal exemptions (PEP) and itemized deductions (Pease), (3) itemized deductions, (4) the earned income tax credit (EITC), (5) the child tax credit, (6) the alternative minimum tax (AMT), (7) the reduced post-2001 tax rates, (8) the exclusion of interest on state bonds, and (9) reduced tax rates on long-term capital gains and qualified dividends. The three transfer programs are (1) temporary assistance to needy families (TANF), (2) supplemental security income (SSI), and (3) food stamps.

The redistributive effect is decomposed into a progressivity effect (a vertical effect), and a reranking effect (a horizontal effect). The progressivity effect measures how individuals in the income distribution are pushed together or pulled apart (without changing relative positions in the distribution). This essentially captures the extent to which the gap between the poorest and richest families is widened or narrowed. The reranking effect captures the extent to which families are moved above or below others in the income distribution as a result of a policy. This reranking within the income distribution is often perceived as unfair and reduces the public’s confidence in the fairness of government programs and the tax system. These two effects can work together or in opposite directions to affect income inequality. The redistributive effect is

measured using the generalized Gini, which permits an explicit examination on effects in different parts of the income distribution. The methods employed pick up several important dimensions of the redistributive effect of government programs and provisions often overlooked in analyses. The analysis extends the work of others in that individual provisions and programs are examined in addition to the whole tax and transfer system. The results highlight the trade-offs policy makers could face in developing policies to raise revenue, reduce income inequality, and reform the tax system.

## **II. Background**

Musgrave (1959, p. 160) argues that there are two parts to the principle of equity, which “are but different sides of the same coin.” A basic sense of fairness suggests that those with equal ability to pay taxes should pay equal taxes; this is referred to as horizontal equity. Most analysts also argue for the principle of vertical equity—how the taxation of people in different positions should differ. Considerable theoretical and empirical work has been devoted to explicitly linking redistribution, vertical equity, and horizontal equity.

Beginning with Feldstein (1976), researchers have worked to develop an operational measure of horizontal equity. Early work by Atkinson (1980), Plotnick (1981), and King (1983) identified horizontal equity as changes in the pre-tax and post-tax orderings or rankings in the income distribution. Kakwani (1984) decomposed the change in the Gini coefficient between pre- and post-tax income (the redistributive effect) into a vertical effect and a horizontal or

reranking effect. He notes that the reranking effect (a violation of horizontal equity) will reduce the redistributive effect of taxation.

More recently, some analysts have argued that reranking does not really measure the classical definition of horizontal inequity (see, for example, Aronson and Lambert 1994, Lambert 2001, Ramos and Lambert 2003, Duclos, Jalbert and Araar 2003, and Kim and Lambert 2009). Their preferred method of directly calculating a measure of horizontal inequity involves defining groups of individuals or families having the same pre-tax income. For example, Kim and Lambert (2009) break a horizontal inequity component out of Kakwani's (1984) vertical equity measure. Consequently, the redistributive effect is decomposed into a vertical effect, a horizontal inequity effect, and a reranking effect. The horizontal inequity effect is based on defining an income band width in which to partition the sample units into groups of equals; the estimate depends on the chosen band width. In two studies (Aronson and Lambert 1994, and Kim and Lambert 2009) the estimated horizontal inequity term was very small—typically less than 2 percent of the total redistributive effect.

Kaplow (1989) argues that horizontal equity is a measure in search of a principle. In particular, he argues that reranking, even though it works to increase inequality is not necessarily a bad thing—the status quo ranking may not be desirable. He does, however, note that horizontal equity could be motivated by arguing that “utility is determined not only by the absolute level of income or wealth, but changes in that level” (p. 149). Furthermore, making adjustments to unanticipated changes in tax provisions could be quite costly.

Two studies have examined individual tax provisions. Ramos and Lambert (2003) examined tax deductions (especially for charitable contributions, payments of state and local taxes, and medical expenses) to separate reductions to the redistributive effect into “socially-

deserving differential tax treatments” and “non-deserving differentiations” or horizontal inequity. They generally find that about 44 percent of the loss of the redistributive effect can be described as “a socially sanctioned reduction.” Kim and Lambert (2009) examine the earned income tax credit and basically find that the difference between the redistributive and vertical effects is quite small—the horizontal inequity and reranking effects are on the order of 2 percent of the redistributive effect.

Previous distributional studies of tax provisions (usually of tax expenditures) generally focused solely on determining if the provisions are progressive or not (see, for example, Witte 1985, Hungerford 2006, 2008, Burman, Geissler and Toder 2008). The general result is the benefits of itemized deductions and many exclusions (such as tax exempt interest, and employer provided pension and health benefits) are regressive, while the benefits of many tax credits and above-the-line deductions tend to be more progressively distributed among taxpayers. These studies, however, indicate the effect of various tax expenditures have on inequality among taxpayers but provide less information on how they affect income inequality among the population (taxpayers and nontaxpayers).

In this study, the redistributive effect (change in the the generalized Gini) is decomposed into a progressivity effect (a vertical effect) and a reranking effect (a horizontal effect).<sup>3</sup> The focus of the study is not to come up with a clean decomposition of the redistributive effect resulting from government policies into vertical and horizontal effects or to argue that reranking captures a pure horizontal equity effect. Rather the focus is on how these policies (1) expand or compress the income distribution holding rankings constant, and (2) move families ahead or behind other families in the income distribution. This type of information can give policymakers

---

<sup>3</sup> The measure of the redistributive effect is the Reynolds and Smolensky (1977) index and the decomposition was developed by Kakwani (1984).

an idea of which changes will reduce income inequality and which ones may generate public opposition because of perceptions of unfairness.

### **III. Data and Methods**

The 2005 wave of the University of Michigan's Panel Study of Income Dynamics (PSID) is employed to study the redistributive effects of taxes, transfers, and specific tax provisions. The 2005 wave of the PSID includes information on family income and its components in 2004. The income top codes in the PSID are considerably higher than the income top codes in other data files such as the Survey of Income and Program Participation (SIPP) and the Current Population Survey (CPS). The PSID is a nationally representative longitudinal data set of the nonimmigrant U.S. population that has been ongoing since 1968. The replacement mechanism of the PSID for births is designed to yield a representative sample of the nonimmigrant population in each year. The PSID oversamples low-income households because it was created by combining the Survey of Economic Opportunity (SEO), a survey of low-income households, with a representative group of households from the Survey Research Center (SRC) national sampling frame (Hill 1992). Consequently, family weights are used throughout the analysis.

The unit of observation for the analysis is the individual, but the income measure is equivalence adjusted after-tax family income. This requires estimating family taxes, but a family may contain more than one taxpayer. To estimate taxes, each family was split into potential tax paying units. For 75 percent of the PSID families there is only one potential tax paying unit; there are two in another 17 percent of families. The second potential tax paying unit was either a cohabitor or a working child who cannot be claimed as a dependent. There are three or more in the remaining 8 percent of families. Not all potential tax paying units actually pay taxes—about 20 percent have no federal income tax liability because of low

or no taxable income. Another 18 percent have negative income tax liability because of the refundable tax credits such as the earned income tax credit.

Income from long-term and short-term capital gains was imputed based on information from the IRS's 2004 Statistics of Income (SOI) public use file. The imputations were based on the taxpayer's income (from wages, total interest, total dividends, and Social Security), filing status, and number of dependents. A two-step method was employed. In the first step, whether taxpayers have capital losses, capital gains, or no capital gains/losses was projected using the parameter estimates of a multinomial logit using the SOI data. In the second step, cell averages (with the cells based on the above variables) were calculated from the SOI data and matched to the PSID.

The PSID contains information on income from interest, but does not contain any information on the proportion that is taxable and the proportion that is tax-exempt. Similarly, the information on dividends does not contain information on the proportion that are ordinary (taxed as ordinary income) and the proportion that are qualified (taxed at lower tax rates). The proportion of interest that is tax exempt and proportion of dividends that are qualified were also imputed based on tobit estimates from the SOI data. The variables cited above are used in the imputation procedure.

Federal income taxes were estimated based on the income and other information from the PSID using a tax module created by the author. State tax information was estimated using the National Bureau of Economic Research's TAXSIM model (see Feenberg and Coutts 1993 for a description of the TAXSIM model). Payroll taxes were computed from reported earnings using the legislated 2004 payroll tax parameters. Taxes are estimated for each potential tax unit within the family and then summed over all tax units within the family to arrive at a total family tax burden. Property taxes are included in the PSID data file.

## *Income*

A precise definition of income is important in studying inequality. Most people think of income as the salary they receive from their employer or adjusted gross income as reported on their income tax return. A broader definition of income is the Haig-Simons concept of income. Simons (1938, p. 49) started from the proposition that “[p]ersonal income connotes, broadly, the exercise of control over the use of society’s scarce resources.” Haig (1921, p. 6) defined “income in terms of power to satisfy economic wants rather than in terms of satisfactions themselves.” Both economists argue that income is the sum of consumption and additions to wealth.<sup>4</sup> Additions to wealth reflect rights that could have been exercised in consumption and may be so exercised in the future; the same reasoning would apply to an increase in debt which is a subtraction from wealth. The Haig-Simons definition would include home production, the rental value of housing and durable goods, and accrued capital gains.

For analytic purposes, however, income has to be measured and expressed in numerical terms in terms of national currency. Consequently, consumed goods and services produced through home production (such as child care services provided by family members and food grown by family members) are not included in income, since a monetary value is difficult to calculate. In this analysis, income is measured in dollars and includes earnings, asset income (interest and dividends), business and farm income, government cash transfers, pension payments, the face value of food stamps, and transfers from private individuals. Realized capital gains are also included since accrued capital gains are difficult to measure especially for assets that are not traded often. Following the tax code, only up to \$3,000 in capital losses are included in the measure of income. Family income is adjusted for family size and composition using a two parameter equivalence scale proposed by the National Research Council (Citro and Michael 1995):

$$E = (A + \theta \times C)^\phi$$

---

<sup>4</sup> Simons states that “[p]ersonal income may be defined as the algebraic sum of (1) the market value of rights exercised in consumption and (2) the change in the value of the store of property rights between the beginning and end of the period in question” (p. 50).

where  $A$  is the number of adults in the family,  $C$  is the number of children in the family, and  $\theta = \phi = 0.7$ .

### *Methods*

The generalized Gini coefficient is employed to measure income inequality and the redistributive effect. The generalized Gini is:

$$G(v) = 1 - v(v - 1) \int_0^1 (1 - F)^{v-2} L(F) dF$$

where  $v$  is a parameter reflecting aversion to inequality,  $F$  is the cumulative distribution of income, and  $L(F)$  is the Lorenz curve; as  $v$  gets larger increasing relative weight is placed on the bottom part of the income distribution.  $G(2)$  is the Gini coefficient, which is sensitive to changes at the mode of the income distribution. Values of  $v$  less than 2.0 place greater relative weight on inequality in the upper part of the distribution while values greater than 2.0 place greater relative weight on inequality in the bottom.

The change in the Gini or redistributive effect can be decomposed into a progressivity (vertical) effect and a reranking (horizontal) effect:

$$\begin{aligned} \Delta G(v) &= G_1(v) - G_2(v) \\ &= [G_1(v) - C(v)] - [G_2(v) - C(v)] \\ &= P - R \end{aligned}$$

where 1 indicates initial income, 2 indicates final income,  $C(v)$  is the concentration curve of final income against initial income ranking,  $P$  is the progressivity effect, and  $R$  is the reranking effect. By varying the value of  $v$ , it can be determined where in the income distribution the redistributive and reranking effects are important.

Lerman and Yitzhaki (1995) note that the redistributive effect can be decomposed in a different way by adding and subtracting the concentration curve of initial income against the

final (post-government) ranking. Thus there is an index number problem. They argue that the post-government (final) ranking “is the appropriate ranking for calculating progressivity.” Most analysts, however, use the pre-government (initial) income ranking for calculating progressivity. Using Lerman and Yitzhaki’s example, suppose a rich family is made poor by a tax. The index number problem basically becomes asking who is paying the tax—a rich family or a poor family? Most observers would probably argue that a rich family is paying the tax (which just happens to make them poor). Furthermore, most government transfers and tax benefits are targeted to particular people or groups based on their position before the transfer or tax. Consequently, the initial ranking is used for calculating progressivity.

### *The Transfer and Tax Provisions*

The three transfer programs examined in this study are means-tested programs that provided about \$100 billion in benefits in fiscal year 2008. Temporary Assistance for Needy Families program (TANF) provides cash benefits to needy families with children as well as other services. The Supplemental Security Income program (SSI) provides cash benefits to the aged, blind, and the disabled. The food stamp program (now called the Supplemental Nutrition Assistance program) provides an in-kind but near cash benefit to individuals and families to purchase food.

Many of the tax provisions examined reduce federal tax revenues; the exceptions are the personal exemption phaseout (PEP), the limitation on itemized deductions (Pease), and the alternative minimum tax (AMT). The Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) enacted the phase-in of the repeal of PEP and Pease. PEP and Pease are scheduled to be eliminated in 2010, and reinstated in 2011. The Obama Administration

estimates that if PEP/Pease were eliminated for tax years after 2010, tax revenues would be reduced by about \$6.3 billion in 2011. The AMT was originally enacted to make sure all taxpayers paid some minimum amount in taxes and is primarily targeted to higher income taxpayers. The Tax Policy Center estimates the AMT raised about \$32 billion in 2008.<sup>5</sup>

The earned income tax credit (EITC) is a refundable credit targeted to lower earning taxpayers. The Joint Committee on Taxation (JCT) estimates that the EITC results in almost \$50 billion in lost tax revenue (\$42 billion from the refundable portion).<sup>6</sup> The child tax credit was adopted in 1997 to address concerns that larger families were less able to pay taxes. Families with qualifying children under 17 are allowed up to a \$1,000 credit against taxes for each child. The credit is refundable for most families. The JCT estimates that the credit loses about \$48 billion in tax revenue (\$20 billion from the refundable portion).

Some interest income and Social Security benefits are excluded from taxable income. Up to 85 percent of Social Security benefits can be subject to taxation. For most lower-income recipients, however, Social Security benefits are not taxable (estimated revenue loss of \$24.2 billion). Interest earned from certain State and local government obligations (e.g., municipal bonds) is excluded from taxable income with an estimated revenue loss of \$19 billion.<sup>7</sup>

Income from realized long-term capital gains and qualified dividends are taxed at lower rates than ordinary income. For the 2004 tax year, long-term capital gains and qualified dividends were taxed at a 5 percent rate for taxpayers in the two lowest tax brackets and at 15 percent for other taxpayers. The reduced tax rates on long-term capital gains and qualified dividends is estimated to have resulted in a revenue loss of \$150 billion in 2008.

---

<sup>5</sup> Tax Policy Center, Aggregate AMT Projections, 2008-2019, Table T09-0186, available at <http://www.taxpolicycenter.org>.

<sup>6</sup> U.S. Congress, Joint Committee on Taxation, *Estimates of Federal Tax Expenditures for Fiscal Years 2008-2012*, Joint Committee Print, JCS-2-08, October 31, 2008.

<sup>7</sup> This is a benefit to state and local governments so they can offer a lower yield on their bonds and still be competitive in the bond markets. President Truman proposed taxing interest on state and local bonds to help pay for fighting the Korean War.

Itemizing deductions allows taxpayers to reduce their taxable income. Taxpayers itemize deductions if the total is larger than the standard deduction (\$4,850 for single taxpayers and \$9,700 for married taxpayers in 2004). There are several deductions but the major deductions are the mortgage interest deduction (\$67 billion revenue loss), the deduction for state and local taxes (\$48 billion revenue loss), the deduction for charitable contributions (\$44 billion revenue loss), and the property tax deduction (\$25 billion revenue loss).

Congress created the 10 percent tax bracket and began the phase-in of the reduced tax rates with the passage of EGTRRA. It was estimated at the time that these provisions would reduce tax revenue by \$103.8 billion in 2008. The tax rate reductions were accelerated with the passage of the Jobs and Growth Tax Relief Reconciliation Act of 2003.

#### **IV. Results**

The Gini coefficient for equivalence-adjusted family income before government transfers are added and taxes are subtracted is 0.5116 (see the first row of table 1). It must be emphasized that this is the Gini coefficient before transfers and taxes are included in income and not what it would be if the transfers and taxes did not exist. In the latter case, the disincentive (and incentive) effects of transfers and taxes would be eliminated and family income would likely be very different from the former measure of pre-government income.

The next three rows show the Gini coefficient and redistributive effect after transfers (second row), taxes (third row) or both transfers and taxes (fourth row) are included in income.<sup>8</sup>

---

<sup>8</sup> The full results behind tables 1-4 are reported in appendix tables 2-4.

Taxes and transfers each reduce income inequality—transfers more so than taxes. Together transfers and taxes reduce the Gini coefficient by 16 percent. Overall, the redistributive effect of transfers and taxes would have been almost 18 percent higher in the absence of reranking; the gap changing or vertical effect is 117.7 percent of the redistributive effect. The redistributive effect from transfers alone would have been 16 percent higher and from taxes alone would have been 10 percent higher in the absence of reranking.

The final two columns of table 1 report the qualitative results for the cases with  $\nu = 1.5$ , which places greater relative weight on inequality at the top of the income distribution, and  $\nu = 4.0$ , which places greater relative weight on inequality at the bottom of the income distribution. The redistributive effect of transfers is greater at the bottom of the income distribution than at the top. Conversely, the redistributive effect of taxes is greater at the top of the distribution than at the bottom. The reranking effect of both taxes and transfers (individually and combined), however, is more important at the lower parts of the income distribution than at the top.

The next table (table 2) reports the results for the three transfer programs.<sup>9</sup> Income from these programs reduce the Gini coefficient by 0.1 to 1.1 percent—SSI has the largest redistributive effect. The redistributive effect of TANF and food stamps would have been slightly larger (about 2.3 percent) in the absence of reranking. The impact of reranking on the redistributive effect of SSI is considerably larger—four times the impact for TANF and food stamps. Reranking reduces the redistributive effect of SSI by about 9 percent. As would be expected, the redistributive effect of the three transfer programs is proportionately larger at the bottom than at the top of the income distribution. The same is true for the reranking effect.

---

<sup>9</sup> The redistributive effect is the difference between the Gini coefficient when the transfer income or tax provision is omitted from calculating income and the Gini coefficient for after-tax total income shown in the fourth row of table 1 (0.4284).

Five of the nine tax provisions reduce income inequality as measured by the Gini coefficient. The results for these five provisions are reported in table 3. The child tax credit has the largest redistributive effect of the five and reduces the Gini coefficient by 0.7 percent. The redistributive effect would have been about 2 percent larger in the absence of reranking. The EITC has a smaller redistributive effect and the reranking effect is also smaller. Both of these tax credits are targeted to lower and middle (in the case of the child tax credit “middle” is rather broadly defined) income taxpayers.

The exclusion of Social Security benefits is also targeted toward lower income disabled or elderly families. Most families relying solely on Social Security benefits for income do not pay federal income taxes and do not have to file an income tax return. Overall, the exclusion reduces the Gini coefficient by almost 0.3 percent and the redistributive effect would be about 5 percent larger in the absence of reranking.

Unlike the two tax credits and the Social Security exclusion, the AMT and PEP/Pease are targeted toward higher income taxpayers and reduce income inequality by increasing the tax bite on these taxpayers. The AMT reduces the Gini coefficient by 0.3 percent, and the redistributive effect would be slightly larger (1.5 percent) in the absence of reranking. PEP and Pease reduce the Gini coefficient by about 0.2 percent; there is essentially no reranking effect from PEP and Pease.

For two of the three tax provisions targeting lower-income taxpayers (the EITC and the Social Security exclusion), the redistributive effect is proportionately larger at the bottom than at the top of the income distribution. The exception is the child tax credit in which the redistributive effect is more important at the top of the distribution than at the bottom. This may be due to the child tax credit being more widely available throughout the income distribution

than the EITC—it does not begin the phaseout until about the 80<sup>th</sup> percentile of taxpayers. The reranking effect is more important at the bottom of the income distribution for all three tax provisions.

Both PEP/Pease and the AMT are targeted toward upper income taxpayers, and the redistributive effect is more important at the upper part of the income distribution than at the lower part. In addition, the reranking effect is more important at the top of the income distribution.

The final four tax provisions all work to increase income inequality (see table 4). Additionally, both the progressivity and the reranking effects work in the same direction to increase inequality. Of the four provisions, the reduced rates on long-term capital gains and dividends has the largest effect of increasing inequality, increasing the Gini coefficient by 1.1 percent. About 96 percent of the increase in the Gini coefficient is due to the gap widening effect and the remaining 4 percent is due to reranking—the regressive redistribution effect would be lower in the absence of reranking. Itemized deductions increases the Gini coefficient by almost 1 percent with 96 percent of the redistributive effect due to the gap widening effect and 4 percent to the reranking effect. The EGTRRA tax rate reductions increased inequality by about 0.6 percent with most (99 percent) due to the gap widening effect. The exclusion of municipal bond interest has a very small effect on inequality (considerably less than a 0.1 percent change in the Gini coefficient) probably because only 3 percent of 2004 taxpayers reported receiving any tax exempt interest.

The redistributive effect is more important at the upper part of the income distribution for all four provisions. The reranking effect of the capital gains reduced rates and itemized deductions is more important at the top of the income distribution. The reranking effect of the

reduced (post-EGTRRA) tax rates, however, is more important at the bottom of the income distribution, which could be due to the introduction of the 10 percent tax bracket.

## **V. Concluding Remarks**

Government transfers and taxes affect both the federal fisc and the distribution of income. When policy proposals are under consideration, however, the focus is on either the effect on the budget or the effect on the income distribution, rarely on both (and rarely the latter). With large federal deficits projected over the next several years, the policy response will undoubtedly include increasing tax revenues by changing, adding, and eliminating various tax provisions. Careful consideration should be given to the effect these changes will have on income inequality, which has been rising over the past 30 years.

This study examined the redistributive effect of various federal tax provisions and transfer programs using methods that pick up important dimensions of redistribution often missed in analyses. The redistributive effect was decomposed into two components that reflect important equity principles. Furthermore, the methods allow for a more detailed look at how different parts of the income distribution are affected by public policy changes. Overall, the results are as expected—both U.S. taxes and transfers reduce income inequality. The redistributive effect, however, could be larger if the reranking effect were reduced or eliminated. The reranking effect tends to be relatively more important for transfers than for taxes.

In general, the reranking effect is more pronounced for programs and tax provisions that target benefits to a subset of individuals and families in a particular part of the income

distribution. For example, PEP/Pease and the reduced tax rates targeted all higher income taxpayers rather than just a subset of high income taxpayers; consequently, the reranking effect is negligible for these provisions. SSI is targeted to a relative small subset of low income families (the blind and disabled) and, consequently, has a large reranking effect.

The results offer some guidance for tax reform given the twin goals of raising revenue and reducing income inequality. For example, the reintroduction effect of PEP and Pease after 2010 could raise a not insignificant amount of tax revenue and reduce inequality with a small to negligible reranking effect; this could limit any perceived unfairness of the provision. The method used in the paper can very easily be applied to any tax provision to determine how the provision would affect income inequality and where in the income distribution the impact would be most felt.

## References

- Aronson, J. Richard and Peter J. Lambert (1994), "Decomposing the Gini Coefficient to Reveal the Vertical, Horizontal, and Reranking Effects of Income Taxation," *National Tax Journal*, vol. 47, no. 2 (June), pp. 273-294.
- Atkinson, A.B. (1980), "Horizontal Equity and the Distribution of the Tax Burden," in Henry J. Aaron and Michael J. Boskin, eds., *The Economics of Taxation* (Washington: Brookings Institution), pp. 3-18.
- Autor, David H., Lawrence F. Katz, and Melissa S. Kearney (2006), "The Polarization of the U.S. Labor Market," *American Economic Review*, papers and proceedings, vol. 96, no. 2 (May), pp. 189-194.
- Bound, John and George Johnson (1992), "Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations," *American Economic Review*, vol. 82, no. 3 (January), pp. 371-392.
- Burman, Leonard E., Christopher Geissler, and Eric J. Toder (2008), "How Big Are Total Individual Income Tax Expenditures, and Who Benefits from Them?" *American Economic Review*, papers and proceedings, vol. 98, no. 2 (May), pp. 79-83.
- Citro, Constance F. and Robert T. Michael, eds. (1995), *Measuring Poverty: A New Approach* (Washington: National Academy Press).
- Congressional Budget Office (2009), *A Preliminary Analysis of the President's Budget and an Update of CBO's Budget and Economic Outlook*, Washington, DC (March).
- DiNardo, John, Nicole M. Fortin, and Thomas Lemieux (1996), "Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach," *Econometrica*, vol. 64, no. 5 (September), pp. 1001-1044.
- Duclos, Jean-Yves, Vincent Jalbert, and Abdelkrim Araar (2003), "Classical Horizontal Inequity and Reranking: An Integrating Approach," *Research on Economic Inequality*, vol. 10, pp. 65-100.
- Feenberg, Daniel and Elisabeth Coutts (1993), "An Introduction to the TAXSIM Model," *Journal of Policy Analysis and Management*, vol. 12, no. 1, pp. 189-194.
- Feenberg, Daniel R. and James M. Poterba (1993), "Income Inequality and the Incomes of Very High-Income Taxpayers: Evidence from Tax Returns," in James M. Poterba, ed., *Tax Policy and the Economy*, vol. 7 (Cambridge, MA: MIT Press).
- Feldstein, Martin (1976), "On the Theory of Tax Reform," *Journal of Public Economics*, vol. 6, no. 1-2, pp. 77-104.

- Frank, Robert (2007), *Falling Behind: How Rising Inequality Hurts the Middle-Class* (Berkeley, CA: University of California Press).
- Goldin, Claudia and Lawrence F. Katz (2008), *The Race Between Education and Technology* (Cambridge, MA: Harvard University Press).
- Gordon, Roger H. and Joel B. Slemrod (1999), “Are ‘Real’ Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?,” in Joel B. Slemrod, ed., *Does Atlas Shrug? The Economic Consequences of Taxing the Rich* (New York and Cambridge, MA: Russell Sage Foundation and Harvard University Press), pp. 240-280.
- Gramlich, Edward M., Richard Kasten, and Frank Sammartino (1993), “Growing Inequality in the 1980s: The Role of Federal Taxes and Cash Transfers,” in Sheldon Danziger and Peter Gottschalk, eds., *Uneven Tides: Rising Inequality in America* (New York: Russell Sage Foundation), pp. 225-249.
- Haig, Robert Murray (1921), “The Concept of Income—Economic and Legal Aspects,” in R.M. Haig, ed., *The Federal Income Tax* (New York: Columbia University Press).
- Hill, Martha S. (1992), *The Panel Study of Income Dynamics: A User’s Guide* (Newbury Park, CA: Sage Publications).
- Hungerford, Thomas L. (2006), “Tax Expenditures: Good, Bad, or Ugly?” *Tax Notes*, vol. 113, no. 4 (October 23), pp. 325-334.
- Hungerford, Thomas L. (2008), “Tax Expenditures and Long-term Federal Budget Pressures,” *Tax Notes*, vol. 121, no. 12 (December 22), pp. 1409-1417.
- Kakwani, Nanak (1984), “On the Measurement of Tax Progressivity and Redistributive Effect of Taxes with Applications to Horizontal and Vertical Equity,” *Advances in Econometrics*, vol. 3, pp. 149-168.
- Kaplow, Louis (1989), “Horizontal Equity: Measures in Search of a Principle,” *National Tax Journal*, vol. 42, no. 2 (June), pp. 139-154.
- Kim, Kinam and Peter J. Lambert (2009), “Redistributive Effect of U.S. Taxes and Public Transfers, 1994-2004,” *Public Finance Review*, vol. 37, no. 1 (January), pp. 3-26.
- King, Mervyn A. (1983), “An Index of Inequality: With Applications to Horizontal Equity and Social Mobility,” *Econometrica*, vol. 51, no. 1 (January), pp. 99-115.
- Lambert, Peter J. (2001), *The Distribution and Redistribution of Income* (Manchester: Manchester University Press).

- Lee, David S. (1999), "Wage Inequality in the United States During the 1980s: Rising Dispersion or Falling Minimum Wage?," *Quarterly Journal of Economics*, vol. 114, no. 3 (August), pp. 977-1023.
- Lemieux, Thomas (2006), "Postsecondary Education and Increasing Wage Inequality," *American Economic Review*, papers and proceedings, vol. 96, no. 2 (May 2006), pp. 195-199.
- Lerman, Robert I. and Shlomo Yitzhaki (1995), "Changing Ranks and the Inequality Impact of Taxes and Transfers," *National Tax Journal*, vol. 48, no. 1 (March), pp. 45-59.
- Levy, Frank and Peter Temin (2007), *Inequality and Institutions in 20<sup>th</sup> Century America*, National Bureau of Economic Research, Working Paper no. 13106, May 2007.
- Marmot, Michael (2004), *The Status Syndrome: How Social Standing Affects Our Health and Longevity* (New York: Henry Holt and Co.).
- Musgrave, Richard A. (1959), *The Theory of Public Finance* (New York: McGraw-Hill Book Co.).
- Piketty, Thomas and Emmanuel Saez (2003), "Income Inequality in the United States, 1913-1998," *Quarterly Journal of Economics*, vol. 118, no. 1 (February), pp. 1-39.
- Plotnick, Robert (1981), "A Measure of Horizontal Equity," *Review of Economics and Statistics*, vol. 63, no. 2 (May), pp. 283-288.
- Ramos, Xavier and Peter J. Lambert (2003), "Horizontal Equity and Differences in Income Tax Treatment: A Reconciliation," *Research on Economic Inequality*, vol. 10, pp. 45-63.
- Reynolds, Morgan and Eugene Smolensky (1977), *Public Expenditures, Taxes, and the Distribution of Income: The United States, 1950, 1961, 1970* (New York: Academic Press).
- Simons, Henry C. (1938), *Personal Income Taxation: The Definition of Income as a Problem of Fiscal Policy* (Chicago: University of Chicago Press).
- Slemrod, Joel and Jon M. Bakija (2001), "Growing Inequality and Decreased Tax Progressivity," in Kevin A. Hassett and R. Glenn Hubbard, *Inequality and Tax Policy* (Washington, DC: AEI Press, 2001), pp. 192-226.
- Wilkinson, Richard G. (1996), *Unhealthy Societies: The Afflictions of Inequality* (New York: Routledge).
- Witte, John F. (1985), *The Politics and Development of the Federal Income Tax* (Madison, WI: University of Wisconsin Press).

Table 1. Decomposition of the Redistributive Effect: Transfers and Taxes

Income Definition	Gini	Total Redistributive Effect (RE)	Percent due to Progressivity Effect (P)	Percent due to Reranking Effect (R)	Part of Income Distribution Most Affected by	
					Redistributive Effect	Reranking Effect
Before taxes and transfers	0.5116					
Transfers (before taxes)	0.4689	0.042694	115.8	-15.8	lower	lower
Taxes (before transfers)	0.4774	0.034176	109.8	-9.8	upper	lower
Taxes and transfers	0.4284	0.083168	117.7	-17.7	upper	lower

Table 2. Decomposition of the Redistributive Effect: Transfer Programs

Provision	Total Redistributive Effect (RE)	Percent due to Progressivity Effect (P)	Percent due to Reranking Effect (R)	Part of Income Distribution Most Affected by	
				Redistributive Effect	Reranking Effect
Temporary Assistance for Needy Families (TANF)	0.000600	103.2	-2.3	lower	lower
Supplemental Security Income (SSI)	0.004754	109.4	-9.4	lower	lower
Food Stamps (SNAP)	0.002897	102.3	-2.3	lower	lower

Table 3. Decomposition of the Redistributive Effect: Tax Provisions Reducing Income Inequality

Provision	Total Redistributive Effect (RE)	Percent due to Progressivity Effect (P)	Percent due to Reranking Effect (R)	Part of Income Distribution Most Affected by	
				Redistributive Effect	Reranking Effect
Child Tax Credit	0.002934	102.1	-2.1	upper	lower
Earned Income Tax Credit	0.001728	101.3	-1.3	lower	lower
Social Security Exclusion	0.001067	105.1	-5.1	lower	lower
Alternative Minimum Tax	0.001296	101.5	-1.5	upper	upper
PEP and Pease	0.000782	100.0	0.0	upper	-

Table 4. Decomposition of the Redistributive Effect: Tax Provisions Increasing Income Inequality

Provision	Total Redistributive Effect (RE)	Percent due to Progressivity Effect (P)	Percent due to Reranking Effect (R)	Part of Income Distribution Most Affected by	
				Redistributive Effect	Reranking Effect
Capital Gains Reduced Rates	-0.004664	96.5	3.5	upper	upper
Tax Exempt Interest	-0.000067	100.0	0.0	upper	-
Reduced Tax Rates	-0.002345	98.8	1.2	upper	lower
Itemized Deductions	-0.003549	96.2	3.8	upper	upper

Appendix Table 1. Summary Statistics

<b>Income Source/Tax Provision</b>	<b>Mean (Std. Deviation)</b>
Pre-government Income	\$43298 (112822)
Social Insurance Income	\$2734 (5058)
Public Assistance Income	\$274 (1349)
State Income Taxes	\$1339 (3545)
Payroll Taxes	\$1933 (1930)
Property Taxes	\$814 (1322)
Federal Income Taxes	\$5890 (37764)
<b>Changes in Federal Income Tax due to:</b>	
Child tax credit	\$163 (337)
EITC	\$55 (225)
Social Security	\$98 (334)
AMT	-\$114 (639)
PEP/Pease	-\$52 (488)
Capital Gains/Dividends	\$502 (2752)
Tax Exempt Interest	\$6 (85)
Pre-2001 rates	\$574 (4483)
Deductions	\$460 (1809)

Appendix Table 2. Decomposition of the Redistributive Effect—Gini coefficient ( $\nu = 2.0$ )

	<b>Gini</b>	<b>Redistributive Effect (RE)<sup>a</sup></b>	<b>Progressivity Effect (P)<sup>b</sup></b>	<b>Reranking Effect (R)<sup>b</sup></b>
Pre-government income	0.5116			
Post-transfer, pre-tax income	0.4689	0.042694 [8.34]	0.049436 [115.8]	0.006742 [15.8]
Post-tax, pre-transfer income	0.4774	0.034176 [6.68]	0.037534 [109.8]	0.003359 [9.8]
Post-tax and transfer income	0.4284	0.083168 [16.26]	0.097912 [117.7]	0.014744 [17.7]
<i>TANF</i>	0.4290	0.000600 [0.14]	0.000619 [103.2]	0.000019 [2.3]
<i>SSI</i>	0.4332	0.004754 [1.11]	0.005200 [109.4]	0.000446 [9.4]
<i>Food stamps</i>	0.4313	0.002897 [0.68]	0.002964 [102.3]	0.000067 [2.3]
<i>Child tax credit</i>	0.4314	0.002934 [0.68]	0.002995 [102.1]	0.000062 [2.1]
<i>EITC</i>	0.4302	0.001728 [0.40]	0.001750 [101.3]	0.000023 [1.3]
<i>Social Security</i>	0.4295	0.001067 [0.25]	0.001121 [105.1]	0.000054 [5.1]
<i>AMT</i>	0.4297	0.001296 [0.30]	0.001316 [101.5]	0.000020 [1.5]
<i>PEP/Pease</i>	0.4292	0.000782 [0.18]	0.000782 [100.0]	0.000000 [0.0]
<i>Capital Gains/Dividends</i>	0.4238	-0.004664 [1.09]	-0.004502 [96.5]	0.000162 [-3.5]
<i>Tax Exempt Interest</i>	0.4284	-0.000067 [0.02]	-0.000067 [100.0]	0.000000 [0.0]
<i>Reduced rates (post-EGTRRA)</i>	0.4261	-0.002345 [0.55]	-0.002318 [98.8]	0.000027 [-1.2]
<i>Itemized Deductions</i>	0.4249	-0.003549 [0.82]	-0.003400 [96.2]	0.000134 [-3.8]

Notes: <sup>a</sup>RE as percentage of Gini is in brackets. <sup>b</sup>P and R as percentage of RE is in brackets.

Appendix Table 3. Decomposition of the Redistributive Effect—Generalized Gini ( $\nu = 1.5$ )

	<b>Gini</b>	<b>Redistributive Effect (RE)<sup>a</sup></b>	<b>Progressivity Effect (P)<sup>b</sup></b>	<b>Reranking Effect (R)<sup>b</sup></b>
Pre-government income	0.3658			
Post-transfer, pre-tax income	0.3368	0.029044 [7.94]	0.032589 [112.2]	0.003545 [12.2]
Post-tax, pre-transfer income	0.3366	0.029192 [7.98]	0.031683 [108.5]	0.002491 [8.5]
Post-tax and transfer income	0.3038	0.062020 [16.95]	0.070884 [114.3]	0.008864 [14.3]
<i>TANF</i>	0.3042	0.000355 [0.12]	0.000362 [102.0]	0.000007 [2.0]
<i>SSI</i>	0.3067	0.002860 [0.94]	0.003054 [106.8]	0.000194 [6.8]
<i>Food stamps</i>	0.3055	0.001738 [0.57]	0.001767 [101.7]	0.000029 [1.7]
<i>Child tax credit</i>	0.3059	0.002084 [0.69]	0.002114 [101.4]	0.000030 [1.4]
<i>EITC</i>	0.3049	0.001049 [0.35]	0.001058 [100.9]	0.000010 [0.9]
<i>Social Security</i>	0.3047	0.000889 [0.29]	0.000920 [103.5]	0.000031 [3.5]
<i>AMT</i>	0.3049	0.001054 [0.35]	0.001077 [102.2]	0.000023 [2.2]
<i>PEP/Pease</i>	0.3046	0.000787 [0.26]	0.000788 [100.1]	0.000001 [0.1]
<i>Capital Gains/Dividends</i>	0.3001	-0.003716 [-1.22]	-0.003554 [95.6]	0.000163 [-4.4]
<i>Tax Exempt Interest</i>	0.3038	-0.000058 [-0.02]	-0.000058 [100.0]	0.000000 [0.0]
<i>Reduced rates (post-EGTRRA)</i>	0.3014	-0.002452 [-0.81]	-0.002429 [99.1]	0.000023 [-0.9]
<i>Itemized Deductions</i>	0.3011	-0.002699 [-0.89]	-0.002582 [95.7]	0.000117 [-4.3]

Notes: <sup>a</sup>RE as percentage of Gini is in brackets. <sup>b</sup>P and R as percentage of RE is in brackets.

Appendix Table 4. Decomposition of the Redistributive Effect—Generalized Gini ( $\nu = 4.0$ )

	<b>Gini</b>	<b>Redistributive Effect (RE)<sup>a</sup></b>	<b>Progressivity Effect (P)<sup>b</sup></b>	<b>Reranking Effect (R)<sup>b</sup></b>
Pre-government income	0.7405			
Post-transfer, pre-tax income	0.6717	0.068768 [9.29]	0.086065 [125.2]	0.017296 [25.2]
Post-tax, pre-transfer income	0.7112	0.029286 [3.95]	0.033943 [115.9]	0.004657 [15.9]
Post-tax and transfer income	0.6282	0.112282 [15.16]	0.141773 [126.3]	0.029492 [26.3]
<i>TANF</i>	0.6295	0.001287 [0.20]	0.001369 [106.4]	0.000083 [6.4]
<i>SSI</i>	0.6381	0.009914 [1.58]	0.011640 [117.4]	0.001726 [17.4]
<i>Food stamps</i>	0.6343	0.006030 [0.96]	0.006284 [104.2]	0.000254 [4.2]
<i>Child tax credit</i>	0.6318	0.003607 [0.57]	0.003766 [104.4]	0.000159 [4.4]
<i>EITC</i>	0.6316	0.003377 [0.54]	0.003473 [102.8]	0.000096 [2.8]
<i>Social Security</i>	0.6289	0.000709 [0.11]	0.000790 [111.4]	0.000081 [11.4]
<i>AMT</i>	0.6293	0.001089 [0.17]	0.001097 [100.7]	0.000008 [0.7]
<i>PEP/Pease</i>	0.6288	0.000525 [0.08]	0.000525 [100.0]	0.000000 [0.0]
<i>Capital Gains/Dividends</i>	0.6237	-0.004511 [-0.72]	-0.004432 [98.2]	0.000079 [-1.8]
<i>Tax Exempt Interest</i>	0.6282	-0.000059 [-0.01]	-0.000059 [100.0]	0.000000 [0.0]
<i>Reduced rates (post-EGTRRA)</i>	0.6265	-0.001728 [-0.28]	-0.001690 [97.8]	0.000038 [-2.2]
<i>Itemized Deductions</i>	0.6247	-0.003487 [-0.56]	-0.003392 [97.3]	0.000094 [-2.7]

Notes: <sup>a</sup>RE as percentage of Gini is in brackets. <sup>b</sup>P and R as percentage of RE is in brackets.