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## **WHO BENEFITS FROM TAX-EXEMPT BONDS?: AN APPLICATION OF THE THEORY OF TAX INCIDENCE**

### **WORKING PAPER**

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### **ABSTRACT**

This paper develops and applies a conceptual framework to estimate the distribution among income groups of benefits from the federal income tax exemption of interest on state and local bonds. We first review the general theory of tax incidence and how it is applied in practice by the Urban-Brookings Tax Policy Center (TPC) and federal agencies. We then apply that framework to the analysis of the effects of the state and local bond exemption, taking account of how the exemption might affect relative returns to different financial instruments and relative costs of private and public sector goods and services. Across a range of possible assumptions, we find that the exemption primarily benefits higher-income individuals even though all holders of debt assets benefit from tax-exemption, not just holders of municipal debt. We also show that the assumption of how state and local government budgets change in the presence of the exemption matters greatly and affects which households benefit from the exemption and how much. Finally, we apply this framework to estimate the distributional effects of the President's proposal to limit the tax savings from the exemption of municipal bond interest to 28 percent of interest received.

# **WHO BENEFITS FROM TAX-EXEMPT BONDS?: AN APPLICATION OF THE THEORY OF TAX INCIDENCE**

## **Introduction**

This paper develops and applies a conceptual framework to estimate the distribution among income groups of benefits from the federal income tax exemption of interest on state and local public-purpose bonds<sup>1</sup>. The current method for distributing the benefits of tax-exemption used by the Urban-Brookings Tax Policy Center (TPC) and federal agencies fails to account for *implicit taxes and subsidies* that result from the tax-exemption of selected sources of investment income. In this paper we examine how the exemption might affect relative returns to different financial instruments and relative costs of private and public sector goods and services and estimate how those changes in returns affect the distribution among income groups of the benefit from the exemption. We find that the benefit that holders of tax-preferred assets receive is over-stated by the failure to account for the implicit tax these investors pay in the form of reduced pre-tax returns. Similarly, the benefit that holders of taxable assets receive is understated by the failure to account for the implicit subsidy these investors receive in the form of increased pre-tax returns. Finally, the current method fails to account for any distributional effects resulting from the reduced costs of state and local finance and the increased prices of private goods and services due to higher costs to business enterprises that must compete with state and local governments for capital resources.

Across a range of possible assumptions, we find that the exemption primarily benefits higher-income individuals even though all holders of debt benefit from tax-exemption, not just holders of municipal debt. We also find that the assumption of how state and local government budgets change in the presence of the exemption matters greatly and affects which households benefit from the exemption and by how much. Within any income group, households could face either a net burden or a net benefit from the changes in borrowing costs depending on how states respond to the lower financing costs from the exemption.

We apply this framework to estimate the distributional effects of the President's proposal to limit the tax savings from the tax exemption of municipal bond interest to 28 percent of interest received. Taxpayers facing marginal tax rates higher than 28 percent would bear most, but not all, of the burden of this proposed change. But some of the burden from the reduced subsidy will flow to middle-income investors who will receive lower returns on their taxable bonds when the subsidy to municipal bonds is reduced. Lower-income taxpayers could either gain or lose depending on how state and local governments respond to the higher costs of debt finance.

## **Tax Incidence – General Principles**

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<sup>1</sup>Adjusting for the share of tax-exempt bonds used for private purposes would likely change the results to a modest degree, but these possible effects are not explored here.

Taxes on income and consumption impose a wedge between prices paid by buyers of consumption goods, labor services, and capital services, and prices received by firms and people who supply these services. Depending on how buyers and sellers react to the prices they face, taxes can raise prices paid by buyers, reduce prices received by sellers, or both. These price changes will reduce the real private income of individuals. Distributional analysis concerns itself with how various taxes affect individuals grouped into certain categories, such as by income, family status, or age.

Three federal agencies, the Office of Tax Analysis at the U.S. Treasury Department (OTA), the Joint Committee on Taxation (JCT), and the Congressional Budget Office (CBO) periodically publish analyses of the distribution of tax burdens in the current federal tax system or of the distributional effects of proposed changes in tax law. TPC publishes distributional analyses of tax proposals on a regular basis. In performing these analyses, these organizations rely on large micro-data files of individual income tax returns provided by the IRS Statistics of Income (SOI) division.<sup>2</sup> The analyses of all three federal agencies and of TPC classify tax units or households into different income groups, either by fixed income level or by percentile rankings in the income distribution. They report various metrics of how proposed and enacted changes in tax laws affect taxpayers within these income groups. These metrics include percentages of taxpayers with tax increases and/or decreases, average tax change per tax unit, percentage changes in after-tax income and taxes paid, percentage point changes in tax rates, and the shares of tax increases or tax decreases in different groups.<sup>3</sup>

Several broad principles underlie distributional analyses:

1. The economic burden of taxes can differ from the legal or statutory burden. The economic burden depends on how the tax affects after-tax incomes of individuals after prices, wages, and capital income returns have adjusted to the tax. This economic burden may differ from the legal liability for a tax. For example, legal responsibility for the Federal payroll tax falls half on employers and half on employees. But because most economists believe that the full burden of a uniform tax on earnings falls on employees in the form of reduced after-tax wages, the federal agencies and TPC all assign the burden of payroll taxes to employees only.
2. All taxes are ultimately paid by individuals. Thus, while the tax law treats corporations as legal “persons” who are liable for corporate income tax, the corporation itself is not a human being who consumes goods and services and enjoys a standard of living. Corporate taxes must ultimately reduce the real income of some individuals, whether they be corporate shareholders, investors in general, wage earners, or consumers of goods and

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<sup>2</sup> OTA and JCT have legal access to individual tax return data for use in policy analysis. TPC uses a separate sample SOI produces called the Public Use File (PUF). The PUF is statistically similar to the file used by OTA and JCT, but excludes identifying information and masks some data to prevent identification of individuals.

<sup>3</sup> Distributional analyses require many choices, including how units are defined, how people are divided into groups, the income concept or other metric used to measure well-being and changes in well-being, the tax sources included in the analyses, and the incidence of various taxes. While there are broad similarities in the methods used by the agencies and TPC, there are also some important differences. For explanations of how the agencies do distributional estimates, see Cronin (1999), Cronin et. al (2012), and, Kasten and Toder (1995)

services produced by taxable corporations.<sup>4</sup> A similar analysis would apply to federal tax provisions that affect the budgetary positions of states and localities. Individuals would be affected by these changes, either as state and local taxpayers or as beneficiaries of state and local public services. The question for distributional analysis is identifying which individuals are affected and to what extent.

3. People differ from each other in two ways – how they earn their income (sources) and how they spend their income (uses). Taxes will affect individuals in their roles as both producers and consumers. A complete analysis of distributional incidence must consider the effects on both the sources and uses sides, although typically analyses of the effects of income and payroll taxes (but not consumption taxes) represent the uses side only incompletely.

### Sources vs. Uses

On the *sources* side, people differ in their level of income and in the form in which they receive income. The level of income affects average tax rates because the federal income tax has a graduated rate structure, with minimum levels of income exempt and marginal and average rates rising with income, and the payroll tax has a cap on earnings that are subject to the OASDI rate. The form of income matters because different forms of income (earnings, interest, capital gains, dividends, Social Security benefits, and capital income accrued within retirement accounts) are subject to different tax rules and because people at different income levels receive their income from different sources. For example, returns from investments (dividends, interest, capital gains etc.) are concentrated overwhelmingly among people with the highest incomes, while Social Security and other transfer payments account for a relatively larger share of income among lower income individuals. Tax changes that differentially affect taxation of earnings, capital returns, and Social Security benefits will therefore have differential effects across income groups.

On the *uses* side, people differ in the composition of goods and services they consume and, in some cases, these differences are systematic among income groups. Analyses of federal excise taxes typically do take these effects into account. For example, a distributional analysis of the federal cigarette tax would capture the fact that low-income households on average spend a larger fraction of their total consumption on cigarettes than higher income households. Analyses of the distributional burden of income taxes, however, take these “uses-side” effects into account only to the extent they directly affect income tax liability. For example, a tax subsidy to home mortgage interest will benefit homeowners compared to renters and also homeowners with expensive homes relative to their income compared to homeowners who spend more of their income on other goods and services. Because the mortgage interest deduction is claimed directly on income tax returns, distributional analyses of the benefits of the deduction do capture the relationship between spending on mortgage interest and overall income levels. But if mortgage

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<sup>4</sup> The issue of who bears the burden of the corporate income tax is, of course, a complex and controversial question that has been the subject of considerable economic research, with economists’ views on incidence changing over time as U.S. corporate activity has become more globalized. For a discussion of how TPC distributes the corporate income tax, based on the findings of other research, see Nunns (2012). Harberger first introduced formal microeconomic analysis to the incidence of the corporate income tax (1962) and in subsequent work (2008). Among the several others who have studied this issue are Auerbach (2006), Gravelle (2010, 2011), and Randolph (2006).

interest were instead subsidized through an interest tax credit to financial institutions, the standard analysis would typically distribute the benefit to corporate income taxpayers (according to how the corporate tax is distributed by income source) but would not capture the effects of favoring home owners relative to renters and favoring those with larger than average consumption of housing services relative to those who consume less housing. A more complete analysis of changes in corporate tax incentives would be needed in order to incorporate these uses-side effects.

### Incidence Assumptions of TPC and the Federal Agencies

TPC, OTA, JCT, and CBO all use similar assumptions about who bears the burden of individual income taxes and payroll taxes.<sup>5</sup> They allocate the burden of individual income taxes in proportion to those who incur income tax liability and they allocate the burden of payroll taxes in proportion to the taxable earnings of individuals (including self-employment earnings and partnership income subject to payroll tax). While these are relatively non-controversial assumptions, they do not fully capture all the distributional effects of income tax provisions. For example, the agencies and TPC allocate the benefits from deductions of charitable contributions and state and local income and property taxes to individuals claiming the deductions, without accounting for how these provisions reduce the costs of goods and services supplied by charitable organizations and sub-national governments relative to the costs of goods and services for private consumption.

TPC and the agencies have used over time various assumptions for allocating the burden of the corporate income tax. TPC currently allocates 60 percent of the burden of the tax in proportion to income from corporate shares (capital gains and dividends), 20 percent in proportion to all capital income of individuals, and 20 percent in proportion to labor earnings.<sup>6</sup> CBO and OTA use a similar distribution – CBO allocates 75 percent to capital income and 25 percent to labor income and OTA allocates 63 percent of the burden to income from corporate shares, and 18 percent each to all capital income and labor income. JCT does not distribute the burden of the corporate income tax. Neither TPC nor the agencies capture uses-side effects of corporate income tax provisions. For example, they treat the low-income housing tax credit as a cut in the corporate income tax and allocate the benefit according to the corporate burden shares they apply, but they do not capture the benefit received by low-income individuals from the subsidized rent in these housing units.

### **Who Benefits from the Exemption of Municipal Bond Interest?**

We now turn to the point of the paper – namely who benefits from the exemption of “municipal” (i.e., state and local) bond interest in the individual income tax. We review the current method

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<sup>5</sup> Individual income taxes, payroll taxes, and corporate income taxes account for about 90 percent of federal revenue sources. TPC and the agencies use different assumptions to estimate the effects of selected other federal taxes. For example, TPC and OTA allocate the burden of estate taxes to decedents, although alternatively the burden could be allocated to beneficiaries. CBO and JCT allocate the burden of excise taxes in proportion to consumption of the taxed goods. TPC does not include federal excise taxes in its distribution tables, but has developed a method for allocating the burden of consumption taxes (Nunns, Toder, and Rosenberg, 2012).

<sup>6</sup> A rationale for the 60 percent allocation to corporate equity income is that a large part of the corporate tax falls on economic rent or “supernormal returns”, not the normal return to investments. The effect of tax changes that affect the 40 percent of the corporate tax that falls only on normal returns, such as changes in the timing of depreciation deductions, is allocated 50 percent to all capital income and 50 percent to labor income.

used by TPC and the federal agencies and then discuss the sources and uses-side effects of the relative price changes that tax-exemption produces in the long-run.

### Current Method

TPC and all three federal agencies currently allocate the benefits of tax-exemption of municipal bond interest to individuals who receive that interest. The benefit individuals receive is computed as the difference between the tax they pay under current law and the tax they would pay if the tax-exempt interest they currently receive were included in taxable income. Because tax-exempt interest is now reported on federal tax returns, computing this benefit for each income group is straightforward. However, this method of computing the benefit does not account for how this tax-exemption might affect relative pre-tax returns on different financial assets (e.g. lowering them on tax-exempt debt compared to private debt) and the relative costs of public and private services (e.g. lowering the cost of state and local services relative to private sector goods).

### Market Effects of Tax-Exemption: Sources Side

Analysts can consider three potential adjustments on the sources side in estimating the incidence of tax-exemption of state and local bonds: 1) changes in interest rates on tax-exempt and taxable bonds, 2) changes in relative returns on equity and debt, and 3) changes in relative returns to recipients of capital and labor income. In this paper, we focus on just the first of these effects. We recognize that a more comprehensive approach would include these other effects as well, and we discuss briefly the implications of such an expanded analysis.

#### *Relative Interest Rates*

Individuals who purchase fixed-income securities or bonds seek the highest risk-adjusted after-tax rate of return. When selected borrowers (e.g., state and local governments) are allowed to issue tax-exempt securities, the interest rate they must pay can be lower than the return on fully taxable securities of comparable risk.

We can illustrate how these market adjustments would work in a simple example of a world in which the supply of saving in fixed-interest securities is constant and both corporations and states and localities issue a fixed quantity of bonds to lenders<sup>7</sup>. Suppose initially that all interest income is taxable, corporations issue \$800 billion of bonds, states and localities issue \$200 billion of bonds of equal risk, the interest rate is 4 percent, and all taxpayers are in the 25 percent rate bracket. (Table 1, Panel A). Total pre-tax interest income in the economy will be \$40 billion, with \$32 billion coming from payments by corporations and \$8 billion paid by states and localities. After paying tax at the 25 percent rate, lenders will receive \$30 billion in after-tax interest income and their tax burden will be \$10 billion (\$40 billion less \$30 billion).

Now, suppose the federal government exempts from tax the interest on bonds issued by states and localities. This preference would make the after-tax return on municipal securities initially higher than the return on corporate securities. Lenders will shift into municipal securities until risk-adjusted after-tax returns on taxable and tax-exempt bonds are equalized. With total saving fixed, the overall weighted-average interest rate will remain constant at 4 percent and total pre-

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<sup>7</sup> In our examples we are assuming that the aggregate level of saving does not change, with prices (or pre-tax interest rates charged to borrowers) adjusting to account for changes in after-tax returns.

tax interest income will also stay fixed at \$40 billion (Table 1, Panel B). Pre-tax returns on corporate securities will increase to 4.21 percent, while the yield on state and local bonds will drop to 3.16%. Tax-exemption will benefit holders of both types of securities in proportion to the amount of bonds they hold. The rise in corporate interest rates will raise the net income of holders of corporate securities by \$1.3 billion. And the after-tax return on state and local bonds will increase as well. Although holders of these bonds will receive only 75 percent of the pre-tax corporate return, their after-tax return will be higher by \$0.3 billion than before the tax preference was introduced because the pre-tax corporate return is slightly higher.

This simple example (Table 1, Panels A and B) illustrates the correct way of allocating the benefits from the state and local bond preference, assuming no changes in the quantities of corporate and municipal bonds issued as a result of the changes in costs of finance. In contrast, under the current methodology, all the benefit is allocated to holders of state and local bonds (Table 1, Panel C). The counterfactual assumption in the current methodology is that, absent the preference, their pre-tax interest income from state and local bonds would be \$6.3 billion, exactly the same as their observed income. At a 25 percent rate, that income would generate \$1.6 billion of tax revenue. So tax exemption saves them \$1.6 billion. This overstates the benefit the investors in state and local bonds receive from tax-exemption by \$1.3 billion, but understates the benefit that investors in taxable bonds receive by \$1.3 billion. So, while in this simplified example, 100 percent of the benefits from tax-exemption continue to go to recipients of interest income, the current methodology is misallocating the benefits among interest income recipients.

The current method for distributing the benefits of tax-exemption errs by failing to account for *implicit taxes and subsidies* that result from the tax-exemption of selected sources of investment income.<sup>8</sup> The benefit that holders of tax-preferred assets receive is over-stated by the failure to account for the implicit tax these investors pay in the form of reduced pre-tax returns. And the benefit that holders of taxable assets receive is understated by the failure to account for the implicit subsidy these investors receive in the form of increased pre-tax returns.

The story is more complicated if people holding debt are in multiple marginal tax brackets because tax exemption will then be more valuable for some bondholders than for others. Who receives what portion of the benefit of tax-exemption will depend critically on how much municipal debt and other debt taxpayers hold and whether individual bondholders are allowed to reallocate their holdings once tax-exemption of interest from state and local bonds is introduced.

Suppose we have three types of taxpayers who face marginal tax rates on interest income of 15 percent, 25 percent, and 40 percent, due to differences in taxable income from other sources, and that each holds twenty percent of their assets in municipal bonds and eighty percent in corporate bonds. Low-income taxpayers (with a 15 percent rate) own 12.5 percent of issued debt, middle-income taxpayers (with a 25 percent rate) own one half of issued debt (each person within the group owns less but there are more of these individuals) and upper-income taxpayers own 37.5 percent of all debt (Table 2, Panel A). Originally all taxpayers are indifferent to holding corporate and municipal debt because they earn the same after-tax rate of return on both. As in the previous example, total pre-tax interest income in the economy will be \$40 billion, with \$32 billion coming from payments by corporations and \$8 billion paid by states and localities. After

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<sup>8</sup> For earlier discussions of implicit taxes and subsidies, see United States Department of the Treasury (1977) and Galper and Toder (1984).

paying tax at their respective marginal tax rates, lenders will receive \$28.25 billion in after-tax interest income and their tax burden will be \$11.75 billion. However, the high marginal bracket taxpayer type will receive much less after-tax income per dollar of bondholding (2.40 percent) than the low marginal bracket taxpayer (3.40 percent).

Now, suppose the federal government exempts from tax the interest on bonds issued by states and localities. This preference would again make the after-tax return on municipal securities initially higher than the return on corporate securities. Lenders will shift into municipal securities until risk-adjusted after-tax returns of taxable and tax-exempt bonds are equalized. As in the previous example, we assume that the implicit tax rate at which the after-tax returns on tax-exempt and taxable bonds are equalized is 25 percent. With total saving fixed, pre-tax returns on corporate debt will again increase to 4.21 percent, while the yield on state and local bonds will drop to 3.16 percent. Tax-exemption will again raise the after-tax returns to both tax-exempt and taxable bonds and benefit holders of both types of securities. However, unlike in the single tax rate example, the benefits will no longer be distributed to investors in proportion to the total amount of bonds they hold (Table 2, Panel B).

With a graduated rate schedule, tax-exemption changes relative returns on taxable and tax-exempt debt for any taxpayer facing a marginal tax rate that differs from the implied equilibrating tax rate. While all taxpayers will receive the same (3.16 percent) after-tax yield on tax-exempt securities, only the middle-income taxpayers will receive that same after-tax return on taxable bonds. Low-income taxpayers will receive a higher return on taxable bonds (3.58 percent) than on tax-exempt bonds, while high-income taxpayers will receive a lower return (2.53 percent). As a result, tax exemption provides a disproportionate benefit to high income taxpayers. High-income taxpayers see their after-tax income rise by about 10.6 percent (from \$9.00 to \$9.95), while low-income taxpayers see their after-tax income rise by only 2.8 percent (from \$4.25 to \$4.37). High-income taxpayers receive over half of the benefit of tax-exemption, while holding only 37.5 percent of the debt, while low-income taxpayers receive only 6.4 percent of the benefit of tax-exemption even though they hold 12.5 percent of the debt.

The changes in relative yields between taxable and tax-exempt assets should induce taxpayers to reshuffle their portfolios, even if the total amounts of bonds that corporations and state and local governments issue remain constant. High-income taxpayers might sell taxable bonds and purchase tax-exempts to take advantage of the higher relative after-tax return they receive from tax-exempts, while low-income taxpayers might do the reverse. Suppose that with the tax-exemption in place, low-income taxpayers now hold only taxable bonds, middle income taxpayers (who receive the same after-tax return on both assets) continue to hold the same shares of both types of bonds as without the exemption, and high-income taxpayers absorb all the tax-exempt bonds that low-income taxpayers give up (Table 2, Panel C). As before, tax-exemption raises the after-tax incomes of all taxpayers. But portfolio shifting raises total after-tax income by an additional 26 cents (from \$30.11 to \$30.37) and correspondingly reduces revenue to the federal government. With portfolio shifting, after-tax income rises by 12.3 percent for high-income taxpayers (from \$9.00 to \$10.11), by 5.3 percent for the middle-income taxpayers (from \$15 to \$15.79) and by 5.2 percent for low-income taxpayers (from \$4.25 to \$4.47). Also, with portfolio shifting, the low-income share of the total benefits increases from 6.4 percent (Panel B) to 10.6 percent (Panel C) since these taxpayers now realize the full gain from the higher taxable interest rate.

### *Relative returns to debt and equity capital.*

In the previous example, we assumed that tax-exemption changed relative returns to taxable and tax-exempt bonds, but had no effect on relative returns between debt and equity. But the higher after-tax returns on both corporate and municipal bonds resulting from the tax exemption of interest on municipals should also cause savers to re-allocate their portfolios in favor of bonds generally relative to corporate equities. Savers would seek to equalize risk-adjusted after-tax returns to debt and equity by selling stocks and buying bonds. This shift in holdings will reduce the pre-tax return on both corporate and municipal debt and increase the return on corporate equity.

This change in relative returns will spread the benefits of tax-exemption from bondholders only to both bondholders and holders of corporate equities. Because returns to equities are also tax-preferred at the individual taxpayer level, analysis of how exemption would affect returns on different assets is more complex than in the simple two asset model with only fully taxable and tax-exempt securities. Estimating the effects on returns to municipal debt, corporate debt, and corporate equities and how these changes in yields affect income distribution would require a more fully articulated model of portfolio choice that is beyond the scope of this paper<sup>9</sup>.

### *Allocating some benefits to labor.*

In a global economy, higher returns to investments in the United States will attract saving from overseas. Foreign investors will not reap the benefit from investing in securities that are exempt from U.S. income tax, but they would benefit from the increase in pre-tax returns on corporate taxable debt (as well as equity). The flow of foreign capital would push down these returns, reducing the overall cost of capital in the United States, thereby raising the capital/labor ratio, increasing real wages in the United States, and by so doing, shifting some of the benefit from tax-exemption to U.S. workers. The size of this response depends on the international substitutability of financial claims and also could depend on effects of capital movements on trade flows. While analysis of international flows is beyond the scope of this paper, we acknowledge that there could be some shifting of the benefit of tax-exempt bonds to labor income.

### Market Effects of Tax-Exemption: Uses Side

Tax-exemption also affects households in their role as consumers (uses-side effects). The increase in yields on corporate bonds raises the cost of goods and services that are produced in the private sector while the decrease in yields on state and local bonds reduces by an equal amount the cost of services delivered by state and local governments. The total increase in the cost of consumer goods and the total reduction in the cost of public goods are equal to the change in tax-exempt interest income received by individuals. Thus, the net change in tax burden from all the uses side effects across all households is zero. But households in different income groups may have net burdens or benefits depending on whether they lose or gain from an increase in the costs of private goods relative to the costs of public goods.

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<sup>9</sup> For an analysis that applies a more comprehensive approach to portfolio shifting to estimate the effects on returns to different financial assets from the Tax Reform Act of 1986, see Galper, Lucke and Toder (1988).

We allocate the burden of higher consumer goods prices among income groups in proportion to the shares of private consumption in each income group. The distribution of the benefit from lower costs of public goods, however, depends on whether states and localities increase spending or reduce taxes when their costs of borrowing decline. It also depends on what types of spending are increased and on how any tax cut is structured.

We examine two polar cases for the analysis in this paper – one in which states and localities reduce taxes by an equal percentage of income for all taxpayers and an alternative case in which they increase spending, and the additional spending provides an equal benefit to all persons (including child dependents).

### **Alternative Estimates of the Distribution of the Municipal Bond Preference**

To this point, we have presented the distributional effects of the tax preference for municipal bonds in terms of simple illustrative examples. We now apply the same conceptual framework to the economy-wide distribution of income using the Tax Policy Center’s microsimulation model. We begin with a brief description of this model.

#### The Tax Policy Center Microsimulation Model

The TPC model is based on data from the Public Use File (PUF) produced by the IRS Statistics of Income (SOI) Division. The PUF contains detailed information from a stratified random sample of about 150,000 federal individual income tax returns, with blurring to prevent identification of individuals. We add additional data on demographics, income sources, and non-filers through a constrained statistical match with the Current Population Survey (CPS) of the U.S. Census Bureau and impute data on wealth from the Federal Reserve Board Survey of Consumer Finances (SCF), consumption from the U.S. Department of Labor Consumer Expenditure Survey (CEX), health insurance coverage and premiums from the Medical Expenditure Panel Survey (MEPS), and housing data from the American Housing Survey (AHS). We extrapolate the data to 2024 based on projections of income from different sources by CBO, baseline revenue projections from CBO and JCT, IRS estimates of the future growth in tax returns, and population projections from the Bureau of the Census. For a description of the model, see Rohaly, Carasso, and Saleem (2005).

We group people into tax units, where a tax unit is an individual filing a single or head of household return or a married couple filing a joint return, along with all dependents of that individual or married couple.<sup>10</sup> We use a broad measure of income (expanded cash income or ECI) to classify people into income groups and to measure their effective tax rates. ECI is equal to adjusted gross income (AGI) plus:

- above the line adjustments claimed on tax returns (such as IRA deductions, student loan interest, and the self-employed health insurance deduction);
- employer paid health insurance and other non-taxable fringe benefits;
- employee and employer contributions to tax-deferred retirement saving plans;
- **tax-exempt interest;**
- non-taxable Social Security benefits, pension income, and retirement income;

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<sup>10</sup> Non-filers are grouped into similar units that would correspond to their status if they filed a return.

- the estimated value of accruals within defined benefit pension plans;
- the inside buildup within defined contribution retirement plans;
- cash and cash-equivalent transfer benefits
- the employer's share of payroll taxes; and
- imputed corporate income tax liability.

### Allocate to Recipients of Tax-Exempt Interest

In the standard distributional tables produced by TPC and the federal agencies (OTA, JCT, CBO), the burden of individual income taxes is allocated to individuals in proportion to their actual tax liability. Following this practice, TPC and the agencies allocate the benefit of tax-exemption to recipients of tax-exempt interest. Using this allocation, the preference provides disproportional benefits to the highest income taxpayers, who own most of the tax-exempt bonds and would otherwise pay tax at the highest marginal income tax rate (Table 3). On average, the preference reduces taxes by \$104 per tax unit or about 0.1 percent of income. But it reduces taxes by 0.2 percent of income for those in the 95-99<sup>th</sup> percentiles of the income distribution and by about 0.4 percent of income for those in the top 1 percent. Taxpayers in the top 5 percent of the income distribution receive 79 percent of the benefit from tax-exemption and taxpayers in the top 1 percent receive 57 percent. Taxpayers in middle-income groups receive much less benefit, but do receive some benefits by this measure.<sup>11</sup>

### Simulating the Capital Market Effects of Tax-Exemption

As noted earlier, the subsidy provided by tax exemption increases investors' demand for state and local bonds. The resulting shifts in demand among holders of financial assets will drive down the return on tax-exempt bonds and raise the pre-tax return on other financial assets.

In order to simulate this effect within the TPC model, we need to estimate how much tax-exemption affects the differential return between taxable and tax-exempt securities with similar risks. This will provide a guide as to how much lower pre-tax returns on tax-exempt securities are as a result of tax-exemption and, correspondingly, how much higher returns must be on other assets to keep total income fixed. In our earlier examples, we assumed that a 25 percent spread or yield differential between taxable and tax-exempt bonds would satisfy the demand for both kinds of securities. In this section, we review the literature to find that this is, indeed, a reasonable assumption, but first we present some basic information about the municipal bond market.

State and local government debt is a large class of assets in the United States. According to Flow of Funds data, in 2012 there were almost \$3 trillion in municipal bonds outstanding, representing about 4.4 percent of the \$67 trillion in total household net worth.<sup>12</sup> From the federal government's perspective, the subsidy for tax-exemption is expensive, projected to cost \$191

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<sup>11</sup> Some low- and middle-income taxpayers receive tax-exempt interest, even though in low tax brackets the after-tax return on tax-exempt securities may be lower than the after-tax return on taxable bonds of comparable risk.

<sup>12</sup> As noted by Gordon (2011), municipal bonds are held both directly by households (about 37%) and indirectly by households through mutual funds and money market funds (about 30 %) with most of the remainder being held by financial intermediaries -- commercial banks, property and casualty insurance companies and life insurance companies.

billion in foregone revenue between fiscal years 2013 and 2017 (Joint Committee on Taxation, 2013).<sup>13</sup>

We define the ratio  $R = (r_t - r_e)/r_t$  as the percentage yield differential between taxable and tax-exempt bonds, where  $r_t$  = the pretax return on taxable bonds and  $r_e$  = the return on tax-exempt bonds. Then, taxpayers in a marginal tax rate bracket greater than  $R$  will receive a higher after-tax yield from tax-exempt than from taxable bonds, and the reverse will be true for taxpayers with a marginal rate less than  $R$ .<sup>14</sup> The lower pretax return on tax-exempt bonds can be viewed as an implicit tax paid by holders of tax-exempt securities, who remit no direct taxes to the federal government on their interest income but receive a lower return due to the application of taxes to other interest income.

In theory, this implicit tax should cause tax-exempt bonds to be held only by upper income investors in the highest tax brackets and taxable bonds to be held by those in lower tax brackets and tax-exempt investors. In practice, many taxpayers hold both taxable and tax-exempt bonds – trading off multiple characteristics, only one of which is tax-exempt status. These other attributes include issuer creditworthiness, the structure and timing of interest payments, and secondary market liquidity.

Using the 2006 PUF, we find that tax-exempt interest is claimed by taxpayers at all income levels and facing multiple marginal tax rates. While 27 percent of tax-exempt interest income is received by taxpayers facing a 35 percent tax rate (the highest marginal rate in 2006), almost 30 percent of such interest is received by taxpayers in the 15 percent tax bracket. The median recipient of tax-exempt interest is in the 25 percent bracket.

Calculating the size of the net benefit received by high-income taxpayers (the tax saving in excess of the implicit tax) depends on being able to identify the effect on relative tax-exempt and taxable bond yields of tax exemption by itself, apart from the other characteristics that determine relative returns on state and local bonds and other fixed income securities.<sup>15</sup> Historically, the net benefit received by high-income taxpayers has been estimated to be up to 20 percent of the subsidy (Zimmerman, 1991).<sup>16</sup> However, due to differences in bond characteristics and limits in the secondary market for debt, it is difficult to calculate who the marginal holder of debt is and what portion of the yield differential is due solely to tax-exemption.

There has been some research that has estimated the equilibrating yield differential. Verdugo and Poterba (2011) compared tax-exempt and taxable bonds (both treasury and corporate) and found that the implicit tax rates for 10-year municipal debt varied substantially over the 1991-2010 period but was well below the top statutory marginal tax rate. The implicit tax rate differential between treasury bonds and tax-exempt municipal bonds averaged 19.22 percent, representing an

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<sup>13</sup> This figure is for public purpose bonds only. There are additional, though much smaller, revenue losses projected from different categories of private purpose bonds. Also, as noted earlier, this estimate is simply a calculation of the revenue that would be raised if current interest on municipal debt were subject to tax without taking into account financial market behavior that would occur if the exemption were repealed.

<sup>14</sup> As a result, it is often said that tax-exemption is an inefficient subsidy because high bracket investors receive a net benefit in excess of the reduction in interest cost to borrowers.

<sup>15</sup> See example from joint study of U.S. Congressional Budget Office and Joint Committee on Taxation, *Subsidizing Infrastructure Investment with Tax Exempt Bonds*, Washington, D.C., October 2009.

<sup>16</sup> See, e.g., Zimmerman, Dennis, *The Private Use of Tax-Exempt Bonds: Controlling Public Subsidy of Private Activity*, Washington, D.C., Urban Institute Press, 1991.

average municipal bond yield of 4.38 percent compared with a Treasury yield of 5.51 percent. However, the yield spread varied substantially from over 26 percent in 1991 and 1994 (and averaging around 25 percent in the 1990s) to between 13 and 19 percent in 2001-2007, before falling precipitously to 4 percent in 2008 and then slowly rising in 2009 and 2010. These varying yield ratios reflect changes in both perceived riskiness and perceptions of what future tax policy might be. This volatility, and especially the decline in yield spreads between municipal debt and treasuries, in part reflected liquidity constraints that developed in the municipal bond market in the autumn of 2008.

In part to help state and local governments issue debt and access a broader investor base in the taxable bond market, the Treasury introduced the Build America Bonds (BABs) program, a program that directly subsidized the debt of state and local governments that issued taxable securities (or BABs). Because the same issuer can offer both tax-exempt debt and BABs, the interest rate differentials between the two can provide a direct test of the yield spread between tax-exempt and taxable securities of comparable risk.

States and localities were permitted to issue BABs in 2009 and 2010, with the first BAB being issued in April 2009. The BABs program was structured to include two distinct types of taxable municipal security. The first type, *Direct Pay*, was by far the most common and accounted for 97% of the total issuance volume of BABs. Direct Pay BABs allowed issuers to collect a subsidy worth 35% of interest expense from the Federal government. Thus, issuers could pay the higher interest rates investors demand to hold taxable securities under the expectation that they would bear only 65% of the interest cost.<sup>17</sup> The second type, known as *Tax Credit* BABs, offered a Federal Tax Credit (worth 35% of interest payments) to bond holders.

The BABs subsidy was deliberately set at the high 35 percent rate to encourage building projects during the worst of the recession. While the program expired at the end of 2010, the Obama administration has repeatedly proposed an extension of the BABs program or the introduction of a new similar program (Fast Forward America) with a 28 percent subsidy rate, which they calculate would be a revenue neutral rate.

Several studies have examined the cost savings to borrowers of the BABs program. In addition, comparisons of yields on taxable and tax-exempt debt by the same issuers can help provide information on both the size of the tax-exempt debt subsidy and on who the marginal holder of tax-exempt debt might be. Liu and Denison (2011) compare the True Interest Cost (TIC)<sup>18</sup> for BABs, non-BAB taxable bonds, and tax-exempt municipal bonds issued in California (the largest tax-exempt and BAB market) between April 2009 and March 2010. After controlling for bond characteristics they find that on average, the tax-exempt TIC was 5.2 percent, while the BAB TIC was 7.1 percent before subsidy. Thus, the implicit tax rate that would equilibrate yields is 26.8 percent (1.9/7.1). Liu and Denison further examine what the implied marginal tax rate would need to be to make an investor indifferent between a California BAB and California tax-

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<sup>17</sup> Note that the Direct Pay BABs subsidy was subject to sequestration rules, and this year issuers received less than the full value of the subsidy.

<sup>18</sup> True Interest Cost (TIC) is defined by the Municipal Securities Rulemaking Board to be “the rate, compounded semi-annually, necessary to discount the amounts payable on the respective principal and interest payment dates to the purchase price received for the new issue of bonds.”

exempt debt and find an average implied tax rate for the marginal BAB investor of 25 percent. Luby (2012) looks at matched pairs of Ohio debt and finds a direct subsidy of 24 percent is equivalent to the indirect subsidy of municipal bond tax-exemption. Scott and Shoven (2012) find lower marginal tax rates implied for some of the longer maturity bonds, but also posit that this may be due to different targeted investors, including pension funds, 401(k) plans and sovereign wealth funds.

Based on this literature, we conclude that 25 percent is a reasonable figure to use for the rate differential between tax-exempt and taxable securities. In the simulations below, we examine the distributional and revenue effects assuming that state and local bond yields are 25 percent lower than they would have been in the absence of tax-exemption. We also perform sensitivity tests using an alternative yield spread of 20 percent.

### Allocate to All Bond Holders

In performing the simulations of tax incidence at the assumed 25 percent yield spread, we assume that in the absence of tax-exemption, the interest income taxpayers would receive from state and local bonds would be 33 1/3 percent higher than they report on their individual tax returns. (The 33 1/3 percent increase corresponds to a 25 percent reduction caused by tax-exemption in the reported interest on tax-exempt securities.) When we add this additional interest income to tax returns, total interest income rises. To keep total interest income fixed and the ratio between taxable and tax-exempt interest at the new levels, we then lower all interest income by the same proportion until the current law level of total interest income is restored. This new income distribution represents an estimate of true before-tax income; that is, the distribution of income that would have been observed if there were no tax-exemption of interest on state and local bonds.

This “adjusted” pre-tax income is the same in aggregate for the whole population, but is lower than reported income for lower and middle-income taxpayers and higher for upper income taxpayers (Table 4a, column 2). Given this adjusted income distribution, we now introduce the tax-exemption of municipal bonds. The combination of taxation of most interest income and exemption of interest on state and local bonds raises reported pre-tax income on taxable bonds and lowers reported pre-tax income on tax-exempt bonds (Table 4a, column 3). Because most taxpayers in the bottom 95 percent of the income distribution hold relatively more taxable than tax-exempt bonds than the population as a whole, tax-exemption provides them an implicit subsidy in the form of higher yields on taxable securities (which outweighs their reduced income from tax-exempt bonds), while the top 5 percent pays an implicit tax in the form of lower yields on tax-exempt bonds (which exceeds their increased income from taxable securities.)

The result is that, taking account of implicit taxes and subsidies, taxpayers in the bottom 95 percent of the income distribution are shown to benefit more from tax-exemption than under the conventional estimating methods and taxpayers in the top 5 percent benefit less (they receive 61 percent of the benefits, compared with an estimate of 79 percent with the standard method). Still, in the model that allocates the benefits of tax-exemption to all recipients of interest income, tax-exemption continues to provide a much larger benefit as a share of income and as a to the

highest income taxpayers than to others and they continue to receive a large share of all benefits (Table 4a, columns 6 and 7)<sup>19</sup>.

The results are similar when we assume an equilibrating rate differential of 20 percent, rather than 25 percent, between taxable and municipal bonds (Table 4b). Differences from the results under the conventional method (Table 3) are less when we assume a smaller yield differential because there are smaller changes in pre-tax income.

### Adjusting for Uses-Side Effects

So far, these results have only analyzed the benefits of exemption on the sources of income. As discussed above, the federal tax exemption also generates uses-side effects by lowering the real cost of goods and services provided by state and local governments relative to the real cost of private consumption. We incorporate these uses-side effects in our simulations under two separate assumptions of how state and local governments respond to the tax exemption. The first case assumes state and local governments hold spending constant and the benefit of the exemption is reflected in lower taxes, distributed in proportion to an expanded measure of income that equals adjusted gross income plus income from tax-exempt debt.<sup>20</sup> The second case assumes state and local governments increase their spending, and that the benefit of the additional goods and services is distributed on a per-capita basis. In both cases, the burden associated with the increased cost of private consumption is distributed among income groups in proportion to the amount of private consumption. The magnitude of this reallocation is equal to the net reduction in interest paid by state and local governments in the presence of the federal exemption. While the net effect of the combined private and public sector adjustments is zero across the entire population, the effects of the individual components vary considerably across income groups (Table 5).

#### *Case 1: Reduced State and Local Taxes*

If we assume that the real level of goods and services provided by state and local governments is held constant, then the lower financing costs resulting from the federal exemption translate into lower taxes or other revenues than would otherwise need to be collected. In this case, the uses-side benefit accrues to taxpayers in the form of lower state and local taxes paid and the net uses-side adjustment reflects differences among income groups in their shares of changes in state and local taxes paid and private consumption. If the tax change is proportional to income, then income groups whose share of private consumption exceeds their share of income will face a net negative uses-side adjustment, because the increased costs to them from higher prices of private goods will exceed the benefit from reduced state and local taxes.

For the simulations in which the sources-side benefit is assumed to be spread to all interest income and the implied equilibrating rate is equal to 25 percent (column 2 of Table 6), the net

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<sup>19</sup> Similarly, if we looked at returns to individuals within income groups, we would find that incomes would rise for individuals who held more taxable debt and would fall for holders of tax-exempt debt due to the implicit taxes and subsidies resulting from the tax-exemption.

<sup>20</sup> Strictly speaking, this result would not be produced exactly by a constant percentage point cut in state and local tax rates because the resulting reduction in the state and local tax deductions claimed on federal returns would not benefit taxpayers exactly in proportion to their income. Implicitly, we assume that the net benefit of the state and local tax cut is proportional to income.

impact on the uses-side is negative for the bottom 80 percent of the income distribution. The effect is largest for the bottom two quintiles, equal to 0.19 and 0.08 percent of income respectively. The adjustment is minimal for taxpayers between the 80<sup>th</sup> and 95<sup>th</sup> percentiles, and becomes positive for taxpayers above the 95<sup>th</sup> percentile. For example, taxpayers in the top 1 percent receive a net benefit equal to 0.10 percent of their income, as the benefit from lower taxes at the state and local level far outweighs the higher costs of private consumption. While the pattern across income groups is the same, the magnitude of the net uses-side adjustments is smaller in the simulations that assume a 20 percent equilibrating tax rate (column 4 of Table 6).

### *Case 2: Increased State and Local Spending*

If instead we assume that state and local governments hold their level of taxes and revenue constant, then the lower financing costs accompanying the federal exemption will result in higher levels of real goods and services supplied by states and localities (public education, roads, police protection etc.). In this case, the uses-side benefit would go to consumers of state and local government services, which we approximate by distributing it on a per-capita basis.

The net uses-side adjustments assuming higher spending differ dramatically from the prior case that assumed lower taxes. Instead of reallocating the benefit from low-income taxpayers to high-income taxpayers, the uses-side adjustments from higher spending reallocate from the higher end of the income distribution to lower-income households (who receive much greater than average benefits from the higher level of state and local services as a share of their income than others). For example, the bottom two quintiles receive net benefits of about the same magnitude as the net burdens they would face under the assumption of lower taxes (Table 6, column 3). The net uses-side adjustment is minimal for the middle and fourth quintiles and negative for the top quintile. As a percentage of income, the negative effect of the uses-side adjustment under this case is largest for taxpayers between the 90<sup>th</sup> and 99<sup>th</sup> percentiles.

### Summary of Distributional Effects

Combining the sources-side and uses-side effects provides a complete picture of the distribution of benefits from the tax exemption of state and local government bond interest (Table 7). Under a range of plausible assumptions, the net benefit from the exemption rises with income, with the majority of the benefit accruing to taxpayers in the top 5 percent of the income distribution.

However:

- Relative to a conventional distributional methodology that would assign the benefit of the exemption in proportion to the reported amount of tax-exempt interest, changes in pre-tax yields on taxable and tax-exempt securities due to tax exemption spread the benefit more broadly across the income distribution. The degree to which the benefits are shifted depends on the distribution of the underlying income sources that pay an implicit tax and receive an implicit subsidy from the exemption.
- Based on an all-interest case, the benefits of the tax exemption are somewhat more concentrated at the upper-end of the income distribution the smaller the yield spread between taxable and tax-exempt bonds. The narrower the yield spread—or equivalently, the lower the implied equilibrating marginal tax rate—the greater the benefit received by taxpayers with high marginal tax rates from holding tax-exempt securities.

- The distributional effects of the reduced costs of borrowing to state and local governments depends on how state and local governments respond to the lower costs of providing public services. At one extreme, if one believes the entire benefit states and localities receive from reduced borrowing costs is reflected in tax reductions that are proportional to income, the net benefits of the exemption would be tilted even more to the top-end of the income distribution. At the other extreme, if state and local governments use the cost saving to pay for increased spending on goods and services that provide the same benefits for each person, then the exemption would provide significant benefits to lower-income taxpayers, whose benefits from increased public spending would exceed any increased costs to them of buying private consumer goods.
- Within income groups, the conventional analysis overstates the benefit to holders of municipal debt and understates the benefit to holders of taxable securities by failing to account for implicit taxes and subsidies that result from changes in relative returns among financial assets.

### **Distribution of Proposed Limitation on Tax Benefit from Interest Exemption**

In this section we apply the methodology developed above to estimate the distributional impact of the Obama administration’s proposal to limit the benefit of a number of tax preferences, including tax-exempt interest, to a 28 percent rate. That proposal limits the tax benefit to taxpayers in marginal tax brackets above 28 percent by imposing an additional tax equal to the excess liability (if any) that would be due if the exemption did not exist and affected taxpayers were instead provided a 28 percent credit.<sup>21</sup>

The first issue in estimating the impact of the 28 percent limit is to determine the extent that it affects the capital market equilibrium and therefore pre-tax reported incomes. If the underlying equilibrium is solely a function of the tax rate of a single marginal investor, as would be the case in a pure tax clientele model, then the 28 percent limit would only affect relative yields if the marginal investor had a rate at or above 28 percent. Otherwise, the limit would have no impact on equilibrium yields, and there would be no additional effects on either the sources or uses side beyond what would be estimated under the current standard methodology. The total change in after-tax incomes would simply be equal to the tax change resulting from the limit, holding reported incomes constant.

However, as described above, the observed distribution of reported tax-exempt interest among income groups suggests the pure “marginal investor” model does not provide a realistic explanation of the underlying capital market equilibrium. Instead, it is reasonable to expect that the reduction in demand for tax-exempt debt among individuals in tax brackets above 28 percent would require the overall yield spread to narrow—increasing returns on tax-exempt debt and lowering yields on taxable debt and other assets. We estimate the magnitude of that change by using the Tax Policy Center’s microsimulation model to calculate the percentage change in the

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<sup>21</sup> Here we simulate a version of the 28 percent limit that only applies to tax-exempt interest. The administration’s proposal would apply to a much larger set of tax preferences—including all itemized deductions and certain above-the-line deductions and other exclusions – and would thereby push some taxpayers into higher rate brackets. Since the limit applies to taxpayers who would otherwise face a marginal tax rate in excess of 28 percent in the absence of many other preferences in addition to tax-exempt interest, the Administration proposal would directly affect slightly more recipients of tax-exempt interest than the version considered here.

overall average marginal tax rate on tax-exempt interest caused by the 28 percent limit, a change of 21.2 percent.<sup>22</sup> This would reduce our initial assumption of an implied equilibrating tax rate of 25 percent to 19.7 percent.

In TPC's current method of distributing the effects of changing tax-exemption rules, the burden of a 28 percent cap on tax-exempt interest would be borne solely by holders of municipal bonds that face a marginal tax rate above 28 percent, all of whom are among the top 5 percent of income recipients. Taxpayers in the top 1 percent bear 82.3 percent of the total tax increase and see their tax burden rise by 0.09 percent of income, while those between the 95<sup>th</sup> and 99<sup>th</sup> percentiles face a tax increase equal to 0.02 percent of income (Table 8, columns 2 and 3).

When we assume that the burden is spread to all recipients of interest income through an increase in the tax-exempt interest rate and a decline in the return on taxable bonds, the tax increase faced by the highest income taxpayers falls (from 0.09 percent of income to 0.06 percent of income for the top 1 percent), with some of the burden shifted to lower income taxpayers. The burden distribution remains highly concentrated at the very top, however, with the top quintile absorbing 77 percent of the total tax increase (62 percent for the top 1 percent).

The changes in the distribution of burdens are most dramatic when we control for uses side effects, but the effects are highly sensitive to assumptions of how states and localities pay for their increased borrowing costs (Table 8, columns 6-9). If we assume state and local taxes will have to increase to make up for the higher return required by holders of municipal debt, then taxpayers in the lowest quintile receive a net benefit from the President's proposal because the benefit they receive from lower prices of consumer goods far outweighs their cost from additional state and local taxes. If, instead, however, the higher borrowing cost for state and local governments translates into lower per-capita state and local spending, households in the bottom two quintiles would bear higher net burdens, with the burden as a share of income imposed on the bottom quintile almost as high as the increased effective tax rate on the top 1 percent.<sup>23</sup>

Note, however, that under all assumptions, the very highest income taxpayers face much greater burdens as a share of income than taxpayers as a whole (between 0.05 percent and 0.09 percent of income, compared with 0.02 percent of income for the entire population.) As in the standard model that fails to take into account market adjustments, the more complete model simulations also find that most of the burden from the Obama administration's proposal falls on the very highest income taxpayers.

## Conclusions

Efforts to reform the federal tax system have put a renewed focus on the long list of tax preferences—the various exclusions, deductions, credits, reduced rates, and other features of the tax code formally referred to as tax expenditures—that is imbedded in the current tax code. The federal income tax exclusion of interest paid on state and local government bonds is one such preference that has come under scrutiny. Policymakers are considering changes to the exemption because of its revenue loss, the perception that it benefits only the very affluent, and its inefficiency as a subsidy to state and local governments. It therefore is being considered by both

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<sup>22</sup> Using the TPC micro-simulation model, the overall weighted average marginal tax rate on tax-exempt interest would fall from 28.3 percent to 22.3 percent after imposing the 28 percent limit, a decline of 21.2 percent.

<sup>23</sup> Note that our estimates do not take into account any benefit from increased federal revenues.

those who wish to raise taxes, although only on the very affluent, and by those who favor sharp cuts in the top marginal tax rates, but want to achieve this without making the tax system less progressive. However, state and local government officials and representatives have argued vehemently against modifying the current exemption on the grounds that it would raise their cost of borrowing.

In this paper, we have laid out a formal framework for traditional incidence analysis, an effort that seeks to assign to individual taxpayers the economic burden of the tax system and proposed changes in the system. We have demonstrated how one should apply that framework to the analysis of tax exemption of state and local government bond interest and how the incidence of the exemption varies based on a number of key assumptions. Those assumptions include: a) how broadly adjustments in returns on assets spread the subsidy across sources of income (e.g., all debt, all capital income, all capital and labor income, etc.), how state and local governments respond to lower costs of financing, and how the responses of states and localities affect individuals in different income groups based on their consumption patterns, the benefits they receive from state and local government services, and the state and local taxes they pay.

Across a range of possible assumptions we find that the exemption primarily benefits higher-income individuals, providing only modest benefits to the majority of households in the middle of the income distribution. The assumption about how state and local government budgets change in the presence of the exemption matters greatly at the bottom-end, however. The lowest income households face a net burden from the exemption if the lower state and local financing costs reduce state and local taxes in proportion to income, but receive a net benefit if the exemption leads to increased state and local spending on an equal per-capita basis.

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**Table 1****Incidence of Tax-Exemption of State and Local Bonds in a Stylized, Flat Rate System**

	Corporations	State and local governments	All
Panel A: Baseline with no tax preference			
Debt held	800	200	1000
Interest rate	4.00%	4.00%	
Pre-tax income	32.0	8.0	40.0
Marginal tax rate	25%	25%	
After-tax income	24.0	6.0	30.0
After-tax yield	3.00%	3.00%	
Panel B: Tax benefit with tax exemption			
Debt held	800	200	1000
Interest rate	4.21%	3.16%	
Pre-tax income	33.7	6.3	40.0
Marginal tax rate	25%	0%	
After-tax income	25.3	6.3	31.6
After-tax yield	3.16%	3.16%	
Tax benefit	1.3	0.3	1.6
Share of benefit	80.0%	20.0%	
Panel C: Current method of allocating benefit			
Pre-tax income	33.7	6.3	40.0
Tax at marginal rate	8.4	1.6	10.0
Current law tax	8.4	0	8.4
Tax benefit	0.0	1.6	1.6
Error in benefit	-1.3	1.3	0.0

**Table 2****Incidence of Tax-Exemption of State and Local Bonds in a Stylized, Graduated Rate System**

	Low-Income		Middle-Income		High-Income		Total	
	Corp.	Muni	Corp.	Muni	Corp.	Muni	Corp.	Muni
Panel A: Baseline with no tax preference								
Debt held	100	25	400	100	300	75	800	200
Interest rate	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%	4.00%
Pre-tax income	4.0	1.0	16.0	4.0	12.0	3.0	32.0	8.0
Marginal tax rate	15%	15%	25%	25%	40%	40%		
After-tax income	3.40	0.85	12.00	3.00	7.20	1.80	22.60	5.65
After-tax yield	3.40%	3.40%	3.00%	3.00%	2.40%	2.40%		
Total Reported Income	5.00		20.00		15.00		40.00	
Total After-Tax Income	4.25		15.00		9.00		28.25	
Panel B: Tax Benefit with SL interest tax-exempt, total interest income unchanged								
Debt held	100	25	400	100	300	75	800	200
Interest rate	4.21%	3.16%	4.21%	3.16%	4.21%	3.16%	4.21%	3.16%
Pre-tax income	4.21	0.79	16.84	3.16	12.63	2.37	33.68	6.32
Marginal tax rate	15%		25%		40%			
After-tax income	3.58	0.79	12.63	3.16	7.58	2.37	23.79	6.32
After-tax yield	3.58%	3.16%	3.16%	3.16%	2.53%	3.16%		
Total Reported Income	5.00		20.00		15.00		40.00	
Implicit Tax (Or Subsidy)	0.00		0.00		0.00		0.00	
Total after-tax income	4.37		15.79		9.95		30.11	
Change	0.12		0.79		0.95		1.86	
Percent of Total	6.4%		42.6%		51.1%		100.0	

**Table 2 (continued):**

**Incidence of Tax-Exemption of State and Local Bonds in a Stylized, Graduated Rate System**

	Low-Income		Middle-Income		High-Income		Total	
	Corp.	Muni	Corp.	Muni	Corp.	Muni	Corp.	Muni
Panel C: Tax Benefit with SL interest tax-exempt, total interest income unchanged, and portfolio shifting								
Debt held	125	0	400	100	275	100	800	200
Interest rate	4.21%	3.16%	4.21%	3.16%	4.21%	3.16%	4.21%	3.16%
Pre-tax income	5.26	0.00	16.84	3.16	11.58	3.16	33.68	6.32
Marginal tax rate	15%	0%	25%	0%	40%	0%		
After-tax income	4.47	0	12.63	3.16	6.95	3.16	24.05	6.32
After-tax yield	3.58		3.16	3.16	2.53	3.16	3.01	3.16
Total Reported Income		5.26		20.00		14.74		40.00
Implicit Tax (Or Subsidy)		-0.26		0.00		0.26		0.00
Total after-tax income		4.47		15.79		10.11		30.37
Change		0.22		0.79		1.11		2.12
Percent of Total		10.6%		37.3%		52.2%		100.0%

**Table 3****Distributional Effects of Tax-Exemption of State and Local Bonds**

Sources Method: Allocate Burden to Recipients of Tax-Exempt Interest

Expanded cash income percentile	Average pre-tax income (\$)	Average federal tax rate (%)	Average benefit (\$)	Benefit from exemption (% of income)	Share of benefit (% of total)
Lowest quintile	15,002	3.40	0	0.00	0.0
Second quintile	37,171	8.35	2	0.01	0.4
Middle quintile	66,306	14.02	14	0.02	2.7
Fourth quintile	111,409	17.14	43	0.04	6.7
Top quintile	325,959	25.66	659	0.20	89.8
<b>ALL</b>	<b>89,524</b>	<b>19.72</b>	<b>104</b>	<b>0.12</b>	<b>100.0</b>
Addendum:					
80-90 <sup>th</sup>	165,183	19.23	73	0.04	5.0
90-95 <sup>th</sup>	232,592	21.07	176	0.08	6.0
95-99 <sup>th</sup>	383,687	24.38	792	0.21	21.8
Top 1 percent	2,119,584	33.91	8,201	0.39	57.2
Top 0.1 percent	9,768,430	36.18	36,368	0.37	26.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

**Table 4a****Distributional Effects of Tax-Exemption of State and Local Bonds**

Sources Method: Allocate Burden to Recipients of All Interest Income

Implied Equilibrating Tax Rate = 25 Percent

Expanded cash income percentile	Adjusted pre-tax income (\$)	Change in pre-tax income (\$)	Change in federal tax (\$)	Net benefit from exemption (\$)	Net benefit from exemption (% of income)	Share of net benefit (% of total)
Lowest quintile	14,989	13	1	12	0.08	2.7
Second quintile	37,145	26	-1	27	0.07	5.0
Middle quintile	66,279	27	-12	38	0.06	6.4
Fourth quintile	111,374	35	-43	78	0.07	10.6
Top quintile	326,087	-128	-774	645	0.20	76.5
<b>ALL</b>	<b>89,524</b>	<b>0</b>	<b>-120</b>	<b>120</b>	<b>0.13</b>	<b>100.0</b>
Addendum:						
80-90 <sup>th</sup>	165,131	52	-77	130	0.08	7.7
90-95 <sup>th</sup>	232,532	60	-203	263	0.11	7.8
95-99 <sup>th</sup>	383,843	-156	-939	783	0.20	18.7
Top 1 percent	2,122,290	-2,706	-9,672	6,966	0.33	42.2
Top 0.1 percent	9,778,476	-10,046	-42,251	32,204	0.33	20.1

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

**Table 4b****Distributional Effects of Tax-Exemption of State and Local Bonds**

Sources Method: Allocate Burden to Recipients of All Interest Income

Implied Equilibrating Tax Rate = 20 Percent

Expanded cash income percentile	Adjusted pre-tax income (\$)	Change in pre-tax income (\$)	Change in federal tax (\$)	Net benefit from exemption (\$)	Net benefit from exemption (% of income)	Share of net benefit (% of total)
Lowest quintile	14,992	10	1	9	0.06	2.1
Second quintile	37,151	20	-1	21	0.06	4.1
Middle quintile	66,285	21	-12	33	0.05	5.7
Fourth quintile	111,381	28	-43	71	0.06	9.9
Top quintile	326,056	-97	-745	648	0.20	79.4
<b>ALL</b>	<b>89,524</b>	<b>0</b>	<b>-116</b>	<b>116</b>	<b>0.13</b>	<b>100.0</b>
Addendum:						
80-90 <sup>th</sup>	165,143	40	-76	116	0.07	7.1
90-95 <sup>th</sup>	232,546	46	-196	242	0.10	7.4
95-99 <sup>th</sup>	383,805	-118	-902	784	0.20	19.4
Top 1 percent	2,121,639	-2,055	-9,310	7,255	0.34	45.5
Top 0.1 percent	9,776,058	-7,628	-40,790	33,162	0.34	21.4

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

**Table 5**

**Exemption of State and Local Bonds: Distribution of Uses-Side Adjustments**

Expanded cash income percentile	Share of benefit from lower state and local government taxes (% of total)	Share of benefit from higher state and local government spending (% of total)	Share of burden from higher costs of private consumption (% of total)
Lowest quintile	3.1	19.6	10.8
Second quintile	7.9	20.0	14.3
Middle quintile	14.3	20.0	18.4
Fourth quintile	20.5	20.0	21.7
Top quintile	55.4	20.0	34.5
<b>ALL</b>	100.0	100.0	100.0
Addendum:			
80-90 <sup>th</sup>	13.1	10.0	13.4
90-95 <sup>th</sup>	9.2	5.0	8.3
95-99 <sup>th</sup>	12.8	4.0	8.5
Top 1 percent	20.3	1.0	4.4
Top 0.1 percent	9.8	0.1	1.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

**Table 6**

**Exemption of State and Local Bonds: Net Distributional Effects of Uses-Side Adjustments**

Sources Method: Allocate Burden to Recipients of All Interest Income

Expanded cash income percentile	Implied equilibrating tax rate = 25 Percent		Implied equilibrating tax rate = 20 Percent	
	Case 1: Lower S&L taxes (% of income)	Case 2: Higher S&L spending (% of income)	Case 1: Lower S&L taxes (% of income)	Case 2: Higher S&L spending (% of income)
Lowest quintile	-0.19	0.22	-0.14	0.16
Second quintile	-0.08	0.07	-0.06	0.05
Middle quintile	-0.03	0.01	-0.02	0.01
Fourth quintile	-0.01	-0.01	0.00	-0.01
Top quintile	0.04	-0.03	0.03	-0.02
<b>ALL</b>	0.00	0.00	0.00	0.00
Addendum:				
80-90 <sup>th</sup>	0.00	-0.03	0.00	-0.02
90-95 <sup>th</sup>	0.01	-0.04	0.01	-0.03
95-99 <sup>th</sup>	0.04	-0.04	0.03	-0.03
Top 1 percent	0.10	-0.02	0.08	-0.02
Top 0.1 percent	0.12	-0.01	0.09	-0.01

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

**Table 7****Summary of Benefit of Tax-Exemption of State and Local Bonds under Different Measures**

Sources Method: Allocate Burden to Recipients of All Interest Income

Implied Equilibrating Tax Rate = 25 Percent

Expanded Cash Income Percentile	<u>Current Distribution Method</u>		<u>Sources only</u>		<u>Sources + Uses Case 1: Lower S&amp;L taxes</u>		<u>Sources + Uses Case 2: Higher S&amp;L Spending</u>	
	(percentage of income)	(share of total benefit)	(percentage of income)	(share of total benefit)	(percentage of income)	(share of total benefit)	(percentage of income)	(share of total benefit)
Lowest quintile	0.00	0.0	0.08	2.7	-0.11	-3.6	0.30	10.1
Second quintile	0.01	0.4	0.07	5.0	0.00	-0.3	0.14	9.7
Middle quintile	0.02	2.7	0.06	6.4	0.03	3.0	0.07	7.7
Fourth quintile	0.04	6.7	0.07	10.6	0.06	9.6	0.06	9.1
Top quintile	0.20	89.8	0.20	76.5	0.24	93.8	0.17	64.5
<b>ALL</b>	<b>0.12</b>	<b>100.0</b>	<b>0.13</b>	<b>100.0</b>	<b>0.13</b>	<b>100.0</b>	<b>0.13</b>	<b>100.0</b>
Addendum:								
80-90 <sup>th</sup>	0.04	5.0	0.08	7.7	0.08	7.4	0.05	4.9
90-95 <sup>th</sup>	0.08	6.0	0.11	7.8	0.13	8.6	0.07	5.2
95-99 <sup>th</sup>	0.21	21.8	0.20	18.7	0.24	22.3	0.16	15.0
Top 1 percent	0.39	57.2	0.33	42.2	0.43	55.4	0.31	39.4
Top 0.1 percent	0.37	26.0	0.33	20.1	0.45	27.3	0.32	19.3

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

Note: The income percentile classes used in this table are based on the income distribution for the entire population and contain an equal number of people, not tax units. Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals. For a description of expanded cash income, see <http://www.taxpolicycenter.org/TaxModel/income.cfm>.

**Table 8****Impact of Imposing a 28% Limit on the Benefit from Tax-Exemption of State and Local Bonds**

Sources Method: Allocate Burden to Recipients of All Interest Income

Implied Equilibrating Tax Rate = 25 Percent

Expanded Cash Income Percentile	<u>Current Distribution Method</u>		<u>Sources only</u>		<u>Sources + Uses Case 1: Lower S&amp;L taxes</u>		<u>Sources + Uses Case 2: Higher S&amp;L Spending</u>	
	(percentage of income)	(share of total tax change)	(percentage of income)	(share of total tax change)	(percentage of income)	(share of total tax change)	(percentage of income)	(share of total tax change)
Lowest quintile	0.00	0.0	-0.02	4.2	0.03	-7.3	-0.06	17.6
Second quintile	0.00	0.0	-0.02	9.3	0.00	-0.4	-0.03	17.9
Middle quintile	0.00	0.0	0.00	4.4	0.00	-1.9	-0.01	6.7
Fourth quintile	0.00	0.0	0.00	5.2	0.00	3.4	0.00	2.6
Top quintile	-0.04	98.4	-0.02	77.0	-0.03	108.5	-0.02	55.1
<b>ALL</b>	<b>-0.02</b>	<b>100.0</b>	<b>-0.02</b>	<b>100.0</b>	<b>-0.02</b>	<b>100.0</b>	<b>-0.02</b>	<b>100.0</b>
Addendum:								
80-90 <sup>th</sup>	0.00	0.0	0.00	3.9	0.00	3.5	0.00	-1.2
90-95 <sup>th</sup>	0.00	0.4	0.00	1.8	-0.01	3.3	0.01	-3.1
95-99 <sup>th</sup>	-0.02	15.6	-0.01	8.4	-0.02	14.9	0.00	1.6
Top 1 percent	-0.09	82.3	-0.06	62.0	-0.08	85.9	-0.05	56.8
Top 0.1 percent	-0.09	39.7	-0.06	32.3	-0.09	45.5	-0.06	30.9

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0613-1)

Note: The income percentile classes used in this table are based on the income distribution for the entire population and contain an equal number of people, not tax units. Tax units with negative adjusted gross income are excluded from their respective income class but are included in the totals. For a description of expanded cash income, see <http://www.taxpolicycenter.org/TaxModel/income.cfm>.