Reforming Taxes and Raising Revenue: Part of the Fiscal Solution

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I. Introduction

Many industrialized countries face significant medium-term fiscal deficits and unsustainable long-term fiscal trajectories. The recent fiscal crises in Greece and other countries are a stark reminder of the costs of ignoring these issues. The looming fiscal shortfalls and borrowing requirements they create are unprecedented. Restoring fiscal balance will demand a reworking of the fundamental, implicit, or explicit social contracts in industrialized countries. More prosaically, the problem will be solved by some combination of spending reductions and revenue increases.

These fiscal shortfalls aside, tax reform itself is a laudable goal. Even if current and projected receipts were sufficient to support current and projected government services, the U.S. tax code could be made more equitable, efficient, and simple. Currently, the panoply of targeted deductions, credits, and exemptions yield widely varying tax rates across equally endowed tax units and across different forms of income and spending. Likewise, the progressivity of the overall system should be reexamined, as the incomes of high-income households have risen substantially in absolute and relative terms over the past thirty years while the effective tax rate for this group has fallen. The complexity of the tax code wastes administrative and taxpayer resources, and makes it more difficult to administer effective tax policy.

In this paper, we focus on the challenges and opportunities that the fiscal problem creates for raising revenues and reforming taxation. We focus on the fiscal problems and tax structure of the United States, but many of the lessons will be applicable to other countries as well.

We begin in section II by summarizing the fiscal outlook and reviewing the case for higher revenues as part of the solution. Sections III through V discuss the rationale for, and effects of, three sets of tax changes: reform of income tax expenditures, implementation of a

value-added tax (VAT), and creation of new or increased taxes on nonrenewable energy use. Section VI provides concluding remarks.

II. The Need for Revenue Increases and Tax Reform

A. Fiscal Outlook

The United States faces the prospects of large federal fiscal deficits in the immediate future, the next 10 years, and the longer term. The short-term deficits—the result of the tax cuts and spending increases of the last decade, the "Great Recession," and economic policy response to the recent downturn—are generally thought to be helping the economic recovery.

In contrast, the medium-term deficits projected for the next 10 years and the long-term deficits projected beyond 2021 are a source of concern. Auerbach and Gale (2011) show that under plausible assumptions regarding "business as usual" policies, the federal deficit will equal $11.9 trillion, or 6.0 percent of GDP, between 2012 and 2021. From a level of 10.0 percent in 2009, the deficit will fall to 5.6 percent of GDP by 2015, before rising to 6.5 percent in 2021 (Figure 1).

The figures are not quite as bad under the Obama administration's proposals, but are troubling nonetheless. The ten-year deficit under Obama policy is projected to be $9.5 trillion. The deficit declines to 4.1 percent of GDP by 2015. By 2021, although the economy is projected to have been at full employment for several years, the deficit rises to 4.9 percent of GDP. Spending rises to 24.2 percent of GDP (the highest since World War II, except for the current downturn), debt-to-GDP ratio rises to 87 percent (the highest since 1947), and net interest payments rise to 3.9 percent of GDP (the highest share ever and larger than defense or non-defense discretionary spending).

All of these figures are poised to rise further after 2021. The debt-to-GDP ratio will pass its 1946 high of 108.6 percent in the early 2020s, respectively, under "business as usual" or Obama policy. Under both scenarios, however, the debt-to-GDP ratio would then continue to rise rapidly (Figure 2), a contrast to its sharp decline in the years immediately after 1946. In addition, after 2021, the growth rate of non-interest expenditures rises significantly as Medicare and Medicaid outlays grow rapidly (Figure 3).

The long-term fiscal gap, the immediate and permanent increase in taxes or reduction in spending that would keep the long-term debt-to-GDP ratio at its current level, is estimated to be 6–7 percent of GDP through 2085 and 8–9 percent on a permanent basis. If the policy changes are delayed, the fiscal gap rises further. For example, if the needed policy adjustments are delayed until 2015, the required adjustment rises by 0.4 percent of GDP.

Although the unsustainability of federal fiscal policy has been discussed at least since the 1980s, the problem has increased in importance and urgency in recent years for several reasons. First, the medium-term projections have deteriorated significantly. Second, the issues driving the long-term projections—in particular, the retirement of the baby boom and the aging of the population and resulting pressure on Medicare and to some extent Social Security—which were several decades away in the 1980s, are now imminent. Third, questions about the rest of the world's appetite for U.S. government debt are growing louder, as the United States has changed from a net creditor country in 1980 to a vast net borrower currently. Fourth, many other countries around the world and many of the 50 American states currently face daunting fiscal prospects.

In addition to being urgent, the policy changes needed to close the fiscal gap represent enormous shifts relative to current policy. By way of comparison, in 2008, for example, the individual income tax raised about 6.4 percent of GDP in revenue. Closing a fiscal gap of 9

percent of GDP will be a Herculean task, requiring broad and deep adjustments to existing spending and tax programs, and quite likely new revenue sources as well.

By way of comparison, the largest deficit-closing deals of the past 30 years were positively tiny relative to the required fiscal adjustment today. The 1983 Social Security Reform reduced deficits by about 1.0 percent of GDP in the four years after passage; the 1990 and 1993 budget deals reduced deficits by about 1.4 percent of GDP and 1.2 percent of GDP, respectively, over the five years after passage.[1]

Budget projections embody considerable uncertainty. Deficit projections are particularly uncertain, since relatively small percentage changes in outlays and revenues can lead to relatively large percentage changes in deficits. Economic projections in the current environment may be more uncertain than usual, given the magnitude of the downturn and the unprecedented scale and scope of policy interventions. Despite this uncertainty, it is hard to paint an optimistic picture of the fiscal outlook. Indeed, the projections above are based on a series of economic and political assumptions that could be viewed as optimistic.

In light of these projections, a reasonable medium-term goal would be to stabilize the deficit at 3 percent of GDP. Under the assumption that long-term nominal GDP growth is about 4.5 percent, this would stabilize the long-term debt/GDP ratio at around 67 percent. If this policy were initiated in 2015, it would require annual tax increases or spending cuts—relative to Obama policy—of 1.3 percent of GDP in 2015, rising to 2.1 percent of GDP in 2020, 3.8 percent of GDP in 2025, 5.3 percent of GDP in 2030, and rising thereafter. To be clear, the exact figure is not crucial. Most important is the establishment of a credible deficit reduction plan to give

[1] Authors' calculations based on Steuerle (2004) and CBO (1983, 1991, 1993).

markets confidence in U.S. fiscal policy and to give households and businesses confidence in the trajectory of policy. This confidence will lead to increased willingness to spend and invest.

B. The Need for Revenue Increases

A sustainable budget deal will require both tax increases and spending cuts. Since projected spending is slated to rise faster than GDP for the indefinite future, spending cuts must be part of the solution; spending cannot grow faster than the economy forever. However, the aging of the baby boom generation combined with increasing health care costs means that spending on health care (i.e., Medicare and Medicaid) and Social Security will increase as a share of GDP over the coming decades even if per-beneficiary benefits are held constant in real terms, which seems optimistic given the persistent rise in health care costs and wages. Because federal government spending is growing more rapidly than real GDP, and demand for Social Security and health care outlays are also expected to grow, many analysts to recommend that the United States "bend the curve" of projected spending. That is, while the United States should accommodate some increased rate of future spending on elderly and health programs, we should do so carefully and with limitations.

The need to reduce spending is complicated by the composition of federal outlays. Government spending is broadly classified into two categories: spending on goods and services and transfer payments. In recent years, transfer payments have comprised a growing share of the federal budget; this trend will likely continue over the next several decades with the projected expansion of Social Security and Medicare. Spending on public goods and services is expected to decline as a share of GDP and is not primary cause of the projected fiscal gap. These projected trends call for focus on transfer programs.

Despite the need to control the growth in federal transfers, achieving fiscal sustainability is likely to be too big of a problem to be resolved on one side of the budget alone. The United States has never repaired a major budget shortfall solely through spending reductions. Budget discipline has been achieved only when imposed on both sides of the ledger. For example, in the successful 1983 Social Security reforms and the 1990 and 1993 budget deals, Congress took aim at both sides of the budget by slashing spending and raising taxes. In the 1990 bipartisan budget deal that sharply reduced deficits, 49 percent of the reductions came from higher tax receipts, 34 percent from reduced defense spending, and 17 percent from other cuts in spending (Steuerle 2004). To the extent that Democrats tend to protect an active role for government spending programs and Republicans advocate for tax cuts, a durable solution clearly requires bipartisan compromise.

In contrast, massive tax cuts in 1981 and 2001 did not lead to reduced spending, despite the promises of the "starve the beast" theory of fiscal reform. Instead, tax cuts were followed by steep increases in spending, thus boosting the deficit from both sides. The logic is clear: if some politicians refuse to ask their constituents to sacrifice by bearing the burden of higher taxes, other politicians see no reason to ask their own constituents to bear the burden of lower benefits.

There are also equity reasons to include tax increases in a deficit-reduction plan. In particular, tax increases are the only way to ensure that high-income households share in the burden. Spending cuts simply do not have a very big impact on high-income households. If the burden is to be shared equitably, high-income households will have to face higher tax burdens.

C. Will Revenue Increases Lead to Higher Spending?

Some advocates reject any source of extra revenue on the grounds that less government revenue

leads to smaller government. The "starve the beast" theory is based on the political assumption that Congress is more likely to increase spending when deficits are small or negative. However, the "starve the beast" hypothesis is not consistent with economic theory, nor does it reflect recent experience.[2] Romer and Romer (2009), for example, find that tax cuts designed to spur long-run growth do not in fact lead to lower government spending; if anything, they find that tax cuts lead to *higher* spending. This finding is consistent with Gale and Orszag (2004a), who argue that the experience of the last 30 years is more consistent with a "coordinated fiscal discipline" view, in which tax cuts were coupled with increased spending (as in the 1980s and 2000s) and tax increases were coupled with contemporaneous spending reductions (as in the 1990s). Given the widely recognized need for both spending cuts and revenue increases to balance the budget, any new revenue stream would likely be accompanied by legislated reductions in spending.

Some observers argue that the VAT (discussed below) is such an efficient and invisible tax that it would be used to fuel government spending increases through a gradually increasing VAT rate. Bartlett (2010a, 2010b) addresses this claim by noting that increased VAT rates in OECD countries were common among early adopters, who operated a VAT in the high-inflation environments in the 1970s, but far less common among countries that adopted a VAT after 1975. Among the 17 countries that instituted a VAT during the post-1975 period of relative price stability, four have not changed their VAT rate and four have decreased the rate; the average rate increase across all late-adopters of the VAT is less than 1 percentage point. The average VAT in OECD countries has been roughly constant since 1984 at or just below 18 percent.

D. Long-Term Growth Effects of Tax-Financed Deficit Reductions

[2] Bartlett (2007) outlines the development of the "starve the beast" theory and shows how it failed to apply during the George W. Bush administration.

Tax changes have two broad sets of long-term effects on the economy.[3] The first set operates through direct changes in relative prices, incentives, and after-tax income. These changes affect the degree to which households are willing to work and save and firms to invest and hire; these effects are known as income and substitution effects.

The second broad effect is on national saving. A reduction in the deficit raises public saving, which typically results in higher national saving (national saving is the sum of household, corporate, and government saving). This effect is often ignored in discussions of tax policy and economic growth, but it can be important. Even in the absence of a financial crisis, sustained deficits have deleterious long-term effects, as they translate into lower national savings, higher interest rates, and increased indebtedness to foreign investors, all of which reduce future national income. Gale and Orszag (2004b) estimate that a 1 percent of GDP increase in the deficit will raise interest rates by 25 to 35 basis points and reduce national saving by 0.5 to 0.8 percentage points. Engen and Hubbard (2004) obtain similar results with respect to interest rates. Thus, relative to a balanced budget, a deficit equal to 6 percent of GDP would raise interest rates by at least 150 basis points and reduce the national saving rate by at least 3 percent of GDP. The IMF (2010) estimates that, in advanced economies, an increase of 10 percentage points in the initial debt/GDP ratio reduces future GDP growth rates by 0.15 percentage points. Hence, the projected increase in the debt/GDP ratio from about 40 percent earlier in the decade to 90 percent by 2020 (Auerbach and Gale 2010) would be expected to reduce the growth rate by a whopping 0.75 percentage points. By cutting deficits, tax increases would help spur economic growth.

The net long-term effect of a tax change is the result of the two effects outlined above, which are sometimes offsetting and sometimes mutually reinforcing. Stokely and Rebelo (1995),

[3] Short-term economic effects of tax-financed deficit reductions often differ from long-term effects. Consequently, the relative benefits of a tax-financed deficit reduction policy depend on the time frame of the analysis. Since this paper is concerned with a long-term fiscal solution, we focus on the long-term economic effects.

for example, show that even the very large tax increases associated with World War II—on the order of 10 percent of GDP—apparently had no discernable impact on the long-term economic growth rate. Gale and Potter (2002), taking a very different approach than Stokely and Rebelo (1995), find that the impact of the 2001 tax cuts on the deficit and national saving outweighed its impact on incentives, so that the net effect on growth is negative. This suggests that raising taxes by undoing the 2001 tax cuts would raise long-term economic growth.

E. Guiding Principles for Tax Reform

The need to raising the overall level of revenue makes it more crucial, not less, to enact structural reforms that focus on efficiency, equity, and simplicity in the tax system

The two main sources of federal revenue in the United States are the individual income tax and the payroll tax. In 2009, 43.5 percent of federal revenues were raised through the individual income tax and 42.3 percent of revenues were raised through the payroll tax (Office of Management and Budget 2011a). The individual income tax incorporates a graduated schedule, with rates rising from 10 percent to 35 percent, and several refundable credits[4] that can eliminate net tax liability or actually generate net payments to the household. The individual income tax contains a wide assortment of deductions, exemptions, and credits—in recent years the "cost" of these provisions has been larger than the revenue raised through the tax itself.[5] Capital income is taxed at preferential rates, usually 15 percent. The payroll tax levies a flat 12.4 percent tax (split by employee and employer) on all wages up to an inflation-indexed cap, plus an additional 2.9 percent tax on all wages. In 2009, the remaining revenues were collected through the corporate

[4] The two largest refundable credits are the earned income tax credit, which serves as a wage subsidy for low-income workers (particularly those with children) and the child tax credit, which provides a $1,000 per child credit.

[5] Some of the major deductions, exemptions, and credits (or "tax expenditures") include deductions for interest paid on home mortgages and for contributions to retirement accounts, and exclusion of all employer-provided health insurance from taxation at any level.

tax (6.6. percent of total revenue), excise taxes (3.0 percent of total revenue), and other taxes (4.7 percent of revenue). The latter category includes the estate tax, which is levied on decedents' estates prior to distribution to heirs.

Public attention is usually drawn to raising income tax rates, but this will prove to be a difficult and damaging strategy if carried too far. If a deficit of 3 percent of GDP were to be achieved in 2019 by raising all income tax rates proportionately, static estimates imply that the required increase would be approximately 50 percent; the top three rates would rise from 28, 33, and 35 percent to 38.4, 45.2, and 48.0 percent, respectively. If only the top two rates were increased to achieve the deficit target, the top rates would rise to 72.4 and 76.8 percent, respectively (Altshuler, Lim, and Williams 2010). Rate increases of this magnitude are likely to spur massive avoidance behavior and prove economically damaging.

Base broadening is a more effective strategy to reach any of several policy objectives. Relative to rate increases, broadening the income tax base is more conducive to economic growth; it reduces the distortions created by the tax system and the inefficiencies involved in economic choices, it is fairer and simpler since different types of income and expenditure are treated the same way, and could raise substantial revenue. In the next section, we discuss how to broaden the income tax base by reducing and reforming tax expenditures.

A second concern is that the national saving rate needs to rise to help fund future economic growth. The most direct way to do this is to tax consumption and use the revenues for deficit reduction. In Section IV, we explore how a VAT could be designed as part of the solution to the U.S. fiscal problem.

A third concern for tax reform is the presence of externalities—actions that affect parties not directly involved in a market transaction. Pollution is the canonical example of an

externality, whereby an individual's choice to pollute imposes costs on others. If the party that pollutes does not have to pay the marginal damage associated with its actions, there will be too much pollution provided. In section V, we argue that a tax on carbon emissions and/or a higher tax on gasoline would address this particular externality and would be auspicious ways to cut the budget deficit as well.

III. Tax Expenditure Reform

The term "tax expenditures" refers to the assortment of various targeted provisions that reduce individual income or corporate tax liability. The term "tax expenditure" is officially defined by the Congressional Budget Act of 1974 (P.L. 93-344), which defines tax expenditures as "revenue losses attributable to provisions of the Federal tax laws which allow a special exclusion, exemption, or deduction from gross income or which provide a special credit, a preferential rate of tax, or a deferral of liability." Burman, Toder, and Geissler (2008) note that 90 percent of tax expenditures can be categorized into six distinct groups: itemized deductions,[6] tax exclusions,[7] above-the-line deductions,[8] refundable credits, nonrefundable credits,[9] and lower rates on capital gains and dividends. Examples of each type are shown in Table 1.

[6] In the U.S. tax code, taxpayers deduct from taxable income the larger of a standard deduction or the sum of their itemized deductions; a taxpayer is said "to itemize" if they elect to deduct the sum of their itemized deductions rather than the standard deduction. In recent years, the most prevalent itemized deductions were those for home mortgage interest paid, state and local income taxes paid, and charitable contributions.

[7] Tax exclusions refer to income that is not taxed under the tax code. A notable example of a tax exclusion is compensation received in the form of employer-provided health insurance.

[8] Above-the-line deductions refer to deductions from income that be claimed regardless of the itemization decision (see footnote 6). Notable above-the-line deductions include contributions to retirement saving accounts and interest paid on student loans.

[9] Unlike a deduction, which reduces taxable income by the value of the deduction, tax credits reduce tax liability. "Refundable" credits refer to those credits which can reduce taxpayers' income tax liability below $0, while "nonrefundable" credits cannot reduce tax liability below $0.

The umbrella term "tax expenditures" in the United States encompasses a diverse assortment of initiatives with differing distributional effects, policy goals, and economic consequences. For example, the earned income tax credit (EITC) is a wage subsidy aimed at increasing progressivity and encouraging labor among low-income workers, while the deductions for contributions to retirement accounts are intended to encourage adequate saving for retirement. The diversity inherent in tax expenditures can make it difficult to generalize the merits of tax expenditure reform; in 2011, the Office of Management and Budget identified 173 separate tax expenditures (Office of Management and Budget 2011b). However, the major tax expenditures are similarly expensive, regressive, and inefficient.

The negative characteristics common among the larger tax expenditures make them ripe for reform. Tax expenditures essentially function as entitlement programs, a form of government spending, that occurs through the tax code and has received little scrutiny in the budget process. Eliminating or reducing tax expenditures would make the system simpler and fairer—since all forms of income would be tax more equally—and could raise substantial revenue. Both the President's National Commission on Fiscal Responsibility and Reform and the Bipartisan Policy Center's Debt Reduction Task Force recommended scaling-back tax expenditures and using the additional revenue to reduce the deficit and lower tax rates. President Bush's 2005 Tax Reform Panel similarly recommended eliminating and limiting many tax expenditures, although to a lesser extent than the recent deficit-reduction panels.

A. Revenue

The revenue loss due to tax expenditures is enormous. According to the Office of Management and Budget (2011b), the sum of each tax expenditure in the 2010 budget amounts to $1.2 trillion.

This figure represents about 7 percent of GDP or about 55 percent of total federal revenue, a sum larger than the revenue raised by the individual income tax. As ranked by OMB, 11 of the 12 largest tax expenditures are in the individual income tax, the lone exception being special rules for depreciation of machinery and equipment. The largest tax preferences are those for housing, health care, and retirement saving, which together account for 3 percent of GDP. These estimates are not precise estimates of the revenue gains from repeal since they do not account for potential behavioral adjustments or interactions.

The total cost of tax expenditures appears to be larger when tax expenditures are measured simultaneously, so that interaction effects are taken into account. Burman, Toder, and Geissler (2008), for example, find that interactions raised the total cost of a large subset of tax expenditures in the individual income tax estimated simultaneously by between 5 and 8 percent in 2007, compared with the sum of the costs of the separate estimates.[10]

Tax expenditures have grown over time. Since the late 1990s and today, tax expenditures have grown from under 6 percent of GDP to well over 7 percent of GDP (Batchelder and Toder 2010). More strikingly, tax expenditures continue to rise relative to revenues collected. Expenditures are expected to grow from 33 percent of total revenue collected in 1995 to 43 percent by 2012.

B. Distributional Effects

On an overall basis, individual income tax expenditures tend to disproportionally benefit wealthier taxpayers, making tax expenditures a regressive aspect of a progressive income tax

[10] The higher figure assumed the "patch" for the individual alternative minimum tax (AMT), which Congress was considering at the end of 2007 and eventually extended through 2009, had not been enacted and 23 million taxpayers were subject to the AMT, while the lower figure assumed the AMT had been repealed. (The AMT "patch" temporarily raised the exemption levels for income subject to AMT.) The paper cited explains the paradoxical result that the AMT raises both the interaction effect and the total cost of tax expenditures.

code (Burman, Toder, and Geissler 2008; Toder, Harris, and Lim 2011). If one assumes that capital owners receive a large share of the benefits of business tax preferences, then the distribution of all tax expenditures is even more tilted toward high-income people. More regressive tax expenditures are sometimes characterized as an "upside down" subsidy because they direct a larger share of benefits towards the wealthiest group least in need of the subsidy.

Different tax expenditures have widely varying effects on the distribution of income (Altshuler and Dietz 2008, Burman, Toder, and Geissler 2008, Hungerford 2006). Refundable credits (e.g., the EITC and child tax credit) raise after-tax incomes the most for low-income taxpayers; nonrefundable credits and above-the-line deductions disproportionately benefit middle-income taxpayers; and reduced tax rates on investment income, itemized deductions (e.g., the mortgage interest and property tax deductions), and tax exclusions (e.g., nontaxation of employer contributions to retirement saving accounts) tend to direct benefits towards high-income taxpayers.

A number of studies show that the principal tax expenditures for housing, health care, and retirement raise after-tax income proportionally more for higher-income taxpayers than for lower-income taxpayers, but raise income proportionately less for those at the very top of the income distribution (Burman, Toder and Geissler 2008; Gale, Gruber, and Stephens-Davidowitz 2007; Poterba and Sinai 2008; Toder, Harris, and Lim 2011).

Brixi and colleagues (2004) provide a survey of how tax expenditure budgets are used in various developed and transition economies. Discussions of tax expenditure analysis in the Canadian context can be found in Boadway (2007) and Kesselman (1977).

C. Efficiency and Growth

The impact of tax expenditures on economic efficiency varies by particular provision. Tax expenditures can raise efficiency if they serve to correct a market failure. However, to the extent that lost revenue due to tax expenditures must be compensated elsewhere in the budget, tax expenditures can represent efficiency losses due to higher distortionary taxes.

Some tax expenditures are ineffective. For example, the mortgage interest deduction does not appear to promote homeownership; instead, it encourages households to acquire bigger mortgages and larger houses (Gale, Gruber, and Stephens-Davidowitz 2007; Toder et al. 2010), and may actually reduce the homeownership rate due to the impact of higher housing prices on the demand for housing among young workers (Bourassa and Yin 2007).

The exclusion of employer contributions for health insurance premiums subsidizes the cost of health insurance. This increases access to employer-provided health insurance, but it also leads to overconsumption of higher-priced and inefficient health insurance plans (Gruber and Poterba 1996), which in turn drives up the cost of all health care. Limiting the value of health insurance premiums that are excluded from taxation would help control costs and help make health insurance more affordable while still enabling access to plans more generally. This strategy was a key aspect of the recent health care legislation, which introduced a tax on "Cadillac" health plans as a means of discouraging demand for high-priced plans as a substitute for cash wages.

Likewise, it is unclear whether the tax expenditures for contributions to pensions, 401(k)s, and individual retirement accounts (IRAs) are very effective in private or national saving (Engen, Gale, and Scholz 1996; Gale 1998; Poterba, Venti, and Wise 1996).

On the other hand, the EITC appears effective in bringing single mothers into the labor force. Under the EITC, low-income workers are offered wage subsidies in the form of refundable

tax credits. For workers with wages in the "phase-in" range, the EITC offers a subsidy of 7.65 percent for childless workers, 34 percent for workers with one child and 40 percent for workers with more than one child.[11] Eissa and Liebman (1996) find that the EITC increased labor force participation by 1.9 to 2.8 percentage points but did not significantly affect hours worked among those in the labor force; others have found similar effects (Eissa and Hoynes 2005; Meyer 2002; Meyer and Rosenbaum 2001).

Lastly, there is also evidence that the political economy of tax expenditures in general can lead to efficiency losses. Burman and Phaup (2011) find that because taxpayers inaccurately perceive their tax burden to be lightened by tax expenditures, government services in the form of tax expenditures are over-demanded by constituents relative to cash outlays. The authors note that because there is little review of tax expenditure spending, a dollar of tax expenditure spending may be less effective than an equal amount of direct spending on cash outlays. Similarly, Kleinbard (2010) attributes the increased prevalence of tax expenditures to the preference by voters for expenditure-funded public programs over other types of initiatives. Kleinbard argues that tax expenditures allow politicians to simultaneously expand government programs while appearing to reduce revenues and the subsequent size of government.

D. Policy Options

There are several broad approaches to tax expenditure reform. All proposals would broaden the tax base and reduce the proportion of income exempt from taxation, but this could be achieved

[11] The EITC subsidy rate has four income ranges. The first range is the "phase-in" where the EITC serves as a negative tax rate on wages. This range is followed by a plateau over which workers do not receive an additional subsidy, but are not disqualified from receiving the maximum subsidy. The third range serves as "phase-out," effectively limiting the taxpayer's ability to claim the credit. This range adds to the taxpayer's marginal tax rate. The fourth income range is all income following the phase-out, where—like the plateau following the credit phase-in—the marginal rate is 0. See Scott (2006) for additional details on the EITC.

through one of three strategies. First, tax expenditures could be eliminated. Second, tax expenditures that are deductions or exclusions from income could be converted to credits. Third, a limit could be placed on the tax rate at which deductions are claimed.

Eliminating tax expenditures in isolation would generate hundreds of billions in additional revenue and substantially enhance progressivity. The particular economic effects would depend on the particular tax expenditure eliminated. For example, the economic consequences of eliminating the deduction for mortgage interest would be quite different than for eliminating the deduction for charitable contributions.

Several proposals that eliminate deductions and replace them with credits suggest that the reformed credits be refundable—that is, they can reduce tax liability below zero, resulting in cash payments from the government to the household. Such a policy would equalize the rate at which taxpayers could take advantage of tax-preferred activity, and also extend tax benefits to taxpayers who don't typically take advantage of the deductions. Batchelder, Goldberg, and Orszag (2006) argue that replacing deductions with refundable credits would make the tax code more efficient by improving access to market-correcting subsidies and smoothing income.

Limiting deductions would improve the tax code's horizontal equity, progressivity, and economic efficiency. For example, capping the exclusion for employer-provided health insurance would help to control rising health care costs and limit the regressive nature of the provision (Clemans-Cope, Zuckerman, and Williams 2009).

Limiting deductions could also raise substantial revenue. Limiting itemized deductions[12] to a 28 percent rate, for example, would raise about $300 billion over 10 years (CBO 2009, relative to current law); reducing the rate to 15 percent would raise more than $1.3 trillion over

[12] Taxpayers in the United States deduct from income the larger of a standard deduction or the sum of a series of "itemized" deductions. The largest and most common itemized deductions include the deduction for mortgage interest paid, state and local taxes paid, and charitable contributions.

the next decade (CBO 2010a, relative to current law). Just converting the mortgage interest deduction to a 15 percent tax credit would raise approximately $400 billion over 10 years (CBO 2009, relative to current law). Clemans-Cope, Zuckerman, and Williams (2009) find that setting the exclusion equal to the median premium level and indexing the cap to the cost of medical expenses would raise $210 billion over 10 years. Indexing the cap with respect to inflation would raise more than $900 billion over the decade. Feldstein, Feenberg, and Macguiness (2011) estimate that limiting certain tax expenditures, like itemized deductions, the exclusion of employer-provided health insurance, and certain tax credits to 2 percent of income would raise $278 billion in 2011.

IV. The Value-Added Tax

Under a value-added tax (VAT), businesses pay taxes on the difference between their total sales to other businesses and households and their purchases of inputs from other businesses. That difference represents the value-added by the firm to the product or service in question.[13] The sum of value added at each stage of production is the retail sales price, so the VAT simply replicates the tax patterns created by a retail sales tax and is like other taxes on aggregate consumption. The key distinction is that VATs are collected at each stage of production, whereas retail sales taxes are collected only at point of final sale. Furthermore, the VAT is easier to enforce and is regarded as having a superior administrative structure to a retail sales tax.

The primary distinction between a consumption tax, such as a VAT, and an income tax is the tax treatment of saving (see Aaron and Gale 1996, Hubbard and Gentry 1997).

[13] The tax can be administered in different ways. For example, under the credit invoice method, firms receive tax credits for the taxes they have paid on their purchases from other firms. Alternatively, under the subtraction method, firms can fully deduct all of their payments to other firms. For discussion of these and other options, see Bickley (2006) and Cnossen (2009).

The United States "income" tax actually contains features of both a consumption tax (for example, in its treatment of retirement saving [14]) and an income tax (for example, in the taxation of interest income and the deduction of interest payments). The combination of the two systems does not create a "hybrid" or improved system or a system that is part-way between one tax and the other. Rather, it creates the opportunity to shelter income in a manner inconsistent with either a consumption tax or an income tax (for example, by funding 401(k) contributions with borrowed funds and deducting the interest payments on the borrowed funds).

Although it would be new to the United States, the VAT is in place in about 150 countries worldwide and in every OECD country other than the United States. Experience suggests that the VAT can raise substantial revenue, is administrable, and minimally harmful to economic growth. Additionally, the VAT has at least one other potential advantage worth highlighting: a properly-designed VAT might help the states deal with their own fiscal issues. This section discusses these issues and addresses several concerns that have been raised about the VAT.

A. Revenue

Among non-U.S. OECD members in 2006, the VAT raised almost 7 percent of GDP in revenue, and accounted for almost 19 percent of revenue raised at all levels of government. As with any tax, revenue from a VAT depends on the rate structure and the base. The standard VAT rate, the

[14] For most retirement accounts, the law allows deductions for contributions and nontaxation of returns to accumulated saving until the funds are withdrawn. In recent years, Roth IRAs have grown in popularity. These accounts are considered "back-loaded" accounts because they do not allow for the deduction of contributions, but all subsequent income—including returns to accumulated wealth and distributions from the account—are untaxed following the initial contributions. In contrast, the "front-loaded" accounts described in the text allow for an initial deduction and the nontaxation of returns to capital, but are taxed when distributions from the account are made. Savers receive a substantial tax benefit if their marginal tax rate in retirement is lower than their marginal tax rate during years in which the contribution was made.

rate charged on most goods and services, has remained relatively steady in recent years in non-U.S. OECD countries. In 2007, it ranged from a low of 5 percent in Japan to a high of 25 percent in Denmark, Iceland, Norway, and Sweden. The average rate was 18 percent (OECD 2008).

The VAT "yield ratio" measures VAT revenues as a share of GDP divided by the standard VAT rate. A ratio of 0.3, for example, implies that a 10 percent VAT raises 3 percent of GDP in revenues.[15] Note that the yield ratio does not include the net costs of policies intended to compensate low-income households for VAT payments, nor do they include the offsetting effects that the VAT may have on other revenue sources. The yield ratio simply measures how much revenue is actually gained from the VAT itself.

In 2006, in non-U.S. OECD countries, the yield ratio ranged from a low of 0.28 in Mexico to a high of 0.69 in New Zealand. Most countries fell within a range of 0.3 and 0.4 (OECD 2008). The yield ratio depends critically on the extent to which the VAT tax base is kept broad, rather than narrowed by preferential rates or exemptions on certain goods or services. In practice, most OECD countries apply preferential rates to some items. Of the 29 OECD countries with a VAT in 2007, 17 countries "zero rated" certain goods (meaning that VAT is not charged on the retail sale of the good, but credits are awarded on the VAT paid on the inputs) and 21 applied at least one non-zero reduced rate to a subsector of goods. Only Japan and the Slovak Republic have no preferential rates (OECD 2008).

Toder and Rosenberg (2010) estimate that the United States could raise gross revenue of $355 billion in 2012 through a 5 percent VAT applied to all consumption except for spending on education, Medicaid and Medicare, charitable organizations, and state and local government. This would represent about 2.3 percent of GDP and produce a yield ratio of 0.45 (Table 2).

[15] If the standard VAT rate applies to all items subject to VAT, the yield ratio provides an estimate of the share of GDP that is covered by the VAT.

However, as discussed further below, governments often provide either subsidies or exemptions in the VAT. One way to do so is to exclude some preferred items. For example, exempting rent, new home purchases, food consumed at home, and private health expenditures from the VAT in the U.S. would reduce revenue by 38 percent, cutting the yield ratio to 0.28.

A different way to provide subsidies is to give each household a cash payment. Using the broad base, the provision of a cash payment of $437 per adult and $218 per child would, according to Toder and Rosenberg (2010) cost $97.7 billion. Note that, under this option, the official revenue collected by the VAT would remain at $355.5 billion and the measure of the yield ratio—given by VAT revenues and the standard rate of 5 percent—would remain at 0.45. But what might be called the "effective" revenue—that is, the revenue gain from the VAT net of the costs of making the compensatory cash payments—would fall to $257.8 billion, or 1.64 percent of GDP, giving an "effective" yield ratio of 0.33.

Imposing the VAT would reduce net business income, which would in turn reduce other revenues. Toder and Rosenberg estimate that declines in other tax receipts would offset about 27 percent of gross VAT revenues. This would reduce "effective" revenues—after netting out the costs of cash payments and the loss in other revenues—of 1.02 percent of GDP for either base, resulting in an effective yield ratio of 0.2.

These figures imply, after allowing for offsetting adjustments in other taxes and the costs of either cash payments or narrowing the base as described above, that a 10 percent VAT would raise just over 2 percent of GDP in revenues.

B. Efficiency

A broad-based VAT that is levied uniformly on all goods and services would not distort relative

prices among consumption goods. Similarly, a VAT with a constant tax rate over time would not distort household saving choices, nor would it distort business's choices regarding new investments, financing instruments, or organizational form.[16] Relative to higher income tax rates—which would distort all of the choices noted above—the VAT has much to offer in the way of incentives. Like the income or payroll tax, however, the VAT would distort household choices between work and leisure. The VAT is border-adjustable; it would exempt exports and tax imports. While this is sometimes touted as providing economic benefits, it is actually a neutral treatment of these items.

A substantial literature, based on economic theory and simulation models, documents the potential efficiency gains from *substituting* a broad-based consumption tax for an income tax (Altig et al. 2001, Auerbach 1996, Fullerton and Rogers 1996). These gains arise from a combination of broadening the tax base, eliminating distortions in saving behavior, and imposing a one-time tax on existing wealth.

The tax on existing wealth merits additional discussion. As a tax on consumption, the VAT can be regarded as a tax on the wealth and income that households use to finance current and future consumption: wealth that exists at the time of the transition to the VAT, future wages, and extra-normal returns to capital (Hubbard and Gentry 1997).[17] The tax on existing wealth is a lump-sum tax, since the wealth has been already accumulated. Lump-sum taxes are preferable to other forms of taxation on efficiency grounds, since they do not distort economic choices. In fact,

[16] It is worth noting that the theory of optimal commodity taxation favors multiple tax rates across consumption goods. The "Ramsey Rule" indicates that under certain conditions commodities should be taxed inversely proportional to their demand elasticity.

[17] In a risk-free world, the normal return to capital is just the risk-free rate of return. Earning the risk-free rate of return on saving does not raise the present value of consumption a household can obtain; it simply affects the timing of the consumption. Allowing for risk changes the normal return to a risk-adjusted return, but also changes the rate at which consumption is discounted, so the result continues to hold that earning the normal return (adjusted for the risk) on capital does not affect the present value (adjusted for risk) of consumption available to the household. In contrast, returns due to rents do affect the present value of consumption available to households and therefore would be subject to a consumption tax.

the lump sum tax on existing wealth is a major component of the efficiency gains due to the creation of a consumption tax.[18]

The efficiency and growth effects due to an *add-on* VAT would include both losses from the increased distortion of work/leisure choices as well as substantial gains noted above from the one-time tax on existing wealth and substantial gains from deficit reduction, discussed above.

C. Distributional Effects and Offsetting Policies

In theory, the distributional burden of the VAT depends crucially on how household resources are measured. Typical distributional analyses are made with respect to current income. The VAT is regressive if households are classified by, and the tax burden is measured as a share of current income. Because the VAT is a proportional tax on consumption, and because lower-income households tend to spend a larger proportion of their income than higher-income households, the VAT imposes higher burdens—as a share of current income—on lower-income households.

However, several other perspectives are possible. The VAT is a proportional tax if households are classified by current consumption since all households are taxed at the same rate on the amount they consume. Likewise, to the extent that current consumption mirrors average lifetime income, the VAT is also proportional with respect to lifetime income. Empirical research broadly confirms these notions (Caspersen and Metcalf 1994, Metcalf 1994, Toder and Rosenberg 2010). However, empirical analysis is complicated by the fact that alternative methods of distributing the burden of a consumption tax, such as distributing the burden to consumption versus wages and capital less investment, can produce drastically different

[18] Altig et al. (2001) show that in the conversion to a flat tax, the taxation of old capital accounts for more than 60 percent of the induced economic growth effect in the first 5 years, more than half of growth in the first decade, and about 40 percent of the induced growth even after 50 years.

estimates of progressivity, even though they are equivalent in theory (Burman et al. 2005).

As mentioned earlier, the VAT imposes a one-time tax on existing wealth, a feature that is desirable on efficiency grounds but is more controversial with regard to fairness. We believe a one-time tax on wealth would be fair, and in fact would be quite progressive. There is concern that imposing a VAT would hurt the elderly, a group that has high consumption relative to its income. However, it is the case that Social Security and Medicare are the principal sources of income for a substantial proportion of low-income elderly households. Since those benefits are effectively indexed for inflation, low-income elderly households would be insulated from any VAT-induced increases in the price of consumer goods or health care services.[19] High-income elderly households, who receive much lower shares of their income in the form of indexed government benefits, would need to pay more in taxes but could afford to do so.

Concerns about the regressivity of the VAT are complex, but they should not obstruct the creation of a VAT for two reasons. First, while we accept the validity of distributional considerations, what matters is the progressivity of the overall tax and transfer system, not the distribution of any individual component of that system. Clearly, the VAT can be one component of a progressive system.

Second, it is straightforward to introduce policies that can offset the impact of the VAT on low-income households. The most efficient way to do this is simply to provide households either refundable income tax credits or outright payments. For example, if the VAT rate were 10 percent, a $3,000 demogrant would equal VAT paid on the first $30,000 of a household's consumption. Households that spent exactly $30,000 on consumption would pay no net tax. Those that spent less on consumption would receive a net subsidy. Those that spent more on

[19] Johnson et al. (2004) show that for households in the bottom quintile and second quintile of the income distribution for the elderly, 80 percent and 68 percent, respectively, of their financial (i.e., non-Medicare) income comes from Social Security.

consumption would, on net, pay a 10 percent VAT only on their purchases above $30,000. Toder and Rosenberg (2010) estimate that a VAT coupled with a fixed payment to families is generally progressive, even with respect to current income.

In contrast, many OECD governments and state government offer preferential or zero rates on certain items like health care or food to increase progressivity. This approach is largely ineffective because the products in question are consumed in greater quantities by middle-income and wealthy taxpayers than by low-income households.[20] Furthermore, this approach creates complexity and invites tax avoidance as consumers try to substitute between tax-preferred and fully taxable goods and policymakers struggle to characterize goods. For example, if clothing were exempt from the VAT, Halloween costumes classified as clothing would be exempt, while costumes classified as toys would not.

D. Administrative Issues

A broad-based VAT would cost less to administer than the current income tax. For example, in the United Kingdom, administrative costs of the VAT were less than half of those of the income tax, measured as a share of revenue. Similarly, the New Zealand revenue department was required to intervene in just 3 percent of VAT returns, compared to 25 percent of income tax returns (GAO 2008).

The VAT has compliance advantages over a retail sales tax, which aims to collect all revenue at the point of sale from a business to a household. Since revenue collection for the VAT is spread across stages of production, with producers receiving a credit against taxes paid as an

[20] Congressional Budget Office (1992, p. xv) finds that "excluding necessities such as food, housing, utilities, and health care would lessen the VAT's regressivity only slightly." Toder and Rosenberg (2010) find that excluding housing, food consumed at home, and private health expenditures from the consumption tax base can somewhat increase progressivity, but not as much as a per-person payment would.

incentive for compliance, the VAT in practice is less likely to be evaded.[21]

Theory and evidence suggest that the compliance burden would likely fall more heavily – as a percentage of sales – on smaller businesses. Most countries address these concerns by exempting small businesses from collecting the VAT. In 2007, 24 out of the 29 OECD countries with a VAT exempted businesses with gross receipts beneath specified thresholds, varying from $2,159 to $93,558 (OECD 2008).

Finally, to the extent that administrative costs are fixed with respect to the VAT standard rate, the presence of such costs suggest that the VAT should be set at a relatively higher rate rather than a lower one.

E. The States

Some analysts express concern that a national VAT would impinge on states' ability to administer their own sales taxes. In our view, a national VAT could help states significantly. State retail sales taxes are poorly designed—they exempt many goods and most services and collect more than 40 percent of their revenue from taxing business purchases, which should be exempt.[22]

Converting sales taxes to VATs and piggybacking on a broad-based federal VAT would offer states several advantages. First, the states could raise substantial amounts of revenue in a less distortionary manner than current sales taxes. Second, administrative costs, which currently exceed 3 percent of state sales tax revenue (PriceWaterhouseCoopers 2006), would decline.

[21] Gale (2005) discusses administrative complications with a retail sales tax and the changes in tax rate resulting from an erosion of the tax base due to evasion.

[22] See McLure (2002) for a description of the "nutty" world of state sales taxes. See Mazerov (2009) for an estimate that most states could increase sales tax revenue by 20 to 40 percent if "feasibly-taxed" services were added to the sales tax base. See Durner and Bui (2010) for the share of sales taxes paid by businesses.

Many states currently link their income tax to the federal income tax base, with obvious administrative and compliance advantages. Similar savings would accrue from linking federal and state VAT bases. Third, a national VAT would allow states and the federal government to tax previously difficult-to-tax transactions, such as interstate mail order and internet sales. If the U.S. experience followed that of Canada, the federal government could collect revenue on behalf of states and absolve states of the cost of administering consumption taxes altogether (Duncan and Sedon 2010).

In 2009, state and local sales tax revenue equaled 2.0 percent of GDP (authors' calculations based on U.S. Census Bureau 2010). If the federal VAT had the broad base and demogrants described in Table 1, and the states and localities piggy-backed on that structure, an average subnational VAT of about 6 percent would raise the same revenue as existing state and local sales taxes.[23] Alternatively, states could maintain their sales taxes or create their own VAT bases. Following the implementation of a federal VAT in Canada, most provinces maintained their existing tax codes for several years. Some provinces have yet to fully harmonize with the federal VAT, while Quebec administers its own VAT (Duncan and Sedon 2010).

F. Making the VAT Transparent

A variant of the concern about spending growth is the notion that the VAT is "hidden" in overall prices. As a result, the argument goes, taxpayers won't notice the VAT the way they do income, sales, or payroll taxes, enabling Congress to increase the VAT rate without much taxpayer resistance.

[23]This estimate is based on the yield ratio of 0.33 listed in Table 1. An alert reader may question why a federal VAT would require a 10 percent rate to raise 2 percent of GDP, while a state and local VAT would only require a 6 percent rate to raise the same revenue. The answer is that the federal VAT would be an add-on tax with partially offsetting reductions in other revenue sources, as described above. In contrast, the state and local VAT discussed here would substitute for existing sales taxes and therefore would not create such offsets.

This issue is easily addressed. The VAT doesn't have to be invisible: for example, Canada simply requires that businesses print the amount of VAT paid on a receipt with every consumer purchase. This is essentially identical to the standard U.S. practice of printing sales taxes paid on each receipt.[24] Another way to make the VAT transparent is to link VAT rates and revenues with spending on particular goods. Aaron (1991) and Burman (2009) propose a VAT related to health spending. Under such a system, the additional health insurance coverage would help offset the regressivity of a VAT and make the costs of both the VAT and government spending more transparent.

G. Inflation

The creation of an *add-on* VAT will create pressure on prices. If, instead, the VAT were replacing a sales tax, there would be no pressure or need to adjust the price level. In our view, the Fed should accommodate the one-time price rise inherent in the creation of an add-on VAT. Failing to do so would create significant and unnecessary adjustment costs in terms of lost jobs and wages.

There is no theoretical or empirical reason to expect that the VAT would cause continuing inflation. Indeed, the presence of an additional revenue source would reduce the likelihood of the Fed having to monetize the debt. Research has found only a weak relationship between the VAT and continually increasing prices. In a survey of 35 countries that introduced the VAT, Tait (1991) finds that 63 percent exhibited no increase in the consumer price index

[24] The growing literature on tax visibility offers somewhat mixed results. Mulligan et al. (2010) find that the proportion of payroll taxes paid by employees does not have a significant effect on the size of the public pension program. Finkelstein (2009) finds that the adoption of electronic toll collection results in higher tax rates and reduced short-run elasticity of driving with respect to toll rates. Similarly, Chetty et al. (2009) find that posting tax-inclusive prices reduce demand for certain goods.

(perhaps because they were replacing existing sales taxes) and 20 percent had a one-time price rise. In the remaining 17 percent of cases, the introduction of the VAT coincided with ongoing acceleration in consumer prices, but in Tait's view, it is not likely that the VAT caused the acceleration.

V. Energy taxes

An energy tax, either a carbon tax or an economically-equivalent limit on tradable carbon emissions, makes economic sense: it would include the social cost of producing and consuming carbon in the price of goods, reduce the U.S. economy's dependence on foreign sources of energy, and mitigate economic effects of environmental deterioration. Furthermore, a tax on carbon (or the trading of emission permits) would create better market incentives for the production of energy-efficient goods, and could be used a mechanism to phase-out the panoply of targeted energy incentives.

Raising taxes on gasoline are another option. While a modest excise tax on gasoline sales already exists, it is substantially lower than the level enforced in other industrialized nations and the level justified by studies of the external cost of gasoline consumption. In the United States, federal excise taxes on gasoline amount to 18.4 cents per gallon, with local tax rates typically taxing gasoline at additional 20–30 cents per gallon. Taxes on gasoline in industrialized countries tend to be several times the levels found in the U.S. In 2010, OECD taxation of gasoline ranges from $0.090 per liter (Mexico) to $1.358 per liter (Turkey); the U.S. has the second-lowest rate of gasoline taxation among OECD countries with a rate of $0.131 per liter (OECD 2011). The OECD average for gasoline excise taxes is approximately $0.895 per liter (authors' calculations based on OECD 2011), about 7 times the rate of the U.S. tax. In addition, per-mile fuel taxes in

the U.S. are low by historical standards, falling by 40 percent in real terms since 1960 (Parry, Harrington, and Walls 2007).

A. Revenue

A well-designed carbon tax would raise about 1 percent of GDP in revenue, dependent on the statutory tax rate and the behavioral response by households and firms to the tax. Metcalf (2008) estimates that a $15 per ton tax on carbon emissions in 2003 would have generated $82.5 billion in revenue, equal to about 0.8 percent of GDP, after accounting for short-run behavioral responses. The revenue yield would fall if the carbon tax base were eroded or if tradable permits were distributed for free, as was the case in the Obama administration's recent proposal (scored by CBO (2010a) to raise $632 billion over 10 years). A higher tax on gasoline could raise up to about 1 percent of GDP for each dollar per gallon in tax. Pirog (2009) estimates that a $2.00 per gallon tax on gasoline could yield approximately $1 billion per day—indicating that a $1 gasoline tax would yield about 1.3 percent of GDP in revenue (authors' calculations based on Pirog 2009); CBO (2009) estimates that a 50 cent increase in the gasoline excise tax would raise $604.8 billion over 10 years—indicating that a $1 gasoline tax would yield about 0.7 percent of GDP (authors' calculations based on CBO 2009).

B. Distributional Effects

The distributional effects of energy taxation has been well-studied (Bull, Hassett, and Metcalf 1994; Hassett, Mathur, and Metcalf 2009; Metcalf 1999, 2007; Poterba 1989, 1991). Distributional concerns over energy taxes stem from the observation that low-income households devote a higher proportion of their income to consumption and will thus bear a higher burden of

the tax relative to high-income households. Gasoline taxes will also fall disproportionately on low-income households, especially in the short-run when households have difficulty adjusting their behavior to avoid the tax.

The regressivity finding is consistent across studies, but varies in magnitude. Metcalf (2008) analyzes the distributional effects of a carbon tax and finds that it would reduce the after-tax income of taxpayers in the first decile by 3.7 percent, compared to just an 0.8 percent reduction for the wealthiest decile. Findings are dependent on whether incidence is measured on a current income versus lifetime basis, with the tax being more regressive when measured on a current income basis relative to lifetime income basis. Hassett, Mathur, and Metcalf (2009) find that the indirect component of a carbon tax (i.e., higher prices due to higher costs of production) is significantly more progressive relative to the direct component (i.e., higher prices of directly consumed energy like gasoline and electricity) with the indirect component being slightly progressive. Lastly, the incidence varies with timing: the carbon tax can either fall forward in the form of higher consumer prices or backwards in the form of lower returns to factor inputs. Bovenberg and Goulder (2001) and Paltsev et al. (2007) find that the short- and medium-term incidence falls primary on consumer prices.

C. Efficiency

In principle, energy taxation receives high marks on efficiency criteria. Energy taxation can improve the efficient allocation of resources if it accounts for externalities in the market price. Externalities can be severe. Stavins (2007) notes that the efficiency benefits of a carbon tax are often understated since the large efficiency gains come in the form of internationally-shared reduced greenhouse gas emissions. Parry, Walls, and Harrington (2007) estimate that the per-

gallon externality cost of gasoline amounts to $2.38 per gallon, with about half the externality gas being due to congestion and the remainder due to accidents, pollution, and oil dependency.

Taxes on energy can serve to correct these market failures. Davis and Kilian find (2009) that even a small excise tax on gasoline would reduce carbon emissions. The authors find that a 10 cent per gallon increase in the U.S. gasoline excise tax would decrease total carbon emissions by 0.5 percent and from vehicles by 1.5 percent; Sterner (2007) similarly estimates that fuel demand in Europe would be twice as high if European governments had implemented a gasoline excise tax schedule similar to that in the United States. Most analysis finds that a carbon tax could also significantly reduce emissions. For example, Metcalf (2008) estimates that a $15 per ton tax on carbon emissions would reduce greenhouse gas emissions by 14.0 percent.

Whether it makes more sense to regulate the price of carbon (via a tax) or regulate the quantity of carbon emitted (via tradable permits) remains an open question. Pizer (1997) finds that the carbon tax is five times more efficient than cap and trade because a carbon tax would fix the marginal cost of carbon emissions but allow emission levels to vary, while cap and trade would fix the emission level but allow marginal costs to vary. Pizer finds that setting the emission level too low can lead to massive losses. Metcalf (2007) finds that a carbon tax is more efficient because it more accurately equates marginal costs and benefits of energy consumption. Parry and Williams (2011) show that the welfare gains from carbon-reduction policies depend critically on whether the revenues gained from the policy are used to cut other distortionary taxes. Of course, because it has a narrower base, the gasoline tax is less efficient than a tax on all sources of carbon emission or all sources of pollution.

Some analysts have proposed a tax on gasoline to stabilize the price of energy and reduce economic volatility. For example, Westin (2010) proposes an oil price stabilization tax, where an

excise tax would serve as a mechanism for creating a floor on the price of domestically consumed gasoline. Westin argues that an oil price stabilization tax would generate revenues, stabilize energy prices, reduce greenhouse gas emissions, and support the biofuel industry, among other benefits.

Lastly, carbon taxes could also be a mechanism for mitigating substantial and arguably inefficient subsidies for biofuel production. For example, since the 1970s the United States has subsidized the production of ethanol and other biofuels as a means of reducing greenhouse gas emissions, reducing U.S. dependence on foreign energy, and stimulating production in the agricultural sector. These subsidies are costly to administer, both in terms of distortions in market behavior and lost revenue. For example, in 2009, tax credits for biofuels reduced excise taxes by $6 billion (CBO 2010b). A carbon tax that accurately reflected the price of negative externalities of fuel consumption would be a more efficient mechanism for achieving reductions in greenhouse gas emissions and improved energy security.

D. Existing Carbon Taxes

Carbon taxes are in place in several European countries, in addition to local jurisdictions in Canada and the United States. Several northern European countries—including Finland, the Netherlands, Norway, Sweden, and Denmark—instituted carbon taxes in the early 1990s. The United Kingdom followed suit in 2001. These nations have used the revenue collected from the carbon taxes in a variety of ways. Norway and Sweden, for example, include carbon tax revenue as part of general government receipts, while carbon tax revenue in Denmark is returned to industry and directed towards environmental subsidies. Several nations have used carbon tax revenue to reduce other taxes (Sumner, Bird, and Smith 2009).

These carbon taxes were implemented as environmental policy strategies, not as a means of achieving deficit reductions. As such, the carbon taxes implemented to date have had little impact on federal budgets. Gross annual revenues collected through payroll taxes amount to between $750 million (0.4 percent of GDP) in Finland and $4.8 billion (0.7 percent of GDP) in the Netherlands, although the revenues in the Netherlands are partially used to offset other taxes. Conversely, the taxes have been shown to have a significant effect on emissions reductions, with some studies attributing reductions of up to 15 percent to the carbon tax (Sumner, Bird, and Smith 2009).

State and local jurisdictions in Northern America have also implemented carbon taxes. The town of Boulder, Colorado, adopted a carbon tax in 2006. The tax, which essentially amounts to a levy on electricity, was adopted with the goal of reducing greenhouse gas emissions to 7 percent below the city's 1990 level. The Canadian provinces Quebec and British Columbia also adopted carbon taxes in 2007 and 2008, respectively. Neither tax is directed at deficit reduction or increasing general revenues. Quebec deposits carbon tax revenues into a fund devoted to public transportation and environmental initiatives, while British Columbia makes its carbon tax revenue-neutral through a series of tax rebates.

VI. Conclusion

Revenue increases will be an important component of any resolution to the fiscal problem facing the United States, and presumably in other countries as well. This need presents both challenges and opportunities. The challenge is the political difficulty of enacting tax increases in the United States, where a vast majority of Republican members of Congress have signed a "no new taxes" pledge. The opportunity is the chance to reform the tax system in ways that it has long needed

and that have now become urgent. These reforms include broadening the income tax base, establishing a consumption tax, and bringing energy taxation in line with the modern economy.

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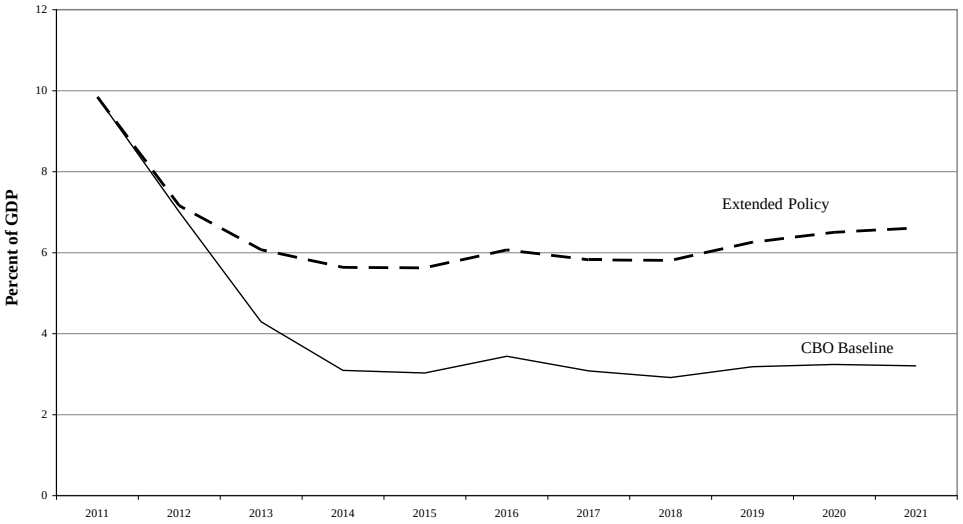
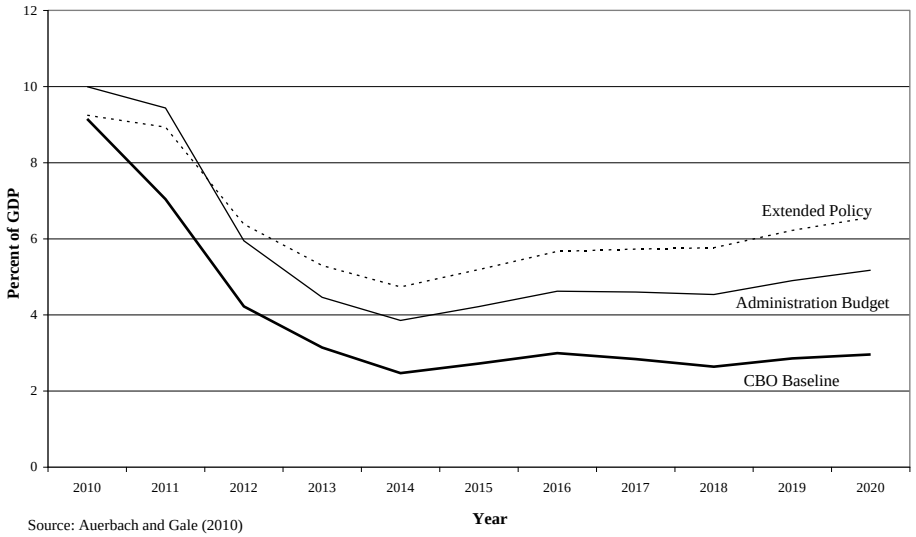
Figure 1. Alternative Deficit Projections
2011-2021



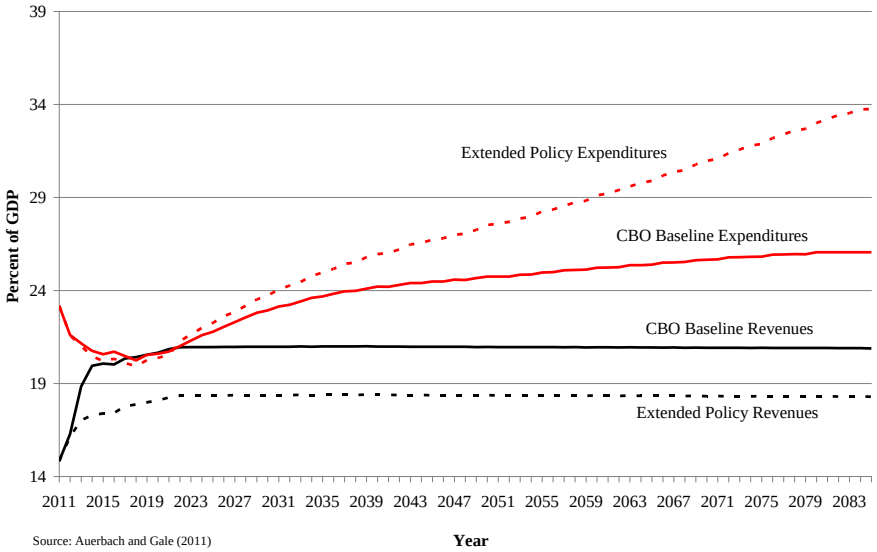
Source: Auerbach and Gale (2011).

Figure 2. Alternative Deficit Projections, 2010-2020



Source: Auerbach and Gale (2010)

Figure 3. Alternative Projections of Revenues and Non-Interest Outlays, 2011-2085



Source: Auerbach and Gale (2011)

Table 1

Percent Change in After-Tax Income due to Tax Expenditures, 2007

	Lower capital gains and dividend rates	Itemized deductions	Tax Exclusions	Above-the-line deductions	Non-refundable credits	Refundable credits	All provisions
Bottom 20 percent	0.00	0.02	0.54	0.01	0.05	5.49	6.52
Second 20 percent	0.01	0.11	2.99	0.06	0.28	5.00	8.16
Middle 20 percent	0.04	0.38	3.79	0.09	0.33	2.20	6.76
Fourth 20 percent	0.12	1.09	3.68	0.11	0.23	1.99	6.79
Top 20 percent	2.11	2.91	4.74	0.08	0.06	0.25	11.36
Top 1 percent	5.87	3.24	2.90	0.06	0.00	0.00	13.53
Total Cost (with AMT), $billion	96	154	326	6	8	89	761

Source: Center on Budget and Policy Priorities calculations based on TPC calculations of effect of eliminating tax expenditures.

*Note: These figures take into account the interaction among individual tax expenditure provisions. They are based on the distribution of tax expenditures under the assumption that the alternative minimum tax is not in place, an assumption TPC made in order to facilitate the comparison among categories of tax expenditures

Table 2

Revenue Effects in 2012 of a 5 percent VAT

(Toder and Rosenberg 2010)

	Broad Base			Narrow Base		
	Billions of Dollars	% of GDP	Yield Ratio	Billions of Dollars	% of GDP	Yield Ratio
Gross Revenues	355.5	26.6	0.45	221.4	1.40	0.28
Cost of Demogrants	97.7	0.62	--			
Revenue Net of Demogrants	257.8	1.64	0.33			
Adjustment of other taxes	96.9	0.62	--	60.5	0.38	--
Revenue net of other taxes	160.9	1.02	0.20	160.9	1.02	0.20