Carbon Taxes as Part of the Fiscal Solution

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SUMMARY OF KEY LESSONS

- The United States faces substantial and unsustainable medium- and long-term budget deficits, which will require a combination of tax increases and spending cuts to resolve.

- A carbon tax could raise significant revenues, with several additional positive effects: it would improve environmental outcomes, increase economic efficiency, and allow the elimination of selected other tax subsidies and spending programs.

- While a carbon tax imposes a disproportionately larger burden on lower-income households, the opposite applies for many of the other options like scaling back tax expenditures. A long-term deficit reduction package that included a reduction in income tax expenditures as well as a carbon tax and offsetting payments could in principle provide a balanced distributional effect.

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I. Introduction

The United States faces large federal fiscal deficits in the immediate future, the next 10 years, and the longer term. Although the current and recent deficits are thought to be helping the economic recovery, the deficits in the medium-term and long-term are more troubling because of their potential impact on national saving, economic growth, and financial markets. Addressing these medium- and long-term challenges will likely require a combination of spending cuts and revenue increases. None of the relevant options (some of which will need to be implemented sooner or later) are particularly attractive from a political perspective.

In this chapter, we consider the fiscal outlook, how new taxes on carbon could not only help address the fiscal problem but also bring about benefits on economic and environmental grounds, and how these taxes compare with some other revenue options. Section II discusses issues related to the fiscal outlook. In section III, we highlight the revenue, efficiency, and equity effects of taxes on carbon emissions and/or a higher tax on gasoline. Section VI provides a brief comparison of a carbon tax to other revenue options -- including a VAT and income tax expenditure reform. Section V offers a short conclusion.

II. Fiscal Outlook and Implications

This section summarizes the fiscal outlook, discusses why both revenue increases and spending cuts will need to be considered as part of the solution, and examines the long-term impact of tax-financed deficit reduction policies.

A. Fiscal Outlook

Figure 1 shows historical budget deficits and deficits projected under different future policy scenarios. Under the current-law baseline produced by the Congressional Budget Office (CBO) assumptions the deficit falls from 5.3 percent of GDP in 2013 to 2.9 percent in 2018, before rising to 3.8 percent by 2023.

Auerbach and Gale (2013), however, show that under a current policy baseline (reflective of more realistic policies), the federal deficit under current policies will hover around 3.5 percent of GDP between 2015 and 2019, before rising to 5.0 percent by 2023 (Figure 1). The policy differences between current law and current policy baseline are shown in Table 1.

Moreover, after 2022, projected deficits are poised to rise further under both scenarios (Figure 1), reaching 10 percent of GDP by 2036 under the current policy baseline and continuing to rise thereafter.

As for the debt-to-GDP ratio, after averaging 37 percent of GDP in the 50 years prior to the Great Recession that started in 2007 and attaining a value of 36.3 percent of GDP in 2007, the ratio is now projected to pass its 1946 high of 108.6 percent in 2035 under current policy baseline (Figure 2). Unlike the aftermath of World War II, however, the debt-to-GDP ratio will continue to rise after surpassing the previous peak. Expenditures are expected to rise significantly as the aging of the populace and excess cost growth of health care cause Medicare

and Medicaid outlays to grow rapidly. Current estimates place the 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 2012 level – or 72.5 percent of GDP – at 3-5 percent of GDP through 2089 and 5-7 percent on a permanent basis (Auerbach and Gale 2013).

In contrast to the U.S projected fiscal trajectory, many organizations place the desired debt/GDP ratio between 40 percent and 60 percent.[1] It is not entirely clear how an optimal debt/GDP ratio can be derived from theoretical first principles. What is clear, however, is the current trajectory for U.S. debt is not sustainable.

Although delayed implementation of deficit-reducing policies may be preferable given the current state of the economy, the longer it takes to put in place deficit-reducing policies, the larger will be the required spending cuts or tax increases in order to address the long-term fiscal gap. For example, if the adjustments are delayed until 2018, when the CBO projects the economy will reach potential GDP, the fiscal gap increases by up to 0.3 percentage points of GDP.

Budget projections (especially for the long-term) embody considerable uncertainty, and deficit projections are particularly uncertain as relatively small percentage changes in outlays and revenues can lead to relatively large percentage changes in deficits. In the current environment, economic projections also may be more uncertain than usual, given uncertainty about the effects of the recent recession on the long-term growth rate. The other major uncertainty is the rate of growth of health care spending, which can have enormous impacts on the projected budget outlook. 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.

B. The need for spending cuts and revenue increases

Since projected spending is slated to rise faster than GDP for the indefinite future, it is clear that spending cuts must be part of the solution, in particular for government health care programs, which have been rising as a share of GDP for several decades and are projected to continue to rise.

There are several reasons to consider tax increases (beyond those already included in the January 2013 budget deal), however, as well as spending cuts, as part of the fiscal solution. First, the sheer magnitude of the fiscal gap suggests that a spending-only solution would need to impose very substantial reductions on spending that might not be seen as equitable. At 5-7 percent of GDP, the fiscal gap is several times larger than the savings that were generated in budget deals in the past. The 1983 Social Security Reform reduced deficits by about 1 percent of

[1] The IMF (2012) suggested 60 percent as an appropriate ratio of gross general debt-to-GDP for advanced countries while emerging and low-income countries had a lower ratio of 40 percent. The Peterson-Pew Commission on Budget Reform (2011), the Bipartisan Policy Center's Debt Reduction Task Force (2010), and the President's National Commission on Fiscal Responsibility and Reform (2010) all had medium-term goals of a 60 percent of debt-to-GDP ratio by 2020 or 2021. Johnson and Kwak (2012) suggested a goal of 50 percent to err on the side of caution to account for the fact that the U.S. workforce is growing more slowly and for the fears that the U.S. may lose its global reserve currency status or face another financial crisis.

GDP in the four years after passage while the 1990 and 1993 budget deals reduced deficits by about 1.4 percent of GDP and 1.2 percent of GDP, respectively, over the 5 years after passage.[2] The recently enacted tax bill only raised 0.3 percent of GDP in revenue over the next decade. In addition, Americans seem particularly reluctant to cut government spending on Social Security and Medicare, two of the key drivers of long-term spending, than on other forms of spending. For instance, a 2011 Gallup poll showed that over 60 percent of Americans were unwilling to cut social security and/or Medicare, and this was true across the political spectrum.

Second, as a political equilibrium, it seems likely that a sustainable budget deal would draw from both sides of the ledger. Indeed, in the past, major deals have included both tax increases and spending cuts. With the 1983 Social Security reforms, the 1990 bipartisan budget deal, and 1993 budget deals, Congress both slashed spending and raised taxes. For example, in the 1990 budget deal, 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).

Third, as a matter of equity, the only way that high-income households will share significantly in the burden of fixing the deficit is through revenue increases since spending cuts typically do not have a large impact on high-income households.

Fourth, spending appears to be controlled more effectively by requiring that it be paid for with current taxes, rather than allowing deficits to grow. In contrast, the "starve the beast" hypothesis argues that keeping revenues down is an effective approach to curtailing spending. However, the hypothesis does not appear to be consistent with recent experience.[3] And evidence in Romer and Romer (2009), for example, suggests 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).

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

An increase in taxes will not necessarily slow long-term economic growth. Tax changes have two broad sets of long-term effects on the economy.[4] 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, save, invest in education and training, etc. and to which firms invest and hire; these effects are known as income and substitution effects. Thus, for example, increases in marginal tax rates, holding other factors constant, can reduce the size of the economy and reduce economic growth.

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

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

[4] 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.

However, other factors are not constant. The second broad effect is on national saving. A reduction in the deficit tends to raise 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 quite important.

Containing deficits matters for several reasons.

Sustained deficits may enhance the risk of a financial crisis. Even in the absence of precipitating a financial crisis, however, 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. In addition to the growth impacts, sustained deficits may impose unfair burdens on future generations and may constrain U.S. foreign policy or defense positions, especially as they relate to creditor nations.

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 in the United States 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, this study suggests 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 (if this result is extrapolated linearly, and we do so with caution, since it would be easy to think of reasons that would make a larger debt change have more-than-proportional or less-than-proportional effects), the increase in the debt-to-GDP ratio from about 40 percent earlier in the decade to 85 percent by 2022 (Auerbach and Gale 2012) would be expected to reduce the growth rate by a whopping 0.675 percentage points. Thus a deficit reduction plan that included tax increases (at least on that did not primarily rely on raising taxes on savings and investment) could, on balance, help spur economic growth in contrast to continuing policy as normal.

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. Stokey and Rebelo (1995), 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 discernible impact on the long-term economic growth rate. Likewise, the 1981 tax cuts, which cut the top rate from 70 percent to 50 percent, accounted for only a very small share of the growth of the economy between 1981 and 1986, according to Feldstein and Elmendorf (1989). Auerbach and Slemrod (1997) also document tepid economic growth responses to the 1986 tax act. Gale and Potter (2002) 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 was negative. This suggests that raising taxes by undoing the 2001 tax cuts would raise long-term economic growth (due to the beneficial effect of lower deficits).

III. Carbon Taxes

The discovery and exploitation of natural resources by humans gave rise to the advanced

civilization in which we live today. Coal, petroleum, and natural gas fueled industrialization, raising living standards and life expectancy for most. Energy use continues to fuel economic growth and development today. But along with the benefits of energy consumption come substantial societal costs – including those associated with air and water pollution, road congestion, and climate change. Many of these costs are not directly borne by the businesses and individuals that use fossil fuels and thus are ignored when energy production and consumption choices are made. As a result, there is too much consumption and production of fossil fuels.

Economists have long recommended specific taxes on fossil-fuel energy sources as a way to address these problems. That recommendation has gained additional urgency in recent years in light of the fiscal situation outlined above. New revenue from energy taxes could be used to reduce the debt or finance reform or reductions in other taxes.

Throughout this paper we use the phrase "carbon tax" to refer to a tax on carbon dioxide. Although a carbon tax would be a new policy for the federal government, the tax has been implemented in several other countries (though—as discussed in the introduction to this volume— not always in a way that conforms to the design principles advocated by economists). Finland, Norway, Sweden, and Denmark instituted carbon taxes in the early 1990s, followed by the Netherlands and Germany in the latter part of the 1990s. The United Kingdom followed suit in 2001. Australia introduced a carbon tax in 2011. North American jurisdictions have also implemented carbon taxes. The town of Boulder, Colorado, adopted a carbon tax in 2006, and Montgomery County, Maryland, did so in 2010. The Canadian provinces of Alberta and Quebec adopted carbon taxes in 2007, followed by British Columbia in 2008.

A. Revenue

Carbon taxes can raise significant amounts of revenue. For instance, in 2007 the tax raised revenue equivalent to about 0.3 percent of GDP in Finland and Denmark, and 0.8 percent in Sweden. A well-designed tax in the United States could raise similar amounts. As shown in Table 2, a number of studies have estimated the net revenue effects of carbon taxes—accounting for the reduction in revenues from broader taxes that would occur—with estimates (for the year 2015) ranging from 0.5 percent of GDP for a $15 per ton tax (McKibbin, Morris and Wilcoxen 2012) to 0.8 percent of GDP for a $31 per ton tax (Metcalf 2010) with intermediate estimates including CBO (2011) and Rausch and Reilly (2012).[5]

Based on analysis in Dinan (2012) discussed below, we assume 38 percent of net carbon tax revenues would need to be used to offset distributional effects—as noted later, this might be viewed as a generous estimate if a carbon tax is part of a broader package of measures to reduce the deficit, and other measures are progressive (i.e., they impose a disproportionately larger burden on higher income households). Our assumption leaves the net revenue yield after

[5] The creation of carbon taxes will cause a partial, automatic reduction in other tax revenues. As one simple example of how this might work, a firm that pays $100 in carbon taxes would, in the absence of any other changes, have $100 less in corporate profits and so would owe less in corporate taxes. Studies estimate overall automatic tax offsets between 25 percent and 31 percent of the gross revenue levels, thus resulting in the net revenue levels reported in the text and shown in Table 2.

distributional compensations, at between 0.32 percent and 0.49 percent of GDP. In terms of gauging how large these taxes are in practical terms, a tax of $25 per ton of carbon dioxide would raise gasoline prices by 25cents a gallon (Bauman 2010)

B. Efficiency

In principle, carbon taxation receives high marks on efficiency criteria. Indeed, the basic rationale for a carbon tax is that it makes good economic sense: unlike most taxes, carbon taxation can improve the efficient allocation of resources by accounting 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 largest efficiency gains come in the form of internationally-shared reduced greenhouse gas emissions. While the United States is the largest per capita emitter of carbon dioxide, China is the largest overall emitter, and the European Union makes a significant contribution as well. Therefore, enacting a program that would lead to better cooperation with other countries, and reduce emissions across the world, would be better suited to deal with the well-known problems brought about by global warming, such as rising sea levels, more frequency in extreme temperatures, among others.

Taxes on energy can address these externalities. Not surprisingly, most analyses find that a carbon tax could significantly reduce emissions. Metcalf (2008) estimates that a $15 per ton tax on CO_2 emissions that rises over time would reduce greenhouse gas emissions by 14.0 percent, while Sumner, Bird, and Smith (2009) estimate that the European countries' carbon taxes have had a significant effect on emissions reductions, attributing reductions of up to 15 percent to the carbon tax. Furthermore, the University of Ottawa (2012) found that the carbon tax implemented in British Columbia led to a 9.9% reduction in greenhouse gas emissions in the province, compared to just 4.6% for the rest of Canada, where comprehensive carbon taxes were not applied.

In addition to reducing emissions, a carbon tax could improve other economic incentives by reducing other tax rates or paying down the deficit (Parry and Williams 2011). A carbon tax could have other benefits too. It would reduce the U.S. economy's dependence on foreign sources of energy, and would create better market incentives for energy conservation, the use of renewable energy sources, and the production of energy-efficient goods. The permanent change in price signals from enacting a carbon tax would stimulate new private sector research and innovation in developing new ways of harnessing renewable energy and energy-saving technologies. The implementation of a carbon also offers opportunities to reform and simplify other climate-related policies affecting transportation sector.

C. Distribution

The net effects of a carbon tax will depend, of course, not only on the magnitude of the tax and the behavioral response by consumers and firms, as the studies above consider, but on how the funding is used. To be clear, all uses of carbon tax revenues (or of other revenues for that matter) involve some form of giving the money back to taxpayers. What varies is which taxpayers receive the funds, during what time period, and under what conditions. Providing a rebate to consumers obviously returns the revenue to citizens. But so do all other uses of the funds. For instance, paying down the deficit implicitly gives the money to future citizens by

reducing the extent to which they have to pay higher taxes or bear the burden of spending cuts. Likewise, using the funds to provide corporate tax cuts reduces burdens for whichever individuals ultimately bear the burden of corporate taxation.

In many instances to date, carbon tax revenues have not been used for deficit reduction. Norway and Sweden do include carbon tax revenue as part of general government receipts, which suggests a possible effect on deficit reduction. But 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). Australia coupled its carbon tax with a substantial increase in the tax-free level of income (and other tax changes).[6] The Netherlands and Sweden have exempted a large portion of the industrial sector from the tax, as well as helping low-income households offset the burden of the tax (the latter measure was also implemented by Germany) (Johansson 2001). Quebec deposits carbon tax revenues into a fund devoted to public transportation and environmental initiatives, while British Columbia makes its carbon tax revenue-neutral by reducing corporate and personal income tax rates and providing an annual credit of $100 per adult and $30 per child to lower-income citizens (British Columbia Finance Ministry 2008).

Distributional concerns over carbon 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. The distributional effects of carbon taxation have been well-studied (Bull, Hassett, and Metcalf 1994, Hassett, Mathur, and Metcalf 2009, Metcalf 1999, Metcalf 2007). 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. For example, 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, whereas the direct component, which focuses on the changes in the cost of gas and electricity, is regressive. 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 primarily on consumer prices.

Importantly, the regressive impact of a carbon tax could be offset in any of a number of ways, similar to offsets for distributional effects of the VAT, as will be discussed in the next section. Most prominent among these options would be refundable income tax credits (Dinan 2012) or payroll tax refunds (Metcalf 2007). Dinan (2012) notes that CBO analysis suggests that fully offsetting the effects of carbon taxes for households in the lowest quintile would require about 12 percent of gross revenues, while fully offsetting the effects for households in the second quintile would require 27 percent of gross revenues. These figures do not account for added

[6] Australia really has an emissions trading system. However, because most of the allowances are auctioned, and there is a price collar (at least until 2015) it looks more like a tax.

government costs (of indexing transfers or higher payments for inputs, for example). Nor do they account for the reduction revenues from other taxes noted above. As a rough approximation, for now we assume that 38 percent of net carbon tax revenues would have to be used for offset purposes. This is not inconsistent with Dinan's estimates and is similar to the calculations derived by Toder and Rosenberg (2010) for a VAT. Thus, while the regressivity of a carbon tax is clearly a concern, it should not be considered an obstacle to the implementation of carbon taxes.

D. Motor Fuel Taxes

Raising taxes on gasoline and (motor) diesel is another option. While modest excise taxes on these fuels already exist in the United States, they are substantially lower than in other industrialized nations.

For example, in the U.S., 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 in 2010. The OECD average for gasoline excise taxes is approximately $3.39 per gallon, about 7 times the rate of the U.S. tax.[7] OECD taxation of gasoline ranged from $0.34 per gallon (Mexico) to $5.14 per gallon (Turkey); the U.S. has the second-lowest rate of gasoline taxation among OECD countries (OECD 2011). 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, Walls, and Harrington 2007). Moreover, fuel taxes at least three times as high as current levels (and perhaps higher still) appear to be justified by the adverse side effects of motor vehicles—pollution, congestion, and so on (Parry, Walls and Harrington 2007).

Higher excise taxes on motor fuels could raise significant amounts of revenue. For example, Parry (2011) estimates that raising gasoline and diesel fuel taxes to their corrective levels would increase revenue by around 0.8 percent of GDP, while CBO (2009) estimates that a 50 cent increase in the gasoline excise tax alone would raise about 0.3 percent of GDP. Raising the gas tax by 25 cents per year for 10 years would raise substantially more in revenues, but would still leave U.S. gas tax rates well below those of European countries.

Although higher fuel taxes would have some impact on reducing carbon emissions, they are much less effective than a carbon tax at reducing carbon emissions, since the former covers a much narrower range of externality-producing goods.[8] Davis and Killian find (2009) find that a 10 cent per gallon increase in the U.S. gasoline excise tax would reduce total carbon emissions by 0.5 percent overall and by 1.5 percent from vehicles. Like carbon taxes, gasoline taxes will fall disproportionately on low-income households, especially in the short-run when households have difficulty adjusting their behavior to avoid the tax (Poterba 1989 and 1991).

IV. Other revenue options

[7] Authors' calculations based on OECD (2011).

[8] Sterner (2007), for example, estimates that fuel demand in Europe would be twice as high if European countries had faced U.S. gas tax rates.

A carbon tax can be compared to other tax options – not necessarily because the ultimate choice will be one of those options versus another, as the country will probably need several ways to raise revenue, but rather to discuss the relative revenue-generating potential, efficiency and equity effects of the different taxes. A full-scale comparison is beyond the scope of this paper (see Gale and Brown 2012 for a more comprehensive discussion of the options). We do briefly describe options relating to the value-added tax (VAT) and to income tax expenditure reform however, to provide some sense of the trade-offs, and possible complementarities, between carbon taxes and broader fiscal options.

A. Value Added Tax

Under a VAT, businesses would pay taxes on the difference between their revenues from 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.[9] The sum of value added at each stage of production (including extraction of the raw materials) 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 widely regarded as having a superior administrative structure to a retail sales tax. 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. Toder and Rosenberg (2010) show that a 5 percent VAT with a relatively broad base could raise revenue equal to 1 percent of GDP in the United States, even after accounting for distributional issues via rebates and adjusting for revenue losses from other taxes (Table 3).

The distributional burden of the VAT is regressive relative to current income (though not relative to current consumption). Concerns about the regressivity of the VAT are valid, 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, adjustments to cash-transfer benefits, or outright payments.[10] In contrast, many OECD governments and U.S. state governments 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

[9] There are several options for administering the tax which we do not go into here. See Bickley (2006) and Cnossen (2009) for some discussion of these options.

[10] Toder, Nunns, and Rosenberg (2011) propose a two-pronged rebate. The rebate would be a credit equal to the VAT rate multiplied by a base of $12,000 for single households and $24,000 for married households (in 2012); the base could not exceed employment income. In addition, they propose an upward adjustment to Social Security payments to offset the reduction in real wages over time.

in greater quantities by middle-income and wealthy taxpayers than they are by low-income households.[11]

B. Tax Expenditure Reform[12]

A third alternative is reform of income tax expenditures. In formal terms, tax expenditures are "revenue losses attributable to provisions of the Federal tax laws which allow a special exclusion, exemption, or deduction from gross income or which allow a special credit, preferential rate of tax or a deferral of liability" (The Congressional Budget Act of 1974 (P.L. 93-344)). The canonical focus for income tax reform is to create a system with a broad base that taxes all sources and uses of income at the same rate so as to generate lower statutory rates. Tax expenditure reform would be essential to achieving these goals. Broadening the base entails restricting the use of exclusions and deductions. Taxing all sources and uses of income, at the same effective rate, entails restricting the use of preferential rates, credits, and deferrals. This would reduce distortions between the taxation of different sources and uses of income and therefore could be efficiency improving.

Many major tax expenditures act essentially as government spending programs that happen to be embedded in the tax code rather than in outlays (Batchelder and Toder 2010; Marron 2012; Marron and Toder 2012). Tax expenditure reform in many cases can be thought of as reducing effective government spending.

The value of most tax expenditures, other than credits, rises with the marginal tax rate. A deduction or exclusion of $1000 would reduce tax liability by $150 for an individual in the 15 percent bracket but $330 to one in the 33 percent bracket.

Although different types of tax expenditures are distributed differently, the aggregate distribution of tax expenditures tends to be tilted toward high-income households because they itemize their deductions, receive a substantial share of the income in the form of returns to investment, which is often subject to preferential rates, they have more tax to offset, and they receive a higher benefit per dollar of deduction or exclusion due to higher marginal tax rates.

Tax expenditure reform can raise significant amounts of revenue. Although precise estimates are difficult to compute, illustrative calculations indicate the potential for revenue-raising. The FY2013 Budget lists 173 individual and business tax expenditures, the total value of which would approach 7.5 percent of GDP in the 2015 fiscal year (relative to current law) and about 80 percent coming from individual income receipts (Office of Management and Budget 2012, Marron 2012). Interaction effects increase the revenue loss: Toder and Baneman (2012) estimated that interaction effects increased lost revenue from non-business individual income tax expenditures by 9.6 percent in 2011.

[11] Congressional Budget Office (CBO; 1992. 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.

[12] All of the revenue estimates here refer to pre-ATRA baselines. Since ATRA raised tax rates, post-ATRA revenue estimates of tax expenditure reform would yield somewhat larger revenue estimates than indicated here.

Yet potential revenue raised from a realistic tax expenditure reform would be much less for administrative and political reasons. Some expenditures are difficult to eliminate for various administrative reasons. Many of the largest tax expenditures (e.g. mortgage interest deduction, employer sponsored health insurance) are broadly popular because they benefit middle-income, as well as high-income, taxpayers. Recent proposals have focused on capping overall tax expenditures for a tax filer rather than eliminating individual policies to ease the political constraints to tax expenditure reform. Such proposals still can raise revenue and increase the progressivity of the tax system.

One recent proposal would cap itemized deductions at $50,000. The Tax Policy Center estimates that, relative to current policy, a $50,000 cap would raise 0.33 percent of GDP in 2015 (Table 3). The policy will have a small effect on households in the bottom 90 percent of the income distribution. Households in the 90th to 99th percentiles would see their after tax income decrease by between 0.3 and 0.5 percent. After-tax income would decrease by 3 percent in the the top one percent of the income distribution.

Feldstein, Feenberg, and MacGuineas (2011) propose a cap on the tax value of certain tax expenditures to 2 percent of the earner's AGI.[13] Baneman et al. (2011) applied the cap to earners making more than $250,000 (married) or $200,000 (single) and estimated that it could raise 0.26 percent of GDP relative to current policy (Table 3). The cap would not affect taxpayers below the 95th income percentile. It would decrease the after-tax income by 0.9 percent of income for filers between the 95th to 99th percentiles and by 3 percent for filers in the top 1 percent (Baneman et al. 2011).

V. Conclusion

The United States faces substantial and unsustainable medium- and long-term budget deficits, which will require a combination of tax increases and spending cuts to resolve. On the tax side, one relatively attraction option for raising revenue would be to impose a carbon tax. Besides its impact on revenues, the tax would improve environmental outcomes, increase economic efficiency, and allow the elimination of selected other tax subsidies and spending programs. The distributional effects would be regressive but could be offset by other policy changes. As policy makers search for solutions to the fiscal problem and for ways to improve the tax system, carbon taxation could play a positive role in addressing each situation.

[13] The Feldstein-Feenberg-MacGuineas proposal limited the tax value of itemized deductions, the health insurance exclusion, and the child tax credit, dependent care credit, and general business credit. For deductions and exemptions, the tax value is equal to the face value of the deduction or exclusion multiplied by the filer's marginal tax rate. The tax value of a tax credit is equal to the credit.

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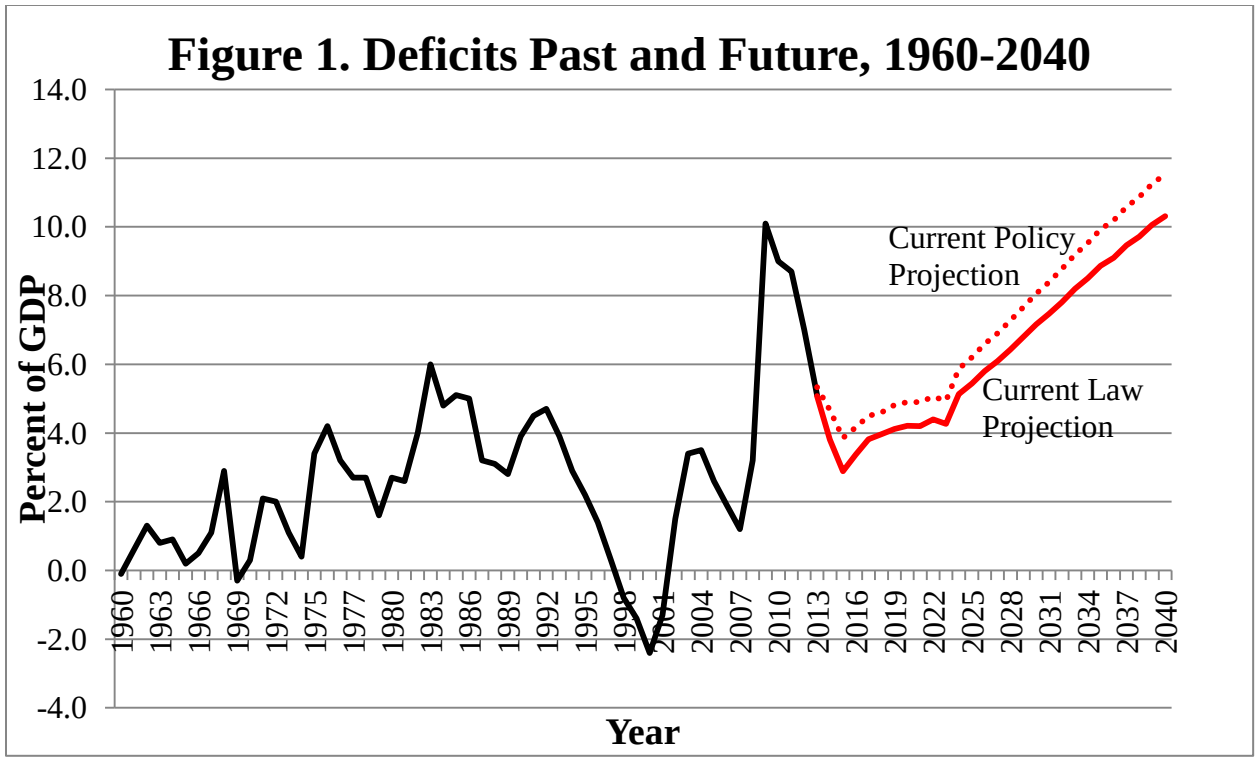

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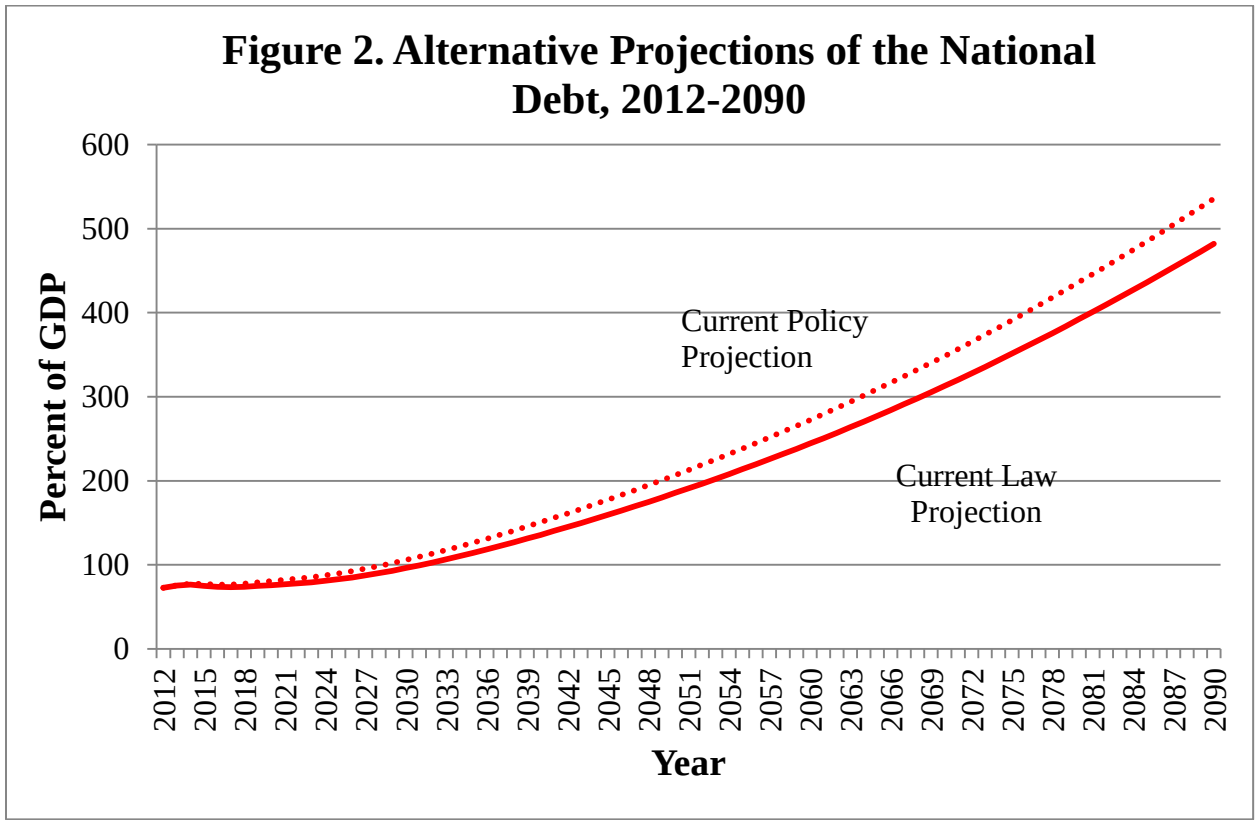

Source: Auerbach and Gale (2013)

Table 1. Major Differences between Current Law and Current Policy Baseline	
Policy Option	**Spending or Revenue in 2020 (Percent of GDP)**
Extend expiring tax provisions	0.5
Cancel sequester	0.5
Institute "doc fix"	0.1
Drawdown in Defense Spending	-0.3
Remove disaster relief funding	-0.2

Source. Auerbach and Gale (2013)

Table 2. Carbon Tax Revenue, 2015			
Author	**Level of Tax ($/tCO$_2$)**	**Net Revenue (Percent of GDP)**	**Net revenue after distributional offsets (Percent of GDP)***
McKibbin et al. (2012)	15	0.51	0.32
CBO (2011)	22	0.60	0.37
Rausch and Reilly (2012)	23	0.66	0.41
Metcalf (2010)	31	0.79	0.49

*For discussion of the notion and nature of distributional offsets, see the text.

Table 3. Revenue Effects of Various Tax Reform Options			
Proposal	**Year**	**Net Revenue (Percent of GDP)**	**Net revenue after distributional offsets (Percent of GDP)***
5 Percent Broad Based VAT (Toder and Rosenberg 2010)	2012	1.64	1.02
Cap Itemized Deductions at $50,000 (Tax Policy Center 2012)	2015	0.33	N/A
Cap the tax value of tax expenditures for high-income households at 2 percent of AGI (Baneman et al 2011)	2015	0.26	N/A

*For discussion of the notion and nature of distributional offsets, see the text.