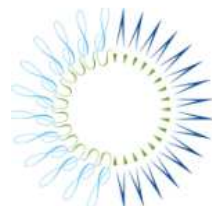


Implications of Different Bases for a VAT

Eric Toder, Jim Nunns, and Joseph Rosenberg

February 2012

The authors are all affiliated with the Urban-Brookings Tax Policy Center. Toder is a Co-Director of the Tax Policy Center and an Institute Fellow at the Urban Institute. Nunns is a Senior Fellow at the Urban Institute. Rosenberg is a Research Associate at the Urban Institute. This paper is one in a series of papers being prepared by the Urban-Brookings Tax Policy Center under contract for The Pew Charitable Trusts.



THE
PEW
CHARITABLE TRUSTS

THE PEW CHARITABLE TRUSTS

The Pew Charitable Trusts is driven by the power of knowledge to solve today's most challenging problems. Pew applies a rigorous, analytical approach to improve public policy, inform the public and stimulate civic life.

PEW FISCAL ANALYSIS INITIATIVE

The Pew Fiscal Analysis Initiative, a project of the Pew Charitable Trusts, seeks to increase fiscal accountability, responsibility and transparency by providing independent and unbiased information to policy makers and the public as they consider the major policy issues facing our nation. Together with outside experts from across the political spectrum, the initiative provides new analysis and more accessible information to inform the debate on these issues.

TEAM MEMBERS

Susan K. Urahn, Managing Director, Pew Center on the States

Ingrid Schroeder, Director, Pew Fiscal Analysis Initiative

Sara Bencic, Fellow

John Burrows, Administrative Assistant

ACKNOWLEDGEMENTS

We would like to thank all team members, Ernest V. Tedeschi, Samantha Lasky, Laura Fahey, Andreas Westgaard, Sarah Holt, Gaye Williams, and Joseph V. Kennedy for providing valuable feedback on the report.

The report benefited from the insights and expertise of two external reviewers: Peter Merrill of PricewaterhouseCoopers and Athiphat Muthitacharoen of the Congressional Budget Office. We also received helpful comments from Robert Dennis, former assistant director, Macroeconomic Analysis Division, of the Congressional Budget Office. Although these individuals reviewed drafts of the report, neither they nor their organizations necessarily endorse the findings or conclusions of the report.

For additional information on The Pew Charitable Trusts and the Pew Fiscal Analysis Initiative, please visit www.pewtrusts.org or e-mail us at pfai-info@pewtrusts.org.

© February 2012

Introduction

The federal budget outlook is unsustainable over the long run. The latest (June 2011) projections by the Congressional Budget Office (CBO)¹ show the ratio of publicly-held debt held to GDP, which was 40 percent at the end of 2008, rising from 69 percent in 2011 to 187 percent in 2035 under their Alternative Fiscal Scenario, which assumes that current federal spending and revenue policies will largely continue. Even under CBO's Extended-Baseline Scenario, which assumes that all of the 2001-2003 tax cuts expire at the end of 2012, the AMT will no longer be patched, and that Medicare and other health-related spending will be held to modest growth rates, debt held by the public is projected to rise to 84 percent of GDP by 2035. Rising debt levels increase the chance of a fiscal crisis, a sudden spike in the interest rate the federal government must pay on its debt that would necessitate large adjustments to spending, revenues, or both. More gradual adjustments could be better designed and less damaging to long-run growth and social welfare.

Two prestigious groups, the President's National Commission on Fiscal Responsibility and Reform and the Bipartisan Policy Center's Debt Reduction Task Force, both recommended a sweeping set of changes in taxes and spending policies to address future deficits and eventually reduce the ratio of publicly held debt to GDP below its current level.² The Debt Reduction Task Force recommendations included adopting a "debt reduction sales tax" structured as a value-added tax (VAT). A VAT is a broad-based tax on household consumption that is collected incrementally by businesses at each stage of their production and distribution of goods and services. VATs are an important source of revenue for nearly all countries, and among major countries, the United States is alone in not imposing a VAT.

VATs around the world typically exclude certain consumption items from the VAT base for policy or administrative reasons. This paper describes the policy and administrative reasons for exclusions from the VAT base and the design of a rebate as a substitute for base exclusions to address distributional objectives. The paper then analyzes the effect of possible exclusions from a U.S. VAT base or a rebate on the VAT rate necessary to achieve a specific deficit reduction target and on the distribution of the tax burden. Two options for the base of a VAT are analyzed: a broad base, which would allow the lowest rate necessary to meet the specific target for deficit reduction, and a narrower base that is designed to address the distributional effects of a VAT by omitting items that are disproportionately consumed by lower-income households. A higher rate would be required on this narrower base to meet the deficit reduction target. A third VAT option that takes a different approach to addressing the distributional effects of a VAT also is analyzed. This option uses the broad base of the first option but provides a rebate to households, so it would also require a higher rate than the first option to meet the deficit reduction target.

All three VAT options are assumed to be effective in 2015, and are analyzed relative to a baseline that assumes the 2001-2003 tax cuts remain in place, the AMT continues to be patched,

¹ Congressional Budget Office (June 2011).

² See, The National Commission on Fiscal Responsibility and Reform (2010) and the Bipartisan Policy Center Debt Reduction Task Force (2010).

and that the estate tax parameters in effect in 2011 are extended. The deficit reduction target for each option is 2 percent of GDP in 2015. So the options, by design, do not differ in the amount of deficit reduction achieved, but do differ in the VAT rate necessary to reach the target. The rate would affect the VAT's impact on economic efficiency, and the choice of the VAT base could affect administrative and compliance costs. Effective marginal tax rates on wages and capital gains are increased at all income levels under the three options, but the increase generally declines with income. The overall average change in effective marginal tax rates is higher under the option with a broad VAT base and a rebate than under the other two options, but the rebate mitigates the change in the marginal tax rate on wages in the first income quintile.

The options also differ in how they affect the distribution of the tax burden. The long-run distributional effects of the options for a broad VAT base (with no rebate) and a narrow VAT base are similar: they are regressive at the bottom of the income distribution, roughly proportional in the middle, and generally regressive throughout the top quintile. The long-run distributional effect of the option with the broad VAT base and a rebate is sharply progressive through the 95th percentile and is roughly proportional within the top 5 percent. During the transition period, as the economic effects of the VAT phase in, all the options are progressive though the 95th percentile, but only slightly so for younger age groups while highly progressive for the 65-and-over group. Under all three options, both in the long run and during the transition, the burden on the 65-and-over group is significantly lower at all income levels than it is for the younger groups.

The remainder of the paper is organized as follows. Section II describes the VAT options: the structure of such a tax, policy and administrative considerations in designing the VAT base and a VAT rebate, the broad and narrow VAT bases analyzed in the paper, the rebate for the third VAT option, the importance of changes in the price level to the analysis, the effect of a VAT on government revenues and spending, and the required VAT rates under each option. Section III analyzes the effects of the VAT options on federal revenues, spending and the deficit; the distribution of tax burdens by income; economic efficiency; and administrative and compliance burdens. Appendix A describes the methodology used by the Urban-Brookings Tax Policy Center (TPC) to distribute a VAT, and Appendix B describes the TPC microsimulation model used in analyzing the options.

II. The VAT Options

The Structure of a VAT

A VAT is a broad-based tax on households' consumption of goods and services, equivalent to a retail sales tax with the same broad base and same rate. Unlike a retail sales tax, which is collected only at the final retail level on sales,³ a VAT is collected incrementally at each stage of the production and distribution of goods and services. There are two forms of VAT. One is the credit-invoice VAT (sometimes referred to as a "goods and services tax," or GST) that is used

³ The retail sales taxes imposed by state and local governments typically also tax many sales between businesses but do not tax many services, so are not "pure" retail sales taxes.

throughout Europe and in Canada, Australia, New Zealand, and most other countries in the world. Under a GST, every business pays VAT on its sales, but is allowed a credit for the VAT included on the invoices for its purchases from other businesses. The net amount of VAT paid by the business is therefore the difference between the tax on its sales and the tax on its purchases from other businesses. The difference between sales and purchases is “value added,” the amount that a business pays to labor and capital. The value added by businesses at every stage of production and distribution through the retail level is the entire value of the good or service sold—its retail value.

The other form of VAT is the subtraction method (sometimes referred to as a “business transfer tax,” or BTT). Under a BTT, every business pays VAT on the difference between its sales and its purchases from other businesses. This difference is value added, so the BTT base is identical to the GST base (assuming there are no exemptions).

The differences in administering a retail sales tax (RST), a BTT, and a GST can be illustrated using the example of the production of bread. If there is no tax, the farmer grows wheat and sells it for \$300 to the miller, who produces flour from the wheat and sells it to the baker for \$700. The baker then uses the flour to make bread, which is sold to customers for \$1,000 (Table 1). Note that the value added by the farmer is \$300, the entire value of his sales (he is assumed not to make any purchases in order to grow the wheat), the value added by the miller is \$400 (\$700 in sales less the \$300 purchase from the farmer), and the value added by the baker is \$300 (\$1,000 in sales less the \$700 purchase from the miller). So total value added is $\$300 + \$400 + \$300 = \$1,000$, which is the amount of retail sales of bread.

Table 1
Example of a 10 Percent RST, BTT, and GST

Stage of Production	No Tax		RST		BTT		GST	
	Sales	Tax	Sales	Tax	Sales	Tax	Sales	Tax
Farmer	\$300	\$0	\$300	\$0	\$330	\$30	\$330	\$30
Miller	\$700	\$0	\$700	\$0	\$770	\$40	\$770	\$40
Baker	\$1,000	\$0	\$1,100	\$100	\$1,100	\$30	\$1,100	\$30
Total Tax		\$0		\$100		\$100		\$100

If an RST of 10 percent were imposed, it would apply only to the \$1,000 of retail sales by the baker; no tax would be imposed on sales between businesses (i.e., the farmer’s sale to the miller and the miller’s sale to the baker). The total RST would therefore be \$100 and the retail sales price \$1,100.

If instead of an RST, a 10 percent BTT were imposed, the farmer would pay a tax of \$30 (10 percent of his value added of \$300) and add the tax to his price, the miller would pay a tax of \$40 (10 percent of his value added of \$400, which is his price before tax of \$730 less his purchase from the farmer of \$330) and add it to his price, and the baker would pay a tax of \$30 (10 percent of his value added of \$300, which is his price before tax of \$1,070 less his purchase from the miller of \$770) and add it to his price. So, the total BTT paid and added to the price of bread

would be $\$30 + \$40 + \$30 = \100 , the same total tax as paid under the RST, and the retail sales price would remain \$1,100.

A 10 percent GST would collect the same amount of tax at each stage of production as under a BTT, but the computations would be different for the miller and the baker. The farmer would pay a tax of \$30 (10 percent of his \$300 of value added), and include the tax on his invoice to the miller. The miller would compute the tax on his price before tax, which is \$70 (10 percent of \$700), but then receive a credit of \$30 for the tax shown on his invoice from the farmer. Thus, the net tax paid by the miller would be \$40 (10 percent of his value added of \$400), but the amount of tax he would show on his invoice to the baker would be \$70, the total tax paid by him and the farmer. The baker would compute the tax on his price before tax, which is \$100 (10 percent of \$1,000), but then receive a credit of \$70 for the tax shown on his invoice from the miller. The total GST paid would be $\$30 + \$40 + \$30 = \100 , the same total tax as paid under the BTT and RST, and the retail sales price would remain \$1,100.

Different adjustments are required to the administration of an RST, BTT, or GST in order to implement a legislative policy of removing tax from the sales of bread.⁴ Under an RST, bread sales by the baker would simply be exempt from tax, since no tax applies to the farmer or the miller. Under a BTT, the sales of the farmer, the miller, and the baker all must be made exempt from tax for there to be no tax included in retail sales of bread.⁵ Under a GST, the farmer and miller would remain subject to tax, but the baker’s sales of bread would be “zero-rated,” which means that the baker would not pay any tax on his sales, but would still receive a credit for the \$70 of tax paid by the miller and farmer; this credit would be refunded to the baker. Table 2 summarizes these changes required to the base of an RST, BTT, and GST in order to remove tax from the sale of bread .

Table 2
**Administrative Changes Required to Remove Sales of Bread
from an RST, BTT, and GST**

Stage of Production	RST	BTT	GST
Farmer	No change	Exempt sales	No change
Miller	No change	Exempt sales	No change
Baker	Exempt sales	Exempt sales	Zero-rate sales

The effect of removing a stage of production from tax, either as a matter of legislative policy or due to the producer failing to report and pay tax, is quite different under an RST, BTT, or GST. If the baker’s sales of bread receive a legislative exemption (or he fails to pay tax), revenue from

⁴ For a fuller discussion of VAT exemptions, see Hellerstein and Duncan (2010).

⁵ If a BTT had a single rate that applied uniformly to all businesses and all businesses were compliant, exempting of sales by the baker combined with a refund of tax on the deduction of purchases from the miller would also remove all tax from retail sales.

an RST are reduced by the entire \$100 of tax, but are reduced by only the \$30 of revenue paid by the baker under a BTT or a GST, since \$70 of tax continues to be paid by the miller and farmer.

The farmer’s wheat sales are already exempt by the structure of the RST, and total tax revenues of \$100 are unaffected by this exemption. Under the GST, legislative exemption of farmers (or a farmer’s failure to pay tax owed) also does not change total tax paid; the miller will still be liable for \$70 of tax and receive no credit, since the farmer paid no tax, and the baker still will be liable for \$100 of tax and receive a \$70 credit for tax paid by the miller. Under the BTT, however, if the farmer is exempt or evades tax, the miller will still pay \$40 of tax and the baker will still pay \$30 of tax, so total tax is reduced to \$70 by the \$30 not paid by the farmer.

Like exemption of the farmer, the miller’s sales of flour are already exempt by the structure of the RST, and total tax revenues of \$100 are unaffected by this exemption. A legislative exemption for millers (or a miller’s failure to pay tax owed), however, has quite different effects under a BTT and GST. Under a BTT, the farmer will still pay \$30 of tax and the baker will still pay \$30 of tax, so total tax is reduced by the \$40 not paid by the miller to \$60. Under a GST, the farmer will still pay \$30 of tax, but since the miller is exempt (not zero-rated) he pays no tax and receives no credit for the tax paid by the farmer, and his invoice to the baker will show no credit. The baker therefore is still liable for \$100 of tax and receives no credit. Total GST is \$30 + \$100 = \$130, an increase of \$30, which is the tax paid by the farmer that is never credited. Table 3 summarizes these changes in RST, BTT and GST revenues from a legislative exemption (or failure to pay tax) for each stage of production.

Table 3
Effect on RST, BTT, and GST Revenue Assuming
A Stage of Production is Legislatively Exempt (or Fails to Pay) Tax

Stage of Production with No Tax	RST	BTT	GST
Farmer	No effect	\$30 revenue loss	No effect
Miller	No effect	\$40 revenue loss	\$30 revenue <u>increase</u>
Baker	\$100 revenue loss	\$30 revenue loss	\$30 revenue loss

These examples illustrate why a broad-based consumption tax is better administered as a VAT than as an RST. Under either a subtraction method (BTT) or a credit-invoice (GST) VAT, only a portion of the tax is lost if the retailer (the baker in this example) fails to pay tax, whereas under an RST, the entire tax revenue is lost. In addition, making sure that an RST only applies to retail sales is difficult, so in practice RSTs typically apply to many sales between businesses. This “pyramiding” of RSTs leads to differential effects on retail sales prices, distorting consumption patterns. In contrast, VATs have a built-in mechanism to allow a deduction (BTT) or credit

(GST) that removes tax on sales between businesses so that only the VAT rate applies at the final retail sales level.⁶

These examples also illustrate why a credit-invoice (GST) VAT has two advantages over a subtraction method (BTT) VAT. First, as shown in Table 2, removing all tax from the retail sales of an item only requires zero-rating the retail sale of the item in a GST, but would require exempting all intermediate sales leading to the retail sales of the item in a BTT. Many intermediate sales would need to be split between sales that lead to the exempt retail sale and other sales under a BTT. In the example, exempting retail sales of bread requires the farmer to split wheat sales between wheat used to make bread (which would be exempt), and wheat used for any other purpose (which would be taxed; such sales are not shown in the example). Achieving such exemptions at all stages requires tracing back from the retail level through all intermediate stages of production, a significant administrative burden.⁷ Second, as shown in Table 3 a GST discourages exemptions of intermediate producers, since such exemptions do not reduce, and can increase, total tax paid. In contrast, in a BTT, an exemption does reduce total tax paid, so there would always be pressures to provide such exemptions.

Consumption taxes worldwide are “destination based,” which means they apply to consumption within the jurisdiction, with exports removed from the tax base and imports included. Destination-based consumption taxes are neutral with respect to international trade, because the tax rate applied to any item of consumption is the rate where the consumption occurs, regardless of where the item was produced. Removing tax from exports under an RST, BTT, and GST is administratively equivalent to the removal of tax from the final sale of bread in the example (see Table 2). In an RST, removing tax from exports simply requires exempting exports, and in a GST, simply requires zero-rating exports. A BTT, however, requires exempting all stages of production of the export.⁸ Imposing tax on imports automatically occurs under an RST, except when a consumer purchases an item directly free of tax.⁹ Under a BTT, an importer cannot subtract the value of imports, since no tax has been paid on them, unless the importer is required to pay BTT at the time of import (“at the border”). Under a GST, there would be no VAT on the invoice to credit against an importer’s VAT liability, unless the importer is required to pay VAT at the time of import.¹⁰

The VAT analyzed in this paper is assumed to use the credit-invoice (GST) design and be “destination-based,” with exports zero-rated and imports subject to tax at the border.

⁶ This assumes, of course, that the VAT applies to all consumption at a single rate. While VATs in place are not that uniform in application, they are much closer to uniform (and could more easily be made uniform) than RSTs in place.

⁷ It could be presumed that the purchase price of flour paid by the baker included BTT of 10%, and that amount could be refunded to him (along with exemption of his sales of bread), but if tax had not been paid (or fully paid) at all prior stages of production, there would be a net revenue loss from trying to exempt the retail sale of bread.

⁸ There could be a refund to the exporter for a presumptive amount of tax included in his purchases, along with exemption of his export sales, with the risk of removing more than 100 percent of actual tax paid in the production of the export.

⁹ State retail sales taxes impose a compensating/use tax on purchases from sellers not subject to tax (“remote sellers”), but in practice, this tax is very difficult to collect from individuals.

¹⁰ VATs around the world generally require collection of VAT at the time of import.

Considerations in Designing the Base for a VAT

Policy Issues

A VAT is a broad-based tax on consumption, so the starting point for the base of a VAT is total consumption as defined in the National Income and Product Accounts (NIPA) prepared by the Bureau of Economic Analysis in the U.S. Department of Commerce. Various items in NIPA consumption, however, likely would be excluded from the VAT base for policy reasons. On policy grounds, VATs and state retail sales taxes typically exclude some or all spending on what are deemed socially desirable goods and services, in particular health, education, and the spending of religious and nonprofit organizations on behalf of households. To address regressivity, VATs and state retail sales taxes often exclude items such as housing and food and non-alcoholic beverages consumed at home.

A separate set of policy considerations is related to the treatment of general government spending – spending on national defense, education, highways, etc. – which is not a component of NIPA consumption.¹¹ For general government spending to be completely removed from a VAT, both employee compensation and purchases from businesses must be free of VAT.¹² Retail sales taxes achieve the same result by not applying to general government spending or to sales to governments. An alternative treatment in a VAT is to make governments “exempt,” which means they are not subject to the VAT on compensation of employees, but VAT does apply to goods and services they buy from businesses. Applying a retail sales tax to government purchases from businesses would achieve the same result. The VATs in most countries, and some state sales taxes, apply to at least some government purchases from businesses. This means that goods and services produced by affected governments are partially subject to consumption tax.

Instead of removing, or partially removing, general government spending from the VAT base, it could be fully included in the VAT base. To achieve full inclusion of general government spending, government purchases from businesses in support of this spending must be fully subject to VAT, and VAT must also apply to the full value of spending for compensation of public employees. The rationale for full inclusion is that governments provide goods and services to meet individuals’ wants and needs, just as privately-produced goods and services do. Government spending should therefore be viewed, for purposes of a VAT, as a form of consumption or use of income. From this perspective, taxes are the “price” paid for government spending on goods and services, which cannot be sold for a market price because of their public nature (the fact that all, or many, households can consume them jointly and cannot be excluded from their consumption). Including government services in the VAT base would provide a better

¹¹ The “commercial” activities of governments, such as running hospitals, colleges and universities, and municipal water systems, are included in NIPA consumption to the extent they are “purchased” by households through the payment of fees or charges. These government activities would be taxed under the VAT in the same manner as comparable goods and services provided by for-profit businesses unless they are explicitly exempted from the VAT base.

¹² In practice, taxing government spending has no net budgetary effect; the increased revenue from the broader VAT base is exactly offset by the higher prices charged to government agencies by taxpayers to cover the tax (see Gale (1999)).

measure of the “true” cost of government services. New Zealand’s VAT applies fully to government spending, and Switzerland is also considering expanding its VAT base to include government spending.¹³

Zero-rating governments would not, in itself, remove the VAT from consumption items provided by businesses, the cost of which is reimbursed by governments (in-kind transfers). Medicare, Medicaid, and Supplemental Nutrition Assistance Program (SNAP, formerly called the food stamp program) are the most important examples of such in-kind government transfers, representing a significant share of household consumption as well as of government spending.

Administrative Issues

In addition to adjustments for policy reasons, adjustments to NIPA consumption may be made for administrative reasons. NIPA measures the consumption of owner-occupied housing as the “(net) imputed rent” of this housing, as if homeowners were their own landlords and paid (gross) rent to themselves, but could deduct expenses for mortgage interest, depreciation, property taxes, repairs, etc. to arrive at net rent. As a practical matter, this net imputed rent could not easily be measured annually for each household, so if a VAT applies to housing it is by applying it to the full value of purchases of new owner-occupied housing and improvements to existing owner-occupied housing, with no tax applied to imputed rent. This is called the “pre-payment” method of collecting VAT, since the economic effect is the same as if no VAT applied at the time of purchase, but full VAT applied to the gross rent of owner-occupied housing. The effect of this treatment on the VAT base is to replace the amounts for (net) imputed rent of owner-occupied housing in NIPA consumption with the amount of spending on new owner-occupied housing and improvements to existing owner-occupied housing.

To avoid differential treatment between owner-occupied and tenant-occupied housing, which would require adjustments when housing switched between owner and tenant occupancy,¹⁴ rents paid by tenants might also be excluded from the VAT base, with VAT instead applied to sales of new housing intended for rental use, as well homeownership and to improvements to rental residential property. Aside from the administrative simplicity of this approach, it should result in no change in housing prices (assuming the consumer price level is unchanged), so property tax revenues from residential properties would not be changed at current property tax rates. However, this approach means that the housing services provided by both owner- and tenant-occupied residential properties in place when the VAT is adopted would not be subject to any VAT burden. To ensure that VAT is paid on consumption items included in residential rents, such as utilities and property management services, these rents would need to be exempt rather than zero-rated.

¹³ New Zealand taxes government budgets and allows governments to take a credit for VAT included in purchases from businesses (or other government agencies). This approach does not require allocation of VAT on purchases or splitting of compensation between “commercial” and “general” government spending.

¹⁴ Note that tenant-occupied housing excludes transient housing such as hotels, motels, etc. Rents from transient housing are generally included in VAT bases and are included in the bases for the options considered in this paper.

Most VATs make an administrative adjustment to exclude certain financial services. It is administratively difficult to value financial services that are provided without charge. For example, a bank's cost of maintaining a checking account for a customer might not be directly charged to the customer, but rather recouped by paying little or no interest on the customer's checking account balance, although the bank earns interest on the balance by investing it. It is difficult to determine the indirect charge to the checking account customer (the amount of interest the bank earned on balances and did not pay to the customer), so such indirect charges may be excluded from the VAT base. However, there are alternatives for taxing financial services provided without charge that might be included in the VAT base.¹⁵ Direct charges to customers by banks and other financial institutions, such as for blank checks and safe deposit boxes, are more easily included in the VAT base.

The VAT base might also be adjusted to remove state and local general sales taxes, so that VAT would not apply to these taxes. If states and localities likewise remove the VAT from their sales tax bases, tax calculations for businesses would be simplified. Federal, state, and local excise taxes generally are collected early in the production/distribution chain, so are already embodied in the prices paid by retailers for goods sold to customers. Although excises are imposed on a unit basis, separate federal, state, and local excise tax rates may be imposed on an item, and the base for each rate might be different. As a practical matter, therefore, it might not be feasible to remove them from the VAT base. Further, removing the excise from the VAT base could be contrary to the policy rationale for the excise if it is to correct an externality.

An additional administrative issue is that most countries have a threshold size of annual receipts for a firm to meet before it must register and pay VAT. Having such a threshold removes the administrative burden of a VAT from many very small firms without reducing the base of the VAT significantly. Threshold levels vary greatly across countries, even within the European Union (EU), where the lowest level (in the Netherlands) is less than \$2,000 and the highest (in France) is over \$110,000. Even higher levels apply in some countries outside the EU; for example, the threshold in Morocco is about \$200,000 and in Singapore is about \$700,000.¹⁶

Large firms might be unwilling to transact business with small firms that are not VAT-registered, because exempting the small supplier would increase VAT liabilities in a credit-invoice VAT (see example above). Therefore, some small firms below any exemption- threshold level would still register and pay VAT. Small retailers, however, would benefit from an exemption because it would remove the VAT on their own value added. So the effect of an exemption for small firms on the VAT base depends on both the size of the exemption and the extent to which firms below the threshold will nevertheless register and pay VAT because they are intermediate sellers to other businesses. Further, income tax compliance studies in the United States have found particularly high noncompliance rates among small businesses.¹⁷ An exemption would not further narrow the VAT base to the extent small retailers would have evaded VAT payments in the absence of exemption.

¹⁵ For a discussion of some of these alternative methods, see Merrill and Edwards (1996).

¹⁶ These figures are primarily from Durner, Sedon and Kothari (2010). The amounts for the EU were converted from euros using the October 21, 2010 exchange rate of \$1.39.

¹⁷ See Toder (2007).

Failure to pay tax in full and on time constitutes the “compliance gap.” The effect on revenues of the compliance gap for a VAT would be the same as narrowing the VAT base. The size of the gap would increase as exemptions, special rates, or other special provisions narrowed the VAT base, requiring a higher rate to raise any given amount of revenue. It is difficult to predict how large the compliance gap would be for a U.S. VAT. Estimates in other countries vary greatly, from as low as 2 percent in Ireland and Spain in 2006, to as high as 24.8 percent in Argentina in 2004 and 30 percent in Greece in 2006.¹⁸ The U.S. Treasury assumed in 2005 that the gap for a U.S. VAT would be 15 percent.¹⁹

Considerations in Designing a VAT Rebate

As noted above, to address regressivity, VATs and state sales taxes often exclude items such as housing and food and nonalcoholic beverages consumed at home. This approach helps reduce regressivity because these items represent a larger share of the spending for lower-income households than for higher-income households. However, average spending on these items rises with income, so the reduction in the amount of VAT burden from excluding these items is larger for higher-income households than for lower-income households. As a result, a significant amount of VAT revenue is lost from the exclusion of these items in order to achieve a modest reduction in regressivity.

One alternative approach to addressing regressivity is to rebate within the income tax some of the VAT paid by low-income households, while retaining a broad VAT base. A rebate would reduce the net VAT revenue produced by each percentage point of VAT rate, just as narrowing the base would, but a rebate can be much better targeted to achieve distributional objectives. Therefore, a rebate with a broad base would require a lower VAT rate than would exclusions from the VAT base to achieve the same amount of tax relief for low-income households. Alternatively, with the same VAT rate, a rebate could be designed to provide much more effective relief for low-income households than would exemptions of specified goods and services.

A rebate can be targeted to lower-income households in two ways. The first is to set the rebate amount to correspond to the VAT burden on a household at a relatively low level of income, such as the federal poverty level. All households with incomes higher than this level would receive the same amount of rebate, unlike an exclusion from the VAT base, which provides a benefit that increases with income. A second form of targeting is to phase out the rebate above some income level so that upper-income households receive no rebate at all. This second form of targeting permits a lower VAT rate than the first form alone. But for households in the phaseout range, there could be a very large reduction in the rebate if their income increased by a small amount. This reduction would produce the same adverse incentives to earn additional income as an explicit increase in the tax rate. Further, an abrupt end to the rebate at or only slightly above the threshold might not be viewed as fair.

¹⁸ These figures are quoted in Durner and Sedon (2010).

¹⁹ See President’s Advisory Panel on Federal Tax Reform (2005).

A rebate approximately offsetting the burden of a VAT on low-income households would be designed as a refundable income tax credit at the VAT rate on wages and self-employment income. If the rebate is not phased out with income, it would function as a “zero-bracket” amount that exempted from tax the first dollars of the components of income burdened by a VAT. An additional adjustment for cash transfer payments (see below) would offset the VAT burden for retirees.

Basing the VAT rebate on wages and self-employment income would align the rebate closely, but not exactly, with the amount of VAT households pay. More generally, however, the burden of a VAT in the long run falls on all labor income (including fringe benefits), the component of profits that represents “supernormal” returns to capital (returns in excess of compensation for the time value of money), and cash transfer payments (see discussion in Appendix A). In principle, a rebate could try to address the total VAT burden on low-income households, but administrative considerations indicate that wages and self-employment income are the only components of the VAT base that are administratively easy to use for computation of a VAT rebate. The remaining administrative issues concern whether the rebate is based on wages earned in each job, or total wages earned in all jobs during the year, and whether the wages and any self-employment income used to compute the rebate for married couples is the combined amount of both spouses or the separate amount of each spouse. These choices have an important effect on eligibility if the rebate is phased out with income. For any level of cost, the rebate will be better targeted to low-income households if the combined wages and self-employment income from all work and of both spouses are used to compute eligibility. Targeting using combined amounts, however, requires some end-of-year filing or similar mechanism, whether or not some portion of the rebate is provided as wages are paid.

Broad VAT Base

The first and third VAT options would use a broad base for the VAT. For policy reasons, this broad base would exclude (zero-rate) several items noted above: government-financed health expenditures (such as Medicare and Medicaid), education spending, and expenditures by religious and nonprofit organizations to provide goods and services to households that are not “purchased” by households through the payment of fees and charges. General government spending would also be zero-rated. Other items are excluded for administrative reasons noted above: (net) imputed rent of owner-occupied housing and rents for tenant-occupied housing are replaced with the amount of spending on new housing and improvements to existing housing, financial services provided without charge are excluded, and state and local general sales taxes also are excluded (so that VAT would not apply to these taxes, just the underlying pre-sales tax amounts). Because it is hard to predict the level of VAT noncompliance and the effect of an exemption for small business on the VAT base, it is assumed here that the combination of these effects will be a reduction of 15 percent in the VAT base (before this adjustment).

TPC estimated the size of the broad VAT base in 2015 by starting with NIPA consumption, which was estimated to be \$13.0 trillion, 70.0 percent of CBO’s projected level of GDP of \$18.6 trillion (Table 4). The base is reduced by policy adjustments for government health expenditures (primarily Medicare and Medicaid) of \$1.4 trillion, education spending of \$0.3 trillion, and religious and nonprofit expenditures of \$0.5 trillion. The net administrative adjustment for

housing reduces the base by \$1.0 trillion, and the adjustment for financial services provided without payment reduces the base by another \$0.3 trillion. With some minor other adjustments, the amount of consumption in the VAT base is \$9.4 trillion, or 71.7 percent of total consumption and 50.2 percent of GDP. Further reductions from the base are the removal state and local general sales taxes of \$0.5 trillion, and the adjustment for noncompliance and a small business exemption of 15 percent, which is \$1.4 trillion. The effective broad VAT base is therefore \$7.4 trillion in 2015, or only 56.9 percent of total consumption and 39.8 percent of GDP. While this VAT base may seem small relative to total consumption or GDP, it is a fairly broad base

Table 4
Broad VAT Base in 2015

	Level (\$billions)	Percent of Consumption	Percent of GDP
Consumption	13,035.0	100.0	70.0
<i>Less:</i> Government health expenditures	1,425.1	10.9	7.7
<i>Less:</i> Education spending	313.8	2.4	1.7
<i>Less:</i> Religious and nonprofit expenditures	526.7	4.0	2.8
<i>Less:</i> Imputed rent on owner-occupied housing	1,433.2	11.0	7.7
<i>Less:</i> Rental of tenant-occupied housing	443.5	3.4	2.4
<i>Plus:</i> New housing purchases	482.5	3.7	2.6
<i>Plus:</i> Improvements to existing housing	421.5	3.2	2.3
<i>Equals:</i> Net housing adjustment	-972.7	-7.5	-5.2
<i>Less:</i> Financial services provided without payment	337.9	2.6	1.8
<i>Less:</i> Other adjustments	107.0	0.8	0.6
<i>Equals:</i> Consumption In Broad VAT Base	9,351.8	71.7	50.2
<i>Less:</i> State and local general sales taxes	543.2	4.2	2.9
<i>Less:</i> Noncompliance/small business exemption	1,398.0	10.7	7.5
<i>Equals:</i> Effective Broad VAT Base	7,410.7	56.9	39.8
ADDENDUM:			
Gross Domestic Product (GDP)	18,622.0	142.9	100.0

Source: U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Congressional Budget Office (CBO), and TPC estimates.

by international standards. In most other countries, VAT bases exempt major items of personal consumption, such as food, housing, and medical care. These additional adjustments are made to arrive at the narrow VAT base used for the second VAT option.

Narrow VAT Base

The second VAT option would use a narrow VAT base which excludes from the broad VAT base food, housing and all health care costs to address concerns over the distribution of the VAT burden. Excluding all health care costs means that both government-financed health expenditures (excluded also in the broad base) and private health expenditures would be excluded. The narrow base also would exclude food (including nonalcoholic beverages) consumed at home, but would continue to tax restaurant meals. Finally, the narrow base would exclude consumption of housing services. It would accomplish this by excluding both rental income (net imputed rent on owner-occupied housing and rents paid for tenant-occupied housing) and investments in housing (new house construction and improvements to existing housing). The narrow VAT base would include 35.9 percent of total consumption and represent 25.1 percent of GDP in 2015 (Table 5).

Rebate for Third VAT Option

The rebate used to address regressivity in the third VAT option illustrates how the considerations discussed above determine the rebate's design. The rebate is designed to remove the VAT burden on the wages and self-employment income of low-income working households and the VAT burden on all cash transfer payments; it does not address any portion of the VAT burden on capital.

The rebate has two components: an earnings credit claimed on income tax returns and an adjustment in cash transfer payments. The first component would be a refundable tax credit based on a measure of employment income. This measure would include amounts taxpayers report on income tax returns of wages, pensions, and other withdrawals from retirement accounts, plus 80 percent of self-employment income.²⁰ The rebate amount would phase in with the combined amount of this income for a tax unit, up to ceiling amounts equal to TPC's estimate of the weighted average federal poverty threshold for a one person household in 2015 of \$12,000 for a single and head of household filer, and to double that level (\$24,000) for a married couple filing a joint return. The credit rate applied to this eligible income would be the effective rate of VAT as a percentage of income. The credit would be refundable (that is, could be claimed in excess of income taxes otherwise paid), and would not phase out at incomes above the ceiling.

The second portion of the rebate would go to recipients of cash transfer payments, mainly Social Security benefits. A new VAT would not burden current recipients of Social Security benefits, because benefits after retirement are indexed to changes in the consumer price level and thus automatically offset any effect of a VAT on the price level. (If, as discussed below, the VAT instead reduced incomes because the Fed did not accommodate a price increase, transfer

²⁰ These sources of income are reduced in real terms by a VAT (see discussion in Section III). Only 80 percent of self-employment earnings are included since (on average) 20 percent of these earnings represents returns to capital.

payments would likewise be unaffected.) Over time, however, the reduction in real wages that a VAT produces would reduce initial Social Security benefits, which are tied to a worker's lifetime earnings. This portion of the rebate, therefore, consists of an adjustment made each year in the government's computation of benefits for each form of cash transfer payment to maintain the benefit at the level that would have been computed using the pre-VAT level of wages. Beneficiaries of cash transfer payments would not need to claim this portion of the rebate on their tax return; it would automatically be included in their benefits.

Table 5
Narrow VAT Base in 2015

	Level (\$billions)	Percent of Consumption	Percent of GDP
Consumption	13,035.0	100.0	70.0
<i>Less:</i> Government health expenditures	1,425.1	10.9	7.7
<i>Less:</i> Private health expenditures	1,539.5	11.8	8.3
<i>Less:</i> Education spending	313.8	2.4	1.7
<i>Less:</i> Religious and nonprofit expenditures	526.7	4.0	2.8
<i>Less:</i> Imputed rent on owner-occupied housing	1,433.2	11.0	7.7
<i>Less:</i> Rental of Tenant-occupied housing	443.5	3.4	2.4
<i>Less:</i> Food consumed at home	833.8	6.4	4.5
<i>Less:</i> Financial services provided without payment	337.9	2.6	1.8
<i>Less:</i> Other adjustments	107.0	0.8	0.6
<i>Equals</i> : Consumption In Narrow VAT Base	6,074.4	46.6	32.6
<i>Less:</i> State and local general sales taxes	480.7	3.7	2.6
<i>Less:</i> Noncompliance/small business exemption	911.2	7.0	4.9
<i>Equals</i> : Effective Narrow VAT Base	4,682.6	35.9	25.1
ADDENDUM:			
Gross Domestic Product (GDP)	18,622.0	142.9	100.0

Source: U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Congressional Budget Office (CBO), and TPC estimates.

Changes in the Price Level

A VAT taxes all the goods and services included in the VAT base. The prices that consumers pay for goods and services, which include the VAT, exceed the amount that producers

(businesses) receive for them by the amount of the VAT. The VAT represents a “wedge” between the prices consumers pay and the prices producers receive. If the Fed did not allow consumer prices to rise when the VAT was introduced, the wedge would mean that producer prices would have to fall at all stages of production and distribution of goods and services, reducing nominal incomes by the amount of the VAT. This means that payments to labor and capital would have to fall by the amount of the VAT.²¹

The federal agencies involved in the estimation and analysis of taxes—the U.S. Treasury’s Office of Tax Analysis (OTA), the Congressional Joint Committee on Taxation (JCT), and the Tax Analysis Division of the Congressional Budget Office (CBO) – assume that the overall price level (measured by the GDP deflator) and real GDP are unchanged from their forecast levels by any change in the tax system. For this paper’s analysis, TPC assumes real GDP is unchanged and the Fed does not allow the consumer price level to change. With no change in the consumer price level when a VAT is introduced, the VAT wedge between consumer and producer prices will cause a reduction in returns to labor and capital.²²

Effect of VAT Options on Government Revenues and Spending

Effect on Revenues

Under this paper’s assumption that there is no change in the consumer price level when the VAT is introduced, the VAT wedge between consumer and producer prices will cause a reduction in returns to labor and capital. Because these returns are the base for the federal income and payroll taxes, the reduction in returns will reduce federal tax revenues from the individual income, corporate income, and payroll taxes. State and local government tax revenues from individual and corporate income taxes would likewise be reduced. Revenues from state and local general sales taxes would also fall if they are based on sales valued at producer prices, as assumed here. Property tax revenues from business properties would fall also, since the VAT would reduce the cost of new business assets and the value of existing (“old”) business assets.²³ Because the VAT base excludes rents and applies to purchases of all new residential housing and improvements, however, it would not change the value of residential properties or property tax revenues from residential property.

²¹ The effect of a VAT on returns to capital changes over time (see discussion in Section III).

²² If the consumer price level does rise (by the full amount of the VAT), there would be no change in the nominal returns to labor and capital, but the purchasing power of these returns would be reduced due to the higher prices of consumer goods.

²³ This analysis holds property tax rates constant, just as all other tax rates are assumed to be held constant.

Effect on Spending

The effect of a VAT on government spending depends on whether any part of government spending is subject to VAT, as well as on whether or not the price level rises when the VAT is introduced. Spending for general government purposes—national defense, elementary and secondary education, highways, etc.—is assumed here to be completely removed from the broad and narrow VAT bases. This means governments would not pay VAT on their value-added (compensation of employees) and VAT would not be included in their purchases from businesses. Since the consumer price level is assumed not to change, producer (pre-VAT) prices would fall, as would wages and other forms of employee compensation. Government spending on purchases from businesses would be at (now lower) producer prices, so it could fall while holding real purchases constant. Likewise, nominal government spending on employee compensation could drop while holding the number and professional mix of employees constant, because the VAT would reduce compensation in competing private-sector jobs.

Government-reimbursed health spending is removed from both the broad and narrow VAT bases, so prices for these health services would fall and the nominal amount of this component of government spending could also be reduced while holding real spending constant. SNAP is also an in-kind government transfer, and because food and nonalcoholic beverages consumed at home are removed from the narrow VAT base, prices for food would fall and the nominal amount of government spending for SNAP could also be reduced, while holding real spending constant in the second VAT option.

With the consumer price level unchanged, as assumed here, spending on cash transfer payments would not change due to price indexing. But Social Security benefits and most other cash transfer payments are directly or indirectly based on wages, so over time they would change with the level of wages. If a VAT reduces wages, these cash transfer payments will be lower for new beneficiaries, as their computed benefits reflect the reduction in wages over their working life. So over time, government spending on such payments would gradually decline. In the option with a rebate, a portion of the rebate would offset this decline.

The nominal level of current federal grants to state and local governments could fall, since these grants finance state and local spending on compensation of employees, purchases from businesses and in-kind transfers. These could fall while holding the real level of such grant-financed spending constant.

Net Effect on Government Budgets

The net effect of a VAT on government budgets is the combined effect of revenue (for the federal government) from the VAT itself, the reduction in revenues from other taxes, and any changes in spending for employee compensation, purchases from businesses, in-kind transfers, cash transfer payments, and federal grants to state and local governments. Holding real government spending constant, the VAT rate for each option was set to generate the target amount of federal deficit reduction of 2 percent of GDP in 2015. Because the distributional analysis is based on the fully phased-in effects of the VAT (see discussion in Section III below),

the fully phased-in effect of the VAT on the federal deficit (at 2015 income levels) was used to determine the VAT rate for each option.

Unlike the federal government, state and local governments would not be able to adjust the VAT rate to achieve a budget target, but the total amount of federal grants to state and local governments could be adjusted so that real state and local spending would be held constant with no change in their surpluses or deficits. The net effect of the VAT on state and local budgets would be determined by the changes due to the VAT in their revenues and spending. If the consumer price level did not rise and these governments are exempt from VAT, as assumed here, the VAT would lead to state and local budget surpluses (in the absence of full adjustments to federal grants), because these governments spend a much larger share of their budgets on employee compensation and purchases from business than the share of their revenues from income, general sales taxes and business property taxes.²⁴ To hold real state and local government spending constant, it is assumed here that federal grants are adjusted to exactly offset these surpluses.

VAT Options--Required Rates

The VAT rate for each option must be set to reduce the deficit in 2015 by 2 percent of GDP. Net VAT revenue is determined by applying the VAT rate to the (effective) VAT base and subtracting the revenue lost due to the income and payroll tax offsets and, for the third VAT option, the rebate. However, the amount of VAT that must be raised under each option to meet the deficit reduction target also takes into account the change in nominal federal spending (including grants to state and local governments) that could be made while holding real federal, state and local government spending constant.

The VAT rate that TPC estimated is required for the first option is 5.0 percent, for the second option 7.9 percent, and for the third option 7.7 percent.

III. Effects of the Options

Government Revenues and Spending

The effects of the options on federal revenues and spending and on the federal deficit are shown in Table 6. By design, the deficit reduction achieved by all three VAT options is the same. For these options, gross VAT revenues are significantly larger than net VAT revenues because of the revenue lost from the income and payroll tax offsets and, for the third VAT option, the rebate. As noted above, however, the VAT options also take into account the change in nominal federal

²⁴ Census data for 2008 indicate that income and general sales tax revenues were 25.1 percent of total state and local revenues and total property taxes were another 15.4 percent of total revenues (of which we estimate about 40 percent, or 6.2 percent of total revenues, is from business property), while employee compensation and purchases from businesses were 86.1 percent of their total spending (computed from: Table 1. State and Local Government Finances by Level of Government and by State: 2007-08, available at http://www.census.gov/govs/estimate/historical_data_2008.html).

spending that could be made while holding real government spending constant. The combination of the federal revenue and spending effects of each option is what achieves the 2 percent of GDP deficit target.

Distribution of the Tax Burden

The distributional effects of all options at 2015 levels of income were estimated using the Urban-Brookings Tax Policy Center microsimulation model. The incidence assumptions underlying the estimates are that individual income tax payers bear the burden of their individual income tax liabilities, households bear the burden of the corporate income tax in proportion to their share of (positive) capital income, and workers bear the burden of both the employee and employer shares of the payroll tax in proportion to their earnings.

The VAT was distributed using a new methodology recently developed by TPC that computes the long-run incidence in a manner consistent with TPC's methods for estimating the long-run incidence of individual income taxes, corporate income taxes, and payroll taxes. However, in addition to its long-run effects, the imposition of a new consumption tax imposes significant transitional burdens on existing capital owners, especially those spending down old wealth, while effectively exempting current recipients of income from indexed transfer payments. Because of the importance of these transitional effects,²⁵ TPC developed a separate method for estimating the transitional burden of introducing a VAT.

The distributional analyses of the VAT presented in this paper are for both long-run effects and transitional effects. In the long-run, when fully phased in, the burden of the VAT is borne in proportion to the sum of labor income, "supernormal returns" to capital and cash transfer income, with adjustments for the effects of changes in relative prices of items of consumption, the decline in government spending associated with excluding government from the VAT base, reduced income and payroll tax receipts that occur because the VAT lowers wages and profits, and the rebate included in the third option to make the tax less regressive. Estimates of transitional burdens make two major modifications to the long-run estimates. First, current wealth holders bear a lump-sum tax on their wealth because a VAT base includes returns and spending from old wealth. Second, the transitional burden measure treats receipts of indexed cash transfer payments, in particular Social Security benefits, as exempt.

²⁵ TPC's new methodology is summarized in Appendix A and described in detail in Toder, Nunns, and Rosenberg (2011).

Table 6
Federal Revenue, Spending and Deficit Effects of Options
Under the Current Policy Baseline
(\$ billions, at 2015 levels of income)

Provision	VAT Options		
	Broad Base	Narrow Base	Broad Base with Rebate
Gross VAT Revenues	359.5	357.3	535.8
<i>Less: Individual Income Tax Offset</i>	93.9	93.8	136.2
<i>Less: Payroll Tax Offset</i>	34.2	34.1	51.1
<i>Less: Corporate Income Tax Offset</i>	6.5	6.5	9.6
<i>Equals: Total Revenue Offsets</i>	134.5	134.4	196.9
<i>Less: Rebate</i>	N/A	N/A	188.5
Net VAT Receipts	224.9	222.9	150.3
Change in Nominal Federal Spending:¹			
Employee Compensation	19.8	19.8	29.5
Purchases from Businesses	20.7	20.7	30.9
In-Kind Transfers	32.4	33.8	48.4
Cash Transfer Payments	39.1	39.1	58.3
Grants to State and Local Governments	40.0	40.8	59.6
Total Reduction	152.1	154.2	226.7
Change in Federal Deficit	377.0	377.0	377.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0509-7) and off-model TPC estimates.

¹ This is the estimated amount by which nominal federal spending could be changed while holding real federal, state and local government spending constant.

Estimates of the fully phased-in distributional effects of each VAT option at 2015 levels of income by cash income percentiles are shown in Table 7. When fully phased in, the transitional VAT burden on “old” capital has been absorbed and cash transfer payments reflect the reduction in wages. So the fully phased in VAT burden falls entirely on labor income, supernormal returns to capital, and cash transfer payments. (The burden on cash transfer payments is exactly offset by a portion of the rebate in the third VAT option.) Distributional effects are expressed as the percentage change in after-tax income, the amount of income available for consumption or saving, a measure of the change in household’s welfare.

The options with a broad VAT base (without a rebate) and a narrow VAT base have similar distributional effects within each age group: they are regressive at the bottom of the income distribution, roughly proportional in the middle, then generally regressive throughout the top quintile (although for the 65-and-over group, there is slight progressivity at the very top of the income distribution). The option with the broad VAT base and a rebate is sharply progressive through the 95th income percentile for all age groups and remains progressive within the top 5 percent in the 65-and-over group, but is roughly proportional for the under-50 and 50-to 64-age groups. Under all three VAT options, the burden on the 65-and-over group is significantly lower at all income levels than it is for the younger age groups. This may seem counterintuitive, but note that these estimates represent the effects of a fully phased-in VAT and not the distribution by the age of households at the time the VAT is introduced. Instead, the fully phased-in distribution by age shows how the annual VAT burden changes over an individual's lifetime. Younger tax units, who have a very high share of their income from working, bear a higher phased-in VAT burden than older units, who have relatively more income from capital that does not bear a VAT burden (except on the portion of returns that are above normal). Further, the option with a rebate removes the VAT burden from all cash transfer payments, which are also a relatively larger share of income for older units.

The transitional burden of a VAT is very different than the fully phased-in burden (Table 8). For the population as a whole, in the transition the distribution of the VAT options without a rebate are progressive up through the 95th percentile of the income distribution and regressive only at the very top. The progressivity at the bottom reflects the exemption of indexed transfer payments from the transitional VAT burden. The shape of the distribution, however, varies markedly among age groups. For those under age 50, where transfer payments are relatively low (mainly disability benefits, which go to the lower-income groups), the distribution across the bottom quintiles is only slightly progressive. For those 65 and over, the distribution of the VAT burden is highly progressive because the share of transfer payments in income is very high for low-income tax units over age 65.

For the broad base VAT, the average VAT burden rises from 3.5 percent of after-tax income for those under age 50 to 3.7 percent of after-tax income for those ages 50-64, but then drops to 2.3 percent of after-tax income for those ages 65 and over. For those in the bottom quintile, the VAT burden drops across all three age ranges, falling from 3.5 percent of after-tax income for those 50 and under to 3.1 percent for those between 50 and 64, and to only 1.1 percent of income for those 65 and over, reflecting the importance of indexed transfer payments for older taxpayers in the bottom quintile. For higher-income households, the highest burden as a share of income is at ages 50-64. While those aged 65 and over still bear the lowest burdens, their burden as a share of after-tax income is only slightly below the burdens of other groups.

Table 7

**Distributional Analysis of Fully Phased in Burden of Options at 2015 Income Levels
by Income and Age of the Tax Unit Head Under the Current Policy Baseline**
(percentage change in after-tax income)

Cash Income Percentile	VAT Options		
	Broad Base	Narrow Base	Broad Base with Rebate
	<u>All Ages</u>		
Lowest Quintile	-3.9	-3.8	-0.6
Second Quintile	-3.6	-3.5	-1.8
Middle Quintile	-3.6	-3.6	-2.9
Fourth Quintile	-3.6	-3.6	-3.5
Top Quintile	-2.9	-2.9	-3.7
All	-3.3	-3.3	-3.2
Addendum			
80-90	-3.4	-3.4	-3.8
90-95	-3.2	-3.2	-3.8
95-99	-2.8	-2.8	-3.6
Top 1 Percent	-2.5	-2.5	-3.6
Top 0.1 Percent	-2.5	-2.6	-3.7
	<u>Under 50</u>		
Lowest Quintile	-3.9	-3.9	-0.8
Second Quintile	-3.6	-3.6	-2.3
Middle Quintile	-3.7	-3.7	-3.5
Fourth Quintile	-3.7	-3.7	-4.0
Top Quintile	-3.1	-3.2	-4.0
All	-3.5	-3.5	-3.6
Addendum			
80-90	-3.5	-3.5	-4.1
90-95	-3.4	-3.4	-4.2
95-99	-3.0	-3.0	-4.0
Top 1 Percent	-2.7	-2.8	-3.9
Top 0.1 Percent	-2.7	-2.8	-4.0
	<u>50 to 64</u>		
Lowest Quintile	-4.2	-4.1	-0.8
Second Quintile	-3.9	-3.9	-2.1
Middle Quintile	-3.9	-3.8	-3.3
Fourth Quintile	-3.7	-3.7	-3.7
Top Quintile	-3.0	-3.0	-3.8
All	-3.3	-3.3	-3.6
Addendum			
80-90	-3.5	-3.5	-4.0
90-95	-3.3	-3.3	-4.1
95-99	-2.8	-2.9	-3.7
Top 1 Percent	-2.5	-2.6	-3.6
Top 0.1 Percent	-2.6	-2.6	-3.8

Table 7 -- Continued

Cash Income Percentile	VAT Options		
	Broad Base	Narrow Base	Broad Base with Rebate
	<i>65 and Over</i>		
Lowest Quintile	-3.7	-3.6	-0.2
Second Quintile	-3.3	-3.3	-0.5
Middle Quintile	-3.1	-3.1	-0.8
Fourth Quintile	-3.1	-3.1	-1.6
Top Quintile	-2.3	-2.3	-2.5
All	-2.8	-2.7	-1.7
Addendum			
80-90	-2.8	-2.8	-2.2
90-95	-2.5	-2.5	-2.2
95-99	-2.1	-2.1	-2.3
Top 1 Percent	-2.1	-2.1	-2.9
Top 0.1 Percent	-2.2	-2.3	-3.3

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0509-7).

Effects on Marginal Tax Rates

Economic incentives, the reward to work effort, saving, risk taking, and other productive activities, are affected directly by the marginal tax rates that apply to returns to additional economic activity. The relevant tax rates reflect not just statutory rates that may apply, but also phase-ins, phase-outs, and other features of the tax law that, in combination with statutory rates, determine how much taxes change when the level of economic activity changes. These tax rates are referred to as effective marginal tax rates, or EMTRs.

The change in EMTRs on wages and capital gains due to the full phased-in effects of the VAT options at 2015 income levels were estimated using the Urban-Brookings Tax Policy Center microsimulation model.²⁶ Estimates were made for each option relative to the Current Policy Baseline.

²⁶ The change in EMTRs for wages is calculated by increasing the wages of all workers by \$1,000; computing the change in income tax, payroll tax and VAT on that \$1,000 of wages; computing the tax change as a percent of \$1,000 (i.e., the effective rate on the marginal \$1,000 of wages); and then weighting these effective rates by current wages. EMTRs on capital gains are computed in the same manner.

Table 8

Distributional Analysis of Transitional Burden of Options at 2015 Income Levels
by Income and Age of the Tax Unit Head Under the Current Policy Baseline
(percentage change in after-tax income)

Cash Income Percentile	VAT Options		
	Broad Base	Narrow Base	Broad Base with Rebate
<u>All Ages</u>			
Lowest Quintile	-2.8	-2.8	-0.9
Second Quintile	-2.9	-2.9	-2.0
Middle Quintile	-3.3	-3.3	-3.2
Fourth Quintile	-3.6	-3.5	-3.9
Top Quintile	-3.4	-3.4	-4.5
All	-3.3	-3.3	-3.8
Addendum			
80-90	-3.6	-3.6	-4.4
90-95	-3.7	-3.7	-4.7
Top 5 Percent	-3.1	-3.2	-4.4
<u>Under 50</u>			
Lowest Quintile	-3.5	-3.4	-0.8
Second Quintile	-3.4	-3.4	-2.3
Middle Quintile	-3.7	-3.7	-3.6
Fourth Quintile	-3.8	-3.7	-4.2
Top Quintile	-3.4	-3.4	-4.5
All	-3.5	-3.5	-3.9
Addendum			
80-90	-3.7	-3.7	-4.4
90-95	-3.7	-3.7	-4.7
Top 5 Percent	-3.1	-3.2	-4.4
<u>50 to 64</u>			
Lowest Quintile	-3.1	-3.1	-1.4
Second Quintile	-3.4	-3.4	-2.4
Middle Quintile	-3.7	-3.7	-3.7
Fourth Quintile	-3.8	-3.8	-4.3
Top Quintile	-3.6	-3.6	-4.9
All	-3.7	-3.7	-4.4
Addendum			
80-90	-4.0	-4.0	-4.9
90-95	-4.0	-4.0	-5.2
Top 5 Percent	-3.3	-3.4	-4.7
<u>65 and Over</u>			
Lowest Quintile	-1.1	-1.1	-0.6
Second Quintile	-1.5	-1.4	-0.8
Middle Quintile	-1.8	-1.8	-1.5
Fourth Quintile	-2.5	-2.4	-2.4
Top Quintile	-2.8	-2.8	-3.8
All	-2.3	-2.3	-2.7
Addendum			
80-90	-2.9	-2.9	-3.4
90-95	-2.9	-2.9	-3.6
Top 5 Percent	-2.7	-2.8	-3.9

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0509-7).

Note that the effects of the VAT option on EMTRs is the net effect of gross VAT, the government spending and federal income and payroll tax offsets, and the rebate (for the third option). Although a VAT does not apply to the normal return to capital, it does apply to supernormal returns, and it is that fraction of capital gains, which TPC estimates to be 75 percent, that is subject to VAT rates.²⁷ These estimates, expressed as percentage-point changes in EMTRs, are shown in Table 9, along with the percentage-point EMTRs under the Current Policy Baseline and under each option.

The estimates show nearly identical changes in EMTRs on both wages and capital gains under the options for a broad VAT base (with no rebate) and a narrow VAT base. EMTRs change by nearly the same amount under these two options because they raise nearly the same amount of revenue and result in nearly identical reductions in nominal federal spending, causing factor incomes (returns to capital and labor) subject to VAT to decline by a nearly identical percentage. The change in EMTRs on both wages and capital gains declines with income because the VAT reduces returns subject to income tax (and payroll tax for wages), so part of the effect of the VAT on marginal income is offset by progressive current EMTRs on wages and capital gains.

For the option with a broad VAT base and a rebate, the average change in EMTRs is higher than under the other two options because the rebate requires a higher VAT rate on the broad base, so raises more (pre-rebate) revenue and reduces nominal federal spending more, causing factor incomes subject to VAT to decline by a higher percentage. The rebate does make the increase in EMTRs on wages in the first quintile less than the increase in the second quintile, but otherwise EMTRs generally increase by declining amounts as income increases, as was true under the other two options.

Changes in Economic Distortions

In addition to changing EMTRs, which were calculated above for items that are in the VAT bases, the options could also distort economic decisions due to exclusions from the bases or differences in the tax treatment of certain portions of the bases. These effects are briefly discussed here, and summarized in Table 10, along with the effects of corresponding distortions in the income tax.

Both the income tax and the VAT bases exclude non-market production, such as cleaning your own house and leisure. If housecleaning is produced in the market, that is, if you hire someone to clean your house, you must earn income subject to income tax to pay for it, and the payment itself would be taxed under the VAT. But if you clean your own house, the value of your time spent housecleaning is not taxed under the income tax, and the value of the housecleaning would not be subject to VAT. Similarly, time spent working produces income subject to income tax, whereas leisure time does not. So, both the income tax and the VAT distort the choice between non-market and market production, because non-market production is untaxed.

²⁷ Capital gains realizations are only a proxy for the amount of supernormal returns subject to VAT associated with the underlying assets. The VAT could apply to the supernormal returns before, at the time of, or after the gain realization, or might not ever apply. For example, the gain on the sale of stock could reflect the value of retained earnings including supernormal returns previously taxed under the VAT, current supernormal returns taxed currently under the VAT, anticipated supernormal returns that will be taxed in the future under the VAT, or anticipated supernormal returns that never materialize.

Table 9

Effective Marginal Tax Rate (EMTR) and Changes in EMTR on Wages and Capital Gain
 Due to VAT Options Under the Current Policy Baseline at 2015 Income Levels)
 (EMTR as a percent or percentage point change in EMTR)

Cash Income Percentile	EMTR Under Current Policy Baseline	Change in EMTR on Due to Options			EMTR Under Options			
		Broad Base	Narrow Base	Broad Base with Rebate	Broad Base	Narrow Base	Broad Base with Rebate	
<i>Wages</i>								
Lowest Quintile	17.4	3.1	3.1	2.8	20.5	20.5	20.2	
Second Quintile	32.3	2.5	2.5	3.7	34.8	34.8	36.0	
Middle Quintile	33.9	2.5	2.5	3.7	36.4	36.4	37.6	
Fourth Quintile	35.9	2.4	2.4	3.6	38.3	38.3	39.5	
Top Quintile	38.1	2.3	2.3	3.5	40.4	40.4	41.6	
All	35.7	2.4	2.4	3.5	38.1	38.1	39.2	
Addendum								
80-90	38.3	2.3	2.3	3.5	40.6	40.6	41.8	
90-95	37.3	2.3	2.3	3.5	39.6	39.6	40.8	
95-99	39.2	2.3	2.3	3.4	41.5	41.5	42.6	
Top 1 Percent	37.1	2.4	2.4	3.6	39.5	39.5	40.7	
Top 0.1 Percent	38.0	2.4	2.5	3.5	40.4	40.5	41.5	
<i>Capital Gains</i>								
Lowest Quintile	1.4	2.2	2.2	3.2	3.6	3.6	4.6	
Second Quintile	1.1	2.1	2.1	3.2	3.2	3.2	4.3	
Middle Quintile	5.3	2.0	2.0	3.0	7.3	7.3	8.3	
Fourth Quintile	9.1	1.9	1.8	2.8	11.0	10.9	11.9	
Top Quintile	17.9	1.6	1.6	2.4	19.5	19.5	20.3	
All	16.8	1.7	1.7	2.5	18.5	18.5	19.3	
Addendum								
80-90	13.1	1.8	1.8	2.6	14.9	14.9	15.7	
90-95	14.6	1.7	1.7	2.6	16.3	16.3	17.2	
95-99	19.9	1.5	1.5	2.3	21.4	21.4	22.2	
Top 1 Percent	18.1	1.6	1.6	2.4	19.7	19.7	20.5	
Top 0.1 Percent	18.2	1.6	1.6	2.4	19.8	19.8	20.6	

Source: Urban-Brookings Tax Policy Center Microsimulation Model (version 0509-7).

Table 10
Effects of Options on Deadweight Loss

Source of Deadweight Loss	Income Tax	VAT
<u>Economic Distortions</u>		
Market vs. Non-Market Production	Distorts	Distorts; amount of distortion rises with tax rate
Present vs. Future Consumption	Distorts	No distortion
Choices Among Consumer Goods	Distorts since some goods and services are tax-favored	Distorts since some goods and services get favorable treatment; narrower base more distorting
Relative Returns Among Capital goods	Distorts since some investments are tax-favored	No distortion
Forms of Business Organization	Distortion due to differential taxation of corporate and non-corporate business income	No distortion
Forms of Business Finance	Distortion due to differential taxation of debt and equity	No distortion
<u>Administrative and Compliance Costs</u>		
Administrative Costs for IRS	Significant	Significant startup and ongoing costs
Compliance Costs for Individuals	Significant	Minimal
Compliance Costs for Business	Significant	Significant startup and ongoing costs

Under the VAT, the tax on consumption out of this year's income is the same, in present value, as the tax on future consumption financed by saving out of this year's income because the VAT would not tax the normal return to saving. However, the income tax generally taxes the normal return to saving,²⁸ so consumption out of this year's income is greater in present value than consumption in the future financed by saving out of this year's income. Thus, the income tax, but not the VAT, distorts the choice between present and future consumption.

The income tax provides incentives to certain forms of consumption, such as health-care financed by employer-provided insurance and homeownership. The VAT bases considered here would also provide incentives to consume items that are omitted from the VAT bases. So both taxes distort choices among consumer goods. The narrow VAT base excludes more items, so would distort consumer choices more.

The income tax also provides incentives to certain forms of investment, such as research and development, investment by small business, and investments that receive accelerated forms of cost recovery. These incentives distort investment patterns. The VAT provides the equivalent of expensing for all investment by all businesses, so it is neutral with respect to investment choices.

The corporate income tax applies only to income earned by regular ("C") corporations, whereas income earned by businesses organized in other forms (e.g., sole proprietorship, partnership, S corporation) is taxed only under the individual income tax. The income of C corporations is also taxed when received by individuals as dividends or realized as capital gains on the sale of stock that reflects the value of retained earnings (this is often referred to as the "double tax" on corporate income). So the relationship of the corporate income tax rate and the individual income tax rates on non-corporate business income, dividends and capital gains affects (distorts) the decision to use the C corporation form or another form of business organization. The choice between debt and equity financing for corporations also is distorted by the relationship between the corporate and various individual income tax rates. The VAT burden would not depend on the form of business organization or the source of business finance, so would not distort decisions about organizational form, or the use of debt versus equity for business finance.

Administrative and Compliance Burdens

A VAT would be a new tax in the United States that, while likely significantly less complex than the current income tax, would nonetheless be quite complex and would affect businesses as well as nonprofits and governments. Unlike the income tax, however, a VAT would place low administrative costs on individuals, which would primarily be related to claiming a rebate.

A VAT would require the IRS, or a new agency, to establish a new administrative apparatus, with its own forms, instructions, regulatory guidance, processing, taxpayer service, and collection and enforcement activities. This would require a significant appropriation in advance of the VAT's startup to establish the VAT apparatus and for initial taxpayer education programs, and annual appropriations thereafter.

²⁸ The normal return to saving accrued in qualified retirement plans and certain other forms of saving is not taxed under the current income tax.

Parallel to the federal government's administrative apparatus, businesses and other entities would have to establish the internal systems needed to learn about and comply with the VAT. Small businesses would likely be allowed to exempt themselves from the VAT, but even businesses that choose exemption would have some compliance costs to learn about the VAT and determine whether exemption is in their best interests. Large businesses would all be directly involved in collecting and remitting VAT, or, if not subject to VAT, at a minimum in determining their eligibility for VAT refunds and filing refund claims. The commercial activities of nonprofits and governments would be subject to VAT, entailing compliance costs similar to those of any other business subject to VAT. Further, the excluded activities of governments and nonprofits would entail compliance costs similar to those of VAT-exempt businesses.

Administrative costs for the IRS and compliance costs for businesses and other entities would likely increase with exclusions from the base and other special provisions. Compliance rates, the fraction of tax liabilities voluntarily paid when due, would also likely be lower, since exclusions and other special provisions provide additional avenues for evading tax.

A national VAT could provide a template to help reform state and local retail sales taxes. It could be used to extend sales tax bases to apply to services purchased by households, to remove the cascading of tax that occurs from taxing sales between businesses, and to resolve the taxation of Internet and other remote sellers. These reforms would most easily be achieved if state and local sales taxes piggybacked on the national VAT. Combining administration of a national VAT and piggybacked state and local sales taxes would reduce compliance costs for businesses and total administrative costs for governments.

Appendix A

The Urban-Brookings Tax Policy Center Methodology for Distributing a VAT

Overview

The Urban-Brookings Tax Policy Center (TPC) methodology for measuring the distributional impact of a national VAT uses two separate approaches: one for estimating the long-run distributional impact of a VAT after its transitional effects have been fully realized and it has become a permanent part of the tax system, and another for estimating the transitional effects of a VAT when it is first imposed. The long-run methodology is designed to be consistent with existing practices for estimating the distributional effects of changes in the individual income, corporate income, and payroll taxes so that a VAT can be directly compared with other taxes, while also making improvements on previous long-run methods. The methodology for estimating transitional burdens is designed to address policy makers' concerns about the short-term effects of introducing a national VAT on certain populations, particularly older individuals who might be spending down their wealth and are therefore paying VAT on consumption out of prior income that has already borne income tax.

Because proposals for a VAT have not been under active consideration recently by either the Executive Branch or the Congress, the federal tax estimating agencies – the Department of the Treasury's Office of Tax Analysis (OTA), the Joint Committee on Taxation (JCT), and the Congressional Budget Office (CBO) – have not been required recently to estimate the distributional effects of a VAT. All the agencies have prepared such estimates in the past, but this previous work may not accurately reflect how the agencies would estimate the distributional effects of a national VAT today based on their current methodologies for performing distributional analyses.

TPC's proposed new methodology for distributing the impact of a VAT makes key improvements over past methodologies:

- It separates the analysis between fully phased-in effects and transitional effects;
- In the transition, it provides a new way of estimating the burden on existing wealth that captures how it varies with an individual's age and the projected spend down of this wealth;
- It holds real government spending constant after a VAT is implemented so that the net effects of the VAT on the federal deficit are properly measured; and
- It recognizes the fact that wage-indexed cash transfer payments, such as Social Security and unemployment compensation, bear a VAT burden in the long run.

Sources and Uses of Income

For the purposes of tax analysis, households differ among each other in two ways: how they allocate their income between consumption and saving (“uses”), and how they earn their income, such as from the wages earned from labor services or the interest, dividends, and capital gains earned as a return on capital (“sources”). A pure uses approach would distribute the burden of a VAT in proportion to the amount of taxable goods and services a household consumed relative to its income. A sources approach instead would analyze a VAT as a tax on income that would exempt current saving but also would tax net withdrawals from saving accounts. Because exempting saving is equivalent to exempting the “normal” (expected) return on saving, the sources approach distributes the burden of a VAT in proportion to the sum of labor compensation plus “supernormal” investment returns (profits above market expectations) but treats the normal return to saving as exempt.

In principle, the sources and uses approaches yield equivalent present value results over an individual’s lifetime, but in reality they have major practical and conceptual differences, and in a given year the two approaches can produce significantly different estimates of burden. Thus, the choice between the sources and uses method is a fundamental modeling decision. OTA and TPC have used a sources method to analyze the burden of consumption taxes such as a VAT.²⁹ A 1993 JCT pamphlet also recommended a sources approach, but JCT has not released any distributional estimates of a VAT since then.³⁰ A 1992 CBO study relied on a uses approach, but CBO also has not performed any recent distributional estimates of a VAT.³¹

In its new methodology, TPC for several reasons relies on a sources approach to distribute the burden of a VAT. First, the income data available from the Internal Revenue Service for the sources method is of higher quality for this purpose than the data on the ratio of consumption to income reported in the Consumer Expenditure (CE) survey. Second, all three federal agencies already use a sources method for analyzing the distribution of income and payroll taxes, so a distributional analysis of a VAT performed under the sources method would be comparable to analyses already done for other federal taxes and also would allow for a comparison of competing tax proposals. Third, all three federal agencies and TPC use some form of current income to measure economic well-being, and therefore the sources method properly aligns measures of tax burden and its timing with measures of income. TPC does, however, apply a uses method for estimating the effects of exempting selected goods and services from a VAT. The data in the CE were designed for measuring the consumer price index and therefore provide a good basis for measuring the composition of consumption by households at different income levels.

²⁹ See President’s Advisory Panel on Federal Tax Reform (2005) and Toder and Rosenberg (2010).

³⁰ See JCT (1993).

³¹ See CBO (1992).

Long-Run vs. Transitional Burdens

Standard distribution tables show estimates of the long-run burden of a tax or tax change – the burden after the tax or tax change has been in place for an extended period of time. In the long-run, when fully phased in, the burden of the VAT is borne in proportion to the sum of labor income, “supernormal returns” to capital, and cash transfer income, with adjustments for the effects of changes in relative prices of items of consumption, the decline in government spending associated with excluding government from the VAT base, reduced income and payroll tax receipts that occur because the VAT lowers wages and profits, and any rebate included in the policy to make the tax less regressive.

- Labor income. A VAT imposes a wedge between consumer and producer prices, reducing returns to labor and capital. So a portion of the VAT is borne in proportion to wages and other employee compensation. For consistency with how distributional analyses treat labor income under the income tax and consistency with the “cash income” measure used to rank units in the distribution tables, we distribute the VAT burden on earnings contributed to retirement accounts in proportion to withdrawals from retirement accounts (which represent the deferred value of prior contributions) and exclude contributions. Note that since employees must compete for jobs across all industries (including government), the VAT will reduce the return to labor in every industry whether or not the industry is subject to VAT. (In particular, government workers bear VAT burden the same as private sector workers even though governments do not pay VAT.)
- Capital income. A VAT exempts the portions of capital returns that reflect the time value of money and inflationary gains because it leaves unchanged the after-tax return to saving.³² The VAT base does, however, include “supernormal” returns; that is, returns in excess of the normal return to waiting. These returns are the portion of business profits due to economic rents, monopoly profits, and returns to labor services captured by entrepreneurs as profits instead of being paid to laborers as wages.³³
- Cash transfer income. In addition to returns to labor and capital, households may receive cash transfer payments. Most cash transfer payments (such as Social Security and unemployment benefits) are directly tied to wages, and the other cash transfer payments are likely to be adjusted if wages change. So, the reduction in wages following introduction of the VAT will reduce cash transfer payments over time (i.e., they will bear a VAT burden) as the computations that determine transfer benefits begin to reflect the reduction in wages due to the VAT. Eventually, when the VAT is fully phased in, all

³² Under a VAT, investments are expensed – the allowance of a credit for VAT paid on purchases of capital goods (and no capitalization of self-constructed capital assets, such as research and development). Expensing makes the after-tax return on saving equal to the pretax return: the government acts effectively as a partner in investments, contributing a share to the investment equal to the VAT rate and then capturing the same share of returns when they are eventually consumed.

³³ A VAT, like the income tax, also effectively exempts the portion of returns due to risk-bearing because the tax authority shares in both winnings and losings.

cash transfer payments will bear a full VAT burden. This fully phased in VAT burden on cash transfer payments is included in the distributional analysis paper, but the rebate in the third VAT option offsets this burden for all recipients of cash transfer payments.

- Relative prices. The broad VAT base includes most consumption goods and services, but excludes government-reimbursed health expenditures, education spending, expenditures on behalf of households by religious and nonprofit organizations, residential rents, and financial services provided without payment. The narrow VAT base also excludes food, private health expenditures, and spending on new housing and improvements to existing housing. Consumers of goods and services fully subject to VAT must pay VAT-inclusive prices, which differ from VAT-exclusive prices by the full amount of the VAT.³⁴ This means households bear relatively more or less VAT than the average household, depending on whether fully taxed goods and services they consume represent a larger or smaller share of their consumption than the share of the average household. Our distributional analysis takes these relative price effects into account by adding to or subtracting from each household's VAT burden depending on whether the household's consumption pays more or less tax than if the household's consumption mix was the same as that of the average household.
- Government spending offset. In addition to the net change in federal revenues, the VAT burdens households to the extent nominal federal spending is reduced to hold real spending constant, because this spending reduction represents a reduction in factor or cash transfer income. The burden of these lower wages and cash transfers is included in the distributional analysis.
- Income and payroll tax offsets. Because a VAT lowers household incomes, it also lowers income and payroll tax liabilities. This reduction in income and payroll tax liabilities offsets a portion of the VAT burden. We directly estimate this effect using TPC's tax model and include it in the distributional analysis.
- Rebate. The benefit of the VAT rebate in the third option is distributed in proportion to the amount of rebate received.

Estimates of transitional burdens make two major modifications to the long-run estimates. First, current wealth holders bear a lump sum tax on their wealth because a VAT base includes returns and spending from old wealth. TPC measures the burden of this tax as the estimated annual annuity from the returns and spending down of old wealth over a tax unit's expected lifetime. The burden is higher for individuals who spend down a larger fraction of their wealth and for those with a shorter remaining life expectancy. Second, the transitional burden measure treats receipts of indexed cash transfer payments, in particular Social Security benefits, as exempt. The nominal value of these benefits would be unchanged if wages fall (see below). And the benefits are indexed to the Consumer Price Index (CPI) so the Social Security benefits of current retirees

³⁴ A good or service must be "zero-rated" to be fully untaxed by a credit-invoice VAT.

are also protected if the VAT causes the consumer price level to rise. The new TPC methodology includes separate estimates of the long-run and transitional burdens.

Price Level

A national VAT would introduce a gap between the prices consumers pay for goods and services and the prices producers receive. Depending on how the Federal Reserve reacts, either consumer prices could rise or producer prices could fall. If consumer prices rise, the nominal value of labor (wages) and income from capital would not change but their real value (purchasing power) would fall. If instead consumer prices remain constant, then both the real and nominal values of wages would fall. The nominal value of equity capital (e.g. stocks and business assets that are not publicly traded) also would fall. Because contractual interest payments for debt capital are fixed in nominal terms, the entire transitional burden on old wealth would fall on equity owners.

All three federal agencies currently assume that real GDP and the overall price level remain constant in response to changes in tax law. However, in past work, both JCT and CBO have analyzed a VAT assuming it raises consumer prices. The assumption about the consumer price level mostly does not affect the real burden of a VAT. However, it does matter in the case of recipients of income that is fixed in nominal terms. Thus, in the transition, bond holders and recipients of un-indexed cash transfer payments bear no burden if consumer prices are unchanged, but do bear a VAT burden if consumer prices rise. The proposed new methodology assumes that consumer prices remain constant. It could be easily modified, however, to allow for an assumption that consumer prices rise when a VAT is introduced.

Appendix B

The Urban-Brookings Tax Policy Center Microsimulation Model

This Appendix provides a summary description of how the TPC model is constructed, how it is extrapolated to represent future years, the macro- and microeconomic assumptions used in modeling, and the definition of key terms used in the TPC model and in the tax law.

How the Model is Constructed

The TPC model is a “microsimulation” model, one that is based on records for individual taxpayer units. The basic microdata file used in the TPC model is the Public Use File (PUF) prepared by the Statistics of Income (SOI) Division of IRS. The PUF is a version of the annual SOI sample of individual income tax returns that has been processed to insure that the record for a specific taxpayer cannot be determined, so is smaller than the full SOI sample.³⁵ The full SOI sample is very large and highly stratified on income. In 2008 for example, the sample size was 329,000 returns (of 142.6 million returns filed), with sampling rates ranging from 0.1 percent (for income groups covering most filers) to 100 percent (for very high income groups).³⁶ The SOI file includes comprehensive data on the income reported on tax returns, as well as reported amounts for exemptions, deductions, income tax liability, tax credits, self-employment tax and tax payments. Sampling error for all common items is quite small because of the large sample size. Extensive testing of the data also reduces nonsampling error. The current TPC model is based on the 2004 PUF, and will be updated to the recently-released 2006 PUF.

The PUF for each year contains all of the information required to accurately compute individual income tax liability, and most of the information required to compute payroll taxes (only wage splits on joint returns, which can be imputed from other sources, is missing). These are the largest two sources of federal tax revenues, accounting for over 80 percent of the total. However, like the full SOI sample from which it is created, the PUF lacks basic demographic information, information on nontaxable forms of income including transfer payments, and information on savings, consumption and wealth. But the PUF does contain sufficient information to permit statistical matching to, or imputations from regressions on, other microdata files.

TPC supplements the PUF through matching and imputations to provide missing information. The most important statistical match is to the Current Population Survey (CPS), conducted annually by the Bureau of the Census in the U.S. Department of Commerce. The CPS is a monthly survey of a sample of about 57,000 households (representing 117.2 million households in 2008) that is stratified on area of residence and represents the civilian noninstitutional

³⁵ This processing is sometimes referred to as “disclosure proofing,” because it is designed to avoid disclosure (possible identification) of the tax return information for a specific taxpayer. The steps in this process include averaging certain data fields which might contain unique information that is publicly available (and therefore would identify a taxpayer) across multiple return records (called “blurring”), and subsampling returns that are sampled at very high rates in the SOI sample.

³⁶ For further information on the SOI sample see U.S. Department of the Treasury, *Individual Income Tax Returns, 2008* (2010).

population of the United States.³⁷ The primary purpose of the CPS is to obtain data on employment, unemployment, and other information related to employment such as hours worked, industry, occupation, and wages. The CPS also collects information on the demographic characteristics of the population, such as age, sex, race, marital status, educational attainment, and family structure. Further, in March of each year the CPS has a supplement that collects additional data on work experience, income, noncash benefits, and migration.

The basic steps in the statistical match to the CPS are to create tax units from the households on the CPS, and to conduct the match through a constrained matching technique (called predictive mean matching). TPC uses the resulting CPS match to impute nonfilers, age and gender, wage splits for married couples, cash and in-kind transfers, and employer coverage for health insurance. Through a similar process, TPC uses matching or regression imputations to other files to provide information on pension coverage and assets, the value of health insurance coverage, saving, consumption levels and shares among different goods and services, and wealth. Table B-1 summarizes the sources of data for the TPC microsimulation model.

The simulation portion of the model is a set of calculators – for individual income taxes, payroll taxes, and estate taxes – that use the information on the matched data file to calculate individual income, payroll (OASDI and HI) and estate tax liabilities under current law and under proposals. There is also a calculator for a portion of the VAT burden on relative prices, but the basic VAT calculations are performed “off-model” and attributed to specific forms of income. Corporate income tax calculations are also performed off-model, with the burden of current law or proposed changes attributed to capital income on the model for distributional estimates. The model also contains programs that gather the results of calculations and prepares tabular outputs.

Extrapolation of the Model

The PUF matched to the CPS and other files represents the entire population in the base year of the PUF. The current (2004 PUF-based) TPC model contains 162,000 unique taxpayer records.³⁸ This base-year data file is “aged” to future years based on forecasts and projections for the growth in income by type from the Congressional Budget Office (CBO), the growth in the number of tax returns filed from the IRS, and the demographic composition of the population from the Bureau of the Census.³⁹ Aging through the end of the budget period (which currently ends in 2020) is done in two stages. In Stage 1, dollar amounts for income, adjustments, deductions and credits are increased by their corresponding forecasted per capita growth rates. CBO provides forecasts for most major sources of income (such as wages, capital gains, interest, dividends, and Social Security benefits), so the per capita growth rates are based on these forecasted amounts. For other items that are

³⁷ The CPS also includes Armed Forces personnel living off post or on post with their families. For a full description of the CPS, see U.S. Department of Commerce, Bureau of the Census, “Current Population Survey, Annual Social and Economic (ASEC) Supplement” (2009).

³⁸ The file contains a total of approximately 200,000 records, since some records are split as part of the matching process.

³⁹ In some instances the PUF is “re-benchmarked” to the latest SOI data, based on published tables, so that the beginning point of the aging procedure is this re-benchmarked file.

Table B-1
Data Sources for the
Urban-Brookings Tax Policy Center Microsimulation Model

Model Component		Data Source
Base Microdata File		SOI (PUF)
Nonfilers		Statistical match to CPS, then identification of nonfiling units
Age and Gender		CPS match file
Wage Splits		CPS match file
Cash Transfers		CPS match file
In-Kind Transfers (except medical)		CPS match file
Pensions	Coverage	SIPP, PSID
	Assets	SCF (dc plans)
Health Insurance	Coverage	CPS match file
	Value	MEPS, benchmarked to NHA
Education		Imputed from NPSAS
Savings		Imputation from DYNASIM3
Consumption	Level	CE, benchmarked to NIPA
	Shares	CE
Wealth		SCF

Source: Jeffrey Rohaly, Adam Carasso and Mohammed Adeel Saleem, “The Urban-Brookings Tax Policy Center Microsimulation Model: Documentation and Methodology for Version 0304” (2005).

not separately forecast by CBO, TPC generally uses the CBO forecast for per capita personal income for the growth rate. In Stage 2, a linear programming algorithm is used to adjust the weights on each record so that aggregate targets for major sources of income, adjustments and deductions are hit. The distribution of total income or any source of income is not targeted.

Modeling Assumptions

The CBO macroeconomic forecast for the price level and output (GDP) under current law are assumed to be unchanged by any proposed change in taxes. So, no “macroeconomic feedback” effects are taken into account in revenue, distributional, or other estimates produced by TPC’s

model. This “macro static” assumption is the standard assumption for all the government agencies responsible for tax modeling -- the U.S. Treasury Department’s Office of Tax Analysis (OTA), the staff of the Congressional Joint Committee on Taxation (JCT), and the Tax Analysis Division in the Congressional Budget Office (CBO).

Microeconomic behavior, however, is assumed to be affected by proposed tax changes and is taken into account to the extent possible in revenue and other estimates (except distributional estimates; see below). “Micro dynamic” behavior may be of three types. First, taxpayers may simply change the timing of an action that affects their tax liability. For example, if tax rates are scheduled to increase next year, taxpayers may delay deductions such as charitable contributions and, if they can, speed up income such as capital gains realizations. Second, taxpayers may change the legal form in which they conduct transactions or business. For example, if IRA or 401(k) contribution limits are increased, some taxpayers may simply shift their savings from taxable accounts to an IRA or 401(k) without changing their level of savings. As another example, the relationship between the tax rates on corporations and on individuals (and specifically capital gains and dividends) may encourage some taxpayers to change the legal form of their business without changing the amount of business they do. Third, taxpayers may alter their mix of consumption, financial investment, or real investment without changing aggregate factor supplies (which would imply a change in real GDP, which is assumed to remain unchanged).

The TPC model contains two forms of microeconomic behavioral parameters to reflect the second and third types of behavior. One form is a response function for capital gains, and separately for “ordinary” (non-capital gains) income, to changes in tax rates. For capital gains, responsiveness to tax rate changes increases with the rate, while for ordinary income the response (the “taxable income elasticity”) does not change. The response to changes in tax rates on ordinary income is meant to represent various behavioral shifts, such as taking more compensation in the form of fringe benefits or consuming more deductible items, without being explicit about what those shifts are. A second form is specific responses to certain tax changes. For example, taxpayers are modeled as shifting taxable savings to pay down mortgages in response to proposed limitations on the mortgage interest deduction. Pure timing responses, the first type of behavior, are not incorporated in the model and have to be taken into account “off-model.”

As noted above, distributional analysis is performed without taking into account microeconomic behavior; the estimates are “static.”⁴⁰ Since taxpayers can avoid some of the effects of higher taxes through behavior, this static behavior assumption will overstate the burden of tax increases. However, this assumption will understate the benefit of tax cuts, since behavioral responses will allow taxpayers to take greater advantage of them. So, the static assumption is never quite right, but it provides consistent treatment of tax increases and tax decreases, which is particularly important in proposals that combine increases and decreases. Further, the static assumption allows direct comparisons of distributional estimates across proposals, which would not be possible if behavioral changes were included in the estimates.

⁴⁰ Note that while micro behavior is static, taxpayers are still allowed to optimize their tax calculation – for example, by switching from itemizing to taking the standard deduction.

Definitions of Tax Law and TPC Model Terms⁴¹

AGI (Adjusted Gross Income). The amount of income counted to determine a filing unit's tax liability, measured before subtracting personal exemptions and the standard or itemized deductions. AGI excludes certain types of income received (e.g., municipal bond interest, most Social Security income) or payments made (e.g., alimony paid, IRA deductions, moving expenses). (See also Taxable Income.)

Alternative Minimum Tax (AMT). A supplemental income tax originally intended to ensure that high-income filers do not take undue advantage of tax preferences to reduce or eliminate their tax liability. The most common "preference" items, however, are for state and local tax deductions, personal exemptions, and miscellaneous itemized deductions -- not items normally thought of as preferences or shelters. Increasingly, this complicated tax applies to middle-income filers, in part because its exemption was not indexed for inflation and in part because Congress did not adjust the AMT to coordinate it with the 2001-2003 (EGTRRA and JGTRRA) tax cuts.

Capital Gains. The difference between the purchase and sale price of capital assets net of brokers' fees and other costs. Capital gains are generally taxable upon sale (or "realization"). Long-term gains, those realized after a year or longer, are taxed at lower rates than short-term gains, which are taxed at the same rates as other ("ordinary") income, such as wages and salaries. Taxpayers can deduct up to \$3,000 of net losses (losses in excess of gains) each year against other income; taxpayers can carry over losses above that amount and deduct them from future gains.

Carryover of basis. Transfer of basis value to a person to whom assets are transferred. The basis of an asset equals its cost, with some adjustments for items like depreciation. When an asset is sold, the realized gain equal sales price less basis (e.g., General Motors stock bought for \$1,000 and sold for \$3,000 has a basis of \$1,000 and a gain of \$2,000). The federal estate tax not only imposes no tax on unrealized capital gains in the decedent's estate but also allows heirs to set the basis of an inherited asset equal to the asset's value on the date the decedent died. (In the example, the heirs get to treat \$3,000 as their basis even though no one ever paid tax on the \$2,000 of gains). Carryover of basis would require heirs to assume the decedent's basis for all inherited assets (\$1,000 in the example). Under current law, beneficiaries of gifts from living donors must carry over the donor's basis. However, EGTRRA temporarily eliminated the estate tax and required carryover of basis for the estates of people who died in 2010, but this treatment was eliminated (unless its application is elected by the estate's executor) by the tax cut extensions enacted at the end of 2010.

Cash Income. A broad income concept used for distribution tables similar to the measures used by the Joint Committee on Taxation and Treasury's Office of Tax Analysis. Cash income equals adjusted gross income (AGI) minus taxable state and local tax refunds, plus total deductions from AGI (IRA deductions, student loan interest deduction, alimony paid, one-half of self

⁴¹ The entries, with some updates, are from the TPC Glossary at <http://www.taxpolicycenter.org/briefing-book/glossary/definitions.cfm>.

employment tax, moving expenses, penalty on early withdrawal of savings, self-employed health insurance deduction and medical savings account deduction, Keogh and self-employed SEP, and SIMPLE plans), non-taxable pension income, tax-exempt interest, non-taxable social security benefits, cash transfers, workers' compensation, employers' contribution to tax deferred retirement savings plans, employers' share of payroll taxes, and corporate tax liability.

Charitable Deductions. Deductions allowed for gifts to charity. Since 1917, individual federal taxpayers have been allowed to deduct gifts to charitable and certain other nonprofit organizations. Corporations are also allowed a deduction under a stricter limit. Among other reasons, the deduction was intended to subsidize the activities of private organizations that provide viable alternatives to direct government programs.

Child and Dependent Care Credit (CDCTC). A tax credit based on eligible child care expenses incurred by some taxpayers deemed to be gainfully employed or students. The credit varies with the expenses incurred, the number of eligible children, and the taxpayer's AGI. A separate exclusion is available for some employer-provided child care.

Child Credit (CTC). A tax credit of \$1,000 per qualifying child (in 2010, scheduled to revert to \$500 at the end of 2012). The credit is partially refundable for filers with earnings over a threshold, with the refundable portion limited to 15 percent of earnings above the threshold. This form of refundability is scheduled to expire at the end of 2012, leaving refundability only in limited instances for families with three or more children.

Consumer Price Index. A measure of the change over time in the prices, inclusive of sales and excise taxes, paid by urban households for a representative market basket of consumer goods and services.

Consumption Tax. Tax on based on consumption of goods or services. Term often applied to sales taxes such as a retail sales tax or value-added tax (VAT), but the term applies to any tax that exempts net saving from the base. Consumption taxes can be collected wholly from retailers (such as the retail sales taxes levied by U.S. state and local governments), from all businesses on the difference between their sales and purchases (such the "value-added taxes" imposed by national governments throughout the world, with the notable exception of the United States), from businesses and wage earners (such as the "flat tax" and "X-tax", which are bifurcated value-added taxes with the labor portion of value-added collected from individuals instead of businesses), and a consumed income tax (an income tax with a deduction for net saving). The common feature that distinguishes consumption tax from an income tax is that under a consumption tax purchases of assets are immediately deductible, whereas under an income tax purchases of assets are capitalized with their costs deducted only as they decline in value.

Corporate Income Tax. A tax levied on corporate profits. A corporation's taxable income is its total income minus allowable current expenses and capital depreciation.

Deduction. A reduction in taxable income for certain expenses. Some deductions, such as that for contributions to an Individual Retirement Account (IRA), are "above the line" meaning they are available to all taxpayers with the qualifying expense. Most deductions in the federal income

tax, such as those for home mortgage interest and state and local taxes, are only available to those who itemize deductions. Most taxpayers choose not to itemize and instead claim the standard deduction because it provides a greater tax benefit. Because marginal tax rates increase with taxable income, deductions benefit high-income more than low-income taxpayers. Deductions cannot reduce taxable income below zero.

Dependent. An individual supported by a tax filer for over half of a calendar year. Federal tax law stipulates five tests to determine whether a filer may claim someone as a dependent and thus qualify for an exemption: a relationship test, a joint return test, a citizen-or-resident test, an income test, and a support test. In 2010, a tax filer may reduce taxable income by \$3,650 for each dependent exemption.

Depreciation. A measurement of the declining value of assets over time because of physical deterioration or obsolescence. Taxpayers may use “facts and circumstances” to claim when assets depreciate, but typically tax depreciation is calculated by a schedule of deductions, usually over the asset’s “useful life” as specified in the tax code, through which the full cost of an asset can be written off. Accelerated depreciation means a speed-up in deductions so that more can be taken in earlier years compared with taking the same amount of depreciation in every year (called straight-line depreciation).

Earned Income Tax Credit (EITC). A refundable tax credit that supplements the earnings of low-income workers. The credit is a fixed percentage of earnings up to a base level, remains constant over a range above the base level (the “plateau”), and then phases out as income rises further. Those income ranges depend on both the taxpayer’s filing status and number of children in the taxpayer’s family. In contrast, the credit rate depends only on the number of children. Married couples with two or more children ordinarily receive the largest credit, a maximum of \$5,036 in 2010, but families with three or more children can receive up to \$5,666 under a temporary provision. Childless workers get the smallest credit, no more than \$457 in 2010. Originally enacted in 1975, the EITC is now the largest federal means-tested transfer program.

Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA). A tax bill that reduced most tax rates, increased the child tax credit and made much more of it partially refundable, expanded tax-free retirement savings, reduced marriage penalties, increased the child and dependent care tax credit, and phased out the estate tax. Most provisions were scheduled to phase in slowly between 2001 and 2010 and then to expire at the end of 2010, but the expiration date has now been extended to the end of 2012. JGTRRA (see below) accelerated some of the EGTRRA tax cuts and added others.

Estate Tax. A tax levied on the value of a person’s estate at the time of his or her death. The federal estate tax applies only to large estates, those worth over \$3.5 million for people dying in 2009, with a top rate of 45 percent. No tax is owed on transfers to spouses or to charities and special provisions apply to farms and small businesses. The tax disappeared entirely in 2010 (with carryover basis, however, unless an election is made by the estate’s executor), applies to estates worth over \$5 million for people dying in 2011 and 2012 with a top rate of 35 percent, and will then revert in 2013 to the provisions in 2001 law (exemption of \$1 million and a top rate of 55 percent). (See also Carryover of Basis and Gift Tax.)

Federal Fiscal Year (FY). The period commencing October 1 and ending September 30 of the following year. For example, fiscal year 2011 runs from October 1, 2010 to September 30, 2011. Prior to 1976, the fiscal year ran from July 1 through June 30. A transition quarter was used in 1976 to bridge the gap between FY 1976 and FY 1977.

Filing Status. All income tax filers fall into one of five categories, depending on their marital status and family structure. A single person without children files as a single; a single parent with dependent children files as a head of household; a married couple, with or without children, files either as "married filing joint" or "married filing separate"; and a recent widow(er) may file as a qualifying widow(er), which is the same, in effect, as "married filing joint." All filers face the same rate schedule but bracket-widths, standard deduction amounts, and qualification criteria for certain credits and deductions vary by filing status.

Flat Tax. A proposal for fundamental tax reform that would replace the income tax system with a single-rate (or flat-rate) tax on businesses and individuals. Most flat tax proposals are designed to be consumption rather than income taxes, and most are really not "flat" because they grant an exemption at least for the first dollars of earnings.

Gift Tax. A tax levied on gifts in excess of a specified threshold. Any tax still due must be paid when the donor dies and is incorporated into the decedent's estate tax. (See also Estate Tax.)

HI (Medicare Part A Hospital Insurance). Medicare is a program administered by the federal government that provides health insurance to people aged 65 and over, as well as some younger than 65 who meet special criteria. The Hospital Insurance benefit covers inpatient hospital stays as well as certain skilled nursing facility stays.

Indexation. Annual adjustments to various parameters in the tax code to account for inflation and prevent bracket creep. Since 1981, many features of the federal individual income tax, including personal exemptions and tax brackets, have been indexed for inflation based on changes in the Consumer Price Index. For instance, with 5 percent inflation, a personal exemption of \$1,000 would be raised to \$1,050. More broadly, the term applies to all efforts to adjust measures of income to account for the effects of price inflation.

IRA (Individual Retirement Account). Retirement accounts funded by individuals through their own contributions or by rolling over benefits earned under an employer-sponsored plan. Typically, contributions to IRAs are deductible, income accrues within IRAs tax-free, and distributions from IRAs are fully taxable. For a Roth IRA, contributions are not deductible, income accrues tax-free and distributions are also tax-free.

Itemized Deductions. Particular kinds of expenses that taxpayers may use to reduce their taxable income. The most common itemized deductions are for state and local taxes, mortgage interest, charitable contributions, medical expenses, and specified miscellaneous expenses. (See also Standard Deduction.)

Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA). The 2003 tax act that accelerated the phase-in of tax rate reductions scheduled under EGTRRA, reduced the tax rates applicable to capital gains and dividends, accelerated increases in the child credit amount, and temporarily raised the exemption amounts for the alternative minimum tax (AMT). Most provisions were scheduled to expire at the end of 2010, but the expiration date has now been extended to the end of 2012. The temporary increase in the exemption amounts for the AMT under JGTRRA have been extended several times and are now scheduled to expire at the end of 2011.

Marginal Tax Rate. The additional tax that would be paid on an additional dollar of income. It is a measure of the effect of the tax system on incentives to work more, save more, and shelter more income from tax. Provisions such as the phase out of tax credits can cause marginal tax rates to differ from statutory tax rates.

Marriage Bonus. The reduction in tax that a married couple owes because they may file as a couple rather than separately. Marriage bonuses result from the combination of treating a family as a single tax unit and progressive tax rates. In general, couples in which spouses have quite different incomes receive marriage bonuses. (See also Marriage Penalty.)

Marriage Penalty. The additional tax that a married couple pays because they must file as a couple rather than separately. Marriage penalties result from the combination of treating a family as a single tax unit and progressive tax rates. In general, couples in which spouses have similar incomes incur marriage penalties. (See also Marriage Bonus.)

Nonfilers. Persons or households who do not file tax returns. Nonfiling tax units -- that is nonfilers grouped together as they would if they filed income tax returns -- are included in the TPC database to get a complete picture of all households, not just those who file income tax returns. Most nonfilers do not work; many are elderly.

Nominal Income. Income that has not been adjusted for inflation and the consequent decrease in its value. (See also Real Income.)

OASDI (Old Age, Survivors, and Disability Insurance). The Social Security programs that pay monthly benefits to retired workers and their spouses and children, to survivors of deceased workers, and to disabled workers and their spouses and children.

Payroll Taxes. Taxes imposed on employers, employees, or both that are levied on some or all of workers' earnings. Employers and employees each pay Social Security (OASDI) taxes equal to 6.2 percent of all employee earnings up to a cap (\$106,800 in 2010) and Medicare (HI) taxes of 1.45 percent on all earnings with no cap. Those taxes are referred to by the names of their authorizing acts: FICA (Federal Insurance Contributions Act) or SECA (Self-Employment Contributions Act), depending on the worker's employment status. Employers also pay State and Federal Unemployment Taxes (SUTA and FUTA) that cover the costs of unemployment insurance.

Personal Exemption. A per person amount of income that is shielded from income tax. In calculating taxable income, tax filers may subtract the value of the personal exemption times the number of people in the tax unit. The personal exemption (\$3,650 in 2010) is indexed for inflation to maintain its real value over time.

Poverty Guidelines. Income levels used to determine eligibility for participation in means-tested federal programs. The guidelines equal a base amount for each household plus a constant additional amount for each household member. One set of guidelines applies to the contiguous 48 states; Alaska and Hawaii each has its own set, as do U.S. territories. The guidelines are indexed annually to the Consumer Price Index. (See also Poverty Levels.)

Poverty Levels. (also called "poverty thresholds") The level of pre-tax cash income below which a family is considered to be officially "poor." Thresholds vary by family size, age of head, and number of children. When established in 1965, the thresholds were set at three times the cost of a minimally adequate diet and indexed annually for changes in the price of food. (See also Poverty Guidelines.)

Progressivity. A measure of how tax burdens increase with income. A progressive tax claims a proportionately larger share of income from higher-income than from lower-income taxpayers. Conversely, a regressive tax takes a larger share of income from lower-income households than from higher-income ones. Taxes that claim the same percentage of income from all taxpayers are termed "proportional."

Real income. The value of income after accounting for inflation. Real income is usually calculated by subtracting inflationary income (e.g., capital gains due to inflation) from nominal income. (See also Nominal Income.)

Refundable Tax Credit. A tax credit payable even if it exceeds an individual's tax liability. Tax credits may generally be used only to reduce positive tax liability and are limited to the amount of tax the individual otherwise would owe. Unlike other tax credits, the refundable portion of a tax credit is scored as an outlay in government budget accounts -- that is, it is treated the same as direct spending. (See, for example, Earned Income Tax Credit.)

Standard Deduction. A deduction that taxpayers may claim on their tax returns in lieu of itemizing deductions such as charitable contributions, mortgage interest, and state and local taxes. Typically, taxpayers with small deductible amounts that could be itemized choose to take the standard deduction. Single filers, heads of household, and married couples filing jointly have different standard deductions. Roughly two-thirds of tax filers claim a standard deduction. (See also Itemized Deductions.)

Tax Burden. The total cost of taxation borne by a household or individual. The burden includes not only the costs of taxes paid directly but also those taxes paid indirectly through lower wages or a reduced return on an investment. For example, in addition to the employee portion of payroll taxes, a worker may also bear the employer's share in the form of lower wages or fringe benefits.

Tax Expenditure. A revenue loss attributable to a provision of federal tax laws that allows a special exclusion, exemption, or deduction from gross income or provides a special credit, preferential tax rate, or deferral of tax liability. Tax expenditures often result from tax provisions used to promote social programs in place of direct spending.

Tax Filing Threshold. The level of income at which filing units of a specific size and filing status first pay a tax before considering tax credits. The amount varies with filing status, allowable adjustments, deductions, and exemptions. Tax credits can further increase the amount of untaxed income.

Tax Filers. Any tax filing unit that files a tax return. Tax filers differ from taxpayers in that many tax filers have no tax liability and file returns only to receive amounts withheld from their paychecks or refundable tax credits.

Tax Filing Unit. A tax filing unit consists of an individual or married couple that would-if their income exceeded the relevant filing threshold-be required to file an individual income tax return. The tax filing unit also includes any other persons who might be claimed as dependents on the unit's tax return. For example, a single person who files a tax return for herself is one tax unit, as is a married couple with three children that files one tax return for the whole family. In contrast, a family of three in which each parent files a return as "married filing separate" and the working child files a separate return is considered three tax units. (Note that the Tax Policy Center includes in its sample of "tax filing units" not only tax filers but also nonfiling individuals, families, and households -- that is, the groupings they would be in if they filed a tax return -- to get a more complete picture of how taxes affect the entire population.)

Tax Policy Center Microsimulation Model. A microsimulation model developed by the Tax Policy Center and based on data from the IRS Statistics of Income (SOI) public use files. TPC uses the model to estimate how proposals would affect revenue, the distribution of tax burdens, and incentives to work and save. It is very similar to the models used by the Treasury Department, the Joint Committee on Taxation, and the Congressional Budget Office.

Acronyms for Data Used in the TPC Model

CE	Consumer Expenditure Survey (conducted by the Census Bureau for the Bureau of Labor Statistics)
CPS	Current Population Survey (conducted by the Census Bureau)
DC	Defined contribution retirement plan (such as a 401(k))
DYNASIM3	Dynamic Simulation of Income Model (an Urban Institute microsimulation model)
EMTR	Effective marginal tax rate
MEPS	Medical Expenditure Panel Survey (conducted by the Agency for Healthcare Research and Quality)
NHA	National Health Accounts (prepared by the Centers for Medicare & Medicaid Services)
NIPA	National Income and Product Accounts (produced by the Bureau of Economic Analysis)

NPSAS	National Postsecondary Student Aid Study
PSID	Panel Survey of Income Dynamics (conducted by the Survey Research Center, Institute for Social Research, University of Michigan)
PUF	Public Use File (prepared by the IRS Statistics of Income Division)
SCF	Survey of Consumer Finances (conducted by the Board of Governors of the Federal Reserve System)
SIPP	Survey of Income and Program Participation (conducted by the Census Bureau)
SOI	Statistics of Income (Division of IRS)
SSA	Social Security Administration

References

- Auerbach, Alan J. and William Gale. The Federal Budget Outlook, Chapter 11. Washington, D.C.: The Brookings Institution, 2010.
- Bipartisan Policy Center. Debt Reduction Task Force. *Restoring America's Future*. Washington, D.C., 2010.
- Congressional Budget Office. Effects of Adopting a Value-Added Tax. Washington, D.C., 1992.
- Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2011 to 2021. Washington, D.C., January 2011.
- Congressional Budget Office. CBO's 2011 Long-Term Budget Outlook. Washington, D.C., June 2011.
- Congressional Budget Office. Federal Debt and the Risk of Fiscal Crisis. Washington, D.C., July 27, 2010. Economic and Budget Issue Brief.
- Durner, Leah and Jon Sedon. VAT Administration: Issues and Enforcement. *Tax Notes* (July 26, 2010): 431-438.
- Durner, Leah, Jon Sedon and Lisa Kothari. VAT Compliance: The Taxpayer's Perspective. *Tax Notes* (October 11, 2010): 245-250.
- Gale, William G. The Required Tax Rate in a National Retail Sales Tax. *National Tax Journal* 52 (September 1999): 443-457.
- Hellerstein, Walter and Harley Duncan. VAT Exemptions: Principles and Practice. *Tax Notes* (August 30, 2010): 989-999.
- Joint Committee on Taxation. Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens. Washington, D.C., 1993. JCS-7-93.
- Joint Committee on Taxation. Estimated Budget Effects of the "Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010," Scheduled for Consideration by the United States Senate. Washington, D.C., 2010. JCX-54-10.
- Joint Committee on Taxation. Technical Explanation of the Revenue Provisions Contained in the "Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010," Scheduled for Consideration by the United States Senate. Washington, D.C., 2010. JCX-55-10.
- Merrill, Peter R. and Chris R. Edwards. Cash-Flow Taxation of Financial Services. *National Tax Journal* 49 (September 1996): 487-500.

President's Advisory Panel on Federal Tax Reform. *Simple, Fair, and Pro-Growth: Proposals to Fix America's Tax System*. Washington, D.C., 2005.

Rohaly, Jeffrey, Adam Carasso and Mohammed Adeel Saleem. The Urban-Brookings Tax Policy Center Microsimulation Model: Documentation and Methodology for Version 0304. Washington, D.C.: Urban-Brookings Tax Policy Center, 2005.

The National Commission on Fiscal Responsibility and Reform. *The Moment of Truth*. Washington, D.C., 2010.

Toder, Eric. What is the Tax Gap? *Tax Notes* (October 22, 2007): 1-12.

Toder, Eric and Joseph Rosenberg. Effects of Imposing a Value-Added Tax to Replace Payroll Taxes or Corporate Taxes. Washington, D.C.: Urban-Brookings Tax Policy Center, 2010.

Toder, Eric, Jim Nunns and Joseph Rosenberg. Methodology for Distributing a VAT. Washington, D.C.: Urban-Brookings Tax Policy Center and The Pew Charitable Trusts, 2011. <http://www.taxpolicycenter.org/UploadedPDF/1001533-Methodology-Distributing-VAT.pdf>

Toder, Eric, Jim Nunns and Joseph Rosenberg. Using a VAT to Reform the Income Tax. Washington, D.C.: Urban-Brookings Tax Policy Center and The Pew Charitable Trusts, Forthcoming in 2011.

U.S. Department of Commerce, Bureau of the Census. Current Population Survey, Annual Social and Economic (ASEC) Supplement. Washington, D.C., 2009.

U.S. Department of Commerce, Bureau of the Census. State and Local Government Finances by Level of Government and by State: 2007-08. Washington, D.C., 2010.

U.S. Department of Commerce, Bureau of Economic Analysis. National Income and Product Accounts (NIPA). Washington, D.C. <http://www.bea.gov/national/>.

U.S. Department of the Treasury. Internal Revenue Service. Statistics of Income Division. *Individual Income Tax Returns, 2008*. Washington, D.C., 2010.