Methodology for Distributing a VAT

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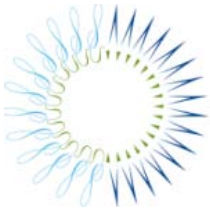

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I. Introduction

A value-added tax (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 countries in the Organization for Economic Co-operation and Development (OECD) and other major countries the United States is alone in not imposing a VAT. Large current federal deficits and forecasts of large future deficits, leading to unsustainable debt levels, have renewed interest in the VAT as a possible revenue source for the United States.[1] A key aspect of the consideration of a U.S. VAT is its distributional effects – the economic burden a VAT would place on households with different levels of income and, within income groups, the economic burden placed on households with different demographic characteristics, such as age of the head of household.

This paper examines the methodology for distributional analysis of a VAT and presents a revised methodology that would improve the analysis. Current methodologies for distributing a VAT are based on either the manner in which households earn income (the "sources method") or on the relationship of households' current consumption to income (the "uses method"). The U.S. Department of the Treasury's Office of Tax Analysis (OTA) and the Urban-Brookings Tax Policy Center (TPC) generally have based their analyses on the sources method. The Congressional Joint Committee on Taxation (JCT) and the Tax Analysis Division of the Congressional Budget Office (CBO) have not recently published distributional analyses of a broad-based consumption tax like a VAT. But earlier work by JCT proposed using the sources method while CBO in the past relied on the uses method.

The revised methodology developed by TPC presented in this paper is based on the sources method for both practical data and conceptual reasons but would improve on prior implementations of the sources method in three key ways:

> First, it provides for separate analyses of the fully phased-in distributional effects of a VAT and the distributional effects during the transition following adoption of the VAT. For consistency with the methods used to distribute the burdens of other taxes, we use the fully phased-in effects as the standard method for estimating the distribution of a VAT.
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> Second, it explicitly takes into account the full effect of the VAT on both other government revenues and government spending, and holds real government spending constant. This adjustment is necessary because a VAT and other indirect business taxes, unlike payroll and income taxes, may directly alter the cost to governments for goods, services, labor compensation and transfer benefits.
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> Third, it includes operational measures for estimating "supernormal" returns to capital (profits from highly successful investments, the only portion of capital returns that bears the

[1] For example, the November 2010 final report of the Deficit Reduction Task Force of the Bipartisan Policy Center (*Restoring America's Future*) included a recommendation for adoption of a "deficit-reduction sales tax" that was structured as a VAT.

burden of a VAT in the long run) and for the higher burden on capital in place when the VAT goes into effect (the "transitional" burden).

These improvements should provide greater clarity and precision about the likely changes in households' well-being if a VAT were adopted in the United States.

The remainder of the paper is organized as follows. Section II describes in some detail the various sources and uses of income, and how sources and uses must be taken into account in distributional analysis. Section III discusses the base of a VAT, possible effects of a VAT on the consumer price level and on relative prices, how a VAT would affect sources and uses of income and the effect of a VAT on government revenues and spending. Section IV reviews methods used in distributional analysis generally, including analysis of consumption taxes like a VAT, and briefly describes the microsimulation models used in these analyses by OTA, JCT, CBO and TPC. Section V discusses considerations in choosing between sources and uses methods for analyzing the distributional effects of a VAT. The final section describes TPC's revised methodology, presents estimates of the distribution of a VAT and illustrates how the revised methodology affects the distributional results. Appendix A provides a mathematical derivation and numerical examples showing the life cycle equivalence of the sources and uses methods. Appendix B provides summary tables describing the general and current VAT distributional methods and the microsimulation models used by OTA, JCT, CBO and TPC. Appendix C describes the various sources of aggregate and micro data necessary to distribute a VAT – income, saving, consumption and wealth.

II. Sources and Uses of Income and the Incidence of Taxes

Each stage of the production and distribution of goods and services requires the time, effort and skill of workers ("labor"), as well as the time and embedded technology of equipment, structures, inventories and intangibles like patents ("capital"). Businesses compensate workers for their labor inputs through the payment of wages and other earnings, and through the provision of nonwage benefits such as health insurance and contributions to retirement accounts. Businesses compensate debt-financed capital through payments of interest, and equity-financed capital through payments (or accumulation) of profits. Capital must also earn an amount sufficient to cover the loss in its value over time due to depreciation – wear and tear, technical obsolescence and aging. In addition to compensation for labor and capital they currently supply, individuals may receive income that does not represent current production. Most of these "cash transfer payments," such as social security benefits, represent payments based on an individual's prior wages.

Household income from labor, capital and cash transfer payments may be used for current consumption or saved for consumption in the future. Taxes can affect households by reducing the amount of income they receive (i.e., by directly reducing income by source), or by reducing the amount of current or future consumption that can be financed from their income (i.e., by increasing the cost of uses of income, which is equivalent to reducing the purchasing power of sources). In practice, no tax reduces all sources, or all uses, of income uniformly, and some tax provisions may apply to a source or use in advance or with a delay. It is therefore necessary for

distributional analysis to determine the effect of a tax on each source or use of income, the timing of tax effects, and how these various effects apply across households given differences in their sources and uses of income.

Tax Incidence on Sources and Uses

Taxes are imposed by law on various sources and uses of income. The corporate income tax applies to corporate profits, the individual income tax to most income received by individuals, payroll taxes to most wages and self-employment earnings, excise taxes to specific products, broad-based consumption taxes (such as a VAT and sales taxes) to a wide range of consumer goods and services, and both property and estate taxes to certain forms of wealth, which represent accumulated savings. The statute imposing a tax specifies how much tax is imposed (the base and rate of tax), when the tax is due and who is liable for payment of the tax.

The statutory specification of a tax is related to, but may differ significantly from, the economic effects of a tax. Distributional analysis measures the economic burden of a tax – when and by how much each household's income sources and uses are reduced by the tax. For example, although the corporate income tax is statutorily imposed on corporate profits, the economic burden of the corporate income tax is shifted over time to other forms of capital income and possibly to labor income. So, a critical aspect of distributional analysis is to determine the economic incidence of each tax on sources and uses of income. The economic incidence of a VAT is examined in detail in Section III. The remainder of this section examines a key reason for differences in households' sources and uses of income – the typical pattern of earning and spending income over individuals' life cycles.

Life Cycle Patterns of Income Sources and Uses

The primary source of income for young adults is wages. As they advance in their careers, individuals' wages rise, but they also likely receive health and retirement fringe benefits and have growing amounts of capital income as their savings accumulate. After retirement, individuals continue to receive capital income, but the amount declines as savings are drawn down while Social Security benefits begin and represent a large share of income for many older adults. Within these broad patterns, of course, there is significant variation among individuals at any age and differences over time due to changes in demographics, technology and international trade in goods and investment.

Uses of income also follow typical patterns over lifetimes.[2] Young adults on average spend a larger share of their disposable income than older individuals on food (particularly food away from home – restaurant and fast-food meals), clothing, rental housing, and the purchase and operation of motor vehicles. Middle-age individuals spend a somewhat smaller share on food and clothing, and more on mortgages (rather than rental housing) and healthcare. Older individuals typically spend a larger share on property taxes and utilities, and considerably more on healthcare, than the middle-aged. As with sources, there is significant variation within these patterns at any age and over time.

[2] The following description of consumption patterns by age are based on Table 3 from the U.S. Bureau of Labor Statistics, Consumer Expenditure Survey for 2008, available at http://www.bls.gov/cex/tables.htm.

As noted above, income, payroll and consumption taxes impose economic burdens only on certain sources and uses of income, so will have different effects on typical individuals at different stages of their life cycles. Distributional analysis must therefore properly reflect how tax burdens change with variations in the sources and uses of income across and within individuals' life cycles.

III. The Effect of a VAT on Sources and Uses of Income[3]

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, a VAT is collected incrementally at each stage of the production and distribution of goods and services. Every business charges VAT on its sales but is allowed a credit for the VAT it pays as a part of its purchases from other businesses.[4] The net amount of VAT paid by the business is therefore the tax on the difference between its sales and its purchases from other businesses. This difference is "value added," the amount that a business pays to labor and owners of 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.

As discussed in the previous section, under our current tax system certain payments to labor and capital are subject to income and payroll taxes, certain forms of wealth are separately taxed, and certain goods and services are subject to tax. In addition, some households receive government cash and in-kind transfer payments, which are not payments for current production. Taking taxes and transfers explicitly into account, the defining equation between sources and uses of income becomes:

Labor Income + Capital Income + Transfers – Taxes = Consumption + Saving

Rearranging this equation shows the equivalence of consumption and income after taxes less saving:

Labor Income + Capital Income + Transfers – Taxes – Saving = Consumption

This equivalence provides two basic methods for analyzing the distributional effects of a VAT:

- As a tax on sources of income (after tax), with a deduction for saving, or

[3] Many of the issues discussed in this section are covered in "On the Incidence of Consumption Taxes" and "Fundamental Issues in Consumption Taxation" in Bradford (2000).

[4] This description is of a "credit-invoice" VAT, the type of VAT used in all countries except Japan. All VATs in place are "destination based," which means they only apply where consumption occurs. Therefore the VAT rate on exports is zero, and exporters receive a refund of VAT paid on their purchases while imports are taxed at the time of importation or on subsequent sale (because VAT would apply to the sale and there would be no VAT at the time of import). The discussion abstracts from border adjustments, which generally have no effect on the distributional analysis.

- As a tax on the use of income for consumption.

Distributing a VAT by the sources method differs to some degree from distributing the current individual income tax. The income tax base in general includes both the normal return (the return for waiting), and any supernormal return (a return in excess of the normal return) to saving,[5] whereas a VAT effectively allows a deduction for saving which is equivalent to exempting the normal return to new saving (saving after imposition of the VAT). So the key differences between the income tax and VAT distributions is that the VAT base in the long run excludes all normal returns to investment, but during a transition period applies to the drawdown of past savings in addition to the returns to all savings that are also included in the income tax base. A VAT could also reduce some cash transfer payments during the transition and would reduce the real value of all cash transfer payments based on wages over time, whereas only unemployment benefits and a portion of Social Security benefits are taxable under the current income tax.

Distributing a VAT by the sources method is also similar to distributing the current payroll tax, in particular the Medicare (HI) portion, which has no wage cap. The key differences are that the VAT would apply to all fringe benefits (including fringe benefits that are exempt from the current payroll taxes) as well as to wages, would apply to supernormal returns to capital (a payroll tax exempts all capital returns), over time would apply to all cash transfer payments based on wages, and during a transition period, would apply to the normal return to old (pre-VAT) savings and the drawdown of those savings.

Using the sources method still requires taking into account any differences in the effect of the VAT on the relative prices of consumption items. (Relative price effects are automatically taken into account in the uses method.)

Transitional effects of changes in current taxes or from the introduction of a new tax are generally not included in standard distribution tables, which measure the effect on tax burdens as if the tax change or new tax had been in effect for an extended period of time, so that the effects of the new tax law were fully phased in. The standard distribution of a new VAT should therefore be based on the fully phased-in effects of the VAT and would exclude any transitional effects. However, the transitional burden of a VAT could be added to the standard distribution by showing the burden a VAT places on old saving under the sources method and the difference between the short- run and fully phased in effect of the VAT on cash transfer payments under both the sources and uses method.

The Effect of a VAT and Changes in the Price Level

A VAT taxes all consumer goods and services included in the VAT base. The prices that consumers pay for goods and services, which include the VAT, therefore, exceed the prices that producers (businesses) receive for them by the amount of the VAT. The VAT represents a "wedge" between the prices paid by consumers and the prices received by producers. At the time

[5] Important exceptions are that the current income tax base excludes from tax the return from savings within qualified retirement accounts and also provides preferential treatment for some other forms of income from savings including capital gains (allowing deferral of tax until realization and then taxing at a preferential rate) and interest from tax-exempt bonds.

a VAT was introduced, if the Fed did not allow the consumer price level to rise, this 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, but the burden on capital would fall entirely on owners of equities because owners of bonds receiving payments that are contractually fixed in nominal value would have unchanged real returns. As discussed more fully below, lower factor payments would reduce government revenues from other taxes and also reduce the nominal level of government spending required to hold real spending constant. Spending on cash transfer payments that are based directly or indirectly on wages would also fall over time as benefits for new beneficiaries reflected the fall in nominal wages.

If at the time a VAT was introduced the Fed did allow the consumer price level to rise, there would still be a wedge between consumer and producer prices, but producer prices and payments to labor and capital would not be reduced in nominal value. However, a higher consumer price level would mean that the purchasing (real) value of payments to labor and capital would fall by the amount of the VAT. With unchanged nominal factor payments, government revenues from other taxes would change only due to the indexation of certain tax parameters, and spending would be affected only if some portion was subject to VAT and, during the transition, by the indexation to consumer price level changes of (most) cash transfer payments for current beneficiaries. The real economic burden of the VAT, and its effect on government budgets, would be the same as it would be if the price level did not rise. However, a change in the consumer price level would change the transitional burden of the VAT in two ways: The burden on old savings would fall partially on owners of bonds (rather than only on owners of equities), and there would be a burden on those cash transfer payments that are not automatically adjusted (indexed) for changes in the consumer price level.

The federal agencies involved in the estimation and analysis of taxes – OTA, JCT and CBO – assume that the overall price level (the GDP deflator) and real GDP are unchanged from their forecast levels by any change in the tax system.[6] This assumption maintains consistency across tax estimates and between tax estimates and spending estimates. It is quite possible, however, that the introduction of a VAT would be accompanied by Fed action to allow the consumer price level to rise so that nominal returns to labor and old capital would not fall. TPC implements its revised methodology under the assumption that real GDP is unchanged and the Fed does not allow the consumer price level to change. The methodology can also be implemented under the assumption that the consumer price level rises (with the level of other prices reduced if the GDP deflator is assumed to be held constant).

The Effect of a VAT on Labor Income

Labor income consists of wages and employer-provided fringe (nonwage) benefits (employer contributions for health insurance, retirement accounts and other items). The income tax generally excludes employer contributions to health insurance and qualified retirement plans and some other employer-provided fringe benefits. It also excludes eligible employee contributions to retirement accounts (401(k)-type accounts and traditional IRAs) and the employee share of

[6] As discussed in Section IV, JCT and CBO did not strictly adhere to this standard assumption in their analysis of a VAT.

health insurance premiums that are made through cafeteria plans. However, the income tax on employer and employee contributions to qualified retirement accounts is only deferred, not permanently exempt, since withdrawals are taxable, so in present value the income tax does apply to contributions.[7] Still, the VAT base on labor income under the sources method is considerably broader than the current income tax base because it applies to health insurance premiums that are provided as a fringe benefit or paid from pretax dollars by employees. The payroll tax base also excludes employer contributions for health insurance and some contributions to retirement accounts (with no subsequent taxation of withdrawals), and the wage base for the tax used to finance old age, survivors and disability benefits (OASDI) benefits is capped. So the VAT base on labor income under the sources method is also broader than the current payroll tax base.[8] Note, however, that the effective VAT rate on sources depends on both the statutory rate and the share of consumption included in the VAT base, so it is lowered if some items of consumption are given preferential treatment under the VAT.

The value added taxed by a VAT includes labor compensation paid by most businesses but typically does not include labor compensation paid by nonprofits or by the federal, state and local governments because nonprofits and governments are largely not engaged in a business that would be subject to VAT.[9] However, even though the VAT would not apply directly to most labor compensation paid by nonprofits and governments, over time labor market competition would result in compensation being equalized across employees. Under the standard assumption for distributional analysis that the economic effects of taxes are fully phased in, the burden of a VAT is applied across all employees and all forms of employee compensation.

The Effect of a VAT on Capital Income

Capital income broadly consists of interest (the return to bond holders) and profit (the return to equity holders). The credit allowed for purchases of capital goods under a credit-invoice VAT is equivalent to allowance of a full deduction for business investments made once the VAT is in place ("new" capital). This deduction for investment in new capital, often referred to as "expensing," has the effect of exempting from VAT the portion of the return to capital for waiting, the "normal return" to capital.[10] The value of "old" capital (business capital in place when the VAT is introduced) is not deducted (or otherwise recovered) under a VAT absent special transition rules, so the returns to old capital are fully taxed, and the value of old capital must fall to reflect its differential tax treatment from new capital. Under the sources method the VAT base includes a declining share of the normal return to capital over time as old capital is consumed and replaced by new investment. Once a VAT is fully phased in, with all old capital consumed, there is no VAT burden on the normal return to capital. Bond holders generally earn only the normal return, but equity owners may also earn "supernormal" returns to capital –

[7] This assumes that an individual's income tax rate is the same when contributions and withdrawals are made. Investment income accrued within qualified retirement plans is tax-free.

[8] Similarly, the base for unemployment insurance taxes is also capped at a very low wage level and is much narrower than the VAT labor income base.

[9] Important exceptions are that nonprofit and government hospitals could be included in a VAT base, as could other commercial-type activities of governments, such as municipal water systems.

[10] Note that it is because old capital receives no expensing (or other cost recovery) that it is fully taxed under a VAT.

returns to successful risk taking, inframarginal returns and economic rent. [11] Supernormal returns are subject to VAT, both during the transition following the introduction of the VAT and when the VAT is fully phased in. [12] So the standard (fully phased in) VAT distribution would show no burden on the normal return to capital, but the same effective burden on supernormal returns to equity as apply to labor income.

The burden of the VAT on old capital is not uniform when the consumer price level is unchanged when the VAT is introduced, as assumed here. Individuals who have invested in bonds that have fixed interest rates will continue to receive the same nominal amount of income they received before the VAT was introduced, so with the consumer price level unchanged they suffer no economic burden from the VAT on their interest income from existing bonds. Equity owners, those individuals who invested in stocks and other forms of business equity, bear the entire transition burden of the VAT on old capital in proportion to their gross asset holdings through a reduction in the returns they receive from their existing equity investments or, if they dissave, through the reduced value of their equity holdings.[13]

The preceding discussion has focused on capital income from business assets. But consumer durables also generate capital income by providing services to consumers over time, unlike nondurables that are consumed when (or shortly after) they are purchased. The most important consumer durable is homes, which provide housing services to their owners over many years. In the National Income and Product Accounts (NIPA), homeowners are considered to be in the business of renting their home to themselves and this "(net) imputed rent" is included in the NIPA measure of income (see discussion in Appendix C). Similarly, furniture, appliances and other consumer durables provide services to their owners beyond the year they are purchased. None of the services provided by consumer durables is taxed directly under a VAT, so "old" consumer durables, those in existence when the VAT is introduced, do not bear any transition burden from the VAT. However, "new" consumer durables, including owner-occupied housing, are subject to VAT (unless there is zero-rating of sales of new homes and improvements to existing homes). Taxing new consumer durables when purchased is equivalent to subjecting the gross rental income they generate to the VAT. The effect of a VAT on consumer durables can therefore be reflected in distribution tables under the uses method as a tax on their purchase (i.e., including their purchase in consumption, even though economically they are capital goods), or by excluding their purchase from consumption and showing the tax on the services (gross rent)

[11] Some supernormal returns may be viewed as a return to the labor skill of extraordinarily talented individuals who develop new products, services and production processes and receive income in the form of profits from their entrepreneurial activities.

[12] A portion of the return-to-equity assets (and some low-graded bonds) represents compensation for the assumption of risk. Taxing this "risk premium" raises revenue but arguably imposes no net burden under either an income or consumption tax because the tax also reduces "after-tax" risk if there are full loss offsets. In general, distributional analysis of income taxes does not distinguish between the portion of the tax that represents "risk insurance" and the portion of the tax that falls on the risk-free return. TPC's proposed method treats this tax on risk-bearing the same way under a VAT as it is treated in the analysis of income tax burdens.

[13] Suppose, for an example, an individual holds $100,000 of stocks, which he financed in part with $40,000 of borrowing. If the price level rises, the owner of stock bears 3/5 of the transitional VAT burden on the $100,000 investment and the lender bears 2/5 (the debt share). In contrast, if the price level remains fixed and instead returns to capital fall, the owner of stock bears the entire transitional VAT burden. If, for example, the transitional burden is 10% of old capital, the equity owner must pay $10,000 on the $100,000 investment, about 16.7 percent of the $60,000 net equity holding.

that new consumer durables provide over their useful lives. The latter treatment corresponds to the sources method, under which conceptually the annual income used to pay for services of housing (and other consumer durables) is included in the base over time. In practice, however, most income measures used in distributional analysis, including TPC's "cash income" measure, do not include imputed rent on any consumer durable.

The Effect of a VAT on Transfer Payments

If, as assumed here, the consumer price level is unchanged when the VAT is introduced, nominal payments and the purchasing power of all cash transfer payments are unchanged, so they bear no transitional VAT burden. However, Social Security benefits and most other cash transfer payments are based directly or indirectly on wages, so over time change with the level of wages. Because wages fall when a VAT is introduced if the consumer price level is unchanged, these cash transfer payments will be lower for new beneficiaries because their benefits will reflect the reduction in wages. So, when fully phased in, a VAT will impose a burden on all cash transfer payments that are directly or indirectly based on wages.

In-kind transfer payments are assumed to be adjusted so that they purchase the same level of goods and services (e.g., medical care paid for through Medicare and Medicaid) as would have been purchased without the VAT in place (see discussion of government spending below). In-kind transfer payments bear no VAT burden during the transition or when the VAT is fully phased in.

The Effect of a VAT on Uses of Income

A VAT is a tax on consumption and can be analyzed directly as such. Information on consumption by characteristics of households is necessary to perform VAT distributional analyses by the uses method. In present value terms, over an individual's lifetime the uses and sources methods should show the same burden of a VAT. But the timing of VAT burdens year-by-year can be quite different between the two methods because in any year an individual or household may be saving out of income for future consumption and therefore consuming less than their current income, or drawing down savings accumulated from prior income (dissaving) and consuming more than their current income. In practice, further differences arise from the measurement issues raised by available household consumption data, which are discussed in Section V. The uses method also differs from the sources method in the relationship between the basis for distributing a VAT and the way households are classified in standard distribution tables and the comparability between the distribution of a VAT and the standard distribution of other taxes. These conceptual differences are also discussed in Section V.

No VAT in practice applies uniformly to all forms of consumption.[14] Some goods and services, such as education and health care, are typically excluded from the base of a VAT, and some countries exclude items such as food in order to mitigate the effect of a VAT on low-income workers. In addition, some countries have different rates of VAT on certain goods and services. Exemptions, preferential rates and certain other differential aspects of a VAT base all cause

[14] The New Zealand VAT (called GST, goods and services tax) is the closest; it applies to about 97 percent of consumption, including the services provided by government agencies.

relative VAT-inclusive (consumer) prices to differ from relative VAT-exclusive (producer) prices. For goods and services that are fully subject to VAT, consumer prices differ from producer prices by the full amount of the VAT. For goods and services fully untaxed by the VAT, consumer and producer prices are the same.[15] For a household, these differential price effects of a VAT mean that the household may bear relatively more or less of the VAT than the average household, depending on whether the household consumes more or less of the fully (or more heavily) taxed items than the average household. The uses method automatically takes into account any effects of the VAT on relative prices of different consumer goods. The sources method must likewise take these relative price effects into account. Further, as noted above, exemption, zero-rating or preferential tax rates on some items change the average effective rate of VAT on all consumption (uses) and therefore the corresponding average effective rate on sources.

The Effect of a VAT on Government Revenues and Spending

Effect on Revenues

A VAT would raise revenue for the federal government but would cause a reduction in revenues from other federal taxes and also in revenues from state and local taxes. The reason for these revenue reductions is that, as discussed above, the VAT wedge between consumer and producer prices will cause a reduction in returns to labor and capital if the consumer price level is unchanged, as assumed here. 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. OTA, JCT and CBO include offsets to capture this decline in federal income tax and payroll tax revenues in their estimates of revenue effects of taxes on consumption, such as a VAT or an excise tax. 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 because producer prices would be lowered by the VAT wedge between consumer and producer prices.[16] Property tax revenues would also fall, at least on business structures and other property subject to tax, since the VAT would reduce the cost of new business assets and the value of existing ("old") business assets.[17] A typical VAT base that exclude rents would not change the value of residential properties (including tenant-occupied housing) or property tax revenues from residential property, but a very broad VAT base (like the illustrative comprehensive VAT base analyzed in Section VI) would.

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 consumer price level rises when the

[15] For a good or service to be fully untaxed by a VAT, it must be "zero-rated," which means a VAT rate of zero applies to the seller, but the seller receives a refund for any VAT paid on its purchases from other businesses. The statement about equivalence between consumer and producer prices in this case assumes there are no other taxes on the good or service; the point is that the VAT does not create a differential.

[16] Some current sales tax statutes might require amendment to avoid application to VAT-inclusive prices, but it is assumed here that all state and local general sales taxes are based on sales at producer prices.

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

VAT is introduced. VATs and other consumption taxes typically apply only to consumption of goods and services produced in the private sector by businesses – food, clothing, housing, motor vehicles, etc. – and do not apply (or fully apply) to the provision of most services by governments – national defense, education, health, highways, etc.[18] For governments to be completely removed from a VAT, government provision of services must not bear VAT, and government purchases from businesses must also not bear VAT. In a credit-invoice VAT, this is done by "zero rating" government services, which means that government spending is subject to VAT at a rate of zero and the VAT paid on government purchases is rebated.[19]

Zero rating governments would not, in itself, remove the application of the VAT to consumption items provided by businesses, the cost of which is reimbursed by governments (in-kind transfers). Medicare and Medicaid are the most important examples of such in-kind government transfers, representing a significant share of household consumption as well as of government spending.

The effect of a VAT on government spending also depends on whether the consumer price level changes. If the consumer price level does not change, as assumed here, producer (pre-VAT) prices would fall as would wages and other forms of employee compensation. Therefore, nominal government spending on employee compensation would fall while holding the number and professional mix of employees constant. Likewise, spending on purchases from businesses (if governments are zero-rated) and in-kind transfers (for covered items not subject to VAT) would be at (now lower) producer prices, so this spending could also fall while holding real purchases constant. With the consumer price level unchanged, spending on cash transfer payments would not change due to price indexing (but would change over time due to wage indexing; see below). The nominal level of federal grants to state and local governments could fall because these grants finance state and local spending on compensation of employees, purchases from businesses and in-kind transfers, which would be reduced if the real level of such grant-financed spending were held constant. OTA, JCT and CBO do not include these spending offsets in their estimates for consumption taxes such as a VAT and excise taxes. Omitting these spending offsets might fail to capture the net budgetary effects of consumption taxes.

Social Security benefits and most other cash transfer payments are directly or indirectly based on wages and over time change with the level of wages. If the consumer price level is held constant when a VAT is introduced, wages will fall. Cash transfer payments will be lower for new beneficiaries because their benefits will reflect this reduction in wages. So over time, spending on cash transfer payments would decline. However, if nominal wages are unchanged when the VAT is introduced because the consumer price level increases, the nominal amount of spending on these cash transfers will eventually be unchanged from pre-VAT levels, but their real value will fall.

[18] VATs and retail sales taxes typically do apply to government enterprises, such as municipal water supply, that are similar to privately produced goods and services.

[19] In practice, taxing government agencies 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 or higher spending for compensation of employees and transfer payments, as discussed in Gale (1999). Including government spending in the VAT base, however, provides a better measure of the "true" cost of government services under a VAT.

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, any 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. Distributional analysis is intended to take into account only the effect of taxes on the well-being of households. To isolate this effect for a VAT, real government spending must be held constant; otherwise, the burden of the VAT will be misestimated. 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 payments. For the federal government, the effect of a VAT on real spending can be taken into account in setting the VAT rate, given the design of the VAT and any expected change in the consumer price level when the VAT is introduced. For example, if the VAT was intended to be a budget-neutral replacement for some or all revenue from one or more existing federal taxes, the VAT rate would be set so that federal revenues financed the same level of real spending (so, the deficit would be unchanged). If instead the VAT was intended to raise a set percentage of GDP for deficit reduction, the VAT rate would be set to achieve this target, taking into account any changes in spending required to hold real spending constant.

Real state and local government spending cannot be held constant by adjusting the VAT rate, but federal grants to state and local governments could be adjusted so that real state and local spending is held constant with no change in their surpluses or deficits. The net effect of the VAT on state and local budgets in the absence of a change in federal grants would be determined by any changes due to the VAT in their revenues and spending, given the design of the VAT and any change in the consumer price level. If the consumer price level did not change and state and local governments are zero-rated, as assumed here, the VAT would lead to state and local budget surpluses 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, sales and business (or total) property taxes.[20] In order to hold state and local government spending constant, it is assumed here that federal grants are adjusted to exactly offset this surplus (or to exactly offset any deficit that might arise because the consumer price level increased or state and local governments were not zero-rated).

A summary of the effects of a VAT on sources of income and on government revenues and spending is provided in Table 1. A key result illustrated in Table 1 is that, with the exception of debt returns to old capital and unindexed cash transfer payments during the transition, a decrease in the nominal value of an item with the price level unchanged (first two columns) is matched by a decrease in the real value of an item if the price level rises (middle two columns). Similarly no change in the nominal value of an item when the price level is unchanged is matched by no real change when the price level rises.

[20] 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 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/.)

Table 1

Changes in Real and Nominal Real After-VAT Amounts With or Without a Change in the Consumer Price Level During the Transition and When the VAT is Fully Phased In

(Guide: ↑ means increase, ↓ means decrease, – means no change, N/A means not applicable)

	Price Level Unchanged (Real & Nominal Change)		Price Level Rises			
			Real Change		Nominal Change	
	During Transition[1]	VAT Fully Phased In	During Transition[1]	VAT Fully Phased In	During Transition[1]	VAT Fully Phased In
Income						
Labor Income	↓	↓	↓	↓	–	–
Capital Income from:						
Old Capital:						
Equity Returns	↓	N/A	↓	N/A	–	N/A
Debt Returns	–	N/A	↓	N/A	↓	N/A
Principal Value	↓	N/A	↓	N/A	↓	N/A
New Capital:						
Normal Returns	–	–	–	–	–	–
Supernormal Returns	↓	↓	↓	↓	–	–
Social Security Benefits[2]	–	↓	–	↓	↑	–
Federal Budget						
Revenues:						
Income Tax	↓	↓	↓	↓	↓[4]	–[4]
Payroll Tax	↓	↓	↓	↓	–	–
VAT	↑	↑	↑	↑	↑	↑
Spending:						
Employee Compensation[3]	↓	↓	↓	↓	–	–
Purchases from Businesses[3]	↓	↓	↓	↓	–	–
In-Kind Transfers						
Items Not Subject to VAT	↓	↓	↓	↓	–	–
Items Subject to VAT	–	–	–	–	↑	↑
Cash Transfer Payments:						
Indexed for Prices	–	N/A	–	N/A	↑	N/A
Not Indexed for Prices	–	N/A	↓	N/A	–	N/A
Based on Wages	N/A	↓	N/A	↓	N/A	–
Not Based on Wages	N/A	↓[5]	N/A	↓[5]	N/A	–[5]
Grants to State and Local Governments	↓[6]	↓[6]	↓[6]	↓[6]	–[6]	–[6]
State and Local Budgets						
Revenues:						
Income Tax	↓	↓	↓	↓	–	–
Sales Tax	↓	↓	↓	↓	–	–
Property Taxes on Business Properties	↓	↓	↓	↓	–	–
Property Taxes on Residential Properties	–	–	–	–	↑	↑
Grants from the Federal Government	↓[6]	↓[6]	↓[6]	↓[6]	–[6]	–[6]
Spending:						
Employee Compensation[3]	↓	↓	↓	↓	–	–
Purchases from Businesses[3]	↓	↓	↓	↓	–	–
In-Kind Transfers						
Items Not Subject to VAT	↓	↓	↓	↓	–	–
Items Subject to VAT	–	–	–	–	↑	↑
Cash Transfer Payments:						
Indexed for Prices	–	N/A	–	N/A	↑	N/A
Not Indexed for Prices	–	N/A	↓	N/A	–	N/A
Based on Wages	N/A	↓	N/A	↓	N/A	–
Not Based on Wages	N/A	↓[5]	N/A	↓[5]	N/A	–[5]

[1] Transitional effects on cash transfer payments are shown for the first year of the VAT, before wage indexing affects benefit calculations.

[2] Effects for all forms of cash transfer payments are shown in government spending.

[3] Governments are assumed to be zero-rated.

[4] The adjustment would be one-time, so the revenue effect would shrink relative to total revenues over time.

[5] Although not based on wages, such transfer payments are likely to be statutorily adjusted with wages over time.

[6] Federal grants to state and local governments are assumed to be adjusted to hold real state and local spending constant.

For nearly all items the effects of a VAT are the same (in real terms) whether or not the price level changes. For old capital during the transition, equity returns and (dissavings from) the principal value of equity bear the burden of a VAT if the consumer price level is unchanged, but both equity and debt bear the burden if the consumer price level rises because they are both unchanged in nominal terms but reduced in real terms. (Supernormal returns to old capital are always borne by equity.) For returns to new capital both during the transition and when the VAT is fully phased in, normal returns are not taxed while supernormal returns are taxed (reduced in real value), regardless of whether the consumer price level changes. Unindexed transfer payments bear no VAT during the transition if the consumer price level is unchanged, but do bear VAT burden if the consumer price level rises. Effects on government revenues and spending follow from the changes in the consumer price level and factor incomes, and from holding real spending constant (with no change in government deficits or surpluses, apart from intended federal deficit reduction from a VAT).

IV. Distributional Analysis by OTA, JCT, CBO and TPC

This section provides an overview of distributional analysis by the U.S. Treasury Department's Office of Tax Analysis (OTA), the staff of the Congressional Joint Committee on Taxation (JCT), the Tax Analysis Division in the Congressional Budget Office (CBO) and the Urban-Brookings Tax Policy Center (TPC). The general distributional methodology and assumptions followed by each group is described as is the micro data used in their microsimulation models. The section then provides a more detailed description of the specific methods, assumptions and data each group has used in distributing a VAT or other broad-based consumption tax.

Overview of Distributional Analysis in OTA, JCT, CBO and TPC

Distributional analysis is intended to measure the effect of taxes on the economic well-being of individuals. Implementation of such a measure requires five key methodological decisions: (1) which taxes to include and their incidence; (2) the time period of analysis; (3) the unit of analysis; (4) the measure of economic well-being; and (5) the measure of tax burden (changes in economic well-being). These decisions are driven in part by the specific data available for the microsimulation models used in the analysis but are also matters of professional judgment.

The methodological and modeling decisions made by each group are briefly described below, with more detail provided in Appendix Table B-1. Note that the descriptions are based on publicly available materials from each group, so they may not reflect recent and unpublished changes in methodology and modeling, which could affect a group's distribution of a VAT.

Taxes included and incidence assumptions. All four groups include both the individual income tax and payroll taxes in their distributional analyses, and all use the same incidence assumptions for both taxes: The individual income tax is borne by those liable for it, and the payroll tax is borne in proportion to taxable wages. These two taxes combined represent more than 80 percent of federal tax revenues,[21] so the groups' baseline distributions of current taxes should be fairly

[21] The figure for FY2010 was 81.6 percent, computed from Table E-3 in CBO (2011).

similar. All groups except JCT include the corporate income tax, and their standard assumption is that it is borne by capital income. Only OTA and TPC include estate and gift taxes, which are assumed to be borne by decedents. All groups except TPC include excises, but OTA uses a "sources" approach to distribute excises, with an adjustment for relative price effects, whereas both JCT and CBO follow a "uses" approach. Only OTA includes customs duties.

Time period for analysis. Generally all groups use a one-year time period for analysis, although that year may differ across groups for analysis of the same proposal. The exceptions to a one-year period are the 10-year period used in OTA's panel model, the five-year period (constructed from five one-year periods) previously used by JCT, the multiple one-year periods that JCT currently provides for major legislation and occasional multi-year analyses by CBO. OTA and TPC use "fully phased in" law in their distributional analyses, whereas both JCT and CBO generally use the law in effect in the current year (the same year as the income year).

Unit of analysis. OTA and TPC use (nondependent) tax-filing units, and JCT uses the same units except that units with zero or negative income are excluded, whereas CBO uses households as defined in the Current Population Survey (CPS). CBO routinely adjusts units for family size (called "equivalencing"), and both OTA and TPC do so in some circumstances.

Measure of economic well-being. This is the measure used to rank units in distribution tables, and to indicate tax burdens (how well-being is changed by current or proposed taxes). OTA and TPC use cash income as their measure of economic well-being, and CBO uses cash income plus in-kind benefits (such as Medicare and Medicaid benefits).[22] JCT uses expanded income, which includes most forms of cash income plus Medicare and employer-provide health insurance benefits and some other adjustments. All measures are on a pre-tax basis (following the respective inclusion of taxes imposed on businesses and their incidence assumptions).

Measure of change in economic well-being. The only measures included in the distribution tables prepared by all four groups are the dollar changes in average taxes paid and the percentage share of the tax change. The percentages of average or total taxes paid are included in the tables of all groups except JCT, but both can be computed from the JCT tables. All groups except JCT also include the percentage change in after-tax income due to a change in tax burdens. The percentage point change in the share of taxes paid is included or can be computed from the tables of all groups except OTA.

OTA, JCT, CBO and TPC all match a Statistics of Income (SOI) file to the CPS, with the SOI file as the base file. Demographic information, wage splits and nontaxable income sources are obtained directly from Social Security Administration (SSA) or IRS information returns where available by OTA, JCT and CBO, and otherwise from the CPS. The CPS is also the source of pension and health insurance coverage. OTA and JCT obtain defined contribution (dc) plan assets from IRS information returns, whereas TPC imputes these values from a match to the Survey of Consumer Finances (SCF). OTA, JCT and TPC also match to the Medical Expenditure

[22] Cash income as defined by TPC includes all items in adjusted gross income (AGI) except state and local tax refunds, plus above-the-line deductions, tax-exempt interest, cash transfer payments excluded from AGI, employer and employee contributions to retirement accounts, the employer share of payroll taxes and imputed corporate income tax burden.

Panel Survey (MEPS) for health insurance values (as well as out-of-pocket costs), and JCT imputes the insurance value of Medicare directly to the eligible population. TPC imputes wealth from the SCF match. The basic components of the microsimulation models used by each group for distributional analysis are shown in Appendix Table B-2.

Distributional Analysis of a VAT in OTA, JCT, CBO and TPC

A distributional analysis of a VAT or comparable broad-based consumption taxes[23] has been prepared at some point by all four groups though some of these analyses are dated (particularly those of JCT and CBO) and may no longer reflect the approach the group would currently take. An important aspect of all of these distributional analyses is that they explicitly or implicitly included at least some transitional effects in addition to fully phased-in effects.

OTA, JCT and TPC have used the sources method for distributing a VAT, whereas CBO followed the uses method. As discussed above, in present value terms over an individual's lifetime the sources and uses methods should show the same burden of a VAT. In practice, however, distributional results from using the two methods can differ substantially. One key assumption is whether the consumer price level will change with the introduction of a VAT. OTA and TPC follow the assumption that the consumer price level will not change.[24] JCT and CBO instead assumed that the Fed would accommodate the introduction of a VAT by allowing the price level to rise. As discussed in Section III, the assumption about the consumer price level affects the transitional VAT burden on certain cash transfer payments, and under the sources method, the allocation of the burden on old capital between debt and equity owners.

The most critical component of these VAT distributions based on the sources method is the way the transitional VAT burden on old capital is estimated and distributed. Over the course of the transition period, old capital bears a VAT burden either through the VAT on returns, or because it is used to finance consumption (dissaving from old capital). In present value, this burden is equivalent to full inclusion of old capital in the VAT base at the time the VAT is introduced, but the timing of the VAT burden on old capital varies across current households. Further, current households may avoid at least some of this burden (or be considered to have avoided it) by bequeathing old wealth to heirs or by contributing it to charities. So there are various ways that the amount and timing of the transitional burden on old wealth borne by current households might be estimated and how that estimated amount might be portrayed in a transitional distributional analysis. It is not possible to directly identify how each group made estimates of the transitional burden on old capital or portrayed it because no group provided a separate analysis of the transitional and the fully phased-in distribution of a VAT (or other consumption tax).

All four groups place no VAT burden on old consumer durables (which includes owner-occupied housing). The allocation of VAT on new (owner-occupied) housing is unclear in the OTA and JCT distributions; in the CBO and TPC distributions such purchases are assumed to be taxed

[23] See, for example, the papers in Bradford (2000) for the equivalence of a VAT and a retail sales tax, a business transfer tax (BTT), the flat tax, and Bradford's X-tax.

[24] Note, however, that if government purchases are zero-rated, the GDP deflator would therefore have to fall for both real GDP and consumer prices to remain constant. This means that nominal GDP would also decline.

under the pre-payment method and therefore treated like any other taxable consumption under their methods. All four groups treat new non-housing consumer durables like any other taxable consumption.

Income and payroll tax offset effects are included by all four groups, with the effect dependent on whether the consumer price level rises (see discussion in Section III). None of the four groups makes explicit assumptions or adjustments to keep the level of real government spending constant.

Appendix Table B-3 describes the components of the analysis for each group that can be identified from publicly available materials.

V. Considerations in Choosing a Methodology for Distributing a VAT

There are two sets of considerations underlying the choice of the methodology for distributing a VAT: data availability and quality, and the conceptual issues of consistency with the measure of well-being and comparability with the distribution of other taxes.

Data Availability and Quality

Appendix C provides detail on the aggregate and micro data available for distributional analysis and indications of the quality of those data. The aggregate data is all timely and of high quality and can support distributional analysis by providing a solid basis for aggregate estimates required for the analysis and benchmarks for aggregates generated from micro data. The key considerations for distributional analysis therefore concern the availability and quality of micro data.

For income data, the SOI files have several distinct advantages over other micro data files based on household surveys such as the CPS, Consumer Expenditure Survey (CE) or SCF. First, the SOI sample is considerably larger than the samples for these survey-based files and is highly stratified on income with especially large samples of high-income units. Second, although there is some subsampling and "blurring" of data in the Public Use File (PUF) version of the SOI file used by TPC, there is no top coding (as in the CPS and CE) on either the full or PUF versions of the SOI file, also making it far more suitable for analysis of high-income units. Third, income tax reporting appears to be much more complete than survey responses, without the need for extensive imputations for missing or incomplete information. Fourth, the SOI file contains not just income items, but deductions, exemptions and credits that are required to compute individual income tax liability. Because the individual income tax is the single largest source of federal revenue, this is an important characteristic. The SOI file also contains most of the information required to compute payroll taxes (only wage splits on joint returns, which can be obtained elsewhere or imputed from other sources, is missing). And, like the CPS and CE, the SOI file is produced annually.

There are, however, some distinct limitations of the SOI file: the lack of basic demographic information, the lack of information on nontaxable forms of income including many cash transfer

payments, and the lack of information on saving, consumption and wealth. However, some of this missing information can be obtained through exact matches to SSA records or IRS information returns. Further, the SOI file contains sufficient information to permit statistical matching to, or imputations from regressions on, the other microdata files. Thus, as discussed in Section IV, the SOI file is routinely matched to the CPS by OTA, JCT, CBO and TPC and frequently matched to, or augmented with imputed data from the CE, the SCF and other microdata files.

Because of its advantages and characteristics, OTA, JCT, CBO and TPC have all chosen to use the SOI file as the base file for their microsimulation models. This choice and the importance of the individual income and payroll taxes in the federal tax system has also led naturally to the use of the sources method for distributional analysis of most current taxes (see Section IV). In some instances, however, excises have been distributed using the uses method, and CBO has distributed a VAT by the uses method. So, there is some precedent for the uses method in the context of consumption taxes, and it could be used instead of the sources method for distributing a VAT.

Implementation of the uses method for distributing a VAT would require the use of the CE as the base micro data file for the distribution. As shown in Appendix C, however, the CE measures expenditures, not consumption, so is not conceptually aligned with a consumption tax base. While adjustments could be made to correct for this misalignment, there are significant measurement issues in the CE, both for expenditures that should align with consumption items (see Appendix Table C-6 and related discussion) and for income items (see Appendix Table C-7 and related discussion). Most critical, however, is the apparent misalignment of income and expenditures within income groups in the CE. This misalignment can be demonstrated in several ways, including the derivation of "Personal Saving" by income quintile from the CE (see Appendix Table C-8 and related discussion).

The most credible explanation for the high level of dissaving in the lowest and second-lowest income quintiles (see Appendix Table C-8) is that the income reported in the CE is substantially understated. Appendix C indicates that CE money income in 2008 was understated by at least $0.6 trillion, or 7 percent. Further, it appears that the relative amount of income underreporting is higher among units that are classified as lower-income, thereby greatly distorting the relationship between their expenditures and income.[25] This misalignment of income and expenditures for lower-income units would significantly affect implementation of the uses method. If consumption-to-income ratios fall as income rises due simply to misreporting, a VAT or other broad-based consumption tax would appear to be much more regressive than it is as an artifact of the misalignment. The CE is, nevertheless, an important microdata source for distributional analysis for purposes of computing relative consumer price effects.[26] This application is consistent with the primary purpose of the CE, which is to provide expenditure weights for computing the Consumer Price Index (CPI).

[25] For example, see FAQs 20 and 21 at http://www.bls.gov/cex/csxfaqs.htm.

[26] Note that since the CE covers only expenditures, consumption of some items (particularly health spending) is significantly understated and data from other sources (e.g., the MEPS) must be used to supplement the CE in order to compute relative consumer price effects.

Conceptual Issues

Distribution tables show how the burden of taxes affects households (or other units) ranked by some measure of their economic well-being. As discussed in Section IV, OTA, JCT, CBO and TPC all use some variant of income (sources) as the measure of economic well-being for ranking households in distribution tables. For consistency with current distribution tables, therefore, the sources method should be used for distributing a VAT.

The alternative of using consumption as the measure of well-being and adopting the uses method would be difficult to implement or interpret. One problem, discussed above, is conceptual and measurement issues with the CE micro data. There is also no direct relationship between the major federal taxes, which apply to income or components of income and consumption. This lack of relationship would make the tables difficult to interpret. While there is a similar issue of the relationship of a VAT and income, consumption typically is closely related to disposable income so the issue is much less pronounced.

The other conceptual issue is the comparability of the distribution of a VAT to the distribution of other federal taxes. As discussed in Section IV, with rare exceptions all groups currently distribute all taxes using the sources method. For comparability with the distribution of other taxes, therefore, the distribution of a VAT must be according to the sources method.

VI. TPC's Revised Methodology for Distributing a VAT

TPC's revised methodology for distributing a VAT retains major features of the current methodology. It still uses the sources method and retains other features of the current methodology, including the use of the SOI as the base for the microsimulation model, a one-year time period, tax units as the unit of analysis, cash income as the measure of economic well-being, and the percentage change in after-tax cash income as the preferred measure of changes in economic well-being. But TPC's revised methodology improves on prior implementations of the sources method by TPC and others in three key ways:

> First, it separates the analysis between fully phased-in distributional effects of a VAT and distributional effects during the transition following adoption of the VAT, with the fully phased-in effects used as the standard implementation of the distribution of a VAT for consistency with the distribution of other taxes;
>
> Second, it explicitly takes into account the full effect of the VAT on both other government revenues and on government spending, and holds real government spending constant; and
>
> Third, it includes operational measures for supernormal returns to capital and for the transitional burden on capital in place when the VAT goes into effect.

These three improvements should provide greater clarity and precision about the likely changes in households' well-being if a VAT were adopted in the United States.

The next two subsections provide a summary of the revised methodology, after which technical details are provided. The final subsection provides illustrative distributions using the revised methodology.

The Fully Phased-in VAT Burden

The fully phased-in VAT burden is allocated across tax units in proportion to the sum of current labor compensation (including fringe benefits, other than employer contributions to retirement funds, which are counted as income when received); supernormal returns (estimated as described below); and cash transfer payments. This differs from the previous TPC method in two main ways:

- The method for estimating supernormal returns has been updated and refined, with the allocation based on a fraction of equity income reported on tax returns instead of on a fraction of all capital income; and

- Cash transfer payments are included in the VAT base because over time they will be reduced in proportion to the decline in real wages from a VAT. Previously, they were treated as exempt because benefits of current recipients are unaffected (most are indexed to changes in consumer prices, if they were assumed to rise).

In addition, because the revised methodology holds real government spending fixed, imposition of a VAT reduces nominal government spending due to the reduction in wages and producer prices, assuming governments are zero-rated. This means that the VAT rate that would be required to replace a given amount of income or other tax revenue while keeping the federal deficit unchanged, would be lower than the rate estimated in our prior methodology. Note, however, that the reduction in government spending requires a reduction in income to households, so is part of the VAT burden.

The fully phased burden shows the distributional effects of a VAT as if it had been in place permanently. In contrast, the transitional burden accounts for effects when a new VAT is introduced or the rate of an existing VAT is raised.

The Transitional VAT Burden

The transitional burden shows how imposition of a VAT would affect individuals living today. It includes two modifications to the fully phased-in analysis:

- Cash transfer payments are treated as exempt from VAT at the beginning of the transition period because they are fixed in nominal dollars and our assumption is that the consumer price level does not change. Cash transfer payments that are indexed for changes in the consumer price level would also be exempt at the beginning of the transition period if the consumer price level increased when the VAT was introduced because their real value would be unchanged.[27]

[27] Because of the administrative delay between an increase in the consumer price level and the indexation of benefits, there could be some transitional burden on these benefits.

- Normal returns to existing wealth (old capital) and the spend down of existing wealth bear a transitional burden, as discussed below.

Technical Details

Supernormal returns are measured using components of equity income currently included in TPC's microsimulation model: dividends, capital gains and the capital income component of income from pass-through entities (sole proprietorships, partnerships, subchapter S corporations, and rent and royalty income).[28] For capital gains, only positive net long-term gains are included in the base for supernormal returns.[29] For income from pass-through entities, positive amounts are split into a labor component (80 percent) and a capital (equity) component (20 percent), based on NIPA aggregate returns to capital and labor in the corporate sector. The portion of dividends, capital gains and the capital component of pass-through entity income that represents supernormal returns is estimated in two steps. First, based on estimates in the literature of the portion of total equity or corporate equity returns that are supernormal, the fraction for all equity is estimated to be 50 percent.[30] Second, TPC assumes that all supernormal returns accrue to equity held outside retirement accounts (including insurance reserves). In 2008, equity holdings outside retirement accounts represented two-thirds of all equity holdings of households.[31] Using these two factors, the supernormal return fraction of the sum of the amount reported on tax returns of dividends, capital gains and the capital component of pass-through entity income is 50 percent divided by two-thirds, or 75 percent. So, 75 percent of this income is included in the VAT base for both the fully phased in and the transitional VAT distributions.

The transitional VAT burden on old capital (excluding supernormal returns) is estimated based on simulations from the Urban Institute's Dynamic Simulation of Income Model (DYNASIM), which starts with a representative sample of individuals and families and then simulates demographic and economic events, including their saving (or dissaving) and wealth, year-by-year over their lifetimes.[32] As discussed in Section III, old capital bears a VAT burden during the transition either through the VAT on returns or because it is used to finance consumption. However, current households may avoid at least some of this burden (or be considered to have avoided it) by bequeathing old wealth to heirs or by contributing it to charities. Over a lifetime,

[28] Although there may be no economic burden from the VAT applied to returns to successful risk, they are included in supernormal returns because returns to risk would be difficult to distinguish from other supernormal returns and they are included in the distributional burden of the current income taxes, so for comparability should be included for a VAT.

[29] All gains are treated as being from equity investments since in 2007 (the latest year such data are available); less than two percent of gains from positive gain transactions were identified as being from non-equity investments (bonds, bond funds and personal residences). See Wilson and Liddell (2010).

[30] Gentry and Hubbard (1997) estimated that supernormal returns represent 60 percent of the total returns to equity. Toder and Rueben (2007) derive an estimate that only 32 percent of corporate returns are normal, implying that 68 percent are supernormal. Calculations made by Auerbach (2010) based on Flow of Funds data indicate that about half of corporate pre-tax profits would remain under a cash flow tax based only on real transactions each year over the 2005-2008 period (the recession year of 2009 would show a much larger fraction); this remaining portion corresponds to supernormal returns. The 50 percent estimate based on Auerbach (2010) is used in TPC's revised methodology.

[31] Authors' estimates from Appendix Table C-4.

[32] For a description of DYNASIM, see Favreault and Smith (2004).

therefore, in present value the VAT burden on old capital is equivalent to the present value of consumption from old capital, which depends on the levels of initial and terminal wealth. On an annual basis, we represent this lifetime burden as the level annuity with the same present value of consumption as the difference between the value of initial wealth and the present value of terminal wealth. DYNASIM was used to simulate the value of initial and terminal wealth for all individuals. The wealth estimates were then combined with data on projected remaining years of life to compute an annual annuity measure of the transitional burden. The annuity measure is equal in present value to the difference between the value of initial wealth and the present value of terminal wealth at a discount rate of 6 percent.[33] The next step calculates the ratio of the sum of these annual annuity amounts to the sum of the values of initial wealth for different age and income groups and imputes these average ratios to all tax units in TPC's microsimulation model in corresponding age/income groups. This imputation enables the assignment of a transitional VAT tax base on old capital to each unit in the TPC database. Because the DYNASIM estimates are not statistically robust for the highest income households, the tables do not display the breakdown of transitional distributional estimates within the top 5 percent of the income distribution.

Implementation of this revised methodology using TPC's microsimulation model and current distributional methodology for other taxes also requires several practical modifications to the VAT burden discussion in Section III. One modification is the way in which contributions and withdrawals to retirement accounts are accounted for. Rather than treating employer and employee contributions to retirement accounts as labor income when the contributions are made and withdrawals not as income but as dissaving, TPC follows the income tax treatment of contributions and withdrawals, so contributions are excluded from labor income, but withdrawals are included. Note that this treatment generally does not change the present value of contributions for an individual, since the deferred amount (withdrawals) in present value should generally be equal to contributions. A second modification concerns an assumption about the fully phased-in level of cash transfer payments that are not based on wages. A reasonable assumption is that such cash transfer payments will be adjusted by the changes in wages. This assumption simplifies the analysis and makes comparisons between fully phased in and transitional VAT distributions more straightforward to compare, because all cash transfer payments will be affected in the same way in both distributions under the standard assumption that the price level does not change. A third modification applies only if it is assumed that the price level does rise, in which case the reasonable assumption would be made that the effect of the one-time indexing of tax parameters when the VAT was introduced would have a relatively negligible revenue effect when the VAT was fully phased in.

The effect of a VAT on the relative prices of taxed and untaxed consumer goods is computed under the assumption that the consumer price level is unchanged. Untaxed goods will therefore sell at (now lower) producer prices, and taxed goods will sell at producer prices plus VAT. Given these assumptions, the share of consumption devoted to untaxed goods and services determines the reduction in producer prices and the VAT rate change in relative prices between taxed and untaxed goods. This relative price effect is applied to each unit's sources VAT base, split by the

[33] The 6 percent rate is approximately equal to a weighted average of assumed future rates of return on stocks and bonds within retirement accounts in DYNASIM.

unit's relative consumption of untaxed and taxed goods and services. For a unit this relative price effect may be positive or negative, but added across all units the net effect is zero.

Illustration of the Revised Methodology – A Comprehensive VAT with No Rebate

The clearest way to illustrate the difference between using TPC's prior and revised methodologies for the distribution of a VAT is to estimate the effects of using a VAT base that comprehensively covers all consumption, including items paid for by in-kind government transfers, so there are no changes in relative prices of consumer goods. The VAT is assumed to be credit-invoice (a GST), the structure used in all major countries except Japan, and destination-based like other VATs in place. Governments are assumed to be zero-rated. The VAT rate is assumed to be 5 percent, and no rebate is provided to households to address the distributional effect of the VAT. The VAT is simply an add-on source of revenue so that net VAT revenues would only be used to reduce the deficit, and is assumed to go into effect in 2015.

With consumption in 2015 estimated to be $13,035 billion, a 5 percent VAT levied on total consumption[34] would raise $620.7 billion in gross revenues (see table 2).[35] With real GDP and real government spending held fixed, reduced factor payments would result in reduced revenues from individual income, corporate income and payroll taxes. These offsets would reduce net revenues to $397.0 billion during the transition and to $422.9 billion when the VAT was fully phased in. Holding real federal government spending constant, the reduced factor payments would also lower nominal federal spending for employee compensation, purchases from businesses, grants to state and local governments and, over time, would lower spending on cash transfer payments (because Social Security benefits and other transfers are tied to beneficiaries' prior earnings.). This reduction in nominal federal spending would be $63.7 billion in the first year of the transition, rising to $121.4 billion (at 2015 income levels) when the VAT was fully phased in. Taking into account effects both on revenues and spending, the 5 percent VAT would reduce the deficit by $460.7 billion during the first year of transition and by $544.3 billion (at 2015 income levels) when the VAT was fully phased in.

Estimates of the distributional effects in 2015 of this illustrative example are shown in Table 3. Consistent with standard TPC distributional tables, we express the average change in tax burden for each income group as the average within group percentage change in after-tax income. The baseline used to define the pre-VAT tax system is TPC's Current Policy Baseline, which assumes that all of the 2001-2003 tax cuts are permanently extended, the AMT continues to be patched by indexing the 2011 exemption levels and that the 2011 estate tax law parameters (a $5 million exemption, indexed for inflation after 2011, and a top rate of 35 percent) remain in effect.

[34] The VAT rate is typically expressed on a tax-exclusive basis, that is, as the ratio of the tax to the price paid by the consumer excluding the tax. A 5 percent VAT is equal to a tax of approximately 4.8 percent (5/1.05 percent) on gross of tax consumption ($13,035 billion), which is assumed to be unaffected by imposition of the tax.

[35] TPC typically assumes a 15 percent noncompliance rate for the VAT, based on IRS estimates of noncompliance with the current income tax and estimates of VAT noncompliance from the United Kingdom. For ease of exposition, the compliance adjustment is omitted from these calculations.

Table 2

Effect on Federal Revenues, Spending and the Deficit
Illustrative VAT with a Comprehensive Base, No Rebate and a 5% Rate
($ billions, at 2015 levels of income and consumption)

Provision	Amounts	
	First Year of Transition	Fully Phased in
Gross VAT Revenue	620.7	620.7
Less: **Individual Income Tax Offset**	142.6	137.8
Less: **Corporate Income Tax Offset**	30.6	9.5
Less: **Payroll Tax Offset**	50.5	50.5
Equals: **Total Revenue Offsets**[1]	223.7	197.8
Net VAT Receipts	397.0	422.9
Reduction in Nominal Federal Spending:		
Employee Compensation[2]	29.2	29.2
Purchases from Businesses[2]	25.6	25.6
In-Kind Transfers[2]	0.0	0.0
Cash Transfer Payments[2]	0.0	57.7
Grants to State and Local Governments[3]	9.0	9.0
Total Reduction	63.7	121.4
Change in Federal Deficit	460.7	544.3

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

Note: Detail may not add to totals due to rounding.

[1] The direct revenue offsets are estimated from a Current Policy Baseline, which assumes extension of 2011 law except the temporary employee payroll tax cut.

[2] This is the estimated amount by which nominal federal spending could be reduced while holding real federal spending constant.

[3] This is the amount that federal grants to state and local governments would have to be reduced in order to hold their real spending constant (with no change in their surpluses or deficits).

Table 3

Distributional Analysis Using the Prior and Revised TPC Methodologies
Illustrative VAT with a Comprehensive Base, No Rebate and a 5% Rate

(Percentage change in after-tax income[1])

Cash Income Percentile[2]	Gross VAT Burden (without Offsets)			Net VAT Burden (with Offsets)		
		Revised TPC Methodology			Revised TPC Methodology	
	Prior TPC Methodology	During Transition	Fully Phased In	Prior TPC Methodology	During Transition	Fully Phased In
Lowest Quintile	-4.1	-4.6	-6.2	-3.5	-4.1	-5.7
Second Quintile	-4.9	-5.6	-6.5	-3.7	-4.3	-5.3
Middle Quintile	-5.8	-6.7	-7.1	-4.3	-4.9	-5.4
Fourth Quintile	-6.1	-7.2	-7.2	-4.5	-5.2	-5.3
Top Quintile	-5.8	-7.4	-6.3	-4.2	-4.9	-4.3
All	-5.7	-7.0	-6.6	-4.2	-4.9	-4.8
Addendum						
80-90	-6.3	-7.7	-7.2	-4.5	-5.4	-5.0
90-95	-6.3	-7.7	-6.8	-4.5	-5.4	-4.7
Top 5 Percent	-5.3	-7.1	-5.7	-3.9	-4.6	-3.8
95-99	-6.2		-6.2	-4.2		-4.1
Top 1 Percent	-4.7		-5.4	-3.5		-3.6
Top 0.1 Percent	-3.9		-5.4	-2.9		-3.7

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

[1] Change in after-tax income is measured relative to a Current Policy Baseline, which assumes extension of 2011 law except the temporary employee payroll tax cut.

[2] Tax units with negative cash income are excluded from the lowest income class but are included in the totals. The cash income percentile classes are based on the income distribution for the entire population and contain an equal number of people, not tax units. For a description of cash income and the breaks, see http://www.taxpolicycenter.org/TaxModel/income.cfm.

Under the revised methodology for a fully phased-in VAT, the net VAT burden after offsets is regressive across the entire income distribution, with the effective VAT burden declining from 5.7 percent of after-income for the bottom quintile to 4.3 percent of after-income for the top quintile, though the distribution is basically flat over the middle-income quintiles. In contrast, under TPC's prior methodology, the VAT is progressive across most of the income distribution with the burden rising from 3.5 percent of after-tax income for the lowest quintile to 4.5 percent of after-tax income for the fourth quintile and regressive only at the top of the distribution. During the transition under the revised methodology, the pattern is similar to the pattern under TPC's prior methodology, but the level is higher (as it was under the revised fully phased in methodology) because the burden includes lower factor payments from reduced government spending. The main reason for the difference in the allocation of VAT burdens at the bottom and middle of the distribution between the methodologies is that the revised fully phased-in method, unlike the prior TPC method and the revised transition method, allocates VAT burden to cash transfer payments. Again, the rationale for this change is that over time real Social Security

benefits will be lower because the VAT reduces real and nominal wages and benefit calculations will reflect these lower wages.

The prior and the revised transition and fully phased-in methodologies all show VAT burdens as a share of income declining at the top of the income distribution. This occurs mainly because a VAT exempts the normal return to new capital from tax and capital income is concentrated at the top of the income distribution. But the revised methodology for the fully phased in burden does show a somewhat higher burden than the prior methodology for taxpayers in the top 0.1 percent of the distribution (3.7 percent, compared to 2.9 percent). This occurs in part because the overall VAT burden is estimated to be higher, but also because the new methodology improves the imputation of supernormal returns among income groups. The prior TPC methodology implicitly assumed supernormal returns were proportional to total income from capital. The revised methodology, however, assigns supernormal returns only to equity income outside of retirement accounts – reported dividends, capital gains and the capital component of pass-through entity income. This equity income is much more concentrated at the very top of the income distribution than income from capital generally.

Illustration of the Revised Methodology – A Broad-Based VAT with A Rebate[36]

This illustrative example uses a more likely VAT base that is also assumed to use the credit-invoice structure, be destination-based and zero-rate governments, but with government-reimbursed health expenditures (primarily Medicare and Medicaid), education spending and expenditures of religious and nonprofit organizations (which are included in NIPA consumption) all removed from the tax base. Imputed rent on owner-occupied housing (which could not easily be measured for each household) and rental of tenant-occupied housing are also removed from the tax base, but spending on new housing and on additions to existing housing are added. Financial services provided without payment, which are difficult to value, are removed. Some minor other adjustments are made for administrative reasons. With all of these adjustments (see Table 4), the amount of consumption in the VAT base is reduced in 2015 from $13,035 billion, or 70 percent of GDP, to $9,351.8 billion, or 71.7 percent of consumption and 50.2 percent of GDP. Further reductions remove state and local general sales taxes and make a combined adjustment for noncompliance and a small business exemption of 15 percent. The effective VAT base is therefore $7,410.7 billion in 2015, or only 56.9 percent of total consumption and 39.8 percent of GDP.

While a VAT by itself is regressive on a fully phased-in basis under TPC's revised methodology, the impact on low- and middle-income households could be offset by allowing a rebate in the form of a refundable credit claimed on income tax returns. In general, such a rebate is a much more effective and better way of addressing distributional concerns than exemption of broad categories of goods (such as food) purchased disproportionately by lower-income households.

[36] The policy and administrative considerations underlying the exclusions from the broad VAT base and the rebate are discussed in Toder, Nunns and Rosenberg, "Implications of Different Bases for a VAT" (forthcoming in 2011).

Table 4

Broad VAT Base in 2015

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

Note: Detail may not add to totals due to rounding.

The rebate used here applies to labor income (excluding retirement contributions) and to pensions and other withdrawals from retirement accounts. The rebate would phase in on the combined amount of labor and retirement income for a household, up to TPC's estimate of the weighted average federal poverty level for a one-person household in 2015 of $12,000 and to double that level ($24,000) for a married couple. The rebate rate would be 3.8 percent, which is the effective rate of the VAT on sources included in the fully phased-in VAT base. A separate portion of the rebate would be 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; it automatically would be included in their benefits.

Table 5

Effect on Federal Revenues, Spending and the Deficit
Illustrative VAT with a Broad Base, a Rebate and a 5% Rate
($ billions, at 2015 levels of income and consumption)

Provision	VAT Revenue	
	During Transition	Fully Phased in
Gross VAT Revenue	357.7	357.7
Less: **Individual Income Tax Offset**	96.4	91.1
Less: **Corporate Income Tax Offset**	20.6	6.4
Less: **Payroll Tax Offset**	33.9	33.9
Equals: **Total Revenue Offsets**[1]	150.9	131.4
Less: **Rebate**[2]	86.7	125.5
Net VAT Receipts	120.2	100.8
Reduction in Nominal Federal Spending:		
Employee Compensation[3]	19.6	19.6
Purchases from Businesses[3]	20.6	20.6
In-Kind Transfers[3]	32.2	32.2
Cash Transfer Payments[3]	0.0	38.8
Grants to State and Local Governments[4]	39.6	39.6
Total Reduction	112.0	150.8
Change in Federal Deficit	232.2	251.6

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

Note: Detail may not add to totals due to rounding.

[1] The direct revenue offsets are estimated from a Current Policy Baseline, which assumes extension of 2011 law except the temporary employee payroll tax cut.

[2] The rebate phases in at the effective VAT rate on the combined amount of labor and retirement income up to $12,000 for single filers and $24,000 for joint filers. The cost of the rebate also includes the adjustment of all cash transfer payments to pre-VAT levels.

[3] This is the estimated amount by which nominal federal spending could be reduced while holding real federal spending constant.

[4] This is the amount that federal grants to state and local governments would have to be reduced in order to hold their real spending (with no change in their surpluses or deficits).

Applying a 5 percent VAT rate to the broad base in this example would raise $357.7 billion in 2015 (see Table 5), much less than the $620.7 billion that a 5 percent rate on all consumption would raise. Lower revenues from individual income taxes, corporate income taxes and payroll taxes would reduce net revenues by $150.9 billion during the initial year of the transition and by $131.4 billion (at 2015 income levels) when the VAT was fully phased in. Note that the revenue offsets reflect lower factor payments due to reduced government spending (see below) as well as from the VAT. The rebate would cost $86.7 billion during the transition and $125.5 billion (at 2015 income levels) when the VAT was fully phased in (reflecting the cost of adjusting all cash transfer payments to pre-VAT levels). This prototype VAT would therefore raise net revenues of only $120.2 billion during the first year of the transition and $100.8 billion (at 2015 income levels) when the VAT was fully phased in. Reduced federal spending associated with lower wage costs, purchases from businesses, cash transfer payments, and grants to state and local governments, however, would significantly increase the deficit reduction achieved by the VAT.[37] This spending reduction would amount to $112.0 billion during the first year of the transition and $150.8 billion when the VAT was fully phased in. Therefore, the VAT would reduce the federal deficit by $232.2 billion during the first year of the transition and $251.6 billion (at 2015 income levels) when fully phased in.

During the transition the VAT before rebate on this illustrative broad base is progressive over the bottom four quintiles and then proportional between the 80th and 95th percentiles and regressive at the very top (Table 6). When fully phased in, the VAT before rebate is regressive at the bottom and roughly proportional over the middle three quintiles, but then the burden drops sharply in the top quintile, with the burden lowest in the top 1 percent of the income distribution. The fully phased in VAT burden on this broad base is slightly less regressive than the VAT on all consumption because exemptions disproportionately benefit those at the bottom of the income distribution as a share of their income.

Adding a rebate makes the distribution of the VAT progressive through almost the entire income distribution, both during the transition and when fully phased in. The VAT burden as a share of income when fully phased in rises from 0.4 percent for the lowest quintile to 2.4 percent for the top quintile. The burden is roughly proportional to income within the top quintile.

[37] As noted above, the reduction in government spending to hold real spending constant represents reduced income to households and is part of the VAT burden and increases the income and payroll tax revenue offsets.

Table 6

Distributional Analysis Using TPC's Revised Methodology
Illustrative VAT with a Broad Base, a Rebate and a 5% Rate

(Percentage change in after-tax income[1])

Cash Income Percentile[2]	During Transition		Fully Phased In	
	VAT Before Rebate	VAT with Rebate	VAT Before Rebate	VAT with Rebate
Lowest Quintile	-2.8	-0.6	-3.9	-0.4
Second Quintile	-2.9	-1.3	-3.5	-1.2
Middle Quintile	-3.3	-2.1	-3.6	-2.0
Fourth Quintile	-3.5	-2.6	-3.6	-2.3
Top Quintile	-3.3	-3.0	-2.9	-2.4
All	-3.3	-2.5	-3.2	-2.2
Addendum				
80-90	-3.6	-2.9	-3.3	-2.5
90-95	-3.6	-3.1	-3.2	-2.6
Top 5 Percent	-3.1	-2.9	-2.6	-2.4
95-99			-2.7	-2.4
Top 1 Percent			-2.5	-2.4
Top 0.1 Percent			-2.5	-2.5

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

[1] Change in after-tax income is measured relative to a Current Policy Baseline, which assumes extension of 2011 law except the temporary employee payroll tax cut.

[2] Tax units with negative cash income are excluded from the lowest income class, but are included in the totals. The cash income percentile classes are based on the income distribution for the entire population and contain an equal number of people, not tax units. For a description of cash income and the breaks, see: http://www.taxpolicycenter.org/TaxModel/income.cfm.

Appendix A:
Life Cycle Burden of a VAT –Mathematical Derivation and Examples

Mathematical Derivation of the Life Cycle Burden of a VAT

The annual budget constraint in year t for an individual is:

(1) $Y_t = C_t + S_t$

where Y_t is income, C_t is consumption and S_t is saving.

Income consists of wages (W_t) and returns to capital (rK_{t-1}), where r is the normal return (supernormal returns are not taken into account) and saving is assumed to occur at the end of the year, so the return to capital during the year is on the beginning capital stock (K_{t-1}). Transfer payments are not modeled but on a fully phased in basis can be thought of as a part of labor compensation (wages). So,

(2) $Y_t = W_t + rK_{t-1}$

For now, the capital stock is treated as nondepreciating, so K can be thought of as financial wealth and the tax as an individual-level consumption tax, but it is shown below that taking depreciation into account (as must be done with a business-level consumption tax like a VAT) doesn't affect the basic result. With no depreciation,

(3) $S_t = K_t - K_{t-1}$

Substituting (2) and (3) in (1) and rearranging gives:

(4) $W_t + (1+r)K_{t-1} - K_t = C_t$

The period of year 1 through year T can be thought of as the period starting with the introduction of a VAT through the year of death, so there is a transitional burden on old capital (K_t), or as an individual's lifetime when the VAT is fully phased in, so $K_0 = 0$. Over this period, the budget constraint is:

(5) $\sum PV(W_t) + (1+r)\sum PV(K_{t-1}) - \sum PV(K_t) = (1+t_u)\sum PV(C_t)$

where t_u is the (tax-exclusive) VAT rate.

This can be simplified using:

(6) $\sum PV(K_t) = (1+r)\sum PV(K_{t-1}) - K_0 + K_T/(1+r)^T$

Substituting (6) into (5) gives:

(7) $\sum PV(Wt) + K_0 - K_T/(1+r)^T = (1+t_u)\sum PV(C_t)$

Equation (7) includes the present value of the lifetime VAT burden under the uses method, $t_u\sum PV(C_t)$. The representation of that burden in year t by the traditional uses method would be t_uC_t. The present value of the lifetime VAT burden under the sources method can be derived from (7) by dividing through by $1/(1+t_u)$:

(8) $[\sum PV(W_t) + K_0 - K_T/(1+r)^T](1-t_s) = \sum PV(C_t)$

where t_s is the (tax-exclusive) VAT rate with $(1-t_s) = 1/(1+t_u)$.

Equation (8) says that, on a sources basis, a VAT imposes a burden on wages and, during the transition, on the draw down of the initial capital stock ($K_0 - K_T/(1+r)^T$), where K_T is the amount the individual leaves as a bequest. When the VAT is fully phased in, K_0 might be thought of as the amount an individual inherits and so $K_0 - K_T/(1+r)^T$ is the difference in present value between inheritances and bequests, which is quite small for most individuals. An important implication of (8) is that the pattern of saving over the period (years 1 through T) has no effect on his or her lifetime VAT burden; all that matters is the individual's initial and terminal capital stock (wealth), which as noted is likely to be important only during the transition. This result simply reflects the fact that a VAT does not alter the relative price of consumption now and consumption in the future because the normal return to saving is not taxed. Another implication of (8) is that for an individual to avoid all transition tax on the initial capital stock, he or she must have savings (in present value) of at least $K_0 - K_0/(1+r)^T$ in order to preserve the present value of the initial capital stock. One way for this saving to occur would be for the individual to reinvest all of the earnings (the normal return) on the initial capital stock, but any pattern of saving that leaves the terminal capital stock in present value equal to at least K_0 is equivalent.

The representation of the sources VAT burden from (8) in year t on wages is just t_sW_t in all sources method and does not change between the transition period and subsequent periods when the VAT is fully phased in.[38] How to represent the transitional burden in year t corresponding to the term $K_0 - K_T/(1+r)^T$ following introduction of the VAT is less clear, but a reasonable approach would be to take the level annuity value over the individual's remaining life that has the same present value, times the VAT sources rate, or $t_sA\{K_0 - K_T/(1+r)^T\}$ where $A\{\cdot\}$ is the annuity operator. Using this representation, the transitional sources method VAT burden in year t would be $t_s[W_t + A\{K_0 - K_T/(1+r)^T\}]$.

This formulation of the burden of a VAT treats any bequest as free of VAT. But if the bequest is eventually consumed by some future generation, it will bear VAT (at the presumably unchanged current VAT rate). If the amount of the bequest grows at the (VAT-free) normal return, the present value of the VAT burden will be $t_sK_T/(1+r)^T$. It might therefore be reasonable to ascribe that burden to the current individual, in which case the present value of his or her VAT burden is just $[\sum PV(Wt) + K_0](1-t_s)$, and the burden in year t, using the level annuity value of the burden on K_0, is just $t_s[W_t + A\{K_0\}]$. Note that this formulation has the practical advantage of not requiring an estimate of the (present) value of bequests for every taxpayer. However, terminal

[38] To the extent wages represent transfer payments based on wages, there is a difference between the transitional and fully phased-in VAT burden, as discussed in Section III.

wealth might also be contributed to charities, which presumably would be zero-rated and escape VAT including the VAT burden on old capital. This possibility again requires an estimate of how much terminal wealth is left as bequests to heirs and how much they eventually consume rather than contribute to charity.

Separating the Returns to Old and New Capital

To see how a VAT treats capital income and saving during the transition, income from capital in (2) can be split into two components, the income from old capital and income from new capital:

(9) $rK_{t-1} = rK_0 + r(K_{t-1} - K_0)$

Substituting (9) into (2) and then (2) into (1) and rearranging gives:

(10) $W_t + rK_0 + r(K_{t-1} - K_0) - (K_t - K_{t-1}) = C_t$

The lifetime budget constraint corresponding to (10) is:

(11) $\sum PV(W_t) + r\sum PV(K_0) + r\sum PV(K_{t-1} - K_0) - \sum PV(K_t - K_{t-1}) = \sum PV(C_t)$

Because capital is assumed to be nondepreciating (infinitely lived), the present value of returns to old capital can be expressed as:

(12) $r\sum PV(K_0) = K_0 - K_0/(1+r)^T$

which shows that the return on old capital in the VAT base from the individual's perspective lasts only through their lifetime (leaving aside any drawdown, which is accounted for in the saving term).

The present value of the return on new capital can be expressed as:

(13) $r\sum PV(K_{t-1} - K_0) = r\sum PV(K_{t-1}) - (K_0 - K_0/(1+r)^T)$

and using (6), the present value of the deduction for saving can be expressed as:

(14) $\sum PV(K_t - K_{t-1}) = - r\sum PV(K_{t-1}) + (K_0 - K_T/(1+r)^T)$

Combing (13) and (14) gives:

(15) $r\sum PV(K_{t-1} - K_0) - \sum PV(K_t - K_{t-1}) = (K_0 - K_T)/(1+r)^T$

which indicates that the deduction for saving has the effect of removing the normal return on new capital from the VAT base and removing the amount by which the present value of the terminal capital stock exceeds the present value of the initial capital stock (or, including the present value of dissaving from the initial capital stock). To see that this result is the same as above, (12) and (15) can be substituted into (11) and the VAT (uses) rate applied to the right

hand side to give (7). Note that as in the discussion above, this result depends on the exemption of bequests in this formulation.

Depreciation

A VAT is a business-level consumption tax, whereas the preceding analysis considered an individual-level consumption tax. The difference lies in whether capital is considered to depreciate. If capital in the consumption tax base depreciates at rate d it must earn a gross return of r+d and gross saving becomes $S_t = K_t - (1\text{-}d)K_{t-1}$. Then, corresponding to (11), the budget constraint becomes:

(16) $\sum PV(W_t) + (r+d)\sum PV(K_0) + (r+d)\sum PV(K_{t-1} - K_0) - \sum PV(K_t - (1\text{-}d)K_{t-1}) = \sum PV(C_t)$

The present value of returns to old capital corresponding to (12) can be expressed as:

(17) $(r+d)\sum PV(K_0) = K_0 - K_0/(1+r)^T$

and the present value of the returns to new capital corresponding to (13) can be expressed as:

(18) $(r+d)\sum PV(K_{t-1} - K_0) = (r+d)\sum PV(K_{t-1}) - (K_0 - K_0/(1+r)^T)$

Using (6), the present value of the deduction for (gross) saving corresponding to (14) can be expressed as:

(19) $\sum PV(K_t - (1\text{–}d)K_{t-1}) = -(r+d)\sum PV(K_{t-1}) + (K_0 - K_T/(1+r)^T)$

Combing (18) and (19):

(20) $(r+d)\sum PV(K_{t-1} - K_0) - \sum PV(K_t - (1\text{-}d)K_{t-1}) = (K_0 - K_T)/(1+r)^T$

which is the same as (15), and indicates that with depreciation the deduction for saving has the effect of exempting the normal return and allowing depreciation for new capital, and making the present value of net saving to be exempt (or net dissaving to be included) in the sources VAT base. So, capital depreciation does not change the present value of the VAT burden.

Examples of the Life Cycle Burden of a VAT

The following examples illustrate the distribution of a VAT for a worker with a highly simplified lifetime earnings profile. The worker starts working at age 25, earns $40,000 per year for 41 years (ages 25 through 65), and retires when she turns 66 and receive Social Security benefits of $15,000 per year until she dies at the end of age 85. The worker has no initial wealth at age 25, and leaves no bequests. The "nonsaver" spends all of her income every year, whereas the "saver" maintains a constant level of consumption throughout her life, so saves before retirement and then dissaves all of her accumulated savings during retirement. The assumed return on saving is 6 percent, all of which is "normal" (there are no "supernormal" returns). All saving is assumed to

be invested in equity (or alternatively, if debt claims are held, that a VAT raises the price level so that its effect on all savings is the same).

The first example is for a nonsaver, shown in Table A-1. Because she has no initial wealth and consumes all of her income every year, the present value of her income is just equal to the present value of her consumption. However, her VAT burden would be shown differently under TPC's prior sources and the uses method than under TPC's revised method. Under TPC's prior method, in this example only wages would be included in the VAT base, making the VAT base 100 percent of income during this individual's working life and zero percent of income during her retirement years. Note that the present value of the individual's lifetime VAT base is therefore less than the present value of consumption. Under TPC's revised method, because she has no initial wealth and the VAT is in effect her entire working life, the fully phased in VAT base includes both wages and Social Security benefits, making it 100 percent of income in all years of her life and also 100 percent of consumption in all years since she consumes all income in every year; the present value of the sources VAT base and consumption are the same. There is no transitional VAT burden. Under the uses method, the VAT base is consumption less Social Security benefits, making it 100 percent of income in all working years and zero percent of income in all retirement years, as under TPC's prior method.

The second example is for a saver, shown in Table A-2. This individual also has no initial wealth but saves during her working years and dissaves during her retirement in order to maintain consumption at the fixed level of $38,376 throughout her lifetime (leaving no bequests). Note that although the pattern of consumption is quite different between the "saver" and "nonsaver" examples, the present value of consumption is the same. The VAT burden in this example under TPC's prior method, as in the nonsaver example, would include only wages in the VAT base. But with (VAT-exempt) income from savings growing, the VAT base as a percent of income would decline over the individual's working life (from 100 percent at age 25 to 72.6 percent at age 65), and then become zero percent of income during retirement. TPC's revised method, as in the nonsaver example, would include both wages and Social Security benefits in the VAT base but represent a lower percentage of income, with the decline during working years the same as under TPC's prior method and the decline during retirement shrinking as she dissaves, rising from 48.3 percent of income at age 66 to 91.9 percent at age 85 (compared to 100 percent in all retirement years for the nonsaver). Again, the present value of the sources method VAT base and consumption are the same, and there is no transitional VAT burden. The VAT base is constant in this example under the uses method during working years at $38,376 and also during retirement years but lower ($23,376) since consumption out of Social Security Benefits is excluded. So the uses VAT base represents a declining share of income during working years (95.9 percent at age 25 and only 69.7 percent at age 65), but a rising share as income declines during retirement (75.2 percent at age 66, rising to 143.2 percent by age 85). The saver and nonsaver examples can be used to demonstrate the transitional effects of a VAT by using only the portion of the examples that pertain to the individual between ages 66 and 85. Table A-3 shows both examples for this period of the individuals' lives, with the savers' constant level of consumption of $38,376 and initial wealth of $268,115 unchanged from Table A-2. For the nonsaver, TPC's prior method would show no VAT burden, so no difference due to the transition (compare to Table A-1). TPC's revised method on a fully phased in basis is not affected by the transition, but during the transition this individual has no VAT burden since Social Security benefits bear no transitional

VAT burden. The uses method is also unaffected by the transition, showing no VAT burden in any year since all consumption is out of Social Security benefits.

For the saver, the VAT base under TPC's prior method would be income from old capital, which declines in absolute size as well as relative to income as the individual ages. Under TPC's revised method, the fully phased in VAT base is unaffected by the transition, but the transitional VAT base is the fully phased-in base, with the level annuity value of initial (old) wealth of $23,376 added and Social Security benefits subtracted. This transitional VAT base rises with income, from 75.2 percent at age 66 to 143.2 percent at age 85. Under the uses method, the VAT base is unaffected by the transition so remains $23,376 in all years (the same base as the transition base under TPC's revised method).

Table A-1

Example of VAT Burden on a Nonsaver, VAT Introduced at (or Before) Age 25

	Income				Consump-		Wealth		VAT Base Under Alternative Distribution Methods							
									Amount				Base Amount as a Percent of Income			
										Revised Method				Revised Method		
Age	Wages	Social Security	Capital Income	Total	tion	Saving	Beginning of Year	End of Year	Prior Method	Fully Phased In	During Transition	Uses Method	Prior Method	Fully Phased In	During Transition	Uses Method
25	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
26	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
27	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
28	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
29	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
30	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
31	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
32	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
33	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
34	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
35	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
36	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
37	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
38	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
39	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
40	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
41	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
42	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
43	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
44	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
45	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
46	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
47	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
48	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
49	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
50	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
51	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
52	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
53	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
54	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
55	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
56	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
57	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
58	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
59	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
60	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
61	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
62	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
63	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
64	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
65	40,000	-	-	40,000	40,000	-	-	-	40,000	40,000	N/A	40,000	100.0%	100.0%	N/A	100.0%
66	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
67	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
68	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
69	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
70	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
71	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
72	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
73	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
74	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
75	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
76	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
77	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
78	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
79	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
80	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
81	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
82	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
83	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
84	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
85	-	15,000	-	15,000	15,000	-	-	-	-	15,000	N/A	-	0.0%	100.0%	N/A	0.0%
NPV[1]	605,521	15,780	0	621,301	621,301		0		605,521	621,301	N/A	605,521	97.5%	100.0%	N/A	97.5%
Annuity[2]	37,401	975	-	38,376	38,376		-		37,401	38,376	N/A	37,401			N/A	

[1] Net present values (NPVs) are computed for amounts over the individual's lifetime, except that the NPV for wealth at the beginning of year is simply wealth at age 25.

[2] Annuity is the level annuity value over the individual's lifetime.

Table A-2

Example of VAT Burden on a Saver, VAT Introduced at (or Before) Age 25

									VAT Base Under Alternative Distribution Methods							
									Amount				Base Amount as a Percent of Income			
	Income						Wealth			Revised Method				Revised Method		
Age	Wages	Social Security	Capital Income	Total	Consump-tion	Saving	Beginning of Year	End of Year	Prior Method	Fully Phased In	During Transition	Uses Method	Prior Method	Fully Phased In	During Transition	Uses Method
25	40,000	-	-	40,000	38,376	1,624	-	1,624	40,000	40,000	N/A	38,376	100.0%	100.0%	N/A	95.9%
26	40,000	-	97	40,097	38,376	1,722	1,624	3,346	40,000	40,000	N/A	38,376	99.8%	99.8%	N/A	95.7%
27	40,000	-	201	40,201	38,376	1,825	3,346	5,172	40,000	40,000	N/A	38,376	99.5%	99.5%	N/A	95.5%
28	40,000	-	310	40,310	38,376	1,935	5,172	7,106	40,000	40,000	N/A	38,376	99.2%	99.2%	N/A	95.2%
29	40,000	-	426	40,426	38,376	2,051	7,106	9,157	40,000	40,000	N/A	38,376	98.9%	98.9%	N/A	94.9%
30	40,000	-	549	40,549	38,376	2,174	9,157	11,331	40,000	40,000	N/A	38,376	98.6%	98.6%	N/A	94.6%
31	40,000	-	680	40,680	38,376	2,304	11,331	13,636	40,000	40,000	N/A	38,376	98.3%	98.3%	N/A	94.3%
32	40,000	-	818	40,818	38,376	2,443	13,636	16,078	40,000	40,000	N/A	38,376	98.0%	98.0%	N/A	94.0%
33	40,000	-	965	40,965	38,376	2,589	16,078	18,667	40,000	40,000	N/A	38,376	97.6%	97.6%	N/A	93.7%
34	40,000	-	1,120	41,120	38,376	2,745	18,667	21,412	40,000	40,000	N/A	38,376	97.3%	97.3%	N/A	93.3%
35	40,000	-	1,285	41,285	38,376	2,909	21,412	24,321	40,000	40,000	N/A	38,376	96.9%	96.9%	N/A	93.0%
36	40,000	-	1,459	41,459	38,376	3,084	24,321	27,405	40,000	40,000	N/A	38,376	96.5%	96.5%	N/A	92.6%
37	40,000	-	1,644	41,644	38,376	3,269	27,405	30,674	40,000	40,000	N/A	38,376	96.1%	96.1%	N/A	92.2%
38	40,000	-	1,840	41,840	38,376	3,465	30,674	34,138	40,000	40,000	N/A	38,376	95.6%	95.6%	N/A	91.7%
39	40,000	-	2,048	42,048	38,376	3,673	34,138	37,811	40,000	40,000	N/A	38,376	95.1%	95.1%	N/A	91.3%
40	40,000	-	2,269	42,269	38,376	3,893	37,811	41,704	40,000	40,000	N/A	38,376	94.6%	94.6%	N/A	90.8%
41	40,000	-	2,502	42,502	38,376	4,127	41,704	45,831	40,000	40,000	N/A	38,376	94.1%	94.1%	N/A	90.3%
42	40,000	-	2,750	42,750	38,376	4,374	45,831	50,205	40,000	40,000	N/A	38,376	93.6%	93.6%	N/A	89.8%
43	40,000	-	3,012	43,012	38,376	4,637	50,205	54,842	40,000	40,000	N/A	38,376	93.0%	93.0%	N/A	89.2%
44	40,000	-	3,291	43,291	38,376	4,915	54,842	59,757	40,000	40,000	N/A	38,376	92.4%	92.4%	N/A	88.6%
45	40,000	-	3,585	43,585	38,376	5,210	59,757	64,967	40,000	40,000	N/A	38,376	91.8%	91.8%	N/A	88.0%
46	40,000	-	3,898	43,898	38,376	5,522	64,967	70,490	40,000	40,000	N/A	38,376	91.1%	91.1%	N/A	87.4%
47	40,000	-	4,229	44,229	38,376	5,854	70,490	76,343	40,000	40,000	N/A	38,376	90.4%	90.4%	N/A	86.8%
48	40,000	-	4,581	44,581	38,376	6,205	76,343	82,549	40,000	40,000	N/A	38,376	89.7%	89.7%	N/A	86.1%
49	40,000	-	4,953	44,953	38,376	6,577	82,549	89,126	40,000	40,000	N/A	38,376	89.0%	89.0%	N/A	85.4%
50	40,000	-	5,348	45,348	38,376	6,972	89,126	96,098	40,000	40,000	N/A	38,376	88.2%	88.2%	N/A	84.6%
51	40,000	-	5,766	45,766	38,376	7,390	96,098	103,488	40,000	40,000	N/A	38,376	87.4%	87.4%	N/A	83.9%
52	40,000	-	6,209	46,209	38,376	7,834	103,488	111,322	40,000	40,000	N/A	38,376	86.6%	86.6%	N/A	83.0%
53	40,000	-	6,679	46,679	38,376	8,304	111,322	119,626	40,000	40,000	N/A	38,376	85.7%	85.7%	N/A	82.2%
54	40,000	-	7,178	47,178	38,376	8,802	119,626	128,428	40,000	40,000	N/A	38,376	84.8%	84.8%	N/A	81.3%
55	40,000	-	7,706	47,706	38,376	9,330	128,428	137,758	40,000	40,000	N/A	38,376	83.8%	83.8%	N/A	80.4%
56	40,000	-	8,265	48,265	38,376	9,890	137,758	147,648	40,000	40,000	N/A	38,376	82.9%	82.9%	N/A	79.5%
57	40,000	-	8,859	48,859	38,376	10,483	147,648	158,131	40,000	40,000	N/A	38,376	81.9%	81.9%	N/A	78.5%
58	40,000	-	9,488	49,488	38,376	11,112	158,131	169,244	40,000	40,000	N/A	38,376	80.8%	80.8%	N/A	77.5%
59	40,000	-	10,155	50,155	38,376	11,779	169,244	181,023	40,000	40,000	N/A	38,376	79.8%	79.8%	N/A	76.5%
60	40,000	-	10,861	50,861	38,376	12,486	181,023	193,509	40,000	40,000	N/A	38,376	78.6%	78.6%	N/A	75.5%
61	40,000	-	11,611	51,611	38,376	13,235	193,509	206,744	40,000	40,000	N/A	38,376	77.5%	77.5%	N/A	74.4%
62	40,000	-	12,405	52,405	38,376	14,029	206,744	220,773	40,000	40,000	N/A	38,376	76.3%	76.3%	N/A	73.2%
63	40,000	-	13,246	53,246	38,376	14,871	220,773	235,644	40,000	40,000	N/A	38,376	75.1%	75.1%	N/A	72.1%
64	40,000	-	14,139	54,139	38,376	15,763	235,644	251,407	40,000	40,000	N/A	38,376	73.9%	73.9%	N/A	70.9%
65	40,000	-	15,084	55,084	38,376	16,709	251,407	268,115	40,000	40,000	N/A	38,376	72.6%	72.6%	N/A	69.7%
66	-	15,000	16,087	31,087	38,376	(7,289)	268,115	260,827	-	15,000	N/A	23,376	0.0%	48.3%	N/A	75.2%
67	-	15,000	15,650	30,650	38,376	(7,726)	260,827	253,101	-	15,000	N/A	23,376	0.0%	48.9%	N/A	76.3%
68	-	15,000	15,186	30,186	38,376	(8,189)	253,101	244,911	-	15,000	N/A	23,376	0.0%	49.7%	N/A	77.4%
69	-	15,000	14,695	29,695	38,376	(8,681)	244,911	236,231	-	15,000	N/A	23,376	0.0%	50.5%	N/A	78.7%
70	-	15,000	14,174	29,174	38,376	(9,202)	236,231	227,029	-	15,000	N/A	23,376	0.0%	51.4%	N/A	80.1%
71	-	15,000	13,622	28,622	38,376	(9,754)	227,029	217,275	-	15,000	N/A	23,376	0.0%	52.4%	N/A	81.7%
72	-	15,000	13,037	28,037	38,376	(10,339)	217,275	206,936	-	15,000	N/A	23,376	0.0%	53.5%	N/A	83.4%
73	-	15,000	12,416	27,416	38,376	(10,959)	206,936	195,977	-	15,000	N/A	23,376	0.0%	54.7%	N/A	85.3%
74	-	15,000	11,759	26,759	38,376	(11,617)	195,977	184,360	-	15,000	N/A	23,376	0.0%	56.1%	N/A	87.4%
75	-	15,000	11,062	26,062	38,376	(12,314)	184,360	172,046	-	15,000	N/A	23,376	0.0%	57.6%	N/A	89.7%
76	-	15,000	10,323	25,323	38,376	(13,053)	172,046	158,993	-	15,000	N/A	23,376	0.0%	59.2%	N/A	92.3%
77	-	15,000	9,540	24,540	38,376	(13,836)	158,993	145,157	-	15,000	N/A	23,376	0.0%	61.1%	N/A	95.3%
78	-	15,000	8,709	23,709	38,376	(14,666)	145,157	130,491	-	15,000	N/A	23,376	0.0%	63.3%	N/A	98.6%
79	-	15,000	7,829	22,829	38,376	(15,546)	130,491	114,945	-	15,000	N/A	23,376	0.0%	65.7%	N/A	102.4%
80	-	15,000	6,897	21,897	38,376	(16,479)	114,945	98,466	-	15,000	N/A	23,376	0.0%	68.5%	N/A	106.8%
81	-	15,000	5,908	20,908	38,376	(17,468)	98,466	80,999	-	15,000	N/A	23,376	0.0%	71.7%	N/A	111.8%
82	-	15,000	4,860	19,860	38,376	(18,516)	80,999	62,483	-	15,000	N/A	23,376	0.0%	75.5%	N/A	117.7%
83	-	15,000	3,749	18,749	38,376	(19,627)	62,483	42,857	-	15,000	N/A	23,376	0.0%	80.0%	N/A	124.7%
84	-	15,000	2,571	17,571	38,376	(20,804)	42,857	22,052	-	15,000	N/A	23,376	0.0%	85.4%	N/A	133.0%
85	-	15,000	1,323	16,323	38,376	(22,052)	22,052	(0)	-	15,000	N/A	23,376	0.0%	91.9%	N/A	143.2%
NPV[1]	605,521	15,780	50,220	671,521	621,301		0		605,521	621,301	N/A	605,521	90.2%	92.5%	N/A	90.2%
Annuity[2]	37,401	975	3,102	41,477	38,376		-		37,401	38,376	N/A	37,401			N/A	

[1] Net present values (NPVs) are computed for amounts over the individual's lifetime, except that the NPV for wealth at the beginning of year is simply wealth at age 25.

[2] Annuity is the level annuity value over the individual's lifetime.

Table A-3

Example of VAT Burden on a Nonsaver and a Saver, Showing Transitional Burden if VAT Introduced at Age 66

	Income				Consump-tion	Saving	Wealth		VAT Base Under Alternative Distribution Methods							
									Amount				Base Amount as a Percent of Income			
										Revised Method				Revised Method		
Age	Wages	Social Security	Capital Income	Total			Beginning of Year	End of Year	Prior Method	Fully Phased In	During Transition	Uses Method	Prior Method	Fully Phased In	During Transition	Uses Method
									Nonsaver							
66	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
67	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
68	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
69	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
70	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
71	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
72	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
73	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
74	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
75	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
76	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
77	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
78	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
79	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
80	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
81	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
82	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
83	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
84	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
85	-	15,000	-	15,000	15,000	-	-	-	-	15,000	-	-	0.0%	100.0%	0.0%	0.0%
NPV[1]	0	172,049	0	172,049	172,049	0	0		0	172,049	0	0	0.0%	100.0%	0.0%	0.0%
Annuity[2]	-	15,000	-	15,000	15,000	-	-		-	15,000	-	-				
									Saver							
66	-	15,000	16,087	31,087	38,376	(7,289)	268,115	260,827	16,087	15,000	23,376	23,376	51.7%	48.3%	75.2%	75.2%
67	-	15,000	15,650	30,650	38,376	(7,726)	260,827	253,101	15,650	15,000	23,376	23,376	51.1%	48.9%	76.3%	76.3%
68	-	15,000	15,186	30,186	38,376	(8,189)	253,101	244,911	15,186	15,000	23,376	23,376	50.3%	49.7%	77.4%	77.4%
69	-	15,000	14,695	29,695	38,376	(8,681)	244,911	236,231	14,695	15,000	23,376	23,376	49.5%	50.5%	78.7%	78.7%
70	-	15,000	14,174	29,174	38,376	(9,202)	236,231	227,029	14,174	15,000	23,376	23,376	48.6%	51.4%	80.1%	80.1%
71	-	15,000	13,622	28,622	38,376	(9,754)	227,029	217,275	13,622	15,000	23,376	23,376	47.6%	52.4%	81.7%	81.7%
72	-	15,000	13,037	28,037	38,376	(10,339)	217,275	206,936	13,037	15,000	23,376	23,376	46.5%	53.5%	83.4%	83.4%
73	-	15,000	12,416	27,416	38,376	(10,959)	206,936	195,977	12,416	15,000	23,376	23,376	45.3%	54.7%	85.3%	85.3%
74	-	15,000	11,759	26,759	38,376	(11,617)	195,977	184,360	11,759	15,000	23,376	23,376	43.9%	56.1%	87.4%	87.4%
75	-	15,000	11,062	26,062	38,376	(12,314)	184,360	172,046	11,062	15,000	23,376	23,376	42.4%	57.6%	89.7%	89.7%
76	-	15,000	10,323	25,323	38,376	(13,053)	172,046	158,993	10,323	15,000	23,376	23,376	40.8%	59.2%	92.3%	92.3%
77	-	15,000	9,540	24,540	38,376	(13,836)	158,993	145,157	9,540	15,000	23,376	23,376	38.9%	61.1%	95.3%	95.3%
78	-	15,000	8,709	23,709	38,376	(14,666)	145,157	130,491	8,709	15,000	23,376	23,376	36.7%	63.3%	98.6%	98.6%
79	-	15,000	7,829	22,829	38,376	(15,546)	130,491	114,945	7,829	15,000	23,376	23,376	34.3%	65.7%	102.4%	102.4%
80	-	15,000	6,897	21,897	38,376	(16,479)	114,945	98,466	6,897	15,000	23,376	23,376	31.5%	68.5%	106.8%	106.8%
81	-	15,000	5,908	20,908	38,376	(17,468)	98,466	80,999	5,908	15,000	23,376	23,376	28.3%	71.7%	111.8%	111.8%
82	-	15,000	4,860	19,860	38,376	(18,516)	80,999	62,483	4,860	15,000	23,376	23,376	24.5%	75.5%	117.7%	117.7%
83	-	15,000	3,749	18,749	38,376	(19,627)	62,483	42,857	3,749	15,000	23,376	23,376	20.0%	80.0%	124.7%	124.7%
84	-	15,000	2,571	17,571	38,376	(20,804)	42,857	22,052	2,571	15,000	23,376	23,376	14.6%	85.4%	133.0%	133.0%
85	-	15,000	1,323	16,323	38,376	(22,052)	22,052	0	1,323	15,000	23,376	23,376	8.1%	91.9%	143.2%	143.2%
NPV[1]	0	172,049	130,595	302,644	440,164	(7,289)	268,115		130,595	172,049	268,115	268,115	43.2%	56.8%	88.6%	88.6%
Annuity[2]	-	15,000	11,386	26,386	38,376	(635)	23,376		11,386	15,000	23,376	23,376				

[1] Net present values (NPVs) are computed for amounts over the individual's lifetime, except that the NPV for wealth at the beginning of year is simply wealth at age 66.

[2] Annuity is the level annuity value over the individual's lifetime.

Appendix B:
Distributional Analysis and Microsimulation Models in OTA, JCT, CBO and TPC

Table B-1

Methodology for Distributional Analysis in OTA, JCT, CBO and TPC

Methodology		OTA	JCT	CBO	TPC
1. Taxes Included/ Incidence Assumptions	**Individual Income**	Included; Borne by payers	Included; Borne by payers	Included; Borne by payers	Included; Borne by payers
	Corporate Income	Included; Borne by all (positive) capital income[1]	Excluded[2]	Included; Borne by all (positive) capital income[3]	Included; Borne by all (positive) capital income
	Payroll	Included; Both employer and employee shares borne by covered wages or self-employment income	Included; Both employer and employee shares borne by covered wages or self-employment income	Included; Both employer and employee shares borne by covered wages or self-employment income	Included; Both employer and employee shares borne by covered wages or self-employment income
	Estate and Gift	Included; Borne by decedents	Excluded[4]	Excluded	Included; Borne by decedents
	Excises	Included; Borne in proportion to relative consumption of taxed consumer goods and by labor and capital for taxed intermediate goods	Included; Borne by consumers[5]	Included; Borne by direct consumers of taxed goods and by all consumers for excises on intermediate goods	Excluded
	Customs Duties	Included; Borne by capital and labor (tax on intermediate goods)	Excluded	Excluded	Excluded
2. Time Period for Analysis		One ("current") year, law at end of budget period[6]	One ("current") year, law in same year[7]	One year (occasionally multiple years), law in same year(s)	One year, law in year when fully implemented
3. Unit of Analysis		(Nondependent) Tax filing units[8]	(Nondependent) Tax filing units	CPS households, size-adjusted	(Nondependent) Tax filing units[9]
4. Measure of Economic Well-Being		Cash income[10]	Expanded income[11]	Cash income plus in-kind benefits[12]	Cash income[13]
5. Measures of Changes in Economic Well-Being	**Change in:**				
	After-tax income (%)	Included	Excluded	Included	Included
	Average tax rate (% point)	Excluded	Included	Excluded, but directly computable	Included
	Total or average taxes paid (%)	Included	Included	Included	Included
	Average taxes paid ($)	Included	Included or directly computable	Included	Included
	Share of tax change (%)	Included	Excluded, but directly computable	Included	Included
	Share of taxes paid (% point)	Excluded	Excluded, but directly computable	Excluded, but directly computable	Included

Table B-1 -- Continued

Sources and Footnotes

Sources: OTA: Julie-Anne Cronin, "U.S. Treasury Distributional Analysis Methodology," OTA Paper 85, September 1999; and James R. Nunns, Deena Ackerman, James Cilke, Julie-Anne Cronin, Janet Holtzblatt, Gillian Hunter, Emily Lin and Janet McCubbin, "Treasury's Panel Model for Tax Analysis," OTA Technical Working Paper 3, July 2008. JCT: "Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens," JCS-7-93, June 14, 1993, but in some respects this description appears to be outdated (see, for example, the distribution tables in "Present Law and the President's Fiscal Year 2011 Budget Proposals…," JCX-36-10, July 12, 2010). CBO: Richard A. Kasten and Eric J. Toder, "Distributional Analysis in the Congressional Budget Office" in David F. Bradford (ed.), *Distributional Analysis of Tax Policy* , The AEI Press, 1995; "Effective Tax Rates: Comparing Annual and Multiyear Measures," CBO Paper, January 2005; and CBO Director's Blog, "Effective Tax Rates," December 11, 2007. TPC: footnotes to all distribution tables; and "The Bush Tax Cuts: How Are the Distributional Effects Measured?" in *A Citizens Guide for the 2008 Election, and Beyond* .

[1] OTA has occasionally produced tables distributing some of the corporate income tax to labor; for example, see the Appendix tables in the *Report of the President's Advisory Panel on Federal Tax Reform* , November 2005.

[2] The corporate income tax was included in JCS-7-93, and assumed to be borne by shareholders in the (then) five-year budget window.

[3] CBO in the past provided an alternative distribution of the corporate income tax that assigned the burden to labor income; for example, see "The Changing Distribution of Federal Taxes: 1975-1990," October 1987.

[4] The estate and gift taxes were included in JCS-7-93, and assumed to be borne by decedents.

[5] In JCS-7-93 consumption taxes were generally assumed to be borne as the income that would finance the consumption is earned.

[6] OTA also prepares distributional analyses with a panel model, for which the time period is the 10-year budget window; see text.

[7] The time period used in JCS-7-93 was the (then) five-year budget window.

[8] OTA has included the income of dependents with the taxpayers who claim them as dependents; this is still done in OTA's panel model.

[9] TPC also produces distributional tables with units adjusted for size ("equivalenced").

[10] Cash income is AGI reported on tax returns plus nontaxable government transfer payments, tax-exempt interest, the employer share of payroll taxes and the corporate income tax. OTA in the past used a more comprehensive income measure called "family economic income"; see Cronin (1999) and references cited there.

[11] Expanded income is AGI plus tax-exempt interest, employer contributions for health plans and life insurance, employers' share of Federal Insurance Contribution Act (FICA), worker's compensation, nontaxable Social Security benefits, the insurance value of Medicare benefits, alternative minimum tax (AMT) preference items, and the excluded income of U.S. citizens living abroad.

[12] In-kind benefits include the value of Medicare and Medicaid benefits, employer-provided health insurance, food stamps, school breakfasts and lunches, housing assistance and energy assistance.

[13] TPC also produces distribution tables that use a more comprehensive measure of income called "economic income"; see "Income breaks for Distribution Tables" March 18, 2004.

Table B-2

Microsimulation Models Used for Distributional Analysis in OTA, JCT, CBO and TPC

Model Component		OTA	JCT	CBO	TPC
Base Microdata File		SOI (full sample)	SOI (full sample)	SOI (full sample)	SOI (PUF)
Nonfilers		Statistical match to CPS, then identification of nonfiling units; recently, IRS information returns	Statistical match to CPS, then identification of nonfiling units; recently, IRS information returns	Statistical match to CPS, then identification of nonfiling units	Statistical match to CPS, then identification of nonfiling units
Age and Gender		SSA records	SSA records	SSA records	CPS match file
Wage Splits		W-2s	W-2s	W-2s	CPS match file
Cash Transfers		CPS match file, IRS information returns	CPS match file, IRS information returns	CPS match file, IRS information returns	CPS match file
In-Kind Transfers (except medical)		CPS match file (food stamps)	N/A	CPS	CPS match file
Pensions	**Coverage**	CPS match file	CPS match file	CPS	SIPP, PSID
	Assets	IRS information returns (dc plans)	IRS information returns (dc plans)	N/A	SCF (dc plans)
Health Insurance	**Coverage**	CPS match file; W-2s	CPS match file; W-2s	CPS match file; W-2s	CPS match file
	Value	MEPS	MEPS; Medicare imputed	CPS	MEPS, benchmarked to NHA
Savings		Assumed proportional to after-tax income	N/A[1]	N/A	Imputation from DYNASIM
Consumption	**Level**	After-tax income less savings	SCF	CE	CE, benchmarked to NIPA
	Shares	CE	CE	CE	CE
Wealth		N/A	N/A	N/A	SCF

Sources: OTA's cross-section microsimulation model: James Cilke, "The Treasury Individual Income Tax Simulation Model," Office of Tax Analysis, April 1994. OTA's panel model: James R. Nunns, Deena Ackerman, James Cilke, Julie-Anne Cronin, Janet Holtzblatt, Gillian Hunter, Emily Lin and Janet McCubbin, "Treasury's Panel Model for Tax Analysis," OTA Technical Working Paper 3, July 2008. JCT's microsimulation model: "Overview of Revenue Estimating Procedures and Methodologies Used by the Staff of the Joint Committee on Taxation," JCX-1-05, February 2, 2005. CBO's microsimulation model: Richard A. Kasten and Eric J. Toder, "Distributional Analysis in the Congressional Budget Office" in David F. Bradford (ed.), *Distributional Analysis of Tax Policy* , The AEI Press, 1995; "Effective Tax Rates: Comparing Annual and Multiyear Measures," CBO Paper, January 2005 and CBO Director's Blog, "Effective Tax Rates," December 11, 2007. TPC's microsimulation model: Jeffrey Rohaly, Adam Carasso and Mohammed Adeel Saleem, "The Urban-Brookings Tax Policy Center Microsimulation Model: Documentation and Methodology for Version 0304," January 10, 2005.

[1] In JCS-7-93, the JCT imputed savings from the SCF.

Table B-2 -- Continued

Acronyms

SOI -- Statistics of Income (Division of IRS)
PUF -- Public Use File
CPS -- Current Population Survey (conducted by Census Bureau)
SSA -- Social Security Administration
dc -- Defined contribution
SIPP -- Survey of Income and Program Participation (conducted by Census Bureau)
PSID -- Panel Survey of Income Dynamics (conducted by the Survey Research Center, Institute for Social Research, University of Michigan)
SCF -- Survey of Consumer Finances (conducted by Board of Governors of the Federal Reserve System)
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)
DYNASIM3 -- Dynamic Simulation of Income Model (an Urban Institute microsimulation model)
CE -- Consumer Expenditure Survey (conducted by Census Bureau for Bureau of Labor Statistics)
NIPA -- National Income and Product Accounts (produced by the Bureau of Economic Analysis)

Table B-3

Distributional Analysis of a VAT (or Other Broad-Based Consumption Tax) by OTA, JCT, CBO and TPC (Prior Method)

Components of Analysis		OTA	JCT	CBO	TPC (Prior Method)
Method		Sources	Sources	Uses	Sources
Level of Consumer Prices		Assumed not to change	Assumed to rise	Assumed to rise	Assumed not to change
Relative Consumer Price Effect		Estimated through consumption shares	Estimated through consumption shares	Implicit in uses method	Estimated through consumption shares
Labor Income		Bears VAT (at effective rate on labor and capital income)	Bears VAT (at effective rate on labor and capital income)	N/A	Bears VAT (at effective rate on labor and capital income)
Transfer Income		If indexed, bears no VAT	If indexed, bears no VAT	If indexed, bears no VAT	If indexed, bears no VAT
Capital Income	**Old Equity**	Bears all VAT on old capital	Both bear VAT (at effective rate on labor and capital income)	N/A	Bears all VAT on old capital
	Old Bonds	Bears no VAT		N/A	Bears no VAT
	New Equity & Bonds	Deduction for new investment (savings) effectively exempts normal return	Deduction for 5-year average new investment (savings) effectively exempts normal return	N/A	Deduction for "new" investment (savings) effectively exempts normal return
Consumer Durables	**Old Durables**	Bears no VAT	Bears no VAT	Bears no VAT	Bears no VAT
	New Housing	Not specified	Not specified	Treated as consumption	All new consumer durables treated as consumption (only affects relative consumer prices)
	New Other Durables	Treated as consumption (only affects relative consumer prices)	Treated as consumption (only affects relative consumer prices)	Treated as consumption	
Income and Payroll Tax Offsets		Estimated from reduction in labor and capital income	Estimated from effect on indexed parameters	Estimated from effect on indexed parameters	Estimated from reduction in labor and capital income
Government Spending		Not specified	Not specified	Not specified	Not specified

Sources: OTA: Julie-Anne Cronin, "U.S. Treasury Distributional Analysis Methodology," OTA Paper 85, September 1999; JCT: "Methodology and Issues in Measuring Changes in the Distribution of Tax Burdens," JCS-7-93, June 14, 1993; CBO: "Effects of Adopting a Value-Added Tax," February 1992; TPC: Eric Toder and Joseph Rosenberg, "Effects of Imposing a Value-Added Tax to Replace Payroll Taxes or Corporate Taxes," March 18, 2010.

Appendix C:
Data Sources for Distributional Analysis

Section III described how a VAT would affect both the sources and uses of income (income, consumption and saving), and as a transitional matter the returns to certain forms of old capital (wealth). Data on each of these items is required to implement distributional analyses of a VAT. Ideally, all of these items (as defined for the distributional analysis) would be available in a representative sample of all households that, when weighted, matched aggregate data amounts. In practice, no microdata set contains sufficiently detailed and properly defined information on income, consumption, saving and wealth for distributional analysis, and none are weighted to add up to corresponding aggregate totals for key items. As a result, distributional analysis must be based on several different microdata sets, and items must be adjusted or other steps taken to make the analysis consistent with conceptual definitions and with aggregate totals. This Appendix describes the micro and aggregate data available for distributional analysis and how they are related to each other and to conceptual definitions.

Aggregate Data on Sources and Uses of Income – National Income and Product Accounts

The National Income and Product Accounts (NIPA) tables prepared by the Bureau of Economic Analysis (BEA) in the U.S. Department of Commerce provide aggregate data on sources and uses of income. Table C-1 reproduces the main entries in NIPA tables 1.1.5, 1.10 and 1.12, which provide the broadest measures of sources and uses, for calendar year 2008. Total labor earnings of employees in 2008 were $8.1 trillion, of which $6.6 trillion was wages and $1.5 trillion were employer payments for retirement and health fringe benefits ($1.0 trillion) and the employer share of social security taxes and unemployment taxes ($0.5 trillion).[39] Gross earnings of capital and the income of the self-employed amounted to $5.2 trillion, including $3.3 trillion of "net operating surplus" (profits and the labor earnings of the self-employed), and $1.8 trillion of depreciation. Taxes on products (net of any government product subsidies) are a "wedge" between the value of goods and services produced and the amount earned by labor and capital, so these taxes ($1.0 trillion) must be added in to arrive at Gross Domestic Income of $14.2 trillion. Gross Domestic Product (GDP) was $14.4 trillion in 2008, with the difference from Gross Domestic Income due to the statistical discrepancy between the sources and uses measures. GDP uses were consumption ($10.1 trillion), gross private investment ($2.1 trillion), net exports (-$0.7 trillion) and government spending ($2.9 trillion).

The relationship between Gross Domestic Income and Personal Income and the major uses of Personal Income are shown in Table C-2, which reproduces the main entries in NIPA table 2.1 and differences from corresponding entries in table 1.10 for 2008.

[39] The NIPA tables do not provide separate estimates for the labor and capital income of the self-employed. Their total income is included in proprietors' income, partnership income, and corporate profits. Proprietors' income and partnership income includes the combined labor and capital income of individuals considered proprietors and partners in firms organized as partnerships for income tax purposes. Corporate profits include the combined labor and capital income of owners of S Corporations, which are treated essentially as partnerships for income tax purposes, but pay some wages to owners. For payroll tax purposes, virtually all of the income of proprietors and partners is treated as labor income.

Table C-1

Sources and Uses of Income from the National Income and Product Accounts, 2008

(billions of dollars)

Source	Amount	Use	Amount
Returns to Labor (Employees Only), Total	**8,068.1**	**Consumption**	**10,104.5**
Wages	6,561.4	Goods	3,379.5
Other labor compensation	1,506.8	Durables	1,083.5
Employer contributions for health insurance, retirement, etc.	1,036.6	Nondurables	2,296.0
Employer payroll taxes	470.1	Services	6,725.0
Returns to Capital and Self-Employment, Total	**5,172.0**	**Investment**	**2,096.7**
Returns net of depreciation	3,322.8	Nonresidential structures	582.4
Interest	1,042.3	Equipment and software	1,082.9
Proprietors' income	1,102.0	Residential	472.5
Rental income	222.0	Change in private inventories	(41.1)
Corporate profits	851.5		
Corporate income taxes	308.4	**Net Exports**	**(710.4)**
Dividends paid less dividends received	611.5	Exports	1,843.4
Undistributed profits	(68.5)	Imports	2,553.8
Other	105.0		
Depreciation	1,849.2	**Government**	**2,878.3**
		Federal	1,079.9
Taxes on Goods and Services	**992.3**	State and local	1,798.5
Gross Domestic Income	**14,232.5**	**Gross Domestic Product**	**14,369.1**
Statistical Discrepancy	**136.6**		
Gross Domestic Product	**14,369.1**		

Source: U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Tables 1.1.5, 1.10 and 1.12 as of August 17, 2010.

Note: Entry labels differ in some cases from the NIPA label.

Note: Detail may not add to totals due to rounding.

Table C-2

Relationship Between Gross Domestic Income and Personal Income, and Major Uses of Personal Income, 2008

(billions of dollars)

Source	Amount
Gross Domestic Income	**14,232.5**
Adjustments to Returns to Capital and Labor, Total	**144.8**
Wages	(2.4)
Interest	272.4
Corporate profits	(56.9)
Other	(68.3)
Plus: Government Transfer Payments	**1,842.6**
Less: Depreciation	**1,849.2**
Less: Taxes on Goods and Services	**992.3**
Less: Employer and Employee Payroll Taxes	**987.2**
Equals: Personal Income	**12,391.1**

Use	Amount
Personal Income	**12,391.1**
Less: Individual Income and Personal Property Taxes	**1,438.2**
Equals: Disposable Personal Income	**10,952.9**
Less: Personal Outlays	**10,505.0**
Consumption	10,104.5
Personal Interest Payments	246.2
Personal Transfer Payments	154.3
Equals: Personal Saving	**447.9**

Source: U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPA), tables 1.10 and 2.1 as of August 17, 2010.

Note: Entry labels differ in some cases from the NIPA label.

Personal Income includes sources of income that are actually received by households, including income in the form of wages, interest and dividends from abroad. Corporate profits used to pay income tax and after-tax profits retained by corporations are not received by households, and therefore are excluded from personal income. Along with other adjustments, these changes to Gross Domestic Income ($14.2 trillion, from Table C-1) total $0.1 trillion. Government transfer payments ($1.8 trillion) are not included in Gross Domestic Income because they do not represent payments for current production but are income to households and therefore are added. Depreciation ($1.8 trillion), taxes on goods and services ($1 trillion), and payroll taxes ($1 trillion) are forms of Gross Domestic Income not received by households, so must be subtracted. The total amount of adjustments, additions and subtractions is -$1.8 trillion, resulting in Personal Income of $12.4 trillion.

In 2008, Personal Income was used to pay individual income and personal property taxes of $1.4 trillion, leaving $11.0 trillion of income available for spending or saving (Disposable Personal Income). The primary use of Disposable Personal Income is for consumption ($10.1 trillion). Nonmortgage interest payments ($0.2 trillion) are treated separately from consumption, as are fines and related payments to governments and personal transfers to relatives and others living abroad ($0.2 trillion). The residual is Personal Saving of $0.4 trillion.[40]

The entries in Tables C-1 and C-2 show the derivation of the sources and uses of Personal Income, starting with GDP. In addition, the tables indicate part of the relationship between the sources of government income (taxes on businesses and households) and the uses of revenue for government spending. Likewise, saving by businesses (undistributed after-tax profits), households, governments (which currently are dissaving) plus borrowing from abroad are the sources of funds required to finance investment. Finally, the tables show net exports, for which the sources are exports and income receipts from abroad, and uses are imports and income paid to recipients outside the United States less (because imports exceed exports) borrowing from abroad.

VATs in practice do not cover all items of consumption, so data are needed by categories of consumption in order to distinguish items that are fully taxed, partially taxed and free of tax. Aggregate data for this purpose are provided in NIPA table 2.5.5 for 2008, which is summarized in C-3. The items listed in Table C-3 cover all the major categories of consumption and the larger sub-categories but not necessarily the level of detail required for estimating a VAT base with finer distinctions in the items that might be provided with preferential tax treatment. Among the most important categories for defining a VAT base are health (18.6% of total consumption) and education (2.2% of total consumption), much (or all) of excluded from tax. To address regressivity, some VAT proposals would also exclude items such as most food and nonalcoholic beverages consumed at home (6.6% of total consumption) and possibly housing (excluding fuels, 15.2 % of total consumption).

[40] Alternative measures of saving are provided in the Flow of Funds Accounts (FFA) prepared by the Board of Governors of the Federal Reserve System, which are derived from the net change in households' assets and liabilities. Table F. 10 (June 10, 2010 FFA) shows personal saving in 2008 of $984.8 billion (conceptually equivalent to the NIPA figure of $447.9 billion), and $1,119.8 billion using the FFA concept of saving, which treats purchases of all consumer durables as saving (and their depreciation as dissaving).

Table C-3

Major NIPA Categories of Consumption, 2008

Consumption Category	Amount ($ billions)	Percent of Total
Food and Beverages Consumed at Home	**775.2**	**7.7%**
Alcoholic beverages	112.1	1.1%
Clothing and Footwear	**352.1**	**3.5%**
Housing, Utilities and Fuels	**1,861.2**	**18.4%**
Rents paid by tenants	326.3	3.2%
Imputed rental value of owner-occupied housing	1,206.8	11.9%
Utilities and fuels	328.1	3.2%
Furnishings, Equipment and Maintenance	**445.2**	**4.4%**
Health	**1,882.7**	**18.6%**
Medical products, appliances and equipment	335.5	3.3%
Outpatient services	745.4	7.4%
Hospital and nursing home services	801.9	7.9%
Transportation	**1,033.5**	**10.2%**
Motor vehicle purchases	291.0	2.9%
Motor vehicle operation	658.0	6.5%
Public transportation	84.5	0.8%
Communication	**230.6**	**2.3%**
Recreation	**916.0**	**9.1%**
Education	**220.5**	**2.2%**
Food Services and Accommodations	**611.3**	**6.0%**
Financial Services and Insurance	**848.1**	**8.4%**
Financial services	534.0	5.3%
Financial services furnished without payment	281.2	2.8%
Financial service charges, fees and commissions	252.9	2.5%
Insurance	314.1	3.1%
Other Goods and Services	**661.8**	**6.5%**
Personal care and items	273.0	2.7%
Social services and religious activities	141.7	1.4%
Professional and other services	171.5	1.7%
Tobacco	75.7	0.7%
Net Foreign Travel and Expenditures Abroad	**(12.5)**	**-0.1%**
Total Consumption by Households	**9,825.7**	**97.2%**
Plus: Total Consumption by Nonprofits	**278.8**	**2.8%**
Equals: Total Consumption	**10,104.5**	**100.0%**

Source: U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts (NIPA), Table 2.5.5 as of August 18, 2010.

Note: Entry labels differ in some cases from the NIPA label.

Note: Detail may not add to totals due to rounding.

Other adjustments to the base are made to reflect taxation of new owner-occupied housing under a VAT. NIPA consumption amounts for owner-occupied housing are the "imputed rent" of this housing, the amount that would be paid in rent by homeowners. As a practical matter, this imputed rent could not be measured annually for each household, so VAT is applied to the full value of purchases of new owner-occupied housing and no tax is applied to imputed rent.[41] This is called the "pre-payment" method of collecting VAT because the economic effect is the same as if no VAT applied at the time of purchase but full VAT applied to the imputed rent of owner-occupied housing. The effect of this treatment on the VAT base is to replace the amounts for imputed rent of owner-occupied housing in NIPA consumption with the amount of spending on new owner-occupied housing.

The VAT base might also be adjusted to remove state and local sales taxes, so that VAT would not apply to these taxes. Federal, state and local excise taxes are generally collected early in the production/distribution chain, so as a practical matter cannot be removed from the base of a VAT. Further, to the extent excises represent quasi charges for the use of public services (e.g., motor fuel excises support public transportation infrastructure) or help internalize externalities (e.g., excises on tobacco and alcoholic beverages offset some of the external costs imposed by their consumption), it may be appropriate to include these excises in the VAT base even if they could administratively be removed from the VAT base.

Aggregate Data on Wealth – Flow of Funds Accounts

The Flow of Funds Accounts (FFA) prepared by the Board of Governors of the Federal Reserve System includes tables on the balance sheets (wealth) of households and nonprofits. Table C-4 reproduces the major categories of assets and liabilities of households and nonprofits as of the end of 2008 from the FFA released June 10, 2010. Total assets were $65.6 trillion, of which $23.9 trillion (36 percent) were tangible assets and $41.7 trillion (64%) were financial assets. Homes and other real estate ($17.0 trillion) and consumer durables ($4.6 trillion) made up most of the real assets. The rest, $2.3 trillion, was owned by nonprofits. Among financial assets, $8.0 trillion (19 percent of total financial assets) were direct holdings of deposits, $4.0 trillion (10 percent) were direct holdings of credit market instruments, and the remaining $29.7 trillion (71 percent) were other financial assets, of which $12.6 trillion, or more than 42 percent, was corporate equities and $7.3 trillion (25 percent) was equity in noncorporate businesses. Total business equity of $19.9 trillion, therefore, represents nearly half (48 percent) of total financial assets.

The liabilities of households and nonprofits at the end of 2008 totaled $14.3 trillion, of which $10.5 trillion (74 percent) was home mortgages and $2.6 trillion (18 percent) was consumer credit (which includes loans for motor vehicles and other consumer durables). Most of the remainder was liabilities of nonprofits.

[41] New rental housing could receive the same treatment or the opposite treatment (no VAT imposed on the purchase value, but VAT applied to rents).

Table C-4

Assets and Liabilities of Households and Nonprofit Organizations from the Flow of Funds Accounts, 2008

(billions of dollars)

Asset/Liability	Amount
Assets, total	**65,558.3**
Tangible Assets, total	**23,889.9**
Real estate owned by households	17,037.8
Consumer durables	4,558.5
Real estate and other tangibles of nonprofits	2,293.7
Financial assets, total	**41,668.4**
Deposits, total	7,972.8
Time and savings deposits	6,068.0
All other deposits	1,904.8
Credit market instruments, total	4,024.9
Corporate and foreign bonds	1,988.6
All other credit market instruments	2,036.3
Other financial assets, total	29,670.7
Corporate equities	5,913.5
Life insurance reserves	1,179.8
Of which: Corporate equities	956.9
Pension fund reserves	10,415.8
Of which: Corporate equities	3,895.8
Equity in noncorporate business	7,326.6
All other financial assets	4,835.1
Of which: Corporate equities	1,844.4
Addendum: Total direct and indirect holdings of corporate equities	12,610.6
Liabilities	**14,265.1**
Home Mortgages	10,496.9
Consumer Credit	2,594.1
Other liabilities of Households	442.9
Liabilities of nonprofits	731.2
Net Worth	**51,293.2**

Source: Board of Governors of the Federal Reserve System, Flow of Funds Accounts of the United States, Tables B.100 and B.100e, June 10, 2010.

Note: Detail may not add to totals due to rounding.

Micro Data on Sources of Income – SOI Sample of Income Tax Returns

The annual samples of individual income tax returns prepared by the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS) provide the basic data files used to produce distributional analyses by OTA, JCT and CBO as well as TPC. The 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).[42] 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.

Income reported on tax returns differs from NIPA accounting in a number of ways, including the inclusiveness of various sources of income, the timing of income and how various items of income are labeled. Income as measured in NIPA (Personal Income) in 2008 was $12.4 trillion (see Table C-2), whereas income as measured for individual income tax purposes (AGI) in 2008 was $8.3 trillion (see Table C-5). There are two main reasons for the $4.1 trillion difference in these measures of 2008 income. First, NIPA measures the income of pension (and other retirement) funds as contributions are made and as income is earned (in the form of interest, dividends and rents); pension benefit payments are excluded.[43] The AGI measure is reversed: Pension contributions and earnings are omitted, but benefit payments (in excess of basis) are included.[44] Second, Personal Income includes income used to pay for health insurance in full, by including employer-provided health insurance in labor compensation (see Table C-1) and government-provided health insurance (Medicare, Medicaid and others) in transfer payments (Table C-2). AGI does not include these sources of income and also excludes certain other types of health spending (e.g., spending through cafeteria plans).

Other important differences between Personal Income and AGI arise because only a portion of Social Security Benefits are included in AGI, other transfer payments (except unemployment benefits) are excluded from AGI, AGI does not included imputed rent on owner-occupied housing, and AGI excludes income earned by nonfilers. AGI exceeds Personal Income by including capital gains and does not exclude the employee portion of payroll taxes. There are also a number of other smaller differences.

Table C-5 provides a comparison between the major sources of income as measured by Personal Income and AGI. As indicated above, much of the difference between Personal Income and AGI is due to conceptual differences in the treatment of health insurance and retirement account contributions, earnings and distributions. Personal Income includes both employer and employee payments for health insurance as well as the value of government-provided health insurance (Medicare, Medicaid and others), whereas AGI omits nearly all such payments (only nontax

[42] For further information on the SOI sample and other information for 2008 and earlier years, see http://www.irs.gov/taxstats/indtaxstats/article/0,,id=134951,00.html.
[43] A very minor exception, noted in Appendix Table C-1, is that Tier 2 Railroad retirement benefits are included in Personal Income (as a transfer payment).
[44] Basis in a retirement account is the amount contributed from after-tax income.

Table C-5

Relationship Between Personal Income and Adjusted Gross Income (AGI), 2008

(billions of dollars)

Source	Amount			Reasons for Difference	
	Personal Income	AGI	Difference	Amounts in Personal Income Excluded from AGI	Amounts in AGI Excluded from Personal Income
Wages	**6,559.0**	**5,950.6**	**608.4**	Employee contributions for retirement and most health insurance, food, clothing and lodging provided by employers, tax exempt military pay, underreported wages, wages earned by nonfilers	Wages earned by nonresident citizens, taxable disability payments, supplemental unemployment benefits
Employer Contributions for Health Insurance, Retirement, etc.	**1,036.6**	*	**1,036.6**	Essentially all of these employer contributions are excluded from AGI	
Interest Income	**1,314.7**	**223.3**	**1,091.4**	Interest retained by insurance companies and pension plans, financial services provided without payment, tax-exempt interest, interest earned by estates and trusts, underreported interest, interest earned by nonfilers	Interest paid by mutual funds (treated as dividends in NIPA)
Proprietors' Income	**1,102.0**	**634.5**	**467.5**	Accounting differences for inventory valuation and depreciation, underreported income, miscellaneous small adjustments	S corporation net income (treated a dividends in NIPA), all estate and trust income (treated also as rental income, dividends and interest in NIPA)
Rental Income	**222.0**	**32.9**	**189.1**	Imputed rent on owner-occupied housing, rents retained by insurance companies and pension plans, rental income earned by estates and trusts, accounting differences for depreciation, underreported rents	
Dividends	**794.6**	**219.3**	**575.3**	S corporation income (treated like partnership income in AGI), dividends retained by insurance companies and pension plans, interest paid by mutual funds (treated as interest in AGI), dividends earned by estates and trusts, underreported dividends	

Table C-5 -- Continued

Source	Amount			Reasons for Difference	
	Personal Income	AGI	Difference	Amounts in Personal Income Excluded from AGI	Amounts in AGI Excluded from Personal Income
Transfer Payments, Total	**1,879.2**	**211.8**	**1,667.4**		
Social Security benefits	605.5	168.1	437.4	Social Security benefits not subject to income tax, benefits received by nonfilers	
Unemployment benefits	50.7	43.7	7.0	Underreported unemployment benefits and benefits received by nonfilers	
Other transfer benefits	1,223.0	-	1,223.0	Medicare and Medicaid benefits, the EITC, veterans' benefits, SNAP (Food Stamps), SSI, family assistance, other benefits	
Taxable Pensions	-	**506.3**	**(506.3)**	Only Railroad Tier 2 pensions are included in Personal Income (as a transfer payment)	Pension and annuity benefits (in excess of basis)
Net Gain from Sale of Capital Assets	-	**461.5**	**(461.5)**		Net gain from sale of capital assets is excluded from NIPA
Other Income	-	**144.3**	**(144.3)**		IRA distributions, state income tax refunds, alimony received, gambling winnings, other net income, cancellation of debt, less NOLs and the foreign earned income exclusion
Employee Portion of Payroll Taxes	**(517.1)**	-	**(517.1)**	Payroll taxes paid by employees and the self-employed are excluded from Personal Income	Half of the payroll taxes paid by the self-employed ($24.3B) are deductible (included in Adjustments to Income).
Adjustments to Income	-	**(121.6)**	**121.6**		Adjustments to income not made in NIPA
Totals	**12,391.0**	**8,262.9**	**4,128.1**		

Sources: Personal Income is from U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 2.1 as of August 18, 2010; AGI is from U.S. Department of the Treasury, Internal Revenue Service, Statistics of Income Division, Individual Income Tax Returns 2008, Table 1.3.

Note: Categorization and definitions of Personal Income and AGI are based on Individual Income Tax Returns 2008 Section 4 - Explanation of Terms; Mark Ledbetter, "Comparison of BEA Estimates of Personal Income and IRS Estimates of Adjusted Gross Income," Survey of Current Business, November 2007; and Robert L. Brown, Ann E. Dunbar and Adrienne T. Pilot, "The Feasibility of Producing Personal Income to Adjusted Gross Income (PI-AGI) Reconciliations by State," BEA Working Paper WP2006-05, January 12, 2006.

favored employee health insurance premiums are included in AGI). Personal Income also includes employer and employee contributions to retirement accounts as well as all earnings on these accounts, both of which are excluded from AGI, but Personal Income excludes distributions from retirement accounts in any form (pensions, annuities, withdrawals from 401(k) type accounts and IRAs), which are included in AGI (in excess of basis – previously taxed contributions). Together, these differences account for most of the excess of Personal Income over AGI in wages ($0.6 trillion) and employer contributions ($1.0 trillion), much of the difference in interest ($1.1 trillion, although this includes amounts due to other conceptual differences as well) and dividends ($0.6 trillion), and much of the difference in other transfer benefits ($1.2 trillion), as well as the excess of AGI over Personal Income for taxable pensions ($0.5 trillion). The other significant conceptual differences are that Personal Income includes all Social Security benefits ($0.4 trillion omitted from AGI) and that AGI includes both capital gains ($0.5 trillion) and the employee portion of payroll taxes ($0.5 trillion) which are both excluded from Personal Income.

Micro Data on Sources of Income – Current Population Survey (CPS)

The microsimulation models used by OTA, JCT, CBO and TPC all supplement the information included in the SOI file, in part to add sources of income not included, or not fully included, in AGI. A major source of supplemental income has been the Current Population Survey (CPS) conducted by the Bureau of the Census in the U.S. Department of Commerce. The CPS is a monthly survey of a sample of 57,000 households (representing 117.3 million households for the March 2009 supplement covering 2008 incomes) that is stratified on area of residence and represents the civilian noninstitutional population of the United States.[45] 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 income concept used on the CPS is "money income," which is the amount received in the preceding calendar year by all persons in the sample who are 15 years old and over from: money wages and salaries; net income from self-employment; interest, dividends and rents; income from estates or trusts; pensions; Social Security and railroad benefits; Supplemental Security Income; public assistance; veterans' benefits; unemployment and workmen's compensation; alimony, child support, and regular contributions from persons not living in the household; and other periodic income. Money income does not include capital gains. Money income is before income and employee payroll taxes, and before employee contributions for health insurance or retirement. Employer contributions for health insurance and retirement are excluded from money income, as are noncash benefits for SNAP (food stamps), Medicare, Medicaid, other publicly-provided health benefits, subsidized housing and energy assistance. Money income therefore is a similar measure to AGI but excludes capital gains and most "other income" shown in Table C-5, includes all cash transfer payments (among them,

[45] The CPS also includes Armed Forces personnel living off post or on post with their families. For a full description of the CPS and summary tables from the March 2009 supplement, see http://www.census.gov/apsd/techdoc/cps/cpsmar09.pdf.

Social Security benefits), all income of nonfilers and all pension benefits, and is not reduced by the adjustments to income allowed in computing AGI.

The CPS has been used to supplement income information on the SOI file in several ways. Generally, the CPS records are first matched to SOI records, and then certain CPS income data is added to the SOI file. First, since the CPS represents nonfilers as well as (nearly all)[46] filers, it has been used to provide micro data records on nonfilers, with their income and demographic characteristics. This addition makes it possible to perform distributional and other analyses for the entire population. Second, information on sources of income excluded from AGI, such as certain transfer payments and nontaxable benefits, are available on the CPS. Third, the CPS records wages of spouses separately, whereas the SOI does not. TPC takes these wage splits from the CPS.[47] In addition, the CPS contains certain demographic information that is missing from the SOI file. TPC has relied on CPS for age, sex and other demographic information.[48] Further, the CPS contains information on the availability of, and participation in, employer-provided health insurance and retirement plans, so the CPS information has been used (along with other sources) to add information on employer-provided health insurance and retirement plans to the SOI file.[49]

Micro Data on Sources and Uses of Income – Consumer Expenditure Survey

The Census Bureau conducts the Consumer Expenditure Survey (CE) for the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor.[50] The survey has two components: a Diary Survey covering about 7,000 consumer units a year and an Interview Survey that covers about 7,000 consumer units each quarter for five quarters on a rotating panel basis. The samples for both components are designed to represent the civilian noninstitutionalized U.S. population. Because of the panel design of the Interview Survey, the number of consumer units covered in at least one quarter of each year in the CE samples is about 42,000 (apart from attrition). The sample for 2008 represents 120.8 million consumer units.[51]

The Diary Survey covers a one-week period and is taken twice in the year for each sample unit. It collects detailed information on expenses for food and clothing, tobacco, housekeeping supplies, nonprescription drugs, and personal care products and services. It also collects information on all other expenses, except expenses while traveling overnight or longer. The Interview Survey gathers detailed information on all expenses for which detail is not obtained in the Diary Survey and quarterly total expenses for food and related items but excludes expenses for housekeeping supplies, nonprescription drugs, and personal care products and services.

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[46] The CPS does not cover filers who are institutionalized or living abroad, or some filers who are members of the military.

[47] Wage splits can be obtained from W-2 information by OTA, JCT and CBO.

[48] Some demographic information (age and gender) is available to OTA, JCT and CBO through matching of taxpayers on the SOI sample to Social Security information, so they generally rely on this source rather than the CPS.

[49] Recently, OTA has obtained some of this information from returns filed with IRS.

[50] See "Appendix: Description of the Consumer Expenditure Survey" in Consumer Expenditure Survey Anthology, 2008, available at http://www.bls.gov/cex/anthology08/csxappendix.pdf.

[51] See U.S. Bureau of Labor Statistics, Consumer Expenditure Survey for 2008, available at http://www.bls.gov/cex/tables.htm.

Expenditure data from the two surveys is integrated, with overlapping data taken from the statistically more reliable of the two surveys for each item. CE expenditures include transactions costs, including sales and excise taxes, expenditures for gifts and contributions, insurance premiums and contributions to retirement accounts. CE expenditures exclude expenses that are reimbursed, such as medical care paid by insurance or government programs, and automobile and home construction or repair paid by insurance or warranties.

CE expenditures in 2008 were $6.1 trillion, $4.0 trillion less than consumption of $10.1 trillion from the National Income and Product Accounts (Table C-3). A significant portion of the difference between CE expenditures and NIPA consumption is due to conceptual differences, but there are also significant measurement differences.

Table C-6 shows how CE expenditures are related to personal consumption expenditures (PCE) in the National Income and Product Accounts by major category and a number of subcategories. In 2008, PCE exceeded CE expenditures by $4.0 trillion, or nearly 40 percent of PCE. Much of this difference ($1.5 trillion) occurs in the Health category, for which the PCE includes all spending on health, including amounts paid by government programs (such as Medicare and Medicaid) and private insurers, whereas CE expenditures include only out-of-pocket payments for health insurance and health care. A sizeable difference also occurs in Housing, Utilities and Fuels, with nearly all the difference ($0.4 trillion) due to the PCE including the imputed rental value of owner-occupied housing, whereas CE expenditures include only out-of-pocket costs of homeownership such as mortgage interest, property taxes and homeowners' insurance. The PCE includes the value ($0.3 trillion) of financial services provided without charge, such as checking accounts, which are excluded from CE expenditures. A similarly large difference ($0.3 trillion) is due to the inclusion in PCE of the value of services provided by nonprofits without charge to households, amounts excluded entirely from CE expenditures. The PCE and CE treat insurance on homes and motor vehicles differently, with the PCE including amounts for reimbursed expenses in the appropriate consumption category and only the net amounts (value added) by insurance companies in "Insurance," whereas CE expenditures on insurance premiums are included in the appropriate spending category. However, this difference should primarily affect the categorization of PCE and CE amounts and not the total amount of consumption and expenditures. Life insurance is also treated differently, with PCE including only the value added by life insurance companies and the PCE including premiums. The one major category of expenditures in the CE that is excluded from PCE is for employee payroll tax payments and contributions to pensions ($0.6 trillion). Note that there are also differences in the populations covered, with the PCE including some individuals living on military bases and abroad who are excluded from the CE.[52]

Like the CPS, the CE collects information on the demographic characteristics of the population, such as age, sex, race, marital status, educational attainment and family structure. The CE also collects information on the income of all members of the consumer unit age 14 and over, and on the amount of income, personal property and payroll taxes paid. Income is defined in the same manner as CPS "money income."

[52] Garner et al. (2006) indicate that this population coverage difference alone makes the PCE about three percent higher than CE expenditures.

Table C-6

Relationship Between Consumption in the NIPA (PCE) and Expenditures in the Consumer Expenditure Survey (CE), 2008
(billions of dollars)

Item	Amount			Reasons for Difference	
	Consumption (PCE)	Expenditures (CE)	Difference	Amounts in PCE Excluded from CE	Amounts in CE Excluded from PCE
Food and Beverages Consumed at Home	**775.2**	**452.2**	**323.0**	Alcoholic beverages consumed at home (in "Food Services" for CE), food produced and consumed on farms, food provided to military personnel	
Clothing and Footwear	**352.1**	**217.5**	**134.6**	Clothing issued to military personnel	Jewelry, watches and similar items (included in "Personal care and items" in PCE)
Housing, Utilities and Fuels	**1,861.2**	**1,450.0**	**411.2**		
Rents paid by tenants	326.3	329.0	(2.7)		Utilities and fuels included in rent
Imputed rental value of owner-occupied housing	1,206.8	816.4	390.4	Imputed rent in excess of actual expenses, insurance-reimbursed expenses	Actual expenses in excess of imputed rent, homeowner insurance premiums (net insurance amounts are included in "Insurance" in PCE)
Utilities and fuels	328.1	304.6	23.5	Amounts included in rent	
Furnishings, Equipment & Maint.	**445.2**	**376.8**	**68.4**	Insurance-reimbursed expenses	
Health	**1,882.7**	**359.4**	**1,523.3**	All health expenses paid by government programs or private health insurance	Health insurance premiums paid by consumer units (net insurance amounts are included in "Insurance" in PCE)
Medical products, etc.	335.5	72.0	263.5		
Outpatient services	745.4	287.4	1,259.9		
Hospital and nursing home services	801.9				
Transportation	**1,033.5**	**1,022.9**	**10.6**		
Motor vehicle purchases	291.0	316.4	(25.4)		Used car sales between households, full value of purchases from business (only dealer margins included in PCE)
Motor vehicle operation	658.0	644.5	13.5	Insurance-reimbursed and warranty expenses	Motor vehicle finance charges, motor vehicle insurance (net insurance amounts are included in "Insurance" in PCE)
Public transportation	84.5	62.0	22.5		

Table C-6 -- Continued

Item	Amount			Reasons for Difference	
	Consumption (PCE)	Expenditures (CE)	Difference	Amounts in PCE Excluded from CE	Amounts in CE Excluded from PCE
Communication	**230.6**	**154.9**	**75.7**		
Recreation	**916.0**	**372.5**	**543.5**	PCs and related for some self-employed, some items included in other CE categories	
Education	**220.5**	**126.3**	**94.2**		
Food Services and Accommodations	**611.3**	**463.7**	**147.6**	Food furnished to employees	Alcoholic beverages consumed at home (in "Food and Beverages Consumed at Home" for PCE)
Financial Services and Insurance	**848.1**	**139.7**	**708.4**		
Financial services	534.0	101.4	432.6		
Furnished without payment	281.2	-	281.2	CE only includes this item indirectly	
Charges, fees and commissions	252.9	101.4	151.5		
Insurance	314.1	38.3	275.8	Net household, health and motor vehicle insurance (premiums included in other categories in CE)	Life insurance premiums (PCE includes only operating expenses of life insurance companies)
Other Goods and Services	**661.8**	**322.5**	**339.3**		
Personal care and items	273.0	74.4	198.6	Jewelry, watches and similar items (included in "Clothing and Footwear" in CE)	
Social services and religious activities	141.7	209.8	(68.1)		Alimony and child support (excluded from PCE)
Professional and other services	171.5	*	171.5	Included in other CE categories	
Tobacco	75.7	38.3	37.4		
Net Foreign Travel and Spending	**(12.5)**		**(12.5)**	Included in other CE categories	
Employee Payroll Taxes and Contributions to Pensions	**-**	**638.6**	**(638.6)**		PCE excludes these items, except administrative expenses of pension funds (included in "Financial services" in PCE)
Totals for Households	**9,825.7**	**6,097.2**	**3,728.5**		

Table C-6 -- Continued

Item	Amount			Reasons for Difference	
	Consumption (PCE)	Expenditures (CE)	Difference	Amounts in PCE Excluded from CE	Amounts in CE Excluded from PCE
Plus: Total Consumption by Nonprofits	**278.8**	**-**	**278.8**	CE excludes these services for households provided without charge by nonprofits	
Equals: Total Consumption or Spending	**10,104.5**	**6,097.2**	**4,007.3**		

Sources: Consumption (PCE) is from U. S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, Table 2.5.5 (as of August 18, 2010); expenditures (CE) are from the U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2008, Table 1 (as of August 18, 2010) (aggregate expenditures computed by authors).

Note: Categorization and definitions of consumption and expenditures are based on the footnotes to NIPA Table 2.5.5; the Glossary to the CE; and Thesia I. Garner, George Janini, William Passero, Laura Paszkiewicz and Mark Vendemia, "The CE and the PCE: a comparison," Monthly Labor Review, September 2006.

* Less than $50 million.

CE money income in 2008 was $7.7 trillion, $0.6 trillion less than AGI in 2008. As is true of the comparison of CE expenditures to NIPA consumption, the difference is due to both significant conceptual differences and significant measurement issues.

Table C-7 shows how money income by major source from the CE compares to adjusted gross income (AGI) from SOI. In total, in 2008 AGI ($8.3 trillion) exceeded money income in the CE ($7.7 trillion) by $0.6 trillion, with most of the difference due to the inclusion of capital gains ($0.5 trillion) in AGI, which are excluded from money income. However, the apparently small remaining difference is the net effect of largely offsetting measurement and conceptual differences. Money income substantially understates the combination of interest, dividends, rental income and self-employment income ($0.3 trillion), which conceptually should be quite similar to the AGI amounts. Further, while money income for Social Security benefits and pensions exceeds the AGI amount by $0.1 trillion, Table C-5 shows that Social Security benefits in money income should exceed the taxable portion of benefits included in AGI by $0.4 trillion, so money income is actually substantially low (by $0.3 trillion) for this source. For wages, money income exceeds AGI by $0.2 trillion, which reflects (in large part) the exclusion from AGI wages of employee contributions to retirement plans and most health insurance.[53] Money income also exceeds AGI by including "Other transfer benefits" and personal transfers such as child support and gifts, and by excluding adjustments to income. To summarize, for conceptually comparable sources it appears that AGI exceeds money income by $0.3 trillion and that money income in the CE also understates income excluded from AGI by at least $0.3 trillion. The total understatement of $0.6 trillion represents over 7.6 percent of money income in 2008.

The steps from income before taxes to "Personal Saving" in Table C-8 correspond to the steps from Personal Income to Personal Saving in the NIPA (Appendix Table C-2). Although 2008 aggregate Personal Saving shown in Table C-8 ($846 billion) is much larger than shown in Appendix Table C-2 ($448 billion), it is less than the conceptually equivalent estimate from the FFA ($985 billion). But across quintiles, the Personal Saving figure from the CE is simply not credible, especially for lower-income units. The lowest income quintile has dissaving of $292 billion, which is $12,104 per unit and 119 percent of their disposable income. Some dissaving in this quintile can be expected from units that have temporarily low incomes due to a spell of unemployment, business losses or other circumstances. Some dissaving may be due to retirees drawing down their assets. Some dissaving may also be due to large one-time expenditures, such as out-of-pocket medical bills or purchases of durables, among units that are low-income over time. Some may be due to college student borrowing. In addition, some units may receive support from family members or others outside the unit (but regular support is already included in money income). None of these explanations, though, explain the very high level of dissaving in the lowest quintile. The median net worth of families in the lowest income quintile was only $8,100 in 2007, and their median financial assets (of the 79 percent with any financial assets) were only $1,700.[54] So, borrowing or drawing down assets to finance the dissaving in just 2008 would have been beyond the financial capacity of most units in the lowest quintile. Further, extensive research using both macro and micro data has made clear that liquidity constraints and uncertainty about future income cause consumption to be closely correlated with income.[55]

[53] The Employee Benefits Security Administration of the U.S. Department of Labor (2010) reports that participant contributions to 401(k)-type plans in 2007 alone were $167 billion (see table D-8).
[54] These figures are from Tables 4 and 6 in Bucks, et al. (2009).
[55] For an early survey, see Deaton (1992).

Table C-7

Relationship Between Money Income as Measured in the Consumer Expenditure Survey and Adjusted Gross Income (AGI), 2008
(billions of dollars)

Source	Amount			Reasons for Difference	
	Money Income	AGI	Difference	Amounts in Money Income Excluded from AGI	Amounts in AGI Excluded from Personal Income
Wages	**6,160.1**	**5,950.6**	**209.5**	Employee contributions for retirement and most health insurance, tax exempt military pay, wages earned by nonfilers	Wages earned by nonresident citizens and members of the military living on base
Interest, Dividends and Rental Income	**182.2**	**493.7**	**(311.5)**	S corporation income (treated as self-employment income in AGI), tax-exempt interest, nonfilers' amounts	
Self-Employment Income	**388.8**	**616.3**	**(227.5)**		S corporation net income (treated as dividends in Money Income)
Transfer Payments (except SSB)	**72.0**	**43.7**	**28.3**		
Unemployment, workers' compensation and veterans' benefits	27.2	43.7	(16.5)	Nonfilers' unemployment benefits, most workers' compensation, veterans' benefits	
Other transfer benefits	44.8	-	44.8	Public assistance, SSI, Food Stamps	
Social Security Benefits and Pensions	**794.3**	**674.4**	**119.9**	Social Security and pension benefits not subject to income tax, nonfilers' benefits	
Net Gain from Sale of Capital Assets	**-**	**461.5**	**(461.5)**		Net gain from sale of capital assets is excluded from Money Income
Other Income	**79.0**	**144.3**	**(65.3)**	Child support, some gifts, nontaxable scholarships and fellowships, meals and rent received as pay	IRA distributions, state income tax refunds, gambling winnings, other net income, cancellation of debt, less NOLs and the foreign earned income exclusion
Adjustments to Income	**-**	**(121.6)**	**121.6**		No adjustments made in Money Income
Totals	**7,676.5**	**8,262.9**	**(586.4)**		

Sources: Money income is from U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2008, Table 1 (as of August 18, 2010) (aggregate amounts computed by authors); adjusted gross income (AGI) is from U.S. Department of the Treasury, Internal Revenue Service, Statistics of Income Division, Individual Income Tax Returns 2008, Table 1.3.

Note: Categorization and definitions of income sources are based on Individual Income Tax Returns 2008 Section 4 - Explanation of Terms; and the Glossary to the CE.

Table C-8

Derived Savings from the CE, 2008
(dollars in billions)

Item	All Units	Income Quintile				
		Lowest	Second	Third	Fourth	Highest
Money Income, Before Taxes	7,676.5	247.6	662.5	1,140.8	1,789.8	3,835.7
Less: Employee Payroll Taxes[1]	517.1	9.8	38.7	82.1	141.1	245.3
Less: Personal Taxes	216.1	-8.3	-9.7	6.3	35.3	192.4
Equals: Disposable Money Income	6,943.3	246.0	633.5	1,052.4	1,613.4	3,398.0
Less: Expenditures	6,097.2	538.0	766.6	1,031.2	1,416.4	2,345.2
Equals: "Personal Saving"	846.2	-292.0	-133.1	21.3	197.0	1,052.7
Addendum						
"Personal Saving" Per Unit ($)	7,006	-12,104	-5,512	881	8,155	43,543
"Personal Savings" Rate[2] **(%)**	12%	-119%	-21%	2%	12%	31%

Source: U.S. Department of Labor, Bureau of Labor Statistics, Consumer Expenditure Survey, 2008, Table 1 (as of August 18, 2010).

[1] Employee payroll taxes are not reported in the CE. The amounts shown are the NIPA total allocated by quintile by the authors.

[2] "Personal Saving" as a percent of Disposable Money Income.

Micro Data on Wealth – Survey of Consumer Finances

The Board of Governors of the Federal Reserve System conducts the Survey of Consumer Finances (SCF) every three years.[56] The SCF provides information on the income, assets and liabilities of families in the United States.[57] Like the CPS and the CE, the SCF also collects information on the demographic characteristics of the population, such as age, sex, race, marital status, educational attainment and family structure. The SCF sample has two parts: an area-probability sample that is a random sample of families by geographic areas and a supplemental list sample that disproportionately samples wealthy families to obtain statistically valid data on wealth held primarily by the wealthy (such as tax-exempt bonds). The total sample for the latest (2007) SCF was 4,422 families, 2,915 from the area-probability sample and 1,507 from the list sample, representing 116.1 million families.

[56] For a description of the SCF, see Bucks, et al. (2009).
[57] Although the unit of observation for the SCF is a "family", the definition of family is quite similar to the definition of "household" used by the Bureau of the Census.

Total assets in the SCF for 2007 were $78.3 trillion, approximately $0.4 trillion less than the $78.7 trillion shown in the Flow of Funds Accounts (FFA) for 2007. However, there are large differences between the SCF and FFA amounts for major asset types, only some of which are due to conceptual differences in coverage. Table C-9 shows how assets and liabilities from the SCF compare to the corresponding amounts in the Flow of Funds Accounts (FFA). The SCF amount for "Real estate owned by households" is $8.4 trillion higher than the FFA amount though conceptually the FFA amount should be larger because it includes vacant land. This difference may reflect homeowners' optimism (in 2007) about the value of their homes (including second homes).[58] "Consumer durables" in the FFA is $1.5 trillion larger than the SCF amount, but much of this difference is due to the exclusion of furniture, appliances and most other durables (except vehicles) from the SCF. Assets of nonprofits are also excluded from the SCF, but only the amount for tangible assets ($2.6 trillion) is shown separately in the FFA. Among financial assets, the FFA amounts significantly exceed the SCF amounts for deposits ($3.5 trillion, some of which is currency excluded from the SCF), credit market instruments ($2.9 trillion) and corporate equities ($5.0 trillion, some of which may represent foreign direct investment rather than household stock holdings). Life insurance assets are valued differently in the FFA (which shows the reserves of life insurance companies) and the SCF (which shows the cash value of life insurance policies). Pension fund reserves in the FFA exceed the SCF amount by a substantial margin ($4.3 trillion), but this is primarily the net effect of the inclusion in the FFA (but not the SCF) of defined benefit plan reserves (approximately $9.4 trillion) and the inclusion in the SCF (but shown in other categories in the FFA) of IRA and Keogh balances ($4.4 trillion outside insurance companies), with the remainder due to measurement differences.[59] The largest difference in assets is for "Equity in noncorporate business," for which the SCF amount is more than double the FFA amount, a difference of $9.1 trillion. These assets are quite difficult to value, and the difference may largely reflect owners' optimism about the market value of their businesses.[60]

For home mortgage liabilities, the FFA amount is $10.5 trillion, $1.0 trillion more than the SCF amount. Both the absolute and relative difference is much larger for other liabilities of households, with the FFA amount of $3.1 trillion more than $1.4 trillion larger than the SCF amount. Conceptual differences move in opposite directions and appear unlikely to explain much of the total difference.

Micro Data on Saving – Survey of Income and Program Participation

The Census Bureau in the U.S. Department of Commerce conducts the Survey of Income and Program Participation (SIPP), a sample of housing units that is designed to represent the civilian noninstitutionalized population living in the United States.[61] Each SIPP sample is divided into four rotation groups that are each interviewed once every four months, with each cycle of interviews covering all four rotation groups making up a panel "wave." A key aspect of the SIPP is that the sample is a panel interviewed over multiple periods, so that longitudinal information is gathered.

[58] The SCF asks respondents to estimate the value of the unrealized gain in several assets, including real estate (which includes nonresidential properties). In 2007, the amount of unrealized gains reported on real estate was $14.4 trillion (authors' estimates from unpublished version of SCF Table 10).
[59] The amounts for defined benefit plan reserves and IRA and Keogh balances are taken or calculated from FFA Tables B.100, L.118.c and L.225.i.
[60] The amount of unrealized gains in business assets reported in the 2007 SCF was $10.7 trillion (authors' calculation from unpublished version of SCF Table 10).
[61] See "Overview of the Survey of Income and Program Participation (SIPP)" and "Evolution and History of SIPP," available at http://www.census.gov/sipp/intro.html.

Table C-9

Relationship Between Wealth in the Flow of Funds Accounts (FFA) and in the Survey of Consumer Finances (SCF), 2007

(billions of dollars)

Asset or Liability	Amount			Reasons for Difference	
	FFA	SCF	Difference	Amounts in FFA Excluded from SCF	Amounts in SCF Excluded from FFA
Assets, total	**78,723.8**	**78,266.5**	**457.3**		
Tangible Assets, total	**28,036.9**	**34,541.5**	**(6,504.6)**		
Real estate owned by households	20,978.0	29,422.5	(8,444.5)	Vacant land (included in "Equity in noncorporate business" in SCF)	
Consumer durables	4,437.5	2,896.8	1,540.7	Most durables excluded from the SCF	
Vehicles*	1,526.3	2,222.2	(695.9)		
Tangible assets of nonprofits	2,621.4	-	2,621.4	Nonprofits are excluded from the SCF	
Financial Assets, total	**50,686.9**	**43,725.0**	**6,961.9**	Financial assets of nonprofits	
Deposits, total	7,406.5	3,862.2	3,544.3	Currency	
Credit market instruments, total	4,089.4	1,181.0	2,908.4		
Other financial assets, total	39,191.0	38,681.8	509.2		
Corporate equities	9,626.4	4,594.9	5,031.5	May include some foreign direct investment	
Life insurance reserves	1,201.5	835.8	365.7	Life insurance company reserves	Cash value of life insurance
Pension fund reserves	13,390.7	9,082.3	4,308.4	Assets of defined benefit pension plans	IRA and Keogh assets (classified by asset type in FFA)
Equity in noncorporate business	8,797.6	17,851.3	(9,053.7)	1-4 unit residential rental units valued gross of debt	Vacant land (included in "Real estate owned by households" in FFA)
All other financial assets	6,174.8	6,317.5	(142.7)		
Liabilities	**14,366.0**	**11,262.2**	**3,103.8**		
Home mortgages	10,538.5	9,556.7	981.8		
Other liabilities of households	3,131.4	1,705.5	1,425.9	Current charges on balances, deferred and unpaid life insurance premiums, some closely-held businesses debt	Debt held by other households
Liabilities of nonprofits	696.0	-	696.0		
Net Worth	**64,357.8**	**67,004.3**	**(2,646.5)**		

Table C-9 -- Continued

Sources, Footnote and Note

Sources: FFA amounts are from Board of Governors of the Federal Reserve System, Flow of Funds Accounts of the United States, Table B.100, June 10, 2010; SCF amounts were computed by authors from unpublished spreadsheets based on internal data from the Survey of Consumer Finances for 2007.

* The amount shown for vehicles in the FFA is from BEA Fixed Asset Table 8.1, and is the sum of lines 2 and 14.

Note: Categorization and definitions of assets and liabilities are based on Brian K. Bucks, Arthur B. Kennickell, Traci L. Mach and Kevin B. Moore, "Changes in U.S. Family Finances from 2004 to 2007: Evidence from the Survey of Consumer Finances," Federal Reserve Bulletin, February 2009; Rochelle L. Antoniewicz, "A Comparison of the Household Sector from the Flow of Funds Accounts and the Survey of Consumer Finances," SCF Working Paper, October 2000; and Robert B. Avery, Gregory E. Elliehausen and Arthur B. Kennickell, "Measuring Wealth with Survey Data: An Evaluation of the 1983 Survey of Consumer Finances," SCF Working Paper, December 1986 (April 1988 revision).

The latest (2008) SIPP panel includes 42,000 housing units and will cover 13 waves of interviews from September 2008 through December 2012.[62]

The SIPP gathers "core" information on labor force, program participation and income for the preceding four months during each interview. Like other samples, the SIPP collects information on the demographic characteristics of the population, such as age, sex, race, marital status, educational attainment and family structure. Additional information is gathered during each wave in "topical modules" that over the course of the panel cover a range of topics including wealth, annual income, taxes, and retirement and pension plan coverage.

The wealth data collected in the SIPP in two (or more) years allow saving during the intervening year(s) to be estimated directly as the change in net worth. Because income and taxes are also collected in the SIPP, it is also possible to estimate disposable income and, by subtracting saving, consumption. The availability of information to make estimates of saving and consumption, combined with detailed information on demographics, income and program participation, make the SIPP an important source of supplementary data for distributional analysis.

Data on Health – National Health Expenditures and Medical Expenditure Panel Survey

Aggregate data on total U.S. health expenditures are published by the Centers for Medicare & Medicaid Services in the U.S. Department of Health and Human Services. These National Health Expenditures cover annual health spending by type of service delivered (e.g., hospital care, physician services, nursing home care) and source of funding for those services (e.g., private health insurance, Medicare, Medicaid, out-of-pocket spending).

The Medical Expenditure Panel Survey (MEPS) is conducted by the Agency for Healthcare Research and Quality in the U.S. Department of Health and Human Services. The MEPS consists of a sample of households (the Household Component or HC) and a sample of employers (the Insurance Component or IC). In addition, some of the information from the HC component is supplemented or replaced by information from providers (hospitals, physicians, etc.) in a Medical Provider Component (MPC). The MEPS collects data on the specific health services that households use, how frequently they use them, the cost of these services, and how they are paid for, as well as data on the cost, scope and breadth of health insurance held by and available to employees.

The MEPS microdata files have been linked to microsimulation models used for distributional analysis to provide more detailed information on health expenditures and insurance coverage than is available on other microdata files such as the CPS. National Health Expenditures data are used to provide benchmark amounts for categories of health spending from the microdata files.

[62] See "Source and Accuracy Statement for the Survey of Income and Program Participation 2008 Wave 1 to Wave 3 Public Use Files," available at http://www.census.gov/sipp/sourceac/S&A08_W1toW3(S&A-12).pdf.

References

Antoniewicz, Rochelle L. A Comparison of the Household Sector from the Flow of Funds Accounts and the Survey of Consumer Finances. Washington, D.C.: Board of Governors of the Federal Reserve System, 2000. SCF Working Paper.

Auerbach, Alan J. A Modern Corporate Tax. Washington, D.C.: Center for American Progress and The Hamilton Project, 2010.

Avery, Robert B., Gregory E. Elliehausen and Arthur B. Kennickell. Measuring Wealth with Survey Data: An Evaluation of the 1983 Survey of Consumer Finances. Washington, D.C.: Board of Governors of the Federal Reserve System, 1986 (April 1988 revision). SCF Working Paper.

Bipartisan Policy Center. Debt Reduction Task Force. *Restoring America's Future*. Washington, D.C., 2010.

Board of Governors of the Federal Reserve System. *Flow of Funds Accounts of the United States*. Washington, D.C. http://www.federalreserve.gov/releases/z1/default.htm.

Bradford, David F. *Taxation, Wealth, and Saving*. Cambridge, MA: MIT Press, 2000.

Brown, Robert L., Ann E. Dunbar and Adrienne T. Pilot. The Feasibility of Producing Personal Income to Adjusted Gross Income (PI-AGI) Reconciliations by State. Washington D.C.: U.S. Department of Commerce, 2006. BEA Working Paper WP2006-05.

Bucks, Brian K., Arthur B. Kennickell, Traci L. Mach and Kevin B. Moore. Changes in U.S. Family Finances from 2004 to 2007: Evidence from the Survey of Consumer Finances. *Federal Reserve Bulletin* (February 2009): A1-A56.

Burman, Leonard E., Jane G. Gravelle and Jeffrey Rohaly. Towards a More Consistent Distributional Analysis. In *Proceedings of the Ninety-Eighth Annual Conference on Taxation*, 223-236. Washington, D.C.: National Tax Association, 2005.

Cilke, James. The Treasury Individual Income Tax Simulation Model. Washington, D.C.: U. S. Department of the Treasury, 1994.

Congressional Budget Office. The Changing Distribution of Federal Taxes: 1975-1990. Washington, D.C., 1987.

Congressional Budget Office. Effects of Adopting a Value-Added Tax. Washington, D.C., 1992.

Congressional Budget Office. Effective Tax Rates: Comparing Annual and Multiyear Measures. Washington, D.C., 2005.

Congressional Budget Office, Director's Blog. Effective Tax Rates. Washington, D.C., December 11, 2007.

Congressional Budget Office. The Budget and Economic Outlook: Fiscal Years 2011 to 2021. Washington, D.C., 2011.

Cronin, Julie-Anne. U.S. Treasury Distributional Analysis Methodology. Washington, D.C.: U. S. Department of the Treasury, 1999. OTA Paper 85.

Deaton, Angus. *Understanding Consumption*. New York: Oxford University Press, 1992.

Favreault, Melissa and Karen Smith. A Primer on the Dynamic Simulation of Income Model (DYNAMSIM3). Washington, D.C.: The Urban Institute, 2004.

Feenberg, Daniel R., Andrew W. Mitrusi and James M. Poterba. Distributional Effects of Adopting a National Retail Sales Tax. Cambridge, MA: National Bureau of Economic Research, 1997. Working Paper 5885.

Fullerton, Don and Andrew B. Lyon. Tax Neutrality and Intangible Capital. In Lawrence H. Summers, ed. *Tax Policy and the Economy, Vol. 2*, 63-88. Chicago: University of Chicago Press, 1988.

Gale, William G. The Required Tax Rate in a National Retail Sales Tax. *National Tax Journal* 52 (September 1999): 443-457.

Garner, Thesia I., George Janini, William Passero, Laura Paszkiewicz and Mark Vendemia. The CE and PCE: a comparison. *Monthly Labor Review* 129 (September 2006): 20-46.

Gentry, William M. and R. Glen Hubbard, 1997. "Distributional Implications of Introducing a Broad-Based Consumption Tax." In *Tax Policy and the Economy, Vol. 11,* 1-47. Chicago: University of Chicago Press, 1997.

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. Present Law and the President's Fiscal Year 2011 Budget Proposals Related to Selected Individual Income Tax Provisions Scheduled to Expire under the Sunset Provisions of the Economic Growth and Tax Relief Reconciliation Act of 2001. Washington, D.C., 2010. JCX-36-10.

Kasten, Richard A. and Eric J. Toder. Distributional Analysis in the Congressional Budget Office. In David F. Bradford, ed. Distributional Analysis of Tax Policy. Washington, D.C.: AEI Press, 1995, pp. 120-127.

Ledbetter, Mark. Comparison of BEA Estimates of Personal Income and IRS Estimates of Adjusted Gross Income. *Survey of Current Business* (November 2007): 35-41.

Nunns, James R., Deena Ackerman, James Cilke, Julie-Anne Cronin, Janet Holtzblatt, Gillian Hunter, Emily Lin and Janet McCubbin. Treasury's Panel Model For Tax Analysis. Washington, D.C.: U.S. Department of the Treasury, 2008. OTA Technical Working Paper 3.

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.

Toder, Eric and Kim Rueben. Should We Eliminate Taxation of Capital Income? In Henry J. Aaron, Leonard E. Burman and C. Eugene Steuerle, eds. *Taxing Capital Income*. Washington, D.C.: Urban Institute Press, 2007, pp. 89-141.

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.

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. Introduction to SIPP. Washington, D.C. http://www.census.gov/sipp/intro.html.

U.S. Department of Commerce, Bureau of the Census. Source and Accuracy Statement for the Survey of Income and Program Participation 2008 Wave 1 to Wave 3 Public Use Files. 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/.

U.S. Department of Labor. Bureau of Labor Statistics. Consumer Expenditure Survey. Washington, D.C. http://www.bls.gov/cex/.

U.S. Department of Labor. Bureau of Labor Statistics. Consumer Expenditure Survey Anthology. Washington, D.C., 2008.

U.S. Department of Labor. Employee Benefits Security Administration. Private Pension Plan Bulletin: Abstract of 2007 Form 5500 Annual Reports. Washington, D.C., 2010.

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

Urban-Brookings Tax Policy Center. Income Breaks for Distribution Tables. Washington, D.C., 2004.

Urban-Brookings Tax Policy Center. The Bush Tax Cuts: How Are the Distributional Effects Measured? In *A Citizens Guide for the 2008 Election, and Beyond*. Washington, D.C., 2008.

Wilson, Janette and Pearson Liddell. Sales of Capital Assets Reported on Individual Tax Returns, 2007. *Statistics of Income Bulletin* (Winter 2010): 75-104.