EFFECTS OF A FEDERAL VALUE-ADDED TAX ON STATE AND LOCAL GOVERNMENT BUDGETS

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A longstanding concern of state and local governments is that a federal value-added tax (VAT) could severely limit their reliance on sales taxes. But a federal VAT could have even larger effects on revenues from other sources and on spending through changes in incomes, relative prices, and asset values. To provide the plausible range of budgetary effects, we examine both a narrow- and comprehensive-based VAT, with consumer prices fully adjusting and not changing, over both short- and long-run time horizons. We find that the plausible range of effects includes an improvement in the fiscal position of states and localities.

Keywords: value-added tax, state and local revenues, state and local spending, and budget balances

JEL Codes: H250, H710, H720

I. INTRODUCTION

Growing dissatisfaction with the federal tax system and projections showing unsustainable long-run federal deficits have led many political leaders over the years to propose a value-added tax (VAT) as a source of federal revenue. Recent examples include the Business Flat Tax proposal of 2016 presidential candidate Senator Ted Cruz (R-TX), which is a form of VAT that would replace the corporate income tax and payroll taxes, and the Progressive Consumption Tax proposed by Senator Ben Cardin (D-MD), which would introduce a VAT and use the revenues to exempt most households from the federal individual income tax.[1]

Adoption of a federal VAT would have significant effects throughout the economy. State and local governments have two main concerns about the effects of a federal VAT on their continued reliance on general sales taxes as a major source of revenue. One

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[1] It should be noted that neither Senator Cruz nor Senator Cardin are willing to use the term VAT to describe their proposals, even though a VAT is exactly what they are.

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concern is that a federal VAT would limit their flexibility in choosing the rate, base, and administrative mechanisms of sales taxes, and could affect the allocation of revenues across jurisdictions.[2] McLure (2010) and Duncan (2010) carefully explore this concern and provide very useful guidance on ways to coordinate state and local sales taxes with a federal VAT.[3] The other concern is that a federal VAT would significantly increase the total tax rate on retail sales, which would shrink sales tax bases through both tax avoidance and evasion. A reduced sales tax base would require higher sales tax rates or increases in other taxes to raise any given level of revenue. This concern is, however, too narrowly focused. A federal VAT could affect state and local revenues even more from sources other than sales taxes and could also affect the level of state and local spending required to provide a given level of public services. These broader budgetary effects have received little attention, which is somewhat surprising because potential effects on other revenue sources and on spending are a direct consequence of how a VAT would affect incomes, relative prices, and the value of existing assets. This paper examines all the potential effects of a federal VAT on state and local budgets.

To provide the full range of plausible effects, we examine two VAT bases. One is modeled on "traditional" European-style VATs, and has a quite narrow base that excludes a significant share of household consumption and nearly all government spending. The other is modeled on "modern" VATs, in particular the New Zealand VAT, and has a comprehensive base that includes nearly all items of household consumption and all government spending. We set rates so that both variants of the VAT would reduce the federal deficit by the same amount. For both bases, we examine the effects of the federal VAT under two assumptions meant to bracket the plausible range of effects on the level of consumer prices: that it increases to fully reflect the VAT, and that it does not change. We also examine, for both bases and both assumptions about changes in the consumer price level, short-run effects and effects in the long run, after the economy has fully adjusted to the VAT. To isolate the effects of the VAT from other federal changes in revenues and/or spending that might accompany the introduction of the VAT, as well as from potential legislative responses of state and local governments, we analyze all effects holding constant the design of federal, state, and local revenue sources and transfer programs, and the real level of goods and services provided by government.

Our main findings, totaled across all states, are summarized in Table 1.

- If the federal VAT base excluded most government spending and the consumer price level increased to fully reflect the VAT, budget balances in each state would be essentially unchanged in the long run and harmed relatively little in the short run. If the consumer price level did not change, the federal VAT would *improve* budget balances in every state, in both the short and long run. Budget balances would improve because the nominal level of spending required to supply the current level of public services would fall by more than the decline in state and local revenues.

Table 1

Effects of a Federal VAT on Total State and Local Revenues, Spending, and Budget Balances in 2012

Percentage of Total State and Local Revenues under Current Law

	Price Level Rises		Price Level Unchanged	
	Narrow VAT Base	Comprehensive VAT Base	Narrow VAT Base	Comprehensive VAT Base
	(5% Rate)	(2.27% Rate)	(5% Rate)	(2.27% Rate)
Short-Run Effects				
Change in revenues	0.5	0.6	–0.8	–0.6
Change in spending	0.7	2.1	–1.1	0.4
Change in budget balances[1]	–0.2	–1.5	0.3	–1.0
Long-Run Effects				
Change in revenues	0.5	0.6	–0.7	–0.5
Change in spending	0.6	1.9	–1.3	0.2
Change in budget balances[1]	0.0	–1.4	0.7	–0.7

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

[1] Positive amounts mean the combined 2012 state and local budget deficit of $43.3 billion would be reduced; negative amounts that this deficit would be increased.

- If the federal VAT base was comprehensive and included most government spending, state and local budget balances would worsen in every state fairly significantly, in both the short and long run, whether or not the consumer price level increased.

- The significant reduction in revenues under either federal VAT base if the consumer price level did not change comes mainly from reductions in income and property tax receipts. Effects on receipts from general sales taxes are less important.

- Differences among states in effects on budget balances are primarily due to differences in revenue structures, rather than differences in spending patterns.

Effects based on intermediate assumptions about the breadth of the federal VAT base, changes in the level of consumer prices, and time horizon can be estimated by interpolation between the estimates we report.

Our findings should be interpreted with some care. They reflect the effects of a federal VAT in isolation, so they do not take into account any other possible federal revenue or spending changes or potential legislative responses of state and local governments. They also reflect "comparative static" estimates which do not take into account macroeconomic effects or changes in household consumption patterns. Further, we model

only differences in the composition of revenue sources and spending by category across states, and not the detailed provisions of state and local revenue and spending programs. Nevertheless, these findings should help inform the discussion of a federal VAT by clarifying the nature and plausible range of effects it could have on the budget position of state and local governments.

The remainder of the paper is organized as follows. In Section II, we describe in more detail our analytical framework, including the design of the two federal VAT variants we examine. Section III analyzes long-run effects on incomes, relative prices, and asset values under both VAT variants and both assumptions about changes in the level of consumer prices. We identify and analyze the long-run impact of these effects on each major source of state and local revenues and each major category of state and local spending in Section IV. We then use these analytical results and Census data on state and local finances for FY2012 in Section V to estimate state-by-state effects of the federal VAT on long-run state and local revenues and spending. Section VI provides conclusions. An analysis of short-run effects on incomes, relative prices, asset values, revenue sources, and categories of spending, along with state-by-state estimates for both VAT bases and under both assumptions about changes in the level of consumer prices, are provided in an online supplement.[4]

II. ANALYTICAL FRAMEWORK

Our analysis is intended to isolate the effects of a federal VAT from the effects of any other federal policy change, as well as from the effects of any policy changes that state and local governments might enact in response to the VAT. Our analysis also isolates the microeconomic effects of a federal VAT, with the real level of gross domestic product (GDP) and its components held constant. Within this framework, our analysis is intended to provide the plausible range of effects of a federal VAT on state and local government budgets. We examine each of these aspects of the analysis in the following.

A. Other Government Policies Held Constant

To isolate the effects of a federal VAT, our analysis holds constant the design of all other federal taxes and other revenue sources, federal transfer programs, and the real level of federal spending on goods and services.[5] We likewise hold constant the design of all state and local revenue sources, transfer programs, and real spending on goods and services.

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[4] The supplement, as well as Appendix A to the paper, are available at https://www.taxpolicycenter.org/publications/effects-federal-value-added-tax-state-and-local-government-budgets.

[5] This is the standard framework used for the analysis of federal tax policies by the Congressional Joint Committee on Taxation and the Office of Tax Analysis in the U.S. Treasury, and for analysis of federal spending policies by the Congressional Budget Office and the Office of Management and Budget.

For revenue sources we hold constant revenue bases, the level and structure of rates, and other parameters. For transfer programs, which include both cash transfer payments and retirement benefits, we hold constant the parameters of benefit formulas. For spending on goods and services, we hold constant labor inputs and real purchases from businesses. We also hold constant the nominal value of intergovernmental grants.

Under these assumptions, the federal VAT can be thought of as strictly an "add-on" source of revenue adopted only to reduce the federal deficit. This is a result of the analytical framework, not a prediction that a federal VAT would ever be adopted solely to reduce the deficit; virtually all proposals for a federal VAT would devote much, if not all, VAT revenues to either the repeal or reform of other taxes or to increases in spending.[6] In a more realistic setting in which other revenue and/or spending policies do change, our estimates can be thought of as if they are made first, and establish a new baseline for revenues and spending against which estimates of the other policy changes are made.[7] Note also that other policies to reduce the federal deficit by the same amount as the federal VATs we consider here — such as a reduction in grants to states for Medicaid or an increase in federal income tax rates — could have far larger, or smaller, impacts on state and local government budgets.

B. No Macroeconomic Effects

Adoption of an add-on federal VAT could be expected to increase aggregate saving and reduce interest rates, which would lead to higher investment. Short-run effects on aggregate demand could also be important, but would differ depending on how close the economy was to full capacity.[8] These are potentially important changes that should be taken into account as part of the consideration of a federal VAT. However, our estimates do not take into account any macroeconomic effects of the VAT. We exclude macroeconomic effects to maintain the same assumption of fixed GDP that is made in preparing standard analyses by the federal agencies responsible for estimating the effects of tax proposals. In addition, in a more realistic setting with changes in other revenue and/or spending policies combined with the adoption of a VAT, the macroeconomic effects of the overall budget package could be substantially different from those of the VAT alone. We see less value, therefore, in macro results of an add-on VAT than in the "static" revenue and spending estimates, which provide information that can be used as the basis for the analysis of the other components of a realistic package.

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[6] For example, both the Cruz and Cardin proposals would use all VAT revenues to reduce other federal taxes.

[7] This might not be the "stacking order" that would be used by Congressional and Executive Branch estimators in making estimates of the change in federal revenues and spending for a legislative package that included a VAT. The stacking order, as well as the elements of the legislative package, could affect the estimates for the VAT.

[8] See the discussion in Carroll et al. (2010).

C. Variants of the Federal VAT

The VATs we examine are credit-invoice and destination-based, the form of VAT used in 167 countries around the world as of the beginning of 2016.[9] Businesses collect VAT on all of their sales receipts, but receive a credit for any VAT they pay on their purchases from other businesses. Border adjustments — that is, imposing VAT on imports and removing VAT from exports — make the VAT apply only to domestic consumption.

To cover the plausible range of effects of a federal VAT on state and local budgets, we examine two quite different VAT bases: one that is quite narrow, excluding many categories of household consumption and most government spending, and one that is very comprehensive, covering virtually all items of household consumption and all government spending.

1. Narrow Base

VATs were initially introduced in Europe as replacements for turnover taxes, and to broadly replicate the base of these taxes excluded a range of consumption items.[10] Many of these exclusions have been retained on the grounds that they serve certain policy goals, such as encouraging consumption of "merit" goods — for example, medical care and education — and making the VAT less regressive by excluding items disproportionately consumed by low-income families — for example, food consumed at home.[11] Other exclusions were made because no workable administrative mechanism had been developed to include the items — for example, housing and financial intermediation services — at the time the VATs were adopted. In addition, policymakers considered most activities of governments and nonprofit organizations to be outside the intended base of a VAT.[12]

The narrow-based VAT we examine is modeled on these "traditional" European-style VATs, and excludes from household consumption all health expenditures, education spending, housing rents, food consumed at home, financial services provided without payment, and all spending by nonprofit institutions on behalf of households.[13] We also exclude state and local sales taxes imposed at the retail level.[14] No government spending is included in the base except spending on items of consumption otherwise included in

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[9] OECD (2016). Note that although we specify the VATs as being credit-invoice, our analysis and findings should apply equally to comparable subtraction method VATs.

[10] Base exclusions in these VATs are generally structured as "exemptions" which means the item is not subject to VAT, but the seller does not receive a credit for VAT paid on purchases, so value added at earlier stages of production of an exempt good is taxed.

[11] These VATs also apply lower rates to certain goods on these policy grounds.

[12] See de la Feria and Krever (2013).

[13] These items correspond to categories of consumption as estimated in the National Income and Product Accounts (NIPA). Unlike exemptions from traditional VAT bases, items excluded from the narrow base are assumed to generally be "zero rated," which means they would technically be subject to VAT (at a zero rate), but the seller would receive a credit for VAT paid on purchases, so VAT would be completely removed from the sale. Housing rents would receive a different treatment, as discussed in Section IV.

[14] We also assume that VAT would not be imposed on state and local sales taxes imposed at pre-retail stages of production and distribution. However, the amount of pre-retail sales taxes would be reflected in the value of subsequent sales but not carry a VAT credit, so effectively they would be included in the VAT base.

the base and sold for a fee (charge) to households — for example, government-produced electricity and water supply. Following the practice in other countries, we assume for administrative reasons that the VAT would allow an exemption for businesses below a certain threshold of sales,[15] and that, following the experience in other countries, noncompliance would reduce the base below the amount of consumption included in the base that is reported in the national accounts. We assume that the combination of a possible small business exemption and noncompliance would reduce the amount of household consumption otherwise included in the base by 15 percent below the amount reported in the national accounts.[16]

We estimate the size of the narrow base as $4.3 trillion in 2012, 39 percent of total consumption of $11.1 trillion and 27 percent of GDP of $16.2 trillion. An alternative measure of the breadth of a VAT is the VAT Revenue Ratio, or VRR, used by the Organisation for Economic Co-operation and Development (OECD).[17] Assuming we have made a reasonable adjustment for noncompliance, we can estimate the VRR for the narrow-based VAT as the ratio of the VAT base to all consumption by households and governments in 2012,[18] which is 32 percent — well below the unweighted OECD average for 2012 of 55 percent.

Appendix A, available online, provides a more detailed description of this base and the comprehensive base discussed in the following section, and explains how they were derived from NIPA tables for 2012.

2. Comprehensive Base

Countries that have adopted VATs more recently, in particular New Zealand, but also including Canada, Japan, and Australia, have much broader VAT bases than European-style VATs. These "modern" VATs exclude many fewer items of consumption, and include new administrative mechanisms for taxing — at least in part — items such as housing and financial intermediation. These VATs also generally include a broader range of spending by governments and nonprofit organizations, but with the exception of New Zealand do not include spending on "public goods" in the VAT base.[19] Modern VATs also differ from traditional VATs in that generally items excluded from the base are zero-rated rather than exempt and all items in the base are taxed at a single rate.

The base of the comprehensive-based VAT follows the example of "modern" VATs, which include virtually all items of consumption and, for New Zealand, all government

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[15] An exemption would reduce VAT collections if applied at the retail level, but increase net collections if applied to intermediate sellers because of the losses of VAT credits on earlier stages of production to firms who purchase from them. We would anticipate, however, that exempt small businesses would be allowed to voluntarily register for VAT if that is to their advantage.

[16] The 15 percent figure is consistent with Internal Revenue Service (IRS) estimates of noncompliance with the current income tax and estimates of VAT noncompliance in Europe (Internal Revenue Service, 2016; CASE, 2016; HM Revenue & Customs, 2016). It is also the figure used by the U.S. Treasury for VAT estimates included in the President's Advisory Panel on Federal Tax Reform (2005).

[17] OECD (2016). The VRR is intended to capture the effect on actual VAT revenues of exclusions from the VAT base, non-standard rates, and noncompliance.

[18] We exclude state and local sales taxes imposed at the retail level from both the numerator and denominator.

[19] See Gendron (2010, 2011) and Millar (2013).

spending in the tax base. The base measures housing consumption on a "prepayment" basis, with sales of all new housing and improvements to existing housing included in the base and all housing rents excluded.[20] We also assume that for administrative reasons the VAT base would include purchases in the United States by foreigners and exclude purchases abroad by U.S. residents, and adjust NIPA consumption accordingly. The only other adjustments to NIPA consumption are the exclusion of state and local sales taxes imposed at the retail level, and the combined adjustment for a small business exemption and noncompliance.[21] Consumption included in the base is $9.8 trillion — 88 percent of total consumption — and the combined adjustments add up to $1.3 trillion — 12 percent of total consumption.

We include all general government spending in the comprehensive VAT base.[22] This may seem an unlikely component of a federal VAT base, in part because this spending is excluded from VAT bases in most countries and from state and local sales tax bases in the United States. But including this spending is consistent with federal and state individual and corporate income tax bases, which apply to incomes generated from government activity — except for interest on state and local government bonds. The current payroll tax base also includes federal and nearly all state and local wages, as well as the wages of employees of businesses that sell to governments and the wages of employees of tax-exempt institutions.

New Zealand provides a precedent for including government services in the VAT base.[23] Further, proposals for a flat tax and an X-tax would include all wages and business cash flow in the base, so the base would include all value added by governments.[24] A proposal by Graetz (2010) to replace much of the current income taxes with revenues from a federal VAT would include all government spending in the VAT base.[25] The

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[20] Taxing new housing and improvements is equivalent — in expected present value — to taxing the rental services of new (post-VAT) housing and improvements.

[21] Some of this combined adjustment could also affect sales to governments, but we estimate it based only on consumption items in the base; see online Appendix A.

[22] Note that NIPA classifies government expenditure for charge-financed activities and in-kind transfers as household consumption — all of which are included in the comprehensive base — and state spending for unemployment benefits as federal spending. Retirement benefits are not a payment for current labor services, so they are excluded from national income.

[23] See Millar (2013). The designers of New Zealand's VAT — referred to as a "goods and services tax" or GST — recognized there would be no net fiscal effect from including budgets of government departments in the VAT base; additional spending by agencies to pay the tax would exactly offset the increased revenue received. But the reformers nevertheless wanted to include government activity in the base on an equal footing with the private sector so that agencies' budgets would accurately reflect the cost of public services they supply. For the United States and other countries with multiple levels of government, including subnational government budgets in the base does raise central government revenue.

[24] A VAT would tax both wages and business cash flow at the business level, whereas a flat tax and an X-tax would split the VAT base between households (wages) and business cash flow (businesses). See, for example, Hall and Rabushka (1985) and Carroll and Viard (2012).

[25] Senator Cardin introduced a legislative variant (S. 3005) of the Graetz proposal in 2015. See Toder, Nunns, and Rosenberg (2012) for a description and analysis of a specific variant of the Graetz proposal, and Nunns and Rosenberg (2013) for an updated analysis of this variant with some further modifications.

subtraction method VAT recently proposed by Senator Cruz would also have included government wages in the VAT base.[26]

There are several policy arguments for including general government spending in the base of a federal VAT. This spending directly or indirectly meets individuals' wants and needs, just like household consumption. Further, to ensure that consumption choices are not distorted by differential tax treatment of public and private-sector providers, government-provided goods and services that can be provided by for-profit businesses or nonprofits — for example, private security firms and private schools — should be taxed in the same way for public and private service providers. And failure to include general government spending in the VAT base would make the relative size of the government sector appear smaller than it really is because government spending would exclude VAT, while private spending would include it.[27]

We include in the comprehensive VAT base government spending — as measured in NIPA — for compensation of general government employees, purchases of intermediate goods, and gross investment spending — less amounts otherwise taken into account.[28] For the federal government, this spending was $1.0 trillion in 2012, while for state and local governments it was $1.7 trillion. Including this spending, the total comprehensive VAT base is $11.2 trillion in 2012, equivalent to 102 percent of household consumption and nearly 70 percent of GDP. The estimated VRR for the comprehensive base is 84 percent, far above the unweighted OECD average in 2012 of 55 percent and lower than the VRRs of only two countries, Luxembourg (112 percent) [29] and New Zealand (94 percent).

3. VAT Rates

For comparability of results, we set rates so that the same level of federal deficit reduction would have been achieved in 2012 using both bases, under the assumption that real and nominal GDP are fixed and there is no change in the overall price level (the GDP deflator).[30] As discussed in Section III, under these assumptions the VAT

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[26] See Cruz Campaign (2015).

[27] In contrast, both government spending and private spending measures include taxes imposed on factor incomes.

[28] Business sales to government would generally be exempt under the comprehensive base. Note that we define government spending as we do to ensure that all of it is taxable and there is no double counting. In practice, other approaches might be taken to reach this base — for example, New Zealand generally taxes government agencies' budgets and allows VAT credits for their purchases from businesses and other government agencies.

[29] VRRs can exceed 100 percent for several reasons, such as over taxing due to the use of exemptions rather than zero rating for excluded items, and differences in timing of tax payments due to taxing housing investment rather than rents. Also, Luxembourg's measured rate of noncompliance was only 3.88 percent in 2012 (CASE, 2016).

[30] These are the assumptions generally used by the federal agencies that prepare official estimates of federal revenue and spending changes. As discussed below, in our subsequent analyses we do not hold the GDP deflator constant.

would reduce incomes, which in turn would reduce federal revenues from individual and corporate income taxes as well as payroll taxes. At the same time, the VAT would reduce federal spending — under the assumption that real government purchases are held constant — because wages of federal workers and (pre-VAT) prices of federal purchases would fall. Our estimates of the effects on federal deficits of both VAT variants take into account these revenue and spending "offsets."[31] A VAT with the narrow base and a 5 percent (tax exclusive)[32] rate would have reduced the federal deficit by an estimated $205 billion in 2012. The rate required for the comprehensive base to reduce the federal deficit by the same $205 billion in 2012 is 2.27 percent.

D. Changes in the Price Level

Both VATs would apply to all the goods and services consumed by households included in the respective bases. The prices that households pay for taxed goods and services would exceed the amount that producers receive for them by the amount of the VAT; the VAT, like a retail sales tax, would create a "wedge" between consumer and producer prices. If the level of consumer prices increased by the full amount of the VAT, producer prices — and factor incomes — would not change; if the level of consumer prices did not change, producer prices — and factor incomes — would have to fall enough to absorb the full VAT wedge.

Empirical studies have generally found that implementing and increasing rates for VATs and sales tax rates have raised consumer prices. In a survey of the literature on how changing VAT and sales tax rates affect the price level, Zodrow et al. (2010, p. 57) state that "In summary… the preponderance of the results are broadly consistent with significant or full forward shifting." Forward shifting of a federal VAT would require accommodating monetary policy by the Federal Reserve.[33] There are reasons to believe the Fed would accommodate a VAT. First, due to nominal wage and other rigidities,[34] failure to accommodate would raise unemployment during a transition period. Second, without accommodation the transitional burden of the VAT on existing capital would fall entirely on equity holders instead of being divided among holders of equity and debt.[35]

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[31] See Toder, Nunns, and Rosenberg (2011) for a detailed description of how we estimate the federal revenue and spending offsets of a VAT. The revenue offsets depend on the reduction in wages and other factor incomes. The size of the spending offset also varies with how much federal spending is included in the base.

[32] *Tax exclusive* rates apply to amounts in the tax base that exclude the tax. This is the standard way that VAT and sales tax rates are expressed. In contrast, income tax rates are *tax inclusive*, with the rate applied to amounts that include the tax. The tax inclusive rate that corresponds to a 5 percent tax exclusive rate is .05/1.05 = 4.76 percent, while the rate that corresponds to a tax exclusive rate of 2.27 percent is .0227/1.0227 = 2.22 percent.

[33] As Brown (1939) and Poterba (1996) note, for a state or local government the money supply is infinitely elastic, so sales tax increases are always effectively fully accommodated.

[34] See Poterba, Rotemberg, and Summers (1986) for evidence of short-run wage and other nominal rigidities.

[35] The online supplement discusses why equity holders bear the transitional burden on old capital if the price level does not rise.

However, if the VAT rate was low or phased in slowly and inflationary pressures were mounting, the Fed might not accommodate — or fully accommodate — it.

To cover the plausible range of effects of a federal VAT on state and local budgets, we estimate these effects for both VAT bases under two assumptions about changes in the level of consumer prices: that they rise by the full amount of the VAT, and that they do not change.

E. Time Horizon

Certain effects of a federal VAT would vary over time. For example, the transition burden on "old" capital is a short-run effect that has no counterpart in the long run. If the consumer price level increased and wages did not change, in the short run current beneficiaries of transfer payments that are indexed for changes in consumer prices, such as Social Security, would receive higher nominal but unchanged real benefits, but in the long run nominal benefits for future retirees would be unchanged and real benefits would fall because starting benefits at retirement are based on nominal earnings histories.

We estimate both the short- and long-run effects of the VAT for both VAT bases and both assumptions about changes in the consumer price level. The short run corresponds roughly to the first year the VAT is in place, assuming that there are no implementation problems or nominal rigidities. The long run corresponds to when all of the economic effects of the VAT have occurred, which, as the example of Social Security benefits indicates, would be decades after it was adopted. However, we would expect most of these permanent effects of a VAT to occur over a much shorter time frame, perhaps a decade or so.

III. LONG-RUN EFFECTS ON INCOMES AND RELATIVE PRICES

A. Effects on Incomes

If the level of consumer prices increased by the full amount of the VAT, the average wedge between consumer and producer prices would be the one-time increase in consumer prices, which we measure as the percentage change in the index for personal consumption expenditures (the PCE) in the NIPA.[36] We estimate this increase as the VAT rate times the percentage of consumption subject to VAT. For the narrow VAT base with a rate of 5 percent, the estimated change in the PCE is 1.96 percent, while for the comprehensive VAT base with a 2.27 percent rate, the estimated change in the PCE is 1.74 percent. The PCE for the comprehensive base is slightly lower than the PCE for the narrow base because the comprehensive base raises revenue from taxing state and local government services, so can tax household consumption items less; that is, at a lower effective rate. With the full amount of the VAT reflected in a change in the PCE,

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[36] We assume the initial rise in the price level would not set off a wage-price spiral, so the rate of inflation would be unaffected.

in the long run the level of nominal incomes would be unaffected, although the higher PCE would mean that real incomes fall.

If the consumer price level (the PCE) did not change when the VAT was introduced, average producer prices would have to fall at all stages of the production and distribution of goods and services by the average VAT rate on total consumption. The wedge between consumer and producer prices would appear immediately upon introduction of the VAT. Producers' sales proceeds would now have to be split between VAT payments and compensation of factors of production, labor and capital, so the amount available for compensation of factors would decline immediately (and permanently).

Although historically annual changes in the consumer price index (CPI) and PCE have not been exactly the same, we assume for our analysis that the CPI would increase by the same percentage as the PCE if the PCE increases, and would be unchanged if the PCE is unchanged. This assumption simplifies the analysis a bit and helps clarify the differences between the effects of the two VAT bases and the two alternative assumptions about changes in consumer prices. However, the choice of an index to measure consumer prices does not affect the analysis or conclusions of the paper.

B. Effects on Income by Source if the Consumer Price Level Does Not Change

1. Labor Income

Labor compensation includes money wages and fringe benefits. The reduction in labor compensation might not fully occur in the short run due to fixed labor contracts and other institutional factors that make wage rates downwardly rigid. But in the long run, labor compensation can be expected to fully adjust with the level of employment unchanged. Further, even though both VAT bases exclude exports and the narrow VAT base excludes a range of consumption items as well as most government spending, workers in untaxed sectors would eventually be affected to the same extent as workers in taxed sectors as labor market competition equalizes compensation across employees with the same skill levels. For this reason, we expect a VAT with either base to reduce the labor income of all workers, including employees in sectors excluded from the VAT base.

We estimate that for the consumer price level to remain constant, nominal labor income must decline by 1.91 percent for the VAT with a narrow base and a rate of 5 percent. The reduction in labor income is much less than the VAT rate because the VAT base includes less than half of total consumption and some additional consumption is effectively removed from the base by the allowance for a small business exemption and noncompliance.[37] For the VAT with a comprehensive base and rate of 2.27 percent, we estimate the reduction in nominal labor income as 1.74 percent. The comprehensive VAT would reduce factor incomes by less than the VAT rate primarily because the housing

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[37] Note that consumption includes pre-retail unit excise taxes that would be unchanged by a VAT, so factor incomes must fall enough to absorb the VAT on these taxes. See online Appendix A for a description of how the amount of such taxes was estimated.

adjustment reduces the base by about 10 percent of total consumption and because of the allowance for a small business exemption and noncompliance. The comprehensive base also would reduce nominal incomes less than the narrow base because it includes state and local government spending, producing federal revenue that lowers the required rate to produce any given amount of federal deficit reduction.

2. Capital Income

Capital income includes interest — the return to bond holders and other lenders — and profits — the return to the equity owners of businesses. Interest generally represents only the (risk-adjusted) compensation for waiting, the "normal" return to capital. However, some returns to capital represent "supernormal" returns — economic rents, infra-marginal returns, and returns to successful risk taking — that equity owners earn in addition to the normal return.[38]

With the consumer price level unchanged, the VAT would reduce the amount available from producers' sales that could be used to pay returns to capital. But the VAT would also allow a credit for purchases of investment goods. In the long run therefore, when all capital is "new," the VAT collected on capital income in part is simply a repayment of the VAT credits received when investments were made — plus the normal return on those credits. As a result, a VAT effectively excludes the normal return, so we would not expect a VAT to affect nominal interest rates.[39] Similarly, a VAT would exempt normal returns to equity. However, the VAT base does include supernormal returns, which research indicates are more than half of total returns to equity.[40]

We assume that 60 percent of total equity returns are supernormal. With the consumer price level unchanged, supernormal returns fall by the same percentage of pretax income as labor income, 1.91 percent for the narrow-based VAT and 1.74 percent for the comprehensive-based VAT.

3. Cash Transfer Payments

Most cash transfer payments are based directly or indirectly on the level of wages. For example, initial Social Security retirement and disability benefits are determined by formulas based on workers' prior earnings histories. Because a VAT would reduce wages if the consumer price level did not change when the VAT was introduced, Social Security benefits for future beneficiaries would also be reduced. If governments wished to prevent this, they would need to enact legislation to adjust the benefit formulas for

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[38] A portion of supernormal returns to capital may be viewed as returns in the form of profits to the labor of extraordinarily talented individuals who develop new products, services, and production processes.

[39] Whether real interest rates would change in response to adoption of a federal VAT is, however, an unsettled question in the economics literature. See, for example, Feldstein (1998).

[40] 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 equity returns are normal, implying that 68 percent are supernormal.

Social Security and other cash transfer payments or provide a supplemental benefit such as a rebate. We hold constant benefit formulas for cash transfer benefits, so these benefits would fall as lower wages entered the benefit formulas and would be reduced in the long run by 1.91 percent for the narrow-based VAT and 1.74 percent for the comprehensive-based VAT. The effect of the VAT on cash transfer payments made by state and local governments is included in the discussion on state and local spending on these payments.

C. Effects on Relative Prices

Prices of taxed consumption items would reflect the VAT and rise relative to the prices of any untaxed goods. If the consumer price level increased by the full amount of the VAT, the VAT-exclusive prices of all consumption items would be unchanged and the relative price of taxed goods would rise by 5 percent for the narrow base and 2.27 percent for the comprehensive base. If the consumer price level did not change, for the narrow base the VAT-exclusive prices of all consumption items would fall by 1.87 percent and the relative price of taxed goods would rise by 4.85 percent — 2.90 percent above pre-VAT levels.[41] For the comprehensive base, the VAT-exclusive prices of all consumption items would fall by 1.70 percent and the relative price of taxed goods would rise by 2.26 percent — 0.51 percent above pre-VAT levels. We discuss other potential effects of a VAT on relative prices in the section on the VAT's impact on state and local general sales taxes.

IV. LONG-RUN EFFECTS ON STATE AND LOCAL REVENUES AND SPENDING[42]

In the long run, by changing incomes and relative prices, a federal VAT would affect state and local revenues and spending.

A. Effects on State and Local Revenues

1. Income Taxes

If the consumer price level increased, individual income tax revenues would be permanently reduced in states that automatically index income tax parameters — such as

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[41] For both the narrow and comprehensive VAT bases, VAT-exclusive prices would fall slightly less than factor incomes because unit excise taxes would be unchanged by the VAT. The relative price of taxed goods would rise by less than the VAT rate because sales taxes are excluded from the VAT base but included in retail prices.

[42] The following discussion follows the classifications of the Governments Division of the Bureau of the Census. The Census classifications are used in part because Census is the primary source of data used to develop state-by-state estimates of the effects of a federal VAT shown in Section V. In addition, the Census classifications of revenues and spending align better with state and local budget concepts than the classifications used in NIPA. Differences between Census and NIPA treatments of various items are noted as appropriate because NIPA data and concepts are used to develop estimates of the two federal VAT bases (see online Appendix A).

rate brackets and personal exemptions — to changes in the price level. Using the Tax Policy Center's (TPC's) microsimulation model, we estimate that in 2012 a 1 percent increase in the CPI would reduce federal individual income tax receipts by 0.36 percent. We multiply this result by our estimates of the percentage change in the CPI for each VAT base, and then reduce these estimates by 1/2 to account for the flatter rate schedules in state and local income taxes and other differences from the federal income tax. This yields an estimated reduction in state individual income tax revenues due to indexing of 0.35 percent for the narrow VAT base and 0.31 percent for the comprehensive VAT base. We apply these estimates in all states with an individual income tax, without regard to the separate indexing — including absence of indexing — provisions in these states.[43]

If the consumer price level did not change, the reduction in wages and supernormal returns would reduce the base of state and local individual income taxes, and the reduction in supernormal returns would reduce the base of corporate income taxes. These base reductions, and the associated reductions in revenues, would be permanent.

The base of corporate income taxes is returns to equity, so the reduction in corporate income tax bases is the reduction in supernormal returns times the 60 percent supernormal share of total equity returns, or 1.14 percent for the narrow VAT base and 1.04 percent for the comprehensive VAT base. We assume that the change in corporate income tax revenues would be proportional to the change in the base, so these revenues would be reduced by the same percentages. In the individual income tax base, dividends and virtually all capital gains represent equity returns, so these sources of income would be reduced by the same percentages as the corporate income tax base. A portion of the net income reported by pass-through entities (sole proprietorships, partnerships, subchapter S corporations, rents, and royalties) represents a return to labor and the remainder a return to equity. We treat the portion of income from pass-through entities that is subject to Social Security and Medicare taxes[44] as the labor portion and the remainder as a return to equity. The labor portion would be reduced for each base by the same percentage as wages, and the equity portion by the same percentage as the corporate income tax base. To estimate the effect of these reductions on state individual income tax revenues, we applied the reductions to the affected sources of income in each state with an income tax in TPC's state income tax simulation models and calculated the percentage reduction in individual income tax revenues for each state.[45]

2. Payroll Taxes

Unemployment insurance (UI) taxes are the only tax we treat as a payroll tax for state and local governments, and they represent a relatively small share of total state

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[43] The inflation indexing modules of TPC's state microsimulation models had not been fully implemented and tested when the estimates for this paper were made, so we could not make estimates specific to each state.

[44] Self-employed individuals pay these taxes under the Self Employment Contributions Act (SECA).

[45] The average reduction in state income tax revenues across all states is 2.59 percent for the narrow base — ranging from a reduction of 0.88 percent in Tennessee to 3.44 percent in New Mexico — and 2.36 percent for the comprehensive base — ranging from a reduction of 0.80 percent in Tennessee to 3.14 percent in New Mexico. Seven states — Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming — have no state tax classified as an individual income tax by Census.

revenues.[46] The wage base of UI taxes in many states is set at a very low level. For example, in 2012 the base was the first $7,000 of wages in Arizona and California, $7,700 in Louisiana, and $8,000 in Alabama, Kansas, Pennsylvania, and Virginia.[47] If the consumer price level increased by the full amount of the VAT there would be no change in nominal wages or payroll taxes. With no change in the consumer price level the VAT would lower wages, but it would not lower wages for most workers in most states to an annual amount that is below the wage base for state UI taxes. We therefore do not include any change in UI revenues in our estimates.[48]

3. General Sales Taxes

   State and local general sales taxes apply to the retail value of goods and services included in the tax base. These retail values are the sum of value added — payments to labor and capital — in the entire chain of production and distribution through the retail level. In addition, retail values include the amount of any general sales taxes levied at pre-retail stages of production and distribution that are passed on ("pyramided") in higher prices to consumers and also federal, state, and local excises and similar taxes that are levied on goods and services, generally on a per-unit basis and at pre-retail stages of production and distribution (indirect business taxes).[49] We assume that the VAT would be excluded from the base of state and local general sales taxes.[50] The general sales tax base would therefore be unaffected if the consumer price level increased by the full amount of the VAT.

   However, if the consumer price level did not change, general sales tax bases would permanently shrink as prices net of the federal VAT fell along with labor and capital income. But general sales tax bases would decline somewhat less than labor and capital income because the amount of pre-retail unit taxes in the bases would generally not be affected by the federal VAT.[51] We estimate that the decline in state and local sales

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[46] In 2012, UI taxes represented 3.5 percent of total state and local tax revenues. Note that Census classifies state and local unemployment taxes as part of trust fund revenues, while the NIPA treats the unemployment system as entirely federal.

[47] These amounts are from the American Payroll Association, http://www.americanpayroll.org/members/stateui/state-ui-2/ accessed December 19, 2011.

[48] Our estimates may therefore underestimate the effect of a federal VAT on revenues in states with high UI bases, such as Georgia ($38,800 in 2012) and Washington ($38,200), if there were no change in the consumer price level.

[49] These include, for example, excises on motor fuels, alcoholic beverages, and tobacco products. Indirect business taxes also include general sales taxes levied on sales to households, which are not part of the sales tax base. NIPA includes indirect business taxes in "taxes on production and imports." See online Appendix A for a description of how we estimated the amount of these taxes in each VAT base.

[50] Current state and local sales tax bases generally exclude federal excises that are imposed on the retailer and separately stated (Due and Mikesell 1994, p. 44). Presumably a federal VAT would be separately stated, and therefore would be excluded from sales tax bases.

[51] All pre-retail state and local indirect taxes would effectively be included in the VAT base, absent a special exclusion for them at subsequent stages of production and distribution through the retail level. If levied on an ad valorem basis, they would decline along with labor and capital income, but unit taxes would be unchanged unless household consumption patterns were affected by the VAT.

tax bases would be 1.87 percent for the narrow VAT base and 1.70 percent for the comprehensive VAT base — compared to 1.91 percent and 1.74 percent reductions in factor incomes.

There are other potential changes to state and local general sales tax bases that our estimates do not take into account. One is the potential effects of the federal VAT on sales tax compliance. The VAT — with either base — would increase the tax rate on retail sales, which would increase incentives for avoidance and evasion. Any reduction in compliance would reduce sales tax bases. But a federal VAT would also provide state tax administrators an additional set of enforcement tools, such as a register of businesses and the results of federal VAT enforcement efforts, and these tools could improve sales tax compliance.[52] The net effect on compliance with state retail sales taxes is unclear, but we do not believe it would be large.

Our estimates also do not take into account possible shifts in household consumption patterns due to higher relative prices for items subject to VAT. These shifts in consumption patterns could either increase or decrease state sales tax receipts, depending on whether the net effect of the shifts is to increase or decrease the share of consumption subject to state sales taxes. The net effect on sales tax bases of any shifts in household consumption patterns cannot be determined without detailed modeling of these net effects on a state-by-state basis, modeling that is beyond the scope of this paper. We have no reason to think, however, that any such shifts would be significant.

4. Property Taxes

A federal VAT could affect revenues from business and residential properties.

Business properties. Because the VAT base excludes the sale of investment goods through the credit allowed to business purchasers, the price of new business properties would not change if consumer prices increased by the full amount of the VAT, leaving factor incomes unchanged. However, if the consumer price level did not change, reduced payments to labor and capital would lower the cost of producing investment goods, including business structures. These lower production costs would flow through to lower prices for businesses purchasing structures and other investment goods. The value of business properties in existence prior to introduction of a VAT would also have to fall because they can only earn the same rate of return — net of VAT — as new business investments. So the business property tax base would decline when the VAT was introduced — assuming assessed values track market values — and remain lower than it would have been in future years. Business property tax revenues, holding rates constant, would likewise be permanently reduced. These declines would be the same as the decline in factor incomes, 1.91 percent for the narrow-based VAT and 1.74 percent for the comprehensive-based VAT.

Residential properties. Residential properties, whether occupied by owners or tenants, are capital goods that provide housing services over multiple years. Tenants pay rent

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[52] How much sales tax enforcement might be improved would depend on the detailed administrative provisions of the federal VAT. See Duncan (2010).

for the housing services provided by their landlords — that is, the owners of residential rental properties. Rents paid by tenants are a component of consumption included in the NIPA estimate of household consumption. Owner occupants are effectively both their own tenants and landlords, but make no actual rent payments for the value of the housing services they provide to themselves. In order to include as a component of consumption the housing services owner occupants provide to themselves, the NIPA includes an imputation for the amount of rent that homeowners would have paid for comparable rental housing. Because there are no actual rent transactions for owner-occupied housing and because of the practical difficulties involved in attempting to estimate and tax such imputed rents, we exclude imputed rents from both VAT bases.[53]

For consistency of treatment between owner- and tenant-occupied housing, in addition to excluding imputed rents on owner-occupied housing both VAT bases also exclude tenant rents.[54] The comprehensive base includes, while the narrow base also excludes — through zero rating of sellers — all spending on new housing and improvements to existing housing.[55]

Including housing in the broad VAT base would increase the relative price of new housing, which would lead to increases in the prices of existing homes and correspondingly higher residential property tax revenues. Housing prices and property tax revenues would increase by the comprehensive VAT rate of 2.27 percent if the consumer price level increased by the full amount of the VAT, and by the same amount as other items subject to VAT, .51 percent, if the consumer price level did not change.

Under the narrow base, if the consumer price level increased by the full amount of the VAT, tenant rents and the price of new housing and improvements would all be unchanged, so residential property values and property tax revenues would also be unchanged. If the consumer price level did not change, tenant rents and the price of new housing and improvements would all fall, driving down the value of existing housing and permanently lowering residential property tax revenues. As with business properties, these declines would be the same as the decline in factor incomes under the narrow-based VAT, 1.91 percent.

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[53] It would be very difficult to determine reasonable estimates of imputed rents for every owner-occupied residence in the United States. And even if reasonable estimates could be determined, taxing imputed rents directly would require every homeowner to make periodic — at least annual — VAT payments based on the estimated value of their imputed rent.

[54] Note that only the amount of tenant rents paid for housing space — that is, excluding any amounts included in rents that pay for other services such as utilities, amenities, and rental management services — would, in principle, at least, be excluded from the VAT base. Note also that tenant-occupied housing typically excludes "transient" housing, such as hotels and motels, the services of which would be included in both VAT bases.

[55] All sales of new housing and improvements would be subject to VAT under the comprehensive base, but because rents would be exempt business purchasers (i.e., landlords) would receive no credit for this VAT. For households, new housing and improvements would simply be treated like any other taxable consumption, so all housing would be taxed under the prepayment method.

5. User Charges

User charges are government revenues from the sale of goods and services to households and businesses.[56] Examples are tuition charged by state colleges and universities, charges for medical services provided by government hospitals, and charges for water and electricity supplied by government-owned utilities.[57] Charges for goods and services provided to households by governments are included in NIPA consumption. We assume that the charge-financed activities of governments (and nonprofits) are treated as a business for VAT purposes, so the charges would be subject to VAT if the corresponding item of consumption is taxed. The narrow VAT base excludes — through zero rating — all medical services, education, residential rents, and sales of new housing and improvements to existing housing, so only state and local user charges for other items — for example, electrical and water services — would be subject to the 5 percent VAT rate for this base. The comprehensive base covers all consumption items provided by governments at a charge, so all state and local government user charges would be subject to the 2.27 percent VAT rate for this base. Note that although user charges for items subject to VAT would increase due to the inclusion of VAT in these charges, as discussed later charge-financed spending would also increase by the amount of the VAT collected, which would be paid to the federal government. The increase in user charges due to the VAT would therefore have no net effect on state and local budget balances.

Charge revenues would increase on items included in each VAT base by the respective VAT rates of 5 and 2.27 percent if the consumer price level increased by the full amount of the VAT.

If the consumer price level did not change, the VAT-exclusive level of all state and local user charges would fall due to the reduction in factor incomes and the VAT-inclusive level of taxed items would increase by 2.90 percent under the narrow-based VAT and by .51 percent under the comprehensive-based VAT.

6. Employee Retirement Revenues

Revenues of employee retirement funds come from two sources: contributions and earnings on fund balances.[58] Holding contribution rates fixed, the effect of a VAT on

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[56] As defined here, charges include amounts classified as "utility revenue" and "liquor store revenue" by Census. In the NIPA, some of these charges are considered revenues of enterprises and included in government revenues net of associated expenditures, and remaining charges are removed from revenues consistent with the treatment of associated expenditures as "sales to other sectors." In the federal budget, charges are generally netted against associated spending as "offsetting receipts."

[57] Census excludes from charges medical vendor payments made by state and local governments to public institutions, but these amounts are included in "sales to other sectors" in the NIPA.

[58] Census excludes employer (state and local government) contributions to their own retirement funds. NIPA includes these contributions in compensation of employees, but pension funds are treated as part of the private sector, so contributions are simply a form of saving and earnings are included in the income of households.

contributions would be the same as the effect on labor compensation generally.[59] Contributions would therefore be unchanged if the consumer price level increased by the full amount of the VAT, and fall if the consumer price level did not change. Earnings on fund balances are returns to capital that could also be affected by a VAT. In the long run, there is no VAT burden on the normal return to capital, whether or not the consumer price level changed, and supernormal returns would also not be affected if the consumer price level increased by the amount of the VAT, but would be reduced if the consumer price level did not change. The reduction in both contributions and the supernormal portion of equity earnings on fund balances if the consumer price level did not change would be 1.91 percent under the narrow-based VAT and 1.74 percent under the comprehensive-based VAT.

7. Other Taxes and Other Own Source Revenues

Revenues from other taxes are primarily from excises on gasoline, cigarettes, and tobacco, and from licenses. To the extent excises are based on units rather than value and licenses have set nominal values, nominal revenues from these sources would be unaffected by a VAT, assuming no changes in consumption of goods subject to excises. Other own source revenues are mainly from interest earnings on investment of state balances — aside from retirement funds — that would be largely unaffected by a VAT. Our estimates therefore do not include any change in revenues from these sources.

8. Intergovernmental Grants

Grants from state to local governments and from local to state governments are removed as a source of revenue when revenues for these levels of government are combined, as they are here, so only federal grants to state and local governments are relevant. As noted earlier, our estimates of the effects of a VAT on the federal deficit held the nominal level of federal grants to state and local governments constant, so state and local revenues from federal grants are unchanged under either VAT base.[60]

B. Effects on State and Local Spending

1. General Government

Spending by state and local governments on public goods, such as police and fire protection, education, and highways, is included in "general expenditures" by Census

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[59] We assume, as is generally the case, contribution rates are set as a percentage of wages (see Schmidt, 2009).

[60] This means that if the consumer price level did not change, federal grants would purchase a larger amount of real goods and services not subject to VAT under the narrow base, but reduced amounts if the goods and services were subject to VAT under either base, whether or not the consumer price level changed.

and considered "general government consumption" in the NIPA. In contrast, as described later, the NIPA classifies any spending that is financed by charges — for example, higher education spending paid by tuition charges — as household consumption. We include in general government spending any deficit in charge-financed spending — that is, spending in excess of related charges — and treat any surplus from charge-financed spending as a reduction in general government spending. The effects of a VAT on general government spending also include any VAT paid on government purchases from business or paid on government compensation of employees.

All general government spending is excluded from the narrow VAT base. Business sales to government would be zero rated, and employee compensation would simply be treated as outside the scope of the VAT. This spending would therefore be unaffected if the consumer price level increased by the full amount of the VAT. However, if the consumer price level did not change, both purchases from businesses and compensation of employees would fall due to the reduction in factor incomes, so this spending could *fall* by 1.91 percent while providing the same real level of general government services.

The comprehensive VAT base includes all general government spending, so this spending would increase by the VAT rate of 2.27 percent if the consumer price level increased by the full amount of the VAT. If the consumer price level did not change, pre-VAT levels of this spending for purchases from businesses would fall due to the reduction in factor incomes, but all of this spending would be subject to the 2.27 percent comprehensive VAT rate. Similarly, pre-VAT spending on compensation of employees would fall due to the reduction in labor income, but would also be subject to the 2.27 percent VAT rate.[61] This spending would therefore rise by the same factor as other taxed spending, .51 percent.

2. Charge-Financed and In-Kind Transfer Spending

We include in charge-financed spending only the amount financed by user charges, so this spending would change in the same direction, and in the same amount, as the related tax-inclusive charges. More than three-fourths of in-kind spending is for Medicaid and other medical assistance;[62] this spending would change in the same direction as consumption of health services.

The narrow VAT base includes only user charges for other items — for example, electrical and water services — while the comprehensive VAT base includes health services and all items subject to user charges. If the consumer price level increased by the full amount of the VAT, spending subject to VAT would increase by 5 percent under

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[61] Note that purchases from business include investment goods, so government consumption of purchased new investment goods would be taxed on a prepayment basis. Likewise, consumption of new self-constructed investment goods would be taxed on a prepayment basis because employee compensation would be subject to VAT.

[62] Using data from NIPA Table 3.12, we calculate that in 2012 about 77 percent of state and local spending on in-kind transfers — referred to as "social benefits" in NIPA — was for Medicaid.

the narrow base and 2.27 percent under the comprehensive base. If the consumer price level did not change, under the narrow base spending subject to VAT would increase by 2.90 percent, but the remainder of this spending — including Medicaid spending — could *fall* by 1.91 percent with no reduction in the real level of services provided. Under the comprehensive base, all of this spending would increase by the same factor as general government spending, .51 percent.

3. Cash Transfer Payments and Retirement Benefits[63]

We treat all state and local cash transfer spending, as well as all retirement benefits, as based on wages. In the long run the nominal amount of this spending will therefore be unchanged under either base if the consumer price level increases by the full amount of the VAT, but will fall by the reduction in wages if the consumer price level does not change — 1.91 percent for the narrow-based VAT and 2.74 percent for the comprehensive-based VAT.[64]

4. Interest on Debt

We do not expect a federal VAT to change interest rates, so nominal spending on interest on debt would not change under either base in the long run (or short run).

5. Intergovernmental Grants

State governments make significant grants to local governments, but any change in state grants would be offset by changes in local revenues, so would have no net effect on combined state and local budgets. We assume there would be no change in the nominal level of the small grants state governments currently make to the federal government. Our estimates therefore do not include any change in this spending.

C. Using these Factors to Estimate State-by-State Effects

The percentage changes for each source of revenue and category of spending for each VAT base under both assumptions about changes in the consumer price level are shown in Table 2. We used these factors to make state-by-state estimates of the long-run effects of each federal VAT base on combined state and local revenues by source, spending by category, and budget balances. These estimates, provided in Section V, are based on Census data on state and local finances for FY2012, with some supplemental data from other sources.

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[63] Neither cash transfers nor retirement benefits are compensation for current production, so they are not included in the NIPA measure of national income. Both are included, however, in NIPA personal income.

[64] Note that these are the same assumptions we followed in computing the effect of the VAT on federal spending for these items.

Table 2

Effects of a Federal VAT on State and Local Revenues and Spending in 2012

Long-Run Effects Assuming the Consumer Price Level Rises and That It Does Not Change
(Percentage Change in Nominal Amounts)

| | Consumer Price Level | | | |
| | Rises | | Does Not Change | |
Source of Revenue or Category of Spending	Narrow VAT Base (5% Rate)	Comprehensive VAT Base (2.27% Rate)	Narrow VAT Base (5% Rate)	Comprehensive VAT Base (2.27% Rate)
Revenues				
Taxes:				
Individual income[1]	−0.35	−0.31	−2.59	−2.36
Corporate income	0.00	0.00	−1.14	−1.04
Payroll (UI)	0.00	0.00	0.00	0.00
General sales	0.00	0.00	−1.87	−1.70
Property - business	0.00	0.00	−1.91	−1.74
Property - residential	0.00	2.27	−1.91	0.51
Other (excises, licenses, etc.)	0.00	0.00	0.00	0.00
Charges:				
Education, hospitals, housing	0.00	2.27	−1.91	0.51
Other (water, electricity, etc.)	5.00	2.27	2.90	0.51
Employee retirement:				
Contributions	0.00	0.00	−1.91	−1.74
Earnings on fund balances:				
Equity normal returns	0.00	0.00	0.00	0.00
Equity supernormal returns	0.00	0.00	−1.91	−1.74
Bonds (all normal returns)	0.00	0.00	0.00	0.00
Other own-source revenues:				
Earnings on other balances	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00
Grants from federal government	0.00	0.00	0.00	0.00
Spending				
General government	0.00	2.27	−1.91	0.51
Charged and in-kind transfers:				
Medicaid	0.00	2.27	−1.91	0.51
Education, hospitals, housing	0.00	2.27	−1.91	0.51
Other (water, electricity, etc.)	5.00	2.27	2.90	0.51
Cash transfer payments	0.00	0.00	−1.91	−1.74
Retirement benefits	0.00	0.00	−1.91	−1.74
Interest on existing debt	0.00	0.00	0.00	0.00
Grants to federal government	0.00	0.00	0.00	0.00

[1] Percentage changes shown in "Consumer Price Level Does Not Change" columns are the weighted averages of state-by-state results from TPC's state individual income tax calculators.

Note that the estimates presented later are for *nominal* changes in revenues and spending, and we use the nominal change in budget balances — or this change relative to the current level of revenues — as a summary measure of the effect of the federal VAT variants on the fiscal position of state and local governments. Nominal changes in budget balances properly indicate whether state and local governments are better or worse off even if prices paid by these governments rise, because the real level of their spending and the design of transfer programs is held constant in all circumstances. Further, this measure may provide an indication of how state and local governments might respond to a federal VAT, because budgets are formulated and enacted using nominal levels of revenues and spending.

V. ESTIMATED LONG-RUN EFFECTS ON STATE AND LOCAL BUDGETS

A. Consumer Price Level Rises

If the consumer price level increased by the full amount of the VAT, the long-run aggregate deficit of all state and local governments combined would increase under both VAT bases, but the increase (from actual 2012 levels) would be quite small ($1.1 billion) under the narrow VAT base and quite large ($42.9 billion) under the comprehensive VAT base (columns 1 and 2 of Table 3).

Under the narrow base, revenues from charges subject to VAT would increase by $17.1 billion, but this would be fully offset by an increase in related spending — that is, the payment of VAT liabilities to the federal government. The entire net decline in the budget balance of $1.1 billion would be due to the effect of indexing on individual income tax revenues.

The deterioration in budget balances under the comprehensive VAT base would be due entirely to changes in spending; revenues would increase on net by $17.3 billion. Revenue increases are from residential property taxes ($4.9 billion) and charges ($13.3 billion), partially offset by the effects of indexing individual income tax parameters (–$1.0 billion). All spending subject to VAT would increase: general government ($38.0 billion), Medicaid ($8.9 billion), and charge-financed spending ($13.3 billion), for a total increase in spending of $60.2 billion. Note that all of the increase in charge-financed spending would be offset by increases in associated revenues.

An increase of 1.4 percent in aggregate state and local revenues would be required to offset the $42.9 billion increase in aggregate state and local deficits under the comprehensive base. Alternatively, if the federal government were to compensate states and localities for these net budgetary losses with increased grants, the net reduction in the federal deficit from the VAT would be 21 percent smaller — $161.8 billion rather than $204.7 billion.

B. Consumer Price Level Unchanged

If the consumer price level did not change when the federal VAT was introduced, we estimate that the aggregate deficit of all state and local governments would be *reduced*

Table 3

Effects of a Federal VAT on Total State and Local Budgets in 2012

Long-Run Effects Assuming the Consumer Price Level Rises and That It Does Not Change

($Billions)

	Consumer Price Level				ADDENDUM
	Rises		Does Not Change		
Source of Revenue or Category of Spending	Narrow VAT Base	Comprehensive VAT Base	Narrow VAT Base	Comprehensive VAT Base	Total Amount in 2012
	(5% Rate)	(2.27% Rate)	(5% Rate)	(2.27% Rate)	($Billions)
Change in revenues, total	16.0	17.3	−20.5	−15.6	3,108.4
Taxes:	−1.1	4.0	−22.9	−16.0	1,438.5
Individual income	−1.1	−1.0	−7.9	−7.3	307.3
Corporate income	0.0	0.0	−0.6	−0.5	49.0
Payroll (UI)	0.0	0.0	0.0	0.0	50.4
General sales	0.0	0.0	−5.9	−5.4	314.8
Property - business	0.0	0.0	−4.4	−4.0	228.5
Property - residential	0.0	4.9	−4.1	1.1	217.6
Other (excises, licenses, etc.)	0.0	0.0	0.0	0.0	270.9
Charges:	17.1	13.3	5.3	3.0	586.9
Education, hospitals, housing	0.0	5.6	−4.7	1.3	244.6
Other (water, electricity, etc.)	17.1	7.8	9.9	1.8	342.2
Employee retirement:	0.0	0.0	−2.8	−2.6	246.9
Contributions	0.0	0.0	−1.5	−1.3	77.1
Earnings on fund balances:	0.0	0.0	−1.4	−1.2	169.8
Equity normal returns	0.0	0.0	0.0	0.0	47.7
Equity supernormal returns	0.0	0.0	−1.4	−1.2	71.5
Bonds (all normal returns)	0.0	0.0	0.0	0.0	50.6
Other own-source revenues:	0.0	0.0	0.0	0.0	251.6
Earnings on other balances	0.0	0.0	0.0	0.0	80.8
Other	0.0	0.0	0.0	0.0	170.8

Table 3 (Continued) Effects of a Federal VAT on Total State and Local Budgets in 2012

Long-Run Effects Assuming the Consumer Price Level Rises and That It Does Not Change

($Billions)

	Consumer Price Level				ADDENDUM
	Rises		Does Not Change		
Source of Revenue or Category of Spending	Narrow VAT Base	Comprehensive VAT Base	Narrow VAT Base	Comprehensive VAT Base	Total Amount in 2012
	(5% Rate)	(2.27% Rate)	(5% Rate)	(2.27% Rate)	($Billions)
Grants from federal government	0.0	0.0	0.0	0.0	584.5
Change in spending, total	17.1	60.2	–41.1	7.2	3,151.7
General government	0.0	38.0	–31.9	8.6	1,672.8
Charged and in-kind transfers:	17.1	22.2	–2.2	5.0	980.0
Medicaid	0.0	8.9	–7.5	2.0	393.2
Education, hospitals, housing	0.0	5.6	–4.7	1.3	244.6
Other (water, electricity, etc.)	17.1	7.8	9.9	1.8	342.2
Cash transfer payments	0.0	0.0	–2.6	–2.4	136.4
Retirement benefits	0.0	0.0	–4.4	–4.1	233.2
Interest on existing debt	0.0	0.0	0.0	0.0	125.1
Grants to federal government	0.0	0.0	0.0	0.0	4.2
Change in budget balances[1]	–1.1	–42.9	20.7	–22.8	–43.3
Addendum					
Change as a percent of total revenues in:					
Total revenues	0.5	0.6	–0.7	–0.5	
Total spending	0.6	1.9	–1.3	0.2	
Budget balances	0.0	–1.4	0.7	–0.7	

Notes: All estimates are based on data from the Bureau of the Census (2014) except business property taxes are from Philips et al. (2013) and Medicaid spending from the National Association of State Budget Officers (2014). We include unemployment payroll taxes in taxes, although they are classified as insurance trust revenue by Census. We also include utility and liquor store revenues in "other" charges.

[1] Positive amounts mean the combined 2012 state and local budget deficit would be reduced; negative amounts that this deficit would be increased.

by $20.7 billion (at 2012 levels) if the VAT base was narrow, and increased by $22.8 billion if the VAT base was comprehensive (columns 3 and 4 of Table 3).

The improvement in budget balances under the narrow-based VAT is the net effect of lower revenues — which would fall by $20.5 billion — and much lower spending — which would fall by $41.1 billion, primarily as a result of the exclusion of most state and local government spending from the base combined with the reduction in factor incomes. Revenues from individual and corporate income, general sales, and business property taxes would all decline, as would revenues from employee retirement contributions and (supernormal) equity earnings, all due to the reduction in factor incomes. The largest declines would be in income taxes ($8.5 billion in total) and property taxes (also $8.5 billion in total), both more than the decline in general sales taxes ($5.9 billion). Partially offsetting these revenue reversals would be a much larger increase in "other" charges, but this increase would be entirely due to imposition of the federal VAT so fully offset by higher spending — payment of the VAT to the federal government. The large reduction in spending would be due primarily to a reduction of $31.9 billion in spending on general government.

The deterioration in budget balances under the comprehensive VAT base is primarily due to changes in tax revenues, which on net would decline by $15.6 billion. Revenues from the same sources that would decline under the narrow base would also decline under the comprehensive base, except that residential property tax revenues would increase under the comprehensive base — which taxes new housing — rather than decline. Note that as was true for the narrow base, income tax revenues would decline more (by $7.8 billion in total) than revenues from general sales taxes — which would decline by $5.4 billion. The small net increase in spending of $7.2 billion comes from the combination of higher spending on general government and Medicaid ($10.6 billion in total) and higher spending for VAT payments to the federal government for taxed charges ($3.1 billion in total), partially offset by lower spending on cash transfer payments (–$2.4 billion) and retirement benefits (–$4.1 billion).

An increase of 0.7 percent in aggregate state and local revenues would be required to offset the $22.8 billion increase in aggregate state and local deficits under the comprehensive base. Alternatively, if the federal government were to compensate states and localities for these net budgetary losses with increased grants, the net reduction in the federal deficit from the VAT would be about 11 percent smaller — $182.0 billion rather than $204.7 billion.

C. State-by-State Estimates

1. Consumer Price Level Rises

Under the narrow-based federal VAT, the long-run fiscal position of state and local governments would be essentially unchanged if the consumer price level increased by the full amount of the VAT, with the largest deterioration in any state's combined budget balance equal to only 0.1 percent of revenues (column 1 of Table 4).

Table 4

Effects of a Federal VAT on Combined State and Local Budget Balances as a Percent of Revenue by State in 2012

Long-Run Effects Assuming the Consumer Price Level Rises and That It Does Not Change

(Percent)

	Consumer Price Level				ADDENDUM
	Rises		Does Not Change		Total
	Narrow VAT Base	Comprehensive VAT Base	Narrow VAT Base	Comprehensive VAT Base	Revenue in 2012
State	(5% Rate)	(2.27% Rate)	(5% Rate)	(2.27% Rate)	($Billions)
All States	0.0	−1.4	0.7	−0.7	3,108.4
Alabama	0.0	−1.4	0.8	−0.7	40.7
Alaska	0.0	−1.3	1.0	−0.3	18.7
Arizona	0.0	−1.3	0.5	−0.8	53.5
Arkansas	0.0	−1.6	0.7	−0.9	24.7
California	0.0	−1.4	0.6	−0.8	428.4
Colorado	0.0	−1.3	0.5	−0.8	49.1
Connecticut	−0.1	−1.3	0.6	−0.7	40.6
Delaware	0.0	−1.6	1.0	−0.7	10.0
DC	0.0	−1.9	0.9	−1.1	12.9
Florida	0.0	−1.3	0.7	−0.7	156.1
Georgia	0.0	−1.4	0.6	−0.8	75.6
Hawaii	0.0	−1.6	0.6	−1.0	14.5
Idaho	0.0	−1.4	0.6	−0.8	12.1
Illinois	0.0	−1.4	0.7	−0.7	124.4
Indiana	0.0	−1.4	0.6	−0.8	54.7
Iowa	0.0	−1.4	0.6	−0.8	32.3
Kansas	0.0	−1.3	0.5	−0.9	26.8
Kentucky	0.0	−1.6	0.9	−0.7	36.9
Louisiana	0.0	−1.7	1.0	−0.8	44.2
Maine	0.0	−1.6	0.7	−1.0	12.3
Maryland	−0.1	−1.6	0.6	−1.0	57.9
Massachusetts	−0.1	−1.4	0.7	−0.7	74.5
Michigan	0.0	−1.3	0.7	−0.6	87.2
Minnesota	0.0	−1.4	0.6	−0.8	57.7
Mississippi	0.0	−1.5	0.8	−0.7	27.9
Missouri	0.0	−1.4	0.7	−0.8	50.8
Montana	0.0	−1.6	1.0	−0.7	9.2
Nebraska	0.0	−1.2	0.4	−0.8	20.6
Nevada	0.0	−1.4	0.8	−0.6	22.9

Table 4 (Continued) Effects of a Federal VAT on Combined State and Local Budget Balances as a Percent of Revenue by State in 2012

Long-Run Effects Assuming the Consumer Price Level Rises and That It Does Not Change

(Percent)

	Consumer Price Level				ADDENDUM
	Rises		Does Not Change		Total
	Narrow VAT Base	Comprehensive VAT Base	Narrow VAT Base	Comprehensive VAT Base	Revenue in 2012
State	(5% Rate)	(2.27% Rate)	(5% Rate)	(2.27% Rate)	($Billions)
New Hampshire	0.0	−1.2	0.8	−0.5	11.1
New Jersey	0.0	−1.3	0.6	−0.6	97.1
New Mexico	0.0	−1.6	0.9	−0.8	20.9
New York	−0.1	−1.4	0.6	−0.8	302.7
North Carolina	0.0	−1.3	0.6	−0.7	86.0
North Dakota	0.0	−1.2	0.6	−0.6	11.2
Ohio	0.0	−1.3	0.7	−0.6	115.0
Oklahoma	0.0	−1.4	0.6	−0.8	33.5
Oregon	−0.1	−1.3	0.7	−0.6	40.0
Pennsylvania	0.0	−1.5	0.9	−0.6	122.4
Rhode Island	0.0	−1.3	0.7	−0.6	11.6
South Carolina	0.0	−1.2	0.6	−0.7	41.1
South Dakota	0.0	−1.5	0.8	−0.7	7.2
Tennessee	0.0	−1.3	0.8	−0.6	55.4
Texas	0.0	−1.4	0.7	−0.7	218.7
Utah	0.0	−1.4	0.7	−0.7	24.6
Vermont	0.0	−1.6	0.8	−0.8	7.0
Virginia	−0.1	−1.4	0.6	−0.8	69.4
Washington	0.0	−1.2	0.8	−0.5	71.7
West Virginia	0.0	−1.6	0.9	−0.7	17.0
Wisconsin	0.0	−1.3	0.5	−0.8	57.7
Wyoming	0.0	−1.3	0.8	−0.6	10.1

Note: Positive amounts mean a state's combined 2012 state and local budget surplus would be increased or the state's combined deficit reduced; negative amounts that the state's combined surplus would be reduced or the combined deficit increased.

The comprehensive-based VAT would reduce combined state and local surpluses — or increase combined deficits — in every state by amounts equivalent to more than 1 percent of revenues (column 2 of Table 4). In all states, higher revenues would only partially offset higher spending. The net budget position worsens by amounts ranging from 1.2 percent of revenues in Nebraska, New Hampshire, North Dakota,

South Carolina, and Washington to 1.9 percent of revenues in the District of Columbia (DC).

2. Consumer Price Level Unchanged

In the long run, with no change in the consumer price level the adoption of the narrow-based federal VAT would improve the fiscal position of every state. The improvements would range from 0.4 percent of revenues in Nebraska to 1.0 percent in Alaska, Delaware, Louisiana, and Montana (column 3 of Table 4).

Under the federal VAT with a comprehensive base, combined state and local surpluses would be reduced — or combined deficits increased — in all states (column 4 of Table 4). The sources of the worsening of fiscal positions in all states would be both revenue declines and spending increases. The decline in the net surplus (increase in deficit) as a share of revenues ranges from 0.3 percent in Alaska to 1.1 percent in DC. These differences mostly reflect differences in sources of revenue; DC relies heavily on individual income and business property taxes for revenue, sources adversely affected by the federal VAT, while Alaska relies heavily on severance taxes and royalties from oil production, sources which would not be affected.

VI. CONCLUSIONS

Introduction of a federal VAT would affect state and local budget balances through both changes in state and local tax bases and changes in the cost of state and local public services due to changes in compensation of public employees and prices governments must pay for goods and services purchased from businesses. Effects of a VAT on income and property tax bases can be larger than effects on sales tax bases, and effects on spending can be as important as effects on state and local revenues. Understanding how a federal VAT would affect state and local finances requires a comprehensive analysis of all changes in product prices and factor costs that affect states and localities.

We estimate that a federal VAT with a narrow base that excluded most government spending would increase state and local government revenues and spending by similar amounts, leaving budget balances essentially unchanged, if the consumer price level increased because nominal factor incomes would not change. If the consumer price level was unchanged, however, budget balances would improve under the narrow VAT base because the resulting decline in factor incomes would reduce spending by even more than it reduced revenues. In contrast, if the federal VAT base was comprehensive and included all government spending, budget balances would worsen under both assumptions about price level changes. If the consumer price level increased, spending would rise more than revenues, while if the consumer price level was unchanged, spending would increase slightly and revenues would fall.

Our findings are qualitatively similar in both the short and long run, but short-run effects negatively affect budget balances under both VAT bases and assumptions about

the price level. Effects for intermediate assumptions about the breadth of the federal VAT base, changes in the level of consumer prices, and time horizon can be estimated by interpolation between the estimates we report.

These findings are limited in that they are for only one year (2012), are based on hypothetical VAT bases, and reflect the effects of a federal VAT in isolation from other possible federal revenue or spending changes, or potential legislative responses of state and local governments. The estimates are also "comparative static" and do not take into account any macroeconomic effects or possible changes in the composition of households' consumption of goods and services. Further, while the estimates capture differences in the composition of revenue sources and spending categories across states, they do not reflect important differences among states within revenue sources and spending categories. Nevertheless, we believe understanding the nature and having estimates of the plausible range of effects on state and local government budgets should help inform the discussion of a federal VAT.

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