

PRICE EFFECTS OF IMPLEMENTING A VAT IN THE UNITED STATES

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INTRODUCTION

MANY OBSERVERS HAVE NOTED THAT THE U.S. economy is on an unsustainable fiscal path (Congressional Budget Office, 2010; Auerbach and Gale, 2010), raising the specter of a catastrophic budget failure (Burman et al., 2010). Realistic solutions to this problem almost assuredly involve both spending reductions, especially in the Medicare, Medicaid, and Social Security programs, and tax increases. In the latter vein, one common suggestion for partially addressing the deficit and debt problems is the enactment of a new federal value-added tax (VAT), not as a substitute for an existing tax, but as an “add-on” tax designed to reduce future deficits, for example, by financing some of the projected shortfalls in the Medicare and Medicaid programs. Several recent studies have analyzed various aspects of implementing a VAT in the United States (Carroll and Viard, 2010; Toder and Rosenberg, 2010; Gale and Harris, 2010; Carroll et al., 2010).

Although the implementation of a VAT in the U.S. would raise many difficult issues, this paper focuses narrowly on only two of these issues — the effect of implementing a VAT on the price level and the associated price level effects on the net revenue obtained from a VAT. The following section begins by examining the alternative assumptions regarding the price level effects of implementing a VAT that have appeared in the literature, which range from full forward shifting of the tax into higher prices to full backward shifting of the tax into lower factor prices. Given the wide range of potential responses, the third section then examines the empirical literature on the price effects associated with both implementing and increasing VATs in other countries, hoping to glean lessons from this experience that might be relevant to the

implementation of a VAT in the United States. We conclude that both practical arguments, and the fairly limited empirical evidence, suggest that full forward shifting of a VAT is the most likely scenario in the U.S. In the fourth section, we examine the issue of the net revenue obtained from a VAT under the assumptions of full shifting and constant real government expenditures; that is, we adjust nominal government expenditures to take into account VAT-induced price increases.¹ A final section concludes.

APPROACHES USED IN THE LITERATURE

Most analyses and discussions of the price effects of a VAT assume that the tax would be fully shifted forward into higher consumer prices. This effectively assumes that the Federal Reserve would accommodate the tax with a one-time increase in the money supply — and in turn assumes that the Fed is able to calibrate such a policy accurately, which in practice may be difficult (Gravelle, 2002), and avoid an acceleration of inflation beyond the one-time increase associated with the enactment of the VAT.

The primary rationale underlying this assumption is the perception that the downward flexibility of nominal wages is limited, in part, because most wage contracts and agreements are specified in nominal terms. Thus, a tax reform that required wage reductions to reach a new equilibrium would be quite costly as these wage reductions would initially be distributed unevenly across industries. This, in turn, might result in considerable unemployment in sectors characterized by rigid wages, as well as misallocations of labor, at least in the short run. Proponents of the full price adjustment view assume that monetary policy would be accommodating to avoid these costs.

A second concern is that, with full price adjustment, any windfall loss experienced by the owners of existing capital due to the imposition of the VAT would be distributed widely across all capital owners in the form of a reduction in the real values of their assets, as consumer prices

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would increase while asset prices would remain constant. By comparison, if nominal consumer prices remained roughly constant and factor prices fell, bond holders, including owners of government debt, would be insulated from loss since the terms of their loans would be fixed in nominal terms. As a result, any reform-induced windfall loss on existing capital would be borne entirely by equity holders (Gravelle, 1995). Such a relatively concentrated pattern of reform-induced windfall losses would be undesirable, as it would increase the transitional problems associated with imposing the VAT and, thus, create a potentially significant obstacle to its implementation (Zodrow, 2002).

As noted above, most observers fall into the full forward shifting price adjustment camp. For example, Gravelle (1995, p. 9) argues that full price adjustment is likely since a “national sales tax ... would tend to produce an economic contraction if no price accommodation is made.” McLure (1997, p. 168) concludes that it would be “hard to imagine the monetary authorities not accommodating such an increase in prices.” Bradford (1996, p. 135) observes that, “It is commonly believed that introducing a value-added tax of the consumption type will bring with it a monetary policy adjustment that would result in a one-time increase in the price level ... and no change in payments to workers in nominal terms.” And most recently, Gale and Harris (2010, p. 10) recommend that “the Fed should accommodate the one-time price rise inherent in the creation of an add-on VAT. Not doing so would create significant and unnecessary adjustment costs in terms of lost jobs and wages.” Carroll and Viard (2010) also argue that an add-on VAT is likely to result in pressure on the Federal Reserve Bank to accommodate a higher price level, since workers can be expected to strongly resist downward adjustments in nominal wages.

Similar views have been expressed by governmental agencies. The Joint Committee on Taxation (1993, p. 59), in its analysis of the distributional implications of implementing consumption taxes, concludes that “unless there are convincing reasons to assume otherwise, the JCT staff assumes the Federal Reserve will accommodate the policy change and allow prices to rise.” Similarly, the Congressional Budget Office (CBO) (1997, p. 65) predicts that introducing a VAT in the United States would “cause a one-time jump in the price level, with no permanent change in the inflation rate.”

Opinion on this issue is, however, not unanimous. For example, in a computational general equilibrium (CGE) simulation analysis of the effects of replacing the income tax system with a national retail sales tax (that, from a modeling perspective, is analogous to a VAT), Jorgenson and Wilcoxon (2002) argue that such a reform would be shifted backward, reducing producer prices on average by 20 percent in the short run and by 25 percent in the long run. Similarly, proponents of the “FairTax” version of a national retail sales tax argue that its replacement of federal income and payroll taxes would result in significant backward shifting as existing income and payroll taxes that are “imbedded” in consumer prices are eliminated, thus reducing or eliminating any increase in prices due to the imposition of the national retail sales tax (Boortz and Linder, 2005).

In addition — and despite the arguments by JCT and CBO presented above — most VAT analyses by the various U.S. governmental agencies that deal with tax issues assume full backward shifting (JCT, 2005; Cronin, 1999). To a large extent, this is an artifact of the revenue estimating convention used by Treasury, CBO and JCT for purposes of revenue estimation that tax policies have no effect on nominal GDP. Similarly, Toder and Rosenberg (2010, p.12) note that, in constructing their estimates of the effects of using a VAT to replace payroll or corporate income taxes, they “follow the estimating convention used by the Treasury Department and the Joint Committee on Taxation (JCT) that assumes that GDP is invariant to changes in tax policy. With nominal GDP (and prices) fixed, a consumption tax must lower factor incomes.”

EMPIRICAL EVIDENCE ON FORWARD SHIFTING OF THE VAT

Much of the empirical evidence on forward shifting of the VAT has focused on the European experience. In early work, Aaron (1981) presents the results of a Brookings Institution conference that examined the experience of European countries that were early adopters of VATs in the period 1967–1973, including France, Germany, Italy, Netherlands, Sweden, and the United Kingdom. In his overview, Aaron (1981, p. 12) concluded that the case studies of VAT adoptions “produced few detectable effects on price levels.” The initial rates for these VATs ranged from 10-17 percent,

well within or above the range of rates that might be enacted with an add-on VAT in the United States. Tait (1990) found broadly similar results in an examination of the inflationary impacts of VAT adoptions and rate increases in 35 countries. For the VAT introductions, Tait argued that the VATs in 29 of the countries (83 percent) could be categorized as having no impact on inflation or resulting in only a one-time increase in inflation, consistent with full forward shifting offset to differing degrees by elimination of other consumption-based taxes. The other six countries were characterized as having some acceleration in the rate of inflation rather than a one-time price increase, which Tait attributed to expansionary wage and credit policies rather than the VAT.

This evidence is generally consistent with full forward shifting of the VAT since the newly enacted VATs typically replaced existing turnover or sales taxes that raised roughly the same total amount of tax revenue and were similarly distributed across industries. Thus, to the extent that the sales or turnover taxes were fully shifted forward, their elimination would cause a reduction in consumer prices that would have to be offset by full forward shifting of the VAT, if the net effect of the tax substitution was a limited change in consumer prices. And most studies suggest that sales taxes are fully shifted forward (or perhaps overshifted, in which case the price of the taxed commodity increases by more than the amount of the sales tax). For example, the most often cited analysis is Besley and Rosen (1999), who examine the extent of forward shifting of state and local sales taxes for various narrowly defined consumer goods, empirically estimating the effects of sales tax rate differentials across cities. They find a mix of full forward shifting and over-shifting of the sales tax for their sample; they attribute the latter result to the strategic behavior of firms in oligopolistic retail markets, drawing on the work of Delipalla and Keen (1992), which shows that both overshifting and undershifting are possible in oligopolistic markets depending primarily on demand conditions. Poterba (1996, p. 165) also analyzes the shifting of state sales taxes, looking at three aggregate commodities, and concludes that “retail prices rise by approximately the amount of the sales tax.”

With respect to the forward shifting of cascading turnover taxes, Smart (2007) examined the impact of the substitution of a VAT for a retail sales tax in four Canadian provinces, focusing on the effects of

cascading sales taxation of business inputs, which is estimated to account for over 40 percent of the retail sales tax base.² He found that the changes in consumer prices in each major consumer expenditure category varied in line with the changes in effective tax rates associated with the tax substitution, consistent with full forward shifting (or modest overshifting) of both the cascading provincial sales taxes and the new VATs. All of these results suggest that it is reasonable to view the absence of a price effect when a VAT is substituted for sales or turnover taxes as consistent with full forward shifting of the VAT.

Aaron (1981) also notes that the Brookings case studies that examined subsequent increases in VAT rates found substantial price increases, with a one percent increase in VAT rates resulting in price increases of “somewhat” less than one percent. For example, in France a one percentage point increase in the VAT was estimated to increase prices by 0.7 percentage points; in Germany, increases in the standard VAT rate of 7 percentage points and in the luxury rate of 2.5 percentage points were estimated to increase prices by 3.75 percentage points. He notes that such a partial adjustment would be expected even with full forward shifting, since the European VATs (and those in most other countries) do not apply uniformly to all consumption expenditures due to numerous exemptions and reduced tax rates. For example, the OECD (2008) estimates that the average VAT coverage ratio (defined as actual VAT collections divided by the revenues that would be raised with full taxation of personal consumption expenditures at the standard VAT rate) for the OECD countries is 58 percent. Aaron further notes that these one-time increases in the price level were made accompanied by increases in the money supply that accommodated the higher nominal spending needed in light of the VAT-induced commodity price increases. Indeed, Aaron (1981, p. 13) observes that none of the countries studied attempted a “monetary policy designed to prevent any increases in prices.”³ Similarly, for the six cases in which VAT rates were increased, Tait (1990) concluded that half were characterized by forward shifting or an acceleration of inflation; although the other half had little or no effect on prices, Tait again attributed this result to other non-VAT factors, including simultaneous changes in exchange rates.

More recently, Viren (2009) examines a wide variety of changes in VAT rates in 15 EU countries

over the period 1970–2004. Although he obtains a wide variety of results, most of them suggest considerable forward shifting, and his general finding is the “taxes have a very strong impact on consumer prices (the long run effect is even slightly above one [indicating slight overshifting]) while the effect on producer prices is quite weak (and statistically) insignificant. . .” (Viren, 2009, p. 132). He also focuses in some detail on three specific cases — VAT rate cuts in Sweden, Norway and Iceland — and finds roughly 90 percent forward shifting in these cases.

Carare and Danniger (2008) examine the effects of an increase of three percentage points in the German VAT in 2007. They find a cumulative price effect consistent with forward shifting of 73 percent of the tax.⁴ Interestingly, they find that roughly one-third of this effect occurred in the year prior to enactment (the reform was announced 13 months before it was enacted); they attribute this to consumers shifting their purchases forward to avoid the tax increase, allowing producers in imperfectly competitive markets to increase prices incrementally in response to the increase in demand. Finally, Carbonnier (2007) examines the industry-specific effects of two recent French VAT reforms, and finds roughly 60 percent forward shifting in the new car sales market and nearly 80 percent forward shifting in the market for home repair services.

In summary, although many of the empirical results on the extent of forward shifting of the VAT and other consumption-based taxes are dated and the results are somewhat mixed, the preponderance of the results are broadly consistent with significant or full forward shifting.

CALCULATING THE NET REVENUE OBTAINED UNDER A VAT WITH FULL SHIFTING

One interesting issue related to the choice between full forward and full backward shifting of the VAT is the calculation of the appropriate revenue adjustment associated with its implementation — the change in net VAT revenue due to price effects. An accurate calculation of such effects would, of course, require a full-scale general equilibrium analysis. We do not attempt such an analysis here, but instead perform a few rough calculations to estimate the magnitudes of some of these price effects.

In order to do so, we must specify the details of the VAT. In principle, an ideal VAT would apply to

all personal consumption expenditures, with no tax applied to production inputs (other than labor).⁵ In practice, however, most VATs exclude a substantial portion of household consumption, primarily on distributional grounds or for social reasons. Exemptions are often provided for goods believed to be consumed disproportionately by low and moderate income households and for most services provided by governments and charitable organizations. In addition, most VATs exempt certain goods and services on administrative grounds, including such hard-to-tax items as financial services and the implicit rental value of housing. The VATs in most OECD countries, for example, do not tax health care, education, government services, and financial services.⁶ Moreover, experience with sales (and indeed with income) taxes in the United States suggests that certain consumption goods would almost certainly be exempt from a new VAT. For example, all of the states exempt prescription drugs, most do not tax health care, and thirty states exempt food for home consumption or tax it at a lower rate. Indeed, Cline, Mikesell, Neubig and Phillips (2005) estimate that only 38 percent of personal consumption expenditures are subject to state and local sales taxes.

We follow Toder and Rosenberg (2010) in considering two potential VAT bases — a “broader” base with a relatively small number of untaxed consumer goods, and a narrow base with an expanded, but not implausible, set of untaxed goods. These two potential VAT bases are shown in table 1, which includes expenditure data for the various categories for 2009. Both bases assume that the VAT is not applied to educational expenses, government-financed medical expenses (primarily Medicare and Medicaid), services provided by charitable and religious organizations, the imputed value of financial services, and indirect sales and excise taxes on consumer purchases. Both bases also do not include the imputed rents on existing owner-occupied housing; however, the broader base includes purchases of new housing in the tax base, which serves as a proxy for current-period taxation of all future housing services from new owner-occupied homes. The narrow base does not make this housing adjustment, and also leaves untaxed rental housing, private health care spending, and groceries and other food consumed at home. The broader base encompasses 67 percent of total personal consumption expenditures, while the narrow VAT base includes 41 percent of such expenditures.

Table 1
Untaxed Goods under a Broader-Based and Narrow-Based VAT (2009)

	<i>\$ billions</i>	<i>% of PCE</i>	<i>Untaxed under Broader-Based VAT</i>	<i>Untaxed under Narrow-Based VAT</i>
Existing owner-occupied housing services	1,070	11%	√	√
Rental and new owner-occupied housing services (1)	511	5%		√
Groceries and other food consumed at home	778	8%		√
Public health care	884	9%	√	√
Private health care	1,293	13%		√
Education	223	2%	√	√
Financial services (non-fee based)	271	3%	√	√
Religious, charitable and non-profit organization goods and services	405	4%	√	√
Indirect and excise sales taxes	470	5%	√	√
Total potentially untaxed goods	5,904	59%		
VAT base as % of personal consumption expenditures (\$10.001 trillion)			67%	41%

Note: (1) The taxation of new housing reflects the inclusion of purchases of new housing in the tax base, which serves as a proxy for current taxation of all future housing services from new owner-occupied homes, but leaves untaxed the imputed rents earned by investments in existing owner-occupied homes.

Sources: Department of Commerce, Bureau of Economic Analysis, and computations by authors.

Another potential feature of a VAT is a tax rebate to relieve the burden of the tax on low and moderate income households. Relative to exempting goods that are believed to be disproportionately consumed by the poor, such rebates are a more highly targeted, and thus more efficient, means of reaching the distributional goal of eliminating or reducing the burden of the VAT for low and moderate income households.⁷ Although some, including proponents of the FairTax proposal, argue for making the rebates universal on simplicity grounds or to limit intrusiveness, means testing is crucial to the efficiency/targeting argument for rebates; that is, although means testing adds some administrative costs and compliance costs for recipients, it provides rebates only to those who need them, thus significantly limiting the revenue costs and the distortionary VAT rate increases needed to finance the rebates, while eliminating the administrative costs of providing the rebates to the entire population.⁸

Following Carroll et al. (2010), we assume a rebate under the broader-based VAT that fully offsets all the tax paid by families near the pov-

erty level of income (including all families that fall below the threshold), and then phases out as incomes increase beyond the poverty level. Specifically, we assume a broader-based VAT that is implemented at a rate of 5 percent (which in the absence of the rebate would raise \$335 billion, assuming full compliance), and that the rebate is phased out at incomes between \$30,000–\$60,000 for married couples and between \$15,000–\$30,000 for singles. Table 2 provides details of the rebates. For example, for a family of four the poverty threshold was \$21,200 in 2007. Using data on consumption expenditures by income group from the Consumer Expenditure Survey for 2007–2008, and classifying expenditures as either taxed or untaxed following the categorizations in table 1, we estimate that such a family would pay \$710 in VAT. Under these circumstances, the cost of the rebate would be \$26.6 billion (by comparison, a uniform rebate would cost \$67.6 billion). Under the broader-based VAT with a phased out rebate, the rebate would require an increase in the VAT rate to 5.4 percent. As shown in table 2, similar phase-outs

Table 2
Calculation of Gross and Transfer-Adjusted Rebates under 5% "Broader Base" Add-On VAT (2009)

<i>Item</i>	<i>Less than \$20,499</i>	<i>\$20,500 to \$34,299</i>	<i>\$34,300 to \$49,999</i>	<i>\$50,000 to \$74,699</i>	<i>\$74,700 and more</i>	<i>Total</i>	<i>Percent of VAT Revenues</i>
Total federal government cash income transfers (\$b)	104.8	131.2	161.7	162.9	164.5	725.0	
Increase in total cash transfers from indexing (\$b)	3.5	4.4	5.4	5.5	5.5	24.3	7.3
Total gross rebate by size of household, no phase-out (\$b)							
1	5.8	2.6	2.1	1.3	1.1		
2	2.5	3.3	3.2	3.8	6.1		
3	1.4	1.5	1.6	2.3	4.2		
4	0.9	1.3	1.6	2.6	5.7		
5 or more	1.1	1.5	1.9	2.7	5.7		
Total	11.7	10.1	10.3	12.6	22.8	67.6	20.2
Rebate per household (\$)	455.7	520.6	550.4	530.1	697.5		
Total gross rebate by size of household w/ phase-out (\$b)							
1	5.2	0.8	0.0	0.0	0.0		
2	2.5	3.0	1.8	1.1	0.0		
3	1.4	1.4	0.9	0.7	0.0		
4	0.9	1.1	0.9	0.7	0.0		
5 or more	1.1	1.3	1.1	0.7	0.0		
Total	11.2	7.6	4.7	3.2	0.0	26.6	7.9
Rebate per household (\$)	434.4	389.1	247.4	134.9	0.0		
Total transfer-adjusted rebate with no phase-out (=total gross rebate with no phase-out less transfers from indexing, in \$billions)	8.2	5.7	4.9	7.2	17.3	43.3	12.9
Total transfer-adjusted rebate with phase-out (\$billions)	7.7	3.2	0.0	0.0	0.0	10.8	3.2

Notes: Cash transfers are from NIPA table 3.2 and are distributed across income groups following CBO data on the sources of income for all households by category, 1979–2007, available at http://www.cbo.gov/publications/collections/tax/2010/income_by_source.pdf. Data on “gross” rebates distributed by household size and income are from the Consumer Expenditure Survey, 2007–2008, tables 35–40 on average annual expenditures and characteristics. Calculations assume a 5 percent VAT under the broader-base VAT which includes 67 percent of personal consumption expenditures as described in table 1.

are applied to families of different sizes, with the basic rebate again determined by the tax paid on the poverty level of consumption for that family size.

We turn next to the calculation of net revenue effects under the full forward shifting scenario with real government expenditures held constant in real terms, in which case the required amount of government revenue would increase, both because the prices of some goods and services purchased by the government may increase and because income

transfers would decline in real value unless their nominal values were increased. In principle, such an offset might be huge — if all federal government expenditures were subject to tax. For example, if all current federal government expenditures, net of interest payments and payments to foreigners — which amounted to 22.2 percent of GDP in 2009 — were subject to tax at a 5 percent rate, the projected increase in required revenues would be \$157 billion, or 42.2 percent of VAT revenues.

However, in practice, the amount of the additional revenue required with full forward shifting is likely to be significantly smaller for at least three reasons. The first is that most, if not all, federal government expenditures are not likely to be subject to tax. In principle, government services that represent consumption should be subject to tax; for example, Aujean, Jenkins, and Poddar (1999) argue for full taxation, primarily to provide for fair competition for services that are provided by both the public and the private sectors, and so that taxpayers have an accurate perception of the relative costs of public services. Indeed, some proposals in the United States, such as the national retail sales tax plan described by Kotlikoff (2006), explicitly provide for such tax treatment, typically by taxing the value of the inputs in the provision of government services (since prices for such services are often not available).⁹ Nevertheless, for both social and political reasons, most countries do not apply VAT to government goods and services (Bird and Gendron, 2007), and this seems quite likely to be the case with a VAT in the United States as well.

A second issue is the treatment of income transfers. Although transfers could generally be indexed to maintain their real purchasing power, such treatment is subject to many exceptions. Assuming that purchases of state and local governments are not subject to the VAT, as recommended in most proposals and as is commonly the case, transfers to state and local governments need not be indexed. Moreover, indexing is not needed to the extent that income transfers, especially to the poor, are (on average for each income group) used to purchase goods and services not subject to the VAT.

Finally, as discussed above, it is highly desirable on efficiency and revenue grounds that a VAT implemented in the United States achieve any distributional goals primarily through the use of a targeted means-tested rebate for low and moderate income taxpayers, rather than with exemptions for goods that are perceived to be disproportionately consumed by the poor. However, the indexation of transfer payments may reduce the need for rebates, as individuals who receive indexed transfers would in principle not need a rebate to offset the tax paid on purchases financed with such transfers. Adjusting rebates on an individual basis to reflect the extent to which the recipient also receives indexed income transfers would be extremely cumbersome from an administrative standpoint, and indeed may be impractical.¹⁰ It would also be

controversial from a political perspective. Nevertheless, to the extent such adjustments could be implemented, they would reduce the amount of additional revenue that would have to be raised under the VAT; that is, reducing the extent of “double indexing” for the price effects of the VAT would reduce the amount of revenue required to keep real government expenditures constant. In any case, we provide some estimates of the magnitude of this effect below.

To illustrate these points, we estimate the magnitude of the revenue increase required to keep federal government expenditures constant under the assumption of full forward shifting of the broader-based VAT with a means-tested low-income rebate. In 2009, total current federal government expenditures, net of transfers to foreigners, interest payments, and business subsidies were \$3,076 billion. Of this amount, \$987 billion were consumption expenditures (e.g., defense spending, administrative expenses, non-transfer spending by government agencies, research and development, etc.) and \$485 billion were transfers to subnational governments, all of which typically would not be subject to tax and thus not require indexing.¹¹ The remaining expenditures of \$1,605 billion consisted of transfer payments to individuals. Of this amount, \$879.5 billion reflected in-kind transfers, including the value of Medicare and Medicaid, and \$725.0 reflected cash transfers.¹² Of the in-kind transfers, only about \$5 billion for energy subsidies reflected expenditures on goods subject to either the broader-based or the narrow-based VAT. For the cash transfers, we assume that 67 percent were spent on taxed goods (as indicated in table 1). Thus, the total amount of federal transfers that must be indexed is \$489 billion and, assuming a five percent VAT, the total revenue increase required to keep federal government expenditures constant in real terms is approximately \$24.3 billion or 7.3 percent of total VAT revenues (exclusive of the rebate). Another way of thinking about this adjustment is that government revenue yield from the VAT, neglecting the rebate, falls from approximately \$67 billion to \$62 billion per percentage point when transfers are indexed to maintain their real value. The revenue yield falls further to \$57 billion with the phased-out rebate, and to \$49 billion with the universal rebate.

The effects of the rebates can be reduced if one reduces the rebate to reflect the indexation of government transfers — that is, if one adjusts the rebate to avoid double indexing. Using the

CBO data, the distribution of transfer payments by income quintile and the amount of indexation required to hold these transfers constant in real terms, again assuming that 67 percent of transfers are spent on taxed goods, are shown in the first two lines of table 2. This table then presents the “gross” rebate (before any adjustment for receipt of indexed transfers) on the poverty level of consumption as calculated above, which is distributed by income and size of household. The total gross rebate is \$68 billion if the rebate is universal and \$27 billion if the rebate is means tested as described above. The minimum possible “transfer-adjusted” rebate required is calculated by subtracting the transfer indexation amount from the gross rebate. The amounts of the transfer-adjusted rebates are presented in the last two lines of the table; the first set of results presents the case of a universal rebate and the second considers a rebate that is phased out as described above. Aggregating across households demonstrates that, if the VAT rebates are not phased out but are adjusted to prevent double indexing in the presence of indexation of government transfer payments, the total rebate falls by \$24.3 billion (the full amount of the indexing of transfers) to approximately \$43.3 billion or 12.9 percent of total VAT revenues. If the rebate is phased out, but is adjusted to prevent double indexing, the total rebate falls by \$15.8 billion (less than the full amount of indexing of transfer payments since some of them go to households that do not receive a rebate or receive small rebates) to \$10.8 billion or 3.2 percent of total VAT revenues. The revenue yields per percentage point of VAT increase from \$57 billion to \$60 billion and from \$49 billion to \$53 billion in these two cases.

Finally, note that our net revenue calculation in the case of full forward shifting has a close analog in the case of full backward shifting. In the latter case, although nominal GDP is constant, all consumer prices do not remain constant; instead, the prices of taxed goods would rise while the prices of untaxed goods would fall. As a result, to the extent that government expenditures directly or indirectly (through transfer payments) take the form of purchases of untaxed goods, the nominal amount of government expenditures would decline. That is, with full forward shifting, the percentage increase in tax revenues needed to hold real government expenditures constant is less than the VAT rate to the extent that government revenues finance the purchase of untaxed goods; by comparison,

in the case of full backward shifting, the amount of tax revenues needed to hold real government expenditures constant does not remain constant in nominal terms (as it would if the government had to pay VAT on all its purchases) but falls to the extent that government revenues are used to purchase, or finance the purchase of, untaxed goods.

CONCLUSION

Most observers conclude that the implementation of a VAT in the United States would be accompanied by an expansion of the money supply by the Federal Reserve Board sufficiently large to result in full forward shifting of the tax, primarily to avoid the disruptions in the labor market that would occur if nominal wages declined in some sectors but not others. A second advantage under the full shifting scenario is that any windfall losses on capital owners due to the imposition of the VAT are borne by all capital owners in the form of a reduction in the real value of their assets. By comparison, with full backward shifting, such reform-induced windfall losses would be concentrated on the owners of equity (since the values of bonds expressed in nominal terms would remain unchanged), which would increase the transitional problems associated with implementation of the VAT.

In this paper, we argue that practical concerns and international experience suggest that the full forward shifting assumption is the more likely outcome. We then present some rough calculations of the effects on net revenue that would arise under the full forward shifting scenario. In particular, we estimate that adjusting government cash transfer payments to keep them constant in real terms would increase required revenues by roughly 7.3 percent with a broader-based VAT with a means-tested rebate. Finally, we note that although this amount could be reduced significantly by reducing the double indexation that occurs with both indexing of transfers and the rebate, the administrative and political feasibility of such adjustments is clearly open to question.

Notes

- ¹ We focus solely on the revenue effects of these price increases. In particular, we do not consider compliance issues; Reckon (2009) estimates an average tax gap under the VATs in the EU of 12 percent, with the VAT gaps in individual countries ranging from 2-30 percent.

We also do not consider any revenue “offset” due to lower income and payroll taxes under the assumption of full backward shifting of a VAT (that is, assuming fixed nominal GDP); the Joint Committee on Taxation (2005) estimates this effect to be roughly 25 percent of revenues, although this calculation appears to ignore the income and payroll tax revenue feedback effects associated with VAT-financed government spending. More generally, a complete analysis of all of the effects on government revenues and spending under the assumption of full forward shifting of a VAT (e.g., through effects on inflation indexing of income tax brackets, or on the interest paid on inflation-protected government securities) is beyond the scope of this paper.

² Smart (2007) compared price effects in the four provinces that “harmonized” their retail sales taxes (RSTs) to the federal VAT (the Goods and Services Tax) in the 1990s with those in the other Canadian provinces that retained their RSTs.

³ Tait (1990) notes that VAT legislation and explanatory literature often assume full forward shifting.

⁴ Carare and Danniger (2008) consider only the effects of the VAT on core inflation, and thus ignore any effects on food or energy prices, on the grounds that the German VAT is not applied to most food and some energy products.

⁵ Under the credit-invoice method VAT used in virtually all countries that utilize the tax, firms are taxed on all their receipts, but receive credits for tax paid on purchases of business inputs; with full crediting of such purchases, the resulting tax base is sales to final consumers. Note that this implies that any firms that are exempt from the VAT may still bear some of the burden of the tax because they purchase inputs from taxable firms for which they receive no credits. Goods may also be “zero rated” under a VAT, in which case sellers pay no tax and get a refund for any tax paid by their suppliers, thus eliminating the entire VAT burden. When we refer to “exempt” goods, we assume that they are completely untaxed, and do not consider any indirect tax burdens that arise due to the purchase of inputs that are subject to tax but never credited.

⁶ For example, see Organisation for Economic Co-operation and Development (2008).

⁷ The simulation results presented in Carroll et al. (2010) confirm that exemptions are not an effective way to address distributional concerns under a VAT.

⁸ See President’s Advisory Panel on Federal Tax Reform (2005) for further discussion.

⁹ Gale and Holtzblatt (2002) discuss the implications of such treatment for the tax rate under a national RST.

¹⁰ Note that making such adjustments “on average” for each income group would be far too imprecise to be workable; in particular, many low and moderate income households receive no transfers. For example, data from the Panel Study of Income Dynamics indi-

cate that 26 percent of households in the bottom quintile do not receive transfer payments. The percentage of households that do not receive transfer payments increases to 38 percent for the second quintile, and to 46 percent for the third quintile.

¹¹ Note, however, that some of these transfers would ultimately finance spending on taxed goods; we assume that the federal government does not adjust its intergovernmental transfers to reflect this factor.

¹² These figures are calculated using CBO data on the sources of income for all households by category from 1979–2007, available at http://www.cbo.gov/publications/collections/tax/2010/income_by_source.xls.

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