Economic Studies
at BROOKINGS

March 2016

Entrepreneurship and Small Business Under a Value-Added Tax

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We gratefully acknowledge helpful comments from Edie Brashares.

We thank the Ewing Marion Kauffman Foundation for funding this work. The opinions expressed are our own and do not represent the views of any organization.

Introduction

The possibility of introducing a value-added tax (VAT) in the United States has been discussed on a sporadic basis for several decades. In recent years, efforts to implement a VAT have been spurred by a desire to replace the revenue lost from reducing and simplifying the income tax (for example, Graetz 2010; Toder, Nunns, and Rosenberg 2012) and/or a desire to shore up the nation's long-term fiscal situation (Debt Reduction Task Force 2010; Gale and Harris 2011).

As explained below, the VAT is, in effect, a consumption tax. Although it would be new to the United States, the VAT is a workhorse of tax systems around the world. Approximately 160 countries around the world—including every OECD member except the United States—administer a VAT. VATs provide the third largest revenue source in OECD countries, behind income and payroll taxes. Across all levels of government, VAT revenue averaged 5.5 percent of GDP and almost 17 percent of overall revenues in OECD countries (OECD 2015) in 2012.

One of the critical questions in designing a VAT is whether to exempt small businesses and, if so, at what threshold. Including all businesses may seem, a priori, like a natural policy choice, but the government's administrative and private compliance costs associated with collecting tax from small businesses often prove to be high relative to the revenue generated. As a result, most countries with VATs exempt some small businesses.

This paper examines issues related to small business and entrepreneurship under a VAT. Section II discusses the basic mechanics of a VAT, including the important distinction between goods or businesses that are zero-rated compared to those that are exempt.

Section III discusses the treatment of small business under a VAT. Most OECD countries provide VAT exemptions to businesses with total sales below a given threshold. Applying the tax to very small businesses often creates significant compliance costs for these firms with little or no revenue gain to the government. The optimal threshold balances the revenue collected and the administrative and compliance costs. Brashares et al. (2014) finds that the optimal threshold for a VAT in the United States would vary dramatically with the actual VAT rate. At a rate of 5, 10, or 20 percent, the optimal threshold—based on a firm's total annual sales—would be $600,000, $200,000 or $90,000, respectively. Political factors may reduce the thresholds further. Despite this seemingly clear relationship in theory and simulations, in practice there appears to be no correlation between an OECD country's standard VAT rate and its business exemption threshold.

The creation of a VAT in the United States would raise taxes on business sales to other businesses and consumers. While it is impossible to directly estimate the effects of a VAT in the U.S. since one has never existed, it is nevertheless possible to shed light on a variety of related subjects that bear on the question of how a VAT would affect small businesses. Toward this end, Section IV shows that the previous literature examining the effects on sales and income taxes on firm behavior and overall economic activity reaches fragile and uncertain conclusions.

Section V presents estimates of the effects of income and sales taxes on the number of small firms and on employment by those firms. Notably, although the VATs around the world define small businesses in terms of total sales, our classification of small firms is based on employment. We find that increases in state sales tax rates, given their impact on revenues, do not have statistically or economically significant effects on the number of firms or the employment within firms. Section VI provides concluding remarks.

The Value-Added Tax

Basic Mechanics

A VAT is applied to the difference between a business's sale of goods and services (to businesses or consumers) and its purchase of inputs from other businesses. It is thus a tax on the value added to a good or service at each stage of the production process. In the credit-invoice method used by most developed countries, businesses levy a tax on their sales and claim a credit on the taxes they paid on the inputs from other businesses. Each firm remits the difference between the VAT collected from its sales and the credit received on its input purchases. In the usual case, the sum of remittances by different firms for a given good is the total value of the tax levied on consumers at the retail sale stage. Hence, a value-added tax in principle replicates the effect of a retail sales tax.

Table 1 provides an example of how a credit-invoice VAT would operate with the production and sale of bread. In the example, which is based on Toder and Rosenberg (2010), a farmer grows wheat and sells it to the miller, who turns it into flour and sells it to a baker, who makes bread and sells it to a retail customer. With no taxes, as shown in the first panel, the farmer sells the wheat to the miller for $40, the miller sells the flour to the baker for $60, and the baker sells the bread for $100. Thus, the farmer provides value added of $40 (assuming he has no input purchases), the miller provides value added of $20 (60-40), and the baker provides value-added of $40 (100-60).

Under a retail sales tax of 10 percent, shown in the second panel, the only change would be that the baker charges consumers $110 (including the sales tax) and remits $10 to the government.

Under a credit-invoice VAT of 10 percent, as shown in the third panel, a tax is collected and remitted at each stage of the production process.[1] The farmer produces $40 of wheat, sells it to the miller for $44 (including the VAT), and remits the $4—or 10 percent of his value-added—to the government. The miller produces the flour and sells it to the baker for $66 (including the VAT). The miller collects $6 in value-added tax from the baker, but also earns a $4 tax credit for his VAT payments to the farmer, and so remits a net payment of $2 to the government, representing 10 percent of his value-added. The baker sells bread to consumers for $110 (including the VAT), collecting $10 in VAT revenue. Given the $6 credit the baker receives on his payments to the miller, the baker remits $4 to the government, which is 10 percent of the value-added he provides. The consumer pays $10 in taxes, which is equal to both the total amount remitted to the government by the three firms and the net VAT revenue received by the government.

Note that the final price to the consumer is the same under a retail sales tax or a VAT of the same rate. But businesses collect a VAT at each stage of production, with cross-reporting (e.g., both the farmer and the miller report their transaction to the government), whereas all revenue from the retail sales tax is collected at the retail level, with no cross-reporting. As a result, the VAT is often said to be less subject to evasion than is a retail sales tax.

Standard Rates, Zero-Rating, and Exemptions

VATs typically have a "standard rate" and may have reduced or higher rates that apply to certain goods and services. More recently adopted VATs tend to have a single positive rate that is applied to all goods and services unless an exception is made. Exceptions come in two main varieties: goods that are "zero-rated;" and goods that are exempt. If a good is zero-rated, the retail sale of the good is untaxed and credits are allowed for the VAT paid on inputs. If a good or business is exempt, the retail sale of the good is untaxed. Producers, however, cannot claim a credit for the VAT paid on inputs used to produce exempt goods. As a result, exempting a good can sometimes raise the level of VAT revenue if the good is sold to a taxable business or lower VAT revenue if the good is sold to a consumer.

Reduced and domestic zero-rated goods are commonly used to lower the burden of taxes on low-income households and help offset the regressivity of a VAT. For example, food and utilities often face reduced or zero rates. This makes the tax more progressive than otherwise since these items represent a greater share of the budget of low-income families than of high-income families. Still, reduced and zero-rating is an inefficient way to generate progressivity, since high-income families also consume food and utilities. A more cost-effective way to offset the regressivity of the VAT would be to provide a per-person or per-family allowance (Gale and Harris 2011).

Exemptions are generally used when output is either hard to tax, is a public good or is subject to other specific taxes, or when policymakers aim to achieve other social and economic policy goals. Financial and insurance services, health and education, postal services, and residential property sales are commonly exempt.

To continue the example from above, the first panel of Table 2 shows that if retail sales of bread are zero-rated, the farmer and miller still remit the same VAT and claim the same credits as before. The baker, however, charges no tax on the retail sale of bread, yet still claims a credit of $6 for earlier taxes paid. As a result, the farmer pays $4, the miller pays $2, and the baker has a burden of -$6, so the net tax burden and net revenue collected are now zero. The bread then sells for $100 to the consumer, who pays no tax. Zero-rating a retail sale, in other words, has the same effect for the consumer and government as eliminating the overall tax.

In contrast, depending upon the market power of participants, exemptions—as opposed to zero-rating—can raise, lower, or leave unaffected the final consumer price and the amount of tax revenue collected. In the example shown in the second panel of Table 2, exempting the miller raises the taxes paid and the consumer price. The farmer is unaffected by the exemption and sells wheat to the miller for $40 (plus a $4 VAT). The miller generates $20 of value-added and sells flour to the baker for $64. The miller does not charge VAT on his sale, but does not receive a credit for the taxes he paid the farmer. The baker adds $40 in value and sells the bread to consumers for $104 (plus $10.40 in VAT). But the baker cannot receive tax credits for his purchases because the miller does not charge a VAT. Thus, the total price to the consumer is $114.40, and $14.40 is paid in taxes—$4 from the farmer and $10.40 from the baker.[2]

VATs Around the World

In 2014, the average unweighted standard rate in the OECD was about 19 percent, with rates as high as 27 percent in Hungary and as low as 5 percent in Canada (Table 3). Nations in the European Union tend to impose slightly higher than average rates than the OECD as a

[1] For simplicity, we are modeling a 10 percent tax-exclusive VAT. This would be a 9.19 percent tax-inclusive VAT.

[2] In contrast, exempting the farmer has no effect on the overall price. In this situation, the farmer sells $40 of wheat to the miller and charges no VAT. The miller adds $20 of value-added and thus sells the flour for $60 (plus a $6 VAT) to the baker; the miller pays $6 in VAT and retains $60, as with no exemption. The baker also has the same outcome as with no exemption: Here, he sells bread for $100 (plus $10 in VAT) and remits $4 ($10 in VAT liability less a $6 credit) to the government and has value-added of $40 ($100-$60). If the baker is exempt, however, the overall price and tax burden fall. Under this situation, the farmer and miller are unaffected. The baker purchases the flour from the miller for $66, adds $40 in value, sells the bread for $106—which is less than the price with no exemption ($110) —and remits no tax.

whole. Charlet and Owens (2010) classify VATs into two groups. The first (and older) group, often thought of as EU countries, has a narrow tax base and many goods or services receiving preferential treatment. The second group is composed of countries such as New Zealand and South Africa that have more recently adopted a VAT and tend to apply the standard rate to a broad base of goods and services. Economists generally agree that a broad-based single-rate VAT is the more efficient way to implement the tax.

The revenue ratio provides a formal measure of how broad the base is. The ratio is calculated by dividing VAT revenue by the product of the standard rate and all consumption. If the standard tax rate applied to all consumption and to nothing else, and if there were no evasion, the ratio would be 1. The presence of preferential rates or zero-rating reduces the revenue ratio, as does tax evasion. Use of exemptions can raise or reduce the ratio, for reasons noted above. As shown in Table 3, the revenue ratio averages 0.55 in OECD countries, which suggests that on average the VAT base is significantly eroded by political factors and/or tax evasion. The ratio ranges from 0.31 to 1.13 across countries, which suggests that high revenue ratios are possible but many countries choose alternative policies.[3]

The Treatment of Small Business

The Small Business Exemption

Most countries exempt some small businesses from the VAT, for any of several reasons. The net revenue that would be collected from including very small businesses is often quite meager and could well be negative.[4] The government's costs of collecting and enforcing the tax at every small business may be excessive. And compliance costs are relatively high for small businesses (as a share of revenue) due to the high fixed costs of invoice and tax preparation. GAO (2008) cites 3 studies showing that the compliance burden as a percentage of annual sales in Canada, New Zealand and Australia falls with income, from approximately 2 percent for businesses with less than $50,000 in annual sales to .04 percent for businesses with more than $1 million in sales.

Of the 33 OECD countries with a VAT, 28 have set a threshold under which small businesses do not have to register for the tax. In some cases, the threshold varies by industry, by whether the business is a non-resident entity that imports goods or by other criteria. In 2014, the UK had the highest threshold at about $103,000 (US dollars), followed by France, and Japan (Table 3). Overall, 9 countries have thresholds over $60,000, 10 countries have thresholds between $60,000 and $20,000, 2 countries have thresholds between $20,000 and $10,000, 7 countries have thresholds below $10,000 and 5 countries—Chile, Mexico, Turkey, Spain, and Sweden—do not have an exemption threshold.

Figure 1 shows that there is little relationship across OECD countries between the standard VAT rate and the business exemption threshold. This lack of relationship stands in sharp contrast to theoretical and simulation results, presented below, which suggests that the threshold should fall (substantially) as the standard rate rises.

Virtually all countries with thresholds allow small businesses to register for the VAT if they choose to.[5] Unregistered small businesses do not have to collect or remit VAT on their sales, but they cannot use the tax credits generated by their purchases. Businesses that do register owe VAT on their sales, but they can deduct the VAT paid on inputs.

While being exempt from the tax may sound attractive, the choice is not always obvious, as there can be benefits of VAT registration. For example, in Australia, during the 2010-11 tax year, 37 percent of businesses had sales below the VAT threshold, but 92 percent of all businesses registered. Registration increases demand from other producers seeking to purchase goods from VAT-registered businesses to obtain tax credits (Bain et al. 2015).

The Optimal Threshold

Keen and Mintz (2004) model the optimal small business threshold as representing a trade-off between the revenues collected and the collection costs of the tax. The collection costs include both the compliance burden imposed on businesses and the administrative costs faced by the government. A higher threshold reduces collection costs, but also reduces revenues. In their basic model, holding firm size constant, they develop a formula showing that the optimal threshold depends on collection costs, the VAT rate, the ratio of value-added to total sales, and the marginal social cost of raising revenues. They also note that firms just above the threshold may want to reduce sales in order to avoid the tax and develop a model extension that incorporates this insight.[6]

[3] The ratio can exceed 1 if government services are taxed and/or if exempted goods raise taxes on net.

[4] Including small firms in the VAT can reduce revenues to the extent that those firms have negative value-added, export most of their sales, or have low sales (due, for example, to being in a start-up stage).

[5] Some countries have a threshold above which a firm is required to register for the VAT. This threshold can differ from the threshold for having to pay VAT. In addition, in some countries, firms that choose to register must do for a specified period that ranges from 1 to 5 years. This deters firms who would strategically choose to register only in years where they have negative value-added.

[6] Zee (2005) constructs a model that assumes that the threshold affects relative consumer prices but not production decisions. In his model, the optimal threshold occurs where the marginal utility of the revenue impact of raising the threshold is

In model simulations, they find that the optimal threshold varies considerably—from about $22,000 to about $280,000—depending on assumptions about the ability of firms to adjust to the tax and the distribution of firm sizes.

Brashares et al. (2014) apply the Keen-Mintz model to examine the optimal threshold in a hypothetical United States VAT. The authors use income tax data from 2007 to estimate entities that would be liable for a VAT, taxable sales, purchases and exports. They use data from Sweden to estimate compliance costs since the country has a similar tax structure to the United States and does not have a business threshold in the VAT.

They find that, with a 10 percent VAT rate, the optimal US threshold based on sales would be $200,000 and would exempt about 43 million businesses. Compared to having no threshold, the $200,000 cut-off would reduce the number of businesses required to register by 89 percent, reduce annual administrative and compliance costs by $2.6 billion and $25.5 billion respectively, and increase VAT revenues by 4 percent, to a total of $353 billion without behavioral adjustments.

This threshold is larger than the ones for the countries listed in Table 3. Part of the difference can be explained by the VAT rate. Recall that the optimal threshold varies with the tax rate; a higher tax rate generally will reduce the optimal threshold, since it implies giving up more revenue at any threshold. At a VAT rate of 20 percent, close to the cross-country average shown in Table 3, Brashares et al. (2014) find that the optimal threshold falls to $90,000, which is within the range shown in the table. At a VAT rate of 5 percent, they estimate the optimal threshold would be $600,000. They also point out that the optimal threshold will vary depending on the size distribution of firms and that actual thresholds may reflect political considerations that are not included in models of optimal taxes.

The authors also provide what they consider to be upper bounds on firm behavior around the threshold. They estimate that more than 8 million businesses, representing 23 percent of all businesses below the threshold, could find it attractive to voluntarily register for the VAT, which could reduce overall VAT revenues by up to $48 billion. They also find that about 0.9 million businesses have incentives to reduce their taxable sales to fall below the threshold.

Evidence on Firm Behavior Relative to the Threshold

Evidence from other countries suggests that firms adjust to the threshold to receive favorable tax treatment. Onji (2009) finds that the 1989 Japanese introduction of a VAT and creation of a small business threshold caused an increase in the number of firms with sales below the threshold and a decline in firms with sales above the threshold.

Harju, Matikka, and Rauhanen (2015) find evidence of firms actively bunching below the VAT threshold in Finland. Prior to 2004, firms in Finland with turnover above €8,500 were required to remit a VAT. VAT liability was discontinuous with respect to sales; if sales exceeded the threshold by any amount, the firm owed VAT on all sales and could take credits on all inputs. In 2004, the policy changed such that VAT liability increased gradually as sales rose above the threshold. Prior to 2004, firms bunched just below the threshold, indicating sensitivity to either taxes and/or compliance costs. After the 2004 change, bunching behavior did not significantly decrease, showing that the compliance cost of VAT participation was driving at least some of the original bunching.

Liu and Lockwood (2015) find that U.K. firms are more likely to register voluntarily for the VAT when the cost of inputs relative to sales is high (i.e., when the firms have low value-added) or if the proportion of sales to registered businesses is high (because the VAT paid on the sale is not a net burden to the purchaser). Consistent with theory, the same factors reduce the extent to which firms bunch below the threshold. The authors also find that bunching concentrates within £2,000 below the threshold and a significant number of firms slow their growth to avoid crossing the threshold.

Related Research

The literature on state taxes and related economic activity is reviewed by Gale, Krupkin, and Rueben (2015); Mazerov (2013); and McBride (2012), and features widely varying methodologies and results. Major recent studies reach almost every conceivable finding relating state tax policy to economic growth: tax cuts raise, reduce, do not affect, or have no clear effect on growth. The effects of different taxes—income, corporate, property, and sales—vary dramatically within and across studies. Several factors complicate interpretation of the findings: the studies use different dependent variables, analyze different time periods, employ alternative measures of tax revenues and/or rates, include different measures of government spending, control for different independent variables, and use different control groups and identification methods. Additionally, state balanced budget requirements imply that revenues and spending should co-vary closely, making it more difficult to study independent influences of taxes or spending. Pjesky (2006); Alm and Rogers (2011); and Gale, Krupkin, and Rueben (2015) conduct extensive sensitivity analysis and find the results to be extremely fragile to specification.

One strand of the literature identifies tax effects by comparing neighboring areas that differ in tax policy

equal to marginal utility of the impact of the change in the threshold on relative consumer prices.

because they lie on opposite sides of a state border. Of five such studies, three (Reed and Rogers 2004; Holcombe and Lacombe 2004; and Goff, Lebedinsky, and Lile 2012) find negligible impacts of taxes on growth, while two (Ljungqvist and Smolyansky 2014; Giroud and Rauh 2015) suggest significant effects of corporate taxes in some circumstances.

Using conventional time series analysis, Reed (2008) documents strong, negative, and robust effects of state taxes on personal income growth. Gale, Krupkin and Rueben (2015), however, extend Reed's sample and estimate the effects in several ways and find that neither tax revenues nor top income tax rates bear a stable relation to economic growth rates across states and over time. In addition, they find that tax revenues do not consistently affect employment over time and marginal tax rates do not impact employment levels.

Several studies look at the effects of taxes on growth and employment levels, with mixed results. [7] Additional studies examine the role of taxes in the formation of firms (see Gale and Brown 2013; Bruce 2000; and Gentry and Hubbard 2000, 2005 for further discussion).

New Results

Specification

Based on an adapted formulation from Reed (2008) and Gale, Krupkin, and Rueben (2015), we estimate equations of the form:

$$(1)\quad Y\_E_{it} = \beta_o + B_1(DSALESRT_{it}) + B_2\left(SALESRT_{i(t-4)}\right) + B_3(SALESREV_{it}) + B_4\left(SALESREV_{i(t-4)}\right) + B_5(DOTHREV_{it}) + B_6\left(OTHREV_{i(t-4)}\right) + B_7(DADJ_{it}) + B_8\left(ADJ_{i(t-4)}\right) + B_9(DX_{it}) + B_{10}\left(X_{i(t-4)}\right) + state_i + time_t + \varepsilon_{it}$$

where the βs are coefficients, t indexes years, i indexes states, D represents the change in a variable between periods t-4 and t, Y represents the dependent variable, E represents a specific firm employment bracket, SALESRT is the state sales tax rate, SALESREV is sales tax revenue as a share of personal income, OTHREV is total tax revenue less sales tax revenue as a share of personal income, ADJ is the top adjusted marginal personal income tax rate, X is a vector of other explanatory variables, state captures fixed effects, and time is a vector of five-year periods.

[7] See, for example, Bartik 1989; Bruce and Deskins 2012; Bruce, Liu and Murray 2014; Burnes, Neumark and White 2012; Goolsbee and Maydew 2000; Goss and Philips 1994; Gius and Frese 2002; Helms 1985; Merriman 2015; Mullen and Williams 1994; Rolin, Rosenthal and Ross 2014; Shuai and Chmura 2013; Thomson and Rolin 2012; and Wasylenko and McGuire 1985.

Reed (2008) estimates both a structural model, which includes measures of capital and labor at the state level, and reduced form model. Our specification in (1) is his reduced form model with a different dependent variable (he uses real per capita income growth). Reed (2008) discusses several virtues of this specification. Annual revenue data are susceptible to measurement error, and five-year periods are long enough to mitigate the biases created. Serial correlation and measurement errors are plausibly less severe when observations are spread out over time. The periods are non-overlapping (1970-74, 1975-79, etc.). Having the year intervals overlap would induce spurious positive correlation across time periods. Having the year intervals connect would induce spurious negative correlation between time periods. Including both contemporaneous and lagged effects of the dependent variables, along with state and time effects, allow for a variety of channels through which taxes can affect growth, including effects that take time to materialize. The panel specification allows controls for state fixed effects.

We use panel data for the 48 contiguous states for the period 1977-2011. The sample period is chosen with regard to U.S. Census data limitations on revenues and business dynamics. We estimate (1) with OLS using five-year, non-connecting intervals (for example, 1977-1981, 1982-1986 and so on through 2007-2011). We weight each state's observations by its average population from 1977-2011, using data from the U.S. Census annual July 1 estimates (US Census Bureau, 2012). Similar to the OLS analyses in Reed (2008) and Gale, Krupkin, and Rueben (2015), we employ robust standard errors to correct for heteroscedasticity. Standard errors are not clustered by group.

Dependent Variables

Our first specification examines the change in the natural log of firms per capita from t-4 to t for each state. Specifically, to look at the effect of sales taxes on small businesses, we look at the number of firms within certain employment size thresholds. As noted in the introduction, this is a different way of classifying small businesses than used by countries in defining VAT thresholds. (See Gale and Brown 2013 for further discussion of alternative ways of defining small businesses.)

These separate dependent variable categories include firms with less than 5 employees, 5-49 employees, or all firms with less than 50 employees. For comparison purposes, we also include a category that includes firms with 50 or more employees and a category that contains every firm in a state. The variables are defined as the number of firms with a specific number of employees, divided by the respective state's population in the relevant year. The resulting measure is logged and differenced (and multiplied by 100 to simplify interpretation). Gross firm data are taken from the September 2014 release of the U.S. Census Business Dynamics Statistics (BDS)

database (US Census Bureau, 2014b).[8]

Since the small business thresholds above encompass a vast majority of all firms, we limit our scope by examining the total number of employees from firms within the size groups (for example, the number of employees in Alabama who work in firms with less than 5 employees). To illustrate this point further, given the total of each year-state observation, firms with less than 50 employees comprise 93.2 percent of all firms, but 30.4 percent of total employment. According to Brashares et al. (2014), 90 percent of firms have annual receipts below $200,000. When measuring employment, we specifically examine the change in the logged number of employees per capita in each firm category. Gross employment data for each category are extracted from the US Census Bureau (2014b) and then divided by the state population in each given year (US Census Bureau, 2012).

Explanatory Variables

Our principal explanatory variable is the standard sales tax rate for a given state and year (State and Local Finance Initiative 2015; Advisory Commission on Intergovernmental Relations 1987-2003).[9] We also include sales tax revenue for each state and year, calculated as total state and local general sales tax revenue as a share of personal income. The variable is taken from the Urban-Brookings Tax Policy Center's State and Local Finance Data Query System (SLF-DQS), which houses state revenue and expenditure data originating from the U.S. Census Government Finance Statistics (GFS) database (Tax Policy Center, 2013).[10] When local data are included in the request, there are missing values for the years 2001 and 2003. To address this issue, we simply use the averages of the preceding and following years. For example, values for 2001 are imputed as the average of 2000 and 2002 values.

We use sales tax data because they represent consumption taxes similar to a VAT. However, because of the state-by-state nature of a sales tax, consumers close to a state border have the option to adapt purchasing or residence behavior across states based on differences in sales tax rates in order to reduce taxes. Under a nationwide VAT, this strategy would not reduce tax burdens. For this and other reasons described above, state sales taxes and a national VAT are not perfectly comparable.

For other revenues, we add a residual category that looks at all tax revenue except for sales tax revenue.[11] This tax variable is simply total tax revenue less sales tax revenue, all as a share of personal income. Total tax revenue is distinguished from total revenue, the latter of which includes inter-governmental transfers. The averaging procedure described above that compensates for missing 2001 and 2003 data is performed here as well.

We also include a measure of state income tax rates. Specifically, we use the top adjusted marginal personal income tax rate (SADJ), which, originally defined in Gale, Krupkin, and Rueben (2015), is the difference between the combined federal and state income tax rate for an itemizer facing the top federal rate and the federal tax rate that filer faces. The combined rate is (1-S)F + S, where S is the statutory state rate and F is the federal rate. The adjusted tax rate is given by:

$$(2)\ SADJ_{it} = (1 - \mathrm{S_{it}})\mathrm{F_t} + \mathrm{S_{it}} - \mathrm{F_t} = \mathrm{S_{it}}(1 - \mathrm{F_t}).$$

Top statutory state marginal income tax rates were extracted from the State and Local Finance Initiative (2015) and Poterba and Rueben (2001). We were unable to code a statutory rate for Nebraska until 1987, Rhode Island until 2000, and Vermont until 2000. These states employed tax features that make it difficult to enumerate a single value. For example, a state might tax its citizens at a certain percentage of federal liabilities. We exclude these year-state observations when analyzing marginal tax rates.

Results

Table 4 shows the effects of tax policy variables on the total number of firms in a particular employment-size category in a state. There are two regressions for each size category; the first shows just the impact of the tax revenue variables (controlling for a constant, and state and time effects), while the second adds the impact of sales tax rates and income tax rates. In general, the non-sales tax revenue variables are not individually statistically significant. Only one (out of 20) is negative and significant. These results compare to those in the literature described above, most of which focuses on the effects of tax revenue, rather than rates, and much of which generates fragile results. On the other hand, in most cases, the change in sales tax revenue has a positive, significant effect.

The second regression for each size category contains data on current and lagged sales tax rates and adjusted income tax rates. These regressions consistently show that the change in sales tax rates, holding sales tax

[8] BDS classifies a firm as a "business organization consisting of one or more domestic establishments that were specified under common ownership or control," and an establishment as "a single physical location where business is conducted or where services or industrial operations are performed." The number of firms and establishments are both one for single-establishment firms (US Census Bureau, 2014a).

[9] Sales tax rates from 2004-2011 can be found at the State and Local Finance Initiative pages, whereas earlier data were extracted from the Advisory Commission on Intergovernmental Relations reports. These reports are released on an annual basis.

[10] Sales tax revenue is series R09 from the SLF-DQS.

[11] Total tax revenue is series R05 from the SLF-DQS.

revenues constant, have negative effects on firm formation in almost all employment-size categories.

However, in reality, an increase in a sales tax rate will most naturally lead to an increase in revenues. As a result, we calculate the net impact of an increase in the sales tax rate, assuming that revenues rise as well. In the sample, the average sales tax rate is 4.8 percent, and the average level of sales tax revenue as a share of personal income is 2.4 percent. Assuming, therefore, that a 1 percentage point rise in the sales tax rate would increase sales tax revenues by 0.5 percentage points of personal income, we calculate the net effect of a sales tax rate increase as the sum of (a) the coefficient on the sales tax rate plus (b) 0.5 times the coefficient on sales tax revenue. We then divide this figure by 4 to approximate the effect on the annual growth rate of firms (recall that the data span five-year time intervals and therefore four periods of annual growth, e.g., 1977-1981). The results are given in the last two lines of the table. In general, a rise in the sales tax rate, coupled with the implied revenue increase, has no significant effect on the total number of firms, the number of small firms with less than 50 employees, or the number of firms with 50 or more employees.

Table 5 shows the effects on employment by firms in a particular size category. For the most part, the results are qualitatively similar to those in Table 4. Some non-sales revenue variables exert negative, significant effects on the employment figures, but the change in sales tax revenue is associated with positive, significant effects on employment. The regressions that include tax rate variables show that the change in sales tax rates, holding revenues constant, negatively affects employment. However, when they are coupled with the implied change in revenue, the effects of a change in the sales tax rate are small and insignificant.

Conclusion

At some point, the United States will likely need to compensate for long-term revenue shortfalls. Consideration of a VAT is a logical and reasonable direction for such a policy (Gale and Harris 2011). One of the principal concerns with a VAT, however, is how it would affect small business. We shed light on this issue by estimating of the effects of income and sales taxes on the number of small firms and on the employment within those firms. We find that increases in state sales tax rates, given their impact on revenues, do not have statistically or economically significant effects on the number of firms or the employment within firms.

In countries with a VAT, these small businesses account for only a small share of potential VAT revenue, but they would create significant collection and administrative costs if they were brought into the VAT system. Most countries deal with this issue by exempting a large share of businesses. It is reasonable to believe that a VAT in the United States would treat small businesses in a similar manner. As a result, the implementation of a VAT should not prove to be a major hurdle for small business.

Table 1
Taxes, Sales and Value Added Under Alternative Taxes

		Value Added	Tax on Sales	Total Sales (Including Tax)	Tax Credits	Net Tax Payments	Net Receipts
No Taxes	Farmer	40	0	40	0	0	40
	Miller	20	0	60	0	0	20 (=60-40)
	Baker	40	0	100	0	0	40 (=100-60)
RST	Farmer	40	0	40	0	0	40
	Miller	20	0	60	0	0	20 (=60-40)
	Baker	40	10	110	0	10	40 (=110-10-60)
Credit Invoice VAT	Farmer	40	4	44	0	4	40 (=44-4)
	Miller	20	6	66	4	2	20 (=66-44-6+4)
	Baker	40	10	110	6	4	40 (=110-66-10+6)
	Total					10	

Table 2
Taxes, Sales and Value Added Under Zero-Rating and Exemption

	Value Added	Tax on Sales	Total Sales (Including Tax)	Tax Credits	Net Tax Payments	Net Receipts
Credit Invoice VAT with Baker Zero-Rated						
Farmer	40	4	44	0	4	40 (=44-4)
Miller	20	6	66	4	2	20 (=66-44-6+4)
Baker	40	0	100	6	-6	40 (=100-66+6)
Total					0	
Credit Invoice with Miller Exempted						
Farmer	40	4	44	0	4	40 (=44-4)
Miller	20	0	64	0	0	20 (=64-44)
Baker	40	10.40	114.40	0	10.4	40 (=114.40 - 64 - 10.40)
Total					14.40	

Table 3
VAT Policy in OECD Countries

Country	Standard VAT Rate (2014)	VAT Revenue Ratio (2012)	Business Exemption Threshold ($Thousands)*
Australia	10	0.47	49
Austria	20	0.59	35
Belgium	21	0.48	6
Canada	5	0.48	23
Chile	19	0.64	-
Czech Republic	21	0.57	68
Denmark	25	0.59	6
Estonia	20	0.70	26
Finland	24	0.56	9
France	20	0.48	94
Germany	19	0.55	21
Greece	23	0.37	7
Hungary	27	0.52	42
Iceland	25.5	0.45	7
Ireland	23	0.45	79
Israel	18	0.64	19
Italy	22	0.38	36
Japan	5	0.69	88
Korea	10	0.69	26
Luxembourg	15	1.13	25
Mexico	16	0.31	-
Netherlands	21	0.53	2
New Zealand	15	0.96	38
Norway	25	0.57	5
Poland	23	0.42	78
Portugal	23	0.47	14
Slovak Republic	20	0.43	87
Slovenia	22	0.58	74
Spain	21	0.41	-
Sweden	25	0.56	-
Switzerland	8	0.71	64
Turkey	18	0.40	-
United Kingdom	20	0.44	103
Unweighted Average	19	0.55	40

*The business exemption thresholds listed represent the general threshold for VAT payment for all business. In some nations, certain sectors have reduced or special thresholds. The following nations have reduced thresholds for suppliers of services only: France ($37,000 Greece ($7,000) and Ireland ($39,000). The following nations have special thresholds for firms in the non-profit and charity sector: Australia ($97,000) Canada ($39,000), Norway ($15,000), and Switzerland ($96,000). All nations except the Netherlands allow firms to register and/or collect VAT at revenue levels below the business exemption threshold listed in the table. The VAT Revenue Ratio is defined in the text.

Source: OECD Consumption Tax Trends 2014.

Table 4
Total Number of Firms Per Capita by Firm Size Category (1977-2011)

Size Category	**1 to 4**		**5 to 49**		**1 to 49**		**50+**		**All**	
Change in Non-Sales Tax Revenue	-0.23	-0.31	**-1.52	-1.57	-0.73	-0.78	-1.89	-2.09	-0.77	-0.83
4 Year Lagged Non-Sales Tax Revenue	0.44	0.51	-0.27	-0.20	0.18	0.26	-0.51	-0.57	0.15	0.22
Change in Sales Tax Revenue	***3.52	**4.23	2.20	**3.53	**2.96	***4.03	**3.79	***6.26	**3.01	***4.15
4 Year Lagged Sales Tax Revenue	0.65	0.15	-0.81	-1.12	0.05	-0.31	0.04	0.04	0.05	-0.30
Change in Adjusted State Income Tax Rate		1.09		0.77		0.94		0.53		0.91
4 Year Lagged Adjusted State Income Tax Rate		-0.62		-0.64		-0.66		-0.26		-0.63
Change in Sales Tax Rate		*-1.51		***-2.25		***-1.92		**-3.39		***-2.00
4 Year Lagged Sales Tax Rate		0.64		0.43		0.49		0.16		0.48
Adj. R-Squared	0.69	0.71	0.73	0.75	0.69	0.72	0.68	0.71	0.69	0.72
Annualized Effects										
Change in Sales Tax Rate		0.15		-0.12		0.02		-0.07		0.02
4 Year Lagged Sales Tax Rate		0.18		-0.03		0.08		0.05		0.08

*** denotes p ≤ .01, ** denotes .05 ≥ p > .01, and * denotes .1 ≥ p > .05

Note:
Annualized effects of 1 percentage point increase in the sales tax rate.
For each regression, the coefficient on the annualized calculation is:[(coefficient on Sales Tax Rate) + 0.5*(coefficient on Sales Tax Revenue)] / 4

Table 5
Employment Per Capita by Firm Size Category (1977-2011)

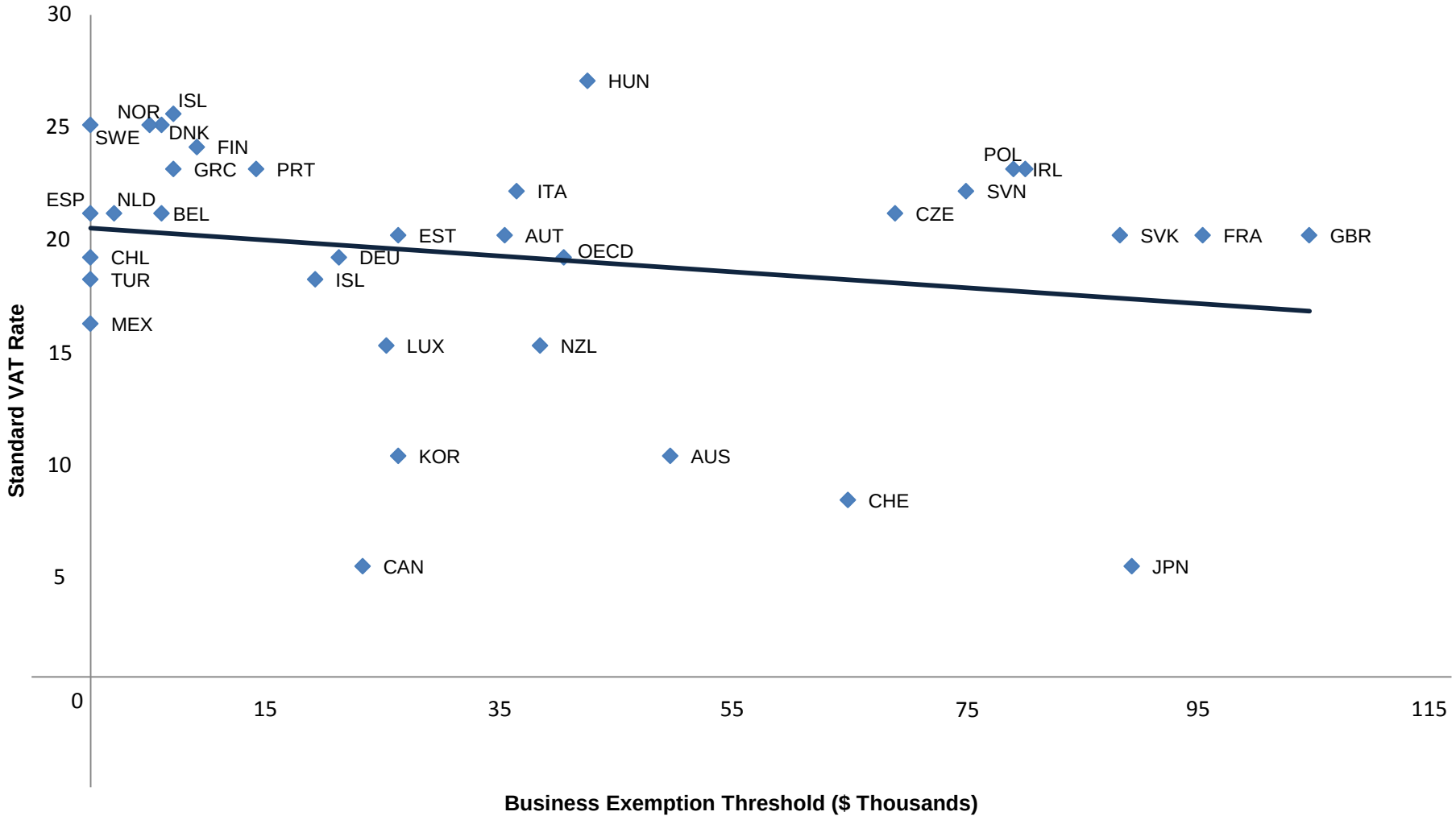
Size Category	1 to 4		5 to 49		1 to 49		50+		All	
Change in Non-Sales Tax Revenue	-0.51	-0.76	***-2.24	***-2.56	**-1.89	***-2.19	-1.32	*-1.77	*-1.45	**-1.86
4 Year Lagged Non-Sales Tax Revenue	0.07	-0.08	-0.61	-0.81	-0.45	-0.64	0.65	0.35	0.38	0.10
Change in Sales Tax Revenue	***4.22	***5.52	**4.39	***6.50	**4.36	***6.37	***6.70	***8.1	***5.95	***7.41
4 Year Lagged Sales Tax Revenue	-0.43	-1.04	-1.28	-1.88	-1.08	-1.64	-0.69	-1.69	-0.71	-1.63
Change in Adjusted State Income Tax Rate		0.84		0.64		0.67		0.96		0.90
4 Year Lagged Adjusted State Income Tax Rate		-0.07		-0.03		-0.05		0.25		0.17
Change in Sales Tax Rate		**-1.99		***-3.00		***-2.86		**-2.19		**-2.25
4 Year Lagged Sales Tax Rate		0.8		0.83		0.79		1.27		1.18
Adj. R-Squared	0.64	0.66	0.69	0.71	0.68	0.7	0.55	0.57	0.59	0.61
Annualized Effects										
Change in Sales Tax Rate		0.19		0.06		0.08		0.47		0.36
4 Year Lagged Sales Tax Rate		0.07		-0.03		-0.01		0.11		0.09

*** denotes p ≤ .01, ** denotes .05 ≥ p > .01, and * denotes .1 ≥ p > .05

Note:
Annualized effects of 1 percentage point increase in the sales tax rate.
For each regression, the coefficient on the annualized calculation is:
[(coefficient on Sales Tax Rate) + 0.5 * (coefficient on Sales Tax Revenue)]
/4

Figure 1

OECD Standard VAT Rates and Business Exemption Thresholds (2014)



Source: OECD Consumption Tax Trends 2014.

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