

State and Local Sales Tax Revenue Losses from E-Commerce: Updated Estimates

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Executive Summary

The sales tax base for state and local government is shrinking because of the expanded use of services which are not subject to sales tax and continued legislatively- granted exemptions. The erosion is also due to growth of remote sales including those made through e-commerce (Internet), the telephone and catalogs.

The extent to which e-commerce reduces state and local sales tax collections continues to be an important issue. As in our earlier work in this area, we focus on the e-commerce losses, recognizing them as furthering the trend erosion. In this brief, we present an update of our earlier revenue loss forecasts (Bruce and Fox, 2000). Sales tax losses by state are given for 2001, 2006, and 2011. The estimates reported here are based on the most recent forecasts of e-commerce sales for 2001 through 2011, provided by Forrester Research, Inc. Our previous report went through 2003.

For 2001, the dollars lost are 41% more than our previous report had indicated due to higher business-to-business (B2B) transactions forecast by Forrester. In 2001, e-commerce is likely to cause a *total* state and local government revenue loss of \$13.3 billion. By 2006, the loss will more than triple to \$45.2 billion and in 2011, the loss will be \$54.8 billion. The *total* e-commerce loss is the sales tax loss on all sales over the Internet. Part of the loss would have occurred anyway even without e-commerce on sales, for example, which might have otherwise been made by purchasers using the telephone and catalogs.

The *new* e-commerce loss is from sales made through the Internet both on goods that would have otherwise been purchased from the over-the-counter method and projected new goods that will be purchased over the Internet. In 2001, the new e-commerce loss is \$7 billion, in 2006 it grows to \$24.2 billion, and in 2011 it is \$29.2 billion.

Measuring the states' e-commerce revenue losses against their total state tax revenues also shows significant impact. In 2011, states will lose anywhere from 2.6 percent to 9.92 percent of their total state tax collections to total e-commerce losses.

A final measurement of the impact of e-commerce losses is the needed increase in the sales tax rate to replace the lost revenue. In 2011, rates will have to rise by between 0.83 and 1.72 percentage points to replace the total e-commerce losses.

The revenue impacts are significant.

Introduction

A central theme in the debate over the tax treatment of remote sales is the extent to which the inability to tax them has eroded state and local sales tax collections. Revenue losses from e-commerce generally arise because e-commerce enables a significant increase in remote sales, thereby causing a shift from collecting sales taxes at the point of sale to collecting use taxes for goods used, consumed, or stored in the state. Compliance rates are much higher for sales taxes than for use taxes, and also use tax compliance is expected to fall further as a result of e-commerce. Revenue losses are generally the result of tax evasion, not tax avoidance, since the use tax is due even if the sales tax cannot be collected.¹

This brief extends our earlier report by using updated e-commerce forecasts from Forrester Research, Inc. and newer data about state and local tax structures. We have not changed our forecast

E-commerce is only one of the factors reducing sales tax bases.

methodology, preferring instead to develop new estimates that are comparable to our earlier forecast.² This is especially appropriate since there is little new empirical guidance for many of the underlying assumptions in our earlier estimates. We continue to contribute to the quantitative estimates of sales tax revenue losses in a variety of ways. First, we place the effects of e-commerce in the context of general sales tax base trends, since e-commerce is only one of the factors reducing sales tax bases. Second, we take a forward looking view, estimating both the losses today and the expected losses through 2011. Third, we estimate the increases in sales tax rates that will become necessary to offset the base declines. With all of our results, a key contribution is that estimates are prepared for every state with a sales tax.

¹ Tax avoidance is the act of changing one's behavior to escape a tax, while tax evasion is the act of not paying a tax that is legally owed.

² State and local revenue losses from e-commerce sales are measured here by estimating the reductions in the sales tax base and then multiplying the lost tax base by the state-specific effective state and local sales tax rate. Key inputs to estimating the tax base loss for e-commerce transactions are forecasts of e-commerce sales, identification of the sales-taxable components of these sales, assumptions about what share of taxable sales could be collected in the absence of e-commerce, and estimates of the share of taxes due that can be collected. We refer readers to Bruce and Fox (2000) for more details on our forecast methodology.

Sales Tax Trends

Despite varied year-to-year fluctuations in state sales tax bases, the long-term trend has been a decline relative to state personal income for many years. For the average sales-taxing state, the tax base equaled 51.4 percent of the state's personal income in 1979, but had fallen to 42.0 percent in 2000.

The narrowing of sales tax bases is attributable to three major factors. The first is remote sales, including e-commerce, catalog and telephone sales, and cross-state shopping, all of which have been expanding rapidly in recent years. The second factor is the shift in consumption patterns towards greater consumption of services and less consumption of goods. Services are much less broadly taxed than goods, meaning the base shrinks relative to the economy as services become more prominent. Third, continued legislated exemptions have narrowed the base in essentially every state. To be sure, some of the recently legislated exemptions, such as for industrial equipment, are consistent with good tax policy, but they still have the effect of lowering the taxable base.

States have responded to the narrowing tax bases by raising tax rates, though the extent of a direct relationship has not been carefully studied. The median state sales tax rate increased from 3.25 percent in 1970 to 4.0 percent in 1980 and to 5.0 percent in 1990. Fifteen states now have rates at or above 6.0 percent. The rate increases have allowed states to slightly increase revenues as a percent of GDP since 1986. Local governments in 32 states are also permitted to impose sales taxes, and a pattern of rate increases appears to have occurred at the local level as well.³

Estimates of Revenue Losses

To estimate sales tax losses from e-commerce in the context of the broader decrease in sales tax bases, we first estimate the trend reduction in sales tax bases that is occurring independent of e-commerce, and then estimate the loss from e-commerce. National totals are provided for 2001 through 2011, but the focus in this paper is on state-by-state estimates of revenue losses for 2001, 2006 and 2011. The Forrester data do not permit revenue loss forecasts beyond 2011.

In Table 1, the tax base as a share of personal income is given for each state for 1996 and an estimate is provided for 2011 in the absence of e-commerce effects. This provides a baseline for the

³ Alaska has no state sales tax and is excluded from the calculations here. Nonetheless, Alaska allows local sales tax rates, and the resulting estimates of local revenue losses are understated because of the exclusion.

sales tax base without the diminishing effects of e-commerce. All states are forecast to experience a reduction in the tax base (relative to personal income) during this time period.

State and local revenue losses from e-commerce sales are measured here by estimating the reductions in the sales tax base that are attributable only to e-commerce and then multiplying the lost tax base by the state-specific effective state and local sales tax rate. State sales tax rates for 2001 and weighted average local sales tax rates for 1998 are employed in the analysis.⁴ Other inputs to estimating tax base losses from e-commerce transactions are forecasts of e-commerce sales, identification of the sales-taxable components of these sales and assumptions about what share of taxable sales could be collected in the absence of e-commerce. All of our assumptions regarding taxability, compliance, and replacement of other remote sales are unchanged in this update.

The total revenue loss from e-commerce equals total taxes due on internet sales minus use taxes collected. However, a *new* (or incremental) loss from e-commerce occurs only to the extent that taxes on the transactions would have been collected without e-commerce. In other words, an e-commerce sale that would otherwise have taken place over the phone is part of the total loss, but not the new loss. An e-commerce sale that would have been transacted (and taxed) locally in the absence of e-commerce represents a new

Table 1: Sales Tax Base as a Percentage of Personal Income

State	1996	2011
AL	39.9	35.8
AR	64.9	58.5
AZ	47.8	42.7
CA	39.6	35.4
CO	45.1	40.7
CT	36.7	32.8
DC	44.0	39.5
FL	55.4	49.3
GA	56.7	50.6
HI	109.2	96.7
IA	46.4	42.4
ID	51.3	46.2
IL	32.2	29.1
IN	44.3	39.9
KS	48.7	44.0
KY	46.5	41.9
LA	64.7	58.9
MA	29.0	26.0
MD	35.8	31.9
ME	42.3	37.7
MI	47.8	43.1
MN	46.6	41.9
MO	48.1	43.3
MS	55.5	50.1
NC	45.8	40.9
ND	51.9	47.6
NE	43.1	39.0
NJ	29.1	26.0
NM	86.2	77.4
NV	58.4	52.0
NY	34.4	30.8
OH	38.8	35.0
OK	67.2	61.4
PA	32.2	29.0
RI	27.6	24.7
SC	52.6	47.0
SD	65.9	59.5
TN	51.0	45.6
TX	48.7	43.9
UT	61.8	55.6
VA	42.8	38.1
VT	41.6	37.1
WA	49.9	44.6
WI	45.5	41.0
WV	48.0	43.7
WY	71.5	65.9

Source: Authors' calculations.

⁴ Our first report used a weighted average state and local rate for 1996. However, to get the most accurate estimates of revenue losses for this update, we used the latest tax rates available.

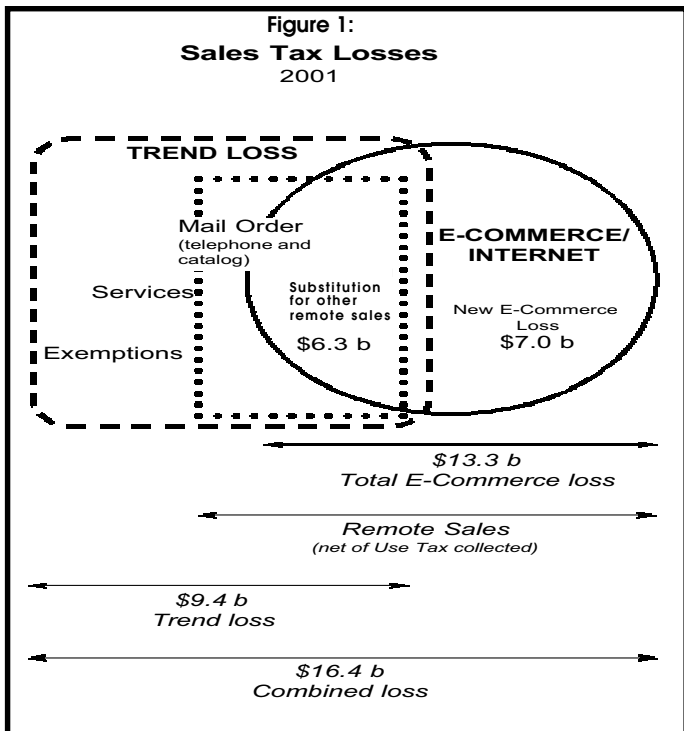
revenue loss. These two factors must be combined to obtain the final loss estimate.

Forecasts of the national state and local revenue losses from e-commerce sales are shown in Table 2 for 2001 through 2011. There are expected to be \$208.5 billion in e-commerce sales on which sales taxes due cannot be collected (out of total sales of \$754.6 billion),

Looking forward to 2011, the total and new revenue loss estimates are \$54.8 billion and \$29.2 billion, respectively.

that will likely cause a total state and local revenue loss in 2001 of \$13.3 billion. Of this, \$7.0 billion represents a new revenue loss; the other \$6.3 billion would have been lost even in the absence of e-commerce activity. Looking forward to 2006, the total and new revenue loss estimates are \$45.2 billion and \$24.2 billion, respectively. By 2011, these figures are expected to grow to \$54.8 billion and \$29.2 billion.

Figure 1 provides a visual means for understanding the various sources of the revenue loss. First, note that the trend losses are composed of three parts: the loss due to the shift from consumption of goods to consumption of services, the loss due to legislated exemptions, and the loss from remote sales. E-commerce causes two types of losses. The first stems from the substitution of remote sales on which tax would not have been collected, even in the absence of e-commerce, and is not a new revenue loss at all. The second is the result of the substitution of local (or otherwise taxed)



sales or the creation of new sales. This is what we refer to as the new revenue loss.

Our new revenue loss estimates are somewhat larger than the original forecast (provided through 2003), primarily because Forrester has significantly increased its business-to-business (B2B) e-commerce forecast. The dominant role that B2B is expected to play in e-commerce sales means that the ability to collect revenues on B2B transactions is very important to the revenue loss for state and local

Table 2: Estimated Total State and Local Sales Tax Revenue Losses from E-Commerce

(Billions)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total Business-to-Business (B2B) E-Commerce*	698.8	1,137.9	1,778.2	2,628.6	3,284.6	3,916.2	4,459.3	4,897.3	5,247.1	5,536.4	5,790.5
Total Business-to-Consumer (B2C) E-Commerce*	55.8	87.5	127.4	173.9	230.6	257.5	276.6	289.0	296.6	301.1	303.7
Total E-Commerce	754.6	1,225.5	1,905.6	2,802.6	3,515.2	4,173.7	4,735.9	5,186.3	5,543.7	5,837.5	6,094.2
Less Exempt B2B	-276.2	-483.9	-828.1	-1,350.0	-1,820.4	-2,301.1	-2,721.6	-3,055.2	-3,309.9	-3,507.3	-3,668.4
Less B2B on which sales/use tax collected	-255.2	-419.8	-626.9	-839.9	-967.0	-1,068.5	-1,152.8	-1,227.8	-1,299.1	-1,370.4	-1,443.9
Less Exempt B2C	-5.0	-8.5	-14.1	-21.2	-31.9	-38.4	-43.6	-47.3	-49.6	-51.0	-51.8
Less B2C on which sales/use tax collected	-9.7	-16.1	-25.0	-36.2	-48.6	-56.6	-62.1	-65.7	-67.7	-68.9	-69.5
Total Adjustments	-546.1	-928.3	-1,494.2	-2,247.4	-2,867.9	-3,464.5	-3,980.2	-4,396.0	-4,726.3	-4,997.5	-5,233.6
E-Commerce Resulting in Revenue Loss	208.5	297.2	411.4	555.2	647.3	709.2	755.7	790.3	817.3	840.0	860.5
Average State and Local Tax Rate	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064	0.064
Estimated Total Sales Tax Revenue Loss	13.3	18.9	26.2	35.4	41.3	45.2	48.2	50.4	52.1	53.5	54.8
Less Substitution for Other Remote Sales	-6.3	-8.9	-12.3	-16.6	-19.2	-21.0	-22.4	-23.5	-24.3	-25.0	-25.7
Estimated New Sales Tax Revenue Loss	7.0	10.1	14.0	18.8	22.1	24.2	25.7	26.9	27.8	28.5	29.2

Source: Authors' calculations based on E-Commerce forecast provided by Forrester Research, Inc.

Note: Apparent mathematical inconsistencies are the result of rounding.

*Sales-taxing states only.

governments. Indeed, B2B transactions represent 92.6 percent of all e-commerce activity in 2001 according to the Forrester forecast, a share that will expand to 95.0 percent by 2011.⁵ As a result of this and our assumptions regarding taxability and compliance, B2B is responsible for roughly three-fourths of the expected new revenue losses. Consequently, failing to account for the manner in which taxes on business purchases are collected can lead to a dramatic understatement of the revenue losses from e-commerce.

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State-specific revenue loss estimates were prepared based on the national calculations in Table 2. The state and local government revenue losses from trend narrowing of the tax base, total e-commerce losses, new e-commerce losses, and the combined total revenue losses are given in Table 3. The new e-commerce losses in the third column should not be interpreted as the taxes that states would collect if Congress enacted legislation establishing nexus for firms with economic rather than physical presence. Rather, it is the incremental effect of e-commerce beyond any losses already occurring from inability to collect sales and use taxes. The total e-commerce revenue loss, shown in the second column, is the estimate of the total revenues from collecting all taxes due on e-commerce transactions.⁶

To illustrate Table 3, consider the findings for Alabama in the first row. The state of Alabama stands to lose \$127.2 million in 2001 from trend erosion of the sales tax base (i.e., from non-e-commerce remote sales, the shift toward consumption of services, and continued granting of exemptions). E-commerce sales themselves will result in a total revenue loss of \$177.4 million for Alabama in 2001. However, much of this revenue would not have been collected even without e-commerce, as consumers and businesses would have made some of these purchases through other remote means. Only \$94.0 million of this loss is new, and the remainder of the e-commerce loss (\$177.4 million less \$94.0 million) is captured in the trend loss in column (a) of Table 3. Consequently, to get the total state and local revenue loss that results from all factors, we simply add the trend loss (column a) to the new e-commerce loss (column c). This combined loss in 2001 for Alabama is \$221.1 million (column d).

⁵ B2B is a larger share of total e-commerce than in our earlier paper partly because leisure travel, which represented a significant component of the previous business-to-consumer (B2C) estimates, has been excluded from the new Forrester forecast. This exclusion has only minor implications for our revenue loss estimates.

⁶ Of course, this estimate is based on full compliance with all sales and use taxes.

Table 3: Combined State and Local Revenue Losses in 2001 (Millions)

 State	(a)	(b) Total	(c) New	(d=a+c)
	Trend E-Commerce Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	127.2	177.4	94.0	221.1
AR	91.9	143.8	76.1	168.1
AZ	154.8	231.1	122.4	277.2
CA	1,380.4	1,750.0	926.8	2,307.2
CO	119.2	200.7	106.3	225.5
CT	147.2	190.5	100.9	248.1
DC	29.2	36.7	19.4	48.7
FL	731.1	932.2	493.7	1,224.8
GA	315.3	439.0	232.5	547.8
HI	96.4	105.1	55.7	152.1
IA	59.5	111.8	59.2	118.8
ID	27.7	44.4	23.5	51.2
IL	339.2	532.9	282.2	621.4
IN	145.6	215.5	114.1	259.7
KS	86.0	134.4	71.2	157.2
KY	104.7	158.7	84.0	188.8
LA	170.1	302.6	160.2	330.4
MA	149.7	200.6	106.2	256.0
MD	158.8	194.4	103.0	261.8
ME	35.0	43.1	22.8	57.8
MI	330.2	502.9	266.3	596.6
MN	180.4	270.6	143.3	323.7
MO	174.3	261.6	138.5	312.9
MS	84.4	136.5	72.3	156.7
NC	212.0	293.4	155.4	367.4
ND	12.2	26.4	14.0	26.2
NE	42.2	70.9	37.5	79.8
NJ	263.4	337.8	178.9	442.3
NM	86.5	129.1	68.4	154.9
NV	84.7	126.3	66.9	151.6
NY	790.1	1,052.9	557.6	1,347.8
OH	298.4	446.7	236.6	534.9
OK	113.5	202.8	107.4	220.9
PA	316.8	446.4	236.4	553.2
RI	29.4	36.8	19.5	48.9
SC	114.7	153.4	81.2	195.9
SD	24.4	39.4	20.8	45.3
TN	258.8	362.3	191.9	450.7
TX	737.5	1,162.1	615.5	1,353.0
UT	62.4	104.5	55.3	117.8
VA	189.5	238.5	126.3	315.8
VT	16.3	21.0	11.1	27.5
WA	296.4	416.5	220.6	517.0
WI	139.0	213.5	113.1	252.1
WV	42.6	70.1	37.1	79.7
WY	12.4	26.1	13.8	26.3
US	9,382.0	13,293.1	7,040.0	16,422.0

Source: Authors' calculations.

The national total for the combined revenue losses is \$16.4 billion in 2001. An estimated 42.9 percent of this total arises from new e-commerce losses. This is a surprisingly large share, given that the trend sales tax base losses over the past several decades appear to have been driven more by shifts to consumption of services and continued legislated exemptions than by increases in remote sales.


The new losses from e-commerce in 2001 are estimated to range from \$11.1 million in Vermont to \$926.8 million in California. These two states also have the lowest and highest estimates in 2006 and 2011, as shown in Tables 4 and 5. In 2006, the new state and local losses from e-commerce range from

The new losses from e-commerce in 2001 are estimated to range from \$11.1 million in Vermont to \$926.8 million in California.

\$38.3 million to \$3,180.7 million, and in 2011 from \$46.4 million to \$3,842.2 million. The loss amounts are highly correlated with state population (0.98) and the state and local tax rate (0.48). Thus, states with larger populations and higher tax rates tend to experience the largest losses.

Table 4: Combined State and Local Revenue Losses in 2006


(Millions)

 State	(a)	(b) Total	(c) New	(d=a+c)
	Trend Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	277.8	604.3	322.9	600.7
AR	208.7	488.0	260.8	469.5
AZ	367.0	799.2	427.1	794.1
CA	2,882.9	5,952.0	3,180.7	6,063.7
CO	287.8	686.4	366.8	654.6
CT	312.0	648.9	346.8	658.8
DC	58.2	123.1	65.8	124.0
FL	1,602.4	3,214.0	1,717.5	3,320.0
GA	724.8	1,517.8	811.1	1,535.9
HI	193.9	359.2	191.9	385.8
IA	137.0	372.3	199.0	335.9
ID	65.3	151.5	81.0	146.3
IL	750.2	1,795.3	959.4	1,709.6
IN	319.0	728.5	389.3	708.3
KS	188.0	451.5	241.3	429.3
KY	229.9	535.5	286.2	516.1
LA	381.2	1,008.1	538.7	919.9
MA	322.2	683.0	365.0	687.2
MD	333.2	664.3	355.0	688.2
ME	72.3	146.4	78.2	150.6
MI	725.3	1,696.2	906.5	1,631.8
MN	405.3	920.6	492.0	897.3
MO	383.1	884.1	472.4	855.6
MS	193.2	462.8	247.3	440.5
NC	481.2	1,010.9	540.2	1,021.4
ND	29.6	87.6	46.8	76.4
NE	96.3	238.7	127.6	223.9
NJ	555.5	1,150.0	614.5	1,170.0
NM	195.7	440.2	235.3	431.0
NV	208.4	441.7	236.1	444.5
NY	1,663.6	3,569.2	1,907.4	3,571.0
OH	643.7	1,502.2	802.8	1,446.5
OK	248.1	670.6	358.4	606.5
PA	669.4	1,503.4	803.4	1,472.8
RI	60.0	124.5	66.5	126.5
SC	251.0	525.0	280.5	531.6
SD	55.9	133.4	71.3	127.2
TN	578.5	1,242.8	664.1	1,242.6
TX	1,695.1	3,957.0	2,114.6	3,809.7
UT	153.0	359.0	191.8	344.8
VA	406.3	817.0	436.6	842.9
VT	34.8	71.7	38.3	73.2
WA	661.3	1,427.3	762.8	1,424.0
WI	308.9	721.5	385.6	694.5
WV	90.7	232.4	124.2	214.9
WY	27.7	85.2	45.5	73.2
US	20,535.6	45,204.3	24,157.2	44,692.8

Source: Authors' calculations.

Table 5: Combined State and Local Revenue Losses in 2011

(Millions)

 State	(a)	(b) Total	(c) New	(d=a+c)
	Trend Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	500.9	734.4	390.6	891.4
AR	381.0	590.9	314.2	695.3
AZ	682.3	982.5	522.5	1,204.7
CA	5,100.6	7,225.0	3,842.2	8,942.8
CO	538.0	836.2	444.7	982.7
CT	555.0	788.2	419.2	974.2
DC	100.8	147.7	78.6	179.3
FL	2,895.9	3,944.4	2,097.6	4,993.5
GA	1,332.6	1,865.6	992.1	2,324.7
HI	338.8	438.3	233.1	571.8
IA	251.0	443.7	235.9	486.9
ID	121.3	184.6	98.2	219.5
IL	1,357.0	2,161.7	1,149.6	2,506.6
IN	575.2	879.8	467.9	1,043.1
KS	338.2	542.2	288.3	626.5
KY	415.0	645.8	343.5	758.5
LA	692.0	1,202.5	639.5	1,331.5
MA	575.2	828.6	440.7	1,015.9
MD	590.7	809.2	430.3	1,021.0
ME	127.2	177.5	94.4	221.6
MI	1,306.7	2,043.6	1,086.8	2,393.5
MN	737.8	1,117.2	594.2	1,331.9
MO	690.3	1,066.7	567.3	1,257.6
MS	354.5	560.0	297.8	652.3
NC	880.6	1,239.4	659.1	1,539.7
ND	54.9	103.9	55.2	110.2
NE	176.1	287.3	152.8	328.9
NJ	985.3	1,396.1	742.5	1,727.8
NM	357.4	535.4	284.7	642.1
NV	395.4	549.0	292.0	687.4
NY	2,948.8	4,318.4	2,296.5	5,245.3
OH	1,152.0	1,805.9	960.4	2,112.4
OK	445.1	794.5	422.5	867.6
PA	1,190.6	1,811.0	963.1	2,153.7
RI	104.9	150.4	80.0	184.8
SC	453.1	640.5	340.6	793.7
SD	102.5	161.3	85.8	188.3
TN	1,052.6	1,518.7	807.7	1,860.3
TX	3,113.5	4,805.6	2,555.6	5,669.1
UT	288.0	439.2	233.6	521.6
VA	726.5	997.2	530.3	1,256.8
VT	62.2	87.2	46.4	108.6
WA	1,207.0	1,745.3	928.1	2,135.2
WI	560.0	871.0	463.2	1,023.3
WV	161.6	276.2	146.9	308.4
WY	50.3	100.0	53.2	103.5
US	37,026.4	54,849.5	29,168.9	66,195.3

Source: Authors' calculations.

State Losses as Percentages of State Taxes

The share of total state tax revenues that each state stands to lose is a useful way to measure the importance of the loss to specific states. For purposes of this calculation, each state's total tax revenue is assumed to be the same percentage of personal income in forecast years as it was in 2000. The losses to state governments for 2001, 2006, and 2011 are given in Tables 6, 7, and 8.⁷ Note first that in 2001 the state-level share of the national *new* e-commerce loss will amount to 1.09 percent of total state taxes (in sales-taxing states only), while the state-level share of the national *total* e-commerce loss will be 2.06 percent and the *combined* loss will be 2.55 percent. While magnitude is in the eye of the beholder, these strike us as quantitatively large shares.

These national estimates mask wide variation across the states. For those states with sales and use taxes, the new loss from e-commerce in 2001 ranges from a low (setting aside D.C.) of 0.66 percent of state tax revenues in Massachusetts to a high of 2.01 percent in Texas. The total e-commerce loss ranges from 1.25 percent of total state taxes in Massachusetts to 3.80 percent in Texas, and the combined loss ranges from 1.60 percent in Massachusetts to 4.59 percent in Florida.

Similar figures are shown in Table 7 for 2006 and Table 8 for 2011. In 2006, the combined revenue loss represents 5.53 percent of total state taxes, a share that increases to 6.51 percent by 2011. In 2006, states stand to lose anywhere from 1.82 percent to


In 2011, states stand to lose anywhere from 2.6 percent to 9.92 percent of their total state tax collections to e-commerce losses alone.

5.51 percent of their total state tax collections to new e-commerce losses alone. The estimated new revenue losses as a share of tax revenues are positively correlated with the importance of the sales tax to states' pre-e-commerce tax structures (0.89), the breadth of states' sales tax bases (0.52) and state and local sales tax rates (0.33). Thus, the losses tend to be greater in states that rely heavily on the sales tax, have broad sales tax bases, and have high sales tax rates.

The dramatic growth of e-commerce is not predicted to last forever. As shown in our data, the growth rate of e-commerce will wane as this distribution channel matures, and the share of state taxes that are lost to e-commerce will stabilize in the general range of the 2006 figures. However, the trend

⁷ Local government losses as shares of total local taxes appear in Appendix Tables 1, 2, and 3. Total local government tax revenues are assumed to be the same percent of personal income in 2001, 2006, and 2011 as local taxes were in 1998.

Table 6: State Revenue Losses as Percentages of Total State Taxes in 2001

 State	(a)	(b) Total	(c) New	(d=a+c)
	Trend	E-Commerce	E-Commerce	Combined
State	Loss	Loss	Loss	Loss
AL	1.08	1.51	0.80	1.88
AR	1.52	2.38	1.26	2.78
AZ	1.52	2.27	1.20	2.72
CA	1.36	1.73	0.92	2.28
CO	0.91	1.54	0.81	1.73
CT	1.34	1.74	0.92	2.26
DC	0.79	0.99	0.52	1.31
FL	2.74	3.50	1.85	4.59
GA	1.60	2.23	1.18	2.79
HI	2.34	2.55	1.35	3.69
IA	1.09	2.05	1.09	2.18
ID	1.23	1.97	1.04	2.27
IL	1.32	2.08	1.10	2.42
IN	1.41	2.09	1.11	2.52
KS	1.37	2.15	1.14	2.51
KY	1.37	2.08	1.10	2.47
LA	1.38	2.45	1.30	2.68
MA	0.93	1.25	0.66	1.60
MD	1.46	1.79	0.95	2.40
ME	1.21	1.50	0.79	2.01
MI	1.42	2.17	1.15	2.57
MN	1.40	2.10	1.11	2.51
MO	1.42	2.12	1.12	2.54
MS	1.79	2.90	1.53	3.32
NC	1.10	1.53	0.81	1.91
ND	0.97	2.10	1.11	2.08
NE	1.20	2.02	1.07	2.27
NJ	1.35	1.74	0.92	2.27
NM	1.82	2.72	1.44	3.26
NV	2.45	3.65	1.93	4.38
NY	0.95	1.26	0.67	1.62
OH	1.24	1.85	0.98	2.22
OK	1.38	2.47	1.31	2.69
PA	1.29	1.82	0.96	2.25
RI	1.37	1.72	0.91	2.28
SC	1.74	2.33	1.23	2.97
SD	2.03	3.27	1.73	3.76
TN	2.48	3.47	1.84	4.31
TX	2.41	3.80	2.01	4.42
UT	1.38	2.31	1.22	2.60
VA	1.19	1.50	0.79	1.99
VT	1.04	1.34	0.71	1.75
WA	2.00	2.82	1.49	3.49
WI	1.03	1.59	0.84	1.87
WV	1.21	2.00	1.06	2.27
WY	1.12	2.34	1.24	2.36
US	1.46	2.06	1.09	2.55

Source: Authors' calculations.

Table 7: State Revenue Losses as Percentages of Total State Taxes in 2006

 State	(a)	(b) Total	(c) New	(d=a+c)
	Trend	E-Commerce	E-Commerce	Combined
State	Loss	Loss	Loss	Loss
AL	1.88	4.10	2.19	4.08
AR	2.76	6.46	3.45	6.21
AZ	2.82	6.14	3.28	6.10
CA	2.27	4.69	2.51	4.78
CO	1.75	4.17	2.23	3.97
CT	2.27	4.72	2.52	4.79
DC	1.27	2.70	1.44	2.71
FL	4.72	9.46	5.06	9.78
GA	2.89	6.05	3.23	6.12
HI	3.74	6.92	3.70	7.43
IA	2.06	5.59	2.99	5.04
ID	2.30	5.33	2.85	5.15
IL	2.36	5.65	3.02	5.38
IN	2.49	5.68	3.03	5.52
KS	2.43	5.84	3.12	5.55
KY	2.43	5.65	3.02	5.44
LA	2.52	6.67	3.57	6.09
MA	1.60	3.40	1.82	3.42
MD	2.43	4.84	2.59	5.02
ME	2.00	4.06	2.17	4.17
MI	2.52	5.89	3.15	5.66
MN	2.51	5.69	3.04	5.55
MO	2.50	5.77	3.08	5.59
MS	3.28	7.86	4.20	7.49
NC	1.97	4.14	2.21	4.18
ND	1.93	5.73	3.06	4.99
NE	2.21	5.48	2.93	5.14
NJ	2.28	4.71	2.52	4.79
NM	3.28	7.37	3.94	7.21
NV	4.65	9.86	5.27	9.92
NY	1.60	3.43	1.83	3.43
OH	2.16	5.04	2.69	4.86
OK	2.49	6.73	3.60	6.09
PA	2.20	4.94	2.64	4.84
RI	2.25	4.67	2.50	4.75
SC	3.02	6.31	3.37	6.39
SD	3.72	8.88	4.74	8.47
TN	4.37	9.39	5.02	9.39
TX	4.41	10.30	5.51	9.92
UT	2.66	6.25	3.34	6.00
VA	2.02	4.07	2.17	4.20
VT	1.76	3.63	1.94	3.70
WA	3.54	7.63	4.08	7.61
WI	1.85	4.31	2.30	4.15
WV	2.13	5.45	2.91	5.04
WY	2.08	6.41	3.42	5.51
US	2.55	5.59	2.99	5.53

Source: Authors' calculations.

Table 8: State Revenue Losses as Percentages of Total State Taxes in 2011

State	(a)	(b) Total	(c) New	(d=a+c)
	Trend Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	2.69	3.95	2.10	4.79
AR	4.01	6.22	3.31	7.32
AZ	4.10	5.90	3.14	7.23
CA	3.19	4.52	2.40	5.59
CO	2.58	4.01	2.13	4.71
CT	3.20	4.54	2.41	5.61
DC	1.77	2.60	1.38	3.16
FL	6.68	9.10	4.84	11.52
GA	4.15	5.81	3.09	7.24
HI	5.15	6.66	3.54	8.69
IA	3.06	5.40	2.87	5.93
ID	3.37	5.13	2.73	6.10
IL	3.42	5.45	2.90	6.32
IN	3.58	5.47	2.91	6.49
KS	3.51	5.63	3.00	6.51
KY	3.50	5.45	2.90	6.40
LA	3.71	6.45	3.43	7.14
MA	2.27	3.27	1.74	4.01
MD	3.40	4.66	2.48	5.88
ME	2.80	3.91	2.08	4.88
MI	3.63	5.68	3.02	6.65
MN	3.62	5.48	2.92	6.54
MO	3.60	5.56	2.96	6.56
MS	4.80	7.58	4.03	8.83
NC	2.83	3.98	2.11	4.94
ND	2.93	5.54	2.94	5.87
NE	3.24	5.29	2.81	6.06
NJ	3.20	4.54	2.41	5.61
NM	4.74	7.09	3.77	8.51
NV	6.81	9.46	5.03	11.84
NY	2.26	3.31	1.76	4.02
OH	3.10	4.87	2.59	5.69
OK	3.65	6.51	3.46	7.11
PA	3.13	4.76	2.53	5.67
RI	3.14	4.50	2.39	5.53
SC	4.29	6.07	3.23	7.52
SD	5.44	8.56	4.55	9.99
TN	6.26	9.04	4.81	11.07
TX	6.43	9.92	5.28	11.71
UT	3.94	6.01	3.20	7.14
VA	2.85	3.92	2.08	4.93
VT	2.49	3.49	1.86	4.34
WA	5.08	7.34	3.90	8.98
WI	2.67	4.15	2.21	4.88
WV	3.08	5.27	2.80	5.88
WY	3.13	6.21	3.30	6.43
US	3.65	5.39	2.87	6.51

Source: Authors' calculations.

losses are projected to continue, leading to combined revenue losses in 2011 between 4.01 and 11.84 percent. Florida, Nevada, Tennessee, and Texas could see combined losses in excess of ten percent of total state taxes.

Necessary Sales Tax Rate Increases

States have demonstrated a propensity to raise tax rates to offset previous base reductions, and it is reasonable to expect state and local governments to respond to further base narrowing with additional rate hikes. As sales tax rates are increased, the sales tax base will be narrowed further as purchasers substitute non-taxable items and use remote purchasing to evade the tax. State and local sales tax rate increases necessary to replace the lost revenues in a particular year were calculated for each state and are given in Table 9 for 2006 and Table 10 for 2011.

To replace only the new e-commerce losses in 2006, rates will have to rise by between 0.44 and 0.91 percentage points. Overall, Tennessee (1.58 percentage points) will need the largest rate increase and Hawaii (0.82 percentage points) will need the smallest increase to offset the total base decline (column 4 of Table 9). The necessary rate increases to offset new e-commerce losses in 2011, as shown in Table 10, range between 0.46 and 0.94 percentage points. Adding in the trend

Table 9: Sales Tax Rate Changes Necessary to Replace Lost Revenue in 2006 (Percentage Point Changes)

State	(a)	(b) Total	(c) New	(d=a+c)
	Trend Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	0.56	1.46	0.77	1.33
AR	0.48	1.35	0.70	1.18
AZ	0.56	1.47	0.77	1.33
CA	0.61	1.51	0.80	1.41
CO	0.46	1.32	0.69	1.15
CT	0.51	1.28	0.68	1.19
DC	0.48	1.22	0.64	1.12
FL	0.55	1.34	0.71	1.26
GA	0.51	1.28	0.68	1.19
HI	0.37	0.83	0.44	0.82
IA	0.35	1.13	0.59	0.93
ID	0.38	1.05	0.55	0.93
IL	0.52	1.51	0.79	1.31
IN	0.38	1.05	0.55	0.94
KS	0.47	1.35	0.70	1.17
KY	0.46	1.28	0.67	1.13
LA	0.51	1.63	0.84	1.35
MA	0.41	1.05	0.56	0.97
MD	0.44	1.05	0.56	1.00
ME	0.43	1.05	0.56	0.99
MI	0.45	1.28	0.67	1.12
MN	0.51	1.41	0.74	1.25
MO	0.46	1.27	0.67	1.12
MS	0.52	1.51	0.79	1.31
NC	0.43	1.10	0.58	1.01
ND	0.33	1.19	0.61	0.94
NE	0.42	1.27	0.66	1.08
NJ	0.51	1.28	0.68	1.19
NM	0.49	1.33	0.70	1.19
NV	0.58	1.49	0.78	1.36
NY	0.62	1.62	0.85	1.47
OH	0.45	1.27	0.66	1.11
OK	0.43	1.39	0.72	1.15
PA	0.48	1.31	0.69	1.17
RI	0.60	1.51	0.80	1.40
SC	0.43	1.09	0.57	1.01
SD	0.40	1.14	0.59	0.99
TN	0.67	1.73	0.91	1.58
TX	0.58	1.62	0.85	1.42
UT	0.45	1.26	0.66	1.11
VA	0.37	0.90	0.48	0.85
VT	0.43	1.05	0.56	0.98
WA	0.66	1.71	0.90	1.56
WI	0.40	1.12	0.59	0.98
WV	0.41	1.28	0.67	1.08
WY	0.29	1.06	0.55	0.83

Source: Authors' calculations.

Table 10: Sales Tax Rate Changes Necessary to Replace Lost Revenue in 2011 (Percentage Point Changes)

State	(a)	(b) Total	(c) New	(d=a+c)
	Trend Loss	E-Commerce Loss	E-Commerce Loss	Combined Loss
AL	0.82	1.46	0.79	1.61
AR	0.72	1.34	0.72	1.44
AZ	0.84	1.47	0.80	1.64
CA	0.88	1.51	0.82	1.70
CO	0.70	1.32	0.71	1.41
CT	0.75	1.27	0.69	1.44
DC	0.69	1.22	0.66	1.35
FL	0.81	1.33	0.73	1.54
GA	0.76	1.28	0.70	1.45
HI	0.53	0.83	0.46	0.99
IA	0.53	1.13	0.60	1.13
ID	0.57	1.05	0.57	1.14
IL	0.78	1.51	0.81	1.59
IN	0.57	1.05	0.57	1.14
KS	0.69	1.34	0.72	1.41
KY	0.68	1.28	0.69	1.37
LA	0.77	1.62	0.86	1.64
MA	0.61	1.05	0.57	1.18
MD	0.64	1.05	0.57	1.21
ME	0.62	1.05	0.57	1.20
MI	0.68	1.27	0.69	1.36
MN	0.77	1.40	0.76	1.52
MO	0.68	1.26	0.68	1.36
MS	0.79	1.51	0.81	1.60
NC	0.65	1.10	0.60	1.24
ND	0.52	1.18	0.63	1.14
NE	0.64	1.26	0.68	1.32
NJ	0.75	1.27	0.69	1.44
NM	0.74	1.33	0.72	1.45
NV	0.88	1.48	0.81	1.69
NY	0.91	1.61	0.87	1.78
OH	0.67	1.26	0.68	1.35
OK	0.65	1.39	0.74	1.38
PA	0.71	1.31	0.71	1.42
RI	0.87	1.51	0.82	1.69
SC	0.64	1.08	0.59	1.23
SD	0.60	1.13	0.61	1.21
TN	0.99	1.72	0.94	1.93
TX	0.87	1.61	0.87	1.74
UT	0.68	1.26	0.68	1.36
VA	0.54	0.90	0.49	1.03
VT	0.62	1.05	0.57	1.19
WA	0.98	1.70	0.92	1.90
WI	0.60	1.11	0.60	1.20
WV	0.62	1.27	0.68	1.30
WY	0.44	1.06	0.56	1.00

Source: Authors' calculations.

losses, the rate increases in 2011 need to be between 0.99 and 1.93 percentage points. Note that the 2011 rate increases are not additive; they assume that no increases have taken place in earlier years and are calculated only to cover the 2011 losses.

Permanent rate increases enacted in earlier years would continue to generate revenues and would reduce or eliminate necessary rate increases in later years.⁸

To replace only the new e-commerce losses in 2011, sales tax rates will have to rise by between 0.46 and 0.94 percentage points.

The estimated tax rate increases are correlated with existing state and local tax rates (0.97), population (0.37), and the importance of the sales tax to states' pre-e-commerce tax structure (0.34). Thus, the necessary rate increase tends to be greater in states that already have higher rates and population and in states that rely heavily on the sales tax.

Caveats

Three critical issues have potentially important consequences for state and local revenues, but have not been explored in this study. The first concerns the propensity for tangible goods to be converted into digitized goods. In some states, sales of certain tangible personal property are taxable but sales of a digital counterpart are not. For example, all states tax pre-packaged software, but 16 states do not tax software if it is downloaded (State Taxation Institute, 2000). No explicit adjustment is made to account for changes in form that alter taxability of transactions, except as assumptions are made about the extent to which certain types of sales are taxable. In all but the earliest years of our forecast, at most one-tenth of e-commerce sales appear to reasonably fit into the category where they might become non-taxable in some states because they are sold in digitized form (for example, software, music, books, etc.). Our revenue loss estimates are overstated (assuming that states do not alter the tax base to reflect this trend) to the extent that this shift reduces the tax base, but most states could be expected to react quickly to such base erosion and redefine the base to include many digitized sales. The one-tenth greatly exaggerates the potential effect because not all of these items will be digitized (for example, not all books will be digitized) and because many of the transactions are already taxable.

⁸ The estimated tax rate increases can be smaller in 2011 than in 2006, due primarily to slower expected growth in total e-commerce. Additionally, state and local taxes (assumed here to be a constant share of personal income beyond 2000 for state and 1998 for local) are expected to grow with personal income growth.

A second issue regards the dramatic expansion of commerce taking place via online auctions (such as through e-Bay). The Forrester data used in this study do not include such sales, but auctions could conceivably contribute to revenue losses. This is especially true if businesses are set up to funnel a significant amount of commerce through online auction houses without paying sales or use taxes. Most sales between individual consumers would be exempt as occasional sales, but the possibility for tax evasion exists for business-to-consumer (B2C) sales. In any case, failing to account for taxes due on online auctions likely leads to understated revenue loss estimates in this study.

Yet another issue involves the extent to which e-commerce sales replace other remote sales. Our forecast methodology is based on the assumption that 35 percent of the B2C revenue loss and 50 percent of B2B revenue loss would have occurred even in the absence of e-commerce. For consistency, these ratios are held constant throughout the forecast horizon, but they imply that the dollar value of non-e-commerce remote sales would increase at a compound annual 15.1 percent growth rate (CAGR), the same as the growth in the revenue losses. We believe that the implied growth rate is too high and a larger and larger share of the total e-commerce loss will represent a new revenue loss over time, as e-commerce sales grow more rapidly than other remote sales. Reducing the 15.1 percent CAGR to what appears to us to be a more reasonable 10 percent would not change the total e-commerce loss estimates over time, but it would reclassify a steadily larger share of the total e-commerce loss as new e-commerce loss. In this scenario, the new loss from e-commerce would be \$38.6 billion in 2011 instead of our baseline estimate of \$29.2 billion. Our results are clearly sensitive to this parameter but further empirical guidance is necessary before more definitive estimates can be calculated.

Policy Implications and Conclusions

Sales tax base erosion has been underway for many years. The revenue loss estimates provided here, totaling more than \$16 billion in 2001 and nearly \$45 billion in 2006, suggest that the combination of the trend decline and e-commerce will significantly alter state tax structures during the next several years.

State and local governments will be confronted with several choices in the face of these revenue losses: they must either cut expenditures, increase existing sales tax rates, or shift to another tax source, such as the property or income tax. Each choice has important implications. The effects of the first option, shrinking government, depend on the choices that are made. For example, reducing education and infrastructure spending could lower the economy's growth potential.

If the size of government is not cut, the issue comes down to the way in which state and local governments are to finance themselves. With these decisions goes the full range of implications regarding taxation, including equity, administration and compliance, and behavioral incentives. From a public policy perspective the issue is whether state and local governments are better financed with the triad of sales, property, and income taxes, or whether the sales tax base should be allowed to continue shrinking and the focus increasingly shifted toward other broad-based taxes. These are significant structural changes, and the shifts could be much larger over the next decade.

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Appendix Table 1: Local Revenue Losses as Percentages of Total Local Taxes in 2001

	(a)	(b) Total	(c) New	(d=a+c)
	Trend	E-Commerce	E-Commerce	Combined
State	Loss	Loss	Loss	Loss
AL	1.72	2.40	1.27	2.99
AR	1.10	1.73	0.91	2.02
AZ	0.94	1.40	0.74	1.68
CA	0.68	0.87	0.46	1.14
CO	1.21	2.03	1.08	2.28
CT	0.00	0.00	0.00	0.00
DC	0.00	0.00	0.00	0.00
FL	0.16	0.20	0.11	0.26
GA	1.20	1.68	0.89	2.09
HI	0.00	0.00	0.00	0.00
IA	0.14	0.26	0.14	0.27
ID	0.00	0.00	0.00	0.00
IL	0.21	0.33	0.17	0.38
IN	0.00	0.00	0.00	0.00
KS	0.63	0.99	0.52	1.15
KY	0.00	0.00	0.00	0.01
LA	1.84	3.27	1.73	3.57
MA	0.00	0.00	0.00	0.00
MD	0.00	0.00	0.00	0.00
ME	0.00	0.00	0.00	0.00
MI	0.00	0.00	0.00	0.00
MN	0.03	0.04	0.02	0.05
MO	0.88	1.32	0.70	1.58
MS	0.00	0.00	0.00	0.00
NC	0.82	1.13	0.60	1.42
ND	0.22	0.48	0.25	0.47
NE	0.31	0.53	0.28	0.59
NJ	0.00	0.00	0.00	0.00
NM	1.52	2.26	1.20	2.71
NV	0.28	0.42	0.22	0.50
NY	0.72	0.96	0.51	1.23
OH	0.32	0.47	0.25	0.57
OK	1.49	2.67	1.41	2.90
PA	0.05	0.07	0.04	0.08
RI	0.00	0.00	0.00	0.00
SC	0.11	0.15	0.08	0.20
SD	0.75	1.20	0.64	1.38
TN	1.28	1.80	0.95	2.24
TX	0.52	0.82	0.43	0.95
UT	0.71	1.19	0.63	1.34
VA	0.40	0.50	0.27	0.66
VT	0.00	0.00	0.00	0.00
WA	0.83	1.16	0.62	1.44
WI	0.12	0.19	0.10	0.23
WV	0.00	0.00	0.00	0.00
WY	0.46	0.97	0.51	0.97
US	0.47	0.67	0.36	0.83

Source: Authors' calculations.

Appendix Table 2: Local Revenue Losses as Percentages of Total Local Taxes in 2006

	(a)	(b) Total	(c) New	(d=a+c)
	Trend	E-Commerce	E-Commerce	Combined
State	Loss	Loss	Loss	Loss
AL	2.99	6.51	3.48	6.48
AR	2.01	4.69	2.51	4.51
AZ	1.74	3.79	2.02	3.76
CA	1.14	2.35	1.26	2.39
CO	2.31	5.51	2.94	5.25
CT	0.00	0.00	0.00	0.00
DC	0.00	0.00	0.00	0.00
FL	0.27	0.54	0.29	0.56
GA	2.17	4.54	2.43	4.59
HI	0.00	0.00	0.00	0.00
IA	0.26	0.70	0.38	0.64
ID	0.00	0.00	0.00	0.00
IL	0.37	0.89	0.47	0.84
IN	0.00	0.00	0.00	0.00
KS	1.12	2.68	1.43	2.55
KY	0.01	0.01	0.01	0.01
LA	3.37	8.91	4.76	8.13
MA	0.00	0.00	0.00	0.00
MD	0.00	0.00	0.00	0.00
ME	0.00	0.00	0.00	0.00
MI	0.00	0.00	0.00	0.00
MN	0.05	0.10	0.06	0.10
MO	1.55	3.58	1.91	3.47
MS	0.00	0.00	0.00	0.00
NC	1.46	3.07	1.64	3.10
ND	0.44	1.30	0.69	1.13
NE	0.58	1.43	0.76	1.34
NJ	0.00	0.00	0.00	0.00
NM	2.73	6.13	3.28	6.00
NV	0.53	1.13	0.60	1.13
NY	1.21	2.60	1.39	2.60
OH	0.55	1.29	0.69	1.24
OK	2.69	7.27	3.88	6.57
PA	0.08	0.18	0.10	0.18
RI	0.00	0.00	0.00	0.00
SC	0.20	0.42	0.22	0.42
SD	1.37	3.26	1.74	3.11
TN	2.27	4.87	2.60	4.87
TX	0.95	2.21	1.18	2.13
UT	1.37	3.21	1.72	3.08
VA	0.68	1.36	0.73	1.40
VT	0.00	0.00	0.00	0.00
WA	1.46	3.15	1.69	3.15
WI	0.22	0.52	0.28	0.50
WV	0.00	0.00	0.00	0.00
WY	0.86	2.64	1.41	2.27
US	0.82	1.83	0.98	1.80

Source: Authors' calculations.

Appendix Table 3: Local Revenue Losses as Percentages of Total Local Taxes in 2011

State	(a)	(b) Total	(c) New	(d=a+c)
	Trend	E-Commerce	E-Commerce	Combined
	Loss	Loss	Loss	Loss
AL	4.28	6.27	3.34	7.61
AR	2.91	4.52	2.40	5.32
AZ	2.53	3.64	1.94	4.47
CA	1.60	2.26	1.20	2.80
CO	3.41	5.30	2.82	6.23
CT	0.00	0.00	0.00	0.00
DC	0.00	0.00	0.00	0.00
FL	0.38	0.52	0.28	0.66
GA	3.12	4.36	2.32	5.43
HI	0.00	0.00	0.00	0.00
IA	0.39	0.68	0.36	0.75
ID	0.00	0.00	0.00	0.00
IL	0.54	0.85	0.45	0.99
IN	0.00	0.00	0.00	0.00
KS	1.62	2.59	1.38	2.99
KY	0.01	0.01	0.01	0.01
LA	4.95	8.61	4.58	9.53
MA	0.00	0.00	0.00	0.00
MD	0.00	0.00	0.00	0.00
ME	0.00	0.00	0.00	0.00
MI	0.00	0.00	0.00	0.00
MN	0.07	0.10	0.05	0.12
MO	2.24	3.45	1.84	4.07
MS	0.00	0.00	0.00	0.00
NC	2.09	2.95	1.57	3.66
ND	0.66	1.26	0.67	1.33
NE	0.85	1.38	0.73	1.58
NJ	0.00	0.00	0.00	0.00
NM	3.94	5.90	3.14	7.08
NV	0.78	1.08	0.57	1.35
NY	1.71	2.51	1.33	3.05
OH	0.79	1.24	0.66	1.45
OK	3.94	7.03	3.74	7.68
PA	0.11	0.17	0.09	0.21
RI	0.00	0.00	0.00	0.00
SC	0.28	0.40	0.21	0.50
SD	2.00	3.15	1.67	3.67
TN	3.25	4.69	2.49	5.74
TX	1.38	2.13	1.13	2.52
UT	2.03	3.09	1.64	3.67
VA	0.95	1.31	0.70	1.65
VT	0.00	0.00	0.00	0.00
WA	2.10	3.03	1.61	3.71
WI	0.32	0.50	0.27	0.59
WV	0.00	0.00	0.00	0.00
WY	1.29	2.56	1.36	2.65
US	1.18	1.76	0.94	2.12

Source: Authors' calculations.