

Tax Compliance in the Amazon¹

January 2022

Celeste K. Carruthers
The University of Tennessee
carruthers@utk.edu

William F. Fox
The University of Tennessee
billfox@utk.edu

Lawrence M. Kessler
The University of Tennessee
lkessler@utk.edu

Matthew N. Murray
The University of Tennessee
mmurray1@utk.edu

JEL: H71 state and local taxation, H26 tax evasion and avoidance

From 2012-2014, Amazon sent three emails to Tennessee purchasers with information about their potential use tax obligations and how to pay them. The messages did not threaten enforcement, but they included information that likely raised awareness and lowered the cost of compliance. Following each email, the volume of consumer use tax filings briefly increased by a factor of 3-5, but the value of new payments was too small to register a significant difference in total collections. Business tax payments were not exceptional in the months following each email.

¹ Inferences and opinions expressed in this study do not represent the position of the Tennessee Department of Revenue or any state agency. We gratefully acknowledge comments, questions, and suggestions from anonymous reviewers, and from the National Tax Association annual meetings. All errors are our own.

Tax collection in the U.S. is based on the honor system.

- Massachusetts Department of Revenue²

I. INTRODUCTION

Amazon established its business model in part by avoiding nexus in most of its market states, thus avoiding responsibility for sales and use tax collection as well. States responded to foregone tax revenues—from Amazon and e-commerce more broadly—by modernizing the definition of nexus and by appealing directly to taxpayers.³ By agreement with the state of Tennessee, Amazon sent three emails between 2012 and 2014 to all Tennessee customers stating that they “...may owe use tax on purchases.” The use tax works in tandem with the sales tax to create a consumption-based tax. Sellers typically collect and remit *sales* tax on behalf of business and individual purchasers. However, if buyers do not pay the sales tax at the point of purchase they owe an equivalent amount in *use* taxes. The emails listed the total value of purchases by the buyer during the previous year and included a link to a state website for tax reporting and payment.⁴ Amazon’s email blasts also notified buyers that sales were not exempt simply because they were made over the Internet, although they assured purchasers that their potential tax obligations were not being shared with the state.⁵ Given the obscure nature of the use tax, it is

² <http://www.taxrates.com/blog/2013/04/11/massachusetts-dont-break-the-law-over-use-tax/>

³ See Agrawal and Fox (2017) on state efforts to define physical presence more extensively and for state efforts to enforce a destination tax on remote sales. The 2018 U.S. Supreme Court ruling in *South Dakota v. Wayfair, Inc., et al.* (585 U.S. ____ (2018)) granted states the ability to collect tax on purchases from large out-of-state sellers regardless of whether those sellers have physical presence in the state.

⁴ Amazon began collecting tax on its own sales to Tennessee buyers in 2014. The company’s intent to begin collecting sales taxes in the future was not communicated to customers in these messages. In 2012, Tennessee passed House Bill 2370 which required online merchants with a physical presence in the state to begin collecting and remitting sales and use tax on qualified online purchases made in Tennessee. Amazon received a temporary waiver until 2014 if they notified consumers via email of their use tax liabilities. A copy of one such message is included in the online appendix as Figure A1.

⁵ Most goods purchases, including food for consumption at home, are subject to tax in Tennessee, so it is likely that most consumer purchases from Amazon were taxable. Business purchases may be taxable as well but taxability depends on how the goods are used. Specifically, business purchases are exempt if the items become component parts of manufactured goods or if they are purchased for resale, among other exemptions.

likely that many buyers were unaware of their use tax liabilities prior to this series of emails. The emails likely increased awareness of the use tax and reduced compliance costs, which could have raised compliance and use tax payments (Slemrod, 2017). Since they came from a third party, however, and explicitly stated that the information would not be shared with the state, the emails likely had little effect on the perceived risk of noncompliance.

We study consumer and business responses to Amazon’s messages, quantifying changes in the volume and likelihood of filing before and after each email. We find evidence that consumers were responsive to the notices in the short term, but not to a degree that significantly increased tax revenues. Businesses, however, appear to have been largely unresponsive to the Amazon emails. The volume of business use tax returns fell modestly in the months following the second and third message, but they were otherwise unexceptional in terms of payments and taxable claims. These findings add to a small use tax literature by offering a glimpse at a large real-world test of the effect of greater awareness and reduced compliance cost. Spotlighting the use tax, easing its payment, and leaving the risk of penalty unchanged had modest effects on compliance but no discernible effect on tax revenues.

II. USE TAXES, COMPLIANCE, AND THE AMAZON EMAILS: FORMING EXPECTATIONS

Sales and use taxes link together to form a broad, destination-based consumption tax on taxable retail sales, regardless of where the taxable item originated. Sellers usually collect and remit sales tax on behalf of business and individual purchasers.⁶ Buyers who do not pay sales tax

⁶ While the 2018 *Wayfair* ruling dramatically changed the tax implications of online sales, it has no impact on tax payments made during our sample time period of 2003 to 2015. Prior to the *Wayfair* ruling, nexus was based on some form of substantial physical presence following the 1992 U.S. Supreme Court ruling in *Quill Corp v. North Dakota* (504 US 298 (1992)). The *Wayfair* decision allows states to require certain vendors to collect the use tax, but

at the point of purchase owe an equivalent amount in use taxes.⁷ For firms, use tax liabilities arise primarily from two sources: out-of-state purchases if tax was not previously paid, and items purchased for a non-taxable use (such as resale), which are then converted to a taxable use.⁸ Use-taxable transactions might include significant items like building materials, forklifts, computers and furniture, or rather inconsequential items like cleaning materials purchased for retail sale but diverted for business use. Forty-five states and the District of Columbia impose sales and use taxes (Fox, 2016).

The sparse available evidence suggests poor compliance with the use tax. Murray (1995) empirically examines sales and use tax compliance for one large subsector of business taxpayers in Tennessee, concluding that “taxpayers with greater opportunities to reduce their tax liabilities exploit these opportunities to their advantage,” and that there were no easy policy solutions given ambiguities in use tax laws at the time. A 2018 tax compliance study from the Washington State Department of Revenue uses a random sample of audits to estimate taxpayer noncompliance (i.e., unreported taxes) among businesses for calendar year 2014. The study finds that the use tax had the highest rate of noncompliance among businesses, at 14.9 percent.⁹ The report also found that businesses were much more compliant with their *sales* tax obligations, estimating noncompliance to be just 0.9 percent relative to total sales tax liabilities in 2014.

it did not eliminate the use tax. The tax is still relevant for large vendors that self-report all sales and use taxes, small remote vendors, cross-border shopping, and community events such as art festivals or home shows.

⁷ In Tennessee, the state sales and use tax rate is 7% for most goods and taxable services. There is also an additional local sales and use tax that ranges from 2.25%-2.75%, leading to a total state and local use tax rate of 9.25%-9.75%.

⁸ See lines 2 and 3 on the Tennessee State and Local Sales and Use Tax Return, Figure A2.

⁹ Specifically, \$68.8 million in use tax liabilities among businesses went unreported, representing 14.9 percent of total use tax liabilities in the state. That is, the state should have collected \$463.4 million in use tax revenues but only received payments of \$394.6 million.

Taxpayers fail to comply with taxes either because they are unaware of a tax or because of explicit decisions not to comply. In the standard Allingham and Sandmo (1972) model of compliance, individual taxpayers make explicit decisions on what to pay (or not pay) as utility maximizers who weigh the benefits of noncompliance against the risk of audit and penalties. However, the model assumes an awareness of the tax and minimal compliance costs, both of which are questionable premises for the consumer use tax.

To increase taxpayer compliance, the traditional deterrent approach to tax enforcement—with audits and penalties from noncompliance—is effective with a high enough probability of detection (Slemrod, 2019). However, these methods are intrusive and costly to administer. Increasingly, low-cost experimental information campaigns have been employed by researchers and policymakers to promote and better understand compliance. Some of these experiments test whether deterrent messages about penalties or the threat of audit elicit more compliance (e.g., Slemrod et al., 2001; Iyer et al., 2010; Kleven et al., 2011; Harju et al., 2013), some test appeals to norms or consciousness (Blumenthall et al., 2001; Hallsworth et al., 2017), and others test both channels with distinct treatment arms (Castro and Scartascini, 2015; Pomeranz, 2015; Chirico et al., 2019; Bott et al. 2020). Most relevant to this study, recent work has tested the effect of reduced compliance costs, either in isolation (Anderson, 2015) or head-to-head against deterrence and norms (Dwenger, et al. 2016; Meiselman, 2018; De Neve et al., 2019). Collectively, these findings indicate that informational campaigns which raise awareness and/or reduce compliance costs can have a positive impact on tax reporting, however the estimated effects are generally smaller than those raised through threats of audit or penalties.

With this theoretical and empirical background in mind, baseline compliance with Tennessee's use tax would have been a function of awareness of the use tax, the costs of

complying, and the risks from not complying. In turn, the effect of the Amazon emails on consumer and business tax payments would have depended on how the messages shifted awareness, compliance costs, and the risk of detection and penalty.

Prior to the first Amazon email, consumers were likely much less aware of the use tax and their use tax liabilities than businesses, since consumers are accustomed to paying sales tax *through* businesses at the point of sale.¹⁰ In Tennessee, firms self-report their sales and use tax reporting liabilities using the tax return shown in Figure A2. The vast majority of firms routinely file this return to report sales tax liabilities incurred through making sales, so they are regularly exposed to the reporting form. Some businesses file annually, and for them the due date is January 20 in the year after a purchase occurs. For larger firms that are required to file monthly, the due date is the 20th of the month following each reporting period.¹¹ Many businesses will employ professional accounting and financial staff who have the dedicated responsibility to understand and properly remit tax. An important feature of the tax return for firms (Figure A2) is that it includes lines for reporting and remitting both the sales tax and the use tax on one form. Firms may incur use tax liabilities based on different classes of taxable purchases made throughout the year, and lines are available on the return to report each. It is much more likely that firms are at least aware of potential use tax liabilities as well as the method in which they would remit use tax payments, given that use tax lines are included in the tax return. By comparison, consumers are required to file a use tax return at least once a year, but can do so at

¹⁰ Furthermore, individuals would need to keep track of their online purchases in order to calculate their use tax liability. In a number of states, including Tennessee, seven other states without a broad-based personal income tax, and nine income-taxing states, individuals must expend effort to find the use tax reporting mechanism, complete the report, and submit it to the state. Twenty-seven states include a line on income tax returns facilitating filing, but often not replacing the need to track expenditures, and only 13 of these states have lookup tables to facilitate use tax compliance (Manzi, 2018).

¹¹ See <https://www.tn.gov/revenue/taxes/sales-and-use-tax/due-dates-and-tax-rates.html>.

any time. See Figure A3 for a copy of the consumer use tax return. In contrast to firms, the consumer return form focuses solely on the use tax, using a return that is filed by a small number of consumers. Despite the scale of untaxed e-commerce in the 2003-2015 time period we study, Tennessee consumers filed just 2,000 – 6,000 use tax returns each year before the first Amazon email in 2012, versus more than 900,000 annual business returns.

Amazon distributed three personalized email blasts to all Tennessee business and individual purchasers in April 2012, January 2013, and January 2014 (see Figure A1 for the 2014 message).¹² The April 2012 email came one month after the state legislature passed a law requiring that Amazon contact all Tennessee purchasers about their potential use tax liabilities. Each message noted that the recipient might owe use tax on their Amazon purchases. The information conveyed in this portion of the message increased use tax salience by making recipients aware of their potential use tax liabilities. The emails also provided a summary of all purchases on the Amazon platform during the previous year, and included a link to the state payment portal. Without this additional information, compliance would have required taxpayers to keep detailed records of all of their Amazon purchases as well as spend effort locating the correct use tax return forms on the state’s website. Thus, this portion of the email reduced compliance costs by providing all of the relevant information necessary for the taxpayer to pay their use taxes. Furthermore, the emails explicitly stated that Amazon would not report this information to the state of Tennessee, so these messages should not have meaningfully altered a taxpayer’s perceived risk of audit.

¹² Emails from 2012 and 2013 were virtually identical to the notice sent in 2014. The April 2012 message itemized “[t]he total sales price of purchases you had shipped to Tennessee in 2011.” The January 2013 and January 2014 emails itemized 2012 and 2013 purchases, respectively, and were sent earlier in the year than the first message. The content of each message was identical for individual and business purchasers.

Internet search behavior suggests that the messages were salient. Figure 1 plots monthly Google Trend indices for Tennessee Google users for three search phrases—“sales tax,” “use tax,” and “Amazon sales tax”—over the years 2011-2016. Vertical lines in the figure highlight months where Amazon’s Tennessee consumers were notified of potential tax obligations by email, and these time periods coincide with very elevated search activity for each phrase.¹³

Inferences from theory and empirical work on tax compliance lead to uncertainty about the expected effect of Amazon’s emails. Greater awareness of use tax liabilities and lower costs of complying should push filings up, but the lack of a deterrent message should temper those effects. Compliance might change more among infrequent filers—consumers, especially—who would gain more awareness of their use tax obligations and benefit from targeted help to fulfill those obligations. Nevertheless, non-compliance with the use tax is very likely in this framework given the low probability of detection both before and after the Amazon emails.¹⁴

III. CONSUMERS

We obtained de-identified, longitudinal administrative records on the universe of Tennessee monthly use tax filings for all individual and business returns processed between July 2003 and March 2015.¹⁵ We know when Amazon sent emails to Tennessee purchasers, but we do not have Amazon microdata, nor are we able to match Amazon balances to individual taxpayers or individual tax payments. So we cannot quantify *non*-compliance, i.e., we do not know how many emails were sent or how many consumer and business filers received an email notice but did not file a tax return. Consumer use tax filings include 52,038 unique monthly records from 39,208

¹³ We do not see a similar level of heightened search interest for the United States as a whole or for the states surrounding Tennessee.

¹⁴ There are some exceptions. For example, the registration of an automobile or boat is typically contingent on demonstrating that tax has been paid.

¹⁵ We thank the Tennessee Department of Revenue for making these data available.

individuals. Among consumers, 85 percent file just once over this nearly 12-year window, and 98 percent file no more than three times. With so few repeat consumer filers, we cannot estimate the extent to which the Amazon emails changed an individual consumer's likelihood of filing. Instead, we try to gain an understanding of how the emails affected the volume and composition of consumer use tax returns at the state level. Specifically, we aggregate monthly consumer returns to the state-by-month level and study how four outcomes changed following each Amazon email: the total number of consumer returns, the percent of filers who were first-time payers (since July 2003, at least), aggregate tax payments, and the median payment for each month.¹⁶

At the state level, Figure 2 shows that the first Amazon email notice coincides with a sudden spike in the total number of consumer filings, from under 1,000 in March 2012, statewide, to over 4,000 in May 2012 (Panel I). Thereafter, filings fell sharply before spiking again in January 2013 after the second email notice, and once more in January 2014 after the last. Panel II of Figure 2 shows that the spike in total tax filings was driven by new filers (especially after the first email), that is, consumers who had no previous record of an individual use tax return going back almost nine years to 2003. Panel III illustrates that resulting tax payments were much smaller than what Tennessee typically received from a consumer use tax filing. Median tax remittances fell from about \$200 per filer to trivial sums immediately following each of the three email notices. In fact, these bursts of new filings were too small to register a visible change in statewide payments (Panel IV).

¹⁶ Aside from their tax payment detail and anonymized identifier, the data include no further information on consumer filers or their purchases, prohibiting us from exploring heterogeneous responses by consumer characteristics.

Figure 3 plots the distribution of consumer use tax payments separately for the three years prior to the first Amazon email and the three years following. Before the first email, consumer remittances were somewhat uniformly distributed from under \$25 to \$500, less common from \$500 to \$999, and *most* common at \$1,000 or more. A \$1,000 use tax bill would have corresponded with purchases valued at more than \$11,000, a sum more likely to have attracted state scrutiny. Furthermore, these larger payments likely include automobile or boat purchases where vehicle registration is contingent on demonstrating that tax has been paid. Panel II shows that the number of large use tax payments was virtually unchanged after the first Amazon email, indicating no change in use tax compliance among the larger use taxpayers. By comparison, the number of small use tax payments grew substantially following the Amazon emails. For example, use tax payments of \$25 or less grew more than 17-fold and remittances of use tax payments ranging from \$25-\$49 grew nearly 8-fold.

Taken together, the descriptive inferences from Figures 2 and 3 show that the Amazon emails led to a sudden and sharp increase in the number of consumer tax filers (from 2,975 in 2011 to 7,287 in 2012), which was driven by consumers who had not filed in the previous 9-11 years, and perhaps had never filed. The rate of new consumer tax filers rose 16.5 percentage points in 2012. The tax payments made by these additional filers were small enough to drive down the median payment per filer with no obvious effect on total tax collections. In the online appendix, we describe county-level regression specifications that quantify and support these visual deviations at a finer level

IV. BUSINESSES

Business filings for sales and use tax payments are substantially more common than consumer filings and are more consequential for state revenues. Each business typically filed in 52 out of the 141 months of the panel, and across 1.1 SITUS taxing areas (city and county

combined). For these reasons, we analyze business returns differently than consumer returns. We observe 10.8 million monthly filings from 247,628 business entities spanning July 2003 through March 2015. We organize business filings around the entity-by-month-by-SITUS level. This results in a panel of nearly 9.9 million monthly observations on business filings.

Figure 4 plots statewide trends in business tax returns, adjusted for calendar month fixed effects. Compared to Figure 2, it appears that businesses did not respond nearly as strongly to the Amazon emails as consumers. Total returns and tax payments do not visibly depart from prior trends, nor do claims for repurposed items or out-of-state purchases.¹⁷ However, with 9.9 million observations, the regression analysis to follow is sufficiently powered to detect small intertemporal changes in business behavior.

We estimate the following empirical specification for business tax outcomes depicted in Figure 4:

$$Y_{icsm} = \beta_0 + AMZ_m\beta_1 + f(t_m, \gamma_m) + X_{cm}\beta_x + \beta_{ism} + \varepsilon_{icsm}, \quad (1)$$

where Y_{icsm} is an outcome measure for business i in county c , SITUS s , and month m .¹⁸ We estimate filing as a binary outcome, and we estimate the log of taxes paid (plus \$0.01) as well as the value of claims for repurposed items and out-of-state purchases. AMZ_m is a vector of three indicators for months that included or shortly followed an Amazon email. Baseline specifications have $AMZ_m = 1$ for the month of the email as well as the following two months. We choose a three-month treatment window to identify short-term changes in filing and payments that may

¹⁷ As noted earlier, use tax liabilities for firms can arise when making out-of-state purchases if the tax was not previously paid, or if items purchased for a non-taxable use are then repurposed to a taxable use.

¹⁸ Another way to approach the analysis of business returns is to aggregate filing and payment statistics to the county or SITUS level (rather than by entity by SITUS). In results not shown, we find that this method yields very similar conclusions as Table 1, suggesting no significant changes in total tax payments in the wake of Amazon emails, but perhaps a somewhat lower volume of business tax filings overall. We also aggregate business data to the state level and find no significant changes to total business tax payments or business tax filings following the Amazon email notices. Results are also similar if we aggregate the panel to the entity-SITUS-quarter level.

have been spurred by updated use tax awareness, ease of compliance, or perceptions about the risk of penalty. The term $f(t_m, \gamma_m)$ is a function of time including a quadratic time trend and indicators for calendar months,¹⁹ and X_{cm} is a vector of time-varying county features (population, income per capita, farming income per capita, labor force participation, and median age),²⁰ The parameter β_{ism} is a fixed effect for the combination of entity i , SITUS s , and calendar month $m' = \{1, 2, \dots, 12\}$.²¹ Standard errors allow for correlated errors by entity.

Coefficient estimates for each element of the AMZ_m vector represent the extent to which the outcome Y_{icsm} for entity i deviates from i 's average Y_{icsm} in the three months following each email, conditional on local economic indicators and a quadratic time trend. We exercise caution in assigning a causal role for email notices to short-term fluctuations in business filing and tax payments. Our only sources of identifying variation are three points in time, which plausibly coincide with unobserved determinants of use tax filings, including coincidental changes in the volume of online purchases or the volume of total liabilities, as well as random, unexplained variation. Point estimates that are statistically different from zero are not necessarily in the extremes of random variation. We place Table 1 results in the context of typical filing behavior by estimating Equation (1) 139 times, substituting every possible three-month window between the third quarter of 2003 and the first quarter of 2015 for the true AMZ_m . The percent of iterations with $\hat{\beta}_1$ greater, in absolute value, than the coefficient estimated for the true email notice is listed in brackets below each estimate's standard error in Table 1.²²

¹⁹ Fixed effects for calendar months will help to control for seasonal patterns in tax filing and payment, particularly those that correspond with January (when purchasers received the second and third emails) and April (when they received the first email).

²⁰ Controls in X_{cm} are drawn from the Bureau of Economic Analysis and measured at the annual level. We do not include local option sales tax rates due to the lack of intertemporal variation.

²¹ Results are very similar with less flexible fixed effects for entity i and calendar month m' , without allowing for entity heterogeneity across SITUS areas.

²² Also see Figures A5 and A6 in the online appendix for the timepath and distribution, respectively, of placebo Equation (1) $\hat{\beta}_1$ estimates.

Our analysis of the extensive margin (Column 1 of Table 2) suggests that filing itself may have been affected by Amazon emails, but in an unintended way. All three Amazon emails were followed by conditionally *lower* rates of filing, by 0.2 percentage points following the first, 0.7 following the second, and 0.8 after the third. The fall in filing rates following the second and third email notices are both larger in absolute value than 94-95 percent of all placebo months. See Figure A6 Panel I in the online appendix, where those two estimates are in the left tail of the distribution.

Column 2 of Table 2 lists Equation (1) results for the log of total taxes paid. Immediately following the first Amazon email notice in April 2012, entities increased their tax payments by 5.9 percent over the conditional mean, while payments fell by 2.9 percent and 2.4 percent, respectively, following the second and third notice. Each of the AMZ_m coefficients for total tax payments is statistically significant, but precise estimates are not unusual given the large number of observations in the sample. None of the Column 2 estimates are atypically large relative to the distribution of three-month placebo effects. This does not rule out a very small causal effect of Amazon notices on total business tax payments but it is also consistent with random noise.

Columns 3 and 4 of Table 2 focus on claims for repurposed items and out-of-state purchases—two lines in the business use tax return where we would most expect to see responses to the Amazon emails. We find that the value of repurposed claims increased by 4 percent following the first email notice, by 1 percent following the second, and fell by an insignificant 0.5 percent following the third. The estimated effect of the first email notice on repurposed claims is larger than all but 14 percent of placebo estimates, while the effects of the second and third email notices are more consistent with noise. Out-of-state business purchases (Column 4) increased by 2 percent following the first email, then declined by 2 percent following

the second email, and exhibited smaller and imprecise changes following the third. As with total tax payments, however, the effect of Amazon email notices on this line item appears to be very slight, or dominated by unobserved noise in filing patterns over time.

In the online appendix, we list Equation (1) results for six subgroups of businesses divided according to their volume of sales and frequency of filing. We expect filing behavior to change more among businesses who file infrequently, have low average sales, or who file infrequently *and* have low average sales. These entities are likely less experienced with use tax payments than larger firms. In the online appendix, we show that infrequent filers and smaller firms were atypically *less* likely to file following the second and third emails, driving small, significant results in Table 2 Column 1. The language of each email may have amplified light enforcement expectations for smaller businesses and less experienced files. None of the subgroups, however, were significantly and atypically responsive in terms of tax payments or claims for repurposed items or out-of-state purchases.

V. DISCUSSION

The Amazon emails provided useful information on an obscure tax with a high rate of noncompliance. Each message listed a summary of all online purchases made on the Amazon platform in the previous year as well as a link to the state's payment portal. Furthermore, these emails should have had little effect on a taxpayer's perceived likelihood of receiving an audit because they came from a third party and stated that Amazon would not share this information with the state. The Amazon emails therefore provide a relatively isolated, albeit non-experimental, test of the effect of use tax awareness and compliance costs on taxpayer behavior.

Overall, results indicate that Amazon's notice of potential use tax obligations had little to no effect on typical business tax payments, and if anything, may have *reduced* the likelihood that

smaller businesses filed at all. This contrasts with what we find for individual consumers, many of whom appear to have been briefly motivated to file payments in response to each Amazon email. We can reconcile the differences between business and consumer responses by differences in tax salience and reductions in relative compliance costs, which were likely larger for consumers. Businesses are better versed in state and local tax law, and the sales and use tax return that the vast majority of businesses use to report sales tax liabilities to the state includes information for remitting both the sales tax and the use tax in one form. Therefore, the information provided in these email blasts may have done little to increase their awareness of the use tax or reduce their compliance costs. Further, the lack of business response suggests that expected risk of noncompliance was unaffected, or even eroded by the Amazon emails. By comparison, many consumers were likely unaware of the use tax and their potential use tax liabilities. Therefore, the information provided in the Amazon emails increased use tax salience and eased the time-cost needed to comply with use tax remittance among consumers. However, we are unable to discern whether consumers respond because the emails alerted them to the existence of the use tax, because they lowered costs of complying with the sales tax or some combination of the two. It is also important to note that despite large changes in consumer filing volumes after each email, new tax payments were typically small. We see no reason to conclude that this series of emails with information about use tax obligations significantly increased state tax revenues.

Disclosures

The authors have no financial or other arrangements that might give rise to conflicts of interest with respect to the research reported in this paper.

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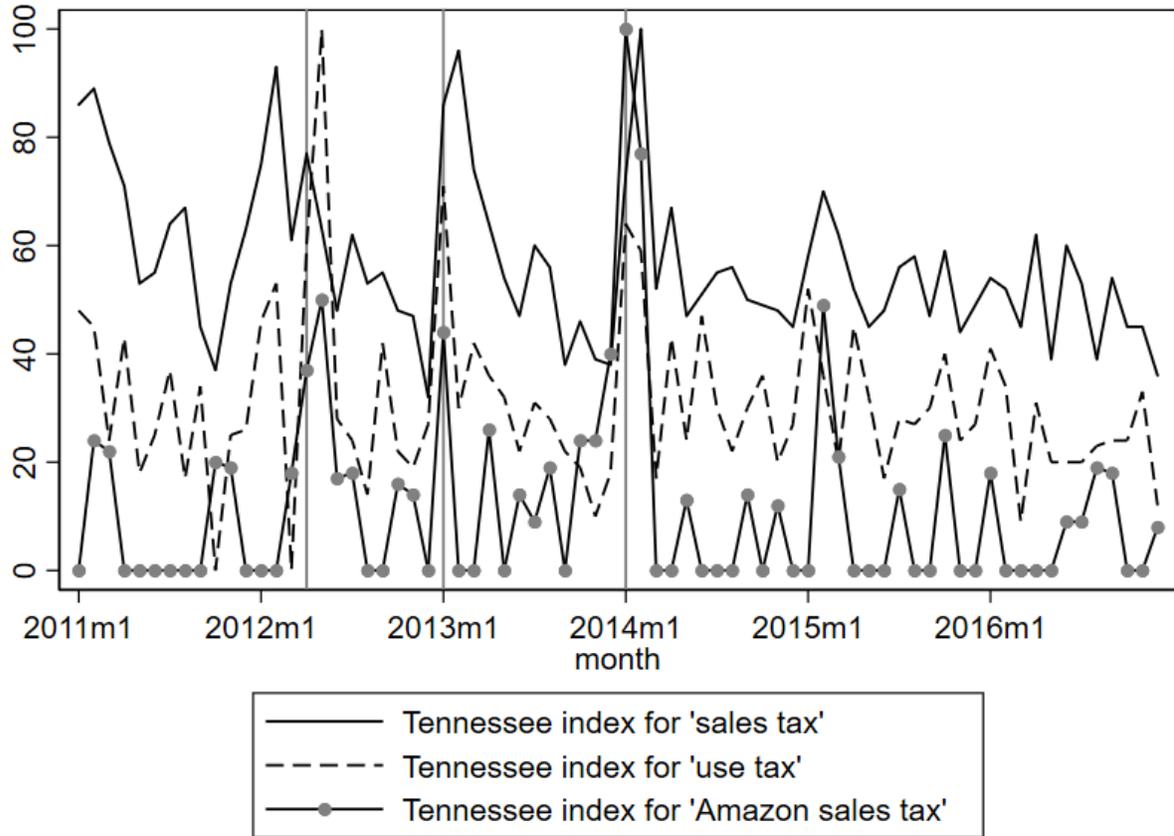
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Tables and Figures

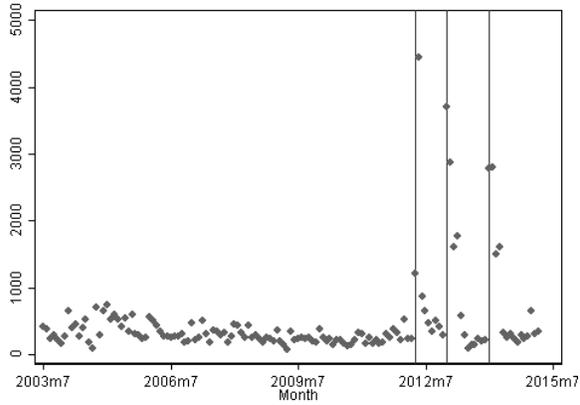
Figure 1. Google Trend Search Indices for “sales tax,” “use tax,” and “Amazon sales tax,” by month, for Tennessee internet users



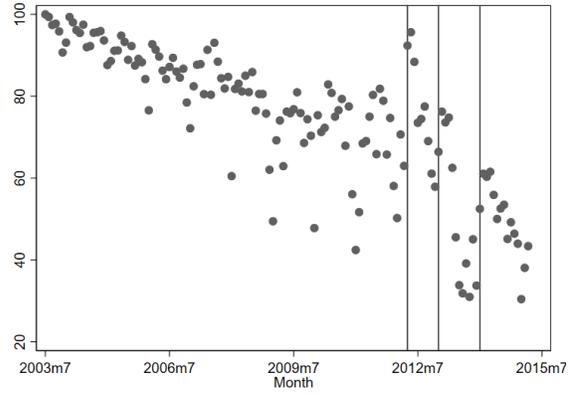
Notes: The figure plots Google Trends indices by month for three relevant search phrases, limited to Google users in Tennessee. Months with Amazon email blasts to Tennessee purchasers are highlighted with vertical lines.

Figure 2. Statewide trends in consumer use tax filings

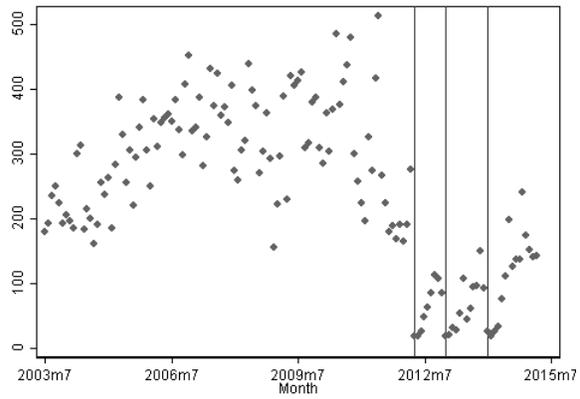
I. Number of consumer use tax filings, by month



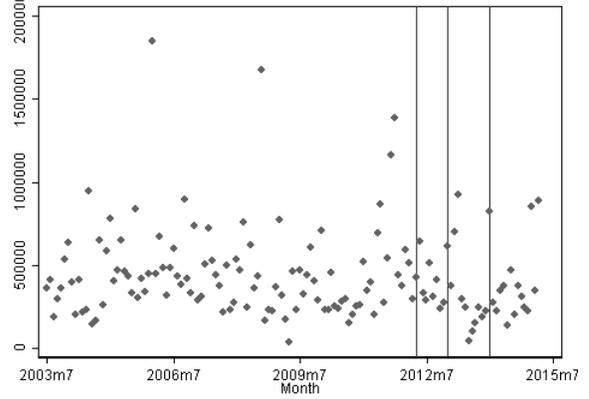
II. Percent of filers with no previous observed payment



III. Median tax paid, by month

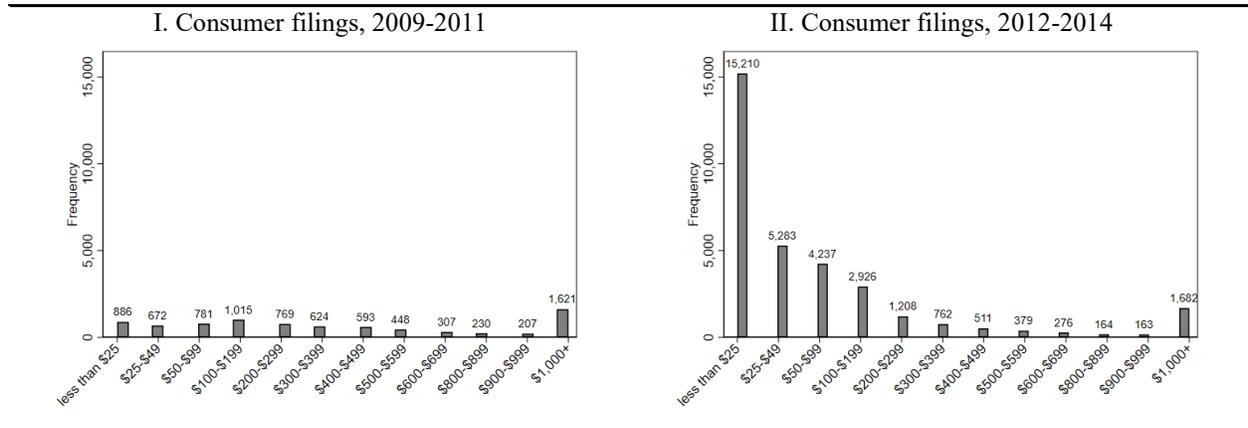


IV. Statewide total tax paid, by month



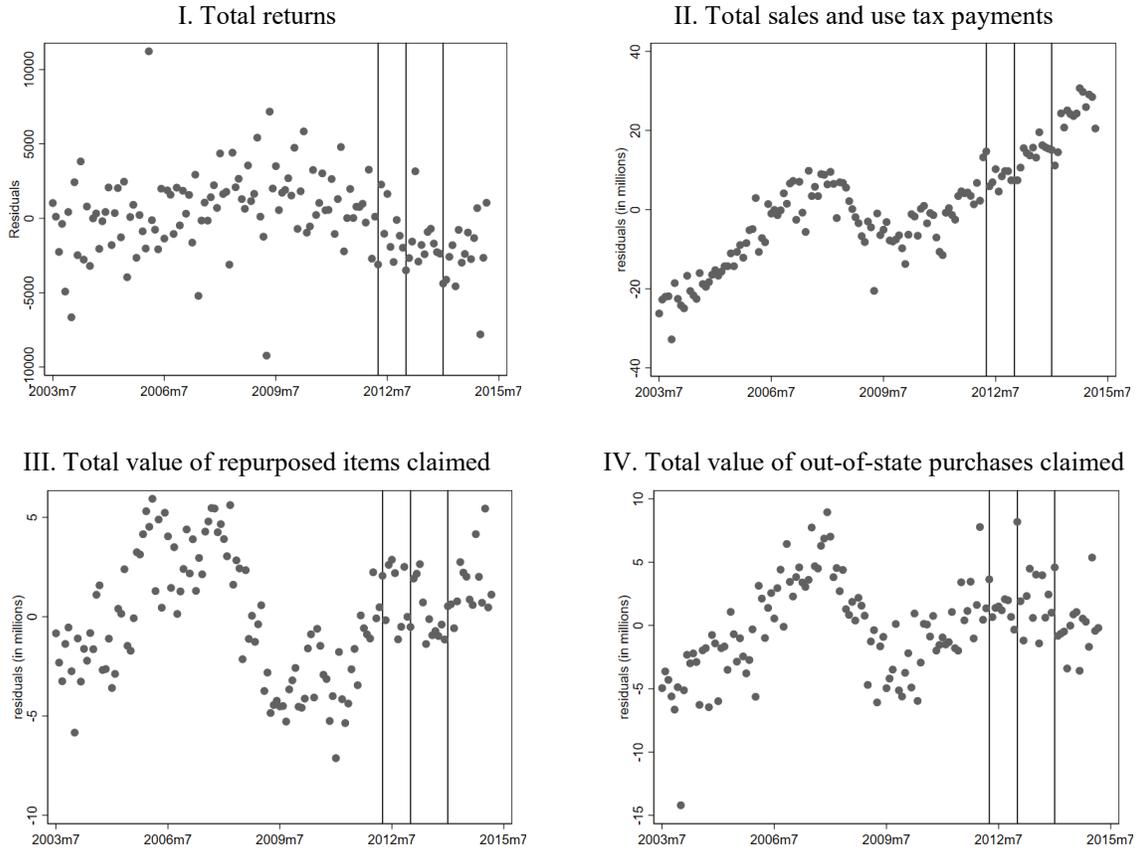
Notes: Panels depict statewide summary measures of consumer tax filings by month. Months with Amazon email announcements are indicated with vertical lines.

Figure 3. Distribution of consumer use tax filings before and after Amazon emails



Figures plot the frequency of consumer use tax filings, by size of the tax payment, over the three years before (Panel I) and after (Panel II) Amazon email blasts. A Wilcoxon rank-sum test rejects the hypothesis that pre-Amazon and post-Amazon distributions of tax payments are equivalent ($z = 134.97$).

Figure 4. Statewide trends in business sales and use tax filings, seasonally adjusted



Notes: Panels show statewide summary measures of business tax filings by month, adjusted for calendar month fixed effects. Nominal values for each outcome were regressed against indicators for month of the year. The figures plot residuals. Months with Amazon email announcements are indicated with vertical lines.

Table 1. Amazon email notices and monthly business filing behavior

	(1)	(2)	(3)	(4)
	Any filing this month (1,0)	Log total tax paid	Log repurposed item value	Log out-of- state item value
April 2012 notice	-0.00254*** (0.0004) [47.8%]	0.0593*** (0.0060) [38.3%]	0.0411*** (0.0044) [14.0%]	0.0203*** (0.0050) [51.5%]
January 2013 notice	-0.00736*** (0.0003) [5.9%]	-0.0293*** (0.0060) [75.0%]	0.00976** (0.0042) [71.3%]	-0.0207*** (0.0048) [51.5%]
January 2014 notice	-0.00818*** (0.0003) [5.1%]	-0.0244*** (0.0061) [80.1%]	-0.0045 (0.0044) [84.6%]	0.00681 (0.0052) [84.6%]
Observations	44,788,157	9,851,981	9,851,981	9,851,981
R-sq	0.53	0.76	0.74	0.75
Summary Statistics (in levels)				
Mean	0.236	3,507.99	410.77	602.51
S.D.	(0.425)	(5,445.95)	(7,254.97)	(8,050.69)

Notes: The table lists Equation (1) results for business sales and use tax filing outcomes, and includes data from July 2003 through March 2015. The notice variables are indicators for the month that Amazon distributed the emails plus the following two months. Each regression includes entity-by-SITUS-by-calendar month fixed effects, a quadratic time trend, and the following time-varying county-level control variables: population, income per capita, farming income per capita, labor force participation, and median age. Standard errors, in parentheses, allow for correlated errors within an individual entity's filings. The percent of placebo time effects that are greater than a given point estimate, in absolute value, is listed in brackets under its standard error.

*** significant at 1%; ** 5%; * 10%