



Tulane Economics Working Paper Series

## Do eBay Sellers Comply with State Sales Taxes?

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Working Paper 1106  
April 2011

### Abstract

The rapid growth in online commerce has harmed state sales tax bases. However, the extent of this base reduction is difficult to estimate. In this paper we collect our own data from eBay.com on a “representative” commodity classification and a “typical” day. Our data consist of nearly twenty-one thousand eBay listings generated by over seven thousand individual sellers with over ninety-three hundred buyers. We find that overall eBay seller compliance is quite low but that compliance by established sellers is significantly higher. Given that established sellers account for the bulk of online commerce, the estimated revenue loss from eBay seller noncompliance may be relatively small.

Keywords: online commerce, sales taxes, nexus, tax evasion  
JEL: H26, H71

# *DO EBAY SELLERS COMPLY WITH STATE SALES TAXES?*

*James Alm and Mikhail I. Melnik*

## SUMMARY

Online commerce has increased enormously in recent years, much more rapidly than the overall growth of retail sales even though online retail sales remain a relatively small percentage (3.6 percent) of total retail sales. This development has harmed state (and local) sales tax bases, due to the current legal interpretation that does not require out-of-state vendors to collect state sales taxes on behalf of any state where they have no legal presence (or “nexus”). There is some evidence this erosion has contributed to revenue declines for these governments, but this evidence remains somewhat speculative. It is quite difficult to know the actual impact of revenues due to difficulties in measuring the compliance of vendors with state sales and excise taxes.

Several methods have been used to generate some notion of these revenue losses. Some studies employ a somewhat indirect procedure, using estimates of consumer responses to sales tax rates to estimate the likely impact of the revenue loss with the application of online sales taxes, or examining tax-induced cross-border shopping. These studies imply, but do not directly estimate, that sales tax revenue losses are likely to be important. Several other studies actually estimate the revenue loss from online sales, typically by estimating the time trend reduction in state government sales tax bases that occurred independently of e-commerce, and then also estimating the additional revenue loss from e-commerce. These studies conclude that sales tax revenues fell due to online commerce. Even so, this approach is still largely an indirect one. In yet another approach, aggregate online retail spending data are now being gathered and analyzed by a number of consulting firms. However, the lack of information at the individual consumer level, especially about the specific location of the consumer, makes an investigation into the impact of the tax rates on retail e-commerce quite difficult.

In this paper we use a different, and more direct, approach. We collect our own data from eBay.com on a “representative” commodity classification and a “typical” day. eBay is by far the largest online consumer-to-consumer and business-to-consumer marketplace in the United States. Specifically, we collect data on one category of eBay listings, “Consumer Electronics”, sold on eBay over a 24-hour period in summer 2007. These data consist of more than twenty-one thousand eBay listings generated by over seven thousand individual sellers with over ninety-three hundred buyers, all taking place in a 24-hour period of time in just a fraction of one category of the U.S. eBay website. We use these data to answer several questions. First, how many sellers actually collect state sales taxes? Second, what is the revenue loss from the seller noncompliance? Third, is seller noncompliance related to specific factors, like seller characteristics or the level of state sales tax rates?

We find that overall eBay seller compliance is quite low, but that compliance by established sellers is significantly higher. Given that established sellers account for the bulk of online commerce, the estimated revenue loss from seller noncompliance is relatively small.

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## I. INTRODUCTION

Online commerce has increased enormously in recent years. According to estimates from the United States Census Bureau (2009), online retail sales grew between 2002 and 2007 at an average annual rate of 23.1 percent, almost five times the overall growth of retail sales during the same period, even though online retail sales remain a relatively small percentage (3.6 percent) of total retail sales in 2009. This development has harmed state (and local) sales tax bases, due to the current legal interpretation that does not require out-of-state vendors to collect state sales taxes on behalf of any state where they have no legal presence (or “nexus”).<sup>1</sup> There is some evidence this erosion has contributed to revenue declines for these governments, but this evidence remains somewhat speculative. It is quite difficult to know the actual impact of revenues due to difficulties in measuring the compliance – or noncompliance – of vendors with state sales and excise taxes.<sup>2</sup> In this paper we use a direct approach to estimate the revenue loss, by collecting our own data from eBay.com on a “representative” commodity classification and a “typical” day. We find that overall eBay seller compliance is quite low but that compliance by established (and larger) sellers is significantly higher, so that the estimated revenue loss from seller noncompliance may be small.

Several methods have been used to generate some notion of the revenue losses from e-commerce. One approach employs a somewhat indirect procedure, using estimates of consumer

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<sup>1</sup> See *Quill vs. North Dakota*, 112 US 298 (1992). Such internet transactions are in principle still subject to a state use tax, imposed at the same rate as the state sales tax. However, the extent of noncompliance with state use taxes is believed to be quite large.

<sup>2</sup> The threat emerging from e-commerce has sparked a number of debates among public policy makers. For example, the National Governors Association has advocated a more uniform sales tax structure in the U.S., one that would be more easily adaptable by out-of-state vendors. While the uncertainty about the implementation of such reform still exists, most states continue to experience ongoing budgetary problems, and are forced to look for immediate solutions. Some states have begun to consider increases in sales tax rates as a response to the shrinking tax revenue problem. However, it is feared that such a response in light of the current tax treatment of e-commerce may cause a further deterioration in the sales tax base. See Luna and Fox (2000), Cornia, Sjoquist, and Waters (2005), and Fox, Luna, and Murray (2008) for useful discussions of many of these debates.

responses to sales tax rates to estimate the likely impact of the revenue loss with the application of online sales taxes. Goolsbee (2000) uses individual survey data from Forrester Research to estimate the impact of sales tax rates on the likelihood that individual consumers purchase online. He finds that sales tax rates have a positive and statistically significant impact on the amount of online consumer spending, and concludes that taxing internet sales could reduce the number of online buyers by 24 percent. Alm and Melnik (2005) use a more recent, larger, and more representative data set from a special supplement to the Current Population Survey (CPS), and they also find that a higher sales tax rate increases the probability that consumers purchase online. However, their estimate of this impact is much smaller (roughly one-fourth) than the Goolsbee (2000) estimate, so that they conclude that taxing internet sales would reduce online purchases by only 6 percent. Scanlan (2007) also finds in some specifications a small and insignificant relationship between sales tax rates and the likelihood of online purchases; however, he also estimates a larger and significant response when he uses a splined tax-rate function, at least for consumers living in high sales tax rate areas. In perhaps the most comprehensive empirical study, Ballard and Lee (2007) also use the special supplement to the CPS to obtain estimates of consumer responses to sales tax rates. Like Goolsbee (2000), Alm and Melnik (2005), and Scanlan (2007), Ballard and Lee (2007) conclude that consumers use the internet to avoid paying sales taxes, with responses roughly similar to those of Alm and Melnik (2005). By implication, all three studies imply that sales tax revenue losses are likely to be important, although none of the studies actually estimates these losses.

Another indirect approach examines tax-induced cross-border shopping. Here consumers respond to differentials in sales tax rates, lottery payoffs, and/or exchange rates between neighboring jurisdictions, by crossing the relevant border and purchasing items in the lower-cost

jurisdiction (just as they do in purchasing online rather than from traditional vendors). FitzGerald (1992) estimates such responses for Ireland and the United Kingdom, as do Gordon and Neilson (1997) for Denmark, Ferris (2000) for Canada and the U.S., and Garrett and Marsh (2002) for Kansas and neighboring states. All of these studies conclude that taxes (and other sources of price differentials) have a significant impact on consumer choices. By implication, these studies also suggest that revenue losses from e-commerce are likely to be significant.

Several other studies actually estimate the revenue loss from online sales. In the best example of this methodology, Bruce and Fox (2000, 2001, 2004) estimate the time trend reduction in state government sales tax bases that occurred independently of e-commerce, and they also estimate the additional revenue loss from e-commerce.<sup>3</sup> They conclude that sales tax revenues fell in 2003 by over \$13 billion from the trend line of revenues, or nearly 2 percent of actual revenues in that year; they also conclude that e-commerce caused an additional reduction in sales tax revenues of nearly \$11 billion (1.5 percent of revenues) in 2003. More recently, Bruce, Fox, and Luna (2009) supplement this approach with detailed state-by-state survey estimates of the degree to which e-commerce transactions are taxable in each state, and estimate that annual national state and local sales tax losses on e-commerce will grow to roughly \$11-13 billion by 2012. These estimates may be the best current estimates of the likely revenue loss, but they have not gone unchallenged.<sup>4</sup> Even so, this approach is still largely an indirect one.

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<sup>3</sup> More precisely, Bruce and Fox (2000, 2001, 2004) estimate the time trend reduction in revenues by: calculating the state sales tax base; estimating the relationship between the calculated base and personal income; forecasting personal income growth; forecasting the sales tax base using the personal income forecast; using the resulting forecast sales tax base to calculate a trend-line of sales taxes; and finally comparing actual sales tax revenues to forecast revenues to generate the trend line revenue losses. They estimate the revenue loss from e-commerce by using Forester Research estimates of the decline in sales tax bases due to e-commerce and by then applying sales tax rates to the resulting tax base declines.

<sup>4</sup> See, for example, various studies by the Direct Marketing Association (DMA), available at <http://www.the-dma.org/index.php>. In its words, the DMA is "...the leading global trade association of business and nonprofit organizations using and supporting multichannel direct marketing tools and techniques". The DMA studies by Johnson (2003, 2008) conclude that the revenue losses are likely to be significantly smaller than the estimates of Bruce and Fox (2000, 2001, 2004) and Bruce, Fox, and Luna (2009).

In yet another approach, aggregate online retail spending data are now being gathered and analyzed by a number of different consulting firms.<sup>5</sup> However, the lack of information at the individual consumer level, especially about the specific location of the consumer, makes an investigation into the impact of the tax rates on retail e-commerce quite difficult.<sup>6</sup>

In this paper we use a different, and more direct, approach. We collect our own data from eBay.com on a “representative” commodity classification and a “typical” day. eBay is by far the largest online consumer-to-consumer and business-to-consumer marketplace in the United States. Specifically, we collect data on one category of eBay listings, “Consumer Electronics”, sold on eBay over a 24-hour period in summer 2007. These data consist of more than twenty-one thousand eBay listings generated by over seven thousand individual sellers with over ninety-three hundred buyers, all taking place in a 24-hour period of time in just a fraction of one category of the U.S. eBay website. Our data have some limitations, as we discuss in detail later. Even so, to our knowledge this is one of the largest datasets ever collected from eBay for academic research.

We use these data to answer several questions. First, how many sellers actually collect – or do not collect – state sales taxes? Second, what is the revenue loss from the seller noncompliance (where the seller appears to have a sales tax collection obligation)? Third, is seller noncompliance related to specific factors, like seller characteristics or the level of state sales tax rates? We find that overall eBay seller compliance is quite low, but that compliance by

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<sup>5</sup> For example, see estimates provided by Forrester Research (<http://www.forrester.com>), GartnerG2 (<http://www.gartnerg2.com>), and Jupiter Media Matrix (<http://www.jupiterresearch.com>). Also, see the eMarketer website (<http://www.emarketer.com>) and the ePayments website (<http://www.epayments.com>).

<sup>6</sup> Also, see Fox and Murray (1997) and Goolsbee and Zittrain (1999) for discussions of various issues about the taxation of electronic commerce.

established sellers is significantly higher. Given that established sellers account for the bulk of online commerce, the estimated revenue loss from seller noncompliance is relatively small.<sup>7</sup>

The next section presents our approach and gives some summary statistics on our dataset. Our main results are discussed in the section III, and our conclusions are in the final section.

## II. APPROACH AND DATA

For several years now eBay has been the leading online consumer-to-consumer and business-to-consumer e-commerce community. In the first quarter of 2009 (January – March), the volume of completed transactions excluding autos on the eBay marketplace exceeded \$10.7 billion, and the number of active users surpassed 88.3 million.<sup>8</sup> With such a volume of trade, eBay is easily the largest single online marketplace in the United States, even though online retail sales remain a relatively small percentage (3.6 percent) of total retail sales in 2009. When one focuses on the third quarter of 2007 (or our period of observation), total e-commerce sales were estimated by a U.S. Department of Commerce survey of some 12,500 retailers at \$31.7 billion, about 3.5 percent of the total retail sales for the quarter, and eBay transactions in the third quarter of 2007 constituted more than 33 percent of the survey’s online retail sales.<sup>9 10</sup>

<sup>7</sup> As discussed in more detail later, it is important to note that our work focuses on *seller* noncompliance. Our data do not provide any information on *buyer* compliance with any use tax that might exist in the jurisdiction. As a result, we are unable to compute state revenue losses due to cross-border shopping.

<sup>8</sup> See eBay’s *First Quarter 2009 Financial Results*, available online at [http://investor.ebay.com/financial\\_releases.cfm](http://investor.ebay.com/financial_releases.cfm).

<sup>9</sup> See the *Quarterly E-commerce Retail Sales*, 3<sup>rd</sup> Quarter of 2007, published by the U.S. Department of the Census. This information is based on a survey of about 12,500 retail firms, and is available online at <http://www.census.gov/mrts/www/data/html/09Q1.html>.

<sup>10</sup> For example, the volumes of total retail sales, total e-commerce sales, and total eBay sales in recent quarters (each in millions of dollars) are:

Period	Total Retail Sales	Total E-commerce Sales	Total eBay Sales
2009, Q3	922,178	34,030	12,192
2009, Q2	906,440	32,557	11,127
2009, Q1	909,867	31,708	10,797
2008, Q4	924,493	31,482	11,470



Also, eBay is much more than an outlet for individual consumers reselling items that they no longer need. A large portion of eBay transactions is generated by businesses, small and large alike. For example, as we discuss in more detail later, our dataset includes items sold by small businesses as well as items sold by national retail chains such as BestBuy. Bailey et al. (2008) argue that this unique characteristic of eBay as a market place within the online commerce leads to large entry by small businesses, and may in turn lead to a bias toward significant underestimation of online sales in the Census Bureau estimates of online commerce because these estimates do not pick up small sellers. The findings of Bailey et al. (2008) further underscore the importance of investigating the size of commerce on eBay and subsequently seller sales tax compliance on eBay.

The large volume of transactions on eBay makes it nearly impossible to get a clear picture of total sales tax compliance in the entire online community. The role of eBay is limited mainly to that of a market facilitator. eBay is not the seller of the product, which removes any responsibility for sales and excise tax collecting or monitoring from eBay itself. Indeed, eBay does not report any tax-related statistics in any of its news releases.

However, eBay apparently understands the importance of sales tax collection for sellers. Indeed, eBay provides sellers with an option to apply state sales taxes at the time of the listing of the item, and many sellers in fact select this option.<sup>11</sup> In our dataset nearly one in five sellers collected sales taxes, and 93 percent of those sellers selected the eBay-offered option of indicating sales taxes. However, this appears to be the full extent of eBay's role in the tax

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2008, Q3	997,086	33,426	11,361
2008, Q2	1,033,794	34,237	12,301
2008, Q1	1,025,344	33,645	12,868
2007, Q4	1,025,957	33,531	13,107
2007, Q3	1,015,408	32,504	11,108

Source: United States Census Bureau (2009).

<sup>11</sup> The seller also has an option to specify the exact sales tax rate.

collection process. Business-to-consumer transactions on eBay are subject to any applicable state and local sales taxes, and sellers who have a nexus in any sales tax state are required to collect the sales tax from any instate transactions that originate on eBay, just as they would had those transactions been done in their “brick and mortar” stores.<sup>12</sup> Sales tax collection, much like any other terms of the transaction, has to be included in the listing, as the listing information acts as a binding contract between the buyer and the seller on eBay.

The setup of the eBay sales tax option is quite simple. At the time the listing is submitted by the seller, the seller can select to apply state sales taxes to the winning bid. If this option is selected by the seller, then the seller must select the state for which the sales tax will be collected, and a message stating the sales tax rate and applicable state will be automatically included by eBay in the payment/shipping section of the listing. Alternatively, a seller who chooses to collect sales taxes may simply include this information as a message in the item description text of the auction. Most sellers in our dataset do not collect sales taxes. However, nearly all the sellers in our dataset who do collect sales taxes (more than 93 percent) do so using the eBay-provided option. For sellers, the eBay-provided option may also serve as a better mechanism because the sales tax information will be included in the eBay payment notification email sent to the buyer, thereby making it part of a binding contract between the buyer and the seller, as based on eBay’s rules.

The lack of eBay-provided information and the sheer number of listings suggest a limited survey of the transactions on eBay as an appropriate method of investigation into the cross-border commerce on eBay and the sales tax collection by eBay sellers. This is our approach here. We use data that we collected from eBay, and we limit our investigation to items listed in most

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<sup>12</sup> For sellers who listed several states as their nexus, we define instate transactions as the ones where the buyer is located in any one of the seller’s nexus states.

of the subcategories of the “Consumer Electronics” category that closed on Friday, 27 July 2007.

We focus on the Consumer Electronics category in large part because the products sold in this category do not appear to be tax exempt or subject to any excise taxes in any of the sales tax states (Bruce, Fox, and Luna, 2009). Furthermore, there were no sales tax holidays on 27 July 2007, which might cause state differences in the tax treatment of these products.

Consumer Electronics is one of 35 major categories on eBay. Table 1 provides a summary of these categories. These numbers indicate clearly the relative importance of these categories in terms of the number of listings.

At the time of our data collection in 2007, the category of “Consumer Electronics” was comprised of seventeen subcategories, since then the category has undergone small changes. In 2008 the category was renamed to simply “Electronics”, and the number of categories was expanded to 20, as three new categories were introduced (Marine Audio, Pro Audio and Stage Effects, and Other). Table 2 lists the subcategories during the period of our data collection (27 July 2007), along with the number of listings for two days in January 2008.<sup>13</sup> These comparative dates are presented in order to demonstrate the representativeness of the date of our original data collection.

Interestingly, there was significant growth in the number of listings in the Consumer Electronics subcategories between 27 June 2007 and 6-7 January 2008, as seen in Table 2, a

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<sup>13</sup> A more recent summary of the number of daily listing closings in the Electronics category by day for the period of 1-7 May 2009 also indicates the representativeness of our data:

Date	Listings Completed
May 1	78076
May 2	66435
May 3	78212
May 4	80572
May 5	77912
May 6	76037
May 7	74778

result that is consistent with the overall growth of eBay in that period. However, the relative importance of these subcategories within the category remained relatively stable.<sup>14</sup> Also, the growth in listings slowed in the 2008-09 period. Both results are in line with the overall performance of the eBay market place, which saw reductions in the value of goods traded throughout the first three quarters of 2008 (eBay Quarterly Financial Releases for 2008).

Table 3 presents the detailed summary by subcategory of the observations collected on 27 July 2007. We were able to collect data on eleven of the seventeen subcategories of Consumer Electronics on eBay mainly because the data were only available for a period of two weeks (see the discussion below). The data consist of more than twenty-one thousand eBay listings generated by over seven thousand individual sellers with over ninety-three hundred buyers, all taking place in a 24-hour period of time in just a fraction of one category of the U.S. eBay website.<sup>15</sup> Note that eBay generally removes all auctions from the search page that is visible to the public two weeks after their completion, which effectively constrains any data identification process. Although these listings generally remain accessible to the public up to ninety days after their completion, their lack of appearance on the search page makes locating them impossible without their eBay-assigned listing identification numbers.

Table 4 presents basic summary statistics. We use the same terminology as eBay when we use “Listing”, which eBay defines as a contract between the seller and eBay where eBay agrees to display the seller’s item (s) for sale. Each listing on eBay is assigned its own unique identification number. However, a listing can result in multiple transactions. Consequently, a “Listing” and an “Observation” may not be equivalent. In our analysis we count the number of transactions by the number of unique buyers. If a listing only has one item for sale, then it can

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<sup>14</sup> The number of all listings on eBay increased by 16 percent between the second quarter of 2007 and the first quarter of 2008; see eBay First Quarter of 2008 Financial Release ([http://investor.ebay.com/financial\\_releases.cfm](http://investor.ebay.com/financial_releases.cfm)).

<sup>15</sup> We are grateful to Robert Buschman and Andrew Chupp for their work in collecting these data.

only result in one transaction; however, for a multi-item listing, it is possible to have multiple winning buyers.<sup>16</sup> For example, if a best- offer listing results in one buyer purchasing one unit at \$10 and another buyer buying two units at \$9 each, we count these as two separate transactions, one valued at \$10 and another at \$18, even though the listing itself is counted only once by eBay and by us. This enables us to identify clearly the size of transactions between buyers and sellers and hence to measure the size of in-state and out-of-state commerce generated on eBay in the categories represented in our dataset. Note that, if a listing receives no bids, it is still included as an observation because it contains information about the seller’s choice of tax policy.

Table 4 also presents information on seller and buyer composition. When collecting the data, we specifically limit the search to only those listings that originate in the U.S.; eBay provides this option on its search page. Even so, a number of foreign sellers are still included in our data because these sellers stated in the auction description that the item offered for sale was located in the U.S. In total there are 33 foreign sellers in the dataset, and for 32 sellers we are unable to establish their location. For buyers the missing locational data are more common, and we could not identify the location of 494 buyers.

Table 5 presents additional descriptive statistics. “Price” represents the price at the time of the closing of the auction. We report the price for the entire dataset and also separately for the successfully completed segment only. “Sold” is a binary variable that assumes the value of one if the item sold and zero otherwise. “Observations Per Seller” refers to the number of observations generated by the seller. On average, each seller generates 36 observations, with one seller generating 306 observations. Such sellers are likely to be business entities, and seem more likely

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<sup>16</sup> eBay offers various selling mechanisms to its sellers: standard English auction format, which may include multiple items but has a single buyer; buy-it-now format, which may include multiple items and may have multiple buyers all paying the same price; and best offer option, which may include multiple items and may have multiple buyers with prices that may differ across buyers.

to collect sales taxes. We also report in Table 5 “Seller Rating”, a feedback measure from the past experience of the seller on eBay. This measure is based on the number of unique transactions with different eBay users, and can act as a proxy for the business status of the seller. Sellers with high feedback have had substantial transaction experience, and so are more likely to be established businesses; for example, the BestBuy outlet had a rating of nearly 31,000 at the time of our data collection. The average of “Seller Rating” is first computed with respect to the number of observations and then with respect to the number of sellers; the second value represents the average seller rating, while the first represents the average seller rating per listing. The sharp difference in the values suggests that more established sellers sell more items on eBay. More precisely, we define “Established Sellers” as eBay sellers with 1000 rating points and higher.

“Taxation” is a binary variable that equals one if the seller collects sales taxes and zero otherwise. The data show that sales taxes are listed in 43 percent of all of our listings. On the surface, this represents a very high compliance level. However, when we examine individual seller compliance, we find that only about 18 percent of all sellers choose to list sales taxes. Together with the observation from the “Seller Rating”, this suggests that established sellers are more likely to collect sales taxes and also to list more items.

Since not all sellers select the eBay option of identifying sales taxation, we had to monitor individual auction descriptions for those auctions that missed the eBay option. In order not to miss the sellers who do not select the eBay option but who still list the sales taxes in the description of the item section of the auction, we visit all individual observations for all sellers with 100+ rating points and for all sellers with more than one observation, and their descriptions are examined for any relevant sales tax information.

### III. RESULTS

Recall that we are interested in three main questions: how many sellers collect – or do not collect – state sales taxes, what is the revenue loss from noncompliance (at least in those cases where the seller appears to have a sales tax collection obligation), and is noncompliance related to specific factors, especially the characteristics of the sellers? Consider each question.

*First*, how many sellers collect state sales taxes? Although the number of observations in individual states is sometimes small, our data are nonetheless suggestive. As shown by summary statistics in Table 5, sales taxes are listed in nearly half (or roughly 43 percent) of all of our listings. However, this number overstates seller compliance among individual sellers. Indeed, only 18 percent of all sellers in Table 5 list sales taxes. However, it must be noted that the seller compliance increases sharply with the degree of establishment on eBay, as measured by the seller’s rating; see Figure 1. Recall that the eBay rating is at most equal to or less than the number of unique individuals with whom the seller had any completed eBay transactions. Recall also that we define an “Established Seller” on eBay as a seller with rating points of at least 1000; that is, these are sellers who had completed transactions with at least 1000 unique eBay users. This approach enables us to remove “Casual Sellers” (and so smaller sellers) from our data, and to focus only on those sellers who produce a significant volume of transactions. Such sellers are likely to represent medium to large businesses. In separating the casual from the established sellers, we attempt to differentiate between consumer-to-consumer transactions and business-to-consumer transactions. Table 6 provides the state-by-state breakdown of these numbers.

The data in Table 6 show that the average sales tax compliance among all sellers in the electronics category on eBay is quite low, at 18.85 percent. However, when restricted to

“Established Sellers” only (or eBay sellers with 1000 rating points and above), the compliance rate increases to 43.65 percent, and the average compliance rate for listings is 43.72 percent.<sup>17</sup>

However, although “Established Sellers” have much higher compliance, the variability in the sales tax compliance rate across states is somewhat high. For the sales tax states, the state average sales tax compliance among established sellers is about one-third, with a large standard deviation (15.25). The lowest compliance is observed among Rhode Island sellers, where none of the six sellers in our dataset lists taxes in their listings. South Dakota, Vermont, and Wyoming also exhibit a zero compliance rate. However, the number of established sellers from these states in our dataset is too low to draw any firm conclusions (e.g., 1 each from South Dakota and Vermont and 2 from Wyoming). The highest compliance is in Nebraska, where five out of the seven established sellers in our dataset list the sales tax. The largest state (in terms of the number of sellers) is California, with a nearly 60 percent compliance rate.

*Second*, what is the revenue loss from noncompliance (where the seller appears to have a sales tax collection obligation)? We compute the revenue losses by state, and report these losses first for the entire population of sellers in our dataset (Table 7) and then for the established sellers only (Table 8). Note that for the purpose of revenue computations we only use listings that resulted in a sale. Here we compute the uncollected sales taxes by state, performed for transactions with in-state buyers only, given that the current legal requirement for collection of taxes requires the presence of nexus. On 27 June 2007, in-state transactions constituted only 8 percent of the gross merchandise sales, or \$60,248.86 out of \$755,904. However, sellers listed applicable sales taxes for only \$24,464.68 of these subject to sales taxes on in-state transactions, leading to possible under-collection of \$2,154.97. These data suggest that for the overall seller population there is a 60 percent under-collection of sales taxes in taxable in-state transactions.

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<sup>17</sup> Sales taxes were listed in 38.7 percent of sold items and in 47.2 percent of listings that resulted in no sale.



When focusing on “Established Sellers” only, we find that the under-collection of sales taxes declines to 39 percent.<sup>18</sup>

Assuming that the behavior of eBay sellers in the Consumer Electronics category on 27 June 2007 is representative of the typical behavior of sellers on eBay, we can extend the observations from our dataset to the eBay website at large. Table 9 reports our basic computations for each state on the basis of the current quarterly gross merchandise sales of \$10.7 billion. Using the share of the state’s originated sales in our data and the current gross merchandise sales, we compute the expected sales by state. Then, with the help of the in-state sales and sales tax compliance rates observed in our dataset, we compute the expected state’s tax liability and the under-collection of sales taxes. It should be emphasized that the computations in Table 9 are merely a rough general guideline as they rely on a static analysis and they assume no change in the buyer behavior in the event of a change in the tax collection by the seller. It should also be remembered that most of our eBay transactions represent business-to-consumer sales, which are meant to be legally taxable.

Perhaps surprisingly, the lack of sales tax compliance by sellers appears to cause only a relatively modest impact on state revenues. The total under-collection is limited to \$30.5 million per quarter, with California accounting for nearly half of all under-collecting (or \$14.1 million). These small losses are largely due to the size of the cross-border shopping that takes place on eBay, resulting in a very limited volume of in-state transactions.<sup>19</sup> However, the buyer use tax

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<sup>18</sup> It is of course possible that some buyers pay the state’s use tax on their purchases. However, compliance with use tax is widely believed to be minimal (Due and Mikesell, 1995). See also Note 20.

<sup>19</sup> These losses may be further reduced by state tax holidays, sales tax exemptions of some of the products sold on eBay, exemptions offered by state governments to not for profit sellers, and the like.

liability remains high. Unfortunately for state revenue agencies, use tax compliance is generally low.<sup>20</sup>

When focusing on established sellers we find the revenue losses to be relatively small, given the size of eBay based commerce. Only \$6.9 million in state sales taxes appears to be undercollected quarterly, with \$11.2 million in state sales taxes being collected by these sellers on eBay.

*Third*, what factors affect noncompliance? We use several methods to determine whether noncompliance is related to specific factors. One method examines simple measures of cross-border shopping between the main states in which such border activities are especially important. These fifteen states include: Arizona, California, Florida, Georgia, Illinois, Michigan, Minnesota, New Jersey, New York, Ohio, Pennsylvania, Tennessee, Texas, Virginia and Washington. See Table 10. All of the states listed in Table 10 employ sales taxes. Cross-border shopping is not subject to sales tax collection, but is still subject to use taxes. Our data have no information on use tax compliance by eBay buyers, and so are mainly suggestive. Out of these 15 states, only California is the largest market for its own sellers, and this is mainly due to the large number of buyers and sellers from California. Table 10 underscores both the importance of cross-border shopping on eBay and the shift in the tax compliance from the seller to the buyer.

Another method uses probit estimations to determine how the tax compliance of sellers is affected by their degree of establishment on eBay. Although we do not know which sellers have legal business establishments and which do not, we assume that the volume of seller activity on eBay is directly correlated with their legal establishment as a business. We are mainly interested

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<sup>20</sup> States recognize the importance of cross-border shopping, and several states list use taxes in income tax return forms. According to Due and Mikesell (1995), states that include use taxes in their resident individual income tax filing include California, Connecticut, Idaho, Indiana, Kentucky, New Jersey, Utah, Vermont, Virginia, and Wisconsin.

in the impact on the dependent variable *Taxation* of the level of the seller's eBay activity, as measured by two variables: *Seller Rating*, a measure of the overall transaction based feedback on eBay; and *Seller Observations*, which is a count of observations by the same seller in our dataset.<sup>21</sup> We also include several other variables (*Seller Rating Percent*, *Price*, *Shipping Charges*) in some specifications. The definitions of these variables follow their earlier usage. Estimation results are reported in Table 11.

Specification I includes only the seller characteristics. Here we treat each seller as an observation. Our dataset is thus reduced to 6465 observations, the number of unique U.S.-based sellers from states that impose sales taxes only. The results of this estimation show that the *Seller Rating*, a measure of the seller's past activity on eBay, has a positive and statistically significant effect on the decision to collect sales taxes. Although the coefficient's absolute magnitude is small (0.0000142), its actual impact is quite large, given the difference between the rating levels of the average seller in our dataset (average *Seller Rating* = 30043) and the new seller. The seller with the average rating in our dataset is 43 percent more likely to collect sales taxes than a seller with a low level of past activity on eBay (who would have a *Seller Rating* level near zero). This observation suggests that established sellers are significantly more likely to comply with the sales tax regulations. The coefficient on *Seller Observations* offers further support for this observation.

Interestingly, *Seller Rating Percent* also has a statistically significant and positive coefficient. This variable is a measure of the positive rating of the seller as a percentage of the overall rating, and it may be interpreted as a measure of honesty of the seller. Our results show

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<sup>21</sup> Recall that eBay seller rating is based on the number of past transactions on eBay with unique buyers. After each transaction, the buyer has the right to evaluate the seller by assigning the seller a rating point: positive, negative or neutral. The difference between the positive and negative responses constitutes the eBay rating. No matter how many transactions the buyer has had with the seller, each buyer's response counts only once as the rating is uniquely defined with respect to the buyer.

that the more honest the seller is in his or her behavior on eBay, the more likely he or she is to comply with the tax regulations. This observation might suggest that tax compliance is at least in part honesty based.

Specification II is performed on our entire dataset (restricted to listing by U.S. sellers from states with sales taxes). This specification is performed using robust standard errors terminology. The focus on the individual listings as observations enables us to include listing specific variables, such as the *Price* and the *Shipping Charges* as controls. The coefficients on the seller establishment measures in Specification II remain positive and statistically significant, supporting the results of Specification I. *Price* appears to be statistically insignificant, which we believe is largely due to the limited if any tax incidence on the seller due to the significant out of the state(s) of nexus market. *Shipping Charges*, a variable determined by the seller, has a statistically significant impact at the 95 percent confidence level, which suggests that sellers who collect sales taxes tend to charge marginally higher shipping charges.<sup>22</sup> Since shipping charges tend to be exempt from sales taxation, this result may suggest a strategic choice on the part of sellers who comply with state sales taxes. These sellers may attempt to shift the cost of their items to the buyer (e. g., from the taxed price to the tax exempt shipping cost) in order to remain competitive with the non-complying sellers. Note that not all listings stated shipping charges, which accounts for the reduced number of observations used in Specification II.<sup>23</sup>

We also estimated specifications to determine whether compliance is affected by, among other things, the level of taxation. We typically find that taxes do not have a statistically significant impact on the probability that the buyer and the seller are from the same state.

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<sup>22</sup> In most jurisdictions the shipping charges are exempt from sales taxation. By charging higher shipping charges, the seller may shift the cost of the item from the taxable price to the tax exempt shipping charge, in order to reduce the sales tax impact on the buyer.

<sup>23</sup> For a further discussion of the role of shipping charges in eBay auctions, see Melnik and Richardson (2010).

However, we are unable to control for item-specific characteristics in these estimations, so these results seem of little value and are not reported.

#### IV. CONCLUSIONS

Using one of the largest transaction datasets collected from the most famous and active online marketplace (eBay), we have attempted to investigate seller compliance with sales taxes. We find that the seller sales tax compliance rate on eBay in the Consumer Electronics category is alarmingly low. When we examine only established sellers, the compliance rate increases significantly, but still to only about one-half of all sellers. Notably, however, since it is those established sellers that account for a disproportionately large amount of online transactions, the low overall seller noncompliance rate causes relatively low losses in sales tax collection. Our analysis of in-state transactions suggests that roughly \$6.9 million in sales tax revenues is lost quarterly due to the lack of compliance by the established sellers on eBay. This number is not only low in its magnitude compared to the volume of transactions on eBay, but it is also considerably lower than the \$11.2 million of state sales taxes that are collected quarterly by the established sellers.

A larger threat to the sales tax collection under the current law likely comes from the significant cross-border activity that exists in online market places such as eBay. Nearly 92 percent of transaction activity in our dataset appears to be cross-state commerce; that is, only 8 percent of eBay transactions were instate sales. Coupled with a low level of use tax compliance, this likely presents a much larger threat to state tax revenues than the seller lack of compliance. Indeed, online commerce websites such as eBay provide a convenient and easily accessible venue for cross-border shopping. Consequently, we believe that an increasingly important area of

concern is use tax compliance. Because our research is limited in its focus to the behavior of the seller, we are unable examine buying behavior. Such analysis is needed in the future in order to understand more fully buyer behavior in online commerce.

## ACKNOWLEDGEMENTS

We are grateful to the editor, George Zodrow, and to three anonymous referees for many helpful comments.

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Table 1 Major Categories of Products Listed on eBay, 27 July 2007

Category	Number of Listings	
	All Listings	U.S. Listings Only
Antiques	26,216	14,041
Art	25,163	16,729
Baby	8,383	6,797
Books	69,665	53,081
Business & Industrial	47,150	36,337
Cameras & Photo	46,877	32,754
Cell Phones & PDAs	95,146	83,891
Clothing, Shoes & Accessories	305,163	221,096
Coins & Paper Money	38,376	24,469
Collectibles	225,085	145,055
Computers & Networking	84,113	64,977
<i>Consumer Electronics</i>	<i>91,903</i>	<i>71,165</i>
Crafts	38,850	30,239
Dolls & Bears	18,493	13,228
DVDs & Movies	52,140	43,506
Entertainment Memorabilia	25,010	18,270
eBay Motors	1,121,605	1,121,411
Gift Certificates	2,756	2,605
Health & Beauty	54,836	44,340
Home & Garden	106,380	79,905
Jewelry & Watches	168,311	111,530
Music	44,358	29,827
Musical Instruments	27,551	19,764
Pottery & Glass	30,478	19,562
Real Estate	317	271
Specialty Services	1,195	1,013
Sporting Goods	82,205	60,761
Sports Memorabilia, Cards & Fan Shop	117,880	78,585
Stamps	19,660	9,193
Tickets	8,274	6,062
Toys & Hobbies	107,400	72,729
Travel	1,611	1,418
Video Games	69,871	59,654
Everything Else	29,706	22,700
Total	3,192,127	2,616,965

**Table 2**  
**Consumer Electronic Category Daily Activity, U.S. Listings Only**

Category	6 January 2007			7 January 2008			27 July 2007	
	Number of Listings	Percent of Consumer Electronics Category	Percent of Obtained Categories	Number of Listings	Percent of Consumer Electronics Category	Percent of Obtained Categories	Number of Listings	Percent of Obtained Categories
Apple iPod, MP3 Players	5750	8.08	18.57	5583	8.11	18.82	3587	16.08
A/V Accessories & Cables	9979	14.02	32.22	9776	14.19	32.95	5623	25.21
Batteries & Chargers	865	1.22	2.79	759	1.10	2.56	267	1.20
Car Electronics	5329	7.49		4279	6.21			
DVD & Home Theater	1692	2.38	5.46	1572	2.28	5.30	1756	7.87
Gadgets & Other Electronics	3713	5.22	11.99	3443	5.00	11.60	2203	9.88
GPS Devices	3165	4.45		3142	4.56			
Home Audio	2405	3.38	7.77	2279	3.31	7.68	2390	10.72
MP3 Accessories	28952	40.68		29169	42.35			
Portable Audio/Video	1222	1.72	3.95	1249	1.81	4.21	733	3.29
Radios: CB, Ham & Shortwave	1851	2.60	5.98	1845	2.68	6.22	1766	7.92
Satellite Radio	811	1.14	2.62	761	1.10	2.56	712	3.19
Satellite, Cable TV	1534	2.16	4.95	1446	2.10	4.87	1252	5.61
Telephones & Pagers	1149	1.61	3.71	959	1.39	3.23	692	3.10
Televisions	1366	1.92		1214	1.76			
Vintage Electronics	1186	1.67		1221	1.77			
Wholesale Lots	196	0.28		177	0.26			
Consumer Electronics	71165	100		68874	100			
Totals for the Relevant Categories obtained on 27 July 2007	30971	43.52		29672	43.08		20981	

**Table 3**  
**Listings by Subcategories, 27 July 2007**

Category	Observations <sup>a</sup>	Transactions (Number)	Transactions (%)	Transactions (\$)	Average Price (\$)	Standard Deviation of Price (\$)	Price Range (sold items only) (\$)
Apple iPod, MP3 Players	3905	2404	61.55	237783.45	98.931	80.904	0.01 - 1279.96
A/V Accessories & Cables	6114	2038	33.33	55134.35	27.052	58.002	0.01 - 760.00
Batteries & Chargers	271	81	29.78	1584.05	19.641	46.170	0.01 - 407.77
DVD & Home Theater	1797	898	49.98	119533.26	133.098	177.154	0.99 - 999.00
Gadgets & Other Electronics	2219	975	43.93	54970.28	56.394	85.894	0.01 - 910.00
Home Audio	2642	1319	49.93	153729.61	116.528	155.025	0.01 - 999.00
Portable Audio/Video	749	396	52.91	18399.28	46.431	55.874	0.01 - 480.00
Radios: CB, Ham, Shortwave	1852	927	50.05	62761.94	67.707	108.241	0.01 - 950.00
Satellite Radio	738	340	46.01	9803.96	28.876	32.066	0.01 - 233.89
Satellite, Cable TV	1248	501	40.12	27474.62	54.860	96.551	0.01 - 986.99
Telephones & Pagers	916	441	48.15	14730.05	33.396	53.549	0.01 - 849.00
Total	22451	10319	45.96	755904.86	---	---	---

<sup>a</sup> "Observation" is defined as a transaction or a listing that results in no sales. Thus, every single item listing produces one data observation, while a multi-item listing with (say) three unique buyers will produce three observations.

Table 4  
Descriptive Statistics I

	Observations <sup>a</sup>	Listings
Total	22451	20831
US Sellers only (state known)	22239	20625
US Sellers only (state unknown)	65	65
Seller Location Unknown	39	37
Canadian Sellers	70	69
Puerto Rico	6	6
Rest of the World	33	30
Sellers		
Total		6888
US Sellers (state known)		6791
US Sellers (state unknown)		33
US Sellers from states with sales taxes		6596
Sellers (Puerto Rico)		5
Sellers (outside US and Puerto Rico)		28
Sellers (location unknown)		31
Buyers		
Total		9261
US Buyers (state of residence known)		7955
US Buyers (state of residence unknown)		424
Canadian Buyers		408
Puerto Rico		51
Rest of the World		353
Buyer (location kept private or unknown)		70

<sup>a</sup> "Observation" is defined as a transaction or a listing that results in no sales. Thus, every single item listing produces one data observation, while a multi-item listing with (say) three unique buyers will produce three observations.

Table 5  
Descriptive Statistics II

	Average	Standard Deviation	Minimum	Maximum
Price(all listings)	64.713	111.575	0.01	1279.96
Price (sold items only)	73.026	108.277	0.01	1279.96
Sold	0.460		0	1
Observations per seller <sup>a</sup>	36.775	60.183	1	306
Seller rating (average based on number of listings)	29784.21	93327.91	-1	590696
Seller rating (average based on number of sellers)	3489.09	3155.296	-1	590696
Taxation (average based on number of listings)	0.431		0	1
Taxation (average based on number of sellers)	0.177		0	1
Taxation (average based on number of listings, states requiring sales taxes only)	0.446		0	1
Taxation (averaged base on number of sellers, states requiring sales taxes only)	0.183		0	1

<sup>a</sup> "Observation" is defined as a transaction or a listing that results in no sales. Thus, every single item listing produces one data observation, while a multi-item listing with (say) three unique buyers will produce three observations.

**Table 6**  
**Buyer/Seller Activity by State**

State	Buyers	All Sellers			Established Sellers			Listings			Observations
		Total	Listed Tax	Listed Tax/Total (%)	Total	Listed Tax	Listed Tax/Total (%)	Total	Listed Tax	Listed Tax/Total (%)	
ALABAMA	96	57	3	5.26	15	2	13.33	79	3	3.80	95
ALASKA	16	12	N/A	N/A	3	N/A	N/A	16	N/A	N/A	16
ARIZONA	173	179	30	16.76	63	22	34.92	726	120	16.53	799
ARKANSAS	50	51	5	9.80	19	5	26.32	80	14	17.50	85
CALIFORNIA	1024	1132	353	31.18	436	260	59.63	5523	3793	68.68	5950
COLORADO	125	98	14	14.29	32	8	25.00	164	23	14.02	169
CONNECTICUT	99	71	10	14.08	23	9	39.13	102	17	16.67	107
DELAWARE	33	18	N/A	N/A	9	N/A	N/A	40	N/A	N/A	43
DISTRICT OF COLUMBIA	12	6	1	16.67	2	1	50.00	198	1	0.51	206
FLORIDA	574	544	120	22.06	165	78	47.27	1739	634	36.46	1829
GEORGIA	224	200	27	13.50	50	19	38.00	450	67	14.89	480
HAWAII	28	14	2	14.29	4	2	50.00	20	6	30.00	20
IDAHO	40	25	6	24.00	9	5	55.56	77	46	59.74	79
ILLINOIS	380	344	62	18.02	95	42	44.21	957	448	46.81	1052
INDIANA	147	152	25	16.45	42	18	42.86	375	135	36.00	412
IOWA	71	53	4	7.55	13	3	23.08	233	6	2.58	244
KANSAS	79	61	11	18.03	22	8	36.36	147	29	19.73	157
KENTUCKY	102	78	7	8.97	14	4	28.57	137	38	27.74	151
LOUISIANA	84	38	4	10.53	7	2	28.57	61	16	26.23	69
MAINE	32	33	1	3.03	6	1	16.67	45	1	2.22	47
MARYLAND	153	119	25	21.01	31	14	45.16	214	71	33.18	224
MASSACHUSETTS	153	122	14	11.48	28	8	28.57	182	42	23.08	189
MICHIGAN	267	232	33	14.22	49	19	38.78	522	144	27.59	537
MINNESOTA	134	115	26	22.61	44	21	47.73	259	118	45.56	266
MISSISSIPPI	45	27	2	7.41	5	2	40.00	35	7	20.00	35
MISSOURI	117	114	15	13.16	27	10	37.04	264	118	44.70	270
MONTANA	25	13	N/A	N/A	4	N/A	N/A	24	N/A	N/A	24
NEBRASKA	35	33	9	27.27	7	5	71.43	95	62	65.26	102
NEVADA	61	64	8	12.50	21	7	33.33	122	10	8.20	130
NEW HAMPSHIRE	36	46	N/A	N/A	12	N/A	N/A	106	N/A	N/A	108
NEW JERSEY	254	218	34	15.60	64	26	40.63	658	249	37.84	705
NEW MEXICO	47	28	3	10.71	6	2	33.33	61	9	14.75	62
NEW YORK	550	523	102	19.50	177	78	44.07	1765	862	48.84	2009
NORTH CAROLINA	229	164	22	13.41	41	15	36.59	322	61	18.94	336
NORTH DAKOTA	15	6	1	16.67	3	1	33.33	6	1	16.67	6
OHIO	299	251	41	16.33	89	33	37.08	539	169	31.35	564
OKLAHOMA	87	58	6	10.34	20	4	20.00	151	65	43.05	167
OREGON	111	108	N/A	N/A	36	N/A	N/A	287	5	1.74	313
PENNSYLVANIA	354	270	41	15.19	68	32	47.06	616	180	29.22	634
RHODE ISLAND	19	25	2	8.00	6	0	0.00	31	2	6.45	33
SOUTH CAROLINA	90	65	7	10.77	17	4	23.53	104	15	14.42	104
SOUTH DAKOTA	18	11	1	9.09	1	0	0.00	16	1	6.25	16
TENNESSEE	188	123	27	21.95	50	22	44.00	525	313	59.62	572
TEXAS	572	414	77	18.60	125	52	41.60	1435	549	38.26	1622
UTAH	81	70	16	22.86	28	11	39.29	191	77	40.31	212
VERMONT	17	10	0	0.00	1	0	0.00	15	0	0.00	15
VIRGINIA	219	127	14	11.02	27	6	22.22	285	88	30.88	299
WASHINGTON	207	152	25	16.45	45	17	37.78	391	176	45.01	420
WEST VIRGINIA	30	25	4	16.00	6	2	33.33	55	11	20.00	63
WISCONSIN	140	109	7	6.42	20	4	20.00	179	15	8.38	187
WYOMING	13	4	0	0.00	2	0	0.00	4	0	0.00	4
State Unknown	424	33	4	12.12	6	2	33.33	65	22	33.85	65
Total (Sales Tax States)	7734	6615	1247	18.85	2025	884	43.65	20155	8812	43.72	21734
Canada	408	12	2		9	1		65	4		70
Puerto Rico	51	5						6			6
Rest of the World	353	16	0		7	0		30	0		33
Location Unknown	70	31	0		9	0		37	0		39
Total	9261	6909	1253	18.14	2120	887	41.84	20831	8838	42.43	22451

<sup>a</sup> "Observation" is defined as a transaction or a listing that results in no sales. Thus, every single item listing produces one data observation, while a multi-item listing with (say) three unique buyers will produce three observations.

Table 7  
Volume of Transactions, All Sellers

State	Value of All Transactions (\$)	Value of Instate Transactions (\$)	Value of Instate Transactions Where Tax Was Listed (\$)	State Sales Tax Rate (%)	State Sales Tax Collected (\$)	State Sales Tax Uncollected by Seller (\$)
ALABAMA	2752.64	5	0	4	0	0.2
ALASKA	2190.48	0	NA	None	NA	NA
ARIZONA	18927.73	272.96	66.99	5.6	3.75	11.53
ARKANSAS	2623.58	43.95	0	6	0	2.64
CALIFORNIA	123735.77	20080.28	6313.65	7.25	457.74	998.08
COLORADO	7915.36	9.99	9.99	2.9	0.29	0
CONNECTICUT	6189.07	56.26	0	6	0	3.38
DELAWARE	1145.62	156.96	NA	None	NA	NA
DISTRICT OF COLUMBIA	814.23	0	0	5.75	0	0
FLORIDA	46670.67	4778.19	987.79	6	59.27	227.42
GEORGIA	19898.06	845.52	404.88	4	16.2	17.63
HAWAII	1430.89	843.99	8.99	4	0.36	33.4
IDAHO	1669.58	0	0	6	0	0
ILLINOIS	41214.46	1802.54	671.42	6.25	41.96	70.7
INDIANA	13106.65	341.1	170.95	6	10.26	10.21
IOWA	3458.08	0.99	0	5	0	0.05
KANSAS	11382.84	0	0	5.3	0	0
KENTUCKY	4742.41	370	0	6	0	22.2
LOUISIANA	3164.32	7.99	0	4	0	0.32
MAINE	2015.43	0	0	5	0	0
MARYLAND	14687.53	873.51	0	5	0	43.68
MASSACHUSETTS	10076.19	0	0	5	0	0
MICHIGAN	15640.67	216.18	9.98	6	0.6	12.37
MINNESOTA	15098.54	1430.99	869.99	6.5	56.55	36.47
MISSISSIPPI	1006.74	0	0	7	0	0
MISSOURI	9114.69	5	0	4.225	0	0.21
MONTANA	500.74	0	NA	None	NA	NA
NEBRASKA	3957.86	0	0	5.5	0	0
NEVADA	3550.97	119.46	30.49	6.5	1.98	5.78
NEW HAMPSHIRE	7189.65	5	NA	None	NA	NA
NEW JERSEY	25433.7	1862.48	391.99	7	27.44	102.93
NEW MEXICO	2120.42	0	0	5	0	0
NEW YORK	73604.56	4903.08	2523.67	4	100.95	95.18
NORTH CAROLINA	14514.56	435.01	299.99	4.25	12.75	5.74
NORTH DAKOTA	88.94	0	0	5	0	0
OHIO	21895.67	763.31	28.49	5.5	1.57	40.42
OKLAHOMA	5835.76	41	0	4.5	0	1.85
OREGON	9447.09	502.99	NA	None	NA	NA
PENNSYLVANIA	31199.53	1573.38	379	6	22.74	71.66
RHODE ISLAND	2066.48	40	40	7	2.8	0
SOUTH CAROLINA	5330.342	30.02	0	5	0	1.5
SOUTH DAKOTA	631.43	0	0	4	0	0
TENNESSEE	27119.86	378.84	250.95	7	17.57	8.95
TEXAS	58784.27	4311.87	1497.77	6.25	93.61	175.88
UTAH	6190.93	116.49	16.5	4.75	0.78	4.75
VERMONT	582.49	0	0	6	0	0
VIRGINIA	19612.22	616.97	387	5	19.35	11.5
WASHINGTON	30962.92	1844.51	173.01	6.5	11.25	108.65
WEST VIRGINIA	1801.07	7.56	0	6	0	0.45
WISCONSIN	10638.83	584.75	0	5	0	29.24
WYOMING	19.99	0	0	4	0	0
State Unknown	2181.51					
Taxable in All States*	9970.84	9970.84	8931.19	5.92	528.44	0
Total	755904.86	60248.96	24464.68	---	1488.21	2154.97

**Table 8**  
**Volume of Transactions, Established Sellers Only**

State	Value of All Transactions (\$)	Value of Instate Transactions (\$)	Value of Instate Transactions Where Tax Was listed (\$)	State Sales Tax Rate (%)	State Sales Tax Collected (\$)	State Sales Tax Uncollected by Seller (\$)
ALABAMA	497.5	5	0	4	0	0.2
ALASKA	169.49	0	0	NA	None	None
ARIZONA	10156.01	135.96	66.99	5.6	3.75	3.86
ARKANSAS	801.86	43.95	0	6	0	2.64
CALIFORNIA	56362.75	7873.24	5300.69	7.25	384.30	186.51
COLORADO	3990.19	9.99	9.99	2.9	0.29	0
CONNECTICUT	2856.48	12.26	0	6	0	0.74
DELAWARE	368.7	0	0	NA	None	None
DISTRICT OF COLUMBIA	404.3	0	0	5.75	0	0
FLORIDA	16952.81	923.39	267.83	6	16.07	39.33
GEORGIA	9125.67	409.87	404.88	4	16.20	0.20
HAWAII	64	8.99	8.99	4	0.36	0
IDAHO	456.89	0	0	6	0	0
ILLINOIS	12736.15	698.31	438.93	6.25	27.43	16.21
INDIANA	4743.97	148.94	89.95	6	5.40	3.54
IOWA	615.53	0	0	5	0	0
KANSAS	1423.12	0	0	6	0	0
KENTUCKY	1161	0	0	6	0	0
LOUISIANA	493.94	0	0	4	0	0
MAINE	757.55	0	0	5	0	0
MARYLAND	2049.25	0	0	5	0	0
MASSACHUSETTS	1710.27	0	0	5	0	0
MICHIGAN	2238.87	23.93	9.98	6	0.60	0.84
MINNESOTA	6632.11	869.99	869.99	6.5	56.55	0
MISSISSIPPI	80.29	0	0	7	0	0
MISSOURI	3042.41	0	0	4.225	0	0
MONTANA	48.5	0	0	NA	None	None
NEBRASKA	2129.36	0	0	5.5	0	0
NEVADA	1336.89	5.99	5.99	6.5	0.39	0
NEW HAMPSHIRE	1331	5	0	N/A	None	None
NEW JERSEY	11310.58	1487.43	391.99	7	27.44	76.68
NEW MEXICO	350.5	0	0	5	0	0
NEW YORK	45719.44	2721.48	2413.25	4	96.53	12.33
NORTH CAROLINA	7456.72	351.02	299.99	4.25	12.75	2.17
NORTH DAKOTA	88.94	0	0	5	0	0
OHIO	10013.29	656.36	28.49	5.5	1.57	34.53
OKLAHOMA	2454.05	0	0	4.5	0	0
OREGON	1658.56	502.99	0	N/A	None	None
PENNSYLVANIA	16555.16	180.99	179	6	10.74	0.12
RHODE ISLAND	844.07	0	0	7	0	0
SOUTH CAROLINA	212.46	0	0	5	0	0
SOUTH DAKOTA	10.5	0	0	4	0	0
TENNESSEE	20759.17	265.33	250.95	7	17.57	1.01
TEXAS	29355.6	1484.85	1347.41	6.25	84.21	8.59
UTAH	2966.02	16.5	16.5	4.75	0.78	0
VERMONT	0	0	0	4.75	0	0
VIRGINIA	7512	411.99	387	5	19.35	1.25
WASHINGTON	21042.3	1702.55	173.01	6.5	11.25	99.42
WEST VIRGINIA	28.44	7.56	0	6	0	0
WISCONSIN	2070.3	0	0	5	0	0
WYOMING	19	0	0	4	0	0
Total	325163.96	20963.86	12961.8		793.52	490.16

**Table 9**  
**Undercollection of Sales Taxes**

State	Estimated State Share of Quarterly Sales (millions of \$)		Estimated Tax Liability (thousands of \$)		Undercollection of Sales Taxes (thousands of \$)	
	All Sellers	Established Sellers Only	All Sellers	Established Sellers Only	All Sellers	Established Sellers Only
ALABAMA	38.96	7.04	2.83	2.83	2.83	2.83
ALASKA	31.01	2.40	NA	NA	NA	NA
ARIZONA	267.93	143.76	216.37	107.77	163.27	54.67
ARKANSAS	37.14	11.35	37.33	37.33	37.33	37.33
CALIFORNIA	1751.51	797.83	20607.46	8079.94	14128.05	2640.09
COLORADO	112.04	56.48	4.10	4.10	0	0
CONNECTICUT	87.61	40.43	47.78	10.41	47.78	10.41
DELAWARE	16.22	5.22	NA	NA	NA	N/A
DISTRICT OF COLUMBIA	11.53	5.72	0	0	0	0
FLORIDA	660.63	239.97	4058.18	784.25	3219.20	556.78
GEORGIA	281.66	129.18	478.74	232.07	249.49	2.83
HAWAII	20.25	0.91	477.87	5.09	472.78	0
IDAHO	23.63	6.47	0	0	0	0
ILLINOIS	583.40	180.28	1594.71	617.80	1000.76	229.47
INDIANA	185.53	67.15	289.70	126.50	144.50	50.10
IOWA	48.95	8.71	0.70	0	0.70	0
KANSAS	161.13	20.14	0	0	0	0
KENTUCKY	67.13	16.43	314.25	0	314.25	0
LOUISIANA	44.79	6.99	4.52	0	4.52	0
MAINE	28.53	10.72	0	0	0	0
MARYLAND	207.91	29.01	618.24	0	618.24	0
MASSACHUSETTS	142.63	24.21	0	0	0	0
MICHIGAN	221.40	31.69	183.60	20.32	175.11	11.85
MINNESOTA	213.72	93.88	1316.64	800.47	516.21	0
MISSISSIPPI	14.25	1.14	0	0	0	0
MISSOURI	129.02	43.07	2.99	0	2.99	
MONTANA	7.09	0.69	NA	NA	NA	N/A
NEBRASKA	56.02	30.14	0	0	0	
NEVADA	50.26	18.92	109.91	5.51	81.87	0.00
NEW HAMPSHIRE	101.77	18.84	NA	NA	NA	N/A
NEW JERSEY	360.02	160.10	1845.47	1473.84	1457.04	1085.43
NEW MEXICO	30.02	4.96	0	0	0	
NEW YORK	1041.89	647.17	2776.17	1540.93	1347.25	174.52
NORTH CAROLINA	205.46	105.55	261.70	211.17	81.24	30.70
NORTH DAKOTA	1.26	1.26	0	0	0	0
OHIO	309.94	141.74	594.27	511.00	572.05	488.82
OKLAHOMA	82.61	34.74	26.12	0	26.12	0
OREGON	133.73	23.48	NA	NA	NA	N/A
PENNSYLVANIA	441.64	234.34	1336.29	153.72	1014.39	1.69
RHODE ISLAND	29.25	11.95	39.63	0	0	0
SOUTH CAROLINA	75.45	3.01	21.25	0	21.25	0
SOUTH DAKOTA	8.94	0.15	0	0	0	0
TENNESSEE	383.89	293.85	375.38	262.91	126.68	14.25
TEXAS	832.10	415.53	3814.72	1313.65	2489.64	121.59
UTAH	87.63	41.98	78.32	11.09	67.28	0
VERMONT	8.25	0	0	0	0	0
VIRGINIA	277.62	106.33	436.67	291.59	162.78	17.69

WASHINGTON	438.29	297.86	1697.11	1566.50	1537.88	1407.31
WEST VIRGINIA	25.49	0.40	6.42	6.42	6.42	6.42
WISCONSIN	150.59	29.31	413.86	0	413.86	0
WYOMING	0.28	0.27	0.00	0	0	0
State Unknown	30.88	0				
Taxable in All States	141.14	141.14	141.14	7.04	0	0
Total	10700.00	4602.77	44230.45	18184.25	30503.73	6944.78



**Table 10**  
**Cross-Border Shopping**  
**(in \$ Volume of Sales between Top 15 States)**

	(in \$ Millions of Sales Between Top 10 States)															
	State															
	WASHINGTON	VIRGINIA	TEXAS	TENNESSEE	PENNSYLVANIA	OHIO	NEW YORK	NEW JERSEY	MINNESOTA	ILLINOIS	GEORGIA	FLORIDA	CALIFORNIA	ARIZONA		
State of Residence of the Buyer	ARIZONA	420.58	3.21	343.06	1034.05	126.94	779.44	1162.01	249.5	494.55	209.98	1017.04	240.98	1995.22	272.96	ARIZONA
	CALIFORNIA	2953.64	2378.86	9175.39	2966.36	2354.82	2285.97	7277.95	2271.19	1699.54	1586.1	5703.44	1402.15	5327.04	1832.9	CALIFORNIA
	FLORIDA	2645.49	1231.31	2567.32	1378.85	2061.37	949.82	4767.07	1880.09	814.39	1838.41	1571.57	1465.43	4778.19	984.16	FLORIDA
	GEORGIA	607.5	215.5	1810.02	825.04	825.48	634.48	899.37	663.97	113.47	363.47	845.94	845.52	570.08	111.75	GEORGIA
	ILLINOIS	2693.01	951.96	3297.56	1361.98	662.58	671.31	1739.38	954.44	139	790.23	1802.54	668.5	926.5	603.9	ILLINOIS
	MICHIGAN	732.98	307.59	1881.74	662.58	895.92	865.5	1369.55	904.4	85.24	216.18	1442.38	502.43	754.72	101.64	MICHIGAN
	MINNESOTA	514.77	842.11	348.42	456.96	327.6	75.75	825.17	282.94	1430.99	28	2025.98	521.27	1198.43	340.8	MINNESOTA
	NEW JERSEY	658.47	264.97	1874.5	789.5	1262.46	898.79	2028.33	1862.48	213.96	173.26	1186.28	289.93	2667.3	431.92	NEW JERSEY
	NEW YORK	2504.81	647.01	3271.5	2331.38	1144.64	1158.8	4903.08	1510.17	1507	1214.91	3407.63	1739.83	4611.8	957.79	NEW YORK
	OHIO	1114.44	470.01	2137.44	716.51	331.07	763.31	2748.18	1184.48	644.5	853.46	1442.38	415.01	1667.69	884.63	OHIO
	PENNSYLVANIA	596.79	1058	2364.09	1573.38	573.57	3964.35	2037.05	938.97	757.25	573.3	1258.51	413.48	1714.9	948.42	PENNSYLVANIA
	TENNESSEE	155.25	139.98	467.13	1166.49	996.93	2037.05	379.02	19.99	42.99	558.01	1586.48	673.68	1871.26	169.6	TENNESSEE
	TEXAS	1400.32	1040.83	4311.87	863.8	1855.84	1965.54	4070	1054.43	2368.88	734.23	1089.62	1141.64	4027.43	585.76	TEXAS
	VIRGINIA	161.26	616.97	2043.75	1114.3	161.77	99.13	2151.53	1471.57	138	292.27	260	84.5	470.23	747.34	VIRGINIA
	WASHINGTON	1844.51	2293.81	571.67	653.47	687.76	39.95	1525.14	180.98	80.99	333.5	162.06	1261.22	505.31	362.59	WASHINGTON

Table 11  
Seller Characteristics and the Decision to Collect Sales Taxes<sup>a</sup>

Independent Variable	Specification I		Specification II	
	Coefficient (Standard Error)	Marginal Effect	Coefficient (Standard Error)	Marginal Effect
Seller Rating	5.33E-05 (2.61E-06)	1.42E-05	4.81E-05 (1.50E-06)	1.30E-05
Seller Rating Percent	0.0343 (0.0136)	0.0092	0.0690 (0.0097)	0.0187
Seller Observations	0.0150 (0.0019)	0.0039	0.0004 (0.0002)	0.0001
Price			-8.6E-05 (0.0001)	-2.30E-05
Shipping Charge			0.0015 (0.0007)	0.0003
Constant	-4.5462 (1.3538)		-7.5055 (0.9612)	
LR $\chi^2$	782.98		1477.24	
Observations	6465		18863	

<sup>a</sup> The dependent variable in both specifications is *Taxation*.

Figure 1  
Sales Tax Compliance Rate by Seller's Rating

