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Mikhail I. Melnik

*Kennesaw State University*, [mmelnik@kennesaw.edu](mailto:mmelnik@kennesaw.edu)

James Alms

*Tulane University*

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## Does Online Cross-border Shopping Affect State Use Tax Liabilities?

James Alm  
Department of Economics  
Tulane University  
New Orleans, LA  
jalm@tulane.edu

Mikhail I. Melnik  
Department of Business  
Administration  
School of Engineering Technology  
and Management  
Southern Polytechnic State  
University  
Marietta, GA  
mmelnik@spsu.edu

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### Abstract

How does online cross-border shopping affect state use tax liabilities? We collect our own data on actual online cross-border shopping transactions from eBay.com, focusing upon a “representative” commodity classification and a “typical” day. These data allow us to examine the extent of actual online cross-border shopping by buyers, and the subsequent potential impact on state use tax liabilities of buyers. Our results indicate that online cross-border shopping is highly prevalent on eBay, with out-of-state purchases accounting for on average 94 percent of the volume of a state’s online purchase transactions. Even so, given the limited volume of eBay-based transactions relative to total sales transactions, the likely impact of cross-border transactions on state use tax revenue streams is negligible, even if we assume full buyer compliance with state use taxes.

Keywords: online commerce, sales taxes, nexus, tax evasion  
JEL: H71, H73

# Does Online Cross-border Shopping Affect State Use Tax Liabilities?

James Alm and Mikhail I. Melnik\*

## Abstract

How does online cross-border shopping affect state use tax liabilities? We collect our own data on actual online cross-border shopping transactions from eBay.com, focusing upon a “representative” commodity classification and a “typical” day. These data allow us to examine the extent of actual online cross-border shopping by buyers, and the subsequent potential impact on state use tax liabilities of buyers. Our results indicate that online cross-border shopping is highly prevalent on eBay, with out-of-state purchases accounting for on average 94 percent of the volume of a state’s online purchase transactions. Even so, given the limited volume of eBay-based transactions relative to total sales transactions, the likely impact of cross-border transactions on state use tax revenue streams is negligible, even if we assume full buyer compliance with state use taxes.

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\* James Alm, Department of Economics, 208 Tilton Hall, Tulane University, New Orleans, LA 70118 (phone +1 504 862 8344; email [jalm@tulane.edu](mailto:jalm@tulane.edu)); and Mikhail I. Melnik, Department of Business Administration, School of Engineering Technology and Management, Southern Polytechnic State University, 1100 South Marietta Parkway, Marietta, GA 30060 – 2896 (phone +1 678 915 7439; email [mmelnik@spsu.edu](mailto:mmelnik@spsu.edu)). A longer and more detailed version of this paper was presented at the National Tax Association 104<sup>th</sup> Annual Conference on Taxation, held November 17–19, 2011, in New Orleans, LA, at the session “State Sales Taxes in Decline”, organized and moderated by Donald Bruce, and will appear in *Public Budgeting & Finance*. This paper will also be published in the *Proceedings of the 104<sup>th</sup> Annual Conference on Taxation* (2012) by the National Tax Association. We are grateful to our session discussant, David Agrawal, for many helpful comments. We are also grateful to Robert Buschman and Andrew Chupp for their work in collecting, processing, and verifying the accuracy of the data that we used in our study.

## **Introduction**

The growth of online commerce has dramatically boosted the ability of any individual to purchase commodities from sellers located outside of the buyer's state. Such online purchases may well affect the sales tax collections of state governments because current law requires the seller to collect a sales tax only when the seller has legal "nexus" in the state. Most research on these revenue effects has examined the revenue impact of seller compliance with sales taxes.<sup>1</sup> However, there is virtually no work on buyer compliance with use taxes. All states with a sales tax also impose a comparable use tax. A use tax is the responsibility of the buyer, and is due on a transaction in which the sales tax is not collected and in which the item is used in the buyer's resident jurisdiction. If the use tax was paid by the buyer, then online commerce would have no impact on combined sales and use tax collections because online transactions would be subject to the state's use tax even if they escaped the state's sales tax.<sup>2</sup> However, these use tax effects are unknown. In this paper we report on research that investigates the potential impact of online cross-border shopping on state use tax liabilities of buyers.<sup>3</sup>

We do this by collecting our own data from the largest online consumer-to-consumer and business-to-consumer marketplace, eBay.com. This information allows us to measure actual cross-border shopping transactions by buyers, focusing upon a "representative" commodity classification and a "typical" day. These data in turn allow us to estimate the potential impact of cross-border online shopping on state use tax liabilities of these buyers.

Our results indicate that online cross-border shopping is highly prevalent on eBay. Even so, given the limited volume of eBay-based transactions relative to total sales transactions, the likely impact of cross-border online transactions on state use tax revenue streams is negligible, even if there is full buyer compliance with state use taxes.

## **Data**

Historically, eBay.com has been the largest online marketplace in the U.S., although that status has recently been challenged by Amazon.com.<sup>4</sup> Although eBay was originally developed as a facilitator of consumer-to-consumer commerce, it has also become a sales platform for businesses. As a result, eBay contributes significantly to business-to-consumer and even business-to-business ecommerce. This unique nature of eBay as a marketplace for various sellers makes it a useful source of data to understand the effects of ecommerce. The U.S. Census Department (U.S. Census, 2011a) reports that the volume of trade on the U.S. eBay website is roughly one-eighth of the total volume of U.S. ecommerce sales.

Our investigation focuses on the magnitude of between-states trade on the eBay U.S. website. This requires that we identify the location of the seller and the buyer in each transaction. This information was publicly available in the summer of 2007 when we collected our data. Seller information remains publicly available even today; however, buyer information is no longer available on the publicly viewable portion of the eBay website.

We collected data on most listings completed within a 24 hour period on Friday, 27 July 2007, in the “Consumer Electronics” category on the U.S. website of eBay. Consumer Electronics was one of the main categories of products traded on eBay. As the time, it was subdivided into 17 subcategories, and we were able to get the information on all listings in 9 of these subcategories. eBay keeps the listing’s information available on its public website for up to 90 days from the date of the completion of the listing; however, the listing can only be searched on the public website for 14 days following the completion of the transaction. Accordingly, we had a limited time window to identify the listings by their eBay identification

(14 days), and then another 90 days to obtain all of the relevant information before the listings were removed from the public section of the website.

With these eBay data, we were able to identify the location of each seller, the seller's degree of presence on eBay, and the seller's status of sales tax collection. Each listing on eBay contains some basic information about the seller: the location of the seller, the seller's sales tax collection status, and the seller's "rating".

At the time that the seller submits a listing on eBay, the seller is asked to select whether s/he will collect the sales taxes on behalf of any state (or states). The seller can select to collect the sales taxes on behalf of the relevant states; in this case, if a buyer is located in one of the selected states, then the buyer's eBay-provided invoice will automatically include the applicable sales taxes. Note that eBay generates the invoice on behalf of the seller at the end of the transaction. However, eBay.com is merely a facilitator of the transaction and thus does not itself collect the sales taxes. Rather, eBay simply provides an easy option for the seller to do so.

The seller's eBay "rating" provides a measure of past activity of the seller on eBay. After completing a transaction, the two parties involved can leave comments about each other. These comments include a buyer assessment of the seller, which can be positive, negative, or neutral. The seller's "rating" is simply the difference between the positive and negative comments. Note that the comments can only be left by those who participated in a transaction. Note also that the count of the comments is based on unique users, not the number of transactions. If two members participated in multiple transactions with each other and rated each other multiple times, these multiple comments will only count as one, as if they are left by one unique eBay member. This last feature enables us to interpret the seller's rating as a measure of the size or level of establishment on eBay; that is, a seller with, say, 812 rating points must have

participated in transactions with at least 812 uniquely registered eBay users. We classify this type of seller as an “established seller”, or one likely to be a larger retail seller.

Table 1 presents summary statistics of our dataset. We were able to obtain 22,451 unique “observations” from 20,831 individual “listings” that contained 10,319 “transactions” with total volume of traded merchandise of \$755,823.<sup>5</sup> Alm and Melnik (2010) use these data to examine whether sellers comply with state sales taxes. Here we use these data to examine the extent of online cross-border shopping and the impact of cross-border shopping on potential state use tax liabilities via buyer compliance.

## **Results**

Our data demonstrate significant online activity from every U.S. state, as measured by the dollar volume of sales transactions and by the number of buyers. Both variables are strongly and positively correlated with the state’s population, with more populous states accounting for a greater proportion of activity on eBay. Other variables (e.g., the state sales tax rate, the percent of the state’s population with a college education, state median income) are not correlated with these measures of online activity. See Table 2 for the simple correlation coefficients between the two measures of online activity and these various factors.

The average state online contribution is 1.66 percent of all purchases on eBay.com. States that serve as major population centers significantly surpass that level.<sup>6</sup> For instance, buyers from California account for 11.4 percent of all purchases made in our dataset.

Importantly, we find that the vast amount of all transactions on eBay.com is done across state lines. On average, out-of-state purchases account for 94 percent of the volume of a state’s online purchase transactions. This finding underscores the potential impact of ecommerce on the

use tax liabilities. Further, when focusing on transactions with established sellers only, we continue to find a similar pattern of purchase behavior. Recall that we define “established sellers” as those with an eBay rating in excess of 812; one-third of the sellers in our dataset have a rating above 812. These sellers are likely to represent larger retail business establishments, given the number of unique eBay users with whom they had transactions. Just as with all sellers, on average 94 cents of every online dollar spent by buyers with established sellers is again used for out-of-state transactions.

Even so, established sellers account for only 46 percent of all online transactions. If we assume that transactions with established sellers are the only retail purchases likely to be subject to taxation, then the implication of online cross-border transactions for the use tax liability becomes much smaller.

Overall, we find that in-state buyers made on average online purchases of \$12,631 on our sample date in the Consumer Electronics category. From these total purchases, 94 percent is purchased from out-of-state U.S. sellers with known locations. When restricted to established sellers only, the volume of purchases declines sharply to a state average value of \$5,644; the propensity to spend on items from out-of-state sellers remains the same at 94 percent. See Table 4.

Our dataset includes information from a *single* day and a *single* category on eBay.com. We attempt to extrapolate our data to measure current *annualized* data for *all* categories of eBay, in order to estimate yearly use tax effects for all online cross-border purchases. We do this in several steps.

First, we start with the total annualized amount of U.S. purchases on eBay, as reported in eBay.com (2011). For the annualized period from the fourth quarter of 2010 through the third



quarter of 2011 (the latest quarter for which information is available), eBay.com (2011) reports that the total volume of gross merchandise trade on the U.S. portion of the eBay website was \$21.842 billion. Second, we assume that the behavior of bidders in the Consumer Electronics category on our sample date (or Friday, 27 July 2007) is representative of behavior across all categories of eBay, especially in terms of the frequency of online cross-border shopping. Third, and relatedly, we assume that the behavior we observe on our sample date is representative of the average behavior for the entire year.

Under these assumptions, we are able to annualize our observations, extend them to the present period, and extend them to all online purchases on eBay.com. Table 4 presents the summary results. In particular, on the assumption that all cross-border purchases are subject to a state's use tax, Table 4 reports potential user tax implications from our dataset. For the purpose of this computation, the weighted average use tax rate to which the transactions are assumed to liable is 5.5 percent; this average rate is based on the state tax rate and the volume of purchase transactions originating from the state, and it does not include any use tax imposed by local governments within the state.

Although the volume of cross-border trades on eBay is large, the use tax implication is negligible, even if all purchases resulted in use tax payments. In the twelve month period ending in September 2011, the use tax liabilities are estimated to equal \$955 million dollars from all transactions and \$442 million from transactions with established sellers. We also report these figures as a percentage of the general sales and gross receipts revenues for 2010 (U.S. Census, 2011b). For all sellers, these revenues are only 0.43 percent of the general sales and gross receipts revenues of the states; if we focus on established eBay sellers, then the corresponding use tax liability generated from those transactions amounts to only 0.20 percent of the general

sales and gross receipts revenues. In either case, these figures represent a very small degree of potential revenue loss due to online cross-border sales.<sup>7</sup>

## **Conclusions**

Online marketplaces facilitate interstate commerce in the U.S. Our data indicate that well over 90 percent of the volume of trade on what arguably is the largest such marketplace, eBay.com, is in the form of cross-border trade. However, given the small size of ecommerce relative to total sales transactions, at least at present, the threat of these marketplaces to potential revenue loss from use taxes is very small relative to the size of the overall sales tax revenues of state governments. Consequently, online commerce currently poses only a limited danger to state government revenue collections. However, a significant expansion of online commerce may well develop over time into a more serious threat.

## **References**

Alm, James, and Mikhail I. Melnik. Do eBay Sellers Comply with State Sales Taxes? *National Tax Journal* 63 (2010): 215-236.

Alm, James, and Mikhail I. Melnik. Cross-border Shopping and State Use Tax Liabilities: Evidence from eBay Transactions. *Public Budgeting & Finance* forthcoming (2012).

Amazon.com. Q3 2011 Financial Results (2011), available online at: <http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-reportsOther> (accessed on 1/12/2012).

Ballard, Charles L., and Jaiman Lee. Internet Purchases, Cross-border Shopping, and Sales Taxes. *National Tax Journal* 60 (2007): 711-725.

Bruce, Donald, and William F. Fox. E-commerce and Local Finance: Estimates of Direct and Indirect Sales Tax Losses. *Municipal Finance Journal* 22 (2001): 24-47.

Bruce, Donald, William F. Fox, and LeAnn Luna. State and Local Government Sales Tax Revenue Losses from Electronic Commerce. Knoxville, TN: The University of Tennessee Working Paper, Center for Business and Economic Research, 2009.

Due, John F., and John L. Mikesell. *Sales Taxation – State and Local Structure and Administration*. Washington, D.C.: The Urban Institute Press, 1995.

eBay.com. eBay Inc. Reports Strong Third Quarter Financial Results (2011), available online at: [http://investor.ebayinc.com/financial\\_releases.cfm](http://investor.ebayinc.com/financial_releases.cfm) (accessed on 1/12/2012).

Manzi, Nina. Use Tax Collection on Income Tax Returns in Other States. Minneapolis, MN: Policy Brief, Research Department, Minnesota House of Representatives, 2010.

Merriman, David. The Micro-Geography of Tax Avoidance: Evidence from Littered Cigarette Packs in Chicago. *American Economic Journal: Economic Policy* 2 (2010): 61-84.

Tosun, Mehmet S., and Mark L. Skidmore. Cross-border Shopping and the Sales Tax: An Examination of Food Purchases in West Virginia. *The B.E. Journal of Economic Analysis & Policy* 7 (2007): Article 63.

U.S. Census Department. *E-commerce Time Series* (2011a), available online at: <http://www.census.gov/retail/> (accessed on 1/12/2012). Washington, D.C.

U.S. Census Department. *State Government Tax Collections, Summary Report: 2010* (2011b), available online at: <http://www2.census.gov/govs/statetax/2010stcreport.pdf> (accessed on 1/12/2012). Washington, D.C.

**Table 1. Some Summary Statistics**

<b>Number of Sellers</b>			
<b>Total</b>	<b>U.S., State Known</b>	<b>U.S., State Unknown</b>	<b>Foreign, Unknown Location</b>
6,888	6,791	33	64
<b>Number of Buyers</b>			
<b>Total</b>	<b>U.S., State Known</b>	<b>U.S., State Unknown</b>	<b>Foreign, Unknown Location</b>
9,261	7,955	424	882

Source: Calculations by authors.

**Table 2. Simple Correlation Coefficients**

	<b>Number of Buyers</b>	<b>Volume of Purchase Transactions</b>
Population	0.9926	0.9803
Sales Tax Rate	0.3037	0.2861
Percent of Population with College Education	0.0840	0.1020
Median Income	0.0456	0.0616

Source: Calculations by authors.

**Table 3. Online Purchase Transactions, State Average Values**

<b>State Average Volume of Purchase Transactions, Dollar Volume</b>	<b>From In-state and Multi-state Sellers</b>	<b>From Out-of-state Sellers</b>	<b>From Sellers with Undisclosed or Foreign Location</b>
	<b>As Percent of State Total</b>	<b>As Percent of State Total</b>	<b>As Percent of State Total</b>
<b>For All Sellers</b>			
\$12,631	5.23%	94.09%	0.68%
<b>For Established Sellers Only</b>			
\$5,644	5.20%	94.18%	0.62%

Source: Calculations by authors.

**Table 4. Estimated Annualized Use Tax Implications**

<b>Cross-Border Volume of Transactions</b>	<b>Use Tax Liability</b>	
	<b>In Dollars</b>	<b>As Percent of State General Sales and Gross Receipts</b>
<b>For All Sellers</b>		
\$17.373 billion	\$955 million	0.43%
<b>For Established Sellers Only</b>		
\$8.540 billion	\$442 million	0.20%

Source: Calculations by authors.

## **Endnotes**

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<sup>1</sup> For example, see Ballard and Lee (2007), Tosun and Skidmore (2007), Merriman (2010), Bruce and Fox (2001), and Bruce, Fox, and Luna (2009) for various indirect and direct approaches used to estimate these sales tax revenue effects.

<sup>2</sup> In fact, most observers believe that buyer use tax compliance is exceedingly low. See Due and Mikesell (1995) and Manzi (2010).

<sup>3</sup> The complete results are presented and analyzed in Alm and Melnik (2012).

<sup>4</sup> In the third quarter of 2011 the level of sales by Amazon.com surpassed the sales level on eBay.com for the U.S. market. In the international market, eBay continues to substantially exceed Amazon.com, and the total volume of trade on all eBay websites continues to exceed that of Amazon.com (Amazon.com, 2011; eBay.com, 2011).

<sup>5</sup> Not all eBay listings result in a sale. In some instances, listings run their course (3, 5, 7, or 10 days) and receive no bids. Also, a single listing may produce multiple transactions if the seller selects to list multiple quantities of the same item in a single listing; if a single listing results in multiple transactions, then each such transaction is counted as an observation in our dataset.

<sup>6</sup> This state average includes all states and the District of Columbia, and is calculated as the average of all jurisdictions' shares of purchase transactions in our dataset, where purchase transactions are defined as those where the buyer is located in the state. Also, note that our dataset includes transactions by foreign buyers and buyers with unidentified locations. As a result, the state average diverges slightly from 1.96 percent (or 100 percent divided by 51 jurisdictions).

<sup>7</sup> Note that our computations may be biased downwards because we base our computations only on those observations where the location of the buyer was known. Transactions with buyers with unknown location were not considered as cross-border transactions in this computation, and these transactions are 5.1 percent of the total volume of transactions in our dataset. Foreign buyers are also not considered as cross-border transactions, because the state use tax does not apply to foreign buyers. Even so, these potential biases appear to be small.