IN A WORLD WITHOUT BORDERS: THE IMPACT OF TAXES ON INTERNET COMMERCE*

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Abstract

The rapid rise in sales over the Internet and the fact that most Internet buyers pay no sales tax has ignited a considerable debate over taxes and the Internet. This paper uses new data on the purchase decisions of approximately 25,000 online users to examine the effect of local sales taxes on Internet commerce. The results suggest that, controlling for observable characteristics, people living in high sales taxes locations are significantly more likely to buy online. The results are quite robust and cannot be explained by unobserved technological sophistication, shopping costs, or other alternative explanations. The magnitudes in the paper suggest that applying existing sales taxes to Internet commerce might reduce the number of online buyers by up to 24 percent.

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I. Introduction

The extraordinary growth of the Internet in the last few years has led some to speak of the birth of a world without borders, a place where free communication, competitive markets, and extensive comparison shopping are a matter of course (see The Economist, [1997a] and Hof, [1998]). This apparent lack of geography in cyberspace, however, has raised some difficult problems regarding government policy, especially tax policy, toward the "new" economy. Although online transactions currently make up only a very small fraction of total retail sales, predictions of astounding future growth have caused state policy makers to become highly concerned with the fact that most online transactions pay no sales or use tax.[1, 2] Since the sales tax makes up the largest single component of state tax revenue, the growth of Internet commerce promises to have serious consequences for future state tax policy. The National Governors Association has called for taxation of all Internet and mail-order sales and Congress has appointed an advisory commission to draft recommendations as to how online commerce should be treated.

There has been no empirical work, however, examining the impact of taxation on Internet commerce.[3] Economists have long argued that consumer sensitivity to tax rates will be larger for people

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[1] In general, Internet sales are treated the same as mail-order sales: no sales tax is collected from companies that have no presence (known as nexus) in the state. The transactions are not legally tax-free, however. Every state requires consumers to pay a use tax (at the sales tax rate) for any out-of-state catalog or Internet purchases. The supreme court has ruled, though, that out-of-state vendors without nexus cannot be required to collect the use tax [*National Bellas Hess*, 386 U.S. 753, 1967; Quill, 504 U.S. 298, 1992] so governments must rely on consumer self-reporting. Non-compliance is widespread so the transactions are, effectively, tax-free.

[2] Discussions of the dilemmas facing state government can be found in Newman [1995], Graham [1999] and the Economist [1997a; 1997b]. Goolsbee and Zittrain [1999] provide direct evidence of the revenue loss estimates.

[3] Existing work on taxes and the Internet has provided conceptual and legal analysis. Examples include McLure [1997; 1999], Eads et al. [1997], Fox and Murray [1997], Hellerstein [1997a], [1997b]. I do not focus on the role of access taxes on Internet use. Discussions of the impact of prices on Internet use can be in Mackie-Mason and Varian [1995] or in McKnight and Bailey [1997].

living along geographic borders or in an open economy where the cost of arbitraging tax rates across locations is low, and that this can have important implications for tax policy.[4] Empirical work on the tax response in border communities has tended to confirm these predictions by finding large elasticities.[5] Against this backdrop, then, perhaps the key issue that the Internet poses for tax policy is not so much its potential to create a world *without* borders but rather to create a world of *only* borders−a world in which everyone is as responsive to local taxation as are the people who now live along geographic borders. At heart, this is an empirical question and one that I attempt to resolve in this paper.

To do so, I turn to a major survey of consumer online purchase patterns and match it to data on tax rates. The results show that Internet sales are highly sensitive to local taxation. Controlling for individual characteristics, people who live in high sales tax locations are significantly more likely to buy over the Internet and I can show that this is unlikely to result from unobserved heterogeneity across locations or people. The estimated tax price elasticities of Internet commerce are large and resemble those found in previous studies of taxes in geographical border areas. The magnitudes suggest that enforcing existing sales taxes on Internet purchases could reduce the number of online buyers by as much as 24 percent.

The paper proceeds as follows. Section II describes the data used in the paper and the general approach. Section III presents the results and examines alternative explanations. Section IV concludes.

II. Data and Specification

A. Data

A major problem preventing empirical work on Internet commerce has been the lack of data. The use of aggregate data is problematic. Observing that Internet sales are high in places with high

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[4] Such theoretical discussions can be found in Gordon [1983], Mintz and Tulkens [1986], Braid [1987], Kanbur and Keen [1993], Trandel [1992; 1994] and Gordon and Neilsen [1997].

[5] Empirical work on taxes (and other policies) in border states can be found in Mikesell [1970], Fox [1986], Walsh and Jones [1988], or Rappaport [1994] and Holmes [1998].

taxes may just indicate that places with high taxes have higher incomes, higher computer ownership, higher education, and the like. While individual level data are crucial, few consumer surveys even ask about the Internet and if they do, once the Internet users are divided by geographic area, the number of observations is usually quite limited.

In this paper, I turn to an extensive proprietary survey conducted in December 1997 for Forrester Research, a market research company in Cambridge, Massachusetts. As described in more detail in the data appendix, this was a nationally representative survey of more than 110,000 U.S. households and it includes detailed information about various demographic characteristics such as income, age, gender, and so on, as well as the state and metropolitan area of residence.[6] The survey also covers computer ownership, online access, and whether the individual has ever bought something online and, if so, which of 13 different types of goods they have purchased.

Using these measures of online buying as the dependent variable, I match each person to the local sales tax rate in their location to determine if tax rates seem to matter for their buying decisions. The method for matching people to tax rates is also described in the appendix. Table 1 gives summary statistics of the sample of people with online access and then divides them according to whether or not they have ever purchased something online. The two groups are not very different in most measures.

B. Model and Specification

The idea of the paper is simple. An individual choosing whether to buy a good at a store versus online will compare the relative prices. Assuming that he avoids paying use tax on the online transaction and that local sales taxes do not affect local retail prices (i.e., elastic local supply), the individual will be more likely to buy online the greater is the relative price ratio, $P_S(1+t)/P_I$, where the t is the sales tax, P is price and the subscript S indicates in a retail store and I indicates an online merchant.[7] In most

[6] The metropolitan areas are actually defined by television markets. These are generally larger than the corresponding SMSA. San Francisco, for example, includes the entire bay area.

cases I will follow the common assumption in the literature on sales taxes and assume the relative price, P_S / P_I, is constant across locations, though the results did not change when I controlled for local price levels. I will test for the sensitivity to this assumption by controlling for the local price level in some of the results below. The results are quite robust.[8] Clearly, identifying a role of the relative tax price does not imply that taxes are the only or even the most influential factor in online decisions.

I will use a Probit model for the {0,1} variable of whether the individual has ever bought something online as a function of the sales tax rate and a number of economic and demographic controls such as income, age, and education.

III. Results

A. Basic Results

The initial results from estimating the Probit regression of the {0,1} response of having ever bought online (conditional on having Internet access) are presented in column 1 of table 2.[9] The coefficients listed there give the estimated marginal effects of the covariates on the probability of buying online. The mean probability of buying conditional on having online access is estimated to be 20.3 percent. The explanatory variables other than the sales tax term include income, education, age, race, gender, marital status, as well as dummies for the presence of children under 18 in the respondent's

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[7] Poterba [1996] and Besley and Rosen [1997] examine the impact of sales taxes on local prices.

[8] Studies that compare Internet and retail prices have yielded differing results. Goldman Sachs [1997] found a ratio close to one. Bailey [1998] found prices higher on the Internet. A more recent estimate on the prices of books and CDs indicates that prices on the Internet are about 9-16 percent lower than in stores but that there is considerable online price dispersion [Brynjolfsson and Smith, 1999]. I will assume a ratio of one for simplicity.

[9] The results on the {0,1} decision were almost the same using information on whether the individual had bought anything in the last three months rather than had ever bought online. This is because almost everyone who has bought something online has bought something online in the last three months.

household, and whether the respondent operates their own business, uses a computer at work, or owned a computer in the previous year, as well as region dummies. The standard errors in all of the results are corrected for the fact that the tax data are clustered by metropolitan area and state.

The results show that the sales tax has a significant impact on the decision to buy online of the predicted sign. The magnitude suggests that raising the sales tax by .01 increases the mean probability of buying online by .005. Since the mean probability of purchase is approximately .20, the estimated elasticity of online buying with respect to the tax price (one plus the tax rate) is 2.3. The other coefficients are significant and have predictable signs.

B. Advanced Results: City-Level Controls

There are a number of city level issues that might create a spurious relationship between tax rates and online commerce. First, the procedure to assign the tax rates has error in it. In normal circumstances, this might bias the coefficient toward zero but in this case the error is not random so the bias can go either way. To examine the impact of measurement problems, I examine responses among consumers in the twenty-one states in the sample (counting the District of Columbia) that have a single, state-wide rate. For these individuals, there is no error in measuring the tax rate but there are fewer observations and less variation. The result of this regression is reported in column 2. The standard errors are corrected for the fact that the individual data are now clustered only by state.

As expected, the standard error on the tax term is larger. The coefficient is still significantly different from zero, however, and the estimated impact of taxes is much bigger. In this regression where the tax rate is measured without error, the average tax-price elasticity rises to 4.3. The error in measuring the tax variable seems to be biasing the estimates in the standard specification toward zero.[10]

A second potential spurious correlation is that high tax places may be places with a greater share of people working with computers or a greater share with Internet access, or with better Internet

[10] I also tried replacing city-state specific tax rates with the population weighted rate for the entire metro area. The results were very similar to the baseline specification.

infrastructure and access. The estimated relationship could even be the result of city level policies if cities raise sales taxes in order to pay for better Internet infrastructure. Any of these would make high sales taxes look influential for online buying but would not imply causality. Another potential source of city-level bias is that the cost of living or house prices may be higher in places with high tax rates and be the true cause of buying online. These might bias the elasticities upward.

To deal with city-level unobservables of this kind, I include metropolitan area dummies.[11] I restrict the sample to individuals living in metropolitan areas where there is variation in the tax rate across state boundaries. There are Seventy-one such locations. New York City, Philadelphia, and Washington D.C. are the most prominent examples but there are many others. The results, listed in column 3, estimate whether people with the same observable characteristics and living in the same metropolitan area but across state boundaries are more likely to buy online if they face higher taxes. The coefficient is large and significant. The mean elasticity in the sample is 3.5. At this magnitude, applying existing sales taxes to the Internet would reduce the number of online buyers by as much as 24 percent. Such an elasticity resembles those estimated for retail sales in border communities and open economies in the literature mentioned above. Those elasticities are often as high as 5 or 6.

C. Advanced Results: Individual Controls

In this section I extend the discussion to consider other alternative hypotheses that could explain the positive relationship between taxes and online commerce within metropolitan area. I include metropolitan area dummies in all the results that follow. The results above, particularly those including

[11] I also tried including city level controls to the regressions without year dummies including the density of the metropolitan area's most populous city, the share of the city-state that uses a computer at work, the share that has a computer at home, the share that has online access, a cost of living index for the primary city as reported by the Chamber of Commerce ACCRA database [ACCRA, 1998], and the size of the state-metropolitan area cell. The results were very similar to the baseline specification. Since these are subsumed by the results that include metropolitan area dummies, I do not report them to conserve space. I also tried restricting the sample to the major urban areas that Downes and Greenstein [1998] report have comparable access to the Internet and the results were the same.

metropolitan area dummies, arise from differences in the shopping patterns of people in central cities relative to those in suburbs. There may be, however, significant hassles for people shopping at stores in central cities that lead them to buy more frequently online. Column 1 of table 3 provides some more direct evidence. In it, I control for the number of cars in the household as a measure of the cost of shopping. Households with automobiles can more easily get to large shopping centers located in the suburbs. The coefficients indicate that more cars do make a household less likely to buy online but they dot change the tax coefficient. The estimated tax elasticity is not caused by these differences in the ease of shopping.

Alternatively, individuals in big cities may be more active bargain hunters than their suburban compatriots and may use the Internet for this purpose. In other words, the price elasticities of city and suburban customers may differ in a way that is correlated with the tax rate and thus make taxes seem important. To deal with this issue, I use the somewhat detailed qualitative response data from the Forrester survey on the frequency with which the individual shops at certain types of stores. The types of stores included are discount retailers, discount or wholesale clubs, upscale department stores, moderate-priced department stores, other department stores, specialty product stores, and convenience stores and the choices are OFTEN, SOMETIMES, RARELY, and NEVER for each.

I repeat the basic specification but include dummies for each frequency of shopping at each type of store (with NEVER as the reference level). The amount of shopping and the different types of stores should control for bargain hunting behavior as well as provide an alternative measure of the ease and frequency of retail shopping. Results from the regression including the 21 shopping dummies are listed in column 2. Again, the coefficient on local taxation is large and significant. The average elasticity is 3.0.

Finally, columns (3) to (6) explore whether the people living in high tax places seem to be more technologically sophisticated than people in lower tax locations. If taxes are only high in places like New York City and San Francisco where people are more technologically sophisticated, controlling for online usage should tend to reduce or eliminate the tax coefficient for online buying. The Forrester data

reports the frequency of going online for everyone with online access. Column 3 shows that online use (in days per month) does have a large, significant effect on the probability of buying online. It does not, however, reduce or eliminate the tax coefficient. It remains large and significant with an elasticity of buying of almost 4.

On top of that, treating the frequency of going online as the dependent variable, column 4 shows that people in high tax places do not use the Internet any more than those in low tax locations. The coefficient on taxes is insignificant and extremely small. People in a city at the lowest decile of sales tax (.04725) use the Internet approximately .018 days per month less frequently than people in the top decile of sales tax (.08). As the mean frequency of use is 16.7 days per month, the effect is tiny. In other words, people in high tax locations are no more likely to *use* the Internet, only to *buy* things over the Internet (even controlling for how much they use the Internet).

Column 5 expands the sample beyond just those with Internet access and asks whether having higher taxes makes an individual more likely to get online access. The tax coefficient is small, negative, and insignificant.[12] This suggests that avoiding sales taxes is probably not the main determinant of people's decision to go online and provides further evidence against the view that the estimated tax elasticities come from people being more technologically advanced in places with higher tax rates.

Column 6 asks whether having higher sales taxes makes an individual more likely to own a computer. The coefficient is negative and, again, insignificant. AlthoughI do not report the results to conserve space, taxes also had no significant impact on the decision to buy a cordless phone, a CD player, a big screen television, a video game console, a VCR, or a home satellite dish, nor did they influence the amount of television watched. After controlling for individual characteristics, higher taxes do not seem to be highly correlated with technological sophistication in any sphere except online buying.

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[12] I found the same result in a regression for the length of time an Internet user has had online access. Internet users have not been online longer in locations with high tax rates.

D. Advanced Results: Types of Products

As a final check on the robustness of the results, I examine the types of online goods that individuals buy. As detailed in the data appendix, there are several types of online goods reported in the Forrester data. Some of them do not create a sales tax differential versus retail (airline tickets, for example) while others do (like books). It would be very clear evidence that taxes are important if higher taxes lead to more buying of items like books but no more buying of items like airline tickets. There are two caveats to this test, however.

The first relates to fixed costs. If individuals incur some fixed costs in their first online purchase then if taxes get the person to buy a first item, this will also raise the probability of buying other items, even if the other items are, themselves, not taxed. That will tend to blur the distinction between the types of goods. The most commonly discussed fixed cost of buying is the first-time-user's fear of giving credit card information out over the web (see Goolsbee and Zittrain [1999] for evidence on the subject). The second caveat is that while there are thirteen categories of goods, there are so few purchasers of most categories that estimates of the tax impact on individual goods are quite imprecise. As a result, I group the goods into three categories.

The first category includes goods where buying online avoids sales tax for the buyer. These are the standard goods where the seller probably does not have nexus and the goods might otherwise have been bought in a store. In this group I include books, computers, software, computer peripherals, clothing, and other.[13] I exclude clothing from this category for the six states that exempt most clothing purchases from sales tax, though this makes little difference. Note that these products are also likely to be purchased with a credit card.

The second category is composed of products where the buyer is unlikely to avoid sales tax but the goods are still likely to be purchased using a credit card. This category includes airline tickets,

[13] Forrester Research data [McQuivey et al., 1998] suggests that most of the "other" category is composed of music, videos, toys, sporting goods, health and beauty, consumer electronics, and household goods so I include it in the tax saving category.

movie tickets, cars, flowers, and groceries (as well as clothing for the six states with exemptions). Sales tax does not apply to the first two items on the list. The others (cars, flowers, and groceries) almost certainly generate nexus for the seller in the delivery location so must pay the tax. In either case, the buyer does not save money on the sales tax by purchasing online.[14] Because these are usually bought with a credit card, however, a fixed cost associated with credit card security will imply that taxes will influence this category. The impact should be smaller than in the first category, however, since only the indirect effect is at work.

The final category also includes goods where the purchaser does not avoid sales tax but these goods are unlikely to be purchased by credit card so there should not be even an indirect reason for taxes to matter for such purchases. This category is composed of the financial products: insurance, stocks and mutual funds.

If the tax coefficient of the second type of goods are larger than the first or if there is a significant tax coefficient at all for the third type of good, this will suggest that the estimated importance of the sales tax is a spurious correlation.

The Probit regressions for each of the three categories are presented in columns 7-9. In column 7, taxes have a large and significant effect on the likelihood of buying goods where the buyer avoids sales tax. Taxes also have a significant effect (in column 8) on the purchase of goods that do not save the buyer sales tax but the point estimate is almost 50 percent smaller than for the tax saving goods, consistent with a fixed cost arising from credit card security issues. Most importantly, for the goods with no fixed costs and no tax savings (column 9) there is no significant impact of taxes on the likelihood of purchase. In this case the point estimate is small and less than zero. In other words, the results show that taxes appear to influence even the composition of online buying in the predicted way.

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[14] Some states exempt food so sales tax might not apply to groceries. Still, this means there is no tax savings from buying online.

IV. Conclusion

This paper has presented an empirical analysis of how local taxation affects the decision of consumers to buy goods over the Internet. Using an extensive data source of approximately 25,000 people with online access, the results suggest that local taxation plays an influential role in online commerce. Controlling for individual characteristics, people living in places with higher tax rates are significantly more likely to buy things over the Internet. This is true within regions and even within metropolitan areas. The results suggest that the effect is not due to city specific differences that might be correlated with tax rates, nor can the role of taxes cannot be explained by differing levels of technological sophistication or shopping behavior among residents of different locations. After controlling for household characteristics, people in high tax locations are not more likely to own a computer, to use the Internet more frequently, to buy other electronic goods, or to have online access than are people in low tax locations. They are only more likely to buy things online. Further, the impact of taxes on Internet commerce appears to be greatest for online products that, a priori, are most likely to save the buyer from paying sales tax.

The magnitude of the tax effect is large and suggests that applying existing sales taxes to the Internet might reduce the number of online buyers by as much as 24 percent or more. These estimated effects are close to those estimated in previous work on the response to changes in retail sales taxes in geographic border communities. In total, the results give empirical support to the idea that taxes (and other price differences) will play an important role for individuals living in a "world without borders" and they motivate further empirical work on demand in an open economy such as the Internet.

DATA APPENDIX

The online purchase data comes from a proprietary survey conducted by Forrester Research, a leading market research company whose specialty is the information economy. The survey was conducted by the NPD group in December of 1997 as part of Forrester's *Technographics 98* program. The survey was conducted by mail and received responses from more than 110,000 U.S. households. Though the sampling methodology is not public, the survey is meant to be nationally representative (more details on the *Technographics* data can be found in Bernoff et al. [1998] or in Goolsbee and Klenow [1998]). Its purpose is to provide technology, communications, and consumer marketing companies with information for evaluating the consumer segments for their products. The Forrester data is widely respected in the industry and private sector companies pay significant amounts of money to get access to it.

The survey asks adults about their household characteristics. The variables I use here include geographic location, income, education, age, gender, marital status, race, whether they have children, whether they use a computer at work, whether they already had a computer in the year preceding the survey, and whether they run a business from home. I turned the series of dummy variables for education, age, and income into continuous variables. If income was stated as between 35 and 40 thousand dollars, for example, I imputed an income of 37.5 thousand. For top-coded variables, I tried various values but the choices had almost no impact on the results. Neither did including dummies rather than converting the observables into continuous variables.

Respondents were also asked whether they have access to the Internet and, if so, how long they have been online, how frequently they go online, whether they had ever bought something online, and

whether they have ever bought one of 13 categories of goods online in the last three months. The categories were books, software, computers, computer peripherals, airline tickets, movie tickets, clothing, groceries, cars, flowers, insurance, stocks and mutual funds, and other.

Matching the purchase data to local sales tax rates is complicated by the fact that the data give do not give the town name, only the state and metropolitan area. Many states have constant rates in all cities. For states without uniform rates across cities, I assume that anyone living in the primary state of the metropolitan area (defined by television market) resides in the area's major city. I classify people in the Chicago area who reside in Illinois as being in Chicago itself. This prevents me from distinguishing between city and suburb within the same state, but is necessary given the nature of the data. I classify people living in a different state as being in the largest city in the closest county to the primary city (measured by Rand McNally, [1997]). The tax rates for each location were compiled either from direct conversation with the department of revenue in the state or from documents on the department's website. For states without centralized information, I contacted a local chamber of commerce in the city or county and I do not include individuals who do not reside in a television market.

TABLE I

SUMMARY STATISTICS

	All Online Users	Buyers	Non-Buyers
n	26219	5544	20675
(1+t)	1.066	1.067	1.066
	(.0168)	(.0163)	(.0169)
Income	61.1	65.3	59.9
	(41.1)	(42.2)	(40.8)
Education	14.9	15.2	14.8
	(2.2)	(2.2)	(2.3)
Age	40.1	39.3	40.4
	(12.4)	(11.9)	(12.6)
Asian	.021	.026	.019
	(.142)	(.159)	(.137)
Nonwhite minority	.145	.137	.147
	(.352)	(.344)	(.354)
Children	.408	.360	.421
	(.491)	(.480)	(.494)
Single	.399	.433	.390
	(.490)	(.496)	(.488)
Female	.556	.648	.531
	(.497)	(.478)	(.499)
Run own Business	.172	.213	.161
	(.378)	(.410)	(.368)
Computer at work	.786	.838	.772
	(.410)	(.369)	(.420)
Own comp last year	.751	.839	.728
	(.432)	(.368)	(.445)

Source: Forrester Research.

TABLE II:

BASIC RESULTS

	(1)	(2)	(3)
(1+*t*)	.5096	.9041	.7180
	(.1510)	(.3948)	(.3058)
Income	.0005	.0003	.0003
	(.0001)	(.0001)	(.0001)
Education	.0048	.0047	.0058
	(.0013)	(.0015)	(.0017)
Age	-.0022	-.0025	-.0023
	(.0002)	(.0004)	(.0003)
Asian	.0058	.0474	.0228
	(.0162)	(.0339)	(.0280)
Nonwhite minority	-.0087	.0095	-.0142
	(.0088)	(.0242)	(.0146)
Children	-.0378	-.0341	-.0324
	(.0059)	(.0068)	(.0080)
Single	.0366	.0388	.0380
	(.0067)	(.0127)	(.0096)
Female	.0720	.0683	.0677
	(.0055)	(.0083)	(.0073)
Run own Business	.0534	.0819	.0770
	(.0072)	(.0160)	(.0097)
Computer at work	.0258	.0071	.0151
	(.0071)	(.0153)	(.0096)
Own comp last year	.1177	.1051	.1121
	(.0073)	(.0152)	(.0084)
Dummies	Region	Region	Metro
N	24,697	7,061	11,004
Tax Elasticity	2.3	4.3	3.4

The coefficients listed are marginal effects evaluated at the sample means. The standard errors (listed in parentheses) are corrected for clustering by metropolitan area in columns (1) and (3) and by state in (2). The dependent variable is whether the individual has bought online. Column (1) is the baseline

specification. Column (2) restricts the sample to people living in states with a uniform rate. Column (3) restricts the sample to people living in metropolitan areas with variance in the tax rate across state boundaries and it includes metropolitan area dummies.

TABLE 3: CONTROLLING FOR UNOBSERVABLES

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Bought Online	Bought Online	Bought Online	Use (OLS)	Access	Computer	Type I Goods	Type II Goods	Type III Goods
$(1+t)$	.7866	.6316	.7263	.5523	-.1291	-.1844	.7236	.4812	-.0780
	(.2814)	(.2823)	(.2728)	(7.749)	(.1235)	(.2833)	(.3016)	(.0737)	(.0667)
Number of Cars	-.0100								
	(.0046)								
Freq. of Use			.0087						
			(.0004)						
Demographics Dummies	11 vars Metro	11 Vars Metro Shopping	11 vars Metro	11 vars Metro	11 vars Metro	11 vars Metro	11 vars Metro	11 vars Metro	11 vars Metro
N	10,498	9,734	10,760	10,760	43,881	43,881	11,004	10,479	9,508

The coefficients in all columns except (4) report marginal effects from probit regressions. The standard errors (listed in parentheses) are corrected for clustering by metropolitan area in all the results. Each column includes the control variables listed in table 2. The method of estimation is listed at the top of each column. The dependent variable in columns (1)-(3) is whether the individual reports having bought something online. The dependent variable in column (4) is the frequency of going online in days per month. The dependent variable in column (5) is whether the individual has access to the Internet. The dependent variable in (6) is whether the individual has a computer. The dependent variables in columns (7)-(9) is whether the individual reports having bought the type of good at the top of the column. Type I goods are those that probably avoid sales tax and are purchased with a credit card including books, computers, computer peripherals, software, clothing (in the relevant states) and "other". Type II goods do not avoid sales tax but are purchased with a credit card including airline tickets, movie tickets, cars, flowers, groceries, and, where relevant, clothing. Type III goods do not avoid sales tax and are not bought with a credit card including insurance, stocks and mutual funds. All of the results restrict the sample to people living in metropolitan areas with variance in the tax rate

across state boundaries and it includes metropolitan area dummies. Column (5) and (6) include people without online access.

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