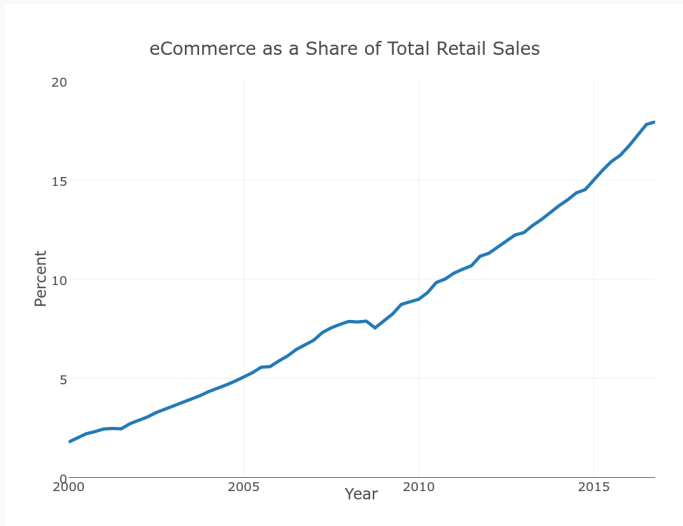


Online Shopping and Taxes

Mallick Hossain

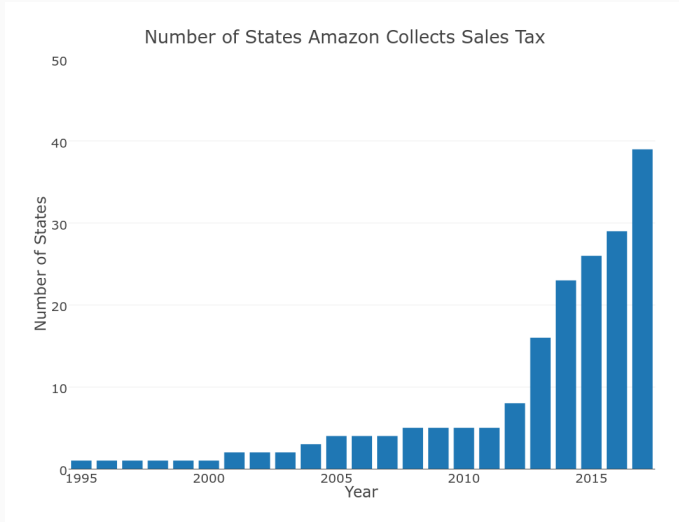
Background

- Online shopping has grown immensely over time



Sales Tax Collection Lagged

- States did not collect sales tax on online sales for many years, but enforcement has picked up over the past decade



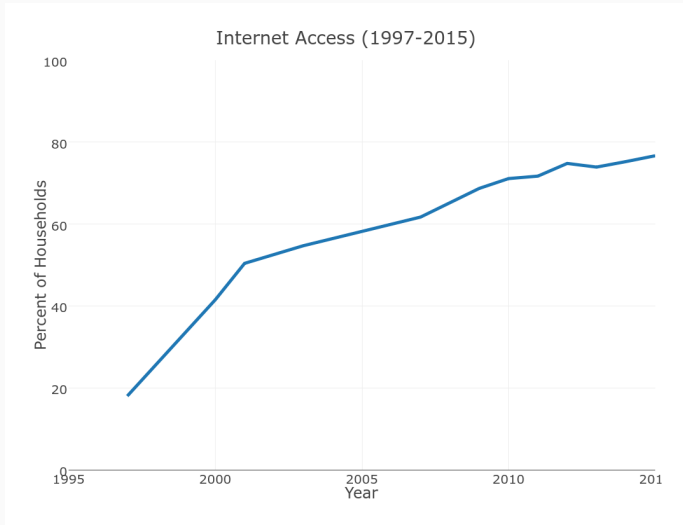
Online Shopping and Tax Elasticity

- Many studies have tried to estimate consumer elasticity with respect to sales tax rates
- Extensive margin estimates tend to be low while intensive margin estimates are high

Paper	Estimate
Scanlan (2007)	0.0
Ballard & Lee (2007)	0.2
Alm & Melnik (2005)	0.5
Baugh, Ben-David, & Park (2016)	1.3
Houde, Newberry, & Seim (2016)	1.3
Einav et al (2014)	1.8
Goolsbee (2000)	2.3

- One potential explanation for this bimodality is search
- **Search costs are lower** for online shopping, so consumers can be more price-sensitive on the intensive margin
- **Switching costs are higher** between online and offline search technologies, so less sensitivity on the extensive margin

Internet Access Over Time



Reduced-Form Results (Expenditures)

	(1)	(2)	(3)	(4)	(5)
Intercept	29.66*** (0.51)	27.79*** (1.01)	36.07*** (2.34)	36.49*** (2.34)	37.00*** (2.34)
Collect	-3.43*** (0.96)	-3.58*** (0.97)	-3.19 (1.90)	-3.15 (1.90)	-3.43 (1.90)
Tax Rate	8.12 (7.35)	11.61 (7.33)	10.07 (27.67)	9.39 (27.67)	8.17 (27.66)
Collect*Tax	47.28*** (13.35)	47.35*** (13.38)	59.23* (29.81)	58.47* (29.81)	62.66* (29.81)
Rate					
Children				-0.74*** (0.21)	-0.82*** (0.21)
<\$35k					-1.83*** (0.22)
MMYY	NO	YES	YES	YES	YES
FEs					
State FEs	NO	NO	YES	YES	YES

Reduced-Form Results (Basket Totals)

	(1)	(2)	(3)	(4)	(5)
Intercept	33.81*** (1.29)	30.18*** (2.54)	38.49*** (5.89)	38.47*** (5.90)	38.95*** (5.90)
Collect	-4.03 (2.39)	-4.75 (2.43)	-3.54 (4.79)	-3.54 (4.79)	-3.80 (4.79)
Tax Rate	34.16 (18.40)	37.72* (18.48)	113.04 (69.72)	113.08 (69.73)	111.91 (69.72)
Collect*Tax Rate	64.38 (33.44)	69.06* (33.68)	55.85 (75.12)	55.89 (75.12)	59.89 (75.13)
Children				0.04 (0.53)	-0.04 (0.53)
<\$35k					-1.75** (0.55)
MMYY FEs	NO	YES	YES	YES	YES
State FEs	NO	NO	YES	YES	YES

Reduced-Form Results (Page Views)

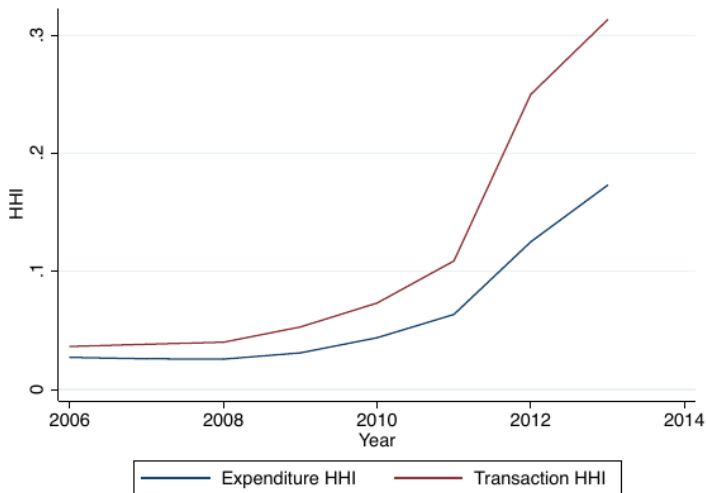
	(1)	(2)	(3)	(4)	(5)
Intercept	101.66*** (2.41)	109.65*** (4.75)	140.35*** (11.00)	135.77*** (11.02)	132.50*** (11.01)
Collect	11.88** (4.48)	-8.65 (4.54)	5.90 (8.95)	5.42 (8.94)	7.21 (8.94)
Tax Rate	129.03*** (34.44)	58.94 (34.54)	170.24 (130.27)	177.66 (130.25)	185.64 (130.20)
Collect*Tax Rate	-188.61** (62.61)	10.79 (62.95)	-111.37 (140.36)	-103.06 (140.34)	-130.32 (140.30)
Children				8.06*** (0.98)	8.59*** (0.98)
<\$35k					11.92*** (1.04)
MMYY FEs	NO	YES	YES	YES	YES
State FEs	NO	NO	YES	YES	YES

List of Variations for Potential Use

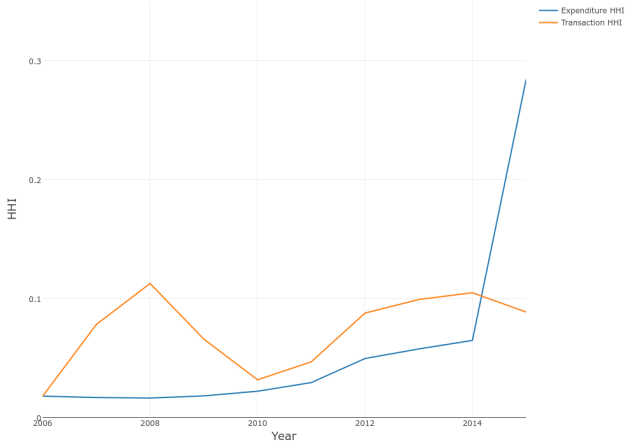
1. Changes in sales tax rates over time
2. Changes in tax rates of neighboring counties and states over time
3. Variation in sales tax rates across different product categories
4. Variation between websites that collect sales taxes or not
(e.g. walmart.com versus Amazon.com before 2008)
5. Variation in Amazon fulfillment center openings
6. Variation in state enforcement of sales tax collection
7. The cross of (1) and (6) and the variation in sales tax rates before state enforcement and after state enforcement of sales tax collection
8. 5 states (Alaska, Delaware, Montana, New Hampshire, and Oregon) have never had sales tax (Alaska has local sales tax)
9. Behavioral changes in browsing throughout each of the above

1. Consumer decision is a choice over search technologies
 - **Offline:** High search costs, high fixed cost, immediate utility
 - **Online:** Low search cost, no fixed cost, delayed utility
 - de los Santos, Hortacsu, and Wildenbeest (2012) provide evidence that online search behavior follows a *fixed-sample* strategy as opposed to sequential search
 - Suggestions for papers that introduce choices over search technologies?
2. Consumer decision is a discrete choice over products
 - Follow Hanemann (1984) where online and offline product are treated as different brands of the same good and they are perfect substitutes
 - Estimation requires data on online and offline shopping decisions
 - Potentially focus on a narrow product category (such as books)

HH Index Replication



Hirshman-Herfindahl Indices in Online Retail, 2006-2015



Summary of Procedure

1. Extracted all transactions from 2006-2015 that were in product categories for which Amazon had some recorded transactions
2. Summed price and number of transactions for each year and each website
3. Computed market shares for each website based on dollars spent or transactions made
4. Computed HHI