

# **Estimation of Washington State Retail Sales Across Taxing Jurisdictions**

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**Major Component of the Presentation;**

**The Washington State *Cross Border Study*:**

**Sales tax evasion across state borders**

**In Addition (time allowing);**

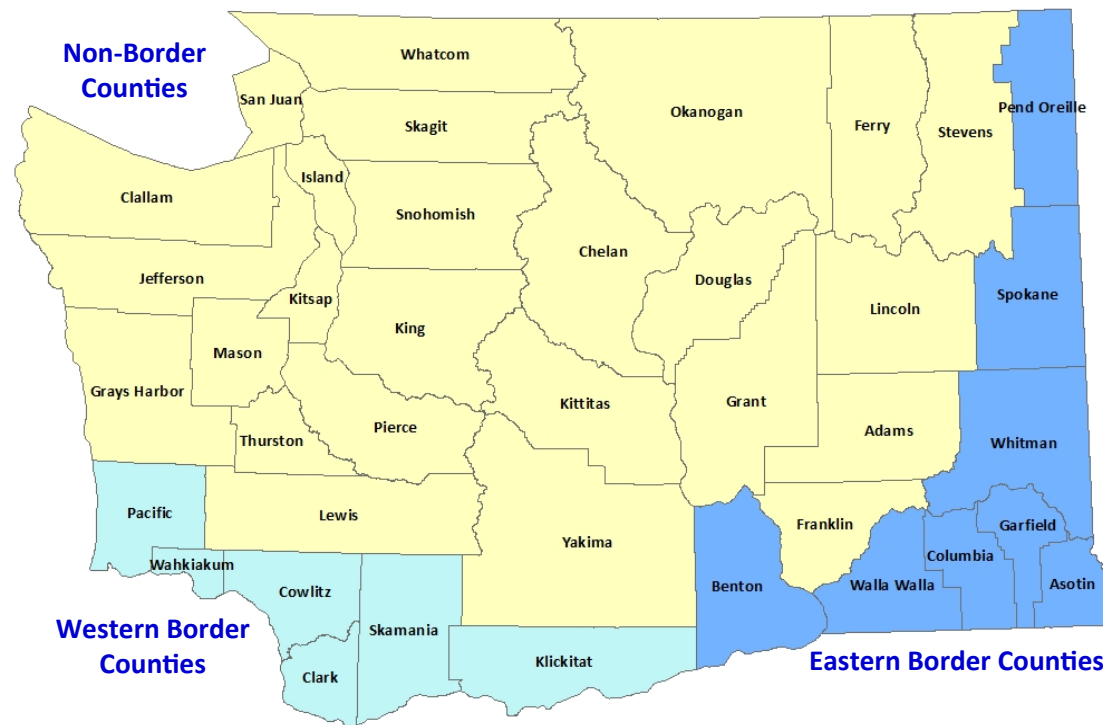
**Preliminary work towards a more general analysis using intrastate (local) jurisdictions**

**E.g., What's the general trade off between sales tax rates and travel distance/time?**

# The *Cross Border Study* measures sales tax evasion across Washington State's U.S. borders

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Washington Border and Non-border Counties



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Washington sales tax rates are the fourth highest in the United States (Tax Foundation)

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Sales Tax Rates: WA Avg. = 8.95%

Oregon = 0% !!!

Idaho = 6% or 6.5% in Nez Peirce Co.

# Interstate tax rate differences lead to the following situation

Real Per Capita Taxable Retail Sales (TRS)		
Washington Region	Total TRS	TRS net of Construction and Accommodations
All of Washington State	\$ 16,400	\$ 13,200
Non-Border Counties Only	17,300	13,800
Border Counties Only	13,100	10,700
Eastern Washington Border Counties	14,700	12,200
Western Washington Border Counties	10,900	8,700
Difference between:		
- Non-Border & Eastern Border Counties	2,600	1,600
- Non-Border & Western Border Counties	6,400	5,100
- Eastern & Western Border Counties	3,800	3,500

# **An Econometric Model was Used to Measure Lost Retail Sales and Sales Taxes**

**The variables that best explained retail sales were:**

- Home county population
- Real, per capita income in the home county
- Relative home county sales tax rate versus the nearest low tax, neighboring jurisdiction's (working through prices)
- Travel costs (miles and real fuel costs)
- The home county's unemployment rate
- Percentages of the home county's population below 19 and over 64 years of age
- Number of retailers per thousand residents in the home county



# Potential Gains from Border County Tax Rate Normalization, by County (FY14)

Border Counties, FY14 Estimates	Potential Gains if Border Counties Face "Normal" Tax Differences		
	Taxable Retail Sales	State Sales Taxes	Local Sales Taxes
Asotin	\$ 7,129,000	\$ 463,000	\$ 71,000
Benton	681,676,000	44,309,000	12,111,000
Clark	1,177,815,000	76,558,000	21,885,000
Columbia	8,416,000	547,000	118,000
Cowlitz	353,865,000	23,001,000	5,004,000
Garfield	1,074,000	70,000	11,000
Klickitat	41,494,000	2,697,000	290,000
Pacific	43,130,000	2,803,000	561,000
Pend Oreille	6,134,000	399,000	67,000
Skamania	10,867,000	706,000	130,000
Spokane	431,695,000	28,060,000	9,342,000
Wahkiakum	4,974,000	323,000	55,000
Walla Walla	180,593,000	11,739,000	4,007,000
Whitman	21,373,000	1,389,000	278,000
All Border Counties	\$ 2,970,235,000	\$ 193,064,000	\$ 53,930,000

## Selected Regression Results:

Model 1, used for the study results, and five comparison models

### Notes:

- All dollar variables are real variables.
- Ln stands for the natural log of the variable.
- "Sig. at" indicates the significance level.
- netTRS is TRS net of the construction and hotel sectors.
- Relative Price- see the next slide

Model 1, Results Used for the Study Results	
Specification	Log -Log
Dependent Variable	Ln netTRS
R-square	0.774
Adjusted R-square	0.758
F value	47.89

Model 2	
Specification	Semi-Log
Dependent Variable	netTRS
R-square	0.750
Adjusted R-square	0.732
F value	41.89

Model 3	
Specification	Levels
Dependent Variable	netTRS
R-square	0.701
Adjusted R-square	0.680
F value	32.82

	Ln ?	Parameter Estimate	't' value	sig. at
Intercept		2.732	3.37	1%
Population	yes	0.243	11.65	1%
Income/Capita	yes	0.262	3.94	1%
<b>Relative Prices</b>	yes	<b>-4.510</b>	<b>-8.08</b>	1%
Travel Cost	yes	0.001	0.03	
Unemp. Rate		-3.027	-2.95	1%
Youth Percent		1.103	2.42	1%
Senior Percent		2.652	4.38	1%
Retailers/1,000	yes	0.231	4.94	1%
Region Binaries		significant		
Year Binaries		significant		

	Ln ?	Parameter Estimate	't' value	sig. at
Intercept		-46,896	-6.72	1%
Population	yes	1,615	8.98	1%
Income/Capita	yes	3,229	5.65	1%
<b>Relative Prices</b>	yes	<b>-33,191</b>	<b>-6.91</b>	1%
Travel Cost	yes	137	0.79	
Unemp. Rate		-22,172	-2.51	1%
Youth Percent		6,295	1.60	
Senior Percent		16,637	3.19	1%
Retailers/1,000	yes	1,541	3.83	1%
Region Binaries		significant		
Year Binaries		significant		

	Parameter Estimate	't' value	sig. at
Intercept	46,071.0	8.61	1%
Population	0.003	3.82	1%
Income/Capita	0.3	6.81	1%
<b>Relative Prices</b>	<b>-40,161.0</b>	<b>-7.67</b>	1%
Travel Cost	-1	-0.40	
Unemp. Rate	-10,914.0	-1.11	
Youth Percent	6,819.2	1.57	
Senior Percent	205.9	0.04	
Retailers/1,000	2.2	0.70	
Region Binaries		significant	
Year Binaries		significant	

Model 4	
Specification	Log -Log
Dependent Variable	Ln netTRS
R-square	0.614
Adjusted R-square	0.602
F value	51.97

Model 5	
Specification	Log -Log
Dependent Variable	Ln TotalTRS
R-square	0.724
Adjusted R-square	0.705
F value	38.97

Model 6	
Specification	Levels
Dependent Variable	TotalTRS
R-square	0.530
Adjusted R-square	0.515
F value	36.86

	Ln ?	Parameter Estimate	't' value	sig. at
Intercept		2.288	3.53	1%
Population	yes	0.137	6.60	1%
Income/Capita	yes	0.440	6.61	1%
<b>Relative Prices</b>	yes	<b>-2.689</b>	<b>-4.86</b>	1%
Travel Cost	yes	0.013	0.54	
Unemp. Rate		-0.871	-1.30	
Youth Percent		1.783	3.21	1%
Senior Percent		1.231	1.74	10%
Retailers/1,000	yes	0.105	3.02	1%
Region Binaries		not modeled		
Year Binaries		not modeled		

	Ln ?	Parameter Estimate	't' value	sig. at
Intercept		3.489	4.49	1%
Population	yes	0.166	8.29	1%
Income/Capita	yes	0.339	5.31	1%
<b>Relative Prices</b>	yes	<b>-3.634</b>	<b>-6.78</b>	1%
Travel Cost	yes	0.035	1.78	10%
Unemp. Rate		-2.206	-2.24	5%
Youth Percent		-0.335	-0.77	
Senior Percent		1.264	2.18	5%
Retailers/1,000	yes	0.203	4.52	1%
Region Binaries		significant		
Year Binaries		2009 is significant		

	Parameter Estimate	't' value	sig. at
Intercept	32,339.0	5.10	1%
Population	-0.001	-1.29	
Income/Capita	0.5	10.70	1%
<b>Relative Prices</b>	<b>-24,908.0</b>	<b>-4.26</b>	1%
Travel Cost	8.6	2.27	5%
Unemp. Rate	-12,427.0	-1.76	10%
Youth Percent	-3,826.4	-0.61	
Senior Percent	-13,821.0	-1.91	10%
Retailers/1,000	2.9	0.80	
Region Binaries		not modeled	
Year Binaries		not modeled	



## Modeling Prices: how sales tax rates affect relative prices

Sales tax rates are the primary reason for price differences across Northwest state borders.

The relative price difference between a home county and a neighboring county that competes for sales revenues can be modeled as:

$$\text{Relative Price} = P_H(1+t_H)/P_N(1+t_N)$$

Where:

- $t_H$  = the tax rate in the Washington State home county,
- $t_N$  = the tax rate in neighboring competitor county in Washington, Oregon, or Idaho,
- $(1+t_H)$  = the general price level in the Washington State home county, and
- $(1+t_N)$  = the general price level in the most likely lower tax neighboring competitor county in one of the 3 states, and
- $P_H$  and  $P_N$  are price indices for all goods in the home and likely neighbor counties.

Given similar costs of goods and market baskets,  $P_H/P_N = 1/1$  the price equation simplifies to:

$$\text{Relative Price} = (1+t_H)/(1+t_N).$$

**Preliminary work towards a more general analysis using 306 local jurisdictions**

**E.g., What's the general trade off between sales tax rates and travel distance/time?**

**Question; how can we measure the change in miles over years if cities don't move?**

**Distance in Miles  
from Income Location to TRS Location**

Location	2005	2006	2007	2008	2009
Seattle	0.31	0.30	0.32	0.35	0.25
Tacoma	1.42	1.41	1.32	1.24	1.11
Everett	0.56	0.66	0.68	0.60	0.53
Spokane City	0.70	0.68	0.74	0.73	0.68
Olympia	0.30	0.36	0.47	0.60	0.51
Lacey	1.30	1.34	1.19	1.09	1.17
Thurston Co. unincorp.	4.12	4.09	4.27	4.71	4.34
Benton Co. unincorp. PTBA	8.62	7.75	7.65	7.68	7.21
Kennewick (Benton Co.)	1.50	1.60	1.61	1.55	1.64
Okanogan Co. unincorp.	13.38	13.28	11.16	10.31	10.66
Okanogan City	0.30	0.27	0.37	0.34	0.33
Chelan Co. unincorp	2.19	2.52	3.17	3.86	4.26
Wenatchee (Chelan Co.)	0.88	0.87	0.88	0.88	0.87
East Wenatchee (Douglas Co.)	0.73	0.51	0.73	0.76	0.78
Douglas Co	16.14	17.74	16.91	22.71	15.13

# Two Local Estimation Methodologies

- **1. A similar frame work**
  - A pair-wise analysis where locations (e.g. cities) have one nearby, low-tax competitor location
- **2. A more general analysis**
  - Where shoppers can choose from multiple, nearby locations based on relative prices and  $1/\text{distance}^2$ . The relative price variable is then a weighted average of feasible competitor prices.