Sales Tax Collections in Nonmetropolitan Communities

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When nonmetropolitan community sales tax rates exceed the mean, a one cent increase in the rate results in a 0.74 to 0.86 cent increase in taxable sales/collections.

INTRODUCTION

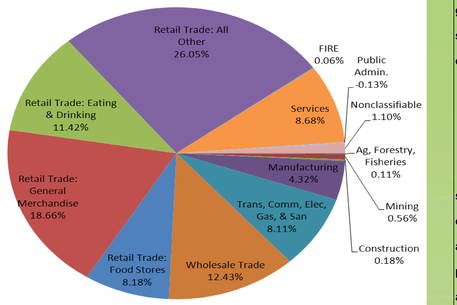
Non-metropolitan communities face budget challenges. Many downtown shopping areas have withered as shoppers turn to regional trade centers and super-stores for lower prices, more variety, and one-stop shopping. Small communities experiencing these economic phenomena suffer not only the loss of trade activity, but also the loss of tax revenue to support local public services and infrastructure. Sales tax rates may be the only politically viable option. Yet, as rates rise, the effective price of taxable goods rises and a consumer response is expected. Because rural community survival may depend on a viable tax base, this paper seeks to address the question: how much increased revenue can a community expect from increasing local sales tax rates? Communities need this information to choose between increasing rates or not and to forecast revenues for budgets when rates change.

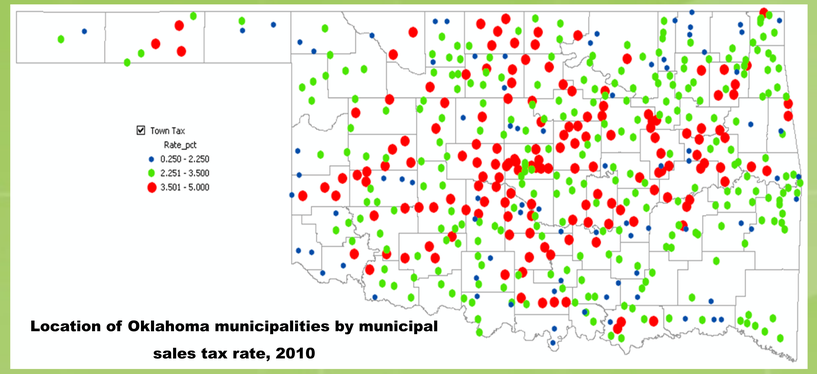
BACKGROUND

Several studies find decreased local retail trade in communities' whose local sales tax rate exceeds that of surrounding communities (Fisher 1980; Love 1992; Mikesell 1970; Snodgrass and Otto 1990; Walsh and Jones 1998). Other studies explore the factors affecting the relative level of retail activity, measured by pull-factors, in rural areas (Ebai and Harris 1997; Gale 1996; Gruidl and Andrianocos 1994; Yanagida, et al. 1991). Here, the questions are aimed at the closely related questions of local government revenue generation. Research consistently finds that internet sales increase where sales taxes are high (Ballard and Lee 2007; Ellison and Ellison 2009; Anderson et al. 2010).

The average city sales tax rate in Oklahoma increased from 2.1% in 1980 to 3.2% in 1999 (Dauffenbach 2000). The rate was 3.25% in 2010. The average county rate increased from 0.01% in 1984 to 1.05% in 2010. City rates vary from 1% to 5% while county rates range from 0% to 2%. The state sales tax rate is 4.5%. The average total sales tax rate for fiscal year 2006 was 8.495%.

Oklahoma sales tax receipts by sector, fiscal year 2011





Location of Oklahoma municipalities by municipal sales tax rate, 2010

METHOD

We go beyond past literature that used linear models by using a semiparametric regression that lets us better determine the point at which sales tax rates begin to cause a decline in retail sales. The semiparametric approach leads us to find that once local sales tax rates exceed a threshold of four percent, retail sales decline sharply with increases in tax rates. This finding would have been missed if only a linear model had been used. Several studies have found decreased local retail trade in communities' whose local sales tax rate exceeds that of surrounding communities. Other studies have explored the factors affecting the relative level of retail activity, measured by pull-factors, in rural areas.

The econometric model uses local government taxable retail sales as the dependent variable (sales collections divided by the sales tax rate for each locale.) The independent variables include per capita personal income, population, county plus municipal sales tax rate, and USDA's rural-urban continuum code. Socio-economic variables, such as age groups, are not included. The primary reason for their exclusion is the lack of time-series data for these variables. Also, since city fixed effects are included, any cross-sectional variation in such variables is already captured by the city fixed effects so any bias created by omitting such variables is likely small.

A log-log model is used of the form:

$$(1)\ \ln(sales_{mt}) = \beta_0 + S(\ln(rate_{mt})) + \beta_2 \ln(Pop_{mt}) + \beta_3 \ln(Mpci_{mt}) + \sum_{i=1}^{6} \gamma_i U_{imt} + u_m + v_t + \varepsilon_{mt}$$

where $sales_{mt}$ is monthly average taxable retail sales in municipality m and year t, $rate_{mt}$ is the county plus municipal sales tax rate, Pop_{mt} is the estimated municipal population by BEA or the Census, and $Mpci_{mt}$ is municipal per capita income based on the 1990 census and scaled to other years using the gross national product implicit price deflator. U_{imt} are indicator variables reflecting the rural-urban continuum code defined by ERS USDA which takes into account county populations and county location relative to urban areas. A Gaussian error term is used so $\varepsilon_{mt} \sim N(0, \sigma^2)$ and v_t are fixed effects for year, while u_m are fixed effects for municipality.

DATA

The data are annual data for nonmetro Oklahoma counties over 1984 – 2010. Every Oklahoma local government that collected a sales tax is included with a few exceptions. Sales tax rates and collections span 1984 through 2010. The monthly sales tax collections average only $13/person/month so the tax amounts are small for most people.

Regression Model of the Natural Logarithm of Retail Sales for Oklahoma Communities

Variable	Estimate	t value	Estimate	t value
Intercept	7.79	17.17	7.92	18.04
Ln(sales tax rate)	-0.034	-2.08	-0.004	-0.19
Ln(high sales tax rate)			-0.24	-5.01
Ln(population)	0.34	10.46	0.34	10.48
Ln(per capita income)	0.52	20.73	0.52	20.41
Rural codes (F-value)	23.02		23.85	
Municipality (F-value)	8.04E12		3.38E13	
Year random effect	0.008	7.29	0.008	
Spatial	2.52	3.31	2.54	
Residual	0.54	11.79	0.054	
-2 log likelihood	1381.2		1367.8	
N	10802		10802	

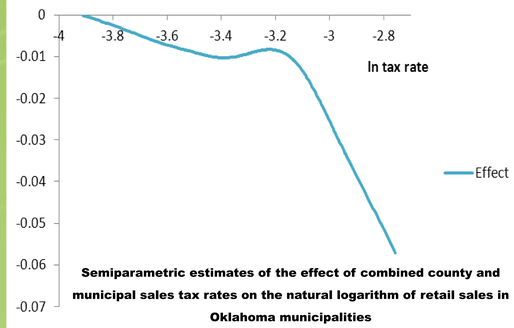
Note: The data are annual. Models were estimated using restricted maximum likelihood. The sales tax rate is the sum of city and county rates. The spatial distance is measured in degrees. A degree of latitude is approximately 69 miles and a degree of longitude in Oklahoma is approximately 56 miles. Thus, the spatial coefficient of 2.54 means that spatial autocorrelation extends roughly 160 miles or over half the distance across Oklahoma.

RESULTS

The semiparametric estimator does not impose a specific functional relationship between retail sales and sales tax rates. The semiparametric estimator worked well here as it found a highly nonlinear relationship that would have been missed if only a linear model had been used. The semiparametric model was used to specify a parametric model that could match the functional form suggested by the semiparametric model.

Using the semiparametric model, an elasticity of -0.125 translates into a tax rate slippage of 14% for tax rate increases above 4 percent.

The nonlinear parametric model shows that tax rates are statistically insignificant until they reach 4 cents. Tax rates above 4 cents, however, have an elasticity of -0.24, nearly double the estimate with the semiparametric model, which translates into slippage of 26% for an increase in sales tax rates from 4 cents to 5 cents.



Semiparametric estimates of the effect of combined county and municipal sales tax rates on the natural logarithm of retail sales in Oklahoma municipalities

CONCLUSIONS

The key finding is that the effect of the local sales tax rate on retail sales is near zero until sales tax rates reach about four percent. As long as communities keep the combined county and municipal rate below four percent, there should be little loss in sales from increased sales tax rates. At sales tax rates above four percent, retail sales decrease sharply. In 2010, combined city and county rates averaged 4.3 percent. Thus, most communities are already at the point where increasing tax rates will cause a substantial drop in sales, but revenues will still go up as the response remains inelastic over the range of data observed. More specifically, most communities are at the point that a penny increase in sales tax rate from four cents to five cents is expected to increase revenues by only 0.74 cents to 0.86 cents instead of one cent. The implications for financing public goods are substantial, setting the stage for significant policy debate.

ACKNOWLEDGEMENTS

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