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Are Traffic Tickets Countercyclical?

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Abstract

There is anecdotal evidence that local governments use traffic tickets to generate revenue. Using panel data for North Carolina counties, we examine whether changes in local government revenue influence the number of traffic tickets issued. We find strong evidence of an asymmetric response by local governments. Specifically, positive changes in revenue have no effect on traffic tickets, but negative revenue changes increase the number of traffic tickets issued. A one percentage point decrease in revenue yields a 0.38 percentage point increase in traffic tickets. We calculate that traffic ticket revenue supplements a low percentage of local revenue losses.

JEL Codes: H72, D72

Keywords: traffic tickets, revenue smoothing, local governments

[*] The views expressed here are those of the authors and not those of the Federal Reserve Bank of St. Louis or the Federal Reserve System.

Are Traffic Tickets Countercyclical?

"[Traffic tickets] provide needed revenue."[1]

I. Introduction

There are roughly 87,000 local taxing jurisdictions in the United States.[2] Local governments amassed nearly $420 billion in tax revenue in 2004, or roughly $1,420 per capita. Compared to per capita tax revenues of $759 in 1970 (2004 dollars), the near doubling of local government tax revenue since that time approximates the increase in state government revenue since 1970 ($886 per capita in 1970 versus $2,010 in 2004). Local governments predominately rely on property tax revenues to fund local expenditures, but their reliance on property tax revenue has decreased from 87 percent of all tax revenue in 1970 to 73 percent of all tax revenue in 2004 as more local governments imposed local income and sales taxes.[3]

The growth in local government revenue and the local government tax mix is a result of economic conditions, voter preferences, industry mix, and the political behavior and incentives of state legislators (Besley and Case, 2003; Crain, 2003). As local tax bases have been exhausted and public opposition to increases in local tax rates has increased over time, local governments face increased pressures to find alternative sources of revenues. In addition, economic downturns often increase the demand for government services but result in less revenue since most local government tax revenues

[1] Quote from a city official in Milwaukee, Wisconsin. See "Ticketing By Police Drops 50%," *Milwaukee Journal Sentinel,* Page 1B, March 30, 2001.
[2] Fisher (1996).
[3] State and local government tax data are from the U.S. Census Bureau, *Statistical Abstract of the United States*, various years. Local income and sales taxes accounted for 1.5 percent and 7.4 percent of local government tax revenue in 1970, respectively, compared with 5.5 percent and 16.7 percent in 2004, respectively.

are procyclical (Holcombe and Sobel, 1996, 1997; Crain, 2003). Although local governments are more insulated from economic downturns than state governments because property tax revenue is more stable over the business cycle than other revenue sources, the increased reliance on sales and income taxes by local governments has increased their susceptibility to budget hardships during economic downturns. This was seen by the budget crises faced by state and local governments following the 2001 recession when many state and local governments experienced revenue decreases in excess of 5 percent (NASBO, 2002).

Given increased pressures on obtaining local revenue from traditional sources and the increased variability of local government revenue, it seems reasonable that local government officials would have a desire to obtain revenues through indirect, less traditional sources. State governments have done this through state lotteries and the taxation of casino gaming. One very common indirect revenue source for local governments is traffic tickets.

There is anecdotal evidence that local governments rely on traffic tickets to generate additional local revenue. After a recent decrease in the number of traffic tickets issued in Milwaukee, Wisconsin, one city official expressed concern since traffic tickets provide much needed revenue to the local government.[4] City officials in Houston, Texas predicted that the number of traffic tickets issued was expected to rise again due to budget cuts resulting from reduced traffic fines.[5] The mayor of Nashville, Tennessee included a 33 percent increase in traffic ticket revenue in his final city budget.[6] Finally,

[4] See "Ticketing By Police Drops 50%," *Milwaukee Journal Sentinel,* Page 1B, March 30, 2001.
[5] "Traffic Tickets to rise again, city says." *The Houston Chronicle*, Section A, Page 1, December 13, 1999.
[6] "Traffic stops just the ticket for Metro budget." *Tennessean,* May 28, 2006.

in a discussion of traffic tickets in Washington, D.C., a city councilman claimed "With the financial situation of the city today, it's not a matter of reducing…we need every penny we can get."[7]

This anecdotal evidence suggests there are two potential objectives of local governments – revenue smoothing and revenue generation – and that traffic tickets can be used to meet these objectives.[8] Although there is anecdotal evidence that local governments use traffic ticket revenues to replace or supplement revenue from traditional sources, there have been no empirical studies that confirm or refute this possibility.

Using data on county governments in North Carolina over the period 1990 to 2003, this paper examines whether changes in local government revenue influence the number of traffic tickets issued. The empirical models are designed to capture any asymmetric effects of positive or negative revenue changes on traffic tickets, with the idea that opposing revenue changes of equal magnitude may create different responses by local governments. We find that changes in local revenues do affect the number of traffic tickets issued, and that the effect is highly asymmetric.

II. Data Description and Discussion

The number of traffic tickets issued in a county is a function of county demographics and a given level of law enforcement (Lee, 1985; Lave 1985; Graves et al., 1999). Year to year changes in the number of tickets thus come from changes in county

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[7] "Parking Fines: Just the Revenue Ticket?" *Governing Magazine*, March 1995. See http://governing.com/archive/1995/mar/fines.txt.

[8] For our purposes, we equate revenue smoothing with minimizing or reducing the variability in local government revenue over time via an optimal tax mix. Revenue smoothing has a somewhat different meaning in the macroeconomics literature. Mankiw (1987) developed the revenue smoothing hypothesis, which argues that an increase in government revenue requirements should increase the use of both taxes and inflation (see also Poterba and Rotemberg, 1990). Clearly inflation control is beyond the powers of local government.

demographics and changes in traffic law enforcement. Changes in the enforcement of traffic laws can be a result of two factors: 1) increases or decreases in public safety campaigns (e.g. click-it-or-ticket) that are independent of local revenue conditions (Polinsky and Shavell, 1992), or 2) changes in local revenue that result in local governments demanding more or less enforcement in order to generate the desired revenue from traffic tickets.

We use county level data from North Carolina counties over the period 1990 - 2003.[9] In order to isolate the local revenue effect on the issuance of traffic tickets, our empirical models control for changes in county demographics and changes in traffic law enforcement that are independent of local revenue changes. Because we are interested in how changes in revenues affect traffic tickets, all of our variables are in annual percent changes. All monetary and count variables are normalized by county population to account for heterogeneity across counties. The majority of our county level data (unless specified otherwise) come from LINC (Log into North Carolina), an online database containing over 1,300 data items on local governments in North Carolina.[10] The remainder of this section discusses the variables we use in our empirical models. Descriptive statistics for each variable are provided in Table 1.

[Table 1 about here]

Traffic Tickets

The annual number of traffic tickets issued in each county is the number of traffic infraction cases filed in District Court. All traffic tickets issued by law enforcement are

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[9] Our sample period was dictated by data availability.
[10] LINC can be accessed at http://linc.state.nc.us/

filed in District Court regardless of whether or not the violator appeals the ticket. Traffic infractions include speeding, failure to yield, following to closely, etc.[11] Over the sample period 1989 to 2003, the number of traffic tickets issued in a county ranged from a low of 369 to a high of 57,404, with a mean value of 7,000. Traffic tickets per capita ranged from 0.034 to 1.066 and averaged 0.111. Descriptive statistics on the annual percentage change in traffic tickets are shown in Table 1.

Local Government Revenue

Our key independent variable is local government revenue per capita. This variable is the sum of the six major revenue sources for local governments in North Carolina: Federal aid to local governments, state aid to local governments, property taxes, license taxes, permits and fees, and local sales taxes. North Carolina is one of 31 states with a local sales tax option, and all counties in the state have a sales tax. Over the sample period, the average contribution of each revenue source toward total local government revenue was, in descending order: property taxes (50 percent), sales taxes (20 percent), state aid to local governments (17 percent), federal aid to local governments (10 percent), license taxes (2 percent), and permits and fees (1 percent). Local government revenue ranged from $165 per capita to $1,918 per capita over the sample period, with an average value of $572 per capita.

Despite any forecasts, local governments do not know their actual revenue until the end of the budget cycle in a given year. In addition, local government fiscal policies in year *t* are often based on revenue conditions in year *t-1* (Wong, 1995; Cirincione et al., 1999). As a result, it seems reasonable that there would be a lag between changes in

[11] A list of all traffic offenses can be found at http://www.aoc.state.nc.us/magistrate/waivable.htm.

local government revenue and traffic tickets. Our models thus consider that local revenue changes in year *t-1* influence changes in traffic tickets in year *t*.

Not only are we interested in how local revenue changes influence the number of traffic tickets issued, we are also interested if positive and negative revenue changes have a different effect on the number of traffic tickets issued. That is, we wish to test for asymmetric responses from positive and negative revenue changes. Our lagged revenue variable is therefore separated into two variables. One variable contains only positive revenue changes and '0' otherwise; the second variable contains only negative revenue changes and '0' otherwise. If traffic tickets are countercyclical with regard to local government revenue, we expect a decrease in local revenue to have a positive influence on the number of traffic tickets and an increase in revenue to have a negative increase on the number of traffic tickets. A perfect asymmetric response can be testing the null hypothesis that the sum of the two revenue variables equals zero.

Demographic and Economic Controls

We include several demographic variables to control for county characteristics. These variables include population density, the number of registered vehicles per capita, the percent of the population aged 15 to 24, the percent of the population registered to vote, and tourism expenditures per capita. *Population density*, the number of people per square mile, is included to capture potential differences in the number of traffic tickets issued in rural versus more urban areas. *Registered vehicles per capita* is included to reflect the idea that more vehicles on the road may translate into a greater number of traffic tickets.[12] The *percent of the population aged 15 to 24* controls for the population segment that is traditionally considered the 'highest risk' by car insurance companies. According to the National Highway Transportation and Safety Administration, individuals aged 15 to 24 are the most likely to be involved in a traffic accident and traffic accidents are also the leading cause of death for individuals in this age group.[13] A relative increase in this segment of the population thus suggests more traffic tickets. The *percentage of the county population registered to vote* is included to capture the political strength of the electorate. It seems reasonable that local governments may be less likely to use traffic tickets for revenue generation rather than pure law enforcement if the constituency is politically active.

Tourist counties have a relatively large amount of traffic from out-of-county residents. Tourism is the largest economic sector in many North Carolina counties, especially those along the coast and in the Western region of the state. A greater traffic flow in these counties suggests a higher level of traffic tickets. Also, local law enforcement may be more likely to issue tickets to tourists because there is a lower probability that tourists will contest the tickets. Thus, *tourism expenditures per capita* is included in the models to account for greater out-of-county traffic and a lower probability of contesting traffic tickets by visitors.[14]

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[12] Registrations are for automobiles and trucks in the county vehicles were registered. Excluded are registrations for trailers, buses, motorcycles, dealers, transporters, drive away and public-owned passenger vehicles, mobile homes, tractor trucks, and wreckers.
[13] See http://www-nrd.nhtsa.dot.gov/pdf/nrd-30/NCSA/TSF2003/809774.pdf.
[14] Tourism expenditures are the total domestic travel spending at the county level produced through the County Travel Economic Impact Model, a computerized economic model that is an extension of the U. S. Travel Data Center's Travel Economic Impact Model. Estimates represent expenditures by U. S. residents traveling in North Carolina. This includes both state residents and out-of-state visitors traveling away from home overnight or on day trips to places 100 miles or more away from home during the calendar year. Excluded is travel commuting to and from work; travel by those operating an airplane, bus, truck, or other

The county *unemployment rate* is also considered in the empirical models. Changes in the county unemployment rate reflect changes in more recent economic conditions that are not captured by the local government revenue variables since the revenue variables are lagged by one period. The local government revenue variables also do not capture the changes in the expenditure side of local government that may result from changes in economic conditions. Changes in the county unemployment rate may thus reflect a greater demand for local government services during economic downturns, which may then increase the likelihood that traffic ticket would be used as an alternative revenue source.

Enforcement Controls

The local government revenue variables described earlier are designed to capture the possibility that local governments will demand more or less law enforcement in response to local revenue in order to generate desired revenue from traffic tickets. Law enforcement changes can also occur independently of local government revenue changes. Examples include an increase in citizen demand for police presence and enforcement, a focus on public safety campaigns, or recognition by law enforcement officials that more enforcement is needed (e.g. a better allocation of police resources toward traffic law enforcement).

We include several variables to capture changes in law enforcement. County *public safety expenditures* per capita reflect changes in resources available to police

form of common carrier transportation; military travel on active duty; travel by students away at school; and travel by foreign visitors. See http://linc.state.nc.us/ for more information.

officers and other county public safety personnel.[15] The change in the *number of law enforcement officers* per capita is included as a measure of change in police presence.[16] Finally, the one-year lag of *the number of traffic accidents* is considered in the models.[17] Presumably, a greater number of traffic accidents in a county in year *t-1* may increase the demand (either from citizens or law enforcement) for greater traffic law enforcement in year *t*.

III. Empirical Methodology and Results

The annual percentage change in traffic tickets is regressed on the local government revenue variables and the economic, demographic, and law enforcement variables.[18,19] We consider four different empirical specifications as a test of robustness across specifications. Year dummy variables are included in several models to account for unobserved temporal factors that may have influenced changes in traffic tickets.[20]

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[15] County public safety expenditures are for the following categories: police and communications, emergency communications, emergency management, fire, inspectors, rescue units, animal control, jails and medical examiners/coroners. From http://linc.state.nc.us/.

[16] The number of law enforcement officers by county are obtained from "Crime in North Carolina" published by the North Carolina Department of Justice.

[17] A reportable accident is one that involves a motor vehicle resulting in injury, death, or total property damage of $1,000 or more. The property damage amount was $500 until January 1, 1996. From http://linc.state.nc.us/.

[18] The regressions use data for 96 of the 100 counties in North Carolina. Four counties were omitted due to lack of complete data. Initial estimates also considered a dummy variable for rural counties, per capita income, payroll employment, road miles, and net migration. The coefficients on these variables were not statistically significant and the inclusion of the variables in the models did not change the significance or magnitudes of the other coefficients.

[19] We initially estimated the models using each of the six components of total revenue (property taxes, sales taxes, license taxes, permits and fees, state aid, and federal aid) rather than the single total revenue variable in hopes of capturing differences in the effect of changes in each revenue source on traffic tickets. None of the variables were statistically significant. Diagnostic tests revealed relatively large standard deviations for each variable compared to the total revenue variable. Summing the six revenue variables thus produces a total revenue variable with relatively less variation than the individual revenue series. See Garrett (2003).

[20] County dummy variables were also considered, but F-tests on the joint hypothesis that the coefficients equal zero could not be rejected at conventional levels. None of the individual county dummy coefficients were statistically significant, and the inclusion of the county dummy variables lowered the adjusted r-squared by roughly 0.05.

The one period lag of the dependent variable is also included in the models to account for potential serial correlation. In addition, our fourth specification considers both a one year lag and a two year lag in the local government revenue variables. The idea is that local governments may not only adjust traffic tickets in response to revenue changes last year, but also the year before. The coefficients estimates from the four empirical specifications are shown in Table 2.

[Table 2 about here]

Focusing first on the economic, demographic, and law enforcement control variables, the results in Table 2 reveal that several of the coefficients on these variables are statistically significant, but only a few coefficient estimates are robust across specifications. Changes in the unemployment rate have a negative and significant effect on changes in traffic tickets in all four specifications. This suggests that contemporaneous changes in local economic conditions have an effect on traffic tickets. Specifically, a one percentage point increase in the unemployment rate results in a 6.4 percentage point (averaging across specifications) increase in the number of traffic tickets. The other variable consistent across specifications is changes in population density. The results suggest that an increase in population density results in a decrease in the number of traffic tickets issued. Since this variable essentially captures increases in county population (since county area is fixed), the negative coefficient reveals that traffic tickets per capita decrease with increases in population, or that population rises faster than the number of traffic tickets.

The public safety expenditures coefficient is negative and significant in the first two specifications, but is insignificant in the models that include year dummy variables.

Similarly, the percentage change in registered voters is negative and significant in only the first specification, thus providing only marginal evidence that an increase in the political awareness of the constituency leads to a decrease in the number of traffic tickets issued.

Although the coefficients on each of the year dummy variables (2003 is omitted) are not reported for the sake of brevity, they do provide some insights. First, all but two of the year dummies is statistically significant (1991 and 1998), and all but two are positive (1991 and 2000 are negative).[21] This suggests that, on average, the change in traffic tickets is positive for the majority of years in the sample period. Perhaps the most interesting finding is that the coefficient on the 2001 year dummy is the largest (0.12), reflecting that during the most recent recession year the average percentage change in traffic tickets was roughly 12 percent.

The coefficients on the local revenue variables are of greatest interest. Across all four specifications, we find that positive changes in revenues have no statistical effect on changes in the number of traffic tickets, but negative revenue changes have a relatively large and negative effect on traffic tickets. Because non-zero values of the negative revenue variable are negative, the negative coefficient reveals that a decrease in local government revenues in the previous year results in a positive increase in the number of traffic tickets in the current year. If we average the negative revenue coefficients across specifications, we find that a one percentage point decrease in local government revenues last period results in a 0.38 percentage point increase in the number of traffic tickets.

The evidence suggests an asymmetric response of local governments to changes in local government revenue. Traffic tickets are countercyclical in response to decreases

[21] The coefficients range from -0.08 to 0.12.

in local government revenue, whereas tickets are acyclical in response to increases in local government revenue. F-tests conducted on the null hypothesis that the sum of the two revenue coefficients is equal to zero results in a rejection for each of the three empirical specifications. The positive traffic ticket effect resulting from decreases in local government revenue appear to occur with a one year lag only since the two year lagged revenue variables are not statistically significant.

The coefficients on the local government revenue variables provide evidence of asymmetric revenue smoothing. The fact that local governments increase traffic tickets during periods of revenue decreases but do not decrease traffic tickets in response to revenue increases reveals some degree of revenue maximization on the part of local governments. If local governments were truly revenue smoothers, then one would expected the positive and negative revenue coefficients to be of opposing signs but equal in magnitude. The fact that local governments increase traffic tickets to counter local revenue losses but do not decrease traffic tickets to counter revenue gains suggests that local governments behave, to some degree, as revenue maximizers. This is not to suggest that local governments behave as Leviathan (Brennan and Buchanan, 1977; Oates, 1985), but rather local governments behave more like constrained revenue maximizers (constrained by economic conditions and citizen preferences) or zealous revenue generators.[22]

[22] Since our results suggest that, controlling for other factors, the number of traffic tickets issued changes in a systematic manner in response to local fiscal conditions rather than systematic changes in driving behavior, decreases in local government revenue may improve the efficiency of automobile insurance markets by reducing the asymmetric information between insurers and drivers. While numerous empirical studies of asymmetric information in the automobile insurance exist (see Chaippori, 2001 for a recent review), we are not aware of any study that examines local fiscal conditions as a potential means to reduce asymmetric information.

Revenue Effects

The empirical results discussed provide interesting insights into local governments' use of traffic tickets in response to local revenue changes. What the results cannot tell us, however, is how local government revenue changes influence traffic ticket revenue. Not only are local governments concerned with the quantity of tickets (at least in response to negative revenue changes), it is the revenue from these tickets that supplements local revenue losses. Specifically, we would like to know what percentage of local revenue losses are supplemented by traffic ticket revenue. To our knowledge, there is no available data on traffic ticket revenue by county. Although fines for most traffic violations are set by state legislatures and there are different fines for different traffic violations, we have no way of determining the fraction of total tickets that comes from various traffic violations. Despite the lack of actual traffic ticket revenue data, the coefficient estimates in Table 2 and other descriptive statistics can be used to arrive at a very rough idea of how much traffic ticket revenue supplements local revenue losses. This analysis is discussed below.

The North Carolina Magistrates Association (NCMA) provides a list of all traffic infractions and the fines associated with each infraction (set by the state legislature).[23] There are about 35 different traffic infractions with fines ranging from $5 to $250. Assuming that each of the 35 infractions are represented equally in a county's total number of traffic tickets issued, then taking an average of all traffic fines listed by NCMA gives an average traffic fine of $50. Because traffic tickets per capita average 0.11 over the sample period and each traffic ticket is assumed to be $50, average traffic

[23] See http://www.aoc.state.nc.us/magistrate/waivable.htm

ticket revenue per capita is thus \$5.50. Total local government revenue per capita over the sample period (see Section II) averaged \$572.

Starting from 100 percent of the mean values of traffic ticket revenue per capita and local government revenue per capita (\$5.50 and \$572, respectively), a percentage point change is equal to a percent change. Thus, a one percentage point decrease in local government revenue is equal to \$5.72 (\$572 · 0.01) and a one percentage point increase in traffic ticket revenue is \$0.055 (\$5.5 · 0.01). The negative revenue coefficients in Table 2 reveal that a one percentage point decrease in local revenue results in a 0.38 percentage point increase in traffic tickets. This translates into a traffic ticket revenue increase of 2.1 cents per capita (0.055 · 0.38). Therefore, a one percentage point decrease in local government revenue per capita (\$5.72) is offset by an increase in traffic ticket revenue of 2.1 cents per capita. Or, traffic tickets supplement about 0.37 percent (\$0.021/\$5.72) of the total decrease in local government revenue.

In sum, although traffic ticket tickets (and ticket revenue) do increase in response to negative changes in local government revenues, the revenues from traffic tickets supplement a very small percentage of the total revenue loss. This could be a result of two factors. First, per capita traffic ticket revenue (\$5.50) is roughly 1 percent of local government revenue (\$572) over the sample period. Given the relatively small contribution of traffic ticket revenue to local government revenue, it is not too surprising that traffic tickets do not significantly supplement local government revenue losses.[24]

[24] A similar analysis was conducted using sales tax revenue rather than total revenue. Sales tax revenues per capita averaged \$112.47 per capita over the sample period, so a one percentage point decrease in sales tax revenue is \$1.12. Assuming the effects of local revenue and sales tax revenue are the same (an arguably strong assumption), then a one percentage point decrease in sales tax revenue results in a 0.38 percentage point increase in traffic tickets. As before, this translates into a traffic ticket revenue increase of 2.1 cents per capita (0.055 · 0.38). Thus, traffic tickets supplement about 1.9 percent (\$0.021/\$1.12) of the total decrease in sales tax revenue.

Certainly, however, local governments are aware the traffic ticket revenue cannot supplement a significant portion of lost local revenue, but rather traffic ticket revenue can help, to a small degree, in reducing the effects of local revenue losses. Second, issuing more traffic tickets requires more law enforcement, which draws scarce law enforcement resources from other police activities, such as criminal investigations, trainings, etc. into traffic enforcement. Despite the desire for greater revenue from traffic tickets, trainings and criminal investigations by the police may be higher priorities for local governments than traffic enforcement. Thus, local governments try to get more traffic enforcement, but are constrained by other priorities. Similarly, reallocating scare police resources is likely difficult over short periods of time.

IV. Summary and Conclusions

There is ample anecdotal evidence that local government use traffic tickets as a means of generating revenue. This paper provided the first empirical of the hypothesis that local governments do indeed use traffic tickets to increase revenue. Our analysis focused on North Carolina counties over the period 1990 to 2003. The evidence present here suggests an asymmetric response of local governments to changes in local government revenue. Specifically, positive changes in local revenues have no statistical effect on changes in the number of traffic tickets, but negative changes in revenue have positive effect on traffic tickets. A one percentage point decrease in lagged local government revenues results in a 0.38 percentage point increase in the number of traffic tickets.

The results thus suggest that traffic tickets behave countercyclical to decreases in local government revenue, whereas tickets are acyclical in response to increases in local government revenue. Local governments in North Carolina are adverse to negative changes in revenue and local governments do not practice pure revenue smoothing since the number of traffic tickets issued does not decrease during periods of local government revenue growth. Traffic tickets appear to be a steady source of revenue for local governments, and this revenue source is tapped more heavily during periods of negative revenue growth.

Future research on the issue can focus on several points. First, this study used the changes in the number of traffic tickets as the dependent variable rather than changes in traffic ticket revenue given the absence of these data for North Carolina counties. Traffic ticket revenue data would allow a more precise analysis of the degree to which traffic ticket revenues supplement losses in local revenue. Rough calculations presented here suggest this effect is quite small, but actual ticket revenue data is likely to provide more precise estimates. Second, the focus of this study was North Carolina counties. The results here should not be generalized for other areas of the country, so it seems reasonable that similar studies to the one done here should be undertaken for other regions of the country. Finally, if data is available, a longer time horizon that includes more recessionary and expansionary periods and a focus on specific cities or town could prove useful.

Table 1 – Descriptive Statistics

Variable	Mean	Stand. Dev.	Minimum	Maximum
Traffic Tickets	0.0075	0.1747	-0.4023	1.028
Positive Local Revenue	0.0823	0.0970	0	1.016
Negative Local Revenue	-0.0109	0.0348	-0.3445	0
Unemployment Rate	0.0681	0.2694	-0.6104	2.238
Public Safety Expenditures	0.0935	0.1816	-0.5135	1.934
Vehicle Registrations	0.0067	0.0187	-0.1914	0.2755
Population 15 to 24	-0.0090	0.0195	-0.1458	0.1277
Population Density	0.0147	0.0134	-0.0563	0.0817
Tourism Expenditures	0.0406	0.1459	-0.7926	3.4843
Registered Voters	0.0176	0.0637	-0.2202	0.3593
Traffic accidents	0.0067	0.0967	-0.2820	0.4663
Law Enforcement officers	0.0170	0.0928	-0.6348	0.8842

Note: All data are in annual percent changes. Descriptive statistics are based on level data from 1990 to 2003 for North Carolina counties. Sample size is 1344. See text for description of sample and data.

Table 2 – Effect of Local Revenue Changes on Traffic Tickets

Variable	(1)	(2)	(3)	(4)
Constant	0.021** (0.009)	0.011 (0.011)	-0.045*** (0.017)	-0.041** (0.018)
Positive Revenue Change (t-1)	-------	0.053 (0.055)	0.082 (0.053)	0.088 (0.053)
Negative Revenue Change (t-1)	-------	-0.414** (0.164)	-0.378** (0.149)	-0.344** (0.170)
Positive Revenue Change (t-2)	-------	-------	-------	0.026 (0.054)
Negative Revenue Change (t-2)	-------	-------	-------	0.160 (0.154)
Traffic Tickets (t-1)	-0.140*** (0.032)	-0.139*** (0.031)	-0.124*** (0.030)	-0.123*** (0.031)
Unemployment Rate	0.068*** (0.018)	0.066*** (0.018)	0.063*** (0.022)	0.063*** (0.022)
Public Safety Expenditures	-0.051** (0.023)	-0.051** (0.023)	-0.025 (0.022)	-0.026 (0.022)
Vehicle Registrations	0.248 (0.252)	0.238 (0.249)	0.134 (0.255)	0.140 (0.252)
Population aged 15 to 24	0.153 (0.280)	0.044 (0.298)	0.055 (0.322)	0.055 (0.322)
Population Density	-0.737** (0.372)	-0.672* (0.372)	-0.853** (0.361)	-0.848** (0.360)
Tourism Expenditures	0.021 (0.022)	0.018 (0.019)	0.019 (0.020)	0.018 (0.021)
Registered Voters	-0.129* (0.078)	-0.123 (0.076)	-0.134 (0.126)	-0.132 (0.126)
Traffic Accidents (t-1)	-0.048 (0.055)	-0.044 (0.055)	-0.074 (0.061)	-0.073 (0.060)
Law Enforcement Officers	0.060 (0.056)	0.059 (0.057)	0.054 (0.058)	0.057 (0.058)
Year Dummy Variables	No	No	Yes	Yes
F-test: H_0: $\beta_2+\beta_3 = 0$	-------	7.027***	4.800**	2.805*
Adjusted R^2	0.037	0.042	0.111	0.111
Number of Observations	1344	1344	1344	1344

Note: *** denotes significance at 1 percent, ** at 5 percent, * at 10 percent. Heteroscedasticity corrected standard errors in parenthesis. Dependent variable is the annual percent change in the number of traffic tickets. All continuous independent variables are in annual percent changes. See text for description of independent variables. Sample is 96 counties in North Carolina from 1990 to 2003.

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