

# **IMPACT OF CLEAN INDOOR AIR ORDINANCES ON RESTAURANT REVENUES IN FOUR TEXAS CITIES**

ARLINGTON, AUSTIN, PLANO AND WICHITA FALLS  
1987–1999

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## EXECUTIVE SUMMARY

The impact of clean indoor air ordinances on restaurant revenues is an important consideration in the effective implementation and sustainability of these public health policies.

Clean indoor air ordinances in the Texas cities of Arlington, Austin, Plano and Wichita Falls have been fully implemented since July 1994, March 1996, August 1995 and July 1995, respectively. Although there are minor differences in the breadth of these ordinances in their respective communities, guidelines for restaurant implementation are nearly identical.

Evaluation of the effect of these ordinances on restaurant sales was performed utilizing quarterly aggregate restaurant and retail sales data obtained from the Texas state comptroller's office, from the first quarter of 1987 through the last quarter of 1999. Total restaurant sales and total restaurants sales as a proportion of total retail sales (to control for economic growth) were analyzed by a time-series linear regression model that included explanatory variables to investigate the economic effect of clean indoor air ordinance implementation, quarterly (seasonal) trends and in the case of Arlington, the effect of a new sports stadium.

For the cities studied, the results demonstrate that clean indoor air ordinance implementation had no detrimental effect on restaurant sales, either in total or as a proportion of total retail sales.

**Conclusion:** The results of these analyses support previously published reports showing no detrimental effect of clean indoor air ordinances on restaurant revenues and provide relevant regional economic data to assist Texas communities in making informed public health policy.

## **Introduction**

The body of scientific evidence on the dangers of environmental tobacco smoke (ETS) continues to increase and is now well documented.<sup>1-4</sup> Environmental tobacco smoke is now classified by the U.S Environmental Protection Agency as a Group A (known human) carcinogen.<sup>5</sup> To protect the public from the effects of ETS, many communities have enacted clean indoor air ordinances.

As public awareness to the dangers of secondhand smoke grow and subsequent public pressure is applied to implement clean indoor air ordinances, anecdotal evidence has been brought forth citing potential declines in restaurant sales for establishments that implement clean indoor air ordinances. Although sound scientific data now exists refuting these claims,<sup>6-8</sup> regional economic data is needed to allow informed decisions when implementing clean indoor air ordinances.

For this analysis, four Texas cities with disparate economic bases and varied geographic location were analyzed. The cities under study, Arlington, Austin, Plano, and Wichita Falls, have had fully implemented clean indoor air ordinances in effect since July 1994, March 1996, August 1995, and July 1995, respectively. This report examines thirteen years of data to assess the economic impact of these ordinances on restaurant revenues.

## Methods

Quarterly data, from the first quarter of 1987 through the fourth quarter of 1999, for taxable restaurant sales and total retail sales were obtained from the Texas state comptroller's office for the four cities. Total restaurant sales (per \$1,000,000) and total restaurant sales as a fraction of total retail sales were analyzed for trend by a linear regression model to assess the economic impact of clean indoor air ordinances.<sup>9</sup> Dummy variables, indicating the presence of a clean indoor air ordinance (all cities), seasonal variation (all cities) and the effect of a new sports stadium (Arlington) were included to assess economic effect. The regression model is in the form:

$$y = b_0 + b_t t + b_l L + b_w W + b_s S$$

where  $y$  is the dependent variable (total restaurant sales or total restaurant sales as a proportion of total retail sales),  $t$  is the time needed to represent the underlying secular trend, and  $L$  is the dummy variable that indicates whether a clean indoor air ordinance was in effect. The dummy variable  $L$  quantifies the presence of a clean indoor air ordinance as follow:

$$L = \begin{cases} 1 & \text{if ordinance present} \\ 0 & \text{if no ordinance present} \end{cases}$$

Similar coding was used for the additional dummy variables of quarterly difference ( $W$ ) and the effect of the new sports stadium ( $S$ ), during baseball season.

The coefficient ( $b$ ) quantifies the magnitude of the dummy variable's effect on the dependent variable. A positive coefficient would suggest that a positive effect on the economic outcome was seen when the variable was present while a negative value would suggest a negative economic impact when the variable was present.

## **Results**

For the dependent variables examined, either total restaurant revenue or restaurant revenue as proportion of the local economy, the results from regression modeling as well as the variable's trend over our analysis period are presented as attachments.

### *Total Restaurant Revenue:*

Review of the temporal trend for all cities show increasing revenues over the period under study regardless of ordinance implementation date. In Arlington, dramatic second and third quarter revenue increases were noted between 1994-1997 and coincided with ordinance full implementation as well as the opening of a new sports stadium (Ballpark in Arlington – April 1994).

Under statistical modeling, the regression coefficients ( $b$ ) for clean indoor air ordinance effect were positive in all cities with results for Arlington and Austin both reaching statistical significance.

The additional explanatory variable (S) to assess the effect of the new sports facility in Arlington showed a positive effect with opening, which did reach statistical significance.

*Proportion of Restaurant Sales of Total Retail Sales:*

Restaurant revenue as a proportion of total retail revenue remained stable over the time studied with the exception of the previously noted second and third quarter variations in Arlington, which did carry through to this outcome measure.

In Arlington, a positive regression coefficient was seen for clean indoor air ordinance effect with statistical significance being reached. For the remaining cities, no statistically significant regression coefficients were observed for the effect of the clean indoor air ordinance.

The assessment of the effect of the new sports stadium showed a positive regression coefficient, which was statistically significant.

**Discussion**

The results of these analyses show no evidence of a decrease in restaurant revenues with the implementation of a clean indoor air ordinance in the four cities reviewed. This lack of effect is an important point given the contrasting geographic, demographic, and economic composition of the Texas municipalities analyzed. The knowledge that clean indoor air ordinances do not negatively

impact the restaurant economies in these diverse municipalities is important information that will allow communities and city officials to implement rational public health policy relating to clean indoor air ordinances.

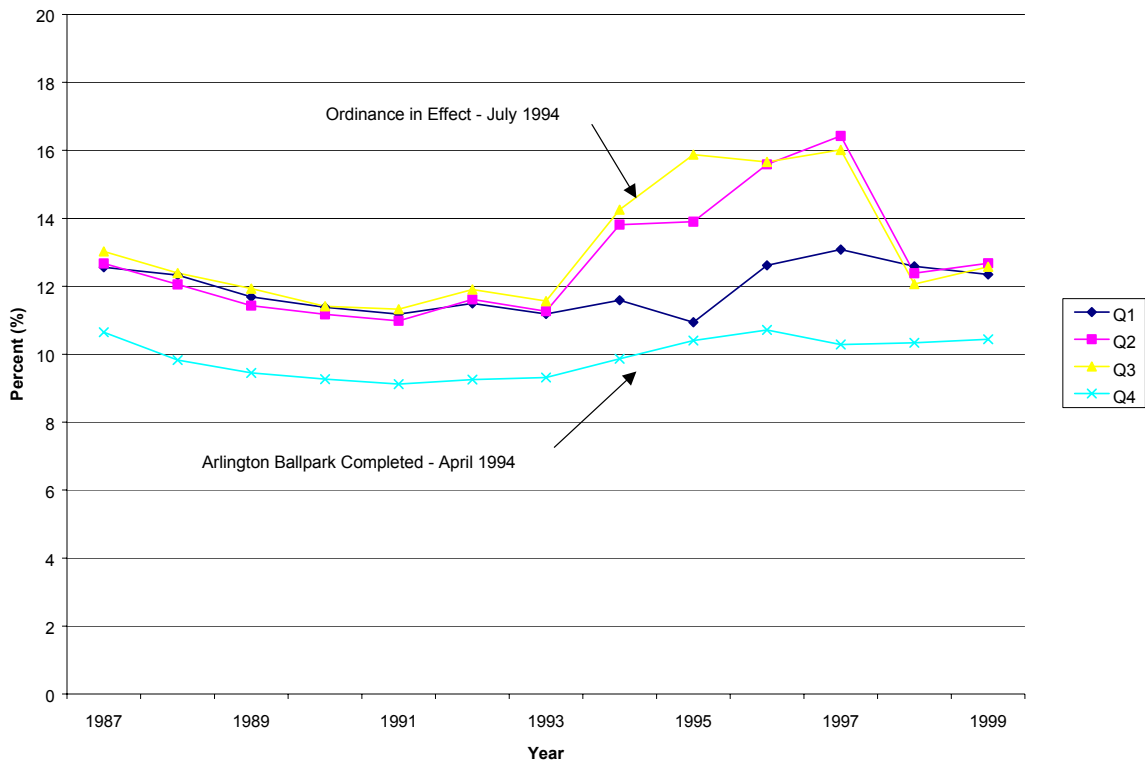
# ARLINGTON

## Proportion of Restaurant Sales of Total Retail Sales

<b>Dependent Variable</b>	<b>Proportion (%)</b>	<b>95% Confidence Interval</b>
Ordinance Effect	2.10	(1.01, 3.19)*
Second Quarter	0.41	(-0.44, 1.25)
Third Quarter	0.50	(-0.36, 1.37)
Fourth Quarter	-2.09	(-2.84, -1.34)
Stadium Completion	1.14	(0.18, 2.10)*

\* - Statistically significant

$R^2 = 0.736$



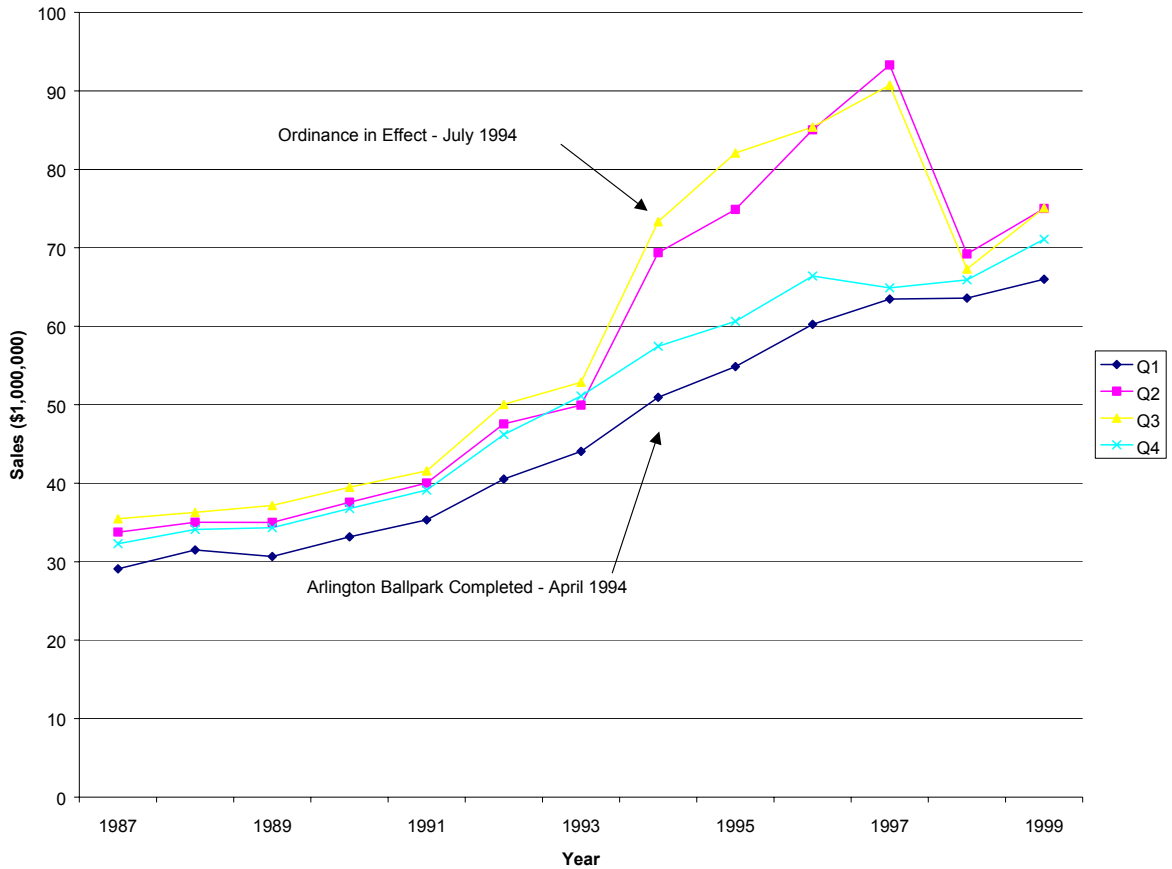


# ARLINGTON

## Taxable Restaurant Sales Revenues

<b>Dependent Variable</b>	<b>Restaurant Sales</b>	<b>95% Confidence Interval</b>
Ordinance Effect	11.11	(4.12, 18.07)*
Second Quarter	6.99	(1.64, 12.33)*
Third Quarter	6.46	(1.01, 11.98)*
Fourth Quarter	1.56	(-0.32, 6.30)
Stadium Completion	8.41	(2.32, 4.50)*

\* - Statistically significant  $R^2 = 0.898$



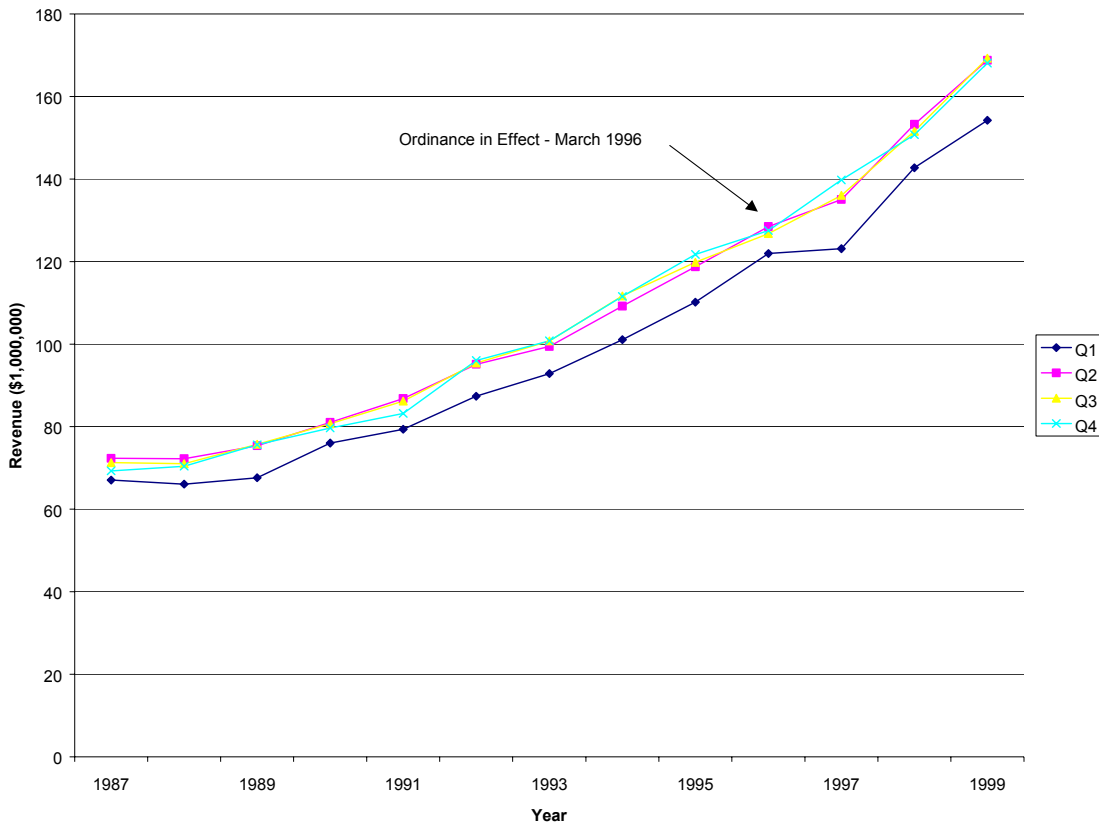
# AUSTIN

## Taxable Restaurant Sales Revenues

<b>Dependent Variable</b>	<b>Restaurant Sales</b>	<b>95% Confidence Interval</b>
Ordinance Effect	11.98	(5.64, 18.33)*
Second Quarter	4.20	(-0.76, 9.15)
Third Quarter	2.51	(-2.43, 7.45)
Fourth Quarter	0.65	(-4.30, 5.59)

\* - Statistically significant

$R^2 = 0.964$

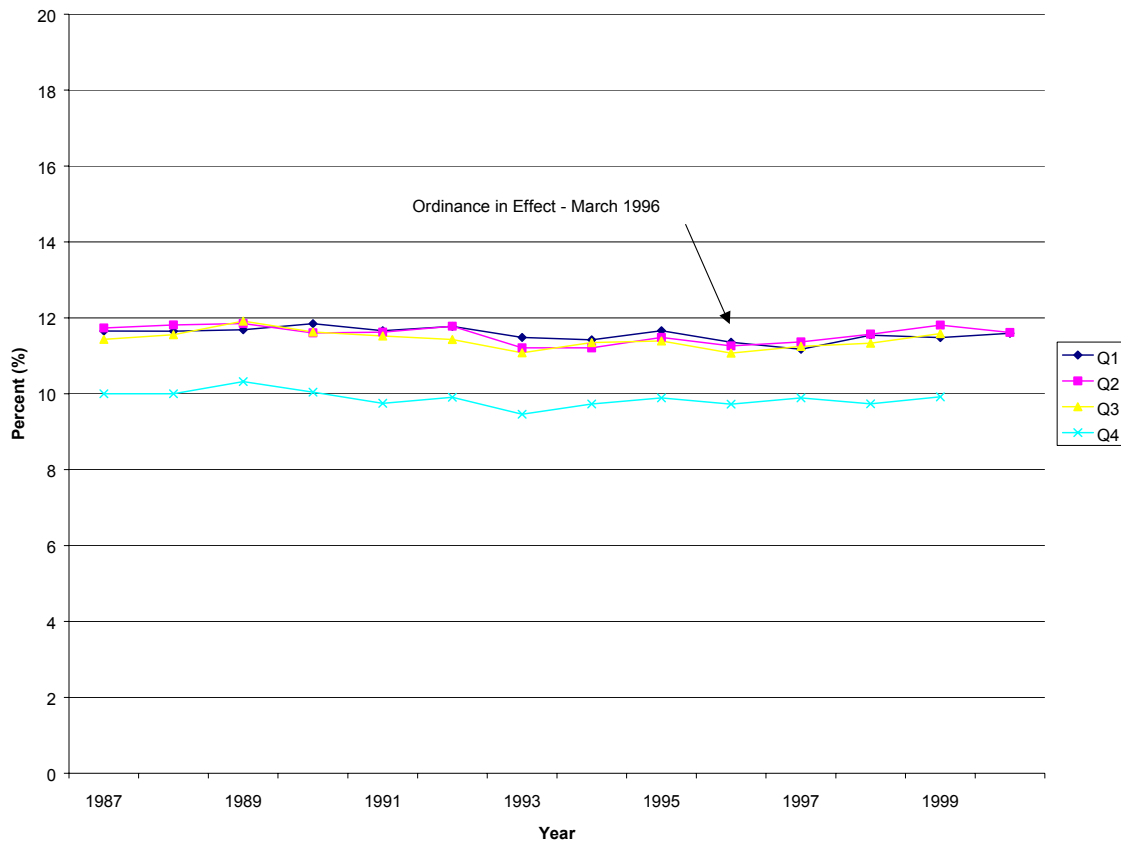


# AUSTIN

## Proportion of Restaurant Sales of Total Retail Sales

<b>Dependent Variable</b>	<b>Proportion (%)</b>	<b>95% Confidence Interval</b>
Ordinance Effect	0.99	(-0.09, 0.29)
Second Quarter	-0.02	(-0.17, 0.13)
Third Quarter	-0.15	(-0.29, 0.01)
Fourth Quarter	-1.69	(-1.84, -1.54)*

\* - Statistically significant  $R^2 = 0.941$

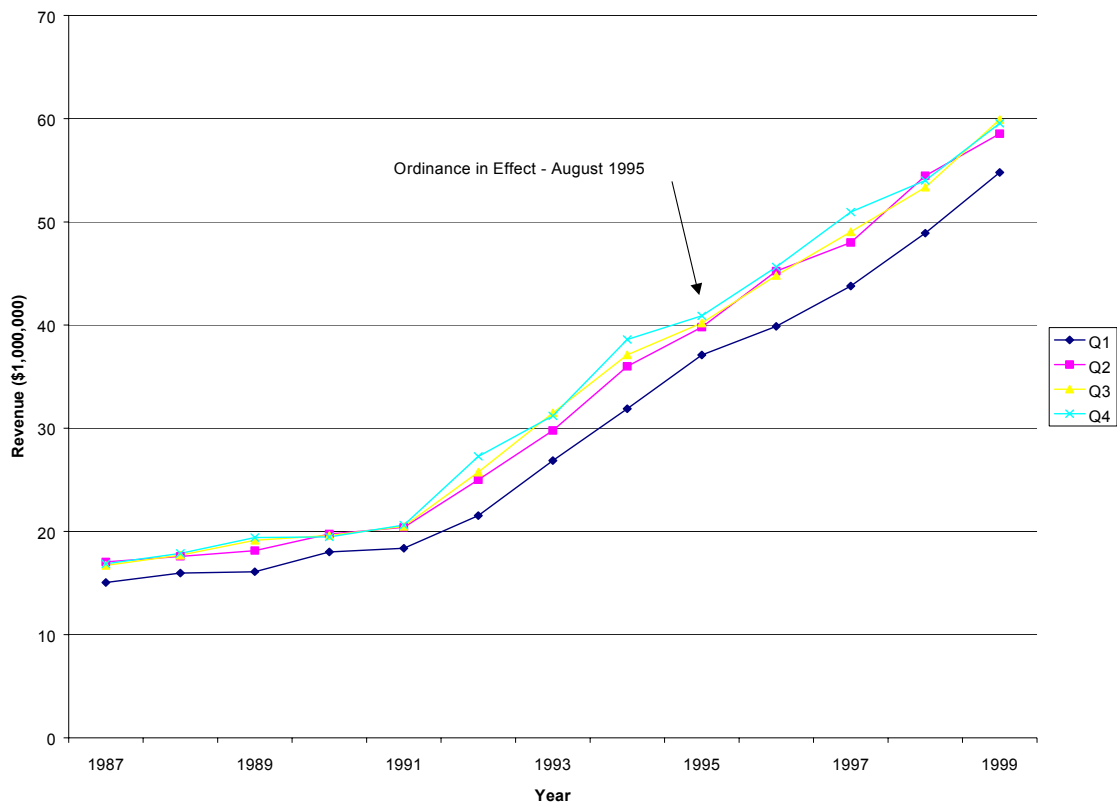


# PLANO

## Taxable Restaurant Sales Revenues

<u>Dependent Variable</u>	<u>Restaurant Sales</u>	<u>95% Confidence Interval</u>
Ordinance Effect	6.34	(3.38, 9.35)*
Second Quarter	2.14	(0.37, 4.31)*
Third Quarter	1.56	(-0.62, 3.73)
Fourth Quarter	1.09	(-1.09, 3.26)

\* - Statistically significant  $R^2 = 0.967$

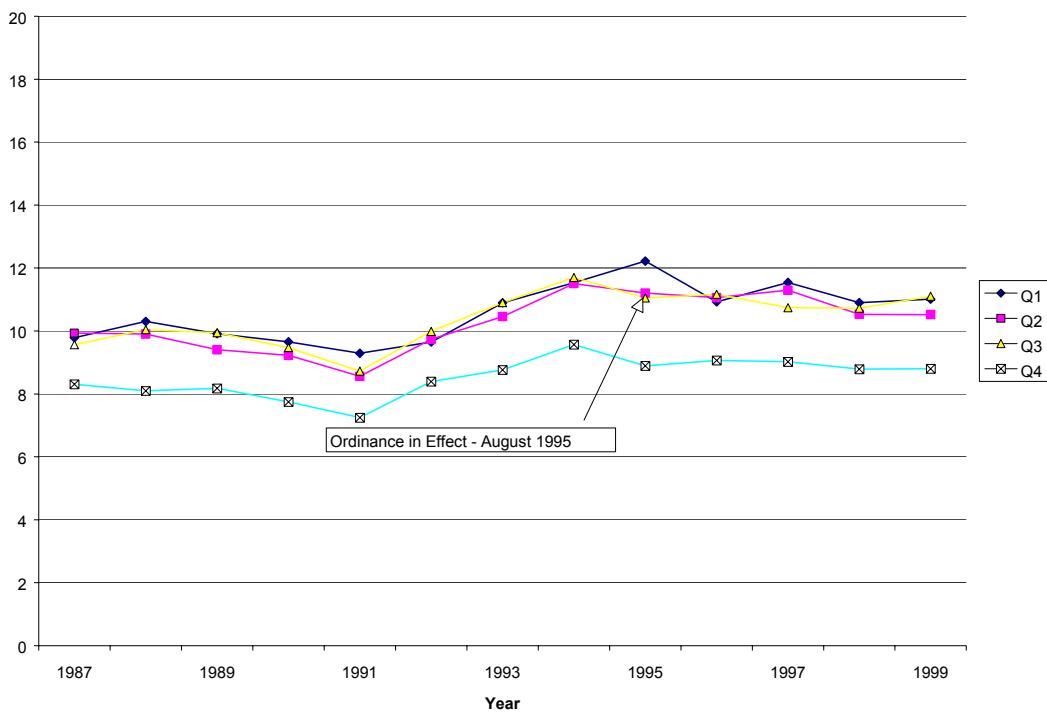


# PLANO

## Proportion of Restaurant Sales of Total Retail Sales

Dependent Variable	Proportion (%)	95% Confidence Interval
Ordinance Effect	-0.43	(-1.09, 0.24)
Second Quarter	-0.32	(-0.80, 0.16)
Third Quarter	-0.21	(-0.69, 2.69)
Fourth Quarter	-2.10	(-2.58, -1.62)*

\* - <sup>2</sup> - 0.734

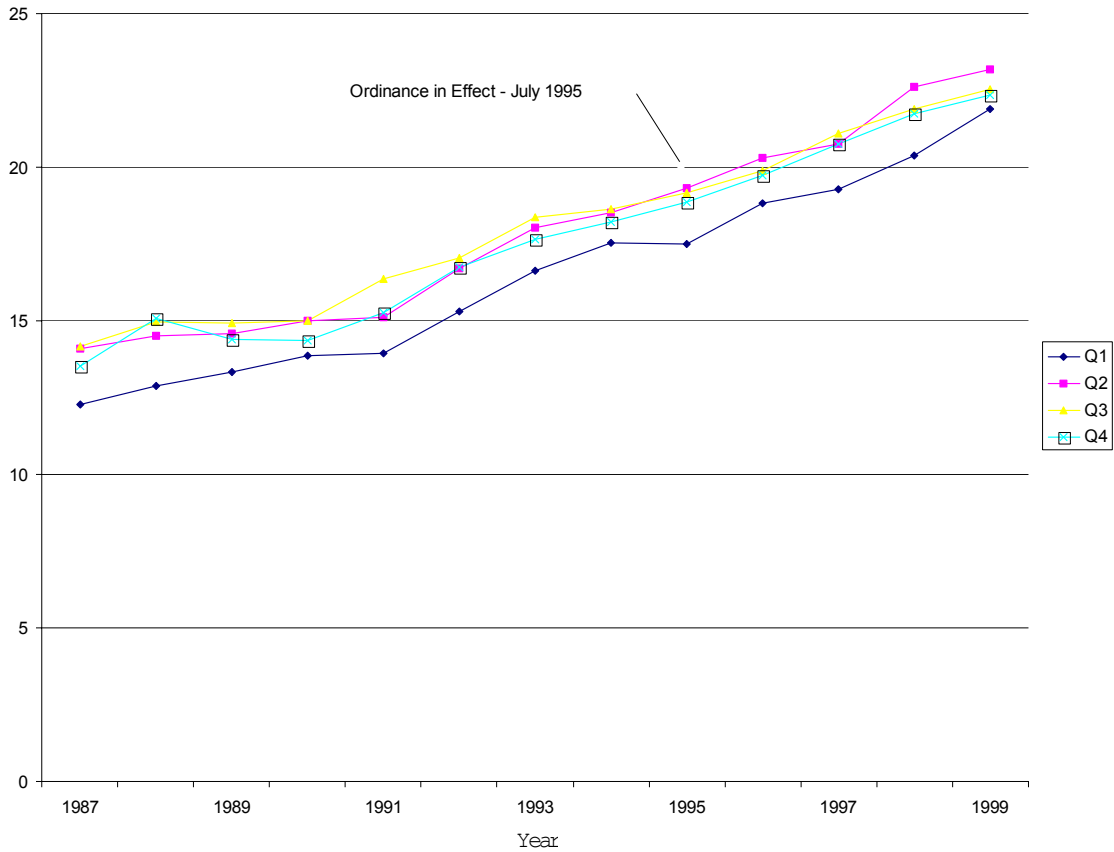


# WICHITA FALLS Taxable Restaurant Sales Revenues

<b>Dependent Variable</b>	<b>Restaurant Sales</b>	<b>95% Confidence Interval</b>
Ordinance Effect	0.47	(-0.06, 1.01)
Second Quarter	1.24	(0.84, 1.64)*
Third Quarter	1.13	(0.72, 1.52)*
Fourth Quarter	0.53	(0.13, 0.93)*

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<sup>2</sup> - 0.974

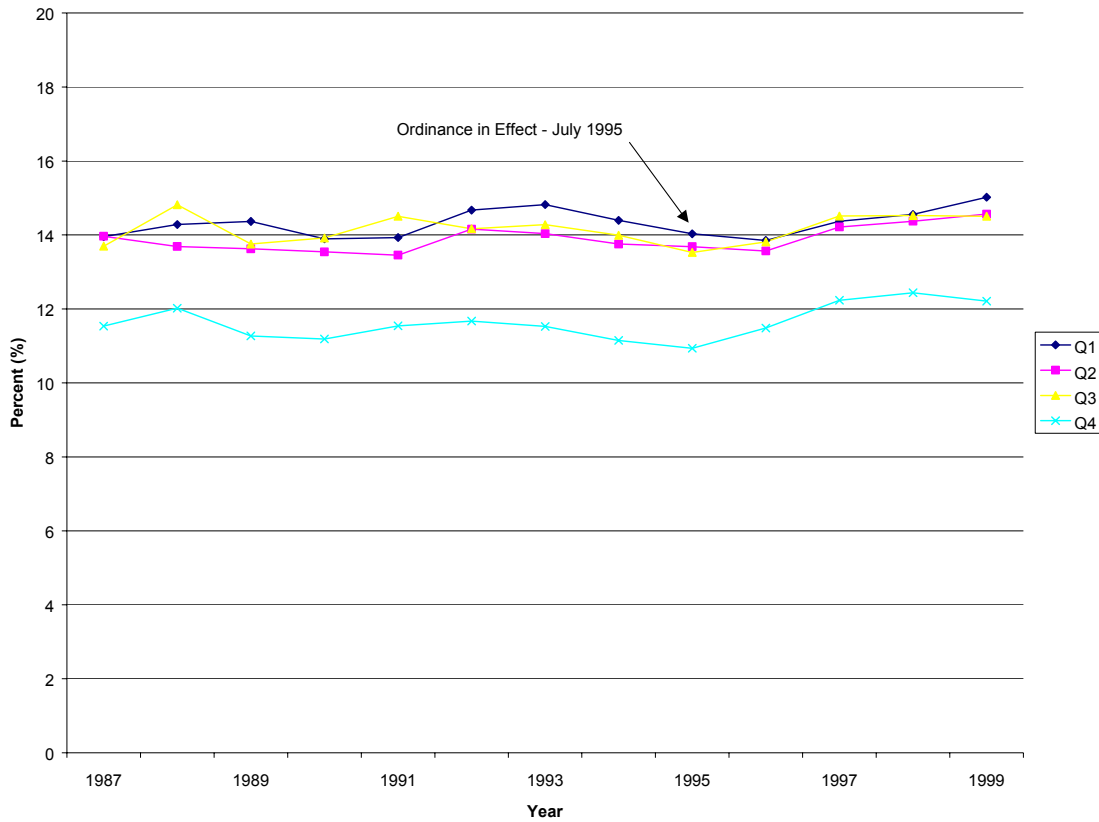


# WICHITA FALLS

## Proportion of Restaurant Sales of Total Retail Sales

<b>Dependent Variable</b>	<b>Proportion (%)</b>	<b>95% Confidence Interval</b>
Ordinance Effect	-0.06	(-0.45, 0.32)
Second Quarter	-0.45	(-0.73, -0.16)*
Third Quarter	-0.19	(-0.48, 0.94)
Fourth Quarter	-2.73	(-3.02, -2.44)*

\* - Statistically significant  $R^2 - 0.909$



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