# El Paso Property Tax Abatement Ineffectiveness

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# EL PASO PROPERTY TAX ABATEMENT INEFFECTIVENESS

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***ABSTRACT***

*Similar to many communities throughout the United States, the City of El Paso, Texas utilizes property tax abatements as a means for inducing companies to invest in the local economy. Abatements in El Paso were first introduced in 1988. Although many studies have examined the effectiveness of municipal abatement policies, most of those efforts rely on survey questionnaires or cross-section data sets. This study employs a time series data set to examine whether municipal authorities have achieved the objectives of the abatement program in El Paso.*

## INTRODUCTION

Fiscal policy generally depends on economic, political, and sociological characteristics of the local jurisdiction in which it is implemented (Heyndels and Vuchelen, 1998). In the hunt for private investments, regional governments use fiscal incentives to reveal their jurisdictions as business sanctuaries. A fairly common tool used by municipalities to attract new companies is the opportunity for property tax abatements. The selective tax base diminution is seen as an investment that will improve the general economic state of the town or city offering it. Adoption of the abatement mechanism often occurs as a consequence of tax mimicking neighbor jurisdiction policies rather than careful analyses of alternatives (Revelli, 2001). Historical evidence and previous econometric work suggest that abatements are not as effective as their proponents argue (Rubin, 1988).

A peculiar characteristic of this phenomenon is that cities with small tax bases often give proportionally high abatements (Morse and Farmer, 1986; Rubin and Rubin, 1987; Reese, 1991). Reduced commercial and industrial property tax collections imply higher tax burdens on other fiscal contributors. Additionally, revenues lost due to abatement ineffectiveness potentially lead to lower quality infrastructure and education programs, as well as other municipal problems in jurisdictions that already face a variety of difficulties.

In the case of El Paso, Texas, the first municipal property tax abatement was approved in 1988. The abated tax amount has increased substantially since then and the number of companies that benefit from the tax cuts grew from 1 in 1988 to 11 in 2001. The abatement program objective is to improve the economic well being of the area by increasing employment, real estate values, personal income, and retail sales. Time series data for all of the economic variables mentioned above are available from approximately 1969 forward. These data are analyzed below to examine economic performance in El Paso.

Because provision of government services and public goods is highly dependent on local taxation, municipal fiscal policy has been the object of previous research. Examples include:

local expenditures (Tiebout, 1956), tax mimicking among neighboring jurisdictions (Cebula, 1990; Heyndels and Vuchelen, 1998; Revelli, 2001), tax competition among local governments (Brueckner and Saavedra, 2001; Buettner, 2001), vote seeking taxation (Besley and Case, 1995), and bequest taxes (Auten and Joulfaian, 1996). As detailed below, property tax abatement programs have also been analyzed on a number of occasions.

The objective of this research is to provide additional evidence on whether property tax abatements help increase personal income, residential housing values, employment, and retail sales in El Paso, Texas. The analysis is more comprehensive than an earlier study that provides evidence of tax abatement ineffectiveness using statistical causality tests (Fullerton, 2002). Similar steps will also be used to examine the effectiveness of tax abatements for a larger number of variables. Another set of tests is separately deployed to garner additional insights to economic performance during the abatements era in El Paso.

The next section provides a literature review of previous research dealing with municipal taxes and other regional fiscal policy topics. The third section covers data and methodologies to be utilized. Empirical results are discussed in the fourth section. A summary and conclusion are presented in the final section.

## PREVIOUS RESEARCH

Property tax abatement is the deduction that private business entities obtain on their fiscal obligations as an incentive for economic development. Most taxing units in the state of Texas are authorized to offer property tax abatements by Chapter 12 of the local taxation section of the Texas tax code (Texas Legislature, 2001). A taxing unit is defined as any political component in Texas that is authorized to impose a property tax and includes counties, incorporated cities or towns, special districts or authorities, or any other jurisdiction authorized to impose a property tax (Texas Legislature, 2001). It is important to note that school districts were prohibited from entering into tax abatements programs beginning in year 2001. The tax abatement act was established in 1987 and currently there are 114 reinvestment and enterprise zones as they are denominated once they grant tax abatements (Texas Comptroller of Public Accounts, 2001).

El Paso, Texas is one of those entities and provides property tax abatements with the intent of promoting economic growth within the city. Abatements are granted based on analyses carried out by the Economic Development Office of the City of El Paso. Some of the objectives sought are greater employment, higher local wages, more tourism and increased property values. As in many other cities, municipal authorities in El Paso adopted the abatements tool on the presumption of policy effectiveness.

Municipal expenditure and revenue balance is fundamental for adequate functioning of urban and metropolitan economies. The supply of municipal services and its quality influences the attractiveness of a given city. Tiebout (1956) argues that public expenditures reflect the tastes and preferences of local residents. If governments can directly identify consumer-voters preferences, the optimal amounts of taxation and expenditure can be determined administratively. Because that is difficult, communities generally use political processes as the means to find consensus.

That model implies there is consumer-voter movement as a result of tax policies among different jurisdictions because taxpayers seek to relocate wherever they feel satisfied with fiscal policies. Cebula (1990) provides an empirical examination of this concept by analyzing how the elderly react to state income taxes. Results indicate elderly consumer-voters choose states with

no income taxes. Taxpayer mobility implies that firms will prefer tax-abatement areas relative to non-abatement areas when localities provide similar facilities and services (Wolkoff, 1985).

Earlier research indicates that municipal jurisdictions tend to emulate abatement policies from similar or competing jurisdictions. Several articles have been published for regions in different countries studying either tax mimicking or tax competition among jurisdictions. Mimicking is the imitation of policies as a direct consequence of similar economic and political conditions across communities. Competition means that policies are a result from the effort of two parties to secure the business of a third party by offering the most favorable terms. Under those circumstances, potential policy effectiveness may be assumed or perhaps even overlooked.

Buettner (2001) confirms the existence of local tax competition between more than 1000 local jurisdictions in Germany. Using instrumental variables, various tax rates are regressed as a function of local characteristics and possible competing jurisdictions. Towns on the borders with France and Switzerland are included in the investigation. Results indicate that local jurisdictions follow tax policy decisions of competing neighbors, but border towns show no significant cross-border competition.

One reason local jurisdictions engage in property tax abatements is the belief that regional competitiveness will improve (Wolkoff, 1985; 1993). The intent is to accelerate job creation, economic, and urban development. Vogel (2000) states that the effectiveness of this type of program is questionable since firm decisions to relocate depend on numerous cost variables of which property taxes are not the most important. Morse and Farmer (1986) survey 24 firms receiving tax abatements in Ohio. Results show that no firm relocated, and only one firm increased local investment, in response to tax abatements. Fullerton (2002) performs a series of F-tests using regression analysis. Results indicate that tax abatements do not precede increases in housing values, jobs, or personal income in El Paso, Texas.

Additionally, there has been debate about whether input movements solely, or ballot results, result from fiscal adjustment. Besley and Case (1995) examines vote-seeking behavior evidence in governor re-election bids and two tax change data sets between states and their neighbors. Results demonstrate that marginally bigger positive changes in home state taxes, relative to neighboring states, increase the probability of incumbent governor electoral defeats. While resource flows are not found to be very sensitive to undesired tax policies, voting behavior possibly is.

Debate over the effectiveness of property tax abatements has led to differing points of view. A number of empirical studies lean toward eliminating property tax abatement program (Coffman, 1993; Fullerton, 2002) or at least making changes to secure greater efficiency (Wolkoff, 1985; 1993). Moreover, infrastructure and education are almost always identified, as the principal factors that induce firms to invest in different regions (Wolkoff, 1993; Vogel, 2000).

Wolkoff (1985) suggests abatements should be granted only following extensive analyses. Limited abatement budgets would be approved for those projects that provide positive benefits. Other authors disagree. If the governments take that approach, it can lead to abatement competition, causing firms, governments and communities to waste large volumes of resources via escalating rent-seeking spirals (Coffman, 1993; Vogel, 2000). Because cities in the United States function as small open economies, Courant (1994) asserts that good local public services can provide the ideal policy package for substituting property tax abatements. Elimination of property tax abatements can even, under some conditions, serve as a signal of fiscal responsibility (Rosen and Fullerton, 1977; Papke, 1994; Fisher, 1996).

## DATA AND METHODOLOGY

The City of El Paso maintains annual data summaries of all property tax abatements granted since the inception of the program in 1988. Records provide information about the company receiving the tax reduction and the economic impact expected from the presence of said firm in the community. Additional information provided by the records includes date of contract initiation, total property holdings in El Paso, and abatement terms. This paper takes advantage of the availability of such data to carry out an analysis of tax abatement effectiveness.

Similar to many other metropolitan economies in the United States, data for most variables measuring economic performance in El Paso are available from 1969 forward. Employment, personal income, total retail sales, new housing values, gross metropolitan product, population, and Ciudad Juárez population are the variables utilized. These numbers are available from the Border Region Modeling Project of the Department of Economics & Finance at the University of Texas at El Paso (Fullerton and Tinajero, 2004). The estimates reported therein are obtained from a number of sources in the United States and Mexico, including government statistical agencies as well as private consulting companies.

Although the data set is fairly unique, the sample size provided in Appendix Table 1 is somewhat limited and imposes degree of freedom constraints on the analysis. Given that, the econometric techniques employed are relatively elementary. The first involve statistical "causality" analysis using standard F-tests and the second relies upon multiple regression analyses with dummy variables and t-tests.

The causality tests provide a helpful starting point since one objective of the paper is to determine whether changes in one variable (property tax abatements) precede changes in other variables (real gross metropolitan product, median prices for existing houses, personal income, retail sales, and employment) in a statistically reliable manner in El Paso. Under the classic approach, movements in $X_t$ are said to "cause" $Y_t$ if inclusion of lags of $X_t$ help improve the empirical performance of an autoregressive specification for $Y_t$ (Granger, 1969). To test whether tax abatements cause any other of the variables the following specification is used:

$$\text{Unrestricted regression} \quad Y_t = a_0 + \sum a_i Y_{t-i} + \sum b_i X_{t-i} + e_t \qquad (1)$$

$$\text{Restricted regression} \quad Y_t = a_0 + \sum a_i Y_{t-i} + e_t \ ,$$

where:

$Y_t$ = dependent variable in period t,

$X_{t-i}$ = property tax abatements in period t-i, and

$e_t$ = random disturbance term.

For example, a 2-period lag version of (1) with real gross metropolitan product as the dependent variable, the unrestricted version of the regression equation would be specified as:

$$ELGMP_t = a_0 + a_1 ELGMP_{t-1} + a_2 ELGMP_{t-2} + b_1 X_{t-1} + b_2 X_{t-2} + e_t.$$

Similar specifications would be used for 1- , 3- , and 4-year lags of real gross metropolitan product. They would also be utilized for each of the specifications involving the other four dependent variables targeted by the El Paso property tax abatement program (house prices, income, retail sales, and jobs). The restricted regression versions of (1) simply drop the lags of each dependent variable.

The error sum squares from each of the specifications in (1) are used to perform F-tests using the following calculation:

$$F_{q,n-k} = [(ESS_R - ESS_{UR}) / q] / [(ESS_{UR}) / (N - k)] \quad (2)$$

where:

$ESS_R$ = error sum of squares from the restricted equation,
$ESS_{UR}$ = error sum squares from the unrestricted equation,
N = number of observations,
k = number of estimated parameters in the unrestricted equation,
q = number of parameter restrictions, and
$H_0$: $b_i$ = 0 is the null hypothesis.

The statistic in (2) follows an F distribution with q degrees of freedom in the numerator and N – k degrees of freedom in the denominator (Pindyck and Rubinfeld, 1998). Failure to reject the null hypothesis implies that movements in X do not precede changes in Y. Computed F-statistics that are larger than their corresponding critical values occur when the parameter coefficients for the various lags of X are jointly significantly different from zero. A large computed F-statistic does not guarantee that X "causes" Y and represents only half of the formal test (Kennedy, 1992). If property tax abatements do improve economic performance, however, a statistically significant relationship should exist between the abatements and the different indicators.

Property tax abatements were introduced in El Paso in 1988. Abatement supporters argue that having such an incentive program in place is necessary to signal a pro-business environment and helps attract new investment. To examine this possibility, an independent dummy variable that takes on discrete values can be used (Pindyck and Rubinfeld, 1998). The dependent variables (gross metropolitan product, house prices, personal income, retail sales, employment) are regressed against El Paso population, Ciudad Juárez population, and a property tax abatement period dummy variable (Freeman, 2001).

$$Y_t = c_0 + c_1 ELPOP_t + c_2 CJPOP_t + c_3 DV_t + u_t \quad (3)$$

where:
$DV_t$ = 0 prior to 1988,
$DV_t$ = 1 for 1988 forward, and
$H_0$: $c_3 > 0$.

Acceptance of the null hypothesis indicates that the value of the dependent variable has improved during the period in which property tax abatements have been utilized. The population of Ciudad Juárez is included as a consequence of the geographic location of El Paso. Economic

activity on the north side of the border is influenced by economic conditions in its neighbor to the south (Fullerton, 2001).

Because time series are utilized, it is possible that serial correlation may be encountered. That problem has been previously documented in other borderplex econometric studies (Fullerton, 2001). If it arises in any of the equations estimated in the next section, a nonlinear ARMAX procedure will be deployed for parameter and variance estimation (Pagan, 1974). The latter is a flexible methodology that can handle autoregressive, moving average, or mixed data generating processes.

## EMPIRICAL RESULTS

Historical data for property tax abatements, house prices, income, and total retail sales are adjusted using the United States gross domestic product (GDP) implicit price deflator. The base year is 1996. Employment data are not affected by inflation and do not have to be deflated prior to estimation. El Paso real gross metropolitan product data are already measured in constant 1996 dollars and also do not have to be deflated. To deflate the four variables that require it, the following calculation is employed:

$$R_t = Z_t \ / \ USGDP_t \qquad (4)$$

where:

$Z_t$ = variable being deflated, and

$USGDP_t$ = United States GDP implicit price deflator.

Computed F-statistics for tests of whether changes abatements do not precede changes in the other series using data in level form appear in Table 1. In every case, the null hypothesis fails to be rejected at the 1-percent level. In two cases, abatements with one- and two-year lags are found to contribute to in a statistically significant manner to explaining the variation in El Paso GMP at less than the 5-percent level. On balance, however, the evidence points in the other direction. For 14 of the 16 sets of regressions estimated, the results in Table 1 indicate that gross metropolitan product, housing prices, personal income, retail sales, and employment are not influenced by property tax abatements in El Paso.

In the second set of F-tests, the variables are logarithmically transformed prior to estimation. This practice is common when analyzing economic data for a variety of reasons, including homoscedasticity, easier comparability, and analytical simplicity (Judge, Griffiths, Hill, and Lee, 1980; Cox, 1990). The property tax abatements are first adjusted by adding one to every observation. As frequently done in empirical analyses, that step is taken in order to permit calculating natural logarithms for the non-abatement years prior to 1988 (Galindo and Micco, 2004).

Results shown in Table 2 share a common outcome. All of the tests fail to reject the null hypothesis at the 1-percent level commonly used for F-tests. Similar to what is reported in Table 1, the hypothesis that abatements do not help explain movements in GMP comes closest to being rejected at short lags, but worsens as lags 3 and 4. For housing prices, personal income, retail sales, and employment, the computed F-statistics fall well below their respective critical values for all lags utilized.

Dummy variable tests using level data appear in Table 3. None of the computed t-statistics are significant at the 5-percent level commonly used for t-tests. Those results, corrected

for serial correlation, imply that the behaviors of the individual indicator variables did not change significantly during the period when property tax abatements have been used as business recruitment incentives in El Paso. In two cases, the parameter standard deviations were relatively smaller than those of their counterparts, but their respective signs point to opposite conclusions. The t-statistic for employment is significant at the 14-percent level and its regression coefficient exhibits the positive sign expected by abatement policy proponents. In contrast, the parameter estimate for the median price for existing houses is significant at the 11-percent level and its arithmetic sign is negative.

As with the causality F-tests, dummy variable least squares regressions are also computed using logarithmically transformed data. Overall results do not change in this group of equations and all of the null hypotheses for the dummy variable coefficients fail to be rejected (Table 4). For two of the dummy variable parameters, housing prices and employment, significance is indicated at the 12- and 22-percent levels, respectively. Once again, the housing price coefficient sign is negative and that for employment is positive, implying that the presence of the abatement weakens fiscal conditions in El Paso. As with the level data specifications in Table 3, parameter estimates in Table 4 have been corrected for serial correlation.

Evidence uncovered in this analysis supports conclusions obtained in earlier studies of municipal tax abatement policy effectiveness. In the specific case of El Paso, Fullerton (2002) presents evidence that property tax abatements do not lead to increases in housing prices, incomes, or the numbers of jobs. In the present study, similar outcomes result for those variables as well as for gross metropolitan product and retail sales. Estimation of equations containing dummy variables for the tax abatement era in El Paso also leads to similar conclusions.

Outcomes of the four sets of tests performed suggest that property tax abatements have not helped improve economic performance in El Paso, Texas. Variations in the four economic indicators included in the sample are not econometrically preceded by changes in property tax abatements using either level or logarithmic data. Moreover, property tax abatement dummy variables in both level and logarithmic specifications are not statistically distinguishable from zero. Consequently, none of the null hypotheses can be rejected in any of the equations.

The municipal tax base in El Paso is low relative to other metropolitan economies in the United States. Evidence discussed herein indicates that property tax abatements apparently have not helped improve economic conditions or expand components of the local tax base. Accordingly, this particular development strategy should be abandoned. Such steps have previously been implemented by other, higher income, cities (Gavin, 2001). Savings obtained can be used to support infrastructure and educational investments that raise metropolitan productivity.

As Enrich (1996) points out, these types of development policies can unintentionally take state and local governments into a race to the bottom. One possible mechanism for ending such practices is provided by the Commerce Clause. The Supreme Court has issued many decisions among them *Boston Stock Exchange v. State Tax Commission, Bacchus Imports Ltd. V. Dias and Westinghouse Electric Corp. v. Tully* that can be used as a base to rule such practices as unconstitutional. Unfortunately, abatement policies and other tax loopholes may reflect rent seeking and preferential treatment of select individuals (Roth, 2002). Eliminating this element of municipal finance in El Paso, or anywhere else, will likely be difficult and may require state or national policy leadership from the legislative and/or judicial branches of government.

## CONCLUSION

Local governments use fiscal incentives as instruments to attract business investment to their municipalities. This study employs a unique data sample to provide statistical evidence regarding property tax abatement effectiveness. Economic indicators used in the analysis include gross metropolitan product, residential housing values, personal income, retail sales, and jobs.

Econometric analyses are carried out using data in level and logarithmic forms. F-tests indicate that changes in abatements do not precede subsequent growth in any of the indicators selected in a statistically verifiable manner. Similar results also occur in equations using dummy variables designed to reflect a more "business friendly" environment during the abatement era in El Paso public finance.

Similar to earlier studies for other municipalities, the empirical evidence gathered herein signals that abatements are not effective in stimulating improvements in gross metropolitan product, residential housing values, personal income, retail sales, or jobs in El Paso. While these results suggest that property tax abatements should be abandoned locally, they do not provide direct information regarding other cities. Comparative analyses would, therefore, be of interest. Historical patterns of regional fiscal competition and tax mimicking imply that those programs may also be ineffective. For relatively tax-poor regions, this represents an important question that deserves more attention. If multi-jurisdictional information can be assembled, one potential avenue would be to employ panel data methods such as those used in related contexts (Bollinger and Ihlanfeldt, 2005).

**Table 1**
**F-Test Statistical Results, Levels**

| *Null Hypothesis* | *Observations* | *F-statistic* | *Probability* | *Lags* |
|---|---|---|---|---|
| ABT does not cause GMP | 32 | 6.813 | 0.014 | 1 |
| ABT does not cause GMP | 31 | 4.388 | 0.023 | 2 |
| ABT does not cause GMP | 30 | 2.746 | 0.066 | 3 |
| ABT does not cause GMP | 29 | 2.191 | 0.107 | 4 |
| ABT does not cause HPX | 32 | 0.171 | 0.683 | 1 |
| ABT does not cause HPX | 31 | 0.302 | 0.742 | 2 |
| ABT does not cause HPX | 30 | 0.254 | 0.857 | 3 |
| ABT does not cause HPX | 29 | 0.551 | 0.700 | 4 |
| ABT does not cause INC | 33 | 0.021 | 0.885 | 1 |
| ABT does not cause INC | 32 | 0.052 | 0.950 | 2 |
| ABT does not cause INC | 31 | 0.379 | 0.769 | 3 |
| ABT does not cause INC | 30 | 0.266 | 0.897 | 4 |
| ABT does not cause SALES | 24 | 2.759 | 0.112 | 1 |
| ABT does not cause SALES | 23 | 1.342 | 0.286 | 2 |
| ABT does not cause SALES | 22 | 0.806 | 0.510 | 3 |
| ABT does not cause SALES | 21 | 0.471 | 0.756 | 4 |
| ABT does not cause JOBS | 33 | 0.378 | 0.543 | 1 |
| ABT does not cause JOBS | 32 | 0.368 | 0.695 | 2 |
| ABT does not cause JOBS | 31 | 0.217 | 0.883 | 3 |
| ABT does not cause JOBS | 30 | 0.581 | 0.680 | 4 |

Acronyms:

| | |
|---|---|
| ABT | El Paso property tax abatements. |
| GMP | El Paso gross metropolitan product. |
| HPX | El Paso median price for existing single-family housing units. |
| INC | El Paso personal income. |
| SALES | El Paso gross retail sales. |
| JOBS | El Paso total employment. |

**Table 2**
**F-Test Statistical Results, Logarithms**

| *Null Hypothesis* | *Observations* | *F-statistic* | *Probability* | *Lags* |
|---|---|---|---|---|
| ABT does not cause GMP | 32 | 4.669 | 0.039 | 1 |
| ABT does not cause GMP | 31 | 3.131 | 0.060 | 2 |
| ABT does not cause GMP | 30 | 2.517 | 0.083 | 3 |
| ABT does not cause GMP | 29 | 1.581 | 0.218 | 4 |
| ABT does not cause HPX | 32 | 0.954 | 0.337 | 1 |
| ABT does not cause HPX | 31 | 0.737 | 0.488 | 2 |
| ABT does not cause HPX | 30 | 0.593 | 0.626 | 3 |
| ABT does not cause HPX | 29 | 0.392 | 0.812 | 4 |
| ABT does not cause INC | 33 | 0.051 | 0.823 | 1 |
| ABT does not cause INC | 32 | 0.422 | 0.661 | 2 |
| ABT does not cause INC | 31 | 0.353 | 0.788 | 3 |
| ABT does not cause INC | 30 | 0.375 | 0.824 | 4 |
| ABT does not cause SALES | 24 | 1.287 | 0.269 | 1 |
| ABT does not cause SALES | 23 | 0.769 | 0.478 | 2 |
| ABT does not cause SALES | 22 | 0.592 | 0.630 | 3 |
| ABT does not cause SALES | 21 | 0.272 | 0.891 | 4 |
| ABT does not cause JOBS | 33 | 0.002 | 0.961 | 1 |
| ABT does not cause JOBS | 32 | 0.784 | 0.467 | 2 |
| ABT does not cause JOBS | 31 | 0.656 | 0.587 | 3 |
| ABT does not cause JOBS | 30 | 1.550 | 0.224 | 4 |

Acronyms:

| | |
|---|---|
| ABT | El Paso property tax abatements. |
| GMP | El Paso gross metropolitan product. |
| HPX | El Paso median price for existing single-family housing units. |
| INC | El Paso personal income. |
| SALES | El Paso gross retail sales. |
| JOBS | El Paso total employment. |

**Table 3**
**Dummy Variable Regression Coefficient Results, Levels**

| *Dependent Variable* | *DV Coefficient* | *t-statistic* | *Probability* |
|---|---|---|---|
| GMP | -0.147 | 0.565 | 0.577 |
| HPX | -6200.208 | 1.677 | 0.105 |
| INC | 13.704 | 0.087 | 0.931 |
| SALES | 798.420 | 0.144 | 0.887 |
| JOBS | 4876.975 | 1.553 | 0.132 |

Notes:
ARMAX serial correlation correction procedure used for parameter estimation (Pagan, 1974).
ABT El Paso property tax abatements.
GMP El Paso gross metropolitan product.
HPX El Paso median price for existing single-family housing units.
INC El Paso personal income.
SALES El Paso gross retail sales.
JOBS El Paso total employment.

**Table 4**
**Dummy Variable Regression Coefficient Results, Logarithms**

| *Dependent Variable* | *DV Coefficient* | *t-statistic* | *Probability* |
|---|---|---|---|
| GMP | 0.006 | 0.214 | 0.832 |
| HPX | -0.072 | 1.644 | 0.111 |
| INC | -0.003 | 0.104 | 0.918 |
| SALES | -0.005 | 0.224 | 0.825 |
| JOBS | 0.018 | 1.276 | 0.213 |

Notes:
ARMAX serial correlation correction procedure used for parameter estimation (Pagan, 1974).
ABT El Paso property tax abatements.
GMP El Paso gross metropolitan product.
HPX El Paso median price for existing single-family housing units.
INC El Paso personal income.
SALES El Paso gross retail sales.
JOBS El Paso total employment.

## REFERENCES


Auten, G., & Joulfaian, D. (1999). Bequest taxes and capital gains realizations. *Journal of Public Economics*, 81, 213-229.

Besley, T., & Case, A. (1995). Incumbent behavior: vote-seeking, tax-setting, and yardstick competition. *American Economic Review*, 85, 25-45.

Bollinger, C.R., & Ihlanfeldt, K.R. (2005). The intraurban spatial distribution of employment: Which government interventions make a difference? *Journal of Urban Economics*, 53, 396-412.

Brueckner, J., & Saavedra, L. (2001). Do local governments engage in strategic property-tax competition? *National Tax Journal*, 54, 203-229.

Buettner, T. (2001). Local business taxation and competition for capital: the choice of the tax rate. *Regional Science and Urban Economics*, 31, 215-245.

Cebula, R.J. (1990). A brief empirical note on the Tiebout hypothesis and state income tax policies. *Public Choice*, 67, 87-89.

Coffman, R.B. (1993). Tax abatements and rent-seeking. *Urban Studies*, 30, 593-598.

Courant, P.N. (1994). How would you know a good economic-development policy if you tripped over one – hint – don't just count jobs. *National Tax Journal*, 47, 863-881.

Cox, D.R. (1990). Transformation of statistical variables. In J. Eatwell, M. Milgate, & P. Newman (Eds.), *The new palgrave econometrics* . New York, NY: W.W. Norton.

Enrich, P.D. (1996). Saving the states from themselves: Commerce clause constraints on state tax incentives for business. *Harvard Law Review*, 10, 377-468.

Fisher, R.C. (1996). *State and local public finance*, *second edition*. Chicago, IL: Irwin.

Freeman, D.G. (2001). Sources of fluctuations in regional growth. *Annals of Regional Science*, 35, 249-266.

Fullerton, T.M., Jr. (2001). Specification of a borderplex econometric forecasting model. *International Regional Science Review*, 24, 245-260.

Fullerton, T.M., Jr. (2002). Empirical evidence on the El Paso property tax abatement program: 1988-2001. *Journal of Law & Border Studies*, 2, 37-48.

Fullerton, T.M., Jr., & Tinajero, R.T. (2004). Borderplex economic outlook: 2004-2006. *Business Report SR04-1*, El Paso, TX, University of Texas at El Paso.

Galindo, A., & Micco, A. (2004). Creditor protection and financial markets: Empirical evidence and implications for Latin America. *Federal Reserve Bank of Atlanta Economic Review*, Second Quarter, 29-37.

Gavin, R. (2001). Getting a lift. *Wall Street Journal*, 237, A1, A8.

Granger, C.W.J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37, 424-438.

Heyndels, B., & Vuchelen, J. (1998).Tax mimicking among Belgian municipalities. *National Tax Journal*, 51, 89-101.

Judge, G.G., Griffiths, W.E., Hill, R.C. & Lee, T.C. (1980). *The theory and practice of econometrics*. New York, NY : John Wiley and Sons.

Kennedy, P. (1992). *A guide to econometrics*, third edition. Cambridge, MA: MIT Press.

Morse, G.W., & Farmer, M.C. (1986). Location and investment effects of a tax abatement program. *National Tax Journal*, 39, 229-236.

Pagan, A. (1974). A generalised approach to the treatment of autocorrelation. *Australian Economic Papers*, 13, 260-280.

Papke, L. (1994). Tax policy and urban development: Evidence from the Indiana enterprise zone program. *Journal of Public Economics*, 54, 37-49.

Pindyck, R.S., & Rubinfeld, D.L. (1998). *Econometric models and economic forecasts, fourth edition.* Saddlebrook, NJ: Irwin McGraw-Hill.

Reese, L.A. (1991). Municipal fiscal health and tax abatement policy. *Economic Development Quarterly*, 5, 24-32.

Revelli, F. (2001). Spatial patterns in local taxation: Tax mimicking or error mimicking? *Applied Economics*, 33, 1101-1107.

Rosen, H.S., & Fullerton, D.J. (1977). A note on local tax rates, public benefit levels, and property values. *Journal of Political Economy*, 85, 433-440.

Roth, T.P. (2002). *The ethics and economics of minimalist government*. Cheltenham, UK: Edward Elgar.

Rubin, H.J. (1988). Shoot anything that flies, claim anything that falls. *Economic Development Quarterly*, 2, 236-251.

Rubin, I.S., & Rubin, H.J. (1987). Economic development incentives: The poor (cities) pay more. *Urban Affairs Quarterly*, 23, 37-62.

Texas Comptroller of Public Accounts. (2001). *Window on state government*. Austin, TX: State of Texas.

Texas Legislature. (2001). *Texas tax code*. Austin, TX: State of Texas.

Tiebout, C.M. (1956). A pure theory of local expenditures. *Journal of Political Economy*, 64, 416-424.

Vogel, R.M. (2000). Relocation subsidies: Regional growth policy or corporate welfare? *Review of Radical Political Economics*, 32, 437-447.

Wolkoff, M.J. (1985). Chasing a dream: The use of tax abatements to spur urban economic development. *Urban Studies*, 22, 305-315.

Wolkoff, M.J. (1993). Tax abatements and rent seeking: a reply. *Urban Studies*, 30, 599-602.

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**Appendix-A**

**Property Tax Abatement and Economic Indicators Statistical Data**

| Year | El Paso Property Tax Abatements | Cd. Juárez Population, 1000s | El Paso Population, 1000s | El Paso Real GMP Billion 1996$ |
|---|---|---|---|---|
| 1969 | 0 | 399.777 | 364.022 | NA |
| 1970 | 0 | 414.908 | 360.462 | 5.33667 |
| 1971 | 0 | 428.051 | 369.189 | 5.60187 |
| 1972 | 0 | 442.941 | 378.364 | 5.91179 |
| 1973 | 0 | 457.272 | 398.203 | 6.38443 |
| 1974 | 0 | 475.919 | 411.532 | 6.49889 |
| 1975 | 0 | 491.700 | 427.292 | 6.80713 |
| 1976 | 0 | 504.994 | 440.333 | 7.17943 |
| 1977 | 0 | 520.897 | 450.007 | 7.55191 |
| 1978 | 0 | 535.742 | 460.611 | 8.11680 |
| 1979 | 0 | 550.421 | 472.343 | 8.30988 |
| 1980 | 0 | 567.365 | 483.711 | 8.41113 |
| 1981 | 0 | 589.421 | 497.523 | 8.75830 |
| 1982 | 0 | 597.774 | 511.892 | 8.67142 |
| 1983 | 0 | 624.102 | 521.038 | 8.67466 |
| 1984 | 0 | 629.000 | 529.668 | 9.07109 |
| 1985 | 0 | 685.303 | 538.809 | 9.33149 |
| 1986 | 0 | 725.610 | 549.592 | 9.49023 |
| 1987 | 0 | 734.810 | 559.479 | 9.20618 |
| 1988 | 54706 | 779.654 | 568.804 | 9.72690 |
| 1989 | 87834 | 789.010 | 580.982 | 10.22827 |
| 1990 | 112016 | 798.499 | 595.350 | 10.39273 |
| 1991 | 351358 | 835.353 | 608.206 | 10.56159 |
| 1992 | 451981 | 884.004 | 619.138 | 11.09567 |
| 1993 | 451624 | 918.794 | 634.044 | 11.52405 |
| 1994 | 468611 | 956.278 | 646.181 | 11.82335 |
| 1995 | 483658 | 1011.786 | 654.250 | 11.92600 |
| 1996 | 586685 | 1057.926 | 656.482 | 12.04200 |
| 1997 | 562500 | 1107.543 | 665.066 | 12.72600 |
| 1998 | 518004 | 1159.487 | 671.250 | 13.19300 |
| 1999 | 536753 | 1213.867 | 675.397 | 13.67700 |
| 2000 | 604810 | 1218.817 | 682.111 | 13.90000 |
| 2001 | 880552 | 1235.975 | 688.039 | 13.67800 |
| 2002 | 526590 | 1264.782 | 697.562 | 14.37300 |

Note:
Property tax abatement data are reported in nominal dollars.

**Appendix-B**

**Property Tax Abatement and Economic Indicators Statistical Data (continued)**

| Year | El Paso Home Prices | El Paso Personal Income | El Paso Retail Sales | USA El Paso Jobs | Implicit GDP Price Deflator |
|---|---|---|---|---|---|
| 1969 | NA | 1024.000 | NA | 154630 | 26.149 |
| 1970 | 21474 | 1077.729 | NA | 149227 | 27.534 |
| 1971 | 23369 | 1186.052 | NA | 153941 | 28.911 |
| 1972 | 25660 | 1289.287 | NA | 157454 | 30.166 |
| 1973 | 28156 | 1474.005 | NA | 171065 | 31.849 |
| 1974 | 30634 | 1665.274 | NA | 176970 | 34.725 |
| 1975 | 32419 | 1750.839 | NA | 181967 | 38.002 |
| 1976 | 33822 | 1973.864 | NA | 188723 | 40.196 |
| 1977 | 36904 | 2184.074 | NA | 192978 | 42.752 |
| 1978 | 41875 | 2462.736 | 1797.428 | 199707 | 45.757 |
| 1979 | 46187 | 2838.029 | 2038.546 | 207562 | 49.548 |
| 1980 | 53527 | 3171.280 | 2265.555 | 214116 | 54.043 |
| 1981 | 60661 | 3857.265 | 2356.430 | 222780 | 59.119 |
| 1982 | 59004 | 4137.470 | 2288.491 | 222226 | 62.726 |
| 1983 | 57449 | 4437.903 | 2340.684 | 219050 | 65.207 |
| 1984 | 59992 | 4875.121 | 2494.434 | 227577 | 67.655 |
| 1985 | 57931 | 5267.499 | 2782.024 | 232670 | 69.713 |
| 1986 | 59050 | 5496.991 | 2937.762 | 235294 | 71.250 |
| 1987 | 59300 | 5769.812 | 3035.190 | 245738 | 73.196 |
| 1988 | 59775 | 6183.927 | 3339.098 | 254885 | 75.694 |
| 1989 | 62750 | 6789.799 | 3563.638 | 264814 | 78.556 |
| 1990 | 63400 | 7384.805 | 3718.228 | 269821 | 81.590 |
| 1991 | 65850 | 7640.200 | 3887.059 | 271930 | 84.444 |
| 1992 | 67425 | 8407.051 | 4258.148 | 282642 | 86.385 |
| 1993 | 71675 | 8853.562 | 4546.083 | 290200 | 88.381 |
| 1994 | 75250 | 9360.739 | 4939.810 | 297093 | 90.259 |
| 1995 | 72175 | 9823.953 | 4871.536 | 301205 | 92.106 |
| 1996 | 76075 | 10164.730 | 5258.415 | 300842 | 93.852 |
| 1997 | 75825 | 10977.130 | 5050.367 | 309696 | 95.414 |
| 1998 | 78050 | 11624.420 | 5309.167 | 316662 | 96.472 |
| 1999 | 78750 | 11874.140 | 5884.997 | 321040 | 97.868 |
| 2000 | 80640 | 12545.870 | 6343.536 | 327662 | 100.000 |
| 2001 | 86250 | 13229.530 | 6354.119 | 325506 | 102.399 |
| 2002 | 87983 | 13250.600 | 6812.438 | 325037 | 104.092 |

Notes:
Median prices for existing houses in El Paso reported in nominal dollars.
El Paso personal income reported in millions of nominal dollars.
El Paso retail sales reported in millions of nominal dollars.