Do Enterprise Zones Work? An analysis at the borders

Stephen Billings
University of Colorado

November 5, 2007

Abstract

This paper analyzes Enterprise Zones in Colorado in order to study the relationship between geographically targeted tax credits and the location of new businesses and jobs. Enterprise Zone (EZ) programs provide tax incentives for investment and job creation in economically lagging regions. While most states have EZ programs, past program evaluations have found a mixture of e□ectiveness. This research improves upon existing literature by utilizing both establishment-level data and a border e□ects methodology to: 1) control for unobservables that influence the self-selection of EZ regions and 2) highlight EZ impacts across di□erent industries. Results find that while EZ fiscal incentives have no impact on where new establishments locate in Colorado, they do increase the number of employees hired. Industry results highlight the heterogeneity of tax credit impacts within the EZ Program. Results are robust to a variety of specifications for land use controls and in comparison to a propensity score matching model.

JEL Classification: H25, H71, and R12
Keywords: Enterprise Zones, State and Local Economic Development, Taxes and Location of Economic Activity

Acknowledgements: This research would not have been possible without the assistance of Devon Lynch, who provided digitized EZ boundaries and helpful discussions with Charles deBartolome, Je rey Zax, Terra McKinish, Randy Walsh, and participants at the 2007 AREUEA Doctoral Session and the 2007 Western Regional Science Annual Meeting.

□Department of Economics, University of Colorado, 256 UCB, Boulder, CO 80309. Phone: (720) 837-4017, Email: stephen.billings@colorado.edu

1 Introduction

State and local governments' economic development strategies commonly include tax incentives to attract mobile capital and workers (Bartik (1996)). Since the early 1980s, a majority of U.S. states have implemented Enterprise Zone programs that provide tax credits for investment and job creation in targeted geographic areas within a state.[1] These programs are costly, with Peters and Fischer (2002) finding that Enterprise Zone tax credits were valued around $5,000 per job for the twenty most industrialized states during the 1990s. Existing empirical studies indicate that the impacts of Enterprise Zone (EZ) programs range from positive to even negative on a variety of outcome measures, including employment, wages, investment, and housing prices (Wilder and Rubin (1996) and Boarnet (2001)).[2]

One significant problem in estimating the effects of EZ programs is that EZ areas are often economically different than non-EZ areas. Since these economic differences likely influence which regions are designated Enterprise Zones, the problem of self-selection of EZ areas will bias resulting program evaluation. Self-selection occurs in two stages of the EZ designation process.

First, eligibility criteria typically require above-average unemployment and/or low income levels to become a qualifying region.[3] These eligibility criteria are correlated with unfavorable economic conditions, which can influence the entry of businesses and the hiring of workers. Separating out EZ tax credit effects from local economic conditions requires the creation of adequate control and treatment groups.

Second, these areas must apply at a state level to receive EZ designation. Some states further complicate the process by requiring applicants to create an economic development plan (including Colorado). an eligible EZ area must apply to the state in order to receive EZ designation. The self-selection that occurs at this stage of EZ designation is due to the role of local institutions or community leaders that organize and complete the applications. Also, these institutions and the

[1] According to Peters and Fischer (2002), approximately forty states as well as the District of Columbia have implemented an EZ program in one form or another. While these programs vary in specifics they are all aimed at stimulating economic deve the5c8the5c8th1(e5c8th)1(e5c8tp-p)-456(a(stim)590(Als)-c)-342(5h980(thes)-1J/F308.966124.15-526535cm0

community leaders themselves influence local economic conditions and subsequent growth rates of EZ areas. This community effect likely varies over time as the application process is completed, designation is determined, and businesses obtain information about the availability of tax credits. This type of self-selection lacks quantifiable measures, which limits most empirical analysis.

This paper introduces a new methodology of program evaluation that will control for unobservables that may influence the self-selection of EZ regions. In particular, this paper uses establishment-level microdata and digitally coded EZ boundaries to match a sample of establish-

matching estimation strategy controls for observable and unobservable factors that influence the self-selection of EZ regions. Second, specific industry results provide a disaggregated assessment of

characteristics.

O'Keefe (2004) 's study of the California EZ program addresses aggregation biases in past studies and allows for propensity score matching by census tract through the use of establishment-level data. She finds that Enterprise Zones raise employment by three percent each year during the first six years after designation. The amount given for EZ tax credits as well as the estimated impacts on employment decrease after the sixth year.

Greenbaum and Engberg (2004) further contribute to the literature with an analysis of urban Enterprise Zones in six states. This paper uses longitudinally linked manufacturing data which allows more detailed information on EZ programs than previous studies. Propensity score matching and difference-in-difference estimation was used to base comparisons between non-EZ and EZ zip codes and found that EZ programs had a positive effect on the birth of new establishments, but a negative effect on retaining establishments. The absence of consensus among these studies of EZ programs can be attributed to variations in methodologies and EZ program characteristics.

A few papers provide examples of incorporating a border effects methodology for policy and program evaluation. Holmes (1998) study of state right to work laws incorporates the idea that any unobservable characteristic is unlikely to vary between businesses in a small geographical area. Using the configuration of states with right to work laws, he then examined the differences in employment growth between bordering counties that differ in state right to work laws. Bronars and Lott (1998) examined concealed weapon laws using differences across state borders and found that "shall issue" concealed gun laws create geographic spillovers in crime to neighboring counties without such laws. Finally, Holcombe and Lacombe (2004) use a "matched" border technique to find that AFDC and food stamp programs have a positive impact on the number of female-headed households and a negative effect on female labor force participation. In these border methodology studies, the data used are at a larger scale than this study of Colorado's EZ program. Black (1999) provides a comparable methodological approach to value school quality. Her analysis at the border of school attendance zones finds a positive impact of primary school test scores on housing prices.

3 Colorado's Enterprise Zone Program

Colorado's Enterprise Zone Program began in 1986 and currently limits the number of distinct enterprise zones to 16.[6] Fourteen of the 16 zones were formed by 1990, the Jefferson County EZ formed in 1991, and the Larimer County EZ formed in 1993.[7] The sixteen EZs vary in size from urban EZs of less than a square mile to rural, multi-county EZs containing over a thousand square miles. Results from analyzing EZs in Colorado are overwhelmingly driven by urban EZs and the border matching methodology limits conducting a separate analysis of sparsely developed rural EZs. Overall, 22.8% of establishments that existed between 1990 and 2000 were located within an EZ.[8] Eligibility for EZ designation requires the area to have a population of less than 80,000 and meet at least one of the following criteria:

1) Unemployment rate at least 25 percent above state average.
2) Population growth rate less than 25 percent of the state average.
3) Per capita income less than 75 percent of the state average.[9]

An eligible jurisdiction must then create an economic development plan and apply for EZ designation with the state. EZ boundaries include some combination of census or political geographies (e.g. census tracts, zip codes, etc.) in order to demonstrate eligibility using readily available census or state data.[10]

selection of EZ regions. The use of propensity score matching models and difference-in-difference techniques controls for observable factors and existing EZ region trends that can influence EZ designation. One issue not controlled for in these techniques is the presence of unobservable factors, which may vary over time and are correlated with EZ designation and the entry and/or employment decisions of an establishment. A difference in difference methodology may control for some unobservable confounding variables, but this technique has an underlying assumption that unobservable factors are time invariant (Cameron and Trivedi (2005)). Intuitively, factors that influence EZ designation affect the growth rates of outcome variables in an EZ area versus non-EZ area. Greenbaum and Engberg (2004) discuss the potential problem that EZs may have fundamentally different growth trends, which requires a time-variant technique to control for self-selection factors. Since the change in growth rates results in different time trends of outcome measures, this makes difference in difference estimation dependent on time trends that are correlated with EZ designation. Resulting estimates will therefore depend on which time intervals are used for differencing.

A border matching methodology that matches only EZ and non-EZ areas in close geographical proximity will control for time-varying unobservables by limiting comparisons between EZ and non-EZ outcomes to neighboring commercial areas. The idea that locations close together are more alike is well established in the geography literature as Tobler's Law and forms the basis for spatial econometric models. Extrapolating this idea to EZ regions is straightforward because factors such as crime, access to markets, and agglomeration economies are likely to be the same within a small area. Therefore, a policy border allows a segmentation of commercial areas into control and treatment groups. The control group is represented by the area just outside the EZ policy border and the treatment group is the area just inside the EZ policy border. Since EZ ta05(con)28(28(or)c(inside

4.1 Econometric Methodology

The above discussion on di□erent econometric methodologies is formalized here. Let outcome measure of establishment i in region j at time t be represented by:

$$Y_{i,j,t} = \alpha D_{j,t} + \beta Z_{j,t-1} + \theta X_i + \gamma_t + \varepsilon_{j,t} \quad (1)$$

In Equation 1, $Y_{i,j,t}$ is the outcome measure of interest, $D_{j,t}$ is an EZ status indicator variable, $Z_{j,t-1}$ represent existing region characteristics, X_i represent establishment characteristics and γ_t

nation process limits the location of the EZ border in two manners. First, state legislation limits the population contained within an EZ, which limits the size and expansion of an EZ area. Second, EZ boundaries are limited to census or political geographies in determining eligibility based on unemployment, income, or population growth measures. Other factors related to neighborhood characteristics that may influence EZ designation are unlikely to vary significantly in such a small geographic area. The main factor that is endogenous to an EZ's border location is commercial land use and zoning limitations. The incorporation of zoning data is problematic due to the small geography of interest and the dynamic nature of zoning and land use. A reasonable proxy for land use is the location of existing establishments. Empirical analysis incorporates two measures of commercial land use to control for zoning limitations. Results report the impacts of EZ tax credits for only border areas with similar existing 1990 number of establishments within and outside the EZ. The second measure of land use only includes border areas with similar numbers of previous year deaths of existing establishments. Since the death of an establishment in the previous year is exogenous to tax credits (which are based only on new establishments and jobs), this measure represents the number of available commercial properties for new establishments to the border area.

4.3 Data Source and Information

Specific information on Colorado's EZ program is from the State of Colorado's Department of Local A□airs. The information on the geography of the EZs and the date of designation for each

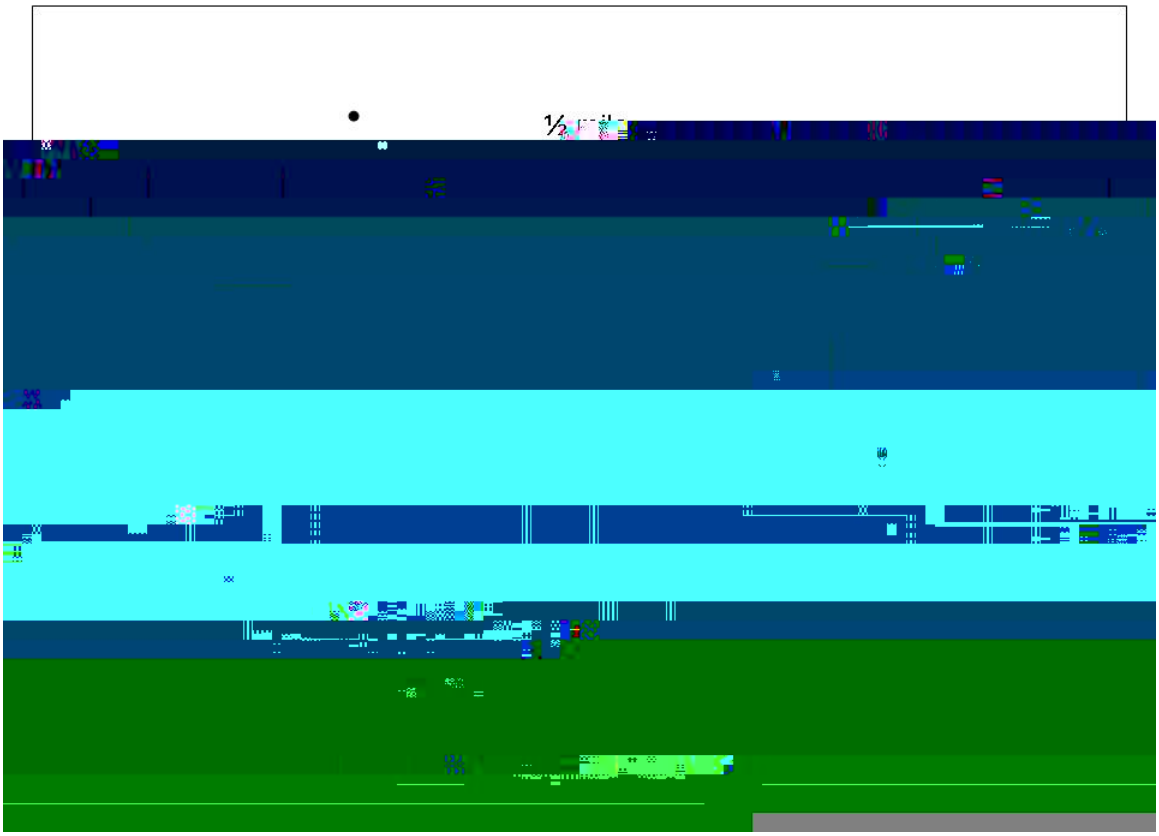

Figure 1: EZ Border Methodology

later analysis is represented by the stars in Figure 1.

In order to create neighborhoods around the EZ border, this research constructed a square lattice of points 1/2 mile apart across the entire state of Colorado using Geographical Information Systems (GIS).[17] Connecting these points created 1/2 mile-wide squares, which were then overlaid onto digitized EZ boundaries. The lines representing the borders of the squares partitioned the EZ border into segments whose length was within the 1/2 mile square. A total of 38, 523 establishments that existed for at least one quarter during 1990 through 2000 and were within a 1/4 mile of the EZ border were assigned to the closest border segment. This methodology created a total of 3, 216 neighborhoods. Of which, 812 neighborhoods contained at least one establishment for at least one year between 1990 and 2000.[18] A total of 481 neighborhoods contained establishments on both

[17] The initial point of the lattice is based on the NW corner of the state.

[18] The large number of neighborhoods not assigned any establishments is due to a number of neighborhoods created

that are part of a multi-establishment firm provide a measure of an establishment's organizational structure and may proxy for any informational differences between single and multi-establishment firms on the availability of EZ tax credits.

Table 1 reveals some differences in industrial composition between the EZ and non-EZ border areas. There is a larger representation of Manufacturing, Wholesale Trade, and Retail and a smaller representation of Construction and Services in EZ areas. The results for Agriculture and Manufacturing could be due to the presence of additional EZ tax credits targeted to these industries.

Annual Means (1990-2000)	All Ests - Census Tracts		All Border Ests		Land Use Matched Border Establishments (1)	
(Standard Deviation)	In EZ	Not in EZ	In EZ	Not in EZ	In EZ	Not in EZ
Census Tract/Border Neighborhoods						
Employees (full and part-time) per Establishment	15.66	13.50	13.86	9.70	23.1	21.2
	(51.9)	(43.4)	(21.1)	(11.06)	(48.2)	(52.1)
Fraction of Establishments	0.15	0.15	0.107	0.081	0.148	0.117
that are part of a Multi-establishment Firm	(0.18)	(0.19)	(0.163)	(0.143)	(0.146)	(0.111)
No. of Establishments in a Neighborhood	79.8	20.1	32.4	21.2	44.2	41.1
	(183.0)	(126.7)	(89.1)	(82.2)	(123.2)	(133.2)
No. of New Establishments in a Neighborhood	11.8	4.0	4.34	3.26	6.80	6.82
	(25.5)	(23.1)	(11.7)	(12.5)	(18.8)	(22.1)
No. of Establishments Lost in a Neighborhood	10.4	3.1	3.86	2.76	5.88	5.78
	(23.2)	(19.0)	(10.8)	(10.8)	(17.6)	(20.0)
Industry Composition for 1 digit SIC by Neighborhood						
Agriculture	4.8%	3.7%	7.5%	5.0%	5.4%	5.6%
Mining	1.9%	1.3%	2.1%	2.1%	1.6%	1.4%
Construction	14.2%	8.6%	21.9%	26.5%	16.2%	18.3%
Manufacturing	11.7%	8.5%	6.4%	4.0%	7.3%	4.9%
Transportation, Communication, and Utilities	4.1%	3.4%	6.4%	6.4%	6.5%	5.9%
Wholesale Trade	3.2%	3.5%	7.3%	5.9%	8.4%	6.8%
Retail Trade	19.1%	28.8%	16.9%	12.6%	19.7%	16.9%
Finance, Insurance, and Real Estate	10.4%	8.7%	4.6%	5.5%	6.6%	6.9%
Services	31.0%	34.3%	26.4%	31.0%	24.3%	28.4%
Government	1.6%	1.5%	1.1%	0.9%	0.7%	0.5%
Number of Observations	1,122	3,707	4,810	4,810	814	814

Border Establishment Location Trends (1990-2000)

Difference in Annual Means Y(InEZ=1) - Y(InEZ=0)	No of New Ests 1990-1995	No of New Ests 1996-2000	No of Ests Lost 1990-1995	No of Ests Lost 1996-2000
Census Tracts				
All Census Tracts (n=4,829)	-0.243	-2.11*	0.96	-0.609
	(1.19)	(1.28)	(1.11)	(1.176))
Propensity Score Matched (n=1,082)	4.31	4.18	4.84**	3.82
	(3.1)	(3.04)	(2.31)	(3.01)
Border Neighborhoods				
All Border Neighborhoods	0.90***	1.08***	0.898***	1.11***
(n=4,810)	(0.295)	(0.410)	(0.257)	(0.35)
Matched on 1990 Ests (1)	1.50	2.46	0.68	2.11
(n=814)	(2.60)	(3.42)	(2.30)	(3.16)
Matched on Death(t-1)(1)	-0.43	0.612	-0.155	1.09
(n=614)	(4.04)	(3.84)	(3.54)	(3.43))

(1) Includes only neighborhoods where EZ and non EZ areas have less than 20% difference in the matched variable for land use.
n represents the number of observations for the entire panel 1990-2000.
Standard errors are bootstrapped and in parentheses.
Significant at *0.10 **0.05 ***0.01. Ests = Establishments; Employ = full or part time employment

Table 2: Border Establishment Location Trends

and as a proxy for the impact of unobservables on estimates of EZ impacts. A nearest neighbor matching based on the propensity score logit regression provided in Appendix Table 1 determines matched census tracts. Only matched census tracts with propensity score differences of less than 10% are included in results. O'Keefe (2004) provides a good explanation of this methodology in the context on EZs.[20]

Results indicate that border areas matched on land use have an insignificant impact of EZ status on the number of new establishments and establishments lost annually. The robustness of this result across specifications that control for land use highlights that EZ tax credits have limited or no influence on establishment location trends. Results were consistent between the first half (1990-1995) and the second half of the panel (1996-2000). This highlights that the initial time period after which most EZs were formed (late 1980s) did not create differential impacts. This is consistent with the tax credits in Colorado's EZ program, which are available to new investment and job creation and have not changed in magnitude over the 1990s. Results are robust to the use

[20] See Black and Smith (2004

Employment Growth for Existing Establishments

Dep Var = Emp(t) - Emp(t-1) (for establishments with prior year employment)	**Census Tracts** (Propensity Score)	**Border Neighs** (No Matching)	**Border Neighs** (Match on 1990 No. of Ests.)	**Border Neighs** (Match on death (t-1))
Enterprise Zone	0.331***	0.2766***	0.286	0.179
	(0.117)	(0.103)	(0.208)	(0.183)
Multi-establishment Dummy	1.471***	1.504***	2.07***	1.88***
	(0.194)	(0.203)	(0.515)	(0.430)
Neighborhood or Census Tract Fixed E□ects	Yes	Yes	Yes	Yes
Two Digit SIC Dummy Variables	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R Squared	0.03	0.14	0.17	0.17
Observations	285,317	160,354	42,393	51,721

Absolute value of standard deviation in parentheses
All regressions include clustered standard errors by establishments
* significant at 10%; ** significant at 5% *** significant at 1%

Employment Growth for New Establishments

Dep Var = Emp(t) - Emp(t-1)	**Census Tracts**	**Border Neighs**	**Border Neighs**	**Border Neighs**

EZ versus those just outside the EZ. Similar interpretation holds for the multi-establishment firm indicator variable.

All specifications except for existing establishments with land use controls provide positive results. The coefficient on the indicator variable for EZ status ranges from 0.0 to 0.3 more employment for existing establishments and from 1.5 to 1.8 greater employment for new establishments. The differences between the border matching and propensity score results highlight that PS matching produces larger estimates than border matching. This is consistent with a concern that unobservables, which are likely positively correlated with EZ designation and establishment outcomes variables, may positively bias the estimated impacts of EZ tax credits.

Overall the smaller impacts for existing establishments is not surprising because EZ tax credits only apply to establishments that expand employment by at least 10% or investment by at least $1 million. The larger impacts for new establishments is consistent with the nature of the EZ tax credits, which are available to all new establishments. Also, the ability of a new establishment to initially determine levels of employment provides greater flexibility in modifying factor inputs in response to the tax credit. The multi-establishment dummy has a significant positive impact on the number of employees an establishment hires and represents an increase of between 20 and 33 employees over single establishment firms.[23] Fixed effects for year and SIC two-digit composition provide controls for industry or temporal variation.

7 Industry Results

Often local economic development programs target specific industries that have desirable characteristics for job creation and wages. This has lead to the focus of a number of regional development efforts on large manufacturing facilities (see Greenstone and Moretti (2004) for a paper on how local policy is used to attract large manufacturing companies) or high technology industries to foster the development of industry-based clusters (based on the model of industry clusters popularized by Porter (1990)). Targeted industry incentives in Colorado's EZ program are represented

[23] Unreported regressions with an interaction term between the EZ dummy and Multi-establishment dummy were insignificant for border matching specifications in Table 3.

by additional tax credits for Manufacturing, Mining, and research and development activities. The

Border Establishment Location Trends (1990-2000)
Number of New Establishment by SIC

Difference in Annual Means (1990 to 2000) **Y(InEZ=1) - Y(InEZ=0)**	**No of New Establishments** *No Land Use Matching*	*Land Use Matching* (1990 Ests)	*Land Use Matching* (Death(t-1))
Agriculture	0.0003	-0.027	0.036
	(0.005)	(0.025)	(0.035)
Mining	-0.17	-0.26*	-0.34*
	(0.12)	(0.14)	(0.19)
Construction	-0.039**	-0.393**	-0.41***
	(0.02)	(0.105)	(0.141)
Manufacturing	0.158***	0.16***	0.296***
	(0.013)	(0.059)	(0.077)
Transportation, Communications, Utilities	0.049***	-0.149	-0.34
	(0.012)	(0.092)	(0.13)
Wholesale	0.156***	-0.21*	-0.013
	(0.02)	(0.118)	(0.157)
Retail	0.32***	-0.027	0.772**
	(0.043)	(0.251)	(0.318)
Finance, Insurance, Real Estate	0.009	-0.71*	-0.82
	(0.039)	(0.43)	(0.546)
Services	0.319***	-0.24	0.254
	(0.108)	(1.07)	(1.49)
Public Administration	0.0002	-0.064	-0.052
	(0.077)	(0.074)	(0.107)
n	4,810	814	614

Land use matching based on ez, non ez areas containing less than 20% di□erence in the matched variable for land use
Standard errors are bootstrapped and in parentheses. n represents the number of observations for the entire panel 1990-2000.
Significant at *0.10%; **0.05%; ***0.01%

Table 4: New Establishment Location Trends by SIC

7.2 Job Creation Analysis

Table 5 extends earlier regressions to include interaction terms between the EZ indicator variable and a dummy variable for an establishment's one digit SIC. As before, analysis is broken down into existing and new employment. Agriculture, Construction, Manufacturing, Wholesale, and Service industries report positive impacts for EZ status. The results for Manufacturing are consistent with the entry of new Manufacturing establishments in EZ areas. An additional tax credit for Agriculture job creation supports the positive results for the Agriculture sector.

The results for Agriculture, Construction, and Retail employment impacts differ from new establishment location results for these industries. Agriculture industries had insignificant results for new location trends and Construction had negative results. Retail had positive impacts on

EZ Impacts on Employment by 1 digit SIC
Border Establishments

Dep Var = Employment(t) - Employment(t-1)	**Existing Establishments**		**New Establishments**	
	No Land Use Match	*Land Use Match*	*No Land Use Match*	*Land Use Match*
Multi-establishment Dummy	1.51**	1.87***	23.60**	30.08***
	(0.203)	(0.430)	(2.09)	(3.84)
Agriculture Dummy*Inez	0.637**	0.581*	1.24*	1.08*
	(0.238)	(0.328)	(0.645)	(0.585)
Mining Dummy*Inez	0.636*	0.686*	2.90	1.55
	(0.376)	(0.391)	(3.13)	(3.92)
Construction Dummy*Inez	1.15***	0.713*	2.31***	4.24
	(0.232)	(0.402)	(0.697)	(6.40)
Manufacturing Dummy*Inez	0.470	0.504*	11.54***	14.70**
	(0.384)	(0.278)	(4.39)	(7.35)
TCU Dummy*Inez	-0.527	-0.984	-13.40	-9.83
	(0.801)	(1.84)	(10.48)	(17.60)
Wholesale Dummy*Inez	0.024	0.054	2.33**	1.67**
	(0.144)	(0.228)	(1.01)	(0.803)
Retail Dummy*Inez	-0.102	-0.161	-1.61	-0.98
	(0.114)	(0.13)	(1.31)	(1.23)
FIRE Dummy*Inez	0.164	0.402	0.361	-0.08
	(0.163)	(0.308)	(0.945)	(1.96)
Service Dummy*Inez	0.365**	0.264	1.61	4.99*
	(0.181)	(0.340)	(1.31)	(2.97)
Government Dummy*Inez	1.45	-0.539	8.95	10.02
	(0.837)	(0.826)	(6.11)	(13.74)
1/2 Mile Border Segments Fixed E□ects	Yes	Yes	Yes	Yes
Two Digit SIC Dummy Variables	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R Squared	0.14	0.17	0.14	0.26
Observations	160,354	42,393	31,894	7,770

Absolute value of standard deviation in parentheses
All regressions for existing establishments include clustered standard errors
Land use matching done based on 1990 establishments

Table 5: Major Industry Results - Job Creation

8 Conclusions

The limited influence of EZ tax credits on location decisions may be explained by the fact that landowners are able to capitalize these tax credits into rents, negating the net benefit to businesses.[24] The capitalization of EZ tax credits should not impact job creation because greater labor intensity positions establishments to incur more land rent than lower labor intensity establishments. The benefit of the tax credit will be realized by the landowner, but job creation will still occur. The insignificant impacts of establishment location could also signify the small impact of EZ tax credits

analysis. This research provides a new empirical methodology for examining the impact of tax incentives on the location of jobs and businesses and tests it on a commonly used tax incentive program in the U.S., the Enterprise Zone program. The problems of spatial mismatch between EZ and data geography and the presence of unobservables have been problematic in a number of earlier works in this area. The use of border effects and establishment level data takes advantage of the spatial nature of these programs to overcome these problems, which provides cleaner estimates of EZ impacts in Colorado. Overall, results find insignificant impacts from the EZ program on the location decision of establishments, but positive impacts for job creation. Industry results highlight the importance of taking specific tax credits into consideration in examining factor specific outcomes.

References

Alm, J. and Hart, J.: 1998, Enterprise zones and economic development in colorado, *Unpublished Manuscript,Center for Economic Studies-University of Colorado at Boulder* .

Bartik, T.: 1996, Jobs, productivity, and local development: What implications does economic research have for the role of government, *National Tax Journal* **47**, 847–860.

Black, D. A. and Smith, J. A.: 2004, How robust is the evidence on the effects of college quality? evidence from matching, *Journal of Econometrics* **121**(1-2), 99–124.

Black, S. E.: 1999, Do better schools matter? parental valuation of elementary education, *Quarterly Journal of Economics* **114**(2), 577–599.

Boarnet, M. and Bogart, W.: 1996, Enterprise zones and employment: Evidence from new jersey, *Journal of Urban Economics* **40**, 198–215.

Boarnet, M. G.: 2001, Enterprise zones and job creation: Linking evaluation and practice, *Economic Development Quarterly* **15**(3), 242–254.

Bondonio, D. and Engberg, J.: 2000, Enterprise zones and local employment: Evidence from the states' programs, *Regional Science and Urban Economics* **30**(5), 519–549.

Bronars, S. and Lott, J.: 1998, Criminal deterrence, georgraphical spillovers, and the right to carry concealed handguns, *American Economic Review* 88(2), 475–79.

Cameron, A. and Trivedi, P.: 2005, *Microeconmetric: Methods and Applications*, Campbridge University Press.

Census: 2000. Tiger/Line Files. http://www.census.gov/geo/www/tiger/tiger2k/tgr2000.html.

Colorado: 1996. Enterprise Zone Annual Report. O□ce of Economic Development and International Trade.

Colorado: 1998. Enterprise Zone Annual Report. O□ce of Economic Development and International Trade.

Colorado: 2005. Enterprise Zone Annual Report. O□ce of Economic Development and International Trade.

de Bartolome, C. and Spiegel, M.: 1997, Does state economic development spending increase manufacturing employment?, *Journal of Urban Economics* 41, 153–175.

Engberg, J. and Greenbaum, R.: 1999, State enterprise zones and local housing markets, *Journal of Housing Research* 10(2), 163–187.

Greenbaum, R. T. and Engberg, J. B.: 2004, The impact of state enterprise zones on urban manufacturing establishments, *Journal of Policy Analysis and Management* 23(2), 315–339.

Greenstone, M. and Moretti, E.: 2004, Bidding for industrial plants: Does winning a "million dollar plant" increase welfare?, *NBER Working Paper 9844* .

Holcombe, R. and Lacombe, D.: 2004, Using matched border counties for policy analysis: The

Lynch, D. and Zax, J.: 2004, An evaluation of colorado's enterprise zone programs: Measuring the impact of establishment level employment and earnings per worker, *University of Colorado at Boulder Working Paper* 04-15.

Man, J.: 1995, The incidence of di□erential commercial property taxes: Empirical evidenc, *National Tax Journal* 48(4), 479–496.

McDonald, J.: 1993, The incidence of the property tax of commercial real estate: The case of downtown chicago, *National Tax Journal* 46(2), 109–120.

O'Keefe, S.: 2004, Job creation in california's enterprise zones: A comparison using a propensity score matching model, *Journal of Urban Economics* 55(1), 131–150. (c) 2004 Academic Press.

Papke, L.: 1994, Tax policy and urban development: evidence from the indiana enterprise zone program, *Journal of Public Economics* 54, 37–49.

Peters, A. and Fischer, P.: 2002, *State Enterprise Zone Programs: Have They Worked?*, W.E. Upjohn Institute.

Porter, M.: 1990, *The Competitive Advantage of Nations*, New York: Basic Books.

Rosenthal, S. and Strange, W.: 2001, The determinants of agglomeration, *Journal of Urban Economics* 50, 191–229.

Wheaton, W.: 1984, The incidence of inter-jurisdictional tax di□erence in property tax rates, *National Tax Journal* 37(4), 515–527.

White, H.: 1980, A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica* 48, 817–830.

Wilder, M. and Rubin, B.: 1996, Rhetoric versus reality: A review of studies on state enterprise zone programs, *Journal of American Plannning Association* 62, 472–492.

Woodbridge, J.: 2002, *Econometric Analysis of Cross Section and Panel Data*, MIT Press.

9 Appendix

Colorado's Enterprise Zone Tax Credits

These tax credits are published on the state of Colorado's O□ce of Economic Development and International Trade website, http://www.state.co.us/oed/enterprise-zone/EZ-Tax-Credits.cfm

1) Three percent investment tax credit. Businesses making investments in equipment used exclusively in an enterprise zone may claim a credit against their Colorado income taxes equal to 3 percent of the amount of the investment, subject to limitations on the amount that can be claimed in any one year. Investment that results from an in-state relocation is not eligible for the credit unless the new location qualifies as an expansion. Excess credits may be carried back three years and forward twelve.

2) 500 dollar job tax credit. Businesses hiring new employees in connection with a "new business facility" located in an enterprise zone may claim a tax credit against state income taxes of 500 dollar for each such employee. An expansion of an existing facility may be considered a "new business facility" if the expansion adds at least 10 employees or a 10 percent increase over the previous annual average, if it is at least 1 million dollars in investment, or, if less, at least doubles the original investment in the facility. The credit may be taken in subsequent years of the enterprise zone for each additional employee above the maximum number employed in any prior tax year. Excess credits may be carried forward five years (applies to 3 and 4 below).

The Colorado EZ Program formula for the job creation tax credits is given by, EZ Job Creation

Propensity Score Logit for Census Tracts

Dep Variable	InEZ
PopDensity(000s per sqmi)	-0.06450*
	(0.03)
White(%)	-4.52*
	(2.36)
Black(%)	-3.36
	(2.45)
Hispanic(%)	-2.71*
	(1.49)
OutofCountyCommute(%)	-0.44
	(0.83)
MultiEstablishmentFirm(%)	1.03
	(1.08)
NumberFirms(00s)	0.13
	(0.15)
TotalEmployment(000s)	0.19
	(0.19)
TotalWages(000s)	-0.00917*
	(0.01)
HighSchoolEduc(%)	5.79**
	(2.43)
LessHighSchoolEduc(%)	6.75***
	(2.43)
CollegeEduc(%)	-0.08
	(2.26)
ManufacturingEmployment(%)	-0.19
	(1.43)
ServicesEmployment(%)	2.01
	(1.73)
SalesEmployment(%)	-0.73
	(3.14)
ManagersAdminEmployment(%)	3.05
	(3.04)
PovertyRate	4.35*
	(2.30)
UnEmploymentRate	3.59
	(2.93)
AvgHHIncome(000s)	-0.01
	(0.05)
HHIncomeless10k(%)	-2.79
	(2.30)
HHIncomemore50k(%)	3.53
	(3.99)
PercentRenters	0.27
	(0.71)
PercentSFHomes	-1.27**
	(0.62)
MedianHomeYr	-0.0265***
	(0.01)
R-squared	0.42
N	872

Based on 1980 Census Tract Data and 1990 ES202 Data.
* p¡0.1, ** p¡0.05, *** p¡0.001

Table 6: Appendix Table 1