DISCUSSION PAPERS IN ECONOMICS

Working Paper No. 98-16

Enterprise Zones and Economic Development in Colorado

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May 1998

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August 1998

ENTERPRISE ZONES AND ECONOMIC DEVELOPMENT IN COLORADO

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Abstract

This paper examines the effects of the state enterprise zone program in Colorado. Colorado began its enterprise zone program in 1986, and the program is Colorado's largest single state economic development program, granting $188.6 million in tax credits through fiscal year 1994-1995. We use data provided by the State of Colorado Department of Local Affairs, as well as from the 1970, 1980, and 1990 United States Bureau of the Census, to estimate the effects of this program. Our results indicate that the Colorado enterprise zone program has had a positive and significant impact both on employment growth in zone areas and on the level of per capita income in zone areas. Other effects of the program, such as the impacts on industry composition, population growth, unemployment, and the percent of people who work in their place of residence, show mixed results.

1. Introduction

In recent years, the notion of regenerating economically blighted areas through targeted economic incentives has become a staple of economic development programs, and one of the most popular programs here is the enterprise zone program.[1] An "enterprise zone" is a targeted geographic area that is considered economically distressed, as measured by such criteria as high unemployment, low population growth or net out-migration, and low levels and growth rates of per capita income. Local governments designate these areas as eligible for certain benefits, usually in the form of tax incentives for increased use of capital and/or labor, in order to induce investment expansion or firm location to the area; tax incentives include investment tax credits, credits for new jobs, credits for new equipment, and credits for property taxes. Firms locating in enterprise zones may also be offered interest-free loans, tax-exempt bonds, free land, infrastructure, and public utilities. All of these incentives are offered to increase investment and employment in the specific geographic regions.

According to Wilder and Rubin (1996), as of 1995 thirty-four states were utilizing some form of enterprise zone program, establishing in total nearly three thousand enterprise zones. The federal government has also created an enterprise zone program. With the passage in 1993 of the Empowerment Zone and Enterprise Community Act, the Clinton Administration implemented a federal program of eleven empowerment zones and ninety-nine enterprise communities, and the Administration plans to enlarge the federal program by adding an additional twenty empowerment

[1] See, for example, Wasylenko and McGuire (1985). For a monumental review of the literature on state and local economic development programs, see Bartik (1991). Also, see the March/April 1997 issue of the *New England Economic Review* for the proceedings of a symposium on state and local development policies.

zones and eighty enterprise communities.[2]

Despite the widespread use of enterprise zones, it has been difficult to determine their economic impact. Many zone programs have not been required to keep track of economic data for their zones, so that data are often not available on the economic indicators targeted by enterprise zones. Further, since enterprise zones rarely coincide with other geographic boundaries like county boundaries, it is difficult to disaggregate the data. Some states have not kept track of the amount of credits awarded, so basic cost-benefit analysis is difficult to perform. Since an area cannot be an enterprise zone without being economically distressed, the data are non-experimental and non-random. Also, to perform time series analysis, data are needed before and after the start of the program, but the data are often not collected in a usable fashion before the program starts. Even if all of the data are available for proper analysis, it is difficult to disentangle the effectiveness of enterprise zone programs from those factors due to the general economic climate and other economic forces. Finally, most of the limited information available is from zone administrators or participants in the program, so there may be an incentive for the informants to overstate the benefits of the program.

Despite these difficulties, there is a growing literature that attempts to evaluate the effectiveness of enterprise zone programs.[3] There are three main methods for analyzing enterprise zones: survey analyses, benefit-cost analyses, and econometric studies. Britnall and Green (1988) survey business and state administrators to evaluate state programs, and they conclude that

[2] "Empowerment zones" and "enterprise communities" are synonyms for enterprise zones; enterprise communities are usually on a smaller scale.

[3] For an excellent critical discussion of much of this literature, see Fisher and Peters (1997).

differences in the programs contribute to their varying success; Gunn (1993) uses a mail survey of enterprise zone administrators, and finds that tax incentives are rated somewhat more important than non-tax incentives as an inducement.[4] Rubin (1991) conducts a benefit-cost analysis of the New Jersey program, and estimates that the benefits from increased tax revenues exceed the program costs.[5] Perhaps the most definitive work applies the econometric approach. Here, Papke (1994) finds that zone specification in Indiana reduced the value of depreciable property (e.g., equipment and machinery) by 13 percent, but also reduced unemployment claims by 19 percent and increased the value of inventories by 8 percent. Boarnet and Bogart (1996) also use econometric methods to estimate the impact of the New Jersey program, but they conclude that this program had no significant impact on employment or property values in designated areas.[6]

These studies have provided many important insights. Still, their main overall conclusion is that the programs generally have somewhat ambiguous results that are closely dependent on their specific programmatic features. Given these ambiguities, a common suggestion is that the performance of enterprise zone programs in other states is an important area for additional research.[7]

This paper examines the effects of the state enterprise zone program in Colorado. Colorado began its enterprise zone program in 1986, in order to increase investment and employment in

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[4] See Wilder and Rubin (1996) for a detailed discussion of this literature.

[5] See Papke (1993) for a critical evaluation of benefit-cost analyses of enterprise zone programs.

[6] Also, see Nissen (1989), Rubin and Wilder (1989), Erikson and Friedman (1990a, b), and Dabney (1991) for empirical analyses of various state programs.

[7] Enterprise zones have also been established in other countries. For example, see Bromley and Morgan (1985) for an analysis of the enterprise zone program in Swansea, Rubin and Richards (1992) for a comparative discussion of British and American experiences, and Talbot (1988) for the results of a survey of enterprise zone program administrators in the United Kingdom.

economically blighted areas. The enterprise zone program is Colorado's largest single state economic development program, granting $188.6 million in tax credits through fiscal year 1994-1995. We use data provided by the State of Colorado Department of Local Affairs, as well as from the 1970, 1980, and 1990 United States Bureau of the Census, to estimate the effects of this program, applying a "natural experiment" or "difference-in-difference" approach. Our results indicate that the Colorado enterprise zone program has had a positive and significant impact both on employment growth in zone areas and on the level of per capita income in zone areas. Other effects of the program, such as the impacts on industry composition, population growth, unemployment, and the percent of people who work in their place of residence, show mixed results, with some enterprise zone areas faring better than their non-zone counterparts and others worse off after zone implementation.

Section 2 gives an overview of Colorado's enterprise zone program. Section 3 discusses the data and the methods of analysis. Results are reported in section 4, and section 5 summarizes the main results.

2. The Colorado Enterprise Zone Program

Colorado began its enterprise zone program in 1986, and the stated purpose of the program has remain unchanged, to bring new employment opportunities and increased investment to the state's economically distressed areas.[8] According to the Colorado Department of Local Affairs, there are four main goals of the program: to even out the economic disparity across the state, to improve the business climate in the zone areas through both the investment tax credit and the new jobs tax credit,

[8] As stated in *The Colorado Enterprise Zone Status Report 1994*, "The underlying premise of the enterprise zone legislation is that the state as a whole benefits if economically distressed geographical areas can improve their condition."

to make it easy for businesses to claim the credits, and to offer the enterprise zone credits as part of a larger economic development package to entice businesses to locate in Colorado. The original legislation limited the number of enterprise zones in the state to 16; the final zone, the Larimer County Enterprise Zone, was identified in 1993.

Colorado has issued $188.6 million in tax credits in the past ten years through its program. While specific dollar amounts of credits granted per zone have not been compiled for each year of the program, information is available for the most recent years, and information on the number of firms receiving credits is also available. In 1995, 5,330 firms claimed enterprise zone credits, and $49.2 million in credits were certified and $26.7 million were claimed.[9] Of the $26.7 million tax credits claimed, individuals accounted for $12.3 million, and corporations accounted for $14.4 million. According to the Colorado Legislative Council (1996), the amount of tax credits certified has increased by 422 percent since 1990.

Some features of the original program have been changed since 1996, due to criticisms from state legislators and the public. For example, the original program did not contain a measure to eliminate an enterprise zone once economic indicators reach benchmark levels. Also, even though there were only 16 zones allowed under the original legislation, there were 99 separate areas contained within these 16 zones, and politicians quickly learned to add non-contiguous areas to parts of an existing zone to bypass the zone number limit provision.[10] The State of Colorado Legislature

[9] The difference between credits certified and credits claimed arises due to the carry forward provision in the program. A firm does not have to use the credit in the year it is awarded, so that it can carry forward the credit to another tax year.

[10] In 1994, 24 areas were added that contained no population. Overall, the program includes only 15 percent of the state's population but covers 70 percent of the land area.

changed the enterprise zone program during the 1996 session to add a procedure to end zone designation.

Criteria for Enterprise Zone Designation. For an area to be designated an enterprise zone, the population of the area must not exceed 50,000. Also, the area must satisfy at least one of three additional indicators: the area must have an unemployment rate 25 percent above the state average, the population growth rate must be at least 25 percent below the state average, and per capita income in the area must be no more than 75 percent of the state average.

Enterprise Zone Tax Credits. Colorado's enterprise zone program consists of nine tax credits intended to increase zone employment and investment, with most incentives aimed at increasing the use of labor and capital in the area. These credits are summarized in Table 1. The first tax credit is a 3 percent investment tax credit given to businesses investing in equipment used exclusively in the enterprise zone. The second incentive is a $500 job tax credit per new employee; this is granted to both locating firms and existing firms in the zones, although existing firms must be expanding by adding more than 10 new employees over the previous annual average, investing at least $1 million in investment, or investing enough capital to double the original investment in the facility. An additional $500 credit per new employee is given to firms that add value to agricultural products through manufacturing. The fourth incentive is for new business facilities, and allows the business a $200 credit for two years for each new employee who is insured under a qualifying employer-sponsored health insurance program. The fifth credit is for research and experimental activities, and equals 3 percent of the increase in expenditures over the previous two year average. A sixth tax credit is given to business owners who renovate commercial buildings that are at least 20 years old and have been vacant for at least two years; this credit amounts to 25 percent of the rehabilitation

costs. Local governments within enterprise zones are allowed to negotiate with individual taxpayers with qualifying new businesses for two incentives: an incentive payment equal to no more than the amount of the increase in property tax, and a refund of local sales tax on purchases of equipment. The final tax incentive is for taxpayers who contribute to local zone administrators for enterprise zone development projects, and equals 50 percent of the cash contribution and 25 percent of the cash value of in-kind contributions.[11]

A "Typical Firm" Example. To illustrate the effects of these credits, consider the following "Typical Firm" example. Suppose a manufacturing firm that adds value to agricultural commodities decides to locate its operation in one of Colorado's enterprise zones. The company purchases a plant for $900,000, but $2.5 million needs to be spent to rehabilitate the building because it is over 20 years old. Manufacturing equipment is purchased for the new plant that totals $3 million. The plant hires 150 local employees, all of whom receive employer-sponsored health insurance. The company donates $10,000 of in-kind contributions to the local economic development commission as a goodwill gesture.

This company benefits from seven of the nine tax credits available in an enterprise zone; the other two tax credits are available to the firm only after its first year of operation. Specifically, the firm receives the following tax credits:

- Rehabilitate building, $2.5 million:
  Tax credit of 25% up to the limit of $50,000 $50,000

[11] The charitable contributions credit has proved to be extremely lucrative for Colorado businesses. For example, when the Western Hemispheric Trade Forum was declared a charity, fifty-seven businesses located in enterprise zones donated close to $381,000 in cash and $155,900 in in-kind donations, for which the firms received over $200,000 in tax credits.

• Purchase $3 million of manufacturing equipment:	
Investment tax credit of 3%	$90,000
Sales and use tax exemption of 3%	$90,000
• Hire 150 new employees:	
Job tax credit at $500 per new employee	$75,000
Health insurance tax credit at $200 per employee)	$30,000
Agricultural job credit at $500 per employee	$75,000
• In-kind contribution of $10,000	
Tax credit of 25% of contribution amount	$2,500
Total Tax Credits	**$412,500**

Since a tax credit is a dollar-for-dollar reduction in the firm's tax liability, this firm saves $412,500 in tax payments through the enterprise zone program.[12] In addition, many of the credits can be carried forward to another year, so the firm can choose when to claim the tax credits to offset years with high taxable profits; however, the program does contain limits to the amount of the tax credits that can be claimed against a firm's tax liability in a given year.

3. Data and Methods

This section discusses the data and methods used to estimate the effects of the Colorado enterprise zone program. In particular, the empirical analysis is directed at the question of whether being designated an enterprise zone improves the economy in zone areas, mainly through increased employment and income. As discussed in more detail below, we use data on the program obtained from the State of Colorado Department of Local Affairs, as well as from the United States Bureau of the Census. As suggested by Bartik (1997), we apply to these data a method based upon the

[12] Note that the health insurance tax credit can be claimed for two years, so this firm can receive an additional $30,000 tax credit if it still employs 150 employees the following year.

natural experiment or difference-in-difference approach, an technique that has been increasingly employed in the analysis of such things as labor supply decisions (Eissa and Liebman, 1996), minimum wages (Card, 1993), and health insurance (Gruber and Poterba, 1995). The enactment of the Colorado enterprise zone program in 1986 constituted a significant break from previous state economic development policy. If we can control for the major influences on variables such as income and employment that occurred in Colorado over time, then any differences that we observe between the performance of zone and non-zone areas will be largely due to the enactment of enterprise zones in 1986.

A. Data

We use two main types of data. The first type is specific information describing Colorado's enterprise zone program. The second type is general economic information for Colorado.

The first type of data is obtained from the Colorado Department of Local Affairs. This information consists of the geographic areas of the enterprise zones by census tract, the population of the zones, the land area occupied by the zones, and the date of individual zone designation, as well a description of the enterprise zone program from recent status reports.[13] Table 2 shows the various enterprise zones and their sizes by county; several counties are not included in an enterprise zone, including Boulder, Clear Creek, Douglas, Gilpin, Grand, Jackson, Park, Pitkin, Summit, and Teller counties.

The other source of data comes from the United States Bureau of the Census *Population and*

[13] Some additional information is provided by the State Auditor's office, which performed audits of the enterprise zone program, and the State of Colorado Legislative Council, which conducted an analysis of the zone program for the Legislature in spring 1996.

Housing Census Tract publications. Since the enterprise zones are designated by census tract and since no specific data have been tracked by the enterprise zone officials, the only available data are decennial census data. These data are broken down by census tract or block numbering group, the identifier used to delineate which areas comprise an enterprise zone. The data are aggregated by census tracts or block numbering groups to form the zone and non-zone groups.

We use data for the census years 1970, 1980, and 1990. For these years, we examine information on income (*Per Capita Income*, in constant 1996 dollars using the Consumer Price Index), the number of individuals (*Population*), the number of people of working age who are older than 16 (*Workers*), the number of households (*Households*), the total number of individuals employed *Employment)*, the total percent unemployed (*Unemployment Rate*), and the percent out of the work force (*Percent out of Labor Force*). Also, we use two categories for race, *Percent White* and *Percent Black*, since the Census only reported these two categories in 1970. We also extract information on various social characteristics, such as the percent of individuals who live in the same house over the prior five years (*Percent in Same House*) and the percent of workers who work in their place of residence (*Percent Who Work in Place of Residence*). Industry variables are also counted: the percent of area employment in agriculture, forestry and mining, in construction, in transportation and communication, in manufacturing, in wholesale and retail trade, in business services, in finance, and in other professional services.

While most of the data are available from the Bureau of the Census *Population and Housing Census Tract* publications, we obtain some information for the rural areas from another Census source. For both 1970 and 1980, census information by tract or block numbering group is not available for all of the rural counties. Since the rural counties are totally encompassed within a zone,

county level information from the Bureau of the Census *Detailed Population Characteristics* is used for rural counties.

A problem with comparing the data between census years arises because the census tracts expanded and split to encompass the growing population of Colorado. To take into account the increasing number of census tracts, we aggregate data backwards from 1990 census tracts to 1970 census tracts. Since 1970 has so many fewer tracts, all split tracts are combined with their former tracts to arrive at the tracts used in the 1970 census. The tract comparability tables are provided by the Bureau of the Census.

B. Methods

As noted above, we apply a difference-in-difference approach to analyze the impact of the enterprise zone program. The basic idea of this approach is straightforward. Suppose that we assume that a development initiative (the natural experiment) affects one group of areas (the treatment group, or the enterprise zones) but not another group (the control group, or the non-enterprise zones). If we measure the change in response of each group (call this change the "group difference") over a period of time (or the "time difference"), then the difference between these responses is the "difference-in-difference" (or DID) estimate of the impact of the enterprise zone program.[14] We apply this basic notion to the individual zone versus non-zone census tracts; we also

[14] It should be noted that the use of the natural experiment approach is not without some difficulties. As emphasized by Heckman (1996), the approach assumes that the experiment affected only the treatment group and that other events over the period affected both groups equally. In particular, if there is a difference in, say, the trend growth of income for the treatment and the control group, and if this difference is independent of enterprise zone status, then the difference-in-difference approach will mistakenly attribute this change in behavior to the enterprise zone program. The approach also often attributes the difference-in-difference estimate to one specific feature of the experiment, even though there are numerous provisions that are changed

find it of some interest to examine the state data aggregated to a single zone versus a non-zone area. Each analysis is discussed.

The crucial issue in the natural experiment approach is how to determine the sources of identifying variation. We use two obvious sources of identification. One is a time-specific factor (e.g., pre- versus post-1986, given the enactment of the enterprise zone program in 1986). The other is a group-specific factor (e.g., zone versus non-zone designation).

To illustrate the approach, consider information on, say, changes in per capita income for zones and non-zones, pre- and post-1986, for all state data aggregated to a single zone versus a non-zone area. Note that zones are designated by either census tract or block numbering group, depending on whether the area is urban or rural. To arrive at aggregate zone versus non-zone designations, we aggregate all of the zone tracts and block numbering groups; similarly, all of the non-zone tracts are aggregated.[15]

For areas designated as enterprise zones, the change in per capita income from 1970 to 1980 was $748, and the change from 1980 to 1990 was $944; the comparable changes for areas designated as non-enterprise zones were $4,575 and $1,795. The changes over time within the groups are therefore $196 for zones (equal to $944 less $748) and $-2,780 for non-zones (or $1,795 less $4,575). The DID estimator is calculated as $196 less $-2,780, and equals $2,976.[16] The estimator

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by a major enterprise zone bill.

[15] Most metropolitan counties contain enterprise zones that are solely within the confines of the county, and many of the metropolitan counties contain both zone and non-zone areas. In the rural areas of the state, several counties in their totality comprise an enterprise zone; there are seven zones that are comprised of more than one rural county. See Table 2.

[16] Note that the difference-in-difference estimator can also be calculated in another, equivalent way. For the 1970s, the difference in the change in per capita income for zone versus non-zone areas is $-3,827 (equal to $748 less $4,575); the difference for the 1980s is only $-851 (or $944 less $1,795). The difference-in-

equals the difference in per capita income growth of zone versus non-zone areas after the enactment of the enterprise zone program; it measures whether income in zone areas changed more after the enactment of the program than did the income in non-zone areas.

Similar analyses can be conducted for a number of income, population, employment, demographic, and housing indicators aggregated to the zone versus non-zone designation at the state level, such as *Per Capita Income*, *Population*, *Workers*, *Households*, *Unemployment Rate*, *Percent out of Labor Force*, *Percent White*, *Percent Black*, *Percent Who Work in Place of Residence*, and *Percent in Same House*. We also examine the impact of zone designation on the percent of area employment in various industry classifications. If enterprise zone designation works as intended by the legislation, then the DID estimates should be positive for such indicators as per capita income and employment, and negative for indicators like the unemployment rate.

Consider some of these aggregate results, as reported in Table 3. Of perhaps most importance is the effect of zone designation on per capita income. While per capita income increased in both zone and non-zone in the 1970s and the 1980s, the increase in zone areas per capita income was greater in the 1980s than in the 1970s, while the non-zone areas experienced a much smaller increase in the 1980s than in the 1970s. As derived earlier, the DID estimate here is $2,976, indicating that zone residents fared considerably better than non-zone residents after the enactment of the program.

As for other indicators, population increased in both zone and non-zone areas in each of the decades, and increased by more in the non-zone than the zone areas in each decade; however, the increases in population slowed for both areas in the 1980s, and slowed by more in the non-zone areas, thereby generating a positive DID estimate of 273,929 for zone versus non-zone areas at the

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difference estimator is again equal to $2,976, or $-851 less $-3,827.

aggregate state level. Similarly, the number of households increased relatively more in zone versus non-zone areas, as shown by the positive DID estimate in Table 3. Another measure of population stability is the number of residents in the same house as in the previous five years. Zone areas saw an increase in the percent of people living in the same house, while non-zone areas experienced a decrease the percent; this results in a final difference-in-difference estimate of 13.57 percent.

The enterprise zone program claims that it should expand employment and reduce unemployment in zone areas. However, the various labor force indicators suggest that this effect was not generally achieved. The DID estimate is 1.29 percent for the unemployment rate, indicating zone unemployment increased by more than non-zone unemployment for the total population. Furthermore, more of the residents in zone areas were not in the work force after zone designation, as shown by the DID estimate of 10.66 percent. However, the enterprise zone program also attempted to increase the employment opportunities for zone residents in their local areas. In zone areas the change from 1980 to 1990 shows nearly 7 percent less people working in their place of residence, while non-zone areas decreased by 35 percent; the resulting DID estimate for the percent who work in their place of residence is positive (27.08 percent). Also, the estimate for the number of workers in zone versus non-zone areas is large and positive (274,404), and more people lived in the same house in 1990 than in 1980 in zone areas, while the non-zone areas saw a decrease in the number of people living in the same house.

Table 3 also demonstrates the changes in industry composition for zone and non-zone areas. Although there were differences between these areas, especially in the 1970s, these differences narrowed considerably in the 1980s. The overall DID estimates in Table 3 suggest a positive impact of zone designation on jobs in agriculture, forestry, fishing, and mining, in construction, in

manufacturing, in business repair, and in other professional jobs, and a negative impact in other sectors (transportation and communication, wholesale and retail, and finance). Note that one hypothesis regarding enterprise zones is that the types of jobs brought in are low-wage, low-skill jobs. However, these DID estimates indicate that there was a relatively higher increase in at least some zone professional jobs than in non-zone professional jobs after the zone program implementation (e.g., construction, manufacturing).

In sum, the state analysis shows that per capita income increased significantly more in zone areas than non-zone areas, as did population, households, and workers. However, unemployment was still slightly more of a problem in zone areas than non-zone areas. Other indicators do not reveal major differences between zone and non-zone areas of Colorado. For example, the changes in industry composition do not show a major impact due to the enterprise zone program.

While suggestive, these agggregate results necessarily miss many details of the individual, disaggregated census tracts. Further, the efficiency of the DID estimates can be increased by controlling for other factors that may affect the variables, using ordinary least squares regression applied to the individual, disaggregated census tracts. We focus here on changes in employment and income, although we also examine the impacts on some other indicators. It is not possible to examine investment growth or changes in property values in zone versus non-zone areas because these data are not available by census tract.

As before, we use two sources of identification: a time-specific factor (or pre- versus post-1986), and a group-specific factor (or zone versus non-zone designation). In a regression context, these variables are introduced as separate dummy variables and also as an interacted variable; the coefficient on the interaction term estimates the impact on, say, per capita income in zone versus non-

zone census tracts before versus after the implementation of the enterprise zone program. Various other economic and demographic variables are included as control variables, as suggested by the literature on state and local government economic development policies.

Note that only the metropolitan counties are analyzed with the regression approach because data are not available by census tract for the rural areas for 1970 and 1980. However, we do not believe that this is a limitation because the bulk of enterprise zone activity is in metropolitan areas. According to the Colorado Legislative Council (1996a, b), urban zone areas accounted for 69 percent of the total tax credit certifications in the fiscal year 1994-1995. Note also that not all urban counties are reported by census tract for 1970; 1970 census tract data are not available for Douglas County, Larimer County, and Weld County. These three counties are left out of the data set.

The basic specification has the form:

$$Y_{it} = \beta \boldsymbol{X}_{it} + \phi_1 \, D1990 + \phi_2 \, ZONE + \phi_3 \, D1990 * ZONE + u_{it}$$

where Y_{it} is the dependent variable (e.g., some measure of income or employment) for tract *i* in time *t*, X_{it} is a matrix of demographic variables (including a constant) for tract *i* in time *t*, *D1990* is a dummy variable equal to 1 for 1990 (or the census year after the enactment of the enterprise zone program) and 0 otherwise, *ZONE* is a dummy variable equal to 1 for enterprise zone tracts and 0 otherwise, (β, ϕ) are vectors of parameters, and u_{it} is an error term distributed normally with zero mean and constant variance. All of the variables are formed at the individual census tract, and there is one observation for each census tract for each year of data. The coefficient ϕ_3 on the interaction term is the DID estimate of the impact of the enterprise zone program. It measures whether, say, per capita income in zone areas changed more after the enactment of the program than did income in non-

zone areas.

We report several specifications of the model. Examination of state economic variables suggests that a variable like per capita income in an area is likely to be stationary in its level, while a more aggregate variable like total area employment can exhibit persistent growth differentials even over a long period of time. Accordingly, in one specification the dependent variable is the level of *Per Capita Income*, while a second specification uses as the dependent variable the percentage change in the level of employment (*Percent Change Employment*), where employment is measured by the total number of individuals employed in a census tract.[17] These results, and those of several alternative specifications, are reported in the next section.

4. Results

This section reports the results from DID regressions estimating the effects of zone designation on employment and income, using individual census tract information in metropolitan counties; we have also estimated several alternative specifications that examine the impact of enterprise zones on the same variables as in the previous analyses. Recall that 1970 information on Larimer, Douglas, and Weld Counties is not available, so these counties are omitted from the data set.

Employment Specifications. The first specifications of the model use the percentage change in the level of employment as the dependent variable (columns 1 and 2 in Table 4); column 1 includes only the *D1990, ZONE,* and interaction variables, while column 2 includes several other control

[17] We are grateful to Tim Bartik for this analysis and suggestion.

variables.[18] The coefficient on *D1990*ZONE* (or ϕ_3) is positive and significant at the 90 percent level in both specifications, demonstrating that enterprise zone designation had a weakly positive impact on employment growth; that is, zone areas showed an increase in employment compared to non-zone areas after the enactment of the program in 1986. In particular, the coefficient on the interaction term indicates that zone designation increased employment growth by roughly 3 to 6 percentage points. The results from numerous (unreported) alternative specifications are generally quite similar.[19]

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[18] Note that *High School Education* is the percent of individuals in the census tract who have finished high school. Note also that the levels for the other variables are taken from the beginning of the period; that is, 1970 data are used for the change from 1970 to 1980, and 1980 data are used for the change from 1980 to 1990.

[19] We have also estimated specifications in which the dependent variable is the level of employment, rather than the change in its level. These results are:

	Dependent Variable: Employment	
Independent Variable	(1)	(2)
Constant	-205.38*** (90.82)	-211.31*** (48.83)
Population	---	0.29*** (0.02)
Households	---	0.59*** (0.04)
High School Education	---	0.05 (0.49)
Percent White	---	0.001 (0.001)
Percent Black	---	-316.57* (192.60)
D1990	662.60*** (134.35)	46.74 (58.93)
ZONE	-593.23*** (163.07)	-206.91*** (69.83)

Income Specifications. The other specifications in Table 4 use the level of per capita income as the dependent variable. As shown in columns 3 and 4, zone designation resulted in an increase in the level of per capita income, indicated by the positive and significant coefficients on *D1990*ZONE* (or ϕ_3). These coefficients show that per capita income increased by roughly $4,000 in zone census tracts, an estimate that is comparable to, though slightly larger than, the earlier state estimate. Given that the mean for the level of per capita income is $17,095 across all census tracts, this impact represents a significant increase in zone areas. Note that the zone census tracts by themselves (or ϕ_2 on *ZONE*) are associated with a lower per capita income; this result is consistent with one requirement to be a part of a zone, or lower than average per capita income. Note also that ϕ_1 on *D1990* has a positive coefficient, which reflects the increase in the level of per capita income for tracts after zone implementation.[20]

D1990*ZONE	584.80*** (163.26)	203.16*** (69.92)
R^2		
F-statistic	[556.68]	[556.68]
Observations		

where "***" denotes significance at 99 percent, "**" denotes significance at 95 percent, and "*" denotes significance at 90 percent. These results indicate that employment in zone areas increased significantly following zone designation, as expected.

[20] We have also estimated specifications in which the dependent variable is the change in per capita income, rather than its level. These results are:

	Dependent Variable: Percent Change Per Capita Income	
Independent Variable	(1)	(2)

Other Specifications. We have also estimated the impact of zone designation on the various income, population, employment, housing, and demographic variables examined earlier at the aggregate state level. The independent variables in these regressions are simply *D1990, ZONE,* and *D1990*ZONE* (plus a constant). The results from these regressions are reported in Table 5. When

Constant	0.36 (0.98)	0.28 (3.12)
Population	---	-0.001 (0.001)
Households	---	0.001 (0.001)
High School Education	---	-0.001 (0.014)
Percent White	---	-0.31 (2.91)
Percent Black	---	-1.91 (5.00)
D1990	0.28 (1.21)	0.50 (1.26)
ZONE	4.01** (1.80)	3.81** (1.80)
D1990*ZONE	-4.02** (1.81)	-3.91** (1.83)
R^2		
F-statistic	[556.68]	[556.68]
Observations		

where "***" denotes significance at 99 percent, "**" denotes significance at 95 percent, and "*" denotes significance at 90 percent. These results indicate that zone designation did not increase per capita income growth; in fact, enterprise zones tracts had a roughly 4 percent lower growth rate in per capita income than non-zone tracts. Even though zone designation had a positive impact on the level and the change in employment, as well as on per capita income in the enterprise zone tracts, the negative impact on the growth of per capita income may have been caused by the types of jobs brought to the zone areas. If mainly low-skill, low-wage jobs were created as a result of the enterprise zone program, as suggested by the industry composition results from the state analysis, then the growth of per capita income could well decrease.

looking at variables like income and employment, we expect the coefficient on *D1990* to be positive because it accounts for the change in zone designation, the coefficient on *ZONE* to be negative because zone tracts tend to be worse off economically, and the coefficient on *D1990*ZONE* to be positive because zone designation should generate a general improvement; when looking at variables like unemployment, we expect the opposite signs.

The DID results in Table 5 show that the enterprise zone program had the expected impact on many, but not all, of the variables. Employment, population, households, workers, the percent in the same house, the percent who work in their place of residence, and per capita income all increased after the enterprise zone program (see the coefficient on *D1990*ZONE*). However, the effects of the program on the unemployment rate and several other variables (e.g., percent with a high school education, percent out of the labor force) are not significant. These results are generally consistent with the earlier state analysis.

5. Conclusions

Enterprise zone programs have been a controversial policy tool for economic development in Colorado, as well as nationwide. Our results suggest that the Colorado enterprise zone program has had mixed but generally positive impacts on the local economies of the zone areas. In particular, the enterprise zone program acted to increase significantly the level of per capita income in zone areas, and also tended to improve employment conditions in zone areas. The program also had different effects on the separate metropolitan counties: some counties saw a general improvement in their economic conditions, while others did not. Unfortunately, there are no currently available data to conduct a thorough benefit-cost analysis of the entire enterprise zone program.

It should be noted that several significant changes have recently been made in the Colorado program. These changes include a recertification of all existing zones; an increase in the population cap from 50,000 to 80,000 residents per zone; a decrease in the charitable contributions credit from 50 percent to 25 percent for new projects; the requirement that contributions now be made directly to the project instead of through the zone administrator and that credits must now be directly related to job creation, job preservation, promotion of child care, or employment for the homeless; an increase of the investment tax credit to 50 percent of the tax liability above the first $5,000, with an increase in the carryover to 12 years; and the creation of a new job training credit of 10 percent of employer expenditures for job training and school-to-work programs. These changes are neither drastic nor far-reaching. They are in direct response to the criticisms the program has felt, but they do not materially change the program.

In short, it appears the Colorado enterprise zone program has achieved at least some of its intended goals, such as increasing per capita income in areas designated as enterprise zones and raising the level and the growth rate in employment in these areas. The lessons of the Colorado experience may well help other states in the design and implementation of their economic development programs.

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Table 2
Colorado enterprise zones

Enterprise Zone (EZ)	Counties Included	Size (square miles)	Total County Part of EZ?
Adams County EZ	Adams County	73	No
Arapahoe County EZ	Arapahoe County	2	No
Denver County EZ	Denver County	31	No
El Paso County EZ	El Paso County	917	No
Jefferson County EZ	Jefferson County	3	No
Larimer County EZ	Larimer County	12	No
Pueblo County EZ	Pueblo County	128	No
Greeley/Weld County EZ	Weld County	32	No
Northeast/East Central EZ	Logan, Morgan, Phillips, Sedgwick, Washington, Yuma, Cheyenne, Elbert, Kit Carson, and Lincoln Counties	17,336	Yes
Southeast EZ	Baca, Bent, Crowley, Kiowa, Otero, and Prowers Counties	9,490	Yes
Huerfano/Las Animas EZ	Huerfano and Las Animas Counties	6,354	Yes
San Luis/Upper Arkansas EZ	Alamosa, Conejos, Costilla, Mineral, Rio Grande, Saguache, Chaffee, Custer, Fremont, and Lake Counties	11,853	Yes
Southwest EZ	Archuleta, Dolores, La Plata, Montezuma, and San Juan Counties	6,500	Yes
Region 10 EZ	Delta, Gunnison, Hinsdale, Montrose, Ouray, and San Miguel Counties	9,490	Yes
Mesa County EZ	Mesa County	10	No
Northwest EZ	Garfield, Moffat, Rio Blanco, Routt, and Eagle Counties	13,273	No

Source: State of Colorado Department of Local Affairs.

Table 1
Colorado enterprise zone tax credits

- 3 percent investment tax credit given to businesses investing in equipment used exclusively in the enterprise zone
- $500 job tax credit per new employee, granted to both locating firms and existing firms in the zones
- $500 credit per new employee to firms that add value to agricultural products through manufacturing
- $200 credit for two years for each new employee insured under a qualifying employer-sponsored health insurance program
- 3 percent credit for increase in research and experimental activities expenditures over the previous two year average
- Credit of 25 percent of rehabilitation costs for renovation of commercial buildings that are at least 20 years old and have been vacant for at least two years
- Incentive payment equal to no more than the amount of the increase in property tax
- Refund of local sales tax on purchases of equipment
- Credit for contribution to local zone administrators for enterprise zone development projects, equal to 50 percent of the cash contribution and 25 percent of the cash value of in-kind contributions

Source: State of Colorado Department of Local Affairs.

Table 3
State analysis

Variable	Zone		Non-zone		Difference-in-Difference Estimate
	Change from 1980 to 1990	Change from 1970 to 1980	Change from 1980 to 1990	Change from 1970 to 1980	
Per Capita Income	$944	$748	$1,795	$4,575	$2,976
Population	158,861	216,267	315,028	646,363	273,929
Workers	100,708	116,535	165,599	455,830	274,404
Households	95,263	226,949	150,637	324,302	41,979
Unemployment Rate	-0.35%	2.53%	-1.76%	2.40%	1.29%
Percent out of Labor Force	1.08%	3.12%	-16.28%	-3.58%	10.66%
Percent White	-10.35%	-8.92%	-37.15%	-8.39%	27.33%
Percent Black	0.65%	-0.91%	-0.56%	0.84%	2.96%
Percent Who Work in Place of Residence	-6.63%	-2.70%	-35.07%	-4.05%	27.08%
Percent in Same House	1.70%	-6.08%	-9.65%	-3.86%	13.57%
Percent in Agriculture, Forestry, Fishing, and Mining	-0.25%	-13.31%	-0.17%	-0.11%	13.34%
Percent in Construction	-0.27%	-9.84%	1.69%	-3.36%	4.52%
Percent in Manufacturing	-3.07%	-6.24%	-3.39%	-3.66%	2.89%
Percent in Transportation and Communication	0.84%	1.24%	3.76%	-2.34%	-6.50%
Percent in Wholesale and Retail	0.48%	6.26%	-1.87%	-0.56%	-4.48%
Percent in Finance	3.85%	-2.90%	6.43%	-5.70%	-5.39%
Percent in Business Repair	-4.41%	3.61%	-3.57%	9.14%	4.68%
Percent in Other Professional	2.81%	21.19%	1.20%	20.74%	1.16%

Table 4
Individual census tract analysis:
Regression analysis of employment and income

	Dependent Variable			
	Percent Change Employment		Per Capita Income	
Independent Variable	(1)	(2)	(3)	(4)
Constant	6.15*** (1.82)	7.52 (5.68)	17278.00*** (340.47)	16612.00*** (420.94)
Population	---	0.001 (0.001)	---	-0.70*** (0.13)
Households	---	-0.003*** (0.001)	---	2.59*** (0.36)
High School Education	---	0.003 (0.025)	---	2.78 (4.24)
Percent White	---	-4.58 (5.31)	---	-0.001 (0.001)
Percent Black	---	-5.46 (9.13)	---	-7099.15*** (1673.94)
D1990	-5.93*** (2.26)	-4.82** (2.29)	1639.39*** (503.84)	883.26* (505.48)
ZONE	-5.79* (3.36)	-2.50 (3.34)	-4154.40*** (612.03)	-3947.04*** (599.83)
D1990*ZONE	5.97* (3.37)	2.49* (1.34)	4155.97*** (612.76)	3914.31*** (600.56)
R^2				
F-statistic	4.10	4.18	18.63	21.21
Observations				

***: Significant at 99% **: Significant at 95% *: Significant at 90%

Table 5
Individual census tract analysis: Regression analysis of other variables

Independent Variable	Dependent Variable									
	Per Capita Income	Population	Workers	Households	Unemployment Rate	Percent out of Labor Force	Percent White	Percent Black	Percent Who Work in Place of Residence	Percent in Same House
Constant	17278.00*** (340.47)	4623.12*** (165.22)	2066.74*** (90.97)	1603.22*** (61.03)	10.74* (4.30)	11.38*** (0.65)	0.94 (1.40)	3.47*** (0.54)	19.50*** (0.83)	16.99*** (0.64)
D1990	1639.39*** (503.84)	898.01*** (244.50)	649.66** (134.63)	589.22*** (90.31)	-4.02 (6.38)	0.93 (0.96)	2.53 (2.08)	2.03* (0.79)	6.41*** (1.23)	6.00*** (0.95)
ZONE	-4154.40*** (612.03)	-854.64*** (297.01)	-600.84*** (163.54)	-228.95** (109.70)	-3.95 (7.75)	0.69 (1.17)	-0.08 (2.52)	2.95*** (0.96)	-5.60*** (1.50)	-2.70** (1.15)
D1990*ZONE	4155.97*** (612.76)	847.62*** (297.36)	592.42*** (163.73)	224.41** (109.83)	4.26 (7.74)	-0.69 (1.17)	-1.41 (2.05)	-2.97*** (0.97)	5.51*** (1.49)	2.67** (1.16)
R^2										
F-statistic	18.63	11.55	19.61	22.25	0.37	0.28	0.58	3.93	21.90	21.91
Observations										

***: Significant at 99% **: Significant at 95% *: Significant at 90%