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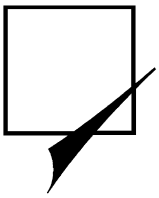

Evaluating Decentralized Policies

A Method to Compare the Performance of Economic Development Programmes Across Different Regions or States

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This article proposes an empirical method to evaluate decentralized economic development programmes with heterogeneous characteristics implemented in different regions or states. The evaluation design developed in the article is a comparative analysis that operationalizes differences in regional policy features and controls for exogenous factors that may affect outcomes independently from the programme intervention. The proposed method is illustrated and tested through the evaluation of the US Enterprise Zone programmes. The results of the analysis show that the proposed evaluation design is an effective tool for turning the heterogeneity of decentralized economic development programmes from a threat to the validity of the analysis into a great opportunity for testing the effectiveness of a variety of region- (or state-)specific policy implementation features.

KEYWORDS: comparative evaluation; decentralized policies; economic development programmes; longitudinal data; propensity score

Introduction

In recent years the number of decentralized economic development programmes has grown considerably in both the European Union (EU) and the United States (US).[1] Programmes such as the initiatives co-funded by the European Regional Development Fund (ERDF), in the EU 'Objective 1' (Ob. 1) and 'Objective 2' (Ob. 2) areas, and the US state Enterprise Zones (EZs) are often implemented with rather heterogeneous policy features across the various districts/regions or states where the target areas are located.[2,3] District/region- or state-specific policy implementation features of such geographically targeted economic development programmes commonly vary in the type and the monetary generosity of the incentives offered to businesses, the criteria for selecting the targeted areas of the intervention and the business eligibility rules for receiving the programme incentives. Evaluation of the incentive packages offered in single target sites, in the

form of case studies of the programme implemented by a single state (in the US) or district/region (in Europe), is not a satisfactory option as the external validity of the results is compromised by the wide heterogeneity of the policies adopted by the various states or districts/regions implementing the programme. For the US state EZ programmes and the EU economic development programmes in Ob.1 and Ob.2 areas, for example, positive or negative findings from the experience of the specific implementation of the programme adopted by a single state or district/region are difficult to generalize to other places or times; this is due to it not being possible to disentangle whether these results were determined by some state- or district/region-specific policy implementation features or by the relatively low or high monetary commitment to the programme.

More informative than single case studies can be comparative evaluations of programmes implemented across various states or districts/regions (located either within the same country or in different countries). For the EZ programmes and the economic development initiatives implemented in the EU Ob.1 and Ob.2 areas, such types of evaluations would be studies that compare outcomes from multiple state- or district/region-specific implementations of the programme. These types of evaluations are generally not easy to perform for two reasons. First, it is difficult to distinguish the net impact of the heterogeneous policy features of the programmes from the impact of district/region- or state-specific exogenous factors that may influence the observed outcome of interest independently of the programme intervention. Second, it is difficult to effectively operationalize and embed into an empirical model the differences in the policy implementation features across districts/regions (or states). If carefully performed, however, comparative evaluations can use the heterogeneity of such decentralized implementations of economic development programmes to their advantage. This is because the variation of specific policy features across district/regions or states can be used as a natural experiment from which valuable evidence can be retrieved on single best practices to be applied to future economic development efforts.

This article proposes a comparative evaluation method suited to investigating the impact (on employment and other business outcomes) of such geographically targeted economic development programmes. The proposed evaluation method is designed, in particular, to retrieve evidence on which district/region- or state-specific policy implementation features of the programme achieve the best results in spurring new business creation in the target areas and which features result instead in high levels of retention of the businesses already operating in the target areas. This type of evidence can be very insightful for reshaping future geographically targeted economic development efforts, as different policy implementation features may be more appropriate in different circumstances. For example, policy implementation features will be found to be effective in attracting new establishment start-ups to target areas. These can be better directed to support the development efforts applied to areas with substantial expansion potential (e.g. newly equipped industrial park sites or underutilized land sites at the edge of the urban texture), rather than being directed to reverse the decline of existing business-district sites.

As target areas are selected into treatment only if they show signs of economic distress (as is the case for US EZ areas and EU Ob.1 and Ob.2 areas), the data used to evaluate such programmes are non-experimental and non-random by nature. This poses the challenge to control for selection bias in retrieving programme impact estimates. The evaluation method proposed in this article addresses the selection bias issue by estimating the designation probability of each target area based on pre-intervention economic growth and socio-economic characteristics. Differences in these characteristics are then controlled for by including the predicted probability of zone designation in an outcome regression that allows retrieval of impact estimates by controlling also for some degree of unobserved differences between target and excluded areas, and for influences due to exogenous cyclical economic factors.

The proposed method is illustrated using, as an empirical application, the evaluation of the US EZ programmes. These programmes were initiated autonomously by a number of states, rather than by the Federal Government, as a policy initiative providing tax and other business incentives aimed at encouraging businesses to relocate to (or to avoid leaving) economically depressed areas. Because the states autonomously initiated the EZ policies with the involvement of county and local governments of the targeted areas, a large variety of programmes emerged. Thus, the US EZ programmes represent an excellent empirical application to test the proposed method and to illustrate the challenges and the opportunities that decentralized interventions pose to evaluators.

The results of the analysis from the US EZ application provide findings that have potentially relevant policy implications to refine future geographically targeted economic development initiatives. These results suggest that the proposed method could be effectively applied to a number of other heterogeneously implemented economic development programmes. In the EU context, for example, the proposed method could be applied to the number of geographically targeted economic development programmes autonomously implemented across different districts/regions and/or countries. The most remarkable examples of such programmes are the aforementioned initiatives developed in the Ob.2 areas, which are planned and implemented independently (though following EU guidelines) by each district/region administration of the EU countries with pockets of declining industrial production. Applying the proposed method to such initiatives would enable evaluators to estimate which specific policy feature of the various Ob.2-area programmes implemented achieved the best results. This would be measured in terms of boosting employment and industrial production through attracting new businesses to the target areas, and in terms of stopping the haemorrhage of employment and production by helping existing businesses. Cross-country comparisons of programmes implemented in Ob.1 areas could also be effective applications of the proposed method. With the proposed method it would be possible to empirically investigate which different country- or area-specific policy features of the Ob.1 programmes (in terms of the types of incentives offered in the target area) yielded best results. These results would be measured in terms of employment, production or investments, controlling for the exogenous factors that may affect the outcome of interest in the different

countries. Such results could take advantage of the policy heterogeneity of the intervention to offer valuable evidence to determine which country- or area-specific policies might best be followed in future interventions.

The remainder of the article is organized as follows. The next section illustrates how to operationalize heterogeneous policy characteristics. The third section describes the proposed evaluation design. The fourth section develops the empirical method of analysis and illustrates the data used in the empirical application. The fifth section illustrates the results from the empirical application. The two final sections of the article discuss the major findings and offer concluding remarks.

Operationalization of Heterogeneous Policy Implementation Features

To effectively evaluate decentralized economic development programmes, it is crucial to distinguish and correctly operationalize the heterogeneous policy characteristics implemented in the different districts/regions or states administering the programme. It is difficult to provide specific and universal guidelines as each decentralized programme has its own specific features. However, it is quite common for the differences between the various policy implementation features to be related to the following factors: the monetary value of the incentives offered to targeted businesses; the designation process to select the target areas; the requirements that targeted businesses have to meet for receiving the programme incentives; and the proportion of state (or district/region) land covered by the target areas.

Using the US EZ programmes as a case study, the following is an illustration of how differences in the heterogeneous state-specific implementation features can be operationalized in policy variables that can be embedded in empirical evaluation models.

The monetary value of the incentives awarded in the target areas should be measured in such a way as to capture the estimated competitive advantage offered by investments performed in the target locations compared to the same investments performed in non-target locations. For the US state EZ programmes, such a competitive advantage should be operationalized by estimating the internal rate of return of an investment in a new plant, located in both an EZ area and a non-EZ area within the same state, made by one typical firm for each of the industrial sectors representing the state economy.[4] The difference between the return on the investment in the EZ areas and the non-EZ areas should be calculated and used as an estimate of the monetary generosity for each state EZ programme included in the data sample.[5] This within-state differential estimate approach is motivated by the fact that development incentives are most likely to be a peripheral concern in business location decisions, e.g. a concern when deciding between similar and spatially adjacent areas within the same state (e.g. Bostic, 1996; Wilder and Rubin, 1996; Bartik, 1991; Bartik and Bingham, 1995). This is because the degree of variation in labour, tax and other business costs, as well as in revenue potential across different regions and states is very likely to be larger

than the degree of variation in development incentives. Thus, business inter-regional (or inter-state) location decisions are likely to be primarily determined by these fundamental cost and revenue variations rather than by the availability of development incentives.

The process for selecting the areas designated as EZs is, in many states, based on minimal unemployment, income or education thresholds to be met by eligible communities. Eligible communities are then required to submit a formal application for EZ designation, which is typically awarded to a large sub-sample of the applicants. A distinctive feature of the EZ application process that has been regarded as potentially important for the effectiveness of the programme is that one of the requirements is the provision of a strategic business plan. In many cases (Bostic, 1996), the strategic planning portion of the application process has been regarded as beneficial by itself for local economic development as it promotes a more productive co-ordination of different local development resources. Thus, the designation process for selecting the target areas should be primarily operationalized with a dummy variable for whether or not a state EZ programme requires the completion of a strategic business plan among its zone application requirements.

State EZ programmes often tie incentives awarded to businesses to either the number of new jobs created or the size of the capital investment performed in the zone. As zone incentives may also have an impact on factor prices, incentives that reduce the price of capital may also have a substitution effect by inducing businesses to substitute capital for labour (Wilder and Rubin, 1996), or vice versa. To effectively test such hypotheses, the business requirements for receiving the programme incentives should be operationalized with both a job- and a capital-requirement dummy variable.

Finally the territorial extension of the programme should be measured as the percentage of state land covered by EZ areas. This solution allows the degree by which the programme incentives are spread over a large portion of the state (rather than focusing on few critical target sites) to be captured in a single informative parameter. Additionally it becomes possible to test whether the territorial extension of the programme is a relevant factor to explain its degree of success.

The Evaluation Design

The evaluation method proposed in this article is designed to assess whether decentralized economic development programmes achieve their immediate goal of retaining existing firms and attracting new ones. It is widely agreed that successful economic development programmes should bring more business activity to both new and existing targeted establishments (e.g. Bartik, 1991; Greenbaum, 1998; Wilder and Rubin, 1996). Empirical evidence of such increments in business activity would be found in increased employment, sales and capital expenditures. Thus, three variables are proposed as outcome measures for the evaluation: employment (to measure whether zones create and retain jobs), total US dollar value of shipments (to measure whether plant output has been

affected), expenditures on new buildings and machinery (to assess whether zone incentives encourage increased capital expenditures).

Although attracting new business and jobs is certainly the most headline-grabbing goal of most decentralized economic development programmes, retaining businesses and jobs is also often stated as an important goal (e.g. Dowall, 1996). This is especially true when the promoters of the programme are concerned with revitalizing declining business districts. Investigating whether certain district/region- or state-specific policy implementation features are more appropriate for spurring new business creation, or whether certain region-specific features are better suited for retaining existing businesses, can be very beneficial in reshaping future economic development efforts. For example, capital is often cited as a primary concern for start-up businesses and new branches of existing businesses (Wilder and Rubin, 1996). Thus, it can be argued that capital and finance incentives for the few first years of a start-up business plan are typically more attractive than tax incentives, since new businesses do not expect to make a profit in the first years of operation. In a survey study of a number of US EZs, Sheldon and Elling (1989) found that new firms reported being significantly affected by EZ programme services (e.g. technical assistance and streamlines regulations) while expanding businesses reported being more affected by financial assistance (e.g. low-rate financing, venture capital and fee waivers). If the specific policy features implemented in some districts/regions or states are found to be particularly effective in attracting new start-up establishments, those features, in the future, should be adopted to support all economic development initiatives targeting areas such as newly equipped industrial parks, rather than initiatives aimed at reversing the decline of existing business districts. Similarly, if other district/region-specific policy features are found to be effective in retaining existing zone businesses, those features should be used to support the future interventions aimed at saving existing business districts, rather than to support the investment aimed at boosting the economic growth of unexploited sites in areas specifically set apart to host new industrial development.

To address these types of research questions, it is crucial to include in the analysis the policy implementation variables illustrated in the second section of the article. Secondly it is important to distinguish, for each outcome variable (i.e. employment, sales and capital expenditures), the pre–post intervention changes accounted for by three different types of business units: birth, existing and vanishing establishments. To implement this distinction, establishment-specific panel data need to be available for the analysis. Employing these data, birth establishments can be defined as business units that have positive employment during the post-intervention stage, but having zero employment prior to the programme intervention. Vanishing establishments can be defined as business units that have zero employment in the current year, but have positive employment in the previous year. Existing establishments can be defined as business units that have positive employment levels, both before and after the programme intervention.

The intersection among the three growth outcome measures and the three different 'types' of business units identifies nine cells. The establishment-specific data inside each cell then need to be aggregated at the geographical level

corresponding to that of the areas targeted for the programme intervention. If, for example, the target areas of the programme intervention are districts/regions or provinces of EU countries, as in the case of the initiatives in Ob.1 and Ob.2 areas, then the data need to be aggregated by province (or by region). If, instead, the target areas are smaller sites corresponding to the size of postal code districts, as is the case for the US Enterprise Zone programmes, then the data need to be aggregated by US postal zip code area.

The Empirical Method: Conditioning on a Propensity Score

The proposed empirical method to estimate the impact of policy implementation variables on each type of establishment (birth, vanishing and existing establishments) is a *conditioning on a propensity score* approach (Bondonio, 2000; Bondonio and Engberg, 2000) that uses pre–post intervention data from both target and excluded areas. The model is implemented by first estimating (through a probit or logit equation) the probability of each geographic area in the data sample to become the target of the programme intervention as a function of the pre-intervention area-specific economic growth and socio-economic characteristics:

$$P(D_i = 1) = \Phi(X_i\gamma + \phi_j), \qquad (1)$$

where X_i is a matrix *(N x K)* (*K* being the number of observable pre-intervention characteristics and growth rates measured and *N* the total number of areas in the data sample), ϕ_j is a set of (*J-1*) district/region (or state) dummy variables (with *J* being the total number of districts/regions [or states] in the data sample). The predicted value $D_i = \Phi(X_i\gamma + \phi_j)$ from equation (1), referred to as the propensity score (e.g. Rosenbaum and Rubin, 1983, 1984; Dehejia and Wahba, 1998a, 1998b; and Heckman et al., 1997, 1998), represents the estimated probability that an area *i* is selected for treatment. This probability can be interpreted as a single area-specific parameter (whose value ranges from 0 to 1) that summarizes the pre-intervention economic growth and socio-economic conditions of area *i*. The predicted probability D_i estimated from equation (1) is then added as a control variable to an outcome equation where the independent variable (ΔLn Y_{it}) is regressed against a treatment assignment variable (D_{it} = 1 if the area *i* is a target area at time *t*, D_{it} = 0 otherwise), a set of policy implementation variables (pol_1_{it}, . . . pol_n_{it}) and a set of time (αt) and district/region (or state) (ϕj) dummy variables:

$$\Delta \text{Ln } Y_{it} = \alpha_t + \phi_j + \lambda \hat{D}_i + \delta D_{it} + [\theta_1(EZ_{it} * pol\_1_{it}) + \ldots + \theta_n(EZ_{it} * pol\_n_{it})] + u_{it} \qquad (2)$$

By inserting the propensity scores into the outcome equation (2) the model allows observed pre-intervention growth trends and socio-economic characteristics to be controlled for.[6] Target areas, in general, tend to have more disadvantaged socio-economic conditions and slower growth trends, prior to the beginning of the programme, than non-target areas. Such disadvantaged initial conditions would

probably induce target areas to grow less than non-target areas even in the absence of the intervention. Without properly controlling for such differences, impact estimates of the programme intervention would be biased (selection bias). The model of equation (2) distinguishes between impacts due to observable differences in pre-intervention growth trends and socio-economic characteristics (coefficient λ) from the actual impacts due to the programme intervention and specific policy features (coefficients δ, θ_1, . . .θ_n).

For geographically targeted economic development programmes (such as the US state EZ and EU Ob.1 and Ob.2 area programmes) the final selection into treatment typically revolves around decisions made by programme officials on the basis of area-specific socio-economic statistics and official thresholds also observable by the evaluator. For such programmes, little room is left for pure self-selection into treatment by local communities or for selection decisions based on factors that are unobservable to the external evaluator (Greenbaum, 1998; Bondonio, 2000). Thus, thoroughly controlling for observable pre-intervention growth trends and socio-economic characteristics should offer good protection against possible selection bias in the impact estimates.[7] Taking advantage of the panel nature of pre–post intervention data, however, the model of equation (2) also offers some robustness against selection on unobservables. By first 'differencing' the dependent variable (ΔLn Y_{it}), the model allows unobserved area-specific characteristics to be correlated with the treatment and/or policy variables and yet provides an unbiased net impact estimate of the programme intervention as long as such unobserved characteristics are relatively constant during the pre–post intervention period.

The analysis is implemented with a comparison group evaluation approach in which the sample of observations includes both target and adjacent, excluded areas located in the same economy. Therefore the proposed method is also robust against biases arising from cyclical macroeconomic factors affecting outcomes during the same period of the programme intervention. The influence of most of these factors would be felt on all adjacent areas, regardless of their treatment status. Thus, estimates of marginal changes due to the programme intervention (expressed by the coefficients δ, θ_1, . . .θ_n in equation [2]) are net of influences from the exogenous macro-factors shaping the general economic cycle affecting the areas in the data set.

In sum, the proposed method yields unbiased net impact estimates of the programme intervention, when any of the following is assumed:

- selection of areas into treatment occurs on area characteristics and pre-intervention growth trends observable to the evaluator;
- unobserved area characteristics that may have different distributions between target and excluded areas (i.e. selection occurs on unobservables) are relatively constant over time;
- unobserved cyclical macroeconomic factors homogeneously affect adjacent areas, regardless of their treatment status.

The proposed method would instead yield biased impact estimates if programme officials select target areas based solely on information (unknown to the

evaluator) that would allow them to forecast with certainty the areas that would display, in the absence of the programme intervention, the poorest (or greatest) future economic growth performances. Selection into treatment would then have to be consistently granted only to the poorest (or the greatest) future performers. Such assumption is quite implausible as, even in the case that programme officials would want to select areas into treatment based solely on their future economic performance, programme officials would typically have to base their forecasts on data and analytic tools that would also be available to evaluators.

A Case Study: the Evaluation of US Enterprise Zone Programmes

To illustrate in detail how to implement the empirical method proposed for the analysis it is useful to use as a case study the comparative evaluation of the EZ programmes of five states: California, Kentucky, New York, Pennsylvania and Virginia. These five states are sampled for analysis (among the 40 or more states that, to date, have implemented their own version of an EZ programme) as a result of a choice based on the longevity of the programmes and the ease of gathering geographic and policy information about the programmes. The specific policy implementation features of these five state programmes (operationalized following the guidelines illustrated in the second section of the article), along with the programme starting dates and the number of zones are summarized in Table 1.

Data

The data used to develop the analysis of the EZ programmes in the five states were collected from various documents and sources provided by state EZ programme administrators and the US Census Bureau. Zone location and designation date information was retrieved primarily through interviews and questionnaires from state EZ and local development administrators. Zone locations were mapped in terms of US postal zip code areas. Zip code areas were encoded as zone-zips if their boundaries, as provided by official state documents, overlap any portion of a computerized GIS map of zip code area. The rationale for this choice (following Greenbaum and Engberg, 2000, and Bondonio and Engberg, 2000) relies on the fact that state EZ programmes are commonly designed with the stated aim to boost employment, production and investments in economically depressed communities. Estimating the impact of zone designation on encompassing zip code areas is therefore consistent with testing these programmes against their most widely stated goals.

Pre-designation demographic, income, poverty, unemployment and population density information was obtained from the US Census Bureau 1980 Decennial Census files. These data, recorded by Census tracts, needed to be allocated to zip code areas to be used in the analysis. This allocation was performed using the MABLE/GEOCORR geographical correspondence engine that determines the degree of overlap between different spatial units.[8]

Employment, value of shipment and capital expenditure data were obtained from the quinquennial Census of Manufactures (CM) portion of the US Census

Table 1. Programme Implementation Features, Starting Dates and Number of Zones

				CA[1]	*KY*	*NY*	*PA*	*VA*
		Programme starting date		*1986*	*1983*	*1987*	*1983*	*1982*
		Number of zones in existence at 31/12/1992		*28*	*10*	*19*	*51*	*24*
Policy feature	*Variable name*	*Measure*		*CA*[1]	*KY*	*NY*	*PA*	*VA*
Zone eligibility is conditional upon the submission of an application complete with a strategic development plan	STRPL	1 = yes	0 = no	0	0	1	1	1
Tax incentives to EZ businesses are proportional to the number of new jobs created	JOBS	1 = yes	0 = no	1	1	0	0	0
Tax incentives to EZ businesses are proportional to the amount of new capital investment	CAP	1 = yes	0 = no	0	1	1	0	0
Total surface occupied by EZ areas as a percentage of the total state land size	LAND	% of state land occupied by zone-zips[2]		1.26% 3.45%	2.51% 3.22%	0% 2.31%	0.21% 6.46%	5.37% 7.91%
Monetary value of the incentive package offered to EZ businesses	MON	ΔIRR (%) between EZ and non-EZ located within the same state[3]		0.115	0.217	0.183	0.229	0.735

Notes:

1. California has two EZ programmes that, respectively, established the Enterprise Zones and the Employment and Economic Incentive Areas. Since the two programmes do not differ from each other in the policy dimensions considered in this article, they are considered as a single programme.
2. The land coverage variable (LAND) is time-varying. The upper range value of the measure reflects the % of state land occupied by EZs in 1992. The lower range value reflects the same % in 1987.
3. ΔIRR values vary across industries. The reported figure is the state average obtained by weighing each two-digit SIC specific estimate by the proportion of establishments in the state operating in that industry prior to the start of the EZ programme.

Bureau's Longitudinal Research Database (LRD). The CM data include information on every US manufacturing plant with five or more employees, allowing each establishment to be tracked over time through a unique identification number assigned to every plant. CM data were available for the analysis in years 1977, 1982, 1987, 1992.

Modelling Zone Designation

To adequately control for pre-existing differences between areas and states in the data sample, the propensity score model of equation (1) and (2) is implemented by first estimating a separate probit regression for each of two state clusters. The five states included in the data sample are clustered based on the criteria mentioned in the EZ state legislation for selecting zone areas. This clustering solution is a good compromise between two extreme options: an extremely flexible model in which a separate probit regression is used for each state included in the analysis, and a very restrictive model in which one common regression is used for all states in the data sample.[9]

The first cluster of states includes California, Kentucky and Pennsylvania, for which official EZ selection guidelines include primarily income, unemployment or poverty indicators. The second cluster of states includes New York and Virginia for which official zone selection guidelines also include criteria based on land availability or building vacancy, in addition to unemployment, income or poverty indicators. Each probit regression (one for each cluster of states) expresses zone designation as a function of five pre-designation variables derived from 1980 Decennial Census data and two pre-designation (1977–1982) growth variables derived from Census of Manufacturers (CM) data. The Decennial Census variables are used to capture poverty, unemployment and income characteristics along with a few basic demographic characteristics, while the CM data capture growth in employment and the number of establishments prior to the beginning of the zone selection process.

The probit specification for the second cluster of states (New York and Virginia) differs from the first-cluster specification as it also includes two 1980 Census housing market variables. These two additional variables are included in the specification for New York and Virginia because these two states have specific policy selection guidelines that also include housing condition indicators. The two probit specifications used in the analysis are illustrated in equations (3) and (4).

$$P(EZ_i = 1) = \Phi\,(CEN80_i\alpha + CM77\_82_i\,\beta + \phi_j\,), \quad i = \text{zip areas}, \; j = \text{cluster I states (CA, KY, PA)} \tag{3}$$

$$P(EZ_i = 1) = \Phi\,(CEN80_i\alpha + CM77\_82_i\,\beta + HOUS80_i\delta + \phi_j), \quad i = \text{zip areas}, \; j = \text{cluster II states (NY, VA)} \tag{4}$$

where: EZ_i equals 1 if zip area *i* is ever a zone in any year from 1982 to 1992, and 0 otherwise; $CEN80_i$ are the set of 1980 Census variables capturing

Table 2. Pre-designation Zips' Characteristics (1980 Decennial Census Data)

Variable	*Variable name*	*Mean (SD in brackets)*	
		Zone Zips (EZ = 1)	*Non-zone Zips (EZ = 0)*
CEN80			
Unemployment rate	UNEMP	0.049 (0.018)	0.045 (0.019)
Per capita income (in US$)	INCOME	6035 (1551)	6630 (2129)
Poverty rate	POVRT	0.167 (0.098)	0.130 (0.081)
Population density (1,000 people per km^2)	POPDNS	1.87 (2.88)	0.80 (2.90)
Proportion of population black or hispanic	MINRTY	0.274 (0.293)	0.099 (0.164)
HOUS80			
Proportion of occupied units over total number of housing units	HS_OCC	0.864 (0.071)	0.896 (0.125)
Average value of owner-occupied housing units (in US$)	HS_VAL	47,930 (24,361)	61,314 (32,320)
CM77_82 [= $ln(Y_{i1982} / Y_{i1977})$]			
Employment growth	EMP_GRW	–0.007 (0.722)	0.231 (0.987)
Establishment growth	EST_GRW	0.558 (0.768)	0.793 (1.168)

unemployment, poverty, per capita income and other demographic characteristics of each zip area *i* in the data sample; $CM77\_82_i$ are the CM growth variables; $HOUS80_i$ are the 1980 Census variables expressing zip *i*'s characteristics of the housing market; and δ_j is a set of state dummy variables. Table 2 illustrates the complete set of independent variables included in equations (3) and (4), along with their means and standard deviations sorted by zone zips and non-zone zips.

Estimating Zone Outcomes

The impacts of EZ designation and of specific policy implementation features on employment, value of shipments and capital expenditures are to be estimated. To do this, the predicted probabilities from equations (3) and (4) are included (to control for the impact on the dependent variable of pre-intervention zip-specific characteristics and economic growth) in a model where the outcome variable (measured as the growth rates recorded within the two five-year periods covered by the available CM data [i.e. 1992–1987 and 1987–1982]) is regressed against:

- a set of state dummy variables (ϕ_j), to control for any state-specific factor that may affect the dependent variable;
- one dummy variable for the 1982–1987 five-year period (82_87_t), to control for the possible impact on the dependent variable of time-specific general economic trends;

- the portion of the five-year period in which the zip area was a zone [EZ_{it}*(t-t^d_i)/5];
- the monetary value of the zone incentives and one specific EZ programme policy feature (weighted for the portion of the five-year period in which the zip area was a zone) [EZ_{it}*mon_i*(t-t^d_i)/5 and EZ_{it}* pol_{it}*(t-t^d_i)/5, respectively],

$$Ln(Y_{it}/Y_{it-5}) = \alpha_t + 82\_87_j + PR\_I_i\delta_1 + PR\_II_i\delta_2 + EZ_{it}*[(t-t^d_i)/5]\ \delta_3 + EZ_{it}*mon_i*[(t-t^d_i)/5]\ \delta_4 + EZ_{it}*\ pol_{it}*[(t-t^d_i)/5]\ \delta_5 + u_{it} \quad (5)$$

The propensity scores from equations (3) and (4) are inserted in equation (5) as two variables: PR_I and PR_II. The variable PR_I is constructed as the predicted probability from equation (3) for all the zips located within the states included in cluster I, and 0 for all the other zips. Likewise, PR_II contains the predicted probability from equation (4) for all the zips included in cluster II and 0 for all the other zips. The zone status variable EZ_{it} equals 1 if a zip contains a zone that is in existence at time t, and 0 otherwise. The term [(t- t^d)/5] is included to express the portion of the quinquennium ending in year *t* for which a zone is in existence (to correctly express such a portion, (t-t^d_i)/5 is capped at 1 when more than five years elapsed between *t* and the time of zone designation t^d). The term EZ_{it}*mon_{it} equals the monetary value of the EZ incentives (as measured with the 'hypothetical firm' method illustrated in the second section of the article) if the zip area *i* is a zip zone at time t, and 0 otherwise. Finally, the term EZ_{it}*pol_{it} is the interaction between the EZ status variable and one of the four remaining policy implementation variables described in the second section of the article (i.e. *pol* is equal to either the portion of state land covered by zones or one of the three dummies used to illustrate whether or not: a strategic business plan is required; tax incentives are tied to the number of new jobs created; and tax incentives are tied to capital investment).

The model illustrated in equation (5) is implemented with a number of different specifications. Each specification differs from the other because of the inclusion of a different dependent variable (Y) among those listed in Table 3, and because of the inclusion of different pairs of policy implementation variables.

The set of dependent variables used in the analysis is formed by intersecting the three outcome measures (i.e. employment growth, capital-expenditure growth and value-of-shipments growth) with the three different 'types' of firm (i.e. birth, vanishing and existing establishments) operationalized for the analysis. The complete set of specifications adopted to implement the model of equation (5) is illustrated in Table 4. Due to space constraints, regression results are presented in the article only for those specifications (highlighted in bold in Table 4) that yield significant impact estimates, while the complete list of regression results is available upon request to the author.

Results

Probability of Zone Selection The propensity scores estimated from the probit regression of equations (3) and (4), as expected, were found to be on average

Table 3. Outcome Variables by Types of Establishments

Variable	*Variable name*	*Average 5-year growth rate: 1987–1982 and 1992–1987 (SD in brackets)*
Outcomes due to birth establishments[1]		
Employment	EMP_BTH	0.086 (1.522)
Value of shipments	SHP_BTH	0.275 (1.891)
Capital expenditures	CEXP_BTH	0.217 (1.857)
Outcomes due to existing establishments[2]		
Employment	EMP_EXT	0.001 (0.765)
Value of shipments	SHP_EXT	0.211 (0.967)
Capital expenditures	CEXP_EXT	0.157 (1.354)
Outcomes due to vanishing establishments (negative values)[3]		
Employment	EMP_VAN	0.242 (1.582)
Value of shipments	SHP_VAN	0.476 (1.964)
Capital expenditures	CEXP_VAN	0.307 (1.878)

Notes:
1. New business activity at time t accounted for by the new establishments opened in the period t-(t-5).
2. Business activity at time t accounted for by the establishments existing both at time t and t-5.
3. Business activity loss at time t accounted for by the death of establishments in the period t-(t-5).

higher in zone zips than in non-zone zips. Such differences vary from state to state, with Kentucky recording the largest average propensity score difference (0.56) and New York the smallest (0.16). Table 5 reports the coefficient estimates from equations (3) and (4) which highlight the actual pre-designation characteristics that drive the selection decision in each cluster of states. In the three states included in cluster I (California, Kentucky and Pennsylvania) zones tend to be placed in areas with low per capita income, slow pre-designation employment growth and a high proportion of minority population and population density. Cluster II states (New York and Virginia) target areas with slow pre-designation employment growth, a high proportion of minority population and low-value housing units.

To test the validity of the clustering solution adopted, the analysis has been replicated adopting the specification of equation (4) (which includes two housing variables) for retrieving the propensity score estimates of the cluster I states. Results from this specification are in favour of the adopted clustering solution, showing that housing criteria do not affect zone designation for the cluster I states.[10]

Birth-establishment Outcomes The first three columns of Table 6 summarize the results for the three birth-establishment specifications of equation (5) that

Table 4. Model Specifications for Equation (5)

Specifications	*Group of dependent variables*	*Dependent variable*			*Policy implementation features: (EZ*MON) and (EZ*POL)*
(I.1) – (III.4)	Birth-establishment outcomes	**EMP_BTH (I)**	**SHP_BTH (II)**	**CEXP_BTH (III)**	(I.1), (II.1), (III.1) EZ*STRPL (I.2), (II.2), (III.2) EZ*JOBS (I.3), (II.3), (III.3) EZ*CAP **(I.4), (II.4), (III.4) EZ*LAND**
(IV.1) – (VI.4)	Existing-establishment outcomes	**EMP_EXT (IV)**	**SHP_EXT (V)**	**CEXP_EXT (VI)**	(IV.1), **(V.1), (VI.1) EZ*STRPL** **(IV.2)**, (V.2), (VI.2) **EZ*JOBS** (IV.3), (V.3), (VI.3) EZ*CAP (IV.4), (V.4), (VI.4) EZ*LAND
(VII.1) – (IX.4)	Vanishing-establishment outcomes (negative values)	EMP_VAN (VII)	SHP_VAN (VIII)	CEXP_VAN (IX)	(VII.1), (VIII.1), (IX.1) EZ*STRPL (VII.2), (VIII.2), (IX.2) EZ*JOBS (VII.3), (VIII.3), (IX.3) EZ*CAP (VII.4), (VIII.4), (IX.4) EZ*LAND

Table 5. Probability of Zone Designation Probit Estimates from Equations (3) and (4)

Variables[1]	*Variable name*	*Cluster I (CA, KY, PA) Eq. (3) (SD in brackets)*	*Cluster II (NY, VA) Eq. (4) (SD in brackets)*
CEN80			
Unemployment rate	UNEMP	–1.194 (2.230)	–0.919 (2.658)
Per capita income (in $)	INCOME	**–0.071** (0.033)**	0.045 (0.059)
Poverty rate	POVRT	0.823 (0.787)	0.732 (1.159)
Population density (1,000 people per km^2)	POPDNS	**0.105*** (0.022)**	0.009 (0.015)
Proportion of population black or hispanic	MINRTY	**1.692*** (0.241)**	**0.760** (0.328)**
HOUS80			
Proportion of number of occupied units over total number of housing units	HS_OCC	–	–0.437 (0.578)
Average value of owner-occupied housing units (in $)	HS_VAL	–	**–0.020*** (0.005)**
CM77_82 [= ln(Y_{i1982} / Y_{i1977})]			
Employment growth	EMP_GRW	**–0.127* (0.067)**	**–0.145** (0.083)**
Establishment growth	EST_GRW	0.027 (0.115)	0.167 (0.153)
Number of observations		2352	1581
Pseudo R^2		0.1517	0.1537
Log likelihood		–721.49	–335.68

Notes:

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

1. For clarity of exposition, the coefficient estimates on the state dummies are not reported. The complete list of regression results is available upon request.

yield significant impact estimates. The first column of Table 6 reports the marginal impact of zone designation, the monetary value of zone incentives and the portion of state land occupied by zone areas on the 5-year employment baseline growth rate (I.4). Zone designation and the portion of state land occupied by zones are estimated to significantly affect the employment baseline growth rate. The estimated impact of zone designation on the baseline growth rate is around 12 percent per year. Extending the territorial coverage of the programme (resulting in a larger portion of state land occupied by zones) is estimated to marginally lower the yearly baseline employment growth rate of zone-zips by 5.6 percent for each one standard deviation increase in the state land coverage of zones.[11]

The second column of Table 6 summarizes the results for the specification II.4, having value of shipments as the dependent variable. The marginal impact of zone designation and zone policies on the 5-year baseline growth rate is very similar to the estimated impact on the employment growth rate. Zone designation and the portion of state land covered by zones are also in this case found to significantly affect the baseline growth rate of the dependent variable. Zone designation is estimated to increase the growth rate of value of shipments by 5.9 percent per year. The estimated impact of the land coverage of zones is such that increasing the zone land coverage by one standard deviation would marginally depress the yearly growth rate of the value of shipments by 4.2 percent.[12]

Impact estimates of zones and zone policies on capital expenditures are reported on the third column (III.4) of Table 6. Results are similar to those for the employment (I.4) and the value of shipment (II.4) specifications, with the estimated coefficient of zone designation highlighting an increase of 6.1 percent in the baseline growth rate and the coefficient of zone land extension of zones highlighting a decrease of 4.0 percent in the baseline growth rate per standard deviation point increase of zone-land occupation. [13]

Existing-establishment Outcomes Results for the existing-establishment specifications are summarized in the three right-hand columns in Table 6. Having incentives tied to hiring requirements is found to be the only EZ feature that marginally affects the employment baseline growth rate (IV.2). Awarding zone businesses with incentives proportionate to the number of new jobs created is estimated to marginally increase employment growth by 4.54 percent per year.

The final two columns in Table 6 report estimates for the value of shipment (V.1) and capital expenditure (VI.1) specifications. The EZ programme feature that is significant for both these specifications is requiring local communities (that qualify for zone designation) to submit a strategic business development plan as part of the application process. Mandating communities to develop a strategic business plan is found to marginally enhance the baseline growth of shipments by 6.48 percent per year and is found to enhance capital expenditure growth by 9.56 percent per year.[14]

Vanishing-establishment Outcomes When the impact of zone designation and zone policy features is estimated on the employment and business outcomes accounted for by vanishing establishments, none of the EZ specific policy features

Table 6. Estimated Zone Impact on Five-Year Growth Rates – Birth-establishment and Existing-establishment Outcomes

Independent Variables[1]		*Birth-establishment specifications (SD in brackets,* p *values in italics)*			*Existing-establishment specifications (SD in brackets,* p *values in italics)*		
		(I.4) Dep.var. EMP_BTH	*(II.4) Dep.var. SHP_BTH*	*(III.4) Dep.var. CEXP_BTH*	*(IV.2) Dep.var. EMP_EXT*	*(V.1) Dep.var. SHP_EXT*	*(VI.1) Dep.var. CEXP_EXT*
Zone Designation							
Portion of the 5-year period ending at time t in which a zone has been in existence	EZ_T_TD5	**0.629*** (0.214) *0.003***	**0.296* (0.168) *0.070***	**0.306* (0.193) *0.091***	0.153 (0.106) *0.150*	0.123 (0.107) *0.250*	**0.264* (0.150) *0.079***
Zone Policies							
Monetary value of zone incentives	EZ*MON	0.619 (0.603) *0.305*	0.377 (0.756) *0.618*	1.070 (0.743) *0.150*	–0.295 (0.250) *0.238*	0.460 (0.315) *0.145*	–1.185 (0.744) *0.208*
Portion of state land covered by zones [0 = 0%; 100 = 100% coverage]	EZ*LAND	**–0.129** (0.051) *0.012***	**–0.096* (0.044) *0.059***	**–0.093** (0.033) *0.039***	–	–	–
Tax incentives tied to job creation	JOB	–	–	–	**0.227** (0.102) *0.027***	–	**–**
Business plan	STRPL	–	–	–	**–**	**0.324** (0.129) *0.012***	**0.478*** (0.182) *0.009***
Number of observations		5368	5368	5368	7352	7352	7352
Adjusted R^2		0.0219	0.0039	0.0043	0.0252	0.0292	0.0189
		F 13.01	3.12	3.33	18.95	23.07	15.16
Prob>*F*		0.0000	0.0006	0.0003	0.0000	0.0000	0.0000

Notes:

* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

1. For clarity of exposition, the coefficient estimates on the state dummies, the propensity scores and the (1982–87) five-year period dummy are not reported. The complete list of regression results is available upon request.

considered has a significant impact on either the baseline employment loss or on the loss of production and capital expenditure.

Discussion of the Results and Policy Implications

The analysis examined the experiences of the states involved in the EZ programme. The aim was to determine whether different impacts of EZ programmes might be detected by examining outcomes accounted for by new, existing or vanishing establishments separately, as different zones might either target the attraction of new establishments, the expansion of existing establishments or the retention of businesses in struggling areas. When outcome measures are separated in this way, results from the analysis show that EZ programmes have different impacts on different types of establishments. Zone designation is found to increase the growth of jobs, production and capital expenditure brought by new establishments. Employment and business outcomes accounted for by existing establishments are also positively affected by selected policy features, though to a very small extent. Zone designation is instead found to have no impact on slowing down the loss of employment, production and capital investment, accounted for by vanishing establishments.

There are various possible explanations for these findings. New businesses could simply increase the rate at which previously existing businesses leave the area (Greenbaum, 1998). New jobs and economic activity are much more headline-grabbing than the retention or salvage of existing jobs and economic activity. New economic activity is quickly used to emphasize the merit of EZ programmes, while business closures are often unlikely to be linked to zone designation. As a result, zone incentives might be marketed more towards attracting new establishments than towards helping struggling existing ones.

The greatest relevance of these findings, however, is perhaps the strong indication that the proposed method of analysis can indeed be used as an effective tool to assess which state-specific (or district/region-specific) policy implementation features are most effective and in which cases. For the US state EZ programmes, a number of predictions about best implementation practices have been long formulated by economists and practitioners for two different types of interventions: initiatives mainly aimed at attracting new businesses in undeveloped areas (e.g. incentives to populate new industrial park areas) and initiatives targeted at retaining existing economic activity in struggling central business districts (Bostic, 1996; Papke, 1993; Wilder and Rubin, 1996). Although being potentially very important to refine future economic development efforts, these types of predictions have never been based on any solid empirical analysis. Taking advantage of the decentralized implementation of the US EZs, the findings retrieved from the analysis offer important empirical evidence to specifically support three predictions.

I) Programmes with fewer target areas are more effective in attracting new jobs and business activity The results of the analysis show that states that have lower zone-land coverage are found to attract more employment and more economic activity accounted for by newly attracted establishments. This finding provides

support to the prediction that geographically targeted economic development programmes are more successful in attracting new businesses if they restrict the number (and the size) of the designated target areas. This is because a more competitive site-selection process can allow programme officials to better evaluate the potential comparative advantage of the different eligible areas (Erickson and Friedman, 1990a, 1990b). In this way, programme officials would be able to designate the areas that have developed the strongest local support for economic growth. A more conservative attitude in the designation process of target areas is also considered beneficial for facilitating closer monitoring and evaluation of the implementation of the programme, allegedly improving its ultimate efficacy in attracting new businesses (Wilder and Rubin, 1996).

II) Employment growth in existing target businesses is promoted only if programme incentives are tied to hiring requirements It has been suggested (Papke, 1993) that tax incentives (as with other zone incentives) may have an impact on factor prices. Incentives that reduce the price of capital goods may increase production and employment by lowering costs, but they may also have a substitution effect by inducing businesses to substitute capital for labour. Programmes that tie tax incentives awarded to zone businesses to the number of new jobs created, therefore, are believed to be more effective in promoting local employment growth than programmes that tie incentives to capital investments (Wilder and Rubin, 1996). Moreover, tax incentives are expected to appeal more to established businesses than to start-ups, since new businesses do not typically expect to make profits in the first years of operation (Sheldon and Elling, 1989). Thus, programmes that tie tax incentives to job creation, in particular, are predicted to benefit zone employment specifically when the targets of zone designation are existing establishments.

The results of the analysis presented in the article support this prediction. Tying incentives to job creation is found to promote employment growth in existing zone businesses, while it is not found to have a significant impact when the evaluation focuses either on the employment growth accounted for by new businesses established in zone areas or on any other outcome measure besides employment growth.

III) Programmes with strategic planning requirements are more effective in promoting production and investment growth in existing target businesses The strategic planning portion of the application process to designate the target areas of the programme intervention, has been regarded as a key positive feature of those regional economic development initiatives specifically aimed at boosting the economic activity of existing target businesses (Bostic, 1996). As the development of a zone strategic plan often groups local businesses with different administrative and community branches, existing zone businesses become more aware of the programme benefit (and of the growth opportunity offered by the programme) if they are located in states (or regions) that mandate the submission of such a plan. However, the provision of a strategic business plan is not predicted to be a relevant policy feature for those programmes that specifically target the

attraction of new businesses into the target areas (rather than targeting existing businesses). For these types of programmes, marketing efforts and the total territorial extension of the target areas are predicted to be by far the most relevant factors. In this article, the provision of a business plan has been specifically operationalized and included in the empirical model, allowing such predictions to be tested. The results from the analysis suggest that requiring a business plan as part of the zone application process is beneficial for inducing growth in the value of shipments and capital investment recorded by existing establishments. However, it does not significantly affect the growth of economic activity brought about by new businesses.

Conclusion

This article proposes a comparative evaluation method to analyse the performance of decentralized economic development programmes that are heterogeneously implemented across different districts/regions or states. These types of programmes, such as the US state EZ programmes and the economic development initiatives implemented in the EU Ob.1 and Ob.2 areas (i.e. the most economically disadvantaged regions and sites with the sharpest decline in industrial activity, respectively) pose great challenges to the analysis. As the various district/region (or state) governments that autonomously implement the programme typically adopt a variety of different policy features, evaluations of the incentives packages offered in the target sites within one single district/region or state do not offer results with adequate external validity. Comparative evaluations are hard to perform. This is due to difficulties in effectively operationalizing the across-district/region/state policy differences and in distinguishing the impacts of the heterogeneous policy implementation features of the programme from the impacts of the district/region- or state-specific exogenous factors.

The proposed evaluation method is intended to turn the heterogeneity of decentralized economic development programmes from a threat to the validity of the analysis into a good opportunity for assessing which district/region- or state-specific policy implementation features are best practices to be recommended for future interventions. In order to provide such empirical evidence, the method offers guidance on how to operationalize differences among the various district/region-specific implementation polices, and on how to control for exogenous factors that may contribute to the observed outcome. A further unique feature of the proposed evaluation method is that it allows one to separately estimate which policy implementation features of the programme work best in attracting new firms to the target areas and which features work best instead in retaining the businesses already operating in the target areas. This type of evidence can help to refine future economic development initiatives. Policies that are found to be effective in attracting new businesses may be used to support efforts applied to sites such as equipped industrial parks ready to host new development. Policies that are found to be effective in retaining existing firms can instead be applied to help boosting production and employment in already developed industrial districts.

A comparative analysis of five US state EZ programmes completes the article as an empirical application of the proposed method. Results from such an application effectively illustrate the potential of the method by separately highlighting the specific implementation features that have most effectively boosted economic activity through attracting new firms to the EZs and most effectively helped struggling existing EZ economic activity.

Notes

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2. Ob.1 areas are the EU most economically disadvantaged regions: Southern Italy, Portugal, Greece, Eastern Germany, Northern Sweden and Finland, Ireland, Northern Ireland, Western and Southern Spain, Northern Scotland, and Western Wales. Ob.2 areas are instead the EU sites where industrial activities are sharply declining. Such sites are moderately sized areas located in almost every country of the EU.
3. The term region/district is used throughout the article for generically referring to the first sub-national tier of governments in the European federal and non-federal countries (e.g. Italian *Regioni*, French *Arrondissements*, German *Länder*, Swiss *Cantons*).
4. These estimates are obtained adopting Fisher and Peters's (1998) 'hypothetical firm' model (the Tax and Incentive Model – TAIM) that fully incorporates both tax and non-tax incentives.
5. A more detailed account on how to operationalize the monetary value of the EZ incentives can be found in Bondonio and Engberg (2000).
6. Area-specific characteristics, however, could be directly inserted in equation (2) instead of being used in the two-step propensity score procedure of equation (1) and (2). Such a two-step procedure is performed because it constitutes a convenient way to deal with non-linearities in the relationship between the outcome variable (ΔLn Y) and pre-designation area-specific characteristics. As argued by Rosenbaum and Rubin (1983), including the set of pre-designation variables of the propensity score equations in place of the propensity scores in the outcome equation (i.e. equation [2]) would require a correct specification of the functional form of the relationship between the pre-designation variables and the outcome variable of the model. This is difficult to achieve since economic theory does not offer solid guidance in this matter. As noted by Engberg and Greenbaum (1999), this is particularly true for programmes such as US state EZ and EU Ob.2 areas, for which target areas are generally a small and very peculiar portion of the sample investigated. Rosenbaum and Rubin (1983) demonstrate that conditioning on the propensity scores corresponds to conditioning on the correct functional form of the pre-designation variables in a direct regression of the outcome variable on the pre-designation variables.
7. In such cases, explicitly controlling for observable characteristics yields more efficient estimates than relying solely on 'differencing' methods (such as the random growth rate models of Heckman and Hotz, 1989; Papke, 1993, 1994; Bondonio and Engberg, 2000).

8. MABLE/GEOCORR is available on the internet at http://plue.sedac.ciesin.org/plue/geocorr/.
9. Neither option is suited to the evaluation of EZ programmes. This is because estimating a separate regression for each state is unfeasible for the entire data sample since among the five states included in the analysis, several of them have too few zip zones. Estimating one common regression for the entire data sample, instead, does not allow one to effectively capture across-state differences in the pre-existing area characteristics that drive the zone selection process.
10. The coefficient estimates for the housing occupancy rate and the average value of housing units are also tested for joint significance through a standard F-test whose results fail to reject the null hypothesis of both coefficients having zero value.
11. The estimated figure of 5.6 percent is obtained as: –0.056 = (–0.129*0.022*100)/5, where 0.022 is the standard deviation of the zone land coverage distribution for the five states in the data sample, and 0.129 is the coefficient estimate of Table 6.
12. –0.042 = (–0.096*0.022*100)/5.
13. –0.040 = (–0.093*0.022*100)/5.
14. For the results of both Tables 5 and 6, it is finally worth commenting on the low values of the Adjusted R-square statistics. Such low values are not uncommon for these types of studies (similar R-squared values were obtained, for example, in Bondonio and Engberg, 2000; Boarnet and Bogart, 1996). Poor overall regression fit for the models in Tables 5 and 6 is also due to the limited variation of all the EZ treatment and policy variables. These variables offer variation only across states but not among zip areas within the same state (in all, these variables can have only six possible values).

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