WHAT DO WE KNOW ABOUT ENTERPRISE ZONES?

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EXECUTIVE SUMMARY

In the last decade, most states have targeted certain depressed areas for revitalization by providing a combination of labor and capital tax incentives to firms operating in an "enterprise zone" (EZ). Britain is also completing a federal program that designated zones for a ten-year period. These zone experiments can add to our understanding of the influence of tax policy on business investment, and provide insights into the design and implementation of federal programs with similar objectives. This paper summarizes the theory and empirical evidence on the operational success of these EZ programs.

Economic theory predicts that the effect of tax incentives on zone wages and employment will depend on the elasticity of supply of factors to the zone and on the elasticity of demand for zone output. For plausible parameter values, a labor subsidy or an equal-cost subsidy to zone capital and zone resident labor will raise zone wages. A capital subsidy alone may actually reduce zone wages. Employment effects are likely to be small if labor is inelastically supplied.

The British national EZ program was intended to promote new economic activity in vacant areas with little or no industry and few residents. Studies of this program found that between 50 and 80 percent of zone businesses were relocations, at an annual cost per job of approximately $15,000.

EZ programs at the state level, by contrast, have an explicit commu-

nity revitalization focus and areas with relatively high unemployment and poverty rates are targeted. Estimates of the average cost per zone job in the United States range from $4,564 to $13,000 annually, and about $31,113 per zone resident job.

While there is much survey evidence on the states' experiences, relatively few studies have been able to address the question, how did zones perform relative to what would have been their performance in the absence of zone designation? Evidence on this issue is summarized for the state of Indiana, where the zone program appears to have increased inventory investment and reduced unemployment claims. But new evidence based on the 1990 Census of Population indicates that the economic well-being of zone residents in Indiana has not appreciably improved.

Enterprise zone programs are geographically targeted tax, expenditure, and regulatory inducements that have been part of subnational economic development strategy since the early 1980s. At least count, thirty-seven states and the District of Columbia have established some form of EZ initiative. While they differ in specifics, all the programs provide tax preferences to capital and/or labor and other development incentives in an attempt to induce investment expansion or location, and to enhance employment opportunities for residents in depressed areas.[1]

EZs have appeared in federal legislation on several occasions over the last decade, but there is currently no federal EZ program. The concept returned to national prominence most recently following the civil disturbances in Los Angeles in April and May 1992. The U.S. House of Representatives and Senate of the 103rd Congress adopted H.R. 11. It contained a pilot program to establish fifty EZs over a five-year period.[2] The tax incentives included a 50 percent reduction in capital gains taxes for profits from interests held in a zone for at least five years (the current maximum rate is 28 percent), a $20,000 immediate expense deduction for newly purchased capital equipment, a 15 percent credit on wages paid to zone residents with a cap of $3,000 per worker annually, and an annual deduction of up to $25,000 for purchases of stock in businesses investing in EZs, up to $250,000 for each person. President Bush vetoed the legislation on November 4, 1992.

EZs have been criticized on the grounds that they will be ineffective and inefficient in stimulating new economic activity. This criticism is part of a longstanding debate on the effects of intersite tax differentials on the

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[1] Most EZs are designated in urban areas, but occasionally rural areas are selected. Federal legislation included rural areas as well. See Erickson and Friedman (1990).

[2] See Lavation and Miller (1992) and the Joint Committee on Taxation (1992) for a discussion of proposals in 1992.

location of capital investment. If any tax-induced investment only represents relocation from another state, then tax competition is a zero-sum game for the country as a whole. In addition, the preferential treatment of certain types of investment or employment within EZs may induce decisions that would be uneconomic in the absence of the tax incentives.

The concern with net capital investment may be less relevant for EZs because redistribution even within the state may be an end in itself.[3] If investment is relocated from local labor markets with low unemployment to local labor markets with higher unemployment, the incentives may generate efficiency gains for the economy as underutilized resources are tapped. Efficiency gains may also result if reductions in unemployment produce positive externalities such as reductions in social unrest.

It is also possible that, in addition to encouraging existing businesses to locate in particular geographic areas, the incentives may induce the creation of new businesses that would not otherwise have been started. Such new businesses could produce taxable profits and incomes that would reduce the revenue cost of the incentives.

The empirical evidence on the effect of differential state taxes on the location of industrial activity is mixed. Surveys of firm location have found that firms choose sites on the basis of primary locational factors (proximity to markets, labor costs, infrastructure, and utility costs), while tax cost differentials are influential at the margin when these other factors are similar at alternative sites. EZ tax incentives may have a greater influence across localities within a state than across states in a federal EZ program.

Recent econometric analyses have emphasized the importance of controlling for interstate differences in public service provision when one is estimating the effects of tax differentials. While low-tax jurisdictions directly reduce business costs, high-tax jurisdictions may have highly skilled workers and a high quality of public services, both of which indirectly reduce the costs of doing business. Using firm-level data, Bartik (1985) and L. Papke (1991a) find statistically significant elasticities of industrial activity with respect to state and local taxes.[4] These

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[3] EZ investment may give individuals employment experience that enhances their long-run employability. Thus, even a relatively short-run economic development program may have long-run effects (see Bartik, 1991).

[4] Bartik finds an elasticity of -0.2 to -0.3 of new branch plants with respect to state corporate tax rates. L. Papke examines start-up firms in five manufacturing industries, and estimates elasticities with respect to combined federal, state, and local tax rates of -1.59 (furniture), -5.62 (communication equipment), and -15.7 (womens' outerwear). Additional examples on both sides of the issue include Carlton (1979), L. Papke (1987), and Bartik (1991). Carroll and Wasylenko (1990) review seventeen recent studies.

estimates suggest that EZ incentives might well generate new capital investment.

The experience and appraisal of EZs are the subject of this paper. The next section outlines a conceptual framework for analyzing the effects of an EZ program inside and outside zone boundaries. I present estimates of the percentage change in zone wages under several incentive scenarios. In section II, I discuss some methodological issues involved in measuring the success of an EZ program. The British EZ experiment is described in section III, and section IV surveys the state EZ programs in the United States. Section V focuses on the EZ program in Indiana. It is one of the oldest state programs and has been evaluated with a variety of types of data. New evidence is presented on the well-being of Indiana zone residents using 1980 and 1990 Census data. I briefly discuss the difficult issue of program cost effectiveness in section VI and conclude in section 7 with observations about a proposed federal program and some unresolved issues.

I. CONCEPTUAL FRAMEWORK

This section presents a theoretical framework for analyzing the effects of EZ incentives on zone wages and employment. First, the effects of EZ incentives on wages and employment inside the zone are analyzed in a partial equilibrium model. Estimates of changes in wages and employment for different EZ wage and capital subsidy packages are presented, and the major findings are summarized. Second, while zone tax incentives are confined to zone firms and the factors they employ, the effects of the program may not be. The section concludes with a general overview of the implication of an EZ program for aggregate national employment and investment.

In brief, if zones are small relative to the rest of the economy, economic theory predicts that the effect on zone wages and employment will depend on the elasticity of supply of factors to the zone, and on the elasticity of demand for zone output. For plausible parameter values, a labor subsidy or an equal-cost subsidy to both zone capital and zone resident labor will raise zone wages. A capital subsidy alone may actually reduce zone wages. Employment effects are likely to be small if labor is inelastically supplied.

If zones are relatively large, and spillovers into the rest of the economy are considered, the effects are more difficult to predict. The net employment effects for the nation of a federal EZ program depend on parameters in both the zone and nonzone sectors of the economy: the relative size of the two sectors, the elasticity of substitution of factors in the two

sectors, the elasticity of substitution of the zone and nonzone products in consumption, and the aggregate elasticities of supply of factors of production. The greater the number of areas designated EZs, the smaller the effects on zone wages. If capital is relatively fixed in the aggregate, as many empirical studies suggest, the net effect will be to relocate productive facilities inside the zone.

A. An Overview of the Model

The typical EZ program offers tax incentives that reduce the costs of businesses located in the zone. These benefits may include subsidies to capital or labor, or both, or a benefit related to total costs (an equal proportional subsidy for capital and labor). All these subsidies would tend to increase zone production—existing zone firms increase production, and new firms begin production in the zone. "New" zone firms may be start-up companies, but they may also be existing firms that relocate or expand into the zone. This output effect encourages firms to employ more of both labor and capital in the zone.

If only one of the factors is subsidized, or if one is tax-favored, a substitution effect accompanies the output effect. For example, a subsidy to labor alone lowers costs and increases output. This would increase the use of both capital and labor. In addition, the firm substitutes the subsidized labor for capital in its production process. In the case of a labor subsidy, this substitution effect reinforces the output effect and encourages increases in employment.

In the case of a capital subsidy, capital becomes relatively less expensive, and firms substitute away from labor and toward capital. While the output effect of a capital subsidy encourages firms to hire more of both labor and capital, the substitution effect causes firms to substitute capital for labor. A subsidy to capital promotes employment only through the output effect and may actually reduce employment if the substitution effect dominates.

The relative magnitudes of the output and substitution effects depend on the elasticity of demand for the product and the ease with which labor can be substituted for capital in the production process. In addition, the effect of either subsidy on wages and employment depends on the labor supply response. The relatively small labor supply elasticity that is suggested by most empirical evidence means that either subsidy would have a larger impact on zone wages than on zone employment.

B. Effects Inside the Zone

A partial equilibrium model of zone production (detailed in Appendix 1) is used to illustrate the effects of different EZ tax incentives on zone

wages and employment.[5] Zone firms produce output with the labor of people living inside the zone (zone resident labor), with the labor of people who commute from outside the zone (nonzone resident labor), and capital. The model allows for two types of labor because many EZ programs restrict labor subsidies to zone residents. The two types of labor may have different supply elasticities. Capital is free to flow into the zone in response to the incentives (i.e., in infinitely elastic supply).[6]

The numerical estimates depend on the output (or product demand), substitution, and labor supply responses. If zone products are close substitutes for products produced outside of the zone, then the elasticity of demand for zone products will be relatively large. This would be typical of manufacturing products. However, surveys of zone firms suggest that much zone production is for a local market (trade and services, e.g.), and heterogeneous enough to have a rather small elasticity of demand.[7]

In Indiana, for example, 74 percent of total receipts of firms participating in the program is derived from sources inside the zone. The 1990 Census data for Indiana indicate that while 36 percent of zone workers are employed in manufacturing, 60 percent are employed in a service industry. Consequently, smaller demand elasticities may be typical of most zone businesses; calculations are presented for a range of elasticities.

For a cost-minimizing firm, the factor substitution elasticity is the percentage change in the ratio of capital to labor divided by the percentage change in the ratio of rate of return on capital to the wage rate. A high substitution elasticity indicates that it is relatively easy to substitute one input for the other. The common Cobb–Douglas assumption of unitary factor substitution elasticity is used in these calculations, as suggested by long-run estimates.[8]

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[5] The "spatial mismatch" literature provides an alternative approach to modeling EZs. But this literature focuses on the movement of people and firms to the suburbs as the cause of employment problems for those who continue to live in the inner cities, especially blacks (see Holzer, 1991); it may be less relevant to small EZs within a larger metropolitan area.

[6] Capital will flow into the zone until the rate of return, net of the subsidy, returns to its original level.

[7] These smaller trade and service firms are often the specific target of zone incentives. See, for example, the statement of Fred T. Goldberg, Jr., assistant secretary (Tax Policy), Department of the Treasury (1992). The emphasis on small firm job creation is based on Birch's (1981) much-popularized finding that small businesses were the source of most new job opportunities. Subsequent research indicates that the true proportion of jobs generated by smaller firms is close to their actual share of the workforce (Armington and Odle, 1982; Brown, Hamilton, and Medoff, 1990).

[8] See Ballard, Fullerton, Shoven, and Whalley (1985) for a discussion of the range of estimates.

A high labor supply elasticity means that the number of people willing to work rises substantially with a small increase in the wage rate. Empirical evidence suggests that overall labor supply response is small.[9] However, the labor of disadvantaged or unskilled workers may be more elastically supplied, so again a range of labor supply elasticities is included.[10]

Some EZ programs distinguish between types of employees. Zone labor subsidies might apply, for example, to any worker employed in the zone, or the subsidy may apply only to the wages of zone residents. Both types of labor subsidies are included in the model in Appendix 2.

I illustrate three types of zone incentive packages below: a subsidy to zone wages, a subsidy to zone capital, and an equal-cost subsidy to zone labor and zone capital. The major findings are summarized here:

- A subsidy to all labor employed in the zone always increases zone wages (and employment). The effect on the wage is larger, the larger is the elasticity of demand (in absolute value), and the smaller is the elasticity of labor supply. If labor supply is completely inelastic, a 1 percent increase in the wage subsidy raises the wage by 1 percent regardless of the product demand elasticity. A labor subsidy targeted to zone residents increases zone wages by more than a general labor subsidy.
- A capital subsidy reduces zone wages at low elasticities of product demand and low labor supply elasticities. Even for products with relatively elastic demand, the increase in the zone wage is much smaller from a 10 percent capital subsidy than with a 10 percent labor subsidy.
- Most EZ programs involve a subsidy to both capital and labor. An equal-cost subsidy to all labor and capital employed in the zone will also reduce zone wages if the demand for the zone product is completely inelastic.[11] At higher product demand elasticities, an equal-cost subsidy to both factors increases zone wages by from 0.33 to 1.54 percent. When zone residents are targeted, that is, only their wages are subsidized, an equal-cost subsidy has a substantially larger effect.[12] The estimated increase in zone wages ranges from 2.5 to 5.2 percent.
- The changes in the price of capital and labor outside the zone will be

[9] See Hamermesh (1993) and Killingsworth (1983).

[10] Juhn, Murphy, and Topel (1991) estimate a labor supply elasticity of 0.4 for men in the lowest decile of the wage distribution.

[11] Wage income is assumed to be three times the size of capital income, so the rate of wage subsidy is one-third that of the capital subsidy. An equal cost subsidy is, for example, a 1 percent subsidy on capital and a 0.33 percent subsidy to labor. See Appendix 1 for details.

[12] An equal cost subsidy when capital's share is 0.25 and zone-resident labor share is 0.05 is a 1 percent capital subsidy and a 5 percent labor subsidy.

small. However, the total effect on nonzone capital or labor returns will not be.[13] For example, Bradford (1978) illustrates that a subsidy to capital in a small jurisdiction raises the gross (and net) return to capital outside of the zone only marginally. But this small increase accrues to all capital in the rest of the economy. Thus, the total effect of the EZ policy on the return to capital is the product of the change in the return to capital (which is small) times the total amount of affected capital (which is large). The total effect on capital income will be of the same order of magnitude as the sum of EZ subsidies provided.

C. *General Equilibrium Effects*

The previous partial equilibrium discussion does not allow for feedback effects from nonzone production and nonzone factors of production. If zones are small relative to the rest of the economy, as in state programs and proposed federal legislation, then the feedback effects will be negligible. Gravelle (1992) illustrates that as zones become larger, however, general equilibrium effects should be considered.[14]

The net employment effects will depend on the relative size of the zone and nonzone sectors, the elasticity of substitution of factors in the two sectors, the elasticity of substitution of the zone and nonzone products in consumption, and the aggregate elasticities of supply of factors of production.[15] Gravelle (1992) illustrates the importance of the size of the zone in a general equilibrium analysis of a capital subsidy. The major conclusions follow:

* As the number of zones (or fraction of initial output eligible for zone incentives) becomes larger, the impact of the subsidy on zone wages and employment becomes smaller. In the limit, if the entire country is designated a zone, a capital subsidy has no effect on zone wages. When the capital subsidy does increase wages, each additional zone reduces the benefits to existing zones in direct proportion.
* Nonzone wages and employment will be affected by a zone subsidy to

[13] Partial equilibrium analysis assumes that zones are small relative to the rest of the economy. Capital is completely elastically supplied to the zone with no or little change in the price of capital. Table A-1 illustrates that the change in nonzone wages is small.

[14] While in the partial equilibrium case, capital is elastically supplied to the zone; in this static general equilibrium framework, capital is fixed in the aggregate. Gravelle cites several empirical studies that fail to find a statistically significant savings response to changes in the after-tax return to capital. See Ballard (1993) for a review of the evidence.

[15] Gravelle (1992) simplifies the analysis by assuming certain parameter values for these elasticities. In McLure's (1970) general equilibrium analysis of the locational effects of tax policy, he substitutes parameters of interjurisdictional mobility for the traditional Harberger assumptions that both factors are completely mobile.

capital. Whatever the percentage increase in zone wages and employment, wages and employment outside of the zone will fall by an equal percentage. Aggregate employment in the country will be unaffected.

- The same general outcome would occur with a general equilibrium model of a labor subsidy. The more areas that are designated zones, the smaller the effects on zone wages and employment. With very mobile labor, the result would be to relocate production locations, with little effect on relative incomes. The primary effect would be inefficiency in the location of investment.

II. HOW IS ZONE SUCCESS MEASURED?

Zone evaluation depends primarily on two factors—program goals and the nature of the available data. Often, the legislation is unclear about whether the goal of the zone program is to increase net employment or investment. Some have argued that these areas are in such economic distress that maintaining the existing levels of employment and investment are desirable EZ goals. The studies reviewed here typically assume that the intent of the legislation is to create new jobs in the zone, not merely relocate jobs from outside of the zone. These jobs may be full-time, part-time, or of limited duration, because the legislation typically does not specify the type of duration of job it is intended to create.

In practice, zone success is frequently measured by the amount of investment undertaken after the designation, the increase in the number of firms in the zone, and the change in zone employment. Cost-effectiveness is measured by direct spending and foregone revenue per job created (or, if the goal of the program is zone resident employment, cost per zone resident job).

Determining which jobs were relocated from outside of the zone presents a practical difficulty. This problem could be addressed with more detailed data (tracking employer identification numbers, e.g.). The key methodological issue is how to separate the effects of zone designation from jobs and investment that arise from other factors—for example, general upturns in the economy or in the area surrounding the zone. Alternatively, which of the measured changes in jobs and investment are attributable solely to the zone program?

Survey or case study methodologies provide useful information on zone participation, but they cannot definitively answer this question. Firm managers' estimates of net job creation or investment are subjective, and even candid managers may have difficulty attributing a certain number of new jobs to zone incentives alone. Surveys of zone administrators are even more problematic, because the responses may be self-serving.

Positive survey results alone are not enough to declare a program a success, because the difference between a success (net job creator) and a failure (relocated jobs) may reflect differences in the relative candor of the respondents.

Econometric analysis is better suited to performing the "but for the zone" experiment. If the zone sites were randomly selected, the effect of the program could be measured by comparing the performance of the experimental and control groups. Actual EZ designation, of course, is based on economic performance, so the data are nonexperimental. This sample selection problem can be addressed with a variety of techniques.[16]

But econometric analyses of zone success face a practical difficulty. Conventional economic data are not available by zone because most zone boundaries are drawn solely for the purposes of the program. In most states, zones do not coincide with census tracts or taxing jurisdictions. As a result, zone areas cannot be pinpointed in standard data collections. While econometric analysis can address the sample selection problem, it must contend with a geographic mismatch problem.

In the next few sections, I present survey and econometric evidence on zone success in Britain and in the states. The British national program was intended to generate new industrial activity in areas with little or no industry and few residents. State EZ programs, by contrast, typically designate zones in areas with relatively high unemployment rates where the residents meet some predetermined poverty threshold. Thus, state EZs have an explicit community revitalization focus.

III. THE BRITISH EXPERIENCE

In 1981, two years into the Thatcher government, the United Kingdom designated eleven areas as EZs, expanding to twenty-four in total in 1983.[17] The zones were small relative to U.S. zones, ranging in size from 100 to 900 acres, and consisting of vacant, unoccupied, or deteriorating industrial land within an economically declining community. In contrast to the state zones in the United States, British zone boundaries excluded both existing business and residential areas. The U.K. program focused almost exclusively on industrial development—community development was not a specific goal of the program.

The U.K. program included a four-part, ten-year incentive package:

[16] See L. Papke (1991b) for a discussion of alternative estimation techniques.

[17] Hall (1977) reportedly introduced the original notion of geographic areas free of normal government regulatory policies and import duties ("freeports") in a 1977 address to the Royal Town Planning Institute.

- an exemption from local property taxes on industrial and commercial property,
- a 100 percent allowance (deduction) from corporation and income taxes for capital expenditures on industrial and commercial buildings,
- an exemption of sales of undeveloped lands from the Development Land Tax, and
- reductions in administrative requirements such as planning permission and government statistical reporting for a ten-year period.

The British program also included public ownership of facilities. Significant public-sector involvement was a characteristic of a number of zones even before designation, such as direct land ownership or nationalized corporate ownership of property or buildings. For example, in the zone in Swansea, 450 acres of derelict land were reclaimed and new infrastructure provided before designation.[18] In Swansea alone, public ownership of vacant land rose from 47 percent in 1981 to 89 percent in 1986, and public investment over this period, excluding the EZ incentives of rates relief and capital allowance, totalled £16 million.

The British experience has been evaluated in a number of studies, which include government-funded monitoring reports (Roger Tym and Partners, 1984) and private evaluations of specific zones.[19] Most are detailed firm level surveys and personal interviews with entrepreneurs both inside and outside the zone. While different researchers employed different measures of zone success, there is remarkable agreement across studies that the British zone program has failed in its goal of generating *new* industrial activity.

The Tym report covers the initial eleven zones. There was a substantial increase in industrial activity in the zone—by 1987, over 4,300 firms were operating in the zones. However, the Tym report indicates that the primary effect of the zone was intrametropolitan relocation—86 percent of firms relocating in the zone were from the same county, and their managers reported that they considered moving to the zone prior to the EZ program.

The survey found no differences between employment generation, investment activities, or production of companies in zones versus outside the zones. The (surprisingly candid) managers of zone firms responded via the survey that only about 25 percent of new jobs in the zone were attributed to zone designation.

[18] See Bromley and Morgan (1985) and Bromley and Rees (1988) for details of the Swansea enterprise zone.

[19] See B. Rubin and Richards (1993) for a detailed comparison of British and several U.S. state EZ programs.

Other studies of individual U.K. zones report similar findings.[20] Summarizing, it appears that between 50 and 70 percent of zone firms represented relocations. Zone firm managers reported that the property tax incentive (exemption) was the only significant incentive provided by the zone program, and frequently ranked this factor third in importance after site characteristics and market access.

While the British EZ program had no explicit labor subsidy, there were effects on zone employment. About 13,000 out of 63,300 zone jobs were thought to represent net new employment.[21] None of the studies includes a figure for disadvantaged workers.

Schwarz and Volgy (1988) estimate that the cost per new job between 1981 and 1986 for the original eleven zones was approximately £45,000, or $67,000. A follow-up government-sponsored study to the Tym report considers job creation in the local economy surrounding all twenty-four of the U.K. zones and estimates the cost at £23,000 per new job.[22] This estimate includes jobs created in the local economy as well as inside the zone. Using this figure, Rubin and Richards (1992) calculate the cost of a new zone job to be £50,000 or $75,000, or between $13,400 and $15,000 on an annual basis. The government study continues to find that over 70 percent of jobs created in the zone were relocations from outside of the zone.

The shift of firms into zones did have an effect on land prices. Erickson and Syms (1985) identify a boundary effect on the local property market from zone designation. They find that a moderate increase in the price of zone industrial land accompanied the slight increase in business development activity in the two zones they examine. Thus, capitalization of zone incentives into zone land prices came at the expense of property bordering the zone where land values declined.

Citing the uniformity of evidence indicating that relocations were the source of activity in the zones, the British government decided to phase out the EZ program. The tax incentives for the initial zones expired in 1991, and the last two zones designated will expire in 1999.

IV. STATE ENTERPRISE ZONES

While there is no operational federal EZ program, thirty-seven states have enacted EZ programs as part of their economic development policies. They differ widely in purpose, coverage, and incentive provisions.

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[20] See Shutt (1984), Barnes and Preston (1985), Thomas and Bromley (1987), Talbot (1988), and Schwarz and Volgy (1988).

[21] Great Britain Department of the Environment (1986).

[22] PA Cambridge Economics (1987).

For example, Michigan has only one zone, while Louisiana has over 800. Most programs offer a combination of capital investment and employment incentives with generally more resources allocated to investment than employment incentives. Investment incentives include the exemption of business-related purchases from state sales and use taxes, investment tax credits, or corporate income or unemployment tax rebates. Labor subsidies include employer tax credits for all new hires, or zone resident new hires, employee income tax credits, or job training tax credits. Some states also assist firms financially with investment funds or industrial development bonds.

Unlike in the United Kingdom, the criteria for eligibility in the states depend upon zone population characteristics. These include comparative unemployment rates, population levels and trends, poverty status, median incomes, and percentage of welfare recipients.

Typical U.S. zone characteristics are reported in a comprehensive survey by Erickson and Friedman (1990, 1991a, 1991b). Most zones experience negative population growth prior to designation and have unemployment rates well above the state and national averages. Unemployment in the adjacent communities at the time of zone designation is also generally above these averages. Median family income in the zones surveyed in 1979 was less than 60 percent of the comparable national figure, and the average proportion of families in poverty was over three times the national mean and 70 percent higher than that in the general community. Minority residents comprise 45 percent of the typical EZ population, about double the proportion in the larger community and nearly three times the national average.

Zones are relatively small in area and population size. The sample mean resident population is approximately 14,500, but the median is 4,500 persons. The median zone size is 1.8 square miles, and 75 percent of the zones contain less than 5.6 square miles, although the mean is 25.6. Zones generally have different land-use patterns than their surrounding communities. The average share of industrial land (18.1 percent) is over twice as large as in the host community, and the share of commercial land (15.3 percent) is about 70 percent higher than in their host communities.

A survey of businesses located in EZs by the Department of Housing and Urban Development found that only 9.1 percent had relocated from outside the zone.[23] An additional 7.5 percent of the business surveyed were branches of nonzone firms, 26.4 percent were new businesses, 2.2 percent were businesses that reportedly had been kept from closing, and

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[23] See Erickson, Friedman, and McCluskey (1989).

54.8 percent of zone investments represented expansion of existing zone businesses. The study was not able to determine, with the exception of the firms that would have closed, whether zone investments would have occurred in the absence of zone subsidies.

State EZ programs have been evaluated and compared in a number of studies. As in the United Kingdom, most studies analyze survey responses of managers of zone firms. Program specifics and findings vary widely—Appendix 1 lists evaluations of individual state programs and multiple-state comparisons. The scope and quality of these evaluations vary.

Rather than examining the diverse survey data from a large number of programs, the remainder of this paper focuses on a program for which there is both detailed longitudinal survey evidence and econometric analysis of conventional data. Like many state programs, the Indiana EZ program includes both subsidies to capital and labor. It has been in operation since 1984—long enough to generate several years of post-EZ data. Several of the survey studies mentioned earlier have concluded that Indiana's program is one of the most successful.[24]

V. THE INDIANA ENTERPRISE ZONE PROGRAM

Initially, areas in six Indiana central cities were designated as EZs in 1984; subsequently, others were added to bring the current total to fifteen. Each zone has a ten-year duration, subject to renewal. Firms participating in the program have been required to report credits claimed, employment and wage figures, origin of receipts and the like, to the Indiana Enterprise Zone Board beginning in 1986.

To qualify for consideration and possible designation, the area must have an unemployment rate at least 1.5 times the average statewide unemployment rate, and a resident household poverty rate at least 25 percent above the U.S. poverty level. Its resident population must be between 2,000 and 8,000 persons and its geographic area between 0.75 and three square miles, all with a continuous boundary. While there is no explicit statement of its goals in the original legislation, presumably the intention of Indiana's program is to increase employment, investment, and the economic well-being of zone residents. The employment tax credits provided are similar to those in other states, but the capital incentives are unusual, as explained below. The tax incentives included in the Indiana EZ program are the following:

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[24] See Wilder and B. Rubin (1988) and Sheldon and Elling (1989).

- A tax credit against local property tax liability equal to 100 percent of the property tax imposed on all inventories located in the zone.
- A total exemption from the corporate gross income (receipts) tax of all incremental income (receipts) derived from sources within the zone after the designation base year; however, if the sale giving rise to the incremental income is outside of the zone, it is ineligible for the exemption.[25]
- A tax credit of 5 percent of interest income received from loans to zone businesses and residents for residential or business real property improvement. (Existing loans qualify for the credit, as well as new loans, and lenders claiming the credit need not be located in the zone.)
- A tax credit for employers hiring zone residents equal to 10 percent of wages with a ceiling of $1,500 per qualified employee.
- Zone residents are allowed an income tax deduction equal to one-half of their qualified adjusted gross income with a ceiling of $7,500.[26]

Indiana's employment tax credits are typical of other EZ programs. The labor incentives are targeted at zone residents. The property tax credit will be valuable to both profitable and unprofitable (i.e., nontaxpaying) firms alike. However, because the dollar amounts of both the tax credit for firms and the deduction for employees are capped and not indexed for inflation, these incentives have lost about 20 percent of their value since adoption.[27]

Like other zone programs, the value of the tax preferences is tilted heavily toward capital investment. Indiana's most valuable investment incentive from a tax savings standpoint, the inventory tax credit, is an unusual mechanism for increasing investment. First, most states do not include inventories in the base of the business tangible personal property tax.[28] Eight states do not tax any tangible personal property, and

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[25] Indiana's gross income or receipts tax is a tax on instate receipts. Corporations pay the greater of this tax and the corporate net income tax (where profits are allocated to the state based on the conventional three-factor formula). Typically, a small firm will pay the gross income tax because no deductions are taken in computing tax liability. Eligibility for the exemption requires that the enterprise be legally organized as a corporation; sole proprietorships, partnerships, and Subchapter S corporations do not qualify because they are not liable for the gross income tax.

[26] A sixth incentive provides an income tax credit of up to 30 percent to individual investors for the purchase of stock in start-up or expanding zone businesses. There are no data indicating that this incentive has ever been used.

[27] This deterioration in value may explain, in part, the low participation rate in the employment subsidy. Although 2,779 zone residents were employed by 949 registered zone businesses in 1988, only seventy-seven firms (less than 3 percent) claimed wage credits for employing qualified zone residents. See J. Papke (1990).

[28] Unlike machinery and equipment, inventories are not depreciable.

another twenty-five states specifically exempt inventories. Like Indiana, neighboring Ohio and Kentucky also tax inventories.

Second, zone programs in other states typically provide incentives for investment in machinery or equipment rather than inventories. U.S. inventories are sharply procyclical, and it is not clear what a large stock of site-specific inventories represents. Further, the stock of inventories held (whether inputs, good in process, or finished goods) will vary with the production process of the firm. The value of the credit will also vary by type of firm.[29] J. Papke and I (1992) calculate, for example, that the inventory tax credit raises net profit rates (after-tax rates of return) by from 1 to 7 percent, depending on the local property tax rate and industry type.

Third, the inventory tax credit applies to the total stock of inventories in each tax year, not just to incremental values.[30] The 1988 total direct budgetary cost (revenue foregone) of the Indiana EZ tax preferences amounted to $13.6 million, of which 84 percent was attributable to the inventory property tax credit.

At a minimum, the inventory tax credit enhances the cash flow for firms that hold inventories. It will also increase profits (decrease losses) of zone firms and may compensate them for the noncapitalized profit-reducing characteristics of their EZ location (e.g., crime). Because the price of holding inventories falls, a zone firm will find it profitable to hold a higher level of inventories than if it were a nonzone firm. This may increase economic activity in the zone and stimulate investment in machinery and equipment that would not have occurred in the absence of the program (particularly if production for inventories takes place in the zone).

The characteristics of Indiana's zone firms and their employees have been detailed in five consecutive years of registration data. These characteristics are briefly described in the following.

A. An Overview of Zone Participants

The number and characteristics of participating firms have not changed much over the life of the program.[31] The number of participating firms averaged about 1,000 each year. Retailers constitute the largest single

[29] For example, instrument manufacturers and retailers hold about 25 percent of total capital in inventories, compared to only 5 percent for manufacturers of petroleum products and providers of business services. These fractions are calculated from the Internal Revenue Service's *Source Book of Statistics of Income*, 1988.

[30] In 1991, the Indiana House Ways and Means Committee voted to eliminate the inventory tax credit. See Carlson, (1991).

[31] J. Papke (1990) summarizes the first three years of data. The registration data from 1989 and 1990 are presented in preliminary form by Rowings, Powers, and Sigalow (1992).

group, accounting for about one-third of all participants. Business and professional service enterprises ranked second (about 30 percent), followed by manufacturers (about 19 percent) and wholesale distributors (13 percent). Eighty percent of firms are organized as corporations (36 percent of those as S-corporations). About two-thirds of the participants have fewer than twenty employees.

Firms reported 2,897 new jobs created in 1988, with 14.7 percent of those jobs going to zone residents. The preliminary 1990 data indicate that zone residents comprised 4.1 percent of total zone employment, and 19 percent of all new zone jobs. On average, the zone residents were paid about half as much as the other employees (between $7,000 and $8,000). The average tax saving per participating firm was $13,933 in 1988. The average tax preference increases with the size of the business. For example, the tax savings for the smallest firm (fewer than eleven employees) averaged $4,106, while the largest firms (over 100 employees) claimed $98,493 on average. Manufacturing firms accounted for over 50 percent of the total tax saving.

B. The Employment and Investment Effects of Zone Designation

This section summarizes an econometric analysis of the investment and employment effects of the Indiana EZ program. Sample selection issues are discussed. This section also illustrates the types of equations that can be estimated to isolate the effects caused by an EZ program alone.

L. Papke (1991b) analyzes the effects of the Indiana EZ program on investment and unemployment. I include several specifications designed to separate the effects of zone designation from other influences. I examine two types of capital investment—inventories, which are targeted by the investment incentives, and investment in machinery and equipment, which would likely coincide with increased economic development. The investment data are derived from the tax records of the taxing districts surrounding the zone.[32]

Labor market effects of zone designation are estimated with data on annual unemployment claims. Because one unemployment office typically serves an entire city, the geographical mismatch problem discussed in section III is more severe for the unemployment claims data. But the data will reflect any spillover effects from the zone into the community's labor market.

. As discussed in section II, the question of EZ effectiveness could be

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[32] A taxing district is a geographic area within which property is taxed by the same taxing unit and is taxed at the same total rate. It is generally smaller in area than a township and is approximately the same size as an EZ.

easily addressed if the programs were administered as traditional experiments. But the data are nonexperimental because actual EZ designation is based on economic performance. Nevertheless, if one controls for sample selection, the data can be used to address the counterfactual question, how did zones perform relative to what their performance would have been in the absence of zone designation?

The correct estimation technique for an experiment is determined by the assumptions about the nature of the data. If zones are selected randomly, the effects of the program are consistently estimated by a cross-section comparison of means between the control and experimental groups. No time-series variation is necessary. Alternatively, if data are available only for the experimental group, but are available both before and after the experiment, then means can be compared across time. In this case, consistent estimation does not require random selection, but it does assume that all changes across time are attributable solely to the experiment—there are no external influences.

With panel data on zones before and after designation, as well as nonzone jurisdictions, aggregate time effects can control for external influences over time. Because EZs are selected on the basis of depressed economic conditions, specifications that allow for different types of sample selection should be estimated. In particular, the specifications should allow for EZ designation to be correlated with unobservables affecting economic performance.

The three specifications include jurisdiction fixed effects. Fixed effects take account of permanent differences across zones that are likely to influence designation. For example, zones may vary with respect to industrial composition and characteristics of the labor force. In a second specification, in addition to the fixed effects, selection is allowed to depend on jurisdiction-specific growth rates. This allows for zones to grow at different rates and allows program designation to depend on these growth rates.[33] The third specification allows designation to be based on lagged values of the dependent variable as well as the zone-specific time invariant unobservables (fixed effects). For example, this allows zone designation to depend on the level of employment or investment in the previous period.

The most basic model is given by equation (1):

$$\log y_{it} = \alpha_i + \beta_t + \delta EZ_{it} + u_{it}. \tag{1}$$

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[33] For example, M. Rubin (1992) claims that the New Jersey program targets fast growing areas in preference to slow-growing ones. Slow-growing areas might be targeted in other states.

EZ_{it} equals 1 if jurisdiction i is a zone in year t, and 0 otherwise. The variable y_{it} is either the annual level of inventories, machinery and equipment, or unemployment claims. The coefficient on the EZ dummy, when multiplied by 100, measures the percentage change in inventories, for example, caused by zone designation. This specification includes a linear time trend β_t, and the α_is control for unobservables that are time-invariant over the sample period and may be correlated with zone designation.

The second specification, the random growth rates model given by

$$\log y_{it} = \alpha_i + \beta_{1i}t + \beta_{2t} + \delta EZ_{it} + u_{it}, \tag{2}$$

allows zone selection to be based not only on the level of activity α_i, but on the growth rates β_{1i} as well. This generalization is desirable if, for example, fast- or slow-growing areas are more likely to be selected. This second model is more general than the first in that aggregate time effects, β_{2t}, replace the linear time trend.

Specifications (1) and (2) control for varying degrees of sample selection, but they impose the restriction that zone designation has the same effect in each year after designation. That is, EZ designation causes a permanent shift in the level of activity in the zone, relative to its nonzone state. This may be too restrictive if the influences of the incentives change over time. This restriction is relaxed in

$$\log y_{it} = \alpha_i + \beta_t + \delta_1 EZYR1_{it} + \delta_2 EZYR2_{it} + \ldots + \delta_5 EZYR5_{it} + u_{it}. \tag{3}$$

This is an extension of equation (1) that allows the effect of zone designation to vary over its life. The EZ dummy is replaced by a series of dummy variables for each year of zone designation; for example, $EZYR2_{it}$ takes on the value 1 if jurisdiction i has been a zone for two years in year t, and 0 otherwise.

The third specification, equation (4), accounts for the possibility that designation is based on the lagged value of the dependent variable before designation:

$$\log y_{it} = \alpha_i + \beta_{2t} + \rho \log y_{i,t-1} + \delta EZ_{it} + u_{it}. \tag{4}$$

The estimated effects are similar across specifications.[34] They indicate that the Indiana EZ program has permanently increased the value of inventories by about 8 percent in the zones relative to what it would have been without the program. However, the value of machinery and equipment is reduced by about 13 percent. The latter could be a transi-

[34] See L. Papke (1991b) for a discussion of estimation techniques for these specifications.

tory one-time adjustment, but the imprecision of the estimates make it difficult to determine. Evaluated at the means of the sample, this is equivalent to about a $5 million drop in the value of depreciable personal property, and a $3.2 million increase in the value of the inventories.[35]

Zone designation appears also to have a positive impact on the local labor market. Unemployment claims decline by about 19 percent following designation, although this finding is more in question because of the geographic mismatch. At the mean of unemployment claims, this is about 1,500 fewer claims per year. The evidence for a permanent effect on unemployment claims is stronger than that for capital.

To summarize, it appears that the Indiana zone program has had a positive effect on employment and inventories. A decline in unemployment claims in the surrounding community, however, does not necessarily imply an increase in the employment or the economic well-being of zone residents. What has happened to the income of zone residents? New evidence on their economic status based on the 1990 Census is presented in the following.

C. The Economic Well-being of Zone Residents

The 1980 and 1990 census years bracket the operation of the Indiana EZ program, which, as indicated earlier, began in 1984. This section compares the economic status of zone residents before the zone program began to a point six years after zone designation. These differences are compared to changes over the same period of time for nonzone residents in Indiana.

The decennial Census of Population and Housing contains data on population, labor force, and housing characteristics at different geographic levels. These levels include, in decreasing order of size, state, county, minor civil division or township, place, census tract, block group, and block.

Some housing characteristics and 100 percent population counts are available by census block.[36] Other economic data (such as income and labor force characteristics) are available by block group. A geographic block group consists of a cluster of blocks within a census tract (or block numbering area for areas without census tracts) that generally contain between 250 and 550 housing units. The Bureau of the Census Summary

[35] Anecdotal evidence presented at a hearing of the Indiana Legislative Tax Incentive Study Committee in June 1992 indicated that some of the new zone firms are liquor stores and gun shop warehouses that hold comparatively large inventories.

[36] Census blocks are small areas bounded on all sides by visible features such as streets, roads, streams, and railroad tracks, and by invisible boundaries such as city, town, township, and county limits, property limits, and imaginary extensions of roads.

TABLE 1.
Average Indiana Zone Characteristics.

	1990 Census	Change from 1980 to 1990
Total population	11,021.67	−2,303.77
Workers 16 years and over	7,942.78	−1,545.11
Households	4,202.33	−673.56
Per capita income	$5,234.53	−$124.38
Percent white	59.50	−2.44
Percent black	36.22	0.93
Percent unemployed	7.98	−1.32
Percent unemployed men	9.30	−2.16
Percent unemployed women	6.89	−0.6
Percent out of the labor force	38.70	−2.94
Percent men out of labor force	29.58	0.77
Percent women out of labor force	46.33	−6.14
Percent who work in place of residence	68.61	3.93

Source: Author's calculations from the Census of Population and Housing, 1980, 1990: Summary Tape File 3 (Indiana).
Note: Zone characteristics are constructed by aggregating over block group data. Per capita income is from the prior year and reported in 1980 dollars. Racial composition characteristics are a fraction of total population. Labor force characteristics are fractions of workers 16 years and older.

Tape File 3 contains block group level data: 100 percent counts of population, and economic sample data weighted to represent the total population in the block group.

After identifying the census tracts and blocks in each Indiana zone, I identified the block groups that contain these census blocks. In some cases, the block groups may contain blocks that are not designated EZs, but economic data are not available at a finer level of disaggregation.[37]

Table 1 contains a summary of zone resident characteristics from the 1990 census and the change in these characteristics since the 1980 census. The change between the two census years reflects either five or six years of zone tax benefits. Zone characteristics are constructed by aggregating all the block groups within each zone in 1980 and 1990. I then average these data to obtain the zone characteristics provided in Table 1.

Zones lost population over this period. Zones lost about 2,300 people and 674 households on average. Per capital income also fell about 2 percent, to an average of $5,235 (1980 dollars). Most zone residents are white, but the white population fell by about two percentage points to 60 percent on average. Black population increased by one percentage point

[37] Population is available by block (Summary tape file 1A) and could be aggregated to obtain exact zone population. Population figures reported here are from block group aggregates, so it will exceed the statutory maximum population for zones.

TABLE 2.
Industrial Composition of Employment of Indiana Zone Residents.

	1980 Census	1990 Census	Change from 1980 to 1990
Percent in agriculture, forestry, fisheries, and mining	0.67	0.79	0.12
Percent in construction	4.14	4.61	0.47
Percent in manufacturing	36.21	29.96	−6.25
Percent in transportation and communication	6.32	6.54	0.22
Percent in wholesale	3.71	3.52	−0.19
Percent in retail	17.00	18.98	1.98
Percent in finance and entertainment	11.80	13.34	1.54
Percent professionals in health, education, and other	16.65	18.86	2.21
Percent in public administration	3.45	3.20	−0.25

Note: See Table 1.

to 36 percent. Zone unemployment fell by 1.3 percent overall to about 8 percent, with most of the drop occurring in the male unemployment rate. In addition, the fraction of people who reported "working in their place of residence" increased by almost 4 percent (where "place" refers to the Census geographic definition).

Table 2 presents the industrial composition of zone resident employment in 1980 and 1990 and the changes between the two censuses. About 30 percent of residents work in manufacturing, down six percentage points from 1980. The proportion working in retail (19 percent), finance and entertainment services (13 percent), and professional, health-, and education-related services (19 percent) each rose about two percentage points over this period.

To determine whether the changes in economic status described in Table 1 were unusual, it is useful to compare the experience of the zones with urban nonzones of comparable size within the state. As a comparison group, I randomly selected block groups within twenty-four other urban Indiana places to compare with the block groups that contain the zones designated in 1984 and 1985. Table 3 presents the difference between zones and nonzones in the changes before and after the zone program. That is, the change in nonzone characteristics between 1980 and 1990 is subtracted from the change in zone characteristics across that same period. Tables 4 and 5 contain the economic characteristics for zone and nonzone block groups from which the Table 3 calculations were made.

TABLE 3.

Difference of Differences: Differences Between Zone Block Changes Between 1980 and 1990 and Nonzone Block Changes Between 1980 and 1990 in Indiana.

	Zone change from 1980 to 1990 minus nonzone change from 1980 to 1990
Total population	−44.58
Workers 16 years and over	−27.75
Households	−25.63
Per capita income	−$172.94
Percent white	−0.16
Percent black	1.29
Percent unemployed	−0.15
Percent unemployed men	−0.11
Percent unemployed women	−0.17
Percent out of the labor force	−1.15
Percent men out of labor force	−2.10
Percent women out of labor force	0.66
Percent who work in place of residence	0.42

Source: See Table 1.
Note: Per capita income is from the prior year and reported in 1980 dollars. Racial composition characteristics are a fraction of total population. Labor force characteristics are fractions of workers 16 years and older.

TABLE 4.

Average Indiana Zone Block Characteristics.

	1990 Census	Change from 1980 to 1990
Total block population	614.23	−124.92
Workers 16 years and over	447.81	−85.68
Households	237.21	−38.61
Per capita income	$5,196.82	−$116.41
Percent white	49.43	0.01
Percent black	41.01	4.89
Percent unemployed	8.52	−0.73
Percent unemployed men	10.54	−1.30
Percent unemployed women	6.86	−0.23
Percent out of the labor force	40.68	−2.73
Percent men out of labor force	31.73	0.56
Percent women out of labor force	48.37	−4.84
Percent who work in place of residence	69.83	6.36

Source: See Table 1.
Note: These data are for block groups that had become part of a zone by 1990. Per capita income is from the prior year and reported in 1980 dollars. Racial composition characteristics are a fraction of total population. Labor force characteristics are fractions of workers 16 years and older.

TABLE 5.
Average Indiana Nonzone Block characteristics.

	1990 Census	Change from 1980 to 1990
Total population	844.13	−80.34
Workers 16 years and over	650.17	−57.93
Households	331.59	−12.98
Per capita income	$7,289.69	$56.53
Percent white	63.58	0.17
Percent black	24.30	3.60
Percent unemployed	5.58	−0.58
Percent unemployed men	6.68	−1.19
Percent unemployed women	4.60	−0.06
Percent out of the labor force	37.47	−1.58
Percent men out of labor force	29.13	2.66
Percent women out of labor force	44.54	−5.50
Percent who work in place of residence	73.78	5.94

Source: See Table 1.

Note: These data are for non-zone block groups. Per capita income is from the prior year and reported in 1980 dollars. Racial composition characteristics are a fraction of total population. Labor force characteristics are fractions of workers 16 years and older.

The difference of differences reported in Table 3 indicate that the population loss was greater for zones, but population also fell in non-zones. On average, block groups in zones lost forty-five more people (twenty-six more households) than did nonzones. Per capita income in zones in 1980 ($5,313) was substantially less than in nonzones ($6,722), and zone per capita income fell over the ten-year period while nonzone per capita income rose to $7,290. Unemployment fell more in zones than nonzones, but the difference is small (0.11 percent). Fewer zone residents work in their place of residence relative to nonzones in 1990 (70 percent vs. 74 percent), but the ratio did increase fractionally more in the zone (0.42 percent).

These zone effects estimated with the census data are much weaker than those estimated econometrically. One interpretation of this finding is that the econometric analysis allowed zone selection to depend on place-specific growth rates. Similar sample selection corrections cannot be made with only two years of census data. For example, if slower-growing sites are selected, and the selection is controlled for, then the zone program has a large measured effect. This selection correction cannot be made with the census numbers, thus accounting for the smaller measured zone effects.

In summary, while the direction of the zone effects from the census data are similar to those from the econometric analysis, the results are much less strong. In spite of the reduction in unemployment rates in the zones, the income numbers suggest that zone residents are not appreciably better off with the Indiana EZ program.

VI. MEASURING THE COST-EFFECTIVENESS OF ENTERPRISE ZONES

This section briefly discusses the limited evidence on EZ cost effectiveness. Estimated costs per job from EZ programs are compared to other federal employment programs. Cost-effectiveness is measured by direct spending and foregone revenue per job created or cost per zone resident job. These measures provide an accounting of the initial level of public investment required per zone job created. But they are not a full cost-benefit accounting of the program, because they do not account for second-round feedback effects (such as zone employee removal from welfare and income tax payments). The difficulty in determining which jobs may be relocations has already been discussed.[38]

Generating jobs in distressed areas entails a variety of costs depending on the type of program. The JOBS program of the late 1960s and early 1970s subsidized the hiring of disadvantaged, unemployed workers. The gross placement cost was $3,200 (in 1969 dollars, or $10,752 in 1990 dollars) per hire.[39] Bendick (1981) states that costs per job ranged from $11,570 ($17,058 in $1990) in the Urban Development Action Grant Program, through $13,000 ($19,110) per job in the Business Loan program of the Economic Development Administration, to $60,000 ($88,200) per job in the local Public Works program of the Economic Development Administration.

Cost per job estimates from zone programs are not that different from these earlier U.S. experiences with job subsidies. Using survey responses for number of new zone jobs, M. Rubin (1992) puts New Jersey's cost per job at between $8,000 and $13,000 annually. J. Papke (1990) calculates that the annual cost of an Indiana zone job was $4,564, and $31,113 per zone resident job. It amounted to over $100,000 per zone resident job in some zones.

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[38] There is no accounting for the length of job tenure or type of job. For example, Indiana's EZ program may encourage annual hiring and firing because the employment tax credit is based on annual average hires.

[39] Hamermesh (1978) explains that, while the subsidy was fairly high, few employers took advantage of it.

Calculations of state EZ costs are complicated by the fact that, in some state programs, local governments bear the brunt of the cost. In New Jersey, the state funds the EZ program.[40] But in Indiana the most generous tax incentive is the inventory tax credit against the local property tax. The credit reduces the assessed value of taxable property in the zone and shifts the remaining tax burden onto other local property sources. The cost per zone job varies across zones.[41] From 1986 to 1988, for example, the average cost of the inventory tax credit alone per new job ranged from $526 to $10,238, and from $1,154 to $67,571 for new zone resident jobs.

VII. CONCLUSION

Some have argued that the uneven pattern of economic growth across states and cities is evidence of a market failure and that government subsidies may be appropriate to encourage a more geographically even growth path. EZs can become valuable tools for evaluating the effectiveness of tax incentives as economic development policy, and can add to the longstanding debate on the effects of tax competition on the location of capital investment.

Based on the U.S. state and British experiences, it is possible to speculate about the likely effects of some of the proposed federal EZ initiatives.[42] First, the capital incentives are likely to increase zone investment. It is not possible to predict whether this will be net new investment or relocation of existing businesses—our limited U.S. survey evidence on this issue indicates that start-up firms average about 25 percent of "new" zone businesses. Capital incentives may revitalize economic activity in depressed areas, but it may well be at the expense of neighboring areas. Data from zone programs suggest that the surrounding community is struggling economically as well.

State zone programs do not seem to have improved the economic

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[40] The most valuable incentives New Jersey offers include business tax credits for employee hires of public assistance recipients, an exemption from state sales and use taxes on purchases of tangible personal property, and materials and services for construction activities, and a 50 percent rebate on unemployment insurance taxes paid by employers on low-paid employees.

[41] For example, the 1987 assessed value of the exempt inventories in the Elkhart EZ was $4.2 million, or 2.7 percent of the total taxable property values in Concord township. To make up this loss in tax base, $331,000 of taxes were shifted to the remaining nonexempt properties. Without the exemption, the gross tax rate in the district would have been $9.7807 (in dollars per $100 of assessed value); with the exemption, the actual tax rate was $9.8870, an increase of 1.1 percent. See J. A. Papke (1990) for additional estimates of the tax cost shifted to local residents in each zone.

[42] Green (1990) and Steuerle (1992) make recommendations specific to a federal EZ program.

status of zone residents. Proposed federal wage credits may stand a better chance of increasing zone resident income, because the cap is higher than that in most states, and it might also be indexed. Certainly, the chances for improvement are greater when zones are smaller relative to the rest of the economy. It is unlikely that the proposed credit for stock purchases will be influential, because few zone firms issue stock specifically for zone location.

Several unresolved issues remain. If investment in certain geographic areas is inhibited because the perceived riskiness of an area increases the required cost of capital, EZ tax incentives may at least partially offset the high cost of funds. But high costs of capital may not be the problem if investment is discouraged because of infrastructure deficiencies or an unskilled work force.

If the goal of an EZ program is to improve the economic status of zone residents, issues relating to their employability are relevant. There may be few income gains if zone businesses require labor skills not possessed by residents of the area. If the business is attracted to the area to use its low-skilled, low-wage labor, there may be employment growth without income growth. Current residents may even be displaced by economic development.

Direct assistance to business may be the most controversial type of state and local economic development policy. Tax concessions or tax expenditures transfer the discretionary authority for a public program to a nonpublic third party—the firm, in the case of EZs. The employment and investment effects of these tax expenditure policies are still being evaluated.

APPENDIX 1: PARTIAL EQUILIBRIUM ANALYSIS OF ZONE INCENTIVES

Appendix 1 employs a partial equilibrium model to analyze the effects on zone wages of a labor subsidy, a capital subsidy, and an equal-cost subsidy to capital and labor. Labor subsidies that target zone residents are also analyzed.

Production in the zone uses three inputs—capital K, zone resident labor L_Z, and labor from outside of the zone L_N. The package of zone tax incentives may include a subsidy to zone capital τ_K, zone resident labor τ_Z, and/or nonzone labor τ_N expressed as percentages (in decimal) of factor cost.

The production process in the zone is described by

$$Q = F(K, L_Z, L_N). \tag{A-1}$$

The demand function for the zone product is described by

$$Q = f(P). \tag{A-2}$$

The two labor supply equations are

$$L_Z = g_Z(w) \tag{A-3}$$

$$L_N = g_N(w). \tag{A-4}$$

Capital is assumed to be in infinitely elastic supply to the zone, or

$$r = r_0. \tag{A-5}$$

Under the assumptions of perfect competition and profit maximization, the zone economy is summarized by the following equations:

$$\hat{Q} = (1 - a_Z - a_N)\hat{K} + a_Z\hat{L}_Z + a_N\hat{L}_N \tag{A-6}$$
$$\hat{Q} = -e_P\hat{P} \tag{A-7}$$
$$\hat{K} - \hat{L}_Z = \sigma_Z(\hat{w}_Z - d\tau_z + d\tau_K - \hat{r}) \tag{A-8}$$
$$\hat{K} - \hat{L}_N = \sigma_N(\hat{w}_N - d\tau_N + d\tau_K - \hat{r}) \tag{A-9}$$
$$\hat{P} = a_Z(\hat{w}_Z - d\tau_Z) + a_N(\hat{w}_N - d\tau_N) + (1 - a_Z - a_N)(\hat{r} - d\tau_K) \tag{A-10}$$
$$\hat{L}_Z = e_Z\hat{w}_Z \tag{A-11}$$
$$\hat{L}_N = e_N\hat{w}_N \tag{A-12}$$
$$\hat{r} = 0, \tag{A-13}$$

where $\hat{Q}$, $\hat{P}$, $\hat{K}$, $\hat{L}_N$, $\hat{L}_Z$, $\hat{w}_N$, $\hat{w}_Z$, and $\hat{r}$ are the percentage changes in output, price of output, capital, nonzone resident labor and zone resident labor, and their wages, respectively, and the after-tax rate of return on capital. In addition, a_Z is zone labor's share of total income, a_N is the nonzone labor's share of total income, e_Z and e_N are the elasticities of labor supply for the two types of labor, σ_Z and σ_N are the elasticities of substitution between capital and the two types of labor.

This system results in the following two equations, which describe the percentage change in wages for the two types of labor in response to any of the subsidies:

$$\%\Delta\,w_Z = \frac{c_1 b_{22} - c_2 b_{12}}{b_{11}b_{22} - b_{12}b_{21}} \tag{A-14}$$

$$\%\Delta\,w_N = \frac{c_2 b_{11} - c_1 b_{21}}{b_{11}b_{22} - b_{12}b_{21}}, \tag{A-15}$$

TABLE A-1.
Subsidizing Zone Resident Labor Only.*

	% Δ zone resident wage e_Z Zone resident labor supply elasticity			% Δ non-zone resident wage e_Z Zone resident labor supply elasticity		
e_p	0.0	0.3	0.5	0.0	0.3	0.5

Panel 1: 1 percent wage subsidy: zone residents only

0.0	1.0	0.7353	0.6250	0.0	0.0	0.0
0.5	1.0	0.7496	0.6423	0.0	0.0039	0.0057
1.0	1.0	0.7578	0.6524	0.0	0.0064	0.0091
1.5	1.0	0.7632	0.6591	0.0	0.0078	0.0113

Panel 2: 1 percent zone capital subsidy

0.0	−1.0	−0.7353	−0.6250	−0.2083	−0.2083	−0.2083
0.5	−0.3593	−0.2693	−0.2308	−0.0750	−0.0763	−0.0769
1.0	0.0	0.0	0.0	0.0	0.0	0.0
1.5	0.2299	0.1754	0.1515	0.0478	0.0497	0.0505

Panel 3: Equal-cost subsidy to zone resident labor and capital

0.0	4.0	2.9412	2.5	−0.2083	−0.2083	−0.2083
0.5	4.6402	3.4785	2.9808	−0.0748	−0.0561	−0.0481
1.0	5.0	3.7890	3.2622	0.0	0.0319	0.0457
1.5	5.2299	3.9912	3.4470	0.0478	0.0891	0.1073

Source: Author's calculations. See Appendix 1 for derivations.
*Percentage change in zone resident wages and nonzone resident wages for various demand and labor supply elasticities under three types of EZ tax incentives

where $b_{11} = e_p a_Z + (1 - a_N)e_Z + a_K \sigma_Z$, $b_{12} = e_p a_N$, $b_{21} = e_p a_Z$, $b_{22} = e_p a_N + (1 - a_Z)e_N + a_K \sigma_N$, $c_1 = (e_p a_Z + a_K \sigma_Z)d\tau_Z + e_p a_N d\tau_N + (e_p a_K - a_K \sigma_Z)d\tau_K$, and $c_2 = e_p a_Z d\tau_Z + (e_p a_N + a_K \sigma_N)d\tau_N + (e_p a_K - a_K \sigma_N)d\tau_K$.

Land is an input to production as well, but excluding land from the model does not significantly alter the calculated wage effects. A stylized fact of income distribution theory is that most of national income is attributable to labor, and the rest is largely a return to capital. Because land is such a small share of total income, its inclusion would not appreciably affect the estimated wage effects.[43]

Calculations are presented for a range of labor supply and demand elasticities in Tables A-1 and A-2. The estimates are in the form of a percentage change in wages for each percentage point change in the

[43] As in Britain, EZ subsidies may increase the price of zone land if its supply is fairly inelastic. While the total amount of land in the zone is fixed in supply, the supply of industrial land may not be. Exactly how much the price of land will rise will depend on its elasticity of supply and the substitution elasticities between land and the other inputs.

TABLE A-2.
Percentage Change in Zone Wages for Various Demand and Labor Supply Elasticities Under Three Types of EZ Tax Incentives.

Demand elasticity e_P	Zone labor supply elasticity e_L		
	0.0	*0.3*	*0.5*
Panel 1: 1 percent zone labor subsidy			
0.0	1.0	0.4545	0.3333
0.5	1.0	0.6757	0.5556
1.0	1.0	0.7692	0.6667
1.5	1.0	0.8209	0.7333
Panel 2: 1 percent zone capital subsidy			
0.0	−1.0	−0.4545	−0.3333
0.5	−0.2	−0.1351	−0.1111
1.0	0.0	0.0	0.0
1.5	0.0909	0.0746	0.0667
Panel 3: Equal-cost subsidy to zone labor and capital			
0.0	−2.0	−0.9091	−0.6667
0.5	0.6	0.4054	0.3333
1.0	1.25	0.9615	0.8333
1.5	1.5455	1.2687	1.1333

Source: Author's calculations. See Appendix 1 for derivations.

subsidy. For example, an estimate of 0.4 means that a one percentage point increase in the wage or capital subsidy increases the wage by 0.4 percent. The percentage change in the wage can be converted into a percentage change in employment by multiplying this estimate by the elasticity of labor supply.

Case 1: Homogeneous labor

Consider first a type of EZ program that makes no distinction between employment of zone residents and nonzone residents. A labor subsidy is provided for all zone employment. (This is a special case of the previous model.) Both zone and nonzone residents share a common elasticity of labor supply.[44] The estimates of the percentage change in wages for a one-percentage point increase in the labor subsidy are presented in panel 1 of Table A-2.

A subsidy to zone labor always increases the wage (and employment). The effect on the wage is larger, the larger the elasticity of demand (in

[44] Following Gravelle (1992), a labor share in total output of 0.75 is assumed.

absolute value) and the smaller the elasticity of labor supply. If labor is completely inelastic, a 1 percent increase in the wage subsidy raises the wage by one percent. The increase in the wage is 0.68 percent at a more elastic labor supply elasticity of 0.3, and product demand elasticity of 0.5.

The resulting percentage change in employment is found by multiplying the percentage change in the wage by the labor supply elasticity. For example, a 6.8 percent increase in the wage causes an increase in employment of 2.04 percent if the labor supply elasticity is 0.3.

Panel 2 presents the wage effects of a capital subsidy. A capital subsidy reduces the wage at low elasticities of product demand and labor supply. There is a small positive increase in the wage for products with a relatively elastic demand, ranging from 0.09 percent with inelastic labor supply to 0.07 percent with a 0.5 labor supply elasticity.

Most EZ programs involve a subsidy to both capital and labor. The effect of an equal-cost subsidy to labor and capital is presented in panel 3. Wage income is assumed to be three times the size of capital income, so the rate of wage subsidy is one-third that of the capital subsidy. This combined subsidy will reduce zone wages if the demand for the zone product is completely inelastic. If the product elasticity is fairly high (1.5) and labor is still relatively inelastic (0.3), an equal-cost subsidy to capital and labor (one percent increase in the capital subsidy combined with a one-third percent wage subsidy) increases wages by 1.27 percent.

Case 2: *Heterogeneous labor*

Often an EZ labor subsidy is provided for the wages of zone residents only (Indiana's program and H.R. 11 are examples). In the previous model, zone resident labor and nonzone resident labor are treated as separate inputs in the production process. Nonzone resident labor is assumed to be highly mobile across zone boundaries. (An elasticity of nonzone labor supply of 1.0 is assumed.)

Zone resident labor's share in total income is assumed to be 0.05, and nonzone resident labor's share is assumed to be 0.70. This accords with survey data from the Indiana program that indicates that zone residents are about 7 percent of total zone employment (provided zone residents are paid the same wage as nonzone residents). If zone residents are paid half as much as nonzone residents (as Indiana survey data also indicate), then these income shares correspond to zone employees comprising 14 percent of total zone employment. Capital's income share remains 0.25.

The effects on the wages of zone residents and nonzone residents of a labor subsidy, capital subsidy, and equal-cost labor and capital subsidy are illustrated in Table A-1. When only zone resident wages are subsidized (panel 1), variation in the elasticity of demand has little effect on

the change in the wage. If zone resident labor is inelastically supplied, a 1 percent subsidy to their wages alone increases their wages by 1 percent (and there is no effect on nonzone resident wages). Zone resident wages increase by about 0.75 percent if their elasticity of labor supply is 0.3, and by about 0.65 percent if their labor supply is 0.5. The increase in nonzone resident wages is less than 0.01 percent in all cases. Thus, at lower elasticities of demand, a subsidy to zone-resident wages only is more effective at increasing the wages (and employment) of zone residents than is a subsidy to all labor employed in the zone.

As in the homogeneous labor case, a capital subsidy causes firms to substitute away from both types of labor, and wages to zone residents and nonzone residents alike fall (panel 2). If the product demand is very elastic (1.5), a capital subsidy increases zone resident wages by 0.18 percent (with an elasticity of labor supply of 0.3).

An equal-cost subsidy to zone resident labor and capital has a substantially larger effect on the zone resident wage (panel 3). An equal-cost subsidy corresponds to a 1 percent capital subsidy and a 5 percent labor subsidy. At a zone resident labor supply of 0.3, an equal-cost subsidy increases zone-resident wages by about 3 percent, regardless of the product demand elasticity. If only zone resident wages are subsidized, the EZ incentive can fund a much larger percentage increase in the labor subsidy with a correspondingly larger effect on the zone resident wage.[45]

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[45] These results assume highly mobile nonzone resident labor (a labor supply elasticity of 1.0). Calculations not reported here illustrate that the equal cost subsidy estimates are not appreciably altered by assuming a completely inelastic supply of nonzone resident labor, or by assuming that zone-resident and nonzone resident labor have an equal share in total output.

APPENDIX 2

Studies of U.S. Enterprise Zones

State	Author
Multiple states	L. Revzan (1983)
	R. Funkhouser and E. Lorenz (1987)
	M. Bendick, Jr., and D. W. Rasmussen (1986)
	M. Brintnall and R. Green (1988)
	M. G. Wilder and B. M. Rubin (1988)
	R. A. Erickson and S. W. Friedman (1990, 1991a, 1991b)
	R. A. Erickson, S. W. Friedman, and R. E. McCluskey (1989)
	S. A. Lavation and E. I. Miller (1992)
	B. M. Rubin and M. G. Wilder (1989)
	A. W. Sheldon and R. C. Elling (1989)
California	E. Litster (1990)
Connecticut	Connecticut Department of Economic Development (1985)
Illinois	E. R. Jones (1985, 1987)
Indiana	J. A. Papke (1988, 1989, 1990)
	J. A. Papke and L. E. Papke (1992)
	L. E. Papke (1991)
Louisiana	A. C. Nelson and R. W. Whelan (1988)
Maryland	U. S. General Accounting Office (1988)
New Jersey	M. Rubin and R. B. Armstrong (1989)
Ohio	S. Staley (1988)

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