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The Economic and Social Impacts of NIMBYs

by

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ABSTRACT: This paper examines some of the issues and controversies that arise when facilities with perceived noxious environmental, social, and economic effects (NIMBYs) locate in communities. Five specific categories of NIMBYs are examined, including: (1) interstate highways, (2) large dams, (3) medium and maximum security prisons, (4) commercial nuclear power plants, and (5) gambling casinos. The paper uses quasi-experimental control group methods to assess the economic impacts of these facilities on U.S. counties during the period 1972-94. The paper shows that few actual negative effects can be attributed to NIMBYs. However, only interstate highways result in broad based effects that measurably stimulate aggregate employment.

KEYWORDS: NIMBY, LULU, economic development, quasi-experimental, control group

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1.0 Introduction

One of the biggest headaches in community economic development occurs when public campaigns arise to prevent "undesirable" economic facilities from locating in a region. Planners recognized this phenomenon decades ago, but only recently graced the objects of this popular outrage with acronyms: NIMBYs ("Not in my backyard") or LULUs ("Locally unwanted land use") (Popper 1985). Unfortunately, any attempt to identify what constitutes a LULU or NIMBY is likely to be futile because they can be so varied. We know that toxic waste dumps are NIMBYs. So are nuclear power plants and prisons. Transportation facilities such as airports, highways, and rail lines are often regarded as NIMBYs. Ditto fun places like shopping plazas, Wal-Marts, Disney theme parks, and sports stadiums. Even such seemingly innocuous facilities as churches may be regarded as NIMBYs in certain times and certain places (*The Economist*).

The NIMBY phenomenon is alive and well in rural America. However, because many rural areas continue to lag economically behind the rest of the nation, the opposition there has been somewhat muted. Almost nothing has seemed to work in many rural regions or the solutions are perceived to take too much time. Therefore, impatient rural communities have sought to improve their fortunes by recruiting enterprises that were resisted ferociously elsewhere. In many instances, the facilities are large and might be thought to create direct employment through new hires and indirect employment through the associated regional multiplier effects. It would seem to be an open and shut case. However, questions remain about such projects and the size of these tangible benefits. Moreover, doubts persist whether they create unacceptable environmental or social externalities which might outweigh the benefits.

Generalizations are difficult. Of course, economic multipliers differ predictably from one locale to another depending on characteristics inherent to the region, including the nature of existing interindustry and interregional linkages. The actual impacts of any given enterprise will also differ based on characteristics of the facility, including the makeup and disbursement of its expenditures. Therefore, the actual regional effects must be evaluated on a case-by-case basis. Will the new jobs be filled by local people who live in the area? Are the linkages with the region strong enough to create substantial multiplier effects? Although few NIMBYs are derailed on the basis of this or that calculated multiplier, they are important considerations

Often, however, the output of economic input-output models seems to be superfluous. Opponents are willing to concede that the project in question will produce jobs in the short-run. Their objections are more likely to center on other matters such as the environmental, social, and distributive effects of the enterprise. These effects are thought to be so detrimental that they might even undo any positive effects in the long run. Opponents often ask hard questions that planners are unable to answer. Who will be the beneficiaries and the losers? Will the new jobs be filled by local residents? Will disaffected residents such as retirees and tourists leave the area because of the disturbance of their placid locale? And, are the noxious qualities of such facilities enough to repel other potential enterprises from possibly building or expanding in the region? With increasing attention being paid to the role of amenities in attracting a skilled laborforce and higher value added businesses, this latter concern has come to the forefront. Communities are sometimes reluctant to consider NIMBYs, not only because they create additional social, safety, or environmental risks, but because of the perception that the introduction of such risks may ultimately make the region less attractive.

The purpose of this paper is to begin to sort out some of the reasons that NIMBYs are often unloved and to gauge some limited economic and social effects of representative NIMBY case studies. Five common NIMBYs are examined: dams, interstate highways, commercial nuclear power plants, prisons, and gambling casinos. These NIMBYs are singled out because of the continuing controversy surrounding their construction and the slightly different nature of each facility. In a sense, each represents a different era in the NIMBY debate. Large dams made their splash during the 50s and early 60s (see figure 1.1). Interstate highways construction (figure 1.2) accelerated during the mid 60s and early 70s. Nuclear power plants rocketed to prominence during the 70s and mid-80s (figure 1.3).

Maximum and medium security prison construction stole the spotlight during the late 80s and early 90s (figure 1.4). Many communities gambled with casinos during the 90s as dozens of state governments permitted their proliferation.

The remainder of this paper is divided into four sections. The next section describes a crude taxonomy of NIMBYs, and reviews the literature concerned with the economic effects of dams, highways, nuclear power plants, prisons, and casinos. The following section describes the quasi-experimental control group research design used to gauge the effects of these facilities on county growth and development during the period 1970-94. The third section describes the sources and characteristics of important data inputs. The final section describes the results of the empirical analysis. The final section provides a summary and conclusion.

2.0 Literature Review

Citizens don't like NIMBYs and the reasons are often varied. Indeed, any NIMBY movement is likely to attract disparate elements who could never get along in another setting or cooperate on another issue. A taxonomy of NIMBYs is needed. It can help to reveal some of the potential friction points and identify some of important considerations in NIMBY project evaluation. The taxonomy is crude. It is not meant to be exhaustive but rather illustrative.

The fizzlers. Fizzlers are public projects which create few or no post-construction direct effects, but instead rely on market forces (which never materialize) to generate the positive regional economic effects.

The islands. Islands are economically isolated from their host regions. They may employ and buy primarily from outside the region, thereby denying local residents many of the benefits of their physical presence.

The befoulers. These enterprises are harmful to the environment or ecology of a region. They may be harmful because they emit pollutants into the air or water or dispose of solid waste in the area. They might also indirectly befoul the environment by facilitating certain types of growth (e.g., tourism) which in turn creates environmental spoilage.

The defilers. These projects may create harmful social effects. For instance, they may contribute to decreased family or community cohesion, increased delinquency and crime, alcohol and drug abuse, or other bad habits

The deniers. These enterprises may negatively impact those who are less fortunate. They may displace low-income or elderly residents from their homes or employment. They also may have disproportionate effects on minority groups and women.

The competitors. These enterprises may affect the livelihoods of those in the community who are generally better off. For instance, established local proprietors may find themselves unable to compete with aggressive NIMBYs who choose to locate in the region.

The deadbeats. Deadbeats don't pay the full cost of their infrastructure and public service needs. They leave others in the area footing part of the bill. This situation may arise when NIMBYs receive substantial relocation subsidies or do not compensate the community for facility externalities that increase public service expenditures.

The repellers. These NIMBY enterprises make it tougher for existing or prospective enterprises to operate in the same region, often because of the negative externalities described above.

The unknowns. Unknowns may not have any immediate negative environmental or social effects, but too little is known about their long-term effects. They introduce an element of risk into the development equation that makes many residents and enterprises uncomfortable.

The deserters. Footloose and fancy-free, the leavers are not committed to a long term community relationship. Perhaps, because of the vagaries of the market in which they operate, they respond rapidly to spatial differences in factor costs. They represent a risk to the community in which they operate because of the costs of picking up the pieces.

The disturbers. These enterprises can destroy a peaceful and quiet ambience by their very presence. Opponents may prefer no growth at all even if it does ameliorate economic conditions and generate few negative effects.

Every NIMBY examined here is alleged to have one or more of the attributes described above. Since each facility is large, huge construction costs are involved at the initial stage. The construction stimulus is temporary and rarely serves as the chief selling point for a NIMBY project. The primary debates concern the post-construction and, indeed, long-term post-construction effects of the project. Regarding these effects, there are varying degrees of uncertainty. Three of the five are direct employers and, therefore, might be expected to have expansionary effects. Two of the NIMBYs are public infrastructure which create little or no direct employment but may be influential in directing private investment and employment.

Dams are often characterized as befoulers, deniers, and fizzlers. They can be environmentally harmful while generating few tangible economic benefits for local residents. They submerge large areas of dry land and alter the ecosystem (though they might help to ameliorate some man-made environmental problems such as erosion), displacing people in the process. They are often built to serve national interests and therefore benefits may be very diffuse. Regional effects are rarely important motivating considerations. Indeed, research on the subject of economic effects sends a fairly consistent message that "water resource developments are likely to be poor tools for accelerating [regional] economic growth . . ." (Howe 1968, 488; Cox et al. 1971, 37) When dams do create employment, the effect is more likely to be connected with recreational uses of the resultant reservoir rather than effects on transportation or water factor costs that might potentially influence the location of water intensive manufacturing industries, transportation and public utilities, or agriculture (Knetsch 1964; Cicchetti et al. 1975). Even when recreation is stimulated, it is unlikely to provide the sort of boost needed for regional growth and development (Gjesdahl and Drake 1979).

Highways are often regarded by their opponents as befoulers, deniers, competitors, fizzlers, and defilers. Although almost all interstate highways are constructed along existing traffic corridors, they sometimes infringe on areas of environmental, historical, or sentimental value. They may not directly create social problems but can serve as a conduit for people who bring social problems (such as crime) to new areas. They change access and transportation costs which may create local competitive advantages as well as disadvantages to a previously isolated community. Whether or not a highway has a stimulative effect on a region is influenced by a variety of factors, including urbanization and prior industrial mix. Previously more urbanized and centrally located areas are more likely to experience growth than less urbanized areas, and sectors such as retail trade and services are more responsive than other sectors (Rephann and Isserman 1994; Briggs 1980; Humphrey and Sell 1975; Lichter and Fuiguitt 1980). Even in those communities that grow, however, there may be distributive effects: (1) from lesser urbanized communities along the route and communities by-passed by the route to those in more urbanized communities and along the route (Rephann and Isserman 1994) and (2) from local ownership to outside ownership. The latter could result if, for example, large corporate entities are quicker to understand and act upon the advantages and disadvantages created by changes in the transportation configuration.

Nuclear power plants are islands, repellers, and unknowns. That is to say, they probably do not employ many local residents (Bjornstad and Vogt 1984; Lewis 1986) but require trained specialists likely to be selected from national employment searches. They represent a risk because of the known hazards

associated with fission reactors. Because of the risk, they may deter firms otherwise inclined to locate or expand in the area. Peculiarly, regional researchers have found that the negative effects of nuclear power plants are mitigated by the often huge public revenue effects that result from taxation of the commercial facilities (Bjornstad and Vogt 1984; Greenberg et al. 1986). In effect, the enterprise subsidizes residents and firms, making the communities more attractive candidates for additional private investment.

Prisons are generally recognized to be a "clean industry." That is to say, they are not defilers. However, many NIMBY opponents argue that they are islands, flagrant defilers, and, to some degree, repellers (Shichor 1992). Prisons are owned and operated by state and federal governments. Consequently, labor is often drawn from state and national searches instead of local searches. During the startup phase, much of the management and labor is drawn from other state and federal facilities (Carlson 1992; Beale 1993). Because prisons siting is dominated by political considerations, the eventual sites are unlikely to be low cost producers of many prison inputs (Sechrest 1992). Therefore, supply purchasing channels may be national as well. The positive effects of prisons are, therefore, likely to result from the household purchases of the relocated workers rather than direct spinoffs. Prisons have the potential to create social problems because they house residents likely to commit offenses against one another. Although this may be isolated from the community at large, imprisoned spouses may serve as a magnet for families who are more likely to commit crimes than the native population. Prisons may alter the safety and prestige of a community, and thereby serve as a deterrent to firm location and expansion.

Casinos are sometimes characterized as defilers, islands, deniers, competitors, and deadbeats (Goodman 1994). They have been called islands because of a tendency to draw workers from outside the immediate community (Rephann et al. 1996). In a young and competitive industry, they can also vanish practically overnight, prompting some opponents to call them deserters. As with any young enterprise, the success of a casino depends on a variety of locational factors, including proximity to urban markets, infrastructure, and availability of other tourist attractions (Eadington 1995). Casino gambling is held to attract all kind of malicious and perfidious activity (Friedman, Hakim and Weinblatt 1989; Goodman 1994). It may also tempt residents to gamble excessively. If the persistent gamblers are disproportionately financially insecure then casino gambling may aggravate poverty, family dissolution, crime, and other social vices. New casinos are often opposed by local merchants because of their deleterious effects ("cannibalization") on home-grown restaurant and entertainment businesses, which may not be able to compete with the lower prices and product differentiation offered by casinos. If these forces act all at once, then a casino can be an expensive proposition because of the social service expenditures required to redress the newly unemployed and newly addicted.

3.0 Methodology

The quasi-experimental control group method used here is documented carefully in several published studies, including Isserman and Merrifield (1987), Isserman and Beaumont (1989), and Rephann and Isserman (1994). The method chooses a control group of counties similar in economic makeup to counties which have received a particular treatment. In the case of NIMBYs, the treatment would consist of the construction or opening of a NIMBY facility. The control group of untreated counties (or counties without such a facility) serve as a benchmark against which to measure the effect of the treatment.

Since the ultimate goal is to compare the growth rates of NIMBY and non-NIMBY counties, every effort should be made to control for other plausible causes of economic growth. For this study, the determinant variables were drawn from mainstream theories of regional economic growth, including reduced form equations of regional economic growth described in Richardson (1973) and von Böventer (1975). These theories emphasize the role of spatial context, economic dynamism, the cost of labor and capital, and industrial structure in regional economic growth. Variables which attempt to measure some of these concepts are listed in table 3.1. They are used as selection variables in choosing non-casino county control groups.

Control counties meet four conditions. First, they have no corresponding NIMBY facility (e.g., the control group for dams must not have counties that have a large dam). Second, they are sixty miles distant from a county with such a facility in order to protect against spatial interdependence. Third, they do not have an inordinate amount of data gaps caused by data disclosure restrictions. Fourth, they are approximately similar to NIMBY counties in industrial structure, spatial position, and demographics in a period before the facility opened in the study counties. A similarity measure is computed using the Mahalanobis metric. It combines numerous variables in a way to produce a single number that may be used objectively for comparison purposes.

When a control group has been selected, it should be evaluated further by performing a statistical pre-test. The pre-test compares the growth of the NIMBY counties to the control group during a period before NIMBYs were constructed. If the control group follows a similar growth path to the NIMBY counties prior to opening, the control group can be used as a benchmark for assessing the effects. For each of the NIMBY groups used in this study, a statistical pre-test is conducted, in effect, by choosing a base year in advance of the expected impact years which occur after 1971. For the categories described here, the years 1970 and 1971 serve as a pretesting period. As things turn out, there are few statistically significant discrepancies during this period; therefore, subsequent growth rate differentials may be reasonably attributed to the NIMBYs themselves.

Economic impacts were measured using data from the Regional Economic Information System (REIS) (US Dept. Of Commerce, 1996). The System contains both personal income and employment data. The data used here is measured at the sectoral level for both earnings and employment. These include sectors such as services, retail trade, and state and local government. In addition, the REIS contains information concerning population, per capita income, residential adjustment (a measure of net earnings leakages paid to non-residents), transfer payments (a category consisting largely of social security and government retiree payments as well as assistance to low income residents), and dividends, interest, and rent. The sectoral abbreviations used in illustrations here are as follows: total employment (EMP), per capita personal income (PCI), transfer payments income (TRF), residential adjustment income (RES), construction earnings (CON), transportation, communication, and public utility earnings (TPU), wholesale trade (WHL), finance, insurance, and real estate earnings (FIR), services earnings (SVC), federal government earnings (FED), and state and local government earnings (STL).

The basis for impact measurement and tests of statistically significant effects are growth rates differentials by sector. Growth rates are measured against a selected base year. Therefore, for counties selected in 1969 (the first year in which REIS data is available for this series), 1969 serves as the base year for all subsequent growth rate calculations, 1970-93. The years 1970-71 serve as a pre-test period, during which we can verify that counties followed similar economic trajectories before the treatment was introduced. The years 1972-1994 deserve attention as the years that NIMBYs were functional.

The results are presented through a series of graphs displaying the differences between NIMBY county average growth rates and respective control group average growth rates. Sectors and years that are statistically significant at the $\alpha = 10\%$ level are identified in the lower left-hand corner of each graph. The t-test is the underlying statistical test for all grouped comparison tests (see Repphann and Isserman 1994). The significance test results should be used in interpreting the results. For example, in figure 5.1, interstate highway counties experienced a 14% increase in employment compared to non interstate highway counties, while dam counties outgrew non-dam counties by more than 30%. Only the former result is statistically significant, however

4.0 Data

The NIMBYs selected for this study were derived from the following sources:

Data regarding dams was obtained from the Federal Emergency Management Agency's National Inventory of Dams Data (FEMA 1983). This database contains information about a dam's capacity, primary usage, location, and construction year. An effort was made to select only large dams (defined by the Geological Survey as having a capacity of more than 50,000 acres-feet) because they engender

greater opposition and might be expected to have larger effects. There were 881 of large dams out of a total of 68,225 dams in the U.S. Counties containing large dam reservoirs were trimmed further on the basis of reservoir locations (all study counties had reservoirs located entirely within the county of study), rurality, uniqueness (only one dam treatment per county during the study period) and dam construction dates (1972 to 1977). These restrictions narrowed the list to 27 counties.

Highway counties were selected using a file obtained from the Federal Highway Administration called Status of Improvement of the National System of Interstate and Defense Highways File (PR-511) (USDOT 1990). This file contains information on the status of various interstate highway links, including construction dates and opening dates. Interstate highways currently run through more than 1,360 out of the 3,142 counties in the United States. Out of these approximately 1,360 counties, 58 counties were chosen for study. These counties were distinguished by the fact that interstates measuring at least 9 miles were opened within their borders during the period 1972-75.

Nuclear power plant counties were selected from a list kept by the Nuclear Regulatory Commission (NRC 1990). The list describes each nuclear reactor and the date that a construction permit was issued and operating license conferred. Seventy five counties contain nuclear power plants. The study group consists of 29 counties where nuclear reactors were issued construction permits after 1971. Most of these reactors obtained operating permits during the early and mid 1980s.

A directory published by the American Correctional Association (ACA 1990) was the source of prison information. This publication contains a thorough and up-to-date inventory of the nation's state and federal prisons, including date of opening, number of employees, and number of inmates. Prisons are also classified according to their degree of security, with maximum, medium, and minimum security arrangements being the most common. This study examines only large sized (250+ inmates) maximum and medium security prisons. Two-hundred and ninety-seven counties host such facilities. The 39 selected for study were opened during the period 1972-80.

The data used to select casinos is by far the least satisfactory of the group. Casino gambling is not a federally regulated industry, and no responsible authority makes an effort to keep track of when a casino is built, how large it is, and other parameters that might be of interest in assessing its economic and social effects. Therefore, this study relies on a publication compiled for travel agencies and casino hobbyists called *Casino Resort and Riverboat Fun Book Guide*, published by Casino Vacations, Inc. The 1994 *Guide* describes casinos that were open as of 1993. There are several drawbacks, however. The guide makes no claim as to completeness and, in fact, excludes several levels of gaming operations, including bingo and pari-mutuel betting. In addition, the *Guide* cannot be used to determine the size of each casino. Because many Nevada casinos were in existence before the data series used here began, Nevada casinos were trimmed from the study group. This left 69 casino counties for the study group.

5.0 Empirical Results

Figures 5.1-5.4 show growth rates differences arranged by sector and NIMBY categories. The results for employment and income reveal no evidence of profound detrimental or favorable effects. Employment growth rate differences are on balance positive but only highways registered a statistically significant positive total employment effect at the end of the period. Among the data used, per-capita personal income provides the closest measure of the average resident's economic well-being. Though both dams and casinos exhibited positive effects at the end of the period, only the casinos were statistically significant. Four of the NIMBYs had a positive effect on population (highways and prisons being significant). Casino counties lagged their control group in population growth, but this had occurred before casinos were opened. Indeed, the downward population growth trend had already reversed in 1991, two years after South Dakota legalized limited stakes casino gambling and one year after Colorado voters approved casino gambling in three old mining towns. Figure 5.4 shows residential adjustment, where a positive growth rate difference can be interpreted to mean that net income inflows occurred and a negative value means net income outflows occurred. One can imagine that the cash inflows and outflows are connected to changes in commuting patterns. In the case of casinos, some of the benefit of

hosting a casino is diffused outside of the county, perhaps because of the increased presence of commuters who work at the casino but reside elsewhere.

All together, the picture presented is a bit of a muddle. On balance, this evidence runs counter to the woeful prognostications of the harshest NIMBY critics. But, neither do the results support the view that NIMBYs offer any quick route to economic salvation either. One could argue that casinos have characteristics of an Island because of the likelihood that outside residents derive some of the benefits of the new facilities. However, additional sectoral information is needed to illuminate these cases.

The literature suggests that dams have few economic effects on their host communities. The economic benefits are often diffuse and dam reservoirs do not serve as much of an industrial location asset, even in water intensive industries. However, dam reservoirs can stimulate recreation related sectors when they are utilized for recreational purposes. Nearly every one of the dams used in this study had a recreational use, and so one might expect some services and retail trade industries to be stimulated. The results obtained here lend some credence to this hypothesis. Retail trade grew 175% faster (significant at $\alpha = 10\%$) in the dam counties than control group counties. Included in the retail trade sector would be eating and drinking places and souvenir vendors. On the other had, services (which would include lodging places and amusement and recreation services) was not affected, and a sector which would appear to have little connection with the reservoir, wholesale trade, grows significantly faster.

Highways are a different story (see figure 5.5). All of the associated effects are consistent with the role attributed to highways of rearranging tertiary sector market areas. Hence, positive effects are observed in services (almost statistically significant in 1994), finance, insurance, and real estate, and wholesale trade. Population expands as do transfer payments. On further investigation of transfer payments income, this effect was revealed to be connected with faster growth in retirement and medical payments. One possible explanation for this result is that highways stimulate elderly immigration, perhaps because of their more centralized locations and easier access to various public and private services. The highway effects are relatively broad based and balanced in comparison with other NIMBYs examined here, and, as mentioned earlier, they are the only category which produces a statistically significant effect on total employment.

Nuclear power plants exhibit the greatest effects on the construction, transportation, public utilities, services, and state and local government sectors (see figure 5.6). The construction effects occur, unsurprisingly, during the nuclear reactor construction stage, when the positive and statistically significant impacts dwarf the size of the original construction sector. The TPU effects are likely connected with the direct employment effects of the nuclear power plant. The state and local government income effect may stem from the fact that new commercial nuclear power plants are a major source of local property tax revenue.

The government sectors are among those stimulated by prisons (see figure 5.7). This is no great surprise since both state and federal correctional facilities are included in the study group. These results likely reflect direct wage disbursements from the government employers. However, there are three additional effects worth comment: construction, finance, insurance, and real estate, and transfers. The first two effects may reflect a healthier local real estate market. If a large share of the new employees are simply transfers from elsewhere, they may have stimulated a small boom in housing construction and housing sales. The downside of this result is that few local residents outside the housing sector might benefit from the situation. The positive effect on transfers might possibly be connected to expenditures on prison inmates or their families. This hypothesis will be studied further using more detailed transfer income data.

Casinos are a substantial boost to local economies (Rephann et al. 1996), but the effect is difficult to gauge here because of the relatively poor fit of the control group. Using a one-size, fits all approach to selecting the control group meant that the lion's share of the casino stimulus occurs nearly

20 years after control group selection. During the years preceding, casino counties lagged their control group because of stagnating state and local government and transportation and public utilities sectors (see figure 5.8). Perhaps, such counties selected themselves to host casinos because of their dire economic and fiscal situation. Whatever the case may be, the casinos seem to have substantial effects. However, it is as yet hard to detect any turnaround in the state and local government situation. Furthermore, the large negative residential adjustment effect reinforces a picture in which casinos are somewhat isolated from their immediate surroundings.

6.0 Summary and Conclusion

This paper examined some of the issues and concerns that arise when facilities with some noxious qualities locate in a region. Although these facilities often create substantial direct employment, they are resisted for a variety of reasons, including concerns that the facility will be detrimental to other enterprises, certain categories of residents, prospective new employers, or local public finances. There are also concerns that the facilities will be of little benefit to the host region, and instead benefit disproportionately outsiders who may not experience the negative effects associated with the facilities. Through examining five representative case studies that been resisted by the public during the last four decades (dams, highways, nuclear power plants, and prisons, casinos), this paper is able to establish that NIMBYs are neither as bad as their opponents insist nor as good as some proponents claim.

Using the categories described earlier, however, it is possible to describe some economic aspects of these NIMBYs. Casinos are islands. They have few economic effects beyond the services sector and distribute part of the earnings stimulus outside the county. Because they apparently do little to reinvigorate state and local government disbursements, they are likely to be deadbeats. Prisons have features of islands too because their primary effects are directly connected to the state and federal sectors. However, there may be some residual effects derived from the relocation of a sizeable chunk of employees into the area. Nuclear power plants are hard to characterize as islands because of effects in the construction and services sectors. They are also not deadbeats because they appear to contribute generously to the public coffers. Highways and dams alone act by influencing the locational decisions of firms and residents. Highways appear to be the more effective of the two strategies because of the relatively broad based tertiary effects and aggregate employment effects. However, neither could be characterized as fizzleers.

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Table 3.1 Control Group Selection Variables*Industrial Structure*

Farm earnings share*, 1969

Manufacturing earnings share*, 1969

Federal government, civilian and military earnings share*, 1969

Population, demand, and spatial aspects

Log of population (base ten), 1969

Logarithm of population potential for counties within 60 miles, 1969

Logarithm of population potential for 60-500 mile radius from the counties, 1969

Residential adjustment share*, 1969

Transfer income share*, 1969

Per capita personal income, 1969

Distance to city of population 25,000 or greater, 1970

Distance to city of population 100,000 or greater, 1970

* Share of total personal income.

Data sources: U.S. Department of Commerce, Bureau of Economic Analysis (1996); U.S. Department of Commerce, Bureau of Census (1979, 1980)