In My Back Yard, Please:
An Analysis of the Siting
and Success of Public Bads
in Japan

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Abstract

This paper examines how the concentration of special interest groups affects the placement and success of controversial facilities. It argues that authorities site public bads—nuclear power plants, dams, and airports—in locations where, especially in the long term, there are fewer pressure groups who oppose such facilities and more who support them. The presence of powerful politicians and worsening first sector employment increase the likelihood that a public bad will be placed in a locality. The placement of an initial public bad in an area overcomes an opposition threshold and makes additional sitings far easier than "greenfields" siting attempts. Using a new dataset on Japan involving approximately 500 observations of villages and towns over the post war period, this paper reveals that special interest groups become more involved in facilities associated with higher levels of risk and that non-political factors, such as higher population density and smaller town size, only occasionally demonstrate exclusionary effects.

Introduction

Siting controversial facilities is a critical problem for industrialized and industrializing nations alike (Rabe 1994, McAvoy 1999, Lesbirel 1998, Garcia-Gorena 1999). Nations struggle to balance the perceived need for large-scale facilities required for nationwide demands for energy, water, and infrastructure against the opposition from local "host communities" who bear the brunt of the externalities of such projects. Do authorities place such public bads randomly, based purely on geographic criteria, or does their placement depend on concentration of local special interest groups, powerful politicians, and minority populations? Many analysts argue that political and business authorities choose locations for public bads based on demographic characteristics (Gould 1986, Austin and Schill 1991). The environmental racism literature charges that planners regularly locate unwanted and dangerous facilities in areas with large numbers of politically underrepresented, low income groups, such as racial, ethnic, or religious minorities (Falk 1982, Hurley 1995, Pastor, Sadd, and Hipp 2001).

A number of studies of siting outcomes found little evidence to support claims of demographic factor-based siting (Atlas 2001). Further, other analysts have found evidence of *political*, not racial, targeting of potential host communities. In one party dominant systems, such as Japan, Mexico, and Sweden, towns supporting the opposition party may be punished with a higher concentration of public bads like nuclear power plants (Ramseyer and Rosenbluth 1993: 129). Homogeneous ward constituencies have exclusionary affects on zoning policies toward group homes (Clingermayer 1994). Private developers avoid areas that have higher potential for mobilization against their projects (Hamilton 1993). Public officials counter that they site projects purely on the basis of "neutral" technical criteria, and that neither local political groups nor racial demographics

factor into their decision making processes (cf. Quah and Tan 2002: 19). This paper investigates both the logic of site selection in Japan—why authorities select certain sites for public bads—and why attempts to complete controversial facilities succeed or fail.[1]

The probability that a town or locality is selected as a host community for a controversial project is modeled here as a function of local demographic, political, and geographic variables (cf. Hamilton 1993: 102). I then extend the analysis to those factors that impact the success or failure of the project, measured by the facility coming "on line" or not. While previous studies have centered on unobserved profit functions for private firms considering where to locate their local public bads (Wolverton 2002), or how such firms internalize their externalities through siting decisions (Hamilton 1993), this study focuses instead on the heuristics of Japanese government decision makers who control the process of site selection. This study utilizes not only rare logit (relogit) and ordered probit (oprobit) analyses alongside weighting techniques to ensure that its sample matches the occurrence in the actual population, but also introduces a new, large N dataset built on both sited and non-sited localities involving three types of public bads. Thus, decision makers in this model choose from an array of geographically and geologically suitable locations in deciding where to place nuclear power plants, dams, and airports. No paper, to the author's knowledge, has analyzed how demographic, political, temporal, and geological variables affect the state's inclusion or exclusion of communities for three types of public bads, along with their chances of success over an extended time period.

[1] For the purposes of this quantitative investigation, I narrowly define "success and failure" as the completion of a proposed project. While cost and schedule overruns, negative publicity, protest, and other outcomes may be undesirable to state authorities, their primary goal is the completion of such projects. Because initial estimates of schedules and spending given by planners rarely reflect complete information about future conditions, indices geared toward measuring time and cost against initial estimates involve issues of measurement error. Social scientists may envision "success" in facility siting as procedures which take citizens views into account, while citizens themselves may envision "success" in siting attempts as blocked or failed cases.

This analysis is important for several reasons. Much ink has been spilled on the issue of environmental racism: governmental authorities and site developers regularly locate unwanted or controversial facilities in areas with lower levels of political representation, and often in areas with higher concentrations of minority groups. Certainly, claims by bureaucrats and developers that they chose locations purely in terms of technocratic criteria are not supported by this analysis.[2] Rather than primarily focusing on the racial or demographic composition of potential host communities, this paper indicates that analysts need to look at the political patterns of representation and interest groups in those localities. Next, this paper demonstrates that interest groups, such as local fishermen's cooperatives, play a role in the siting process, despite common perception of Japan as a strong state in which bureaucracies (by themselves, or in alignment with private firms) determine overall policy outcomes (Johnson 1982, Zysman 1983). Finally, it shows that the Japanese state closely monitors local political and demographic conditions in the process of siting, and hints at larger interactions between the state authorities and local political groups, including the use of a variety of state policy instruments.

All governments face the dilemma of balancing the economic costs of foregone development with the political costs of confronting contentious citizens. By not building those structures that are perceived as necessary[3] by state planners— dams, research laboratories, energy plants, waste incinerators, and land fills—authorities must deal with

[2] Given Japan's comparatively homogeneous racial make-up and dearth of data on such issues, tests which solely investigate racial discrimination (perhaps against *burakumin* or Korean residents) in the siting of controversial facilities would be difficult to implement.

[3] Opponents of such facilities regularly argue that any "need" is in fact over stated by project proponents, and that alternatives to construction of such a controversial project, such as reducing trash and waste production, engaging in alternative energy sources, or cutbacks in nuclear power make such facilities unnecessary. This thesis does not engage in debate over the necessity of such projects, but rather over the patterns with which they are proposed and sited.

ever-swelling populations that require such facilities for daily life. Airports, dams, nuclear power plants, waste incinerators, and even hospices fall under the category deemed "entrepreneurial politics" by James Q. Wilson, because their costs and benefits fall out asymmetrically across the population.[4] Nuclear power plants, for example, confer upon much of society diffuse benefits, but concentrate externalities on those most geographically proximal. While many in a nation or region benefit from the electricity, heat, and light generated by the plant, those most proximal to it suffer the most in the case of an accident or catastrophe.[5] Wilson argues that "[w]hen a specific, easily identifiable group bears the cost of a program conferring distributed benefits, the group is likely to feel its burden keenly and thus to have a strong incentive to organize" to decrease their externalities (Wilson 1974: 334). Some analysts refer to these projects as *public goods*, in the sense that "those who operate [them] cannot fully recoup the costs from the full range of beneficiaries" (Brion 1991: 37), while others see them more accurately as (*local) public bads*, in the sense that they "increase overall welfare but impose net costs on the individuals living in the host community" (see Frey, Oberholzer-gee and Eichenberger 1996: 1298 fn. 1; Aranson and Ordeshook 1985: 93 – 94)[6].

Regardless of their label, attempts to site such facilities reduce the typical barriers to collective action underlined by Olson (1965) and create a community of easily mobilized opponents. The resulting "Not In My Back Yard" (NIMBY) movements may dissipate once the issue is resolved (Brion 1991: 103), but even short-lived opposition presents formidable obstacles to leaders. Local citizens' movements have stalled

[4] Wilson argues that "a policy may be proposed that will confer general (though perhaps small) benefits at a cost to be borne chiefly by a small segment of society" (Wilson 1980: 370).
[5] Events at Three Mile Island (1979), Chernobyl (1986), and Tōkaimura (1999) have become common knowledge around the world and have raised concerns about adverse environmental and health impacts on citizens in these host communities.
[6] The category of public bads includes phenomena as diverse as civil wars and terrorism (Reuter and Truman 2004).

numerous domestic and international projects and impose hefty costs on developers and governments. Despite a dire need for new waste facilities, the United States, Germany, and Canada have not opened new hazardous waste treatment plants since the mid-1980s (Rabe 1994, Seeliger 1996). In Japan, the amount of time necessary to site a fossil fuel plant more than doubled since the 1960s (Munton 1996). Despite President Bush's stated interest in increasing the number of nuclear power plants in North America (*New York Times* 2 August 2001), none have been ordered since 1978. Researchers underscore the problems of citizen resistance to nuclear power plants and waste dumps by labeling it as a "mental illness" (Piller 1991: 4), a "disease," a "syndrome," and a "dragon to be slain" (Ehrman 1990, Inhaber 1998).

Much recent literature on public bads uses political economy models of redistribution and utility to investigate the effect of various political, demographic, procedural, technical, and economic factors on site selection and/or on the outcome of siting attempts (Zeiss 1996, Lesbirel 1998, Hamilton and Viscusi 1999, Wolverton 2002). The basic model for predicting where local bads will be sited depends upon a central decision maker (usually a private developer or utility) weighing the welfare effects of such a move against the consequences of location choice. Overall, the state or developer, hoping to minimize costs, seeks to locate projects where labor and land are the least expensive, and local actors create the least losses due to resistance and stalling strategies.

One author informally assembled a moderate size (N=67) database of facility siting cases in America, but used only descriptive statistics to evaluate which methods (prevention, control, or reduction) led to "successful" siting outcomes (i.e., whether or not the facility was completed and came on line) (Zeiss 1996). Beierle and Cayford (2002) used a quantitative approach to examine public participation in environmental

decisions, but not facility siting *per se.* Hamilton and Viscusi (1999) used data on 150 Superfund sites, but their investigation focuses upon risk assessments and health outcomes along with the expansion of existing facilities, as opposed to the siting of new ones. Lesbirel's (1998) ground breaking study of Japanese thermal and nuclear power plant siting used inferential statistics to analyze the time necessary for the siting of such facilities.[7] These studies ask important questions, and in some cases provide tentative answers, but have not produced definitive results.

The Basic Model

Governmental decision makers, here the bureaucrats within three Japanese ministries (Construction, Transportation, and International Trade and Industry),[8] choose from an array of sites that must meet geographic and geological criteria. Analysts have shown regularly that politicians and governmental authorities alike can maneuver benefits and costs onto communities and constituencies within certain constraints. As "agenda setting [is] fundamentally biased in favor of those who possess the most resources" (Berry, Porney, and Thomson 1993: 103), Japanese bureaucrats have at their disposal wide powers in decision making. The kinds of projects under study here can be seen as a subcategory of redistributive policies in which benefits are geographically targeted on a locality-by-locality basis (Weingast, Shepsle, and Johnsen 1981: 643). Studies have shown that opposition of power-holding elites to planned facilities strongly impacts both

[7] Lesbirel has been unable to make his data, which cover the period from 1960 to 1979, public because of promises to informants, and thus replication of his results is not possible.

[8] The Ministry of Construction (*Kensetushō*), responsible for dam siting, and the Ministry of Transportation (*Unyushō*), responsible for airport siting, were merged into a single ministry, the Ministry of Land, Transportation, and Infrastructure (MLIT, or *Kokudokōtsūshō*) as of January 2001. The Ministry of International Trade and Industry (MITI, or *Tsūsanshō*) was, as of January 2001, renamed METI, the Ministry of Economy, Trade, and Industry (*Keizaisangyōshō*). All of the cases under study here took place before these administrative changes.

the decision of whether or not to site a facility, as well as the outcome of such an attempt if it is undertaken (Eckstein 1997: 27).

Projects seen as public or local goods may be targeted to selected areas (Ferejohn 1974), while costs may be inflicted on those least likely to affect re-election probabilities. McGillivray argues that in highly disciplined majoritarian systems "the government will inflict costs on party loyal districts while providing protection to industries concentrated in marginal districts. In low party discipline majoritarian systems, such as the United States, industries in marginal seats are the least likely to receive favorable levels of protection (1997: 586)." Ramseyer and Rosenbluth argue that the Ministry of International Trade and Industry (MITI) sites nuclear reactors near towns that are dominated by the opposition party (Socialist) so that they will be most affected by the externalities of the nuclear reactors (Ramseyer and Rosenbluth 1993: 129). Given that the government chooses where to locate these facilities, what factors impact their decisions and hence the policy outcome?

Economists and political scientists recognize that those most affected by state policies such as regulation and privatization are the ones who seek to influence policy processes (Mitchell and Munger 1991). More specifically, in the process of siting controversial facilities, better-organized interest groups rather than mass opinion matter immensely (Stigler 1971, Peltzman 1976, Becker 1983). Because of the controversial and sometimes hazardous nature of these projects, some pressure groups are more responsive to siting policies than others (Ray 1981: 108). Preferences of interest groups and hence their activities in the siting process depend substantially on their perception of benefit or loss from these facilities.[9] For example, rural towns in North Carolina with populations of

[9] This is a modification of arguments that "appropriable pecuniary gains and losses of factor owners and competing factor users, respectively…drive the political production process" (Weingast, Shepsle, and

1000 or fewer individuals regularly view prisons as local public goods because of the jobs and community wide financial benefits associated with their siting. This is true to the extent that communities actually compete for the chance to have prisons in their backyards (Hoyman 2001), despite common fears about the possibilities of jailbreaks and riots.

In Japan, certain special interest groups, particularly those occupationally-defined special interest groups of citizens employed in the primary sector as fishermen and farmers, envision projects such as nuclear power plants primarily in terms of their externalities and negative effects on livelihood.[10] Farmers and fishermen have strong social networks and organizations, such as fishermen's cooperatives (*gyōgyō rōdō kumiai*) and farmers' cooperatives, which provide information to members and hold political leverage over policy processes. In Japan, fishermen's cooperatives hold veto powers over siting attempts (Tsebelis 2002); a majority must agree through a formal vote to a contract with site developers for the plant to proceed (Lesbirel 1998, Aldrich 2005). Savvy politicians like Prime Minister Kakuei Tanaka recognized early on the importance of properly handling fishermen involved in nuclear power plant siting attempts through redistributive payments (Tanaka 1972). Other organized groups, such as local representatives to the national legislature, specifically the powerful Liberal Democratic Party politicians, see these facilities in terms of economic gains for constituents (Interviews, 2002 - 2003). These Japanese interest groups employ their resources to

Johnsen 1981: 648). In this case, local interest groups may in fact not be affected by the proposed project because it may not come to fruition; hence their preferences and actions depend on perceived, not actual, gains and losses.

[10] Nuclear power plants in Japan are routinely built on oceans, drawing in cooling water and expelling waste water at a temperature six degrees Celsius higher than standard water. Initial accidents in which radioactive elements along with hot water were released combined with fears about the negative impact of hotter water raised concerns among fishermen about their livelihood (*Nihon Genshiryoku Sangyō Kaigi* Feb 1966 Vol. 10 No. 2, *Asahi Shinbun* 23 March 1972, Council for Nuclear Fuel Cycle No. 36 Winter 2002: 3).

influence siting policy (cf. Rosenbluth 1993: 108) either to encourage the placement of a facility in their constituency or to delay or sabotage the siting of a public bad in their "backyard." For governmental authorities choosing sites for public bads, the magnitude of special interest groups impacts their selection.

In terms of the power of interest groups, size matters. A superficial reading of Olson (1965) might lead one to believe that a smaller interest group will be able to acquire its goals better. We might imagine, then, that a locality with fewer farmers and fishermen might be able to sabotage a siting attempt better, and therefore that such villages would be less likely to be chosen as host communities. A more accurate reading of Olson's argument would be that small groups find it easier to solve their collective action problems because of the ease in applying sanctions, monitoring, and other techniques to fellow members (Kindleberger 1951, Cameron 1988, Tracy 1989). **This does not translate into the small group having its way**. Rather, as Acemoglu and Robinson argue, political power is increasing in group size (2001). Larger groups can amass more votes, donations, as well as protestors, and can better pressure state leaders and decision makers. Smaller groups, conversely, are less powerful, bringing to bear a smaller political power on decision makers. Hence a smaller number of veto players are easier for a political entrepreneur to manage than a larger one.

Scholars have long argued that smaller interest groups are easier for the state to handle. For example, much work focused on the fact that industrialized nations regularly protect farmers, perhaps due to interests in "food security," nostalgia for the farm sector, or sympathy for a clearly recognizable group. Lindert takes a different approach, viewing the farmers as one interest or pressure group among many that compete for rents, and he argues that "[p]art of the logic is that appeasing a smaller group is cheaper" (Lindert

1991: 56). That is, if the state must pay off certain groups through redistribution, its costs are lower with smaller target populations. Hence the size of the subsidized group is an important factor in determining its effect on policies that affect it directly. Size matters, but not just measured in the short term.

In reviewing potential host communities, the long-term health of the primary sector, not its size at the initial siting attempt, forms the core concern for state authorities. This is because siting procedures for facilities like nuclear power plants in Japan can now take up to thirty years to complete (Lesbirel 1998). Siting authorities analyzing potential sites for atomic reactors recognize that villages that suffer from problems like depopulation of fishermen, low community solidarity, and pollution are less able to resist siting attempts. Those localities where fishing is and will remain a vital part of local industry represent the biggest challenges to long-term siting plans. Those villages that have healthier primary sectors will maintain, if not increase, the population of farmers and fishermen in the area. Such healthy areas become more expensive targets for redistribution in terms of both time (contacting, negotiating with, or coercing the individuals) and money (if redistribution is used). Areas in which the importance of fishing and farming will decrease—perhaps because of local environmental conditions, shifting demographics, or over fishing—present ideal targets for projects like nuclear power plants. The health of a fishing community can be forecast using a variety of signals available when the siting process has begun, ranging from the catch volume at that time to longer term demographic trends in the area. As a proxy[11] for the health of the primary

[11] Previous research on the siting choices of externalities relies on similar proxy variables when other systematic data is not available. Hamilton (1993), for example, uses the percentage of the voting age population that voted in the 1980 president election "to measure the potential for residents to overcome free-rider problems and engage in collective action" (Hamilton 1993: 107). With no way to directly measure how communities will respond, he has utilized available data to model this characteristic.

sector, I measure the rate of change in employment in the percentage of workers employed in the primary sector from 1980 through 1995.[12]

Alongside the preferences and relative strengths of interest groups, other local factors, such as the cohesiveness of the community (as a proxy for their ability to overcome collective action problems) and long term, local or regional support for the dominant party will affect exclusion or inclusion decisions. Areas that supported the hegemonic party can be expected to be rewarded for their cooperation, while those that have gone to the opposition will be punished with more public bads. A higher district magnitude makes it more likely that opposition-minded local politicians will become involved, and less likely that locality is to be chosen as a host community. Areas with lower community solidarity, such as those that have experienced rapid population growth, are more likely to be targeted by authorities for controversial facilities because these communities are more vulnerable and more likely to fracture under pressure (Putnam 1993, Munton 1996: 307).

A standard prediction is that the probability of siting in an area decreases as population density increases. Higher density areas are more likely to be able to fight off siting attempts because of their higher numbers of individuals with free time and energy to mobilize against such plans. Larger localities, such as those found in rural areas, are more likely to have zones with few inhabitants and thus fewer potential opponents. As with population density, the more land available in an area, the more likely it is to be less expensive. Hence the larger the area of the locality, the more likely it will be chosen as a host community. Finally, citizen consciousness towards controversial facilities changed over time. Before the mid 1960s, few citizens were willing or interested in challenging

[12] See Appendix 2 for a full discussion of this variable.

plans for new nuclear power plants, dams, and airports. Thus many assume that most attempts to site facilities were made before 1975, a critical point involving increasing citizen mobilization in advanced industrial nations.

Siting Controversial Facilities in Japan

Japanese government bureaucrats are directly involved in the siting of dams and airports and indirectly involved in the placement of nuclear power plants. With the advent of nuclear power, the Ministry of International Trade and Industry assisted private utility companies by carrying out years of extensive geological and demographic surveys of potential host communities. The state continues to help these companies in the process of siting nuclear plants. Recently, when anti-nuclear activists argued that plans for a nuclear site encroached on wetlands in Yamaguchi Prefecture's town of Kaminoseki, the state's pressure moved the company to alter the plant's layout. Company officials from the private utilities meet regularly with relevant bureaucrats, and the system of *amakudari* (literally "descent from heaven," where bureaucrats retire into private companies within their regulatory field)[13] ensures that ties between the two remain close. In the fields of dam and airport siting, bureaucrats alone decide where facilities under study here will be located.[14]

In all three types of projects, certain technical criteria must be met for the facility to proceed. Thus planners require that the land base for dams 1) be impermeable to water, 2) be highly durable, especially to the seismic shocks of earthquakes, and 3) resist long-

[13] Colignon and Usui (2003) extensively map out the employment of bureaucrats in their "retirement" phases.
[14] There are a number of dams and airports under either local or regional government control along with private power dams; such facilities are not within the scope of this study.

term erosion.[15] Similarly, nuclear power plant sites must be seismically stable, close to a source of cooling water (as all of Japan's nuclear reactors rely on water for heat exchange), and far from heavily populated metropolitan areas (to ensure that evacuation, if necessary, will be easier to accomplish). Authorities siting airports now have the technology to site runways in water (using float and land fill techniques), but they also seek some minimum distance from heavily populated areas and access to ground transportation networks.

Having briefly described underlying theories of why authorities select certain sites and not others, and how these political, demographic, and temporal factors can impact the overall success of a siting attempt, summarized below in Table 1 are the relevant variables and their predicted impact on being selected for a public bad. I will analyze their affects on the **outcome** of siting attempts in a later section of the paper.

[15] The exact characteristics which trigger dam building remain unknown; one opposition party Diet member remarked that this aspect of dam siting remains ambiguous even in an era of increasing transparency and demands for open information (Interview with *Minshuto Shūgiin* [Democratic Party of Japan MP], 14 May 2003). Administrators within the (former) Land Ministry and the Ministry of Construction argue that plans for dam construction first arise at the provincial branch offices of central government bureaucracies (*Gekkan Damu Nihon* No. 363 Vol. 1 1975: 32- 33). More cynical observers argued that often undisclosed ties between construction firms and the Ministry of Construction created a ministry bent on building times regardless of actual need (Takahashi 2000).

Table 1: Predicted Impact of Relevant Factors on the Probability of Being Selected by Authorities as a Host Community

Factors Affecting Selection as Host Community	**Predicted Effect on Being Selected for a Public Bad**
Political and Demographic Factors:	
Long hegemonic party support	—
Powerful hegemonic politicians	—
Opposition party presence	+
District magnitude	—
Health of primary sector	—
Community solidarity	—
Geographic Features:	
Population density	—
Town area	+
Period and Time Effects:	
Late time period	—

Note: + indicates increased chance of siting and success; - indicates decreased chance of siting and success; and ? indicates uncertainty as to the direction of the effect.

Data Collection Methodology

To test the impact of these various factors and variables on both government site selection and siting outcomes, I created a dataset on controversial facility siting in Japan between 1940 and 1995 using a variety of sources (see Appendix 1). Japan experienced both well-publicized failures in siting NIMBY-causing facilities,[16] along with absolute and relative successes vis-à-vis other industrial democracies.[17] The dataset uses political-geographic units in Japan (towns, cities, and villages) as the unit of analysis and contains 475 observations across more than 250 variables, including chronological, political, demographic, and economic indicators. A random selection from Japan's 3000 or so towns would have picked up only a handful of observations involving actual siting attempts.

To overcome this problem I employed an *equal-shares*, *choice based* (also known as *endogenous*) sampling method (see King and Zeng 2001a, King and Zeng 2001b, King et al 1994 Sect 4.4.2) in which I included the entire universe of localities selected by the government for public bads. I collected observations on towns where a siting attempt for a nuclear power plant, dam, or airport occurred (but may or may not have been completed), along with a selection of geographically, geologically, and temporally matched observations where no controversial facility was proposed. (See Appendix 2 for

[16] The initial Narita Airport siting attempt in Chiba's Tomisato municipality, the Hosogōchi Dam siting attempt in Kitō Village, and the Ashihama nuclear power plant are well known as cases in which the government selected these localities for projects but then was unable to construct them because of local opposition. Similarly approximately half of the attempts to site nuclear power plants have resulted in rescinding of those plans. From the viewpoint of the state, these were failed cases, while citizens, of course, viewed them as successes because of their strong impact on the outcome. Using the narrow definition I described earlier, these cases are classified as failures for the purposes of this dataset.

[17] The Japanese government's commercial nuclear power program is the second most advanced in the world (Pickett 2002), and it has a higher concentration of dams and airports than most other industrialized democracies (McCormack 1996, Kerr 2001).

a full description of the methodology used to create some of the proxies within this dataset.)

The method of intentionally selecting cases based on their outcome is known in political science as "sampling on the dependent variable," and is a regularly-critiqued approach to case selection. Despite these criticisms, "[w]hat seems essentially unknown in the discipline is that correction for selection on a binary dependent variable is easily accomplished, requires no assumptions, and can save enormous costs in data collection" (King and Zeng 2001b: 698). Table 2 on the following page provides descriptive statistics for the variables used in this study.

Table 2: Descriptive Statistics of Siting Data, 1945 until 1995

Variable	Description	Mean	Standard Deviation	Min.	Max.
Siting Attempt	Dummy variable; 0 if no attempt, 1 if attempt	0.4936441	0.5004901	0	1
Ternary Siting Attempt	Three category ordinal variable; 0 if no siting attempt, 1 if siting attempt failed, 2 if succeeded	0.875	0.9348467	0	2
Town Area	Square kilometers of the locality	135.9705	139.2028	3	869.13
Population Density	Number of individuals per square kilometer	509.192	1321.484	5.6	14652
Community Solidarity	Percentage change in population from 1950 until nearest year of siting proposal	0.0103726	0.7067375	-0.78	6.3777
Health of Primary Sector	Rate of change in primary sector employment percentage from 1980 to 1995	-0.319822	0.2159345	-0.88	0.623
Over Time LDP support	Average prefectural percentage of votes for Liberal Democratic Party candidates in Upper House elections between 1956 and 1989	0.5174699	0.0836085	0.27	0.678
District magnitude	Number of Lower House seats in the locality	4.097458	0.8158683	2	6
LDP Percentage in LH	Percentage of seats from the district held by LDP members	0.6386017	0.1879088	0	1
Number of LDP Representatives In Lower House	Number of seats held by LDP members in the lower House	2.565678	0.8395277	0	5
Socialists in LH	Number of seats held by Socialists in the Lower House	1.002119	0.6164722	0	3
Communists in LH	Number of seats held by Communists in the Lower House	0.0868644	0.2819351	0	1
Other Party Members in Lower House	Number of seats held by other parties, such as Soka Gakkai, in the Lower House	0.4173729	0.6846474	0	4
Presence of Powerful LDP member	Number of LDP members serving 6 consecutive terms from the locality at the time of siting	1.644068	1.009723	0	4
Presence of Prime Minister	Number of LDP politicians in office during siting who served or would go on to serve as Prime Minister	0.1144068	0.331701	0	2
Health of Tertiary Sector	Rate of change in tertiary sector from 1980 until 1995	0.1554478	0.1926868	-0.4	1.3678
Post 1975	Dummy variable; 1 if siting attempt occurred in or after 1975, 0 if before	0.625	0.4846366	0	1

Part I: Empirical Evidence of Inclusion and Exclusion

These three types of controversial facilities come with different levels of perceived risk: nuclear power, dams, and airports, in descending order (cf. Inhaber 1998: 19; Mitchell and Carson 1986: 286). Although analyzing these as a single dataset provides smaller confidence intervals around both estimators and errors, it would confound the effects that each type of facility has upon these various factors. The following section analyzes each type of project separately.

The Dependent Variable

My analysis focuses on whether or not siting authorities selected a community for a nuclear power plant, dam, or airport. With a dependent variable that takes only two values, 0 and 1 (representing the presence or absence of an attempt at siting a controversial facility), the most appropriate model is a logistic regression, which follows the Bernoulli probability function. The probability that a variable takes on the value of 1 is π_i, while the probability of a non event (i.e. 0) being 1 - π_i. There is a vector of explanatory variables (political, demographic, and geographic) that has effects on this probability; these are represented by the term $x_i\beta$. The standard form for logit models involves:

$$Y_i \sim \text{Bernoulli}(Y_i \mid \pi_i), \quad \pi_i = \frac{1}{1 + e - x_i\beta}$$

Because the events under study here are rare, with far more 0s (i.e., no attempt at siting) than 1s (a siting attempt) in the population, this standard form for computing probabilities provides biased estimators. Instead, I utilize the rare events logistic model, or *relogit*, as developed by King and Zeng (2001a, 2001b), which estimates parameters using correction factors for the scarcity of ones in the population.

Results: Nuclear Power Plants

Table 3 lists the variables and their effects on the probability of a locality being chosen as a nuclear power host community. Rather than relying on the standard presentational form of lists of coefficients, I utilize simulation techniques and confidence intervals to produce more intuitive displays of the impact of variables on the probability of selection. Confidence intervals "express the appropriate degree of certainty around . . . quantities," whereas simulation techniques allow us to "extract the currently overlooked information" and "interpret and present it in a reader friendly manner" (King, Tomz, and Wittenberg 2000: 341). The quantity of interest at this point is the probability of a locality being selected as a host community for a nuclear power plant. This quantity is displayed in Figures 1 and 2 as a solid line, with dotted lines on either side representing the 95 percent confidence intervals. If we were able to go into "the real world" and decrease or increase the number of primary sector employees and the number of Liberal Democratic Party politicians thousands of times and observe the results, 95 percent of the time the results would fall within these boundaries.

I base my discussion on the results from the prior corrected estimators.[18] As predicted, authorities were most likely to attempt nuclear power plant sitings in communities with lower levels of community solidarity (i.e., experiencing higher population growth rates), poorer long-term primary sector employment health (i.e., higher decreases in the percentage of workers employed in the primary sector over the 1980 through 1995 period), and larger numbers of powerful politicians.

[18] Although prior corrected estimators are more suspect than weighted ones because of the possibility of model misspecification, in this case analytic limits prevented the proper calculation of estimators using the actual weight correction (i.e., 0016). The smallest weighting value that would resolve computationally was far larger, at .006, than the actual frequency in the population. See Appendix 3 for a discussion of weighting techniques.

This last result— the relationship between LDP politicians and selection for siting —overturns the conventional logic that such powerful politicians would lobby against "public bads" like nuclear plants from their constituencies; such representatives instead view nuclear power from the perspective of constituents such as local businessmen who focus on its economic benefits, not actual or potential negative externalities.

Unlike other variables, the presence of LDP politicians was robust across model specification (i.e., both the prior corrected and weight corrected models show this variable to have a significant impact on the probability of being selected). In many interviews (summer and fall 2002), LDP Diet members discussed their strong support for these projects, and powerful politicians like Tanaka Kakuei have openly discussed their successful drive to bring such projects into their electoral districts (Tanaka 1972, Schlesinger 1997: 72, 103). While folk theorems argue that these legislators will "protect" their constituents from such facilities, it could be that their own perceptions of the status and prestige that comes with the capture of such projects leads LDP members to seek them out. In many cases, local businesses envision nuclear power plants not as public bads, but as public goods because of the taxes, jobs, roads, and their accompanying subsidies. Furthermore, powerful LDP politicians can better survive protests against such facilities if in fact they miscalculated their constituents' interest in such a facility.

Table 3: Dependent Variable: Selection/Exclusion as Host for a Nuclear Power Plant

	Model 1 [Relogit with prior correction between .001 and .002]	Model 2 [Relogit with weighting correction of .006]
Town Area	-0.0000157	0.000111
	[0.0019216]	[0.0018197]
Population Density	-0.0023943	-0.0018552
	[0.0015205]	[0.0016444]
Community Solidarity	2.018476*	-0.535162
	[1.027516]	[1.891203]
Health of Primary Sector	-3.441199***	-0.882463
	[0.8514814]	[1.819029]
Health of Tertiary Sector	1.519598	-2.612767
	[1.535041]	[2.655742]
Over Time LDP support	1.926022	0.2777802
	[2.553749]	4.555265
District Magnitude	0.0441963	-1.275035***
	[0.3018687]	[0.4005419]
Number of LDP members in Lower House	-0.399843	2.092193***
	[0.363523]	[0.532573]
LDP Percentage in LH	1.037769	-13.96298*
	[3.063566]	[6.174132]
Presence of Prime Minister	-0.8063208	-0.0397009
	[0.6434047]	[0.8935713]
Post 1975	0.4827063	0.3119359
	[0.3695565]	[0.5370785]
Number of Socialists in LH	-0.1773547	-2.175102
	[0.6880509]	[1.659007]
Number of Communists in LH	0.7632002	0.0953348
	[1.055592]	[1.398485]
Number of Other Party Legislators in LH	0.1205899	-1.275728
	[0.6937363]	[1.320227]
Presence of Powerful LDP member	0.5879114*	0.4998335
	[0.269863]	[0.334296]
Constant	[-2.280829]	6.030094
	[2.733228]	[6.041846]

Note: N = 188. Robust standard errors in brackets. *** p < .001, ** p < .01, * p < .05

Figure 1: Poorer Primary Sector Health Increases Probability of Selection for a Nuclear Power Plant

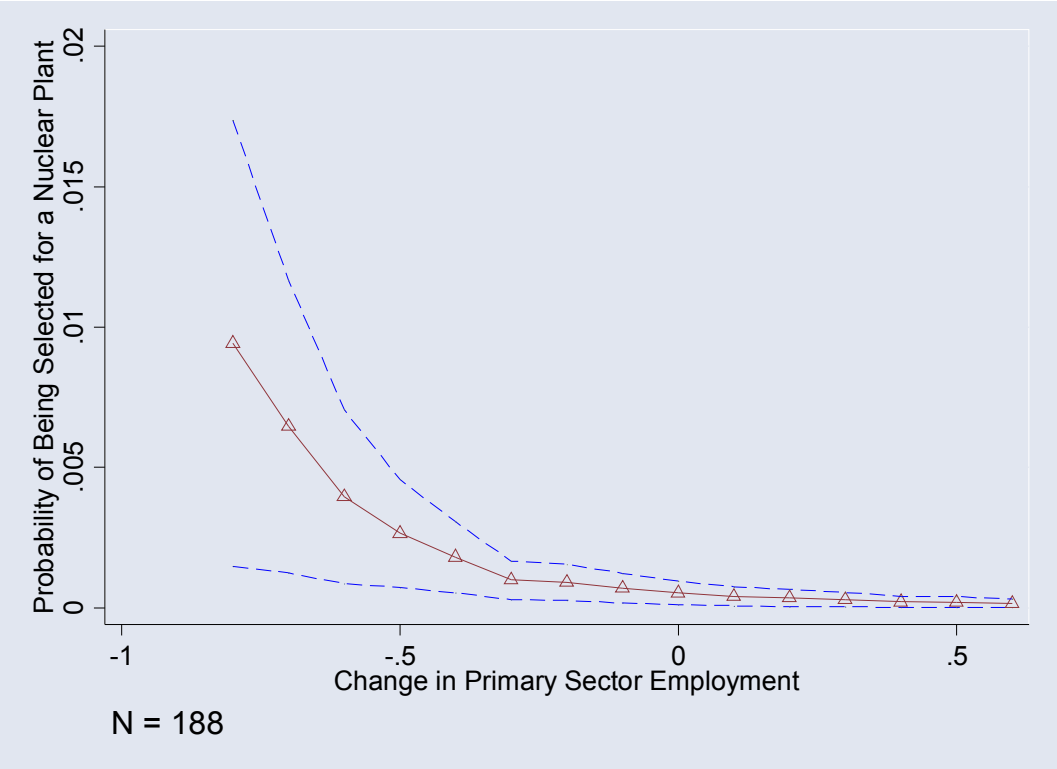
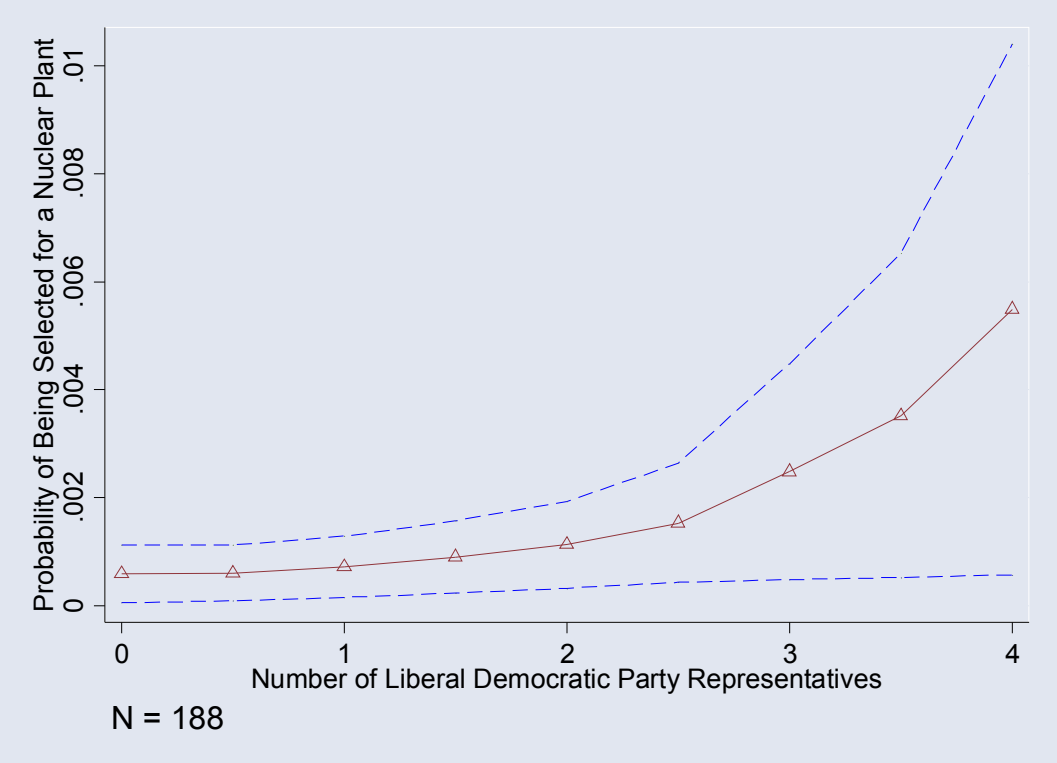


Figure 2: Presence of More LDP Politicians Increases Probability of Selection for Plant



Results: Dams

The results of weighting correction and prior correction in the subset of dam attempts (or lack therein) were robust across model specification. Table 4 displays the coefficients affecting the probability of being selected as a dam host community. In the process of dam siting, unlike that of nuclear power plant siting, few purely "political" variables impacted the probability of selection. In terms of being selected as a host community for a dam, the size of the locality and the time period in which the siting decision was made were the most significant factors affecting the decision to site or not to site.

I again utilize simulation and confidence intervals to extract information from the dataset and present it in a more intuitive way, with the probability of being selected as a dam host community as the quantity of interest. As shown in Figure 3, the larger the town area, the more likely the locality will be chosen for a dam project. On average, larger localities have more unused land than do smaller ones, and they have lower land prices overall than their smaller counterparts. It is not the case that larger localities have a better chance of being near a river, as all of included observations in the dam subset have a body of water nearby. Figure 4 shows that overall, communities in later time periods (after 1975) were more likely to be chosen for dams than in earlier periods. Interestingly, this contradicts speculation that Japan is gradually decreasing spending on public works projects.

Table 4: Dependent Variable: Selection/Exclusion as Host for a Dam

	Model 1 [Relogit with prior correction between .001 and .002]	Model 2 [Relogit with weighting correction of . 006]
Town Area	0.0051105**	0.0051528***
	[0.0012977]	[0.0011851]
Population Density	-0.0000638	-0.0000912
	[0.0002193]	[0.000398]
Community Solidarity	0.1297697	0.1655126
	[0.2830634]	[0.417229]
Health of Primary Sector	0.7894382	1.171101
	[0.7805406]	[0.7798565]
Health of Tertiary Sector	0.3365942	0.8859643
	[0.7919639]	[0.843149]
Over Time LDP support	2.073035	0.1281337
	[2.164651]	2.760633
District Magnitude	0.7099823	[0.4720244]
	[0.9735132]	1.574779
Number of LDP members in Lower House	-0.5413858	-0.1336308
	[1.074761]	[1.354895]
LDP Percentage in LH	0.2904191	0.4063363
	[2.876988]	[5.201376]
Presence of Prime Minister	0.3380155	0.1127903
	[0.4930462]	[0.4438634]
Post 1975	0.6347229*	0.8061179*
	[0.3138255]	[0.3560297]
Number of Socialists in LH	-1.064616	-0.7569844
	[1.058633]	[2.203684]
Number of Communists in LH	0.0746376	0.5717583
	[1.103335]	[2.366827]
Number of Other Party Legislators in LH	-0.3661992	0.0134069
	[1.061279]	[2.135231]
Presence of Powerful LDP member	0.032327	0.095559
	[0.1641244]	[0.2036702]
Constant	-2.542161	-7.416919
	[2.236267]	[4.078207]

Note : N = 213. Robust standard errors in brackets. *** p < .001, ** p < .01, * p < .05

Figure 3: The Larger the Town Area, the Greater the Probability of Receiving a Dam

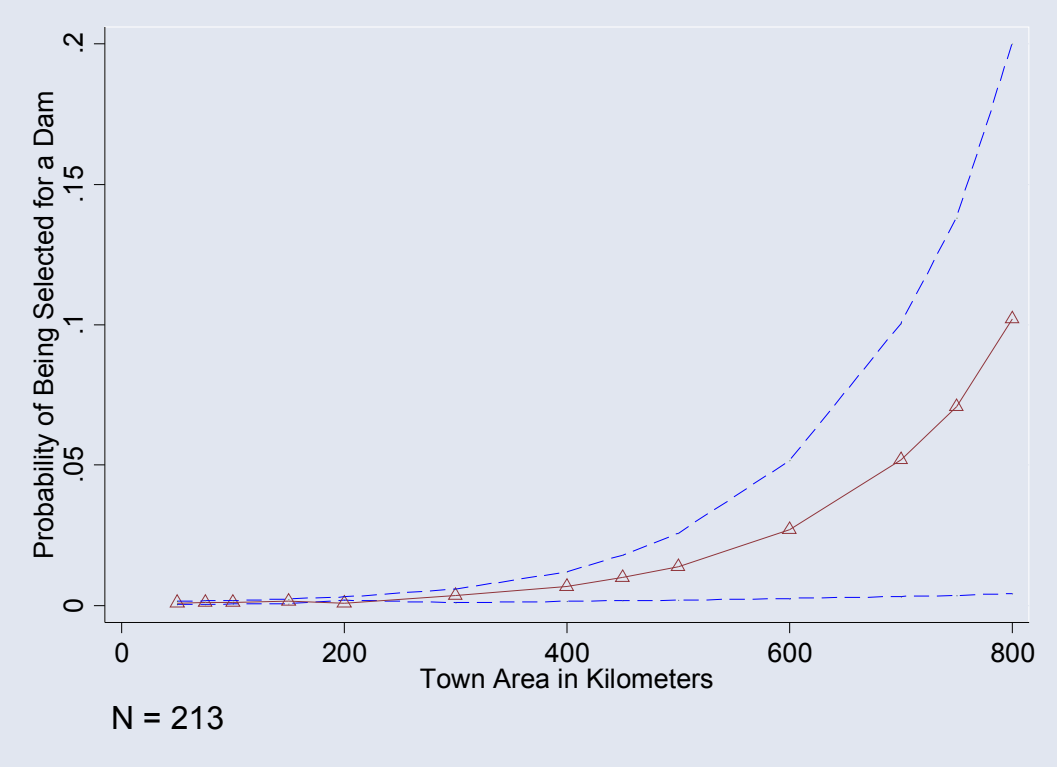
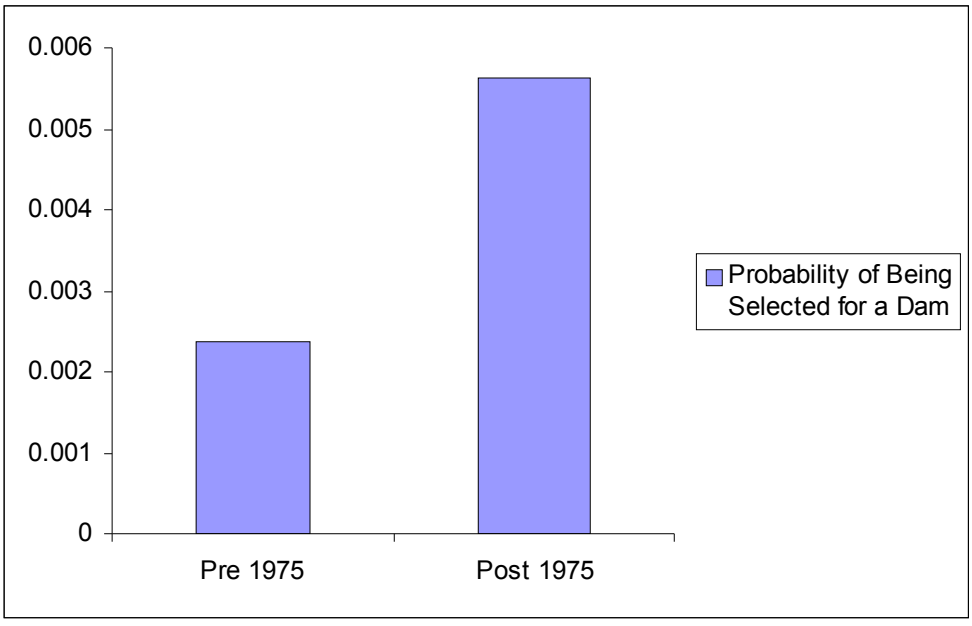


Figure 4: Increasing Possibility of Being Selected for a Dam after 1975



Results: Airports

Due to the small number of observations of localities suitable for airports (N<70), weighting correction at the actual population levels was impossible due to computational requirements. Hence again I rely on the prior corrected estimators despite warnings about possible model misspecification. Table 5 shows that the only significant variable affecting the probability of being selected for an airport was the health of the primary sector.

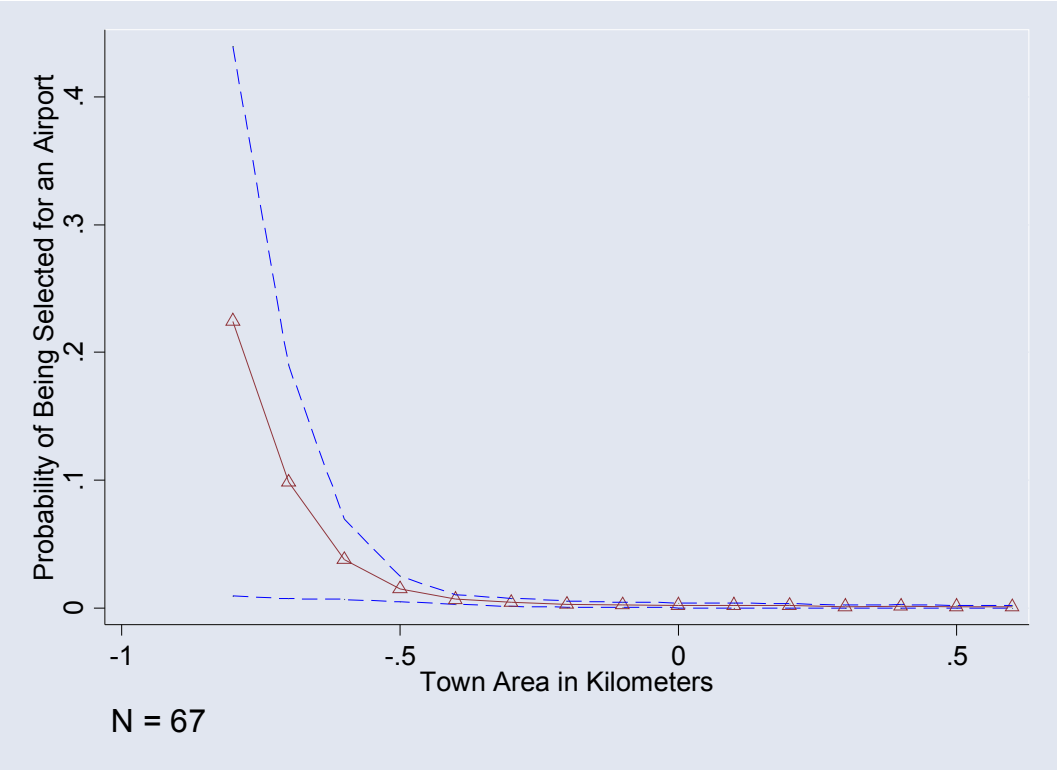
Figure 5 shows how a decrease in the percentage change of workers in the primary sector would increase the probability of being selected for an airport project. Analysts studying the controversial Narita Airport siting case in Japan long argued that the growing numbers of farmers in the area should have alerted state officials against choosing the area for an airport. In Chiba prefecture, the number of farmers and agricultural laborers living in the area selected for the airport had increased over the decades before the plan was announced. Immediately following the end of World War II, many demobilized soldiers and repatriated colonial families were brought to the Narita area to work on the land as farmers. These communities quickly mobilized to resist the siting of the airport, stalling its opening by more than seven years and engaging three decades of guerilla warfare and clashes with riot police that left eleven dead by the late 1990s.

Table 5: Dependent Variable: Selection/Exclusion as Host for an Airport

	Model 1 [Relogit with prior correction between .006 and .007]	Model 2 [Relogit with weight correction at .02]
Town Area	0.0026685	-0.0114217***
	[0.0017113]	[0.0028502]
Population Density	-0.000176	-0.0009157***
	[0.0001835]	[0.0002872]
Community Solidarity	1.11422	0.653198
	[0.7347707]	[1.182548]
Health of Primary Sector	-6.763098*	8.316285*
	[2.755124]	[4.034065]
Health of Tertiary Sector	-0.0197283	10.56112
	[2.949122]	[5.645787]
Over Time LDP support	-2.662085	-6.535855
	[3.178722]	[6.827932]
District Magnitude	-1.550993	2.864046
	[1.515747]	[2.174964]
Number of LDP members in Lower House	2.316377	-4.343267
	[2.253339]	[3.357152]
LDP Percentage in LH	-10.29229	25.80107
	[9.18572]	[15.51433]
Presence of Prime Minister	1.35614	-1.936381
	[0.9810549]	[1.792158]
Post 1975	0.5115897	-0.4788314
	[1.001225]	[1.942995]
Number of Socialists in LH	-0.2982026	2.135085*
	[0.7542541]	[1.010585]
Number of Communists in LH	-1.855931	2.87325
	[1.382495]	[2.422081]
Presence of Powerful LDP member	-0.6341802	-0.0243172
	[0.4500176]	[0.3872977]
Constant	6.143866	-14.48817
	[6.950549]	[12.53579]

Note: N = 67. Robust standard errors in brackets. *** p < .001, ** p < .01, * p < .05

Figure 5: Decreasing Health of Primary Sectors Increases Likelihood of Location Being Chosen for an Airport



Part II: Empirical Testing of Siting Outcomes

Having investigated the factors that determine whether or not a locality is selected for a siting attempt, I now turn my attention to the factors that make an attempt more or less likely to succeed. A village, town, or city may be chosen for an airport, dam, or nuclear power plant, but the project itself may come on line or be stalled or canceled, depending on local response. While some of the same overall factors may have an impact on the ability of the local citizens to successfully resist (or to embrace) their role as host for a controversial facility, additional factors may play a role. I now include a measure of extant public bads in the area to test the folk theorem that an area that already has a local public bad (e.g., a waste dump) is more likely to agree and also to be targeted to host another public bad (e.g., a waste incinerator) than a "greenfields" area that has no such facilities. Citizens who are accustomed to having a single nuclear power cooling tower block their ocean view do not object to a second one as strongly as occupants of a pristine landscape.

I also include a measure of the local mayor's party, arguing that a Liberal Democratic Part (LDP) or independent (*mushozoku* in Japanese) mayor will be more likely to go along with plans for a nuclear power plant, dam, or airport, than his Socialist or Communist counterpart. The third "new" variable for these tests is a measure of the number of LDP local councilmen. The logic is that the greater the number of LDP supporters on the town council, the more likely they are to approve such projects in an effort to improve the economy of their constituents.

The remainders of the variables are carry-overs from my initial investigation into the factors that determine selection or exclusion of a possible host community for such controversial facilities. I summarize these predictions in Table 6 below.

Table 6: Predicted Impact of Relevant Factors on the Success or Failure of a Siting Attempt (once initiated)

Factors Affecting Failure or Success of Siting Attempt	Predicted Impact
Presence of Other Local Public Bads	+
Mayor's Political Party	+
Number of Liberal Democratic Party/ Independents on Town Council	+
Community Solidarity	?
Town Area	+
Population Density	—
Health of Primary Sector	—
Over Time LDP support	—
District Magnitude	—
Number of LDP members in Lower House	—
LDP Percentage in LH	—
Socialists in LH	+
Communists in LH	+
Number of Other Party Legislators in LH	+
Presence of Powerful LDP member	—
Presence of Prime Minister	—
Post 1975	—

Note: + indicates increased chance of siting and success; - indicates decreased chance of siting and success; and ? indicates uncertainty as to the direction of the effect.

Empirical Results

At this point in the analysis, my dataset contains almost the entire universe of siting attempts of three types of controversial facilities in Japan. It is therefore no longer necessary to use rare event logit or other tools for weighting or re-weighting the dataset, because here the data within the sample matches that of the population in terms of event outcomes. As such, I use a standard logit regression, in which 0 indicates that siting attempt ended in a canceled or indefinitely stalled project (failure), with a 1 indicating that the project was completed and became operational (success). Further, because splitting the dataset by controversial facility type reduces the efficiency of my estimators and makes computation almost impossible ($N < 50$ for some subsets), I run all of the projects together in a single analysis. Three of the factors that strongly impacted the selection of a locality for a public bad also impacted the outcome of siting attempts: the health of the primary sector, the presence of powerful LDP members, and the time period during which the siting was attempted. A fourth factor, the density of other controversial facilities, also strongly influenced the outcome of the project.

Localities that already had taken on one or more other controversial facilities before the new facility was proposed were most likely to see the facility come to completion. An area that already has one nuclear power plant is far more likely to allow the siting of additional plants than those that have none. This may be due to a process of *habituation*, where local citizens become used to the risks that they encounter with the first project, so that additional projects no longer impose such large costs. Or, this could also indicate a sense of fatalism, where communities that already have one public bad imagine that they will not be able to stop future ones, which reduces their mobilization

and activism. Figure 6 demonstrates that the addition of one public bad from none increases the probability of the new facility being successfully completed by more than 20 percent. If the number of local public bads increases to two, the probability of future successes is all but assured for authorities. This behavior helps explain the large clusters of public bads, especially nuclear power plants, in Japan, where groups of six or seven reactors exist within the same community.

As mentioned in the previous section, the long-term presence of a powerful Liberal Democratic Party (LDP) politician from a locality *increased* that area's chances of being selected for a nuclear power plant. Overall, however, that same variable (a local *daijin*, usually a minister, secretary, or chancellor within the government who has served at least six consecutive terms of office) *reduces* the likelihood that such projects will be completed. LDP politicians in interviews described seeking out such facilities, believing them to be "rewards" for their loyal constituents. Subgroups of local residents in fact feel differently, and hence we have forecast failure at the national level. That is, while leading LDP politicians argue that nuclear power plants and other projects are not *meiwaku shisetsu* (projects that cause NIMBY-type reactions), they may be mistaken. More importantly, although LDP politicians may at first take credit for bringing in nuclear power plants, dams, and airports, if their seats become jeopardized due to a change in opinion, they might in turn fight against siting public bads in their area. . Politicians may be two-faced in their approach; like Janus, willing to sponsor their communities as hosts, but just as willing to fight against them if public opinion turns negative.

Facility siting attempted before 1975, as predicted, was more likely to succeed, perhaps because the consciousness of citizens had not yet been raised at that point in time. An increase in the percentage of people employed as farmers and laborers—those

most likely to be negatively impacted by these facilities—reduced the chances of siting success. Finally, as in the tests for selection or exclusion, communities with healthier primary sectors were more successful in preventing successful sites. Figure 7 shows how localities with less healthy primary sectors are more likely to have a completed project than those with increasing numbers of primary sector employees.

Table 7: Dependent Variable: Success/Failure in Siting Attempt for All Types

	Model 1 [logit analysis]	Model 2 [logit analysis]
Presence of Other Local Public Bads	2.368887*	
	[0.9679681]	
Mayor's Political Party	0.2425301	0.1366997
	[1.261637]	[1.283804]
Number of LDP / Independents on Town Council	-0.0239886	-0.0333584
	[0.0401633]	[0.0402233]
Community Solidarity	-0.5400528	-0.5777044
	[0.4201386]	[0.4062036]
Town Area	0.002433	0.0019448
	[0.0018589]	[0.0017432]
Population Density	0.0000379	1.15E-06
	[0.0002067]	[0.0001896]
Health of Primary Sector	-3.344827***	-4.229698***
	[1.059766]	[1.022031]
Over Time LDP support	-1.241406	-0.7761739
	[2.907144]	[2.916645]
District Magnitude	-0.6176901	0.1282838
	[0.6382258]	[0.5280253]
Number of LDP members in Lower House	1.624123	0.5723602
	[0.7710388]	[0.5656411]
LDP Percentage in LH	-3.404847	-0.6526714
	[3.914744]	3.576754
Number of Socialists in LH	0.7865613	[0.27705]
	[1.003612]	[0.9398569]
Number of Communists in LH	0.1654735	-0.4540887
	[1.127445]	[1.073996]
Number of Other Party Legislators in LH	0.5443941	0.2356109
	[1.004345]	[0.9451365]
Presence of Powerful LDP member	-0.8854523***	-0.907431***
	[0.2770745]	[0.280362]
Presence of Prime Minister	1.717986	2.048676*
	[0.8967404]	[0.881156]
Post 1975	-0.9101876*	-0.5506127
	[0.433951]	[0.4104166]
Constant	1.766092	0.3498249
	[3.211057]	[2.982406]

Note: Logit analysis, N = 208. Robust standard errors in brackets. *** p < .001, ** p < .01, * p < .05

Figure 6: Other Public Bads Increase Probability of Siting Success

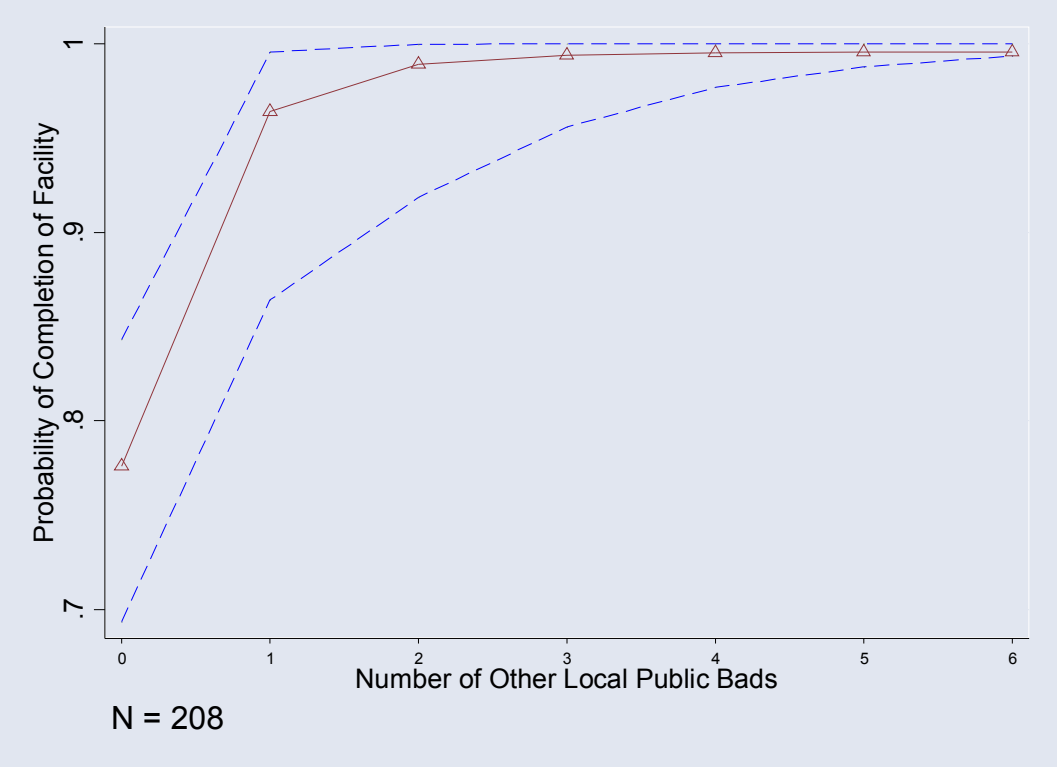
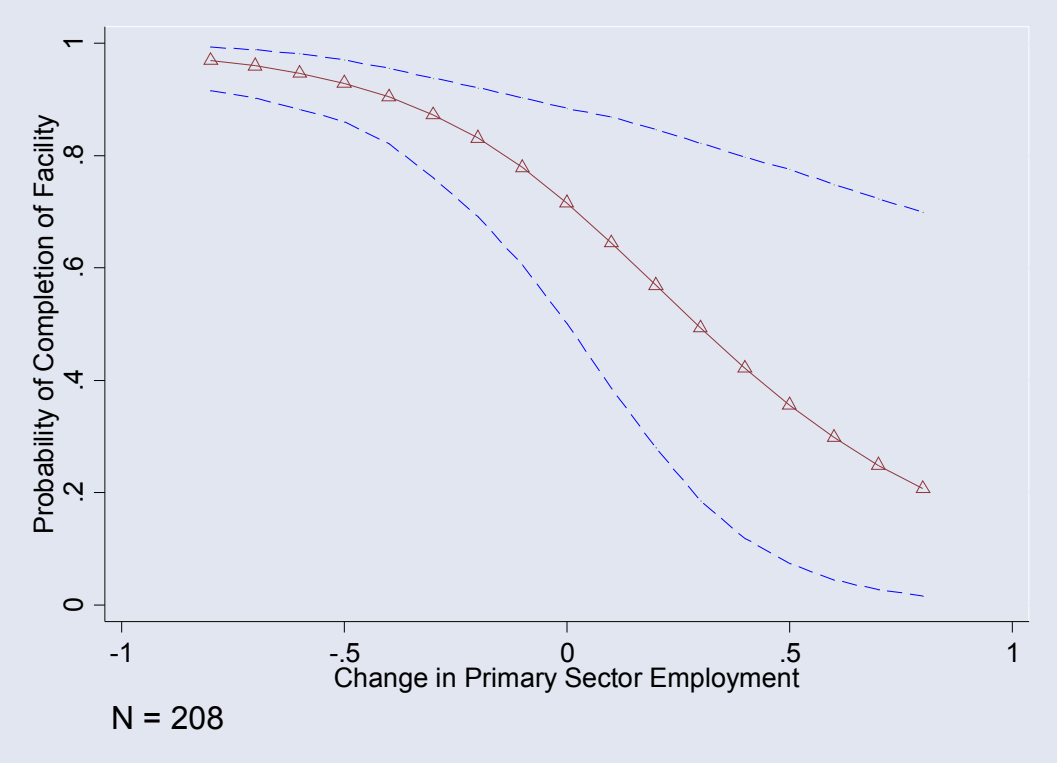


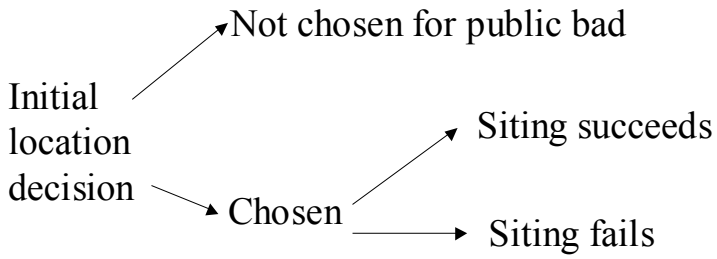
Figure 7: Better Health of Primary Sector Decreases Likelihood of Success



Final Check: Ordered Probit Analysis

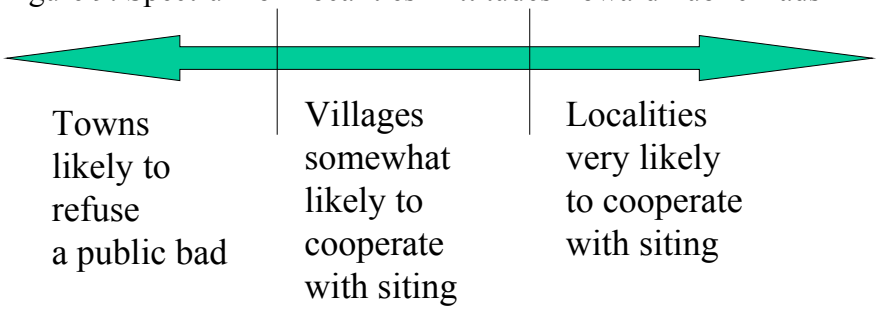
Until this point, I have portrayed the process of siting public bads as a two-stage process. In this approach, siting authorities make an initial decision to chose or exclude a locality from hosting a nuclear power plant, dam, or airport. If excluded, the locality is out of the picture. If included, there is another selection process in which local political, demographic, and temporal factors affect the outcome. The siting process then succeeds or fails. This paper used two separate (re)logit models to illustrate this two-stage approach to siting. Figure 8 below illustrates this process graphically.

Figure 8: Two-Stage Process



However, in interviews with bureaucrats and decision makers involved in siting, while some did describe the process as a two stage one, others viewed it more as a spectrum. Some authorities depicted the siting process as one involving a scale of cooperation, with some localities very willing to accept a public bad, others less willing, and one group of towns completely unwilling to do so. Figure 9 below details a range of localities from uncooperative to cooperative.

Figure 9: Spectrum of Localities' Attitudes Toward Public Bads



As a final confirmation to ensure that my estimates were not strongly affected by the model type because of the necessity of reweighting the rare logit events analysis, I carried out an ordered probit (*oprobit*) analysis with a three-category dependent variable. The three categories were: 0) not being selected for a controversial facility; 1) being selected for a controversial facility but failing to complete the project because of resistance; and 2) being selected for a controversial facility and allowing it to carry through to completion. The continuum ranged from a locality in which authorities would not attempt a siting because they believed the town would be resistant (or had been resistant in the past), to one in which they might be willing to site with some probability of failure, to a more or less guaranteed success. An ordered probit model might better capture the dynamics at work in the selection process. Because this dataset involves both siting attempts and non-siting attempts, I weight the analysis using frequency counts to better approximate the ratios of 1s (siting attempts) and 0s (no siting attempts) in the population.

The presence of local public bads significantly improved the chances of overall siting success, as did higher percentages of Liberal Democratic Party members and conservatives on the local town council. As in previous models, healthier primary sectors decreased the chances of a project moving forward, as did a larger number of Lower

House seats for that electoral district. Finally, as in previous analyses, the presence of a powerful LDP representative from a district in the legislature decreased the overall probability of success, while more LDP members increased those chances. The results of this analysis are shown in Table 8 on the following page.

Table 8: Dependent Variable: Three Category Ordered Probit (Exclusion, Selection but Failure, Selection and Success)

	Model 1 [Ordered probit], frequency weighting	Model 2 [Ordered probit, frequency weighting]
Presence of Other Local Public Bads	3.921356***	
	[0.2624769]	
Community Solidarity	-0.0998201	-0.0937
	[0.0559862]	0.053482
Town Area	0.0010165***	0.0009831***
	[0.0001551]	0.0001459
Population Density	0.0000755*	0.0000564
	[0.000034]	0.0000341
Health of Primary Sector	-0.2342978*	-0.5974035***
	[0.11941]	0.1142333
Over Time LDP support	-0.1166346	-0.024901
	[0.3459602]	0.3215685
District Magnitude	-0.3016826**	-0.0185262
	[0.117128]	0.0541128
Number of LDP members in Lower House	0.2614772*	-0.0265186
	0.1143754	0.0536079
LDP Percentage in LH	0.4705931	0.6726882
	[0.4626912]	0.4584925
Socialists in LH	0.290181	0.0244066
	[0.1578365]	0.1070194
Communists in LH	0.5150974**	0.2194517
	[0.1766289]	0.1316644
Number of Other Party Legislators in LH	0.3871931*	0.1353069
	[0.1521441]	0.1032651
Presence of Powerful LDP member	0.0222273	0.0318797
	[0.0292713]	0.0267817
Presence of Prime Minister	-0.0218248	0.0304579
	[0.0778091]	0.0686085
Post 1975	-0.0127818	0.0875193*
	[0.0490126]	0.0431301
First Cut Point	3.50557	3.787873
	[0.3781302]	0.3750124
Second Cut Point	3.608242	3.868937
	[0.3783734]	0.375172

Note: Robust standard errors in brackets. N=157937. *** p < .001, ** p < .01, * p < .05

Table 9: Actual Impact of Various Factors

Factors Affecting Failure or Success of Siting Attempt	Predicted Impact	Actual Impact
Presence of Other Local Public Bads	+	+
Mayor's Political Party	+	=
Number of Liberal Democratic Party/ Independents on Town Council	+	=
Population Change Until Siting Attempt	?	=
Town Area	+	=
Population Density	—	=
Primary Sector Employment Change	—	—
Over Time LDP support	—	=
District Magnitude	—	=
Number of LDP members in Lower House	—	=
LDP Percentage in LH	—	=
Socialists in LH	+	=
Communists in LH	+	=
Number of Other Party Legislators in LH	+	=
Presence of Powerful LDP member	—	—
Presence of Prime Minister	—	=
Post 1975	—	=

Note: + indicates increased chance of siting and success; - indicates decreased chance of siting and success; and = indicates no measurable impact. This chart is based on combined results from both the logit and oprobit analyses.

Future Research

Several analysts have underscored the importance of measuring the siting process not merely in terms of its "success" or "failure," but also in terms of the time necessary for siting. S. Hayden Lesbirel's analysis of siting times in the Japanese energy field identified a number of factors that impacted the length of time necessary for siting energy plants (Lesbirel 1998). This dataset measures the duration of the siting attempt, and future research should more closely examine how this measure ties into arguments about the impact of various factors. Additionally, this analysis focused primarily on the "demand side" of the policy process; that is, the affect of various interest groups upon the siting of controversial facilities (cf. Shepsle 1982). Future research should expand beyond this initial approach to take the bureaucracy and developer more seriously. Similarly, this analysis also raises questions about the instruments used by siting authorities in interaction with local interest groups, such as redistributive policies and negotiations.

Conclusions

Despite the pressing and urgent problems of local resistance to large scale, often noxious facilities, work to date has not provided statistically-significant measures of the impacts of factors on such attempts. Through a new dataset and multiple analytical techniques, I have attempted to advance our knowledge of the factors that affect the exclusion or inclusion of a locality as a possible host community for a controversial facility, along with those factors that affect the outcome of that attempt. The majority of the variables often cited by the literature on NIMBY-causing facilities had no measurable impact on this study. For example, the argument that long-term hegemonic parties site public bads

in areas with higher concentration of opposition party support (Ramseyer and Rosenbluth 1989) was not backed up by this analysis. Similarly, arguments that the size of district magnitude or the party of the local mayor should impact selection and/or success were not supported. However, several political factors did bring about a higher probability of selection as a host community along with a better chance of the proposed project being completed. One overall lesson from this paper is that "politics" matters more for facilities that have greater externalities, such as nuclear power plants, than others with lower burdens for host communities, such as dams and airports.

Those factors that were supported as significant included health of the primary sector, the presence or absence of other public bads in the community, and the concentration of powerful politicians. This paper suggests that we should look closely at local-level political and demographic phenomena rather than national-level characteristics (Cohen, McCubbins, and Rosenbluth 1995) in our investigations of controversial facilities. Localities with healthier, long-term populations of veto players, such as fishermen and farmers, are more likely to resist both selection for siting and siting itself, while those experiencing a loss of such populations are more likely to receive and to accept such facilities. Similarly, once initial resistance has been overcome and a facility sited there, future facility sitings are far easier. The siting of the initial public bad is crucial in determining the long-term cooperation of the locality for future ones.

The core elements that influence facility siting revolve around local veto players (especially fishermen and farmers) and potential host communities' LDP representatives in the Diet. Counterintuitively, rather than keeping public bads out of their constituents' districts, LDP politicians act like magnets, bringing in nuclear power plants to their home areas. These differences in preferences are important in mapping out the effects of these

interest groups on national policy. It is clear that the government considers local special interest groups when choosing which localities will host its dams, nuclear power plants, and airports. While bureaucrats may claim that "neutral" technical criteria, such as geological and geographical factors, play a major role in their decisions, this analysis has not supported such arguments. Instead, state planners closely monitor local communities through focus groups, interviews with important opinion holders, feedback from politicians, and visits to potential host communities, in an attempt to determine where resistance will be lowest.

Despite the best-laid plans based on local characteristics, however, siting attempts are often met by opposition, even if only from short-lived, single-issue social movements. How will bureaucratic agencies like the Japanese Ministry of International Trade and Industry handle resistance from important local actors like fishermen and farmers? Do such bureaus rely on coercive tools like expropriation and police suppression, or do they instead seek to create policy instruments specifically targeted at these groups? Does their monitoring of preferences when choosing locations for public bads mirror a concern for preferences in their responses to contention? Future work should investigate how bureaucracies within industrial democracies handle the almost inevitable contestation that accompanies the siting of controversial facilities through a variety of policy instruments and strategies.

Appendix 1) Data Sources

Political Data

Steven Reed, *Shūgiin Giin Sōsenkyo Kōhoshabetsu Tokuhyō Kekka* 1947 – 1995 [Japan Election Data, House of Representatives, 1947 – 1995], Takayoshi Miyagawa, *Shō senkyoku Handobukku* [Handbook of Single Member Constituencies] (Tokyo: *Seiji Kōhō Senta* [Center for Political Public Relations], 1996), and direct surveys of mayoral offices, gubernatorial offices, and fishing cooperatives (carried out by the author, June 2002 – September 2003).

Facility Data

Direct surveys of local ministerial offices and controversial facility siting authorities (by the author June 2001 – September 2001 and June 2002 – September 2003), *Genshiryoku shiryō jōhō shitsu* [Citizens' Nuclear Information Center, CNIC], *Genshiryoku shimin nenkan 2002* [Citizen's yearbook on nuclear energy] (Tokyo: CNIC, 2002), *Hangenpatsu Undō Zenkoku Renraku kai* [National Anti-Nuclear Liaison Group], *Hangenpatsu Shinbun* [Anti-Nuclear Newspaper]. (Tokyo: *Hangenpatsu Undō Zenkoku Renraku kai* 1978 – 1998), *Asahi Shinbun* [Asahi Newspaper], *Asahi Shinbun Sengo Midashi Sakuin* [Asahi Newspaper Headline Database 1945 – 1995] (Tokyo: Asahi Shinbun), *Nihon Damu Kyōkai* [Japan Dam Federation], *Damu Nenkan* [Dam Yearbook] (Tokyo: *Nihon Damu Kyōkai*, various years), and from http://www.mlit.go.jp/koku/04_outline/01_kuko/01_haichi/index.html.

Demographic Data

Tōyō Keizai Shinpōsha, Jinkō tōkei sōran: kokusei chōsa shūtaisei [Population Statistics of Japan: Summary of National Censuses and other Surveys, 1872 – 1984] (Tokyo: *Tōyō Keizai Shinpōsha*, *1985*), *Sōmuchō Tōkeikyoku* [Statistics Bureau, Home Affairs Ministry], *Nihon no Jinkō: Heisei Ninen Kokuseichōsa Saishūhōkokusho* [Population of Japan: Final Report of the 1990 Population census] (*Tokyo*: Sōmuchō Tōkeikyoku, 1995), *Sōmuchō Tōkeikyoku* [Statistics Bureau, Home Affairs Ministry], *Nihon no Jinkō: Heisei Nananen Kokuseichōsa Saishūhōkokusho* [Population of Japan: Final Report of the 1995 Population census] (Tokyo: *Sōmuchō Tōkeikyoku*, 2000), *Sōmuchō Tōkeikyoku* [Statistics Bureau, Ministry of Home Affairs], *Heisei Jūninen Kokuseichōsa Saishūhōkokusho Jinkōsōsū, Dai ichi maki* [Total Population: 2000 Population Census of Japan, Volume 1] (*Tokyo*: *Sōmuchō Tōkeikyoku* 2002)

Geologic and Geographic Data

Nihon Daiyonki Gakkai hen [Japan Association for Quaternary Research], ed. *Nihon Daiyonki chizu* [Quarternary Maps of Japan]. (Tokyo: Tōkyō Daigaku Shuppankai, 1987), International Society for Educational Information, *Atlas of Japan: Physical, Economic, and Social* (Tokyo: International Society for Educational Information, 1970), and electronic GIS databases available at http://www.cast.uark.edu/jpgis/

Appendix 2) Variable Proxies

I measure the presence of hegemonic and opposition party legislators through data on the number and percentage of such representatives in the Lower House of Parliament. I measured over-time support for the Liberal Democratic Party by compiling a yearly, prefectural index of votes for LDP candidates in the Upper House and average each area's "score" between 1956 and 1989.[19] I used Upper House election data as opposed to Lower House elections data for three main reasons. First, upper House elections take place at regularly-scheduled intervals, and their outcomes are not endogenous with election timing, as is often a problem with Lower House elections. Second, unlike the Lower House electoral processes, Upper House elections are non-personalistic and are seen to reflect party interest, not personal voting. Finally, Upper House election data maps well onto prefectures thanks to the SNTV districting procedures. To analyze the effect of powerful hegemonic politicians, I tracked the number of politicians in the LDP serving six terms or longer in the Lower House. Those who do so are often referred to as *daijin* (cabinet level politicians in Japanese) because long-tenure candidates regularly gain seats within the cabinet. I separately measured the presence or absence of Prime Ministers from these localities.

I measure the health of the primary sector as the rate of change in employment in the percentage of workers employed in the primary sector from 1980 through 1995, during which 70 percent of the nuclear power plant siting attempts took place; the remainder took place in the 1960s and 1970s. Even for earlier attempts, this variable still measures the long-term viability of occupations in the first sector. For analysts concerned that this proxy measure obfuscates the exactly-opposite causal relationship—instead of

[19] Rob Weiner and Ross Schaap assisted in the creation of this measure.

serving as an independent variable that effects exclusion of localities, the health of the primary sector should be a dependent variable that is effected by the siting of public bads — I carried out a test using propensity matching scores and average treatment effects to ensure that this was not the case.

Propensity score matching of concomitants to produce balance between control and treatment groups provides an alternative to standard analysis techniques, even in observational studies (Rosenbaum and Rubin 1983, 1985; Angrist and Krueger 1999: 1314- 1315). Propensity score matching, in which we attempt to match observations in the treatment group (e.g., those that receive nuclear power plants) with those in the untreated group (those that do not), brings with it a number of benefits. Creating treated and control groups that are as similar as possible theoretically reduces the bias in estimators by controlling for confounding factors (Becker and Ichino 2002, Imai and Van Dyk 2003). That is, instead of comparing apples to oranges, matching allows us to focus on the treatments effect on two groups of apples. Further, matching "does not require restrictive functional form assumptions common to usual regression analysis" (Imai forthcoming: 2). Additional merits of matching methods are their transparency in statistical identification (Angrist and Krueger 1999: 1315) and the observation that non-technical audiences often find it "a persuasive method of adjusting for imbalances in observed covariates" (Rosenbaum and Rubin 1985: 33). We estimate average treatment effects (ATE) on the treated units "by averaging within match differences in the outcome variable between the treated and untreated units" (Abadie and Imbens 2002: 1).

Using nearest neighbor matching, the standard average treatment effect of siting a public bad on the percentage change in primary workers over the 1980 to 1995 period was -.0665, a figure statistically significant at the .003 level. That is, the placement of a

nuclear power plant, dam, or airport in a locality is responsible, on average, for a decrease of less than 7 percent in the employment rates of their farmers and fishermen. There is a feedback effect on local fishermen and farmers from siting, but it is a minor one. For example, all other factors equal, a 7 percent decrease in the concentration of workers in the primary sector has little effect on the probability of selection as host community; the threshold effect for locational inclusion for nuclear power plants, in contrast, is closer to 30 percent. In some of the more extreme cases, there has been almost total loss of the primary sector. Given that the average locality in this dataset saw a decrease of *thirty percent* in its primary employment over that time period, I believe that concern about reverse-causality is misplaced. Public bad siting is primarily a function of the health of the primary sector, and not vice versa.

Appendix 3) Data Set Creation Methodology

The observations in my dataset where Y = 1 constitute the entire universe of attempted siting cases of nuclear power plants and airports in which the Japanese central government acted as an entrepreneur and/ or founder of the project, and half of the dam cases where the state played a similar role (dam cases were selected at random). I chose airport, dam, and nuclear power plant siting attempts because of the resistance the government potentially faces in attempting to build these large-scale facilities in or near local communities. Local, regional, and national citizens' and social movements have formed in opposition to these projects, and in some cases protestors and challengers have used violence as a strategy. The balance of observations where Y = 0 (where no siting was attempted) and Y =1 (where the government sought to locate a facility in the locality) within the dataset was approximately .5, hence the "equal shares" method ($\hat{Y}$ = .494).

I matched the set of cases where authorities attempted siting against those where no siting had occurred temporally, geographically and geologically. Analysts who build observational datasets without ensuring that their cases involve "apples and apples," as opposed to dissimilar subject samples, do so at their peril (see Rosenbaum and Rubin 1985, Reiter 2000). In matching the observations where Y= 0, I followed the explicit decision heuristics of siting authorities according to both interviews and archival records. To assist my selection of cases where no siting attempt had occurred, I relied upon both geographic information systems (GIS) data and extensively detailed geological and geographical maps of Japan. Accordingly, areas where nuclear powers plants could potentially be sited met four geologic, geographic, and demographic criteria: 1) solid bedrock (and not alluvial plain) to ensure aseismicity; 2) distance from large population centers, such as Osaka and Tokyo; 3) proximity to water, so that cooling towers could

draw in seawater to dissipate heat from the nuclear reactors; and 4) relatively low population density to ensure the evacuation plans would be feasible. I excluded a number of landlocked prefectures from the nuclear power plant potential sample subgroup of the Y = 0 set because of their lack of access to seawater (Tochigi, Gunma, Saitama, Yamanashi, Nagano, Gifu, Nara), because of ground quality (Toyama), and an additional one because of the need for evacuation plans (Tokyo). Potential host communities for dams and similar water projects (river gates, rerouting, etc.) required, obviously, bodies of water, and, when possible, bodies of water that extended across prefectures. (The central government is most likely to build dams on "first grade" rivers.) Thus, I excluded Fukuoka and Nagasaki prefectures from possible dam locations. Airports required proximity to large urban centers that would generate demand for such facilities, along with suitable geographic conditions. (Whole prefectures were not excluded from the possible airport siting location subset.)These balancing cases also matched the Y=1 cases in terms of time; hence observations match on both spatial and temporal axes (i.e., each case of an actual siting attempt is balanced by a non event, so that in a given year both localities are equally suitable for siting a controversial project).

Appendix Table 1 summarizes the X variables for sited and unsited cases.

Appendix 4) Weighting Correction

There are two main methods for correcting estimates when one selects on the dependent variables: 1) prior correction and 2) weighting. Such additional techniques must be employed to "compensate for differences in the sample ($\hat{y}$) and population (τ) fraction of ones induced by choice based sampling" (King and Zeng 2001a: 144). While the dataset contained a ratio of Y=1 to Y= 0 of 1:1, the actual population of cases is closer in nuclear power plants to 1:600, while in dams it is closer to 1:888, and the ratio for airports is closer to 1:144. That is to say, when a nuclear power plant was sited in year 19XX, there were 600 other localities with the same suitable geographic and geologic criteria that were not selected. I calculated the population of 1s to 0s in the actual population; that is, the fraction of localities in Japan that met geographic and geologic criteria using GIS data and existing geographic and geological maps, for each type of facility. Those estimations allow me to re-weight the dataset to create a population roughly equivalent to that found in the field. Because prior corrections require proper model specification, the outcome is slightly disadvantageous when compared to weighting (Xie and Manski 1989).

Appendix Table 1: Comparison of X Variables for Sited and Controlled Groups, Nuclear Suitable Municipalities

Nuclear Power Plants	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Town Area	93.00	106.51	83.12	95.00	99.24	102.72
Population Density	93.00	214.94	323.46	95.00	384.27	429.13
Population Change Until Siting Attempt	93.00	-0.15	0.26	95.00	-0.12	0.24
Population Change until 2000	93.00	-0.10	0.64	95.00	-0.20	0.38
Population At Attempt	93.00	18565.32	30096.54	95.00	28762.80	54660.00
Primary Sector Employment Change	93.00	-0.44	0.23	95.00	0.22	0.20
Secondary Sector Employment Change	93.00	0.19	0.17	95.00	0.13	0.16
Tertiary Sector Employment Change	93.00	0.10	0.14	95.00	0.05	0.12
Over Time LDP support	93.00	0.55	0.06	95.00	0.52	0.08
District Magnitude	93.00	3.96	0.85	95.00	4.06	0.81
Number of LDP members in Lower House	93.00	2.63	0.83	95.00	2.54	0.77
LDP Percentage in Lower House	93.00	0.69	0.19	95.00	0.65	0.17
Number of Socialists in LH	93.00	0.87	0.56	95.00	1.02	0.55
Number of Communists in LH	93.00	0.04	0.20	95.00	0.07	0.26
Number of Other Party Legislators in LH	93.00	0.33	0.66	95.00	0.34	0.58
Presence of Powerful LDP member	93.00	1.98	0.88	95.00	1.78	0.94
Presence of Prime Minister	93.00	0.11	0.31	95.00	0.13	0.33
Party of the Governor	93.00	0.99	0.10	93.00	0.94	0.25
Post 1975	93.00	0.44	0.50	95.00	0.33	0.47

Note: Locations where siting was attempted are on the left, those where no siting was attempted are on the right.

Appendix Table 2: Comparison of X Variables for Sited and Controlled Groups, Dam Suitable Municipalities

Dams	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Town Area	108.00	210.99	173.77	105.00	117.17	127.92
Population Density	108.00	359.57	1048.41	105.00	588.35	1542.92
Population Change Until Siting Attempt	108.00	0.01	0.68	105.00	0.16	1.19
Population Change until 2000	108.00	0.05	1.18	105.00	0.19	1.51
Population at Attempt	108.00	32111.53	75021.20	105.00	31707.80	72051.46
Primary Sector Employment Change	108.00	-0.29	0.20	105.00	-0.31	0.21
Secondary Sector Employment Change	108.00	0.19	0.20	105.00	0.14	0.25
Tertiary Sector Employment Change	108.00	0.09	0.16	105.00	0.06	0.21
Over Time LDP support	108.00	0.52	0.08	105.00	0.51	0.08
District Magnitude	108.00	4.21	0.81	105.00	4.16	0.84
Number of LDP members in Lower House	108.00	2.55	0.90	105.00	2.59	0.88
LDP Percentage in Lower House	108.00	0.60	0.19	105.00	0.62	0.18
Number of Socialists in LH	108.00	0.91	0.65	105.00	1.04	0.65
Number of Communists in LH	108.00	0.16	0.37	105.00	0.08	0.27
Number of Other Party Legislators in LH	108.00	0.62	0.75	105.00	0.48	0.77
Presence of Powerful LDP member	108.00	1.51	1.12	105.00	1.58	1.10
Presence of Prime Minister	108.00	0.12	0.33	105.00	0.11	0.35
Party of the Governor	108.00	0.94	0.23	105.00	0.95	0.21
Post 1975	108.00	0.51	0.50	105.00	0.42	0.50

Note: Locations where siting was attempted are on the left, those where no siting was attempted are on the right.

Appendix Table 3: Comparison of X Variables for Sited and Controlled Groups, Airport Suitable Municipalities

Airports	N	Mean	Standard Deviation	N	Mean	Standard Deviation
Town Area	32.00	168.99	184.83	39.00	111.50	125.13
Population Density	31.00	1567.54	3003.21	38.00	884.76	1673.53
Population Change Until Siting Attempt	29.00	0.23	0.50	38.00	0.13	0.53
Population Change until 2000	29.00	0.92	1.00	38.00	0.74	1.35
Population at Attempt	29.00	110477.70	150155.10	38.00	34604.00	51143.57
Primary Sector Employment Change	32.00	-0.44	0.17	39.00	-0.34	0.16
Secondary Sector Employment Change	32.00	0.12	0.16	39.00	0.09	0.11
Tertiary Sector Employment Change	32.00	0.04	0.10	39.00	0.02	0.10
Over Time LDP support	32.00	0.46	0.10	39.00	0.49	0.10
District Magnitude	32.00	4.00	0.72	39.00	4.10	0.75
Number of LDP members in Lower House	32.00	2.34	0.87	39.00	2.64	0.71
LDP Percentage in Lower House	32.00	0.59	0.21	39.00	0.66	0.18
Number of Socialists in LH	32.00	1.28	0.63	39.00	1.21	0.61
Number of Communists in LH	32.00	0.06	0.25	39.00	0.08	0.27
Number of Other Party Legislators in LH	32.00	0.31	0.59	39.00	0.18	0.45
Presence of Powerful LDP member	32.00	1.13	0.75	39.00	1.49	0.79
Presence of Prime Minister	32.00	0.06	0.25	39.00	0.13	0.41
Party of the Governor	32.00	0.97	0.18	39.00	1.00	0.00
Post 1975	32.00	0.09	0.30	39.00	0.08	0.27

Note: Locations where siting was attempted are on the left, those where no siting was attempted are on the right.

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