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Explaining the Political Outcomes of Social Movements: Anti-Nuclear Energy Mobilization in 18 OECD Countries before the Chernobyl Accident[1]

- Second Draft -

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Explaining the Political Outcomes of Social Movements: Anti-Nuclear Energy Mobilization in 18 OECD Countries before the Chernobyl Accident

Abstract:

This article argues that we can substantially improve our ability to explain movement outcomes by not omitting independent variables and by theorizing the causal processes of political change. Based on this formula the impact of the anti-nuclear energy movement across 18 OECD countries is examined using quantitative and qualitative methods in a nested research design. Results show that the viability of movement goals, public opinion, elite conflict, and political institutional structures determined the impact on nuclear programs, but the relevance of different political opportunities were contingent on the goal pursued by the movement. Different combinations of causal mechanisms are demonstrated to have caused the reductions in nuclear program size across countries. Whether anti-nuclear mobilization succeeded in activating a causal mechanism, depended on the presence of certain opportunities, on which the political effectiveness of different tactics is dependent.

INTRODUCTION

When and why are social movements successful in their struggle for social and political change? When and why do they fail? These probing questions not only occupy the minds of activists, but also became an important topic in social movement research when Frances Fox Piven and Richard Cloward (1977) asked why movements succeed, and how they fail. Despite the widely held belief that social movements have important consequences– or maybe because of it – very little attention was devoted to the study of movement outcomes in the 1970s and 80s (Marx and Wood 1975; McAdam, McCarthy and Zald 1988). Reviews of the subject frequently concluded with complaints that we still know little about the impact of social movements on social and political change, or that the study of the movement consequences is one of the most neglected topics in the literature (Burstein, Einwohner and Hollander 1995; Giugni 1999; Gurr 1980). However, as Giugni (1998) stated and Amenta and Caren (2004) more recently confirmed, social scientists have published much more on the outcomes and consequences of social movements than some scholars would have us believe. Unfortunately, the mere number of studies cannot be considered as an indicator for the increase in our systematic knowledge about the political outcomes of social movements. Although the literature on social movement outcomes has grown quickly over the last years, it has not contributed to the same extent to the accumulation of a core consensus about the factors shaping the political outcomes (Kolb 2005). I believe that at least three factors are responsible for this development:

First, the field still lacks a comprehensive and widely accepted theory of social movements and political change, and consequently there exists no consensus about which explanatory variables have to or at least should be included in empirical research. Therefore, it often seems quite arbitrary why some independent variables are included in a specific study but are left out in a study with an almost identical research question. For example, whereas studies of

the gay and lesbian movement are generally sensitive to the influence of public opinion (e.g. Haider-Markel 1999; Kane 2003), many studies on the women's movement simply ignore it as a potential explanatory factor (e.g. Outshoorn 2004; Weldon 2002).

Second, in particular our knowledge of the processes through which political or social change can be caused by social movements is pretty limited (Andrews 2001; Earl 2000; McAdam and Su 2002; Meyer 2005). Most studies have ignored, or at least underspecified, the causal links between external, non-movement factors and movement characteristics such as strength and strategies on the one hand, and political change on the other. It is not only unsatisfying when mere correlations are presented as explanations, but such "correlational analysis provides a weak foundation for integrating diverse quantitative finding into a single coherent framework that can sustain knowledge accumulation" (Mahoney 2001).

Third, the empirical scope of some of the research – in particular cross-national – is so limited that its findings can hardly be generalized beyond the cases studied, or must even be considered as inconclusive (e.g. Breyman 2001; Carter 1997; Franceschet 2004; Linders 2005; Nathanson 1999). These studies are only based on one or less than a handful of empirical cases, which often leads to indeterminate research designs, because the studies make more causal inferences than there are observations at hand (King, Keohane and Verba 1994). In addition by overwhelmingly restricting their cases to strong and / or political successful movements scholars inserted a collective selection bias into the study of movement outcomes (cf. Geddes 1990).

Although the anti-nuclear energy movement has attracted many extensive efforts to explain its political outcomes, it is no exception to these rules (cf. Campbell 1988; Flam 1994b; Giugni 2004; Kitschelt 1986; Kriesi et al. 1995; Rucht 1990). As I will show in this article, by regularly omitting public opinion and elite conflict as explanatory variables the literature overemphasized political opportunity structures in determining the outcomes of anti-nuclear

mobilization. Because previous studies didn't pay sufficient attention to the causal dynamics of political change, some scholars have questioned, whether the observed reductions in nuclear programs were indeed caused by anti-nuclear mobilization (Jasper 1990; Nichols 1987). In addition we don't know which of the tactics used by anti-nuclear activists proved to be political effective. Almost all of the previously conducted studies are based on four or even fewer cases (e.g. Delmas and Heiman 2001; Giugni 2001; Jasper 1990; Kitschelt 1986; Kriesi et al. 1995; Oppeln 1989; Rucht 1994b). In addition, almost all of these comparisons have included all or some of the same four countries – namely France, Germany, Sweden, and the United States. In contrast countries which experienced a less significant conflict over nuclear power such as Austria, Belgium, Canada, Denmark, Ireland, Italy, Japan, or Norway were never or at least rarely analyzed in comparative studies.

Using the anti-nuclear movement as an example, I will demonstrate that we can substantially improve our understanding of movement outcomes by overcoming the flaws of previous research. To avoid an indeterminate research design and selection bias, I made my case selection as inclusive and diverse as possible. I was able to include eighteen countries in my comparative design. These countries are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Great Britain, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, and the United States.[2] I will explain the deviations between the indented and realized capacities of the nuclear programs of these countries conducting a nested

[2] I started from the whole universe of the thirty highly industrialized democracies in the OECD today. I decided to drop the former communist OECD member countries, because they never experienced an anti-nuclear mobilization in the 1970s and 1980s. The scope and the design of this study made it unavoidable to rely heavily on existing secondary sources as case studies. Due to the lack of high quality studies in English on the involvement of the anti-nuclear energy movement in the nuclear energy conflict, I had to drop eight additional countries. These countries are Australia, Greece, Iceland, South Korea, New Zealand, Turkey, Mexico, and Portugal.

analysis, which combines statistical analysis of a (relatively) large sample of cases with the more in-depth investigation with a few cases contained with the large sample (Lieberman 2005).

In order to ensure that my research design includes all relevant explanatory variables, I will review the literature on movement outcomes to propose nine explanatory hypotheses. These hypotheses will be tested in a subsequent section by quantitative statistical analysis. In order to explain how anti-nuclear mobilization could influence nuclear program development I will suggest three causal mechanisms of political change – the disruption, the judicial and the public preference mechanism. I will propose three additional hypotheses, which specify the conditions under which these mechanisms can be activated by social movements. Relying on several case studies I will show that the political outcomes of anti-nuclear mobilization were indeed caused by a combination of these mechanisms.

SOCIAL MOVEMENTS AND POLITICAL CHANGE – A PARTIAL THEORY

What makes some social movements more successful and politically influential than others? It is possible to identify two different theoretical traditions concerned with this question – one focusing on factors internal to movements and the other one on external factors – which were initially seen as competing approaches (Giugni 1998). The first approach assumes that the strength and strategies of a social movement determine the scope and the nature of the political change it can achieve (e.g. Brill 1971; Gamson 1975; Lipsky and Levi 1972). This approach is based on the so-called *direct-effect model* of social movement outcomes, which maintains that movements can have an impact on policy making with their own forces without external support (Giugni 2004). The second approach argues that the political impact of social movements is overwhelmingly context-dependent, thus contingent on political and/or economic opportunities (e.g. Jenkins and Perrow 1977; Kitschelt 1986; Piven and Cloward 1979). Authors in this tradition do not agree on one model of movement impact. Some favor

the *indirect-effect model*, which sees movements exerting their influence through a two-stage process (Giugni 2004). Certain aspects of the political environment, which were previously influenced by social movements in the first step, are assumed to actually cause political change in the second step. In contrast the *joint effect* or *political mediation model* states that movements can only bring about political change if external opportunities intervene with mobilization (Amenta, Carruthers and Yvonne 1992; Giugni 2004). Which of the three models best seem to fit reality will be also examined in the empirical part of the article. In order to develop hypotheses explaining the impact of anti-nuclear mobilization, I will identify a series of internal and external independent variables, which have been consistently proved to have explanatory power in past research. I will also briefly discuss whether these variables were and could found to be relevant in previous studies of anti-nuclear energy movements, and how they are operationalized in this study.

Social Movement Strength, Tactics, and the Viability of Political Goals

Although this is an extremely intuitive idea that the strength of a movement influences its prospects for success, the empirical evidence concerning is at best mixed. Whereas some studies reported a significant impact (e.g. Fording 2001; Hicks and Swank 1984; Rucht 1999; Santoro 2000; Soule and Olzak 2004), it is striking that a number of studies found no support at all for the hypothesis that strength has a positive effect on the political outcomes (e.g. Boreham and Compston 1992; McCammon et al. 2001; Murphy 1997; Scruggs 1999; Skocpol et al. 1993). One possible explanation for the missing influence of movement strength is suggest by the joint-effect model of movement outcomes: Even strong movements cannot be political successful in the absence of political opportunities (Amenta, Carruthers and Yvonne 1992; Amenta, Hoffman and Zylan 1999). Therefore the possible interaction effect between movement strength and different political opportunities – which will be specified later –

should be examined in order to test the joint-effect model as an alternative to direct-effect model.

In general the strength of anti-nuclear mobilization is not even considered as an explanatory variable in case of the anti-nuclear energy movement and certainly its impact has been rarely systematically tested (cf. Jasper 1990; Kitschelt 1986; Kriesi et al. 1995). When it had been included, evidence about the influence of movement strength had been weak or even contradictory across countries (Giugni 2004; Midttun and Rucht 1994). I measure the strength of the anti-nuclear energy movement based on two different indicators: the strength of local and regional resistance to the construction of nuclear facilities, and the level of mass mobilization against nuclear power. Each national movement could attain a score between zero and four on both indicators; they results (see *Table A1*) overall correspond with the quantitative measurement of the strength of resistance to nuclear energy compiled by Rucht (1995) for sixteen countries.

HYPOTHESIS 1a.– *The stronger the anti-nuclear mobilization in a country, the greater the impact of the anti-nuclear energy movement.*

HYPOTHESIS 1b.– *Stronger anti-nuclear mobilization will only matter if political opportunities are present.*

The *viability of the goals* pursued by a social movement influences the likelihood of its political success (e.g. Gamson 1975; Giugni 2004; Sanders 1997; Schumaker 1975). The viability of a goal depends on the profile of the involved policy issue. Whether a policy issue is considered to be high-profile or low-profile depends on the perception of political and economic elites, which is shaped by their conception of the core tasks and the core interests of the state (Kriesi et al. 1995). In general high-profile policy issue are defined by four features: 1) high levels of resources – in terms of past expenses and future investments – involved in a policy issue; 2) significant challenges to power held by established actors; 3) significant chal-

lenges to the survival of the government; and 4) widespread perception of a policy issue as part of the national interest (Kriesi et al. 1995).

Obviously this definition qualifies nuclear energy as a high profile policy issue. However, one caveat has to be considered. Whereas in most countries nuclear power plants were online for many years when the anti-nuclear energy movement emerged, the situation was quite different in the case of Denmark, Ireland, Luxembourg and Norway (cf. Andersen and Midttun 1994; Baker 1988; Lund and Breinholt 1981).[3] Mobilization already emerged in response to the stated governmental plans starting a nuclear energy program. Thus, defined in the above terms nuclear energy was certainly more low profile in these countries than in the others. Just to illustrate this argument, consider that abandoning nuclear power involves more resources in terms of past expenses, and thus is more threatening for the political and economic elite. It is striking that this issue was completely overlooked in the literature on the political outcomes of anti-nuclear movements.

HYPOTHESIS 2.– *The anti-nuclear energy movement was more successful in countries where it had to prevent the introduction of nuclear power, compared to the countries where it had to cause the abandonment of nuclear power.*

The tactics used by a social movement – in addition to its strength and goals –influence the prospects of its political success (Gamson 1975; Szymanski 2003). While many authors agree that tactics can influence outcomes, it is disputed how they matter. For example, whereas insider tactics are reported to me more effective than outsider tactics in one study, it is the other way round in a second study (Balbach, Traynor and Glantz 2000; Soule et al.

[3] Although Austria never started producing nuclear energy, it proceeded much further with its nuclear program than Norway, Denmark, or Ireland. It managed to complete the Zwentendorf nuclear power plant in 1978, but the start of its operation was prevented by a referendum in the same year (Pelinka 1983).

1999). The most intense debate about the political effectiveness of tactics has emerged around the question of whether the use of disruptive or even violent tactics is more likely to lead to political change than moderate tactics (cf. Giugni 1999; Giugni 1998). The empirical evidence is mixed, inconclusive, and too extensive to be summarized here, but one of its most convincing conclusions is the claim that"[t]he effectiveness of disruptive tactics and violence is likely to vary according to the circumstances under which they are adopted by social movements" (Giugni 1999). This does not only hold for the use of disruption, but for the political effectiveness of tactics in general (Amenta 2005; Cress and Snow 2000).

The anti-nuclear energy movement is a good case to further explore this claim, because it used a quite similar repertoires of contention across countries (cf. Diani and van der Heijden 1994; Rüdig 1990). The repertoire can be clustered into three broad categories: 1) disruptive tactics such as site occupations and sabotage; 2) litigation; and 3) signaling tactics such as mass demonstrations, rallies, and signature campaigns. Later in this article I will return to this issue and suggest the conditions, which determine the political effectiveness of these tactics. I understand these conditions as the opportunities provided by the political and economic environment of a social movement.

The Economic and Political Context of Social Movements

The *political institutional structure* of a polity is defined by the characteristics of major political institutions and the way in which they are arranged and connected to each other. It is the most stable part of a social movement's political context, because institutional changes occur infrequently and often take a long time (cf. Birchfield and Crepaz 1998; Huber, Ragin and Stephens 1993). What I have termed the "political institutional structure" of a polity is often called political opportunity structure (POS). I refrain from using the term, because over the years not only institutional features but all possible dimensions of a movement's political context have been called POS, which rendered the concept meaningless (cf. Soule and Olzak

2004). In a rather simplifying way, most students of social movements have distinguished "between 'open' and 'closed' structures, that is, structures which allow for easy access to the political system or which make access more difficult" (Kriesi 2004). Normally it is hypothesized that the greater the openness of the political institutional structure – that is, the more access points it provides for challengers – the greater the political impact of a social movement. In particular much of research about the anti-nuclear energy movement supports this hypothesis (Delmas and Heiman 2001; Kitschelt 1986; Kriesi et al. 1995).

That political institutional structure is treated as a dichotomous rather than a continuous variable is an inadmissible simplification because 'openness' or 'closeness' can be defined by several independent institutional features. In order to develop a quantitative index, I searched the literature on movement outcomes for indicators which represent potential access points to the political process (Kitschelt 1986; Kriesi et al. 1995; Meyer and Minkoff 2004; Midttun and Rucht 1994; Tarrow 1998). I finally chose the following six items to form an additive index of political institutional structure (see *Table A2*): 1) the relationship between the executive and legislative branches of government; 2) the degree of federalism; 3) the existence of bicameralism; 4) the possibility of popular referendum; 5) the strength of judicial review; and 6) the effective number of political parties. The higher the index scores for a country the more open and thus the more vulnerable it will be to the influence of social movements.

HYPOTHESIS 3.– The more open a country's institutional structure, the greater is the impact of the anti-nuclear energy movement.

The *degree of elite conflict* is an unspectacular but important variable, because the claims of a social movement almost inevitably confront and conflict with a formidable array of elite interests (Brockett 1991). If political elites – in particular government officials, party leadership, members of parliament, business leaders and journalists – are united against the challenge posed by the social movement, it is extremely unlikely that it will have a substantial

political impact. Elite splits can take very different forms: They can occur on the same political level between different governmental units, as between the U.S. Congress and the president (Filvaroff and Wolfinger 2000); between the political elites of different territorial units such as national and regional governments (Huberts 1989); or along the lines of competing political parties (Haider-Markel 1999). The studies that have included an explicit measure of elite conflict support the notion that elite conflict enhances the potential for political change (e.g. Haider-Markel and Meier 1996; Jenkins and Brents 1989; Midttun and Rucht 1994; Schumaker 1975).

With regard to the anti-nuclear energy movement the importance of elite conflict have been highlighted by researchers, who have been unconvinced of the exclusive role attributed to the political opportunity structure in much of the literature. Most convincing in this respect is the edited volume *States and Anti-Nuclear movements* (Flam 1994b). Whereas strong conflicts within the scientific elites were the rule in all countries covered by the study, the intensity of conflicts within the political elites differed and influenced nuclear outcomes (Midttun and Rucht 1994). Flam (1994a) argued that elected officials are the most visible and vulnerable part of the state elite, who as leaders of both governing and opposition parties played leading roles in the conflict over nuclear power. Thus, the degree of elite conflict over nuclear power is defined by the existence of controversy about nuclear energy among and within political parties. These controversies took place over substantial questions – introducing nuclear power or not, phasing-out nuclear energy, etc. – and strategic and procedural questions concerning the management of the nuclear energy conflict (Kitschelt 1982). I distinguished between four different situations ranging from unified elite support for nuclear energy to strong conflict involving dissent between major political parties (see *Table A3*).

HYPOTHESIS 4.– *The more the political elites are split on the issue of nuclear energy, the greater the impact of the anti-nuclear energy movement.*

Partisan influences on public policies in democratic nations is one of the standard approaches to account for cross-national and cross-temporal variations (cf. Schmidt 1996). One of its major theoretical origins can be seen in the *power resource approach* to welfare state development, which tends to see political parties as the organized expression of the diverging interests of distinct societal groups (e.g. capital versus labor). Therefore it argues that parties "can be expected to adopt differing political stand in areas such as social and welfare state policies" (Korpi 1989). Overall, the available empirical evidence is mixed. A number of studies – in particular cross state and cross time comparisons of U.S. social movements – have detected significant partisan influence, whereas evidence in cross-national research is rather rare (e.g. Amenta, Carruthers and Yvonne 1992; Fowler and Shaiko 1987; Haider-Markel 1999; Kane 2003; Korpi 1989; Meyer and Minkoff 2004; Stetson 2001).

Systematic partisan influences have been absent in the case of nuclear energy before green political parties, which can in itself be considered an offspring of the anti-nuclear movement, started to participate in European governments in the mid-1990s (Müller-Rommel 2002). During the 1960s in the early days of the controversy nuclear energy was univocally supported by all political parties. As nuclear energy developed in a highly controversial and politicised issue in the early 1970s, it was not a typical right-left issue. Thus, the side a party choose in the nuclear conflict was more influenced by its government status than its program: "Despite international opposition, *governing parties* tend to be more pro-nuclear. […] Opposition parties, on the other hand, tend to be more critical towards nuclear energy" (Kitschelt 1982). Therefore the role of partisanship has not to be considered in this study.

Political alignments refer to the informal structures of power relations that typically undergird a polity. In liberal democracies, unstable alignments are indicated by electoral insta-

bility (Tarrow 1983). In empirical research, quantitative indicators for unstable political alignments are often measured as interparty competition (e.g. Haider-Markel 1999) or electoral volatility (e.g. Bartolini and Mair 1990). When political alignments become unstable political leaders cannot safely ignore disturbances and are inclined to placate the protesters by offering political concessions (Piven and Cloward 1979). A number of studies have reported no statistically significant impact on the political outcomes of social movements (e.g. McCammon et al. 2001; Skocpol et al. 1993). However, a fair number have also found a significant impact (e.g. Barclay and Fisher 2003; Jenkins and Brents 1989; Piven and Cloward 1979).

In case of the anti-nuclear energy movement empirical support for the influence of changing political alignments are weak (Flam 1994a). I will examine the influence of changing political alignments in terms of electoral instability, which I define as the aggregate electoral volatility, measured in terms of "*the net electoral change between two consecutive elections*" (Bartolini and Mair 1990). The values displayed in *Table A4* are the means of electoral volatility for the national parliamentary elections between the early 1970s, when nuclear power became a political issue in these countries, and the last election before Chernobyl; elections in 1986 were excluded.

HYPOTHESIS 5.– *The greater electoral volatility in a country, the greater is the impact of the anti-nuclear energy movement.*

In political science, *public opinion* is widely believed to be an influential determinant of public policies (Brettschneider 1996; Burstein 2003; Jones 1994; Stimson, MacKuen and Erikson 1995). The basic argument – which will be elaborated in more detail later – is that politicians must consider public opinion because they want to be re-elected. If they fail to do so they will be punished at the polls and replaced by a candidate who is more in line with public opinion. This argument suggests that the influence of public opinion is contingent on

the presence two other political opportunities. *First*, elite conflict is a necessary condition for public opinion to influence policy making. *Second*, the impact of public opinion will be higher before elections and in times of high electoral instability (cf. Brettschneider 1995). However, depending on the fit between public attitudes and movement goals public opinion can either work as an opportunity or as a constraint (Burstein 1999). The growing body of research on the political outcomes of social movements which includes public opinion as an explanatory variable supports the importance of public opinion (e.g. Burstein 1998; Costain and Majstorovic 1994; Kane 2003; Soule and Olzak 2004).

The role of public opinion was very much neglected in the literature on the anti-nuclear energy movement, although it is considered to be an important factor in nuclear policy making (Nealey, Melber and Rankin 1983; OECD Nuclear Energy Agency 1984). In the few cases it had been included in studies, evidence for its influence was weak or couldn't be detected (Giugni 2004; Midttun and Rucht 1994). In order to measure public opinion on nuclear energy before the Chernobyl catastrophe, I decided to use the net majorities of nuclear opponents / proponents – calculated as the percentage difference between supporters and opponents of nuclear energy – as my central indicator for the statistical analysis (see *Table A5*). Most of the data comes from the *Eurobarometer* surveys, the only existing cross-national time series, which is carried out biannually in all EU-member states since 1973 by the European Commission.[4] In 1978, the first *Eurobarometer* survey contained a question regarding public support for nuclear energy, asked in an identical formulation in 1982, 1984, 1986 (after Chernobyl), 1987, and 1989. Thus, for all countries that were already members of the European Community in the 1970s, the data on the development of public opinion could relatively easily be drawn from the *Eurobarometer* surveys. The data for the non-EU member countries in

[4] http://europa.eu.int/comm/public_opinion/index_en.htm

my sample as well as for the countries that joined the EU later had to come from various national surveys.[5]

HYPOTHESIS 6.– *The greater the public's hostility toward nuclear energy, the greater is the impact of the anti-nuclear energy movement.*

Although their assumed impact is rarely theorized, a broad range of socio-economic factors are included as control variables in quantitative work on movement outcomes. The specific variables used differ in general depending on the type of movement. Whereas for example macro-economic variables such as the gross national product, the rate of inflation, or the unemployment rate have often been used in studies of the labor movement, the ratio of women to men in the labor force is frequently used in studies on the women's movement (cf. Hicks and Misra 1993; Korpi 1989; McCammon et al. 2001; Skocpol et al. 1993). A variable used across different types of movement was the *population size* of a given political unit (county, state, country). Some studies found more populous political units to be an opportunity for political change (e.g. Wald, Button and Rienzo 1996; Wolfson 1995), whereas other studies reached the opposite conclusion (e.g. Frank and McEneaney 1999). In case of the anti-nuclear energy movement one study found that political elites responded more quickly to the challenge posed by the anti-nuclear energy movement in small countries (Flam 1994a).

HYPOTHESIS 7.– The smaller the country, the more responsive the political elite and the greater is the impact of the anti-nuclear energy movement.

The outcomes of the anti-nuclear energy movement might be also influenced by economic variables such as the degree of state engagement in the electricity industry and in nuclear energy promotion as well as the linkage of the civilian and the military atomic complexes (Campbell 1988; Jasper 1990). In systematic comparative research an influence of

[5] These nine countries are Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, and the United Kingdom.

these variables couldn't be established (Midttun and Rucht 1994). However, the national material resource endowment, which determines a country's dependence on energy imports, was found to have a significant influence in another cross-sectional study (Fort and Hallagan 1994). I calculated a country's degree of foreign energy dependence based on the ratio of total net import and the total energy supply for the year 1973.

HYPOTHESIS 8.– The greater a country's foreign energy dependency, the smaller is the impact of the anti-nuclear energy movement.

Causal Mechanisms of Political change

So far I have identified a series of internal and external variables, which are assumed to determine the political impact of social movements. However, at the same time this theory says almost nothing about why and how social movements are thought to be able to cause political change in the first place. This silence is problematic, because – as an emerging consensus in the most recent research has suggested – our understanding of the influence of social movement will be greatly improved by specifying how movement generate change (cf. Andrews 2001; Cress and Snow 2000; Knopf 1998; Linders 2005; McAdam and Su 2002; Soule and King 2006). Therefore I will specify the processes, which link anti-nuclear mobilization and nuclear outcomes. Thus, I believe that good explanations, and hence good theories will not only make predictions about the correspondence between explanatory and dependent variables, but also "about the character of the processes that links the latter to the former" (Hall 2000). Following recent development in the social science theory I call these processes "causal mechanisms" (Johnson 2006; Little 1991; Mahoney 2001; Mayntz 2004; Opp 2005).[6]

[6] The idea to overcome the limitations of "black-box" explanations – also prevalent in other areas of social movement studies – by using the concept of causal mechanism was recently introduced in social movement studies by Doug McAdam, Sidney Tarrow, and Charles Tilly (2001) in their landmark book *Dynamics of Contention*.

The broad popularity the concept might turn into liability, if the fruitful theorizing about mechanisms will indeed degenerate into unfruitful "mechanism talk" as we have been recently warned (Norkus 2005). Although an extensive debate over the role of causal mechanisms in social science theories is beyond the scope of this article, I will briefly sketch out how I understand the mechanism approach.

To begin with, I define causal mechanisms as the specification of the processes "by which a given cause brings about its effect" (Kiser and Hechter 1998). In addition I regard causal mechanisms and their role in theories being characterized by series of propositions. *First*, most macro explanandum such as political change can be caused by more than a single mechanisms, and thus several mechanisms might combine in producing a certain outcome (Mayntz 2004). I argue that anti-nuclear outcomes (before 1986) were caused by a combination of three different causal mechanisms of political change, which will be introduced shortly. *Second*, it is not enough to specific, why and how a causal mechanism – when activated or triggered – is sufficient to produce a certain outcome. One has also but one also has to specify the range of conditions under which a mechanism is likely to be activated (Johnson 2006). Therefore I will link my independent variables with my causal mechanisms by specifying the tactics and political opportunities necessary to activate a mechanism. *Third*, causal mechanisms posited relations and processes, which are principle unobservable. Although unobservable as such, causal mechanisms have special empirical implications, which can be observed (Kiser and Hechter 1998). Keeping these propositions in mind, I will know sketch the three causal mechanisms of political change, which will help to explain how anti-nuclear mobilization could bring about political change.

The *disruption* mechanism states that social movements can force political concession from political elites by creating a crisis through the massive use of disruption. The power of mass disruption stems from its ability to destroy the normal functioning of institutions (Piven

and Cloward 1979). Institutional disruption can be defined as the withdrawal of a crucial contribution on which others depend. The influence of disruption depends on whether the contribution withheld is crucial to others; whether those who affected by the disruption have resources to be conceded; and whether the obstructionist groups can protect themselves from reprisals. Poor people and other marginalized social groups can be so isolated from significant institutional participation that "the only 'contribution' they can withhold is that of quiescence in civil life: they can riot" (Piven and Cloward 1979).

However, it is not the impact of mass defiance on particular institutions, but the political impact of institutional disruption that finally counts. The political responses to institutional disruption are shaped by the electoral-representative system. During periods of electoral stability, governments have three rather obvious options when institutional disruption occurs: "They may ignore it; they may employ punitive measure against the disruptors; or they may attempt to conciliate them" (Piven and Cloward 1979). Institutional disruption is more likely to be ignored when the disrupted institution is not central to the society as a whole, and is not threatening to other powerful groups. However, in times of electoral instability, protest cannot be safely ignored, but it often cannot simply be repressed either. Sometimes social movements have already aroused strong sympathy among groups that are crucial supporters of the regime, and unless the protesters have a total outcast status, the use of force is risky, because the reactions of other aroused groups are impossible to predict. In such situations where neither ignorance nor repression is a viable option, the government will make efforts to conciliate and disarm the protestors. One form such placating efforts can is that the political leadership will respond with political concessions or press economic elites to offer concessions in order to remedy some of the grievances of the protest group (Piven and Cloward 1979).

In other words, if the ramifications of institutional disruption are so strong that it develops into political crisis, the political elites may be forced to offer political concessions. Politi-

cal crisis is defined “as a situation of large-scale public dissatisfaction or even fear stemming from wide-ranging economic problems and/or an unusual degree of social unrest and/or threats to national security” (Keeler 1993). The political impact of crisis has been also central to the concept of *windows for reform,* suggested by Keeler (1993) in his study of “extraordinary policy-making”. A government’s mandate and the severity of a crisis can act separately or in combination to open a macro policy window. Keeler (1993) has suggested three different mechanisms which help to explain the impact of crisis on policy change. First, the *crisis-mandate* mechanism states that a crisis can discredit the ideas and leaders of the incumbent party or coalition and thus empowers and seemingly authorizes a new government to put extensive reform into effect. Second, the *urgency mechanism* states that a sense of urgency, predicated on the assumption that already serious problems will be exacerbated by inaction, can override the caution and/or concern for procedure by government officials. Third, the *fear mechanism* is predicated on the assumption that inaction may endanger lives and property or even result in a revolution or coup d’état.

To sum up, the *disruption* mechanism can be characterized as a process in which institutional disruption cumulates into a political crisis, which can finally force political elites to make political concessions to restore public order. The *disruption* mechanism will be only triggered under two conditions. *First*, social movements have to use disruptive tactics on a massive scale, in order to cause large-scale institutional disruption. *Second*, in the absence of political opportunities, the use of disruptive tactics is likely to be either ignored or subject to harsh repression. Therefore political disruption will only have its intended impact under conditions of elite conflict and electoral instability. The impact of disruption is likely to be particularly strong if the government also enjoys a large mandate and public opinion is supportive.

HYPOTHESIS 9.– *Anti-nuclear mobilization will only activate the disruption mechanism when the political elites are split and threatened by unstable electoral alignments.*

The *public preference* mechanism states that social movements can try to influence and mobilize public opinion in order to generate a response from policy makers. The public preference mechanism is basically an application of the theory of dynamic representation, which rests on the following core argument (Stimson, MacKuen and Erikson 1995): Every politician facing a policy choice has to balance two potentially contradictory factors if she or he wants to protect her / his electoral career from unwanted termination. On the one hand she/he holds personal preferences and thus has a personal ideal point in the space of policy options. On the other hand there is an electoral expediency point defined as the policy position most likely to optimize future reelection chances.[7] Thus, policy change can occur through the following two processes (Stimson, MacKuen and Erikson 1995). *First*, it can result from turnover following an election, when a politician (or government) fails to account for the expediency point and it is replaced by another politician who will adapt policies to public sentiment. *Second*, policy change can result from rational anticipation, when a policy maker successfully calculates the future (electoral) implications of his current public policy preferences and adapts his policy positions to better fit the expediency point. Social movements can try activating the public preference mechanism in the following two ways.[8]

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[7] Theories of dynamic representation have been developed in the context of the American two-party system, but we can assume that the public preference mechanism will also operate in other democracies (cf. Brettschneider 1995; Knopf 1998).

[8] In countries that such use instruments of direct democracy the potential political influence of the public preferences mechanism should be in particular strong, because politicians have a particularly strong incentive to take public opinion seriously, because social movements will otherwise try to initiate a referendum (cf. Giugni and Passy 1999).

First, social movements can try to systematically influence public policy making through providing new information to policy makers about public opinion – a tactic which was termed *signaling* (Kollman 1998; Lohmann 1993). Signaling works because – as the theory of democratic representation implies – what finally influences policy action is not public opinion as such, but what policy makers perceive as public opinion (Stimson, MacKuen and Erikson 1995). To develop an accurate perception, they rely on several information sources about mass public preferences, or more precisely, on information about the preferences of their specific constituency (Fuchs and Pfetsch 1996). Among these information sources are public protests, opinion polls, mass media, direct contact with citizens, and meeting with interest group representatives.

Second, if a social movement is faced with a situation, in which its political goals do not fit with the public's policy preference, signaling is not likely to be an effective tactic, because public opinion works as a constraint rather than as an opportunity. This situation is typical for most social movements in their early years, because they frequently struggle for goals outside the national consensus, at least initially. In this situation social movements can try to change the policy preferences of the public in two different ways: "by altering the distribution of preferences on an issue as currently framed, or by reframing the issue – changing what the preferences are about" (Burstein 1999). Reframing a policy issue – that is, changing its policy image – normally involves a struggle over the appropriate definition of the problem (cf. Baumgartner and Jones 1993; Hilgartner and Bosk 1988; Schetsche 1996). To alter the distribution of preferences on an issue as it is currently framed, it might be sufficient for social movements to organize protest events – such as demonstrations, rallies and so on – with the aim of attracting media attention, because the information conveyed by media coverage has a strong influence on public attitudes (Zaller 1992).

To sum up, through the processes of electoral replacement and rational anticipation, public policy preferences have a considerable influence on public polices. The *public preferences* mechanism argues that social movements can influence public policies through changing policy makers' perceptions of public opinion or the distribution of policy preferences itself. However, even public preferences support the goals of a movement political change is not guaranteed, because empirical research has proved that the fit between public opinion and public policy is far from perfect (cf. Brettschneider 1995; Monroe 1998; Page and Shapiro 1983). Examining two the reasons for this misfit will allow us the specific the scope conditions for the public preferences mechanism. *First*, public policy preferences are only likely to be politically influential if the salience of the issue is high, because only high salience issues are likely to influence the voting decisions of large numbers of individuals (Jones 1994). *Second*, neither the turnover from elections nor rational anticipation will result in policy shifts if a broad elite consensus exists on a policy issue.

> HYPOTHESIS 10.– *Anti-nuclear mobilization will be only triggering the public preference mechanism when the salience of nuclear energy is high and the political elites are split on the issue.*

The *judicial* mechanism suggests that social movements can use the political power of the courts on their behalf. In the following discussion, which heavily relies on *The Hollow Hope: Can Courts Bring About Social Change?*, I will specify under what conditions judicial processes can be effectively used to produce social or political change (Rosenberg 1991). First of all, it is important to consider that it cannot be assumed that the court system will automatically work in the interest of social movements. Three major structural constraints seriously limit the potential of courts to be a force of significant social change (Rosenberg 1991):

First, "[t]he bounded nature of constitutional rights prevents courts from hearing or effectively acting on many significant social reform claims" (Rosenberg 1991). Social change

litigation is normally based on constitutional claims that an individual is being denied certain rights. Because the constitution is not unbounded – only certain rights are enshrined in it while others are rejected – not all social movement goals can be plausibly presented and framed in terms of constitutional rights (Smith 2005).

Second, "[t]he judiciary lacks the necessary independence from the other branches of the government to produce significant social reform" (Rosenberg 1991). Because of the appointment process, judges – including Supreme Court judges – are chosen at the federal level by politicians, the president, and the Senate. Although court decisions do not have to reflect public opinion, empirical research has shown that Supreme Court decisions have seldom strayed away from what was seen as politically acceptable by the public (cf. Marshall 1989; Mishler and Sheehan 1996; Mishler and Sheehan 1993).

Third, "[c]ourts lack the tools to readily develop appropriate policies and implement decisions ordering significant social reform" (Rosenberg 1991). In particular, they lack enforcement power; for their orders to be carried out, electorally accountable political elites must support them and act to implement them. Particularly in the case of the contested policy issues normally pursued by social movements, political elites are likely to withhold their support. This constraint is not relevant in the case of the anti-nuclear energy movement, because its goal was to prevent change – the construction of nuclear power stations – rather than to achieve change. This sets anti-nuclear activism apart from the struggle of the civil rights or the women's movement, which tried to use litigation to achieve social change (cf. Burstein 1989; Morton 2001).

However, it would be misleading to deny that the court system has some power and autonomy (Rosenberg 1991). Courts can act in the face of public opposition, because they are free from electoral accountability. In contrast to the normal policy making process, access to and influence in the court system is not dependent on connections or social and economic

position, but on the strength of legal arguments. In addition, judicial decisions can have important extra-judicial effects – such as creating publicity or increasing the bargaining power of social movements. The structural constraints which normally prevent courts from being significant forces of social change be overcome under three conditions. *First*, to overcome the limited nature of constitutional rights, there needs to be ample legal precedent for change. This precedent can be only produced by gradual litigation, because judges are gradualists, and "small changes must be argued for before big ones" (Rosenberg 1991). *Second*, to overcome the lack of judicial independence and the resulting unwillingness of the judiciary to act on contentious issues requires the substantial support from the legislative or from the executive. *Third*, overcoming the judiciary's lack of implementation power requires support from some citizens, or at least low levels of opposition from all citizens. In addition proper implementation requires alternative enforcement mechanisms such as the market and the offer of financial incentives.

To sum up, the judicial mechanism suggest that social movement can use the political leverage of the courts system if they succeed in overcoming three constraints which normally prevents courts from being a significant force of social change. Thus, social movement litigation can only successfully trigger the judicial mechanism when certain political opportunities are available. When the power of the Court system is even constrained in the United States, which is known for having strong and independent courts, it is unlikely that it can be activated in countries with less independent court system (Boyle 1998).

HYPOTHESIS 11.– Litigation by the anti-nuclear energy movement will only trigger the judicial mechanisms in countries with an open political institutional structure and in context of a strong elite conflict over nuclear energy.

OPERATIONALIZING THE POLITICAL IMPACT OF THE ANTI-NUCLEAR ENERGY MOVEMENT

Before I start testing the previously developed hypotheses, I will discuss how to operationalize the political outcomes of anti-nuclear mobilization. This process is far from being banal, because the reliability and validity of our findings depend on its accuracy. To begin with I am not interested in all possible dimensions of political outcomes, but only in the substantial political impact of the anti-nuclear energy movement (cf. Kolb 2006; Soule and King 2006). For example I won't discuss institutional outcomes of anti-nuclear mobilization, such as the emergence of the Green and new left parties although this have been an important outcome (cf. Kitschelt 1989; Müller-Rommel 1993). And I exclusively focus on political impacts of anti-nuclear mobilization achieved before the Chernobyl accident. Framed in common sense language, I want to know what influence the activities of an anti-nuclear movement had on the nuclear program of a country. Thus, I looked for answers to questions like the following one: Did the emergence of the anti-nuclear movement lead to the abandonment of nuclear power as an option for supplying electricity? Were nuclear power plants shut down, or were the construction of new ones stopped in response to anti-nuclear protests? In order to determine the impact of an anti-nuclear movement in this way, I had to speculate about what would have happened in the absence of anti-nuclear protest. Such counter-factual reasoning is a tricky issue, but I will show that I had no better alternative (cf. Fearon 1991).

Previously used impact indicators have been highly problematic, because they did not account for the counterfactual nature of anti-nuclear outcomes. The most inappropriate indicators are simple nuclear energy statistics – such as the percentage of nuclear power in total electricity production or the absolute volume of nuclear power – e.g. used by Giugni (2004)

and Midttun and Rucht (1994). Because we cannot know on base of such figures how big the nuclear programs was originally intended to be, these numbers tell us nothing about the possible impact of the anti-nuclear energy movement. A small nuclear program does not necessarily mean that the anti-nuclear movement was more successful than in a country with a larger program. For example the anti-nuclear energy movements were far more successful in Switzerland, with a 37 percent share of nuclear power production, than in Canada, with its mere 12 percent share. Thus, nuclear energy statistics must not be used alone as dependent variables for the political impact of the anti-nuclear energy movement, because they cannot capture the amount of nuclear energy originally planned, but ultimately prevented by anti-nuclear mobilization.

An indicator that is by definition better suited to capture the impact of the anti-nuclear mobilization is based on a comparison between the planned and the realized size of a country's nuclear program (see *Table A6*). This indicator was introduced by Wolfgang Rüdig (1990) using a 1973 energy prognosis, and was replicated by other authors (e.g. Kriesi et al. 1995; Rucht 1995). It was thought to represent the percentage of the planned nuclear program that was prevented by the activities of the anti-nuclear movement. Its value can range from zero, if the nuclear program was realized as planned, to 100 percent if a nuclear program was completely prevented by the anti-nuclear movement. However, the validity of this indicator naturally depends on the nature and quality of the energy prognosis used to define the size of the planned nuclear program. When I recalculated this indicator using more recent energy prognosis – one from 1978 and one from 1982 – the deviations to Rüdig's numbers were enormous (see *Table A6*). Rüdig's prognosis did not capture the increases in many countries' nuclear programs after the 1973 oil crisis, and therefore it overemphasized the impact of anti-nuclear energy movement in some countries.

Nuclear latecomers such as Belgium, Canada, Finland, France, and Japan realized much more nuclear capacity than was prognosticated in 1974, but only about the amount prognosticated in 1977 and 1982. Germany, Spain, Switzerland, the United Kingdom, and the United States already had a relatively ambitious program in 1974, and therefore did not show the huge over-realizations in the 1974 prognosis. At the same time, the 1974 prognosis underestimates problems with the realization of the finally planned nuclear programs, because Germany and Spain intensified their nuclear programs in/after 1974 as well. An additional problem is that particularly the 1977 and 1982 estimates are already likely to account for the expected impact of the anti-nuclear energy movement. Switzerland is the most prominent case, because the anti-nuclear movement was successful relatively early on, and the 1977 prognosis already accounts for the expected impact of the anti-nuclear energy movement.

In order to overcome the deficiencies of the existing indicators, I developed a variable called *nuclear program deviation*. It also expresses the reduction in the realized nuclear program size compared to attempted program size, but avoids the problems related to relying on IAEO energy prognosis. The question, then, is not under what conditions anti-nuclear protests were able to prevent the construction of single nuclear plants at specific sites, but to assess their overall impact on the national level nuclear program and the development of nuclear power.[9] In order to compile the nuclear program deviation, I intensively studied the development of nuclear program in countries of my sample. Nuclear power is a highly complex technique that could not be introduced on an ad-hoc basis, but involved long-term state-sponsored research and planning. For each country and year, I researched how many nuclear power

[9] To illustrate this difference, consider the case of the French anti-nuclear energy movement (cf. Rucht 1994a). In June 1981, the newly elected Mitterrand government decided to cancel the projected reactors in Plogoff, Brittany, where the resistance had been persistent and deeply rooted in the local community. The overall nuclear program, in contrast, was only slightly reduced, but as a consequence of foreseeable overcapacities rather than as the consequence of the anti-nuclear protest.

plants were already running, still under construction, and only projected. For each country, I proceeded in three steps to estimate the nuclear program deviation. In the *first* step, I established the number of commercial nuclear power plants ultimately built and operated. In order to not overstate the impact of anti-nuclear mobilization, I also included nuclear units that operated for some time, but were then shut down for purely technical or economic reasons. In the *second* step, for the years before the Chernobyl accident in 1986, I counted the number of nuclear operating units planned but not realized and the number of units running or under construction that were terminated. In the *third* and final step, I calculated the ratio between the number of prevented nuclear operating units, and the number of nuclear operating units that were originally intended to be realized. The values of the nuclear program deviation for all countries are reported in *Table A7*. The variable can take scores between 0 and 100 percent. A score of 0 means that the nuclear program was basically realized as it had been indented by the nuclear industry. A score of 100 signifies that a planed nuclear program could not be realized and that all existing nuclear capability had to be shut down. A score between 0 and 100 percent indicates the percentage share of the potential nuclear program that could not be realized by the nuclear industry.

A QUANTITATIVE ANALYSIS OF THE IMPACT OF ANTI-NUCLEAR ENERGY MOVEMENTS

I begin the nested analysis with a quantitative statistical analysis, which tests the previously developed hypotheses. I start with testing the influence of the independent variables following the logic of the direct-effect and the indirect-effect models of movement outcomes. For this purpose, I will present the correlation matrixes between the eight explanatory variables and my dependent variable – nuclear program deviation. The correlation coefficients were computed using Kendall's thau-b; a two-tailed p-test was used to establish the level of statistical significance (cf. Wagschal 1999). *Table 1* displays the correlation matrix for all

eighteen countries included in my study, showing that only four of my hypotheses can be regarded as confirmed by the results.

- Table 1 about here -

To begin with, as suggested by hypothesis 2 the anti-nuclear energy movement was more successful in the four countries in which it could pursue the goal of preventing the introduction of nuclear energy rather than abandoning nuclear energy and halting future nuclear construction. Hypotheses 4, 6 and 7 are also supported by the data; the smaller the population of the country, the greater the intensity of elite conflict over nuclear power, and the stronger anti-nuclear attitudes, the greater the impact of the anti-nuclear energy movement. Whereas the level of significance for these correlations is high for all variables, the correlation coefficient is somewhat higher for the intensity of elite conflict than for public opinion, and is smallest for population size. In contrast, the hypotheses 1a, 3, 5, 8 are not confirmed by the analysis; movement strength, political institutional structure, electoral stability, and energy import dependency are not significantly correlated to nuclear program deviation, and thus do not seem to influence the success of anti-nuclear mobilization. The most likely explanation for the missing impact of electoral instability is that in order to increase government responsiveness, high electoral volatility has to be directly related to or caused by the issue raised by a social movement.[10]

- Figure 1 about here -

Regarding earlier research findings, it is in particular striking that the institutional openness has no significant influence on the impact of the anti-nuclear energy movement. This

[10] However, one could also argue that the explanation lies in flawed measurement of the concept. It could be that the overall electoral volatility is less relevant than electoral volatility between pro- and anti-nuclear parties or between incumbent and oppositional parties (Bartolini and Mair 1990).

puzzle can be solved if we visualize the relationship between both variable in a scatterplot (see *Figure 1*). The political institutional structure of the five countries – Austria, Denmark, Ireland, Luxembourg, and Norway – with the most successful anti-nuclear energy movements is rather closed. As I will show shortly is not a coincident that four of these five countries had never introduced nuclear power; the impact of institutional openness will become statistically significant if they are removed from the sample. In addition the Netherlands and Spain must also be considered as outliers, because anti-nuclear mobilization was successful there although the political institutional structure is rather closed. In contrast, data on the remaining eleven countries seems to strongly support the hypothesis 3. In countries with relatively closed structures, the anti-nuclear energy movement failed (as in Belgium, Canada, France, Japan and the United Kingdom), or had only limited success (as in Finland and Sweden). In contrast, the movement was relatively successful in Italy, Germany, Switzerland, and the United States – the countries with the most open institutional structures.

Any causal interpretation of the significant correlations is complicated by the fact that several of the explanatory variables are significantly correlated with each other. This multicollinearity makes it impossible or at least difficult to determine their independent causal effects (cf. King, Keohane and Verba 1994). The intensity of elite conflict and public opinion are correlated, but it is likely that this partial multicollinearity is systematic rather than arbitrary, since elite positions are likely to influence public attitudes (Zaller 1992). Most problematic in this respect is that the type of goal pursued by the anti-nuclear energy movement is also correlated with each of the three other statistically significant independent variables. Countries in which the anti-nuclear energy movement tried to prevent the introduction of nuclear power were also smaller, had higher proportions of anti-nuclear attitudes, and displayed more intense elite conflicts over nuclear power. To determine whether the influence of these variables re-

mains significant if we control for the goal pursued by a movement, I will remove Denmark, Ireland, Luxembourg, and Norway from the sample in the next step of the analysis.

- Table 2 about here -

Table 2 presents the correlation matrix among the seven explanatory variables and nuclear program deviation for the remaining fourteen countries. The influence of most variables is not different as compared to the results revealed by the former analysis. The intensity of elite conflict remains highly significant and has still the highest correlation coefficient. Although the impact of movement strength is slightly larger, it remains at a statistically insignificant level. Electoral volatility and energy import dependency remain insignificant, and now even show the reverse signs as predicted by my hypotheses. Public opinion still has a significant impact in this limited country sample, but the correlation coefficient is smaller and the correlation is only significant on the .05 level. This is a somewhat surprising finding, given the emphasis put on the impact of public opinion on policy outcomes in high salience issues in general, and on the development of nuclear energy in particular (cf. Freudenburg and Baxter 1984; Jones 1994; OECD Nuclear Energy Agency 1984; Rosa and Dunlap 1994). The weak correlation reflects the fact that anti-nuclear movements have not only been (relative) successful in countries with strong anti-nuclear majorities, but also in countries in which nuclear supporters and opponents were about evenly split or the former even outweighed the later (see *table A5*). However, this is not surprising, because it was argued that when public opinion is evenly balanced other factors should determine political outcomes (Burstein 1999).

The comparison of the results shown in *table 1* and *table 2* also reveals two striking differences. These differences underline once again that the selection of cases is a highly sensitive issue that is likely to strongly affect the results of hypothesis testing and thus the general theoretical conclusions drawn from empirical research. On the one hand, the political institutional structure becomes correlated with nuclear program deviation on a significant level, con-

firming the central hypothesis put forward in the literature on anti-nuclear outcomes (Campbell 1988; Delmas and Heiman 2001; Kitschelt 1986; Kriesi et al. 1995). Why does the relevance of political opportunities depend on the goal pursued by the anti-nuclear energy movement? As long as nuclear energy has not been introduced, the sunk costs are limited and governments' desire to avoid future conflict with anti-nuclear forces will prevail. However, if nuclear energy has already been introduced, the sunk costs are much higher, and thus governments are more seriously committed to nuclear energy in these countries. Unable to change official energy policy, the only remaining chance for anti-nuclear activists is to obstruct program implementation, which is only likely to succeed in countries with an open political institutional structure (Delmas and Heiman 2001).

On the other hand, as the correlation between country size and nuclear program deviation is no longer statistically significant. This finding supports my earlier argument that the impact of country size in the complete sample is due the fact that all the countries that tried to introduce nuclear power after the emergence of an anti-nuclear energy movements were small countries. Therefore, I argue that we have to completely reject hypothesis 7.

- Figure 2 about here-

In the previous statistical analysis hypothesis 1a could not be confirmed; stronger anti-nuclear mobilizations are not more likely to succeed than smaller ones. This finding is not surprising, because as I already argued and I expressed by hypothesis 1b the causal impact of movement strength could be highly contingent on the presence of political opportunities. *Figure 2,* which shows the scatterplot of movement strength and the anti-nuclear impact indicator, suggests that we can distinguish between two groups of outliers. On the one hand, there are France, Germany, Switzerland, and the United States, with very strong anti-nuclear movements that achieved no or only moderate impacts. In France, the anti-nuclear movement was confronted with a highly unfavorable political environment: Elites were unified in their

support for nuclear power, the institutional openness of the French state is extremely low, and the public was overwhelmingly supportive towards nuclear energy (Rucht 1994a). Under these circumstances, we cannot expect a social movement to be successful despite a strong mobilization. Although public attitudes leaned more towards pro-nuclear than anti-nuclear in Germany, Switzerland, and the United States (see *Table A5*), these three countries are characterized by the most open political institutional structure of the countries included in my study (see *Table A2*).

On the other hand, there are Austria, Denmark, Ireland, Luxembourg, the Netherlands, and Norway, in which the strength of anti-nuclear mobilization was only moderate, but the movements were nonetheless the most successful. Political opportunities again help to explain this pattern. In Denmark, Ireland, Luxembourg, and Norway, public opinion turned heavily against nuclear power, and elites were strongly split (see *Table A3* and *A5*). The same pattern basically applies to the Netherlands, with the difference that the Netherlands had already started to use nuclear power before the movement emerged (van der Heijden 1994). Austria is a more complicated case, because the anti-nuclear energy movement was highly successful despite relatively unfavorable public opinion. However, the result of the 1978 Austrian referendum on the Zwentendorf plant must be considered as sort of an accident, since it had been called for by the ruling social democratic party (SPÖ), it was expected to be won by a pro-nuclear majority (Müller 1998). However, the public rejected nuclear energy, with a thin majority of 50.47 to 49.53 percent. It is therefore extremely likely that the anti-nuclear energy movement would have lost the referendum if most leaders of the conservative party (ÖVP) – in particular the party's chairman – had not argued publicly for a 'No' vote, despite the fact that the party officially did not support either side (Pelinka 1983).

- Table 3 about here -

In order to directly test hypothesis 1b and thus the joint-effect model of movement outcomes, I computed the interactive terms for movement strength, and the political opportunities presented by an open institutional structure, anti-nuclear attitudes, strong elite conflict and high electoral volatility. If political opportunities and movement strength really do reinforce each other, the interactive terms should be statistically significantly correlated with nuclear program deviation, possibly even revealing stronger correlation coefficients than the political opportunities by themselves. As shown in *Table 3,* hypothesis 1b is only partly confirmed for the opportunities provided by anti-nuclear attitudes, strong elite conflict, and open political institutional structure. Because the interactive terms of movement strength and anti-nuclear public attitudes/elite conflict are less correlated to nuclear program deviation, I argue that the influence of these opportunities seem to operate according to the indirect-effect model. In contrast, the evidence in case of open political institutional structures supports the joint-effect model. The effect of open institutional structures is weak for the eighteen-country sample, where the interactive term remains insignificant, although the values did develop in the expected direction. However, for the fourteen-country sample, the interactive term becomes stronger and more significantly correlated to the anti-nuclear impact indicator. These findings are supported by the fact that institutional structures are highly stable and under most circumstances cannot be changed by social movements. In contrast public opinion and elite's policy preferences are much more volatile and thus can be influenced by movement mobilization. However, longitudinal research is required to show that anti-nuclear mobilization indeed influenced public and elite attitudes towards nuclear energy.

- Table 4 about here -

To sum up, the previous analysis has shown that three different political opportunities – strong elite conflicts over nuclear energy, anti-nuclear public attitudes and open political institutional structures – enhanced the impact of anti-nuclear mobilization (see *Table 4* for a sim-

plified and schematized summary). In addition the analysis suggests that a) two of them – elite conflict and public opinion – work in tandem and that b) in particular the third one has been only relevant for a subset of countries. Thus, I argue that the anti-nuclear energy movement relied on one of two typical configurations of opportunities different opportunities to succeed across countries. Political opportunities were provided by public opinion and elite conflicts in Denmark, Finland, Ireland, Luxembourg, the Netherlands, and Norway. In Italy, Germany, Switzerland, and the United States, the strongest political opportunities were provided by an open institutional political structure.

ANTI-NUCLEAR OUTCOMES AND THE CAUSAL MECHANISMS OF POLITICAL CHANGE

In the previous section I showed that anti-nuclear energy movements had a significant impact on nuclear energy programs in many OECD countries. I demonstrated that the presence of political opportunities decided over the political success of anti-nuclear mobilization. However, in order to understand how and why these political opportunities mattered across countries I have to shift the level of analysis to "an examination of *within*-case processes" (Lieberman 2005). Thus, in the second step of my nested analysis I will complement the estimation of causal effects with case studies specifying and tracing the causal mechanisms, which link anti-nuclear mobilization and its outcomes. Because it is beyond the scope of the paper to study all eighteen countries I have to limit the analysis to some countries. For the case selection I followed the advice provided by Lieberman (2005). Thus, I selected France, Germany, Denmark, Ireland, Netherlands, and Spain, because they are well explained by my statistical analysis, and represent a wide degree of variation on the explanatory variables. I will in particular make to two arguments. *First*, I will show that the presence of political opportunities can explain why strong anti-nuclear mobilization could activate the judicial and disruption mechanism in Germany whereas similar efforts completely failed in France. *Sec-*

ond, I will show that the public preference mechanism caused the political outcomes in countries, which have both anti-nuclear publics and strong elite conflicts over nuclear energy.

The Judicial Mechanism

Litigation was used as a tactic by anti-nuclear energy movements in many countries, but unfortunately the legal activities of the anti-nuclear energy movement have only been systematically studied and analyzed for France, Germany, Sweden, and the United States (cf. Boyle 1998; Cook 1980; Fach and Simonis 1987; Nelkin and Pollak 1980; Nelkin and Pollak 1981; Walsh and Cable 1986). Litigation has been marginal or absent in countries such as Austria, Denmark, Ireland, Luxembourg, the Netherlands, and Norway, where anti-nuclear mobilization achieved its most significant successes, because there had been no decision to construct atomic power plants (after the development of the anti-nuclear movement) that could be challenged in the courts. However, what do we know about the political effectiveness of litigation in the remaining countries? Unfortunately, the existing evidence is so limited that we only know for sure that litigation was frequently used in France, Germany, Italy, Switzerland and the United States. Litigation is thought to have been most influential in Germany, to have completely failed in France and to have had moderate impacts in Italy, Switzerland and the United States (Boyle 1998; Diani 1994; Kitschelt 1986). In the following paragraphs I will explain why the anti-nuclear movement could activate the judicial mechanism in Germany but failed to do so in France.

I argued that bounded nature of (constitutional) rights effectively prevents the courts from hearing and acting on many significant claims. In general, the issue of nuclear energy was no exception, but the specific possibility of effective litigation depended on the legislative context and the structure of the court system. Anti-nuclear litigation in France and Germany – as in the other countries – did not challenge the constitutionality of atomic power, but was limited to more narrow concerns regarding the safety of atomic energy. However, the

rules of nuclear litigation that determine the substantial scope of litigation varied across both countries. In Germany, judicial review is based on interpretation of the atom law (Nelkin and Pollak 1981). By 1972, the Supreme Administrative Court had ruled that safety must take precedence over economic development and nuclear promotion. In 1976, the Bundestag passed legislation amending the atom law and providing that nuclear facilities could only be licensed after all possible safety precautions had been taken, to the limits of science and technology. Because this law used such an indeterminate legal term, it "had the effect of delegating the substantive licensing issues to Germany's administrative courts" (Boyle 1998).

The bounded nature of rights played out dramatically in France, mainly because France had no atomic energy law, only regulations – which didn't clearly lay out the principles of safety for nuclear power plants – and administrative decrees merely requiring a separate operating permit for nuclear reactors (Nelkin and Pollak 1981). However, this permit is not subject to full court review unless challenged on the grounds of illegal procedure (Nelkin and Pollak 1981). Consequently, lawsuits tended to focus solely on irregularities in licensing procedures (Boyle 1998). Although similar numbers of cases were filed relative to the number of nuclear reactors in France, its courts decided fewer claims than the German courts because so many cases were dismissed.

Regarding the limited independence of courts, national differences based on structural features seem to be less influential. As predicted by hypothesis 9 positive court outcomes only occurred when political elites were deeply split over nuclear energy. In France, anti-nuclear groups filed suits against more than fourteen planned nuclear power plants between 1975 and 1981; but the suits were generally either dismissed or lost (Fach and Simonis 1987). When in one of the few exceptional cases the administrative court ruled in favor of nuclear opponents, the decision was overturned a few months later in the appellate court.

The influence of elite conflict on the outcomes of anti-nuclear litigation is most obvious in the case of Germany (Fach and Simonis 1987). As long as nuclear energy was generally a consensus issue, courts unanimously rejected the scattered anti-nuclear suits; but when the political consensus began to unravel after 1975, decisions became inconsistent and even contradictory. Although a lawsuit contesting a permit compels suspension of work, "the licensing authority may by-pass this through an immediate effect order (IEO), insisting that its decision to issue a permit is in the public interest and therefore must take immediate effect" (Nelkin and Pollak 1981). This was the case with the planned nuclear power plant at Wyhl. Its construction permit had been challenged by nuclear opponents, but the licensing authority had issued an IEO arguing that stopping construction would endanger the sufficient production of electricity. In March 1975, the administrative court in Freiburg decided to withdraw the IEO because it was not convinced that suspension of construction would lead to a future electricity shortage. The most far-reaching decisions were handed down in 1977, as courts ordered the suspension of construction for the nuclear power plants at Brokdorf, Mühlheim-Kärlich, Grohnde, and Esenshamm. In the case of Brokdorf, the court openly questioned the existence of public interest in immediate nuclear construction, pointing to conflicting statements by politicians: "How should the court ascertain the public interest, when it had not been unequivocally defined in the political realm (Fach and Simonis 1987).

The *judicial* mechanism's direct contributions to the political impact of the anti-nuclear energy movement were minimal. With the single exception of the nuclear power plant Mühlheim-Kärlich, litigation has been unsuccessful in preventing the construction, licensing, or operation of individual plants in Germany. Due to two decades of anti-nuclear litigation, Mühlheim-Kärlich was only online for a short period, and was ultimately shut down in 1998 because administrative courts retroactively invalidated its construction permit. However, anti-nuclear litigation also had a more indirect political impact on the development of nuclear en-

ergy in Germany, and contributed to the curtailment of the nuclear program; partly scattered evidence suggests that similar development occurred in Italy, Switzerland, and the United States. To make this argument, one must understand that while it was not successful in preventing nuclear construction, litigation nonetheless had a triple effect.

First, although litigation ultimately failed to prevent the licensing and construction of nuclear power plants, temporary success in the courts led to the suspension of construction in some cases and increased the time needed to complete the construction permit process. Both contributed to the considerable increase in construction times (Kitschelt 1986). *Second*, litigation complicated and slowed the work of licensing authorities in general, causing them to take all possible measures to avoid defeat in the courts. Fach and Simonis (1987) found that German licensing authorities tried to make construction permits "court-proof" by considering any conceivable security objection that could be raised by nuclear opponents. Consequently, the period between the application and approval for a construction permit grew exponentially. *Third*, litigation and other anti-nuclear activities increased the safety requirements for nuclear energy during the 1970s (Komanoff 1981). As a consequence, more stringent manufacturing, testing, and performance criteria for structural materials such as concrete and steel doubled the amounts of materials, equipment, and labor and tripled the design engineering effort required for each unit of nuclear capacity.

Through these effects, litigation contributed to soaring construction costs for nuclear power plants, and more importantly resulted in the delay of nuclear construction overall. On the one hand, atomic energy lost its financial appeal, making electricity produced by atomic energy less competitive (Hewlett 1994; Komanoff 1981). One study found that one kWh of nuclear electricity would have cost 6.1 Pf rather than 14.7 Pf had the construction of German nuclear power plants not been delayed through court orders and changes in security requirements (Bald 1981). On the other hand, the delays in the implementation of nuclear programs

resulted in the cancellation of many atomic plants, because previous energy prognoses turned out to be inaccurate and the demand of energy continued to grow more slowly than expected immediately after the 1973 oil crisis.[11]

To sum up, this comparison between France and Germany confirms hypothesis 11, which suggested the conditions under which anti-nuclear litigation can activate the judicial mechanism. In terms of political opportunities, a relatively open political institutional structure seems to be a necessary but not sufficient condition to trigger the *judicial* mechanism. In addition relatively strong elite conflicts over nuclear energy are necessary to overcome the limited political independence of the court system. These findings also seem to be supported by considering Italy, Switzerland and the United States, in which litigation also seems to have been political effective. These countries have very open political institutional structures and experienced a relatively strong elite conflict over nuclear energy (see *table A2* and *table A3*).

The Disruption Mechanism

The anti-nuclear energy movement used disruptive tactics in many of the fourteen OECD countries in which actual nuclear construction took place. In particular the movements in France, Germany, Italy, Spain, Switzerland, and the United States regularly used site occupations or other forms of disruptive tactics (cf. Lindner 1981; Rucht 1990). The high responsiveness of political elites to anti-nuclear protest prevented the use of disruption in Austria, Denmark, Ireland, Luxembourg, Netherlands, and Norway (cf. Andersen 1980; Baker 1988; Rieder 1998) (cf. Preglau 1994; van der Heijden 1994). However, the conflicts over nuclear power in Canada, and Belgium demonstrate that anti-nuclear energy movement did not

[11] Thus, it is not incorrect when authors such as Nichols (1987) argue that mainly economic considerations convinced nuclear utilities in the United Sates to abandon atomic power stations even after construction had begun. However, Nichols overlooked the fact that these very economic realities stemmed partly from politics and would have played out differently in the absence of anti-nuclear mobilization.

necessarily resort to disruption when political elites remained unresponsive (Rüdig 1990). Although disruptive tactics were used in many countries, the scale and intensity of disruption was only severe enough to reach crisis dimensions – needed for exerting broad political pressure – in France, Germany, and, to a lesser degree, in Switzerland.[12] Whereas anti-nuclear mobilization had some success in Germany and Switzerland, it totally failed in France. In the following paragraphs I will explain why the French anti-nuclear movement failed to activate the *disruption* mechanism, while it was triggered by the movement in Germany.

The French movement was the first to flourish in Europe; as early as 1971, about fifteen thousand people rallied against a planned nuclear power station (Rucht 1994a). After the French government announced its extremely ambitious nuclear program in response to the oil crisis in 1974, the use of disruptive tactics began to spread, "involving sit-ins, occupation of sites and the occasional destruction of material and facilities"(Rucht 1994a). Despite widespread anti-nuclear mobilization, the government decided in the mid 1970s to accelerate the nuclear program and to construct the fast breeder in Creys-Malville that became the focus of future protests. In July 1976, some twenty thousand people participated in the first major demonstration at Malville, which was quite successful. Stimulated by this event, the anti-nuclear energy movement mobilized for a demonstration at Malville scheduled for July 1977. In quantitative terms it was a major success, with 40-60,000 participants; but the protests turned into a violent confrontation between protesters and police forces (Rucht 1994a). Al-

[12] Although anti-nuclear protest has been partly disruptive and even highly violent in Spain, this is an exceptional case. Almost all disruptive actions carried out by anti-nuclear forces were targeted against the Lemóniz nuclear power station in the Basque country (Rüdig 1990). Many Basque people regarded Lemóniz as a legacy of Francisco Franco and a political symbol of the political powerlessness of the Basque nation (Lancaster 1989). Thus, Lemóniz did not become a major issue "because of popular opposition on safety or other environmental grounds but because it was exploited as a symbol for the radical Basque nationalist cause" (Rüdig 1990).

though the disaster at Malville did not end all anti-nuclear activities, the movement lost much of its credibility and never fully recovered. Consequently, anti-nuclear mobilization lost its mass character, and its more radical fringe started to resort to more disruptive and even violent tactics (Jasper 1990). In the following years, the national debate over nuclear energy faded away, and the government did not change its nuclear policies even slightly (Rucht 1994a). That the disruptive protest and violence at Malville and elsewhere failed to trigger the *disruption* mechanism had two main reasons:

First, the degree of elite conflict over nuclear energy was very limited. The Socialists, with the most affinity to the anti-nuclear movement, were divided on the general question of nuclear energy (Jasper 1990). They "could agree on nuclear energy as a problem of capitalist profits, but no as an ecological issue" (249). *Second*, anti-nuclear mobilization neither caused nor was accompanied by major electoral instability. Although the anti-nuclear movement entered electoral politics, its successes were so limited and small that it did not threaten the major parties. In addition, and maybe even more importantly, the parties succeeded in spinning the nuclear issue in a way that would not upset the traditional French party cleavage. French political parties identify themselves along a Right-Left axis defined by the question of how policies affect the interests of Labor or Capital (Jasper 1990). Therefore, "partisan debates unfolded largely as a question of who would own the nuclear industry and who would profit from it" (Jasper 1990). To put it briefly, the anti-nuclear movement failed to trigger the *disruption* mechanism because sufficient political opportunities were absent.

Anti-nuclear mobilization emerged later, in the early 1970s, and in a weaker form in Germany, although the German nuclear program before 1973 was significantly larger (Nelkin and Pollak 1981). The use of disruptive tactics began with a tactical innovation in early 1975, when a few hundred protesters temporarily occupied the construction site of a planned nuclear power plant in Wyhl (Koopmans 1995). Only a few days after police evacuated the site, sev-

eral thousand protesters reoccupied it (Kitschelt 1980). The occupation lasted for most of the year, until the contractor, the state government, and the protesters settled on a moratorium through informal agreement. Although the Wyhl site occupation succeeded in forcing the state government to the negotiating table, it failed to produce a crisis beyond the regional level. Nuclear power was kept off the agenda by all political parties in the election campaign for the Bundestag in fall 1976, and it did not rank high among voters' concerns (Kitschelt 1980). The issue was hushed up because the parties already recognized that the issue cut across party lines and traditional political cleavages, and thus was considered threatening.

However, the tactic to keep atomic energy off the national political agenda was soon to fail. Very shortly after the 1976 general election, the construction permit for the nuclear power plant at Brokdorf was issued, but made public only after the construction company had brought in equipment overnight and police had blocked access to the site (Kitschelt 1980). Two weeks later, ten thousand outraged demonstrators were mobilized at the site, and large groups overcame the police barriers. A civil war-like confrontation with police developed, but the police prevented permanent occupation of the site (Wagner 1994). The political impact of the demonstrations and the violence at Brokdorf was immense. On the one hand, Brokdorf catapulted the nuclear energy issue to the top of the national mass media agenda (Overhoff 1984) as well as the national political agenda (Hatch 1986). On the other hand, the elite consensus began to unravel as state branches of the Liberals (FDP) and the SPD began to adopt anti-nuclear platforms (Kitschelt 1980).

Although the eruption of violence at Brokdorf also threatened the unity and public appeal of the anti-nuclear movement, it had a much less negative consequence than Malville (Rucht 1990). Thus, the crisis further intensified as the anti-nuclear energy movement continued to organize protests of similar size and disruptiveness at Brokdorf and other nuclear sites, which resulted in often violent clashes with police forces (Rucht 1990). The further escalation of

violence led to internal conflicts and fragmentation of the anti-nuclear movement, with different factions adopting various tactics. Among these tactics were highly disruptive actions such as sabotage, litigation, intensifying the scientific debate, and creating the Alternative Lists and Green parties. However, in contrast to France, the movement did not permanently lose its mass character (Wagner 1994).

What was the overall political impact of this major wave of anti-nuclear political disruption in the years 1975, 1976, and 1977? I will show that on various fronts, the prospects for nuclear energy seriously deteriorated in these years. The first blow occurred in August 1976, when an amendment to the Atomic Energy Act was passed by the Bundestag. The revised act required that a license for a nuclear facility be granted only if "every necessary precaution has been taken in the light of the existing scientific knowledge and technology to prevent damage resulting from construction and operation of the installation" (Supplement to NLB 18). This indeterminate legal term must be seen as partially responsible for the relative success of anti-nuclear litigation in Germany (Fach and Simonis 1987). In 1976 and 1977, serious conflicts about nuclear energy developed within the SPD and FDP, which formed the governing coalition on the federal level (Kitschelt 1980). The proposal introduced by the anti-nuclear energy movement for a moratorium on nuclear plant construction gained considerable support within both parties, but also led to strong internal conflict (Hatch 1986). These inter-party conflicts effected the second revision of the Energy Program, which was first postponed and finally passed in December 1977. The Second Revision reflected the new posture on nuclear energy by signalling a changeover from 'as much as possible' to 'as much as necessary' (Meyer-Abich 1982).

In addition the approval of additional nuclear power capacity was made contingent upon proof that the problem of assured waste handling ("gesicherte Entsorgung") could be solved not only in principle but also in practice. This requirement was laid down in a joint Federal-

State Declaration of Principles relating to the Nuclear Power Plant Waste Handling Provision dated September 29, 1979: “thereafter the doctrine of coupling the licensing of power plants with the disclosure of realizable and approvable plans for waste management was in force (Entsorgungskoppelung)” (Meyer-Abich 1982). The impact of this doctrine can be best seen in the fact that no construction licenses for nuclear power plants were issued between July 1977 and July 1982, and thus no additional nuclear construction began between 1978 and 1981. Thus, the nuclear program experienced a strong rupture in 1975-1977 (Wagner 1994): Almost all projects begun before that time could be completed, in most cases after long struggles; but only three projects would be started and fought through afterward.

To sum up, the empirical evidence suggests that, by resorting to disruptive tactics, the German anti-nuclear energy movement succeeded in triggering the *disruption* mechanism. I argue that this success was only possible because, in contrast to France, political opportunities were more frequent and powerful. *First*, the evolving elite conflict over nuclear power was much stronger and long-lasting (cf. Jasper 1990; Koopmans 1995; Oppeln 1989). In addition, the intra-party conflicts within the SPD and FDP were more politically relevant than those of the French Socialist Party, because the state branches of German political parties have more influence over the national parties and, as governing parties, can influence the policies of the states. *Second*, the nuclear power issue was not spun to reflect the traditional party cleavage in Germany. Although some partisan conflicts existed between the SPD and the CDU over the necessary degree of state involvement in the nuclear industry in the early 1970s, those disputes were replaced by the principled conflict over nuclear power (Kitschelt 1980). The emerging Green Party, as the only party that generally opposed nuclear power, threatened to destabilize the electoral bases of the SPD and FDP. Although the initial electoral successes were small as in France, they had considerable political impact since within a span of ten

months, the Greens had altered the outcome of several elections (Hatch 1986). Thus, the paired comparison between France and Germany confirms hypothesis 11.

The Public Preference Mechanism

All of the anti-nuclear energy movements covered in my study employed a wide range of signaling tactics to convince the public of the dangers inherent in the use of atomic energy and to inform policy makers about public attitudes (Falk 1982; Rüdig 1990). The tactics used to influence public opinion varied, but often included handing out leaflets, organizing rallies, and mobilizing for demonstrations. I will argue that the anti-nuclear energy movement in particular succeeded with these activities in triggering the *public preference* mechanism in Denmark, Ireland, Netherlands, and Spain referring to two sets of information for each country. *First*, I will use poll data to show that either a majority of the public opposed nuclear energy, or a significant shift towards anti-nuclear attitudes occurred prior to political decisions to postpone, curtail, or abandon nuclear power. *Second*, I will summarize existing case study material to show that governments were indeed concerned over public opinion in making their political decision.

- *Figure 3 about here* –

Figure 3 shows the development of public opinion between 1974 and 1989 in Denmark, Ireland, Netherlands, and Spain. The two time series for Denmark reveal striking deviations in the calculated net majority, but the trends are identical. In 1978, public majorities in Ireland still favored nuclear energy, but by 1982 significant majorities opposed it in all countries. The development of public opinion in the Netherlands is a special case because it became slowly more pro-nuclear after 1978, until the Chernobyl catastrophe reversed this trend. Thus, public opinion was opposed to nuclear in the early 1980s in these countries, but how do we know that public opinion was decisive for governments to abandon or curtail nuclear energy programs. I will show that existing case studies of nuclear policy making support the notion that

in Denmark, and Ireland the ruling political parties refrained from introducing nuclear power due to fear of strong public opposition and the potential electoral consequences. In Spain, faced with such opposition, a newly elected government curtailed the existing nuclear program and enacted a moratorium on additional nuclear stations. In the Netherlands, the government repeatedly stepped back from the construction of additional nuclear power stations.

In *Denmark*, the development of nuclear energy started in 1955 as the Danish Parliament passed a law setting up the Atomic Energy Commission to promote the peaceful use of atomic energy (Nielsen et al. 1999). However, only in 1973 one of the two major electric utilities announced its plan to construct of a 1,000-megawatt light water reactor (Nathan 1981). This plan was supported by the Danish government – a coalition made up of the Social Democratic Party and the Liberal Party (VENSTRE), but was strongly opposed by the Organization for Information about Atomic Power (OOA) - the national umbrella organization of local anti-nuclear groups. Although its call for a public debate on nuclear power previous to a decision was initially supported only by the small Left Socialists and the Socialists People's Party, OOA achieved its first success as the Danish Parliament agreed to postpone the decision and initiate an information campaign (Andersen 1990). Although the ruling Social Democratic Party was still officially pro-nuclear in 1976, it hesitated to put a law to a vote required to license the planed nuclear power station. In August, party chair and Minister President Anker Jørgensen learned via opinion polls of the strong public opposition to nuclear energy, and declared that nuclear energy could be only introduced with broad public support, and consequently the nuclear part of the energy program was stopped (Mez and Bethke 1979). In 1984 the Danish Parliament formally decided to abstain from nuclear power (Rieder 1998).

The plans to introduce nuclear energy in *Ireland* date back to 1968. In 1973, the state-run Electric Supply Board (ESB) started detailed planning for a nuclear power plant at Carnsore Point, County Wexford (Mez and Bethke 1979). Due to the stagnating energy demand after

the oil crisis, planning was put on hold until 1976. After its 1977 reelection, the Fianna Fáil government encouraged the ESB to push ahead with nuclear plans (Baker 1988). In reaction to this rush for nuclear energy, an anti-nuclear movement began to form at the local and the national levels. In August 1978, nuclear opponents managed to mobilize about 15,000 people for an anti-nuclear festival near the planned site (Rüdig 1990). In 1978, hoping to defuse the opposition against Carnsore Point, Fianna Fáil agreed to hold the full public inquiry demanded by nuclear opponents, which however was never carried out. In May 1980, the anti-nuclear movement achieved an important success as the main opposition party Fine Gael cautiously stated that the party was no longer committed to nuclear power. “The unanimity of agreement between the major parties was thus broken, leaving Fianna Fáil in an ever more vulnerable position” (Baker 1988). Also in May 1980, the Minister of Energy announced the postponement of the Carnsore plans, which were never to be revitalized. Assuming a linear shift of public opinion between 1978 and 1982, a net majority of 10 percent of the Irish population opposed nuclear energy by 1980.

The *Netherlands* had initiated a civilian atomic energy program in the 1960s; two small nuclear power plants with a total capacity of 517 MW were operating by 1973 (Lagaaij and Verbong 1999). In 1974 the Government Memorandum on Energy was published, which called for the diversification of energy sources and the construction of three nuclear power plants, and two years later a second memorandum twelve possible reactor sites (van der Heijden 1994). The plan evoked an enormous wave of protest in the selected municipalities as well as in the general population strengthening the anti-nuclear energy movement, which had emerged the year before when the Dutch parliament decided to participate in the construction and financing of the liquid metal fast breeder reactor (FBR) in Kalkar, Germany. Opposition came not only from outside the parliament, but also from within the government coalition. The small PPR was most adamant in its opposition, but leading members of the PvDA – the

largest party in parliament – also vigorously opposed nuclear energy (Hatch 1986). After the threat of resignation by a government minister, and in order to avoid a governmental crisis, the decision was postponed until after the parliamentary election scheduled for May 1977. The elections established a new government coalition (CDA-VVD) more favorably disposed to nuclear expansion. Nonetheless, it announced that the construction of new nuclear power plants would not be considered until certain safety problems related to atomic energy had been satisfactorily resolved. In addition, the parliament agreed to hold a Broad Public Debate on Energy Policy, supported by pro-nuclear forces as an attempt to channel the rampant resistance against nuclear energy. Before the actual debate, elections and further changes in government took place in the autumn of 1981. The new coalition government (PVdA, CDA, D'66) decided to withdraw the Memorandum on Energy Policy, and thus stopped the plans for the three nuclear plants.

In *Spain* nuclear energy was introduced and promoted by the Franco regime. During the dictatorship, open opposition to nuclear energy had been impossible. After the transition to democracy, the anti-nuclear energy movement quickly emerged on both the local and national levels. The second National Energy Plan (PEN) adopted in 1979 still contained a strong commitment to nuclear energy. The PEN-1982 acknowledged the technical and political delays in nuclear construction, but nevertheless did not significantly alter the strong nuclear direction of Spain's energy policy (Lancaster 1989). The parliamentary opposition of the Socialist Party (PSOE) and the Communist Party (PCE) had criticized both PENs, but only adopted stringent anti-nuclear positions after the 1979 accident at Three Mile Island. Public opinion was also strongly positioned against nuclear energy, with a net majority of 19.7 percent opposing the construction of atomic energy plants. After the October 1982 election, the PSOE formed a new government that adopted a new PEN in 1983 (Lancaster 1989). Although the Socialist government did not totally abandon nuclear energy as its previous rhetoric might

have suggested, it did nevertheless significantly curtail the nuclear program. It not only issued a nuclear moratorium, but also prevented the opening of seven new plants (Lopez-Pintor and Ramallo 1986). It took the step of suspending the construction of five nuclear plants, although "these five plants accounted for 18.5 percent of 1982's fixed-capital formation in the nuclear sector. The construction stoppage significantly altered investment in energy" (Lancaster 1989).

To sum up, these case studies support the argument that public opinion played a significant role in the decision making on nuclear energy and that anti-nuclear mobilization sensitized governments about the public opinion towards nuclear energy. Change in nuclear programs was achieved through rational anticipation in Denmark, Ireland and the Netherlands. In contrast change in nuclear programs was achieved through electoral turnover in Spain. However, the public preference mechanism – following the logic of the direct-effect model of movement outcomes – makes an even stronger claim, namely that anti-nuclear movements can even influence public opinion. Unfortunately, literature which systematically explores the link between anti-nuclear mobilization and public attitudes towards nuclear power is practically absent. Most of the literature on nuclear public opinion either deals with the influence of mass media coverage on nuclear attitudes (Fabris 1980; Gamson and Modigliani 1989; Kepplinger 1988; Mazur 1984; Mazur 1990; Overhoff 1984; Saxer et al. 1986), or with the impact of nuclear accidents on public opinion (De Boer and Catsburg 1988; Melber 1983; Peters et al. 1990; Renn 1990).

However, the existing scattered evidence supports the argument that the anti-nuclear energy movement also shaped the development of public opinion on nuclear energy. On the one hand, the politicization of the nuclear energy issue which was necessary to evoke large-scale mass media interest in nuclear power was preceded by contentious activities of the anti-nuclear movement (Baumgartner and Jones 1991; Jasper 1988; Mazur 1984; Overhoff 1984).

Overhoff (1984) found that nuclear energy in Germany started to become a news issue after the occupation of a proposed nuclear power plant construction site in Whyl and the violent eviction by police forces. He also reported that the quantity of coverage increased when the anti-nuclear energy movement staged spectacular mass demonstrations such as the one against the Brockdorf nuclear power station. This link between protest and reporting is also confirmed by data from the United States. Mazur (1990) found that the size of each year's biggest anti-nuclear demonstration closely parallels the quantity of reporting. Finally, Baumgartner and Jones (1991) documented how, after the mid 1960s, the tone in the coverage of civilian nuclear power become more and more negative, because the anti-nuclear movement "had succeeded in convincing writers for the mass media that the future of nuclear power was not the shinning city on the hill, but death, destructions, and debt" (1055). On the other hand, nuclear opponents' wide range of activities to disseminate information on the dangers of nuclear energy seems to have had an effect on public opinion as well (Fabris 1980).

CONCLUSION

I claimed that we can improve our ability to explain and understand the political outcomes of social movements if we conduct empirical research, which complies with three propositions: 1) It has to include all relevant independent variables; 2) it should try to specify the causal mechanisms of political change; and 3) it should be as inclusive as possible in the case selection. I will argue that following this approach indeed substantially improved our understanding of the political impact of anti-nuclear energy mobilization. I believe that the broader theoretical implications of my findings not only contribute to our general understanding of political outcomes, but in addition also support the notion that the theoretical framework laid out in this paper could help to more fully understand and explain the political outcomes of other social movements.

The quantitative analysis revealed that only hypotheses 2 and 4 can be regarded as confirmed without any reservations. Anti-nuclear mobilization was significantly more successful in countries where the movement attempted to prevent the introduction of nuclear power, as compared to those in which it advocated abandoning nuclear power and halting the construction of additional nuclear power stations. This relationship was completely overlooked in past research, most likely because with the exception of Norway, the comparative studies have neglected countries such as Denmark, Ireland, and Luxembourg in which the anti-nuclear energy movement prevented the construction of nuclear power plants in the first place. Elite splits seem to constitute the most powerful and universal political opportunity, which is also a surprising finding because the role of elite conflicts have rarely mentioned in previous research, but is consistent with other research. Hypotheses 3 and 6 have been also been confirmed, but some reservations do apply. Public opinion had only a relatively weak, though statistically significant impact in the fourteen-country sample. The index of political institutional structure only had a strong and significant impact in countries where the movements pursued the goal of halting further nuclear construction.

Hypotheses 1a, 5, 7, 8 were not supported by the analysis and thus have to be rejected, but the evidence is simple and straightforward for only one of them. The dependency on energy imports in 1973 did not reveal any meaningful relationship with the impact of anti-nuclear energy movements. The evidence is somewhat more convoluted for hypotheses 1a, 5, and 7. Although anti-nuclear mobilization initially seemed more successful in smaller countries, a more thorough analysis uncovered the artificiality of this link. The success of the movements was not due to the countries' small size, but because their movements pursued a less demanding goal and succeeded in preventing the introduction of nuclear power. Although the degree of electoral stability had no statically significant influence in the quantitative analysis, my case studies nonetheless indicate that the instability in electoral alignment mat-

tered. In Germany disruptive tactics worked because anti-nuclear mobilization threatened to undermine electoral alignments, and thus contributed to a de facto nuclear moratorium.

Movement strength was weakly correlated with the impact of the anti-nuclear movement, but not on a statistically significant level. Thus, I found no evidence for the direct-effect model of movement outcomes rather the impact of movement strength is contingent on the presence of political opportunities. Relatively weak social movements can achieve great successes in a favorable political context, as is documented by the anti-nuclear movement in the Netherlands; very strong movements might fail to have the intended political impact in an unfavorable political context, as exemplified by the movement in France. Nonetheless, we can still assume that social movements need a certain minimum of strength to achieve meaningful goals, since the anti-nuclear energy movements have been unsuccessful in the countries with the weakest anti-nuclear mobilization. This argumentation is supported by the fact that the interactive terms between movement strength and elite conflict, public opinion and open institutional structures are correlated with nuclear program deviation on a statistically significant level. Thus, although hypothesis 1a could not be confirmed, evidence supporting hypothesis 1b was strong. However, with the exception of institutional openness correlations between political opportunities and nuclear program deviation were stronger and more significant than the ones between nuclear program deviation and their interactive terms. Thus, support of the indirect-effect model of movement outcomes is greater than for the joint-effect model.

As many studies did before my findings clearly support the notion about the crucial importance of political opportunities to account for the political success of social movements. My quantitative analysis and the presented case study material both show that anti-nuclear energy movement had a substantial political impact if a) it is confronted with a situation of intense elite conflict and favorable public opinion; or b) the country has an open political institutional structure. In other words, when political opportunities are absent anti-nuclear mobi-

lization failed to activate the causal mechanisms of political change. More specifically my research findings have three important implications for understanding the role of political opportunities in the process of movement generated political change.

First, my study demonstrated that the impact of political opportunities is not additive but rather complementary – various configurations of political opportunities can lead to success. My statistical analysis showed that three types of political opportunities mattered in the case of the anti-nuclear energy movement. To be successful, a single anti-nuclear energy movement did not require all of these opportunities; but two typical patterns became visible. In most countries, anti-nuclear movements benefited either from a combination of an anti-nuclear public and strong elite conflict, or from an open political institutional structure. This finding also corrects a common bias in the literature on the anti-nuclear energy movement, which often exclusively considered institutional openness rather than presence of political opportunities in general as a pre-condition for political success (Campbell 1988; Delmas and Heiman 2001; Kitschelt 1986).

Second, my research suggests that the importance of certain political opportunities is contingent on the goals pursued by the anti-nuclear energy movement. For the full country sample only the intensity of elite conflict and public opinion on nuclear energy turned out to be statistically significant variables. However, when we remove the four countries in which anti-nuclear mobilization attempted to prevent the introduction of nuclear energy, the political institutional structure becomes a statistically significant political opportunity as well, while the statistical significance of elite conflicts and public opinion decreases.

Third, some political opportunities are contingent on the presence of others. My analysis of the disruption mechanisms showed that certain features of the political institutional structure increase the vulnerability of established parties to electoral instability. The electoral system is Germany is based on proportional representation, guaranteeing that the Green Party

affected election outcomes with merely 2 percent of votes, whereas it failed to do in France with similar results at the polls. In addition, the federal nature of the German state decentralizes implementation power and provides many more elections and possible venues for anti-nuclear activism. My analysis of the public preference mechanisms in Denmark, and Ireland provided evidence for the argument that the public opinion only influence public policy making after anti-nuclear movements had won some support by political elites.

Fourth, we have to spend more effort to identify the origins of political opportunities (cf. Pedriana 2004). Many studies found the presence political opportunity the key explanatory variable. Some authors assess this finding as being a challenge to the claim that social movements are important forces of political change, because political opportunities are considered as being external to social movements (Kitschelt 1986). Although this is true for the opportunities provided by an open institutional structure of a country I argue that one cannot generalize this finding to other types of political opportunities. My research suggests that opportunities provided by elite conflicts and public opinion might be an outcome of earlier social movement mobilization. Thus, I argue that the indirect-effect model might be more appropriate than the joint-effect model of social movement outcomes in the case of opportunities other than open institutional structures.

By using a nested analysis, combining quantitative statistical analysis and qualitative case studies, I demonstrated that statements about causal mechanisms can indeed complement analysis based on statistical correlations (cf. Mayntz 2004). However, more importantly this article suggests that the inclusion of causal mechanism into theories of social movements and political change provide us with more complete understanding of movement outcomes. I could prove that the assumption that "most social movement outcomes are probably obtained through multiple pathways rather than through one surefire pathway" (Cress and Snow 2000) is absolutely true. My case studies analysis demonstrated that political outcomes in countries

with strong elite conflicts and majority anti-nuclear attitudes – most notably Denmark, Ireland, the Netherlands, and Spain – were obtained by the public preference mechanism. Political outcomes in the other countries seem to be caused by combination of causal mechanisms. I showed that the disruption and the judicial mechanisms were activated by anti-nuclear mobilization in Germany. My findings strongly support the claim that changes in nuclear program size were really caused by anti-nuclear mobilization.

By linking political opportunities to my causal mechanisms of political change, I could show that the political effectiveness of different tactics depend of the presence of certain political opportunities. Thus, my case studies confirmed hypotheses 9, 10 and 11. The movement succeeded in triggering the *public preference* mechanism in countries such as Denmark, Ireland, the Netherlands, Norway, and Spain, where political opportunities included strong elite conflicts and anti-nuclear publics. Anti-nuclear litigation could only trigger the *judicial* mechanism in countries with an open institutional political structure, such as Germany, Italy, Switzerland, and the United States. In addition to overcoming the bounded nature of rights and the lack of independence of courts, successful litigation required a favorable legislative context and elite conflicts over nuclear energy. Disruptive tactics triggered the *disruption* mechanism only when political elites were split, electoral instability threatened the governing parties, disruptive action was sustained, and the movement's constituency pool was perceived to be on the rise.

Although the theoretical framework developed in this article proved to be helpful to explain the political outcomes of the anti-nuclear energy movement, it obviously requires substantial refinements and elaboration before it could evolve into a full-fletch theory of social movements and political change. For example, the process of political change as the dependent variable has to be disaggregated, because state action is much more than the adoption of legislation and the subsequent levels of spending as several authors have emphasized recently

(Amenta and Young 1999; Burstein 1993; Kolb 2006; Soule and King 2006). For example, it would be interesting to know, which variables and causal mechanisms explain, why the least successful movements differed remarkably in their ability to bring nuclear energy on the national political agenda. However, for the moment I will restrict myself to discuss two possible charges against another core element for the framework – causal mechanisms. In this article I suggested three causal mechanisms of political change, and demonstrated that they caused anti-nuclear outcomes. However, critics might on the one hand question the robustness of these mechanisms, and on the other hand argue that additional mechanisms must be used to explain anti-nuclear outcomes.

Although it is reversed for future research to assess the robustness of my mechanisms, I argue that existing research likewise suggests so. Several studies of the women‘s, the gay/lesbian, and the civil rights movement have shown how social movements obtained political outcomes through litigation (cf. Alter and Vargas 2000; Burstein 1991; Frymer 2003; McCann 1994; Morton 2001; Rosenberg 1991; Smith 2005). A fair number of studies also showed how disruptive tactics used by the civil rights, labor, student's, and racist movement succeed in activating the disruption mechanism (Goldfield 1989; Haines 1989; Koopmans 1996; Piven and Cloward 1979; Tarrow 1993). Although is rarely made explicit a couple of studies showed that the civil rights, and the peace movement activated the public preference mechanism (cf. Burstein 1999; Knopf 1998; Lee 2002; McAdam and Su 2002).

To be clear, I never made the claim that the mechanism suggested in the paper are sufficient to explain the political outcomes of all social movements or even the impact of the anti-nuclear energy movement after 1986. Although we should be careful not to inflate the number of mechanisms there seem to be at least two additional mechanism through which social movements regularly obtain political outcomes (Kolb 2005). The *political access* mechanism states that social movements can achieve substantive political change by becoming more inte-

grated into the polity and thereby gaining access to the policy process. In case of the anti-nuclear struggle, the decision to phase-out nuclear energy in Germany, was clearly (partly) a consequence of the green party government participation (Mez and Piening 2002). Studies of the civil rights and the women's movement suggest that the political access mechanism has also more a more general relevance (Canon 1999; Outshoorn 2004; Stetson 2001; Weldon 2002). The *international politics* mechanism states that social movements can mobilize the leverage of other states or international organizations in order to achieve domestic political change. Evidence of the international politics mechanism is strongest for the civil rights movement and the women's movement in the European Union (Alter and Vargas 2000; Dudziak 2000; Layton 2000; Skrentny 1998).

TABLE 1

CORRELATION MATRIX (THAU-B) EIGHT EXPLANATORY VARIABLES AND NUCLEAR PROGRAM DEVIATION, EIGHTEEN OECD COUNTRIES

		Goal	Movement strength	Intensity of elite conflict	Electoral stability	Energy import dependency (1973)	Political institutional structure	Population (2002)	Public Opinion
Movement Strength	Corr.. coeff.	-.206							
	Sig. (2-tailed)	*.333*							
Intensity of elite conflict	Corr. coeff.	-.453*	.202						
	Sig. (2-tailed)	*.045*	*.310*						
Electoral stability	Corr. coeff.	-.238	.055	.099					
	Sig. (2-tailed)	*.243*	*.758*	*.603*					
Energy Import Dependency	Corr. coeff.	-.303	-.007	-.046	0.262				
	Sig. (2-tailed)	*.137*	*.969*	*.810*	*.129*				
Political institu-tional structure	Corr. coeff.	.326	.159	.048	-.157	-.082			
	Sig. (2-tailed)	*.121*	*.393*	*.809*	*.379*	*.646*			
Population (2002)	Corr. coeff.	.583**	.042	-.357	-.190	-.210	.252		
	Sig. (2-tailed)	*.004*	*.817*	*.060*	*.272*	*0.225*	*.157*		
Public Opinion	Corr. coeff.	-.540**	.014	.494**	.085	.013	-.007	-.556**	
	Sig. (2-tailed)	*.008*	*.939*	*.009*	*.622*	*.940*	*.969*	*.001*	
Nuclear program deviation	Corr. coeff.	-.603**	.335	.628**	.007	.021	.110	-.582**	.568**
	Sig. (2-tailed)	*.005*	*.076*	*.002*	*.969*	*.907*	*.557*	*.009*	*.001*

*. Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

TABLE 2

CORRELATION MATRIX (THAU-B) SEVEN EXPLANATORY VARIABLES AND NUCLEAR PROGRAM DEVIATION, FOURTEEN OECD COUNTRIES

		Movement strength	Intensity of elite conflict	Electoral stability	Energy import dependency (1973)	Political institutional structure	Population (2002)	Public Opinion
Intensity of elite conflict	Corr. coeff.	.216						
	Sig. (2-tailed)	*.345*						
Electoral stability	Corr. coeff.	.012	-.025					
	Sig. (2-tailed)	*.955*	*.908*					
Energy Import Dependency	Corr. coeff.	-.035	-.203	.209				
	Sig. (2-tailed)	*.867*	*.353*	*.298*				
Political institutional structure	Corr. coeff.	.325	.324	-.148	-.034			
	Sig. (2-tailed)	*.128*	*.128*	*.472*	*.868*			
Population (2002)	Corr. coeff.	.221	-.127	-.099	-.055	.057		
	Sig. (2-tailed)	*.289*	*.562*	*0.622*	*0.784*	*.782*		
Public Opinion	Corr. coeff.	-.151	.356	.011	-.165	.262	-.429*	
	Sig. (2-tailed)	*0.468*	*.104*	*.956*	*.412*	*.203*	*.033*	
Nuclear program deviation	Corr. coeff.	.370	.593**	-.198	-.268	.506*	-.198	.431*
	Sig. (2-tailed)	*.086*	*.009*	*.340*	*.196*	*.017*	*.340*	*.038*

*. Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

TABLE 3

CORRELATIONS BETWEEN THE IMPACTS OF MOVEMENT STRENGTH, ELITE CONFLICT, PUBLIC OPINION, POLITICAL INSTITUTIONAL STRUCTURE, ELECTORAL VOLATILITY THEIR INTERACTIVE TERMS, AND NUCLEAR PROGRAM DEVIATION

		Movement strength	Intensity of elite conflict	Movement strength X Intensity of elite conflict	Public Opinion	Movement strength X public opinion	Political institutional structure	Movement strength X Political institutional structure	Electoral volatility	Movement Strength X Electoral volatility
Full sample	Corr. coeff.	.335	.628**	.517**	.582**	.554**	.110	.297	.007	.259
	Sig. (2-tailed)	*.076*	*.002*	*.005*	*.001*	*.002*	*.557*	*.102*	*.969*	*.151*
Fourteen country sample	Corr. coeff.	.370	.593**	.500*	.431*	.361	.506*	.562**	-.198	.340
	Sig. (2-tailed)	*.086*	*.009*	*.018*	*.038*	*.082*	*.017*	*.007*	*.340*	*.465*

*. Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

TABLE 4

SUMMARY OF THE PRESENCE OF POLITICAL OPPORTUNITIES AND ANTI-NUCLEAR SUCCESS IN EIGHTEEN OECD COUNTRIES

Country	Presence of political opportunities				Anti-nuclear success
	Strong elite conflict	Anti-nuclear public opinion	Open political institutional structure	Electoral Instability	
Austria	+	+	-	-	++
Belgium	-	++	+	+	-
Canada	-	-	-	+	-
Denmark	+	++	-	++	++
Finland	-	++	+	+	+
France	-	-	-	++	-
Germany	+	-	++	-	+
Ireland	++	++	-	-	++
Italy	+	-	++	++	+
Japan	-	-	-	-	-
Luxembourg	++	++	-	++	++
Netherlands	++	++	+	+	++
Norway	++	++	-	+	++
Spain	++	++	+	++	+
Sweden	++	-	-	+	+
Switzerland	+	-	++	-	+
UK	-	-	-	+	-
USA	+	+	++	-	+

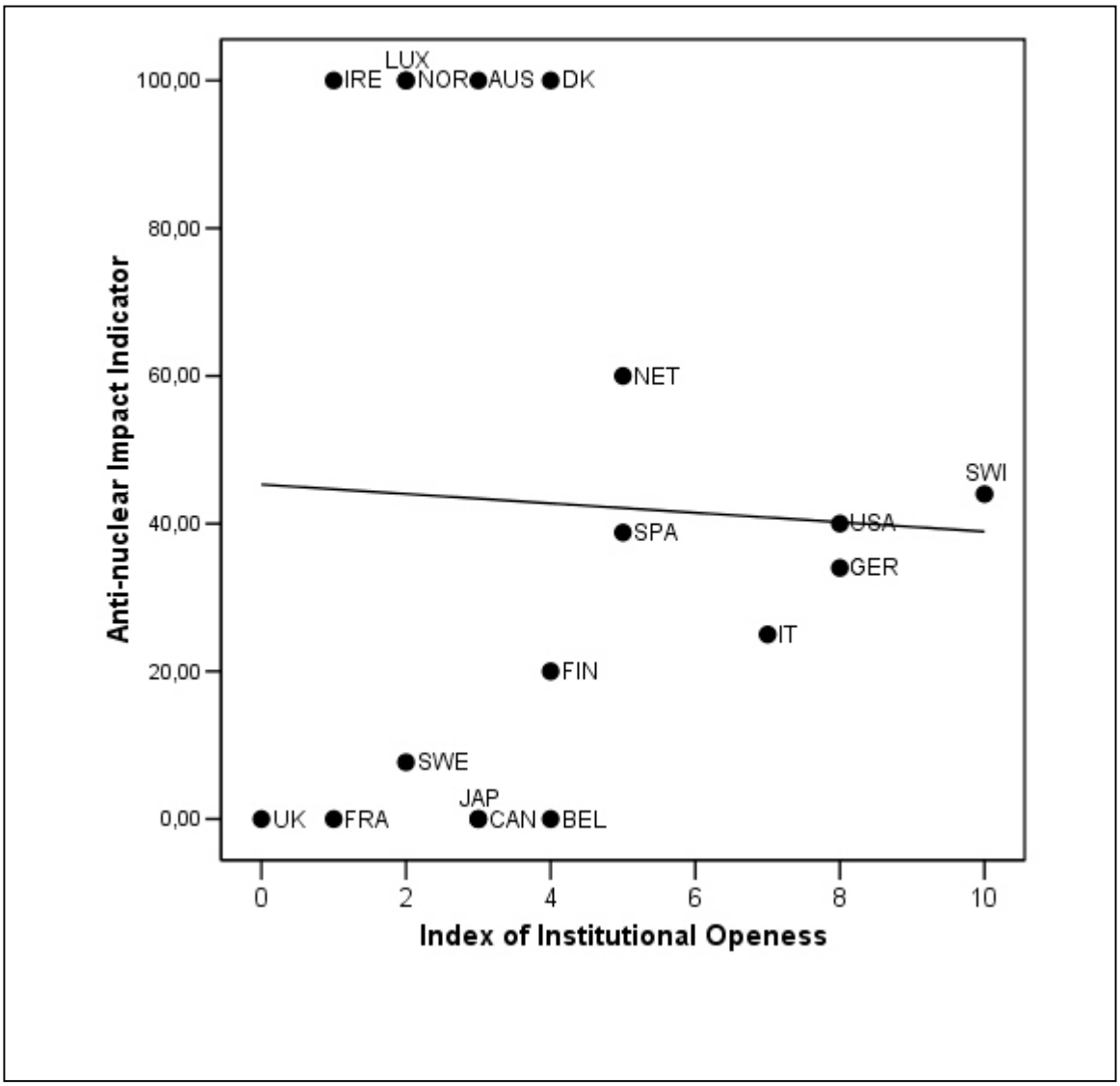

FIG. 1.–The impact of political institutional on the anti-nuclear impact indicator.

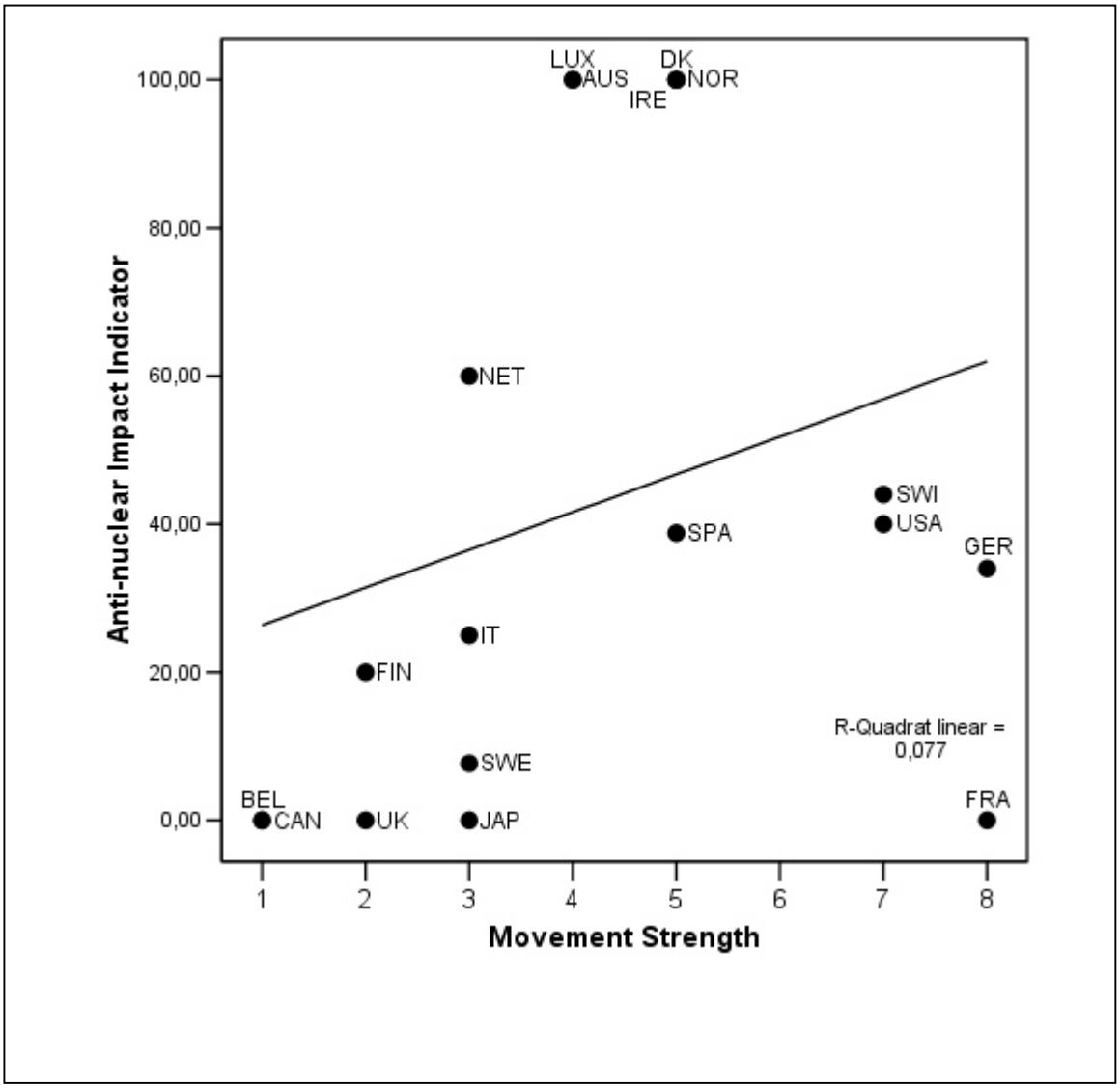

FIG. 2.–The impact of movement strength on the anti-nuclear impact indicator.

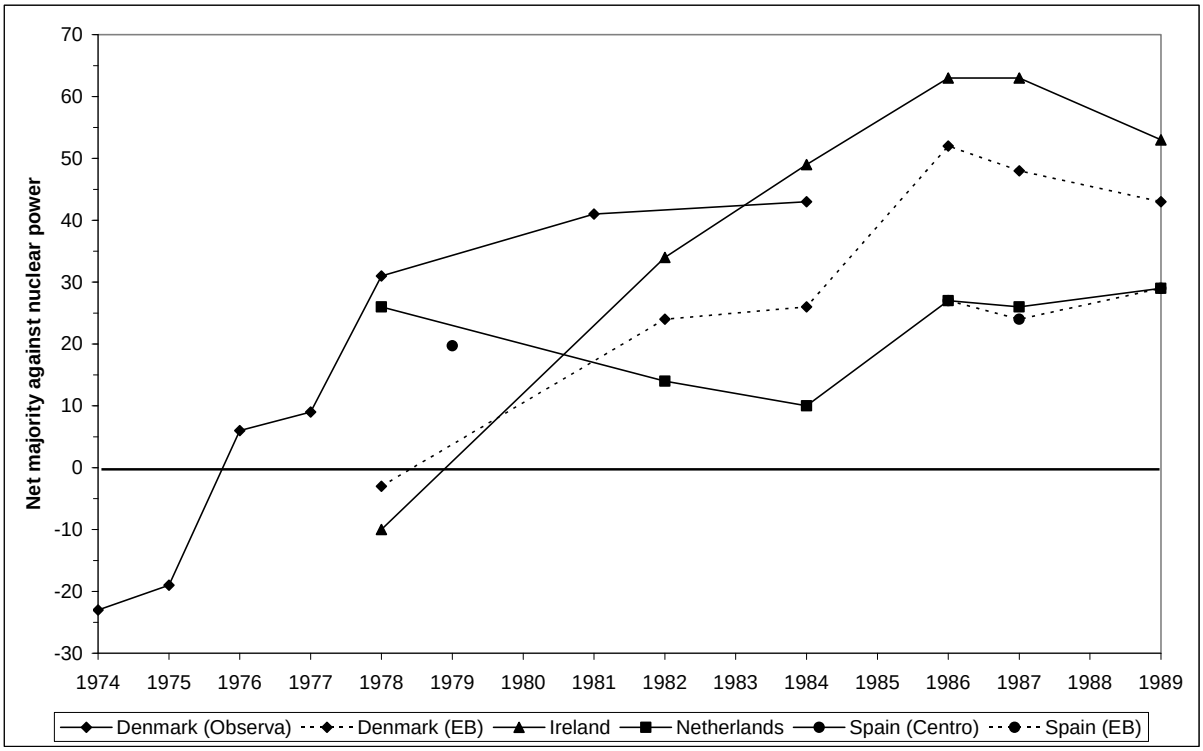

FIG. 3.– Development of public opinion on nuclear energy in Denmark, Ireland, the Netherlands, and Spain, 1974-1989.

APPENDIX A

Measurement of Independent and Dependent Variables

TABLE A1

THE STRENGTH OF THE ANTI-NUCLEAR MOVEMENT IN EIGHTEEN OECD COUNTRIES, 1975-1986

Country	Mass Mobilization	Local Resistance	***Sum***
Austria	3	1	**4**
Belgium	0	1	**1**
Canada	0	1	**1**
Denmark	3	2	**5**
Finland	0	2	**2**
France	4	4	**8**
Germany	4	4	**8**
Ireland	3	2	**5**
Italy	1	2	**3**
Japan	1	2	**3**
Luxembourg	1	3	**4**
Netherlands	2	1	**3**
Norway	1	4	**5**
Spain	2	3	**5**
Sweden	2	1	**3**
Switzerland	3	4	**7**
United Kingdom	1	1	**2**
USA	3	4	**7**

SOURCE.– Authors own estimates based secondary literature (e.g. Camilleri 1984; Diani and van der Heijden 1994; Falk 1982; Rüdig 1990) and protest event data for France, Germany, the Netherlands, and Switzerland provided by Hanspeter Kriesi and his collaborators (1995) and by Marco Giugni (2004) for Italy and the United States.

TABLE A2

INDEX OF POLITICAL INSTITUTIONAL STRUCTURE, EIGHTEEN OECD COUNTRIES

	Executive-Legislative Relationship[1]	Federalism[2]	Bicameralism[3]	Referendum[4]	Strength of Judicial Review[5]	Effective Number of Political Parties[6]	**Index of political institutional structure**
Austria	0	1	0	1	1	0	**3**
Belgium	2	0	1	0	0	1	**4**
Canada	0	2	0	0	1	0	**3**
Denmark	1	0	0	1	0	2	**4**
Finland	2	0	0	0	0	2	**4**
France	0	0	0	0	0	1	**1**
Germany	1	2	2	0	2	1	**8**
Ireland	0	0	0	0	0	1	**1**
Italy	2	0	1	2	1	1	**7**
Japan	1	0	1	0	0	1	**3**
Luxembourg	1	0	0	0	0	1	**2**
Netherlands	1	1	1	0	0	2	**5**
Norway	1	0	0	0	0	1	**2**
Spain	1	1	0	1	1	1	**5**
Sweden	0	0	0	1	0	1	**2**
Switzerland	2	2	2	2	0	2	**10**
UK	0	0	0	0	0	0	**0**
USA	2	2	2	0	2	0	**8**

[1] 0=weak parliament, 1=balanced executive-legislative relationship, 2=strong parliament (Lijphart 1984; 1999). [2] 0=no or very weak federalism, 1=weak federalism, 2=strong federalism (Lijphart 1999). [3] 0 = no second chamber or weak second chamber 1=medium strong bicameralism, 2=strong bicameralism (Lijphart 1999). [4] 0=no referendum provision in the constitution or referendum can be only initiated by the government, 1=referendum can be initiated by a minority of the parliament, 2=referendum can be initiated by the electorate (Butler and Ranney 1994). [5] 0=no or weak judicial review, 1=medium-strength judicial review, 2=strong judicial review (Lijphart 1999). [6] 0=low, 1=medium, 2=high (Lijphart 1984; 1999).

TABLE A3

INTENSITY OF POLITICAL ELITE CONFLICT OVER NUCLEAR ENERGY IN EIGHTEEN OECD COUNTRIES, 1973-1986

Country	Strength	Country	Strength	Country	Strength
Austria	2	Germany	2	Norway	2
Belgium	1	Ireland	3	Spain	3
Canada	1	Italy	2	Sweden	3
Denmark	2	Japan	1	Switzerland	2
Finland	1	Luxembourg	3	United Kingdom	1
France	0	Netherlands	3	United States	2

NOTE.– 0) No or very weak elite conflict: A far-reaching consensus among and within political parties about the need to extensively use nuclear power exists; 1) Weak elite conflict: All major political parties support the use of nuclear power, but at least one minor political party is fundamentally opposed, 2) Medium elite conflict: Although all major parties support the use of nuclear power in principle, at least one major party ties its support to certain conditions (for example, organization of a referendum, proof of safe waste disposal) or supports temporary restrictions on the continuation of the nuclear program. In addition, at least one minor political party is opposed to the use of nuclear power and strong anti-nuclear minorities exist within major political parties. 3) Strong elite conflict: At least one major political party actively opposed the introduction and / or construction of additional nuclear power plants, and / or supports the abandonment of nuclear power. SOURCE.– Author's research based on secondary literature (Flam 1994b; Mez 1981; Mez and Bethke 1979).

TABLE A4

AVERAGE ELECTORAL VOLATILITY IN EIGHTEEN OECD COUNTRIES BETWEEN 1973 AND 1986

Country	Percent	Country	Percent	Country	Percent
Austria	2.18	Germany	5.56	Norway	11.30
Belgium	10.62	Ireland	5.95	Spain	17.32
Canada	8.56	Italy	13.06	Sweden	10.78
Denmark	14.02	Japan	4.42	Switzerland	5.26
Finland	11.68	Luxembourg	14.07	United Kingdom	10.32
France	22.72	Netherlands	10.45	United States	5.31

SOURCE.– Author's calculations based on Mackie and Rose (1991; 1997).

TABLE A5

AVERAGE PERCENTAGE DIFFERENCE BETWEEN NUCLEAR ENERGY OPPONENTS AND SUPPORTERS IN EIGHTEEN OECD COUNTRIES, 1978-1984

Country		Country	Percent	Country	Percent
Austria [1]	1.00	Germany	- 4.33	Norway [5]	72.40
Belgium	9.33	Ireland	24.33	Spain [6]	9.70
Canada [2]	- 2.66	Italy	- 4.33	Sweden [7]	- 4.00
Denmark	15.67	Japan [4]	- 27.33	Switzerland [8]	- 1.40
Finland [3]	11.00	Luxembourg	10.33	United Kingdom	- 12.66
France	- 14.33	Netherlands	16.67	United States [9]	0.75

NOTE.– If not otherwise specified data comes from Eurobarometer surveys conducted in 1978, 1982 and 1984. [1]Data from 1978 Referendum on nuclear energy; [2] Gallup polls from 1978, 1982, and 1983; [3] Yhdyskuntatutkimus Oy polls from 1984, and 1985; [4] Asahi polls from 1979, 1982, and 1985; [5] Gallup poll from 1979; [6] Centro de Estudios de la Energía poll from 1979; [7] SIFO polls from 1978, 1981, and 1983; [8] Polls from 1978, and 1982; [9] Polls from 1978, and 1982.

TABLE A6:

DIFFERENT ESTIMATES OF DEVIATIONS FROM PLANNED NUCLEAR PROGRAM CAPACITIES FOR THIRTEEN OECD COUNTRIES

	Estimate based on 1974-1988 comparison[1]	Estimate based on 1977-1990 comparison[2]	Estimate based on 1982-1990 comparison[3]
Belgium	324 %	39 %	4 %
Canada	66 %	- 34 %	- 8%
Finland	50 %	-	9%
France	150 %	-	1%
Germany	+/- 0 %	-32 %	-9%
Italy	-100 %	-100 %	-100%
Japan	89 %	-37 %	-31%
Netherlands	-86 %	-67 %	0%
Spain	+/- 0 %	-38 %	-43%
Sweden	32 %	30 %	9%
Switzerland	-48 %	19 %	3%
United Kingdom	+/- 0%	-5 %	19%
United States	-57 %	-46 %	-13%

SOURCES.– [1]Rüdig (1990) [2] own calculations based on data from IEA (1978) [3] own calculations based on data from IEA (1982).

TABLE A7:

NUCLEAR PROGRAM DEVIATION FOR EIGHTEEN OECD COUNTRIES, 1973-1986

Country	Percent	Country	Percent	Country	Percent
Austria	100	Belgium	0	Canada	0
Denmark	100	Finland	20	France	0
Germany	34	Ireland	100	Italy	25
Japan	0	Luxembourg	100	Netherlands	60
Norway	100	Spain	38.8	Sweden	7.6
Switzerland	44.4	United Kingdom	0	United States	40

SOURCE.– Author's calculations based on information from the nuclear industry magazine Atomwirtschaft (ATW) and the nuclear industry yearbook Jahrbuch Atomwirtschaft.

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