

ABSTRACT

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ABSTRACT

The policy beliefs of advocacy groups, policymakers, and other interested individuals help to shape public policy. Yet, policy beliefs are rarely used in policy analyses. This dissertation changes that by examining the role of policy beliefs in pesticide regulatory reform in the 1980s and 1990s. Important concepts explored in this analysis of pesticide regulatory reform include: a determination of whether the policy core beliefs of like-minded advocacy groups possess enough uniformity to justify categorization of these groups into larger advocacy coalitions, an identification of the process by which an advocacy coalition's secondary policy beliefs toward pesticide regulations change over time, an examination of whether compromises in secondary policy beliefs among advocacy coalitions are associated with policy change, and an investigation into whether stronger advocacy coalitions influence compromises in secondary policy beliefs among weaker advocacy coalitions. Examining these concepts reveals the role of policy beliefs in shaping public policy. In addition, the answers to these questions help to compare two policy theories: the Advocacy Coalition Framework and Punctuated Equilibrium.

The findings help integrate key concepts from the Advocacy Coalition Framework and Punctuated Equilibrium to forge a new level of policy analysis that explores how the policy beliefs of advocacy groups change. By analyzing the debates over pesticide regulatory reform in the 1980s and 1990s, this dissertation finds that the

policy beliefs of consumer-environmental advocacy groups exhibit a punctuated equilibrium pattern. In essence, these groups incorporate pro-agribusiness beliefs when a change in pesticide regulations seems imminent. This suggests that pro-environmental groups bargain with their beliefs in attempts to influence pesticide regulations. Other findings examine key tenets of both the Advocacy Coalition Framework and the Punctuated Equilibrium model through time-series analyses, group comparison tests, and interviews with agency personnel and advocacy groups. Overall, these findings indicate that the need for policy reform often drives compromises in policy beliefs and that advocacy groups often use policy beliefs to directly influence other advocacy groups.

NORTHERN ILLINOIS UNIVERSITY

BARGAINING OF BELIEFS: AGENCIES, ADVOCACY GROUPS,
AND THE EVOLUTION OF PESTICIDE REGULATORY
REFORM

A DISSERTATION SUBMITTED TO THE GRADUATE SCHOOL
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DEPARTMENT OF POLITICAL SCIENCE

BY

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DEDICATION

For Lesley Abigail Hoenig, and Jerry and Joy Greitens

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LIST OF ABBREVIATIONS

ACF	Advocacy Coalition Framework
CPR	Campaign for Pesticides Reform
EPA	Environmental Protection Agency
FDA	Food and Drug Administration
FEPCA	Federal Environmental Pesticide Control Act
FFDCA	Federal Food, Drug, and Cosmetic Act
FIA	Federal Insecticide Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FQPA	Food Quality Protection Act
GAO	General Accounting Office
IUAC	International Union Against Cancer
PE	Punctuated Equilibrium
PFDA	Pure Food and Drug Act
NACA	National Agricultural Chemicals Association
NAS	National Academy of Science
NRDC	Natural Resources Defense Council
RPAR	Rebuttable Presumption Against Registration
USDA	United States Department of Agriculture

CHAPTER 1

INTRODUCTION

Policy beliefs shape public policy. These statements of principle are the mantra of advocacy groups, concerned citizens, and other organized entities at legislative hearings and other policymaking events. Over and over again, these groups state their policy beliefs to policymakers in order to influence public policy. Sometimes, these efforts help to change public policy. But more often than not, public policy stays the same. In the face of policy stasis, how do these groups respond? Do they assess current political and socioeconomic forces and adapt their policy beliefs accordingly? Or do the groups keep their policy beliefs inflexible and hope for the perfect moment when their policy beliefs correspond to the beliefs of policymakers and the public?

This dissertation explores these issues by examining the policy beliefs of advocacy groups, concerned citizens, and other organized entities in the policy subsystem of federal pesticide regulations. Defined in very general terms, policy beliefs are just statements that reveal what an organization or person believes in, and why the organization or person is currently advocating a particular policy position. Being relatively straightforward, policy beliefs play a key role in the policy process. Advocacy groups, concerned citizens, policymakers, and other organized lobbying

entities use their policy beliefs to influence executive and legislative policymakers to pass specific policy changes. As a result, policy beliefs constitute the core of American politics.

Although they often lead to specific policy changes, many like-minded advocacy groups, concerned citizens, policymakers, and other organized lobbying entities have similar policy beliefs. For example, many environmental advocacy groups share a common set of policy beliefs that emphasize environmental protection by increasing governmental regulatory efforts on specific chemical releases into the environment. When different environmental advocacy groups, concerned citizens, policymakers, and other organized lobbying entities share similar policy beliefs, political scientists often categorize them together as one advocacy coalition. Therefore, from the view of political science, any policy subsystem typically has at least one advocacy coalition influencing the policy process with its policy beliefs.

The major research questions of this dissertation examine advocacy coalitions and involve two specific types of policy beliefs: policy core beliefs and secondary policy beliefs. Policy core beliefs are general statements that identify what an organization or person believes. For example, a pro-environmental group may have policy core beliefs that state that the group believes in increasing governmental regulations of chemicals in order to protect human health and the environment. In contrast, a pro-chemical group may have policy core beliefs that state that the group believes in reducing governmental regulations of chemicals in order to enhance profitability for chemical manufacturers. Secondary policy beliefs are more specific.

They reveal the level of support for a specific piece of legislation that impacts a policy subsystem. For example, a pro-environmental group may have a secondary policy belief that supports a specific piece of legislation that increases groundwater monitoring for an especially toxic chemical. In contrast, a pro-chemical group may have a secondary policy belief that does not support the same piece of legislation because of concerns about the impact of increased monitoring on future sales of the chemical in question.

Both types of beliefs play an important part in policy analysis. Political scientists use policy core beliefs to categorize similar advocacy groups, concerned citizens, policymakers, and other organized lobbying entities as one advocacy coalition. Additionally, political scientists use secondary policy beliefs to analyze the evolution of a policy subsystem and the impact of an advocacy coalition's policy beliefs on policy change. This dissertation analyzes the use of these two types of policy beliefs in federal pesticide regulations by asking 1) Do the policy core beliefs of like-minded advocacy groups possess enough uniformity to justify categorization of these groups into larger advocacy coalitions? 2) If uniform advocacy coalitions exist, do their secondary policy beliefs toward pesticide regulations change over time? 3) Are increases in compromises in secondary policy beliefs among advocacy coalitions associated with policy change? and 4) Do stronger advocacy coalitions influence compromises in secondary policy beliefs among weaker advocacy coalitions?

Over the last two decades, a growing body of research suggests that these two types of policy beliefs are important units of analysis that political scientists can use to study the public policy process. Witnesses at legislative hearings often state these beliefs as part of their testimony, making the beliefs part of the public record and accessible to researchers. However, these beliefs are also stated to policymakers in direct lobbying efforts and other communication pathways. As a result, these beliefs help to sway policymakers toward accepting or rejecting a particular public policy.

Using policy beliefs to learn more about advocacy groups and the policy process first gained widespread support in the early 1990s with the advent of the Advocacy Coalition Framework (ACF). The ACF is a theoretical model of the policy process emphasizing the role of coalitions of advocacy groups, policymakers, concerned citizens, and other organized entities on the policy process. Its central theme is one of openness and gradual policy belief change. For example, the ACF emphasizes that advocacy coalitions with divergent policy beliefs often gradually change their policy beliefs in light of new socioeconomic conditions and changing political forces (Sabatier & Jenkins-Smith, 1999, p. 149). Over time, these gradual changes often result in different advocacy coalitions having similar policy beliefs. This type of policy belief change, classified as policy-oriented learning by ACF scholars, eventually results in actual policy change.

Over time, Paul Sabatier, Hank Jenkins-Smith, and other researchers used policy beliefs within an ACF analysis to explore various public policy subsystems including: airline deregulation (Brown & Stewart, 1993), education policy

(Mawhinney, 1993), energy policy (Jenkins-Smith, St. Clair, & Woods, 1991), forest policy (Lertzman, Rayner, & Wilson, 1996), and natural resources policy (Ellison, 1998; Weible & Sabatier, 2005). These studies helped to validate the ACF as a public policy model. By 2005, most political scientists viewed the ACF model with its emphasis on advocacy coalitions and policy beliefs as an acceptable way to analyze public policy. However, it was not viewed as the definitive public policy model. That honor usually went to the theory of punctuated equilibrium (PE), a policy model that did not even emphasize policy beliefs in its theoretical construct (John, 2003, p. 482).

Working from research originally proposed by Eldredge and Gould (1972) in the field of evolutionary paleontology, Baumgartner and Jones (1993) applied the concept of punctuated equilibrium to public policy. In the PE view of public policy, policy subsystems are usually closed, unchanging systems dominated by a few policy actors such as prominent policymakers and advocacy groups. (Baumgartner & Jones, 1993, pp. 7-8). These policy actors control the policy debate in the policy subsystem by limiting access to new policy actors. As a result, significant policy change in these subsystems usually does not occur. However, in rare circumstances a focusing event occurs that captivates the public's attention and makes the policy subsystem more open to other advocacy groups and more susceptible to change.

For example, policymakers often pass new policies because of accidents or scandals. As a result, if a chemical manufacturing accident resulted in the deaths of thousands of people, then policymakers would probably respond to the crisis by considering a new regulatory policy aimed at preventing such an accident from

happening again. In considering this new policy, Congressional policymakers would hold hearings on the accident. At these hearings, policymakers would consider differing policy proposals from both pro-regulatory groups and anti-regulatory groups, even if anti-regulatory groups associated with chemical manufacturers controlled this subsystem before the accident. With policymakers finally considering the policy beliefs of the pro-regulatory groups, this policy subsystem would become more open. As a result, policymakers in this subsystem would be more likely to consider different policy beliefs and more likely to pass a policy change. However, once policymakers passed the new regulatory policy and no other accidents occurred, then the policy subsystem would probably revert to being a closed system dominated by anti-regulatory groups. PE researchers classify this phenomenon as a punctuated equilibrium type of policy change. In this type of policy change, a policy subsystem has long periods of policy stasis interrupted by short bursts of policy change (Baumgartner & Jones, 1993, pp. 19-21).

In contrast to the ACF model, studies using the PE model did not examine the policy beliefs of advocacy groups, concerned citizens, policymakers, or other organized entities involved in the policy process. Instead, most PE studies used more general data like budgetary information and content coded data that emphasized the topic discussed at a particular legislative hearing. These studies examined policy areas such as: health care (Hardin, 2002); immigration (Hunt, 2002); national security (True, 2002); nuclear power, pesticides, and smoking (Baumgartner & Jones, 1993); science and technology (Feeley, 2002); telecommunications (MacLeod, 2002); and

wildfire management (Busenberg, 2004). Researchers also expanded the use of the PE model to examine federal budgetary system (Jones, Baumgartner, & True, 1998; Jones, Sulkin, & Larsen, 2003; Jones, True, & Baumgartner, 1997; True, 2000). Overall, these studies supported PE as a useful and valid policy model. These studies showed that public policy is usually defined by long periods of stasis intermixed with short dynamic periods of policy change.

Scholars attempting to integrate the results of two decades' worth of research from the ACF and PE models are left with two major conclusions. First, as shown by numerous ACF studies, the policy core beliefs and secondary policy beliefs of advocacy coalitions help to shape policy change, but these beliefs gradually change due to socioeconomic factors, political forces, and information-processing parameters in a policy-oriented learning style that results in lasting alterations to a coalition's policy beliefs (Jenkins-Smith & Sabatier, 1993, p. 42; Sabatier & Brasher, 1993, p. 202-203; Sabatier & Jenkins-Smith, 1999, p. 122). Second, as portrayed in various PE studies, policy change occurs in a punctuated equilibrium fashion as relatively rapid changes in public policy are followed by long periods of policy stasis (Baumgartner & Jones, 1993, p. 243-245; Busenberg, 2004, p. 146-147, 154; Hunt, 2002, p. 93; Jones, Sulkin, & Larsen, 2003, p. 166-167; True, 2002, p. 178).

These two conclusions result in a key theoretical disjuncture. If advocacy coalitions engage in policy-oriented learning, which results in their policy core beliefs and secondary policy beliefs changing and then staying at that changed level for some time, then how do changes in public policy follow a punctuated equilibrium pattern?

If policy beliefs play an important role in the policy process and the policy process follows a punctuated equilibrium pattern, then shouldn't policy core beliefs and secondary policy beliefs also follow a punctuated equilibrium pattern? Rather than remaining at newly changed levels for some time, shouldn't policy core beliefs and secondary policy beliefs also go back to their original levels once policy change occurs? Theorists from both sides solve this disjuncture by pointing out that policy core beliefs can undergo an enduring change that leads to certain policy tipping points that help to produce a sudden and quick policy change (Sabatier & Jenkins-Smith, 1999, p. 147-148; see also MacLeod, 2002, p. 56-57; True, 2002, p. 162-163, 166). However, researchers have yet to prove this conclusion by comparing these two models with actual policy beliefs.

As a result, political science needs a new study to help better integrate these two models and discover which concepts of which model work better. Such a study can determine if general tenets of these models are correct, and perhaps more importantly, discover the role of policy beliefs in the policy process by examining how policy beliefs change. This dissertation attempts to do that by examining the policy subsystem of federal pesticide regulations from 1982-2003. During that time, advocacy groups representing agriculture interests and environmental protection interests expressed their policy beliefs at Congressional hearings that eventually led to significant reforms in federal pesticide regulations.

Aims of Study

Over the last twenty years, the ACF and PE constructs have emerged as the predominant models of the policy process in political science. Yet, no research effort has attempted to directly compare the models to see which one better captures the reality of the policy process. This dissertation changes that by directly comparing these two research models. With this comparison, this dissertation can determine: if policy core beliefs can be used to categorize groups into advocacy coalitions, if secondary policy beliefs of advocacy coalitions change according to policy-oriented learning or in a more dynamic punctuated equilibrium way, if increases in compromises in secondary policy beliefs correspond to changes in public policy, and if dominant advocacy coalitions cause compromises in secondary policy beliefs among more minor advocacy coalitions.

In addition, political science studies on federal pesticide regulations stopped after Christopher Bosso (1987) examined pesticide regulations in the late 1980s. This dissertation updates that study by explaining changes to federal pesticide regulations that occurred in the mid 1990s. These facts make this dissertation unique. Exploring these topics will help political scientists garner more knowledge about pesticide regulations and the role of policy beliefs in the policy process.

As detailed in Figures 1 and 2, the underlying goal of this dissertation is to explore whether advocacy coalitions' secondary policy beliefs on pesticide regulations undergo an enduring change as theorized by the ACF model's emphasis on policy-oriented learning, or whether these beliefs change quickly over the short term and then go back to their original state as theorized by the PE model. Exploring this goal should determine if policy beliefs act directly on the policy process or if they act more as a tipping-point mechanism that indirectly influences the policy process. This makes this dissertation the first attempt by a political scientist to examine the role of policy beliefs in the policy process by comparing the two predominant policy models in the discipline. However, since research on advocacy groups and the policy process can cover a wide variety of topics, it is also important to consider what this dissertation *does not* attempt to do in order to avoid confusion among readers and other researchers.

First, this dissertation does not attempt to determine if the policy subsystem of pesticide regulations is elitist or pluralistic. Bosso (1987) argued that since 1970 the pesticide regulatory subsystem is generally a pluralistic system with elements of elitism represented by dominant chemical makers (p. 11, 242). Research from this dissertation generally supports Bosso's findings.

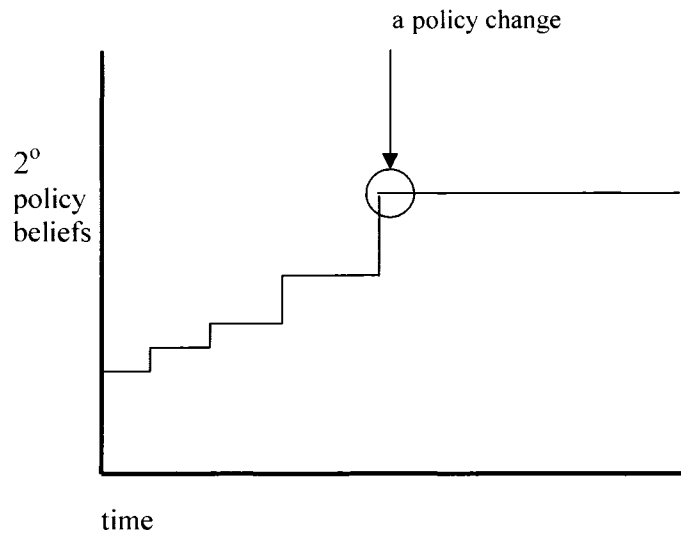


Figure 1: Hypothesized Behavior of Secondary Policy Beliefs in the ACF Model

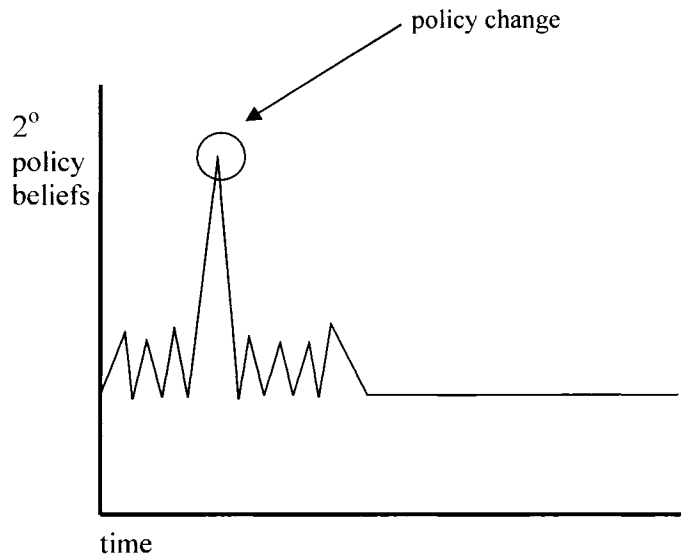


Figure 2: Hypothesized Behavior of Secondary Policy Beliefs in the PE Model

For example, from 1982-2003 data from this dissertation reveals that over 264 unique advocacy groups testified in Congressional hearings on federal pesticide regulations. Only five of these groups appeared in more than 20% of the hearings and no group managed to appear in more than half of the hearings. This suggests that the pesticide regulatory policy subsystem was quite pluralistic from 1982-2000. While this is an interesting finding, it is not a major research emphasis of this dissertation. Researchers interested in this line of research should examine Bosso's work and extend his methodology to pesticide regulations since 1988.

Second, this dissertation does not emphasize collective action and the problems of forming an advocacy group. This is not a study to determine how collective action leads to group formation in the pesticide regulatory policy subsystem. Instead, this dissertation examines what happens to these advocacy groups after formation and the role their policy beliefs play in the policy process. Researchers wishing to learn more about collective action and the formation of advocacy groups, particularly environmental advocacy groups, should inspect the research of Lubell, Schneider, Scholz, and Mete (2002).

Third, this dissertation does not examine policy implementation. It is just not concerned with implementation problems that may occur once a pesticide regulatory policy is passed and funded. As a result, this dissertation assumes that advocacy coalitions involved in pesticide regulations do not believe that passing a particular policy will lead to a non-implementation scenario. For this dissertation, once policymakers sign policy change into law, it is counted as a policy change.

Researchers interested in the problems of implementing environmental policies should look at Scheberle's (2004) analysis of federal and state environmental policy interactions.

Lastly, this dissertation is not an attempt at quantitatively modeling the public policy process. At its core, this dissertation just compares two public policy models by emphasizing the role of policy beliefs in the policy process. It does not attempt to model all of the determinants of policy change in the pesticide regulatory process. It assumes that the policy process is a nebulous creature that political science researchers cannot entirely model.

However, this dissertation does cover a number of unique and noteworthy concepts. First, it compares two major policy models to discover which model, or which parts of the two models, best capture the public policy process. Second, it examines the role of policy beliefs on policy change with a goal of determining if secondary policy beliefs directly impact policy change or whether these beliefs act more like a tipping mechanism that indirectly influences policy change. Third, it explores how policy beliefs change over time. Fourth, it gives political science a policy history of pesticide regulations since 1982. All of these facts make this dissertation a unique contribution to political science research.

Organization of Study

The organization of this dissertation follows the traditional logic of any research endeavor. First, the dissertation explains the ACF and PE models and goes over their place in the literature of public policy. Then, the dissertation provides a history of federal pesticide regulations and introduces the key concepts confronting advocacy coalitions and their belief structures from 1982-2003. After that, the dissertation integrates key concepts of the ACF and PE models and analyzes those concepts with data collected from the pesticide regulatory policy subsystem. Results from this analysis are then explained and examined. As a result, the organization of this study is as follows.

Chapter 2 delves further into the specifics of the ACF and PE models. This chapter goes over the major concepts from both models with a special emphasis on the role of policy beliefs in both models. In addition, this chapter explains the place of the ACF and PE models in the interest group and policy process literature of political science. Overall, Chapter 2 helps researchers understand the ACF and PE models, their place in the relevant literature, the concept of policy beliefs, and the major unresolved questions confronting these two models.

Chapters 3 and 4 set the stage for analysis. These chapters examine the history of federal pesticide regulations and explain the major tenets of current pesticide regulations. These chapters go over regulatory issues such as the labeling of pesticides, pesticide residues on food, and the environmental fate of pesticides. These

chapters should help researchers understand the historical debate over federal pesticide regulations as well as the current reality of pesticide regulations. Above all else, these chapters allow researchers to understand the issues confronting advocacy coalitions in the federal pesticide regulatory policy subsystem.

Chapter 5 explains this dissertation's research methodology. It includes a discussion of hypotheses and how these hypotheses relate back to the four research questions presented in this chapter. This chapter also includes a discussion on data analysis methods including the use of the McNemar's test for ordinal data to determine the uniformity of policy core beliefs within advocacy coalitions, kurtosis to ascertain how secondary policy beliefs change over time, correlations to examine the relationship between compromises in secondary policy beliefs and changes in public policy, and structural equation models to determine which variables influence compromises in secondary policy beliefs. Chapter 5 also discusses data collection methods. It explains the content analysis used to code Congressional hearings on federal pesticide regulations, and also clarifies the importance and origin of this dissertation's other data sources. These include secondary historical documents that illuminate the debate on federal pesticide regulations and a small set of interviews that verify results from the content analysis.

Chapter 6 provides the answers to the four research questions. This chapter includes results from various analyses that reveal which hypothesis is correct. Chapter 7 provides the main conclusions of this dissertation and identifies areas of future research.

CHAPTER 2

ADVOCACY COALITIONS AND PUNCTUATED EQUILIBRIUM

The advocacy coalition framework (ACF) and punctuated equilibrium (PE) models both examine the policy process and what forces influence it. These forces, usually independent of direct governmental control, can sway the policy process one way or another. Political scientists have long pondered the forces that influence the policy process. In studying these forces, many researchers emphasized the important role of advocacy groups, also known as interest groups or pressure groups. Although many political scientists link the origins of such studies on interest groups to David Truman's (1951) work on group theory, the emphasis on interest group research actually started with Arthur Bentley. Bentley's (1908) research offered preliminary insights on how advocacy groups affect the policy process. After Bentley's research, numerous studies on interest groups followed, with each study revealing the importance of interest groups to the policymaking process and the difficulty of measuring the impact of interest group influence on the policymaking process (Baumgartner & Leech, 1998, p. 45-46).

In addition to interest groups, political scientists also emphasized the role of bureaucrats, policymakers, and the media in the policy process. All of these entities

could influence a specific policy subsystem such as agricultural subsidy policy, pesticide regulatory policy, or any policy considered by policymakers. Over the course of 100 years, political scientists used case studies and quantitative analyses to further examine the impact of these variables on the policy process. By the late 1980s, this collection of research helped to provide the theoretical backdrop to models such as the ACF and PE that attempted to theorize about policy process.

The Origins of the Advocacy Coalition Framework (ACF)

The ACF owes much of its intellectual heritage to research on the impact of interest groups on the policy process. This line of research started in the early 1900s and can be roughly divided into four eras. In the first era, lasting from 1900-1930s, researchers examined the pressure tactics of groups and the impact of those tactics on the policy process. Significant works during this era included Arthur Bentley's (1908) *The Process of Government*. Bentley broadly theorized that groups compete against one another in order to influence governmental processes (p. 222, 269). Although Bentley was not concerned with constructing specific theories on group activity, his research was the first to suggest that groups influenced the policy process. It also helped political scientists refocus their research efforts to other aspects of government aside from legalistic examinations of governing institutions (Bentley, 1908, p. 162).

Similar works that examined the role of interest groups, or pressure groups as they were commonly known during this period, followed with each work examining the importance of interest groups in policymaking and reconciling that notion with theories of government and democracy (Griffith, 1939; Herring, 1929; Odegard, 1928; Schattschneider, 1935; see also Cleveland, 1913; Crawford, 1939; Croly, 1915; Pollock, 1927; Zeller, 1937). Even more than Arthur Bentley, whose work was generally not even recognized until the 1950s, these researchers made the study of interest groups' impact on the policy process noteworthy (Garson, 1978, p. 77).

However, it was not until the 1950s that interest group research really became important to political science. During this second era of research, lasting approximately from the 1940s-1960s, the study of interest group influence on the policy process reached its scholarly zenith as the administrative size of the federal government increased. Research during this time period reaffirmed the importance of interest groups to policymaking (Griffith, 1951; Latham, 1952; Truman, 1951; see also Key, 1952; McConnell, 1966). Some of the most influential research also extended the notion of interest group influence on the policy process to the notion that interest groups, policymakers, and agencies jointly controlled the policy process.

For example, Selznick (1949) showed how agencies could co-opt local interest groups in order to provide support for a specific agency and policy (p. 217). This was important because once an agency had support from these groups it helped to solidify their clientele or customer base. As a result, the agency could ensure its survival by actively promoting the policy interests of their clientele groups (Long, 1949, p. 257;

Simon, Smithburg, & Thompson, 1950, p. 385). Over time, this type of relationship often turned into a permanent symbiotic relationship where policymakers and interest groups mutually benefited from policies that did not always benefit the public at large. Researchers exploring the physical structure of this relationship developed the notion of subgovernments or iron triangles. In this type of relationship, an interest group, an agency, and a legislative committee formed a close relationship over a specific policy area in order to influence it for the mutual benefit of all those in the relationship (Freeman, 1955, p. 31; Mass, 1950, p. 583).

Research during the second era often used a case study approach where the researcher learned all about a specific policy subsystem. However, as the 1960s ended, political scientists began to realize that their studies of policy subsystems did not reflect the complex reality of the policy process. As a result, as the second era came to a close, the importance of examining the influence of interest groups on the policy process faded for a majority of political scientists.

This shift in interest group research occurred because political scientists realized that previous attempts to examine the relationship between interest groups and the policy process were too simple. Therefore, some political scientists started to focus on other elements of interest groups. This originated with the theoretical insights provided by Mancur Olson (1971) on why groups mobilize (i.e. the logic of collective action). After Olson, interest group research became divided into two areas: collective action analyses that built off Olson's work, and influence studies that continued to show the effect of interest groups on policy (Baumgartner and Leech

1998, p. 7). In these two camps of research, more theoretical and methodological progress occurred in collective action analyses rather than influence studies.

As a result, during the third era of research that examined the influence of interest groups on the policy process, researchers backed off from many of the key findings of the previous era. During this time, lasting from the 1970s-1980s, interest group research focused on quantitative analyses that emphasized why rational individuals would join interest groups rather than case studies that focused on how interest groups influenced the policy process within a specific policy subsystem. However, some progress still occurred in influence studies as researchers tried to quantitatively measure the influence of interest groups on policymaking (Culhane, 1981; Fowler & Shaiko, 1987; Meier & Van Lohuizen, 1978).

Additional progress in influence studies occurred when other researchers working slightly after this era examined specific lobbying efforts of interest groups on the policy process. Building off research conducted by Lester Milbrath (1963) that defined the approach to lobbying surveys, researchers such as Jeff Berry (1977), Jack Walker (1991), and John Heinz, Edward Laumann, Robert Nelson, and Robert Salisbury (1993) analyzed effective lobbying strategies, described daily lobbying activities, and continued to offer insights on how lobbying groups influenced the policy process. The results of these studies suggested that successful lobbying efforts were complex and often depended on interest groups' knowledge of their own organizational situation, as well as specific knowledge of the policy subsystem they were trying to influence (Berry, 1977, p. 45; Heinz et al., 1993, p. 371). In addition,

the study by Heinz et al. (1993) argued that a major interest group influence strategy included joining other interest groups in lobbying coalitions is (p. 15). However, the Heinz et al. study also acknowledged that due to constantly changing political conditions, most interest groups operated their lobbying efforts in an environment of uncertainty (Heinz et al., 1993, p. 370). As a result, most interest groups focused their lobbying efforts on short-term policy goals that often resulted in no significant change to the policy subsystem (Heinz et al., 1993, p. 412).

Overall, the third era is best remembered for works that either stressed the diffuse, immeasurable nature of the policy process (Hecklo, 1978), or works that questioned if the notion of traditional regulatory studies on the policy process was even accurate (Wilson, 1980). Research in the third era tended to invalidate the numerous case studies used in the second era. But, it's also important to note that researchers during this era described what they saw. By the 1970s and 1980s the number of active interest groups lobbying policymaking bodies exploded in the United States (Petracca, 1992, p. 13). This made interest group research difficult and led many researchers to lean toward a more diffuse explanation of the policy process. Unfortunately, this more diffuse explanation was harder to quantitatively validate.

As a result, in the fourth era, lasting from the late 1980s to the present, researchers developed various policy models that tried to theoretically explain the more diffuse policy process that became accepted in the 1970s. During this period, the focus shifted to the development of policy theories or models that could better explain the policy process observed in the 1970s and 1980s. Political scientists

developed theories such as the ACF model, the PE model, and John Kingdon's streams metaphor for policymaking to explain the policy process (Baumgartner & Jones, 1993; Kingdon, 1995; Sabatier & Jenkins-Smith, 1993). Research during this era incorporated many aspects of the traditional interest group literature. For example, the ACF examined the policy beliefs of interest groups and other entities in one policy subsystem over an extended time frame. In this way, this type of research methodology mirrored the attempts of researchers in the second and third eras to examine the influence of interest groups on the policymaking process. However, in the fourth era more researchers attempted to theoretically validate their findings through policy models.

While these theoretical models of the policy process took much from previous research that examined interest group influence on the policy process, they also took from previous research on systems analysis. Starting in the 1960s and 1970s, political scientists started to use systems analysis to better understand and theoretically model the policy process. The genesis of such attempts occurred with David Easton's (1965) black box systems model of policymaking that constructed an input/output schemata to policy development. This type of approach helped to introduce the concept of systems analysis into political science and helped to form later models of the policy process such as the ACF.

Easton (1965) argued that the policy process is a political system of inputs and outputs mediated by the structure of government, social forces, political factors, and economic conditions (p. 32-33). Inputs such as elections, public opinions, and media

coverage enter the black box of the political system where they are transformed into policy outputs such as laws, regulations, and policy decisions (Easton, 1965, p. 32-33; see also Birkland, 2005, p. 202). These outputs can then influence the political system or the inputs to the political system through a feedback loop (see Figure 3).

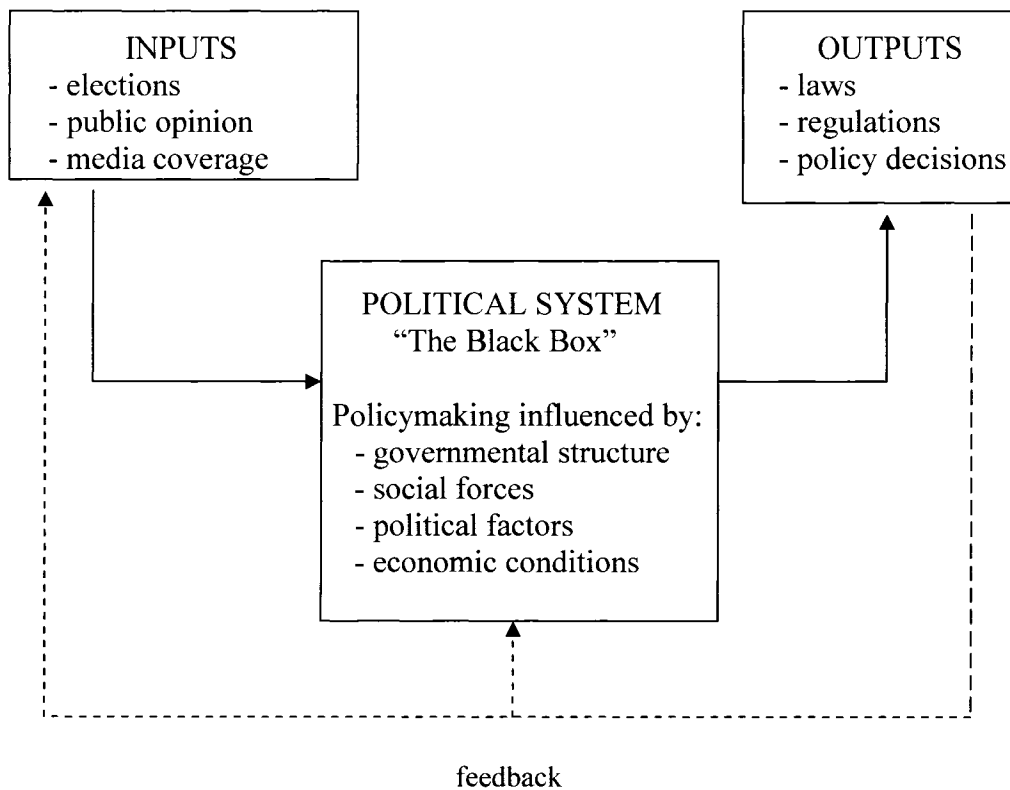


Figure 3: Systems Model of the Policy Process

Easton provided a good, general theoretical model of the policy process that influenced political science well into the 1980s. The genius of Easton's approach resided in the emphasis on the policy process. Rather than focusing on a specific institution involved in the policy process, Easton focused on the policy system as a whole. As a result, the black box systems model did not just look at a specific institution such as Congress, the presidency, the judicial system, a specific executive agency, or specific interest groups. Instead, this type of analysis examined a policy process that could include many state, local, and federal agencies; different appropriations and oversight committees in Congress; court decisions from state courts and federal courts; and various interest groups operating at multiple levels of government (Sabatier & Jenkins-Smith, 1993, p. 2). This provided political science with a more realistic description of the policy process.

However, there was a weakness in most studies using systems analysis to examine the policy process. These studies usually did not attempt to systematically examine the inner workings of the black box (Birkland, 2005, p. 223-224). Or, in other words, systems analysis did not try to hypothesize about the interaction of governmental structure, social forces, political factors, and economic conditions on a specific policy subsystem consisting of various policy actors. That line of analysis was left for ACF scholars.

Building from the systems approach to policy analysis as well as research that examined the influence of interest groups on the policy process, Sabatier and Jenkins-Smith developed the advocacy coalition framework (ACF) in the late 1980s. The

ACF emphasized the role of beliefs on policy development and policy change within a specific policy subsystem. However, unlike other policy models, the ACF integrated the socioeconomic and political forces that could impact the influence tactics of interest groups and other organized entities into its theoretical construct. Therefore, the ACF opened the black box of political systems and served as an important bridge linking the research of traditional interest group theorists with theorists of the policy process such as David Easton.

Aspects of the Advocacy Coalition Framework (ACF)

The Advocacy Coalition Framework (ACF) is a theoretical model of the policy process emphasizing the role of policy beliefs and coalitions of advocacy groups on policy change. The ACF allows scholars to determine how various coalitions influence public policy within a particular policy subsystem as well as how those coalitions respond to dynamic changes impacting the policy environment (Sabatier & Jenkins-Smith, 1999, p. 123, 145, 149). The framework hypothesizes that stable parameters (such as basic problem attributes, natural resource distributions, cultural values, and governmental structure) interact with dynamic parameters (such as economic conditions, public support of governmental leaders, and outcomes from other policies) outside a specific policy environment to influence the actions of

various advocacy coalitions within a specific policy environment (Sabatier & Jenkins-Smith, 1999, p. 149) (see Figure 4).

In the framework, the policy beliefs of diverse policy actors such as advocacy groups, governmental agencies, private organizations, political leaders, and other entities coalesce around a set of policy core beliefs (Sabatier & Jenkins-Smith, 1999, p. 131). These coalitions then try to influence governmental authorities, given resource constraints and the interaction of external events (the stable and changing parameters discussed above), by using certain guidance instruments (such as lobbying, actual political support during elections, media manipulation, and even demonstrations) (Sabatier & Jenkins-Smith, 1999, p. 142). The ultimate goal of these influence tactics is a policy change that favorably aligns a new policy output with their policy beliefs.

Policy beliefs constantly adapt to changing socioeconomic conditions and political factors. The ACF emphasizes the role of bounded rationality and the ability of individuals within advocacy coalitions to effectively process new policy information, current socioeconomic trends, and relevant political information (Jenkins-Smith & Sabatier, 1993, p. 44; Sabatier & Jenkins-Smith, 1999, p. 131). Once processed, the information becomes integrated into the existing policy beliefs of an advocacy coalition as new policy beliefs. Advocacy coalitions can then communicate these new beliefs to other groups, policymakers, the public, or even to other advocacy coalitions.

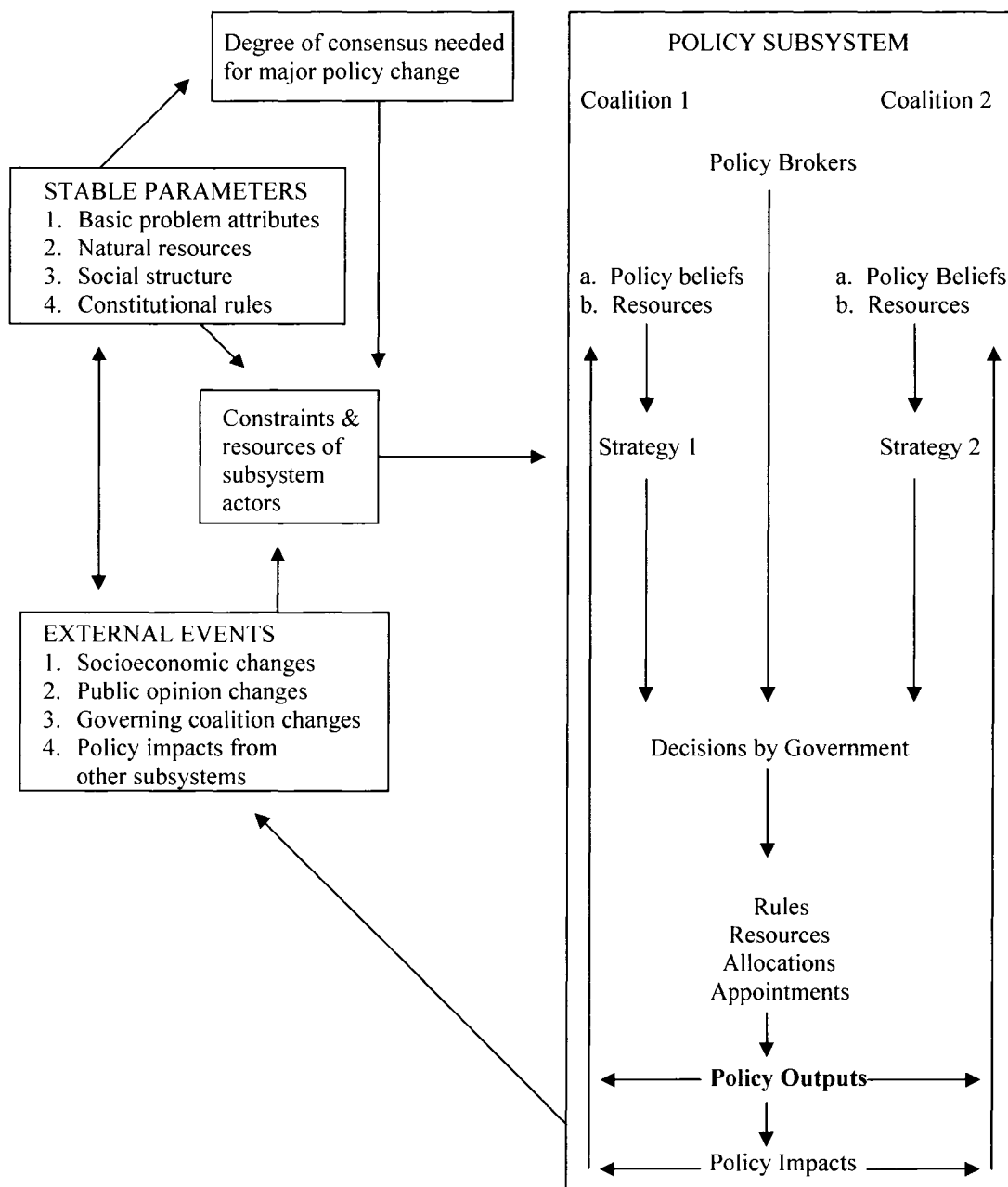


Figure 4: The Advocacy Coalition Framework

The ACF classifies this type of response to changing conditions as policy-oriented learning. In policy-oriented learning, advocacy coalitions change their policy beliefs to incorporate current conditions impacting the policy subsystem in which they operate. Conditions that impact a policy subsystem can range from the socio-economic and political impacts discussed above to feedback information from previous policy changes to policy interactions from other advocacy coalitions (Sabatier & Jenkins-Smith, 199, p. 149). Coalitions readjust their policy beliefs in light of these conditions. This results in a long-lasting alteration to an advocacy coalition's policy beliefs (Jenkins-Smith & Sabatier, 1993, p. 42; Sabatier & Jenkins-Smith, 1999, p. 122).

Whether policy beliefs change or whether they stay the same, it is important to note that the ACF model stipulates that not all policy beliefs are created equally. According to the ACF model, there are three types of beliefs within an advocacy coalition: deep core beliefs, policy core beliefs, and secondary beliefs (Sabatier & Jenkins-Smith, 1999, p. 121-122). Deep core beliefs are broad, guiding beliefs that influence an advocacy coalition across policy subsystems. An example of such deep core beliefs could include the conservative versus progressive (liberal) belief debate. Policy core beliefs are more specific beliefs that unite groups into advocacy coalitions and usually only apply to a particular policy subsystem. An example of policy core beliefs in pesticide regulations could include an "agriculture promotion" coalition that believes in reducing pesticide regulations in order to reduce economic burdens on farmers and agri-businesses, and a "consumer-environmental protection" coalition that

believes in increasing pesticide regulations in order to improve the environment and human health. Finally, secondary beliefs are very specific beliefs that apply to a specific part of a policy or policy subsystem. Examples of secondary beliefs are policy preferences such as the belief that a certain division of an agency should be funded at a higher level than another division of the same agency (see Table 1 for an example of each of these beliefs).

Table 1

Hypothetical Example of Beliefs of a “Consumer-Environmental Protection” Coalition

Type of Policy Belief	Definition of Policy Belief
<i>Deep Core</i>	Government should ensure the protection of the environment
<i>Policy Core</i>	Government should ensure the protection of the environment and the safety of human health from agriculture applications of pesticides, fertilizers, and other substances and organisms.
<i>Secondary</i>	To ensure the safety of human health, the USEPA Office of Water should increase its monitoring of pesticides in groundwater.

These differences in policy beliefs are very important to consider in any ACF analysis. According to the ACF model, policy beliefs are either broad or specific. In general, more specific policy beliefs enable advocacy groups to recruit new members and organize around key concepts. These types of beliefs often serve as the bond that holds an advocacy group together. These types of beliefs are also visibly communicated to policymakers in legislative hearings, direct lobbying efforts, and other communication pathways. In contrast, broader policy beliefs are often implied by the advocacy group and may only be explicitly stated in mission statements. These types of beliefs are usually not visibly stated by the advocacy group in legislative hearings, direct lobbying efforts, or other communication pathways.

Most ACF analyses focus on secondary beliefs since these beliefs are the ones most likely to change over time (Sabatier & Jenkins-Smith, 1999). Secondary beliefs are also where conflict occurs. With secondary policy beliefs, groups within an advocacy coalition can disagree about a specific part of a proposed policy, while agreeing on the broader need for such a policy. Or, different advocacy coalitions can disagree about both the specific parts of a proposed policy as well as the broader need for such a policy. However, these conflicts over policy are usually short lived. Due to changing socioeconomic conditions and political factors, one coalition will usually move toward the secondary policy beliefs of an opposing coalition over time in a policy-oriented learning manner (Sabatier & Brasher, 1993, p. 203).

In especially intense and long lasting conflicts, policy brokers can also operate within the policy subsystem. These actors try to resolve differences between the

competing coalitions in a way that influences governmental authorities toward certain policy decisions (Sabatier & Jenkins-Smith, 1999, p. 122). Policy brokers can range from respected policymakers to respected members of an advocacy group. Wherever they originate, they must hold the respect of all of the actors in the policy subsystem in order to successfully resolve a policy conflict.

Through the 1990s the ACF model gained prominence as a way for scholars to analyze policy beliefs and policy change within a specific policy subsystem. Scholars using the ACF in this time period typically analyzed data from public hearings in a case study approach that either quantitatively or qualitatively validated the framework's numerous hypotheses concerning advocacy coalitions, policy change, and policy learning (for a qualitative approach see Barke, 1993; Brown & Stewart, 1993; Ellison, 1998; Mawhinney, 1993; Munro, 1993; Weible, Sabatier, & Lubell, 2004; for the more quantitative approach see Jenkins-Smith & St. Clair, 1993; Sabatier and Brasher, 1993; Weible & Sabatier, 2005). These research efforts allowed political scientists to examine if the policy beliefs of advocacy groups within advocacy coalitions changed and why public policy changed at a certain time.

However, even though use of the ACF model in research has become standard and accepted within political science, it still has three contentious concepts. First, the ACF theorizes that advocacy groups and other interested entities can unknowingly coalesce into advocacy coalitions. In some circumstances, these groups do not willingly engage other groups in the formation of an advocacy coalition. For example, the Sierra Club may not routinely enter into discussions with other environmental

groups on the formation of a large environmental advocacy coalition for a specific pesticide regulatory issue. Although advocacy groups often join forces in support of specific legislation or to bring publicity to specific issues, the use of advocacy coalitions within the ACF model is more of an aggregation tool for researchers. By using policy beliefs to aggregate similar advocacy groups into advocacy coalitions, researchers can learn more about the policy process and if the members of one coalition are moving towards the beliefs of an opposing coalition.

Second, the ACF is a framework of related hypotheses and not a definitive theoretical construct. Currently, the ACF has fifteen different hypotheses concerning advocacy coalitions, policy change, and policy learning (Sabatier & Jenkins-Smith, 1999, p. 124, 129, 134, 139, 140, 145). As a result, researchers can use the ACF to examine a wide variety of traditional research problems in policy analyses, collective action studies, agenda-setting research, and even cognitive decision-making investigations. Indeed, the two major works on the ACF model by Sabatier and Jenkins-Smith reveal a broad framework in which it is hard to capture distinct insights on the policy process other than the facts that distinct advocacy coalitions exist in a policy subsystem, policy-oriented learning occurs in these coalitions, and exogenous political and socioeconomic forces significantly impact the policy process and the belief structure of advocacy coalition (Jenkins-Smith & Sabatier, 1993; Sabatier & Jenkins-Smith, 1999).

As a result, detractors often note that the ACF model is too vague, has too many hypotheses, and attempts to explain too much. Nonetheless, effective ACF

research can still occur as long as the researcher narrows the topic area of ACF research. For example, instead of parsing through fifteen different hypotheses, this dissertation simply analyzes the most basic tenets of the ACF as depicted in Figure 4. These tenets include the following: that researchers can group similar advocacy groups into larger advocacy coalitions, that socioeconomic and political forces can significantly impact the policy beliefs of advocacy coalitions, and that these policy beliefs help to influence policy change.

For the third contentious concept, the ACF model explains policy belief change within advocacy coalitions as a policy-oriented learning process whereby the policy beliefs of one coalition undergo an enduring change due to socioeconomic conditions, political forces, and information processing parameters (Sabatier & Jenkins-Smith, 1999, p. 123). As depicted in Figure 4, sudden socioeconomic or political shocks to the policy subsystem will lead to changes in policy beliefs and policy change. In response to external shocks, even if they are sudden, advocacy coalitions learn and re-adjust their policy beliefs to the new reality affecting their policy subsystem. This type of change among advocacy coalitions allows individual members of an advocacy coalition, or even an entire advocacy coalition, to move closer toward the policy beliefs of an opposing advocacy coalition due to changing socioeconomic and political conditions. As a result, the process of change for an advocacy coalition's policy beliefs as theorized in the ACF is one of constant readjustment in response to socioeconomic and political forces.

The concept of policy beliefs notably distinguishes the ACF from other models of the policy process such as punctuated equilibrium (PE). While the ACF model embraces the notion of policy beliefs and its role on policy change, researchers using the PE model usually just look at the process of policy change. However, the analysis in this dissertation is different in that it theorizes that a punctuated equilibrium process also occurs for the process of policy belief change within advocacy coalitions that operate in a specific policy subsystem.

The Origins of Punctuated Equilibrium (PE)

Niles Eldredge and Stephen Jay Gould first proposed the concept of punctuated equilibrium (PE) to explain the evolutionary speciation patterns of organisms observed in the fossil record. In their original work, Eldredge and Gould (1972) described the process of speciation as rapid, episodic, and best represented by a PE process instead of a gradual process (p. 84). In evolutionary paleontology, the PE process works over a long period of time according to the following principles. First, any population of organisms has slight genetic variations within its individual members. Second, environmental changes isolate a small group of organisms within that population. Third, these new environmental conditions favor the further development of genetic variations within the isolated group. Over a short amount of time, which can last thousands of years in evolutionary paleontology terms, the descendants of the isolated

group become a new species morphologically different from the original population (Eldredge & Gould, 1972, p. 94-95; Gould 2002, p. 766-768). As a result, organisms rarely show any gradual evolutionary change throughout their phylogeny. Instead, new species appear quite suddenly in the fossil record.

Working from the theoretical insights of Eldredge and Gould, Frank Baumgartner and Bryan Jones used PE to explain their observations on public policy. Baumgartner and Jones (1993) found that for long periods of observations on different policy subsystems, policy change rarely occurred (p. 17-18). However, on rare occasions certain policy conditions fluctuated such as the venue for a policy debate or the public's image of a specific policy problem. Fluctuations in venue and image often led to a quick policy change that was immediately followed by additional long periods of policy stasis (Baumgartner & Jones, 1993, p. 38). As a result, Baumgartner and Jones concluded that the evolution of any public policy followed a PE pattern rather than a gradual, incremental pattern.

While Frank Baumgartner and Bryan Jones owed much of their insights on PE to Eldredge and Gould, they also used previous research from agenda-setting studies, the policy subsystems literature, and social choice theory to help configure the idea of PE to existing research on public policy. By using these three concepts from social science research, Baumgartner and Jones brought a theory from evolutionary paleontology to political science. This made PE a viable model of the policy process.

With the incorporation of agenda-setting, the PE model had its basic political science foundation. Political scientists classify agenda-setting as a debate among

advocacy groups, agencies, policymakers, the public, the media, and any other interested organizations over the problems that should be on the active policy agenda of policymakers (Baumgartner & Jones, 1993, p. 10; Kingdon, 1995, p. 3). Once on the agenda, governmental debates over a policy problem occur and the probability of policy change increases. Therefore, agenda-setting becomes important in the PE model because it helps to describe the most fundamental part of policy change.

Bringing a policy problem to the agenda is a tough process. Successful agenda-setting usually happens when the public directs the right mix of attention to policymakers on a policy problem that already has various solutions advocated by organized interests (Hunt, 2002, p. 75-76). This helps to change the image of the policy problem from the perspective of policymakers. Such a change in image also causes more policymakers to consider solving the problem with new legislation.

When more policymakers know more about a specific policy problem, a change in venue for debates over the problem often occurs. By moving the policy discussion from its usual venue, such as a particular Congressional committee, policy change is more likely to occur. With the interaction of changing images and venues, more people become involved in the policy process and it becomes more open and more susceptible to change.

This is an important process because policy venues are usually closed to outsiders. This helps to explain long periods of policy stasis. With the same actors involved with a particular policy and with the public usually indifferent to such a policy because the policy image has remained constant, policy change rarely occurs.

However, with the interaction of changing images and different venues, the policy process becomes more open. The notion of a closed policy system originates from the subgovernment literature. As discussed earlier in the “Origins of the ACF” section, the subgovernment literature often explained the structure of closed policy systems as iron triangles. These iron triangles usually prevented significant policy change from occurring to the mutual benefit of the agency, interest groups, and policymakers involved in the process.

The sub-government literature helped Baumgartner and Jones explain periods of stasis in policymaking, while agenda-setting research helped them understand why policy changed. To understand why policy change would quickly revert back to policy stasis, Baumgartner and Jones looked at the expansive literature on social choice theory. Basic research on social choice examines how individual preferences become group choices (Baumgartner & Jones, 1993, p. 13). Researchers expand this basic concept to consider the fact that no policy and no election in a democratic society can ensure political equilibrium (Baumgartner & Jones, 1993, p. 14). In other words, for every issue and every policy there will be an opposing group with views at odds with the current policy and political reality. This fact ensures non-equilibrium in policymaking.

So if policymaking is not in equilibrium, how can this be resolved with the notion of long periods of policy stasis that is central to a PE model of policymaking? According to Baumgartner and Jones (1993), the answer lies in the fact that most of the public is apathetic toward policymaking (p. 38). As a result, it takes a skilled

policy entrepreneur to define a policy issue in terms that motivate the public to act (Baumgartner & Jones, 1993, p. 38). In addition to public apathy, a closed policy subsystem helps to exclude new entrants to the policy process. All of these forces act to quickly ensure policy stasis after a policy change.

Aspects of Punctuated Equilibrium (PE)

A PE model of policymaking explains policy change as being dependent on a positive feedback system and serial processing. Baumgartner and Jones (2002) make clear that public policy subsystems are either in a state of positive feedback or negative feedback (p. 3). Most of the time, policy systems are in a negative feedback situation. This is policy stasis: a time of stability with no new policy outputs. During this time, small shocks to the policy subsystem can occur, but they are so small that the various policy actors within the policy subsystem can react to them and readjust actions accordingly (Baumgartner & Jones, 2002, p. 8-9).

For example, when a pesticide storage container leaks into the drinking water supply of a small town, it causes a loud and vocal response from local citizens. Citizens complain about the problem to their elected officials and the media. In response, legislative bodies hold hearings on the matter. But ultimately, since it is an isolated incident, the legislative body passes no new pesticide regulations. Therefore, no new policy outputs occur. This is policy stasis and negative feedback. Actors

within the policy subsystem readjust their plan of action to meet the crisis at hand. In this case, policymakers held hearings to examine the issue.

But what if pesticide storage containers leaked into the groundwater supplies of communities across the nation? In response to such a serious situation, more citizens across the country voice their concern to policymakers and the media. With greater media coverage, the image of pesticide regulations changes. Multiple legislative bodies across the country hold hearings on pesticide regulations. Now, policymakers, pesticide regulatory agencies, and agri-chemical interest groups know that a change in pesticide regulations has to occur. When the policy process opens up like this in response to a crisis, positive feedback occurs and often results in policy change.

The process of positive feedback occurs as the public and the media focus more attention on a particular policy problem. This reveals new aspects of a policy problem to various actors in the policy subsystem. But more importantly, policymakers shift their attention to these new aspects since humans are serial information processors who can only think about one dimension of issue information at a time (Baumgartner & Jones, 2002, p. 15; see also Simon, 1985; Simon, 1997). As more of the policy subsystem shifts to this new aspect, more actors within the policy subsystem start to focus on this new aspect in a mimicking type of behavior (Baumgartner & Jones, 2002, p. 16). The resulting effect is like rolling a boulder down a hill. As the boulder rolls down the hill, momentum constantly builds up in a positive reinforcing cycle. Except in the PE model, the need for policy change

constantly builds up in policy actors due to a continual focus on a policy problem by the public and the media.

In the PE view of public policy, policy subsystems are closed, unchanging systems maintained by dominant policy actors (Baumgartner & Jones, 1993, p. 7-8). Points of stability such as the same venue for policy debates and a steady image of a public policy ensure that policy change rarely occurs (Baumgartner & Jones, 1993, p. 38). When these points of stability become upset, new groups and new policymakers enter the policy process. As a result, when policy change happens, it is a remarkable event.

Comparing the Two Models

Political scientists have used either the ACF or PE models to study the policy process for over two decades. However, political scientists have yet to directly compare these models to determine their accuracy and appropriateness for examining the policy process. This dissertation attempts to do that by using the ACF and PE models to examine policy change and the process of policy belief change among advocacy coalitions in the federal pesticide regulatory subsystem from 1982-2003.

This is not an easy process since the models were never really designed for such an endeavor. For example, ACF researchers specify that policy beliefs play a major role in the policy process. Advocacy coalitions, bound by policy beliefs and the

current socioeconomic and political reality, compete with one another to influence policy change (John, 2003, p. 490-491; Sabatier & Jenkins-Smith, 1999, p. 118-119; Schlager & Blomquist, 1996, p. 657). However, policy beliefs are rarely mentioned in the PE model. About the only time they are mentioned is in discussions on agenda-setting where they are mentioned as tipping-point mechanisms for policy change (Sabatier & Jenkins-Smith, 1999, p. 147). As a result, the ACF model focuses more on group interactions and the changes in policy beliefs that occur because of those interactions rather than just on policy change like the PE model (Wood, 2006, p. 2).

Even though an emphasis on policy beliefs sets the ACF and PE models apart, the two models do have similarities. For example, both models focus on the policy subsystem rather than on a specific group or institution. This continues the line of interest group research as first envisioned by Bentley in 1908. In addition, the two models emphasize policy change in their theoretical constructs. The ACF model explains that policy change occurs due to fluctuating policy conditions such as socioeconomic conditions and political factors that lead advocacy coalitions to change their policy beliefs. Similarly, the PE model explains that policy change occurs due to fluctuating policy conditions such as policy venues and policy images that cause a change in the perceived importance of an issue among the public, media, policymakers, and other organized entities.

Both models also have their respective faults. The PE model often places too much emphasis on agenda-setting when describing the policy process (True, Jones, & Baumgartner, 1999, p. 97). While agenda-setting is important, it is only one aspect of

the process of policy change. The process of policy change can also happen in other stages of the policy process such as enactment, implementation, or evaluation. In addition, the PE model really makes no attempt to specifically outline what forces lead to changing policy venues and policy images. In contrast, the ACF model at least theorizes that socioeconomic conditions and political factors are the primary motivators behind policy change and policy belief change.

However, even more faults can be found with the ACF model. The largest fault of the ACF is that it is too broad. As a theoretical framework, the ACF is a mix of theories that attempts to explain the behavior of interest groups, agencies, policymakers, and other organized entities in the policy process; why policy changes at a particular time; the role of scientific and policy information in the formation of policy beliefs; and the cognitive processing limitations of individuals involved in the policy process (Sabatier & Jenkins-Smith, 1999, p. 153-154). Unlike the PE model that primarily focuses on the process of policy change, the ACF model focuses on too many topics. As a result, because the ACF model explains so much, researchers continually question whether it really explains anything at all.

Despite these problems, both models make useful contributions to research. At the most fundamental level, both models theorize about how policy changes. For the ACF model, policy beliefs of advocacy coalitions become transformed due to new socioeconomic conditions and political factors. In turn, these transformed beliefs help to change public policy. For the PE model, policy changes due to fluctuating policy images and policy venues that allow more people to enter the policy process and

debate public policy. The issue that has to be further explored in both models is the role of policy beliefs in policy change. As a result, this dissertation will determine if the PE model can use the concept of policy beliefs as a primary unit of analysis and determine if policy beliefs of advocacy coalitions change according to a punctuated equilibrium pattern.

Examining the Models in the Pesticide Regulatory Subsystem

This dissertation uses the ACF and PE models to examine the federal pesticide regulatory subsystem from 1982-2003. During this time period, pesticide regulations were the primary issue discussed by policymakers, advocacy groups, agencies, the media, and other organized entities. However, other issues also emerged during this time period. In addition to pesticide regulations, actors in the subsystem debated other agri-environmental issues such as agricultural conservation efforts like Integrated Pest Management (IPM), the impact of agricultural fertilizers on water pollution, biotechnology, the economic health of agri-businesses, the declining state of the American farmer, and farmland loss. Therefore, while this dissertation examines the changing state of pesticide regulations from 1982-2003, these other issues also appeared from time to time. In other words, even if a debate was supposed to focus on pesticide regulations, these other issues often appeared in the debate. This is a

significant fact and will be explored more in Chapters 3 and 4. But, overall, groups seemed to use these other issues to help influence the debate on pesticide regulations.

Two advocacy coalitions opposed one another during this time period, a coalition of “consumer-environmental protection” activists and a coalition of “agriculture promotion” advocates. Although not named as advocacy coalitions, previous research on pesticide regulations and agricultural policy by the Board on Agriculture of the National Research Council (1987), Bosso (1987), Browne (1988; 1995), Chuang (1994), Hosemann (2003), Meiners & Yandle (2003), and Smith (1994), clearly identifies these two coalitions. These previous research endeavors papers indicate that which is intuitive: a “consumer-environmental protection” coalition and an “agriculture promotion” coalition exist in the agri-environmental policy subsystem. Above all else, this dissertation will empirically demonstrate that such coalitions exist. In addition, this research will examine which factors influence the ability of advocacy coalitions to influence public policy.

Such an emphasis contributes to the uniqueness of this dissertation. Other researchers have examined parts of the pesticide regulatory debate. For example, Bosso (1987) explored aspects of pesticide politics from the 1940s through the 1980s. But his research did not include the significant changes to pesticide regulations made in 1996 with the Food Quality Protection Act (FQPA). Other researchers have also examined pesticide regulations with the ACF or PE models. However, these research efforts also did not include regulatory changes made with FQPA. In addition, these researchers did not directly compare the two theoretical models to determine which

parts of which model are accurate. Overall, no previous research attempted to accomplish what this research project hopes to accomplish: namely, to examine the pesticide regulatory subsystem since 1982 with two different policy models in an attempt to determine which policy model better explains the process of policy change.

Concluding Remarks

Overall, the ACF and PE models have a rich research history. Researchers have used both models to successfully explore a variety of policy subsystems. Even with specific problems and quirks, these two models have emerged as the dominant descriptions of the policy process within political science. However, researchers have yet to directly compare each model in a research effort. This dissertation attempts such a comparison.

This chapter served three primary purposes. First, it explained the origins and theoretical bases of both the ACF and PE models. The chapter clarified the basic concepts behind each model and showed how the models compared against each other. Second, this chapter placed the ACF and PE models of the policy process in the extant political science literature on interest groups and the policy process. This helped to determine why researchers developed each model and how each model continues research traditions that first appeared in the early 1900s. Lastly, this chapter introduced the pesticide regulatory subsystem and the two advocacy coalitions

operating in that subsystem. The next chapter examines this subsystem more thoroughly by explaining the history of federal pesticide regulations from the early 1900s to the late 1970s.

CHAPTER 3

PESTICIDE REGULATIONS BEFORE THE 1980s

In many respects, the historical development of federal pesticide regulations mirrored the development of American public policy in the 20th century. In American public policy before the 1930s, policymakers passed basic policies that minimally affected the public. The power of policies increased through the 1940s and 1960s as the administrative size of the federal government increased. During this time, policymakers often passed policies to benefit preeminent advocacy groups and to ensure their continued control over a specific policy subsystem. Policy subsystems generally became more open and more focused on public welfare as the number of interest groups increased in the late 1960s and 1970s. However, after the 1970s, policymakers transformed most non-defense policies with anti-regulation and anti-federal control initiatives that emphasized economic growth as a way to protect the public welfare.

Like most federal policy subsystems, the pesticide regulatory subsystem also went through this type of evolution. For example, federal policymakers passed the first pesticide regulations in the early 1900s to protect the economic interests of farmers. Throughout this time period and into the late 1930s, federal policymakers

primarily used pesticide regulations to protect farmers from unscrupulous pesticide manufacturers who used deceptive pesticide labels to exaggerate the effectiveness of their product. This focus on product efficacy remained from the late 1930s through the 1960s even as some federal regulations started to focus on product safety. During this time period, a cadre of chemical manufacturers and agricultural groups dominated the debates on federal pesticide regulations. As discussed in Chapter 2, this helped to establish a closed policy subsystem for federal pesticide regulations. Then, during the 1970s, as the number of interest groups increased and a wave of pro-environmental sentiment spread across the nation, federal pesticide regulations changed to focus more on product safety rather than product efficacy. Finally, in the 1980s and 1990s, the scope and power of federal pesticide regulations generally decreased as policymakers and agribusiness leaders successfully linked a decline in the agricultural industry to excessive pesticide regulations.

As a result, federal pesticide regulations represent a perfect lens by which to analyze the ACF and PE models of the policy process. Over time, policymakers incorporated the policy beliefs of consumer and environmental protection advocates, as well as agriculture promotion advocates, into pesticide regulatory policy to satisfy the public's changing attitude toward food and environmental safety. This chapter shows that process at work by examining the major points in the evolution of federal pesticide regulations from the early 1900s through the late 1970s.

Early Federal Pesticide Regulations

Pesticide regulations at the federal level commenced in 1910 with the passage of the Federal Insecticide Act (FIA). Like most pesticide regulations before the 1960s, this act served to protect farmers' interests more than the public's by ensuring that a pesticidal product worked as advertised. FIA used labels on pesticide products as a way to protect farmers from ineffective, counterfeit pesticides made by illegitimate manufacturers. It mandated that a pesticide's label contain a list of the product's ingredients and also made sure that any claims on the product's label were truthful (Federal Insecticide Act, 1910).

Hearings on FIA occurred in 1910 in the U.S. House of Representatives' Committee on Interstate and Foreign Commerce (the U.S. Senate did not hold hearings on FIA). Debates in the hearings were generally peaceful because the prominent agriculture promotion advocates, represented by the pesticide manufacturers and farmers, wanted this type of pesticide efficacy regulation. The FIA helped farmers by ensuring that purchased pesticides were effective. As a result, pesticides became a viable and reliable tool for farmers. Farmers could now believe a pesticide's label because chemical manufacturers had to operate under a standard set of rules when marketing products as pesticides. This contrasted with life before FIA when farmers often purchased products labeled as pesticides that were in fact anything but effective pesticides.

The FIA also helped chemical manufacturers by ensuring that legitimate pesticides were sold to farmers. At the time, farmers mainly relied on pesticides that either had arsenic or lead as the main ingredient (Perkins, 1982, p. 3). However, dishonest salesmen and manufacturers often sold pesticides to farmers that didn't have these ingredients or made other exaggerated claims about the pesticidal properties of some new substance. As a result, before the passage of FIA, genuine pesticide producers faced a major problem: the selling and manufacture of these counterfeit pesticides threatened the continued use of authentic pesticides. The passage of FIA helped to solve that problem. With stricter labeling provisions, chemical manufacturers could assure farmers that purchased pesticides were genuine, effective products.

While FIA strengthened labeling requirements and stabilized the pesticide market, it had three major weaknesses. First, FIA had no regulatory strength. The U.S. Department of Agriculture (USDA) enforced the act by creating the Bureau of Chemistry, but the Bureau had no real power to recall pesticides violating FIA (Bosso, 1987, p. 48). In addition, the leaders of USDA had no desire to pull pesticides off the market (Bosso, 1987, p. 48).

Second, FIA had a narrow technical scope. It only applied to lead-based and arsenic-based pesticides. In 1910, lead and arsenic were the primary pesticidal compounds. However, by the 1930s and 1940s the number of synthetic pesticidal compounds significantly increased and surpassed the use of lead- and arsenic-based

pesticides (Osteen, 1993, p. 308). This weakness directly led to a significant revision to FIA in 1947.

Third, FIA offered no safety regulations. The FIA emphasized pesticide efficacy or the idea that a pesticide should work as advertised, not pesticide safety. Throughout the twentieth century, pesticide regulations either emphasized efficacy, safety, or both. FIA really had no provisions to ensure product safety. This is somewhat surprising given the progressive concern over food safety sweeping the nation at the time policymakers passed this act. This lack of emphasis on safety could indicate that the initial debates on pesticide regulations were closed to the few progressive advocacy groups and farmers concerned about the use of pesticides on food. But by the 1920s, rampant concern over pesticidal residues in food helped to transform an older food safety law into a quasi-pesticide regulation.

This older law was the Pure Food and Drug Act (PFDA) of 1906. Debates on PFDA occurred in the U.S. House's Committee on Interstate and Foreign Commerce. Once again, the U.S. Senate did not hold hearings on PFDA. Consumer protection advocates who wanted the act and food manufacturing advocates who did not want the act dominated the hearings. Bolstered by popular progressive sentiments, consumer protection advocates were able to influence policymakers to a greater extent. Indeed, the wave of progressive enthusiasm for food and drug safety helped PFDA pass into law in 1906. Progressive enthusiasm for food and drug safety, best exemplified by articles on the dangers of patent medicines, Upton Sinclair's (1906/2003) account of lax food safety in *The Jungle*, and Harvey Wiley's campaign on the dangers of food

preservatives while heading the USDA's Bureau of Chemistry, led policymakers to pass PFDA (Bosso, 1987, p. 47).

PFDA aimed to prevent the sale or manufacture of adulterated food, drugs, medicines, and liquors. The act defined adulteration as a process of deliberately reducing the quality or strength of a substance by mixing or packing it with another, inferior substance (Pure Food and Drug Act, 1906). It specifically gave USDA's Bureau of Chemistry (later to be replaced by the FDA: the Food and Drug Administration) the authority to set adulteration tolerances for substances harmful to health (Pure Food and Drug Act, 1906). Tolerances ensured food safety. They represented the maximum level at which a dangerous substance could be in a food product and still be considered safe. PFDA also gave the Bureau of Chemistry/FDA the ability to seize products that exceeded an established tolerance level (Pure Food and Drug Act, 1906). But the act also gave the seller or producer of the adulterated product the explicit right to a jury trial to decide if the seized product really was adulterated and dangerous (Pure Food and Drug Act, 1906).

Like FIA, PFDA was a weak regulation. While the act gave the Bureau of Chemistry/FDA the authority to set tolerances, these tolerances did not have the force of law. Rather, PFDA tolerances were recognized only as administrative guidelines that helped inspectors determine when food was dangerous (Whorton, 1974, p. 112). Since they did not have the force of law, lawyers for producers and sellers could easily invalidate a tolerance and overturn a seizure order from the agency. Nonetheless, policymakers of the time viewed PFDA as an important step toward protecting the

public from the dangers of adulteration. Policymakers amended PFDA in 1912, 1913, and 1930 (Jackson, 1970, p. 8). However, these amendments did not substantially change the PFDA provisions that eventually impacted pesticide regulations.

While technically not a pesticide regulation, the limited authority given to Bureau of Chemistry/FDA officials under PFDA played an important role in the evolution of pesticide regulations. By 1919, Bureau of Chemistry officials suspected that residues from arsenic pesticides on fruits and vegetables posed an unacceptable risk to consumers (Whorton, 1974, p. 95-96). Yet, USDA as a whole ignored the Bureau's concerns and continued to aggressively advocate the application of arsenic pesticides. Instead of using the Bureau to regulate pesticide residues, USDA used the Bureau to hold meetings with farmers on ways to lower residues by preventing excessive applications of arsenic pesticides (Whorton, 1974, p. 124). These meetings were not successful. Farmers continued to overuse arsenic pesticides and concern over residues continued. That same year, the city of Boston seized pears throughout the city after a health inspector noticed pears heavily inundated with a white powder that later turned out to be arsenic residue (Whorton, 1974, p. 95).

It was not until 1925 that the issue of arsenic pesticides became a concern for USDA. During that year, European countries with established tolerances levels for arsenic pesticides banned the importation of American apples because of concerns about high arsenic levels (Whorton, 1974, p. 133-134). The outright ban of American apples finally made the USDA take regulatory action on arsenic pesticide residues. In 1926, with the Secretary of Agriculture's blessing, a USDA-sponsored group of

toxicologists established the first tolerances for arsenic on apples (Whorton, 1974, p. 155-156). However, Bureau officials viewed the tolerance as too lenient. The Bureau even announced a more stringent tolerance later in the year that was further modified after meetings with farmers (Whorton, 1974, p. 161). By the end of 1926, the Bureau of Chemistry, farmers, and the main leaders of the USDA reached a compromise on the tolerance level for arsenic pesticide residues. The more stringent Bureau tolerance level still applied starting in 1928, but for 1927 all of the participants agreed to a more lenient interim tolerance (Whorton, 1974, p. 163). This allowed farmers time to transition to the new tolerance level.

The long debate over establishing a tolerance for arsenic pesticides garnered the Bureau of Chemistry a large number of critics. Within the USDA, officials viewed the Bureau as too progressive and not giving enough consideration to the impact of residue regulations on the economic well-being of farmers (Piott, 2006, p. 177). Outside of USDA, the general public viewed the Bureau as being too lenient to farmers at the expense of public safety (Bosso, 1987, p. 48). Many also viewed the Bureau's dual role of protecting farmers' interest through FIA while at the same time protecting consumers' interest through PFDA as contradictory and untenable (Bosso, 1987, p. 48).

As a result, USDA abolished the Board in 1927 and replaced it with the Food, Drug, and Insecticide Administration, later to be known as the Food and Drug Administration (FDA) (Weber, 1928, p. 1). FDA only had to enforce PFDA, not FIA. Therefore, with a newly established FDA, the USDA could now theoretically keep

farmers' and consumers' interest separate. However, the FDA also had its fair share of critics among interested stakeholders and federal policymakers. The animosity toward FDA became so intense that by the late 1930s, policymakers stripped the agency of funds needed to examine the potential negative effects of pesticide spray residues on fruits and vegetables (Bosso, 1987, p. 50).

Under increasing pressure from critics worried about consumer safety, policymakers strengthened PFDA with the Food, Drug, and Cosmetic Act of 1938, and moved FDA out of USDA in 1940 (Bosso, 1987, p. 49). This left the regulation of pesticide residues outside of USDA's jurisdiction. The agency that ensured farmers' interests by regulating product efficacy finally separated from the agency that ensured consumers' interests by regulating product safety. This formal separation between regulating pesticide efficacy and pesticide safety defined pesticide regulations for the next six decades.

The Emergence of FFDCCA

PFDA and FIA possessed minimal pesticide regulatory strength. Since PFDA pesticide tolerances were considered administrative tolerances, not legal tolerances, regulated parties could effectively delay the establishment of any pesticide tolerance through the use of jury trials. These jury trials often invalidated pesticide tolerances, as members of the jury possessed little knowledge of toxicology and often had strong

sentiments that favored farming interests (Whorton, 1974, p. 112). In addition, both acts did not prevent the sale of many products that contained potentially dangerous substances. By the 1930s, the USDA had only classified a few substances as too dangerous to include in pesticide products (Whorton, 1974, p. 196). As a result, as long as the pesticide's label did not include these banned substances, and as long as the label listed other potentially dangerous substances as ingredients, then it was legally okay to sell the product (Whorton, 1974, p. 197).

Policymakers awakened to the weaknesses of PFDA in 1937. During that year, a patent medicine marketed as the "Elixir Sulfanilamide" killed over one hundred consumers (Whorton, 1974, p. 238). Realizing that existing regulations prevented any type of meaningful response to such an incident, officials within Franklin D. Roosevelt's administration began to advocate a stronger regulation that could replace PFDA and better protect consumers from dangerous substances. This led to the passage of the Federal Food, Drug, and Cosmetic Act (FFDCA) in 1938.

Hearings on various bills that eventually became FFDCA started in 1933 and continued through 1935 (Jackson, 1970, p. 225). Hearings took place in the U.S. House's Committee on Interstate and Foreign Commerce and the U.S. Senate's Committee on Commerce (Jackson, 1970, p. 225). The hearings on FFDCA proved quite contentious. Organized interests representing consumer safety and organized interests representing farmers and pesticide manufacturers debated one another over the merits of FFDCA.

Some of the fiercest debates over passage of FFDCA concerned its provisions that allowed FDA to establish legal pesticide tolerances that had the full force of the law. With the authority to establish legal tolerances, FDA could assert greater control over the regulatory process. If disputes occurred over legal tolerances, the FDA could simply present a case in court that a manufacturer exceeded the established legal tolerance. In contrast, with just administrative tolerances, the FDA had to prove to the court (and a jury) that the tolerance was valid and that exceeding the tolerance harmed public health (Bosso, 1987, p. 52).

Farmers feared the possibility of legal tolerances. Their primary concern was that a single agency could control how much pesticide they could apply to their crop. Ever since the Bureau of Chemistry adopted the first administrative pesticide tolerances in the 1920s, farmers feared that agency officials too often protected the consumer without considering the economic impact of the regulation on their economic well-being. During the debates on FFDCA, farmers formed various associations to protest the possibility of legal tolerances. These groups classified such tolerances as dictatorial and even un-American (Bosso, 1987, p. 52). For a revised food and drug law, these groups wanted to continue the use of administrative tolerances with judicial review by jury trials in district courts (Jackson, 1970, p. 180). They additionally wanted the option of continuous judicial review (Jackson, 1970, p. 180). Or, in other words, they wanted the option of legally disputing a tolerance whenever the manufacturer or user of the product wished.

The FDA and other consumer protection advocates opposed this type of judicial review fearing a reprisal of the effective judicial blocking efforts of agricultural interests that undermined PFDA (Bosso, 1987, p. 52). The final language in FFDCA reached a compromise. It gave FDA the authority to establish legal tolerances for pesticides and it gave farmers the ability to contest the tolerance but only for ninety days after the issuance of the tolerance (Whorton, 1970, p. 242). Unlimited ability to contest a tolerance at any time it adversely impacted the farmer was not allowed. In addition, the act enabled the judicial review of tolerances in circuit courts only (Jackson, 1970, p. 189). This prevented the use of jury trials at the lower district court level.

Both sides obtained what they wanted with FFDCA. The FDA received the ability to set legal tolerances for pesticides, and farmers were allowed an opportunity to contest the validity of a tolerance in court. This helped to alleviate farmers' fear about one agency's ability to set tolerances that could negatively impact their way of life. But the FDA and consumer protection advocates were the real winner from FFDCA. The act gave the agency not only the power to set legal tolerances for pesticide residues, but also required drug manufacturers to submit test results for new products to FDA in order to protect consumers from dangerous products (Federal Food, Drug, and Cosmetic Act, 1938). This helped to strengthen FDA's regulation of pesticide residues and especially pharmaceutical products.

FFDCA did much more than regulate pesticide residues. It also regulated drugs and cosmetics. But the debates over pesticides were perhaps the most

controversial because the policy beliefs of agriculture promotion advocates clashed with the policy beliefs of consumer protection advocates. Publicly, policymakers incorporated many of the policy beliefs of consumer protection advocates into the final version of FFDCA. But hidden from the public's eye, policymakers crafted many of FFDCA's provisions with the policy beliefs of agriculture promotion advocates in mind.

For example, FFDCA mandated that FDA establish legal tolerances from research performed by the U.S. Public Health Service (Federal Food, Drug, and Cosmetic Act, 1938). FDA's problem with the Public Health Service concerned research methodology. The FDA, and especially its predecessor the Bureau of Chemistry, often used actual laboratory experiments on animal and human subjects to assess the safety of products (Taylor, 1991, p. 203; Young, 1989, p. 152-153). In contrast, the Public Health Service often relied on surveys that assessed pesticide use and farmers' health (Bosso, 1987, p. 50-51). FDA viewed these surveys as unreliable (Bosso, 1987, p. 50-51). As a result, the use of this type of data often led to FDA issuing more lenient pesticide tolerances. Additionally, FFDCA mandated that FDA could only set legal tolerances for pesticide residues after farmers applied the pesticidal product on the field (Federal Food, Drug, and Cosmetic Act, 1938). This presumed innocence clause prevented FDA from analyzing a product before it entered the marketplace. As a result, under FFDCA, FDA could not prevent a potentially dangerous pesticide from entering the market and being used by farmers. FDA could

only regulate pesticide residues after farmers or consumers noticed adverse effects of pesticides.

FFDCA Amendment of 1954

Over time, the inability to regulate before a product entered the market caused great concern among consumers and public health advocates. This concern deepened as the number of man-made, synthetic pesticides continued to greatly increase after the passage of FFDCA in 1938. Increasing numbers of synthetic pesticides corresponded to increased use and FDA simply did not know how their use impacted consumer health. Of particular concern during this time period was the widespread use of DDT, an especially potent synthetic pesticide that remained in ecosystems long after the application date. The large increase in synthetic pesticide use and the concern over their use expressed by FDA, policymakers, and the public resulted in two substantial amendments to FFDCA in the 1950s. These amendments were the Miller Amendment of 1954 and the Delaney Amendment of 1958. These amendments, together with the passage of FIFRA (the Federal Insecticide, Fungicide, and Rodenticide Act) in 1947, set the basic framework for federal pesticide regulations for the next four decades.

Policymakers passed the Miller amendment after hearings conducted by the U.S. House of Representatives' Select Committee to Investigate the Use of Chemicals in Food and Cosmetics. Established in 1950, Democratic policymakers formed the

committee due to concern about weaknesses in FFDCA and the ever-increasing use of synthetic pesticides on food crops (Bosso, 1987, p. 72). Just forming the committee proved controversial. While urban policymakers and a few progressive policymakers from rural areas favored the establishment of the committee, most policymakers from rural states strongly opposed the establishment of the committee (Bosso, 1987, p. 72-73). In the end, the realization that the hearings could alleviate concern among many urban constituencies about the safety of pesticides in food made the hearings a reality.

Representative James Delaney of New York, a Democrat, chaired the committee. As a result, the committee quickly became known as the Delaney Committee. The Delaney Committee examined the health impact and economic necessity of using chemicals in food production (Bosso, 1987, p. 73). Despite having the support of the powerful Democratic Speaker of the House Sam Rayburn, the committee faced stiff opposition from rural policymakers and farmers who did not want more pesticide regulations (Bosso, 1987, p. 72-73).

The Delaney hearings lasted from 1950-1952 and reached two main recommendations. First, in order to protect consumer safety, FDA needed the regulatory ability to examine a pesticidal product before farmers used it (Bosso, 1987, p. 75). This was known as pre-market notification. Policymakers saw this as an important step not just toward protecting consumer health but also toward aligning FFDCA's process of drug regulations, which already had pre-market notification, with FFDCA's process of pesticide residue regulations. With this recommendation, FDA could protect consumer safety before the public used a pharmaceutical, cosmetic

product, or a pesticidal compound. Second, the committee found that farmers needed pesticides, even extremely toxic pesticides, in order to maintain an acceptable level of food production that met consumer demand (Board on Agriculture of the National Research Council, 1987, p. 164).

From those hearings emerged various attempts to revise FFDCA with a more explicit and stronger role for FDA in the regulation of pesticide residues. Republican Representative Arthur L. Miller of Nebraska, who was a member of the Delaney Committee, offered his own FFDCA amendment in 1953. This amendment called for the FDA to consider pesticide and chemical residues on raw fruits and vegetables as harmful and not safe until conclusive evidence indicated otherwise (Federal Food, Drug, and Cosmetic Act Amendments, 1954). The amendment also called for pre-market notification. Under the amendment, manufacturers had to give FDA data that proved the safety of new chemicals used on food before the chemical was available on the open market (Federal Food, Drug, and Cosmetic Act Amendments, 1954). From there, the FDA had ninety days to either establish a tolerance level for the chemical on any raw fruit and vegetable crop, proclaim the chemical as safe for use on any raw fruit and vegetable crop, or classify the chemical as unsafe for use on any raw fruit and vegetable crop (Federal Food, Drug, and Cosmetic Act Amendments, 1954).

Under the amendment, the FDA also had to consider the risks of using the chemical versus the benefits of using the chemical (Federal Food, Drug, and Cosmetic Act Amendments, 1954). The balancing of risks versus benefits pleased rural policymakers, farmers, and other advocates of agriculture promotion. This helped to

ensure passage of the amendment, but the balancing act also made sense. As the Delaney Committee discovered, the nation needed pesticides to ensure an adequate supply of food, even if residues from those pesticides posed a certain amount of risk to human health.

Despite strong debates during the Delaney hearings from consumer safety advocates and agriculture promotion advocates, the Miller amendment passed into law in July 1954 with no additional hearings occurring in the U.S. Senate (Bosso, 1987, p. 77). The amendment generally pleased both sides. With the risk/benefit balance test, the amendment addressed the concerns of rural policymakers and the agricultural community about the impact of pesticide residue regulations. But by giving the FDA increased authority to regulate pesticide residues on raw agricultural crops, the amendment also addressed the concerns of urban policymakers and consumers concerned about food safety. The Miller amendment, also called the Pesticide Residues Amendment, became codified as Section 408 of FFDCA. Perhaps not wishing to disrupt the relative harmony achieved between consumer protection advocates and agriculture promotion advocates, the amendment specifically excluded any mention of regulating pesticide residues in processed food (Board on Agriculture of the National Research Council, 1987, p. 165). The regulatory debate over pesticide residues in processed food had to wait until 1956.

FFDCA Amendment of 1958

Shortly after the Miller amendment became law, the FDA used Section 406 of the FFDCA to enact a “flow through” provision for processed food (Board on Agriculture of the National Research Council, 1987, p. 163). Under this provision, FDA gave de facto approval to any amount of pesticide residue in processed foods as long as the pesticide residue did not exceed its established tolerance level for raw food (Board on Agriculture of the National Research Council, 1987, p. 163). The significance of this provision greatly increased after the passage of the Delaney Amendment, also known as the Food Additives Amendment.

Passed in 1958, the Delaney amendment to FFDCA set a more rigid safety standard for pesticide residues and food additives in processed food. It specifically directed the FDA to establish tolerances for food additives and pesticide residues in processed food without any balancing of costs and benefits (Food Additive Amendments, 1958). Remember, one of the key tenets of the Miller amendment to FFDCA was the provision that when setting tolerances for pesticides, FDA had to consider the risks and benefits of pesticide use. This helped to ensure passage of the amendment in 1954. However, the Delaney amendment included no such provisions. The Delaney amendment also specifically prohibited the addition of any additive, including pesticide residues, to processed food if scientific evidence suggested the additive/residue possessed carcinogenic potential (Food Additive Amendments, 1958). As a result, if the additive or residue posed just a slight risk of being a cancer-causing

agent in humans or animals, then the FDA had the regulatory power to ban it. This was known as a zero risk standard for carcinogens in processed food.

The idea for a zero risk standard for carcinogens in processed food emerged from a meeting of the International Union Against Cancer (IUAC) in 1954. IUAC promoted the idea that a safe tolerance for chemicals containing carcinogens was impossible (Epstein, 1974, p. 79-80). Any amount of carcinogen posed immediate and irreversible damage to humans and animals. This idea, which was a policy belief of the IUAC, influenced policymakers as they debated legislation that eventually became the Delaney amendment.

Policymakers passed the Delaney amendment after two years of sporadic hearings in the House on the safety of food additives and pesticide residues in processed food. The U.S. House's Interstate and Foreign Commerce Committee held preliminary hearings in 1956 and continued the hearings in 1958 (Board on Agriculture of the National Research Council, 1987, p. 166-167). The hearings focused on the carcinogenic risk of food additives and pesticides in processed food as well as the Section 406 "flow through" provision used by the FDA. Consumer protection advocates gave evidence that miniscule amounts of carcinogens in food products could greatly harm humans. Agriculture promotion advocates demanded that policymakers exempt pesticide residues from any possible amendment and classify pesticides as a non-additive substance (Board on Agriculture of the National Research Council, 1987, p. 166). In general, the agricultural advocacy groups opposed any more regulations for pesticides. They noted that the 1954 Miller amendment

guaranteed the safety of pesticides (Board on Agriculture of the National Research Council, 1987, p. 166). However, the real debate over the Delaney amendment centered on FDA's "flow through" provision.

More progressive policymakers like Representative James Delaney wanted to end any type of "flow through" provision for processed food. In particular, Representative Delaney's initial version of the food additive amendment contained no "flow through" provision for processed food (Board on Agriculture of the National Research Council, 1987, p. 167). Some groups concerned with consumer safety, like the FDA, favored the continued use of the "flow through" provision (Board on Agriculture of the National Research Council, 1987, p. 170). Agricultural and chemical manufacturer groups continued to oppose the amendment no matter how it was designed (Board on Agriculture of the National Research Council, 1987, p. 166).

The Delaney amendment eventually passed with the "flow through" provision intact. Now codified as Section 402(a)(2)(C) and Section 406 of the FFDCFA, the "flow through" provision allowed FDA to regulate pesticide residues in processed food under tolerances established for raw food (Board on Agriculture of the National Research Council, 1987, p. 26-27). Only if the residue amount in processed food exceeded the tolerance established for raw food would the FDA invoke the stricter Section 409 regulations. In addition, the amendment had the Delaney clause. This clause stipulated that the FDA could not approve a food additive that induced cancer in humans or animals (Board on Agriculture of the National Research Council, 1987, p. 1-2). As a result, if a pesticide residue in processed food was higher than the

established tolerance in raw food, and if that pesticidal compound posed any amount of carcinogenic risk, then the FDA had to prohibit any amount of the pesticidal compound in any processed food product. In practice, such a prohibition also caused regulators to forbid the use of the compound on raw food since there was always the potential for raw food to become processed food.

The Delaney amendment had two major weaknesses. First, the amendment established the Delaney Paradox by permitting the use of inconsistent regulatory standards for raw and processed food (Board on Agriculture of the National Research Council, 1987). When setting tolerances, regulations for processed food excluded any mention of potential benefit, while regulations for raw food specifically included a consideration of potential benefit. This created a more stringent regulation for pesticide residues that tended to concentrate in processed food. In addition, the Delaney amendment was simply too strict. As codified, the amendment required a zero risk standard for carcinogens in processed food (Food Additive Amendments, 1958). This may have been fine in the 1950s when scientists could only detect residues in the parts per million range. But by the 1970s and 1980s, scientists had the ability to detect residues in the parts per billion and parts per trillion range (Taylor, 1991, p. 205). As a result, if regulators took the Delaney amendment at face value in the 1980s, then they would have to prohibit the sale of many pesticides and chemicals that only posed a minimal carcinogenic risk that was undetectable decades earlier. In the 1980s and 1990s, this posed an incredibly large problem for FFDCa regulations

and eventually led to the regulations being revised as the Food Quality Protection Act (FQPA) in 1996.

After the Delaney amendment, policymakers amended the pesticide portions of FFDCA only three times. In 1960 policymakers passed an amendment backed by agriculture promotions advocates that exempted pesticidal based preservatives from certain labeling requirements (Bosso, 1987, p. 106). In 1970, regulatory authority to set tolerances for pesticide residues went to the U.S. Environmental Protection Agency (EPA) (Bosso, 1987, p. 153). However, FDA still retained the authority to enforce tolerance levels on raw and processed food (Bosso, 1987, p. 153). And in 1996, policymakers revised the pesticide portions of FFDCA into the Food Quality Protection Act (FQPA). However, from 1958 through 1996, policymakers basically left the major regulations of FFDCA untouched. In contrast, policymakers repeatedly revised regulations dealing with product efficacy from the 1940s through the 1990s.

The Emergence of FIFRA

The only pesticide efficacy regulation, the Federal Insecticide Act (FIA), had become obsolete by 1947. Increasing technological breakthroughs, coupled with a federal subsidy policy that stressed more productive agriculture, resulted in the widespread adoption of synthetic pesticides by farmers. Since almost all of these

synthetic pesticides did not contain lead or arsenic as ingredients, FIA quickly lost its relevance.

To ensure farmers that these new pesticidal products were legitimate, policymakers agreed to amend FIA to include the new synthetic pesticides. These more expansive regulatory amendments became the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in 1947. Just like the original version of FIA passed in 1910, FIFRA protected farmers from buying ineffective pesticides. But the act also served to legitimize the continued use of synthetic pesticides on crops. As a result, farmers and pesticide manufacturers actively pursued the passage of FIFRA (Bosso, 1987, p. 54). Thus, FIFRA emerged because agri-business wanted a regulatory process to ensure the availability of these new pesticides to farmers. Safety to actual consumers was not an overriding concern. Those involved shared the view that all types of pesticides, and especially the newer pesticides developed after WWII, were safe, effective, and needed by farmers to ensure America's food production system.

Hearings over FIFRA occurred in the U.S. House of Representatives' Committee on Agriculture from 1946-1947. Representative John W. Flannagan, a Democrat from Virginia, chaired the Committee in 1946 while Representative Clifford Hope, a Republican from Kansas, chaired the Committee in 1947 (Bosso, 1987, p. 54, 56). The debates were not contentious. Republican policymakers, Democratic policymakers, urban policymakers, and rural policymakers all wanted new pesticide efficacy regulations. Additionally, USDA officials, the agricultural community, and pesticide manufacturers all actively supported a new pesticide efficacy bill (Bosso

1987, p. 56). Policymakers excluded groups concerned with pesticide safety and even the FDA (Bosso, 1987, p. 59). Consequently, policymakers passed FIFRA in 1947 without any hearings in the U.S. Senate's Committee on Agriculture and Forestry and without the vigorous types of debates that often characterized FFDCA legislation in the 1940s.

The main part of FIFRA expanded USDA's existing labeling requirements to the new synthetic pesticides dominating the marketplace. However, the act also included a registration process that included premarket notification. Under this provision, pesticide manufacturers had to register a pesticide with the USDA before it entered the market. This included submitting the pesticide's ingredients, directions for use, and label to the USDA before the product entered the market (Federal Insecticide, Fungicide, and Rodenticide Act, 1947). Once submitted, the USDA then registered the pesticide for use. FIFRA even provided for cases when the USDA refused to grant a registration. If USDA denied a registration, then FIFRA still allowed manufacturers to protest it and receive a registration under protest (Federal Insecticide, Fungicide, and Rodenticide Act, 1947). As a result, FIFRA gave the USDA no real power to ban a pesticide. Instead, that power remained with federal district courts in a provision retained from FIA that allowed manufacturers to challenge agency administrative decisions (Bosso, 1987, p. 56). The lack of power to legally ban pesticides caused no concern among USDA officials or policymakers. After all, in their view FIFRA was only a pesticide efficacy law, not a pesticide safety law. Policymakers designed the

registration process to protect farming and pesticide manufacturers' interests, not to ensure safety.

FIFRA was a major event in the history of federal pesticide regulations. At the time of the act's passage, the agricultural community and pesticide manufacturers had the complete approval of the USDA and important policymakers within Congress. The approval was so great and the debate over FIFRA so peaceful that some authors viewed FIFRA as an example of iron triangle policymaking at work with agricultural interests, pesticide manufacturing interests, USDA officials, and policymakers on agricultural committees all working together for a mutually beneficial pesticide regulation (Bosso, 1987, p. 53).

If an iron triangle policymaking system existed in 1947, it soon collapsed. In 1959, policymakers debated another amendment to FIFRA in the U.S. House's Committee on Agriculture. The 1959 amendment expanded FIFRA's scope to include new classes of pesticide products such as nematocides, defoliants, plant regulators, and desiccants (Toth Jr., 1996, p. 1). The debates over the 1959 amendment were again peaceful. But by the 1960s, the situation had changed. With the publication of Rachel Carson's *Silent Spring* in 1962, a new concern over synthetic pesticides emerged from the public.

Carson's (1962) book examined the environmental dangers of DDT, an insecticide commonly used in agricultural and urban areas in the 1940s and 1950s. Carson's work riveted the public's attention to the use of pesticides. In contrast, many farmers and pesticide manufacturers viewed the book as muckraking sensationalism

that failed to mention the positive role that DDT played in eliminating public health threats from insect-based diseases (Dahlberg, 1993, p. 282). Whatever the view of Carson's work, the publication of *Silent Spring* caused citizens and newly emergent environmental advocacy groups to lobby for more stringent pesticide regulations. Environmental groups soon lobbied the federal government, as well as state governments, for a complete ban on the use of DDT (Bosso, 1987, p. 127). These actions caused a ripple effect as policymakers in many states considered a more stringent state registration system for pesticides. By 1963, a state-by-state registration system for pesticides became a real possibility.

With the public and environmental groups concerned about pesticides, and with pesticide manufacturers and farmers concerned about pesticides having to go through fifty state registration systems, policymakers passed another FIFRA amendment in 1964. Once again, debates over the amendment occurred in the U.S. House's Committee on Agriculture in 1963 and 1964. This time, the debates were not peaceful. Instead, environmental and consumer protection advocates (here after identified as consumer-environmental protection advocates) actively debated the agricultural promotion advocates who historically dominated FIFRA hearings.

The 1964 amendment gave USDA the authority to immediately suspend pesticide registrations if they posed an immediate health hazard to the public and required pesticide manufacturers to put toxicity-based warnings on pesticide labels (Federal Insecticide, Fungicide, and Rodenticide Act Amendments, 1964). In addition, the 1964 amendment abolished the option of protest registrations (Federal

Insecticide, Fungicide, and Rodenticide Act Amendments, 1964). The amendment also gave anyone, not just manufacturers, adversely impacted by a pesticide suspension judicial standing (Federal Insecticide, Fungicide, and Rodenticide Act Amendments, 1964). As a result, those affected by a pesticide suspension could challenge the agency's decision in court. Policymakers passed this provision for farmers. But over time, courts used the clause to increasingly give standing to citizens concerned about the impact of pesticides on the environment and human health (Bosso, 1987, p. 159).

These provisions significantly increased the regulatory power of USDA. However, USDA seemed reluctant to use its new regulatory authority. The agency rarely suspended a pesticide registration even when a manufacturer violated the provisions of FIFRA (Bosso, 1987, p. 139). USDA officials seemed to hold the view that suspending even one registration could unduly harm modern agriculture. However, by the late 1960s, this view was out of step with the public's growing concern about the environmental and health effects of pesticides.

Governmental officials also became increasingly concerned with USDA's role in pesticide registration and the inability of pesticide registration to ensure pesticide safety. A report from the General Accounting Office (GAO) severely criticized USDA's registration enforcement activities in 1968 (Bosso, 1987, p. 138). Then, in 1969 a commission established by the U.S. Department of Health, Education, and Welfare issued its findings on the issue of pesticide risks. The Mrak Commission discovered evidence that the federal government needed to implement some type of

corrective action in order to adequately protect human health and the environment from the potential harm of pesticides (U.S. Department of Health, Education, and Welfare, 1969).

Pressure from the public, as well as reports from GAO and the Mrak Commission, helped to end USDA's regulatory responsibilities with pesticide registration. In 1970 policymakers transferred USDA's regulatory responsibilities on pesticide registrations, along with FDA's authority to set tolerances for pesticide residues, to the newly created U.S. Environmental Protection Agency (EPA) (Bosso, 1987, p. 153). By 1972, the U.S. Congress passed an amendment to FIFRA that transformed the act from a mere pesticide efficacy regulation to an act that ensured pesticide efficacy while concurrently ensuring pesticide safety. Passed as the Federal Environmental Pesticides Control Act (FEPCA), the 1972 amendment set the stage for modern debates on pesticide regulations. In one corner were agricultural promotion advocates consisting of USDA, the agricultural community, and pesticide manufacturers. In the other corner were consumer-environmental protection advocates consisting of EPA, FDA, and the community concerned about the environmental and health impact of pesticides.

FIFRA Amendment of 1972

The 1972 FIFRA amendment, known as the Federal Environmental Pesticide Control Act (FEPCA), substantially transformed pesticide registration. Most

importantly, the amendment linked pesticide safety with pesticide efficacy for the first time. The debates over the 1972 amendment started in the U.S. House of Representatives' Committee on Agriculture (Bosso, 1987, p. 160). Chaired by Texas Democrat W. Robert Poage, the committee heard testimony from the agricultural community, pesticide manufacturers, and environmental groups in 1971 (Bosso, 1987, p. 160). Agricultural and pesticide manufacturing interests, who dominated debates on previous FIFRA amendments, this time faced stiff competition from consumer-environmental protection groups. Initially, the wave of environmentalism was so strong, that everyone knew that some sort of FIFRA amendment that better protected the environment and human health would pass.

But as the debate progressed, the strength of consumer-environmental protection groups faded. Pro-agricultural sentiments from strong members of the committee, in conjunction with some consumer-environmental protection groups outright dismissing any negative economic impact of strengthened regulations on farmers, led the House committee to weaken a somewhat strong environmental bill initially proposed by the administration (Bosso, 1987, p. 161-162). In particular, the Committee's revised bill significantly reduced penalties for regulatory offenders; required a National Academy of Science (NAS) advisory panel for all cancellation decisions; and required financial payments to farmers, pesticide manufacturers, and pesticide merchants to offset any economic loss sustained due to pesticide cancellations or suspensions (Bosso, 1987, p. 160).

From 1971-1972, the U.S. Senate debated the revised bill in the Committee on Agriculture and Forestry, chaired by Georgia Democrat Herman Talmadge (Bosso, 1987, p. 167-168). The Agriculture Committee removed the financial payment provisions, but also rejected other amendments to the bill that strengthened environmental and safety regulations (Bosso, 1987, p. 171). However, the real breakthrough in the 1972 amendments occurred when Senator Talmadge gave authority to revise the bill to the Senate's Committee on Commerce chaired by Philip A. Hart, a Democrat from Michigan who generally favored stricter regulations for pesticides (Bosso, 1987, p. 171). Apparently, the transfer was a quid pro quo. Senator Talmadge transferred authority to Senator Hart's Committee, which generally favored stronger environmental regulations, so that Senator Hart would drop a proposal to transfer authority to regulate meat, poultry, and egg inspections from the USDA to a newly proposed agency focusing on consumer health (Bosso, 1987, p. 171).

Once in the Commerce Committee, the bill became stronger. The Committee made cancellation requirements more expansive and required a greater amount of data submission from pesticide manufacturers for registration (Bosso, 1987, p. 172). Final negotiations between the House and Senate resulted in a compromise bill that was weaker than what many consumer-environmental protection groups wanted. For example, the final bill gave greater weight to considerations of benefits rather than costs in registration decisions, suspension orders, and cancellations (Bosso, 1987, p. 172). Additionally, the final bill allowed citizens to only sue the EPA for either non-

enforcement or over-enforcement of FIFRA (Bosso, 1987, p. 173). Suits against the makers, sellers, and users of pesticides were not allowed.

As passed, the 1972 amendment mandated that the EPA consider risks and benefits when issuing a registration for a pesticide (Federal Environmental Pesticide Control Act, 1972). To fulfill this regulatory requirement, EPA had to develop new risk analysis procedures for data submitted by pesticide manufacturers (Federal Environmental Pesticide Control Act, 1972). This was a substantial change from the original version of FIFRA that mainly emphasized labeling requirements and nothing more.

Other important provisions mandated a “general use” and “restricted use” classification system for all pesticides. These provisions gave EPA the authority to place more dangerous pesticides in the “restricted use” category where only specially trained personnel could apply them (Federal Environmental Pesticide Control Act, 1972). Perhaps most importantly, the 1972 amendments gave EPA authority to suspend a pesticide registration for a limited amount of time or cancel it forever if the pesticide had “unreasonable adverse effects on the environment” or if the manufacturer refused to comply with labeling requirements (Federal Environmental Pesticide Control Act, 1972). However, the 1972 amendments did not apply to pesticides sold before 1970. For those pesticides, of which there were thousands, the 1972 amendments mandated that EPA reregister them under FIFRA’s new requirements within four years (Federal Environmental Pesticide Control Act, 1972).

Pressure from consumer-environmental protection groups as well as findings from the Mraz Commission helped to pass the 1972 amendment. In these debates, consumer-environmental protection groups finally received unprecedented access to pesticide regulatory hearings where they were able to state their policy beliefs to policymakers. However, the results were really not what the consumer-environmental protection groups wanted. Instead of a strong pesticide regulation that primarily protected consumers and the environment from pesticide use, they had a watered-down regulation that still placed more emphasis on the benefits of pesticide use rather than the risks.

Consumer-environmental protection groups and the EPA accepted the 1972 amendment, but it is clear they were not happy with it (Bosso, 1987, p. 169). This is surprising given the fact that the environmental movement was arguably at its strongest point in the early 1970s. Yet even at its strongest point, a consumer-environmental protection coalition of environmental groups, consumer safety advocates, and progressive policymakers was no match for an agriculture promotion coalition of agricultural groups, pesticide manufacturers, and conservative policymakers. Realizing that the regulatory policy they truly wanted could not pass, the consumer-environmental protection groups seemingly compromised with their secondary policy beliefs on pesticide regulations and accepted more lenient regulations than they initially wanted. As the 1970s progressed, this type of behavior among consumer-environmental protection advocates increased.

FIFRA Amendments of 1975 and 1978

Policymakers amended FIFRA two more times in the 1970s. These amendments were not as significant as the 1972 amendment, but they continued to reflect the weakened position of consumer-environmental protection advocates. A scheduled revision to FIFRA occurred in 1975 as funding authorization for the 1972 amendments expired. Policymakers mainly held hearings on reauthorization in the House's Agriculture Committee, although at least one hearing on extending the authorization of the 1972 amendment occurred in the Senate's Committee on Agriculture and Forestry (Bosso, 1987, p. 191). Debates in the hearings were once again contentious. The main issue was EPA's implementation of the 1972 amendment. The agricultural community and pesticide manufacturers attacked EPA for not fully considering the economic impact of pesticide cancellations and even questioned EPA's scientific methodology for risk analysis (Bosso, 1987, p. 192). They especially cited the agency's desire to cancel chlordane, a pesticide used on corn, as an example of the agency's extremism and non-scientific analyses (Bosso, 1987, p. 190).

Hearings on the 1975 amendment dragged on from May to November. The final version of the amendment passed on November 19 and included provisions that weakened EPA's regulatory power (Bosso, 1987, p. 191). Most significantly, the 1975 amendment required EPA to consult with USDA before taking any regulatory

action against a pesticide and to consider the impact of pesticide cancellations on commodity prices and production costs (Federal Insecticide, Fungicide, and Rodenticide Act Extension, 1975). This was a large win for agriculture promotion advocates. They now had their representative agency back at the table in regard to pesticide regulations. In addition, the inclusion of considerations of commodity prices and productions to EPA risk analyses gave the agricultural community another significant policy victory.

EPA's position continued to deteriorate as authorization for FIFRA again expired in 1977. Policymakers initiated another round of hearings on FIFRA in the House's Committee on Agriculture and the Senate's Committee on Agriculture and Forestry (Bosso, 1987, p. 203). This time, criticism focused on EPA's reregistration process.

The 1972 FIFRA amendment established a deadline of 1976 for EPA to complete the reregistration of older pesticides (Federal Environmental Pesticide Control Act, 1972). However, with over 30,000 older pesticides needing reregistration, EPA had to establish some sort of streamlined data review process in order to meet the deadline. The agency's answer was the Rebuttable Presumption Against Registration (RPAR) process. In the RPAR process, EPA instituted a complete review of pesticide data for a reregistration only if the data indicated that the pesticide: 1) exhibited acute toxicity to humans and other species, 2) showed signs of chronic toxicity, such as oncogenic and mutagenic effects, to humans and other species, or 3) had no known antidotes or other emergency procedures for humans

exposed to the pesticides (National Research Council, 1980, p. 29). When a pesticide violated any of these three provisions, EPA instituted a complete reregistration data analysis.

Even with the RPAR process, the agency still failed to meet its statutorily defined 1976 deadline for reregistration of older pesticides. In addition, pesticide manufacturers called the RPAR process unfair and environmental advocates thought the process was not stringent enough (Bosso, 1987, p. 195). In particular, consumer-environmental protection advocates criticized the ability of pesticide manufacturers to overturn a complete reregistration analysis with data that showed how the pesticide's benefits outweighed any potential risks (Bosso, 1987, p. 195).

As a result, the emphasis of the 1977-1978 debates remained on EPA's implementation of the 1972 FIFRA amendment. During the debates, EPA lobbied for a conditional registration process whereby products could enjoy a type of temporary registration until completion of testing protocols and review of data points (Bosso, 1987, p. 200). The 1978 amendment, known as the Federal Pesticide Act, gave that authority to EPA. Additionally, the 1978 amendment gave states that adopted pesticide laws equivalent to the 1972 amendment to FIFRA, the ability to enforce EPA's registration decisions (Federal Pesticide Act, 1978). The 1978 amendment also abolished any type of deadline for reregistration and simply directed the EPA to complete reregistration as quickly as possible (Federal Pesticide Act, 1978).

In retrospect, policymakers passed the 1978 amendment to reduce the regulatory workload of EPA. By abolishing the deadline for reregistration, giving

states a prime role in registration enforcement activities, and approving EPA's conditional registration system, policymakers gave the agency a workable regulatory system. Throughout the 1970s, implementation of reregistration remained one of EPA's biggest problems. The 1978 amendment helped to make the reregistration process more workable. But even with the 1978 amendment, reregistration was still a problem for EPA well into the 1980s.

Policy Trends

This chapter gave a general overview of the evolution of federal pesticide regulations from the early 1900s to the late 1970s. The chapter detailed only the major events and major provisions in the history of federal pesticide regulations. Nonetheless, by covering the evolution of federal pesticide regulations in this manner, three interesting policy trends emerged.

First, from 1906 until the mid 1960s policymakers passed two distinct types of pesticide regulations. One type of regulation focused on pesticide efficacy while the other type of regulation focused on pesticide safety. During this time period, agriculture promotion advocates consisting of farmers, pesticide manufacturers, rural policymakers, and USDA influenced pesticide efficacy regulations. Consumer-environmental protection advocates consisting of concerned citizens, progressive groups, environmental groups, urban policymakers, Bureau of Chemistry/FDA, and

EPA influenced pesticide safety regulations during this time period. As indicated in Table 2, each type of pesticide regulation had its own set of specific policies.

Second, agriculture promotion advocates usually influenced policymakers to a greater extent than environmental protection advocates. In essence, agriculture promotion advocates were stronger. Their policy beliefs led policymakers to pass pesticide efficacy regulations in 1910, 1947, and 1959 with almost no input from consumer and environmental protection advocates. In contrast, consumer-environmental protection advocates always actively debated the policy beliefs of agriculture promotion advocates as policymakers passed pesticide safety regulations in 1906, 1938, 1954, and 1958. When it came to pesticide regulations, the policy beliefs of agriculture promotion advocates directly influenced pesticide efficacy regulations and indirectly moderated the incorporation of consumer-environmental protection advocates' policy beliefs into pesticide safety regulations.

The strength of agriculture promotion advocates decreased in the 1960s. With an increasing concern over the effects of pesticides on human health and the environment helping to launch modern environmentalism, the regulatory separation between efficacy and safety began to dissolve. In 1964, the policy beliefs of consumer-environmental protection advocates influenced the passage of a pesticide efficacy regulation for the first time. This was a significant event signifying that agriculture promotion advocates had lost absolute control of their pesticide efficacy policy subsystem.

Table 2

Evolution of Federal Pesticide Regulations Emphasizing Pesticide Safety and Pesticide Efficacy from 1906 to 1980

PESTICIDE SAFETY

1906 – Pure Food and Drug Act (PFDA)
1938 – Federal Food, Drug, and Cosmetic Act (FFDCA)
1954 – Miller Amendment to FFDCA
1958 – Delaney Amendment to FFDCA
1972 – Federal Environmental Pesticides Control Act (FEPCA) / FIFRA Revision
1975 – FIFRA Amendment
1978 – Federal Pesticide Act / FIFRA Amendment

PESTICIDE EFFICACY

1910 – Federal Insecticide Act
1947 – Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
1959 – FIFRA Amendment
1964 – FIFRA Amendment
1972 – Federal Environmental Pesticides Control Act (FEPCA) / FIFRA Revision
1975 – FIFRA Amendment
1978 – Federal Pesticide Act / FIFRA Amendment

However, the loss of control did not last. Even as early as 1972, the position of agriculture promotion advocates strengthened due to extreme policy beliefs taken by many environmental protection advocates. This led policymakers to pass a version of the 1972 FIFRA amendment that was weaker than what many consumer-environmental protection advocates wanted. But consumer-environmental protection advocates supported the amendment anyway since it improved pesticide safety regulations and finally integrated pesticide safety and pesticide efficacy regulations into one cohesive set of regulations. In 1975, the weakness of consumer-environmental protection advocates continued as agriculture promotion advocates influenced policymakers to give back a limited amount of pesticide regulatory authority to USDA.

The third trend that emerged from this overview is the importance of external focusing events for pesticide safety regulation. As seen in Table 3, external events often led to some type of pesticide safety regulation. In the early 1900s, muckraking campaigns led by Progressive authors directly led to the adoption of PFDA. In the 1920s, USDA officials finally used their PFDA authority to issue the first pesticide residues after European countries boycotted American fruits and vegetables due to fears about residues from arsenic based residues. In 1937 a patent medicine killed over 100 consumers and led policymakers to pass FFDCA. Then, in the 1960s the publication of *Silent Spring* helped to spread environmentalism across the country. This wave of environmentalism helped to influence the 1964 FIFRA amendment and the 1972 FIFRA amendment. These focusing events allowed the pesticide regulatory

subsystem to become more open and more malleable to consumer-environmental protection advocates concerned about pesticide safety.

Table 3

Timeline of Key Pesticide Focusing Events (1906-1978)

Year	Event
1919	Cities seize raw fruits and vegetables with arsenic residues
1925	European countries boycott American produce because of high residues
1937	Patent medicine "Elixir Sulfanilamide" kills over 100 consumers
1954	IUAC statement on carcinogens in food
1962	<i>Silent Spring</i> published
1969	Mrak Commission Report

Concluding Remarks

The history of federal pesticide regulations from the early 1900s through the mid 1960s reveals two distinct policy subsystems. Agriculture promotion advocates dominated the subsystem that emphasized pesticide efficacy. Agriculture promotion advocates had so much power over this subsystem that they blocked consumer protection advocates and environmental protection advocates from even testifying at any pesticide efficacy hearings in the 1940s and 1950s. Agriculture promotion advocates also dominated the other subsystem emphasizing pesticide safety, but to a lesser extent. Intense competition between consumer-environmental protection

advocates and agriculture promotion advocates actually occurred in the pesticide safety subsystem. In this subsystem, policymakers incorporated many of the policy beliefs of consumer-environmental protection advocates into pesticide safety regulations. However, agriculture promotion advocates were still able influence pesticide safety regulations and weaken them.

These two policy subsystems merged in the mid 1960s due to increasing public concern over the use of pesticides. Aided by an increasing wave of environmentalism, consumer-environmental protection advocates successfully influenced policymakers to include more safety provisions in efficacy regulations in 1964. By 1972, policymakers officially integrated pesticide efficacy regulations with pesticide safety regulations by passing the Federal Environmental Pesticides Control Act (FEPCA). Consumer-environmental protection advocates were initially stronger in this new policy subsystem. However, even while in the dominant position, consumer-environmental protection advocates could not completely influence policymakers and implement all of their policy beliefs. Instead, consumer-environmental protection advocates compromised with their beliefs. That is, they adapted their secondary policy beliefs on pesticide regulations to support pesticide safety regulations that were not as strong as they wanted. Unlike pesticide efficacy debates in the 1940s and 1950s, consumer-environmental protection advocates as well as agriculture promotion advocates often compromised with their beliefs in debates over pesticide safety in the 1960s and 1970s. These compromises were a direct consequence of the competition between an agriculture promotion coalition consisting of pesticide manufacturers,

agri-business advocates, farmers, and rural policymakers, and a consumer-environmental protection coalition consisting of environmental protection groups, consumer protection groups, and urban policymakers.

Agriculture promotion advocates quickly reestablished their dominant position in the mid 1970s by capitalizing on lobbying mistakes made by consumer-environmental protection advocates. During this time, many consumer-environmental protection advocates came under increased pressure from policymakers for unrealistic policy beliefs. As a consequence policymakers weakened many pesticide safety provisions.

The evolution of these policy subsystems validates two important tenets relevant to the ACF and PE models of the policy process. First, pesticide regulations have two types of advocates: agriculture promotion advocates and consumer-environmental protection advocates. Examining the policy history of pesticide regulations, it is easy to group the agriculture promotion advocates into a larger agriculture promotion coalition, and the consumer-environmental protection advocates into a larger consumer-environmental protection coalition. This helps to justify the usefulness of the ACF. For any given policy, there will usually be two opposing sides that can be grouped into larger coalitions.

Second, external events that capture the attention of a large segment of the public help to open policy subsystems and lead to policy change. This happened with pesticide safety regulations in the early 1900s with progressive concerns over food quality, in the 1930s as the public became concerned over the deaths of consumers

from dangerous products, and in the 1960s with the publication of *Silent Spring*. Just as the PE model suggests, all of these events directly led to more advocates entering a policy subsystem and helping to pass a new type of policy.

Understanding the process of policy change is often a difficult process, even for a relatively narrow scope of policies such as pesticide regulations. While this chapter only examined the major provisions of changes in federal pesticide regulations from the early 1900s through the late 1970s, important trends and concepts emerged. These concepts give further support to both the ACF and PE models of the policy process. But more importantly, these concepts help set the stage for the policy debates over pesticide regulations that occurred in the 1980s and 1990s.

CHAPTER 4

PESTICIDE REGULATIONS IN THE 1980s AND 1990s

Federal pesticide regulations fundamentally changed in the 1960s and 1970s. Responding to increasing concern over the safety of pesticides from consumer-environmental protection advocates, policymakers moved pesticide registration authority from the USDA to the EPA and consolidated the regulation of pesticide efficacy and pesticide safety into one regulation. These moves helped to open the federal pesticide regulatory subsystem to consumer-environmental protection advocates. However, as EPA's implementation of FIFRA faltered in the late 1970s, the ability of consumer-environmental protection advocates to successfully influence pesticide regulations faded. This decline continued in the 1980s and 1990s as both agriculture promotion advocates as well as consumer-environmental protection advocates became dissatisfied with the state of federal pesticide regulations.

This chapter describes the debates over federal pesticide regulations in the 1980s and 1990s. During this time period, debates on pesticide regulations continued to include significant criticism of EPA's implementation of FIFRA and FFDCA. With anti-regulatory sentiment increasing among the public during this time period and with increasingly conservative policymakers, agriculture promotion advocates were able to

use this criticism to advocate FIFRA and FFDCA amendments that were more aligned to their policy beliefs.

Criticism on federal pesticide regulations generally focused on three problem areas during the 1980s and 1990s. The first problem area was EPA's registration of new pesticides. In order to register a pesticide, EPA first had to analyze toxicity data points that revealed the safety of the pesticide's chemical ingredients to the environment and human health. However, chemical companies often refused to make such information readily available to EPA scientists and interested third parties. This helped to delay the formal registration process and resulted in EPA issuing temporary, conditional registrations for many pesticides without knowing the potential effects of the pesticidal chemical on the environmental and human health. Predictably, this process angered many consumer-environmental protection advocates since it seemingly gave more weight to the benefits of using pesticides rather than the risks. When evidence finally did emerge that a pesticide used by farmers posed unacceptable dangers to the environment or human health, EPA cancelled or suspended the pesticide's registration. However, suspension and cancellation orders angered agriculture promotion advocates. The final result was a registration process that both agriculture promotion advocates and consumer-environmental protection advocates viewed as not functioning properly.

The second problem area concerned EPA's reregistration of older pesticides. Reregistration, first passed in the 1972 FIFRA amendment, mandated that EPA analyze older pesticides previously registered by the USDA under the pre-1972 system

of pesticide registration (Federal Environmental Pesticide Control Act, 1972).

However, EPA could not complete reregistration by statutorily defined deadlines. The problem centered on the complexities of reregistration. To reregister a pesticide, EPA had to examine a large number of health and environmental data points to ensure the pesticide's safety. Even with programs that expedited the reregistration process, like the RPAR program, EPA still could not reregister pesticides fast enough. While policymakers abolished deadlines for pesticide reregistration in the late 1970s, problems with the implementation of pesticide reregistration were always at the forefront of pesticide policy debates in the 1980s.

The third problem area concerned the Delaney clause of FFDCA. As detailed in Chapter 3, the Delaney clause mandated that pesticide residues could not have any carcinogenic risk in processed food. However, by the 1980s the strict interpretation of this clause created a potential policy quagmire. With new analytical techniques, laboratories could find a small amount of carcinogenic risk in just about any pesticide residue. As a result, if agency officials followed the Delaney clause to a tee, then the country faced the real possibility of losing a substantial number of pesticides. Many policymakers, agriculture promotion advocates, and consumer-environmental protection advocates questioned the usefulness of the Delaney clause. In fact, many policymakers and advocates wanted a new pesticide safety regulation that focused on other health concerns rather than on small and often inconsequential carcinogenic risk potentials in pesticide residues.

Policy criticisms over these three problems drove the debates over federal pesticide regulations in the 1980s and 1990s. During this time period, the schism of policy beliefs between agriculture promotion advocates and consumer-environmental protection advocates continued. However, while these advocates continued to hold divergent policy beliefs, they also realized that regulatory reforms had to occur to correct problems associated with registration, reregistration, and the Delaney clause. This realization helped to bring the policy beliefs of many agriculture promotion and consumer-environmental protection advocates closer for a brief period of time. The resulting impact on pesticide regulations was FIFRA regulatory reform in 1988 and FFDCA/FIFRA regulatory reform in 1996. But before those significant reforms, agriculture promotion advocates specifically tried to limit the power of FIFRA in 1980 and 1982.

FIFRA Amendment of 1980

As the 1970s ended, EPA's implementation of pesticide regulations came under attack from consumer-environmental protection advocates as well as agriculture promotion advocates. Consumer-environmental protection advocates criticized the agency's registration and reregistration processes as being too favorable to pesticide manufacturers at the expense of public health. Agriculture promotion advocates also criticized the agency's registration and reregistration processes. In particular, these

advocates criticized the agency's RPAR process as well as its decision to cancel the registrations for many organochlorine-based pesticides such as DDT and chlordane (Bosso, 1987, p. 196). Criticism from agriculture promotion advocates intensified in 1978 with EPA's decision to suspend the registration for Mirex, a fire ant pesticide. The suspension of Mirex caused EPA great harm within the House of Representatives' Committee on Agriculture. Since fire ants were such a large problem in many southern states, southern policymakers on the Committee accused EPA of recklessness in its registration decisions (Bosso, 1987, p. 205). In response to the Mirex decision, southern policymakers in the House of Representatives sponsored another amendment to FIFRA in 1980 as debates on the reauthorization of the regulation started.

Representative William Wampler, a Republican from Virginia, and Representative Kika de la Garza, a Democrat from Texas, sponsored the 1980 amendment. The amendment required the EPA to use a scientific advisory panel to review any of its decisions to suspend a pesticide's registration (Federal Insecticide, Fungicide, and Rodenticide Act Amendments, 1980). In addition, the 1980 amendment allowed for a Congressional veto of any EPA regulatory decision promulgated under FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act Amendments, 1980). With the 1972 FIFRA amendment, EPA had a NAS advisory panel that examined its pesticide cancellation decisions. Now with the 1980 FIFRA amendment, also known as the Wampler amendment, EPA had a scientific advisory panel that examined its pesticide suspension decisions as well as a potential

Congressional veto of any regulatory action. These provisions were a direct response to EPA's controversial suspension and cancellation of pesticides in the late 1970s.

Debates on the 1980 amendment and the reauthorization of FIFRA were brief. Only two hearings were held on the matter. As usual, the House Committee on Agriculture held the first hearings. Much like the late 1970s hearings on FIFRA, these debates focused on EPA's implementation of FIFRA. After testimony from EPA on its pesticide regulatory procedures, the first House hearing quickly became one-sided, as the rest of the witnesses testifying were agriculture promotion advocates such as the National Agricultural Chemicals Association and the Chemical Specialties Manufacturers Association (*FIFRA Extension*, 1979a). These advocates wanted more oversight over EPA and therefore supported the provisions of the 1980 amendment. Policymakers on the Committee easily passed the amendment.

The other hearing occurred in the Senate Committee on Agriculture and Forestry. Once again, the hearing focused on EPA's implementation of FIFRA. Agriculture promotion advocates also dominated this hearing by criticizing EPA's implementation of FIFRA (*FIFRA Extension*, 1979b). With almost no testimony from consumer-environmental protection advocates, the Senate Committee passed the amendment. By the end of the year, the 1980 amendment easily became law.

The 1980 FIFRA amendment continued policymakers' attempts to further constrain EPA's pesticide regulatory capabilities. These attempts increased after 1980 due to changing political conditions. Chief among these new political conditions was a large increase in the number of pro-business/anti-regulation advocates (Bosso, 1987,

p. 208). This helped to augment the expanding strength of agriculture promotion advocates who generally held pro-business, anti-regulation policy beliefs.

Additionally, the election of Ronald Reagan to the U.S. Presidency in 1980 also helped to expand these types of beliefs among policymakers. Agriculture promotion advocates such as agri-businesses and chemical manufacturers generally liked the new anti-regulatory climate promoted by Reagan's administration. As debates over the reauthorization of FIFRA occurred once again in 1981, these advocates thought they finally had the chance to revise major sections of FIFRA and make it more focused on the policy beliefs of agriculture promotion advocates rather than the policy beliefs of consumer-environmental protection advocates.

Debates on FIFRA: 1981-1982

Bolstered by favorable political conditions in 1981, agriculture promotion advocates lobbied for a new, pro-agriculture amendment to FIFRA that significantly relaxed pesticide registration and reregistration requirements on pesticide manufacturers. The proposed amendment eased data submission requirements for pesticide manufacturers, made independent verification of submitted data more difficult, and expanded the legal rights of pesticide manufacturers to limit the use of their data by non-governmental entities (Bosso, 1987, p. 219-220). These changes had the potential to significantly alter the landscape of FIFRA registration and

reregistration decisions in favor of agriculture promotion advocates. For example, with data submission guidelines relaxed, pesticide manufacturers could more easily delay the submission of toxicity results for pesticides in the registration or reregistration process. And with independent verification of submitted data made more difficult, the validity of the entire registration and reregistration process could become questionable since the accuracy of the submitted data could not be validated by non-governmental entities (which were often interested consumer-environmental protection advocates).

Agriculture promotion advocates successfully lobbied policymakers to include many of these provisions in a proposed 1982 FIFRA amendment. Attempts by consumer-environmental protection advocates to sway the proposed amendment back toward their policy beliefs generally failed. Consumer-environmental protection advocates were only able to include a provision in the proposed amendment that increased the ability of private individuals to sue pesticide manufacturers on pesticide matters (Bosso, 1987, p. 220-221). Representative George Brown, a Democrat from California, sponsored the amendment and hearings on the reauthorization of FIFRA, and the 1982 FIFRA amendment began in the House Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture on February 4, 1982.

The 1982 amendment passed the House Agriculture Committee but faced a more formidable challenge on the House floor. During the floor debates, policymakers aligned with consumer-environmental protection advocates were able to

successfully delete provisions of the amendment that made pesticide toxicity data less open to the public (Bosso, 1987, p. 222). That change, in conjunction with a change that continued to permit states to issue their own pesticide regulations, made the amendment slightly more acceptable to consumer-environmental protection advocates. As a result, the amendment as well as reauthorization of FIFRA for two more years passed the House of Representatives (Boss, 1987, p. 222).

Debates on a Senate version of the amendment then took place in the Senate's Committee on Agriculture, Nutrition, and Forestry. Under Republican leadership for the first time in over three decades, the Committee simply adopted the amendment's provisions as originally passed by the House Agriculture Committee (Bosso, 1987, p. 222). This included provisions that made pesticide data less open to the public.

The Senate FIFRA amendment passed the Committee. But afterwards, it stalled on the Senate floor. Consumer-environmental advocates were able to persuade key Senators to delay consideration of the amendment (Bosso 1987, p. 223). After realizing that a Senatorial floor debate on the amendment would probably produce a modified version of the 1982 FIFRA amendment that they did not want, agriculture promotion advocates were also able to persuade key Senators to delay consideration of the amendment (Bosso, 1987, p. 223). The delay lasted the entire Congressional session. Congress passed no new FIFRA amendment in 1982. The only action taken was a simple one-year reauthorization of FIFRA at the end of 1983 (Bosso, 1987, p. 223).

The ability to prevent the passage of a new FIFRA amendment more aligned with the policy beliefs of agriculture promotion advocates indicated that consumer-environmental protection advocates were still influential participants in the policy debates over pesticide regulations. Policymakers had increasingly made FIFRA more aligned with the interests of agriculture promotion advocates since 1975. However, those revisions were generally minor changes that gave agriculture promotion advocates more oversight over EPA regulatory decisions. In contrast, with provisions that specifically reduced pesticide registration and reregistration requirements on pesticide manufacturers, the proposed 1982 amendment actually weakened the validity of FIFRA's regulatory process. As a result, the debates over the proposed 1982 amendment showed that while consumer-environmental protection advocates were no longer able to influence policymakers to adopt strong pesticide regulations, they still possessed enough influence to stop the passage of a FIFRA amendment catered to agriculture promotion advocates that significantly weakened the pesticide regulatory process.

The Origin of Pesticide Regulatory Reform

In many respects, the debate over the 1982 amendment signaled the end of the 1970s debates on pesticide regulations. The 1970s debates first focused on passing new registration and registration requirements to FIFRA that satisfied consumer-

environmental protection advocates. Then the debates shifted to passing new restrictions on EPA in their implementation of FIFRA. This helped to satisfy agriculture promotion advocates in the latter part of the decade. In contrast, policy debates on pesticides after 1982 focused on significant reform that specially tried to satisfy both sets of advocates. After 1982, both sets of advocates knew that a substantial reform to pesticide regulations had to occur in order to solve problems associated with registration, reregistration, and the Delaney clause.

The need for pesticide regulatory reform became clear at the end of 1982. Representative George Brown, a California Democrat who chaired the Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture, held a hearing on a report prepared by the Subcommittee's own staff that criticized the current state of federal pesticide regulations. The report discovered a registration and reregistration process in disarray, and a pesticide tolerance-setting process that did not adequately assess health risk and carcinogenic risk (*EPA Pesticide Regulatory Program Study*, 1982, p. 84, 87). In addition, the report criticized the EPA for not considering more stringent health risks when setting pesticide tolerances (*EPA Pesticide Regulatory Program Study*, 1982, p. 173-176). The report concluded that EPA had to reform its pesticide regulatory procedures in order to make the registration and reregistration process work, and implement new, cumulative risk standards for pesticide tolerances that better estimated risks (*EPA Pesticide Regulatory Program Study*, 1982, p. 83-84).

The immediate consequence of the report was controversy. Other members of the Subcommittee criticized the report as subjective and refused to endorse it as an official report of the Subcommittee (*EPA Pesticide Regulatory Program Study*, 1982, p. 6). Nonetheless, the report had the effect that Chairman Brown wanted. The report signaled to consumer-environmental protection advocates and agriculture promotion advocates that true policy reform had to occur in pesticide regulations. As a result, the hearing on the Subcommittee's report, which lasted only forty-five minutes, directly led to new policy debates on significant reforms to FIFRA as well as FFDCA.

Consideration of FIFRA Reform: 1983-1984

The Brown report from 1982 first signaled the need for reform to all of the participants in the pesticide regulatory debates. In 1983, consumer-environmental protection advocates and agriculture promotion advocates reacted to the report by asking for time. EPA in particular wanted additional time to review the current state of its pesticide regulatory process (Bosso, 1987, p. 224). After the harsh debates from 1980-1982, agriculture promotion and consumer-environmental protection advocates also wanted more time to review the new political conditions surrounding pesticide regulations and form the necessary policy beliefs that could help lead to FIFRA reform (Bosso, 1987, p. 224).

By 1983, political conditions surrounding pesticide regulations were quickly changing in favor of consumer-environmental protection advocates. During that year, Ann Burford was removed as EPA administrator and replaced with William Ruckelshaus (Bosso, 1987, p. 211). Ruckelshaus was the first EPA administrator from 1970-1973 and was seen as the only person who could help the agency regain its footing after the controversial administration of Burford. Ironically, the administration of Burford helped consumer-environmental protection advocates. Burford's administration caused such a national scandal with the mismanagement of EPA's Superfund program that the public supported consumer-environmental protection advocates to a greater degree than they had from 1980-1982 (Bosso, 1987, p. 223). This helped to bolster the strength of consumer-environmental protection advocates during the upcoming debates on FIFRA reform.

Changing political conditions also helped strengthen the position of consumer-environmental protection advocates in 1984. During that year, approximately 15,000 people died in Bhopal, India when a Union Carbide pesticide plant accidentally vented a pesticidal precursor compound (Bosso, 1987, p. 236). The publicity over that tragedy increased the public's concern over the manufacturing, storage, and use of pesticides in the United States. The increasing concern over pesticides led many state policymakers to consider new state regulations that allowed state governments to issue pesticide registrations that limited the use and storage of especially lethal pesticides.

The prospect of state pesticide registrations alarmed agriculture promotion advocates. Above all else, agriculture promotion advocates wanted to avoid the

potential of fifty different state registrations on pesticides. After 1984, this led many agriculture promotion advocates to compromise on the registration and reregistration issues associated with FIFRA reform as long as consumer-environmental protection advocates agreed to limit the ability of states to issue pesticide registrations. Since they wanted to avoid the potential of fifty different state registrations on pesticides, many agriculture promotion advocates issued joint policy statements on FIFRA reform with consumer-environmental protection advocates. After decades of intractable policy beliefs, changing political conditions and the very real prospect of conforming to fifty state pesticide registrations made agriculture promotion advocates accept some of the policy beliefs of consumer-environmental protection advocates. In return, agriculture promotion advocates asked for a reform to FIFRA that limited the ability of state governments to issue pesticide registrations, protected the proprietary pesticide data of chemical manufacturers during registration and reregistration, and prevented the sudden cancellation or suspension of a pesticide's registration.

For their part, most consumer-environmental protection advocates were finally willing to compromise on their secondary policy beliefs on the issue of pesticides. Throughout the 1970s and early 1980s, many consumer-environmental protection advocates narrowly viewed pesticides as a dangerous product that had to be eliminated. The environmental benefits of some pesticides and the integral part that all pesticides played in modern agriculture were not considered. However, those types of policy beliefs often angered agriculture promotion advocates and helped result in FIFRA amendments in 1978 and 1980 that gave agriculture promotion advocates, such

as the USDA, more oversight over the implementation of FIFRA. After failing to turn many of their policy beliefs into public policy from 1978-1982, consumer-environmental protection advocates were finally ready to compromise on reforming FIFRA's registration and reregistration process. Consumer-environmental protection advocates just wanted to ensure that the registration and reregistration process remained open to external reviewers and that both processes protected the environment and human health.

First Attempt at FIFRA Reform: 1985-1986

Many of the major agriculture promotion and consumer-environmental protection advocates informally met in 1985 to work on a joint proposal to reform the registration and reregistration provisions of FIFRA. Participating in these meetings were large pesticide manufacturers represented by the National Agricultural Chemicals Association (NACA) and a coalition of major consumer and environmental groups called the Campaign for Pesticides Reform (CPR). Left out of these discussions were smaller chemical manufacturers and some major environmental protection groups such as the National Audubon Society who left the meetings after refusing to compromise on certain policy issues beneficial to the chemical industry (Bosso, 1988, p. 12).

These informal meetings occurred because FIFRA's registration and reregistration requirements were quickly turning into a regulation that no one wanted. For agriculture promotion advocates, FIFRA's registration and reregistration requirements allowed: proprietary pesticide data to be stolen, unfair cancellations and suspensions of pesticide registrations by EPA, and state-specific pesticide registrations that impaired the ability of farmers to use specific pesticides in certain states. For consumer-environmental protection advocates, FIFRA's registration and reregistration requirements did not protect the environment or human health because the reregistration of older pesticides was over a decade behind schedule, pesticide manufacturers often did not submit accurate toxicity data during the registration process, and many pesticides with cancelled registrations still showed up in residues on imported agricultural commodities (Nownes, 1991, p. 10).

The joint FIFRA reform proposal crafted at these meetings attempted to solve many of these deficiencies associated with registration and reregistration. It envisioned a major reform to FIFRA that included a five- to six-year timetable for EPA to complete reregistration, greater public access to pesticide toxicity data submitted in the registration process, enhanced EPA enforcement power to issue fines when manufacturers intentionally submitted false toxicity data during the registration process, a ban on the importation of commodities into the U.S. that had detectable residues from pesticides with cancelled registrations, a limit on the ability of state governments to issue pesticide registrations, and a five-year reauthorization for FIFRA that included increased fees to adequately fund the registration process (Bosso, 1987,

p. 225-226, 230). The joint proposal reflected more of the policy beliefs of consumer-environmental advocates rather than agriculture protection advocates. However, agriculture promotion advocates still accepted it and envisioned it as their best chance to make FIFRA reform more aligned to their beliefs.

Initially, the chances for passage of this type of FIFRA reform seemed good. Policymakers in both the House and Senate Committees on Agriculture were impressed with the joint policy proposal and agreed to consider it as a legislative bill (Bosso, 1987, p. 226-227). In addition, the time for policy reform seemed right. Agriculture promotion advocates, consumer-environmental protection advocates, and key policymakers all wanted FIFRA reform.

Hearings on the FIFRA reform bill once again started and primarily occurred in the House Agriculture Committee. Hearings started in the Committee on Agriculture's Subcommittee on Department Operations, Research and Foreign Agriculture in March 1986. The Subcommittee and Committee passed the bill with no changes (Bosso, 1988, p. 13). On September 19, the full House passed the bill in a floor vote (Bosso, 1988, p. 13).

The Senate Committee on Agriculture, Nutrition, and Forestry also held hearings on a similar version of the bill (Bosso, 1988, p. 13). However, the Senate version of the bill included a provision to protect groundwater from pesticide contamination (Bosso, 1988, p. 13). This key provision angered agriculture promotion advocates. It was not part of the initial joint policy proposal and it made the Senate bill more aligned to the policy beliefs of consumer-environmental protection

advocates. Nevertheless, the Senate Committee passed the bill with the groundwater protection provision intact (Bosso, 1988, p. 13). On October, 6, the full Senate passed the bill in a floor vote (Bosso, 1988, p. 13).

House and Senate members then crafted a joint version of the bill. The joint legislation eventually included a patent extension provision that allowed pesticide manufacturers an extended amount of time to have patent protection for a particular pesticide (Bosso, 1988, p. 13). Pesticide manufacturers wanted this provision since many manufacturers experienced registration delays that often prevented them from selling their pesticides in a timely fashion. With an extension of patent protection, pesticide manufacturers felt that these types of delays would no longer compromise the economic lifespan of a patented pesticide for the manufacturer.

The House ended up passing the joint legislation. However, the joint legislation then stalled in the Senate. With elections approaching and with many consumer-environmental protection advocates such as the National Audubon Society unsatisfied with the joint legislation, it failed to advance (Bosso, 1988, p. 13). This ended any chance of FIFRA reform in 1986.

The reasons for policy failure in 1986 primarily occurred due to the more extreme advocates of agriculture promotion and consumer-environmental protection. For example, many consumer-environmental protection advocates still refused to accept the initial, joint policy proposal crafted by NACA and CPR. These advocates generally wanted more protections for groundwater, refused to limit state authority to issue pesticide registrations, and refused to give chemical manufacturers an extended

patent protection for their pesticides as compensation for time lost due to delays in registration approval from EPA (Finegan, 1989, p. 627). Many agriculture promotion advocates also refused to accept a new regulatory mandate for pesticides in groundwater. However, the Senate's focus on protecting human health and the environment also had much to do with this failure.

Democrats formally regained control of the Senate in 1987. However, even with Republican control of the Senate in 1986, policymakers in that legislative body still focused more on protecting the environment and human health from the dangers of pesticides than their counterparts in the House of Representatives. In contrast, the House generally had a more balanced approach that equally focused on regulating to protect the environment and human health, as well as regulating to ensure the economic viability of agriculture. The Senate, dominated by strong Democratic policymakers such as Patrick Leahy and Ted Kennedy, wanted FIFRA reform to focus more on safety. This stance helped to prevent FIFRA reform in 1986.

Second Attempt at FIFRA Reform: 1987-1988

Even though reform did not occur in 1986, all of the participants knew that FIFRA reform still had to occur at some point. In March of 1987, the House Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture restarted the debates on reforming FIFRA's registration and

reregistration provisions. In order to ensure passage of reform, the House Committee on Agriculture dropped controversial elements of the proposed FIFRA reform from 1986 and instead focused on a few core provisions that all advocates could agree on. These core elements included a revamped reregistration process, an increase in registration fees for pesticide manufacturers, an increase in fines for pesticide manufacturers when committing registration violations, an end to the practice of EPA paying chemical manufacturers for stocks of unused pesticides when their registration was cancelled or suspended, and new storage and disposal requirements for pesticides that had their registrations cancelled (Finegan, 1989, p. 628). The new proposal quickly became known as “FIFRA Lite” since it contained only a few provisions from the major FIFRA reform that agriculture promotion and consumer-environmental protection advocates envisioned from 1985-1986. Notably, FIFRA Lite did not mention the impact of pesticides on groundwater, prohibit the importation of food commodities with residues of pesticides whose registration was cancelled in the United States, or extend patent protection for registered pesticides.

Over the course of the next twelve months, the Subcommittee held six hearings on FIFRA Lite and the general need for FIFRA reform. Concurrently, the Senate’s Committee on Agriculture and Forestry also held six hearings on its version of “FIFRA Lite” which still included a groundwater protection provision. Although most advocates supported “FIFRA Lite,” debates during the hearings quickly regressed from the spirit of compromise exhibited by so many advocates in 1986. Agriculture promotion advocates lobbied hard for a significant reduction in the authority of states

and localities to issue pesticide registrations and opposed any increase in fines and fees for registration violations (U. S. House of Representatives, 1988, p. 68-69). Consumer-environmental protection advocates lobbied hard for a prohibition on imported commodities with residues from pesticides whose registration was cancelled in this country, and supported the increase in fines and fees for registration violations (U. S. House of Representatives, 1988, p. 69-71).

At the end of the debates, in a somewhat unprecedented move for pesticide regulations, the House Agriculture Committee adopted the Senate version of “FIFRA Lite” and specifically excised the groundwater provision from the bill (U. S. House of Representatives, 1988, p. 75). This marked the first time since the 1950s that most of the language for a pesticide regulation came from the Senate. In September of 1988 the Senate and the House passed “FIFRA Lite” and President Reagan signed the bill into law in October. The bill authorized FIFRA until 1991. This was a three-year extension aimed at avoiding the constant debates over FIFRA that plagued Congress through the 1980s.

“FIFRA Lite” was a marginal policy victory for consumer-environmental protection advocates since it increased fines and fees for registration violations, helped to ensure a pesticide registration process open to the public, and established a new eight-year time frame for reregistration. Agriculture promotion advocates were able to prevent the passage of an amendment that included new protections for groundwater. However, many of the policy beliefs of agriculture promotion advocates were not addressed. These included an extension of patent protection for registered pesticides

and a limit on state and local authority to issue pesticide registrations. A decade that started out so promising for agriculture promotion advocates ended with hardly any of their policy beliefs being enacted into FIFRA reform.

First Attempt at FFDCA Reform: 1987-1988

Even though FIFRA reform finally occurred in 1988 and helped to solve the registration and reregistration problems plaguing the pesticide regulatory subsystem, another large problem remained for federal pesticide regulations. This was the Delaney clause of FFDCA. The Delaney clause regulated pesticide residues on processed food and mandated that no carcinogens could be present in processed food. This was known as a zero risk standard for carcinogens. However, by the 1980s this zero risk standard presented a significant problem for policymakers since new analytical techniques commonly revealed that almost all pesticide residues posed at least a minimal amount of carcinogenic risk. Additionally, the Delaney clause mandated that when setting tolerances for pesticide residues in processed food, there could be no consideration of benefits. This was inconsistent with FFDCA regulations in raw food where regulators could consider both risks and benefits.

These problems remained in the background throughout the 1980s as advocates emphasized FIFRA reform over FFDCA reform. However, the Delaney problem reemerged in a significant way in 1987 when the National Academy of

Sciences finished an EPA-commissioned report on the regulation of pesticide residues. Titled *Regulating Pesticides in Food: The Delaney Paradox*, the report criticized current pesticide residue regulations and made two important recommendations for improvement. First, the report recommended consistent regulations for raw and processed food (Board on Agriculture of the National Research Council, 1987, p. 11). Having more stringent regulations for processed food simply made no sense. Second, the report recommended a negligible risk standard for pesticide residues in both raw and processed food (Board on Agriculture of the National Research Council, 1987, p. 12-14). A negligible risk standard would allow EPA to set pesticide tolerances so that the likelihood of a person developing cancer from a pesticide residue was a predefined probability based on toxicity studies. For example, a negligible risk standard could be set at 1 in 1,000 for certain classes of pesticides. This meant that a person ingesting the residue had a 1 in 1,000 chance of developing cancer from the residue over a course of a lifetime.

The report had a large impact at EPA. The agency quickly adopted a negligible risk standard of 1 in 1,000,000 for all pesticides as part of its new “de minimis” or minimal risk policy for pesticide residues. The report also had a large impact on policymakers in the pesticide regulatory subsystem. After its publication, policymakers started to consider FFDCA reforms to implement the recommendations of the report. The first attempt at FFDCA reform occurred in 1988 as the House and Senate considered policy proposals that implemented many of the report’s recommendations.

In this first attempt at FFDCa reform, policymakers considered three proposals. In the House, policymakers considered a bill sponsored by Representative Pat Roberts, a Republican from Kansas, and a bill sponsored by Representative Henry Waxman, a Democrat from California. The bills were vastly different. The Roberts bill incorporated the policy beliefs of agriculture promotion interests. It outlined a flexible negligible risk standard for carcinogens in raw and processed food that could be exceeded as long as the benefits of using a pesticide outweighed its costs (Smart, 1998, p. 291). The Waxman bill targeted the policy beliefs of consumer-environmental protection advocates. It adopted a more stringent negligible risk standard for carcinogens of 1 in 1,000,000 (Smart, 1998, p. 291). In addition, the Waxman bill did not include any provisions for the consideration of benefits when assessing the risk of carcinogens (Smart, 1998, p. 291). Meanwhile, Senator Edward Kennedy sponsored an identical version of the Waxman bill in the Senate (Smart, 1998, p. 291).

Hearings over these proposals occurred in the House Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture as well as the House Committee on Energy and Commerce's Subcommittee on Health and the Environment. Nothing of consequence happened in the House hearings, and the Senate chose not to hold any hearings on the matter. In the House hearings, agriculture promotion advocates supported the Roberts bill and consumer-environmental protection advocates supported the Waxman bill (*Pesticide Food Safety Act*, 1988). With FIFRA reform still the main item of interest for

pesticide regulations in 1988, both of these bills failed to advance to a House floor debate. However, these initial bills established the basic framework of legislation that drove the policy debates over FFDCA reform for the next eight years.

This basic framework included revising the Delaney's clause zero risk standard for pesticide residues in processed food into a negligible risk standard for pesticide residues in both processed and raw food. The difference between the two sets of advocates was how to construct such a standard. Agriculture promotion advocates wanted a flexible negligible risk standard that considered the economic benefits as well as the environmental and health effects of the pesticide (*Pesticide Food Safety Act*, 1988). In contrast, consumer-environmental protection advocates wanted a negligible risk standard strictly defined in statute that only considered the environmental and health effects of the pesticide (*Pesticide Food Safety Act*, 1988).

Second Attempt at FFDCA Reform: 1989-1990

In 1989, the Natural Resources Defense Council (NRDC) released a report detailing the carcinogenic risks of alar, a growth regulator commonly used on apples to make them more colorful and to make their harvest easier. The report discovered that alar produced tumors in laboratory animals and that alar residues on apples and in apple products posed an especially significant risk to children's health. The report resulted in a large amount of publicity, arguably the largest amount of publicity on

pesticides since Rachel Carson published *Silent Spring*. The television show *60 Minutes* did a report on the connection between alar, apples, and cancer. In addition, many Hollywood celebrities such as Meryl Streep actively lobbied Congress to cancel the registration for alar and implement stricter pesticide residue regulations.

The highly public nature of the alar issue led to intense debates on reforms to pesticide residue regulations. Indeed, the debates over this issue from 1989-1990 represented some of the fiercest debates in pesticide regulatory history. Agriculture promotion advocates, led by farmers and chemical manufacturers, maintained that alar was safe and needed for modern apple harvesting. Consumer-environmental protection advocates, led by the NRDC, aggressively used alar as an example as to why pesticide residue regulations failed to ensure the safety of the nation's food supply. In this stimulated policy environment, Congress once again considered FFDCA reform.

In the House, two proposals emerged for FFDCA reform in 1989. Representative Waxman introduced a bill very similar to his 1988 bill. However, the new version of the Waxman bill added one important section that required EPA to base risk standards on the most vulnerable subpopulations (Smart, 1998, p. 295-296). Although never precisely defined in the bill, Representative Waxman probably used the term "vulnerable subpopulations" as a way to protect children from the dangers of carcinogenic residues. The inclusion of vulnerable subpopulations was significant. The consequence of basing risk decisions on more vulnerable populations was a stricter risk standard that could drastically limit the use of certain pesticides.

Representative Kika de la Garza, a Democrat from Texas, sponsored the other House bill. De la Garza's bill included much of the language of Representative Brown's bill from a year earlier. This included a flexible negligible risk standard where the EPA considered a pesticide's benefits when calculating the negligible risk standard (Smart, 1998, p. 296-297).

Hearings over these two bills mainly occurred in the House Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture, and the House Committee on Energy and Commerce's Subcommittee on Health and the Environment. While both bills failed to emerge from committee, the debates in these hearings were fiery. In particular, the often simplistic testimony of Hollywood celebrities before the committees made farmers and other agriculture promotion advocates angry (*Health Effects of Pesticide Use on Children*, 1989). This helped to drive the policy beliefs of consumer-environmental protection advocates further from the policy beliefs of agriculture promotion advocates.

In the Senate, policymakers considered two proposals. Senator Ted Kennedy sponsored a bill that was identical to the current Waxman bill in the House (Smart, 1998, p. 295-296). Additionally, the Senate considered a compromise bill sponsored by Senator Richard Lugar, a Republican from Indiana. Lugar's bill replaced the Delaney clause with a negligible risk standard for both raw and processed food (Smart, 1998, p. 298). In this regard, the bill was like the Waxman/Kennedy bills. However, the Lugar bill also included a negligible risk standard as low as 1 in 100,000

(Smart, 1998, p. 298). This resulted in higher cancer risks and was directly at odds with Waxman's negligible risk standard of 1 in 1,000,000.

Hearings on these bills occurred in the Senate's Committee on Labor and Human Resources, and the Committee on the Environment and Public Works. The Lugar bill had the complete backing of President Bush (Smart, 1998, p. 298). However, agriculture promotion and consumer-environmental advocates were in no mood to compromise. As a result, only the Kennedy bill reported out of committee (Smart, 1998, p. 296). However, because the bill only had the support of consumer-environmental protection advocates, policymakers never brought it to the Senate floor for a full debate.

Third Attempt at FFDCA Reform: 1991-1994

The NAS study on the Delaney clause drove the first attempt at FFDCA reform in 1988. Then, the alar controversy intensified the debate over FFDCA and the general safety of pesticides from 1989-1990. Nothing came of these debates, however. The Delaney clause still remained in effect as of 1991. However, the NAS report and the alar controversy were definitely moving the pesticide regulatory subsystem toward some type of FFDCA reform.

Movement toward FFDCA reform again intensified in 1991. This time, the driver was uncertainty over EPA's "de minimis" policy. After EPA implemented the

“de minimis” policy in 1989, consumer-environmental protection advocates immediately filed a lawsuit to revoke existing tolerances for pesticides that EPA had classified as probable carcinogens (Smart, 1998, p. 299). Remember, the “de minimis” policy allowed carcinogens as long as the tolerance granted ensured negligible risk. However, consumer-environmental protection advocates viewed this as a direct violation of the Delaney clause since it allowed at least some amount of carcinogenic residue in processed food.

Anticipation over the judicial ruling on the “de minimis” policy helped to prevent real FFDCa reform from 1988-1990. Consumer-environmental protection advocates were confident that the court would overturn the policy. Therefore, these advocates were unwilling to work toward the passage of any type of FFDCa reform with a negligible risk standard when they were sure that the court would soon make EPA re-implement the Delaney clause’s zero risk standard. For their part, agriculture promotion advocates were unwilling to adopt any new FFDCa reform since they generally supported the use of the EPA “de minimis” policy.

The uncertainty over the pending decision once again helped to prevent FFDCa reform in 1991. Representative Waxman and Senator Kennedy reintroduced their bills with a more specific identification of vulnerable subpopulations as “sensitive populations” of children (Smart, 1998, p. 302). Representatives Terry Bruce, a Democrat from Illinois, and Thomas Bliley, a Republican from Virginia, sponsored a new bill that was essentially the de la Garza bill from 1989 (Smart, 1998, p. 303). Hearings on these bills occurred in the usual committees. In the House this

included the Committee on Energy and Commerce's Subcommittee on Health and the Environment, and the Committee on Agriculture's Subcommittee on Department Operations, Research, and Foreign Agriculture. In the Senate, hearings occurred in the Committee on Agriculture, Nutrition, and Forestry. However, the only bill to make it out of committee was Senator Kennedy's bill (Smart, 1998, p. 302). Once again, no further action was taken on the bill.

Then, in 1992 the Ninth Circuit Court announced its decision on the "de minimis" policy. In the *Les v. Reilly* (1992) case, the Ninth Circuit Court unanimously ruled in favor of the consumer-environmental protection advocates and overturned the "de minimis" policy. As a result, EPA began the process of strictly enforcing the Delaney clause's zero risk standard for carcinogens in processed food. A strict enforcement of the zero risk standard meant that the use of many pesticides soon faced elimination. Since new laboratory techniques could detect a small amount of carcinogenic risk in pesticides, and since these techniques could also detect these small amounts of carcinogenic risk in the pesticide residues of processed food, then EPA would soon have to revoke legal tolerances for many pesticide residues. This prospect forced agriculture promotion advocates such as rural policymakers and especially chemical manufacturers into action on FFDCA reform.

In 1993 debates once again started on FFDCA reform. Agriculture promotion advocates now desperately wanted reform. In addition, consumer-environmental protection advocates now wanted additional regulations that protected the health of children and infants. This new policy belief emerged from another NAS report that

showed that pesticides were more dangerous to children and infants than adults (Board on Agriculture of the National Research Council, 1993). As a result, the NAS report recommended a new type of risk standard that considered the health effects on children and infants.

Policy makers considered four bills for FFDCA reform in 1993. Senator Kennedy and Representative Waxman reintroduced their bills from 1991. These bills called for: a strict negligible risk standard of 1 in 1,000,000 for carcinogenic residues in raw and processed food, a calculation of risk based on children who were identified as the most vulnerable parts of the population, and the elimination of benefits when considering risk standards (Smart, 1998, p. 309). Following suit, Representative Bliley reintroduced the Bliley/Bruce bill from 1991. The Bliley/Bruce bill continued to advocate for: a consideration of benefits when calculating negligible risk, no special procedures to protect children, and a limit on state/local authority to issue state pesticide tolerances (Smart, 1998, p. 311). The inclusion of limiting the power of state and local governments to set pesticide tolerances was significant since many states and localities had started to take action on alar and other pesticides that caused potential danger to human health.

The President once again supported compromise bills. However, this time it was President Clinton instead of President Bush. Senator Kennedy sponsored a Clinton compromise bill in the Senate and Representative Waxman sponsored it in the House (Smart, 1998, p. 312). The Clinton compromise bill established one negligible risk standard for raw and processed food that resulted in a “reasonable certainty that

no harm will result from all anticipated consumer exposures to such residues” (Smart, 1998, p. 312). The inclusion of the reasonable certainty provision negated attempts by consumer-environmental protection advocates to strictly define a negligible risk standard in statute. The proposal also had specific provisions that protected infants and children. However, the proposal also left in a consideration of benefits in the negligible risk assessment.

Hearings on these bills occurred in the House Committee on Agriculture’s Subcommittee on Department Operations and Nutrition, and the House Energy and Commerce Committee’s Subcommittee on Health and the Environment. In the Senate, hearings occurred in the Committee on Agriculture, Nutrition, and Forestry. Debates over these bills once again resulted in no enacted legislation. Indeed, only the Bliley/Bruce bill even made it out of Committee (Smart, 1998, p. 318). However, many agriculture promotion advocates were receptive to the compromise proposal crafted by the Clinton administration (Smart, 1998, p. 315). In particular, advocates such as Monsanto and the National Agricultural Chemicals Association liked the proposal since it ended the Delaney clause, established a flexible negligible risk standard, and included a consideration of economic benefits (Smart, 1998, p. 315). Agriculture promotion advocates still supported the Bliley/Bruce bill, but this movement toward accepting a compromise bill represented the first real attempt by either an agriculture promotion advocate or a consumer-environmental protection advocate to consider a FFDCa reform bill that did not directly conform to its policy

beliefs. The extremism and brinkmanship that characterized pesticide regulatory debates since the alar controversy was starting to fade.

Fourth Attempt at FFDCA Reform: 1995-1996

A significant change in the political conditions affecting the pesticide regulatory subsystem occurred in 1995 as the Republican party took control of the Senate and the House of Representatives. By 1996 Republican leaders in Congress attempted to implement a steep cut in EPA's budget and worked hard to rewrite acts such as the Clean Water Act to better suit their policy beliefs (Smart, 1998, p. 318). Much like the targeting of the EPA and various environmental programs in the early 1980s by Republican leaders, these acts in 1996 helped to mobilize consumer-environmental advocates. In turn, this mobilization, along with a Republican view that they had badly mishandled environmental policy in general, finally led to FFDCA reform.

Against this political backdrop, Representative Bliley reintroduced his bill from 1993 on pesticide residue reform (Smart, 1998, p. 329). Once again, this bill was crafted for agriculture promotion advocates. It replaced the Delaney clause with a flexible negligible risk standard that included a consideration of economic benefits during risk assessment (Smart, 1998, p. 329). Senator Lugar adopted the language of that bill for his Senate version of the bill (Smart, 1998, p. 329). In contrast,

Representative Waxman once again sponsored an FFDCA reform bill tailored to the policy beliefs of consumer-environmental protection advocates. This included a specifically defined negligible risk standard of 1 in 1,000,000 and also did not include provisions that allowed the consideration of a pesticide's economic benefit during risk assessment (Smart, 1998, p. 329). In addition to these provisions, the Waxman bill also required the labeling of all food products that had carcinogens and established a new analytical mandate for EPA to make certain that exposure to carcinogenic tolerances did not result in breast cancer or any reproductive, neurological, or immunological disorders (Smart, 1998, p. 328).

Hearings on these bills mainly focused on the Bliley bill. The Waxman bill was ignored, even by many consumer-environmental protection advocates (Smart, 1998, p. 329). Hearings occurred in the House Committee on Agriculture's Subcommittee on Department Operations, Nutrition, and Foreign Agriculture, and the House Committee on Commerce's Subcommittee on Health and the Environment. In the Senate, hearings occurred in the Senate Agriculture, Nutrition, and Forestry Committee.

Bliley's bill eventually passed the House Agriculture Committee, but failed to pass in the House Commerce Committee. That's because most of the controversial elements of the bill relating to risk assessment were under the jurisdiction of the Commerce committee (Smart, 1998, p. 331). In addition, Representative Waxman held up passage of the bill since it did not conform to the policy beliefs of consumer-

environmental advocates (Smart, 1998, p. 331). By 1996, Bliley's bill was stalled and no hope of passage of FFDCA reform seemed possible.

Then, an interesting thing happened. In June of 1996 agriculture promotion advocates started to pressure Representative Bliley to take action on his bill (Smart, 1998, p. 335). Bliley then reached out to Democratic leaders for a compromise (Smart, 1998, p. 335). In July of 1996, agriculture promotion advocates, consumer-environmental protection advocates, and key Congressional Committee members met and revised Bliley's bill as a compromise bill. The impetus for this compromise came from agriculture promotion advocates and Republican policymakers (Smart, 1998, p. 334).

By 1996, agriculture promotion advocates such as chemical manufacturers and food processors now desperately wanted FFDCA reform. Without reform, these groups faced the very real possibility that many pesticide tolerances would be revoked because the tolerances resulted in carcinogenic residues on processed food. But the biggest reason for movement was the Republicans' need to pass some sort of environmental regulation that the public perceived to be fair and an improvement (Smart, 1998, p. 334). This need was very great in 1996 as the November elections neared. Consumer-environmental protection advocates were initially reluctant to join the compromise. But after Democratic Representative John Dingell and James Aidala (the Associate Assistant Administrator of EPA's Office of Prevention, Pesticides, and Toxic Substances) supported the compromise, many consumer-environmental protection advocates joined the compromise legislation (Smart, 1998, p. 334).

The compromise legislation eventually became known as the Food Quality Protection Act. Since agriculture promotion and consumer-environmental protection advocates agreed to the legislation, it easily passed the Commerce Committee's Subcommittee on Health and the Environment in the House of Representatives, and the Committee on Agriculture, Nutrition, and Forestry in the Senate. On the House and Senate floors, FQPA passed without a single dissenting vote. Finally, on August 3, 1996, President Clinton signed the bill into law.

The compromise legislation ended the Delaney clause's zero tolerance standard for carcinogens in pesticide residues by specifically exempting pesticide residues in raw agricultural commodities and processed foods from food additive regulations (Food Quality Protection Act, 1996). In addition, all regulations of pesticide residues on raw and processed food were now detailed in a revised Section 408 of the FFDCA (Food Quality Protection Act, 1996). This revised section established a "reasonable certainty" risk standard modeled on the compromise reform bill from the Clinton administration in 1993 (Smart, 1998, p. 336). The "reasonable certainty" standard directed risk assessments to determine that there was a reasonable certainty that a pesticide residue would not cause cancer and would not result in harm to sensitive populations such as infants and children (Food Quality Protection Act, 1996).

The "reasonable certainty" standard appealed to both sets of advocates. Agriculture promotion advocates backed it because it included a consideration of the economic benefits of using a pesticide during the risk assessment. Consumer-

environmental protection advocates supported it because they felt that the “reasonable certainty” standard equaled the 1 in 1,000,000 standard for risk assessments that they were seeking. The Commerce Committee supported this view and even issued a report in which it equated the 1 in 1,000,000 standard to the “reasonable certainty” standard (Smart, 1998, p. 336). However, consumer-environmental protection advocates also supported the standard because it specifically examined aggregate risks and cumulative risks from pesticides. This allowed for a more stringent risk analysis that helped to protect human health.

In addition to FFDCA reform, FQPA also revised FIFRA. Most significantly, these revisions mandated a periodic review of pesticide registrations every fifteen years and required EPA to examine pesticides for endocrine disruption (Food Quality Protection Act, 1996). Other provisions of FQPA supported reduced-risk pesticide alternatives such as integrated pest management. As a result, while FQPA technically resulted in a less restrictive pesticide regulation that allowed carcinogenic residues on processed food, it also resulted in a more effective regulation that promoted reduced risk alternatives to pesticide use and increased the validity of risk assessments that protected human health.

Policy Trends

This chapter examined the reform of federal pesticide regulations in the 1980s and 1990s with a special emphasis on problems associated with registration, reregistration, and the Delaney clause. These three problems drove the debates over pesticide regulatory reform from 1983 until 1996. With the support of agriculture promotion advocates and consumer-environmental protection advocates, policy makers solved these problems with FIFRA reform in 1988 and FFDCA/FIFRA reform in 1996.

But before those significant reforms, policymakers passed a 1980 FIFRA amendment that subjugated EPA registration decisions to oversight from an advisory panel and Congress. This helped to quell fears among agriculture promotion advocates that an over-zealous EPA would unfairly cancel or suspend the registrations for pesticides vital to modern agriculture tactics. In 1988, policymakers passed another amendment to FIFRA that helped to solve the problem of registration delays caused by pesticide manufacturers submitting insufficient data for registration decisions. In addition, the 1988 amendment also solved the reregistration issue by establishing new reregistration protocols and deadlines. And in 1996, policymakers solved the issue of the Delaney clause with the Food Quality Protection Act (FQPA). All of these policies were unique. But the debates over the 1988 FIFRA amendment and FQPA had at least four unique trends that help shed light on the nature of the public policy process.

First, external events drove policy reform as well as the policy beliefs of agriculture promotion and consumer-environmental protection advocates. The Bhopal, India pesticide tragedy in 1984 caused the American public to actively campaign for pesticide regulatory reform. This pressure played a large role in forcing agriculture promotion advocates to meet with consumer-environmental protection advocates to issue a joint pesticide regulatory reform proposal. This helped to pass FIFRA reform in 1988. Additionally, the alar residue problem as well as a judicial decision on reinstating the Delaney clause helped both sets of advocates realize that FFDCa reform had to happen. As a result, FFDCa reform finally happened in 1996.

Second, in order to reform federal pesticide regulations both sets of advocates had to compromise with their policy beliefs. By the 1980s, the federal pesticide regulatory subsystem was in a stalemate. Neither agriculture promotion advocates nor consumer-environmental advocates could completely control the subsystem. As a result, policymakers passed no significant amendments or revisions to FIFRA and FFDCa. This resulted in pesticide regulations quickly becoming obsolete. In the case of FIFRA, unrealistic registration and reregistration deadlines established in the 1970s made parts of the regulation obsolete by the late 1980s. In the case of FFDCa, advances in risk assessment technology made the Delaney clause a regulation that no one wanted. In order to pass regulatory reform, both sets of advocates had to come together and compromise on their policy beliefs in order to make pesticide regulations work again.

Third, debates over pesticide regulations no longer garnered the national policy spotlight. Exceptions, of course, occurred. But even with the Bhopal tragedy and the alar controversy, only a handful of policymakers, agriculture promotion advocates, and consumer-environmental protection advocates focused constant attention toward federal pesticide regulatory policy in the 1980s and 1990s. Instead, the public, policymakers, chemical manufacturers, and consumer-environmental protection advocates focused more attention on EPA's large budgetary cuts and the mismanagement of EPA's Superfund program by politically appointed administrators. By the late 1980s, this lack of attention enabled agriculture promotion advocates and consumer-protection advocates to compromise on their policy beliefs.

Fourth, consumer-environmental protection advocates continued the long-term trend of losing much of their policy influence on pesticide regulations. Consumer-environmental groups still had influence in this subsystem. They were able to stop the proposed 1982 amendment to FIFRA and still were able to influence powerful policymakers on the Congressional agriculture committees. In addition, the controversial administration of Anne Burford as EPA administrator galvanized consumer-environmental protection advocates and helped lead to large membership increases in environmental protection groups (Bosso, 1987, p. 216). But by 1983, the ability of consumer-environmental protection advocates to actively propose and then influence new pesticide regulations degraded due to more conservative political conditions. Over time, this meant that agriculture promotion advocates had to initiate any compromises in policy beliefs in order to pass regulatory reform.

Concluding Remarks

More than anything else, these four trends help to explain pesticide regulatory reform in the 1980s and 1990s. Debates over pesticide regulations in the 1980s and 1990s represented the final stage in the evolution of federal pesticide regulations. The reforms completed during this era completed the evolution of federal pesticide regulations that began in 1906. With problems over registration, reregistration, and the Delaney clause solved, the debate over pesticide regulatory reform ended in 1996. Additionally, with both sets of advocates finally content with the current setup of federal pesticide regulations, the evolution of federal pesticide regulations also ended. From 1997-2003 the number of hearings on pesticide regulations decreased to a point that by the year 2000 only one or two Congressional hearings occurred per year. The nine-decade debate over the evolution and validity of federal pesticide regulations had ended.

The question that remains for political scientists is whether this pesticide regulatory reform debate can illuminate the nature of the policy process and specifically reveal the role of policy beliefs in the policy process. Chapter 5 explores these issues with four different hypotheses that examine the policy core beliefs and secondary policy beliefs of both agriculture promotion advocates and consumer-environmental protection advocates. The research results associated with these hypotheses show how advocates change and compromise with their policy beliefs when policy change is eminent.

CHAPTER 5

METHODOLOGY

Policy core beliefs and secondary policy beliefs both play an important part in the policy process. As detailed in Chapter 2, these statements of principle guide participants in the policy process and help influence policy change in specific policy subsystems. In the ACF model of the policy process, these types of policy beliefs develop gradually and help to influence policy change along with a variety of other political, socioeconomic, and information-processing factors. In the PE model of the policy process, these types of policy beliefs are not even mentioned. But presumably, in a PE model of the policy process, policy beliefs change suddenly and correspond to sudden, brief changes in policy.

The history of the debates over federal pesticide regulations shows the importance of these types of policy beliefs on the policy process. From 1906-2003, policy beliefs drove the debate over pesticide regulations as a coalition of agriculture promotion advocates and a coalition of consumer-environmental protection advocates competed with one another to have their policy core beliefs and secondary policy beliefs expressed in pesticide regulations. During these years, the competition between coalitions helped to bring about policy change. But by the 1980s, the

competition just led to a policy stalemate as significant problems occurred in the implementation of FIFRA and FFDCA.

As both coalitions realized the need to break the policy stalemate in the late 1980s and mid 1990s, the competition over influencing pesticide regulations temporarily ended. Rather suddenly, both coalitions compromised on their more specific secondary policy beliefs in order to reform federal pesticide regulations. This act of compromise, termed here as a bargaining of beliefs, led to FIFRA reform in 1988 and the passage of FQPA in 1996. These reforms helped ensure that federal pesticide regulations would continue to satisfy the policy core beliefs of agriculture promotion advocates and consumer-environmental protection advocates.

After the reforms of 1988 and 1996, both sets of advocates stopped compromising on their secondary policy beliefs and went back to longstanding secondary policy beliefs that traditionally defined both coalitions. As a result, compromising with policy beliefs (alternatively identified as policy-oriented learning by ACF scholars) seemed to exhibit more of a PE pattern as opposed to a typical ACF pattern. With an ACF pattern of policy-oriented learning, secondary policy beliefs should change gradually over many years and eventually help lead to policy change. However, for federal pesticide regulations in the 1980s and 1990s this did not happen. Secondary policy beliefs changed quickly as the two coalitions temporarily changed some of their secondary policy beliefs in order to ensure passage of FIFRA reform and FFDCA reform.

This finding, along with research on the ACF and PE policy models, leads to four research questions on both policy core beliefs and secondary policy beliefs. First, do the policy core beliefs of like-minded advocacy groups, concerned citizens, and other organized entities possess enough uniformity, over time, to justify categorization of these groups into larger advocacy coalitions? Second, if uniform advocacy coalitions exist, do their secondary policy beliefs toward pesticide regulations change over time in a typical policy-oriented learning pattern? Third, are increases in compromises in secondary policy beliefs among advocacy coalitions associated with policy change? And fourth, do stronger advocacy coalitions influence compromises in secondary policy beliefs among weaker advocacy coalitions? Answering these research questions will help political scientists better understand how advocates use policy beliefs in the policy process.

To examine these four research questions, this dissertation examines the debates on federal pesticide regulations from 1982-2003. This dissertation uses 1982 as the initial year of analysis because in that year policymakers in Congress commenced the process of FIFRA reform by releasing the controversial Brown Report detailing problems with EPA's implementation of FIFRA. That report eventually led to agriculture promotion advocates and consumer-environmental protection advocates compromising on their secondary policy beliefs in order to pass FIFRA reform in 1988 and FFDCA/FIFRA reform in 1996. In addition, 2003 is chosen as the ending date since that date represents the year the analysis for this dissertation began. But more importantly, by 2003 the debates on reforming federal pesticide regulations had ended.

What had once been an active policy subsystem in which agriculture promotion advocates and consumer-environmental protection advocates continually debated one another in attempts to influence pesticide regulatory policy had quietly turned into an inactive policy subsystem. By 2003, most agriculture promotion advocates, consumer-environmental protection advocates, and policymakers expressed little interest in the state of federal pesticide regulations.

Research Design

This dissertation uses an interrupted time-series research design. As diagrammed in Table 4, this type of design compares the policy beliefs of two separate coalitions from 1982-2003. Twenty-two observations occur for two sets of groups: an agriculture promotion coalition and a consumer-environmental protection coalition. Each observation reflects the policy core beliefs and secondary policy beliefs made by each coalition during Congressional hearings on federal pesticide regulations for one year. For example, the first observation period (O_1) occurs in 1982. For that year, the research design: 1) identifies the Congressional hearings on federal pesticide regulations that took place during that year, 2) assigns advocates testifying in the hearing to either an agriculture promotion coalition or a consumer-environmental

protection coalition, and 3) uses a content analysis protocol to quantify policy core beliefs and secondary policy core beliefs expressed in the opening statement of each advocate.

Table 4

The Interrupted Time Series Research Design

O₁ O₂ O₃ O₄ O₅ O₆ X O₇ X O₈ O₉ O₁₀ O₁₁ O₁₂ O₁₃ O₁₄ X O₁₅ X O₁₆ O₁₇ O₁₈ O₁₉ O₂₀ O₂₁ O₂₂

O₁ O₂ O₃ O₄ O₅ O₆ X O₇ X O₈ O₉ O₁₀ O₁₁ O₁₂ O₁₃ O₁₄ X O₁₅ X O₁₆ O₁₇ O₁₈ O₁₉ O₂₀ O₂₁ O₂₂

Policy change in federal pesticide regulations occurred in 1988 and 1996. As a result, this dissertation identifies those two years as policy change years (the X after O₇ and the X after O₁₅). These years serve as an effective way to examine the role of policy beliefs on the policy process and policy change. However, if advocates compromise on policy beliefs in order to pass policy, then policy beliefs should change just before a policy change year or during the actual policy change year. Thus, the sixth year and the fourteenth year (the X after O₆ and the X after O₁₄) are also identified as treatment years since in those years Congress actively debated specific legislation that resulted in FIFRA reform in 1988 and in the passage of FQPA in 1996.

As a result, the policy core beliefs and secondary policy core beliefs of advocacy coalition members should also change during those years.

There are numerous advantages to the use of this type of research design. The most significant advantages are that the design reduces threats to internal and external validity. With external validity assured, the results from this research can be expanded to new policy subsystems, different policy beliefs, and additional advocacy coalitions (Shadish, Cook, and Campbell, 2002, p. 20). And with internal validity assured, researchers examining this research are assured that the causal relationship observed between variables actually occurred due to the hypothesized stimulus of policy change (Shadish, Cook, and Campbell, 2002, p. 37).

To reduce threats to internal validity, the design has repeated observations of policy beliefs both when policy change occurred and when policy change did not occur. Repeated observations both before and after a policy change year decrease the chances that maturation or historical effects could threaten the internal validity of the results. For example, if the research design had only one observation before or after a policy change year, then there would be an increased chance that policy beliefs recorded during a policy change year were influenced by one-time events that reflected either the maturation of the two coalitions or another historical event (Shadish, Cook, and Campbell, 2002, p. 56-57). With repeated observations, this dissertation's research design catches such threats.

In addition, the dissertation's research design reduces threats to external validity by examining two different coalitions across two different policy change

years. By examining two different coalitions, the chances of negative interaction effects with one specific coalition decrease (Shadish, Cook, and Campbell, 2002, p. 87). For example, if the dissertation examined only one coalition, then conclusions reached could not apply to different types of coalitions involved in federal pesticide regulatory policy. Also, by examining two different policy changes, the chances of negative interaction effects with one specific policy change decrease (Shadish, Cook, and Campbell, 2002, p. 87). For example, if the dissertation examined only one policy change year, then conclusions derived from that year might not apply to another policy change year.

However, the dissertation's research methodology still has numerous threats to validity. For external validity, the most obvious threat is a setting interaction effect. In this type of threat, findings from one type of study may not extend to the findings in another type of study (Shadish, Cook, and Campbell, 2002, p. 87). This type of threat is important, because this dissertation only examines the policy beliefs on federal pesticide regulations. As a result, the findings may not hold when other types of policy subsystems are examined.

For internal validity, the major threats are attrition and instrumentation. To analyze policy beliefs, the beliefs must be recorded from groups and individuals that appear before Congressional hearings. However, appearances before Congressional hearings are not stable. Different individuals, different groups, and different individuals within the same group testify before Congressional hearings from year to year. This makes the theoretical membership of advocacy coalitions dynamic in any

given year. As a result, when an individual or group stops appearing before Congressional hearings, then their attrition could lead to a change in policy beliefs for the whole coalition (Shadish, Cook, and Campbell, 2002, p. 59). This is a significant weakness associated with collecting information on policy beliefs expressed during any type of public hearing. To help control this threat, this dissertation also analyzed letters and other types of policy statements submitted by individuals and groups to Congressional hearings. These documents are included in the hearing document. That way, if an individual or group could not appear because of some unforeseen event, then this dissertation still analyzes their submitted policy beliefs. Otherwise, when groups or individuals stop testifying in hearings, it is treated as a significant event that indicates that the policy beliefs of a group or individual no longer correspond to the policy beliefs of the coalitions present in the hearing.

The instrumentation threat is especially worrisome for research using content analyses. If the content analysis is not constructed properly, then changing policy dynamics through the years could cause the content analysis to become obsolete and show an effect where there is none (Shadish, Cook, and Campbell, 2002, p. 60). For example, a content analysis may work well for policy beliefs in 1984, but not so well in 2001 because beliefs, policies, and issues change. To avoid this, this dissertation uses a modified content analysis framework that emphasizes general topics related to federal pesticide regulations.

Content Analysis Protocol

Sabatier and Jenkins-Smith (1993) originally developed a complex ACF content analysis protocol that identified deep core, policy core, and secondary policy beliefs of each individual testifying in hearings on development in the Lake Tahoe region of Nevada and in hearings on oil and gas leasing on the U.S. continental shelf (p. 247-256). Sewell (2005) simplified the framework when he looked at the policy core beliefs of policy actors on global climate change. Sewell (2005) first looked at the debate on global climate change and came up with eleven different policy core beliefs that policy actors usually expressed (p. 222). He then devised a Likert ranking for the eleven policy core beliefs (Sewell, 2005, p. 223). In that way, he grouped actors according to their expressed policy beliefs on global climate change.

Building on the work of Sabatier, Jenkins-Smith, and Sewell, this dissertation simplifies the ACF content analysis to an even greater degree. For the years 1982-2003, this dissertation examines both the policy core beliefs and secondary policy beliefs of agriculture promotion advocates and consumer-environmental protection advocates. These policy beliefs originate from opening statements made by these advocates at Congressional hearings on federal pesticide regulations. A content analysis coding framework originally developed by Sabatier and Jenkins-Smith (1993) and later simplified by Sewell (2005) is adapted for this dissertation in order to quantify both policy core beliefs and secondary policy beliefs from opening statements.

Content analysis is a research method that generates reliable and valid inferences from written material (Krippendorff, 2004, p. 18). It allows researchers to categorize and quantify written text into pieces of data that can be further analyzed to yield answers to theoretical questions. To devise a research content analysis that is both reliable and valid, researchers commonly focus on conceptualization, operationalization, and inter-coder reliability (Neuendorf, 2002, p. 50-51).

Conceptualization of Content Analysis

In conceptualization, researchers define the concepts to code (Neuendorf, 2002, p. 50). This dissertation's content analysis has four concepts to code: coalition membership, policy core beliefs on pesticides, secondary policy beliefs on pesticide regulations, and secondary policy belief compromises on pesticide regulations. This dissertation defines coalition membership according to the interests of either agriculture promotion advocates or consumer-environmental protection advocates. As such, agriculture promotion advocates are members of the agriculture promotion advocacy coalition and consumer-environmental protection advocates are members of the consumer-environmental protection advocacy coalition. Policy core beliefs are defined as any phrase or sentence spoken by a speaker during an opening statement on the issue of pesticides, excluding phrases or sentences on specific pesticide regulations or pending pesticide regulation bills. Secondary policy beliefs on pesticide regulations

are defined as those phrases or sentences spoken by speakers during an opening statement on specific aspects of pesticide regulations. Lastly, secondary policy belief compromises on pesticide regulations are defined as opening statements that contain phrases or sentences supporting the secondary policy beliefs on pesticide regulations of agriculture promotion advocates as well as phrases or sentences supporting the secondary policy beliefs on pesticide regulations of consumer-environmental protection advocates.

Operationalization of Content Analysis

Operationalization explains how the content analysis measures the concepts (Neuendorf, 2002, p. 107). The dissertation operationalizes agriculture promotion coalition membership as organizations that exist to promote farmers, businesses associated with agriculture, or agricultural practices. Membership in the consumer-environmental protection coalition is operationalized as organizations that exist to protect consumers or the environment in some capacity. Since organizations typically state their organization's mission as part of their opening statements, the identification of membership in this manner is based on an examination of federal Congressional hearings on pesticide regulations. After recording each organization that submitted an opening statement in the hearing, the coder examined each organization's mission statement contained in its opening statement to determine coalition membership.

Operationalization of policy core beliefs and secondary policy beliefs proceeded according to an ordinal measurement scale as previously defined by both Sabatier and Jenkins-Smith (1993) and Sewell (2005). Policy core beliefs on pesticides and secondary policy beliefs related to the debates on pesticide regulations are operationalized on a 1-5 scale. While this is explained more thoroughly in Appendix B, scores of 1 or 2 indicate consumer-environmental protection beliefs and scores of 4 or 5 indicate agriculture promotion beliefs. The score of 1 indicates an extreme consumer-environmental protection belief such as strengthening pesticide regulations and banning pesticides, and a score of 5 indicates an extreme agriculture promotion belief such as mandating that there should be no regulations at all for pesticides. Scores of 3 indicate a neutral or no opinion statement. Coding the policy core beliefs and secondary policy beliefs of advocates in this manner allows for answers to the first research question. Since the content analysis allows for an identification of policy core beliefs from advocacy groups testifying before a committee, then these policy core beliefs can be analyzed to determine if like-minded advocacy groups possess similar policy core beliefs (the first research question).

However, over the course of an opening statement, advocates also talked about more specific aspects of pesticide regulations. These are secondary policy beliefs. By examining Congressional debates on pesticide regulations beforehand, it was determined that advocates commonly focused on six types of secondary policy beliefs during opening statements. These included secondary policy beliefs on pesticide regulations, water pollution, biotechnology, conservation, agri-business (excluding

farmers), and the current economic state of farmers. Advocates talked about these secondary belief areas when debating pesticide regulations (e.g. how pesticide regulations impact water pollution, how do pesticide regulations impact biotechnology, how can pesticide regulations support conservation efforts, how do pesticide regulations impact agri-business, and how do pesticide regulations impact the economic livelihood of farmers). As a result, the content analysis also allows for a determination on whether the secondary policy beliefs of like-minded advocacy groups changed over time (the second research question).

In the coding framework, each of these secondary policy belief areas also receives a score from 1-5. Once again, scores of 1 or 2 indicate consumer-environmental protection beliefs and scores of 4 or 5 indicate agriculture promotion beliefs. The score of 1 indicates an extreme consumer-environmental protection belief such as strengthening pesticides and banning pesticides, and a score of 5 indicates an extreme agriculture promotion belief such as mandating that there be no regulations at all for pesticides. Scores of 3 indicate a neutral or no opinion statement.

Operationalization of secondary policy belief compromises on pesticide regulations emerges from the coding of secondary policy beliefs on pesticide regulations. In these secondary policy beliefs, the occurrence of compromises often becomes evident. These compromises occur when an agriculture promotion advocate expresses both agriculture promotion secondary policy beliefs and consumer-environmental protection secondary policy beliefs. For example, a secondary policy belief compromise occurs when a member of the agriculture promotion coalition

scores a 4 on the farmer belief area and a score of 2 on the pesticide regulation belief area. Such an act represents a coalition member reaching out to the opposing coalition. In essence, it represents an attempt at compromise (also called policy-oriented learning or bargaining of beliefs) since some of the secondary policy beliefs of one coalition member are moving toward some of the secondary policy beliefs of the opposing coalition in the opening statement. Once the content analysis identifies these instances of compromise, then the dissertation can examine if increases in compromises in secondary policy beliefs are associated with policy change (the third research question) and determine if stronger coalitions influence compromises in secondary policy beliefs among weaker coalitions (the fourth research question).

Reliability of Content Analysis

Ideally, at least two different coders should use a content analysis to code documents (Neuendorf, 2002, p. 142). This helps to ensure inter-coder reliability. However, this dissertation analyzed 118 Congressional hearings and 1,807 opening statements with the coding scheme. As a result, the large number of hearings and statements prevented two different coders from using the coding scheme on all of the documents. However, to arrive at some measure of inter-coder reliability, this dissertation randomly picked two hearings and had an external coder code the hearings. The external coder coded the hearings in the same manner as the original

coder. That is, the external coder examined the entire hearing document starting from the first page and ending at the last page. Additionally, the external coder used the same content analysis protocol that the original coder used (this is included in Appendix B). The resulting inter-reliability of the coding had an 83.9% agreement rate for the first hearing and an 85.7% agreement rate for the second hearing. In other words, the external coder produced coding results that agreed with author's coding results approximately 84.8% of the time. From these results, the content analysis should have an inter-coder reliability rate of above 80%. Such a rate is similar to the inter-coder reliability rate of Sabatier and Jenkins-Smith's (1993) work (p. 245).

Descriptive Statistics from the Content Analysis

As indicated in Table 5, a total of 118 Congressional hearings on federal pesticide regulations were coded with the content analysis protocol. This included 757 opening statements from advocacy groups in the agriculture promotion and consumer-environmental protection advocacy coalitions. These statements allowed for a coding of the policy core beliefs on pesticides, secondary policy beliefs on pesticide regulations, and number of annual secondary policy belief compromises on pesticide regulations by the agriculture promotion coalition and the consumer-environmental protection coalition.

Table 5

Total Number of Opening Statements Coded with the Content Analysis

Speakers/Writers of Opening Statements	Number
<u>Advocacy Groups</u>	
Agriculture Promotion Advocacy Groups	497
Consumer-Environmental Protection Advocacy Groups	260
<u>Other</u>	
Federal Legislators	581
Federal Agencies	211
Non-affiliated Individuals	151
State and Local Governments	107
TOTAL	1807

Table 6 shows the number of statements made by each coalition during each year of analysis. As the table indicates, 1987 and the years 1991-1994 were the most active years for debating pesticide regulations. In contrast, after the formal passage of the Food Quality Protection Act in 1996, debates on pesticide regulations pretty much ended at the federal level. From 1997-2003 there were only nine Congressional hearings on pesticide regulations. Those nine hearings corresponded to twenty-nine opening statements by the agriculture promotion coalition and only two statements by the consumer-environmental protection coalition.

Tables 7 and 8 show descriptive statistics for the coding of policy core beliefs on pesticides. By comparing the two tables, the data reveals that the mean policy core belief value for the agriculture promotion coalition is higher than 3 (thus indicating an agriculture promotion policy core belief according to the content analysis protocol). In contrast, the mean policy core belief value for the consumer-environmental protection coalition is always below 3 (thus indicating a consumer-environmental protection coalition policy core belief according to the content analysis protocol). Similar results are contained in Tables 9 and 10. These tables contain the mean secondary policy belief on pesticide regulations for each coalition. Once again, the agriculture promotion coalition constantly has coded values above 3 and the consumer-environmental protection coalition constantly has coded values below 3.

Table 6

Statements by the Coalitions During Each Year of Analysis

Year	Number of Congressional Hearings on Pesticide Regulations	Number of Agriculture Promotion Statements	Number of Consumer-Environmental Protection Statements
1982	1	0	1
1983	10	34	31
1984	7	3	6
1985	4	16	14
1986	7	38	19
1987	16	78	35
1988	7	28	13
1989	11	43	30
1990	5	14	16
1991	12	46	27
1992	9	45	15
1993	10	39	27
1994	6	50	14
1995	4	25	8
1996	1	9	2
1997	0	0	0
1998	3	6	1
1999	2	13	0
2000	1	4	0
2001	0	0	0
2002	2	6	1
2003	0	0	0

Table 7

Descriptive Statistics for the Coding of Agriculture Promotion Advocates' Policy CoreBeliefs on Pesticides

Year	Sample Size (N)	Mean	Median	Mode	Stand. Deviation
1982	0	---	---	---	---
1983	34	3.735	4.000	4.000	0.5110
1984	3	3.667	4.000	4.000	0.5774
1985	16	3.938	4.000	4.000	0.2500
1986	38	3.684	4.000	4.000	0.4711
1987	78	3.654	4.000	4.000	0.5543
1988	28	3.607	4.000	4.000	0.5670
1989	43	3.977	4.000	4.000	0.2662
1990	14	3.714	4.000	4.000	0.4689
1991	46	3.826	4.000	4.000	0.4374
1992	45	3.711	4.000	4.000	0.5886
1993	39	3.744	4.000	4.000	0.4424
1994	50	3.920	4.000	4.000	0.5284
1995	25	4.000	4.000	4.000	0.4083
1996	9	4.111	4.000	4.000	0.3333
1997	0	---	---	---	---
1998	6	4.000	4.000	4.000	0.0000
1999	13	3.846	4.000	4.000	0.3755
2000	4	4.250	4.000	4.000	0.5000
2001	0	---	---	---	---
2002	6	4.167	4.000	4.000	0.4082
2003	0	---	---	---	---

Table 8

Descriptive Statistics for the Coding of Consumer-Environmental ProtectionAdvocates' Policy Core Beliefs on Pesticides

Year	Sample Size (N)	Mean	Median	Mode	Stand. Deviation
1982	1	2.000	2.000	2.000	---
1983	31	1.968	2.000	2.000	0.180
1984	6	2.667	2.000	3.000	0.516
1985	14	2.000	2.000	2.000	0.000
1986	19	2.105	2.000	2.000	0.459
1987	35	1.771	2.000	2.000	0.490
1988	13	2.077	2.000	2.000	0.494
1989	30	1.767	2.000	2.000	0.430
1990	16	2.125	2.000	2.000	0.342
1991	27	1.926	2.000	2.000	0.474
1992	15	1.867	2.000	2.000	0.352
1993	27	2.000	2.000	2.000	0.277
1994	14	1.714	2.000	2.000	0.469
1995	8	1.000	1.000	1.000	0.000
1996	2	2.000	2.000	2.000	---
1997	0	---	---	---	---
1998	1	1.000	1.000	1.000	---
1999	0	---	---	---	---
2000	0	---	---	---	---
2001	0	---	---	---	---
2002	1	2.000	2.000	2.000	---
2003	0	---	---	---	---

Table 9

Descriptive Statistics for the Coding of Agriculture Promotion Advocates' SecondaryPolicy Beliefs on Pesticide Regulations

Year	Sample Size (N)	Mean	Median	Mode	Stand. Deviation
1982	0	---	---	---	---
1983	34	3.647	4.000	4.000	0.6912
1984	3	3.667	4.000	4.000	0.5774
1985	16	3.875	4.000	4.000	0.5000
1986	38	3.526	4.000	4.000	0.7618
1987	78	3.603	4.000	4.000	0.6515
1988	28	3.393	4.000	4.000	0.8751
1989	43	3.954	4.000	4.000	0.3750
1990	14	3.500	4.000	4.000	0.8549
1991	46	3.783	4.000	4.000	0.5543
1992	45	3.667	4.000	4.000	0.6742
1993	39	3.692	4.000	4.000	0.5691
1994	50	3.900	4.000	4.000	0.5803
1995	25	4.000	4.000	4.000	0.4083
1996	9	4.111	4.000	4.000	0.3333
1997	0	---	---	---	---
1998	6	4.000	4.000	4.000	0.0000
1999	13	3.846	4.000	4.000	0.3755
2000	4	4.250	4.000	4.000	0.5000
2001	0	---	---	---	---
2002	6	4.167	4.000	4.000	0.4082
2003	0	---	---	---	---

Table 10

Descriptive Statistics for the Coding of Consumer-Environmental ProtectionAdvocates' Secondary Policy Beliefs on Pesticide Regulations

Year	Sample Size (N)	Mean	Median	Mode	Stand. Deviation
1982	1	2.000	2.000	2.000	---
1983	31	1.903	2.000	2.000	0.301
1984	6	3.333	3.000	3.000	0.516
1985	14	1.929	2.000	2.000	0.267
1986	19	2.105	2.000	2.000	0.459
1987	35	1.771	2.000	2.000	0.490
1988	13	2.154	2.000	2.000	0.689
1989	30	1.767	2.000	2.000	0.430
1990	16	2.188	2.000	2.000	0.544
1991	27	1.963	2.000	2.000	0.587
1992	15	1.867	2.000	2.000	0.352
1993	27	2.000	2.000	2.000	0.437
1994	14	1.714	2.000	2.000	0.469
1995	8	1.000	1.000	1.000	0.000
1996	2	2.000	2.000	2.000	---
1997	0	---	---	---	---
1998	1	1.000	1.000	1.000	---
1999	0	---	---	---	---
2000	0	---	---	---	---
2001	0	---	---	---	---
2002	1	2.000	2.000	2.000	---
2003	0	---	---	---	---

Tables 11 and 12 give descriptive statistics for the coding of secondary policy belief compromises on pesticide regulations for each coalition. These tables show the rareness of having a compromise on secondary policy beliefs in an opening statement. Out of 497 opening statements made by advocacy groups within the agriculture promotion coalition, a compromise was coded in only 32 of those statements. Similarly, out of 260 opening statements made by advocacy groups within the consumer-environmental protection coalition, a compromise was coded in only 17 of those statements. The rareness of secondary policy belief compromise is evident in the cumulative descriptive statistics contained in Table 12. That table reveals that the agriculture promotion coalition averaged 1.5 compromises per year and the consumer-environmental protection coalition averaged less than 1 compromise per year.

Overall, the descriptive statistics included in Tables 6-12 show support for the use of the content analysis. For instance, the statistics prove that the agriculture promotion coalition constantly had scores indicative of agriculture promotion policy beliefs on pesticides and pesticide regulations (i.e., scores above 3). Similarly, the statistics prove that the consumer-environmental protection coalition constantly had scores indicative of consumer-environmental policy beliefs on pesticides and pesticide regulations (i.e., scores below 3).

Table 11

Number of Secondary Policy Belief Compromises on Pesticide Regulations by Each Coalition

Year	Agriculture Promotion Coalition	Consumer-Environmental Protection Coalition
1982	0	0
1983	1	1
1984	0	0
1985	0	0
1986	2	0
1987	4	3
1988	9	2
1989	4	0
1990	4	0
1991	1	1
1992	1	2
1993	0	6
1994	4	1
1995	2	1
1996	0	0
1997	0	0
1998	0	0
1999	0	0
2000	0	0
2001	0	0
2002	0	0
2003	0	0

Table 12

Cumulative Descriptive Statistics for the Number of Secondary Policy Belief
Compromises on Pesticide Regulations by Each Coalition from 1982-2003

	Agriculture Promotion Coalition	Consumer-Environmental Protection Coalition
Mean	1.45	0.77
Median	0.00	0.00
Mode	0.00	0.00
Stand. Deviation	2.28	1.45
Sample Size (N)	22	22

Note that because this variable is a simple count variable, the 22 cases that comprise this sample size are the years of analysis. So, each year equals one case. This type of cumulative unit of analysis is different from the preceding tables on policy core beliefs and secondary policy beliefs.

Data Collection

To answer the four research questions posed in Chapter 5, this dissertation examined a variety of data sources. These data sources included primary historical documents such as Congressional hearings, secondary historical accounts of the debates over pesticide regulations, and interviews with individuals who were involved in the pesticide regulatory debates. This section describes each data source and explains its importance.

Congressional Hearings

The most important data sources were Congressional hearings on pesticide regulations. Information extracted from Congressional hearings helped to answer all of the research questions. To answer these questions, this dissertation examined Congressional hearings on pesticide regulations from 1982-2003. This time period was chosen for study because in December of 1982, Chairman Brown released the controversial report calling for FIFRA and FFDCA reform. As a result, in 1983 the first hearings were held on the inadequacy of current pesticide regulations. This started the line of thinking that led to passage of FIFRA reform in 1988 and the passage of FFDCA reform in 1996. In many ways, 1982 represented the beginning of

the era of pesticide regulatory reform. In addition, 1982 represented the beginning of the full tilt of the Reagan revolution and the increased scrutiny on regulations of all types that that revolution entailed.

To discover the number of Congressional hearings on pesticide regulations during this time period, two types of searches were conducted. First, the legislative histories of FIFRA 1988 and FQPA 1996 were examined. This revealed that Congress held 24 hearings on legislation that eventually became “FIFRA 1988” from 1983-1988, and 37 hearings on legislation that eventually became FQPA from 1986-1996 (Note that these totals do not include unpublished hearings. In 1988, the House Agriculture Committee’s Subcommittee on Department Operations, Research, and Foreign Agriculture held a hearing on “FIFRA 1988” that was never published. Since it was not published, it could not be examined for this dissertation. Similarly, in 1996 the Senate Agriculture, Nutrition, and Forestry Committee held a hearing on FQPA that was never published). As a result, these 61 hearings were included in the analysis.

The second type of search was broader. Using the *Congressional Universe* database of Congressional hearings, a search was performed to find all hearings on pesticides from 1983-2003. This resulted in 57 more hearings that focused on pesticides. As a result, a total of 118 hearings were examined for this dissertation.

These additional hearings were needed because they had important information that further illuminated the debate on pesticide regulatory reform in the 1980s and 1990s. These types of hearings examined topics such as pesticide storage accidents or

the specific health effects of a pesticide. These hearings were omitted from Legislative Histories since they did not have any specific mention of FIFRA 1988 or FQPA. However, these types of hearings had important information that showed the policy beliefs of both agriculture promotion and consumer-environmental protection advocates. Therefore, these hearings had to be included in the analysis. These 118 hearings were then analyzed with a content analysis protocol modified from previous ACF studies that used content analyses (Sabatier and Jenkins-Smith 1993; Sewell 2005).

Historical Data Sources

To provide a basic background on pesticide regulations, this dissertation used a variety of secondary historical data sources. These sources included major works on the history of pesticide regulations by James Whorton (1974), Christopher Bosso (1987), and James Smart (1998). When combined, these three sources helped to illuminate an important fact about the basic framework of the federal pesticide regulatory subsystem: Namely, that debates over federal pesticide regulations almost always had two main sets of participants: agriculture promotion advocates and consumer-environmental protection advocates. Agriculture promotion advocates included groups that represented the agriculture industry, farmers, chemical manufacturers, and other agri-business concerns. Consumer-environmental protection

advocates included groups that represented consumer advocacy groups, worker protection groups such as unions, and environmental protection groups. In addition, within both groups were also individuals and policymakers representing themselves or constituencies who felt strongly about pesticide regulations.

To assess the annual political conditions affecting these advocates in federal pesticide regulatory policy from 1982-2003, this dissertation used three political variables. These variables included an interval level variable showing the annual percent of Democratic legislators in the U.S. House of Representatives, another interval level variable showing the annual percent of Democratic legislators in the U.S. Senate, and a nominal level variable indicating when a member of the Democratic party occupied the U.S. Presidency. Data for these variables originated from the U.S. Census Bureau's (2004) annual *Statistical Abstract of the United States*.

Interviews

In addition to the content analysis of Congressional hearings, this dissertation examined other data sources. First, a very small sample of interviews was conducted to determine if data and conclusions extracted from the content analysis of hearings were accurate. Before any interviews took place, the author obtained Institutional Review Board approval from Northern Illinois University's Office of Research Compliance. After Institutional Review Board approval, the author located ten

individuals who agreed to be interviewed. These individuals had extensive experience working in agri-environmental policy and pesticide regulations in particular. These individuals held high positions in the EPA and USDA during the years 1982-2003. One individual even was on the EPA's administrator's high profile FQPA policy implementation team in 1996. Other individuals interviewed had extensive experience working for pesticide companies and working with environmental protection groups. Some of these individuals were interviewed multiple times. In the end, sixteen interviews were conducted with these ten individuals.

While still a small sample of interviews, this small sample served its purpose of verifying conclusions reached in the content analysis as well as the overall conclusion that a consumer-environmental protection coalition and an agriculture promotion coalition exist in the agri-environmental policy domain. In essence, these interviews helped to triangulate the data. The interviews gave another viewpoint on this policy subsystem and allowed the researcher to determine if conclusions from this research were accurate. Further interviews were not conducted because all of the interviewees agreed on the main data points.

Hypothesis 1

Working from the research design, content analysis protocol, and a variety of data sources, this dissertation constructed hypotheses for each research question. To

answer the first research question on the existence of advocacy coalitions, Hypothesis 1 theorizes that the pesticide policy core beliefs of advocacy groups with agriculture promotion interests should be statistically different from advocacy groups with consumer-environmental protection interests (see Table 13). Note that Hypothesis 1 and the following hypotheses only examine advocacy groups. While this excludes from the analysis policymakers, the media, and other interested individuals who may be part of a larger advocacy coalition, it does allow the analysis to concentrate on advocacy groups – the largest and most significant component of advocacy coalitions. To determine if distinct advocacy coalitions exist, this dissertation examined the policy core beliefs of advocacy groups testifying in Congressional hearings on pesticide regulations since 1982 with the content analysis framework. This quantified the policy core beliefs on pesticides for advocacy groups testifying in the Congressional hearings.

However, to ascertain if distinct coalitions existed, these groups had to be assigned to their hypothesized coalition. Assignment proceeded according to the content analysis protocol by examining the mission statements of advocacy groups. In the consumer-environmental protection advocacy coalition, assignment was based on being an advocacy group whose primary mission supported consumer or environmental protection. In the agriculture promotion advocacy coalition, assignment was based on being an advocacy group whose primary mission was to support the promotion of farming or business (see Appendix B).

Table 13

Methodology for Hypothesis 1

Research Question 1

Do the policy core beliefs of like-minded advocacy groups possess enough uniformity to justify categorization of these groups into larger advocacy coalitions?

Hypothesis 1

The pesticide policy core beliefs of advocacy groups with agriculture promotion interests cluster at higher policy belief scores than advocacy groups with consumer-environmental protection interests.

Methodology

Comparison of policy core belief scores with the McNemar's test for ordinal data (i.e., the marginal homogeneity test)

Unit of Analysis

Policy core beliefs

Dependent Variable

Annual policy core beliefs on pesticides

By assigning groups to these two coalitions, this dissertation could use a version of the McNemar's test for ordinal level data (also known as a marginal homogeneity test) to determine if the policy core beliefs of groups in each coalition were statistically distinct. A McNemar's test is a procedure that examines whether two related samples have a significant difference in their values (Jacqmin-Gadda and Commenges, 1995, p. 1237; Norusis, 2000, p. 325). If advocacy coalitions existed in some form, then groups that traditionally protected consumers and the environment should have different policy core beliefs than groups that traditionally promoted business and farming. However, if advocacy coalitions did not exist, then the policy core beliefs of those assigned to the consumer-environmental protection advocacy coalition should be no different than the policy beliefs of those assigned to the agriculture promotion advocacy coalition.

Hypothesis 2

For the second research question that examined how the secondary policy beliefs of advocacy coalitions change over time, this dissertation used Hypothesis 2. Based off of past research evidence from numerous ACF studies, Hypothesis 2 theorizes that changes in an advocacy coalition's secondary policy beliefs on pesticide regulations increase gradually throughout the years in a policy-oriented learning style. To test this hypothesis, the dissertation used a content analysis framework to quantify

the secondary policy beliefs of a consumer-environmental protection advocacy coalition and an agriculture promotion advocacy coalition.

Using the content analysis framework to assign a numerical value to secondary policy beliefs on pesticide regulations, this dissertation averaged the expressed policy beliefs of each coalition for each year. Then, the dissertation examined the percent change in the value of the secondary policy on pesticide regulations beliefs from year to year. Percent changes for each coalition were then plotted to discover kurtosis levels.

Kurtosis levels indicate whether the distribution of a variable is peaked (Greene, 1990, p. 60). If a variable exhibits kurtosis, then it means that the variance contained in the distribution of the variable originates from sporadic, extreme values (Balanda and MacGillivry, 1988, p. 111; Chissom, 1970, p. 19). Or, for Hypothesis 2, if the percent change in the *secondary policy beliefs on pesticide regulation* variable has high kurtosis, then the coalitions' secondary policy beliefs on pesticide regulations had at least a few years of major change and many years of relatively minor change (see Table 14).

If secondary policy beliefs changed in a gradual fashion, as Hypothesis 2 theorizes, then kurtosis levels should be low. Or, in other words, the percent change in each coalition's secondary policy beliefs should be small from year to year. In contrast, if kurtosis levels are high, then it indicates that the percent change in each coalition's secondary policy beliefs had sudden, large changes in at least one year. This type of percent change would be more aligned to a PE pattern of change.

Table 14

Methodology for Hypothesis 2

Research Question 2

If advocacy coalitions exist, do their secondary policy beliefs toward pesticide regulations change over time?

Hypothesis 2

Changes in an advocacy coalition's secondary policy beliefs on pesticide regulations increase gradually over time in a policy-oriented learning style.

Methodology

Examination of kurtosis

Unit of Analysis

Secondary policy belief

Dependent Variable

Annual percent change of secondary policy beliefs on pesticide regulations

Hypothesis 3

To analyze the third research question on whether increases in compromises in an advocacy coalition's secondary policy beliefs on pesticide regulations are associated with policy change, the dissertation uses Hypothesis 3. Hypothesis 3 states that advocacy coalitions increase compromises with their secondary policy beliefs on pesticide regulations when policy change is about to occur (see Table 15). To examine this hypothesis, the dissertation uses opening statements coded with the content analysis protocol to reveal when acts of compromise over secondary policy beliefs occur. As indicated previously, these acts of secondary policy belief compromises by the consumer-environmental protection coalition and the agriculture promotion coalition are extremely rare and significant events.

Compromises over secondary policy beliefs occur when an advocacy coalition member expresses traditional secondary policy beliefs on one area of pesticide regulations, but in the same opening statement also expresses additional secondary policy beliefs on issues related to pesticide regulations that are more aligned to the secondary policy beliefs of the opposing coalition. These additional secondary policy beliefs occur over issues that commonly surround debates on pesticide regulations. As defined in the content analysis, these issues include: water pollution, biotechnology, conservation, agri-business, and farmers. If these acts of belief compromise are important to the policy process, then they should be associated with policy change.

Table 15

Methodology for Hypothesis 3

Research Question 3

Are increases in compromises in secondary policy beliefs associated with policy change?

Hypothesis 3

Advocacy coalitions increase compromises with their secondary policy beliefs on pesticide regulations when policy change is about to occur.

Methodology

Pearson's correlation analysis

Unit of Analysis

Number of annual belief compromises for each coalition

Dependent Variables

i. Annual number of times that members of the agriculture promotion coalition compromised on their secondary policy beliefs (differenced)

ii. Annual number of times that members of the consumer-environmental protection coalition compromised on their secondary policy beliefs (differenced)

Independent Variable

Did Congress debate on specific legislation that eventually became a new pesticide regulation (yes or no, differenced)

To quantitatively answer this type of hypothesis, this dissertation uses three time-series variables: *policy output*, *number of belief compromises for the agriculture promotion coalition*, and *number of belief compromises for the consumer-environmental promotion coalition*. As initially constructed, both belief compromise variables are interval level, count variables that tally the number of belief compromises from the content analysis for each coalition during each year from 1982 through 2003. In addition, as initially constructed the policy output variable is a nominal level, time-series variable that indicates the years that Congress debated and then passed specific legislation that became new pesticide regulations. This variable is coded 0 for a year in which Congress had specific debates that did not lead to a new pesticide regulation and 1 for a year in which Congress had specific debates that directly led to the passage of a new pesticide regulations. As a result, the years 1987 and 1988 are coded 1 since Congress passed the 1988 FIFRA revision off of specific debates occurring in 1987 and 1988, and the years 1995 and 1996 are coded 1 since Congress debated the specific bills that later became FQPA in 1996 during those years.

These variables had certain anomalies common to time-series data. The most significant anomaly was a trend problem associated with both belief compromises variables. Trend indicates that the values in a time-series variable drift in one direction over the course of many years (McDowal, McCleary, Meidinger, and Hay, 1980, p. 13). To correct for this problem, time-series variables can be differenced. In differencing a variable, the researcher subtracts the value from an initial case from the

value from the case immediately preceding it (McDowal et al., 1980, p. 20). This usually corrects for the drift problem.

In this dissertation, differencing is performed for the *policy output, number of belief compromises for the agriculture promotion coalition, and number of belief compromises for the consumer-environmental promotion coalition* variables. While differencing these variables corrects the drift problem associated with the belief compromises variables, it also transforms the data. Notably, the policy output variable becomes a trinary variable. After differencing, the variable has more than two values and can no longer be classified as a nominal variable.

Differencing also changes the nature of the belief compromises variables. Initially, these variables were count variables that tallied the occurrences of compromises. As a result, as initially constructed they had more of a Poisson distribution common to count variables as opposed to a normal distribution (Kennedy, 1998, p. 236). However, after differencing, these variables have negative values. As a result, they no longer exhibit a Poisson distribution (Kennedy, 1998, p. 236-237). After differencing, these variables have an approximately normal distribution.

These changes allow for a statistical examination of Hypothesis 3. If compromises in secondary policy beliefs are associated with policy change, then Pearson's correlations can be examined to determine if the belief compromises variables are statistically correlated with the policy output variable. Pearson's correlations allow researchers to discover measures of association for variables measured at the interval level (Healey, 1999, p. 394). Given that differencing turned

all of the variables into interval variables, the use of Pearson's correlations should result in a valid analysis for Hypothesis 3.

Hypothesis 4

Lastly, this dissertation examines the fourth research question that asks if stronger advocacy coalitions influence belief compromises in weaker advocacy coalitions. To answer this question, this dissertation developed Hypothesis 4. Hypothesis 4 theorizes that the agriculture promotion coalition influences compromises in the consumer-environmental protection coalition's secondary policy beliefs on pesticide regulations at a later time. Or, in other words, Hypothesis 4 implies that the agriculture promotion coalition was the dominant coalition in the 1980s and 1990s. As a result, when the agriculture promotion coalition issued opening statements with belief compromises, the consumer-environmental protection coalition followed suit and had opening statements with belief compromises at a later time.

To examine this hypothesis, the dissertation examines four policy belief variables and three political variables measured annually. The policy belief variables all originate from counting the annual number of compromises in the secondary policy beliefs on pesticide regulations of the agriculture promotion coalition and the

consumer-environmental protection coalition. The political variables all originate from historical data sources.

As indicated in Table 16, the analysis for Hypothesis 4 has four policy belief variables. These variables include: *number of belief compromises for the agriculture promotion coalition in year (t)*, *number of belief compromises for the agriculture promotion coalition in year (t + 1)*, *number of belief compromises for the consumer-environmental promotion coalition in year (t)*, and *number of belief compromises for the consumer-environmental promotion coalition in year (t + 1)*. As in the analysis for Hypothesis 3, these variables are differenced to correct for trend problems.

The three political variables measure the Democratic party's control of the main policymaking bodies at the federal level. These political variables are: *Democratic control of the Presidency in year (t)* (a nominal level variable coded 1 for when a Democrat is President and 0 for when a Republican is President), *percentage of Democrats in the House of Representatives in year (t)* (a continuous variable showing the total percentage of Democrats in the House), and *percentage of Democrats in the Senate in year (t)* (a continuous variable showing the total percentage of Democrats in the Senate). All of these variables are time-series variables measured each year from 1982-2003. Just like the policy belief variables, the political variables are differenced to correct for trend problems.

Table 16

Methodology for Hypothesis 4

Research Question 4

Do stronger advocacy coalitions influence compromises in secondary policy beliefs among weaker advocacy coalitions?

Hypothesis 4

The agriculture promotion coalition influences compromises in the consumer-environmental protection coalition's secondary policy beliefs on pesticide regulations.

Methodology

Time-series, path analytic causal model

Unit of Analysis

Number of annual belief compromises for each coalition

Dependent Variables

- i. Annual number of times that members of the consumer-environmental protection coalition compromised with their secondary policy beliefs in year (t + 1)
- ii. Annual number of times that members of the agriculture promotion coalition compromised with their secondary policy beliefs in year (t + 1)

Independent Variables

- i. Annual number of times that members of the agriculture promotion coalition compromised with their secondary policy beliefs in year (t)
 - ii. Annual number of times that members of the consumer-environmental protection coalition compromised with their secondary policy beliefs in year (t)
 - iii. Control of the Presidency by the Democratic party in year (t)
 - iv. Percentage of Democrats in the House of Representatives in year (t)
 - v. Percentage of Democrats in the Senate in year (t)
-

These political variables are included in the causal model because they ultimately help to assess coalition strength. Stronger coalitions should be able to withstand political pressure to compromise better than weaker coalitions. As a result, if the agriculture promotion coalition is the stronger coalition in the pesticide regulatory subsystem, then these political variables should influence the consumer-environmental protection coalition to a greater degree. Or, in other words, political variables should influence compromises in the weaker coalition and not influence compromises in the stronger coalition.

To determine if the agriculture promotion coalition is stronger than the consumer-environmental protection coalition, this dissertation uses the policy belief and political variables in two time-series, path analytic causal models. In Model I, the agriculture promotion coalition is assumed to be stronger than the consumer-environmental protection coalition. This model should confirm Hypothesis 4. In Model I, the three political variables in year (t) influence the weaker consumer-environmental protection coalition in year (t) to compromise with their secondary policy beliefs. However, even with that effect accounted for, the stronger agriculture promotion coalition should have a greater influence on the consumer-environmental protection coalition. When the agriculture promotion coalition compromises on secondary policy beliefs in year (t), then that influences the consumer-environmental protection coalition to compromise on secondary policy beliefs in year (t + 1) (see Figure 5).

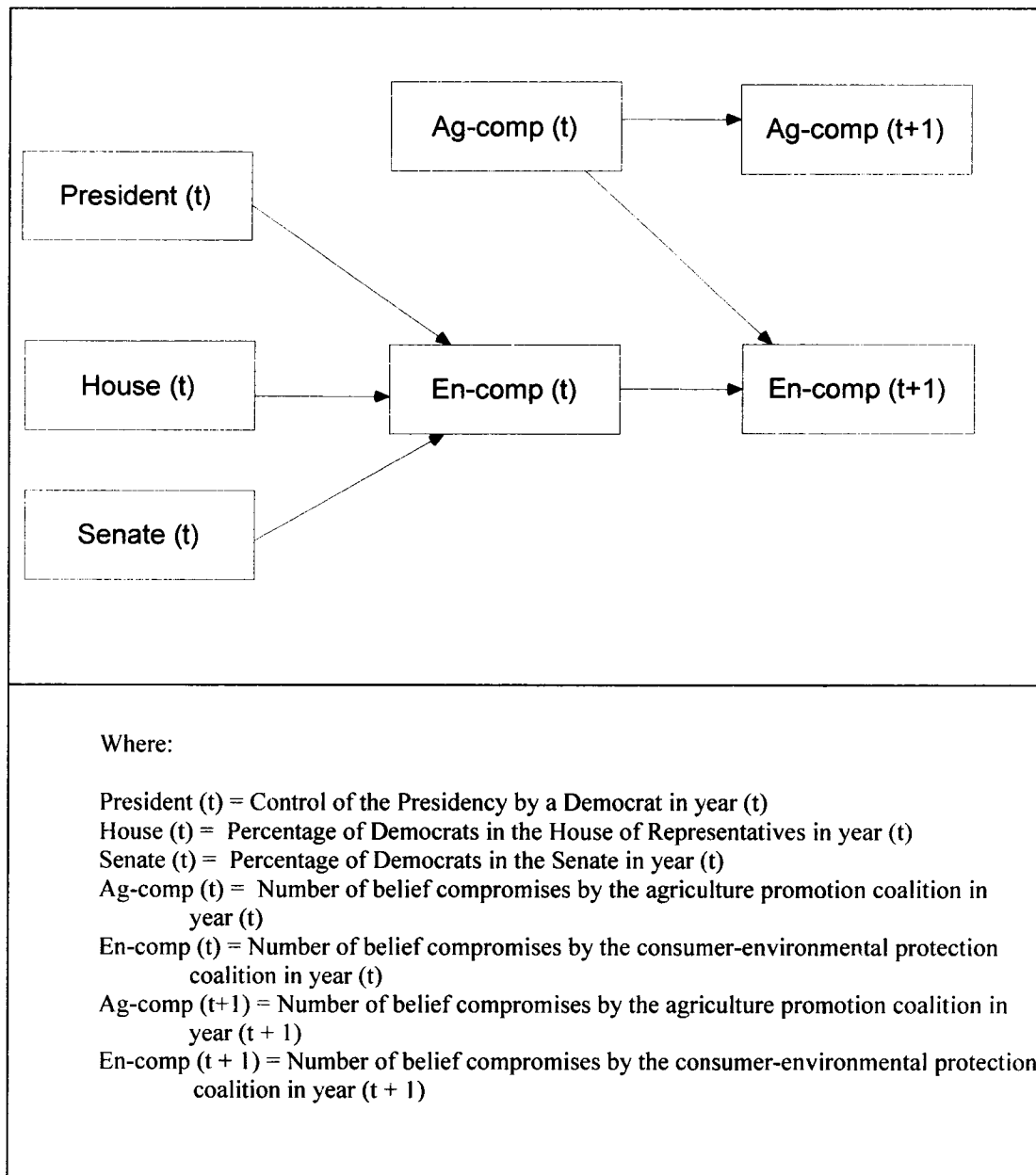


Figure 5: Model I Indicating a Stronger Agriculture Promotion Coalition

Model II reverses the hypothesized influence relationship and should not be significant. In Model II, the three political variables in year (t) influence compromises in secondary policy beliefs in the weaker agriculture promotion coalition in year (t). With that effect accounted for, the stronger consumer-environmental coalition should have a greater influence on the agriculture promotion coalition. When the consumer-environmental protection coalition compromises on secondary policy beliefs in year (t), then that influences the agriculture promotion coalition to compromise on secondary policy beliefs in year (t + 1) (See Figure 6). If the agriculture promotion coalition controls this policy subsystem, then influence relationships in Model II should be weaker and more insignificant than the influence relationships in Model I.

Note that both models take into account how compromises by a coalition in the previous year influence compromises by the same coalition in the following year. For example, in Model I there are two main influences on compromises by the consumer-environmental protection coalition in year (t + 1). These influences are compromises by the agriculture promotion coalition in year (t) as discussed previously, and compromises by the consumer-environmental protection coalition in year (t). In Model II, the two main influences on compromises by the agriculture promotion coalition in year (t + 1) are compromises by the consumer-environmental protection coalition in year (t) and compromises by the agriculture promotion coalition in year (t). It stands to reason that a significant influence on a coalition's compromises in a year should be the number of compromises issued by the coalition in the previous year. As a result, it's included in the causal model.

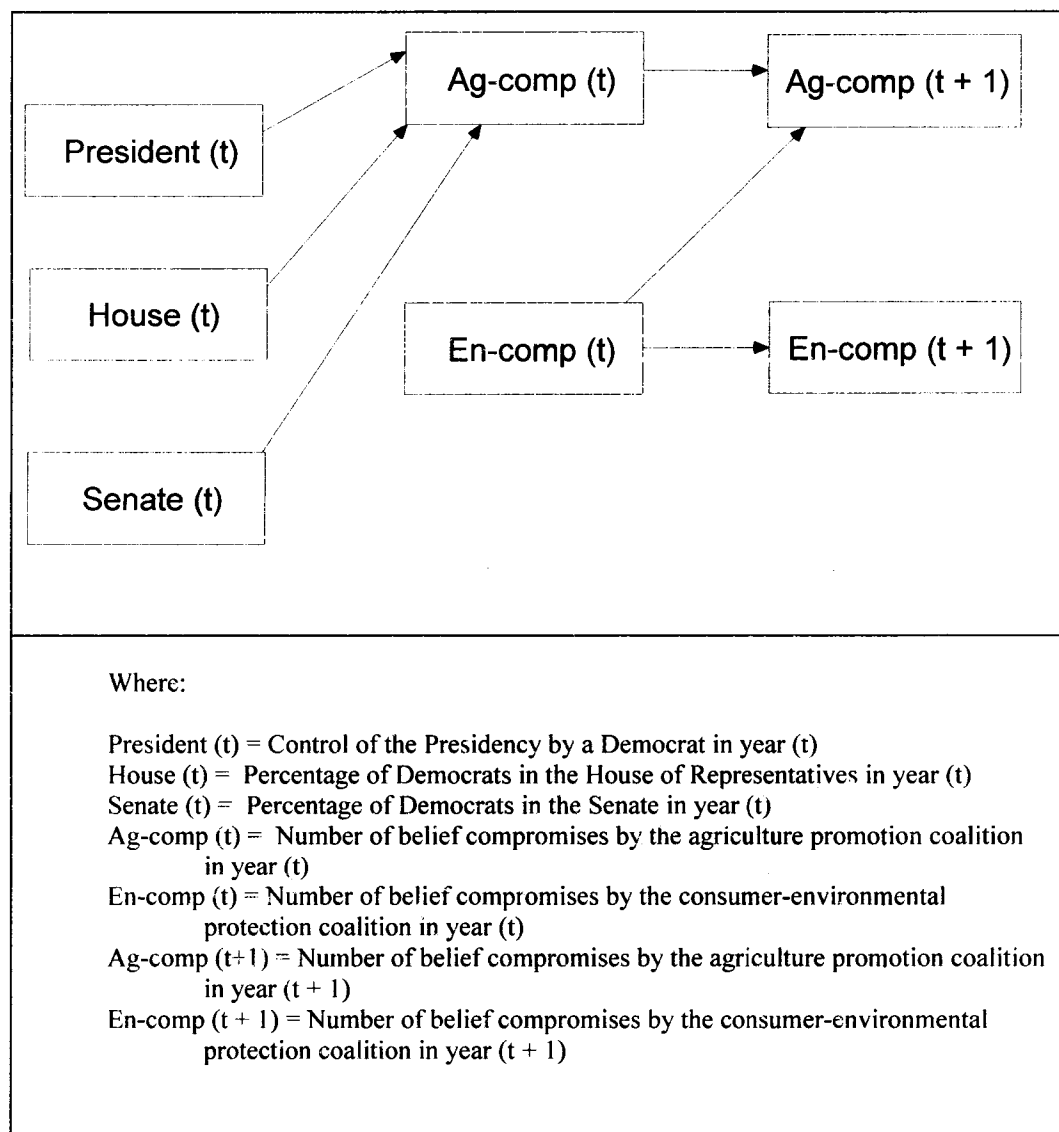


Figure 6: Model II Indicating a Weaker Agriculture Promotion Coalition

The causal models also account for how political variables in year (t) affect compromises by coalitions in year (t). If the agriculture promotion coalition is the stronger coalition and truly in control of the pesticide regulatory subsystem, then they should be able to withstand political pressure to compromise on policy beliefs from Democratic policymakers. As a result, in Model II the political variables in year (t) influencing compromises in the agriculture promotion coalition in year (t) should be insignificant. Correspondingly, the weaker coalition of consumer-environmental protection advocates should not be able to withstand political pressure to compromise on policy beliefs from Democratic policymakers. As a result, in Model I the political variables in year (t) influencing compromises in the consumer-environmental protection coalition in year (t) should be significant.

The results from both of these models should reveal a number of insights on the strength of coalitions. These results should include how political pressure in year (t) influenced policy compromises in strong and weak coalitions in year (t), how the stronger coalition in year (t) influenced policy compromises in the weaker coalition in year (t + 1), and how a coalition at year (t) influenced its own policy compromises in year (t + 1). But the most important finding from Models I and II relates to the proving or disproving of Hypothesis 4.

These two causal models of policy belief and political variables heavily rely on a concept known as Granger causality. Granger causality explains the occurrence of an event at time-point 1 as the result of an event at time-point 0 (Granger, 1987, p. 45). For Hypothesis 4 this means that belief compromises by the agriculture promotion

coalition in year (t), in conjunction with belief compromises by the consumer-environmental protection coalition in year (t) and various political factors in year (t), should influence belief compromises by the consumer-environmental protection coalition in year (t + 1).

Concluding Remarks

To summarize, this research uses a content analysis of Congressional hearings on pesticide regulations to determine the primary and secondary beliefs expressed by each coalition during opening statements. The data collected from this type of content analysis can answer important questions regarding the use of policy beliefs in the policy process. Chief among these questions are whether like-minded advocacy groups have uniform policy core beliefs, how the secondary policy beliefs of like-minded advocacy groups change over time, whether compromises in secondary policy beliefs occur when policy change is close to occurring, and if stronger coalitions of like-minded advocacy groups influence compromises in secondary policy beliefs in weaker coalitions of like-minded advocacy groups.

CHAPTER 6

FINDINGS

This chapter includes the findings for the four research questions and the corresponding hypotheses. As discussed in the last chapter, these findings originate from a content analysis protocol modified from similar content analysis protocols designed by Sabatier and Jenkins-Smith (1993) and Sewell (2005). The overall goal of these findings is to discover the role of policy beliefs in the policy process. With these findings, political scientists can learn if: 1) policy core beliefs of like-minded advocacy groups possess enough uniformity to justify categorization of these groups into larger advocacy coalitions; 2) if secondary policy beliefs toward pesticide regulations change over time; 3) if increases in compromise in secondary policy beliefs are associated with policy change; and 4) if advocates within stronger advocacy coalitions influence compromises in secondary policy beliefs in advocates within weaker advocacy coalitions. These findings help political scientists learn about the role of policy beliefs in the process. In addition, these findings help political scientists directly compare the ACF and PE models of the policy process to discover which parts of which model are accurate.

Results for Hypothesis 1

Hypothesis 1 states that the pesticide policy core beliefs of advocacy groups with agriculture promotion interests cluster at higher policy belief scores than advocacy groups with consumer-environmental protection interests. Or, in direct answer to the first research question, the policy core beliefs of like-minded advocacy groups can be categorized into larger advocacy coalitions. To test this hypothesis, the policy core beliefs of members of advocacy groups testifying before Congressional committees were analyzed with this dissertation's content analysis protocol. Since these hearings were on federal pesticide regulations and since this policy subsystem is on federal pesticide regulations, then these policy core beliefs were also on pesticides.

As mentioned in Chapter 5, only members of advocacy groups were included in this type of analysis since they were the only groups whose organizational mission could be grouped into an agriculture promotion coalition and a consumer-environmental protection coalition. This grouping was key. The only way to determine if policy core beliefs on pesticides were uniform among like-minded advocacy groups was to first categorize these groups testifying before Congress into an agriculture promotion coalition and a consumer-environmental protection coalition based on organizational mission. That way, similar advocacy groups were included in one advocacy coalition. Then, the content analysis protocol revealed the policy core beliefs on pesticide regulations for these advocacy groups.

If policy core beliefs on pesticide regulations were uniform among like-minded advocacy groups, then there should be a statistical difference between the policy core beliefs of members within the agriculture promotion coalition and the consumer-environmental protection coalition. If these policy core beliefs were not uniform among like-minded advocacy groups then there should be no statistical difference. That is, the policy core beliefs of those members grouped into the agriculture promotion coalition would not be statistically different from those members grouped into the consumer-environmental protection coalition. This would mean that policy core beliefs of like-minded advocacy groups were not uniform. In essence, such a finding would also discredit the ACF as a viable framework for policy analysis.

The findings for this hypothesis originate from a comparison of related groups using the McNemar's test for ordinal data (i.e., the marginal homogeneity test). Note that in statistical terms the marginal homogeneity statistic is like a standardized Z score, with larger values indicating statistical significance. Also note that in each year of analysis this type of comparison of related groups can only use matched cases. As a result, analysis only proceeded on the lowest number of statements per year. For instance, if the agriculture promotion coalition had 16 statements in year 1985, and the consumer-environmental protection coalition had 14 statements in year 1985, then only 14 statements from year 1985 could be analyzed with the marginal homogeneity test.

The findings reveal that the pesticide regulatory policy beliefs of advocacy groups with agriculture promotion interests are statistically different from the pesticide

regulatory policy beliefs of advocacy groups with consumer-environmental protection interests (see Table 17). The only year this did not happen was in 1984 because an unusually low number of advocacy groups testified in Congressional hearings on pesticide regulations. In addition, statistically significant differences in policy core beliefs did not occur in 1982, or from 1996-2003. But this was mainly because of the low number of hearings during those years. Remember, the prime years for debate on pesticide reform happened from 1983 to 1996. Since the time period of 1996 - 2003 had few hearings on pesticide regulations, a coding of a suitable sample of opening statements with policy core beliefs could not occur for those years. As a result, the policy core beliefs of agriculture promotion advocates and consumer-environmental protection advocates could not be compared for those years.

Therefore, the results lend support for hypothesis 1. The pesticide policy core beliefs of advocacy groups with agriculture promotion interests cluster at higher policy belief scores than advocacy groups with consumer-environmental-protection interests. Or, in other words, the pesticide policy core beliefs of advocacy groups with agriculture promotion interests are statistically different from advocacy groups with consumer-environmental protection interests. This result supports the general notion of advocacy coalitions since different groups with similar organizational missions will have similar policy core beliefs that are statistically distinct from different advocacy coalitions.

Table 17

Results for Hypothesis 1

Year	Mean Value of Agriculture Promotion Policy Core Beliefs	Mean Value of Consumer- Environmental Protection Policy Core Beliefs	Standardized Marginal Homogeneity Statistic	Significance
1982	---	2.0000	---	---
1983	3.7353	1.9677	5.061	0.000
1984	3.6667	2.6667	-1.414	0.157
1985	3.9375	2.0000	3.638	0.000
1986	3.6842	2.1053	3.817	0.000
1987	3.6538	1.7714	5.196	0.000
1988	3.6071	2.0769	3.275	0.001
1989	3.9767	1.7667	4.998	0.000
1990	3.7143	2.1250	3.397	0.001
1991	3.8261	1.9259	4.626	0.000
1992	3.7111	1.8667	3.508	0.000
1993	3.7436	2.0000	4.702	0.000
1994	3.9200	1.7143	3.349	0.001
1995	4.0000	1.0000	-2.828	0.005
1996	4.1111	2.0000	---	---
1997	---	---	---	---
1998	4.0000	1.0000	---	---
1999	3.8462	---	---	---
2000	4.2500	---	---	---
2001	---	---	---	---
2002	4.1667	2.0000	---	---
2003	---	---	---	---

Results for Hypothesis 2

Hypothesis 2 states that changes in an advocacy coalition's secondary policy beliefs on pesticide regulations increase gradually over time in a policy-oriented learning style. To test this hypothesis, this dissertation examined the annual percent change in secondary policy beliefs on pesticide regulations for advocacy group members in the agriculture promotion coalition and advocacy group members in the consumer-environmental protection coalition. Figure 7 shows these annual percent changes for the consumer-environmental protection coalition and Figure 8 shows these annual percent changes for the agriculture promotion coalition.

The values for secondary policy beliefs on pesticide regulations originated from the content analysis (see Appendix B). Then, the secondary policy beliefs were averaged for each coalition for each year. For example, all of the secondary policy beliefs on pesticide regulations expressed during hearings in 1988 by the agriculture promotion were averaged. Then, the annual percent change for these secondary policy beliefs was calculated. Lastly, the annual percent change values for each coalition were plotted on a histogram chart. The histogram chart shows the frequency of percent changes for the years in the analysis. So, for example, the histogram chart can indicate that a 10% change occurred seven times or for seven years.

If these members engaged in policy-oriented learning, there should only be small percent changes in secondary policy beliefs from year to year. However, as Figures 7 and 8 demonstrate, some of these percent changes were not small. This was

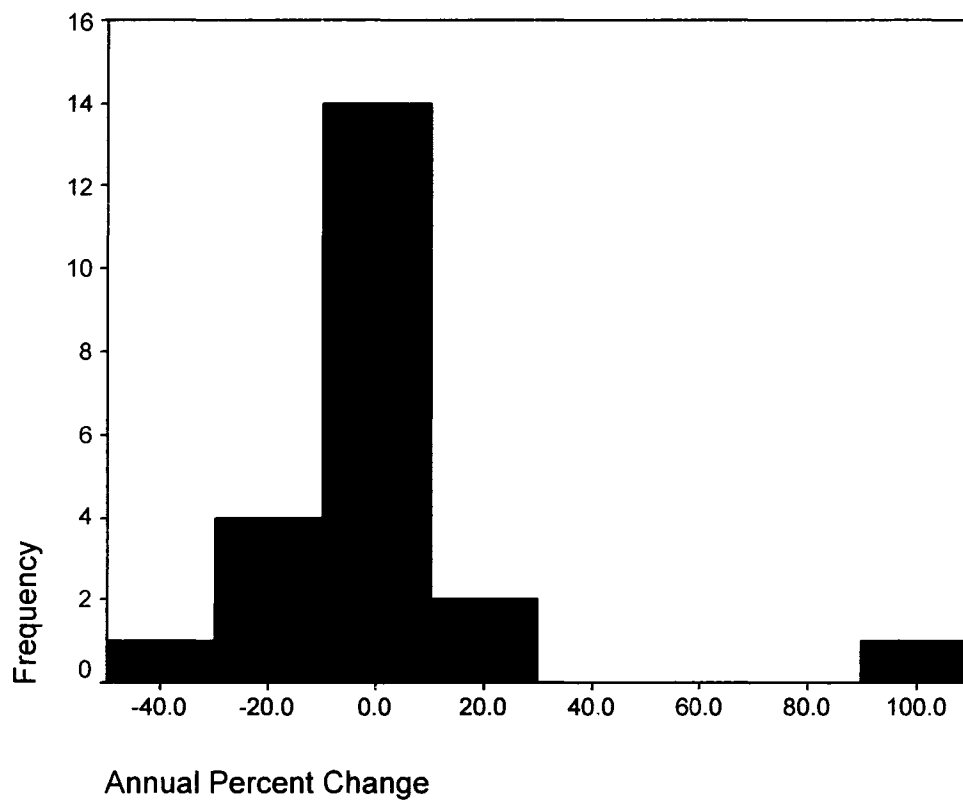


Figure 7: Distribution of Annual Percent Changes in the Secondary Policy Beliefs of Advocacy Groups within the Consumer-Environmental Protection Coalition (1982-2003)

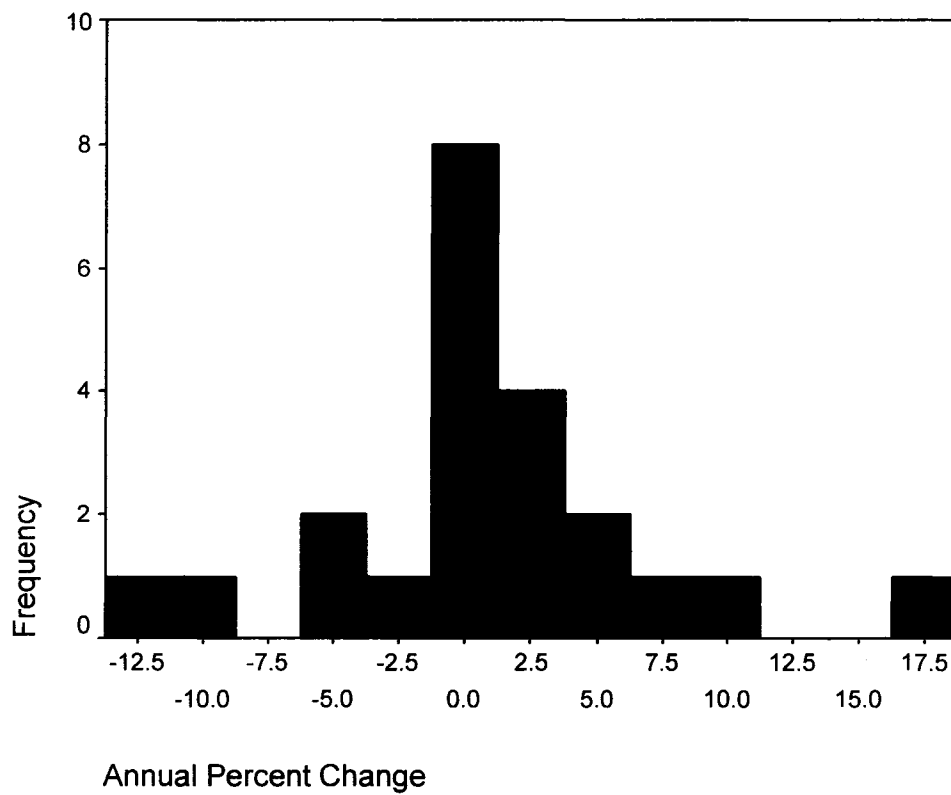


Figure 8: Distribution of Annual Percent Changes in the Secondary Policy Beliefs of Advocacy Groups within the Agriculture Promotion Coalition (1982-2003)

especially true for the consumer-environmental protection coalition. As Figure 7 indicates, the consumer-environmental protection coalition typically had a 0% change in their annual secondary policy beliefs on pesticide regulations. However, in at least eight years, this coalition had percent changes in their secondary beliefs that ranged from 20-40%. In one year, the percent change was even 100%.

These percent changes are larger than what is observed in the agriculture promotion coalition. As shown in Figure 8, the agriculture promotion coalition typically had smaller annual percent changes in its secondary policy beliefs. For twelve years of this analysis, these changes were in the range of 0-2.5%. This means that the agriculture promotion coalition had small, gradual changes in its policy beliefs for a majority of the time.

These findings lend support to the notion that changes in secondary policy beliefs do not always occur gradually. Or, in other words, policy-oriented learning as envisioned by the ACF does not always occur. Especially for consumer-environmental protection advocates, changes in secondary policy beliefs seem to follow a punctuated equilibrium pattern. In this type of pattern, no change occurs to secondary policy beliefs for a majority of the time. However, in a few instances, there are large swings in policy beliefs from year to year. This type of pattern especially applies to the consumer-environmental protection coalition, where changes of over 100% were observed on at least one occasion.

To more quantitatively indicate a punctuated equilibrium pattern, researchers often rely on measures of kurtosis. Typically, researchers rely on the notion of positive kurtosis (also known as a leptokurtic distribution). Leptokurtic distributions have more values around the mean or center of the distribution and more values near the tails or end of the distribution (Baumgartner and Jones, 2002, p. 295). As a result, leptokurtic distributions are often indicative of a punctuated equilibrium pattern since these types of patterns should reveal long periods of no change (i.e., values cluster around the center of the distribution) and short periods of large change (i.e., some values in the tail of the distribution).

To assess kurtosis in this manner, researchers rely on a measure of kurtosis that is typically defined as the "...ratio of the average of the fourth power of the deviation from the mean, to the square of the variance" (Chissom, 1970, p. 20). While normal distributions should have a kurtosis value of zero, leptokurtic distributions should have a kurtosis value of greater than one (Chissom, 1970, p. 20). However, when the standard error of the kurtosis measure is considered, leptokurtic distributions should probably have kurtosis values of two or even three.

As indicated in Table 18, the secondary policy beliefs of the consumer-environmental protection coalition exhibit a decided leptokurtic distribution. With a kurtosis value of 9.9 and a standard error of 0.97, there is no question that the distribution of annual percent change in secondary policy beliefs for the consumer-environmental protection coalition as observed in Figure 7 is leptokurtic. However,

the secondary policy beliefs of the agriculture promotion distribution have a relatively normal distribution with a kurtosis value of 1.3 and a standard error of 0.97. For all practical purposes, the distribution observed in Figure 8 for the agriculture promotion coalition is close to normal.

Table 18

Kurtosis Values for Annual Percent Change in the Average Secondary Policy Beliefs on Pesticide Regulations of Advocacy Groups within the Agriculture Promotion Coalition and the Consumer-Environmental Protection Coalition (1982-2003)

	Agriculture Promotion Beliefs	Consumer-Environmental Protection Beliefs
Kurtosis	1.344	9.900
Stand. Error	0.972	0.972

These mixed results both support and disprove hypothesis 2. On the one hand, the agriculture promotion coalition does seem to engage in policy-oriented learning since the coalition has annual percent changes of secondary policy beliefs on pesticide regulations distributed normally. This is to be expected since only small, gradual changes in policy beliefs occur in policy-oriented learning. However, the consumer-environmental protection coalition does not have this pattern. Its annual percent

changes on secondary policy beliefs are mostly unchanged from year to year, with a few years that exhibit rather large changes. This is indicative of a leptokurtic distribution or a punctuated equilibrium pattern.

Results for Hypothesis 3

Hypothesis 3 examined compromises in secondary policy beliefs among the agriculture promotion coalition and the consumer-environmental protection coalition. Hypothesis 3 declared that advocacy coalitions increase compromises with their secondary policy beliefs on pesticide regulations when policy change is about to occur. To more quantitatively test this hypothesis, a Pearson's correlation analysis was performed on the variables *policy output*, *annual number of compromises in secondary beliefs of the agriculture promotion coalition*, and *annual number of compromises in secondary beliefs of the consumer-environmental protection coalition*. As detailed in Chapter 5, all three of these variables are differenced to correct for time-series problems. Results from this analysis are presented in Table 19.

Results indicate that the annual number of compromises in the agriculture promotion coalition does not have a statistically significant association with whether a new pesticide regulation is passed (i.e., a policy output). However, compromises by the consumer-environmental protection coalition do have more of a significant association with new policy outputs than compromises by the agriculture promotion

coalition. For example, compromises by the consumer-environmental protection coalition have a 0.077 significance level. Given the relatively low number of cases in this analysis (there are only twenty-two cases – one for each year of analysis), this is an acceptable significance level. In addition, the association between compromises and policy output is better in the consumer-environmental protection coalition than in the agriculture promotion coalition. A Pearson's r score of 0.323 suggests a moderate relationship between compromises by the consumer-environmental protection coalition and policy output.

Table 19

Pearson's Correlations for Policy Output (Differenced) and the Annual Number of Compromises in Each Coalition (Differenced)

	Agriculture Promotion Compromises	Cons.-Env. Protection Compromises
Pearson's r	0.258	0.323
Significance	0.130	0.077

These results indicate that a moderate association that is significant exists between the annual number of compromises in secondary policy beliefs by the

consumer-environmental protection coalition and the policy output of a new pesticide regulation. This moderate association disappears when compromises in secondary policy beliefs by the agriculture promotion coalition are considered. For that coalition, the association is weaker and the statistical significance is worse. Overall, this suggests that policy output may be more important to the consumer-environmental protection coalition in regard to developing compromises in secondary policy beliefs.

Results for Hypothesis 4

Hypothesis 4 states that the agriculture promotion coalition influences compromises in the secondary policy beliefs of the consumer-environmental protection coalition. As Table 11 in Chapter 5 makes clear, opening statements with compromises on secondary policy beliefs are extremely rare events. Over the course of twenty-two years, advocacy groups in the agriculture promotion coalition and the consumer-environmental protection coalition made 757 opening statements in hearings on pesticide regulations. Out of those 757 opening statements, only 49 statements had compromises on secondary policy beliefs.

As a result, the decision to issue an opening statement with compromises reflects much deliberation and thought by each coalition. For example, if the agriculture promotion coalition issues opening statements with compromises in a hearing on March 1, then the consumer-environmental protection coalition does not

automatically respond in that hearing with an opening statement with similar types of compromises. Instead, the consumer-environmental protection coalition may respond with compromises at a hearing date later in that year or even in the next year after they have carefully considered the public position of the agriculture promotion coalition.

To try and catch this trend from year to year, two path analytic models were constructed. In Model I, the agriculture promotion coalition is the stronger coalition that influences policy compromises in the consumer-environmental protection coalition at a later time. In Model II, the agriculture promotion coalition is the weaker coalition. As a result, the consumer-environmental protection coalition influences policy compromises in the agriculture promotion coalition at a later time.

Both models examine four different time-series policy beliefs variables and three different political variables. The policy beliefs variables include: *the annual number of compromises by the consumer-environmental protection coalition in year (t)*, *the annual number of compromises by the consumer-environmental protection in year (t + 1)*, *the annual number of compromises by the agriculture promotion coalition in year (t)*, and *the annual number of compromises by the agriculture promotion coalition in year (t + 1)*. The political variables include: *Democratic control of the Presidency in year (t)*, *percentage of Democrats in the House of Representatives in year (t)*, and *percentage of Democrats in the Senate in year (t)*. All of these variables are measured each year from 1982-2003 and are differenced to correct for trend problems. Additionally, further analysis of Models I and II reveals no serial auto-correlation between variables (a common problem in time-series

analyses). As a result, both models use twenty-one cases adjusted only for trend problems.

In Model I, compromises in secondary policy beliefs by the agriculture promotion coalition in year (t) influence compromises in secondary policy beliefs by the consumer-environmental protection coalition in year (t + 1). Or, in other words, the agriculture promotion coalition controls the pesticide regulatory policy subsystem. When its opening statements start to reflect compromises in secondary beliefs in any given year, then the consumer-environmental protection coalition takes notice. Seeing a window of opportunity to have their secondary policy beliefs translated into policy, the consumer-environmental protection coalition starts to also make opening statements that reflect compromises in secondary beliefs. In Model II, compromises in secondary policy beliefs by the consumer-environmental protection coalition in year (t) influence compromises in secondary policy beliefs by the agriculture promotion coalition in year (t + 1). This model shows the consumer-environmental protection coalition controlling the pesticide regulatory policy subsystem.

The path analytic models were analyzed through maximum likelihood estimation with AMOS statistical software. AMOS statistical software easily allowed for an analysis of the path analytic models. In addition, this type of statistical software allowed the researcher to model measurement error inherent in each variable. This was especially important since the House (t) and Senate (t) variables should share some of the same covariance. While the residual correlations between these two

variables were not statistically significant, the covariance modeled between these two variables made both models more accurate.

Results from Models I and II are presented in Figures 9-10 and Tables 20-21. As expected, the results reveal that Model I performed better than Model II. This supports hypothesis 4 and the view that the agriculture promotion coalition was stronger than the consumer-environmental protection coalition from 1982-2003. During this time, the results indicate that the agriculture promotion coalition was able to withstand political pressure from federal policymaking institutions to compromise on their policy beliefs.

In contrast, the results indicate that the consumer-environmental protection coalition was not able to withstand this type of pressure. As indicated in the Model I portion of Table 20, when Democrats controlled the Presidency and when the percentage of Democrats in the Senate increased, the number of policy compromises issued by the consumer-environmental protection coalition also increased. For example, when the percentage of Democratic Senators increased by 1 point, there was a corresponding increase of 0.290 policy compromises by the consumer-environmental protection coalition. Additionally, when the Democrats controlled the Presidency, there was a corresponding increase of over 2.435 policy compromises by the consumer-environmental protection coalition. This suggests that these policymaking bodies, when controlled by Democrats, influence the consumer-environmental protection coalition to compromise on their policy beliefs.

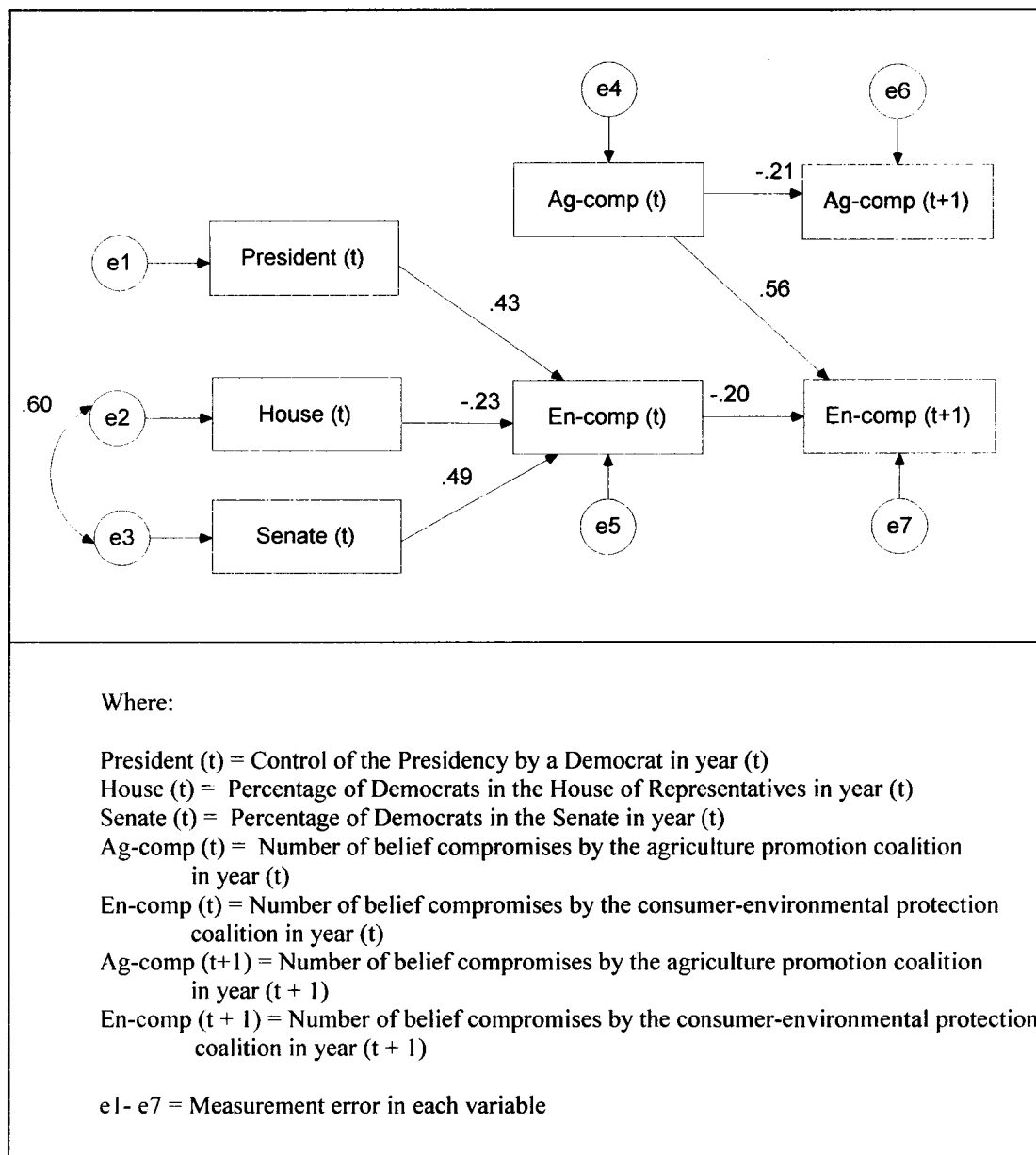


Figure 9: Model I Indicating a Stronger Agriculture Promotion Coalition with Standardized Estimates Shown

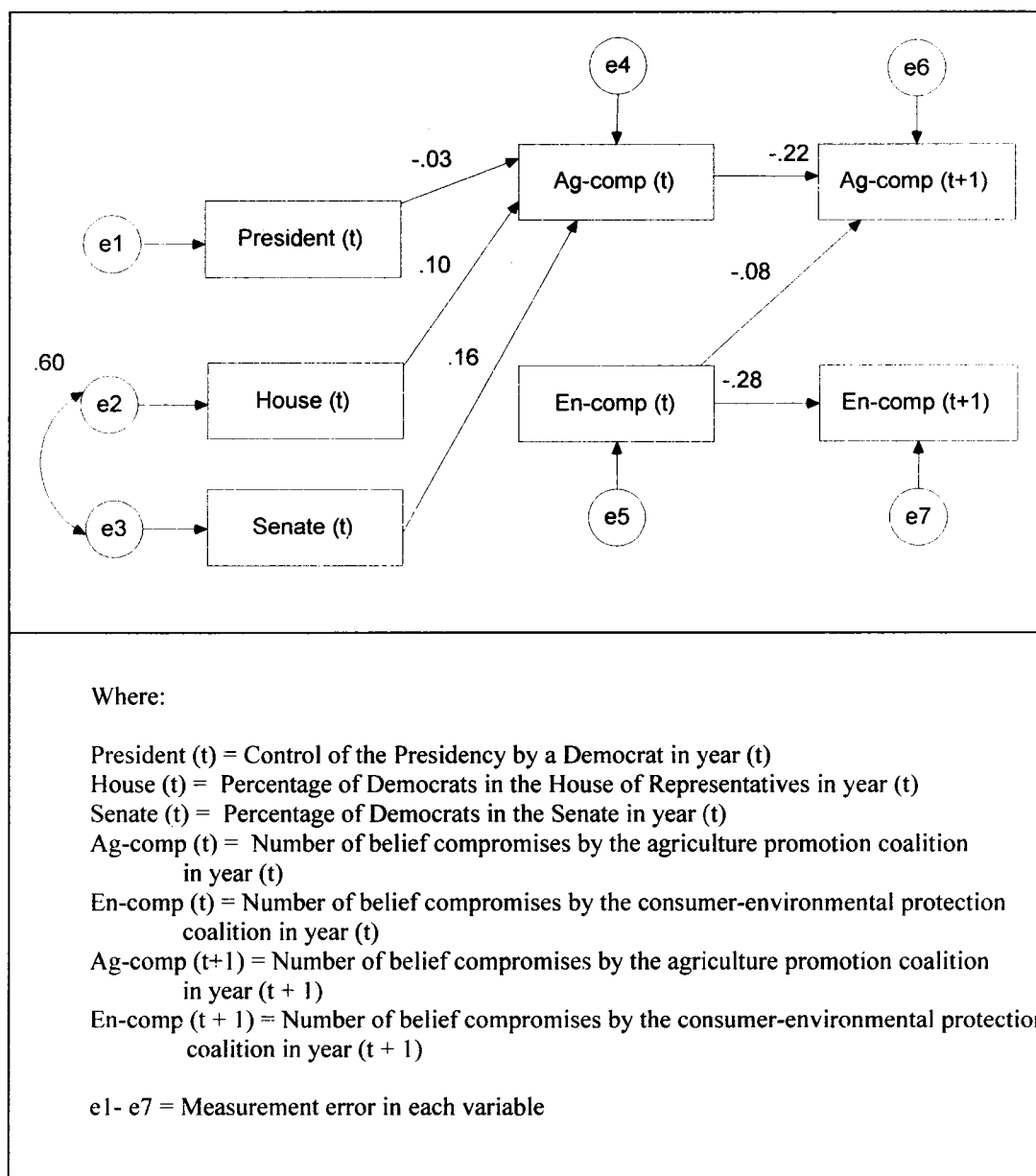


Figure 10: Model II Indicating a Weaker Agriculture Promotion Coalition with Standardized Estimates Shown

Table 20

Results from Model I and Model II

	<u>Model I</u>			<u>Model II</u>		
	Stand. Estimate	Estimate		Stand. Estimate	Estimate	
<u>En-comp (t)</u>						
President (t)	0.430	2.435	(1.026)**	---	---	---
House (t)	-0.232	-0.126	(0.124)	---	---	---
Senate (t)	0.494	0.290	(0.133)**	---	---	---
<u>Ag-comp (t)</u>						
President (t)	---	---	---	-0.28	-0.195	(1.488)
House (t)	---	---	---	0.098	0.065	(0.179)
Senate (t)	---	---	---	0.162	0.115	(0.193)
<u>En-comp (t+1)</u>						
Ag-comp (t)	0.564	0.443	(0.141)***	---	---	---
En-comp (t)	-0.205	-0.195	(0.218)	-0.283	-0.283	(0.214)
<u>Ag-comp (t+1)</u>						
En-comp (t)	---	---	---	-0.076	-0.095	(0.273)
Ag-comp (t)	-0.213	-0.213	(0.218)	-0.224	-0.225	(0.218)
<u>Covariances</u>						
Error 3 - Error 2	0.601	5.731	(2.487)**	0.601	5.731	(2.487)**

Maximum Likelihood Estimation. Standard Errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table 21

Measures of Fit for Model I and Model II

	Model I	Model II
<u>R Squared</u>		
En-comp (t)	0.35	---
En-comp (t+1)	0.36	0.080
Ag-comp (t)	---	0.056
Ag-comp (t+1)	0.045	0.056
<u>Adjusted R Squared</u>		
En-comp (t)	0.23	---
En-comp (t+1)	0.29	0.032
Ag-comp (t)	---	-0.11
Ag-comp (t+1)	-0.005	-0.049
<u>Fit Measures</u>		
Chi-Square	23.50	37.16*
GFI	0.823	0.769
AGFI	0.646	0.538
PGFI	0.412	0.384
AIC	51.50	65.16
BIC	66.12	79.79
CAIC	80.12	93.79

* $p < 0.01$

However, the most significant impact on consumer-environmental coalition compromises was from the agriculture promotion coalition. When the agriculture promotion coalition increased its compromises in policy beliefs in year (t), the consumer-environmental protection coalition followed suit in year (t + 1). Specifically, for every 1 compromise issued by the agriculture promotion coalition in year (t), the consumer-environmental protection coalition issued 0.443 policy compromises in year (t + 1). This is almost a 2:1 ratio and suggests that for every 2 compromises issued by the agriculture promotion coalition in year (t), at least 1 compromise by the consumer-environmental protection coalition occurred in year (t + 1).

In contrast to Model I, none of the estimates in Model II are significant. This suggests that the three political variables in year (t) did not have a statistically significant impact on the agriculture promotion coalition in year (t). In addition, the number of compromises by the consumer-environmental protection coalition in year (t) did not have a statistically significant impact on the agriculture promotion coalition in year (t + 1). Both of these findings lend support to the notion that the agriculture promotion coalition was the stronger coalition in the pesticide regulatory subsystem from 1982-2003.

The fit statistics in Table 21 also reveal that Model I is a better fitting model than Model II. For instance, Model II's chi-square is significant. This suggests that the null hypothesis of no statistically significant relationship between the data exists. In practical terms, this means that the hypothesized relationship depicted among the

variables in Figure 10 probably does not exist. In addition, Model II's GFI, AGFI, and PGFI scores are all lower than Model I. Lower scores for these three fit indices reflect poorer fitting models and suggest that Model II does not adequately explain the variance and covariance in the data. Additionally, the AIC, BIC, and CAIC scores in Model II are higher than in Model I. Higher scores for these three fit indices suggest a poorer fitting model. These latter fit statistics suggest that the inherent data structure of the existing variables is more parsimonious in Model I.

Overall, these results indicate support for hypothesis 4. However, the analysis did reveal some inconsistencies. Of note, Model I indicates that an increasing percentage of Democrats in the House of Representatives actually led to a decrease in policy compromises by the consumer-environmental protection coalition. However, it should be noted that this value is not significant. In addition, Model I reveals that compromises by a coalition in year (t) did not influence compromises by the same coalition in year (t + 1). For example, compromises issued by the agriculture promotion coalition in year (t) had no statistically significant impact on compromises issued by the agriculture promotion coalition in year (t + 1). This unexpected finding suggests that policy compromises have no long-lasting effect within a coalition.

Concluding Remarks

Results from this statistical analysis reveal varying levels of support for each hypothesis. The strongest statistical evidence is found for hypothesis 1. The McNemar's test for ordinal data (i.e. the marginal homogeneity test) revealed statistical differences in the policy core beliefs of each hypothesized coalition on pesticides. As a result, the policy core beliefs of like-minded advocacy groups possess enough uniformity to justify categorization of these groups into larger advocacy coalitions.

The statistical evidence for hypothesis 2 was mixed. Assessments of kurtosis revealed that policy-oriented learning does not always occur. Weaker coalitions seem to have long periods of no change in their secondary policy beliefs followed by relatively short periods of large change in their secondary policy beliefs. This was especially the case for the consumer-environmental protection coalition. In contrast, stronger coalitions exhibit policy-oriented learning that has small changes occurring in secondary policy beliefs from year to year. This was especially the case for the agriculture promotion coalition. As a result, the secondary policy beliefs of advocacy coalitions do change over time. But the pattern of change depends on the strength of the coalition.

Hypothesis 3 had some statistical evidence. In part, this is due to the small number of cases in the analysis. However, even with a limited number of cases the analysis revealed that increases in compromises in secondary policy beliefs seem to be

moderately associated with occurrences of policy change in weaker coalitions. Stronger coalitions, such as the agriculture promotion coalition, had no association between compromises and policy change. As a result, increases in compromises in secondary policy beliefs among advocacy coalitions are sometimes moderately associated with policy change. However, this association seems to depend on the strength of the coalition.

Hypothesis 4 had good statistical support. Most notably, the statistical analysis discovered that stronger coalitions influence future compromises in secondary policy beliefs among weaker coalitions. For example, when the agriculture promotion coalition compromises with secondary policy beliefs in one year, then the consumer-environmental protection coalition compromises with secondary policy beliefs in the following year. This seems to indicate that stronger advocacy coalitions influence compromises in the secondary policy beliefs of weaker advocacy coalitions.

CHAPTER 7

CONCLUSIONS

The research in this dissertation had four main objectives. First, this dissertation updated the policy history of pesticide regulations by integrating the debates over FIFRA reform in 1988 and FFDCA/FIFRA reform in 1996 with the traditional pesticide regulatory debates that occurred since the early 1900s. Second, this dissertation directly tested the ACF notion of advocacy coalitions by examining whether advocacy groups categorized in one advocacy coalition were statistically distinct from different advocacy groups categorized in another advocacy coalition. Third, the research in this dissertation assessed the importance of policy core beliefs and secondary policy beliefs to the policy process. Fourth and perhaps most importantly, this research explored whether advocacy coalitions' secondary policy beliefs undergo a relatively enduring change as theorized by the ACF model's emphasis on policy-oriented learning, or whether these beliefs change quickly over the short term and then go back to their original state, as theorized by the PE model.

Secondary historical sources and interviews with individuals who were active participants in the pesticide regulatory debates in the 1980s and 1990s helped this dissertation meet the first objective. Four research questions and their corresponding

hypotheses helped this dissertation meet objectives two through four. Taken together, research associated with these four objectives generated three substantive research conclusions. These conclusions should help political scientists better understand the policy process.

Conclusion 1: The Need for Reform Drives Policy Compromise

This dissertation provided an overview of the main provisions of federal pesticide regulations since 1906. Because of the sheer complexity of each regulation, the historical accounts provided in Chapters 3 and 4 were broad. This resulted in a historical account that possessed none of the finer details that often make policy histories worthwhile. However, there was also a significant benefit in providing a broad history of all federal pesticide regulations rather than a specific policy history of one pesticide regulation. The broad overview allowed for a better understanding of the dynamics at work in federal pesticide regulations during the 1980s and 1990s.

These dynamics included the fact that coalitions of agriculture promotion advocates and coalitions of consumer-environmental protection advocates had continually debated one another over pesticide regulations since 1906. However, by the 1980s the debate was at a stalemate. Due to a patchwork of regulations passed since 1906 and changing technology, both sets of advocates wanted significant reforms to federal pesticide regulations. Knowing that each side had a vested

historical interest in pesticide regulations, the two sets of advocates finally agreed to compromise in order to pass reforms in 1988 and 1996.

Accounts of the pesticide regulatory debates in the 1980s and 1990s detailed the need for compromise. In addition, interviews conducted for this dissertation confirmed the notion that the main driver of compromise in the 1980s and 1990s was pesticide regulatory reform. This made the pesticide regulatory debates of the 1980s and 1990s unique when compared to the historical debates on pesticide regulations. Instead of considering new pesticide regulations, advocates in the 1980s and 1990s considered reform to existing pesticide regulations.

This conclusion has consequences for our understanding of environmental policymaking. It suggests that compromises between opposing advocates should occur more frequently when some type of policy reform is needed for existing environmental policies. As policymakers become more reluctant to pass proactive environmental legislation that turns into new policies, the reform of existing environmental policies will become more important and more frequent in the future. This dissertation shows that when policymakers consider environmental policy reform, the dynamics of a typical environmental policy debate change. Advocates are likely to compromise and policy reform is likely to occur. This is at odds with typical views of the environmental policy process where little change occurs and advocates hardly ever compromise with their policy beliefs.

Conclusion 2: Policy Beliefs Have a Subtle Impact on Policy Reform

The historical accounts of the pesticide regulatory debates provide evidence that at least two sets of advocacy coalitions debated each other on the economic, environmental, and human health aspects of pesticides. This dissertation added to that evidence by statistically proving that distinct advocacy coalitions exist. By examining the main part of any advocacy coalition, the advocacy group, this research discovered that the policy core beliefs of like-minded advocacy groups are statistically distinct from the policy core beliefs of other advocacy groups. This lends support to the ACF model.

However, the results from this dissertation also indicate that advocacy coalitions influence the policy process in subtle ways. Rather than influencing direct changes on policymakers or policy, advocacy coalitions mainly influence policy belief changes in other advocacy coalitions. This is especially true during times of policy reform and is supported by three key findings in this dissertation.

First, advocacy coalitions differ in terms of strength. In the 1980s and 1990s, the historical evidence indicates that the agriculture promotion coalition was generally stronger than the consumer-environmental protection coalition due to favorable political conditions. This difference in strength had profound implications for the use of policy beliefs. Results from hypothesis 2 indicate that the weaker consumer-environmental protection coalition did not exhibit policy-oriented learning patterns in its secondary policy beliefs. Instead, it had little or no change in secondary policy

beliefs most of the time, and large changes in secondary policy beliefs on a few occasions. This corresponds to a punctuated equilibrium pattern of policy belief change for weaker coalitions. In contrast, the stronger agriculture promotion coalition had more gradual adjustments to its policy core beliefs that followed a policy-oriented learning pattern as theorized in the ACF.

Second, weaker coalitions also seem to compromise with their secondary policy beliefs closer to times of policy change. As the results from hypothesis 3 indicate, weaker coalitions have a very moderate statistical association between compromises and times of policy change. In contrast, the association completely disappears when the compromises of the stronger agriculture promotion coalition are considered.

Third, stronger coalitions also seem to influence compromises in secondary policy beliefs in weaker coalitions. As indicated in the results for hypothesis 4, the stronger agriculture promotion coalition influences compromises in the weaker consumer-environmental protection coalition. The results from hypothesis 4 also indicate that the weaker consumer-environmental protection coalition is not able to influence compromises in the stronger agriculture promotion coalition.

Taken together, these three findings indicate that stronger advocacy coalitions influence weaker advocacy coalitions to greatly change their policy beliefs as chances for policy reform improve. Once policy reform occurs, the stronger coalition stops working with the weaker coalition and the weaker coalition regresses back to its

traditional policy beliefs. Meanwhile, the stronger advocacy coalition is able to use the weaker coalition to pass some type of policy reform.

Conclusion 3: The ACF Model Should Better Incorporate Punctuated Equilibrium

An important finding of this research is that the concept of policy-oriented learning does not always apply to the policy beliefs of advocacy coalitions. Instead, policy beliefs can also exhibit a punctuated equilibrium pattern where beliefs greatly change on a few occasions, but more often than not exhibit no change. As indicated in this research, this type of pattern probably occurs in the weakest advocacy coalition in a policy subsystem. As a result, future ACF studies should consider punctuated equilibrium patterns when analyzing the process of policy belief change in advocacy coalitions.

Traditional ACF studies can readily incorporate the use of punctuated equilibrium. As used in this dissertation, researchers can use the annual percent change of secondary policy beliefs to determine whether policy-oriented learning occurs in advocacy coalitions. If the punctuated equilibrium pattern appears, then policy-oriented learning did not occur. However, the real value of using the punctuated equilibrium pattern is that it makes intuitive sense. Secondary policy beliefs are dynamic values. They do not gradually change to a new level and then stay at that newly changed level for some time, as envisioned by the ACF view of policy-

oriented learning. Instead, advocacy coalitions can readily change their secondary policy beliefs to suit new policy situations while still retaining uniform policy core beliefs. As a result, the use of punctuated equilibrium in ACF studies does not really take away from the ACF model; it simply adds more depth and more analytical richness to an already valid policy model.

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APPENDIX A
LIST OF CONGRESSIONAL HEARINGS CODED

Changing structure of the U. S. fruit and vegetable industry: Hearing before the Subcommittee on Domestic Marketing, Consumer Relations, and Nutrition of the Committee on Agriculture, House of Representatives. 100th Cong., 2d Sess., (1988).

Chemicals and food crops: Hearing before the Subcommittee on Toxic Substances, Environmental Oversight, Research, and Development of the Committee on Environment and Public Works, United States Senate. 101st Cong., 1st Sess., (1989).

Circle of poison, impact on American consumers: Hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 102d Cong., 1st Sess., (1991).

Circle of poison, impact of U. S. pesticides on third world workers: Hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 102d Cong., 1st Sess., (1991).

Contamination from ethylene dibromide (EDB): Hearing before the Subcommittee on Toxic Substances and Environmental Oversight of the Committee on Environment and Public Works, United States Senate. 98th Cong., 2d Sess., (1984).

Contamination of ground water by pesticides: Hearing before the Subcommittee on Investigations and Oversight of the Committee on Public Works and Transportation, House of Representatives. 100th Cong., 2d Sess., (1988).

Cosmetic standards and pesticide use on fruits and vegetables: Hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 102d Cong., 2d Sess., (1992).

EDB pesticide disposal problems: Hearing before the Subcommittee on Environment, Energy, and Natural Resources of the Committee on Government Operations, House of Representatives. 99th Cong., 2d Sess., (1986).

Emergency exemptions, section 18 of FIFRA: Hearing before the Subcommittee on Environment of the Committee on Science, Space, and Technology, House of Representatives. 102d Cong., 1st Sess., (1991).

Environmental issues related to the use of pesticides: Hearing before the Committee on Environment and Public Works, United States Senate. 100th Cong., 2d Sess., (1988).

- EPA contracting, pesticide regulation: Hearing before the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, House of Representatives. 100th Cong., 1st Sess., (1987).*
- EPA pesticide regulatory program study: Hearing before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 97th Cong., 2d Sess., (1982).*
- EPA's pesticide indemnification and disposal program: Hearing before the Subcommittee on Environment, Energy, and Natural Resources of the Committee on Government Operations, House of Representatives. 100th Cong., 1st Sess., (1987).*
- EPA's pesticide registration activities (part 1): Hearing before the Subcommittee on Environment, Energy, and Natural Resources of the Committee on Government Operations, House of Representatives. 98th Cong., 1st Sess., (1983).*
- EPA's pesticide registration activities (part 2): Hearing before the Subcommittee on Environment, Energy, and Natural Resources of the Committee on Government Operations, House of Representatives. 98th Cong., 2d Sess., (1984).*
- Farmworkers' high mortality, government neglect? Hearing before the Committee on Aging, House of Representatives. 102d Cong., 1st Sess., (1991).*
- Federal Insecticide, Fungicide, and Rodenticide Act: Hearings before the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 100th Cong., 1st Sess., (1987).*
- Federal Insecticide, Fungicide, and Rodenticide Act: Hearings before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 99th Cong., 1st Sess., (1985).*
- Federal Insecticide, Fungicide, and Rodenticide Act Amendments of 1987: Hearings before the Subcommittee on Department Operations of the Committee on Agriculture, Research, and Foreign Agriculture, House of Representatives. 100th Cong., 1st Sess., (1987).*
- Federal Insecticide, Fungicide, and Rodenticide Reform Act and Pesticide Import and Export Act of 1983: Hearings before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 98th Cong., 1st Sess., (1983).*

Federal Insecticide, Fungicide, and Rodenticide Act (S. 958, S. 1478, and S. 2050): Hearing Before the Subcommittee on Agricultural Research, Conservation, Forestry, and General Legislation of the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 103d Cong., 2d Sess., (1994).

Food Quality Protection Act of 1993: Hearing Before the Subcommittee on Department Operations and Nutrition of the Committee on Agriculture, House of Representatives. 103d Cong., 1st Sess., (1993).

Food Quality Protection Act of 1995: Hearing Before the Subcommittee on Department Operations, Nutrition, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 104th Cong., 1st Sess., (1995).

Food Quality Protection Act of 1995: Hearings before the Subcommittee on Health and Environment of the Committee on Commerce, House of Representatives. 104th Cong., 1st Sess., (1995).

Food safety: Hearing before the Subcommittee on Health and the Environment of the Committee on Energy and Commerce, House of Representatives. 100th Cong., 1st Sess., (1987).

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Food Safety Amendments of 1989: Hearing before the Committee on Labor and Human Resources, United States Senate. 101st Cong., 1st Sess., (1989).

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Food safety issues: Hearing before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 101st Cong., 1st Sess., (1989).

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Generic pesticide registration: Hearing before the Subcommittee on Energy and Agriculture of the Committee on Small Business, House of Representatives. 100th Cong., 1st Sess., (1987).

Government regulation of the pesticide ethylene dibromide (EDB): Hearings before the Subcommittee on Intergovernmental Relations and Human Resources and the Subcommittee on Environment, Energy, and Natural Resources of the Committee on Government Operations, House of Representatives. 98th Cong., 2d Sess., (1984).

Health effects of estrogenic pesticides: Hearing before the Subcommittee on Health and the Environment of the Committee on Energy and Commerce, House of Representatives. 103d Cong., 1st Sess., (1993).

Health effects of pesticide use on children: Hearing before the Subcommittee on Children, Family, Drugs, and Alcoholism of the Committee on Labor and Human Resources, United States Senate. 101st Cong., 1st Sess., (1989).

Impact of the Food Quality Protection Act implementation on public health: Hearing before the Subcommittee on Department Operations, Oversight, Nutrition, and Forestry of the Committee on Agriculture, House of Representatives. 106th Cong., 1st Sess., (1999).

Implementation of the Food Quality Protection Act: Hearing before the Subcommittee on Department Operations, Nutrition, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 105th Cong., 2d Sess., (1998).

Implications of banning methyl bromide for fruit and vegetable production: Hearing before the Subcommittee on Livestock and Horticulture of the Committee on Agriculture, House of Representatives. 106th Cong., 2d Sess., (2000).

Links between Agent Orange, herbicides, and rare diseases: Hearing before the Subcommittee on Human Resources and Intergovernmental Relations of the Committee on Government Operations, House of Representatives. 101st Cong., 2d Sess., (1990).

National Academy of Sciences report on pesticides and children: Hearing before the Committee on Agriculture, Nutrition, and Forestry, United States Senate. 103d Cong., 1st Sess., (1993).

Pesticides and groundwater: Hearing before the Subcommittee on Toxic Substances and Environmental Oversight of the Committee on Environment and Public Works, United States Senate. 99th Cong., 2d Sess., (1986).

Pesticide Food Safety Act of 1988: Hearings before the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Committee on Agriculture, House of Representatives. 100th Cong., 2d Sess., (1988).

Pesticides in food: Hearing before the Subcommittee on Oversight and Investigations of the Committee on Energy and Commerce, House of Representatives. 100th Cong., 1st Sess., (1987).

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APPENDIX B
CONTENT ANALYSIS PROTOCOL

- A. COALITION MEMBERSHIP
 - 1. Consumer/Environmental Protection Coalition
 - i. Organizations that exist to protect consumers or the environment in some capacity
 - 2. Agriculture Promotion Coalition
 - i. Organizations that exist to promote farmers, businesses associated with agricultural, or agricultural practices

B. POLICY CORE BELIEFS ON PESTICIDES/FERTILIZERS/CHEMICALS

0-1. Policy Core Beliefs on Pesticides/Fertilizer/Chemicals

- 1. Government should strengthen regulations on pesticides, fertilizers, and chemicals and ban certain ingredients in order to protect the environment and human health.
- 2. Government should strengthen regulations on pesticides, fertilizers, and chemicals to protect the environment and human health, but not ban certain ingredients at this time.
- 3. No opinion or stance.
- 4. Government should not strengthen regulations on pesticides, fertilizers, and chemicals at this time.
- 5. Government should not have any regulations on pesticides, fertilizers, and chemicals at this time.

C. SECONDARY POLICY BELIEFS ON THE MAIN TOPIC AREAS DISCUSSED IN THE FEDERAL PESTICIDE REGULATORY POLICY DOMAIN

1-1. Secondary Policy Beliefs on Current Pesticide Regulations

- 1. Supports sections of proposed legislation that strengthen pesticide regulations and ban certain pesticides
- 2. Supports sections of proposed legislation that strengthen pesticide regulations
- 3. No opinion or stance on proposed pesticide regulatory legislation
- 4. Supports sections of proposed legislation that weaken pesticide regulations
- 5. Supports sections of proposed legislation that end pesticide regulations

1-2 Secondary Policy Beliefs on Pesticides' Impact On Water Pollution

1. Supports sections of proposed legislation that strengthen pesticide regulations and ban certain pesticides to protect water quality
2. Supports sections of proposed legislation that strengthen pesticide regulations to protect water quality
3. No opinion or stance on proposed pesticides' impact on water pollution
4. Supports sections of proposed legislation that do not strengthen pesticide regulations to protect water quality
5. Supports sections of proposed legislation that have no pesticide regulations to protect water quality

1-3. Secondary Policy Beliefs on Biotechnology and Pesticide Regulations

1. Supports sections of proposed legislation that strengthen pesticide regulations and ban certain practices in order to protect the environment and human health from potential dangers associated with biotechnology
2. Supports sections of proposed legislation that strengthen pesticide regulations in order to protect the environment and human health from potential dangers associated with biotechnology
3. No opinion or stance on proposed regulatory legislation
4. Supports sections of proposed legislation that do not strengthen pesticide regulations in order to protect the environment and human health from potential dangers associated with biotechnology
5. Supports sections of proposed legislation that have no pesticide regulations to protect the environment and human health from the potential dangers associated with biotechnology

1-4 Secondary Policy Beliefs on Conservation Tactics and Pesticides

1. Supports sections of proposed legislation that require farmers to adopt mandatory conservation practices that can reduce pesticide use
2. Supports sections of proposed legislation that require farmers to adopt voluntary conservation practices that can reduce pesticide use
3. No opinion or stance on how conservation tactics can reduce pesticide use
4. Supports sections of proposed legislation that do not include voluntary conservation practices that can reduce pesticide use
5. Supports sections of proposed legislation that eliminate conservation programs that can reduce pesticide use

2-1 Secondary Policy Beliefs on the Impact of Pesticide Regulations on Agri-Business (excluding farmers)

1. Supports sections of proposed legislation that end all support of agri-business (excluding farmers)
2. Supports sections of proposed legislation that support agri-business (excluding farmers) in ways that decrease pesticide risk to human health and the environment
3. No opinion or stance on the impact of pesticide regulations on agri-business (excluding farmers)
4. Supports sections of proposed legislation that continue general support of agri-business (excluding farmers) regardless of how pesticides impact human health and the environment
5. Supports sections of proposed legislation that increase general support of agri-business (excluding farmers) regardless of how pesticides impact human health and the environment

2-2- Secondary Policy Beliefs on the Impact of Pesticide Regulations on Farmers

1. Supports sections of proposed legislation that end all support for farmers
2. Supports sections of proposed legislation that only supports farmers if they minimize human health and environmental impact of pesticide applications
3. No opinion or stance on the impact of pesticide regulations on farmers
4. Supports sections of proposed legislation that continue general support of farmers regardless of how pesticides impact human health and the environment
5. Supports sections of proposed legislation that increase general support of farmers regardless of how pesticides impact human health and the environment

D. SECONDARY POLICY BELIEF COMPROMISES ON PESTICIDE REGULATIONS

3-1. Compromise Definition for the Consumer-Environmental Protection Coalition

1. The consumer-environmental protection coalition has one act of compromise on their secondary policy beliefs on pesticide regulations when both of the following occur for a member of the coalition:
 - i. The coalition scores either a 1 or 2 on any of the six secondary policy belief topic areas listed in section C.
 - ii. The coalition scores a 4 or 5 on any of the additional secondary policy belief topic areas listed in section C.

3-2. Compromise Definition for the Agriculture Promotion Coalition

1. The agriculture promotion coalition has one act of compromise on their secondary policy beliefs on pesticide regulations when both of the following occur for a member of the coalition:
 - i. The coalition scores either a 4 or 5 on any of the six secondary policy belief topic areas listed in section C.
 - ii. The coalition scores a 1 or 2 on any of the additional secondary policy belief topic areas listed in section C.

E. TYPICAL FRAMEWORK OF AN OPENING STATEMENT

1. First Paragraph
 - i. Greeting and personal identification statement
 - ii. Organizational identification statement
 - iii. Identification of the organization's primary policy beliefs
2. Second Paragraph
 - i. Identification of pending legislation issue
 - ii. Statement on whether the organization can support the legislation
3. Third-Penultimate Paragraphs
 - i. Identification of which sections of the pending legislation the organization supports or does not support (i.e. the secondary policy beliefs of the organization)
 - ii. Statements on other topic areas related to pesticides
4. Last Paragraph
 - i. Thank-you statement
 - ii. Final summation statement on whether the organization can support the legislation