2015

THREE ESSAYS ON PUBLIC ORGANIZATIONS

Changgeun Yun
University of Kentucky, yuchge@gmail.com

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Changgeun Yun, Student

Dr. Edward Jennings, Major Professor

Dr. Edward Jennings, Director of Graduate Studies

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Changgeun Yun, Student

Dr. Edward Jennings, Co-Director

Dr. Nicolai Petrovsky, Co-Director

Dr. Edward Jennings, Director of Graduate Studies

THREE ESSAYS ON PUBLIC ORGANIZATIONS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy
in the Martin School of Public Policy and Administration
at the University of Kentucky

By

Changgeun Yun

Lexington, Kentucky

Co-Directors: Dr. Edward Jennings, Professor of Public Policy and Administration
and : Dr. Nicola Petrovsky, Professor of Public Policy and Administration

Lexington, Kentucky

2015

ABSTRACT OF DISSERTATION

THREE ESSAYS ON PUBLIC ORGANIZATIONS

Organizations play key roles in modern societies. The importance of organizations for a society requires an understanding of organizations. In order to fully understand public organizations, it is necessary to recognize how organizational settings affect subjects of organizations and organizing. Although public and private organizations interrelate with each other, the two types are not identical. In this dissertation, I attempt to describe public organizations in their own setting by discussing three important topics in public organization theory: (1) innovation adoption; (2) representative bureaucracy; and (3) decline and death of organizations.

In Chapter II, I scrutinize early adoption of innovations at the organizational level and explore which public organizations become early adopters in the diffusion process. The adoption of an innovation is directly related to the motivation to innovate. That is, organizations performing poorly will have a motivation to seek new solutions. I estimate the strength of the motivation by observing prior performance. The main finding of the second chapter is that performance-based motivation has a twofold impact on early innovation adoption: negative for organizations with low performance, but positive for those with very high performance. This study estimates top 3.8% as the turning point defining which organizations attain outstanding performance and show the positive relationship between performance and innovation adoption.

In Chapter III, develop a theoretical framework for predicting and explaining active representation in bureaucracy and test two hypotheses from the framework to test its validity. First, active representation requires the loss of organizational rewards. Second, a minority group mobilizes external support to minimize the cost of active representation. These findings support that active representation is a political activity in which bargaining between formal and informal roles occurs. In addition, I add evidence to the literature demonstrating that the two prerequisites – policy discretion and a critical mass – must be satisfied for active representation to occur.

In Chapter IV, I argue that organizational change is a result of a relationship between an organization and the environment. And, I suggest and advance the theory of organizational ecology for examining environment effect on organizational decline and death. The theory has been extensively studies in the business sector, so I advance the

theory to be applicable to the public sector. First, I add political variables, such as change in the executive branch and the legislature, unified government, and hypothesize that (1) an organization established by a party other than the one in the executive branch in any given year will be more likely to be terminated or decline; that (2) an organization established by a party other than the one in the legislature in any given year will be more likely to be terminated or decline; and that (3) if an unfriendly party controls both the executive branch and the legislature, organizations established by other parties are more likely to be terminated or decline. Second, the effect of the economic environment on the life cycle of public organizations is not as straightforward and simple as their effect on business firms.

KEYWORDS: Innovation adoption, performance-based motivation, active representation, Self-interest optimization, Organizational ecology, Event history analysis.

Changgeun Yun

December 11, 2015

THREE ESSAYS ON PUBLIC ORGANIZATIONS

By

Changgeun Yun

Dr. Edward T. Jennings, Jr.
Co-Director of Dissertation

Dr. Nicolai Petrovsky
Co-Director of Dissertation

Dr. Edward T. Jennings, Jr.
Director of Graduate Studies

December 11, 2015

I dedicate this dissertation to my beloved wife, Gyeongok Kim, and my lovely daughter, Claire (Sarang) Yun. Without your selfless love and support, I would not have been able to complete this dissertation.

ACKNOWLEDGEMENTS

Though only my name appears on the cover of this dissertation, a great many people have contributed to its production. Foremost, I would like to express my sincere gratitude to my advisor, Dr. Nicolai Petrovsky for his patience, motivation, enthusiasm, and immense knowledge. His guidance helped me in all the time of research and writing of this dissertation.

I would also like to thank Dr. Edward T. Jennings. Without his comments and criticisms as a co-chair of my committee, this dissertation would have been impossible. And also, I appreciate all his contributions of time and ideas that he provided me as a director of graduate studies of the Martin School of Public Policy and Administration, which made my Ph.D. experience productive and stimulating.

I cannot express enough gratitude for Dr. J.S. Butler. No matter of what time or night, knocking his office door was the first step to solve methodology problems. Without his econometric expertise, I would not have finished. Besides my advisor, my sincere thanks also goes to Dr. Eugenia Toma for allowing me use her data on schools in Appalachian Kentucky and letting me understand the context.

I would like to acknowledge my friends in the Martin School, Seungjin Choi and Saerim Kim. I could not have asked for better colleagues. Their input has been extremely valuable, which I hope I will continue to merit.

Finally, and most importantly, I would like to thank my wife and daughter. Her support, encouragement, quiet patience, and unwavering love were undeniably the bedrock upon which the past 15 years of my life have been built. My daughter, Claire (Sarang), has been a source of constant joy and strength to me. Also, I would like to thank my parents who have been consistently providing me with mental support and encouragement throughout my academic career.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter I
Introduction

Organizations play key roles in modern societies. First, almost all collective action in modern societies takes place in an organizational context. Organizations are the main vehicles for action in modern society (Coleman 1974). Second, organizations are not simply technical systems. A modern society identifies not only persons but also organizations as actors who can take actions, use resources, enter into contracts, and own property. The former are called private or natural actors, the latter collective actors. Thus, the social structure of a modern society consists of relations among collective actors as well as between natural and collective actors, and among natural actors. Finally, organizations are vital mechanisms for pursuing collective goals. In order to systemize united action for the achievement of collective goals and, once achieved, provide benefits for all members, organizations with a hierarchical structure for decision-making and distribution are required. Taken together, the direction and speed of social development depends on the dynamics of organizations (Hannan and Freeman 1989).

The importance of organizations for a society requires an understanding of organizations and attracts research interest. Organization theory had its primary origin in sociology. Sociologists first suggested organizations as an area of study and have contributed to the improvement of our understanding of organizations. However, they have concentrated on the development of general principles concerning administrative arrangements (e.g., Taylor 1911; Fayol 1949; Gulick and Urwick 1937). Generalized organization theory provides valuable insights and concepts, but not all organizations

operate in the same context. In order to fully understand organizations, it is necessary to recognize how organizational settings affect subjects of organizations and organizing.

Despite some controversy concerning how different public organizations are from private ones, it is obvious that the two types are not identical (Perry and Rainey 1988; Wamsley and Zald 1973; Warwick 1975) and that the difference is essential (Rainey 2003). The distinctive feature of public organizations can be found in their purpose. While private organizations seek to make profits from selling goods and services, public organizations supply socially necessary but unprofitable products that private counterparts avoid producing so as to prevent or deal with market failure.[1] This difference in purpose also leads to the difference in performance measurement. The performance of business firms is generally assessed by how much money they have made or are expected to make in a market. On the other hand, public organizations are required to operate because of political and social justifications, such as maintaining individual rights and freedoms, providing public goods, and other social demands (Rainey 2003). In addition to complex sets of goals, expectations of the public regarding the provision of public services in efficient and effective way even at no (or less) cost make it difficult to measure performance of public organizations.

Some scholars object to distinguishing between public and private organizations by arguing that the border between the two organizational forms is blurred (Rainey 2003). For example, many public organizations, such as state-owned enterprises and government-sponsored corporations, have systems and structures similar to those of

[1] This is an average comparison between the two types of organizations. In reality, some public organizations exist for other reasons, which may not socially optimal, such as the US Postal Service.

business firms. Also, public and private organizations interrelate with each other. The former buy products from the latter for their operation or even finance the latter so that public services are provided by the private sector. In spite of the blurring of the two sectors in terms of management, there is another feature which differentiates between the sectors: While private organizations are formed in a market context, public organizations arise out of politics (Moe 1989). Relationship with and dependence on the political environment is another distinctive and salient feature of public organizations. For example, they are often controlled by their political masters (Rainey 2003; Wood and Waterman 1991), and their design reflects the interests, strategies, and compromises of those who exercise political power (Moe 1989, p. 267). Thus, if political factors are ignored when understanding public organizations, omitted variable bias can arise, leading to biased or simply incomplete understanding.

In this dissertation, I attempt to describe public organizations in their own setting, such as dependence on the political environment and serving the public interest, as well as in the context of a general organization theory. To put it more concretely, I discuss three important topics in public organization theory: (a) innovation adoption in the public sector; (b) representative bureaucracy; and (c) decline and death of public organizations. Addressing the three topics not only deals with core problems that public organizations encounter – performance enhancement and democratic deliberation in public organizations –, but it also tackles the question of which organizations avoid being terminated and maintain their survival.

Innovations in society and in organizations figure importantly in social progress (Rainey 2003). Public organizations have been often criticized for their low performance,

and the adoption of innovations (e.g., New Public Management and E-Governance) is suggested as a solution. Although not all innovations result in increasing performance, innovation adoption itself indicates that the organization realized and attempts to solve a problem of low performance. In Chapter II, I scrutinize early adoption of innovations at the organizational level and explore which public organizations become early adopters in the diffusion process. The diffusion model has served as the main theoretical framework for investigating reasons and patterns by which an innovative policy spreads (e.g., Berry and Berry 1990; Gilardi 2010; Gray 1973; Mintrom 1997; Mooney and Lee 1999; Shipan and Volden 2008). The model explains the process of innovation diffusion through one or more of four mechanisms: learning, competition, imitation, and coercion. However, since these four mechanisms assume that early adopters already exist, the diffusion model cannot answer the question of how innovation diffusion begins. What distinguishes early adopters from subsequent adopters? To find determinants of the early innovation adoption at the agency level, I analyze which schools first adopted the Appalachian Math and Science Partnership (AMSP) in Appalachian Kentucky. Because the AMSP is not a general public policy requiring formal legislative enactment, I can examine the effects of organizational characteristics as key explanatory variables.

The adoption of an innovation is directly related to the motivation to innovate (Mohr 1969). Organizations performing poorly will have a motivation to seek new solutions. I estimate the strength of the motivation by observing prior performance. Meanwhile, the motivation does not always lead to innovation adoption. Organizations require resources for overcoming obstacles to innovations; effective leadership and management provide resources for continuing on the path to innovations. I test their

effects on innovation adoption by using proxies: organizational size for slack resources and managers' characteristics for leadership and management skills. In addition, I explore the effects of external pressure and organizational experience on innovation adoption.

In Chapter III, I explore another important issue that emerges in the public sector: responsiveness. As mentioned already, political accountability is a distinctive feature that differentiates public and private organizations. As government grows and grows in order to deal with increasing complex demands (e.g., political equality, economic justice, and personal liberty), bureaucracy has increased in power. And, the rise of bureaucratic power places severe strains upon democratic government. The theory of representative bureaucracy is a normative one that describes an ideal role of bureaucracy in the formation of a good state. As Edmund Randolph warned at the Constitutional Convention in 1787 (Balinski and Young 1982), "If a fair representation of the people be not secured, the injustice of the Govt. shall shake to its foundation." Thus, passive representation – shared demographic characteristics between public administrators and the population their agencies serve – is a way to obtain legitimacy of governments from the public. On the other hand, active representation – the process of public administrators advancing the interests of groups with whom they share demographic origins – is related to the reason why governments exist. Democratic governments have an obligation to satisfy the basic needs of their citizenry, and have to take account the percentage of the population left without basic needs being met (Oppenheimer 2012). Given that increasing the welfare of the poorest is a way to promote social welfare and justice (Rawls 1971), active representation by bureaucrats who come from under-represented and discriminated groups is rationalized because they know best what their social groups want. Therefore, it

is necessary to understand minority bureaucrats as political agents who try to satisfy (or maximize) their social groups rather than simply being human resources of their organizations. To do this, I develop a framework for modeling how decisions to serve as active representatives within organizations are made. It rests on the basic assumption of public choice theory that humans are egoistic and rational utility maximizers (Buchanan and Tullock 1962), and recognizes that active representation may conflict with organizational (formal) roles. And, I test several propositions deduced from the framework by using data on female representation in the executive branch of the Korean government. Meanwhile, since testing the propositions requires evidence of active representation, I first empirically identify the presence of and conditions for the link between passive and active representation.

Chapter IV contains a theoretical argument suggesting that organizational ecology serves as a framework for analyzing the effect of the environment on organizational decline and death. The survival of government organizations has attracted a great deal of empirical attention, but most of studies fail to systemize their results and to discuss general theoretical implications (Adam et al. 2007). To avoid this critique, a strong theory with a broad conceptual framework is required. The theory of organizational ecology satisfies the requirement. So far, organizational ecology has only been extensively studied in the business sector. Even though public and private organizations share the majority of organizational principles, such as organizing mechanisms, assuming the sameness of the two types is far from the reality. Above all, ecological studies on business firms have generally emphasized competition with rivals in the market. They have rarely paid attention to other environmental factors except market control. Thus, I

advance the theory of organizational ecology to be applicable to the public sector. First, as previous literature has examined, external political control is instrumental in bringing about the termination of public organizations. So, I suggest several variables of political change and hypothesize how they affect the decline and death of public organizations. Second, the effect of the economic environment on the life cycle of public organizations is not as straightforward and simple as its effect on business firms. An economic crisis not only causes a reduction in revenues and an increase in the probability of termination, but also often provides some public organizations with the chance to grow, such as the expansion of structures or expenditures, because it is required that the public sector takes, to a lesser or greater degree, the role to cope with the market failure. In addition, I suggest empirical directions and methods for future studies that aim to determine the validity of organizational ecology in the public sector as well as in the private sector

Finally, in Chapter V, I not only summarize findings from each of the three essays, but also outline future research. For example, it is necessary to examine which organizations are more likely to become followers after the initiation of an innovation, providing a full picture of innovation diffusion in conjunction with Chapter II. The optimization model of active representation in Chapter III should be also investigated at the individual level. That is, although I examine the optimization model, I employ organizational-level data. So, since the model explains behavioral patterns of bureaucrats, it is necessary to examine the model with individual-level data. Likewise, the argument that the theory of organizational ecology is a relevant theoretical base for analyzing organizational survival and the advancement of the theory so as to be applicable to the public sector should be empirically checked by subsequent studies.

Overall, with this dissertation, I attempt to contribute to a better understanding of public organizations by addressing two important issues that public organizations in a modern society should deal with – innovation management and representativeness to the public – and by suggesting and developing the theory of organizational ecology as a tool for analyzing the effect of the environment on organizational decline and death.

Chapter II

Early Adoption of Innovations: The Effects of Performance-based Motivation and Organizational Characteristics on Innovation Adoption

Introduction

Since Walker (1969) proposed in his seminal study that the diffusion of innovations across U.S. states is a function both of state characteristics (e.g., demographic and political factors) and regional patterns, diffusion models have served as a theoretical framework for investigating reasons and patterns by which an innovative policy spreads (e.g., Berry and Berry 1990; Gilardi 2010; Gray 1973; Mintrom 1997; Mooney and Lee 1999; Shipan and Volden 2008). However, although previous studies have contributed to our understanding of how innovations spread, relatively scarce attention has been paid to making clear why some organizations act as pioneers or early adopters by accepting innovations more readily than others (Walker 1969, p. 881). In addition, existing leader-laggard models are often criticized due to their failure to identify pioneering organizations (Berry and Berry 2007). Nevertheless, given that early adopters produce neighbor or regional effects, such as learning, competition, imitation, and coercion, understanding fully the process of innovation diffusion requires a study of why some organizations become early adopters.

To find determinants of the early innovation adoption at the agency level, I analyze which schools first adopted the Appalachian Math and Science Partnership (AMSP). School-level data have two advantages for this study: First, schools are the most common public organizations; and second, they provide a sufficient sample size due to the large size of their population. The goal of the partnership is to increase the academic

achievement of students in Central Appalachia. It has been funded by the National Science Foundation (NSF) since 2002. Although there was no participation fee, only about one-third of eligible schools saw at least one of their teachers participate in the first year of implementation, creating an excellent test case for a theory distinguishing early adopters from followers.

Schools are the unit of analysis in this study, allowing me to focus on the relevance of organizational characteristics for explaining whether an organization adopts an innovation. Also, the AMSP is not a general public policy requiring formal legislative enactment, but an administrative innovation which consists of changes in organizational structure or in the management of personnel, finance, and physical resources (Damanpour and Evan 1984). Thus, political factors, such as election year, ideology, and party control, are expected to be less significant in the adoption decision. Instead, the effects of organizational characteristics are examined as key explanatory variables (Berry 1994a; Damanpour and Schneider 2006; Jun and Weare 2011; Moon and Norris 2005).

The adoption of an innovation is directly related to the motivation to innovate (Mohr 1969). Organizations performing poorly will have a motivation to seek new solutions. I estimate the strength of the motivation by observing prior performance. Meanwhile, the motivation does not always lead to innovation adoption. Organizations require resources for overcoming obstacles to innovations and effective leadership and management for continuing on the path to innovations. I test their effects on innovation adoption by using proxies: organizational size for slack resources and managers' characteristics for leadership and management skills. In addition, I explore the effects of external pressure and organizational experience on innovation adoption.

The subsequent discussion proceeds as follows. In the second section, I discuss the theoretical background of innovation adoption. I then advance a set of hypotheses regarding the effects of performance-based motivation and other organizational characteristics on the propensity to adopt an administrative innovation. I test these hypotheses with school-level data on the adoption of the AMSP in Appalachian Kentucky. Subsequently, I present the results of data analysis and discuss the findings in the fifth and sixth section, respectively. Finally, I conclude with theoretical and practical implications for future research.

Theoretical Background

Innovation is generally defined as a practice, process, structure, or technology that is new to the unit of adoption (Gray 1973, Rogers 2004; Walker 1969), and innovation adoption is the application (development or introduction) of an innovation for existing problems (Van de Ven and Rogers 1988). Organizations choose to adopt innovations or they are forced to do so by their overseers or clients so as to improve performance (Downs 1966). However, an innovation is not always welcome because a tendency to continue what has been done before leads to a greater or lesser degree of resistance to change (Downs 1969).[2] Therefore, the availability of resources for overcoming resistance to change is a key determinant of innovation adoption. Resources include tangible assets (e.g., materials and financial assets) and intangible assets (e.g., information and knowledge). Innovations that require substantial tangible assets to be implemented tend

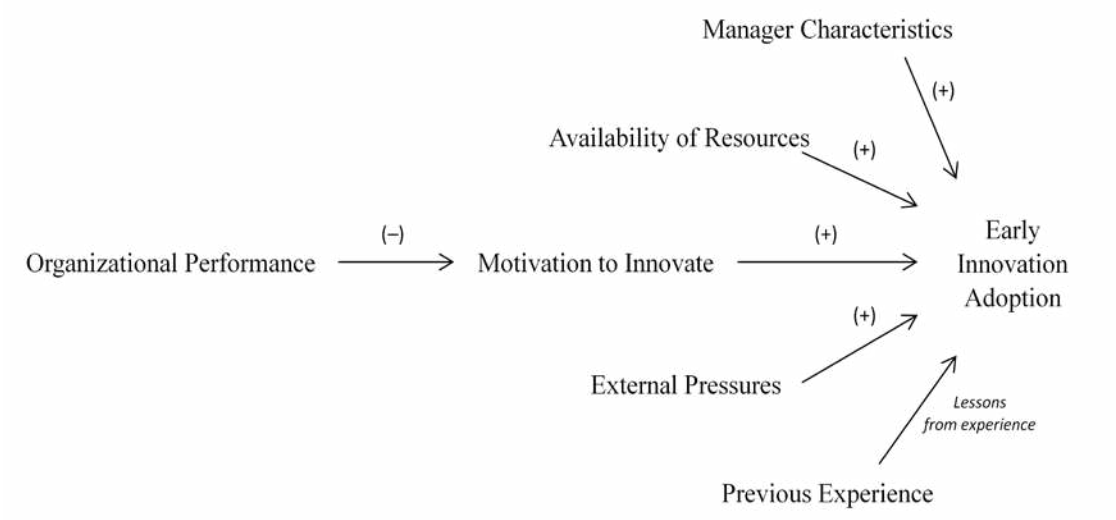
[2] About five centuries ago, Niccolo Machiavelli (1532) mentioned in his book, *The Prince*, that innovations provoke strong resistance by defenders who desire to hold onto the status quo and lack support by those who might benefit from the innovations.

to face more resistance and be less-readily adopted. On the other hand, positive information and knowledge about an innovation help organizations to convince their employees that an innovation will succeed and should be adopted.

Meanwhile, not all organizations immediately adopt a specific innovation. Even if an innovation is universally adopted, the timing generally differs from organization to organization. This variation is attributable to differences in the motivation and the ability to innovate. As Mohr (1969) proposes, innovation adoption is a multiplicative function of the motivation to innovate and the availability of resources for overcoming obstacles to innovation.

Unfortunately, most previous studies have focused on the role of resources with the assumption that there is no difference in the motivation to innovate. This study examines the effect of the motivation on innovation adoption by using organizational performance as a proxy for the motivation to innovate. To put it more concretely, since organizations adopt innovations to increase the level of performance, the motivation to innovate comes from consideration of current performance: dissatisfaction with the status quo and the desire to do a good job result in the motivation to innovate (Downs 1969). For instance, Stream (1999) finds that as the percent of uninsured citizens in a state increases, the likelihood that the state will adopt a set of health insurance reforms increases. Performance as a driver of the adoption of innovations should be especially important in the presence of yardstick competition between organizations (Besley and Case 1995).

Figure 1. Theoretical Framework for Early Innovation Adoption



Innovation adoption is also influenced by manager characteristics and external pressure. The adoption of an innovation is not an event, but a process in which doubts about its utility are continuously raised (Page 2005). It is up to managers to prevent their organization and employees from abandoning or ignoring an innovation (Damanpour and Schneider 2009). The ability of managers to create an organizational climate for innovation and to eliminate doubts is related to their characteristics such as education, job experience, and salary (De Vries et al. 2015; Markham et al. 1987; Mumford et al. 2000). Therefore, it is expected that managers' characteristics influence the adoption of innovations. External pressures also influence innovation adoption. Downs (1969) suggests that outsiders, such as overseers and clients who want an organization to perform better, push it to adopt innovations so as to increase performance. Finally,

innovation adoption is expected to be influenced by past experience of implementing a similar one because it is an important information source in decision-making.

Drivers of the Early Adoption of Innovations

Organizational Performance

Because an innovation is directly related to the motivation to innovate (Mohr 1969, p. 114), it is assumed that early adopters have been self-motivated to find and accept an innovation, even though there are no competitors or role models who stimulate and encourage the adoption of the innovation. At the agency level, the adoption of an administrative innovation is a management strategy. Given that an innovation means a departure from existing routines and that its implementation is to improve organizational performance, the adoption of the innovation is determined by risk attitude and/or opportunity cost, which vary with the level of current organizational performance. To put it more directly, organizations with low performance are perceived to have inferior routines or outdated operating systems (Cyert and March 1963; Desai 2008), so decision-makers seek solutions and are willing to take risk to address the shortfall (Harris and Bromiley 2007; Singh 1986). Also, according to prospect theory, poor performance leads leaders (or managers) to overestimate the expected return to adopting the solution (Kahneman et al. 1982). In this context, it is hypothesized that organizations with low performance have the tendency to overvalue the effects of an innovation and are more likely to adopt it. On the other hand, for organizations with high performance, the expected margin from the implementation of an innovation is not so large as to accept it, increasing the likelihood of persistence in existing routines (Hall 2007; Grossback et al.

2004; Levitt and March 1988). Furthermore, the opportunity cost of adopting a new policy is greater for them because they have performed well with existing ones. That is, good performance reinforces the attitude of risk-aversion to changes.

> **Hypothesis 1**: *(low performance) Organizations with low performance are more likely to adopt an innovation at the beginning of the diffusion process.*

In addition to the conventional wisdom that poor performance triggers the adoption of an innovation, there is a complementary argument. Roberts and Amit (2003) find that the current organizational performance is significantly influenced by the history of innovative activity. Introducing multiple successful innovations over time leads to outstanding performance, which is different from the result of a single successful innovation. And, adopting innovations is encoded in organizational routine with the confidence that a current innovation will also succeed in improving performance. Consequently, as opposed to the first hypothesis, outstanding performance sometimes may encourage risk-taking. Baum and Dahlin (2007) suggest that organizations that exceed pre-set performance targets tend to learn from and embrace others' knowledge and practices that are new for them rather than simply relying on their own existing practices. Thus, the following hypothesis is proposed:

> **Hypothesis 2**: *(very high performance) Organizations with very high performance are more likely to adopt an innovation first.*

Direct Experience

Organizations may learn from their prior experience, which is similar to the concept of learning-by-doing (Gino et al. 2010; Levitt and March 1988). Although obtaining knowledge from past experience is through a learning process, its use in decision-making is termed *direct experience* in this study in order to be distinguished from the *learning* mechanism of policy diffusion, which is the use of knowledge generated and transferred from others' experience. Direct experience is an important information source in the decision-making process because it provides less noisy data compared to indirect experience (Gino et al. 2010). It is less complicated to identify good and bad practices from direct experience than from indirect experience (Levitt and March 1988).

Likewise, past experience of implementing a similar innovation has a significant influence on the likelihood of adopting a recent innovation, but the direction of the influence depends on the history of success and failure. Learning from success encourages exploitation, which reinforces existing policies and practices through single-loop processes and pays less attention to information that does not support existing approaches (Scott and Vessey 2000). Thus, a successful experience with a certain past innovation produces an optimistic basis for implementing a similar one in the present. This inclination overestimates the expected return from the innovation and encourages risk-taking decision-making (Rogers 2003). In addition, direct experience is also transformed into organizational routines (Levitt and March 1988). If the previous innovation results in success, the organization may develop routines for adopting future

similar innovations as well (*successful direct experience*). On the contrary, an organization with a history of failure routinizes risk-aversion toward similar innovations in order not to repeat the same mistake (*failed direct experience*). Therefore, I hypothesize the following:

> **Hypothesis 3**: *(successful direct experience) Experience of the success of similar innovations in the past will positively influence the likelihood of adopting an innovation.*

Slack Resources and Organizational Size

Adopting an innovation involves risk to a greater or lesser degree because it does not always produce a positive gain and because it requires extra resources to be successfully implemented (Berry 1994a; Cyert and March 1963; Moon and Norris 2005). Hence, organizations need slack resources – some productive capacity in reserve – to adopt an innovation because they enable managers to avoid transferring resources from existing operations to an innovation, preventing internal conflict over resource reallocation. Slack resources also serve as a cushion against the failure of an innovation, ensuring reliability of organizational performance (Hannan and Freeman 1989). For these reasons, slack resources can promote an ethos of risk-taking, and the proportional relationship between slack resources and innovation adoption is expected: the more slack resources an organization possesses, the less concerned it is about the adoption cost and the more likely it is to adopt an innovation.

Slack resources include personnel, knowledge, technology, financial assets and others, so it is not easy to measure slack resources directly. Instead, organizational size has been widely used as a proxy to estimate the amount of slack resources (e.g., Berry 1994a; Hannan and Freeman 1989; Jun and Weare 2011; Walker 1969) because large organizations often have more slack resources than small ones (Cyert and March 1963). At the same time, it should be noted that size is also positively associated with structural inertia that impedes innovation adoption (Downs 1969; Hannan and Freeman 1989). Nevertheless, this study hypothesizes a positive effect of organizational size on innovation adoption because the amount of slack resources is a more visible consideration when mangers decide whether to adopt an innovation. Structural inertia including resistance to change can be overcome by managers with enough resources or effective leadership and management.

Hypothesis 4: *(organizational size) Larger organizations are more likely than smaller ones to adopt an innovation.*

Manager Characteristics

The implementation of an administrative innovation at the organizational level requires more than the decision of agency directors to adopt it. Effective leadership should follow so that their staff is motivated to accept and carry out the innovation successfully (Boyne et al. 2005; Cooper and Zmud 1990; Damanpour and Schneider 2006). If an innovation is adopted by managers with less effective leadership, an internal conflict between supporters and opponents is more likely to occur. Thus, whether or not

managers have effective leadership and management skills should be examined to understand why organizations adopt (or do not adopt) an innovation. Leadership and management skills have been developed over time by obtaining an education or learning from job experience (Mumford et al. 2000; Northouse 2006). In addition, educated managers have a high receptivity to innovations because their greater ability to gain information reduces a sense of reluctance to adopt innovations. So, it is expected that agency directors with more education are more likely to accept innovations.

Hypothesis 5: *(education) A manager's education level will positively influence the probability of adopting an innovation.*

The effect of job experience is not as straightforward as the education effect because of its highly positive relationship with age. Since more experienced managers have better knowledge and are more able to deal with critical issues that may arise during the adoption process, it is expected that experience has a positive effect on innovation adoption. To the contrary, Huber et al. (1993) find that age has a negative impact on personal orientation to innovation. Older managers have been socialized into existing systems and routines, so they will place less value on organizational changes or innovations than younger managers do. So there would be confounding for the effect of job experience on innovation adoption: its hypothesized positive effect may offset or be offset by the negative effect of age. Regardless of the discussion above, however, the following hypothesis addresses only the net effect of job experience.

Hypothesis 6: *(job experience) The job experience of a manager has a positive impact on innovation adoption.*

Salary influences the probability of adopting an innovation in two ways. First, salary has been widely used as a proxy for evaluating individuals' career success and the value of their competitive abilities in the market (Markham et al. 1987). Managers with high salaries are assumed to have a greater capability to provide effective leadership and monitor the adoption of innovations than those with low salaries. Second, organizations pay the cost of employing highly-paid managers with the expectation that their contribution exceeds cost and improves the status quo. This expectation leads the managers to be inclined to seek for an innovative policy which is to increase organizational performance and to distinguish them from predecessors. In short, managers with high salaries are more likely to implement successfully innovations and be well disposed to innovations. Therefore, a positive relationship of salary with innovation adoption is predicted.

Hypothesis 7: *(salary) The higher a manager's salary is, the more likely he or she will be to adopt an innovation.*

There is no consensus among scholars as to whether gender difference in leadership and management skills exists and how it influences innovation adoption. DiTomaso and Farris (1992) find that female engineers in research and development tend to view themselves as less innovative than their counterparts. It is also found in the public

sector: female city managers perceive themselves as less entrepreneurial and more reluctant to innove (Fox and Schuhmann 1999). On the other hand, Rosener (1990) and Stelter (2002) suggest the positive effect of a transformational leadership of women on innovation adoption, arguing that female leaders exhibit interpersonally-oriented behaviors, whereas male leaders are described as directive and controlling. Furthermore, there are some studies finding no gender difference in the probability of adopting innovations (Damanpour and Schneider 2009; Sonfield et al. 2001). These conflicting arguments make it difficult to predict how gender difference influence innovation adoption. Nevertheless, this study develops the following hypothesis for the purpose of empirical analysis.

> **Hypothesis 8**: *(gender difference) There is a gender difference in the tendency to adopt an innovation.*

Pro-innovation Bias of Superiors

Managers have discretion in managing their organizations so as to achieve organizational goals. Simultaneously, their discretion is not absolute: managers (e.g., chief executive officers or principals) are hired, supervised, and even fired by superiors (e.g., a board of directors in a company or a superintendent in a school district). Also, although superiors do not intervene in day-to-day activities, they provide vision and direction that managers and organizations follow. In the private sector, boards of directors are less likely than before to delegate the decision-making authority to managers, but actively participate in agenda-setting and information flow (Millstein and MacAvoy

1998). In the public sector, organizations are subject to the Law of Hierarchy: the activities of individual organizations are coordinated by a hierarchical authority structure. That is, superiors can exert authority to make their subordinate organizations adopt an innovation designed to increase performance (Downs 1966).

Drawing on the previous literature, I expect that the strategic decision of whether to adopt an innovation is explicitly or implicitly influenced by the perspective of a superior on the innovation. First, a superior's preference for a certain innovation serves as a managerial signaling. The signal may persuade subordinate organizations to adopt the innovation. Second, a superior's preference is able to mitigate the risk-aversion attitude of a manager by sharing responsibility for the possible failure of management resulting from the adoption of the innovation. Thus, I hypothesize that if a superior has a pro-innovation bias, then his or her subordinate organizations are more likely to adopt the innovation than others whose superiors have no such bias.

> **Hypothesis 9**: *(pro-innovation bias) If a superior favors an innovation, then his or her subordinate organizations are more likely to adopt the innovation.*

Data and Variables

The Appalachian Math and Science Partnership (AMSP)

The reputation of the US as a global leader in scientific discovery and new technological application has been challenged by the poor performance of US students on

international academic tests.[3] This poor performance also causes a concern about the sustainable supply of a highly-skilled workforce in science, technology, engineering, and mathematics (STEM), which is vital for national prosperity and power. The Math and Science Partnerships (MSPs) have been implemented since 2002 in order to improve the performance of students in the subjects of math and science and maintain the global competitiveness of the US in science and technology. At the core of the project is the partnership between high-need school districts and the STEM faculty in institutions of higher education (IHEs), through which the quality of math and science teachers is enhanced, leading to improved student learning. The MSPs are funded by the National Science Foundation (NSF).

The widening achievement gap between rich and poor districts is less surprising. In reality, US students in affluent suburban school districts occupy a position at the top level of academic achievement in international tests (Carnoy and Rothstein 2013; Tienken 2013).[4] The Appalachian Math and Science Partnership (AMSP) is a local MSP project in Central Appalachia, a region characterized by low socio-economic status and low student achievement. It is an externally-developed staff training program for

[3] The US is ranked low in international math and science tests. According to the 2012 Program on International Students Assessment (PISA), the US is ranked 26th in mathematics and 21st in science among OECD countries. Similarly, 3333the 2011 Trends in International Mathematics and Science Study (TIMSS) shows the poor performance of US students relative to those in other countries; 11th and 9th in 4th and 8th grade mathematics; 7th and 10th in 4th and 8th grade science.

[4] In the 2009 PISA, every country that outranked the U.S. had significantly lower percentage of child poverty. If controlling the influence of poverty on the test results, U.S. students positioned at the top level. For example, U.S. students from schools with less than 10% poverty won the second place in the 2009 PISA. This repeats in the 2011 TIMSS. Grade 8 students in Massachusetts which has about 15% child poverty are ranked 2nd and 5th in science and math, respectively.

Appalachian K-12 schools, requiring no cost of participation. In this partnership, school principals provide information to STEM faculty in the partner IHEs about the deficiencies of their math and science teachers, and then the faculty designs and delivers training programs to the teachers. A staff training program is a very important component of the personnel management to maintain or increase performance. Likewise, the participation in the AMSP results from a school's decision to improve the quality of their education service and increase organizational performance (i.e., student achievement). So, the unit of analysis in this study is a school.

The AMSP has been implemented in four states (Kentucky, Tennessee, Virginia, and West Virginia), but this study examines only Kentucky public elementary and secondary schools for two reasons: First, there is no standardized test to evaluate and compare student achievement across the four states; and second, Kentucky has the largest number of schools in the region. At the onset of the AMSP, of 74 school districts in Appalachian Kentucky, 30 standard and 3 independent ones entered into partnership with it. Only schools in the 33 partner districts were able to participate in the program. Thus, the risk set in this study contains the 304 schools in the 33 partner districts, which were at risk to adopt the AMSP at the first year of implementation.

Data on the eligible schools were collected from two sources: school characteristics including the AMSP participation from the AMSP Research, Evaluation and Technical Assistant (RETA) project and superintendents' and principals' characteristics from the Kentucky Department of Education.[5]

[5] The AMSP RETA project examines the effectiveness of the AMSP, where the principal investigator is Dr. Eugenia Toma, a professor at the University of Kentucky. The Kentucky Department of Education (KDE) provides data related to the state's public education system to

Dependent Variable

The first year when the AMSP started to provide training programs is 2003. However, the participation of schools in the project is not mandatory: only about one-third of schools in the partner districts joined the AMSP in the first year of implementation. A school joining the programs in that year is considered as an early adopter. Thus, the dependent variable in this study is whether or not a school participated in the AMSP in 2003. It takes on the value of 1 if at least one teacher in a school participates in the AMSP and 0 otherwise. Since this dependent variable is a dummy variable, I employ a logit regression model to test my hypotheses.

Organizational Performance

Organizations have multiple goals, but some of them are prioritized. In educational policy circles, it is generally accepted that the primary mission of schools is to educate children. School performance is then measured by students' levels of achievement on standardized tests. Kentucky has conducted an annual test (known as Kentucky Core Content Test) since 1998/1999. To examine the effect of organizational performance on early adoption of an innovation, this study employs only average math and science test scores of each school as performance variables because other scores are presumed not to be related to the decision to participate in the AMSP. Also, the scores are entered with a one-year lag because school performance is evaluated at the end of the

---

researchers if their studies meet criteria related to KDE goals and objectives (for more details, see at http://education.ky.gov/research).

academic year and because last year's performance is generally used as a baseline for managerial decision-making. Furthermore, by using the one-year lagged variables, I tackle the possible simultaneity bias between organizational performance and innovation adoption. As shown in Table 1, students in Appalachian Kentucky have, on average, poor test scores in math and science compared to those in non-Appalachian Kentucky. But, the achievement gap is much more pronounced in math than in science.

Raw test scores are comparable only within the same level of schooling because students in different levels of schooling take different tests in accordance with the level of difficulty of their curriculum. For example, it is not reasonable to compare the math scores of high school students with those of elementary school students. Therefore, the raw scores are standardized and converted to z-scores for the comparison across all levels. To put it more concretely, the z-score of an elementary school is obtained by dividing the difference between its test score and the mean of all elementary schools by the standard deviation of the group. This process is also used to calculate the z-scores of middle and high schools.

Table 1. The Achievement Gap between Appalachian and non-Appalachian Kentucky

	Elementary		Middle		High	
	Math	Science	Math	Science	Math	Science
Appalachia	61.83	76.22	54.97	64.10	54.30	60.34
Non-Appalachia	67.93	77.64	63.69	68.84	64.10	65.89
Difference (Δ)	−6.10	−1.42[†]	−8.72	−4.74	−9.80	−5.55

[†]Except for this difference (*p*-value=0.13), all other differences are significant at the 0.001 level.
Note: This table shows the average math and science scores of the 2002 KCCT by the two regional groups.

The comprehensive performance variable is created by summing up the z-scores of math and science and by adding 5.08 to each summed score. In order to investigate the twofold effect of comprehensive performance (Hypothesis 1 and 2), a squared measure of comprehensive performance should be also examined. However, the summed z-scores have a range from –5.08 to 6.67: approximately a half of summed scores are negative and most of them are located close to zero. Thus, 5.08 are added to make the minimum score zero so that I can avoid the problem of underestimating values close to zero in the process of calculating a squared measure of overall performance.

In addition to the test score variables, this analysis includes a school's dropout rate because increasing the quality of education has an additional but unintended effect: it encourages students to stay in school via improving achievement (Allensworth 2005).[6] So, although no hypothesis regarding the effect of the dropout rate is made, it is included as a control variable to account for non-academic performance associated with the early adoption of the AMSP, through which it is allowed to examine the pure effect of the school's academic performance.

Institutional Characteristics

Prior to the AMSP, there was already a federal intervention in the region to improve student achievement. The Appalachian Rural Systemic Initiative (ARSI) began

[6] Getting poor performance students to drop out can be a way to increase test scores in a school. However, a dropout rate has been also suggested as a performance measure. So, this study does not consider a way to drop out some students as a solution for improving performance, but a factor influencing the motivation to innovate.

in 1995 as a five-year project with NSF sponsorship.[7] It had the same goal as the AMSP, but its method to accomplish the goal was different: while the AMSP directly provides professional development training programs to K-12 teachers of math and science, the ARSI focused on the development and support of "catalyst schools", which served as models for other schools in their districts to develop their own school improvement plans. The ARSI improved student achievement and has been evaluated as successful (Henderson and Royster 2000). I include a dummy variable for whether or not a school participated in the ARSI (*participation in the ARSI*) so as to investigate the effect of successful past experience on innovation adoption (Hypothesis 3). Organizational size serves as a proxy for the amount of slack resources that help an organization to adopt an innovation (Hypothesis 4). In this study, organizational size is estimated by the number of students who enroll in a school (*total enrollment*).

[7] Dr. Wimberley Royster, a professor of the University of Kentucky, developed much of the vision for the AMSP. He was also instrumental in creating the Appalachian Rural Systemic Initiative (ARSI).

Table 2. Descriptive Statistics

Variable	Measurement	*N*	Mean	S.D.	Min.	Max.
Dependent Variable						
Participation in the AMSP	Dummy indicating if at least one teacher in a school attended an AMSP program in 2003	304	0.34	0.48	0	1
Organizational Performance						
Performance in Math	Z-score of math test score in 2002	295	0.05	0.99	−2.45	3.19
Performance in Science	Z-score of science test score in 2002	297	0.00	1.02	−2.63	3.47
Comprehensive Performance	Adjusted sum of *Z*-scores of math and science test scores	293	5.12	1.83	0.00	11.74
Dropout	Percentage of dropout students in 2002	304	0.83	1.75	0	10.10
Direct Experience						
Participation in the ARSI	Dummy indicating if a school participated in the ARSI	304	0.26	0.44	0	1
Organizational Size						
Total Enrollment	Number of students enrolled in a school in 2003	301	423.17	222.10	86	1362
Manager Characteristics						
Principal with Rank 1 Education	Dummy indicating if a principal has master's degree and 30 graduate hours or not	293	0.96	0.21	0	1
Principal Experience	Years of experience at school	294	19.91	8.31	0	49
ln(Principal Salary)	Amount of money to be paid to a principal under a contract	294	10.69 (44086)	0.15 (4544)	8.80 (6605)	10.85 (51648)
Female Principal	Dummy indicating if a principal is female or male	294	0.40	0.49	0	1
Superior's Pro-innovation Bias						
Intention to Endorse the AMSP	Difference between actual and predicted probabilities of endorsing the AMSP (%)	304	34.13	19.51	4.96	81.25
Controls						
Independent District	Indicator of whether a school is in an independent district	304	0.03	0.17	0	1
Student-teacher Ratio	Number of students per teacher in 2003	302	15.21	2.72	0	21
Average Years of Experience	Average years of teachers' experience in 2003	298	12.10	2.62	3.4	18.6
ln(Spending)	Amount of spending per student in 2003	301	8.57	0.29	4.73	9.18
Middle School	Indicator of if the school is a middle school or not	304	0.27	0.44	0	1
High School	Indicator of if the school is a high school or not	304	0.16	0.37	0	1

Manager Characteristics

Principals are the managers in charge of individual schools. Although school principals represent the middle management level between the superintendents and teachers, they may directly and indirectly influence outcomes and are responsible for implementing educational policies (Bedwell et al. 2014). In the case of professional development programs such as the AMSP, principals can promote the participation of teachers by establishing a culture of professionalism or by mentoring them. In this study, I use demographic proxies for managerial skills and style: education, job experience, salary and gender (Hypothesis 5 to 8).

All principals have at least a Master's degree. Those who have 30 graduate hours beyond the Master's degree are classified as rank 1 and otherwise as rank 2. Thus, I create a dummy variable, *principal with rank 1 education*, for principals with rank 1 education. The second demographic variable, *principal experience*, is a continuous variable indicating how many years a principal has worked in education. Meanwhile, as principals' salaries vary widely and are negatively skewed, I take the natural log of principals' salaries.[8] Finally, I include a dummy for principals who are women.

Pro-innovation Bias

A superintendent is a chief education officer who can recruit, train, and reward talented mid-level administrator (school principals) and motivate them to adopt specific educational reforms by providing and communicating a vision for schools improvement (Meier and O'Toole 2002). Of 74 superintendents from Appalachian Kentucky, only 33

[8] The skewness of principals' salaries is –7.5, meaning that it is skewed right or positively skewed.

ones endorsed it in the first year of implementation. Their decisions were strongly associated with their bias toward the project, which cannot be measured by their demographic characteristics and environmental factors demanding innovations. So, the residual-based estimation approach is used to measure their pro-AMSP bias: First, I run a logit regression of the dichotomous decision on available variables and then predict the probability of endorsing the AMSP; and then I calculate residual probabilities for the 33 partner districts (*intention to endorse the AMSP*). The residuals are used as proxies of superintendents' bias toward the AMSP. For example, the predicted probability of the Bath County endorsing the AMSP is about 40.5%, but it actually did and has the residual probability of 59.5% (see Appendix A for more details).

The residual-based measure is uncommon and messy because it contains all other factors not included in the logit model such as experience of implementing similar innovations and their networks with other colleagues, as well as the pro-AMSP bias. However, it should be noted that simply omitting the variable from the analysis increases the inconsistency of estimates for other variables, even though it has measurement error (Bollen 1989). In addition, given that any relationship between a superior's pro-innovation bias and the participation of a school in the AMSP will be attenuated by the measurement error (Bollen 1989; Meier and O'Toole 2002), including the latent variable creates a bias in favor of null findings and thereby allows a more rigorous testing of its effect (Hypothesis 9).

Control Variables

This study includes several control variables that are expected to influence the adoption of the AMSP. A dummy variable, *independent district*, codes 1 for schools of independent districts. In Appalachian Kentucky, standard school districts are organized at the county level, but independent districts cover urban areas rather than an entire county.[9] In other words, independent districts are located in relatively more urbanized areas, so this study includes the dummy variable to control for environmental effects (e.g., Boyne et al. 2005; Damanpour and Schneider 2009). This study also controls educational inputs, such as student-teacher ratio, spending per student, and average years of teachers' experience, which measure the quality of schools and affect student outcomes. Finally, students in middle and high schools study more advanced content. Thus, the motivation of a school to participate in training programs of the AMSP is expected to be influenced by the level of difficulty of classes that they provide. In order to control a school level, two dummy variables, *middle school* and *high school*, are included. Elementary schools are the base group.

Analyses and Results

Table 3 reports the results of three models. Model 1 serves as the base model to test whether including the latent variable, *intention to endorse the AMSP*, changes results. It does not cause marked changes in the coefficients of other explanatory variables in

[9] In the dataset, there are three independent school districts: Jackson Independent, Pikeville Independent, and Corbin Independent. The former two are located in the county seats of the Breathitt County and the Pikeville County, respectively. The Corbin Independent serves a city across two counties – the Whitley County and the Knox County.

Model 2, and therefore, through which all hypotheses are tested. Model 3 uses the same independent variables as Model 2, but its dependent variable is the number of teachers who participated in the AMSP. The purpose of this additional analysis is not only to provide further evidence concerning the early adoption of the innovation, but also to extend discussion to issues of the innovation rate, which means the intensity of the adoption like "extent of use." Since the dependent variable in Model 3 is a count variable, I use the Poisson regression. As their likelihood ratios indicate, the three models are statistically significant, having a *p*-value of less than 0.001.

Table 3. Determinants of the Early Adoption and the Extent of Use of the AMSP

	Model 1 (Logit)	Model 2 (Logit)		Model 3 (Poisson)	
	β	β	dy/dx[10]	β	%Δ[11]
Organizational Performance					
Comprehensive performance	−0.644**	−0.675**	−0.150	−0.285*	−24.8
Comprehensive Performance Squared	0.044[a]	0.050*	0.011	0.010	1.0
Dropout	−0.208	−0.251	−0.056	−0.166**	−15.3
Direct Experience					
Participation in the ARSI	0.631*	0.486†	0.112	0.319**	37.5
Organizational Size					
Total Enrollment	0.004***	0.005***	0.001	0.003***	0.3
Manager Characteristics					
Principal Education	−1.211*	−1.468**	−0.351	−0.936***	−60.8
Principal Experience	−0.010	−0.010	−0.002	−0.031***	−3.1
ln(Principal Salary)	−1.903	−0.923	−0.205	−0.359	−30.2
Principal Gender (female=1)	0.203*	0.102	0.023	0.251*	28.6
Superior's Pro-innovation Bias					
Intention to Endorse the AMSP	-	0.033***	0.007	0.022***	2.3
Control Variables					
Independent District	3.305***	1.630†	0.386	0.591*	80.6
Student-teacher Ratio	−0.104	−0.069	−0.015	0.030	3.0
Average Years of Experience	−0.007	−0.030	−0.007	−0.054*	−5.3
ln(Spending)	0.689	0.811	0.180	1.300***	266.8
Middle School	0.074	−0.046	−0.010	0.256	29.2
High School	1.089	1.143	0.272	0.585*	79.4
Constant	16.716	3.960	-	−7.091	-
N	285	285		285	
LR chi-squared	60.93	75.75		182.95	
P>x^2	0.000	0.000		0.000	

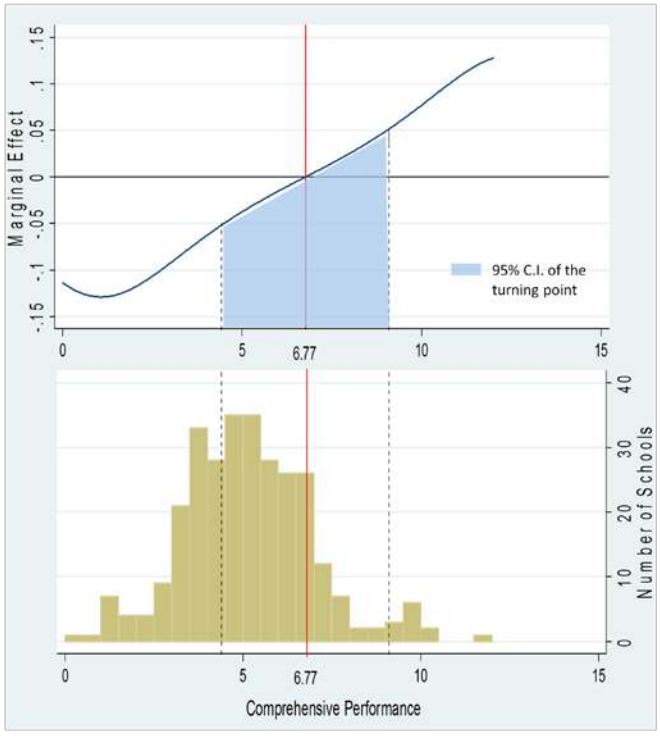
†p < .10 (one-tailed test); *p < .10; **p < .05; ***p < .01 (two-tailed test).
[a]The p-values of the coefficient is 0.108.

[10] The marginal effects of the continuous variables and the discrete change of the dummy variables are calculated by $\frac{\partial \Pr(y=1|X)}{\partial x_i}$ and $\frac{\Delta \Pr(y=1|X)}{\Delta x_i}$, respectively. The marginal or discrete changes of one unit increase in the variables are computed by keeping all variables at their means.

[11] The percent change coefficient means the percentage change in the expected count for a δ unit change in x_i, holding other variables constant. The equation for the calculation is as follows: $100 \times \frac{E(y|X,x_i+\delta)-X(y|X,x_i)}{X(y|X,x_i)} = 100 \times \{\exp(\beta_{x_i} \times \delta) - 1\}$

In Model 2, *comprehensive performance* and its square are significant at the given levels, but have difference signs: the former has a negative sign and its absolute value is bigger than that of the latter. Since the second derivative of the estimated equation with respect to comprehensive performance is positive ($f''(C) > 0$), the effect of comprehensive performance on the logit has a convex curve. The upper graph in Figure 2 shows marginal effects of different levels of comprehensive performance on the adoption of the AMSP. The sign of the marginal effect of performance is reversed from negative to positive at the point of 6.77 (see Appendix B for more details). Only 16% of schools score 6.77 or above in the index.

Figure 2. Twofold Effect of Comprehensive Performance on Innovation Adoption



Estimated Equation (Model 1):

$$logit\{\Pr(y=1|X\} = \ln\left\{\frac{\Pr(y=1|X)}{\Pr(y=0|X)}\right\}$$

$$= 3.96 - 0.6752 * C + 0.0499 * C^2 + Z\hat{\delta}$$

C: comprehensive performance
Z: a vector of other variables
$\hat{\delta}$: a vector of coefficients

$$\frac{\partial logit\{\Pr(y=1|X\}}{\partial c} = -0.6752 + 0.0998 * C$$

Turning Point ($\frac{\partial logit}{\partial c} = 0$): $C \fallingdotseq 6.77$

95% C.I. of the turning point (delta method): [4.44 , 9.09]

Ratios of schools:
1) scoring 6.77 or above: 16.0% (47/293)
2) situated to the right side of the upper limit of the confidence interval: 3.8% (11/293)
3) situated to the left side of the lower limit of the confidence interval: 36.5% (107/293)

However, like most of previous studies of innovations, this study also focuses on the adoption of a particular innovation within a certain population of organizations. So, the turning point is just a sample estimate. Instead of taking the point estimate, this study calculates its 95% confidence interval through which not only Hypothesis 1 and 2 are tested but also the findings can be generalized to other types of innovations or organizations. The 95% confidence interval is from 4.44 to 9.09, meaning that the probability of the interval containing the true turning point for the population is 95%. From this, it is inferred that a high value beyond the confidence interval has a positive impact on innovation adoption and that the upper limit is the turning point for the population (see Appendix C for more details). Given that only top 3.8% of schools score 9.09 or higher, these results support Hypothesis 2, which is that very high performers are more likely to adopt an innovation.

On the other hand, 36.5% of schools are situated in the left side of the lower limit of the confidence interval. That is, the negative relationship of comprehensive performance with innovation adoption occurs in more than one third of an organizational population. In addition, only top 4% organizations show the positive relationship between comprehensive performance and innovation adoption. Thus, it can be concluded that most organizations, except those with very high performance, are encouraged to adopt an innovation by their poor performance and that Hypothesis 1 is supported.

Since Hypothesis 3 predicts the positive effect of direct experience on innovation adoption and Model 1 empirically demonstrates the relevance of the prediction, a one-tailed test is used to analyze the significant of the variable in Model 2. The coefficient of *participation in the ARSI* is positive and significant at the one-tailed 10% level,

supporting Hypothesis 3. Organizations with a successful experience of implementing a similar innovation in the past are 11.2% more likely to adopt an innovation than those without direct experience, holding the other covariates at their means.[12]

The *total enrollment* coefficient is positive and statistically significant, supporting Hypothesis 4. The marginal effect of the variable suggests that holding other factors at the mean values, a 100 increase in the number of enrolled students (from its mean) raises the probability of participating in the AMSP by about 10%.[13]

Hypotheses 5–8 propose that managers' demographic characteristics are associated with innovation adoption. In Model 2, the coefficient of *principal education* is statistically significant but negative, which is contrary to the expectation formulated in Hypothesis 5. Other demographic variables – job experience, salary, and gender – are not significant. No support for any of the hypotheses regarding the positive effect of a manager's ability on innovation adoption is obtained.

Hypothesis 9 is strongly supported by the highly significant (at the two-tailed 0.1% level) and positive coefficient of *Intention to Endorse the AMSP* in Model 2. A 10% increase in a superintendent's pro-AMSP bias (i.e., the residual probability) raises the probability of his or her schools to participate in the AMSP by 7.4%,[14] holding the other

[12] The 95% confidence interval of the marginal effect of the ARSI participation is [–5.1%, 27.4%].

[13] The average and the standard deviation of enrollments is 423.17 and 221.1, respectively. The 95% confidence interval of the marginal effect of a 100 increase in total enrollment from its mean is [6.4%, 14.2%].

[14] The 95% confidence interval of the marginal effect of one-percent increase in the intention probability from its mean is [3.5%, 11.3%].

independent variables at their means, and also the expected number of teacher participants by about 23%, ceteris paribus (Model 3).

Implications and Discussion

Twofold Effect of Organizational Performance

Innovation adoption is the result of a complex process of decision-making. Especially, at the beginning of the diffusion process when there is no neighbor or regional effect, the necessity and the ability of an organization to adopt an innovation are key determinants. First, organizational performance is a major determinant of innovation adoption, but its effect is not straightforward. On the one hand, low performance stimulates the motivation of an organization to adopt an innovation because innovations are basically developed to improve performance and because low performance reduces the opportunity cost of adopting innovations. On the other hand, organizations with very high performance adopt innovations more readily than others because they have organizational routine to generate change (i.e., adopting innovations) or tend to be open to innovations. Meanwhile, in Model 3, only the *comprehensive performance* variable is consistently significant and has a negative coefficient, meaning that poor performance causes organizations to be more engaged in an innovation. Given that it is not necessary for high performers to replace their existing routines with innovations regardless of their receptiveness to innovations, the nonsignificant coefficient of the square measure is not surprising. These results imply that to adopt an innovation is one thing, to use the innovation is another.

Although its effect is not a main concern of this study, the coefficient of *dropout* is not significant in Model 2, suggesting that indirect and unintended outcome of an innovation do not influence the likelihood of adopting it. At the beginning of the AMSP, the additional effect was not noticed and discussed, so it is natural that the variable is not significant. Rather, it discourages the innovation rate as indicated by its significantly negative coefficient in Model 3. Taken together, dropout not only does not promote the motivation to adopt the AMSP, but even functions as an obstacle to innovation intensity.

Effects of Organizational Experience and Slack Resources

Experience is an important source of information for organizational decision-makers. The experience of adopting a similar and successful innovation in the past leads to the overestimation of the probability of a recent innovation succeeding in improving performance, and therefore, increases the probability of innovation adoption. In addition, a successful experience increases the intensity of adopting an innovation: it increases the expected number of teachers participating in the AMSP by 37.5%, ceteris paribus.

As examined in Hypothesis 4, organizational size is a significant predictor of adopting an innovation. Considering that organizational size is a proxy for the amount of slack resources, the results support the notion that the more slack resources an organization has, the more likely it is to adopt an administrative innovation. Similarly, Model 3 shows that a large organization with more slack resources is more intensely engaged in the AMSP. For each 100 additional students, the expected number of teachers participating increases by 30%, holding other variables constant.

Null Effects of Manager Characteristics

The ability of a manager, which is measured by demographic variables, appears not to be related to or even to hinder innovation adoption. There are two possible explanations for the negative sign of the *principal education* variable. First, it may result from measurement error because the variable does not fully represent individual variation in education but just indicates whether or not a principal has 30 graduate hours. Second, managers with high levels of leadership and management skills may be less dependent on external ideas or innovations by devising their own solutions to improve the status quo. Further research with more explicit methods should be carried out to clarify these competing arguments.

The coefficient of *principal experience* has a negative value, but is not statistically significant. Two possible explanations can be suggested to interpret these results. First, because the dataset does not contain age information for each principal, it cannot separately examine the effects of job experience and age. So, the positive effect of job experience would be offset by the negative effect of age. Second, a manager with a high level of job experience may devise optimal solutions by oneself without relying on others' solutions. Teodoro (2009) finds that professional socialization is not a key determinant for initiating innovations. In reality, job experience has a significantly negative impact on the intensity of innovation adoption (Model 3). These alternative explanations should be verified by further research with better data.

Salary has also a nonsignficant and even negative impact.[15] It implies that along with the previous demographic variables, the level of leadership and management skills of managers are not significant predictors for early adoption of innovations. In addition, although it is not statistically significant, the negative sign of the coefficient suggests the crowding-out effect of monetary incentives on the motivation to innovate. In general, intrinsic motivation is thought to spur creativity, flexibility, and risk-taking (Amabile, 1996; Deci & Ryan, 1985; Dewett, 2007), so managers should be intrinsically motivated to adopt innovations. However, intrinsic motivation is not stimulated by financial incentives, but by intrinsic rewards such as prestige and self-esteem (Deci, 1972; Jordan, 1986). Besides, given that public sector employees are more intrinsically motivated than private sector workers (e.g., Buelens & Van den Broeck, 2007; Georgellis, Iossa, & Tabvuma, 2011; Perry, 1997), it can be concluded from the results that financial incentives crowd out the motivation to innovate in the public sector.

The interpretation of the effect of gender is not entirely straightforward, as there is no consensus on it. On the one hand, Model 2 shows that there is no gender difference in the probability of adopting an innovation, rejecting Hypothesis 8. On the other hand, the coefficient of *principal gender* is significant and has a positive sign in Model 3. That is, regardless of whether managers make their organizations open to innovations or force them to consider innovations, the ability of a manager to institutionalize changes in routines is not characterized by gender. However, the process of implementing an

[15] Salary has been sometimes used as the proxy for the district effect. Thus, I again run the logit regressions with dummies for school districts in order to take account district variation in innovation adoption. Salary is not still a statistically significant determinant in models controlling the district effect, and even has a negative value.

innovation differs with gender. The extent to which an innovation has been infused is greater in organizations with female leaders than in those with male leaders. For example, the presence of a female leader increases the expected number of teacher participants by 28.6 %, ceteris paribus (Model 3). These results can be explained by the difference in leadership style. A transformational leadership of women enhances their subordinates' willingness to accept an innovation more strongly and more immediately than a transactional leadership of their counterparts.

Effect of a Superior's Pro-innovation Bias

A superior's pro-innovation bias increases not only the probability of innovation adoption, but also the extensity of the adoption. The accountability of public organizations to the public is generally secured by political control, which is more hierarchical than market control in the private sector. In line with this argument, a favorable climate for an innovation can be created by superiors. Also, their pro-innovation bias can be reflected in the decisionmaking process. Stated differently, it is perceived as a control mechanism which limits the discretion of managers, not as an individual preference, in the public sector. These results imply that innovative activities of a public organization can be promoted by political superiors (or external management or hierarchical superiors) as well as internal management.

Effect of Urbanization

Since previous studies find the positive effect of urbanization on innovation adoption (Aiken and Alford 1970; Damanpour and Schneider 2009) and Model 1 also

confirms the positive impact, the coefficient of *independent district* is tested through a one-tailed test and significant at the 10% level. Strictly speaking, schools in independent districts are 38.6% more likely than those in county districts to participate in the AMSP, holding the other variables at their means.[16] In addition, being located in an independent district increases the expected number of teacher participants by 81%, ceteris paribus. Urban areas have more people per unit area, so they have more resources and higher density of information linkages (Fennell 1984), increasing the ability of the organizations to adopt innovations. However, it is too hasty to conclude that the positive effect results from population density. Independent districts in Kentucky are not operating across large geographical areas, so they are more sensitive to the demands of students and parents and are more likely to seek innovations to satisfy needs of the customers. That is, urban areas have enough resources for innovation adoption, but also a high demand for innovations. Collectively, these results indicate that the external environment is one of the stimuli for the adoption and the use of innovations.

Other control variables are not significant in Model 2. However, teachers' average job experience and schools' spending have significant coefficients in Model 3, supporting the negative effect of professional socialization and the positive effect of slack resources on the intensity of innovation adoption, respectively, as *principal experience* and *total enrollment* do in the same model.

Performance and Innovation Intensity: Symbolic vs. Substantive Adoption

[16] Holding other variables at their means, the 95% confidence interval of the marginal effect of an independent district is [–12%, 89.2%] in Model 2.

Model 3 shows that high schools tend to have a higher innovation rate, meaning that the behavior of adopting the AMSP is different depending on the school level. And also, the comprehensive performance is composed of two component tasks (i.e., math and science), so it is necessary to examine their individual effects on innovation intensity as well as the overall performance.

Table 4 presents the Poisson regression results for testing the effects of each component's performance on innovation intensity. Model 4 is the results for all K-12 schools, and Model 5–7 are the results for elementary, middle, and high schools, respectively. First, the lack of significance of the academic performance variables in elementary schools may suggest that their principals are less convinced of the expected effect of the AMSP. The curriculum of elementary schools reflects an emphasis on basic skills, and the emphasis gradually shifts to the contents and the methods of inquiry embodied in academic disciplines as students progress through school (Doyle 1983, p. 160). So, the AMSP, which focuses on improving teacher quality so as to increase student achievement, seems to be more appropriate and effective for secondary schools where school work becomes more advanced and technical. In addition, the achievement gap between Appalachian and non-Appalachian students is widening as they progress through school (see Table 1), so secondary schools seem to be more motivated to enhance the status quo. Because of these circumstances, performance variables have significant coefficients in the secondary-school models, not in the elementary-school model. In line with Model 3 and Hypothesis 1, poor performance in math and science increases innovation intensity in the high-school and the middle-school model, respectively.

Table 4. Poisson Results for the Effect of Each Component Task's Performance by School Level

	Model 4 (Total)	Model 5 (Elementary)	Model 6 (Middle)	Model 7 (High)
Organizational Performance				
Performance in Math	−0.164*	−0.227	0.261	−0.576*
	(−15.1)	(−20.3)	(2.6)	(−43.8)
Performance in Science	−0.192**	−0.118	−0.549**	0.366
	(−17.5)	(−11.1)	(−42.2)	(44.2)
Dropout	−0.164**	−0.006	0.167	−0.396***
	(−15.1)	(−0.6)	(18.1)	(−32.7)
Direct Experience				
Participation in the ARSI	0.313**	0.261	0.101	0.807*
	(36.8)	(29.8)	(10.7)	(0.490)
Organizational Size				
Total Enrollment	0.003***	0.003***	0.003***	0.003***
	(0.3)	(0.3)	(0.3)	(0.3)
Manager Characteristics				
Principal Education	−0.923***	−1.033**	−0.924	−0.577
	(−60.3)	(−64.4)	(−60.3)	(−43.8)
Principal Experience	−0.031***	−0.037**	−0.008	−0.014
	(−3.0)	(−3.6)	(−0.8)	(−1.4)
ln(Principal Salary)	−0.315	0.204	0.388	−5.720
	(−27.0)	(22.7)	(47.4)	(−99.7)
Principal Gender (female=1)	0.262*	0.256	0.656**	−0.233
	(29.9)	(29.1)	(92.8)	(−20.8)
Superior's Pro-innovation Bias				
Intention to Endorse the AMSP	0.022***	0.016***	0.025***	0.018*
	(2.2)	(1.6)	(2.5)	(1.8)
Control Variables				
Independent District	0.653*	0.799†	1.036†	0.639
	(92.1)	(122.4)	(181.7)	(89.5)
Student-teacher Ratio	0.027	0.014	0.023	−0.133
	(2.7)	(1.4)	(2.3)	(−12.4)
Average Years of Experience	−0.055*	−0.039	−0.041	0.016
	(−5.3)	(−3.8)	(−4.0)	(1.6)
ln(Spending)	1.340***	0.539	1.253	1.816
	(281.9)	(71.4)	(250.1)	(515.0)
Middle School	0.268	-	-	-
	(30.8)			
High School	0.622**	-	-	-
	(86.2)			
Constant	−9.020	−7.266	−16.834	47.347
N	285	161	77	47
LR chi-squared	182.44	69.65	55.87	59.00
P>x^2	0.000	0.000	0.000	0.000

Note: Values in parentheses indicate the percent changes in the expected count for a unit increase (%Δ).
†p < .10 (one-tailed test); *p < .10; **p < .05; ***p < .01 (two-tailed test).

Second, the significant variables are different depending on the school level. In the elementary-school model, innovation intensity is not influenced by internal factors, but by external factors such as *intention to endorse the AMSP* and *independent district* (see Table 5). However, as the school level increases, internal factors begin to have significant effects. Poor performance leads secondary schools to be more intent on adopting the AMSP. On the other hand, external factors, which are strongly significant in elementary and middle schools, become weakly significant or nonsignificant in high schools. Compared to other school levels, a large part of the motivation of a high school to participate and engage in the AMSP stems from internal necessity with the expectation that it will improve organizational performance and from direct experience which convinces the success of the innovation.

Table 5. Comparison of Factors Influencing the Adoption of an Innovation

	Elementary Schools	Middle Schools	High Schools
Internal Factors			
Performance in Math	×	×	○
Performance in Science	×	○	×
Participation in the ARSI	×	×	○
External Factors			
Intention to Endorse the AMSP	○	○	Δ
Independent District	○	○	×

×: Having no significant influence; ○: having a significant influence as expected in the hypotheses.
Δ: Although it is still significant, the level of significance decreases.

Finally, innovation adoption and its intensity vary with the school level (see Table 6). For example, 58% of high schools participated in the AMSP, which is about two times higher than the ratios of other schools. Also, the average number of

teacher participants in a high school is 1.53, whereas those in an elementary and a middle school are 0.64 and 0.89, respectively.

Table 6. Innovation Adoption and Innovation Rate by School Level

	Ratio of Schools Participating in the AMSP	Average Number of Teacher Participants
Elementary School	0.285 (0.453)	0.637 (1.226)
Middle School	0.317 (0.468)	0.889 (1.541)
High School	0.580 (0.499)	1.531 (2.022)

Note 1: Values in parentheses are standard deviations.
Note 2: The null hypothesis of no difference is rejected only when high schools are compared to others. There is no significant difference between elementary and middle schools in terms of the two indexes.

All things considered, these results suggest that the adoption of the AMSP may be symbolic as well as substantive. The innovation-decision process involves two types of adoptions: symbolic and substantive (or actual) adoption (Klonglan and Coward 1970). The former is the cognitive acceptance of idea component of an innovation, whereas the latter means the actual use of an innovation. Organizations may adopt an innovation symbolically in response to external pressure (Kalev et al. 2006; Meyer and Rowan 1977) or for the purpose of showing that they are performing and in charge (Edelman 1967; Hess 1998). In addition to these aims, public organizations may adopt innovations, which do not generate performance improvements, in search of bureaucratic self-interest such as budget maximization (Feller 1981; Yin 1977). In the case of the AMSP, the adoption by elementary schools is mainly caused by the external factors, and thus is classified as symbolic adoption. On the other hand, given that substantive adoption is motivated by an

internal desire to improve performance, high schools adopt the AMSP substantively because their adoption is mostly attributed to performance-based motivation. Meanwhile, high schools are more likely to adopt and use it than elementary or middle schools (see Table 6). Although details remain to be filled out by further research, substantive adoption seems to be positively related to the early adoption of an innovation and its intensity.

Conclusion

At the initial stage of innovation diffusion, there are no role models or competitors who trigger the diffusion mechanisms of learning, competition, and imitation, which means that the existing diffusion model cannot account for the beginning of innovation diffusion. The main contribution of this paper is the development of the theoretical framework for early innovation adoption in terms of performance-based motivation and organizational characteristics. First, organizational performance has a twofold impact on early innovation adoption: negative for organizations with low performance, but positive for those with very high performance. This study estimates top 3.8% as the turning point defining which organizations attain outstanding performance and show the positive relationship between performance and innovation adoption.

Second, the adoption of an innovation is positively influenced by direct experience, a superior's pro-innovation bias, and the amount of slack resources (or organizational size). A successful experience with a certain innovation convinces an organization of the success of a similar one in the present, increasing the propensity to adopt it. Meanwhile, the adoption of an innovation is an important strategic decision

because it requires the use of additional resources and because its failure may threaten the survival of the organization. So, organizations, which have abundant slack resources or whose superiors have a pro-innovation bias, are more likely to consider and adopt an innovation.

Finally, innovations can be adopted symbolically or substantively. Symbolic adoption is not related to internal necessity, but to comply with external demands or to pretend that organizations struggle to improve their performance. On the other hand, substantive adoption is caused by the motivation to improve the status quo, resulting in higher rates of innovation adoption and engagement.

This study has several limitations. First, as other policy diffusion studies, this study is also based on a certain innovation in a particular region (i.e., AMSP). Although I seek to provide more generalized findings by using a confidence interval approach for the turning point of the effect of performance, the sample is still organization- and context-specific. Thus, the findings may not be fully replicable in other cases. Second, the nine hypotheses tested in this study are not enough to understand the early adoption. Because of data constraints, this study does not include several determinants which have been examined by previous research, such as innovation characteristics (e.g., Boyne et al. 2005; Damanpour and Schneider 2009) and external communication and internal bureaucratic politics (e.g., Damanpour and Schneider 2006; Jun and Weare 2011). Their omission may lead to less-clear conclusions or even a bias in the results.

Despite the limitations, this study contributes to a better understanding of innovation adoption by unpacking the process of early innovation adoption, which has been overlooked by previous researchers. Besides, given that the motivation to innovate

is the starting point for innovation adoption, the concept of performance-based motivation may help future researchers to design how to measure the desire to adopt innovations.

Chapter III
Politics of Active Representation in Bureaucracy: The Tradeoff between Group Interest and Self-interest

Introduction

Since Mosher (1969) subdivided the concept of representation into passive and active representation, the link between the two forms has been a central concern in public administration, guided by the belief that evidence supporting the link can provide practical guidance for enhancing the efficacy of a representative bureaucracy (Sowa and Selden 2003). An extensive literature has documented that passive representation does not always lead to active representation (e.g., Meier 1993; Rosenbloom and Featherstonhaugh 1977; Thompson 1976; Wilkins and Williams 2008) and that two conditions – policy discretion and critical mass – have to be met for the translation to take place (e.g., Henderson 1979; Hindera 1993; Meier 1993; Meier and Bohte 2001; Sowa and Selden 2003; Wilkins and Keiser 2006).

However, the previous literature has not fully taken into account organizational socialization, the process of being indoctrinated and taught what is important in an organization (Van Maanen and Schein 1979), which may conflict with socialization in a social group before entering the organization. Although some studies have explained organizational socialization as a barrier to the link between passive and active representation (e.g., Meier 1993; Wilkins and Williams 2008), it is an ongoing process after a member joins an organization. Thus, the issue should be incorporated into representative bureaucracy theory rather than being presented as a potential reason for why passive representation does not translate into active representation in an ex post

interpretation. In addition, the previous literature has often overlooked the human tendency to seek personal rewards (i.e., self-interest). Or they have implicitly assumed that a good thing for a social group is also beneficial for bureaucrats from the group, which need not be true.

As an effort to better understand bureaucrats' behavioral patterns to serve as active representatives, I build a theoretical framework in this study. It rests on the basic assumption of public choice theory that humans are egoistic and rational utility maximizers (Buchanan and Tullock 1962), and recognizes that active representation may conflict with organizational (formal) roles. I develop two propositions from the framework: (1) active representation is in a trade-off with organizational roles; and (2) support of external agents reduces the cost of active representation. To prove the propositions and the validity of the framework, I specify and test two hypotheses: (1) active representation requires the loss of organizational rewards; and (2) bureaucrats reduce the loss of organizational rewards for active representation by mobilizing external support. Meanwhile, since testing the two hypotheses needs evidence of active representation, I first empirically identify the presence of and conditions for the link between passive and active representation.

The subsequent discussion proceeds as follows. In the second section, I discuss the theoretical background of representative bureaucracy, especially in terms of the two conditions (i.e., policy discretion and a critical mass) for the link between passive and active representation. I then establish a framework for understanding individual decision-making about active representation and derive two propositions and two hypotheses for analytical purposes. Following is a description of data used for testing the hypotheses.

Subsequently, I report empirical results and discuss the findings in the fifth and sixth section, respectively. Finally, I conclude not only with contributions and theoretical implications, but also limitations and issues which should be investigated in future research.

Theoretical Background

Representation in Bureaucracy

The rise of bureaucratic power often leads to the assertion that public administration is a fourth branch of government (e.g., Long 1952; Meier 1979; Tummala 2003) and, at the same time, causes a concern about how to make bureaucrats accountable to the public and legitimize their exercise of discretion in policy formulation and implementation (Bradbury and Kellough 2011; Cook 2014; Krislov and Rosenbloom 1981). The theory of representative bureaucracy offers a potential solution (Kingsley 1944; Long 1952; Meier 1979; Van Riper 1958). The greater the demographic similarity – such as gender, race, ethnicity, and socioeconomic traits – between the public and a bureaucracy becomes, the better actions and policies of the bureaucracy are accepted by the public. This is because the public generally evaluates the legitimacy of the exercise of power by bureaucrats on the basis of the demographic similarity – symbolic representation (Levitan 1946; Thielemann and Stewart 1996; Theobald and Haider-Markel 2009). This proposition is based on the assumption that bureaucrats representing citizens do not misuse their positions for personal gains, but act on behalf of citizens in policy formulation and implementation.

Mosher (1968) is most often cited for his contribution to the elaboration of the concept of representation. He divides representation into a passive and an active form. Passive representation is achieved when a bureaucracy demographically mirrors the public. The passive form carries symbolic values that are significant for a democratic society, such as equality of opportunity or better access to public services (Pitkin 1967; Rosenbloom 1977; Thielemann and Stewart 1996). On the other hand, active representation denotes the situation in which bureaucrats make administrative decisions in favor of their social group they passively represent. As Mosher (1968) implies, passive representation translates into active representation due to socialization. Members of a group having similar demographic backgrounds undergo a similar socialization process and share core attitudes, values, and beliefs (Krislov 1974), which generate social norms and cognitive reference.[17]

Bureaucrats providing active representation produce policy outputs on behalf of their social group. Furthermore, bureaucrats can indirectly produce substantive benefits for the represented by influencing the behavior and thoughts of other bureaucrats (Lim 2006). For instance, Hindera and Young (1998) find in their study of the U.S. Equal Employment Opportunity Commission (EEOC) that if black investigators constitute a prominent group (i.e., comprising the largest proportion, but not a majority of the staff) in an organization, then white investigators also take seriously complaints filed by black citizens and more agency resources are allocated on their behalf. Meier and Nicholson-Crotty (2006) also support the indirect contribution of bureaucrats, noting that female

[17] Socialization processes do not focus on one or two characteristics, such as gender or ethnicity. For example, the socialization of wealthy white women from the East Coast is rather different than that of poor white women from Appalachia.

police officers can sensitize their male colleagues to gender issues and make them pay more attention to women's safety.

Conditions for the Link between Passive and Active Representation

Passive representation does not always foster active representation. The willingness of bureaucrats to represent their social group will continue if they obtain political support either within their organization or from the outside (Henderson 1979; Meier 1993). A major source of external political support is the presence of a leader who shares the same demographic backgrounds and sympathizes with active representation. For example, a minority leader may either explicitly or implicitly help minority bureaucrats to become active representatives by freeing them from the pressure to comply with organizational rules (Henderson 1988) and supporting their policy proposals benefiting the social group (Winn 1989).

Political support within an organization is obtained through interactions with other bureaucrats supporting active representation efforts (Henderson 1979; Meier 1993; Thompson 1976). Generally, the proportion of colleagues who share the same demographic backgrounds has been employed as a proxy for internal political support. And, some studies have found evidence of the importance and role of a critical mass in the linkage between passive and active representation, which is defined as the minimum proportion of organization personnel that a group must constitute to become active representatives. For instance, if a minority group in a public organization does not exceed a critical mass, then they cannot produce policy outputs benefiting the social group because their active representation is suppressed by a dominant group or organizational

norms. The idea of a critical mass originates in the work of Kanter (1977b) on women in industrial enterprises. She finds that if women make up less than 15 percent of employees, they suppress self-expression and just serve as 'tokens.' Meier (1993), who is most often given credit for recognizing the importance of a critical mass for active representation, estimates it to be between 16 to 26 percent and finds a U-shaped relationship between passive and active representation.[18] A critical mass may also be important in the legislature. Dahlerup (1988) identifies 30 percent as the crucial cut-off point for gauging the impact of women in Scandinavian politics, but Grey (2002) finds that a critical mass of women in the New Zealand parliament is about 14 percent. In short, a critical mass is one of the prerequisites for the linkage between passive and active representation, but it is not a universal percentage across settings. Rather it depends on characteristics of the organization.

Finally, and most importantly, in order for active representation to take place, bureaucrats must have policy discretion – the authority to make a decision in policy formulation or implementation. Having discretion means having an opportunity to transform passive into active representation (Meier and Stewart 1992). However, despite its importance, policy discretion has been given little empirical attention because it is not easily measured. Meier and Bohte (2001) indirectly measure the degree of policy discretion that a bureaucrat has by using the span of control – the number of subordinates whom a superior supervises. The authors assume that an organization with large spans of

[18] Meier (1993, 407) finds that in Texas school districts, the critical mass of Latino principals to decrease the number of Latino students in EMR classes is 16 percent, but the critical mass to increase the number in gifted classes is 23 percent. In addition, the percentage of Latino principals to decrease punishments assigned to Latino students is 24 percent for corporal punishments, 26 percent for out-of-school suspensions and expulsions.

control has difficulty in keeping track of their employees, so generally permits them to exercise more discretion. Their research finds that discretion strengthens the translation of passive into active representation.[19] Sowa and Selden (2003) measure minority supervisors' perception of how much discretion they have through a mail survey, and find that when minority perceive themselves as possessing significant discretion, they are more representative of minority interests by granting more resources to minority applicants.

Wilkins and Keiser (2006) investigate the effect of policy discretion by assuming that while bureaucrats in senior positions have discretion, others do not. Their main finding is that an increase in the number of female supervisors in a child support area office in Missouri leads to greater child support enforcement for women. On the other hand, an increase in the number of female caseworkers does not result in a significant increase in enforcement. Smith and Fernandez (2010) also find supporting evidence that increased minority representation in senior executive positions in federal agencies is associated with an increased proportion of federal contracts awarded to small minority-owned firms. In short, policy discretion serves as a moderator for the link between passive and active representation.

Politics of Active Representation in Bureaucracy

The activity of representation as acting for others must be defined in terms of what the representative does and how he or she does it, or in some combination of these

[19] Each additional percent increase in minority teachers is associated with 0.24 percent increase in the pass rate of minority students in high-discretion organizations, but just 0.16 percent increase in low-discretion organizations

two considerations (Pitkin 1972). However, most previous literature on active representation has mainly been devoted to the link between passive and active representation by focusing on what bureaucrats do for their social group. Little effort has been put into understanding of how they become active representatives. In this section, I will argue that active representation is the result not only of an individual's behavioral intention but also bureaucratic politics.

Organizational Socialization and Conflicts with Other Groups

Active representation occurs within an organization. It is implicitly taken for granted that bureaucrats produce policy outputs for their social group by mobilizing organizational resources. Thus, active representation should be understood in terms of organizational decision-making as well as individual intention.

Personnel vary in values and goals, so organizations generate numerous conflict-controlling and consensus-making mechanisms (Downs 1967). One of them is organizational socialization – the process by which employees (especially newcomers) fit in, adjust, and conform themselves to the organization by acquiring the attitudes, behaviors, knowledge, and skills required to function effectively as a member of an organization (Feldman 1976; Krislov and Rosenbloom 1981; Van Maanen and Schein 1979). Above all, it provides employees not only with an ordered view of the work life that precedes and guides experience, but also with the ground rules under which day-to-day activities are managed, regardless of employees' previous socialization (Louis 1980; Shibutani 1962). In short, organizational socialization allows an organization to minimize the effects of employees' personal values and attitudes on decision-making and to ensure

that they make decisions consistent with organizational goals and values (Oberfiled 2014; Simon 1957).

Socialization in an organization often conflicts with socialization in a social group before becoming part of the organization, which is a fundamental and crucial assumption to link passive and active representation (Dolan 2002; Meier 1993; Meier and Nigro 1976; Rehfuss 1986; Thompson 1976). In particular, organizational socialization is ongoing after a member joins an organization, and it is enforced through monitoring and motivational factors such as rewards and punishments. Wilkins and Williams (2008) present a notable and paradoxical finding that as the number of black police officers increases, the racial disparity in vehicle stops also increases. That is, black officers have been exposed to organizational socialization that indoctrinates them to adapt to their departments and achieve organizational goals, so they represent their organizations, not their social group (i.e., black drivers).[20]

Meanwhile, the theory of representative bureaucracy understands an organization as a natural system, meaning that an organization consists of a coalition of groups with conflicting goals (Long 1962). Employees create informal groups within a formal organization, which are based on the personal characteristics and relations of the specific participants, and act according to not only organizational roles and norms, but also their own values and beliefs (Barnard 1938; Scott and Davis 2007). Active representation is the outcome of successful collective action by an informal group. However, as the critical mass theory implies, active representation by minority bureaucrats can be retarded by

[20] Simultaneously, the study of Wilkins and Williams (2008) indicates that (1) white police officers have racial bias (or informal norm) toward black drivers, and that (2) black police officers are socialized by white colleagues to take on the informal norm.

those in the dominant social group. Kanter (1977a; 1977b) demonstrates that women's status in an organization depends on their relative number. If very few women compared to men are in the organization, then they are significantly marginalized and even subordinated to the dominant group (i.e. men), assuming stereotypically feminine traits. Similarly, Meier (1993) argues that if Latino principals do not achieve a critical mass in a school district, an increase in their proportion leads to a decrease in Latino students' performance.

Even if bureaucrats achieve a critical mass in their organizations and are able to represent their social group's interests in decision-making, conflicts with other informal groups cannot be avoided. Organizations have limited resources, so pursuing interests of a particular social group will generally be at the expense of another and inevitably cause conflicts.[21] Karpowitz et al. (2015) show in their lab experiment that women's increasing empowerment sometimes causes men's resistance. For example, in the case of majority rule, female participants must make up more than half of an experimental group so as to have equal opportunities to speak and defend successfully their opinions in a group discussion with male participants. In the case of unanimity rule, although on average women have more opportunities to express preferences than in the case majority rule, the effect of large number of women is offset by the countervailing benefit that the unanimity

[21] The experiment of Karpowitz et al. (2015) consisted of three stages. First, the researchers randomly assigned participants to 5-person groups that varied in their gender composition (i.e., number of women between 0 and 5) and decision rule (unanimous vs. majority rule), generating 12 experimental conditions (6×2). The researchers had 6-10 groups for each condition, making 64 groups in the dataset. Second, participants of each group were brought together and discussed about which principle of redistribution was most just and voted to choose their group's principle according to the decision rule. Finally, participants returned to private computer terminals and answered a series of questions about the nature of the discussion and their impressions of the other members of the group.

rule imparts to a numerical minority. Women in a unanimity-rule setting have fewer opportunities than men in any gender composition.

Self-interest versus Group interest

Bureaucrats are motivated by their own self-interests as well as by their formal organizational and informal group roles (Selznick 1948). Employees lower down in the hierarchy are under surveillance (or believe they are), resulting in timidity and caution among them (Downs 1967; Perrow 1979).[22] Given that they fear criticism from superiors and colleagues and have tendency toward self-protective behavior (Perrow 1979), it is not reasonable to assume that bureaucrats propose advocating their social group's interests as a policy agenda at the risk of exposing themselves to conflicts with their organization or another informal groups. As public choice theory has suggested (e.g., Niskanen 1971), a bureaucrat acts as a private person and pursues their private utility at least to the same extent as other persons are allowed.

At the same time, socialization in a social group based on an individual's socioeconomic traits (e.g., gender, race, region, and income) encodes and shapes the skills, attitudes, and very sense of self that individuals bring to social interaction, including peer interaction and creating an informal group in an organization (Selznick 1948; Tyler 1993). Besides, since power differences exist in an informal group (Blau 1964; Dornbusch and Scott 1975), members' behaviors are rewarded or sanctioned by

[22] Or according to person-organization fit theory (Christensen and Wright 2011; Kristof-Brown et al. 2005), some of them can leave because surveillance decreases employer attractiveness and makes them look for outside options. As a result, those remaining under hierarchical surveillance tend to have two characteristics –timidity and caution.

informal power based on interpersonal relationships – i.e., endorsed power –, depending on the degree of their compliance with informal norms and orders (Scott and Davis 2007). In addition to interpersonal authority, an informal group creates social pressure to follow informal norms through mutual surveillance. That is, members in an informal group police one another's behavior, keeping individual behavior in conformity with the informal norms (Gerber et al. 2010; White et al. 2014).

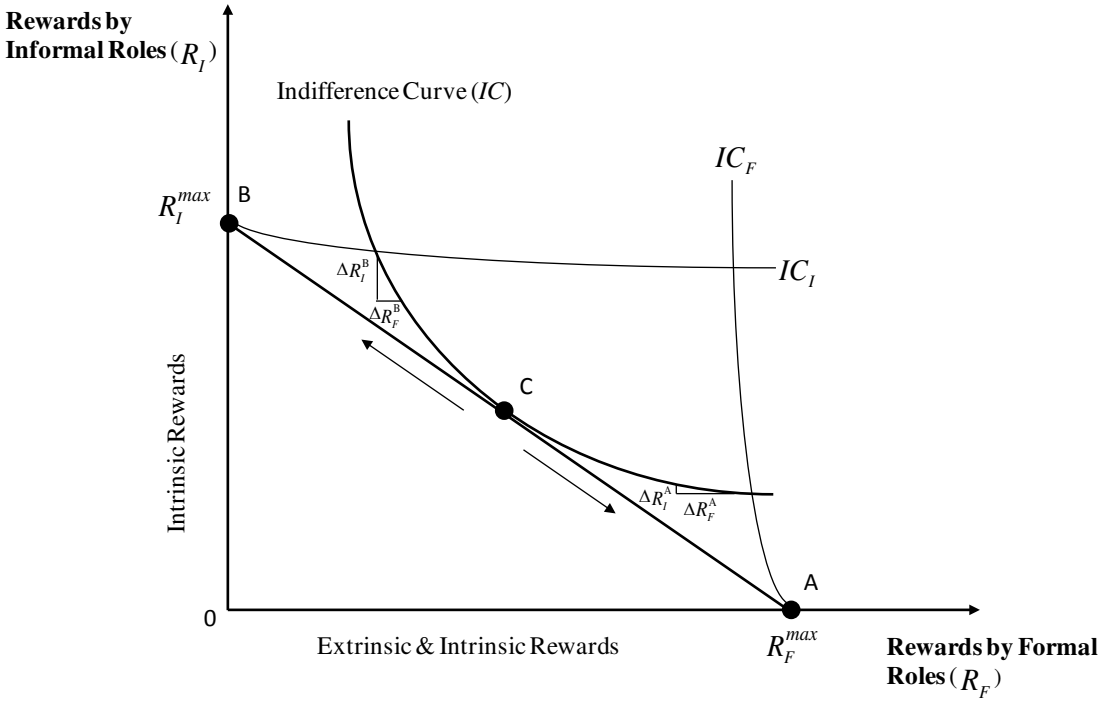
Because formal and informal role requirements are incompatible, bureaucrats face a commitment dilemma or an inter-role conflict. The conformity to informal norms and the pursuit of a social group's interests (group interests) may conflict with organizational goals and cause backlash from other informal groups, which hurts the individual interests of bureaucrats themselves (self-interests). Bureaucrats as representatives of their social groups may not be able to escape a trade-off between self-interest and group interest. If the intention to serve as an active representative is overwhelmed by the conflicts and requires significant personal sacrifice, then the translation of passive into active representation may not appear. Consequently, in order to serve as active representatives, bureaucrats have to deal with conflicts within their organizations and minimize their personal losses.

Politics of Active Representation

March and Simon (1958) suggest four processes of conflict resolution – problem solving, persuasion, bargaining, and politics. Although the processes focus on interpersonal or intergroup conflicts, their underlying idea is that conflicts can be resolved by behavioral mechanisms. Given that active representation is a certain

characteristic activity resulting from behavioral norms of a social group, the behavioral conflict resolution mechanisms can be translated into individual decision-making about how to balance formal and informal role expectations – i.e., minimizing personal loss while serving as active representatives. The former two processes assume that there are common goals, whereas the latter two are valid for a situation in which persistent differences in interests exist. Therefore, the realistic approach to resolve conflicts between self-interest and group interest with regard to active representation is (self) bargaining and politics.

Figure 3. Optimization of Self-interest in Active Representation



As individuals maximize utility by dividing time between labor and leisure, the self-bargaining process for active representation is based on a compromise between self-

and group interest through swaps and concessions. For example, as an extreme case of the bargaining, if an organization has overwhelming power vis-à-vis informal groups, then bureaucrats are given one choice – total dedication to their formal roles (i.e., management ideology or inactive representation) – because reward for active representation by informal groups never makes up for personal loss resulting from punishment for deviance by the organization (point A in Figure 3). On the other hand, if informal groups are not restrained by organizational control and enjoy absolute autonomy, their members totally follow informal roles and engage in rent-seeking at the expense of the organization or other groups (point B in Figure 3) because it is the way to maximize self-interest by receiving informal as well as formal rewards.

Just as consumers spend money to buy goods, it is assumed in Figure 3 that employees in an organization use their commitment in order to receive rewards from the organization or their informal groups. While formal organizations can compensate workers for their increased involvement in organizational goals through the use of intrinsic (e.g., praises, recognition, and relationships with colleagues) and extrinsic rewards (e.g., pay, promotion, and security), a set of tools that informal groups have to motivate members is generally based on intrinsic rewards. In other words, informal groups do not have personnel management authority and financial resources, but instead compensate conducting informal rules through the use of interpersonal resources such as information accessible only within the groups (Pescosolido 2001), increased status (Thompson 1967), and positive networking with group members (Riley and Cohn 1958). So, the total amount of rewards for total dedication to formal rules is bigger than that for

total dedication to active representation ($R_F^{max} > R_I^{max}$), which is attributed to the relatively limited ability of informal groups to reward.

The incompatibility between formal and informal roles causes commitment constraint (the line AB), on which decisions to act for a social group are made. And, people tend to have loss (or risk) aversion in decision-making, overweighing losses with respect to comparable gains (Kahneman and Tversky 1979). That is, the marginal value of both gains and losses is a decreasing function of their magnitude – diminishing sensitivity (Tversky and Kahneman 1991). As a result, although the maximum quantity of rewards obtainable from a formal organization exceeds that available in an informal group, management ideology does not always assure the highest level of value in the self-bargaining process.

Because of loss aversion and diminishing sensitivity, the value (or utility) function shows a convex indifference curve (*IC* in Figure 3), meaning a diminishing marginal rate of substitution (MRS) between the two kinds of rewards (R_F and R_I). For example, organizations have to provide more rewards than personal loss resulting from refusal of informal roles so as to exhort an employee, who has the indifference curve in Figure 3 with the reference point C, to be more dedicated to formal roles (i.e., $\left|\Delta {R_F}^A\right| > \left|\Delta {R_I}^A\right|$). On the other hand, likewise, punishment (losses) for deviance from formal roles at the reference point is overvalued than comparable gains for complying with informal roles (i.e., $\left|\Delta {R_I}^B\right| > \left|\Delta {R_F}^B\right|$). Proposition 1 summarizes this idea:

Proposition 1: *Active representation is in a trade-off with organizational roles.*

The political process refers to the same situation as self-bargaining, but posits that at least one group expands the arena of conflict so as to enlist the aid of outside forces (March and Simon 1958). In the bargaining process, bureaucrats are concerned about the degree of personal loss as the cost of active representation, which results from punishment (or reduced rewards) by the organization or other informal groups. If an informal group is able to reduce backlash from counterparts and the cost, their members are more likely to represent or more oriented to informal roles. That is, the marginal rate of substitution of active representation for formal role requirements (i.e., $\frac{\Delta R_I^B}{\Delta R_F^B}$) decreases, and the shape of the indifference curve approaches IC_I. To do that, an informal group seeks to mobilize the intervention of outsiders who can arbitrate or mediate conflicts with the organization or others in favor of the informal group. For instance, minorities at top leadership levels in government organizations can provide political power for minority bureaucrats to win the fight against organizational roles and other informal groups and reduce the cost of active representation (Henderson 1988; Winn 1989). Similarly, formal organizations can also mobilize external forces in favor of their interests, forcing employees to be more dedicated to formal roles (e.g., IC_F). The effect of external support on active representation is described in Proposition 2:

Proposition 2: *Support of external agents reduces the cost of active representation.*

All things considered, active representation should be understood in the context of political decision-making by individuals. Bureaucrats do something for their social groups by compromising their formal and informal roles and by optimizing self-interests in the trade-off with their informal (and social) group's interests. I specify two hypotheses grounded in the two propositions for analytical purposes.

> **Hypothesis 1**: *(self-bargaining) Active representation requires the loss of organizational rewards.*
>
> **Hypothesis 2**: *(politics) Bureaucrats reduce the loss of organizational rewards for active representation by mobilizing external support.*

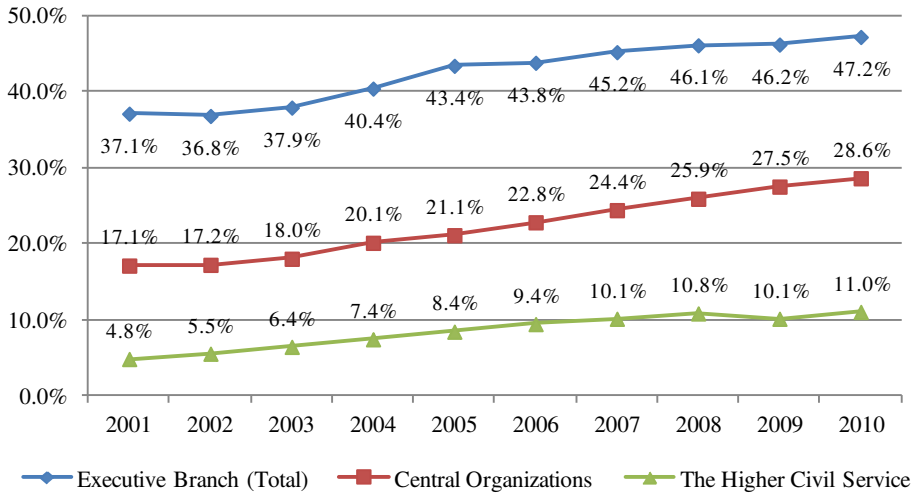
Data and Variables

Data Collection

To examine the political process through which active representation appears, I focus on female representation. Gender is the first system of social differentiation, a salient template for making sense of all sorts of social situations, and a social standard to which one can be held accountable in social relations (Ridgeway 2011). More specifically, this study examines female active representation in the South Korean government for two reasons. First, the Confucian tradition makes the difference in gender socialization between men and women more obvious. In a Confucian society like South Korea, women are still expected to be exclusively responsible for childcare and household work. They remain vulnerable to gender discrimination at work. Second, South Korea has experienced a rapid change in women's social status compared to the

past. For example, women's participation in the labor force has increased from 39.1 percent in 1968 to 49.7 percent in 2011 (Statistics Korea 2011). In this context, the South Korean government has implemented affirmative action programs for women, whereupon the ratio of women in the executive branch of the Korean government has steadily increased from 37.1 percent in 2001 to 47.2 percent in 2010. However, although passive representation seems to be almost achieved,[23] they still suffer from gender specific barriers to career progression, such as a lack of promotion to the higher civil service and limited access to positions in central organizations (see Figure 4).

Figure 4. Proportion of Women in the Executive Branch of the Korean Government



Source: Ministry of Security and Public Administration (MOSPA), South Korea.

The unit of analysis in this study is an organization in the executive branch of Korea. The dataset covers the period from 2002 to 2007 because the Korean government has provided data on gender representation since 2002 and because there was a great deal

[23] the proportion of women in Korea is 49.9 percent in 2010

of reorganization in the executive branch in 2008 when the leadership changed. Although there were 40 organizations as of 2007, four of them were established or abolished during the period. So, the dataset creates 224 observations for analysis. To control for heteroskedasticity and serial correlation across time periods, I include a set of dummy variables for individual years.

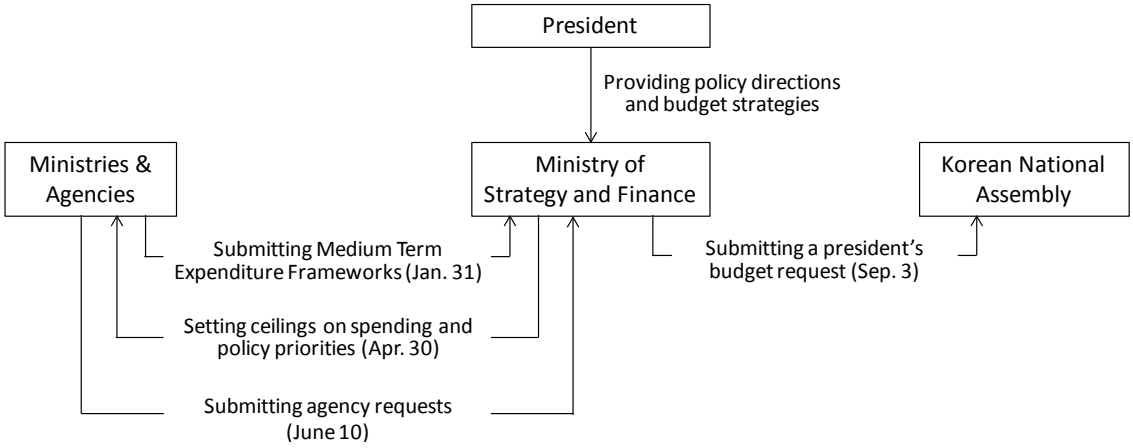
Active Representation: Women Support Fund in a President's Budget Request

The budget serves as a policy vehicle (Gosling 2009), so the extent of active representation by female bureaucrats is measured through the amount of funds that their organizations allocate to meeting women's needs. Taking this a bit further, the Korean Women's Associations United (KWAU), a coalition of Korean women's interest groups,[24] has demanded that the Korean government allocate or increase funds for eliminating the discrimination against women. And, they have identified and reported how much the government allocates to female education and employment, child birth and care, and the protection of women from domestic violence, sexual crimes, and pay inequality, which has been generally referred to as 'women support fund (WSF).' The WSF meets the three criteria of being a gendered policy area (Keiser et al. 2002): First, the fund directly benefits women as a class; second, the gender of a bureaucrat changes the client-bureaucrat relationship regarding the fund; and finally, allocating government resources to women's programs is defined as a political issue in Korea. In addition, given that the policy preferences of budget participants typically reflect their values (Gosling 2009), the

[24] 21 women's organizations established the Korea Women's Association United (KWAU) in 1987. This first national coalition has consolidated women's collective power and enhanced women's rights in Korea.

amount of the WSF is valid to measure the level of active representation by female bureaucrats.

Figure 5. Budgeting Process in the Executive Branch of the Korean government



A government budget must be appropriated by the legislature. During the appropriation process, a president's budget request is amended according to policy preferences of members of the legislature. So, in order to exclude active representation by female legislators, I analyze the amount of funds for women's programs in a president's budget request for the following year. Although this approach does not directly measure policy outputs for women, it can isolate active representation by female bureaucrats in the budgeting process, which is the main focus of this study. Meanwhile, agencies try to participate in developing a president's budget request by the Ministry of Strategy and Finance (MOSF), which functions like the Office of Management and Budget (OMB) of the US government by controlling the total amount of an agency's request and its distribution, so as to justify and protect their budget requests. That is, an agency reveals their policy preferences more clearly and accurately in a budget request than it does in an

agency's request. Thus, the amount of the WSF in a president's budget request is more adequate than that in an agency's request in order to assess active representation by female bureaucrats, and so I use it as the dependent variable in this study. Meanwhile, the currency of South Korea is the Korean Won (KRW), and the US Dollar to Korean Won exchange rate is about 1,100.[25] So, I adjust all budget variables in this dataset by dividing by 110,000,000, which is worth about 100,000 US Dollars.

Passive Representation and Policy Discretion

Three measures of passive representation are used: (1) the percentage of women in the higher civil service; (2) the percentage of women in subordinate positions; and (3) the percentage of total women. The grading system is the Korean civil service differs from the American system. The Korean general schedule is separated into nine grades and Grade 1 is the highest level. Positions classified Grade 5 or above are considered as the higher civil service, and bureaucrats in these positions are generally in charge of developing or supervising a policy (Kim 1993). Thus, it is assumed in this study that female bureaucrats in the higher positions have policy discretion of making resource allocation decisions based on their own values and preference (Rehfuss 1986; Rourke 1984). On the other hand, positions at Grade 6 or below are categorized as subordinate, and those in these positions receive orders from higher officials and often should change their behavior according to the orders. So, the second passive representation variable is used as a reference variable to control the effect of not having policy discretion on active representation.

[25] The USD-KRW exchange rate has fluctuated significantly. This study uses the average exchange rate in 2015, which is about 1,100.

The aim of the third variable is to find the critical mass for the translation of passive into active representation. However, as previously mentioned, the percentage necessary for the translation varies from 15 percent to 30 percent according to context (e.g., Dahlerup 1988; Kanter 1977b; Meier 1993). Thus, following the method suggested by Atkins and Wilkins (2013), I test the dependence of active representation on a critical mass by using representation categories. This approach has two advantages: first, it can examine the level of the effect of a critical mass differs across levels of passive representation; and second, it allows a researcher the flexibility of estimating the range of a critical mass, not specifying a threshold point. In this study, there are five representation category variables (see Table 7).

Table 7. Descriptive Statistics and Correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1. WSF in a budget request	204.88	1315.10												
2. WSF in the current budget	136.58	950.46	.96											
3. Total current budget	26702.81	58691.46	-.02	-.02										
4. Female leader	.065	.25	.52	.48	-.05									
5. Cabinet-level organization	.47	.50	.16	.15	.29	.17								
6. Women in the higher civil service (%)	9.56	10.64	.60	.53	-.04	.58	.13							
7. Women in subordinate positions (%)	26.48	16.44	.31	.28	-.005	.27	.07	.69						
8. Women in all positions (%)	21.51	15.11	.36	.32	-.008	.33	.03	.73	.97					
9. 0%−9% women (dummy)	.23	.42	-.08	-.07	.01	-.06	-.02	-.31	-.56	-.52				
10. 10%−19% women (dummy)	.38	.49	-.12	-.11	.04	-.10	.01	-.24	-.33	-.37	-.43			
11. 20%−29% women (dummy)	.15	.36	-.06	-.06	.02	-.06	.09	.03	.11	.07	-.23	-.33		
12. 30%−39% women (dummy)	.07	.25	-.04	-.04	-.09	-.07	-.04	.02	.27	.26	-.14	-.21	-.11	
13. Over 40% women (dummy)	.17	.38	.34	.03	-.02	.30	-.05	.62	.77	.83	-.25	-.36	-.19	-.12

Note: The correlation matrix is based on pairwise deletion.

Organizational Characteristics

The analysis takes into account four organizational characteristics: (1) a leader's gender; (2) the current budget; (3) the current WSF being implemented; and (4) organizational type. Leaders of organizations in the executive branch of the Korean

government are generally filled by political appointment. Many of them are external appointees, and especially all female leaders have been drawn from outside the civil service. Given that leaders make critical decisions on organizational structure and functions and play a central role in personnel management (Selznick 1957), whether they have the same socialization experience or not is an important variable for active representation by bureaucrats. For example, a female leader may serve as an external support for active representation on behalf of women by shielding female bureaucrats from the punishment inflicted by the organization or their male counterparts for performing informal gender roles. Besides, considering the patriarchal tradition and gender segregation in the higher civil service in Korea, the presence of a female leader is a rare and precious resource that a female group tries to mobilize so as to reinforce their active representation. Thus, a female leader is operationalized in this study as the aid of outside forces which reduces the cost of active representation by female bureaucrats and shifts them closer to gender roles.

Generally speaking, the more resources an organization has, the more resources the organization allocates to women's programs. This occurs mainly because abundant resources provide organizational slack, which also allows competing informal groups to increase funds for their group interests without lowering that of others. As a result, female bureaucrats can avoid internal zero-sum conflict with others in the budgeting process. Moreover, as the total amount of budget increases, the proportion of the WSF decreases. So, active representation by female bureaucrats becomes less visible and has received less attention due to its small percentage. This study controls the current budget in order to examine the net effect of passive representation of women on the amount of

the WSF.

In addition to the current budget, this study controls the amount of the current WSF. As policy makers focus on the increments of change by adjusting their choices to the choices of prior actors (Lindblom 1959), budgeting is incremental and stable because budget makers accept past allocation decisions as the budgetary base (Wildavsky 1964). That is, the largest determinant of this year's budget is last year's (Wildavsky 1988). So, the amount of the WSF in a current budget is included as a control variable to remove the influence of budgetary incrementalism.

Finally, the dataset in this study is comprised of 18 cabinet-level organizations and 22 affiliated agencies. Cabinet-level organizations are led by cabinet officers and have a broad range of administrative functions including policy making and planning resources, whereas affiliated agencies are controlled by non-cabinet officers and deliver specific public services such as fire fighting, police protection, and coast guard. Furthermore, affiliated agencies are responsible for reporting what and how well they perform to the prime minister or their superior organizations. Thus, I include the dummy for a cabinet-level organization to account for the differences in organizational type.

Analyses and Results

Table 8 compares the results of three models which include different passive representation variables. Model 1 includes the comprehensive variable – *Women in All Positions* –, which does not distinguish between female bureaucrats with and those without policy discretion. Model 2 focuses on the effect of policy discretion on active representation by including two passive representation measures, *Women in*

Subordinate Positions and *Women in the Higher Civil Service*. Model 3 is not only to detect the critical mass for female active representation, but also to examine the simultaneous effect of the two conditions by testing the interactions between *Women in the Higher Civil Service* and the representation category variables – five dummies for ranges in the percentage of female bureaucrats: 0-9%; 10-19%; 20-29%; 30-39%; and over 40%.

The comparison between Model 1 and 2 shows that ignoring the moderating role of policy discretion can lead to misleading implications: recruiting more minority members fosters active representation, regardless of which positions they take. Model 2 demonstrates the importance of having policy discretion. The linear term of female bureaucrats in the higher civil service is positive and significant, suggesting that increased passive representation of female bureaucrats in positions with discretionary decision-making power leads to an increase in policy outputs favored by women. A 1% increase in the female representation in the higher civil service is associated with a $1.95 million increase in the WSF in a president's budget request, which is about 14.3% growth compared to the average of the WSF in a current budget. On the other hand, the relationship between the amount of funds for women's programs (WSF) and the percentage of female bureaucrats in subordinate positions, who are not given discretion in the budgeting, is negatively significant. A 1% increase in the female representation in subordinate positions leads to a $354 thousand decrease in the WSF in a president's budget request.

Table 8. Determinants of the Women Support Fund (WSF) in the President's Budget Request

	Model 1	Model 2	Model 3
Passive Representation			
Women in All Positions (%)	3.65**	-	-
	(1.70)		
Women in Subordinate Positions (%)	-	−3.54*	−6.95***
		(1.89)	(2.37)
Women in the Higher Civil Service (%)	-	19.53***	−9.05
		(3.83)	(14.66)
Women in the Higher Civil Service × 10%−19% Women-dummy	-	-	11.56
			(12.56)
Women in the Higher Civil Service × 20%−29% Women-dummy	-	-	17.39
			(14.20)
Women in the Higher Civil Service × 30%−39% Women-dummy	-	-	25.65
			(18.59)
Women in the Higher Civil Service × Over 40% Women-dummy	-	-	32.18**
			(15.25)
Incremental Budgeting			
WSF in the Current Budget	1.26***	1.22***	1.19***
	(0.03)	(0.03)	(0.03)
Organizational Characteristics			
Female Leader (yes=1)	395.20***	122.83	108.14
	(114.66)	(122.06)	(120.86)
Cabinet-level (yes=1)	27.72	8.74	41.63
	(49.45)	(47.04)	(48.17)
Total Amount of the Current Budget	−0.0001	−0.0001	−0.0003
	(0.0004)	(0.0004)	(0.0004)
Constant	−93.15	−81.39	98.67
	(72.09)	(71.33)	(94.64)
N	220	220	220
F value	314.34	319.72	240.54
R^2/adjusted R^2	0.94/0.93	0.94/0.94	0.95/0.94

Note: Unstandardized coefficients are given, with SEs in parentheses. Dummy variables for the time period are included, but not shown in this table. Levels of significance: *$p < .10$; **$p < .05$; ***$p < .01$.

As mentioned already, I use the representation category variables to find a critical mass. However, since policy discretion is found necessary for active representation, a question arises as to whether the two conditions should be satisfied or

at least one of them. To answer this question as well as to find a critical mass, I add interaction terms between the percentage of women in the higher civil service and each of the four representation categories. Organizations where women constitute less than 10% of the total workforce serve as a reference group. In Model 3, the coefficient of *Women in the Higher Civil Service* is not significant, suggesting that we cannot rule out the effect of the critical mass even if the effect of policy discretion is controlled. Only the last interaction term – *Women in the Higher Civil Service* × *Over 40% Women* – has a positive and significant coefficient. That is, if female bureaucrats are in an organization where men are dominant and occupy more than 60% of workforce, then they do not significantly produce policy outputs for women, even if policy discretion are given to them.

Additionally, the gender of a leader in and of itself is of little practical value in promoting active representation for women in the preferred models (Model 2 and 3). While not a focus of this study, the coefficient of *WSF in the current budgeting* has a positive and strongly significant value, revealing that there is an incremental increase in the amount of the WSF. Other two organizational characteristic variables – type and size – have no effect in the budgeting decision process.

Model 4–6 in Table 9 are estimated to examine the inter-role conflict between organizational and gender roles. In the models, the dependent variable is the percentage of female bureaucrats in the higher civil service. Bureaucrats are motivated to maximize their own gain, such as power, income, and prestige. Of different types of rewards that an organization provides to employees who have done a good job in their organizational roles, promotion is more satisfactory than others because the range of

variation in power, income, and prestige among different levels in the hierarchy is much greater than the range available at any one level (Downs 1967, 92). Unfortunately, the dataset in this study does not include the career path of an individual, so I use the percentage of women in the higher civil service as a proxy to capture punishments for performing gender roles by the organization or other informal groups (i.e., male bureaucrats).

The main independent variable is the growth of the WSF. To put it more concretely, it measures how much the amount of the WSF in a president's budget request increases compared to that in the current budget.[26] A higher value implies that female bureaucrats in the higher civil service act more aggressively for women in the budgeting decision process. In analysis, the variable is lagged one year (t-1) because it takes time for the organization or other informal groups to recognize and punish their active representation and because last year's performance is generally used as a baseline for managerial decision-making including reward and punishment.

[26] So, the growth of the WSF variable was calculated as follows:

Growth = the amount of the WSF in a budget request – the amount of the WSF in the current budget

Table 9. Determinants of the Percentage of Women in the Higher Civil Service

	Model 4 (Whole Sample)	Model 5[a] (Starting the WSF)	Model 6[b] (Increasing the WSF)
Active Representation			
Growth of the $WSF_{(t-1)}$	−0.0016***	0.1851	−0.0014***
	(0.0003)	(0.8340)	(0.0003)
External Support			
Female Leader (yes=1)	2.0615***	3.2610***	1.0422
	(0.6490)	(0.9769)	(0.8904)
Internal Support			
Women in Subordinate Positions	0.0978***	0.0265	0.1383***
	(0.0248)	(0.0439)	(0.0314)
Control Variables			
Women in the Higher Civil $Service_{(t-1)}$	1.0102***	0.9777***	1.0608***
	(0.0212)	(0.0345)	(0.0348)
Women in All $Positions_{(t-1)}$	−0.1043***	−0.0246	−0.1738***
	(0.0283)	(0.0394)	(0.0405)
WSF in the Current $Budget_{(t-1)}$	0.0001	-	0.0000
	(0.0002)		(0.0002)
Cabinet-level (yes=1)	−0.1647	−0.2029	0.2457
	(0.2575)	(0.3366)	(0.4495)
Total Amount of the Current Budget	0.0000001	0.0000006	0.0000025
	(0.0000020)	(0.0000026)	(0.0000031)
Constant	−0.1751	0.2609	−0.4706
	(0.3709)	(0.5116)	(0.6145)
N	181	116	65
F value	674.22	121.15	595.46
R^2/adjusted R^2	0.98/0.98	0.93/0.92	0.99/0.99

Note: Unstandardized coefficients are given, with SEs in parentheses. Dummy variables for the time period are included, but not shown in this table. Levels of significance: *$p < .10$; **$p < .05$; ***$p < .01$.

[a]: Model 5 is run with the subsample of organizations which do not have WSF in the last year's budget.

[b]: Model 6 is conducted for organizations which have WSF in the last year's budget.

In Model 4, the coefficient of *Growth of the $WSF_{(t-1)}$* is negative and significant, meaning that if more funds were allocated to women's programs in a budget request for the current year, which was conducted in the previous year (t-1), the percentage of female bureaucrats in the higher civil service decreases. This result suggests that female bureaucrats are punished for their active representation through the loss of

promotion opportunities by the organization or the dominant group, supporting Hypothesis 1. On the other hand, the coefficients of both support variables have a positive sign and significant at the 1% level. A 1% increase in the percentage of female bureaucrats in subordinate positions (*internal support*) leads to 0.1% increase in the percentage of female bureaucrats in the higher civil service. Similarly, the presence of a female leader (*external support*) is associated with an approximately 2.1% increase in female bureaucrats with discretionary power and more than makes up for the punishment for active representation, which supports Hypothesis 2.

In order to further examine the finding that active representation requires sacrifice of formal rewards, I divide the whole sample into two subsamples: One includes 116 organizations which did not have the WSF in the previous year (Model 5) and the other includes 65 ones with the WSF in the previous year (Model 6). The coefficient of *Growth of the* $WSF_{(t-1)}$ is no longer significant in Model 5, meaning that the first attempt to advocate women's interests does not result in the loss of promotion. However, the variable has a significant and negative coefficient in Model 6. Among the support variables, external support has a statistically significant and positive impact on starting the WSF (Model 5, $\beta = 3.26$, $p < .01$), but is not significant when increasing the fund. On the contrary, internal support is not significant in Model 5, but has a significantly positive impact on increasing the WSF (Model 6, $\beta = .14$, $p < .01$).

Discussion and Implications

Organizational socialization for new minority bureaucrats is influenced and even directed by a dominant group, forcing new minority bureaucrats (or any new

bureaucrats for that matter) to play subordinate roles. Also, minority bureaucrats in lower positions are marginalized and act like a member of the dominant group to get ahead in the organization (Kanter 1977a; 1977b). They can keep and base decisions on their personal values and attitudes by occupying a higher position and having policy discretion. In other words, policy discretion is a prerequisite for the translation of passive into active representation. However, if policy discretion is not given, not only does passive representation not correlate with active representation, but it can also hurt the interests of a social group, as revealed in Table 8. The moderating effect of policy discretion in the pathway between passive and active representation takes place when a critical mass is achieved. Only minority bureaucrats, who have policy discretion and receive enough support from their informal group, can produce policy outputs for their social group.

The critical mass of female bureaucrats examined in this study is about 40%, which is relatively higher than found in previous research. This difference can be attributable to social factors in Korea. First, minority groups cooperate with each other and serve as a source of political support for active representation by a partner group. For instance, Bratton and Haynie (1999) find a reciprocal relationship between black and female legislators. Compared to their white male counterparts, black legislators introduce more women's interest measures and female legislators are more supportive of blacks' interests. Unlike previous studies using data sampled from an ethnically diverse country (e.g., Meier 1993 and Kanter 1997b from the US), this study examines representative bureaucracy in Korea, which is an ethnically homogenous country. Thus, female bureaucrats in Korea do not have other partner groups in their organization, so

they cannot expand the base of internal support for their active representation beyond their own boundaries. A higher critical mass is required for active representation by a minority group that has no partner group. Second, because of the Confucian tradition, gender discrimination is more severe in East Asian countries than in Western countries. According to the 2014 Global Gender Gap Report published by the World Economic Forum (WEF), Korea has a low gender equality (117th out of 142 countries), whereas the US ranks in the top 20 (Hausmann et al. 2014).[27] Although details remain to be filled by further research, it seems that the greater the social pressure for women to conform to stereotypically feminine roles and patriarchal social orders, the greater critical mass is necessary for active representation by female bureaucrats.

The importance of a critical mass also provides a new perspective for interpreting female (or minority) representation in lower levels of a hierarchy. Considering the pyramidal hierarchy of employees, bureaucrats in subordinate positions significantly contribute to achieving a critical mass. Although they cannot act as active representatives, female representation in the bottom of the pyramidal hierarchy builds a crucial foundation of internal political support for active representation by other in-group colleagues with discretion. On the other hand, female leaders, who are external appointees and not (or less) influenced by organizational socialization, are more committed to their formal roles at the expense of informal roles – active representation (see Model 2 and 3). This is because of fear of punishment by the president and, subsequently, because of fear of loss of self-interest, which cannot

[27] China, Japan, and South Korea in East Asia rank 87th, 104th, and 117th out of 142 countries, respectively. On the other hand, Canada, the United States, and the United Kingdom rank 19th, 20th, and 26th, respectively.

be offset by rewards for assuming gender roles. Regardless of demographic origins, greater managerial accountability forces bureaucrats to accept management ideology.

The intention to benefit a social group is not a distinct characteristic of a specific informal group (or minority bureaucrats), so the willingness of an informal group to serve as an active representative may conflict with that of another groups. Furthermore, informal roles to benefit a social group are often incompatible with formal roles to accomplish organizational goals. Thus, as indicated in Model 4, active representation requires the loss of organization rewards. However, the sacrifice can be mitigated by internal or external support. First, minority bureaucrats in subordinate positions protect their in-group colleagues with discretion from punishment for active representation as well as contribute to achieving a critical mass. Second, although not directly producing policy outputs for the social group, a minority leader serves as an external source of political support for active representation by minority bureaucrats by minimizing the loss of organizational rewards.

A sacrifice of organizational rewards for active representation can be better understood according to the context of the observations. For example, in the case of the first attempt to advocate women's interest in this study (Model 5), active representation does not require the loss of organizational rewards. There are two explanations to account for this finding. First, in the social atmosphere which favors women's rights and interests in Korea in the early 2000s,[28] no wonder women's programs were developed and financed, especially for organizations without the WSF. Second, the average amount of funds allocated to new women's programs is very low (about $3,131,

[28] The Ministry of Gender Equality and the National Human Rights Commission were established in 2001 to improve women's status and protect human rights, respectively.

see Table 10), which does not have a substantive effect on increasing women's interests. To sum up, because the advocacy of women's interests is socially supported and less intensive within an organization, female bureaucrats can produce polity outputs for women without the threat of punishment.

Observations in Model 6 try to increase the WSF and show an average of a $22.1 million increase in the process of making a budget request (see Table 10). Unlike the symbolic act of starting new but small women's programs, representing substantive interests of women is punished, decreasing the percentage of female bureaucrats in the higher civil service in the following year. In short, active representation is punished in these organizations.

Table 10. Growth of WSF and Female Bureaucrats with Discretionary Power

	Average Increase in the WSF in a President's Budget Request[a]	Average Percentage of Female Bureaucrats in the Higher Civil Service
Organizations without the WSF in the previous year (Model 5)	$0.03 (0.30)	8.14% (6.95)
Organizations with the WSF in the previous year (Model 6)	$221.34 (857.61)	13.96% (14.89)

Note: Standard deviations are in parentheses. The null hypothesis of no difference is rejected for all comparisons.
[a]: One unit is worth approximately $100,000.

The effects of the two support variables also vary with the context of active representation. Internal support from minority bureaucrats in subordinate positions offsets the loss of organizational rewards only in cases of weak active representation. For example, in Model 5, a one-standard-deviation increase in female bureaucrats in subordinate positions raises the percentage of female bureaucrats in the higher civil service by 2.67%, which overcomes the negative impact of a one-standard-deviation

increase in the WSF in the lagged year (−1.23%). On the contrary, the positive effect of external support (i.e., female leader) disappears in Model 6. Minority leaders cannot totally deviate from management ideology and responsibilities, and have to keep a balance among different tasks. Encouraging employees to devote organizational roles and controlling conflicts within organizations are duties of top leaders.

Conclusion

The theory of representative bureaucracy is a normative one that describes an ideal role of bureaucracy in the formation of a good state. As Edmund Randolph warned at the Constitutional Convention in 1787 (Balinski and Young 1982), "If a fair representation of the people be not secured, the injustice of the Govt. shall shake to its foundation." Thus, passive representation in bureaucracy itself is a way to obtain legitimacy of governments from the public. And also, active representation is related to the reason why governments exist. Democratic governments have an obligation to satisfy the basic needs of their citizenry, and have to take account the percentage of the population left without basic needs being met (Oppenheimer 2012). Given that increasing the welfare of the poorest is a way to promote social welfare and justice (Rawls 1971), active representation by bureaucrats who come from under-represented and discriminated groups is rationalized because they know best what their social groups want. Therefore, it is necessary to understand minority bureaucrats as political agents who try to satisfy (or maximize) their social groups as well as human resources of their organizations.

This study contributes to the literature on representative bureaucracy by providing a framework for modeling how decisions to serve active representatives within organizations are made. It is grounded on the assumptions that bureaucrats are self-interested (Downs 1967; Niskanen 1971) and that there is inter-role conflict between organizational (formal) and minority (informal) roles. Bureaucrats find the optimal point at which self-interest is maximized in the conflict. For example, if an organization has a powerful reward/punishment system and a minority group cannot compensate the punishment or the loss of organizational rewards, then minority bureaucrats are not willing to carry out minority roles. This study indicates that the framework is acceptable by proving two propositions drawn from it: Active representation is in a trade-off with organizational roles (Proposition1), but support of external agents reduces the cost of active representation (Proposition 2).

In addition, this study adds evidence to the literature demonstrating that the two prerequisites – policy discretion and a critical mass – must be satisfied for active representation to occur. It is also found that the size of a critical mass depends on the context. A larger size of a critical mass is necessary if a minority group has no partner groups and cannot expand the base of internal support for their active representation and/or if the culture of a society is less concerned about diversity and minority rights. For example, I show that because of the two reasons, women in the Korean bureaucracy need a critical mass of about 40% for their active representation.

Clearly, this study also has a number of limitations. First, and most importantly, I cannot examine the proposition that informal groups compensate their members for performing informal roles because of data constraints. This proposition is

another critical element of the framework of self-interest. Second, the framework describes active representation as an individual's decision, but the empirical analysis has been carried out using organizational-level data. Although it is commonly done in the literature and not a statistical issue, this study commits a fallacy of division. Thus, it should be noted that individuals have different levels of reward motivation and socialization pressure for active representation and that the intensity of active representation depends on individual characteristics.

The framework developed in this study calls for additional research on whether and how it is relevant and appropriate to explain decision-making for active representation. Also, besides the two propositions proved here, the framework contains various propositions about the politics of active representation, which need empirical evidence. My hope is that this study will provide 'food for thought' to representative bureaucracy theorists and the framework will be investigated and verified by future research.

Chapter IV
Ecology of Government:
The Dynamics of Organizational Decline and Death

Introduction

The survival of government organizations has attracted a great deal of empirical attention (Adam et al. 2007; Boin et al. 2010; James et al. 2015; Kaufman 1976; Lewis 2002; Peter and Hogwood 1988). A government as a whole cannot be replaced by business or nonprofit organizations and has generally expanded, but its subunits (e.g., departments or ministries in an executive branch) are not immortal. Their roles and functions are transferable to others in the government (Lewis 2002). However, organizational structure to perform certain policies indicates the degree to which they receive attention and support from politicians and the public because structural choices have important consequences for whether and how the policies turn into outcomes (James et al. 2015; McCubbins et al. 1989; Moe 1989). Especially, organizational decline or death has two important implications. First, if functions of an organization are no longer considered important, the organization will be terminated and its functions will be transferred to others or less resources will be allocated and the organization will decline. Second, changes in organizational structure have been used as a performance measure (Carroll and Swaminathan 1992).[29] Therefore, the survival of an organization means that it has performed well historically. For instance, the cessation of the United State Immigration and Naturalization Service (INS) is a classic example of replacing a poorly-

[29] Carroll and Swaminathan (1992) suggest six reasons why failure and mortality of an organization deserve consideration as a performance measure.

performing organization with new ones. The agency was widely seen as ineffective, particularly after the September 11 attacks (9/11) in 2001 (U.S. Department of Justice 2002). Thus, eventually, the functions of the INS were transferred to three agencies by the Homeland Security Act of 2002: (1) immigration services to the U.S. Citizenship and Immigration Services (USCIS); (2) investigation and deportation to the U.S. Immigration and Customs Enforcement (USICE); and (3) border functions to the U.S. Customs and Border Protection (USCBP).

Defining an organization is a first and fundamental step before studying organizational change. The concept of an 'organization' is not universally defined, and three contrasting definitions have arisen in terms of which features of an organization are emphasized: rational, natural, and open system. In the first definition, organizations are viewed as highly formalized collectivities to achieve specific goals. The second definition focuses attention on the behavior of members of an organization and perceives organizations as social systems in which participants not only pursue multiple interests, but also recognize the value of perpetuating their organizations as an important resource. The closed system view of the two previous definitions has been challenged since the 1960s by the open system view, which takes account of the effect of the environment on organizations. So, the third perspective defines organizations as activities involving coalitions of participants with varying interests embedded in wider environments (Scott and Davis 2007).

This study discusses the decline and death of government organizations based on the open system perspective because relationship with and dependence on the political environment is a distinctive and salient feature of public organizations. For example, they

are often controlled by their political masters (Rainey 2003; Wood and Waterman 1991). In other words, interaction with the environment is essential for them to function and survive, which is the focus of the open-system view. Of several open-system theories, I use organizational ecology as a theoretical base for three reasons. First, political control of public organizations implies the importance of environmental effects on public organizations. Second, the importance of the environment can hardly be more strongly underlined than it is in organizational ecology (Scott and Davis 2007). Third and finally, given that all organizations have inherent tendencies to expand (Downs 1966; Parkinson 1957), decline or death cannot be a strategy that organizations employ for adapting to varying environment. Thus, some open-system theories focusing on response and adaptation of organizations to environmental changes (e.g., structural contingency theory) are not given consideration in this study. Consequentially, organizational ecology is appropriate for exploring environmental effects on organizational decline and death.

However, it should be noted that public organizations are somewhat different from private ones (Perry and Rainey 1988; Wamsley and Zald 1973; Warwick 1975). For example, while the survival of business firms is generally determined by their performance in the market, public organizations are required to operate because of political and social justifications, such as maintaining individual rights and freedoms, providing public goods, and meeting other social demands (Rainey 2003). So, as previous studies have pointed out (e.g., James et al. 2015; Lewis 2002; Moe 1989; Park 2013; Robinson 2004), it is undoubtedly important to consider political factors as critical causes of the survival of public organizations. However, on the other hand, public and private organizations both have some common features and are subject to a common set of rules,

so they can be organized according to the same principles (Christensen et al. 2007). That is, the survival of public organizations should be also investigated from the viewpoint of organization theory as well as that of politics.

The subsequent discussion proceeds as follows. In the following section, I describe organizational ecology as a guiding theory for understanding environmental effects on organizational decline and death in the public sector. I then advance a set of hypotheses concerning organizations decline or death on the basis of not only propositions of organizational ecology but also findings of previous studies which recognize political and economic effects on structural change of a public organization. This complementary process is necessary in order to enhance the theoretical fitness of organizational ecology for the public sector. In the fourth section, I outline research designs and methods to test the hypotheses. Finally, I conclude with a brief summary and with reasons why an open-system approach is required to deepen understanding of public organizations.

Organizational Ecology

Natural Selection of Organizations

Most ecology studies have been conducted at the population level, through which organizational ecologists can explore the nature of the larger system of relations in which an organization is but one player among many and the evolutionary mechanism of organizations (Scott and Davis 2007). Thus, the terms of 'organizational ecology' and 'population ecology' are often used interchangeably (e.g., Hannan and Freeman 1989).

As described briefly in the previous section, organizational ecology is an alternative paradigm within organization theory in the way that it is distinct from existing theories with an emphasis on rational adjustment of structure by individual organizations to the situation (Donaldson 1995). It has paid attention to the effect of the environment on organizational changes. To put it more concretely, an organization adjusts to external conditions through birth-and-death process of natural selection (Baum and Amburgey 2002; Donaldson 1995; Hannan and Freeman 1989), and the process is an important source of diversity of organizations in a population. And also, non-vital changes, such as growth and decline in organizational structure, serve as another source of organizational diversity through the addition of new forms to a population or the influence on vital changes.

Natural selection of organizations arises through three stages: variation, selection, and retention. While in organic evolution, variations occur through the genetic mutation process, organizational variation comes about due to different responses of organizations to external stimuli according to their own characteristics such as experience, culture, and capacity (Baum and Amburgey 2002). Selection mechanism constitutes the central pillar of organizational ecology, arguing that the environment differentially selects or eliminates some organizations on the basis of the fit between organizational structure and environmental characteristics (Aldrich and Pfeffer 1976). The final stage involves the operation of a retention mechanism, through which certain organizational variations selected by the environment in the previous stage are preserved, duplicated, or reproduced. However, it should be noted that the retention phase is not stable. Organizations are continuously exposed to external stimuli and the diffusion of the

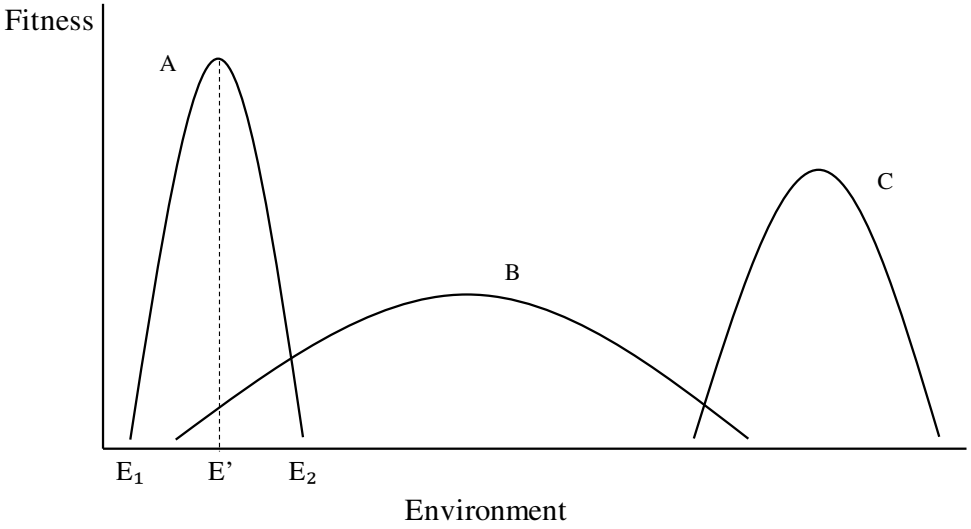
variations increases the degree of competition for resources in the population (Baum and Amburgey 2002), which triggers another process of natural selection process.

Niche Theory of Fitness

As organizational ecology states, organizations have to maintain the state of being fit for the environment in order to survive. Organizational fitness is determined by the niche that an organization occupies. The niche was first mooted by bio-ecology and is defined as the set of environmental conditions within which a species can reproduce itself. In organization theory, the organizational niche includes not only a set of social, economic, and political conditions and forces affecting the life and development of an organization, but also relationships that the organization intentionally or unintentionally has, which serves as the base of organizational activities for survival. Since organizations have their own niches, the environment may provide some organizations with favorable conditions for reproduction and growth, but the others with severe survival conditions.

As shown in Figure 5, the niche indicates a range of conditions, which is named as niche width. And, there is a variance in the level of prosperity in the niche width. For example, organization A can survive in their niche width from E_1 to E_2, but prosper in the environment of E'. However, it should be noted that residence in the niche does not always guarantee the survival of the organization. The niche width causes natural selection by competition. Organizations whose niches overlap will compete for limited resources, and some of them can occupy no portion of the niche. The environment excludes the defeated out of the population.

Figure 6. Hypothetical Fitness Functions



Source: Hannan and Freeman (1989, p. 99, Figure 5.1)

An organization with a broad niche width (e.g., organization B in Figure 6) has considerable plasticity in resource use. However, at the same time, the broader the niche of an organization, the more likely the organization competes with other rivals. From this dilemma, two organizational strategies for survival have been developed: 'specialist,' occupying a very narrow band of environmental variation but maximizing its exploitation of the environment versus 'generalist,' accepting a lower level of exploitation in return for the capacity to survive under diverse environmental conditions (Freeman and Hannan 1983; Hannan and Freeman 1977; Scott and Davis 2007). Generalist organizations hold some productive capacity in reserve (i.e., organizational slack) to cope with future environmental fluctuations, whereas specialist organizations commit most of their resources to maximize organizational fitness for the current environment.

Competitive advantages of the two organizational strategies are determined on the basis of environmental variation. Organizational ecology addresses two dimensions of

environmental variation: variability and grain (Freeman and Hannan 1983). The former refers to the variance in environmental fluctuation about their mean, and the latter refers to the length of typical periodicities. In the environment with low variability, while organizational slack of generalists is of no use at all, specialist organizations can maximize efficiency and effectiveness in achieving their objectives. Thus, specialism is the optimal strategy in environments with low variability. Meanwhile, if variations occur frequently and their typical durations are long relative to the lifetime of an organization, then the environment is said to be coarse-grained. In contrast, a particular environmental fluctuation only exists for a brief period, which is termed as fine-grain. In coarse-grained environments, generalist organizations are selected for survival because by using their organizational slack, they are able to withstand and sustain longer periods of environmental variations. However, in fine-grained environments, organizational slack does not provide any evolutionary advantages because buffering against a short period of environmental fluctuations does not need a large amount of reserve capacity. Thus, generalist organizations appear inefficient due to the waste of resources and specialism emerges as the optimal strategy in fine-grained environments.

Structural Inertia Theory of Environmental Determinism

Organizational ecology argues that the environment determines the survival of organizations. However, it does not necessarily mean that organizations never try to transform their structures. They respond to threats and opportunities in the environment, but not quickly enough so that their adaptations do not enhance the chance of survival, and natural selection replaces adaptation as the vehicle of change (Astley and Van de Ven

1983; Betton and Dess 1985; Hannan and Freeman 1989). The lack of capability to balance the speed of organizational response with the temporal patterns of relevant environments is due to structural inertia, which is defined as the tendency to resist changes and maintain a state of rest. A high level of inertia increases the gap between availability and requirement of adaptation strategy of an organization in changing environments.

Structural inertia results from both internal and external factors (Hannan and Freeman 1977, 1989). Constraints arising from internal considerations are 1) sunk costs, 2) imperfect information, 3) internal politics, and 4) organizational histories. First, decision-making in organizations is strongly subject to previous decisions, especially concerning investments in specific assets which are not easily transferable to other tasks and functions – sunk costs. Second, rational adaptation stems from the assumption of perfect information. In reality, however, organizations rarely receive full information with respect to the risk of changing environments. Although they employ strategic planning for imperfect-information situations, it should be noted that strategic planning is based on what they think will happen. Consequently, organizations are less likely to recognize the necessity of reorganization, so adaptation to environmental changes is slow and incomplete. Third, adaptation is followed by redistribution of resources, which may bring about conflicts among subunits and resistance by those who lose thereby. Finally, it is costly to change standardized work procedures and authority allocation processes. Organizations with long histories of operations tend to have normative agreement on functions and resource distribution, so any attempt to change organizational structures require huge amount of time and energy, confronting structural inertia.

Structural inertia is also derived from external pressures. First, as legal and fiscal barriers to entry and exit do in the business sector (Hannan and Freeman 1984), legal procedures and time requirements to reorganize a government serve as a source of structural inertia. For example, public organizations are established by law, and they are not allowed to arbitrarily end their services. As a result, these barriers raise the tendency to maintain the status quo by increasing the cost of change. Second, the problem of imperfect information has been worsened in turbulent environments. So, the tendency to draw on organizational histories becomes more conspicuous. Finally, changes in organizational structure by adaption may threaten current organizational legitimacy, resulting in the loss of institutional support and resources which had been granted. Legitimacy threat makes organizations hesitate to adjust themselves to new environmental conditions.

Structural inertial serves as a criterion for the environment to decide which organizations survive as well as a reason why adaption cannot become a strategy for survival. In population ecology, organizational competence is composed of two properties: reliability and accountability (Amburgey et al. 1993; Hannan and Freeman 1984, 1989). Reliability is the capacity to produce outputs with low variance in quality in a timely manner. Accountability is defined as holding organizations to account for their actions. Organizations with low reliability and accountability are considered as incompetent, and less likely to be selected by the environment for survival. High level of reliability and accountability are achieved through processes of institutionalization and by creating organizational routines (Hannan and Freeman 1984). First, institutionalization lowers the cost of organizing collective action by inducing members to take accepting

organizational goals and strategies, and authority relations for granted. Second, organizational routines are defined as repetitive and recognizable patterns of collective actions such as military drills (Nelson and Winter 1982). By formulating and remembering a means by which to accomplish goals and missions, organization can produce reliable and accountable performance.

The two solutions that provide advantage of competence in natural selection imply that surviving organizations had successfully resisted environmental changes. In other words, inertia is a by-product of selection. High competence is accompanied by strong structural inertia, and natural selection favors organizations whose structures have high inertia (Hannan and Freeman 1989). Individual organizations are characterized by different degrees of structural inertia, and the strength of inertial forces varies with age, size, and complexity of an organization. Thus, structural inertia theory argues that the survival of organizations is influenced by not only environmental factors, but also their demographic characteristics.

Determinants of Organizational Decline and Death

Organizational ecology and related studies have focused on business firms and paid little attention to characteristics of public organizations. For example, political control is a distinctive characteristic of the public sector. Thus, I develop a set of hypotheses regarding determinants of the decline and death of public organizations by adjusting the theory of organizational ecology to the public sector and by introducing political factors which have been found to influence the mortality rate of public organizations.

Niche: Density Dependence and Environmental Conditions

The environment of each organization is mainly composed of other organizations, from which the density development model was derived. Density is technically defined as the number of organizations or the sum of the sizes of all organizations in the population. Niche overlap does neither necessarily lead to competition for scarce resource, nor does it have a linear effect on mortality. The niche has a carrying capacity, below which all organizations prosper. Also, in terms of institutional process (e.g., DiMaggio and Powell 1983; Meyer and Rowan 1977), a growth in the density can increase the institutional legitimacy of a specific organizational form – institutional isomorphism. To sum up, rising density can encourage the addition of new organizations to the population. However, the limited carrying capacity of the niche produces a ceiling on the legitimation process. After the threshold of the capacity is reached, competition operates to eliminate relatively incompetent organizations, and the denser the population is, the more intensified the competition becomes. Because of the legitimation and the competition effects, organizational decline and death are expected to have a non-monotonic relationship with population density.

> **Hypothesis 1**: *(non-monotonic relation) Organizational decline or death rates will have a U-shaped relation with the population density.*

Organizations are imprinted with social structure or environmental variables that were common when they were formed (Stinchcombe 1965). In this context, the social

context at time when an organization was founded influences the decline and death of the organization. First, some functions, such as national defense and foreign affairs, are considered essential enough to be implemented at the organizational level in a government. So, organizations assigned to perform the core functions become founding members of a government, and their continued existence has been perceived as being taken for granted. Second, new organizations established in competition periods tend to be pushed to the margin of resource distribution and cannot move quickly from organizing to full-scale operation (Carroll and Hannan 1989), which results in less-developed organizational routines and low capacity to overcome challenges. That is, new entrants are subject to severe selection pressures. Since an increase in population density implies an increase in the number of rivals and intense competition for limited resources, it is expected that population density at time of founding is positively related to organizational decline or death.

Hypothesis 2: (*founding membership*) *Founding organizations are less likely to experience decline or death.*

Hypothesis 3: *(density at time of founding) A higher level of density at time of establishment will increase organizational decline or death.*

The degrees of legitimation and competition effects vary by hierarchical characteristics of a group of organizations (Carroll and Wade 1991; Hannan et al. 1995). To put it more precisely, competition effects operate more strongly in localized environments, whereas legitimation effects are more pronounced in wider institutional

environments (Hannan et al. 1995). Competition for resources should become more intense between organizations in the same localized group – subpopulation – because it amounts to a constant-sum game, in comparison with competition between organizations in different groups which depend on different resource sources. On the contrary, an increase in the number of organizations in a subpopulation legitimizes the emergence of new organizations in other subpopulations. In light of this finding, it is predicted that competition is more acute between organizations in the same subpopulation than between those which have different functions.

Hypothesis 4: *(localized competition) An increase in the density of a subpopulation will increase organizational decline or death rates.*

The niche theory argues that if environmental change is fluctuating and of long standing (i.e., a highly variable and coarse-grained environment), generalist organizations are more likely than specialist ones to survive because their organizational slack is finally utilized to overcome harsh environmental conditions and survive. And, the more slack resources an organization has, the more likely it is to survive. However, it is not easy to measure the amount of slack resources because they include various types of resources, such as personnel, knowledge, technology, financial assets and others. Thus, organizational size has been widely used as a proxy for organizational slack (Hannan and Freeman 1989). In other words, large organizations generally have more slack resources than small ones, and thus may be able to ensure reliability and accountability of their performance even in changing environments. Also, when survival is at stake and

organizations need additional resources from the outside, large organizations are more likely to be supported because of their prominence, high visibility, and significance in the society (Starbuck 1965). The liability of smallness plays an important role in organizational decline and death, and two hypotheses are suggested with respect to the influence of organizational slack.

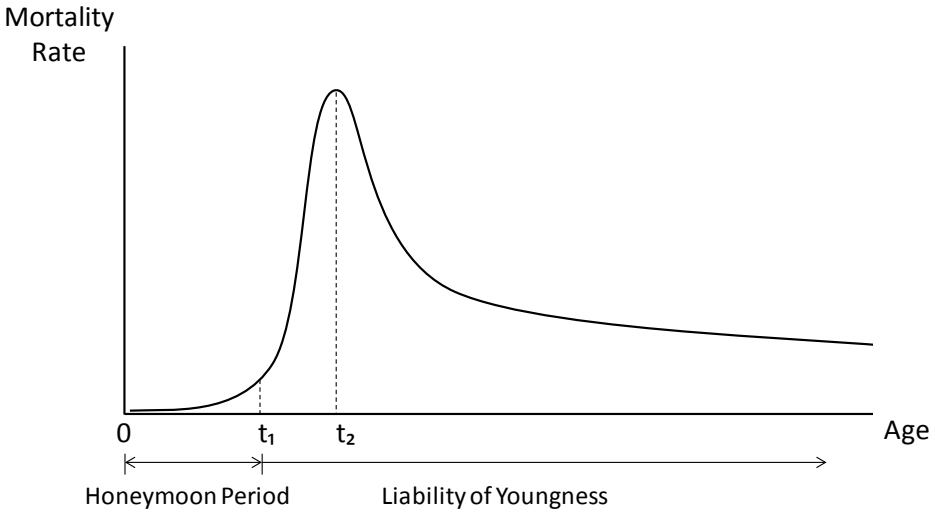
> **Hypothesis 5**: *(competitive advantage) In a highly variable and coarse-grained environment, generalist organizations are more likely than specialist ones to survive.*
>
> **Hypothesis 6**: *(organizational size) Organizational decline or death rates decrease with the size of an organization.*

Structural Inertia: Demographic Characteristics

The strength of structural inertia varies with demographic characteristics of an organization, so organizational decline and death are also expected to be influenced by these factors. Since Stinchcombe (1965) introduced the liability of newness, new organizations are believed to suffer from a high rate of organizational mortality (Carroll and Delacroix 1982; Freeman et al. 1983; Hannan and Freeman 1984). A significant amount of time and effort is needed for newly established organizations to set up organizational roles and routines, to develop relationships with existing organizations, and to form a channel for the inflow of resources from the environment. This additional consumption of resources becomes a disadvantage for new organizations which are being exposed to competitive threats, and they are more likely to be defeated by existing ones.

Meanwhile, vulnerability of young organizations to competitive threat and environmental change is most apparent in the immediate newborn period, so it is expected that the average rate of organizational mortality decreases rapidly over the very early portion of the life span (Hannan and Freeman 1988).

Figure 7. Organizational Mortality Rate by Age



In addition to the liability of newness, however, it should be simultaneously noted that organizational founding is the outcome of natural selection. That is, the environment serves as a niche for newly established organizations, creating suitable conditions for their growth as well as emergence. In addition, all organizations have been established with a certain amount of initial resources and endowments that help themselves to survive during their early stages of high failure rates. Consequently, new organizations are viewed as legitimate and have increasing access to resources as long as the favorable environment lasts (Singh et al. 1986). An initial stock of resources or the acquisition of legitimacy may attenuate the liability of newness in terms of age dependence, which

brings about a honeymoon period – low risk at very young age (Amburgey et al. 1993; Brüderl and Schüssler 1990; Fichman and Levinthal 1991; Singh et al. 1986). After this period, organizational mortality rate jumps to a high level as predicted by the liability of newness (i.e., t_2 in Figure 7). This tendency is termed as liability of youngness because time passed after the founding. Accordingly, three hypotheses are proposed to explain the effect of age on organizational decline or death.

Hypothesis 7: *(honeymoon period) Organizations are less likely to be terminated, but more likely to grow up in their infancy.*

Hypothesis 8: *(liability of youngness) Organizational mortality or decline is negatively related with the age of the organization after the honeymoon period.*

Hypothesis 9: *(decreasing convexity) After the liability of youngness operates, organizational mortality rate reduces at a decreasing rate.*

As Simon (1962) has argued, a hierarchical structure has an evolutionary advantage because it simplifies links among subunits or functions. That is, a hierarchical structure can reduce internal conflicts and make coordination more efficient, which may strengthen the ability of an organization to overcome environmental changes – strong structural inertia. And also, hierarchical systems are characterized by localized flow of information, commands, and resources for each subunit or function. Localized structure prevents one or a few subunits, which are highly sensitive to environmental change, from transmitting vulnerability to others and putting the whole organization at risk (Hannan

and Freeman 1984). On the other hand, in less hierarchical and complex organizations, structure is less stable, and change in one subunit requires adjustments by many more subunits. Consequently, complex organizations have a low inertia and are more vulnerable to external shocks than hierarchical and simple organizations.

Hypothesis 10: *(organizational complexity) Complex organizations have higher rates of organizational decline or death.*

If organizations have previously experienced decline, their structures are less inertial than those of organizations without such experience (Baum and Amburgey 2002; Downs 1966). More specifically, as organizational learning theory predicts, since organizations experiencing decline in structure could escape negative natural selection at any rate, they may also consider reorganization as a solution when facing other environmental threats (Amburgey et al. 1993). However, organizational decline is not always a successful strategy for survival. As mentioned already, rational adaptation to environmental changes is not possible in reality, and frequent attempts to reorganize produce low levels of reliability and accountability (Hannan and Freeman 1984). So, organizations, which experienced structural decline in the past, have high rates of organizational mortality. Meanwhile, it is also speculated that the more recently an organization experienced structural decline, the more likely that reorganization is considered as a plausible response to environmental changes and finally the lower the rate of survival of the organization is (Amburgey et al. 1993). Thus, two hypotheses are offered regarding the effect of experience on organizational mortality.

Hypothesis 11: *(history dependence) If organizations experienced structural decline in the past, their mortality rates will increase.*

Hypothesis 12: *(elapsed-time effect) The organizational mortality rate decreases with the elapsed time since the occurrence of structural decline.*

Distinctive Environment for Public Organizations

Although organizational ecology pays attention to the effect of the environment on organizational change, it has developed mainly in the business sector and does not identify distinct characteristics of public organizations. When it comes to multiple dimensions of the environment, public organizations is characterized by political control, and political variation is one of key drivers of natural selection in the public sector. Unlike the business sector, where organizational decline and termination are determined on the basis of performance, whether or not an organization is perceived as successful depends on political predispositions (Lewis 2002).

Political turnover is a profound change in political environment because it exposes vulnerable organizations to the threat of termination or downsizing by providing the opponents with an opportunity to punish them (Berry et al. 2010; Boin et al. 2010; James et al. 2015; Kaufman 1976; Lewis 2002). Political control occurs in two realms: the executive branch and the legislature (Wood and Waterman 1991). A chief executive officer (a president in a presidential system or a prime minister in a parliamentary system) has multiple mechanisms of executive control and can reorganize or even abolish an agency which is perceived as underperforming. Also, the legislature participates in the

process of reorganizing organizational structure and can directly (in a parliamentary system) or indirectly (in a presidential system) control public agencies (James et al. 2015; Lewis 2002). Thus, it is expected that if a party which opposes a certain public agency comes into power in the executive branch or the legislature, then the organization are more likely to be terminated or decline.

Hypothesis 13: *(change in the executive branch) An organization established by a party other than the one in the executive branch in any given year will be more likely to be terminated or decline.*

Hypothesis 14: *(change in the legislature) An organization established by a party other than the one in the legislature in any given year will be more likely to be terminated or decline.*

Since executive and legislative control occur independently in a presidential system, their preference on a certain organization may be opposite to each other. For example, the initiative of a new president to abolish the agency might fail due to the opposition of the legislature or vice versa. However, if a party controls both the executive branch and the legislature – unified government, then it will be easier to terminate or downsize organizations which have been supported by the party's opponents (Lewis 2002).

Hypothesis 15: *(unified government) If an unfriendly party controls both the executive branch and the legislature, organizations established by other parties are more likely to be terminated or decline.*

A response to changes in economic environment (especially, market failure) is clearly different between private and public organizations. How business firms are affected by economic changes is relatively predictable because their relationship with the economic environment is very simple: selling goods and services in a market for a profit. Economic crises or recessions generally reduce consumption demand and the amount of resources flowing into business firms, leading to an increase in organizational decline or even mortality. On the other hand, a response of the public sector to economic crises is very complex. Like business firms, some organizations are under pressure to cut budgets and end some programs perceived as ineffective or costly during an economic crisis. However, not surprisingly, a government is under pressure to take on the role to overcome market failure by preventing another crisis from taking shape and by stimulating its depressed economy. So, in the public sector, certain existing organizations are allocated more resources or new organizations are established to combat economic crises, as was the case with New Deal agencies. In this connection, I speculate that an economic crisis has a negative impact on the decline or the mortality of public organizations.

Hypothesis 16: *(economic crisis) An economic crisis has a negative influence on organizational decline and mortality in the public sector.*

In addition to the negative effect of an economic crisis, economic growth is also expected to have a negative association with organizational decline and death in the public sector. Wagner (1890, 1893) put forward his hypothesis of increasing expansion of government activities along with economic growth, nowadays known as "Wagner's Law." He suggests three reasons for the increased government activities. First, in industrialization and modernization, the demand for public protection and regulation grows, leading to an increase in government activities. Second, income growth has led to the requirement for a government to provide further income-elastic services, such as welfare, education, and culture. Finally, economic and technological development requires a government to manage natural monopolies (e.g., railroads), which the private sector would be unable to finance and run efficiently. In line with the theory, I speculate that economic development promotes an environment in which organizations providing social protection or income-elastic services can thrive. As the other side of the same coin, if an economy is less developed, the demand would be relatively modest. Instead, it is expected that organizations in charge of economic affairs are more likely to thrive because the society is more concerned to advance their economy.

Hypothesis 17: *(economic development & social protection) As an economy becomes advanced, organizations in charge of social protection are less likely to decline or be terminated.*

Hypothesis 18: *(economic development & income-elastic services) As an economy becomes advanced, organizations providing income-elastic services are less likely to decline or be terminated.*

Hypothesis 19: *(economic development & economic affairs) As an economy becomes advanced, organizations in charge of economic affairs are more likely to decline or be terminated.*

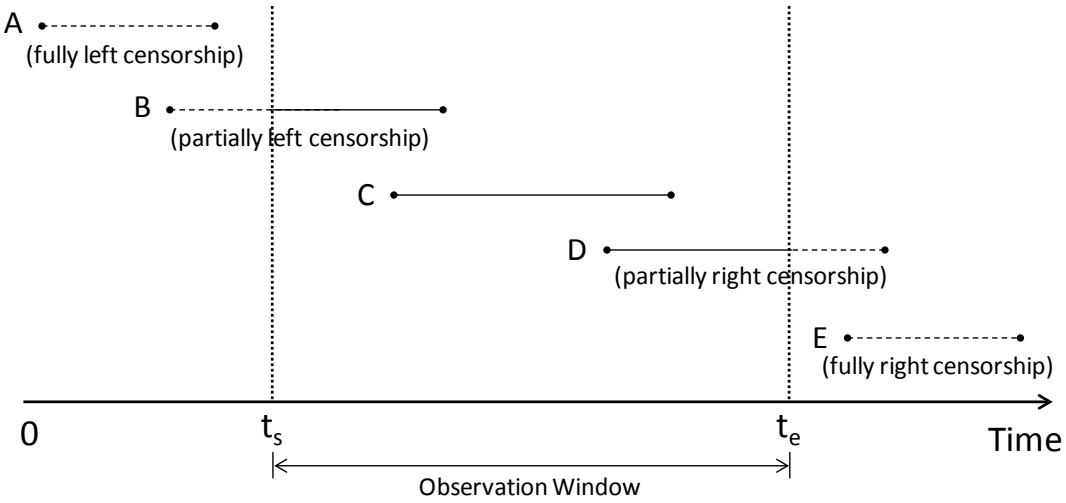
Suggestions for Empirical Work

Theoretical progress can only be made through precise and ultimately falsifiable predictions (O'Toole and Meier 1999). In addition, the translation of a theory from one area to another often makes a trade-off of accuracy against generality. Thus, empirical research is needed to determine the validity of organizational ecology in the public sector as well as to provide knowledge and understanding of what actually happens. This study suggests empirical directions and methods for future investigation.

Data Collection

Given that organizational ecology is basically to analyze the life histories of organizations, panel data with a long time dimension are required. To put it more technically, because organizational change (e.g., birth, growth, decline, and death) is a qualitative alteration of an organization's life cycle, a continuous measurement of the qualitative dependent variables over the lifetime of an organization – event history data – would be a fruitful avenue for future investigation.

Figure 8. Types of Censorship in Event History Data



Observations of event histories are often censored. That is, researchers have no information on organizational change prior to (left censorship) or after (right censorship) a certain date (see Figure 8). While right censorship problem can be handled by analysis methods, both full and partial left censorship problems (A and B in Figure 8) result in substantial error and make it impossible to employ sophisticated event history analysis such as duration analysis. Instead, data with left censorship can be analyzed by pooled logit models. However, it should be noted that the length of time leading up to an event is not of interest in the models and, more seriously, that logit regression assumes statistical equilibrium, that is, stability of the process. As discussed in the theory section, organizational change in the public sector is subject to time-varying characteristics of the environment, so time-stationary condition cannot be satisfied. In order to examine empirically organizational decline and death, researchers should have data with few censorship problems, especially if possible, without left censorship problems.

The fact that the unit of analysis in organizational ecology studies is a population suggests a few considerations regarding data sampling. First, researchers have to choose which population is to be studied. This approach may be criticized as selection bias, but at the same time, it allows an up-close, in-depth, and detailed examination as a case study. Second, ecology studies ideally have to examine all organizations in a population in order to avoid selection bias of organizations which have good recording-keeping and still thrive. By doing so, they can generate transferable findings among organizations, which is the ultimate goal of organization studies.

Operationalization of Variables

Although an organizational population (e.g., industry in the business sector) is the unit of analysis, its members are not totally homogeneous. Heterogeneity within a population is more obvious in a government, and ignoring the issue can yield a severely distorted picture of reality. Especially, because public organizations perform different tasks, change in population density may have different consequences depending on function of an entry or exit organizations. For example, a newly-entered organization can increase competition among organizations whose functions overlap with the new one, but have less effect on the life cycle of others with different functions. Thus, in the application of organizational ecology to the public sector, subjects in a population should be sub-grouped in terms of their functions (i.e., subpopulation). There would be various approaches to disaggregate a population, a universal way is required for comparison and generalization of findings across studies. In this connection, the Classification of the Functions of Government (COFOG) of the United Nations (UN) would be very helpful

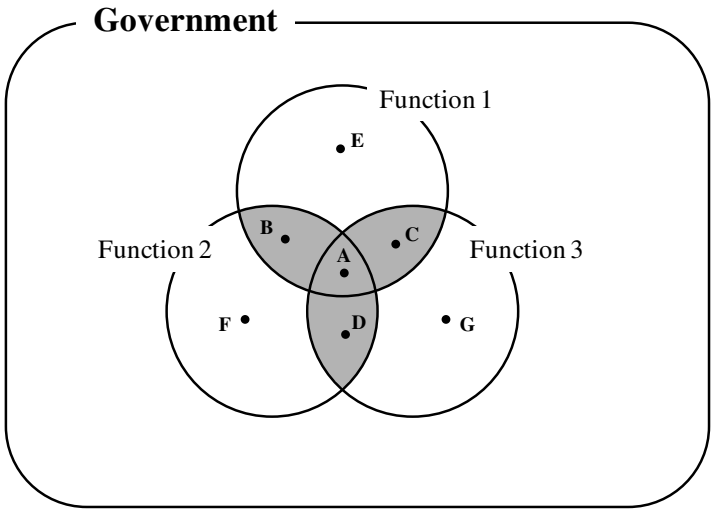
because it can be used for studies from anywhere in the world. The COFOG classifies government functions into 10 subpopulations: 1) general public services; 2) defense; 3) public order & safety; 4) economic affairs; 5) environmental protection; 6) housing & community amenities; 7) health; 8) recreation, culture & religion; 9) education; and 10) social protection.

Key explanatory variables in ecology studies are the density of a population and demographic characteristics of an organization. Population density has been usually measured by counting the number of organizations in a population (e.g., Carroll and Swaminathan 1992; Hannan and Freeman 1988). And also, as the concept of subpopulation implies, ecology studies in the public sector should consider the density of a subpopulation. Since subpopulations are identified within a population, subpopulation density can be captured by how much the subpopulation accounts for in terms of either the number of members or the amount of expenditures. For example, a subpopulation of 5 organizations is dense if the total population is composed of only 10 organizations (i.e., accounting for 50%), but sparse if there are 100 members in the total population (i.e., 5%).

Organizational size and strategy (generalist vs. specialist) should be also examined with regard to the niche theory. Size is operationalized by two indicators: 1) the number of full-time employees; and 2) the amount of the total budget. Although the former is a direct measure of size, it may create bias due to heterogeneity among subpopulations. For example, it overestimates organizations with labor-intensive services, such as defense and education, but underestimates those with capital-intensive services, such as economic affairs and health. Therefore, the best approach for measuring

organizational size is to examine both of the two indicators. The effect of strategy has been generally analyzed as a dummy variable in most previous studies based on the size of sales area, the number of products, or the amount of total sales (e.g., see Brüderl et al. 1992; Carroll 1985; Carroll and Swaminathan. 1992; Freeman and Hannan 1983), but the dichotomous measurement does not capture the extent of generalism or specialism. On the other hand, if researchers identify organizations through the specialism-generalism spectrum, measurement error could arise because there are no organizations which disclose all information on their organizational strategy and because subjective classification by researchers would take up the slack with incorrect categorizations. Thus, an optimal approach is to count the number of functions of an organization. To put it more directly, if an organization performs only one of the 10 functions defined by the COFOG, the count variable of organizational strategy takes value of 1, meaning that the organization is a specialist. However, if an organization has multiple functions, the count variable is coded as 2 or greater, considering the observation as a generalist. And also, this simple counting can measure the extent of generalism: Bigger values except 1 indicate more generalism. For example, in Figure 9, organizations in the shaded area (i.e., A, B, C, and D) perform at least two functions, whereas others commit to a specific function. Thus, the formers are considered as generalists. And among them, organization A is more general because its niche covers three functions.

Figure 9. Measuring Organizational Strategy by Functions



Age and organizational complexity are key antecedent variables for the inertia-survival relationship. Like a person's age, organizational age is measured by the number of years of continuous existence since founding. Sometimes, an organization is abolished and re-established with the same (or very similar) structures as before. In this case, organizational ecology argues that environmental changes again provide niche opportunities to and revive the organization, so the re-establishment is considered as organizational founding, and the age is reset to zero.

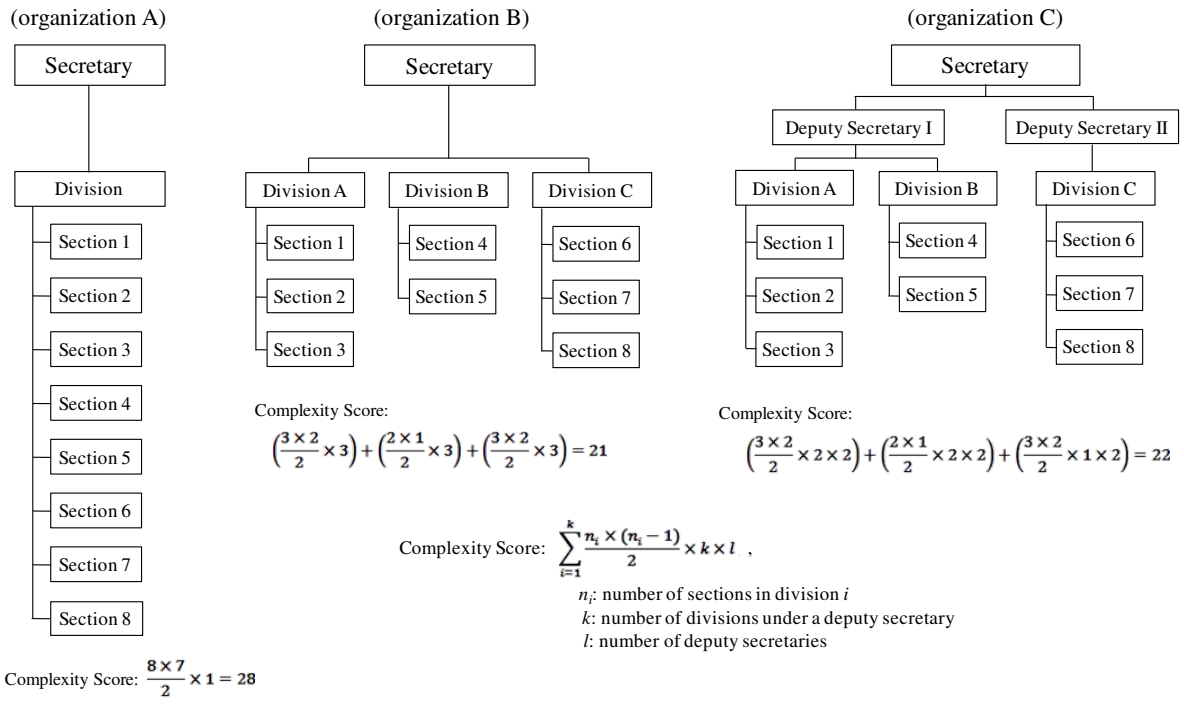
Organizational complexity is defined in different ways by different disciplines, leading to various operationalizations, for instance, the number of subunits or functions, and even size (Dooley 2002). Fortunately, organizational ecology defines complexity as patterns of links among subunits, measuring by the number of links (Hannan and Freeman 1989). However, since links with others are cognitive content, it is almost impossible to measure links among subunits for the entire history of organizational

change. So, I suggest a proxy variable of complexity score as an alternative way of estimating the number of links, which is based on three central ideas. First, a subunit should explicitly or implicitly cooperate with others to maintain and perform their work and role. Second, as cited already in the hypothesis section, a hierarchical structure simplifies links among subunits (Simon 1962). Third, a tall hierarchical structure leads to an increase in bureaucratic procedures (e.g., red tape) for a link of cooperation. The value of the proxy is calculated as follows:

$$\sum_{i=1}^{k} \frac{n_i \times (n_i - 1)}{2} \times k \times l \,,$$

where n_i is the number of sections in division i, k is the number of divisions under a deputy secretary, and l is the number of deputy secretaries.

Figure 10. Complexity Score and Hierarchical Structure



A traditional proxy – the number of the lowest subunits – considers the three organizations in Figure 10 as having the same level of organizational complexity because they have the same number of sections. Or if a researcher operationalizes complexity as the number of total subunits below the secretary level, organization C is the most complex. However, these traditional proxy approaches overlook a hierarchical structure and generate biased estimates. The complexity score not only measures the number of links among sections (i.e., $\frac{n_i \times (n_i - 1)}{2}$), but also reflects effects of hierarchy (i.e., multiplying it by *k* and *l*) – simplifying versus complicating patterns of links. To put it more concretely, although organization A and B have the same number of sections, the latter is more hierarchical, so its complexity score is lower than the former's (see Figure 10). On the other hand, a tall hierarchy increases bureaucratic procedures and organizational complexity. The complexity score captures the negative effect of a tall hierarchy. For instance, the complexity score of organization C is higher than that of organization B even though the former has a more hierarchical structure.

Political turnover is directly measured on dichotomous scale (e.g., Lewis 2002, 2004). Change in the executive branch and in the legislature would be captured by a dummy variable which takes a value of 1 if an opposition party controls the executive branch or a majority of seats in the legislature, and 0 otherwise. An indicator for unified government equals 1 if the executive branch and the legislature are occupied by the same political party, and 0 otherwise. Meanwhile, in order to accurately assess the actual effect of legislative change, the strength of a majority party should be also examined, which can be gauged by the percentage of its seats.

Various economic data are available for testing the influence of changes in economic environment. The effect of an economic crisis has been generally examined by a binary indicator. However, although the dummy captures a sudden and unpredicted economic shock, it overlooks that economic depression occurs even in non-crisis years and that the extent of the seriousness of an economic crisis varies. To complement the indicator, other business cycle variables, such as unemployment and the gross domestic product (GDP) growth rate, should be included in analysis. The level of economic development can be measured by real GDP per capita which is adjusted for price change (i.e., inflation).

Empirical Methods: Duration Analysis

Response variables in ecology studies have the form of a duration, and recent treatments of duration analysis tend to focus on the hazard function (Wooldridge 2010). It is defined as

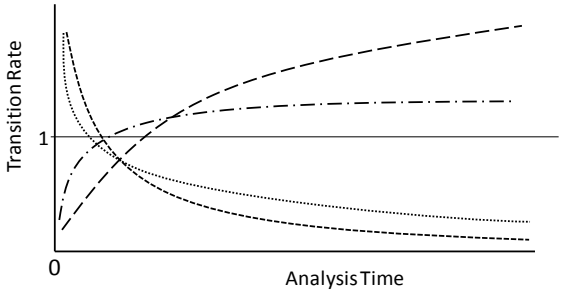
$$r(t) = \lim_{t' \to t} \frac{\Pr(t \leq T < t' | T \geq t)}{t' - t}.$$

T is the length of time that a subject changes. r(t) is a transition rate or hazard rate, providing the possibility of giving a local, time-related description of how the process (e.g., organizational change in this study) evolves over time.

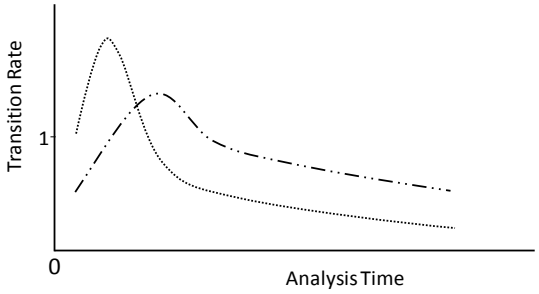
Of different event history methods with the hazard function, parametric models of time-dependence and semi-parametric transition rate models are best suited to organizational ecology research. First, parametric models generally focus on how the rate of transition (e.g., organizational decline or death) changes with analysis time (e.g., age). Other covariates are tested as to whether they affect the direction (increasing or

decreasing) and the slope of a transition rate curve (see, for example, Figure 11a). Meanwhile, it should be noted that using a parametric model whose distribution does not fit a given dataset can lead to misleading results (Blossfeld et al. 2007). Therefore, because it is hypothesized that the relationship of organizational death to age is bell-shaped (see Figure 6), the log-normal or the log-logistic model would be more appropriate than other monotonic models, such as the Weibull and the Gompertz model (Figure 11b).

Figure 11. Transition Rate Curves



(a) Monotonic Trends (Weibull or Gompertz models)



(b) Non-monotonic Trends (Log-normal or Log-logistic models)

Second, time in parametric models serves as a proxy for latent factors, and the influence of other covariates on the transition rate are not directly specified. Semi-parametric modes are suggested as alternatives, and the proportional hazard model proposed by Cox (1972) is the most widely used semi-parametric model. In the Cox model, the transition, r(t), is the product of an unspecified baseline rate, h(t), and a vector of time-dependent covariates, A(t),:

$$r(t) = h(t)\exp\,(A(t)\alpha).$$

α is a vector of associated coefficients. However, the Cox regression has two limitations: First, covariates have to be strictly exogenous (Wooldridge 2010); and second, the model is only used if the shape of a transition rate curve is not affected by covariates (Blossfeld et al. 2007). To sum up, researchers are required to design their own models depending on their datasets and which variables are of interest.

Conclusion

Organizational change is a result of a relationship between an organization and the environment. However, most previous studies have focused on an organization's activities, overlooking the environment as a significant determinant. The rational system perspective (e.g., Taylor's scientific management or Weber's bureaucracy theory), which is based on rationality, infers that organizations can achieve immortality by setting up specific goals and formalizing their structures. Although departing from the rationality assumption, scholars with the natural system perspective (e.g., Mayo's human relations or Barnard's cooperative system) have still concentrated on internal organizational arrangements. They believe that organizing occurs against the environment and often omit the effect of the environment on the life cycle of organizations. However, as the environment becomes more complex, less predictable, and intractable, it is necessary to investigate how environmental change influences organizations.

Thus, in this study, I try to understand the effect of the environment on organizational decline and death by defining an organization as an open system not being sealed off from their environment.

Organizational ecology is an ideal tool for studying environmental effects on organizations. Given the import of theoretical elements from bio-ecology, it is not surprising that organizational ecology takes an extreme position in the organization-environment spectrum, arguing that adaptation strategies of organizations to the environment are incomplete and useless. Rather, the narrow but intense focus on the environment helps us understand organizations by broadening and deepening our view to encompass environmental influences on organizations. Basically, organizational ecology identifies which organizations are able to overcome environmental changes and thrive. First, the inertia theory argues that demographic characteristics, such as organizational age, structural complexity, and history, are important factors in predicting survival of organizations. Second, according to the niche theory, an organizational population is the most important and influential part of the environment. An increase in the density is a critical environmental change and affects organizational survival in two opposing ways: institutional isomorphism vs. competition for limited resources. Also, the theory asserts that two organizational strategies (generalist and specialist) have their own competitive advantage in terms of environmental variation: specialists in stable environments vs. generalists in long-term fluctuating environments.

However, organizational ecology has been extensively studied in the business sector. Even though public and private organizations share the majority of organizational principles, such as organizing mechanisms, assuming the sameness of the two types is far from the reality. Above all, ecological studies on business firms have generally emphasized competition with rivals in the market. They have rarely paid attention on other environmental factors except market control. Thus, in the application of

organizational ecology to public organizations, I incorporate their distinctive interactions with the political and economic environment. First, as previous literature has examined, external political control is instrumental in bringing about the termination of public organizations. So, I suggest several variables of political change and hypothesize how they affect the decline and death of public organizations. Second, the effect of the economic environment on the life cycle of public organizations is not as straightforward and simple as their effect on business firms. As Wagner's Law implies, economic growth is closely associated with an increase in government activities, particularly regarding social protection and income-elastic services (e.g., welfare and culture). An economic crisis also often provides public organizations with the chance to grow, such as the expansion of structures or expenditures, because it is required that the public sector takes, to a lesser or greater degree, the role to cope with the market failure.

Despite the recognition of the importance of the environment to the life cycle of organizations, there are few attempts to examine how and how much public organizations are subject to environmental changes. Given that an organization can be fully understood when viewed through three theoretical lenses – rational, natural, and open system perspectives, the absence of the realization of the interaction of organizations with the environment may lead to misunderstanding or incomplete knowledge. This matter clearly deserves more theoretical and empirical attention. In addition, although a number of studies have examined the effect of political factors on the termination of public organizations, most of them fail to systemize their results and to discuss general theoretical implications (Adam et al. 2007). To avoid this critique, a strong theory is required, which provides a broad conceptual framework. In this connection, I hope this

study may help lay the groundwork for future research on the effect of the environment on organizational change by refining organization ecology so as to be transferable to the public sector and by suggesting empirical strategies to test the theory.

Chapter V

Conclusion

Summary

Although organizations as social institutions are considered as key actors in a modern society in the field of not only sociology and business management, but also political science and public administration, a better understanding of organizations rests on the recognition that they perform at different settings. Thus, as I lay out in Chapter I, the motivation of this dissertation is to contribute to a better understanding of public organizations by recognizing the difference between the public and the private sector. Especially, I focus on addressing three critical issues that most public organizations face or will face as they grow: innovation adoption, representation in personnel, and environmental effect on organizational survival.

In Chapter II, I examine the initial state of innovation diffusion, that is, which public organizations become early adopters. At the initial stage, there are no role models or competitors who trigger the diffusion mechanisms of learning, competition, and imitation. And also, early adopters produce neighbor or regional effects to subsequent adopters. Thus, early adoption of innovation should be scrutinized as an independent topic worthy of attention. The main finding of the second chapter is that performance-based motivation has a twofold impact on early innovation adoption: negative for organizations with low performance, but positive for those with very high performance. This study estimates top 3.8% as the turning point defining which organizations attain outstanding performance and show the positive relationship between performance and

innovation adoption. In short, not every organization can become a pioneer in the diffusion of an innovation. Only those who need it or can do it mark the kickoff of innovation diffusion. In addition to the motivation, some organizational characteristics – organizational size, pro-innovation bias of an outside superior, and successful experience of implementing a similar innovation in the past – are also found as significant determinants of early innovation adoption. Finally, this study finds that innovations can be adopted for a symbolic or a substantive purpose: symbolic for complying with the external demands versus substantive for improving the status quo. Through this study, I contribute to the innovation adoption literature by unpacking the process of early innovation adoption and to the public management literature by examining the effect of performance on the motivation to innovate and innovation adoption.

In Chapter III, I develop a theoretical framework for predicting and explaining active representation in bureaucracy and test two hypotheses from the framework to test its validity. Most of previous literature has focused on the transformation of passive into active representation, that is, conditions of active representation – policy discretion and a critical mass. On the other hand, in this study, I focus on behavior of why and how bureaucrats decide to serve as active representatives. An informal group in an organization has relations with other informal groups and the organization. So, the intention of an informal group to benefit their social group may conflict with that of other informal groups or formal roles socialized by the organization to accomplish organizational goals. The framework that I develop in this chapter is based on the basic assumption of public choice theory that humans are utility maximizers. In other words, bureaucrats are expected to choose the optimal point between formal rewards from an

organization and informal rewards from an informal group. As a result, they are not totally devoted to advance interest of their informal and social group (i.e., group interest). But instead, they optimize their self-interests in the trade-off with group interest. From this framework, I derive and test two hypotheses. First, active representation requires the loss of organizational rewards. Second, a minority group mobilizes external support to minimize the cost of active representation. These findings support that active representation is a political activity in which bargaining between formal and informal roles occurs. In addition, I add evidence to the literature demonstrating that the two prerequisites – policy discretion and a critical mass – must be satisfied for active representation to occur. Especially, the size of a critical mass depends on the context. A larger size of a critical mass is necessary if a minority group has no partner groups and cannot expand the base of internal support for their active representation and/or if the culture of a society is less concerned about diversity and minority rights. For example, I show that because of the two reasons, women in the Korean bureaucracy need a critical mass of about 40% for their active representation. This essay is probably the only one in examining conditions of the intention to serve as active representatives as well as conditions of the action.

To predict which organizations in a government will survive, we should first answer the question of which organizations will be selected by the environment for survival. In Chapter IV, I argue that organizational change is a result of a relationship between an organization and the environment. And, I suggest and advance the theory of organizational ecology for examining environment effect on organizational decline and death. The theory has been extensively studies in the business sector, so I advance the

theory to be applicable to the public sector. First, I add political variables, such as change in the executive branch and the legislature, unified government, and hypothesize that (1) an organization established by a party other than the one in the executive branch in any given year will be more likely to be terminated or decline; that (2) an organization established by a party other than the one in the legislature in any given year will be more likely to be terminated or decline; and that (3) if an unfriendly party controls both the executive branch and the legislature, organizations established by other parties are more likely to be terminated or decline. Second, the effect of the economic environment on the life cycle of public organizations is not as straightforward and simple as their effect on business firms. As Wagner's Law implies, economic growth is closely associated with an increase in government activities, particularly regarding social protection and income-elastic services (e.g., welfare and culture). An economic crisis also often provides public organizations with the chance to grow, such as the expansion of structures or expenditures, because it is required that the public sector takes, to a lesser or greater degree, the role to cope with the market failure. Additionally, I suggest empirical directions and methods to test hypotheses that I set for in this essay for future studies. First, because ecology studies investigate the history of an organization, event history data are required. And, when collecting data, researchers should be cautious about censorship problems, particularly left censorship. Second, I propose ways to operationalize key explanatory variables, for example, measuring organizational complexity and subpopulations. Finally, I introduce duration analysis as a proper research method for analyzing event history.

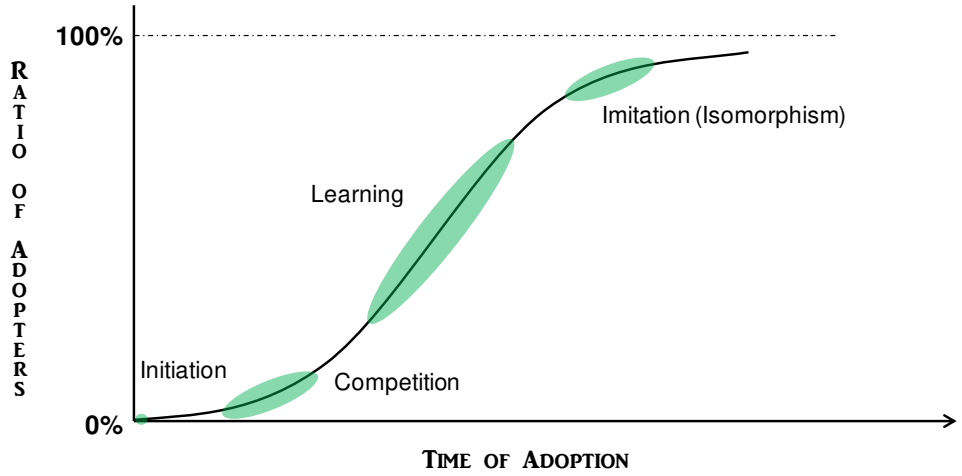
Future Research

This dissertation has contributed to a better understanding of public organizations by extending the literature on innovation diffusion, representative bureaucracy, and organizational survival. At the same time, however, the three essays are not meant to be definitive studies, but rather serve as starting points for future research.

The first essay on innovation management focuses on the early adoption of innovations among public organizations. Thus, in order to draw a full picture of diffusion process of an innovation, it is necessary to examine which organizations are more likely to become followers after the initiation of the innovation. Fortunately, the Appalachian Math and Science Partnership (AMSP) has been implemented since 2002, and I have panel data on how the policy has been diffused in the organizational population. In the succeeding study, I will also examine effects of performance and other organizational characteristics on the decision of potential acceptors to participate in the diffusion. However, the main research question is whether diffusion mechanisms – learning, competition, and imitation – operate and how they affect adoption by followers. And also, I hypothesize that the three mechanisms are sequentially activated. While learning is the process to determine whether an innovation implemented by others has been successful, competition does not require evidence of success. The fact that rivals already adopted the innovation is the reason of adoption by followers. So, it is expected that competition is preceding learning. On the other hand, later adoption is not predicted by organizational characteristics, but is related to the pressure of homogeneity. As a result, an innovation can become recognized as taken-for-granted after it has been adopted by a large number of organizations. Therefore, imitation would be the last diffusion mechanism. This study

will provide a full picture of innovation diffusion in conjunction with Chapter II in this dissertation.

Figure 12. Order of Diffusion Mechanisms



In Chapter III, I use organizational-level data to test the framework of active representation. Although a fallacy of division is common and does not cause a statistical issue, the framework describes active representation as an individual decision. And also, individuals have different levels of reward motivation and socialization pressure for active representation and that the intensity of active representation depends on individual characteristics. Thus, an empirical analysis using individual-level data is required. I have been looking for survey data in which respondents (i.e., bureaucrats) were asked about how they perceive informal roles for their social group and formal roles assigned by their organizations. At the same time, I design a survey experiment in case of no available data. Although finding data or conducting a survey experiment takes a lot of time, investigating whether individuals maximize their self-interest in the trade-off between

formal and informal rewards is required to test the validity of the framework of active representation suggested in Chapter III.

Third, in order to test the hypotheses regarding organizational decline and death in Chapter IV, I am collecting data on the history of the Korean central government. This dataset includes all information on the histories of public organizations in Korea since 1948 when Korea was officially established since being liberated from Japanese colonial rule between 1910 and 1945. So, the dataset has a critical advantage as a sample – minimizing censorship problems. Above all, there is no left censorship in the dataset. And also, Korea has experienced rapid technological and societal change. For example, the country was established as one of the poorest countries in 1948, but it has now grown as a country showing off a rapid economic development and advanced industries such as electronic and shipbuilding industries. Thus, it is ideal for investigating the history of Korean government agencies so as to find general and more comprehensive patterns on organizational decline and death in the public sector. The dataset will allow me not only to suggest the theory of organizational ecology as a theoretical framework for analyzing environmental effects on organizational survival, but also provide empirical evidence on whether my suggestions are sensible and more details about how the environment selects which organizations survive.

Finally, as an effort to connect the three issues (innovation adoption, workforce diversity, and the life-cycle of an organization), I hypothesize several relationships among them. 1) More diversified organizations are more likely to adopt an innovation because they are rationally designed to minimize incentives and communication problems which may hinder innovation adoption. 2) Although diversification has advantages in

terms of innovation adoption, more diversified organizations are more difficult to manage. Thus, it can be also speculated that diversified organizations do not readily adopt an innovation than others. And 3) high performance in some dimensions which are not directly related to an innovation may also influence the probability of adopting the innovation because performance has multiple dimensions. Organizations may try to offset low performance in some dimension by high performance in other dimensions. Or high performance in some dimensions may encourage risk-taking in adopting an innovation, even though the innovation is to improve performance in other dimensions.

Appendix A

A Superior's Pro-innovation Bias: Intention to Endorse the AMSP

To generate the residual-based measures of a superior's pro-AMSP bias, I first design the prediction model. The dependent variable is a dummy variable indicating whether or not a superintendent in Appalachian Kentucky entered into partnership with the AMSP in 2002. Seven independent variables are used to predict the probability of endorsing it: three personal characteristics; two district characteristics; and two environmental characteristics.

Table A.1. Logit Model for Predicting Probability of Endorsing the AMSP

Dependent Variable = Dummy of Whether a Superintendent Endorsed the AMSP in 2002			
	Coefficient	Standard Error	z-statistic
Personal Characteristics			
Job Experience	−0.0062	0.0400	−0.15
Logged Salary	2.4058	3.1425	0.77
Female Superintendent	−0.5245	0.9963	−0.53
District's Characteristics			
Overall Performance[a]	0.2970	0.2758	1.08
Total Enrollment	0.0004	0.0002	1.97
Environmental Characteristics			
Average Income of a District	−0.0002	0.0001	−1.58
Independent District	−1.4108	0.9104	−1.55
Constant	−24.2104	32.9724	−0.73
N	74		
LR chi-squared	18.52		
P>x^2	0.0098		
Count R^2	0.716		

[a]The variable is obtained by averaging math and science scores of all schools in a district and by summing the two values.

Table A.1. shows the results of the logit model. Although only one explanatory variable (*total enrollment*) is significant, it should be noted that the model is to identify superintendents with greater desire to participate in the project beyond some objective

factors, not to provide a framework for district participation. That is, the main concern is the fitness of the model. The likelihood-ratio test indicates that the model is statistically significant at the 1% level. The model's goodness-of-fit is verified with the Count R-squared index (0.716). The index is obtained by transforming the predicted probabilities into a binary variable (1 if the predicted probability is greater than 50% or 0 otherwise) and assessing the predictions as correct or not, so it implies that the model correctly predicts about 72 percent of superintendents' choices.

Since only schools in the 33 partner districts are analyzed in this study, I need the intentions of their superintendents to enter into a partnership with the AMSP in 2002. The intention is estimated by the residual-based approach. That is, the residual probability, which is not explained by objective variables in the prediction model, is used a proxy for a superintendent's pro-AMSP bias. Their actual probability to endorse the AMSP is 100%, so their intentions are determined by the following equation:

Residual probability = 100% – Predicted probability from the prediction model

The remaining concern about this measure of the pro-AMSP bias is whether it is too strongly correlated with a school's participation in the AMSP. The correlation coefficient between the two variables is 0.252, meaning that superintendents' choice was not forced on their schools. In short, the intention of a superintendent to endorse the AMSP is one of factors influencing a school's choice.

Appendix B

Wald Test for the Comprehensive Performance Variables in Model 2

I conduct a Wald test to examine the joint significance of the c*omprehensive performance* variable and its squared measure. The chi-squared value generated by the test is 5.73, and the *p*-value is 0.057. From these results, it can be concluded that the coefficients of the two variables are not simultaneously equal to zero, meaning that the inclusion of the two variables improves the model fit.

Confidence Interval of the Turning Point (Delta Method)

The estimated equation of Model 2 is as follows:

$$logit\{\Pr(y=1|X\} = \ln\left\{\frac{\Pr(y=1|X)}{\Pr(y=0|X)}\right\} = 3.96 - 0.6752 * C + 0.0499 * C^2 + Z\hat{\delta}$$

C: comprehensive performance
Z: a vector of other variables
$\hat{\delta}$: a vector of coefficients

The turning point is obtained by taking the first derivative with respect to *C* and setting it equal to zero.

$$\frac{\partial logit\{\Pr(y=1|X\}}{\partial C} = -0.6752 + 0.0988 * C = 0$$

Since the turning point is the negative ratio of the two coefficients, its confidence interval can be calculated through the Delta method. I use the "nlcom" command in STATA software (version 12.0, StataCorp., TX, USA) to estimate a nonlinear

combination of the parameters. The 95% confidence interval of the turning point is about from 4.44 through 9.09.

Marginal Effect of Comprehensive Performance

Because Model 2 includes not only the *comprehensive performance* variable but also its squared measure, the equation for obtaining the marginal effect is slightly different from the general equation. The marginal effect of comprehensive performance on the probability of adopting the AMSP is calculated through the below equation:

$$\frac{\partial \Pr(y=1|X)}{\partial C} = \frac{\partial \Lambda(X\beta)}{\partial C} = \frac{\partial\left(\frac{\exp(X\beta)}{1+\exp(X\beta)}\right)}{\partial C}$$

$$= (\beta_C + 2\beta_{C^2} * C) * \frac{\exp(X\beta)}{1+\exp(X\beta)} * \frac{1}{1+\exp(X\beta)}$$

Λ: Logit function
C: comprehensive performance
X: a vector of all independent variables
β: a vector of coefficients
β_C: coefficient of C
β_{C^2}: coefficient of C^2

This equation provides marginal effects of different levels of comprehensive performance. Other factors except performance variables are held constant at their means.

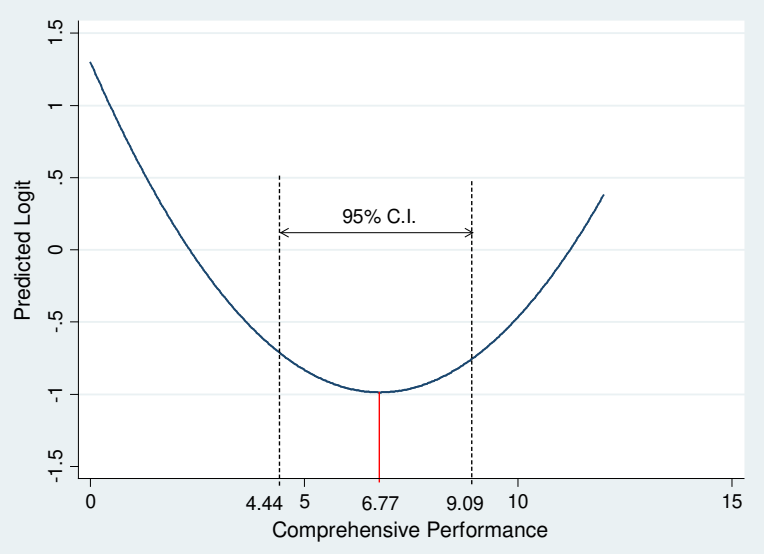
It is also possible to find the turning point from the above equation because the probability function, $\Pr(y=1|X) = \frac{\exp(X\beta)}{1+\exp(X\beta)}$, is another form of the estimated equation of Model 2. That is, by setting the derivative above equal to zero, the turning point can be found, where the slope of the probability graph is zero.

Appendix C

Testing Hypothesis 2 by using a Confidence Interval

The estimated turning point of 6.77 is the turning point for the AMSP in Kentucky, not for other types of policies or organizations. No one can conclusively say that the point estimate is the population parameter. Instead, this study uses its 95% confidence interval so as to estimate the population parameter with the probability of random sampling error.

Figure A.1. 95% Confidence Interval of the Estimated Turning Point



First, I develop the null (zero marginal effect) and the alternative (positive marginal effect) hypothesis. Figure A.1 shows that if the value of comprehensive performance is higher than 9.09, its marginal effect is positive. Nevertheless, this study conducts a two-tailed test for the null hypothesis.

$$H_0: (\beta_C + 2\beta_{C^2} * C) * \frac{\exp(X\beta)}{\{1 + \exp(X\beta)\}^2} = 0, \qquad if\ C > 9.09$$

$$H_A: (\beta_C + 2\beta_{C^2} * C) * \frac{\exp(X\beta)}{\{1 + \exp(X\beta)\}^2} \neq 0, \qquad if\ C > 9.09$$

Second, the probability that the confidence interval contains the true turning point for the population is 95%. Conversely, the probability that the right side of the upper limit includes the population parameter is only 2.5%. Also, the value of 9.09 has the *p*-value of 0.051, which is calculated through the "display 2*ttail(285, 1.9597)" command in STATA. Therefore, any value higher than the upper limit is rejected as the true turning point for the population with low *p*-value (<0.05), and the upper limit is estimated as the turning point for the population. Given that only 3.8% of schools score 9.09 or above, Hypothesis 2 is supported at the 5% level.

Testing Hypothesis 1 by using a Confidence Interval

Testing Hypothesis 1 is similar to testing Hypothesis 2. The null and the alternative hypothesis for testing Hypothesis 1 are as follows:

$$H_0: (\beta_C + 2\beta_{C^2} * C) * \frac{\exp(X\beta)}{\{1 + \exp(X\beta)\}^2} = 0, \qquad if\ C < 4.44$$

$$H_A: (\beta_C + 2\beta_{C^2} * C) * \frac{\exp(X\beta)}{\{1 + \exp(X\beta)\}^2} \neq 0, \qquad if\ C < 4.44$$

The probability that the left side of the lower limit contains the true turning point is only 2.5%, and the *p*-value of the lower limit is also 0.051. So, more than one-third of

schools ($C < 4.44$) are encouraged to adopt an innovation by their poor performance, which is statistically significant at the 5% level. In addition, this study suggests 9.09 as the turning point for the population. Taken together, Hypothesis 1 is supported.

References

Chapter I & V

Adam, Christian, Michael Bauer, Christoph Knill, and Philipp Studinger. 2007. The Termination of Public Organizations: Theoretical Perspectives to Revitalize a Promising Research Area. *Public Organization Review* 7: 221-236.

Balinski, Michel L., and H. Peyton Young. 1982. Fair Representation: Meeting the Ideal of One Man, One Vote. New Haven, CT: Yale University Press.

Berry, Frances S., and William D. Berry. 1990. State lottery adoptions as policy innovations: An event history analysis. *The American Political Science Review* 84(2): 393-415.

Buchanan, James M., and Gordon Tullock. 1962. *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Ann Arbor, MI: University of Michigan Press.

Coleman, James S. 1974. *Power and the Structure of Society*. New York, NY: Norton.

Fayol, Henri. 1949. *General and Industrial Management*. London: Pitman (first published in 1916).

Gilardi, Fabrizio. 2010. Who learns from what in policy diffusion processes? *American Journal of Political Science* 54(3): 650-666.

Gray, Virginia. 1973. Innovation in the states: A diffusion study. *The American Political Science Review* 67(4): 1174-1185.

Gulick, Luther, and Lyndall F. Urwick, eds. 1937. *Papers on the Science of Administration*. New York, NY: Institute of Public Administration, Columbia University.

Hannan, Michael T., and John Freeman. 1989. *Organizational Ecology*. Cambridge, MA: Harvard University Press.

Mintrom, Michael. 1997. Policy entrepreneurs and the diffusion of innovation. *American Journal of Political Science* 41(3): 738-770.

Moe, Terry M. 1989. "The Politics of Bureaucratic Structure." In *Can the Government Govern?* eds. John E. Chubb and Paul E. Peterson. Washington, D.C.: Brookings Institute.

Mohr, Lawrence B. 1969. Determinants of innovation in organizations. *The American Political Science Review* 63(1): 111-126.

Mooney, Christopher Z., and Mei-Hsien Lee. 1999. The temporal diffusion of morality policy: The case of death penalty legislation in the American states. *Policy Studies Journal* 27(4): 766-780.

Oppenheimer, Joe. 2012. *Principles of Politics: A Rational Choice Theory Guide to Politics and Social Justice*. Cambridge, NY: Cambridge University Press.

Perry, James L., and Hal G. Rainey. 1988. The Public-Private Distinction in Organization Theory: A Critique and Research Strategy. *The Academy of Management Review* 13(2): 182-201.

Rainey, Hal G. (2003). *Understanding and Managing Public Organizations* (3rd ed.). San Francisco, CA: Jossey-Bass.

Rawls, John. 1971. *A Theory of Justice*. Cambridge, MA: Harvard University Press.

Shipan, Charles R., and Craig Volden. 2008. The mechanisms of policy diffusion. *American Journal of Political Science* 52(4): 840-857.

Taylor, Frederick W. 1911. *The Principles of Scientific Management*. New York, NY: Harper.

Wamsley, Gary L., and Mayer N. Zald. 1973. The Political Economy of Public Organizations. *Public Administration Review* 33(1): 62-73.

Warwick, Donald P. 1975. *A Theory of Public Bureaucracy: Politics, Personality, and Organization in the State Department*. Cambridge, MA: Harvard University Press.

Wood, B. Dan, and Richard W. Waterman. 1991. The Dynamics of Political Control of the Bureaucracy. *American Political Science Review* 85(3): 801-828.

Chapter II

Aiken, Michael, and Robert R. Alfort. 1970. Community structure and innovation: The case of urban renewal. *American Sociology Review* 35(4): 650-665.

Allad, Scott W. 2004. Competitive pressures and the emergence of mothers' aid programs in the United States. *Policy Studies Journal* 32(4): 521-544.

Allensworth, Elaine M. 2005. Dropout rates after high-stakes testing in elementary school. *Educational Evaluation and Policy Analysis* 27(4): 341-364.

Amabile, Teresa M. 1996. *Creativity in context*. Boulder, CO: Westview Press.

Balla, Steven J. 2001. Interstate professional associations and the diffusion of policy innovations. *American Politics Research* 29(3): 221-245.

Baum, Joel A. C., and Kristina B. Dahlin. 2007. Aspiration performance and railroads' patterns of learning from train wrecks and crashes. *Organization Science* 18(3): 368-385.

Bedwell, Emily, Joshua Cowen, Peter Jones, and Eugenia Toma. 2014. Do public managers promote employee development in hard-to-staff locales? *Public Performance and Management Review* 37(4): 529-551.

Berry, Frances S. 1994a. Innovation in public management: The adoption of strategic planning. *Public Administration Review* 54(4): 322-330.

_____. 1994b. Sizing up state policy innovation research. *Policy Studies Journal* 22(3): 442-456.

Berry, Frances S., and William D. Berry. 1990. State lottery adoptions as policy innovations: An event history analysis. *The American Political Science Review* 84(2): 393-415.

_____. 1992. Tax innovation in the states: Capitalizing on political opportunity. *American Journal of Political Science* 36(3): 715-742.

_____. 1994. The politics of tax increases in the states. *American Journal of Political Science* 38(3): 855-859.

_____. 2007. Innovation and diffusion models in policy research. In *Theories of the policy processes* (2nd ed.), ed. Paul A. Sabatier. Boulder, CO: Westview Press.

Besley, Timothy, and Anne Case. 1995. Incumbent behavior: Vote-seeking, tax-setting, and yardstick competition. *The American Economic Review* 85(1): 25-45.

Boehmke, Frederick J., and Richard Witmer. 2004. Disentangling diffusion: The effects of social learning and economic competition on state policy innovation and expansion. *Political Research Quarterly* 57(1): 39-51.

Bollen, Kenneth A. 1989. *Structural equations with latent variables*. New York, NY: John Wiley & Sons, Inc.

Boyne, George A., Julian S. Gould-Williams, Jennifer Law, and Richard M. Walker. 2005. Explaining the adoption of innovation: An empirical analysis of public management reform. *Environmental and Planning: Government and Policy* 23(3): 419-435.

Buelens, Marc, and Herman Van den Broeck. 2007. An analysis of differences in work motivation between public and private sector organizations. *Public Administration Review* 67(1): 65-74.

Burke, Sarah, and Karan M. Collins. 2001. Gender differences in leadership style and management skills. *Women in Management Review* 16(5): 244-257.

Carnoy, Martin, and Richard Rothstein. 2013. *What do international tests really show about U.S. student performance?* Washington, DC: Economic Policy Institute.

Cooper, Randolph B., and Robert W. Zmud. 1990. Information technology implementation research: A technological diffusion approach. *Management Science* 36(2): 123-139.

Cyert, Richard M., and James G. March. 1963. *A behavioral theory of the firm*. Englewood, NJ: Prentice-Hall.

Damanpour, Fariborz, and William M. Evan. 1984. Organizational innovation and performance: The problem of "organizational lag." *Administrative Science Quarterly* 29(3): 392-409.

Damanpour, Fariborz, and Marquerite Schneider. 2006. Phases of the adoption of innovation in organizations: Effects of environment, organization and top managers. *British Journal of Management* 17(3): 215-236.

_____. 2009. Characteristics of innovation and innovation adoption in public organizations: Assessing the role of managers. *Journal of Public Administration Research and Theory* 19(3): 495-522.

De Vries, Hanna, Victor Bekkers, and Lars Tummers. 2015. Innovation in the Public Sector: A Systematic Review and Future Research Agenda. *Public Administration*. doi: 10.1111/padm.12209.

Deci, Edward L. 1972. The effects of contingent and noncontigent rewards and controls on intrinsic motivation. *Organizational Behavioral and Human Performance* 8(2): 217-229.

Deci, Edward L.,and Richard M. Ryan. 1985. *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum Press.

Desai, Vinit M. 2008. Constrained growth: How experience, legitimacy, and age influence risk taking in organization. *Organization Science* 19(4): 594-608.

Dewett, Todd. 2007. Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment. *R&D Management* 37(3): 197-208.

DiMaggio, Paul J., and Walter W. Powell. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review* 48(2): 147-160.

DiTomaso, Nancy, and George Farris. 1992. Diversity and performance in R&D. *IEEE Spectrum* 29(6): 21-24.

Doyle, Walter. 1983. Academic work. *Review of Educational Research* 53(2): 159-199.

Downs, Anthony. 1966. *Inside bureaucracy*. Prospect Heights, IL: Waveland Press Inc.

Edelman, Murray J. 1967. *The Symbolic uses of politics*. Urbana, IL: University of Illinois Press.

Feller, Irwin. 1981. Public sector innovation as conspicuous production. *Policy Analysis* 7(1): 1-20.

Fox, Richard L., and Robert A. Schuhmann. 1999. Gender and local government: A comparison of women and men city managers. *Public Administration Review* 59(3): 231-242.

Funnell, Mary L. 1984. Synergy, influence, and information in the adoption of administrative innovations. *Academy of Management Journal* 27(1): 113-129.

Georgellis, Yannis, Elisabetta Iossa, and Vurain Tabvuma. 2011. Crowding out intrinsic motivation in the public sector. *Journal of Public Administration Research and Theory* 21(3): 473-493.

Gilardi, Fabrizio. 2010. Who learns from what in policy diffusion processes? *American Journal of Political Science* 54(3): 650-666.

Glick, Henry R., and Scott P. Hays. 1991. Innovation and reinvention in state policymaking: Theory and the evolution of living will laws. *The Journal of Politics* 53(3): 835-850.

Gino, Francesca, Linda Argote, Ella Miron-Spektor, and Gergana Todorova. 2010. First, get your feet wet: The effects of learning from direct and indirect experience on team creativity. *Organizational Behavior and Human Decision Processes* 111(2): 102-115.

Gray, Virginia. 1973. Innovation in the states: A diffusion study. *The American Political Science Review* 67(4): 1174-1185.

Grossback, Lawrence J., Sean Nicholson-Crotty, and Davia A. M. Peterson. 2004. Ideology and learning in policy diffusion. *American Politics Research* 32(5): 521-545.

Hall, Jeremy L. 2007. Implications of success and persistence for public sector performance. *Public Organization Review* 7(3): 281-297.

Hanna, Michael T., and John Freeman. 1989. *Organizational ecology*. Cambridge, MA: Harvard University Press.

Harris, Jared, and Philip Bromiley. 2007. Incentives to cheat: The influence of executive compensation and firm performance on financial misrepresentation. *Organization Science* 18(3): 350-367.

Haunschild, Pamela R., and Anne S. Miner. 1997. Modes of interorganizational imitation: The effects of outcome salience and uncertainty. *Administrative Science Quarterly* 42(3): 472-500.

Henderson, Stephen A., and Wimberly C. Royster. 2000. The Appalachian Rural Systemic Initiative. *Education Policy Analysis Archives* 8(17): 1-13.

Hess, Frederick M. 1998. *Spinning wheels: The politics of urban school reform*. Washington, DC: Brookings Institution Press.

Huber, George P., Kathleen M. Sutcliffe, C. Chet Miller, and William H. Glick. 1993. Understanding and predicting organizational change. In *Organizational change and redesign*, eds. George. P. Huber and William. H. Glick, 215-265. New York, NY: Oxford University Press.

Jordan, Paul C. 1986. Effects of an extrinsic reward on intrinsic motivation: A field experiment. *Academy of Management Journal* 29(2): 405-412.

Jun, Kyu-Nahm, and Christopher Weare. 2011. Institutional motivations in the adoption of innovations: The case of e-government. *Journal of Public Administration Research and Theory* 21(3): 495-519.

Kahneman, Daniel, Paul Slovic, and Amos Tversky. 1982. *Judgment under uncertainty: Heuristics and biases*. New York, NY: Cambridge University Press.

Kalev, Alexandra, Frank Dobbin, and Erin Kelly. 2006. Best practices or best guesses? Assessing the efficacy of corporate affirmative action and diversity policies. *American Sociological Review* 71(4): 589-617.

Klonglan, Gerald E., and E. Walter Coward. 1970. The concept of symbolic adoption: A suggested interpretation. *Rural Sociology* 35(1): 77-83.

Levitt, Barbara, and James G. March. 1988. Organizational learning. *Annual Review of Sociology* 14: 319-340.

Long, J. Scott, and Jeremy Freese. 2006. *Regression models for categorical dependent variables using Stata* (2nd ed.). College Station, TX: Stata Press.

Markham, William T., Sharon L. Harlan, and Edward J. Hackett. 1987. Promotion opportunity in organizations: Causes and consequences. In *Research in personnel and human resources management*, eds. Kendrith M. Rowland and Gerald R. Ferris. Vol. 5: 223-287. Greenwich, CT: JAI Press.

Meier, Kenneth J., and Laurence J. O'Toole, Jr. 2002. Public management and organizational performance: The effect of managerial quality. *Journal of Policy Analysis and Management* 21(4): 629-643.

Meyer, John W., and Brian Rowan. 1977. Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology* 83(2): 340-363.

Millstein, Ira M., and Paul W. MacAvoy. 1998. The active board of directors and performance of the large publicly traded corporation. *Columbia Law Review* 98(5): 1283-1322.

Mintrom, Michael. 1997. Policy entrepreneurs and the diffusion of innovation. *American Journal of Political Science* 41(3): 738-770.

Mintrom, Michael, and Sandra Vergari. 1998. Policy networks and innovation diffusion: The case of state education reforms. *The Journal of Politics* 60(1): 126-148.

Mohr, Lawrence B. 1969. Determinants of innovation in organizations. *The American Political Science Review* 63(1): 111-126.

Moon, M. Jae. 1999. The pursuit of managerial entrepreneurship: Does organization matter? *Public Administration Review* 59(1): 31-43.

Moon, M. Jae, and Donald F. Norris. 2005. Does managerial orientation matter? The adoption of reinventing government and e-government at the municipal level. *Information System Journal* 15(1): 43-60.

Mooney, Christopher Z., and Mei-Hsien Lee. 1999. The temporal diffusion of morality policy: The case of death penalty legislation in the American states. *Policy Studies Journal* 27(4): 766-780.

Mumford, Michael D., Stephen J. Zaccaro, Francis D. Harding, T. Owen Jacobs, and Edwin A. Fleishman. 2000. Leadership skills for a changing world: Solving complex social problems. *Leadership Quarterly* 11(1): 11-35.

Northouse, Peter G. 2006. *Leadership: Theory and practice* (4th ed.). Thousand Oaks, CA: Sage Publication.

Page, Stephen. 2005. What's new about the New Public Management? Administrative change in the human services. *Public Administration Review* 65(6): 713-727.

Perry, James L. 1997. Antecedents of Public Service Motivation. *Journal of Public Administration Research and Theory* 7(2): 181-197.

Powell, Gary N. 1990. One more time: Do female and male managers differ? *Academy of Management Executive* 4(3): 68-75.

Puffer, Sheila M., and Joseph B. Weintrop. 1991. Corporate performance and CEO turnover: The role of performance expectation. *Administrative Science Quarterly* 36(1): 1-19.

Roberts, Peter W., and Raphael Amit. 2003. The dynamics of innovative activity and competitive advantage: The case of Australian retail banking, 1981 to 1995. *Organization Science* 14(2): 107-122.

Rogers, Everett M. 2004. *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Rosener, Judy B. 1990. Ways women lead. *Harvard Business Review*. 18(6): 119-125.

Rosenthal, Alan. 1998. *The Decline of representative democracy*. Washington, DC: CQ Press.

Scott , Judy E., and Iris Vessey. 2000. Implementing enterprise resource planning systems: The role of learning from failure. *Information Systems Frontiers* 2(2): 213-232.

Selznick, Philip. 1943. An approach to a theory of bureaucracy. *American Sociological Review* 8(1): 47-54.

Shipan, Charles R., and Craig Volden. 2008. The mechanisms of policy diffusion. *American Journal of Political Science* 52(4): 840-857.

Singh, Jitendra V. 1986. Performance, slack, and risk taking in organizational decision making. *The Academy of Management Journal* 29(3): 562-585.

Sonfield, Matthew, Robert Lussier, Joel Corman, and Mary McKinney. 2001. Gender comparisons in strategic decision-making: An empirical analysis of the entrepreneurial strategy matrix. *Journal of Small Business Management* 39(2): 165-173.

Stetler, Nichole Z. 2002. Gender differences in leadership: Current social issues and future organizational implications. *Journal of Leadership Studies* 8(4): 88-99.

Stream, Christopher. 1999. Health reform in the states: A model of state small group health insurance market reforms. *Political Research Quarterly* 52(3): 499-525.

Teodoro, Manuel P. 2009. Bureaucratic job mobility and the diffusion of innovations. *American Journal of Political Science* 53(1): 175-189.

Tienken, Christopher H. 2013. Conclusions from PISA and TIMSS testing. *Kappa Delta Pi Record* 49(2): 56-58.

Tolbert, Pamela S., and Lynne G. Zucker. 1983. Institutional sources of change in the formal structure of organization: The diffusion of Civil Service Reform, 1880 – 1935. *Administrative Science Quarterly* 28(1): 22-39.

Van de Ven, Andrew H., and Everett M. Rogers. 1988. Innovations and organizations: Critical perspectives. *Communication Research* 15(5): 632-651.

Volden, Craig. 2002. The politics of competitive federalism: A race to the bottom in welfare benefits? *American Journal of Political Science* 46(2): 352-363.

_____. 2006. States as policy laboratories: Emulating success in the Children's Health Insurance Program. *American Journal of Political Science* 50(2): 294-312.

Walker, Jack L. 1969. The diffusion of innovations among the American states. *The American Political Science Review* 63(3): 880-899.

Wilson, James Q. 1989. *Bureaucracy: What government agencies do and why they do it*. New York, NY: Basic Books, Inc.

Wooldridge, Jeffrey M. 2010. *Econometric analysis of cross section and panel data* (2nd ed.). Cambridge, MA: The MIT Press.

Yin, Robert K. 1977. Production efficiency versus bureaucratic self-interest: Two innovative processes? *Policy Science* 8(4): 381-399.

Chapter III

Atkins, Danielle N., and Vicky M. Wilkins. 2013. Going Beyond Reading, Writing, and Arithmetic: The Effects of Teacher Representation on Teen Pregnancy Rates. *Journal of Public Administration Research and Theory* 23(4): 771-90.

Balinski, Michel L., and H. Peyton Young. 1982. Fair Representation: Meeting the Ideal of One Man, One Vote. New Haven, CT: Yale University Press.

Barnard, Chester I. 1938. *The Function of the Executive*. Cambridge, MA: Harvard University Press.

Blau, Peter M. 1964. *Exchange and Power in Social Life*. New York, NY: John Wiley.

Bradbury, Mark D., and J. Edward Kellough. 2011. Representative Bureaucracy: Assessing the Evidence on Active Representation. *American Review of Public Administration* 41(2): 157-67.

Bratton, Kathleen A., and Kerry L. Haynie. 1999. Agenda Setting and Legislative Success in State Legislature: The Effects of Gender and Race. *The Journal of Politics* 61(3): 658-79.

Buchanan, James M., and Gordon Tullock. 1962. *The Calculus of Consent: Logical Foundations of Constitutional Democracy*. Ann Arbor, MI: University of Michigan Press.

Cook, Brian J. 2014. *Bureaucracy and Self-government: Reconsidering the Role of Public Administration in American Politics*. Baltimore, MD: Johns Hopkins University Press.

Christensen, Robert K., and Bradley E. Wright. 2011. The Effects of Public Service Motivation on Job Choice Decisions. *Journal of Public Administration Research and Theory* 21(4): 723-43.

Dahlerup, Drude. 1988. From a Small to a Large Minority: Women in Scandinavian Politics. *Scandinavian Political Studies* 11(2): 275-98.

Dolan, Julie. 2002. Representative Bureaucracy in the Federal Executive: Gender and Spending Priorities. *Journal of Public Administration Research and Theory* 12(3): 353-75.

Dornbusch, Sanford M., and W. Richard Scott. 1975. *Evaluation and the Exercise of Authority*. San Francisco, CA: Jossey-Bass.

Downs, Anthony. 1967. *Inside Bureaucracy*. Boston, MA: Little, Brown and Company.

Feldman, Daniel C. 1976. A Contingency Theory of Socialization. *Administrative Science Quarterly* 21(3): 433-52.

Gerber, Alan, Donald Green, and Christopher Larimer. 2010. An Experiment Testing the Relative Effectiveness of Encouraging Voter Participation by Inducing Feeling of Pride or Shame. *Political Behavior* 32(3): 409-22.

Gosling, James J. 2009. *Budgetary Politics in American Governments* (5th ed.). New York, NY: Routledge.

Gouldner, Alvin W. 1954. *Patterns of Industrial Bureaucracy*. Glencoe, IL: Free Press.

Grey, Sandra. 2002. Does Size Matter? Critical Mass and New Zealand's Women MPs. *Parliamentary Affairs* 55(1): 19-29.

Hausmann, Ricardo, Laura D. Tyson, Yasmina Bekhouche, and Saadia Zahidi. 2014. *The Global Gender Gap Report 2014*. Cologny/Geneva, Switzerland: World Economic Forum.

Henderson. Lenneal J. 1979. *Administrative Advocacy: Black Administrators in Urban Bureaucracy*. Palo Alto, CA: R & E Research Associates.

_____. 1988. Urban Administrators: The Politics of Role Elasticity. In *Urban Minority Administrators: Politics, Policies, and Style*, eds. Albert K. Karnig and Paula D. McClain. New York, NY: Greenwood.

Hindera, John J. 1993. Representative Bureaucracy: Further Evidence of Active Representation in the EEOC District Offices. *Journal of Public Administration Research and Theory* 3(4): 415-29.

Hindera, John J., and Cheryl D. Young. 1998. Representative Bureaucracy: The Theoretical Implications of Statistical Interaction. *Political Research Quarterly* 51(3): 655-71.

Kahneman, Daniel, and Amos Tversky. 1979. Prospect Theory: An Analysis of Decision under Risk. *Econometrica* 47(2): 263-91.

Kanter, Rosabeth M. 1977a. *Men and Women of the Corporation*. New York, NY: Basic.

_____. 1977b. Some Effects of Proportions on Group Life: Skewed Sex Ratios and Responses to Token Women. *American Journal of Sociology* 82(5): 965-90.

Karpowitz, Christopher F., Tali Mendelberg, and Lauren Mattioli. 2015. Why Women's Numbers Elevate Women's Influence, and When They Do Not. *Politics, Groups, and Identities* 3(1): 140-77.

Keiser, Lael R., Vicky M. Wilkins, Kenneth J. Meier, and Catherine A. Holland. 2002. Lipstick and Logarithms: Gender, Institutional Context, and Representative Bureaucracy. *The American Political Science Review* 96(3): 553-64.

Kim, Pan S. 1993. Toward Gender Equality in the Korean Civil Service. *Public Personnel Management* 22(3): 403-19.

Kingsley, J. Donald. 1944. *Representative Bureaucracy: An Interpretation of the British Civil Service.* Yellow Springs, OH: Antioch Press.

Krislov, Samuel. 1974. *Representative Bureaucracy*. Englewood Cliffs, NJ: Prentice Hall.

Krislov, Samuel, and David H. Rosenbloom. 1981. *Representative Bureaucracy and the American Political System*. New York, NY: Praeger Publishers.

Kristof-Brown, Amy L., Ryan D. Zimmerman, and Erin C. Johnson. 2005. Consequences of Individuals' Fit at Work. *Personnel Psychology* 58(2): 281-342.

Levitan, David M. 1946. The Responsibility of Administrative Officials in a Democratic Society. *Political Science Quarterly* 6(4): 562-98.

Lim, Hong-Hai. 2006. Representative Bureaucracy: Rethinking Substantive Effects and Active Representation. *Public Administration Review* 66(2): 193-204.

Long, Norton E. 1952. Bureaucracy and Constitutionalism. *American Political Science Review* 46(3): 808-18.

_____. 1962. The Administrative Organization as a Political System. In *Concepts and Issues in Administrative Behavior,* eds. Sidney Mailick and Edward H. Van Ness. Englewood Cliff, NJ: Prentice Hall.

Louis, Meryl R. 1980. Surprise and Sense Making: What Newcomers Experience in Entering Unfamiliar Organizational Settings. *Administrative Science Quarterly* 25(2): 226-51.

March, James G. 1962. The Business Firm as a Political Coalition. *The Journal of Politics* 24(4): 662-78.

March, James G., and Herbert A. Simon. 1958. *Organizations*. New York, NY: Willey.

Meier, Kenneth J. 1979. *Politics and the Bureaucracy: Policymaking in the Fourth Branch of Government*. North Scituate, MA: Duxbury Press.

_____. 1993. Latinos and Representative Bureaucracy: Testing the Thompson and Henderson Hypotheses. *Journal of Public Administration Research and Theory* 3(4): 393-414.

Meier, Kenneth J., and John Bohte. 2001. Structure and Discretion: Missing Links in Representative Bureaucracy. *Journal of Public Administration Research and Theory* 11(4): 455-70.

Meier, Kenneth J., and Joseph Stewart, Jr. 1992. Active Representation in Educational Bureaucracies: Policy Impacts. *American Review of Public Administration* 22(3): 157-71.

Meier, Kenneth J., and Jill Nicholson-Crotty. 2006. Gender, Representative Bureaucracy, and Law Enforcement. *Public Administration Review* 66(6): 850-60.

Meier, Kenneth J., and Lloyd G. Nigro. 1976. Representative Bureaucracy and Policy Preferences: A Study in the Attitudes of Federal Executives. *Public Administration Review* 36(4): 458-69.

Miller, Charles E. 1989. The Social Psychological Effects of Group Decision Rules. In *Psychology of Group Influence,* ed. Paul b. Paulus. Hillsdale, NJ: Erlbaum.

Mosher, Frederick C. 1968. *Democracy and the Public Service*. New York: Oxford University Press.

Ministry of Security and Public Administration (MOSPA). *Annual Report on Korean Central Civil Service* (from 2005 to 2010). http://www.mospa.go.kr/ (December 2, 2012).

Niskanen, William A. 1971. *Bureaucracy and Representative Government*. Chicago, IL: Aldine-Atherton.

Oberfield, Zachary W. 2014. *Becoming Bureaucrats: Socialization at the Front Lines of Government Service*. Philadelphia, PA: University of Pennsylvania Press.

Oppenheimer, Joe. 2012. *Principles of Politics: A Rational Choice Theory Guide to Politics and Social Justice*. Cambridge, NY: Cambridge University Press.

Perrow, Charles. 1979. *Complex Organizations: A Critical Essay*. 2nd ed. New York, NY: Random House.

Pitkin, Hanna F. 1967. *The Concept of Representation*. Berkeley, CA: University of California Press.

Pescosolido, Anthony. 2001. Informal Leaders and the Development of Group Efficacy. *Small Group Research* 32(1): 74-93.

Rawls, John. 1971. *A Theory of Justice*. Cambridge, MA: Harvard University Press.

Rehfuss, John A. 1986. A Representative Bureaucracy? Women and Minority Executives in California Career Service. *Public Administration Review* 46(5): 454-60.

Ridgeway, Cecilia A. 2011. *Framed by Gender: How Gender Inequality Persists in the Modern World*. New York, NY: Oxford University Press.

Riley, Matilda W., and Richard Cohn. 1958. Control Networks in Informal Groups. *Sociometry* 21(1): 30-49.

Rosenbloom, David H., and Jeannette G. Featherstonhaugh. 1977. Passive and Active Representation in the Federal Service: A Comparison of Blacks and Whites. *Social Science Quarterly* 57(4): 873-82.

Rourke, Francis E. 1984. *Bureaucracy, Politics, and Public Policy*. Boston, MA: Little-Brown.

Selznick, Phillip. 1948. Foundation of the Theory of Organization. *American Sociological Review* 13(1): 25-35.

_____. 1957. *Leadership in Administration*. Evanston, IL: Row, Peterson.

Scott, W. Richard, and Gerald F. Davis. 2007. *Organizations and Organizing: Rational, Natural, and Open System Perspectives*. Upper Saddle River, NJ: Pearson Prentice Hall.

Shibutani, Tamotsu. 1962. Reference Groups and Social Control. In *Human Behavior and Social Processes*, ed. Arnold M. Rose. Boston, MA: Houghton Mifflin.

Simon, Herbert A. 1957. *Administrative Behavior* (2nd ed.). New York, NY: Macmillan.

Smith, Craig R., and Sergio Fernandez. 2010. Equity in Federal Contracting: Examining the Link between Minority Representation and Federal Procurement Decisions. *Public Administration Review* 70(1): 87-96.

Sowa, Jessica E., and Sally Coleman Selden. 2003. Administrative Discretion and Active Representation. *Public Administration Review* 63(6): 700-10.

Statistics Korea. 2011. *Annual Report on the Economically Active Population Survey in 2011.* http://kostat.go.kr/portal/english/resources/2/4/2/index.static (December 19, 2012).

Theobald, Nick A., and Donald P. Haider-Markel. 2009. Race, Bureaucracy, and Symbolic Representation: Interactions between Citizens and Police. *Journal of Public Administration Research and Theory* 19(2): 409-26.

Thielemann, Gregory T., and Joseph Stewart, Jr. 1996. A Demand-Side Perspective on the Importance of Representative Bureaucracy: AIDS, Ethnicity, Gender, and Sexual Orientation. *Public Administration Review* 56(2): 168-73.

Thompson, Frank J. 1976. Minority Groups in Public Bureaucracy: Are Passive and Active Representation Linked? *Administration and Society* 8(2): 201-26.

Thompson, James D. 1967. *Organizations in Action*. New York, NY: McGraw-Hill.

Tullock, Gordon. 1965. *The Politics of Bureaucracy*. Washington, D.C.: Public Affairs Press.

Tummala, Krishna K., ed. 2003. *Comparative Bureaucratic Systems*. Lanham, MD: Lexington Books.

Tversky, Amos, and Daniel Kahneman. 1991. Loss Aversion in Riskless Choice: A Reference Dependent Model. *Quarterly Journal of Economics* 106(4): 1039-61.

Tyler, Tom R. 1993. The Social Psychology of Authority. In *Social Psychology in Organizations: Advances in Theory and Research*, ed. J. Keith Murnighan. Upper Saddle River, NJ: Prentice Hall.

Van Maanen, John, and Edgar H. Schein. 1979. Toward a Theory of Organizational Socialization. In *Research in Organizational Behavior* (vol. 1), ed. Barry M. Staw. Greenwich, CT: JAI Press.

Van Riper, Paul P. 1958. *History of the United States Civil Service*. Evanston, IL: Row Peterson.

Wanous, John P. 1992. *Organizational Entry: Recruitment, Selection, and Socialization of Newcomers*. Reading, MA: Addison-Wesley.

White, Ismail K., Chry L. Laird., and Troy D. Allen. 2014. Selling Out?: The Politics of Navigating Conflicts between Racial Group and Self-interest. *American Political Science Review* 108(4): 783-800.

Wildavsky, Aaron. 1964. *The Politics of Budgetary Process*. Boston, MA: Little, Brown.

_____. 1988. *The New Politics of the Budgetary Process*. Glenview, IL: Scott, Foresman.

Wilkins, Vicky M., and Lael R. Keiser. 2006. Linking Passive and Active Representation by Gender: The Case of Child Support Agencies. *Journal of Public Administration Research and Theory* 16(1): 87-102.

Wilkins, Vicky M., and Brian N. Williams. 2008. Black or Blue: Racial Profiling and Representative Bureaucracy. *Public Administration Review* 68(4): 654-64.

Winn, Mylon. 1989. Black Administrators and Racial Roadblocks in Public Organizations. *International Journal of Public Administration* 12(5): 797-819.

Chapter IV

Adam, Christian, Michael Bauer, Christoph Knill, and Philipp Studinger. 2007. The Termination of Public Organizations: Theoretical Perspectives to Revitalize a Promising Research Area. *Public Organization Review* 7: 221-236.

Amburgey, Terry L., Dawn Kelly, and William P. Barnett. 1993. Resetting the Clock: The Dynamics of Organizational Change and Failure. *Administrative Science Quarterly* 38(1): 51-73.

Aldrich, Howard E., and Jeffrey Pfeffer. 1976. Environments of Organizations. *Annual Review of Sociology* 2: 79-105.

Astley, W. Graham, and Andrew H. Van de Ven. 1983. Central Perspectives and Debates in Organizational Theory. *Administrative Science Quarterly* 28(2): 245-273.

Baum, Joel A. C., and Terry Amburgey. 2002. "Organizational Ecology." In *The Blackwell Companion to Organizations*, ed. Joel A. C. Baum. Malden, MA: Blackwell.

Berry, Christopher R., Barry C. Burden, and William G. Howell. 2010. After Enactment: The Lives and Deaths of Federal Programs. *American Journal of Political Science* 54(1): 1-17.

Betton, John, and Gregory G. Dess. 1985. The Application of Population Ecology Models to the Study of Organizations. *The Academy of Management Review* 10(4): 750-757.

Blossfeld, Hans-Peter, Katrin Golsch, and Götz Rohwer. 2007. *Event History Analysis with Stata*. New York, NY: Psychology Press.

Boin, Arjen, Sanneke Kuipers, and Marco Steenbergen. 2010. The Life and Death of Public Organizations: A Question of Institutional Design? *Governance* 23(3): 385-410.

Brüderl, Josef, Peter Preisendörfer, and Rolf Ziegler. 1992. Survival Chances of Newly Founded Business Organizations. *American Sociology Review* 57(2): 227-242.

Brüderl, Josef, and Rudolf Schüssler. 1990. Organizational Mortality: The Liability of Newness and Adolescence. *Administrative Science Quarterly* 35(3): 530-547.

Carroll, Glenn R. 1985. Concentration and specialization: Dynamics of niche width in populations of organizations. *American Journal of Sociology* 90(6): 1262-1283.

Carroll, Glenn R., and Jacques Delacroix. 1982. Organizational Mortality in the Newspaper Industries of Argentina and Ireland: An Ecological Approach. *Administrative Science Quarterly* 27(2): 169-198.

Carroll, Glenn R., and Micaheal T. Hannan. 1989. Density Delay in the Evolution of Organizational Populations. *Administrative Science Quarterly* 34(3): 411-430.

Carroll, Glenn R., and Anand Swaminathan. 1992. The Organizational Ecology of Strategic Groups in the American Brewing Industry from 1975 to 1990. *Industrial and Corporate Change* 1(1): 65-97.

Carroll, Glenn R., and James Wade. 1991. Density Dependence in the Organizational Evolution of the American Brewing Industry across Different Levels of Analysis. *Social Science Research* 20(2): 271-302.

Cox, David R. 1972. Regression Models and Life-tables. *Journal of the Royal Statistical Society* 34(2): 187-220.

DiMaggio, Paul J., and Walther W. Powell. 1983. The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. *American Sociological Review* 48(2): 147-160.

Donaldson, Lex. 1995. *American Anti-Management Theories of Organizations: A Critique of Paradigm Proliferation.* New York, NY: Cambridge University Press.

Dooley, Kevin. 2002. "Organizational Complexity." In *International Encyclopedia of Business and Management*, ed. Malcolm Warner. London, England: Thompson Learning.

Downs, Anthony. 1966. *Inside Bureaucracy*. Prospect Heights, IL: Waveland Press Inc.

Fichman, Mark, and Daniel a. Levinthal. 1991. Honeymoons and the Liability of Adolescence: A New perspective on Duration Dependence in Social and Organizational Relationships. *Academy of Management Review* 16(2): 442-468.

Freeman, John, and Michael T. Hannan. 1983. Niche Width and the Dynamics of Organizational Populations. *American Journal of Sociology* 88(6): 1116-1145.

Freeman, John, Glenn R. Carroll, and Michael T. Hannan. 1983. The Liability of Newness: Age Dependence in Organizational Death Rates. *American Sociological Review* 48(5): 692-710.

Hannan, Michael T., Glenn R. Carroll, Elizabeth A. Dundon, and John C. Torres. 1995. Organizational Evolution in a Multinational Context. *American Sociology Review* 60(4): 509-528.

Hannan, Michael T., and John Freeman. 1977. The Population Ecology of Organization. *American Journal of Sociology* 82(5): 929-964.

_____. 1984. Structural Inertia and Organizational Change. *American Sociological Review* 49(2): 149-164.

_____. 1988. The Ecology of Organizational Mortality: American Labor Unions, 1836-1985. *American Journal of Sociology* 94(1): 25-52.

_____. 1989. *Organizational Ecology*. Cambridge, MA: Harvard University Press.

James, Oliver, Nicolai Petrovsky, Alice Moseley, and George A. Boyne. 2015. The Politics of Agency Death: Ministers and the Survival of Government Agencies in a Parliamentary System. *British Journal of Political Science*, available on CJO2015. doi:10.1017/S0007123414000477.

Kaufman, Herbert. 1976. *Are Government Organizations Immortal?* Washington, DC: Brookings Institution.

Lewis, David E. 2002. The Politics of Agency Termination: Confronting the Myth of Agency Immortality. *The Journal of Politics* 64(1): 89-107.

_____. 2004. The Adverse Consequences of the Politics of Agency Design for Presidential Management in the United States. *British Journal of Political Science* 34(3): 377-404.

McCubbins, Matthew D., Roget Noll, and Barry Weingast. 1989. Structure and Process, Politics and Policy. *Virginia Law Review* 75(2): 431-482.

Meyer, John W., and Brian Rowan. 1977. Institutionalized Organizations: Formal Structure as Myth and Ceremony. *American Journal of Sociology* 83(2): 340-363.

Moe, Terry M. 1989. "The Politics of Bureaucratic Structure." In *Can the Government Govern?* eds. John E. Chubb and Paul E. Peterson. Washington, D.C.: Brookings Institute.

Nelson, Richard R., and Sidney G. Winter. 1982. *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.

O'Toole, Laurence J., Jr., and Kenneth J. Meier. 1999. Modeling the Impact of Public Management: Implications of Structural Context. *Journal of Public Administration Research and Theory* 9(4): 505-526.

Parkinson, C. Northcote. 1957. *Parkinson's Law and Other Studies in Administration*. Boston, MA: Houghton Mifflin Company.

Perry, James L., and Hal G. Rainey. 1988. The Public-Private Distinction in Organization Theory: A Critique and Research Strategy. *The Academy of Management Review* 13(2): 182-201.

Peters, B. Guy, and Brian W. Hogwood. 1988. The Death of Immortality: Births, Deaths and Metamorpheses in the U.S. Federal Bureaucracy 1933-1982. *The American Review of Public Administration* 18(2): 119-133.

Rainey, Hal G. (2003). *Understanding and Managing Public Organizations* (3rd ed.). San Francisco, CA: Jossey-Bass.

Robinson, Scott E. 2004. The President as Reformer: When Do Presidents Initiate Administrative Reform through Legislation? *Presidential Studies Quarterly* 34(4): 793-803.

Scott, W. Richard, and Gerald F. Davis. 2007. *Organizations and Organizing: Rational, Natural, and Open System Perspectives*. Upper Saddle River, NJ: Pearson Prentice Hall.

Simon, Herbert A. 1962. The Architecture of Complexity. *Proceeding of the American Philosophical Society* 106(6): 67-82.

Singh, Jitendra V., David J. Tucker, and Robert J. House. 1986. Organizational Legitimacy and the Liability of Newness. *Administrative Science Quarterly* 31(2): 1171-193.

Starbuck, William H. 1965. "Organizational Growth and Development." In *Handbook of Organizations*, ed. James G. March. Chicago, IL: Rand McNally.

Stinchcombe Arthur L. 1965. "Social Structure and Organizations." In *Handbook of Organizations*, ed. James G. March. Chicago, IL: Rand McNally.

U.S. Department of Justice. Office of the Inspector General. 2002. *The Immigration and Naturalization Service's Contacts with Two September 11 Terrorists*. Washington, D.C.: Department of Justice.

Wagner, Adolph. 1890. *Finanzwissenschaft* (3rd ed.). Leipzig, Germany: Winter.

_____. 1893. *Grundlegung der politischen Ökonomie* (3rd ed.). Leipzig, Germany: Winter.

Wamsley, Gary L., and Mayer N. Zald. 1973. The Political Economy of Public Organizations. *Public Administration Review* 33(1): 62-73.

Warwick, Donald P. 1975. *A Theory of Public Bureaucracy: Politics, Personality, and Organization in the State Department*. Cambridge, MA: Harvard University Press.

Wood, B. Dan, and Richard W. Waterman. 1991. The Dynamics of Political Control of the Bureaucracy. *American Political Science Review* 85(3): 801-828.

Wooldridge, Jeffery M. 2010. *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.

Vita

Changgeun Yun

EDUCATION

University of Kentucky, Lexington, Kentucky — (expected) Dec. 2015
- Ph.D. in Public Policy and Administration

Texas A&M University, College Station, Texas — May 2011
- Master of Public Service and Administration

Yonsei University, Seoul, Korea — Aug. 2008
- Master of Public Administration

Sungkyunkwan University, Seoul, Korea — Aug. 2002
- Bachelor of Science in Architecture

RESEARCH AND PROFESSIONAL EXPERIENCE

Adjunct Professor — August 2015 - present
- Morehead State University, Morehead, Kentucky
- PA 625 (Public Budget & Finance)

Research Assistant — August 2015 - present
- International Public Policy & Management Institute
- Martin School of Public Policy and Administration, University of Kentucky

Research Assistant
- University of Kentucky — Summer 2012 - Summer 2015
- Yonsei University, Korea — Spring 2007 - Spring 2008

Military Engineering Officer (first lieutenant)
- Republic of Korea Army, Korea — June 2003 - Oct. 2006
- Engaged in Operation Iraqi Freedom — Apr. 2005 - Oct. 2005

PUBLICATIONS

2009 **Yun, Changgeun**, and M. Jae Moon. "A study on the Shift from Passive Representation to Active Representation: A Focus on Critical Mass and the Role of Discretion." *Korean Journal of Public Administration (행정논총)* 47(3): 25-50. (in Korean)

MANUSCRIPTS UNDER REVIEW

1. **Yun, Changgeun**. "Early Adoption of Innovations: The Effects of Performance-based Motivation and Organizational Characteristics on Innovation Adoption."

2. **Yun, Changgeun**. "Politics of Active Representation in Bureaucracy: The Tradeoff between Group interest and Self-interest."

WORK IN PROGRESS

1. "Ecology of Government: The Dynamics of Organizational Decline and Death."

2. "Advocacy Coalition Framework: Examining the Role of Coalition Opportunity Structure in the Relationship between an External Shock and Policy Change."

3. "Economic Crisis and the Nonprofit Sector." (with Saerim Kim).

4. "Organizational Ecology: Decline and Death of Public Organizations."

5. "The Spread of Innovation: Examining the Order of Diffusion Mechanisms."

CONFERENCE PRESENTATIONS

2016 "Politics of Active Representation in Bureaucracy: The Trade-off between Group Interest and Self-interest." The 2016 Annual Conference of the Southern Political Science Association in San Juan, Puerto Rico, January 7-9.

2014 "Diffusion of Administrative Innovation: the Effect of Organizational Performance and the Order of Diffusion Mechanisms." The 2014 Annual Conference of the Southeastern Conference for Public Administration (SECoPA) in Atlanta, Georgia, September 17-20.

2014 "Early-Adopter or Late-Adopter?: the Mechanism of Triggering or Boosting Policy Diffusion." The 2014 Annual Conference of the Public Management Research Association in Seoul, South Korea, June 29-July 1.

2013 "Advocacy Coalition Framework: Examining the Role of Coalition Opportunity Structure in the Relationship between an External Shock and Policy Change." The 2013 Annual Conference of the Midwest Political Science Association in Chicago, Illinois, April 11-14.

2013 "Representative Bureaucracy: Exploring the Prerequisites for the Link between Passive and Active Representation." The 2013 Annual Conference of the Southern Political Science Association in Orlando, Florida, January 3-5.

TEACHING EXPERIENCE

Department of Public Management & Government, Morehead State University

- Adjunct Professor: (PA625) Public Budget & Finance — Fall 2015
- Adjunct Professor: (RAPP101) Introduction to Public Policy — Spring 2016

Department of Political Science, University of Kentucky

- Primary Instructor: (PS372) Introduction to Political Analysis — Spring 2014

RESEARCH AND TEACHING INTERESTS

Public Management: Organization Theory, Representative Bureaucracy, Reorganization

Public Policy: Advocacy Coalition Framework, Innovation Adoption, Policy Change

Research: Research Design and Methods, Regression Analysis, Event History Analysis

HONORS AND AWARDS

Awards

- Artinian Travel Award, Southern Political Science Association — 2016
- Dissertation Enhancement Award, University of Kentucky — 2014
- Prestage-Cook Travel Award, Southern Political Science Association — 2013
- Student Travel Funding, University of Kentucky — 2013; 2014; 2016

Honors

- Letter of Appreciation by the Iraqi Kurdistan Government — 2005
- Korean Army Chief of Staff Award (Operation Iraqi Freedom) — 2005
- Early Graduation of Excellence Award, Sungkyunkwan University — 2002

FELLOWSHIPS AND SCHOLARSHIPS

Fellowships

- Daniel Reedy Quality Achievement Award, University of Kentucky — 2011-2012
- Kentucky Opportunity Fellowship, University of Kentucky — 2011-2012
- George and Barbara Bush Fellowship, Texas A&M University — 2009-2011

Scholarships

- Brain Korea 21 Scholarship, Yonsei University, Korea — 2007
- Honors Scholarship, Sungkyunkwan University, Korea — Fall 1999; Fall 2001
- Chun-Hyang Scholarship, the City of Namwon, Korea — 1996 – 2002

PROFESSIONAL MEMBERSHIP

- Southern Political Science Association (SPSA)
- Midwest Political Science Association (MPSA)
- American Society for Public Administration (ASPA)
- Association for Public Policy Analysis and Management (APPAM)