Size Matters: Towards a Contingency Theory of Diversity Effects on Performance

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Abstract

This study examines the diversity-performance link by focusing on two types of diversity—gender and functional—in the context of governing boards of 24 quasi-government agencies in Korea over 16 years (2000-2015). Although public management scholarship contains evidence regarding the importance of diversity in public organizations, there is little consensus on what constitutes diversity and how it affects public sector performance. This study expands the scope of dialogues by highlighting multi-dimensional characteristics of diversity and the contingent nature of diversity effects. Multiplicative interaction models confirm that there are distinctive effects of different types of diversity on performance, and the relationship is moderated by the size of the group to which minorities belong. While the effect of board gender diversity is limited in our data, the effect of having a female chief executive is positively significant with decreasing marginal effect as the number of board members increases. On the other hand, the relationship of functional diversity in the boardroom to agency performance is negative, while the negative marginal effect decreases and becomes positive when board size rises above a critical number.

[Keywords: gender diversity, functional diversity, public sector performance, governing boards, group size]

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Introduction

This study examines the diversity-performance link by focusing on two types of diversity—gender and functional—in small leadership groups located at the highest level of organizational structures. Using sixteen years' of longitudinal data (2000-2015) drawn from governing boards of 24 quasi-government agencies, this study examines the extent the two different types of diversity in top management teams influence performance of public sector organizations, and whether and how the relationship is moderated by the size of the group to which minorities belong. A substantial body of work in various disciplines has evaluated factors that moderate the relationship between diversity and performance. Yet there is little systemic evidence as to what kind of diversity is more effective for improving performance, or whether and how the extent of diversity relates to organizational performance in various contexts (Andrews et al. 2005; Choi and Rainey 2010; Pitts 2009).

This study aims to contribute to the literature, first, by expanding the scope of dialogues on the diversity effect. Diversity encompasses varied attributes including demographic characteristics and identity such as gender, race/ethnicity, sexual orientation, language, and geographical backgrounds as well as cognitive or functional characteristics reflecting skills, education, expertise, and experience (Andersen and Moynihan 2016; Rose 2007). We shed light on the multi-dimensional characteristics of diversity by bringing functional characteristics to the fore as an important dimension of diversity in public management research. Most literature has focused on ascribed identity such as gender and race/ethnicity, but acquired characteristics related to functional diversity and its cognitive consequences have not been given the same consideration (Milliken and Martins 1996; Moon 2016; Page 2008). Functional diversity can be conceptualized in different ways, but refers to the heterogeneous composition of job-related

backgrounds "reflecting the mix of skills, educations, backgrounds, and experiences in groups" (Andersen and Moynihan 2016: 448; Bunderson and Sutcliffe 2002; Moon 2016).

Second, the contingent effect of diversity is examined by focusing on group size as a moderating factor in the relationship with organizational performance. The role of group size that affects interactions among organizational members has been noted in sociology, psychology, political science, and business management (Dahlerup 1988; Kanter 1977, 1987; Granovetter 1978). However, it has drawn less attention in public management scholarship while decision making in small leadership groups such as boards, councils, juries, and commissions becomes increasingly important. We know little about how the scope and type of groups moderate diversity effects in different contexts, although a few studies have attempted to empirically test its validity in public organizations (e.g., Meier 1993; Meier and Stewart 1992), quasi-public and nonprofit organizations (e.g., Ellwood and Garcia-Lacalle 2015; Gazley et al. 2010), and private organizations (e.g., Bond 2005; Konrad et al. 2008; Torchia et al. 2011; Joecks et al. 2013).

We broach this topic in the context of governing boards as a collective decision making body. Board members including a chief executive officer (CEO) make strategic decisions about whether or how to respond to external challenges and monitor internal management (Finkelstein and Hambrick 1996; Hinna et al. 2010), reduce uncertainty by securing resources, information, and legitimacy (Pfeffer and Salancik 1978; Hillman et al. 2000), and protect the interest of shareholders or customers (Finkelstein and Hambrick 1996; Carver 2001). Despite growing interest and importance, board leadership and boardroom dynamics as well as formal structures of board governance are still largely unknown (Hambrick et al. 1996; Huse 2007; Hinna et al. 2010; Leblanc and Schwartz, 2007; Van Thiel 2015). It is imperative to pay more notice to governing bodies in public, quasi-public, and nonprofit organizations with different governance

models and their impact on board effectiveness and organizational performance (Skelcher 1998; Carver 2001; Monteduro et al. 2011; Cornforth 2001; Van Thiel 2015).

This study contributes knowledge by exploring quasi-government organizations, which are an interesting testing ground for our research question. These entities, often called quangos, public sector organizations or hybrid organizations, share characteristics of both public and private organizations and have played an increasingly important role in delivering public services since the 1980s (Grossi et al. 2015; Van Thiel 2004, 2015). On that account, performance measures of these entities are less obscure than those in public organizations and calls for diversity tend to be more coercive than in private organizations. Yet quangos are under pressure to meet oftentimes conflicting demands from different stakeholders, including politicians, bureaucrats, and citizens. Governing boards of these entities play an important role in aggregating and securing their interests (Carver 2010; Ellwood and Garcia-Lacalle 2015) and multiple facets of responsibility related to the quality of service delivery, various missions of the government, and the impact on society as a whole (Alexius and Örnberg 2015; Grossi et al. 2015; Swiatczak et al. 2015). However, corporate governance of quasi-government organizations and its influence on performance is surprisingly understudied (Hinna et al. 2010; Van Thiel 2015).

A final contribution of this study is to expand the inquiry to the non-US context. Research on the topic has been largely skewed to US or European cases. Part of the reason may be related to the fact that Asian countries, including South Korea, tend to be racially homogenous and attention to the issue of board diversity itself has been relatively scant. Exploring a Korean case over sixteen years offers a unique opportunity to understand the distinctive effect of gender and functional diversity contingent to the size of a small leadership

group, and provide meaningful directions of diversity research. In past decades, demand for gender diversity has been increasing in all sorts of organizations including government, university, and National Assembly; however, quasi-government agencies have a negligible portion of female board members. This is partly because there is no mandatory legal requirement for gender consideration, but mainly because the selection of board members is somewhat secretive and network-based in Korea (Park and Cho 2014). Besides, the attention to diverse board composition has been focused on board members' occupational backgrounds related to different interests of stakeholders (Ellwood and Garcia-Lacalle 2015; Gazley et al. 2010) and incentives to patronage appointment in quasi-government agencies (Skelcher 1998; Park and Cho 2014).[1]

In the next section, we provide a more detailed review of the literature on the diversity-performance link and the possible contingent relationship, followed by our hypotheses. The third section states our data, measures, and empirical models to test these hypotheses. A presentation and discussion of our results follows in the fourth, and we conclude with implications in the last section.

Literature and Hypotheses

The Link between Diversity and Performance

Studies have examined the effect of different types of diversity in a number of organizational groups on various outcomes. Yet the empirical evidence is not as straightforward as it appears, and concentrated on demographic diversity and its impact on organizational performance. Given the quasi-government context of this study, this section reviews a broad spectrum of both public

and private sector research providing evidence on the various effects of diversity on performance.

First of all, much of the literature claims that diversity creates positive changes in organizations by tapping a broader base of ideas, knowledge, and information; improving images and reputations of organizations; enhancing problem-solving with a variety of perspectives (Cox and Blake 1991; Campbell and Minguez-Vera 2008; Page 2008; Riccucci 2002). It also increases pay equity and mobility opportunities for minorities and enables more transparent, accountable, and effective communications (Meier, O'Toole, and Goerdel 2006; Wise and Tschirhart 2000) and reduce gender salience and stereotype (Marvel 2018; Wegge et al. 2008). In addition, the effort to increase diversity itself can be a positive signal to employees and job applicants (Rose 2007; Kakabadse et al. 2015).

Presuming that each individual from heterogeneous groups provides access to a broader range of resources, this argument comports well with resource dependence literature and human capital theory (Pfeffer and Salancik 1978; Monteduro et al. 2011; Kakabadse et al. 2015). Having individuals who can complement the existing human capital is particularly important in small leadership groups such as boardrooms. From this perspective, board composition is a response to changes in resource needs from the external environment (Hillman et al. 2000). Although human capital theory has been focused on demographic diversity, an argument can easily be extended to functional diversity where each board member brings unique resources, skills and perspectives.

On the other hand, mounting evidence also indicates a negative effect of diversity (Adams and Ferreira 2009; Bunderson and Sutcliffe 2002; Choi and Rainey 2010; Jehn et al. 1997; Moon 2016; Pelled et al. 1999; Pitts et al. 2010). The theoretical foundation of this

argument rests on the logic of social categorization and similarity/attraction that posits people tend to classify others into groups with similar characteristics and are attracted to groups sharing their characteristics (Williams and O'Reilly 1998). Thus, heterogeneous groups may suffer from less communication, more conflicts, and time-consuming decision making (Adams and Ferreira 2009; Bunderson and Sutcliffe 2002) and higher turnover and absenteeism (Cox and Blake 1991). For gender diversity, Adams and Ferreira (2009) show an overall negative effect of gender-diverse boards on performance, although the relationship with attendance records and monitoring efforts was positive. In a similar vein, Bunderson and Sutcliffe (2002) reveal a negative effect of function diversity in a management team due to problems associated with the categorization processes.

Along with the contrasting evidence on the relationship between diversity and performance, we identify a set of arguments in the literature that reports either a positive or negative, weak or no relationship between diversity and performance. For example, diverse groups may have advantages in solving novel problems, while homogeneous groups handle routine problems better (Filley et al. 1976). Diversity of members' backgrounds is related to either synergistic effect of various talents and perspectives or detrimental effect due to conflict and slow communication (Bunderson and Sutcliffe 2002; Williams and O'Reilly 1998). Several meta-analytic studies reached a similar conclusion. For example, Pletzer et al. (2015) found a small and insignificant relationship between board gender diversity and financial performance; and Post and Bryon (2015) found a weak positive relationship with performance in countries with greater gender parity.

The Possibility of Contingent Relationships

Given the mixed findings, we can reasonably assume that the relationship between diversity and performance is nonlinear, contingent, and moderated by other factors. Scholars emphasize the importance of moderating variables that link the diversity-performance relationship. After reviewing over 80 studies on the effect of diversity, Williams and O'Reilly (1998) identify potential moderators such as task interdependence, goals, identity and culture. Recent studies also suggest that the effects of diversity on performance can be moderated by organizational culture (Andersen and Moynihan 2016), management structure (Opstrup and Villadsen 2015), diversity management (Choi and Rainey 2010; Pitts 2009; Riccucci 2002; Wise and Tschirhart 2000), policy areas/issues (Keiser et al. 2002; Wilkins and Keiser 2004), policy/administrative discretion (Meier and Bohte 2001; Sowa and Selden 2003), critical mass of minority groups (Joecks et al. 2013; Keiser et al. 2002; Meier 1993), and organizational/geographical levels and characteristics (Groeneveld and Van de Walle 2010; Meier and Morton 2015).

This study hypothesizes that the effect of diversity on performance depends on the size of the group to which a minority belongs as it affects an individual's incentive to cooperate or conflict with others. We expect that the role of group size is not so much directly effectual as indirectly moderative in the relationship between diversity and performance. Social psychology scholars have been studying the effects of group size as an important predictor variable as well as a moderating variable that affects group dynamics related to communication, conflict, feeling inclusion and attachment as well as salience of minority groups (Bond 2005; Baumeister and Leary 1995; De Cremer and Leonardelli 2003; Kerr 1989; Mullen et al. 1994; Pelled et al. 1999; Wegge et al. 2008).

Two conditional hypotheses are proposed as to the potential moderator of board size. The first hypothesis expects gender diversity or a greater female presence to be associated with

higher performance, and its positive effect to decrease as board size increases. As male dominance is subject to implicit bias and discrimination, we expect to see a negative effect of the old-boys' network inside boardrooms, such as closed, secretive, and often corruptive decision-making. Inclusion of qualified and capable women on the board will be positively associated with performance by bringing new perspectives with democratic, equality-inducing, participative leadership styles (Eagly and Johannesen-Schmidt 2001; Torchia et al. 2011; Marvel 2018; Meier et al. 2006) and safeguarding against groupthink (Opstrup and Villadsen 2015).

However, the potential positive impacts of gender diversity are likely to disappear as board size becomes larger. It is plausible that the positive effect of gender diversity can be more pronounced in large groups owing to higher gender salience and better monitoring (Ellwood and Garcia-Lacalle 2015; Wegge et al. 2008). However, the observable benefits of gender diversity may be diluted in a large board due to stereotyping and communication deficiency (Ellwood and Garcia-Lacalle 2015; Wegge et al. 2008). When minority members are severely underrepresented, in particular, the degree of their influence on group dynamics and their capabilities to bring about changes in the organization are limited (Kanter 1977, 1987; Granovetter 1978).[2] They tend to be assimilated into dominant groups rather than highlight their unconventional background and take the risk of being marginalized (Meier and Stewart 1992; Meier 1993; Rose 2007). Thus, small groups may be advantageous for minorities to reach a critical mass especially when they are severely underrepresented (Kanter 1977; Torchia et al. 2011). In addition, membership in small groups may promote cooperation rather than conflicts among constituent individuals of an organization due to the effect of perceived efficacy, commitment and communication (Kerr 1989; Opstrup and Villadsen 2015).

Hypothesis 1: Gender diversity of governing boards is positively related to agency performance, and its positive effect will decrease as the size of the board becomes larger.

On the other hand, it is less clear about how functional diversity affects individual members participating in group decision making within the literature of public sector governance. It could be beneficial if an organization (and its members) capitalizes on diverse perspectives of people with different occupational backgrounds; however, functional diversity is "a double-edged sword" (Bunderson and Sutcliff 2002: 875). Indeed, the potential benefit of bringing people together from heterogeneous groups can disappear or morph into increased conflicts, delayed decisions, difficult communication, in-group/out-group biases, groupthink and satisficing behaviors, which often leads to poor decision making (Janis 1982; 't Hart 1994; Bunderson and Sutcliffe 2002; Moon 2016; Van Ees et al. 2009). This study expects a negative effect of functional diversity to be found in the boardroom of quasi-government agencies. Due to the patronage practice of board governance in the public sector (Skelcher 1998; Park and Cho 2014), board members are likely to act in the interest of their own stakeholders (e.g., previous organizations or political parties), rather than represent perspectives from their professional backgrounds. It is also likely to see more tension among members and groupthink behavior when they are under pressure to reach an agreement.

However, more discussion is needed to better understand how functional diversity influences organizational performance depending on the size of the group. It remains unclear whether and how group size affects group dynamics, and under what conditions it leads to suboptimal decision making (McCauley 1998; Van Ees et al. 2009). Scholars have drawn attention to the role of leadership and organizational size in public organizations (Jung and Lee

2016; Kaufman et al. 2018; Moon 2016), which may not necessarily apply to small groups such as governing boards or top management teams. The concept of groupthink is helpful to understand the dynamics in small groups and "how group dynamics can get in the way of effective decision making" (McCauley 1998: 142). However, the concept encompasses a variety of meanings; and the link between groupthink, group cohesion, and decision quality is conditional to interpersonal relationships embedded in social, psychological and cultural climates (Boje and Murnighan 1982; Janis 1982; McCauley 1998). In fact, there is no definitive evidence on the causal link between group size, conflicts, and groupthink (McCauley 1998; Janis 1982; Bond 2005).

This study hypothesizes that the potential negative effect of functional diversity will decrease as board size increases. The expectation is based on two arguments found in the literature. First, smaller groups are usually highly cohesive and more tight-knit than larger groups, which provides a favorable condition to groupthink that discourages individuals to dissent (Mullen et al. 1994; Janis 1982; 't Hart 1994). Mullen et al. (1994) reports that more cohesive groups show lower decision quality and this negative relationship strengthens with increasing group size. Given the negative correlation between group size and cohesion, the problems associated with functional diversity are likely to be severe in smaller groups where group members are more vulnerable to conformity pressures and less tolerable to conflicts of ideas and policy preferences. Further, decision making in smaller groups tends to be less structured, more informal, and exclusive, which leads individual members to attain strategic consensus and legitimize group decisions, especially in the collectivistic organizational culture with a strong majority influence.

Second, much of the decision making literature suggests that larger groups are more likely to reap benefits from bringing a diverse functional perspective. It is plausible that the negative impact of heterogeneous board composition may increase in substantially large groups, due to fear of dissent, tension, lack of motivation to participate, and social loafing (Boje and Murnighan 1982; Mullen et al. 1994; McCauley 1998) as well as the problems in coordination and communication (Blau 1970; Wegge et al. 2008). However, the combination of findings in previous research provides support that individuals with different backgrounds in larger groups are more likely to cooperate with others (Baumeister and Leary 1995; De Cremer and Leonardelli 2003), focus on the accuracy (rather than confidence) of their decisions (Boje and Murnighan 1982), and act as owner-representatives or stewards of the interests of their organizations and the public (Carver 2001; Davis et al. 1997). It is also argued that large groups have more potential to absorb conflicts from heterogeneity and are open to a broad range of perspectives (Pelled et al. 1999). Accordingly, the second hypothesis is stated as follows.

Hypothesis 2: Functional diversity of governing boards is negatively related to agency performance, and its negative effect will decrease as the size of the board becomes larger.

Methodology

The data is constructed with 24 quasi-government agencies in Korea over 16 years from 2000 to 2015. The 24 agencies, categorized as "state-owned enterprises" by law, include organizations with assets of more than $2 billion and with over 85% of own-source revenue, in between the public and private sectors. Among these 24 agencies, eleven agencies were established after 2000 (Appendix 1 for details).

Dependent variable: Agency performance

Public service performance can be measured in different ways with different purposes. Due to the challenging nature of measuring performance in the public sector, it is often recommended to use multiple indicators including archival (objective) and perceptual (subjective) measures to increase the validity of the findings (Andrews et al. 2005, 2006; Walker et al. 2010). However, research on this topic tends to focus on narrow proxies for performance, usually financial indicators such as debt, stock returns, Tobin's Q, and net operating profits (Bhagat and Black 1999; Bunderson and Sutcliffe 2002; Kakabadse et al. 2015; Campbell and Minguez-Vera 2008). Although often used, these financial indicators may not represent overall performance of quasi-government agencies, as they are less incentivized by profits but more by politics, public relation and government regulation. Given their broad focus on public value, it is important to take a holistic approach that reflects multiple accountabilities to assess their performance with financial and non-financial indicators (Alexius and Örnberg 2015; Swiatczak et al. 2015: 379). Besides, relying only on financial indicators has been criticized even for private organizations' performance evaluation since they are subject to manipulation and may cause systematic bias due to the lack of standardization (Dalton et al. 1999).

In this study, we use a composite measure of performance to capture diverse aspects of performance of quasi-government agencies: goal achievement, labor productivity, personnel and finance management, and policy initiatives, based on the guideline proposed by the government as well as financial statements and performance reports submitted by each agency.[3] The Ministry of Strategy and Finance (MOSF) provides specific criteria and weights of performance evaluation indicators, including leadership and accountability (e.g., ethical leadership, consumer satisfaction, contribution to society), managerial efficiency (e.g., human resource management,

financial management, labor relations management), and efficient management of major projects.

Using a composite measure offers several advantages: first, it encompasses multiple policy objectives, public values, and institutional logics of public sector organizations that are required to provide quality services, achieve financial return (Ellwood and Garcia-Lacalle 2015) as well as generate values to the whole population (Alexius and Örnberg 2015; Grossi et al. 2015; Huse 2007; Swiatczak et al. 2015). Any composite measure hides variations among components to some degree, however, this archival and external indicator is a reliable and legitimate performance measure for hybrid organizations facing dilemmas from different public values embedded in various missions and responsibilities (Alexius and Örnberg 2015; Grossi et al. 2015; Swiatczak et al. 2015). The measure also provides standardized information of agency performance with a certain level of objectivity and reliability, which allows comparison among agencies not solely relying on financial indicators. The claims regarding the diversity-performance link should be built on the use of a relevant, comparable and reliable performance measure (Gazley et al. 2010).

However, there are two caveats of using this composite performance score. One is related to the fact that performance evaluation has been expanded in 2004 to encompass most of quasi-government agencies. As our data spans the period between 2000 and 2015, some agencies included in the study have missing values for the years prior to 2004. The other is that performance evaluation with 100-point ratings was revised in 2008 into the one with six categories (S-A-B-C-D-E) to alleviate excessive competition among agencies (Park and Cho 2014). In order to merge the data from 2000-2007 and 2008-2015, we have transformed the letter

grade into 100-point ratings by using average scores of each category given the distribution of the scores: S (95), A (90), B (80), C (70), D (65), and E (60).[4]

Explanatory variables

The main explanatory factor of the study includes two types of diversity: (1) gender diversity measured by the percentage of female board members including the executive and non-executive directors on a governing board[5]; and a dummy variable indicating the presence of a female CEO and, (2) functional diversity with the Blau index that measures within-group variety in the past career/occupation of each board member.

Gender diversity in the boardroom can be measured in various ways: a dummy variable indicating the existence of one or more female directors, percentage of female directors, Blau index, Shannon index, and although less common, the number of female board members. This study measures board gender diversity with the percentage of female directors on boards, considering that it is widely used in both academia and practice as a legal target of board representation in UK and EU governance codes. The Blue's (1970) index, also known as the Hirschman-Herfindal index, captures an important attribute of gender diversity, i.e., the balance between male and female, in case of boards with a high female presence. However, there is no case in our data that female members hold a majority in their boards. This study uses the number of female board members as an additional indicator of gender diversity for our estimation, given that one or two minorities can make a difference in a severely underrepresented small group. Previous empirical studies often used the number of minorities to test the effect of minority within critical mass argument, and find an optimum size of a board and the critical mass in terms of the number of women directors (Joecks et al. 2013; Konrad et al. 2008; Torchia et al. 2011).

In addition, this study include a variable indicating the presence of a female CEO on governing boards. As a chief executive or chairperson undoubtedly plays a pivotal role in boardroom behavior and dynamics, the influence of boards chaired by a woman is worthy of further evaluation and empirical scrutiny (Ellwood and Garcia-Lacalle 2015; Kakabadse et al. 2015). A CEO participates in collective decision-making as a board member and takes up ultimate responsibilities for their decisions as the leader of the governing board. The upper echelon perspective emphasizes that background characteristics of the top management team can partially predict their strategic choices and performance (Hambrick and Mason 1982; Hambrick et al. 1996; Opstrup and Villadsen 2015; Smith et al. 2006). Women leadership of the board is measured by an indicator variable that takes a value of one when the CEO is female, and zero otherwise.

Measuring functional diversity is tricky as it can be conceptualized in different ways (Andersen and Moynihan 2016; Bunderson and Sutcliffe 2002). This study uses the Blau Index to measure functional background diversity or dominant function diversity as a proxy for the specific skills, experience and expertise that each member brings to the team. The category has five professions within which each board members have spent the greater part of their life (Williams and O'Reilly 1998; Bunderson and Sutcliffe 2002): politicians, military personnel, bureaucrats, private experts, and insiders, i.e., those promoted from inside the agency.

$$1 - \sum_{i=1}^{n} p_i^2$$

, where p_i = the proportion of group members in i^{th} category, and n denotes the number of categories. The Blau index ranges from 0 to 1, where 0 means all group members are classified in the same category and 1 means perfect diversity within the group. The data on careers/background of each board member before the year 2008 was obtained from information

request based on the Freedom of Information Act (FOIA) in Korea. The recent information is accessible from the government database (www.alio.go.kr).

Regression Models

We estimate the multiplicative interaction models to test our hypotheses on the moderating effect of board size with each explanatory variable. The general form of our regression equation of the interaction models is noted as follows:

$$Performance = \beta_0 + \beta_1 EV_{it} + \beta_2 C_{it} + \beta_3 EV_{it} * C_{it} + \sum_{j=1}^{9} \gamma_j X_{it} + +f_i + \mu_t + \varepsilon_{it}$$

, where i = 1,…, 24 agencies, t = 2000,…, 2015, f_i are agency-specific unobserved effects, μ_i are year-specific unobserved effects, ε_{it} are general stochastic errors, and X is a vector of control variables. *EV* = Explanatory variables (*CEO, Board, Blau*), *C* = Contingent variables (*Size*), and *X* = Control variables (*Independence, Workforce, Succession (t-1), Debt ratio, Age, Revenue, Fulltime, Turnover (t-1), Unemployment*). The contingent factor that moderates the effect of board diversity is the size of the board measured by the total number of board members including the CEO. The boards in our sample had an average size of approximately six members (s.d. = 1.46), ranging from two to twelve.

In this study, the result from fixed-effects estimation including year dummies for each and all interaction variables is reported based on the Hausman test and potential correlation between unobservable heterogeneity and explanatory variables. Robust standard errors are

corrected for unequal variance and serial correlation. The variables related to leadership changes, i.e., *Succession* and *Turnover*, are lagged by one year.

Several control variables that consistently identified as significant predictors in previous research are included in this study. As internal/organizational factors, we include *board independence* (Adams and Ferreira 2009; Ellwood and Garcia-Lacalle 2015; Bhagat and Black 1999)*, chief executive succession* (Hambrick and Mason 1982; Park and Cho 2014)*, debt ratio* (Campbell and Minguez-Vera 2008)*, organizational age* (Smith et al. 2006)*,* and organizational size measured by *total revenue* and *the number of full-time employees* (Adams and Ferreira 2009; Torchia et al. 2011). Two external factors related to the political change and economic conditions – *presidential turnover* and *unemployment rate* – are also included in the model. Details on data, measures, and sources are presented in Table 1. Summary statistics and correlations are presented in Appendix 2.

[Table 1 about here]

Results and Discussion

The estimation results in Table 2 summarize the effect of board diversity varying across the diversity measures: board gender diversity measured by *the percentage of female board members* and *the presence of a female CEO*, and functional diversity measured by *the Blau index*. An additional model is also presented to estimate the effect of board gender diversity measured by *the number of females on the board*. Each diversity measure has a positively significant,

insignificant, and negatively significant relationship with our dependent variable assuming that there is no contingent effect of the board size.[6]

[Table 2 about here]

For starters, *having a female CEO* appears to be positively related to agency performance. However, the coefficient of the variable does not represent the average effect but only captures the effect of having a female CEO on agency performance when there is no contingent effect of the board size. As the model is estimated with an interaction term, our focus is on interpreting the marginal effect. Figure 1 indicates that the marginal effect of having a female CEO on agency performance is statistically significant only when the number of board members is less than six, and the marginal effect of the variable decreases as the number of board members increases. Any particular point on the solid line is $\frac{\partial Performance}{\partial CEO} = \beta_1 + \beta_3 Size$.

[Figure 1 about here]

However, the impact of board gender diversity measured by *the ratio of female board members* does not depend on the size of the board. We found no significant impact of the ratio of female board members on agency performance regardless of the existence of the moderating effect. This result is also confirmed by an alternative specification using the number of female board members, which is consistent with the findings of private sector research that a small number of women on the board has an insignificant effect on board performance (e.g., Kakabadse et al. 2015) as well as research on the governing boards of public sector organizations

with large numbers of female directors (e.g., Ellwood and Garcia-Lacalle 2015) and the meta-analysis on the effect of board gender diversity (Pletzer et al. 2015; Post and Bryon 2015). This result implies that the influence of women in the boardroom is limited or not enough to make a difference in organizational outcomes, partly or mostly because women as a minority may have been marginalized and tokenized.

Another interesting finding concerns the effect of functional diversity measured by *the Blau index*. Assuming no interaction effect of board size, functional diversity contributes negatively to agency performance as expected. Using the same measure as the one used in this study, Bunderson and Sutcliff (2002) found that dominant functional diversity was negatively associated with effectiveness by decreasing information sharing within the team. The negative marginal effect of functional diversity is significant until the number of board members reaches 4.5 as depicted in Figure 2. At this point, the effect becomes positive as the board size passes the critical number, although the positive marginal effect is hardly significant.

[Figure 2 about here]

After controlling for agency-specific and year-specific characteristics, two control variables, *board independence* and *debt ratio*, were consistently significant across all models. The effect of board independence measured by the percentage of directors from inside the organizations was found to be positively related to public sector performance in our data. The impact was rather inconclusive in studies of firm performance (e.g., Adams and Perreira 2009; Bhagat and Black 1999), but governing boards with a higher proportion of independent directors

are likely to perform better by providing a critical link to the environment and more effective monitoring of the board (Dalton et al. 1999; Ellwood and Garcia-Lacalle 2015).

Debt ratio reflecting agencies' financial soundness is controlled to estimate the effect on our dependent variable, as it is a slow-reacting indicator that is not solely determined by the efforts of quasi-government agencies but reflected in performance evaluation. Although often used as a performance measure in studies on firm performance, *debt ratio* of quasi-government agencies consistently contributes to their performance evaluation scores in the negative direction in our study. However, *total revenue* and *total number of employees* as indicators of agency size, as well as *presidential turnover* and *unemployment rates* related to political and economic changes failed to reach a significance level.

We perform a number of robustness checks to provide further details on the stability of our findings. An alternative specification using the Blau Index for board gender diversity produces similar results to the estimation using the percentage of female directors, as reported by Campbell and Minguez-Vera (2007). In addition, we reestimate the model with generalized estimating equation (GEE) for panel data with different family-link combinations. The results from the GLM-type estimation were substantially identical to our final solution of the balanced panel data as noted in Papke and Wooldridge (2008). In this alternative estimation, a control variable *presidential turnover* turned out to be significant without changing the significance of other variables. However, we could not reliably claim this relationship as the variable was not consistently supported (results not shown and available online).

Conclusion

This study highlights that the concept of diversity is not unitary and its relationship with performance is conditional to diversity dimensions, measurement, and board structure. In particular, the size of the group to which minorities belong is found to be an important moderator of the diversity-performance relationship in a relatively smaller leadership or top management group. The advantages from diverse composition of human capital as well as the problems of heterogeneous backgrounds are mitigated as the groups become large. All in all, size matters as a way to moderate either positive or negative effects of diversity.

The first hypothesis on board gender diversity received mixed support from the data. The analyses did not corroborate the influence of board gender diversity moderated by the size of the boards. However, the presence of a female CEO increases performance with the positive effect decreasing as board size increases, which suggests that the positive influence of female leadership may not show up in large groups where women are markedly underrepresented within boards. On the other hand, we found support for the second hypothesis pertaining to the contingent effect of functional diversity focused on board members' past careers. The relationship of functional diversity in the boardroom to agency performance appears to be negative, while the negative marginal effect decreases and turns to positive as the board size increases up to a certain level. Accordingly, the efforts to enhance diversity in board governance of public sector organizations may bring positive impacts or lead to unexpected negativities. This study does not assume that diversity always leads to the 'right' decisions, however, there is normative expectation on collective decisions made by governing boards due to the hybridity of these organizations (e.g., Alexius and Örnberg 2015; Huse 2007). As public sector organizations are neither value-neutral nor revenue-neutral, it is important to consider whether and how board

governance in the public domain can be effectively designed to strengthen the positive aspects of diversity while minimize the negativities.

Despite its interesting findings, our study has several limitations that need to be addressed in further research. First, investigating the relationship between diversity and performance involves endogeneity concerns due to omitted variables that could lead to spurious correlations. Although using observable background characteristics to predict behaviors and outcomes has several advantages, a potential problem in inferencing causality arises as board members/executives may have been selected because the organization needs their background characteristics (Hambrick and Mason 1984). However, reverse causation seems not a serious concern for this study, as individual members' incentive to join the board is less likely to rely on agency performance. Board members of quasi-government agencies with specific background characteristics have been selected for political considerations rather than agencies' needs or performance (Skelcher 1998; Park and Cho 2014).

Second, the approach of our study did not allow us to determine whether the effect of diversity is related to changes in behavior of minority board members inside the boardroom. An investigation into professional and personal ties among directors in addition to board compositions could reveal group dynamics inside the boardroom. The role of leadership, CEO-board relationships, and organizational culture/structure that facilitate interaction and integration among individuals deserve more attention in future research. The study may also have omitted important unobserved factors for agency performance, which may never be observable to researchers. The type of mission or task characteristics, for example, are considered one of the potential moderators (Williams and O'Reilly 1998; Wegge et al. 2008). However, our analysis does not include them on the grounds that such characteristics as task complexity are partly

reflected in our composite performance scores as well as that it is almost impossible to conceptualize and measure them in a comparable way.

The access to extensive information on board members and a governing board itself was limited, which may be one reason that attempts at understanding this subject have been rare and, if when they did occur, may have suffered from the same problem. Yet the effects of gender diversity could be more clearly explained if we had more variations in the number of female board members in our data, which is an issue we hope to resolve in the future. With regard to the composite measure of agency performance, a potential issue of instrumentation can be raised as the assessment unit has been changed during our time scope. Lastly, the data drawn from the specific context may limit external validity, i.e., the generalizability of the findings.

Declaration of interest statement:

The author declares no conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Notes

[1] Yet the reform of quasi-government agencies has been more focused on the appointment process itself rather than the diverse composition of the boards. The appointment of board members has been criticized as *Nakhasan* (parachute in Korean) referring negatively to a kind of spoils system where someone is designated to a post with political strings attached (for details, Park and Kim 2014).
[2] Although the effect of being a minority member can differ according to gender and career backgrounds, tokens are often negatively stereotyped, doubted, and labeled, which results in lower performance (Kanter 1977).
[3] A uniform methodology for performance evaluation was initiated by the Korean government since 1999 right after the East Asian financial crises. Other countries take similar approach to monitor targets for these hybrid organizations. For example, Sweden developed performance indicators with four categories include "occupancy, customer satisfaction, control group, and customer surveys" according to public policy assignment (PPA) (Alexius and Örnberg 2015: 196).
[4] The means and standard deviations of performance evaluation scores before and after 2008 were similar: mean = 76.37 and 75.28; s.d. = 6.61 and 8.19; min= 60.77 and 60; max= 60 and 90.
[5] The executive and non-executive directors have the same legal responsibilities and liabilities as board members making collective decisions. Yet executive directors are more involved in daily management of the organization, while non-executive directors play more of the mentoring role independent from the management. According to the four archetypes of boards presented by Van Thiel (2015), public sector organizations in Korea correspond to Type II (mixed composition board) with one tier including non-executive members.
[6] The linear fixed-effects estimation results are available upon request.