The Influence of Korean Central Government's Budgeting for Environmental Protection Activities on Environmental Pollution Disputes Coordination

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ABSTRACT
This study aims to explore the link between government investment for environmental pollution control and environmental pollution disputes. To be specific, this research examined its hypothesis that the mean of percentage of settled petitions against environmental pollution damages in high environmental budgeting years are higher than those in low environmental budgeting years. All data for this research comes from Environmental Statistics Year Book by the Korean Ministry of Environment (1983~2006). To test the hypothesis, this study utilizes a t-test. The empirical result is not consistent with the alternative hypothesis that the mean of percentage of settled petitions against environmental pollution damages in high environmental budgeting years are higher than those in low environmental budgeting years. Also, limitations of this research with suggestions for future research on the environmental pollution and environmental pollution disputes coordination are discussed in this article.

Keywords: Environmental Budgeting, Environmental Pollution Dispute, Environmental Pollution Control

INTRODUCTION

Koreans' qualities' lives have been considerably degraded as result of various kinds of environmental destruction including air, water and soil pollution, because Korea has only pursued its goal of high economic development within a short time without considering any environmental concerns. However, as concerns of people and environmental organizations with regard to environmental values gradually increase, the Korean Central government has annually extended environmental budgeting for recovering destructed environments and supporting environmental protection activities. As a result, total environmental budgeting has been relatively increased about 90 times (from 378 in 1983 to 33,978 hundred million dollars in 2006), compared to the 17 times of the total budgeting of the Korean Central government increased during the same period (from 101,766 in 1983 to 1,753,882 hundred million dollars in 2006), according to Korean Environmental Statistics Year Books. In the same way, budgeting for coordinating petitions against environmental pollution, Alternative Dispute Resolution (ADR) and compensation for environmental damages has been increased based on a strong belief that increased environmental budgeting has a positive impact on solving environmental conflicts and petitions.

To be specific, petitions include all individuals and companies' petitions against their damages resulting from various kinds of pollution such as air, water, soil, noise and offensive odor. In addition, environmental budgeting for environmental protection activities includes expenditures for coordinating and resolving these petitions. Therefore, some scholars have argued that increased environmental budgeting would lead to increased settlement of petitions.

However, Sa (1997) argued that disputes and petitions have been substantially increased resulting from environmental pollution, damages and development constructs regardless of expansion of environmental budgeting. In addition, he mentioned that this issue is one of the major social problems in Korea to be rapidly solved.

In this context, the central research question to be explored in this research is like that. Does high governmental investment for environmental pollution control have a direct impact on environmental pollution disputes coordination? This is one current and urgent environmental problem to be dealt with more efficiently and effectively to keep sustainable development with decreased environmental disputes in Korea. Given this, the research hypothesis is that the percentage of settled petitions on environmental pollution damage in a specific year will be higher where the percentage of the environmental budgeting for environmental protection activities for the specific year is high, in relation to the average percentage of budgeting for environmental protection activities.

LITERATURE REVIEW

Two key concepts of this research are "Environmental budgeting" and "Environmental petitions and conflicts against pollution or damages".

Firstly, with regard to definition of environmental budget, "The category of environment includes natural and artificial environment, but excludes the broader components of the social environment. An environment budget focuses on the relationship between nature and human beings, the components of environment, and the domestic environment problem" (Mun, 2001). In addition, Kang (2003) addressed the question regarding the appropriateness of budget scale in environmental sectors in Korea. He analyzed that it is necessary for the environment budget in Korea to increase up to 1 % of the GDP compared to OECD (Organization for Economic Co-operation and Development) countries to continually promote environmentally sustainable developments. However, Lee (1997) argued that expansion of environmental budgeting is not a necessary condition for solving multiple kinds of environmental problems efficiently and effectively. In addition, Lee (1997) indicated that several cases brought unsatisfied performances concerning environmental disputes and coordination in spite of sufficient budget.

With regard to environmental conflicts and petitions, Sa (1997) mentioned that environmental problems inevitably emerge, because of unresolved political agendas, since they have very complicated characteristics and difficulties to make diagnoses and solutions precisely. Furthermore, as noted by Lee (2006), "For environmental disputes, the Arbitral System of Environmental Dispute (ASED) which can manage a matter both fairly and expeditiously put into effect. It has not only expertise but also objectivity. "

In this context, as one kind of ASEDs, functions of the Administrative Arbitration which resolves individuals or organizations' petitions against environmental damages by government agencies like the Korean Ministry of Environment, has become very significant. As mentioned earlier, this research tries to address the problem regarding the relationship between the scale of environmental budgeting and settlements of petitions against environmental damages by analyzing whether environmental budgeting has a significant influence on settlements of petitions on environmental damage based on 24 years of data (1983~2006). Because the question has not been empirically examined, this research can contribute to develop environment and pollution literature, by adding to the argument regarding the relationship between environmental budget and petitions against environmental damages.

DATA

All data for this research comes from Environmental Statistics Year Book by the Korean Ministry of Environment (1983~2006) and all data were collected by the Korean Ministry of Environment and other related governmental agencies. For more reasonable results, I ideally would have liked a larger sample size, but the data of settlements of petition on environmental pollution damage before of 1983 were not available. In addition, there are not any specific changes of environmental acts or regulations which might influence on data absence at this time, although I tried to search them in order to support insufficient data for my research. I recognize the small size of data as one of the significant limitations of my research.

To sum up, the final data sample includes 24 data from 1983 to 2006. In addition, the data is time series data and the unit of analysis is the year. Thus, I don't need to drop any data from the original one since there is no missing values in given dataset. In addition, all data including environmental budgeting and settlement of petitions on environmental damage, which this study uses for analysis, are from Korean central government not from local governments.

Based on above backgrounds and research question, this study utilizes the variable of "environmental budgeting for environmental protection activities" from 1983 to 2006 as its independent variable, in order to operationalize its independent construct of interest-"the governmental investment for environmental pollution control". The independent variable indicates the sum of all budgeting for various kinds of environmental protection activities, not only from the Korean Ministry of Environment but all related agencies such as the Ministry of Construction & Transportation, the Ministry of Government and the Ministry of Agriculture & Forestry.

In addition, this study uses the variable of "settlements of petition on environmental pollution damage" from 1983 to 2006 as its dependent variable to operationalize its dependent construct of interest- "environmental pollution disputes coordination". The dependent variable includes all individuals and companies' petitions against their damages resulting from various kinds of pollution such as air, water, soil, noise and offensive odor.

Given this, in the case of processing independent variable, I calculate the average percentage of environmental budgeting for environmental protection activities for 24 years, calculated from total governmental budgeting for 24 years, divided by total environmental budgeting for environmental protection activities for 24 years. As a result, I get the average percentage of environmental budgeting of 1.67679 as shown from table 1.

<Table 1. Summary of peb-percentage of environmental budget and psp-percentage of settled petitions>

	peb	psp
Mean	1.67679	99.44583
Standard Deviation	.73825	.300694
Minimum	.371	98.8
Maximum	2.822	99.9
N	24	24

And then, I get the percentage of environmental budgeting for environmental protection activities of each year, calculated by total governmental budget of each year, divided by environmental budgeting for environmental protection activities of each year. These results are shown at table 2.

<Table 2. Independent variable(percentage of environmental budgeting for environmental protection activities)>
(Unit: Hundred Million Won)

year	gb	eb	peb
1983	101,766	378	0.3714
1984	110,721	640	0.578
1985	124,064	877	0.7069
1986	137,965	1,017	0.7371
1987	157,945	1,658	1.0497
1988	180,250	2,160	1.1983
1989	216,531	1,806	0.8341
1990	325,369	3,447	1.0594
1991	393,669	4,863	1.2353
1992	438,421	6,138	1.4
1993	511,879	7,271	1.4205
1994	644,575	11,612	1.8015
1995	745,344	17,801	2.3883
1996	853,083	22,406	2.6265
1997	983,299	27,747	2.8218
1998	1,103,139	28,121	2.5492
1999	1,200,206	27,636	2.3026
2000	1,251,792	30,581	2.443
2001	1,398,487	32,236	2.3051
2002	1,497,133	33,465	2.2353
2003	1,628,435	34,513	2.1194
2004	1,612,627	32,323	2.0044
2005	1,679,332	35,578	2.1186
2006	1,753,882	33,978	1.9373

In addition, in the case of processing dependent variable, I get the percentage of the settlements of petition on environmental pollution damage for each year, calculated from total petition cases, divided by settled petition cases for each year. These results are shown at table 3.

<Table 3. Dependent variable(percentage of settlements of petition on environmental pollution damage)>
(Unit: Number)

year	sp	psp	up	Pup	Total
1983	1,210	99.3	9	0.7	1,219
1984	1,194	99.3	8	0.7	1,202
1985	1,099	99.4	7	0.6	1,106
1986	1,155	99.6	5	0.4	1,160
1987	1,430	99.2	12	0.8	1,442
1988	1,207	99.0	12	1.0	1,219
1989	1,190	99.1	11	0.9	1,201
1990	1,032	99.9	1	0.1	1,033
1991	1,264	99.2	10	0.8	1,274
1992	1,153	99.6	5	0.4	1,158
1993	2,144	99.9	3	0.1	2,147
1994	2,301	99.6	9	0.4	2,310
1995	2,061	99.5	10	0.5	2,071
1996	2,234	99.4	14	0.6	2,248
1997	2,348	99.5	12	0.5	2,360
1998	4,578	99.8	10	0.2	4,588
1999	2,981	99.4	19	0.6	3,000
2000	5,504	99.5	27	0.5	5,531
2001	7,663	98.8	97	1.2	7,760
2002	4,500	99.6	20	0.4	4,520
2003	7,368	99.8	17	0.2	7,385
2004	15,356	99.9	17	0.1	15,373
2005	3,805	99.0	40	1.0	3,845
2006	5,368	99.4	32	0.6	5,400

Finally, I create a dummy variable of "highpeb" that equals **one** when the percentage of environmental budgeting for environmental protection activities of the specific year is higher than the average percentage of environmental budgeting for environmental protection activities for 24 years (1.67679%). Conversely, I create another dummy variable of "lowpeb" that equals **zero** when the percentage of environmental budgeting for environmental protection activities of the specific year is lower than the average percentage of environmental budgeting environmental protection activities for 24 years (1.67679%).

<Table 4. Variables Explanation>

gb	governmental budget
eb	environmental budget
peb	percentage of environmental budget
sp	settled petitions
psp	percentage of settled petitions
up	unsettled petitions
pup	percentage of unsettled petitions
total	total petitions

METHODS

Given the above discussions and findings in prior scholarly literatures, my alternative hypothesis is that **H**a: μH > μL, where μH = the mean of percentage of settled petitions on environmental pollution damages in high environmental budgeting years and μL = the mean of percentage of settled petitions on environmental pollution damages in low environmental budgeting years. In addition, my null hypothesis is that two means are equal (**H**o: μH = μL).

As shown from table 5, we can check difference in means of settled petitions without formal hypothesis testing. To be specific, high environmental budget percentage years have an average 99.47692 % of settled petitions and low environmental budget percentage years have an average 99.40909 % of settled petitions.

<Table 5. Summary of psp (percentage of settled petitions) by high and low environmental budget percentage years>

Variable	High environmental budget percentage years	Low environmental budget percentage years	Difference	t-score (p-value)
Mean of settled petitions percentage (Standard deviation)	99.47692 (.3059244)	99.40909 (.3048106)	0.06783	0.641 (>0.25, k=10)
n	13	11		

However, to show whether the observed difference in means of percentages (99.47692-99.40909=0.06783%) is statistically significant, this study utilizes a t-test for testing its hypothesis, since the sample size in both groups are less than 30 (k=10). Furthermore, the analysis uses a one-tailed test based on the fact that its alternative hypothesis is directional. Finally, according to general standards in previous literatures, the analysis chooses its statistical significance level using $\propto$ equal to 0.05.

RESULTS

As shown from table 5, at the 0.05 level, this analysis obtains a t-score of 0.641 and p-value (t>=0.641, k=10) of > 0.25. In other words, because p-value of > 0.25 is larger than 0.05, the analysis fails to reject the null hypothesis in favor of the alternative hypothesis. In other words, the evidence is not consistent with the alternative hypothesis that the mean of percentage of settled petitions against environmental pollution damages in high environmental budgeting years are higher than those in low environmental budgeting years. Finally, this study concludes that the observed difference in means of percentage of settled petitions (0.06783=99.47692-99.40909) is not statistically significant using alpha equal to 0.05.

DISCUSSION

This research examined its hypothesis that the mean of percentage of settled petitions against environmental pollution damages in high environmental budgeting years are higher than those in low environmental budgeting years. Consequently, the result indicates that the difference in population means is not statistically different based on t-test with using alpha equal to 0.05. Firstly, it is interested in having an opposite result compared to the mainstream of environmental scholars who has supported the positive relationship between two variables at their previous studies in Korea. However, my research can be attacked by potential critiques and I should correct and make up for weak points by being a better organized research in future studies, since it has following limitations and weaknesses.

First, the small sample size of 24 years is one of the major limitations of this research. Although the author fully realized that sample size which is less than 30 has obstacles in order obtain statistical significances and interpret those results discussed before, this research utilized that sample since the Korean Ministry of Environment doesn't have data of petitions against environmental damages before of 1983, as mentioned earlier. In addition, to the best of my knowledge, there is not a more appropriate data set for examining my research hypothesis.

Second, I directly assumed my independent variable of environmental budgeting for environmental protection activities as investment for solving petitions against environmental damages for this research. However, the budget I examined virtually includes not only a budget for resolving petitions, but also various kinds of usages for solving other environmental protection activities. In addition, in the case of my dependent variable of settlements of petitions against environmental damages, as a matter of fact, the data does not specifically indicate petitions on what kinds and scopes of damages. Those problems might have the possibility to limit the usefulness of the results and make better and practical implications.

Third, I can't underestimate the importance of potential omitted variables that could affect empirical results of this research, making a crucial threat to internal validity. For instance, regardless of influence of environmental budgeting on settlement of petitions against environmental damages, the variable of increased national policies to construct Social Overhead Capital (SOC) such as roads, harbor facilities and railroads can be a significant omitted variable which has influence on both my independent and dependent variables at the same time.

Fourth, it is very essential to note that utilizing bivariate analysis in this research can be considered as another limitation. This study could not include other significant independent variables such as scope of environmental damages, type of pollution and petitioners' experience to appeal their damages to agencies which influence on solving environmental petitions. Employing regression analysis will be able to consider all possible independent variables and estimate own the influences of each variable on the dependent variable.

Fifth, this analysis used the average percentage of environmental budgeting of total 24 years (1.67679%) as a standard to divide 24 years into two groups including high and low environmental budgeting years. However, it is absolutely right that the empirical results of this study could change depending on different methods and standards to determine two groups.

All things considered, the research suggests two possible future researches which might be useful on this topic and can contribute to both theoretical development and practical implication. First, the regression analysis to analyze different scales of impacts of independent variables such as environmental budget, scope of environmental damages, type of pollution and petitioners' experience to appeal their damages to agencies on dependent variable of settlement of petitions against environmental damages might be useful. Second, it would be recommended to employ comparative studies on the same topic using different data and cases of other developing countries which have similar economic, social and political standards compared to Korea.

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