Allocative effects of state capital budgeting institutions

Application for 2016 Graduate Research and Creative Activities (GRACA) Grant

Doctoral Student: Ji Seul Kim
Faculty Mentor: Dr. Carol Ebdon, Regents/Foundation Professor
School of Public Administration

I. PROJECT DESCRIPTION

This research will contribute to my dissertation for completing my doctoral degree in public administration at UNO (expected graduation date of summer 2017). The GRACA funding will be used for a stipend in summer 2016 and for purchasing supplies essential for the project.

1. Project Background and Rationale

Infrastructure is an important component of public capital assets such as highways and bridges, water and sewer systems. State and local governments have substantial demands for public infrastructure to enhance economic growth, public safety, environmental quality and citizens’ quality of life. Unfortunately, the nation’s infrastructure is in very poor condition with an overall grade of D+ (ASCE, 2013). Catastrophes such as the collapse of the St. Anthony Bridge in Minneapolis that killed 13 people (USA Today, 2008) highlights the importance of adequate maintenance spending in a timely manner. However, existing revenue sources have not been able to meet these needs. For example, it has been estimated that $3.6 trillion would be required by 2020 to meet public infrastructure needs (ASCE, 2013). Yet the federal fuel tax rates have not been adjusted since 1993, and increased fuel efficiency has resulted in lower taxes paid per mile traveled (NASBO, 2014). This bleak outlook calls for a greater understanding of capital budgeting and its roles in resource allocation.

Capital budgeting is one important government tool for bringing about rationality in allocating scarce resources to public capital assets including infrastructure (Pagano, 1984). One of the common conflicts is related to spending decisions for asset maintenance versus new construction (Bland, 2013). Many criticize officials for generally preferring to spend on new, visible capital projects compared to maintenance of existing infrastructure (e.g., Marlowe, 2013). Asset maintenance is the weakest area in capital management (Ebdon, 2007). Thirteen states have noted that maintenance was underfunded by more than 50% (GPP, 2008). Given the fact that preventive maintenance can reduce life cycle costs tremendously, scholars have contended that governments should consider asset maintenance needs in the capital budgeting process, and create more funding sources for asset maintenance (e.g., Ebdon, 2004, 2007; Marlowe, 2013). In the current public budgeting and finance scholarship, however, little literature exists that provides a comprehensive understanding about state maintenance funding mechanisms in the capital budgeting process.

Capital budgeting practices vary widely across state governments due to different institutions or policies that affect resource allocation differently. For example, some states have capital budgets separate from operating budgets while others combine the two, some states pay for maintenance with current operating funds while others incur debt, and some states have longer-term plans than others. In addition, one recent government report suggests that 37 state governments have specific mechanisms for maintenance funding while 13 states do not (NASBO, 2014). Some states have maintenance funds such as a maintenance reserve fund and a building renewal fund (Bunch, 1996). All of these are important institutions that may affect maintenance spending decisions. For example, Pagano (1984) stated that capital projects should be linked to operating requirements in order to increase infrastructure maintenance
activities; Poterba (1995) suggested that pay-as-you-go requirements for financing capital projects affect state government spending. Although scholars have addressed the importance of capital budgeting institutions on infrastructure investment (e.g., Bland, 2013), some limitations and gaps still exist in the current literature. First, current studies mainly examine the effect of one or two individual capital budgeting institutions (e.g., Poterba, 1995; Kim & Ebdon, forthcoming), but they ignore how multiple capital budgeting institutions simultaneously affect resource allocation decisions. Second, most of the current literature focuses on new capital expenditure decisions with limited focus on maintenance funding. The significant literature gap and the widely expressed concern about the deteriorating public infrastructure systems call for a better understanding about the roles of capital budgeting institutions in maintenance investment decision.

2. Research Questions and Contributions

As a first step in the evaluation of the allocative effects of various capital budgeting institutions, this study will address the following research questions:

*How do institutions in the capital budgeting process affect maintenance investment decisions?*

Based on existing literature about budget decisions and incentives, I have developed the following hypotheses:

1) *States that have specific mechanisms for maintenance funding have higher levels of infrastructure maintenance spending.*
2) *States that have a pay-as-you-go policy for financing capital projects have higher levels of infrastructure maintenance spending.*
3) *States that coordinate the capital budget with the operating budget have higher levels of infrastructure maintenance spending.*
4) *States that have a separate capital budget from an operating budget have lower levels of infrastructure maintenance spending.*
5) *States that have a joint legislative and executive review and approval process have higher levels of infrastructure maintenance spending.*
6) *States that have a long-term capital improvement plan have higher levels of infrastructure maintenance spending.*

The research will contribute to the field of public budgeting and finance in several ways—namely, by exploring how capital budgeting institutions simultaneously affect maintenance funding decisions; and expanding the theoretical understanding of the determinants of infrastructure maintenance spending. In addition, this study will provide practical policy suggestions for reforming capital budgeting institutions for better infrastructure maintenance funding mechanisms.

3. Activities to be Undertaken

The major research activities will be as follows:

- Compile data relating to the different capital budgeting institutions, and maintenance spending patterns of state governments.
- Design and develop capital budgeting institution indexes.
- Explore states’ infrastructure maintenance spending patterns.
- Empirically examine the effect of capital budgeting institutions on maintenance spending.
- Write the sections of introduction, literature review, methodology, results, and conclusion.
- Present the manuscript at the 2017 Student Research and Creative Activity Fair.
4. Research Methodology

To answer the main research question, various capital budgeting institution indexes will be constructed by the use of fuzzy rule-based systems (see Ammar, Duncombe, & Wright, 2002). A government report, Capital Budgeting in the States, will be used for constructing the institution indexes (NASBO, 2014). This study will specifically concentrate on state highway maintenance spending as a dependent variable, because transportation accounts for 61.6% of state capital expenditures, and the highway system is the largest spending category (NASBO, 2014). I will analyze a single cross-section of 50 states in 2013 as relatively little short-term change occurs in state budgeting institutions (see Poterba, 1995). Data are available online from the federal government’s Highway Statistics. A multiple regression model will be used to estimate the effects of capital budgeting institutions on highway maintenance expenditures. To avoid specification errors, the study carefully selected control variables based on the existing literature. The control variables will include capital stock, revenue sources, real median household income, total lane miles, population, and gross state product. Data are available from Highway Statistics, National Governors Association Highway Statistics, U.S. Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistics.

5. Project Timeline

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<tr>
<th>Year</th>
<th>Month</th>
<th>Main Research Activities</th>
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<tbody>
<tr>
<td>2016</td>
<td>May</td>
<td>Write the Introduction and Literature Review sections</td>
</tr>
<tr>
<td></td>
<td>June</td>
<td>Write the Methodology section and create research database</td>
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<tr>
<td></td>
<td>July</td>
<td>Develop indexes for capital budgeting institutions, and analyze the data</td>
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<tr>
<td></td>
<td>August</td>
<td>Write the Results and Conclusion sections</td>
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6. Project Roles

**Doctoral Student:** Ji SEUL KIM, School of Public Administration

The research is a part of my dissertation, and I will take an active responsibility for the following research activities: developing a detailed research design and theoretical framework, collecting data for the empirical tests, developing indexes for capital budgeting institutions, exploring states’ maintenance expenditure patterns, building an econometric model, identifying an appropriate statistical technique, analyzing statistical results, writing all sections, and presenting the results at the 2017 Student Research and Creative Activity Fair.

**Faculty Mentor:** Dr. Carol Ebdon, Regents/Foundation Professor, School of Public Administration.

Dr. Ebdon is the faculty mentor. She will advise me in the development of a research design, reviewing the model and collected data, reviewing the results of the analysis, and reviewing each section of the paper and providing feedback.
II. REFERENCES


### III. BUDGET JUSTIFICATION

As a doctoral student, I have received a graduate assistantship since Fall 2013. However, it does not cover the summer semester. Therefore, GRACA grant will be mainly used for my living expenses to fully focus on the research development. The specific budget items and amounts will be the following:

<table>
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<th>Budget Item</th>
<th>Objective</th>
<th>Justification and Amount</th>
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| **Personnel** | May 2016 Complete to Write the Introduction and Literature Review Sections | - Partial stipend for living expenses  
- Work 40 hours per week  
- The wage is $10 per hour  
- \((40\text{hrs}\times\$10) \times 2\text{weeks}= \$800\) |
| | June 2016 Complete to Write the Methodology Section and Data Collection | - Stipend for living expenses  
- Work 40 hours per week  
- The wage is $10 per hour  
- \((40\text{hrs}\times\$10) \times 4\text{weeks}= \$1,600\) |
| | July 2016 Complete to Analyze Data | - Stipend for living expenses  
- Work 40 hours per week  
- The wage is $10 per hour  
- \((40\text{hrs}\times\$10) \times 4\text{weeks}= \$1,600\) |
| | August 2016 Complete to Write the Results and Conclusion Sections | - Partial stipend for living expenses  
- Work 40 hours per week  
- The wage is $10 per hour  
- \((40\text{hrs}\times\$10) \times 2\text{weeks}= \$800\) |
| **Supplies** | - Printing and photocopying research articles and reports  
- Purchasing Books | - The request for $200 will go toward supplies such as printing and photocopying research articles and reports, as well as purchasing books  
- Those supplies are essential for the progress of the project |
| **Total Budget** | Amount: $5,000 | |
IV. LETTER OF MENTOR SUPPORT

January 19, 2016

Beth White
Coordinator – Internal Research Resources
The Office of Research and Creative Activity
University of Nebraska at Omaha

Dear Beth,

I am writing to support Ji Seul Kim’s GRACA application. I am Ji Seul’s dissertation committee chair, and I have been her mentor since she began her Ph.D. studies. Her GRACA proposal is an accurate reflection of a portion of the research that she plans to conduct for her dissertation. I have reviewed the proposal, and believe that it is deserving of funding.

Ji Seul is interested in capital budgeting in state and local governments. This is one of the areas in which I have conducted research, and I have several publications related to this topic. Ji Seul is particularly interested in understanding whether and how specific institutional features affect capital outcomes, such as spending levels and asset quality. There are significant gaps in the literature on this topic, and it is vitally important because of the poor condition of existing public infrastructure, such as roads and utilities, and the lack of resources to make improvements.

Ji Seul took the initiative to develop two analyses regarding the effects of new financial reporting requirements for capital assets. One manuscript (which has been conditionally accepted for publication, pending minor revisions), finds that the requirements have had limited effects on capital and maintenance spending. A second manuscript, to be submitted in the next several weeks, finds effects of the reporting requirements on highway condition. While I am a co-author on these manuscripts, Ji Seul is the lead author. She suggested the topic and did the vast majority of the work on these projects.

Her GRACA proposal focuses specifically on determinants of maintenance spending and road condition. There is currently no model for infrastructure maintenance, so I expect this project to be an important contribution to the literature. I have provided advice to her as she has read the literature, narrowed her interests, and developed her research questions and design. However, this is very much her own work, and goes far beyond the general research that I have done on capital budgeting.

I apologize that this letter is not on letterhead and is unsigned. I am currently out of town. Please email me at cebdon@unomaha.edu or call at 402-659-2615 if you need anything further from me. My thanks to you and the reviewers for considering Ji Seul’s proposal.

Sincerely,

Carol Ebdon
Regents/Foundation Professor
School of Public Administration