THE RELATIONSHIP BETWEEN EARMARKS AND SPENDING ON INFRASTRUCTURE

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By

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ABSTRACT

The federal budget process is a complex procedure that involves countless rules and processes, millions of work hours on behalf of tens of thousands of staff in the executive and legislative branches and the active participation of the President and Members of Congress. A critical component of the annual federal budget procedure is the Congressional Appropriations process—the process in which Congress uses its power under the Constitution to appropriate federal funds. Up until 2011, a common practice by which Members of the House of Representatives and Congress appropriated funds, particularly for parochial interests, was earmarking. This paper examines whether earmarks had an effect on federally funded projects. Specifically, I will study infrastructure projects and if the lack of earmarks has limited or reduced spending on these projects. I hypothesize that the ban on earmarks reduced infrastructure spending. However contrary to my hypothesis, my analysis reveals that there was actually increased spending on infrastructure projects following the implementation of the ban.
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I. INTRODUCTION

The federal budget process is a complex procedure that involves countless rules and processes, millions of work hours on behalf of tens of thousands of staff in the executive and legislative branches, and the active participation of the President and Members of Congress. The goal is to allocate funds needed for the federal government to operate. In recent years, the Congressional appropriations process, a critical part of the federal budget procedure, has been criticized for consistently failing to pass, and in some years even consider, annual appropriations bills in the House and Senate Appropriations Committees. Some have characterized Congress’ inability to consistently come to a budget agreement as Congress not doing its job and giving in to partisan politics. Others believe budget disagreements have been a part of the appropriations process since the Congressional Budget and Impoundment Control Act of 1974 gave Congress the ability to respond to the President’s yearly budget proposal. Following the first shutdown in 17 years and what seems like a budget showdown every appropriations cycle, lawmakers and the public have agreed that we need to find solutions. That solution could be lifting the moratorium on earmarks.

This paper examines a budget procedure that was banned in 2011—the inclusion of congressionally directed spending, or earmarks, in annual appropriations bill and if the ban of earmarks has had an effect on federally funded projects. Specifically, this paper will study infrastructure projects and if the lack of earmarks has limited or reduced spending on these projects. My hypothesis is there is a relationship between the moratorium on earmarks and infrastructure spending, specifically, the ban on earmarks has resulted in a reduction in federal
spending on highways, mass transit and rail, aviation, water transportation, water resources and water utilities.

The “Bridge to Nowhere,” a bridge that was to serve an Alaskan island with just 50 residents received more than $100 million in the 2005 highway bill and became the most famous infrastructure project never built. The bridge, and more generally infrastructure projects, became the symbol of government waste and the abuses of pork barrel spending. This made the term “earmarks” a bad word and forced many lawmakers to disavow the appropriations procedure that funded many local and regional projects.

Following the funding of the “Bridge to Nowhere” and the public urging lawmakers to outlaw pork-barrel spending, President George W. Bush signed Executive Order 13,457, “Protecting American Taxpayers from Government Spending on Wasteful Earmarks” on January 29, 2008. This order states that it is the policy of the federal government to be “judicious in the expenditure of tax payer dollars.” To ensure taxpayer funds are used properly, the order provides that the number and cost of earmarks should be reduced, that their origin and purposes should be transparent, and that they should be included in the text of bills voted upon by Congress and presented to the President. Following the issuance of the Executive Order, House and Senate lawmakers placed a moratorium on earmarks in 2011 that has been renewed every Congressional session.

While still a politically contentious form of spending, the stagnation in infrastructure spending and accounts in states and communities of crumbling infrastructure has led to renewed interest in earmarks and if the earmark moratorium has resulted in a lack of infrastructure
spending. To examine whether this relationship exists, I will examine earmarked spending on infrastructure projects from fiscal years 2008, 2009 and 2010 and federal funding dedicated after the moratorium in 2011 for fiscal years 2011, 2012, and 2013. I will reference these findings with population data and national infrastructure grades and standards.

In Section II, I will provide background on rise and fall of earmarking as a mechanism to allocate federal funding and views of congressionally directed spending. I will also discuss existing literature on earmarks and infrastructure spending. I will then transition into the theoretical framework that will describe the factors that could influence federal infrastructure spending. Section IV will be a description of the data used to evaluate whether there is a relationship between federal infrastructure spending and congressionally directed spending. Section V provides the empirical model and results of the analysis. I will then conclude with a summary of the study and policy recommendations.
II. **Background and Literature Review**

In this section, I provide a background on pork-barrel spending, earmarking trends and views of congressionally directed spending. I will also discuss existing literature involving earmarks and more specifically, works that examine the relationship between earmarks and transportation and infrastructure spending.

**Background**

Article I, Section 9, Clause 7 of the U.S. Constitution states, “No money shall be drawn from Treasury but by consequence of Appropriations made by law.” This authority provides lawmakers in the House of Representatives and the Senate the power to spend federal dollars. Congress expresses this legislative power through the annual congressional appropriations process—the rules and practices that provide discretionary funding for education, defense, environment, housing, transportation, infrastructure and other national activities.

During the annual appropriations process, Congress and the Administration have to decide how scarce resources (federal funds) are allocated among alternative purposes, locations and recipients. Lawmakers have different opinions on who should determine how funds are spent and where funds should be allotted. Lawmakers also have different priorities and constituencies with differing needs. Being elected by constituents, there is an inherent desire for Members to advocate for funding that would be beneficial to the region he or she represents. A way in which lawmakers achieved this goal was the use of earmarks.

Members of Congress have directed spending for local and regional projects since the first Congress when Congressman George Thatcher of Massachusetts, with the support of President George Washington, worked with Congress to earmark $1,500 for the completion of
the Portland Head lighthouse. Since, earmarks regularly appeared in spending bills, but it was not until the 1990s that pork barrel spending began to rise dramatically and reached historical levels in 2005. In fact, Congressional Research Service estimates that by 2005 the number of earmarks rose by 285% from 4,126 to 15,877.

During this same time, cases of mismanaged earmark projects and accounts of earmarks being used as political tools hit the newsstands. Congressionally directed spending was publically tied to government waste and in 2007, reforms were put in place to make the process more transparent. From fiscal years 2008 to 2010, the number of earmarks dropped following increased pressure to reduce government spending, until a moratorium on congressionally directed spending was put in place in fiscal year 2011 and has been renewed every year since.

Placing a moratorium on earmarks shifted the responsibility of setting spending priorities from lawmakers in the House and Senate to government agencies, or the Administration. While Congress still plays a role in authorizing, or setting the parameters of legislation, Members cannot allocate funds to local or regional projects. As representatives of districts and states, lawmakers have argued that government bureaucrats do not understand the needs of a constituency and should not be setting funding priorities. The primary example used is federal spending on transportation and infrastructure.

*How Funding is Earmarked*

The definition of congressionally directed spending in both the House and Senate is as follows:
First, a provision or report language included at the request of a Representative, Delegate, the Resident Commissioner, or Senator under House rule (or a Senator under Senate rule.) Second, the provision or language provides, authorizes or recommending a specific amount of discretionary budget authority, credit authority, or other spending authority for certain purposes (1) with or to an entity, or (2) targeted to specific state, locality, or congressional district. The purposes are a contract, grant, loan, loan guarantee, loan authority, or other expenditure. Finally, any of the above spending set asides that are selected through a statutory or administrative formula-driven or competitive-award process are excluded.a

The definition applies to authorization bills, legislation that articulates program goals and policies, authorize spending ceilings for programs and specify whether programs will operate by apportion or allocation. Authorization acts for transportation and infrastructure have traditionally set the parameters for federal spending over multi-year periods. Annual appropriation bills set yearly funding amounts, or obligation limits for the fiscal year. Once the bills are signed into law, recipients can begin implementing projects.

In addition to appropriation and authorizing bills, there were other vehicles to earmark for infrastructure and transportation projects: supplemental spending bills, economic stimulus packages and other types of legislation that were considered outside of periodic bills. Existing literature documents Congressional transportation earmarking and analyzes how Congress earmarks funds for projects and how earmark features determine beneficiaries. (Sciara 2009) For

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my study, I further this work by analyzing not just transportation related earmarks, but spending on highways, mass transit and rail, aviation, water transportation, water resources and water utilities. Additionally, I use available data detailing earmarks enacted in annual appropriations bills to examine whether there is a relationship between funding for infrastructure projects through the use of earmarks compared to funding for these projects through the Administration.

**Distribution of Federal Funding**

A majority of literature on earmarks focus on how federal funding is distributed, more specifically, on a political and regional basis. David Albouy examined how party membership of Members of Congress may influence the distribution of funds from 1983 to 2004. Using fixed-effect and regression-discontinuity designs, estimates indicated that states represented by a Member of Congress in the majority receive a greater amount of federal funds, especially in transportation and defense spending. Additionally, Republicans receive more for defense and transportation and Democrats receive more funding for education and urban development. (Albouy 2009). While this study does not look specifically at congressionally directed spending, it does highlight political factors that could affect how earmarks were distributed, which regions received more transportation funding and why those districts or states more funding compared to other areas in the country.

There is also literature that specifically examines influences that affect the distribution of earmarks. Building on the idea that Members of Congress were incentivized to use earmarks as a mechanism to deliver projects for their constituents, there have been a number of studies that examine the desire of a Member to stay in office and pork barrel spending. Ashworth and Bueno de Mesquita (2006) theorize that constituencies with a greater degree of partisan balance tend to
produce incentives for Members to bring home the bacon so they can increase their probability of returning to office. Crespin and Finocchiaro (2013) build upon this study and previous studies in the 1990s, and argue that the ability to bring home earmarks provides a direct, and statistically significant electoral benefit for some, but not all, senators. Specifically they found that divergent members and senators that represent small states receive greater returns than other members. This study brings to light motivations that could affect how earmarks were distributed. Members who represented constituencies that needed to improve roads or build a bridge valued earmarks and therefore would be highly motivated to secure earmarks for local or regional transportation and infrastructure projects.

A study by Melissa Boyle and Victor Matheson (2009) specifically examines the factors that lead to states to receive earmarked funds by studying earmarks per capita, population, income per capita, number of Republican senators, tenure of junior senators, tenure of senior senators, proportion of House Representatives Republicans and swing state observations between 2000 and 2006. What Boyle and Matheson found was that states with small populations earn a disproportionately large share of Congressional earmarks. They site a 2007 study by Hauk and Wacziarg the result is almost certainly due to states, no matter their size, have two Senators. In terms of political explanatory variables, the presence of a Republican delegation and the party in power over the time period of the study, increased pork spending in each state. Additionally, the tenure of a state’s senior Senator has a large effect on how many earmarks are directed to that state.

The discussion of how earmarks are distributed is important to my analysis because these outlying factors could have an effect on how infrastructure funds were allocated when earmarks
were permitted and how funding possibly changed after the moratorium was put in place. Fewer studies examine the funding directed for infrastructure, but works that focus generally on infrastructure spending add to this analysis.

**Infrastructure Spending and Earmarks**

Through analyzing transportation spending bills and interviewing federal, state and local agencies, transportation policy organizations, Congressional committee staff and lobbyists, Gian-Claudia Sciara (2009) produced an in depth look at pork and barrel spending on transportation measures. Though her study lacks statistical analysis, it does explain how earmarks move through the appropriations and authorization process and how those earmarks are implemented on a local level. Sciara concludes that an important determination of whether an earmark was successfully implemented is how closely Member coordinated with existing local and regional priorities. Earmarking millions of dollars for a bridge that a community does not want does not benefit the region. If an earmark coincides with already established priorities, then congressionally directed spending can be greatly beneficial to the project.

The Congressional Budget Office performed a thorough examination of infrastructure spending from 1956 to 2014. The report divides spending into two broad categories—spending to purchase physical capital related to infrastructure, including labor and other inputs necessary for improving and rehabilitating structures and equipment in place, and spending to operate and maintain infrastructure. This study and the data collected on federal outlays from OMB and on state and local governments’ outlays from the Census bureau provide a comprehensive overview of how the federal government and states have historically funded infrastructure and how much has been spent on projects. This report, in combination with earmark, population, and highway
spending data can aid explaining any potential trends or unexpected results from my analysis. I
next present my theoretical framework.
III. Theoretical Framework

To study whether and how earmarks are related to federal infrastructure funding, I developed a theoretical model that will illustrate other factors that could influence funding for transit and infrastructure projects from fiscal year 2008 to 2014. This theoretical model provides the basis for the empirical model that follows in Section V.

\[
\text{Federal Infrastructure Funding} = f (\text{Political Party, Status of Lawmaker, Population D, } \mu)
\]

Only one political party can represent a majority of the members of the House and/or Senate during a Congressional session. The party in control holds a majority of seats on the Committees, including the Appropriations Committee, and has the ultimate power to set and approve funding allocations. When congressionally directed spending was allowed under House and Senate rules, the political party had an impact on which Members and therefore states and regions, received earmarked funds. In that same vein, a lawmaker’s position within their respective party and if that lawmaker is a member of the Appropriations Committee, likely affected how successful that Member was in securing earmarked funds for parochial projects. For infrastructure projects that tend to be expensive, important to local constituents and require a federal match, Members were motivated to secure earmarked funds. This likely swayed to who and where federal funds were allocated.

Following the earmark moratorium, presumptively, a lawmaker’s political party or status would not drive how federal funding was allocated. Instead infrastructure spending is allocated through the annual budget cycle and individual projects go through internal agency processes to
be prioritized. Each agency has a unique process for allocating funds. However, the population of the state or Congressional district level could influence federal funding in regions with higher populations tend to need more resources for road repairs, port improvements or stormwater systems. Therefore, federal agencies with purview over infrastructure projects could direct more funds to those regions thus providing a comparison between funding trends before and after the ban on congressionally directed spending.
IV. Data and Descriptive Statistics

The data come from three primary sources: Taxpayers for Common Sense, the U.S. Federal Highway Administration and the U.S. Census Bureau. Table 1 below gives the descriptive statistics.

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**Earmark Data**

Tax Payers for Common Sense is an independent, non-partisan organization that focuses on government accountability. The organization devotes a significant amount of their work to the Budget process. Following transparency reforms to the earmark procedure, Tax Payers for Common Sense created master data bases with available earmark data for fiscal years 2008, 2009 and 2010.
There are five categories of earmarks. The category of earmarks used for this analysis are those that that were requested by a Member of the House and/or Senate. There are also earmarks that were identified as not being disclosed by a Member. These are provisions that meet Taxpayer’s for Commons Sense’s definition of an earmark, but are not disclosed as an earmark by a Member and were not a request made by the Administration. The earmark total used by Taxpayers for Common is the total disclosed and undisclosed earmarks. Additionally, there are earmarks that are requested by the Administration. These include earmarks requested only by the President, those requested by the President and Members of the House and Senate, and those that were requested by the President but were not included by Congress in any explanations. It is important to note that the earmarks requested by both the President and by lawmakers are not included in the member’s totals and are not included in the total earmark values.

Tax Payers for Common Sense collected and disseminated data with the intent of increasing transparency and accountability in the Appropriations process. For this reason, the data included both numerical values and descriptions of how the earmarks were tagged through the Appropriations process from the request to the allocation of funds. The data included are: the number of earmarks; funding amounts; the amount requested by the Administration; a description of the earmark provided by Congress; the city and location of the beneficiary or city or location and state that is included in the project description; the bill, bill section and bill subsection in which the earmark appears; agency receiving funds; the sponsor, whether the sponsor was a Member of the House or Senate; party affiliation; state and congressional district of the sponsor; whether it was a Presidential earmark with no Members of the House or Senate listed; whether the earmark was requested by both the Administration and Members and whether
the earmark was undisclosed as not being requested by the Administration or a Member of the House and Senate. This data made up a significant number of the independent variables used in this analysis.

Infrastructure Spending – Revenues used by States for Highways

Federal Highway Administration is an agency within the U.S. Department of Transportation (DOT) works with state and local governments on the design, construction and maintenance of the U.S. highway system. Part of the Administration’s mission to improve mobility on U.S. highways is the collection of accurate surface transportation data. There data are used by policy makers and the transportation community for the development and implementation of decisions, policies, legislation, programs, and performance goals related to the federal highway system. The Administration receives data from states and releases them annually through Highway Statistic Series. The Series analyzes and reports statistical information on motor vehicles, driver licenses, travel, highway mileage, finance and user taxation.

For my analysis, I used revenues used by states for highways to determine how funding was spent on highway infrastructure. Specifically, I looked at highway-user revenues which are comprised of motor-fuel, motor-vehicle and motor-carrier taxes and road and crossing tolls. Highway-user revenues are collected by the state annually and then submitted to the Federal Highway Administration to be included in the yearly Highway Statistic Series. For my analysis, I used years 2008 to 2014, the years following the moratorium.
**State-Level Population Data**

Lastly, I used state-level population data collected by the U.S. Census Bureau, the primary source of statistical and demographic data on the population of the U.S. The Bureau collects this data every ten years through conducting a nationwide census. Between the decennial censuses, the Bureau runs the Population Estimates Program (PEP.) The PEP uses current data on births, deaths, and migration to calculate population change since the most recent census and produce a times series of estimates of population. The annual time series of estimates begins with the most recent decennial census and extends to the vintage year which includes all years since the most recent census.

To accurately reflect where infrastructure investments were targeted, I included state level population estimates gathered for vintage year 2015. This includes the population of all 50 states, plus the District of Columbia from 2010 to 2015. For 2008 and 2009, I used a separate data set that compiled population estimates from the states from 2000 to 2010. The purpose of including population estimates at a state level is to evaluate whether a state’s population has an impact on how much funding is dedicated to infrastructure projects within the state.

*Data Weaknesses*

While the data collected provide the information needed for this study, a weakness that must be acknowledge is the accuracy in earmark data collected by the Tax Payers for Common Sense. It was not until 2007 that the House and Senate established new earmark transparency rules. Under House rule XXI, clause and Senate Rule XLIV, procedures were put in place to provide for public disclosure of approved earmarks and the identification of their congressional sponsors, federal agency, project name, purpose or location of the earmark. It was up to the
committee of jurisdiction to determine what constitutes an earmark and identifying earmarks in legislative text and any accompanying reports.

Throughout the process, Members of Congress, particularly those on the Appropriations Committee, and the President can direct spending through the budget process starting with the President’s budget proposal and ending with the conference between the House and Senate on what should be included in a particular Appropriations bill. Prior to 2009, any earmarks that were not specified in Appropriation legislative text or the report accompanying the bill had to be included in the conference report or joint explanatory statement at the end of the appropriations process. This was how earmarks were officially reported for fiscal years 2008 and 2009. In 2009 when fiscal year 2010 was considered, the Appropriations Committee began making earmark lists publically available that same day the subcommittee reports its bill.

Differences between the House and Senate process for generally reporting earmark information and changes in how the Appropriations Committee reported earmark data between fiscal years 2008 and 2009 compared to 2010 made it difficult for third party groups to track the data. Taxpayers for Common Sense started collecting earmark data prior to these rules being in place, but the 2008 data were not as complete or disaggregated in the same way the 2009 and 2010 data were. While I used a 2008 through 2010 master list, because of the methods Congress used for reporting data and the nature of implementing a new system for a decades old process, the 2008 (and possibly 2009 and 2010) may be complete. However, I do believe the data are what is best available and representative of House and Senate earmarks made through the Appropriations process from 2008 to 2010. I now turn to the empirical model I estimate with these data.
V. Empirical Model

\[
\text{TOTAL_HWY_UserRev} = \beta_0 + \beta_1 \ y_{2009} + \beta_2 \ y_{2010} + \beta_3 \ y_{2011} + \beta_4 \ y_{2012} + \beta_5 \ y_{2013} + \beta_6 \ \text{popstate} + \beta_7 \ \text{HAmount} + \beta_8 \ \text{SAmount} + \beta_9 \ \text{FAmount} + \beta_{10} \ \text{HApprop} + \beta_{11} \ \text{HMultiApprop} + \beta_{12} \ \text{SApprop} + \beta_{13} \ \text{SMultiApprop} + \beta_{14} \ \text{Hbipart} + \beta_{15} \ \text{Sbipart} + \beta_{16} \ \text{HDem} + \beta_{17} \ \text{SDem} + \beta_{18} \ \text{HMultistate} + \beta_{19} \ \text{SMultistate} + \mu
\]

(2)

Where:

TOTAL_HWY_UserRev = Represents the taxes and fees collected to spent primarily on highways and other transportation expenditures in thousands;

popstate = The population of each state from 2008 to 2013 in thousands;

y2009 = An indicator variable that equals 1 if the year is 2009 and zero otherwise;

y2010 = An indicator variable that equals 1 if the year is 2010 and zero otherwise;

y2011 = An indicator variable that equals 1 if the year is 2011 and zero otherwise;

y2012 = An indicator variable that equals 1 if the year is 2012 and zero otherwise;

y2013 = An indicator variable that equals 1 if the year is 2013 and zero otherwise;

HAmount = Monetary Value of the earmark in the House Appropriations bill;

SAmount = Monetary Value of the earmark in the Senate Appropriations bill;

FAmount = Monetary Value of the earmark in the Appropriations bill conferenced by the House and Senate Appropriations Committee;

HApprop = A binary variable indicating the Member requesting the earmark was a member of the the House Appropriations Committee;

HMultiApprop = A binary variable indicating the earmark was requested by multiple members of the House Appropriation Committee;

SApprop = A binary variable indicating the Member requesting the earmark was a member of the Senate Appropriations Committee;

SMultiApprop = A binary variable indicating the earmark was requested by multiple members of the Senate Appropriation Committee;

HDem = A binary variable indicating the requesting Member(s) of the House was a Democrat(s);
HBipart = A binary variable indicating the earmark was requested by House members of both the Democrat and Republican parties;

SDem = A binary variable indicating the requesting Member(s) of the Senate was a Democrat(s);

SBipart = A binary variable indicating the earmark was requested by Senate members of both the Democrat and Republican parties;

HMultistate = A binary variable indicating multiple Members of the House, who represent districts in different states, requested the earmark;

SMultistate = A binary variable indicating multiple Members of the Senate, who each represent different states, requested the earmark;

and μ is the random error.

* Note- y2008 is used as the base year.

TOTAL_HWY_UserRev is the dependent variable in the model. The intention is use this variable to compare outcomes from fiscal years 2008 through 2010, when earmarks were permitted to fiscal years 2011 to 2013, after the moratorium went into effect. I predict that there will be a difference in TOTAL_HWY_UserRev between years 2008 to 2010 and 2011 to 2013 and that spending will be higher in the years 2008 to 2010 when earmarks were used compared to 2011 to 2013 when they were prohibited.

The variables y2009 and y2010 represent spending on infrastructure the years in which earmarks were used in the Appropriations process. My hypothesis is that spending on infrastructure was higher when earmarks were permitted, so I believe both y2009 and y2010 will be positive and have a greater magnitude than other fiscal year variables compared to 2008.
Comparatively, $y_{2011}$, $y_{2012}$, and $y_{2013}$ represent spending on infrastructure when earmarks were not in effect. As mentioned above, my hypothesis predicts that spending on infrastructure will be greater when earmarks were used in the Appropriations process. For that reason, I believe the variables will be positive, but at lesser magnitude that $y_{2009}$ and $y_{2010}$ compared to the base year.

It is logical that the size of a state’s population will have an impact on highway spending. To account for this influence, I included each states population for the years 2008 through 2013. I believe that the population variable will have a positive relationship with infrastructure spending.

$H\text{Amount}$, $S\text{Amount}$ and $F\text{Amount}$ are the variables that represent the monetary value of the earmarks. While there could be some multicollinearity among the variables, I included all three in my model because the amount requested by the Senate, House or both do not always match the final amount. Given this discrepancy, I decided to leave all three in my model and because I am predicting earmarks have a positive relationship with infrastructure spending, I believe all three of these variables will be positive.

$H\text{Approp}$, $H\text{MultiApprop}$, $S\text{Approp}$ and $S\text{MultiApprop}$ are binary variables used to evaluate whether a Member or Members of the Appropriations Committee had a greater influence on the earmarking process. According to the research and conventional wisdom, Members of the House and Senate who sat on the Appropriations Committee naturally had more influence on the Appropriations process and were able to earmark more spending. Therefore, members of the Appropriations Committee likely had greater influence on highway spending.
For this reason, I predict that $H_{Approp}$, $H_{MultiApprop}$, $S_{Approp}$ and $S_{MultiApprop}$ will have a positive relationship with the dependent variable.

Along with Appropriators having more spending power, it’s also believed that the political party with the Majority on the House and Senate Appropriations Committee have greater control over spending. Additionally, spending provisions with support from both Democrats and Republicans tend to be more successful. In the 110th and 111th Congresses, Democrats held the Majority. To analyze the whether political party had an influence on infrastructure spending while earmarks were used in the Appropriations process, I created the $H_{Dem}$ and $S_{Dem}$ variables to indicate the Member or Members political affiliation. To also see whether earmarks from a bipartisan group of Member influenced spending on infrastructure, I created $H_{Bipart}$ and $S_{Bipart}$. I predict that all four will have a positive influence on infrastructure spending.

Finally, I differentiated between earmark requests that were attributed to a single state versus multiple states. Similar to the $H_{Bipart}$ and $S_{Bipart}$ variables, more Members, each representing different constituencies requesting the same funding likely had better success in securing the funding. To factor this rationale in to my analysis, I created $H_{Multistate}$ and $S_{Multistate}$ to determine whether earmark requests that were attributed to Members representing different states and constituencies had an influence on infrastructure spending. I believe this does and believe that $S_{Multistate}$ and $H_{Multistate}$ will have a positive relationship with spending. I will next discuss my results and analysis.
VI. Results and Analysis

Given the data included above, I ran Ordinary Least Square (OLS) regressions and Fixed Effects (FE) regressions both for years in which earmark data is available (fiscal 2008 through 2010) and all fiscal years included in my analysis (fiscal years 2008 through 2014) to determine whether infrastructure spending decreased following the earmark moratorium. Contrary to the stated thesis, both the OLS and FE model reported a significant increase in infrastructure spending in fiscal year 2011 and for the years in which earmarks were permitted, reduced spending on infrastructure projects. Below I will discuss these results further.

Overall

Across all four regressions, results show F statistics that are highly significant indicating that the results are not random and there is a statistically significant relationship between the independent variables models and infrastructure spending. Additionally, results are generally consistent across the four regressions meaning the results do not differ greatly between the FE and OLS models. The type of model used did not have a significant effect on the results. Finally, the R-squared indicator in the regressions is high. This suggests that the independent variables of significance in the equation can explain variations in infrastructure spending during the years included in the regressions. Overall, these results allow for there to be further examination of the independent variables and to what extent the variables impacted infrastructure spending. The Table that follows contains the results.
<table>
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<tr>
<th>MODEL</th>
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<th>(2) OLS</th>
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Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
Fiscal Years 2008 through 2010

The primary goal of the analysis is to determine whether there is a difference in the spending on infrastructure when earmarks were allowed in the Appropriations process compared to years following the moratorium on congressionally directed spending. As stated above, I examined the difference by running two different regressions, one of which analyzes if there is a relationship between infrastructure spending and earmarks. To examine this specific relationship, I ran both an OLS and FE model that included only fiscal years 2008 through 2010. The results from the OLS and FE model differed, but generally suggested that there was less spending on infrastructure when earmarks were permitted.

All four results for fiscal year 2009 were negative suggesting that spending on infrastructure in 2009 was lower compared the base year, 2008. However, in the FE model in which earmarks were permitted, fiscal year 2009 was significant at 90 percent and negative to a greater magnitude compared to the other three results. This suggests that for the years in which earmarks were permitted, adjusting for fixed effects, spending on infrastructure was $118,906,000 million less compared to the base year, although not at the highest level of precision.

The results for fiscal year 2010 did not produce statistically significant results across all four models, but differed in terms of the effect on spending. Both OLS models suggested positive spending compared to 2008 while the FE model suggested negative spending to a much greater degree.
In response to the 2008 fiscal crisis and Great Recession, Congress passed and President Obama signed into law the American Reinvestment and Recovery Act (ARRA) of 2009. This bill combined hundreds of billions of dollars in discretionary spending, mandatory spending, and revenue provisions. These provisions included the supplemental appropriations for fiscal year 2009 covering all 12 regular appropriations bills and state fiscal stabilization fund, accountability and transparency, and tax provisions. This included $48.1 billion to the Department of Transportation to invest in transportation infrastructure. This funding did not get allocated just in fiscal year 2009. 20.9 percent of the funding was to be allocated by the end of fiscal year 2009 and 59.0 percent by the end of 2010. By the end of 2011, 80.9 percent of the outlays were to occur. The table below depicts the cumulative outlays of ARRA.

### Table 3: Estimated Cumulative Outlay Impact of the ARRA of 2009: FY2009-FY2019

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<tr>
<td>Cumulative Outlay Impact</td>
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<td>145.5</td>
<td>221.8</td>
<td>259.9</td>
<td>282.8</td>
<td>295.6</td>
<td>302.6</td>
<td>305.7</td>
<td>307.3</td>
<td>308.1</td>
<td>308.3</td>
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<td>Cumulative Outlay Impact as a Percentage of Total Division A Outlays</td>
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<td>47.20%</td>
<td>71.90%</td>
<td>84.30%</td>
<td>91.70%</td>
<td>95.90%</td>
<td>98.20%</td>
<td>99.20%</td>
<td>99.70%</td>
<td>99.90%</td>
<td>100.00%</td>
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<td><strong>Mandatory Spending</strong></td>
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<td>Cumulative Outlay Impact</td>
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<td>243.8</td>
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<td>Cumulative Outlay Impact as a Percentage of Total Division B Outlays</td>
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<td>72.60%</td>
<td>91.30%</td>
<td>94.30%</td>
<td>97.10%</td>
<td>102.80%</td>
<td>104.50%</td>
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<tr>
<td><strong>Total Discretionary and Mandatory Spending</strong></td>
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<tr>
<td>Cumulative Outlay Impact</td>
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<td>339.4</td>
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<td>542.1</td>
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<td>Cumulative Outlay Impact as a Percentage of Total Division A and Division B Outlays</td>
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<td>100.90%</td>
<td>100.40%</td>
<td>100.20%</td>
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**Notes:** ARRA refers to the American Recovery and Reinvestment Act of 2009 (P.L. 111-5). Components may not sum to totals because of rounding. The totals for Division A include about $29 billion in mandatory spending increases and $0.1 billion in revenue reductions over FY2009-FY2019.
This means that there was a significant increase of funding being allocated specifically to transportation projects in 2010. This may explain differences in the fiscal year 2009 and 2010 results. However, contrary to my hypothesis, earmarks do not have a positive relationship with spending on infrastructure projects, but instead they actually decreased spending.

_Fiscal Years 2011 through 2013_

Compared to the previous section, only two of the four regressions include results for fiscal years 2011, 2012 and 2013. To compare analyze whether there is a relationship between earmarks and spending on infrastructure, I needed to include all the years in the analysis and a regression needed to highlight what is happening only during the years in which earmarks were allowed. Given I ran both an OLS and FE model, this resulted in two regressions that analyzed fiscal years 2011 to 2013, the years following the earmark moratorium.

Spending on infrastructure following the earmark moratorium are counter to what I predicted—spending actually increased in fiscal years 2011 through 2013 compared to the base year 2008, a year in which earmarks were permitted. In fact, these findings were quite significant. Fiscal year 2011, the year following the earmark ban, is statistically significant at the 99 percent level in both the OLS and FE model. It is also positive meaning the for the OLS model, there was $474,399,000 more spending on infrastructure compared to 2008. For the FE model, adjusting for fixed effects, there was $438,145,000 more spending on infrastructure compared to the base year. With both models showing similar results and being highly significant, it can be confidently assumed that spending on infrastructure greatly increased in
2011 compared to all of the other years included in the models. This may be because compared to 2008, 80.9 percent of the $40.8 billion in ARRA transportation funds had been allocated to projects.

Interestingly, after what is assumed to be a significant increase in spending in 2011, infrastructure spending in 2012 and 2013 decreased comparatively to 2011 while remaining positive compared to the baseline. However, the OLS model produced statistically significant results for fiscal year 2012 at the 90 percent level meaning that there was $217,714,000 more spending on infrastructure in 2012 compared to 2008. This could be because there was not as much change in spending in 2012 resulting in the FE model becoming imprecise and the OLS better accounting for variation in the dependent variable. In terms of the the allocation of ARRA funds, most of the supplemental spending had been allocated by the end of 2011. So, this could explain why infrastructure funding decreased comparatively to 2011.

**Population**

As discussed above, the state level population variable is included to account for how a state’s population can affect infrastructure spending. Results indicate that population is significant at the 99 percent level in both the OLS models and significant at the 90 percent level in the FE model that includes all fiscal years in the analysis. Predictably, across all four regressions, the relationship between a state’s population and spending on infrastructure spending is positive—states with larger populations spend more on infrastructure.

Given the difference in significance across regressions, it is pertinent to discuss the differences among the coefficients in both the OLS models and the FE model. Taking the OLS
model containing all years in the analysis, for every one thousand person increase in population, spending on infrastructure increased by $211. Similarly, for the OLS model that only includes the years in which earmarks were permitted, for every one thousand person increase in population, there was an increase in spending by $178. In terms of amounts spent, these two results do not differ greatly. However, adjusting for fixed effects, for every one thousand person increase in population, infrastructure spending increased by $679.

It is important to note the difference in results between the OLS and FE models. While at a lower confidence level, the population variable in the FE is still significant and suggests that increases in population will lead to over three times more in infrastructure spending. Fixed Effects models better explain differences in state population over time because the model accounts for time-variant factors. In terms of analyzing the relationship between infrastructure and population, it makes sense that the FE model would have a different result because changes in population over time logically have an effect on how much is spent on infrastructure.

*Amounts Appropriated in the House, Senate and Overall*

As discussed in sections above, the earmarking process included values that were included in the House and Senate Appropriations bill as well as a final amount. Across all four regressions, one measure was significant and the relationship to infrastructure spending varied.

The final earmark amount, the *FAmount* variable, in the OLS model for all years in the analysis was statistically significant at the 90 percent level. This implies that having an earmark amount decreased spending on infrastructure by $0.43. While the results for the final amount in the OLS model including only earmark years and for the House and Senate amounts in both OLS
regressions were not significant, and therefore are estimated imprecisely, they were consistent. The House amount for both regressions was positive, the Senate amount and final amounts for both regressions were negative and the coefficients were very small.

Comparatively, the FE model produced different results and none of the variables were significant. Opposite of the OLS model, the FE model produced negative results for House amounts in both regressions and similarly to the OLS model, the FE model produced negative results for the Senate amounts. For the final amounts, the FE model produced a positive result for the regression including all years and a negative result for the regression that included years in which earmarks were allowed.

Across the board, the coefficients were small which in terms of comparability could mean that the results between the OLS and FE models for both regressions are similar. One conclusion is clear: my hypothesis is not supported. Earmarks have no clear and precise effect, but they definitely do not support higher highway spending.

*Appropriator Variables*

To examine whether there was a relationship between infrastructure spending and whether the requesting Member was an Appropriator or not and if the earmark was requested on behalf of multiple Appropriators, I created variables for both the House and Senate would identify the requestor of the earmark: House Appropriator, Senate Appropriator, House Multiple Appropriator request and Senate Multiple Appropriator request. Among the four regressions, results showed that earmark requests from the multiple Members of the Appropriations
Committee in the House of Representatives was significant and requests coming from Appropriators in the Senate were significant.

Requests coming from multiple Members of the Appropriations Committee in the House was significant in both the OLS model with all years and the model that included only years in which earmarks were permitted at the 90 percent level. Both results are negative and very similar: for every request coming from multiple appropriators in the House, spending on infrastructure decreases by $169,990,000 and $158,344,000 respectively. This is a significantly greater decrease compared to the results generated by FE model for this same variable. Additionally, the results are opposite to the results for generated for earmarks requested by multiple Senate Appropriators, which were insignificant and had a positive effect on infrastructure spending.

Additionally, requests coming from Members of the Senate Appropriations Committee was significant in the OLS models. This result makes sense and is as expected given the power of Appropriations Committee Members. The result from the OLS model which included all years was significant at the 99 percent level and the result from the OLS model which included only the years in which earmarks were allowed was significant at the 95 percent level. Both coefficients are positive meaning that for every request coming from a Member of the Senate Appropriations Committee, spending on infrastructure increased by $8,232,000 and $7,070,000 respectively. Similar to the results for requests coming from multiple members on the House Appropriations committee, the results generated by the FE model was opposite—insignificant and negative. Additionally, the results are the opposite of those requests from a single House
Appropriator which were not significant and negative. The results from the FE models are likely due to a lack of variation in these variables, not due to the correction for time-invariant factors.

**Political Party Variables**

As discussed above, the political party of the may have an effect on earmarking spending and therefore infrastructure spending generally. To examine if the political party of the requester has an effect on infrastructure spending, I accounted for earmarks that were requested by a single party, for example, all Democrats and earmarks that had bipartisan support. I created variables for both the House and the Senate.

Among all four regressions, the bipartisan variables were reported as not being significant. For those earmarks that had bipartisan support in the House, each model produced different results. The OLS model and FE model that included all years produced similar, negative results. Comparatively, the OLS model and FE model that included only the years during which earmarks were allowed, both the OLS and FE model produced positive results, however, the FE model produced positive results with a much greater magnitude. The Senate earmarks that came from a group of bipartisan Members produced more chaotic results. The OLS models resulted in opposite signs, but to a similar magnitude. The FE models produced results with the same sign, but at very different magnitudes.

Both variables that identified whether an earmark came from a Democratic or Republican Member of the House or a Democratic or Republican Member of the Senate were significant in both models. For the OLS model, the $DemH$ variable was not significant in the regression that included all years, but was significant in the model that only included the years with earmarks to
the 90 percent level. Both regressions using the FE model produced significant results. For the regression including all years, the result was significant at the 90 percent level and for the model that included years with earmarks, the result was at the 95 percent level. For this model, sponsorship by a Democrat in the House results in higher appropriations by $28,305,000.

The DemS variable also included significant results. For the OLS model, the regression that includes all year was not significant, but the regression that included years with earmarks was significant at the 90 percent level. For the FE model conversely, the regression with all years was significant at the 95 percent level and for the years with earmarks, was not significant. However, all had positive signs. While conventional wisdom might be that Democrats favor higher government spending, these inconsistent and imprecise results may indicate that when it comes to highway spending, almost every member of Congress favors higher spending.

One note about the magnitudes noted above: while they may seem large, when it comes to highway spending, this is not surprising. Given that the average federal highway bill authorized appropriates billions of dollars, large magnitudes are the rule, not the exception. I now turn to the policy implications of the results.
VII. Policy Recommendations and Conclusion

Policy Recommendations

The U.S. received a D+ in the American Society of Civil Engineers Infrastructure Report card in 2013 and at that time, it was predicted $3.6 trillion would be needed by 2020 to keep our roads, bridges and water systems safe. At the same time, Congress has struggled to pass regular authorizing and appropriations bills making the flow of federal funds chaotic for infrastructure planners. The combination of these two situations makes the policy implications for this study serious. The U.S. needs to find a way to create a more consistent flow of funds from Congress to projects on the ground.

Figure 1: Infrastructure Spending as a Share of the Federal Budget (1956-2014)
I conducted a statistical analysis using an OLS model and FE model to determine whether the practice of earmarking affected federal spending on infrastructure. I predicted that the use of earmarks increased federal spending on infrastructure and therefore once the use of earmarks was prohibited, spending on infrastructure decreased. I based my hypothesis on existing knowledge of the current Appropriations process and literature that indicated earmarks do have an effect on how federal funds were allocated through the Congressional Appropriations process. Contrary to my hypothesis, the analysis I conducted indicated that earmarks decreased spending on infrastructure and after earmarks were prohibited, spending on infrastructure increased. If earmarks had a negative effect on infrastructure spending and this practice has been stopped in the Appropriations process, then how can the U.S. improve roads, bridges and ports? How can the federal budget process be changed from moving from crisis to crisis to long term planning? Is funding being directed and spent effectively? Are states prioritizing infrastructure spending? Below I discuss policy recommendations that can provide answers to these questions.

**Smarter Investments in Infrastructure**

My hypothesis implies that removing earmarks decreased infrastructure spending. What my hypothesis did not necessarily show that higher spending was a good thing. I do not argue that increased funding for infrastructure is needed and will help improve our nation’s systems, but more funding does nothing when it’s not spent properly.

Spending on infrastructure can be categorized as either capital expenditures or operations and maintenance. Capital spending includes spending for the purchase of new structures and the improvement and modernization of these existing structures. Operations and maintenance
includes the maintenance, upkeep and administration of public infrastructure. Since 1956, capital purchases, on average, have made up 78 percent of federal infrastructure spending. This means that a significant amount of federal funding goes towards the new structures, not maintaining the infrastructure systems are already in place.

Figure 2: Real Federal Infrastructure Spending by Category (1956-2014)

According to the American Society of Civil Engineer’s Report Card for America’s Infrastructure, our roads, levees, wastewater and drinking water systems, energy and dams are considered to be in poor condition and our ports, bridges and rail systems are in mediocre condition. Each of these systems are a critical component of our economy, communities and our every day lives for decades. So yes, more funding is beneficial, but what is truly needed is an
evaluation of how infrastructure funding is allocated—capital projects or making sure our existing systems do not fail and end up requiring even more funding.

Fix the Budget Process

The annual appropriations cycle begins when the President submits the Administration’s budget proposal to Congress on or before the first Monday in February. Traditionally, the House starts considering the appropriations bills and the Senate considers and amends House-passed bills. However in recent years, the Senate has produced bills independently of the House. This means that the two chambers consider 12 different appropriations at the same, typically through Spring and into early Fall. The House and the Senate come together in the fall and winter to attempt to rapidly resolve differences among measures before the end of the fiscal year. If either the House or Senate do not consider some of the regular bills activities are funded in an omnibus appropriations bill and if the omnibus or separate spending measures are not agreed upon by the end of the fiscal year, a continuing resolution is passed for a temporary period of time, or the government shuts down for a period of time.

In conjunction with the Appropriations cycle, Congress must pass a concurrent budget resolution that sets the House and Senate Appropriation Committee’s allocation of spending for the next fiscal year and aggregate spending levels for at least five years. This serves both as Congress’ response to the President’s budget proposal and the agreed upon budget policy document for the fiscal year. The budget resolution is not law and if an agreement or it can not be met, the Appropriations process can move forward.
In recent years, Congress has experienced an appropriations and budget process that has failed to produce an annual fiscal policy, let alone a five-year outlook on spending and revenues. Many years, both the Senate and House Appropriations Committees fail to consider all 12 bills at a Committee level and pass even fewer on the floor. In addition, Congress and the President are rarely able to come to an agreement on a budget resolution for the fiscal year. This results in an inefficient and ineffective budget process. Congress has survived through passing omnibus bills at the 11th hour or ditching the last year of work and passing a continuing resolution until the next budget cycle. If an omnibus or continuing resolution is not agreed to, a shutdown of the federal government can, and has, occurred.

Rather than establishing budgetary and fiscal policy for the federal government, lawmakers move from one fiscal crisis to the next. This makes it difficult for recipients of federal funds to plan expenditures on a yearly and multi-year basis. For projects that require longer planning periods or need match funding from state or local governments, like infrastructure projects, getting projects off the ground can be very challenging. It is important agencies that support infrastructure projects can advocate for funding needs and are able to receive regular funding allocations. The current federal budgetary process does not support this. To develop strong and reliable fiscal policy, Congress must fix the budget process through making reforms that will simplify budget and appropriation proceedings and facilitate the development of reliable federal budgetary and fiscal policy.
Authorize Long Term Investments in Infrastructure

To allocate funding to make federal highways repairs, dredge a port or create a program to assist with state and local infrastructure projects, Congress must have the authorization to do so. Similarly to the budget, Congress has struggled to pass comprehensive bills that reform outdated policies or pass bills that simply reauthorize existing programs for sufficient periods of time. This stagnation in Congress hinders the ability of federal agencies with jurisdiction over federal infrastructure to allocate funds to maintain our nation’s railways, highways, ports, let alone to build new structures.

This leaves the maintenance and improvement to our nation’s infrastructure in what has proven to be a dangerous place—responding to a failing system when it occurs. When a bridge falls or there is a railway accident, attention is turned towards infrastructure improvement and the need to focus investments on the system. However, when it comes to authorizing a bill that aim to make meaningful improvements to how agencies prioritize and allocate funds and provide long-term stability needed in funding infrastructure projects that take longer to complete, Congress many times drops the ball.

To allow for agencies and local governments to make improvements to infrastructure systems, Congress needs to pass authorizations that will be in place for longer periods of time, rather than a couple of years as has been the case recently. This means it’s important for lawmakers to see the long-term outlook on infrastructure spending. Arguably during the earmark era, Members who had the ability to secure funding for a local bridge to be built or a port to be dredged had a great interest making sure the budgets for the agency of jurisdiction were robust
enough to support the project. As was my hypothesis, one would assume spending on infrastructure would have been greater during that time. However, my analysis called this assumption into question. So, could earmarks garnered interest into specific projects rather than the maintenance of our nation’s infrastructure system as a whole? Possibly. For this reason, it is critical that lawmakers and the budgetary process account the need for long term funding that support both new projects and ongoing improvements.

Support State-Level Infrastructure Spending

Safe and reliable infrastructure is critical to growing the economy, especially to growth at a state and local level. To create economic growth opportunities, state and local governments need to make greater investments in preserving and building quality infrastructure systems. Well-maintained roads, bridges, ports, railroads, airports attract businesses that rely on transportation routes to receive materials and get products to market. In turn, businesses rely on reliable public transportation and safe water infrastructure systems to attract quality employees and their families. Arguably, local communities and states have been hit hardest when infrastructure systems are not maintained, fail or are not proactively planned. However, instead of making investments to improve and building out roads, public transportation, and ports, investments in infrastructure has plummeted and is currently at a 30-year low.
While a contributing factor to the reduced spending was the Great Recession in 2008, it can be argued investments in infrastructure have not been prioritized on a state and local level compared to other policies aimed at growing the economy such as cutting taxes or offering incentives to businesses to locate to the region. This neglect has left communities large and small that seek opportunities to grow or diversify their economy in a lurch. It has also harms the U.S. infrastructure system as a whole. State and local governments own over 90 percent of non-defense public infrastructure assets and although the federal government assists in the building and maintenance of these assets, state and local governments pay a large portion of the cost of maintaining and improving them. This means that if crumbling roads and falling bridges need to be fixed, a majority of that responsibility falls on state and local governments.
To identify and make infrastructure investments, like the federal government, states and localities need to understand the benefits of making long term investments in infrastructure. Along with attracting private investment, improved infrastructure can make communities a better place to live through improving local transportation, the environment and health of citizens. As discussed above, there are improvements to be made on a federal level in terms of making sure federal agencies are funded and authorized to support projects on the ground. However, it is up to states to initiate projects, take advantage of grants and government subsidies such as tax exempt bonds, and put in the investment to improve and expand infrastructure systems. States
and localities can no longer rely on lawmakers to fund, finish and maintain local infrastructure projects.

**Conclusion**

In conducting my analysis, I faced limitations that had an effect on the data I was able to gather and the conclusions reached. With any analysis, data are never perfect and I faced hurdles in acquiring data that tracked comprehensive infrastructure spending at a state level for the fiscal years in my analysis and only having access to earmark data for the three years prior to the moratorium going into effect. My intention was to use infrastructure data that included federal spending on highway, mass transit and rail, aviation, water transportation, water resources and water utilities. The earmark data which were collected were designed to match the earmarks that were attributed to the Appropriations subcommittees of jurisdiction and more specifically, the Department and Federal Agencies charged with allocating the funds and managing the project. Unfortunately because I had to map data on a state spending level and the desired data were not aggregated to that level, I used a more specific metric for infrastructure spending—highway user revenue. This could have underestimated the magnitude of the relationship between earmarks and infrastructure spending.

There were also limits in the earmark data. I was able to find two sources with data on earmarks, the Office of Management and Budget (OMB) and Taxpayers for Common Sense. I would have preferred to use OMB’s data, but their earmark data were not as comprehensive, necessary data were located in multiple sources and there were a significant amount of data missing for fiscal year 2008. Additionally, the data only included fiscal years 2008, 2009 and
2010, the years after lawmakers were required to disclose earmarks and prior to the moratorium. This was the first time since earmarks became a part of the budget process that Congressional Committees and Members had to disclose the amount and recipients of earmarks. The nature of implementing a new process can be seen in the amount of data collected for fiscal year 2008 and how that data were disseminated compared to fiscal years 2009 and 2010. In addition, to have a more robust analysis of the relationship between earmarks and infrastructure spending, having data on earmarks prior to 2008 would be required. However, lawmakers and Congressional Committees were not required to collect that information.

The conclusion to my analysis was contrary to my hypothesis—earmarks did not have a positive effect on infrastructure spending. To further examine the affect earmarks had on the budgetary process, I would analyze earmarks comprehensively within the Energy & Water, Defense or the Labor, Health and Human Services and Education spending bills. Those three bills had the highest number of earmarks in fiscal years 2008, 2009 and 2010. To further examine whether there is a relationship between infrastructure spending and earmarks, I would analyze whether earmarks had an effect on particular infrastructure and if that affected state and local spending on infrastructure.
VIII. Bibliography


