

Capital spending in local government

Providing context through the lens of government-wide financial statements

William C. Rivenbark, Whitney Afonso and Dale J. Roenigk
School of Government, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

Abstract

Purpose – The purpose of this paper is to understand the impact of the Great Recession on the capital assets being depreciated and the capital assets condition ratio for the governmental activities of the government-wide financial statements, while identifying possible socioeconomic and financial variables that help explain capital investment behavior in local government.

Design/methodology/approach – Based on capital spending from fiscal year 2005–2006 (FY06) to fiscal year 2012–2013 (FY13) for the governmental activities of 471 North Carolina municipalities as reported on their government-wide financial statements, the authors use a fixed effects model to test our two hypotheses.

Findings – The authors find that most municipalities consistently invested in capital assets before, during, and after the Great Recession but were not able to maintain pace with depreciation. The authors also find that the capital assets being depreciated is affected by numerous socioeconomic and financial variables, while the capital assets condition ratio is not.

Research limitations/implications – The study continues to build on previous research, demonstrating that different results are produced when the analysis is based on local data rather than sub-national data.

Practical implications – An implication from our study that expands across research and practice is that capital investment and capital value are two different dimensions of capital management in local government, which drives research in terms of how this multidimensional concept is specified and drives practices in terms of how this multidimensional concept is approached within annual capital budgets and capital improvement programs.

Originality/value – The study represents one of the first studies that focuses on capital spending in local government based on data from the government-wide financial statements.

Keywords Local government, Capital spending, Government-wide financial statements

Paper type Research paper

Introduction

Capital spending is vital in local government for multiple reasons, including the need to maintain current infrastructure for community sustainability and quality of life (Chen, 2018) and the need to expand infrastructure for economic development (Chen, 2016). The combination of these overarching needs in local government, which necessitates the best practice of long-term financial planning, was one of the primary drivers of the passage of Statement No. 34, *Basic Financial Statement – and Management's Discussion and Analysis – for State and Local Governments*, by the Government Accounting Standards Board in June 1999 (Johnson and Bean, 1999). The financial reporting model now requires local governments to include capital assets–net of depreciation on their government-wide financial statements to help inform community stakeholders of the cost of maintaining critical public infrastructure (Pryor, 2013).

Wallace (2000) proposed shortly after the passage of Statement No. 34 that it is replete with research opportunities, including the themes of valuation, depreciation, intergenerational equity and user comprehension. However, there has been surprisingly little research on using the government-wide financial statements to explore the fiscal health of local government, which includes the net value of capital assets (Maher and Deller, 2013).



An issue that magnifies this absence of research is that studies conducted on governmental expenditures are primarily focused on federal and state government rather than local government, overlooking the services and capital assets most visible to citizens (Afonso, 2013). An implication from this research gap is a lack of understanding on the patterns and trends for capital spending specifically in local government and the need for more information on how the Great Recession impacted capital outlay, where prior studies have typically used a subnational (state-local) perspective (Fisher and Wassmer, 2015). Another implication is the critical area of cutback management, where much of the previous literature on coping strategies with recessions suggests that reducing, if not eliminating, capital expenditures during recessions is one of the two primary ways that local governments balance their budgets in the face of revenue shortfalls (Afonso, 2013, 2014; Dougherty and Klase, 2009; Bartle, 1996).

This paper presents capital spending from fiscal year 2005–2006 (FY06) to fiscal year 2012–2013 (FY13) for the governmental activities of 471 North Carolina municipalities as reported on their government-wide financial statements, which covers an eight-year period of growth, recession and recovery. The purpose of our research is to understand the impact of the Great Recession on the capital assets being depreciated and the capital assets condition ratio, while controlling for possible socioeconomic and financial variables that help explain capital investment behavior in local government.

We begin by discussing previous studies that are related to our research before describing the fixed effects model that we used to test our two hypotheses. We then present our findings, which include that most municipalities consistently invested in capital assets before, during, and after the Great Recession but were not able to maintain pace with depreciation though our results suggest that this was not due to the recession. We also find that the capital assets being depreciated are impacted by numerous socioeconomic and financial variables, while the capital assets condition ratio is not. We conclude with several research implications that emerged from our findings before discussing future research opportunities on capital spending in local government. The research implications include that a more nuanced approach is needed before generalizing cutback management tactics across all local governments, that the determinates of capital spending are different in local government compared to other levels of government, and that capital investment and capital value are two different dimensions of capital management in local government.

Previous studies

We focus on two lines of inquiry in conducting our literature review for creating our hypotheses and for specifying our fixed effects model. The first is on how local governments responded to the Great Recession from the perspective of cutback management, where local governments tend to reduce or eliminate capital spending in times of economic downturns as a coping strategy to produce balanced budgets. We also include the limited research that explored the impact of the Great Recession on local government from the perspective of government-wide financial statements. The second line of inquiry is the determinants of capital spending, responding to the few studies that have attempted to identify the socioeconomic and financial factors that impact capital investment behavior in local government.

Cutback management

Scorsone and Plerhoples (2010) confronted the Great Recession within the context of cutback management, beginning with the work of Levine (1978, 1979). The scholars made two observations that are relevant to our research. First, most cities instituted hiring freezes and layoffs during the Great Recession, including delays and cancellations of infrastructure projects.

Second, there were major swings in state and local cash reserves during the 2000s; however, we must be cautious in interpreting this finding given that these data are aggregated for subnational governments and countercyclical behavior may be different between state and local governments (Rivenbark *et al.*, 2015).

Marlowe (2012) suggested that capital cutbacks as a strategy to manage through recessions can even distort relationships between capital spending and economic development goals, responding to significant reductions in capital outlay by both state and local government during fiscal years 2009–2011. The scholar also noted that the impact of the Great Recession would have been even greater without the American Recovery and Reinvestment Act (ARRA), which was particularly helpful during fiscal years 2008 and 2009. The major conclusion from this research effort is that the Great Recession impacted capital spending in local government at slightly higher levels than in prior recessions and that the Great Recession created an opportunity for numerous improvements regarding local government capital budgeting practices.

Afonso (2013) explored cutback management tactics during the Great Recession, focusing specifically on county governments from the states of California and Georgia. This study differentiated itself from prior studies by including information on how decision-makers of county government felt about the Great Recession, where unemployment was the most cited overall impact from the economic decline. The county commissioners from both states also reported that capital projects were heavily affected by the recession, resulting in an overall reduction of capital investment.

Afonso (2014) also examined capital spending during the Great Recession and found that the reduction in capital expenditures and the delay in maintenance projects were commonly used to cope with the fiscal stress. The scholar ultimately recommended that local governments rethink their behaviors during economic downturns. The observation is in alignment with the research of Marlowe (2012), where capital reductions or the elimination of capital projects may have broader repercussions on long-term community goals.

Maher and Deller (2013) delved into the financial condition of Wisconsin counties during the Great Recession. The authors calculated five fiscal indicators for governmental, business-type and total activities for 55 of the 72 counties in Wisconsin. After exploring the relationship between objective and subjective measures of fiscal condition, the scholars concluded that county officials were still relying on fund-level statements for decision making and that the study was the first known attempt to use government-wide financial statements at the sub-state level of government. The implication from this research is the possibility that local officials are still overlooking the annual change in capital assets–net of depreciation as reported on government-wide financial statements, returning to one of the key reasons for the passage of Statement No. 34.

A study conducted by Ross *et al.* (2015) focused on how the 35 largest population cities in the USA managed the Great Recession during the time period from 2005 to 2011, including the change in total net assets. The scholars obtained their data from comprehensive annual financial statements, using both governmental fund financial data (modified-accrual basis of accounting) and government-wide financial data (accrual basis of accounting). Two findings from this research included that cities were able to engage in deficit spending by relying on their net assets, which is more common in national governments, and that capital grants were being used to partly reduce property taxes and restore cash reserves.

Determinants of capital spending

Pagano (2002) analyzed capital spending in municipal government between 1993 and 2000, referring to this era as one of unprecedented economic growth. The scholar found that the average annual growth rate in constant dollars for capital spending during the selected time period was a robust 7.8 percent, compared to the average annual growth rate of general fund

spending of approximately 2 percent. Another critical finding from this research was that the municipalities relied more heavily on own-source revenues to fund their capital spending during the 1990s rather than on debt financing or intergovernmental aid.

Fisher and Wassmer (2015) focused more specifically on the factors influencing total capital spending, where the scholars found that population density and population growth from the previous decade were positively related to capital outlay. It should be noted, however, that this research was based on subnational governments (state and local) rather than local government. Another finding is that the ARRA influenced greater capital spending during 2009 and 2010, which partially aligns with the research of Marlowe (2012).

Bates and Santerre (2015) used a panel data set of Connecticut municipalities from 2000 to 2010 to estimate public demand for infrastructure projects, including the total number of projects, road projects, building projects and park projects. The authors began by pointing out that prior studies on the determinants of capital spending tended to combine state and local capital investment data (Holtz-Eakin, 1991; Holtz-Eakin and Rosen, 1989; Holtz-Eakin and Rosen, 1993; Temple, 1994; Balsdon *et al.*, 2003; Fisher and Wassmer, 2015), overlooking possible differences between state and local government investment behavior. The authors found that the number of capital projects was inversely related to own-source financing based on a median-voter model to discern how local communities make decisions, which is in alignment with the work of Paganò (2002). Another important finding was that median household income was statistically insignificant in the four estimated equations, which is in contrast with prior research based on subnational data. This finding highlights the potential differences between capital investment behavior between state and local government.

Wang and Wu (2018) conducted a more recent study on the determinants of municipal capital investment, using a data set of the 100 largest cities in five selected years from 1992 to 2012. While the study included a host of socioeconomic and financial variables to explore capital investment over this time period, the scholars found that the institutional variables of legal debt limitations and local tax and expenditure limitations negatively impacted capital spending and that the financial variable of cash reserves positively impacted capital spending. The socioeconomic variables, other than population density and percent of population of 25 years and over with bachelor's degree or higher, had minimal impact on capital investment behavior, including median household income.

Hypotheses, data and methodology

The review of previous studies produced two findings that are essential to our research. First, more studies are needed on how the Great Recession impacted capital spending in local government, which was clearly described by Bates and Santerre (2015) in response to studies that relied on subnational financial data rather than sub-state financial data. Second, very few studies beyond the work of Maher and Deller (2013) and Ross *et al.* (2015) have responded to the research call made by Wallace (2000) on exploring the utility of government-wide financial statements.

Hypotheses

We responded by identifying two hypotheses to guide our research. The first hypothesis, which we frame as the traditional approach, comes from the cutback literature on capital spending in local government. More specifically, several studies found a reduction in capital spending in local government during the Great Recession within the context of cutback management in order to manage through a time of declining revenue (Scorsone and Plerhoples, 2010; Marlowe, 2012; Afonso, 2013, 2014). Therefore, we offer the following hypothesis based on the theory that an economic decline affects capital investment in local government.

Traditional approach

H1. Capital investment in local government, as measured by total depreciable capital assets for governmental activities, declines during an economic downturn.

The second hypothesis, which we frame as the alternative approach, follows the same line of reasoning; however, we responded to the limited research on understanding financial dimensions of local government through the lens of government-wide financial statements (Maher and Deller, 2013; Ross *et al.*, 2015). Therefore, we offer the following hypothesis on the theory that an economic decline also affects the management of capital depreciation in local government.

Alternative approach

H2. Remaining useful life of capital assets in local government, as measured by the capital assets condition ratio, declines during an economic downturn.

Data

Local governments in North Carolina are required by law to operate on the same fiscal year (July 1 to June 30), to have their annual financial statements audited by an independent auditing firm, and to submit their annual audited financial statements to the State and Local Government Division of the North Carolina Department of State Treasurer. We obtained the financial data for our research from the State and Local Government Division for the 548 municipalities in North Carolina from FY06 to FY13, which came from the audited annual financial statements of each local government. This eight-year time period allowed us to explore capital spending in local government before, during and after the Great Recession.

Our study is based on the 471 municipalities that submitted complete data and reported on capital asset data for all eight reporting periods. The population range for our sample of municipalities is 13 to 789,248, with a mean population of 10,558. An important contribution of this analysis is the inclusion of smaller municipalities in terms of population, where they have been typically omitted in previous studies. However, they are critical to understand because their responsibilities for capital investment and maintenance are the same as for larger local governments.

Methodology

Table I presents the two dependent variables, capital assets subject to depreciation (to test H1) and capital assets condition ratio (to test H2), used for our analysis. We first use trend analysis to determine the directional change for these variables during an economic period of growth, recession and recovery. Trend analysis for capital assets being depreciated allowed us to explore the change in stock of depreciated capital assets, while for the capital assets condition ratio allowed us to explore the annual rate of depreciation within the context of remaining useful life of capital assets.

We do acknowledge that these data points underestimate total capital investment in local government for two reasons. First, our study does not include capital assets, which are

Dependent variable	Specification	Data source
Capital assets subject to depreciation	Total depreciable capital assets for the governmental activities	Notes of the financial statements
Capital assets condition ratio	Total accumulated depreciation of capital assets for the governmental activities divided by capital assets subject to depreciation and then subtracted from one	Notes of the financial statements

Table I. Financial indicators for governmental activities

non-depreciable such as land. This is because our research scope includes understanding how local officials are actually managing the depreciation dimension of capital assets once they are acquired. Second, our study does not include capital assets being depreciated from business-type activities, such as public utilities, recognizing that the evaluation, prioritization, and funding processes for capital assets with private goods characteristics are different from capital assets with public goods characteristics (Marlowe *et al.*, 2009). For example, there is an important difference in North Carolina regarding the approval of debt financing to fund capital assets. Revenue bonds, which require only board approval, are commonly used to fund capital assets with private good characteristics. General obligation bonds, which require voter approval through referendum, are commonly used to fund capital assets with public good characteristics. In other words, these decision-making processes are extremely different.

We then use a series of fixed effects models to analyze the panel data from FY06 to FY13 in order to identify possible socioeconomic and financial variables that explain the relationships between the dependent variables of capital assets being depreciated and capital assets condition ratio[1]. Our models also include year effects and the standard errors are clustered at the municipal level. Table II presents the independent variables, specifications and data sources used for our analysis based on the available literature. The socioeconomic variables are: per capita income (Bates and Santerre, 2015), unemployment rate (Bates and Santerre, 2015), population over 65 (Bates and Santerre, 2015), population (Bates and Santerre, 2015), population density (Fisher and Wassmer, 2015) and the percentage of voters that identify as Republican (Fisher and Wassmer, 2015). The financial indicators are: property tax revenue (Pagano, 2002), local sales tax revenue (Pagano, 2002), total expenses (Fisher and Wassmer, 2015), the one year change in capital outlay (Pagano, 2002), the recession (Marlowe, 2012) and the ARRA (Fisher and Wassmer, 2015). The per capita income, population, number of Republican voters and financial variables are log transformed as to estimate elasticities.

We specify four models to test our hypotheses. Models 1 and 2 use the capital assets subject to depreciation as the dependent variable to test *H1*, while Models 3 and 4 use the capital assets condition ratio as the dependent variable to test *H2*. However, Models 1 and 3 and Models 2 and 4 share the same specification outside the different dependent variables. The following is the specification of independent variables for Models 1 and 3:

$$DV_{it} = \beta_0 + REC_{it}\Gamma + SE_{it}\Delta + FIN_{it}E + RIT_{it}Z + YV_{it}H + \varepsilon_{it}.$$

Independent variable	Specification	Data source
Per capita income	Per capita income at county level	Bureau of Economic Analysis
Unemployment rate	Percent of persons seeking employment at the county level	NC Department of Commerce
Population over 65	Actual population over the age of 65	NC Office of the Governor
Population	Municipal population	NC Office of the Governor
Population density	Population per square mile	NC Office of the Governor
Republican	Total number of republican voters in most recent election at the county level	NC State Board of Elections
Property tax revenue	Total annual municipal property tax revenue	NC Office of State Treasurer
Local sales tax revenue	Total annual municipal sales tax revenue	NC Office of State Treasurer
Total expenses	Total annual municipal expenses for all governmental funds	NC Office of State Treasurer
Capital outlay	Capital outlay represents the change in net capital flow in terms of capital increases and decreases during each fiscal year	NC Office of State Treasurer
Recession	1 = 2008, 2009 or 2010; 0 otherwise	–
ARRA	1 = 2009, 2010 or 2012; 0 otherwise	–

Table II.
Independent variables,
specifications, and
data sources

The dependent variable, DV_{it} , is the natural log of capital assets subject to depreciation for model 1 and is capital assets condition ratio for Model 3. The independent variables are: REC_{it} , is the vector of binary variables for whether the years was a part of the Great Recession and whether ARRA was in place; SE_{it} , the vector of socioeconomic variables; FIN_{it} , the financial variables for the municipality; RIT_{it} , the vector of recession interaction terms; and YV_{it} represents the binary controls for year. Where i is municipality and t is year.

The second specification used for Model 2 and 4 includes the same independent variables but adds two lagged variables: a lag of the recession binary variable and a one year change in total expenses. That model is specified as follows, where LAG_{it} is the additional vector of controls[2]:

$$DV_{it} = \beta_0 + REC_{it}\Gamma + SE_{it}\Delta + FIN_{it}E + RIT_{it}Z + LAG_{it}\Theta + YV_{it}H + \varepsilon_{it}.$$

The addition of the lagged variables is critical because it is reasonable to assume that the current fiscal year's budget will not yet reflect the changes in the economy. More specifically, changes in the status of the recession will take a fiscal year to be incorporated into the budget, and overall expenses may shed light on policy choices as well as be another indicator of fiscal health.

Table III presents the summary statistics for the dependent and independent variables, including the mean, standard deviation, minimum value and maximum value for time period of FY06–FY13. It should be noted that some of the data are presented in thousands. Therefore, the minimum value is zero for property tax revenue and local sales tax revenue, which are attributable to extremely small municipalities where the value is actually zero or extremely close to that value. Again, the variables of per capita income, unemployment rate and republican are at the county level due to data availability.

Findings

Figure 1 shows that North Carolina municipal government had a total of \$11.3bn of capital assets subject to depreciation at the end of FY06 and \$16.7bn at the end of FY13 for their governmental activities, representing an increase of approximately 48 percent over the eight-year period. We then converted the financial data to constant dollars and found that municipalities experienced an average annual growth rate in capital outlay of approximately 6 percent, demonstrating that municipal government maintained a high rate of capital investment before, during, and after the Great Recession. It also rivals the

Variable	Mean	SD	Min.	Max.
Capital assets being depreciated (00,000s)	14.56869	2.139188	7.830028	22.03711
Capital assets condition Ratio	0.5169756	0.1820142	0.01	0.98
Per capita income	32,516.810	5,191.846	21,550	53,336
Population over 65	15,840.560	15,361.190	640	90,686
Population	10,558.970	44,488.890	13	789,248
Density	933.465	617.159	6.566	4,387.180
Republican	29,937.220	35,354.380	855	211,596
Property Tax Revenue (000s)	4,237.424	19,742.890	0	374,397
Unemployment rate	8.796	3.022	3.200	17.500
Local Sales Tax Revenue (000s)	1,539.770	7,535.496	0	158,997
Expenses (00,000s)	93.995	428.352	0.157	8,148.960
Capital outlay (00,000s)	17.49	119.06	0	4,081.230
Recession			0	1
ARRA			0	1

Table III.
Summary statistics for
dependent and
independent variables
(2006–2013)

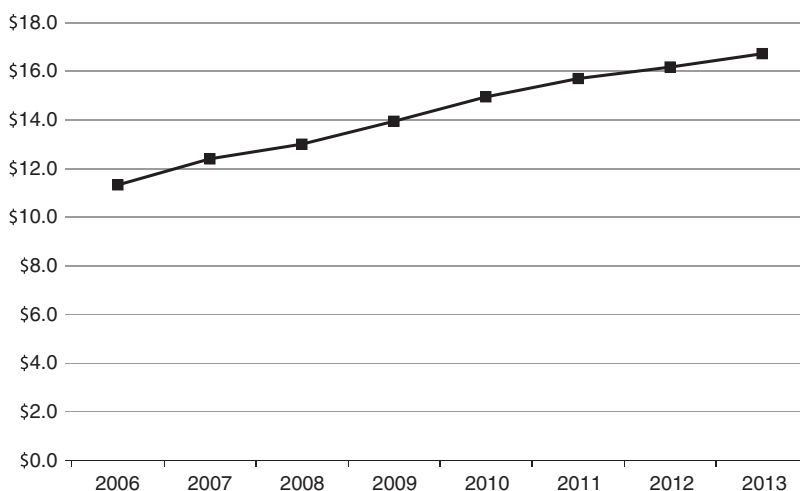


Figure 1. Capital assets subject to depreciation (billions)

average annual growth rate of 7.8 percent for capital spending in municipalities as reported during an era of unprecedented economic growth (Pagano, 2002).

Two other surprising aspects also emerged from this analysis. First, the growth rate between FY08 and FY09 of 7.23 percent and the growth rate between FY09 and FY10 of 7.18 percent both exceeded the average annual growth rate of approximately 6 percent, representing the recession years. Second, 92.7 percent of the municipalities experienced an actual increase in capital assets subject to depreciation during this time. This percentage is extremely important to our research, showing that it is not just larger municipalities are not the primary drivers of this trend.

Table IV presents the results of the regression equations. Model 1 shows the results for the dependent variable of capital assets being depreciated and Model 2 shows the results for the second specification of the model once the lagged variables are included. The first result that warrants attention is the lack of significance associated with the three recession related variables in both models at the 95 percent confidence level, while noting that the recession variable is significant at the 90 percent confidence level. Therefore, we find only minimal evidence to support *H1* that capital investment in local government declines during an economic downturn based on the overall trend in Figure 1 and the results from Models 1 and 2, which is in contrast to much of the cutback management literature (Scorsone and Plerhoples, 2010; Marlowe, 2012; Afonso, 2013, 2014). The second result that warrants attention is the ability of the models to explain the variance in the dependent variable of capital assets being depreciated (Model 1 has an R^2 of 0.693, and Model 2 has an R^2 of 0.763).

Models 1 and 2 also provide evidence that several socioeconomic and financial variables impacted capital investment behavior, responding to the statistically significant variables at the 95 percent confidence level for total expenses, total capital outlay, property tax revenue and population over 65. The significance of the first two financial variables, total expenses and total capital outlay, is logical in that local governments that spend more increase their stock of capital assets being depreciated. The reliance on own-source revenue of property taxes, however, is particularly important in allowing local governments to control their own destination, which aligns with the research of Pagano (2002). The models also show that the socioeconomic variable of per capita income is not statistically significant, which provides additional support for the research conducted by Bates and Santerre (2015) and Wang and Wu (2018).

	DV: ln(capital assets being depreciated)		DV: capital assets condition ratio	
ln(Expenses)	0.213	0.340	0.029	0.040
	0.047***	0.077***	0.008***	0.013***
One year change in ln(Expenses)		-0.164		-0.015
		0.042***		0.008*
Recession	-0.188	-0.188	-0.003	-0.003
	0.108*	0.108*	0.039	0.039
Lag of recession		-0.052		0.025
		0.038		0.010***
Recession × Income	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000
ln(per capita income)	0.023	0.095	0.108	0.108
	0.313	0.289	0.100	0.110
Recession × Unemployment	0.006	0.006	0.002	0.002
	0.005	0.005	0.002	0.002
Unemployment rate	-0.004	-0.004	0.000	0.000
	0.008	0.008	0.002	0.002
ARRA	-0.047		0.025	
	0.037		0.009***	
ln(capital outlay)	0.092	0.094	0.029	0.029
	0.010***	0.010***	0.002***	0.002***
ln(local sales tax revenue)	-0.004	-0.004	-0.007	-0.007
	0.039	0.039	0.008	0.008
ln(property tax revenue)	0.081	0.081	-0.006	-0.006
	0.038**	0.038**	0.008	0.008
Population Over 65	0.000	0.000	0.000	0.000
	0.000***	0.000***	0.000	0.000
ln(Republican)	0.437	0.439	0.021	0.021
	0.272	0.272	0.056	0.056
ln(Population)	0.102	0.102	-0.003	-0.003
	0.053*	0.053*	0.008	0.008
Density	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000
Constant	7.865	8.254	-0.847	-0.842
	4.848	4.931*	1.132	1.223
R ² (Overall)	0.693	0.763	0.068	0.056
	Model 1	Model 2	Model 3	Model 4
Observations	3,324	3,324	3,324	3,324

Table IV. Fixed effects model from 2006 to 2013

Notes: All models include year effects and the standard errors are clustered by municipality. Standard errors appear below the estimated coefficients. ARRA omitted from the models with lags due to collinearity. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

The significance of the socioeconomic variable of population over 65, while not as intuitive, may be a proxy variable for service demand.

We then use the alternative approach to determine how the annual investment in capital assets impacted the annual rate of depreciation within these municipalities before, during, and after the Great Recession. Figure 2 shows that North Carolina municipal governments lost ground over this eight-year time period as measured by the capital assets condition ratio, decreasing from 60.3 percent in FY06 to 55.0 percent in FY13 for their governmental activities. We explored this outcome even further for additional context, finding that approximately 59 percent of the municipalities experienced an actual decrease in their respective capital assets condition ratios over this period. The exception to this consistent downward trend is between FY09 and FY10, when the capital assets condition ratio remained approximately the same.

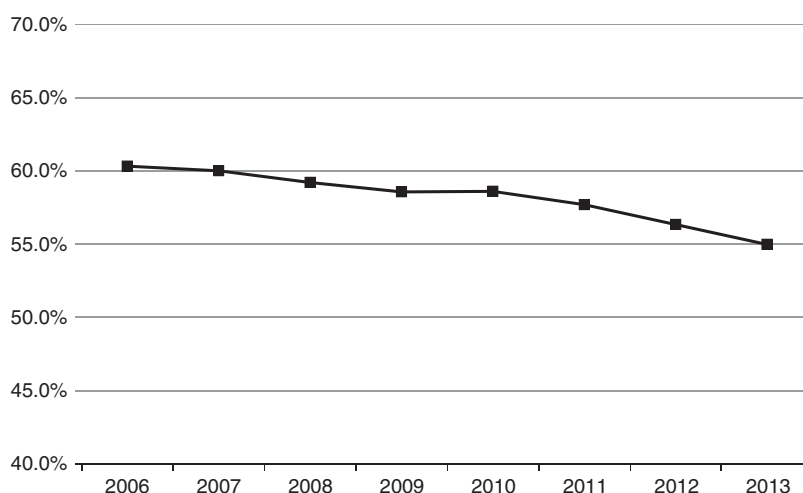


Figure 2.
Capital assets
condition ratio

Table IV presents the results of the regression equations for the alternative models, where Model 3 shows the results for the dependent variable of capital assets condition ratio and Model 4 shows the results for the second specification of the model once the lagged variables are included. One result, which is in alignment with the previous two models, is the lack of significance associated with the three recession variables with the exception of lag of recession variable in Model 4 at the 99 percent confidence level. However, the relationship between the capital assets condition ratio and the lag of recession variable is actually positive, which suggests that there is a lag between when the recession starts and when local officials react to capital management. Based on Figure 2 and the results from Models 3 and 4, we have no evidence to support our second hypothesis that the remaining useful life of capital assets in local government, as measured by the capital assets condition ratio, declines during an economic downturn. Another key result, which is in contrast to the previous two models, is the inability to explain the variance in the dependent variable of capital assets condition ratio (Model 3 has an R^2 of 0.068, and Model 4 has an R^2 of 0.056).

Models 3 and 4 also suggests that that the remaining useful life of capital assets in local government, as measured by the capital assets condition ratio, is affected only by selected financial factors. Again, the two financial variables of total expenses and capital outlay are significant in explaining the change in the capital assets condition ratio in addition to the ARRA variable, which is in alignment with the research of Marlowe (2012). We find, however, that none of the socioeconomic variables are statistically significant in either Model 3 or 4, suggesting that the alternative approach of remaining useful life of capital assets and the traditional approach of capital investment are different dimension of capital management in local government.

Conclusion

The purpose of our research is to determine whether or not the annual investment in capital assets was sufficient to offset the annual rate of depreciation in North Carolina municipalities during a time period that included the Great Recession. We found that North Carolina municipalities invested in capital assets before, during, and after the Great Recession similar to rates during the 1990s (Pagano, 2002) but that municipalities were not able to maintain pace with depreciation despite the high levels of capital investment though our results suggest that this was not due to the recession. We also found that selected socioeconomic and financial variables

are more applicable in explaining the variance in the annual capital investment rate but not the annual capital depreciation rate. Several important research implications emerged from these findings, which add value to the limited literature on capital spending in local government.

One research implication is that we must be careful in using aggregated data to drive the cutback management literature. Without question, this line of inquiry has demonstrated that local governments use capital reduction and elimination to help balance their budgets during times of economic stress. Our data reveal, however, that we must take a more nuanced approach before generalizing this budgeting tactic across all local governments, responding to the majority of North Carolina municipalities that maintained their capital investment behavior even during the Great Recession. Another research implication relates to the expanding theory that the determinants of capital spending are different in local government as compared to other levels of government. Our study continues to build on previous research, demonstrating that different results are produced when the analysis is based on local data rather than subnational data (Bates and Santerre, 2015; Wang and Wu, 2018). An implication from our study that expands across research and practice is that capital investment and capital value are two different dimensions of capital management in local government. This multidimensional concept drives research in terms of model specification (Chen, 2016) and drives practice in terms of how capital budgets and capital improvement programs are prepared regarding the balance between capital expansion and capital maintenance (Marlowe *et al.*, 2009).

We conclude with a number of future research opportunities that would add critical value to the limited literature on capital spending in local government. One need is more information on the intergenerational theme, which was one of the main drivers of the passage of Statement No. 34 from the standpoint of providing community stakeholders with information on the cost of maintaining public infrastructure (Pryor, 2013). This theme will become even more important given local government's role in responding to the infrastructure crisis in the USA (Chen, 2018). More studies are needed on the factors that drive capital decision-making processes in local government (Bates and Santerre, 2015), including how decisions are made to evaluate and prioritize capital projects. More information also is needed on how local government is monitoring financial condition through the use of government-wide financial statements (Chaney *et al.*, 2002; Wang *et al.*, 2007; Rivenbark *et al.*, 2010; Rivenbark and Roenigk, 2011; Johnson *et al.*, 2012). More importantly, how local officials are actually using this information to inform major policy decisions like investing in capital assets for the sustainability of their respective organizations and communities.

Notes

1. FY05 data also were obtained for our analysis to calculate the dependent variable of capital outlay, which is based on the change in net capital flow in terms of capital increases and decreases during each fiscal year (Marlowe, 2012).
2. Initially a one-year lag of the dependent variables was also included in this specification; however, after conducting the Wooldridge (2010) test for autocorrelation, we cannot reject the null hypothesis that it is not present. Therefore, we did not include the lags of the dependent variables. We also clustered the standard errors to decrease the autocorrelation. Those results are available from the authors upon request.

References

- Afonso, W.B. (2013), "Coping with the great recession: theory and practice for county governments", *International Journal of Public Administration*, Vol. 36 No. 11, pp. 768-779.
- Afonso, W.B. (2014), "Local government capital spending during and after recessions: a cause for concern?", *International Journal of Public Administration*, Vol. 37 No. 8, pp. 494-505.

- Balsdon, E., Brunner, E.J. and Rueben, K. (2003), "Private demand for public capital: evidence from school bond referenda", *Journal of Urban Economics*, Vol. 54 No. 3, pp. 610-638.
- Bartle, J.R. (1996), "Coping with cutbacks: city response to aid cuts in New York State", *State & Local Government Review*, Vol. 28 No. 1, pp. 38-48.
- Bates, L.J. and Santerre, R.E. (2015), "The demand for municipal infrastructure projects: some evidence from connecticut towns and cities", *Public Finance Review*, Vol. 43 No. 5, pp. 586-605.
- Chaney, B., Mead, D.M. and Schermann, K. (2002), "The new governmental financial reporting model", *Journal of Government Financial Management*, Vol. 51 No. 1, pp. 26-31.
- Chen, C. (2016), "Effects of fiscal stress on state highway infrastructure finance: a composite index approach", *Municipal Finance Journal*, Vol. 37 No. 2, pp. 1-28.
- Chen, C. (2018), "Public infrastructure finance: symposium introduction", *Journal of Public Budgeting, Accounting & Financial Management*, Vol. 30 No. 2, pp. 126-134.
- Dougherty, M.J. and Klase, K.A. (2009), "Fiscal retrenchment in state budgeting: revisiting cutback management in a new era", *International Journal of Public Administration*, Vol. 32 No. 7, pp. 593-619.
- Fisher, R.C. and Wassmer, R.W. (2015), "An analysis of state-local government capital expenditures during the 2000s", *Public Budgeting & Finance*, Vol. 35 No. 1, pp. 3-38.
- Holtz-Eakin, D. (1991), "Bond market conditions and state-local capital spending", *National Tax Journal*, Vol. 44 No. 4, pp. 105-120.
- Holtz-Eakin, D. and Rosen, H.S. (1989), "The 'rationality of municipal capital spending: evidence from New Jersey'", *Regional Science and Urban Economics*, Vol. 19 No. 3, pp. 517-536.
- Holtz-Eakin, D. and Rosen, H.S. (1993), "Municipal construction spending: an empirical examination", *Economics and Politics*, Vol. 5 No. 1, pp. 61-84.
- Johnson, C., Kioko, S. and Hildreth, W.B. (2012), "Government-wide financial statements and credit risk", *Public Budgeting & Finance*, Vol. 32 No. 1, pp. 80-104.
- Johnson, L.E. and Bean, D.R. (1999), "GASB statement no. 34: the dawn of a new government reporting model", *The CPA Journal*, Vol. 69 No. 12, pp. 14-24.
- Levine, C.H. (1978), "Organizational decline and cutback management", *Public Administration Review*, Vol. 38 No. 4, pp. 316-325.
- Levine, C.H. (1979), "More on cutback management: hard questions for hard times", *Public Administration Review*, Vol. 39 No. 2, pp. 179-183.
- Maher, C.S. and Deller, S.C. (2013), "Assessing the relationship between objective and subjective measures of fiscal condition using government-wide statements", *Public Budgeting & Finance*, Vol. 33 No. 3, pp. 115-136.
- Marlowe, J. (2012), "Capital and budgeting and spending", in Ebel, R.D. and Peterson, J.E. (Eds), *The Oxford Handbook of State and Local Government Finance*, Oxford University Press, Oxford, pp. 658-681.
- Marlowe, J., Rivenbark, W.C. and Vogt, A.J. (2009), *Capital Budgeting and Finance: A Guide for Local Governments*, 2nd ed., ICMA, Washington, DC.
- Pagano, M.A. (2002), "Municipal capital spending during the 'boom'", *Public Budgeting & Finance*, Vol. 22 No. 2, pp. 1-20.
- Pryor, C.A. (2013), "Reporting the cost of infrastructure", *The Journal of Government Financial Management*, Vol. 62 No. 1, pp. 43-49.
- Rivenbark, W.C. and Roenigk, D.J. (2011), "Implementation of financial condition analysis in local government", *Public Administration Quarterly*, Vol. 35 No. 2, pp. 238-264.
- Rivenbark, W.C., Roenigk, D.J. and Allison, G.S. (2010), "Conceptualizing financial condition in local government", *Journal of Public Budgeting, Accounting & Financial Management*, Vol. 22 No. 2, pp. 149-177.

- Rivenbark, W.C., Roenigk, D.J. and Noto, L. (2015), "Exploring countercyclical fiscal policy in local government: moving beyond an aggregated approach", *International Journal of Public Administration*, Vol. 38 No. 2, pp. 75-81.
- Ross, J., Yan, W. and Johnson, C. (2015), "The public financing of America's largest cities: a study of city financial records in the wake of the great recession", *Journal of Regional Science*, Vol. 55 No. 1, pp. 113-138.
- Scorsone, E.A. and Plerhoples, C. (2010), "Fiscal stress and cutback management amongst state and local governments: what have we learned and what remains to be learned?", *State and Local Government Review*, Vol. 42 No. 2, pp. 176-187.
- Temple, J. (1994), "The debt/tax choice in the financing of state-local capital expenditures", *Journal of Regional Science*, Vol. 34 No. 4, pp. 529-547.
- Wallace, W.A. (2000), "GASB statement no. 34: research opportunities", *Financial Accountability & Management*, Vol. 16 No. 3, pp. 179-199.
- Wang, W. and Wu, Y. (2018), "Why are we lagging behind? An empirical analysis of municipal capital spending in the United States", *Public Budgeting & Finance*, Vol. 38 No. 3, pp. 76-91, available at: <https://doi.org/10.1111/pbaf.12193>
- Wang, X., Dennis, L. and Tu, Y.S. (2007), "Measuring financial condition: a study of US states", *Public Budgeting & Finance*, Vol. 27 No. 2, pp. 1-21.
- Wooldridge, J.M. (2010), *Econometric Analysis of Cross Section and Panel Data*, 2nd ed., MIT press, Cambridge, MA.

Corresponding author

William C. Rivenbark can be contacted at: rivenbark@unc.edu

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