The effect of GAAP conformity on pension underfunding

Julia Y. Davidyan
Department of Accounting, University of Wisconsin, Whitewater, Wisconsin, USA, and
Tammy R. Waymire
Department of Accounting, Middle Tennessee State University, Murfreesboro, Tennessee, USA

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Abstract

Purpose – The purpose of this paper is to examine the association between conformity with generally accepted accounting principles (GAAP) indicated by Governmental Accounting Standards Board (GASB) 34 presentation and pension underfunding in Illinois.
Design/methodology/approach – The authors used a fixed effects regression and employed a sample of Illinois municipalities ($n = 2{,}565$ municipal-year observations) over the period 2009–2014.
Findings – The findings show that GAAP is inversely associated with pension underfunding, but only among the subsample of municipalities that are within the healthy pension funding range, i.e., above 80 percent funded. These municipalities may be in a better position to increase pension funding in response to the disciplining effect of broad GAAP conformity.
Research limitations/implications – The paper focuses solely on one state and one multi-employer plan. Future studies should consider assessing the applicability of the results to other states and plan settings.
Social implications – The results inform the standard-setting process, particularly as the implementation of the new GASB standards is evaluated and as GASB 34 is reexamined.
Originality/value – Despite concerns associated with state and local pension underfunding, academic studies examining its determinants are few. The sample setting is representative of municipal pension plans in the USA (with a comparable average pension funding ratio of 74.2 percent) and provides variability in GAAP conformity (the state encourages, but does not require, financial statement presentation consistent with GASB 34), as well as homogeneity in actuarial assumptions across observations (all sample municipalities participate in a large multi-employer municipal pension plan). The sample period immediately precedes the implementation of GASB Statements Nos 67 and 68, which increase the scope of pension reporting, providing the opportunity to consider the effects of broad GAAP conformity and a baseline for subsequent consideration of the effects of the new standards.

Keywords Municipal government, GAAP conformity, Pension underfunding
Paper type Research paper

Introduction

Concerns with pension underfunding are at the forefront of discussions of municipal finance. The economic downturn in 2008 led to investment losses that increased the gap between retirement benefits promised and assets available to fund these benefits. Unfunded liabilities for state pensions are estimated at more than $4 trillion (Luppino-Esposito, 2014), and unfunded liabilities for just 61 key US cities are estimated to exceed $217bn (Pew, 2013). Among these 61 cities, the pension funding percentage fell 5 percent during the downturn, from 79 to 74 percent, with 50 percent of these cities experiencing declines of 8 percent or more (Pew, 2013). Alongside retiree health care benefits, pension underfunding is linked to the overall challenges to fiscal sustainability of state and local governments (GAO, 2016). Many states and local governments have responded with structural changes to pension plans including reducing member (retiree) benefits, increasing member contributions, and implementing hybrid arrangements that incorporate defined contribution features (GAO, 2012; Sun, 2013). Despite these changes, pension underfunding continues to have negative consequences for the fiscal outlook of state and local governments, and a poor

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fiscal outlook is a determinant of pension underfunding, as these conditions make annual required contributions (ARCs) to pension plans difficult (GAO, 2012, 2016).

In the academic literature, pension underfunding has been similarly studied with bifurcated foci on its consequences and its determinants. Consequences of pension underfunding are generally unfavorable with empirical evidence suggesting that pension underfunding is associated with greater budget deficits (Munnell *et al.*, 2010), lower credit ratings and higher cost of debt (Martell *et al.*, 2013; Munnell *et al.*, 2011a; Coggburn and Kearney, 2010). Although the intuitive and empirically documented consequences of pension underfunding are unfavorable, little is known about the determinants of pension underfunding. Among the academic studies that study its determinants, two consider whether pension funding is determined by generally accepted accounting principles (GAAP) conformity. Marks *et al.* (1988) find a negative association between a state-level GAAP disclosure quality measure and pension underfunding, i.e., GAAP increases pension funding. Similarly, Vermeer *et al.* (2012) find a negative association between an indexed measure of pension-specific disclosures and pension underfunding. In both of these studies, all government-entity observations follow GAAP; the variation in GAAP was therefore measured with quantity of disclosures on a continuum. Under the current reporting environment (GASB, 1999, Statement No. 34), no studies have examined whether conformity with the basic reporting model is associated with pension funding. Whether this GAAP reporting model conformity contributes to better pension funding is an important empirical question, particularly as the GASB (2012a, b, 2018) contemplates changes to the existing reporting model and evaluates the recent implementation of Statements No. 67 and 68 specific to pension reporting.

To address this research question, we utilize a sample of Illinois municipalities ($n = 2{,}565$ municipal-year observations and 435 unique municipalities) over the period 2009–2014, just prior to the implementation of Governmental Accounting Standards Board (GASB) Statement Nos 67 and 68 which increase the scope of pension reporting. This setting is advantageous in that Illinois State Statute encourages, but does not require, conformity with GAAP (and with GASB Statement No. 34, in particular), providing the variability to address the research question. Furthermore, the governments in our sample all participate in the Illinois Municipal Retirement Fund (IMRF), which serves almost 3,000 government units and provides for homogeneity in actuarial assumptions and state regulatory environment[1]. Finally, unlike the State-level pension plans in Illinois which are notoriously troubled, the average Illinois municipal pension funding ratio in our sample is 74.2 percent, which is comparable to the national average (Munnell *et al.*, 2014).

Although we hypothesize that GAAP conformity will be inversely associated with pension underfunding, the full sample results reveal the opposite effect, i.e., GAAP-conforming municipalities are associated with greater magnitudes of pension underfunding. Partitioning the sample reveals interesting and contrasting results depending on pension funding levels. Among municipalities within the healthy pension funding range, i.e., above 80 percent funded, we find the expected result, that GAAP conformity is associated with increased pension funding, i.e., lower pension underfunding, a result that in sensitivity tests appears to be driven by smaller municipalities. The effect of GAAP conformity is also sensitive to the healthy cut-off level used. While the GAO (2008) recommends that 80 percent is the threshold for healthy (albeit underfunded) pensions, our results suggest a positive association between GAAP conformity at 80, 79 and 78, but not 77 percent as the threshold. GAAP conformity is also associated with significant increases in pension funding (changes analysis) of 3 and 5 percent among the municipalities with healthy pension funding.

These results extend the literature by providing contrasting results within a subsample of municipalities below the healthy pension funding threshold. Within this

group, the disciplining effect of conformity with the GASB 34 reporting model may not be sufficient to encourage better pension funding, i.e., financial resources are not available to make recommended pension plan contributions. These results inform the standard-setting process, particularly with the reexamination of GASB 34, which may result in changes to the basic reporting model, and the evaluation of recently implemented pension standards – Statement Nos 67 and 68. Within these pension standards, GASB (2012a, b) states that a primary objective is to provide information that may be "used in assessing accountability and interperiod equity." Presumably, having financial reports that allow users to evaluate interperiod equity related to pension benefits (i.e. whether the costs of the current generation have been shifted to future generations) would discipline governments to improve pension funding. However, our results suggest that GAAP as a disciplining mechanism, in the pre-GASB 67 and 68 time period, is only associated with improved pension funding among municipalities with healthy, and yet underfunded pensions. Whether the newly implemented pension standards will result in better pension funding is unclear, but our study provides evidence of differential GAAP effects based on partitioning by funding level. Given the negative circular effects associated with pension funding (poor pension funding contributes to unfavorable financial conditions, and unfavorable financial conditions contribute to poor pension funding), improved financial reporting may be insufficient among municipalities below the healthy funding threshold to yield improved pension funding.

In the following sections, we develop our hypotheses guided by the extant literature, present the empirical methods and models utilized, discuss primary results and robustness tests, and conclude with implications and directions for future research.

Literature review and hypothesis development

Background on defined benefit plans in the public sector

Defined benefit pension plans offer an attractive form of compensation to an organization's employees. With future guaranteed annuity benefits typically based on a formula that involves the employee's years of service and final salary[2], the risks associated with ensuring plan assets are sufficient to meet the promised benefits rest with the employer. Although the earliest defined benefit plans noted in US history were offered in the private sector (Seburn, 1991), defined benefit plans are more common in the public sector than the private sector today[3]. The US Department of Labor (DOL, 2016) estimates that the number of private sector employees covered by pension plans has almost tripled from 1975 to 2014; however, this growth is almost entirely within defined contribution, rather than defined benefit, plans[4]. Within the public sector, the percentage of employees covered by defined benefit plans remained steady from 1975 to 2005, with 98 percent and 92 percent, respectively (Munnell *et al.*, 2007). With more than 14m members in 3,418 state and local pension plans as of 2009 (GAO, 2012), defined benefit pension plans pose significant financial risk for the sponsoring government employers.

Public pension funding was cause for concern prior to the economic downturn in 2008; however, the downturn revealed and exacerbated pension underfunding. Prior to 2008, most public pension plans were still considered soundly funded based on the 80 percent funding ratio suggested by the GAO (2008); however, the percentage below 80 percent funded increased steadily from 2000 to 2006. The governments with less sound plans (below 80 percent funded) were often those that failed to contribute the full amount of the ARCs in multiple periods (GAO, 2008). Pension underfunding is also associated with the generous benefit sweeteners that have been added to the pension formulas over the years (Birrer, 2014)[5]. The economic downturn of 2008 and $672bn of investment losses it produced therefore exacerbated these existing public pension concerns (Healey *et al.*, 2012; GAO, 2012). A survey of 121 of the largest state and local government pension plans in the

US reports pension liabilities of $4.36 trillion in 2016, an increase of 5.3 percent over the prior year, and an average pension funding ratio of 72.1 percent (Brainard and Brown, 2017).

Public pension underfunding is a policy concern for multiple reasons. Although defined benefit plans are more common among state and local governments than in the private sector, only corporate DB plans are subject to the Employee Retirement Income Security Act of 1974. This legislation created the Pension Benefit Guaranty Corporation to protect the interest of the participant employees (Elliott, 2009). Public pension underfunding is also a policy concern because public pension participants often forego other benefits to which they may otherwise be entitled. For example, the GAO (2008) notes that, "about 30 percent of all state and local government workers nationwide are not covered [by Social Security][6]." Finally, although the benefits associated with public pensions may be attractive to employees, they still bear some risks, especially in the case of financial failure of their government employers. For example, the City of Detroit bankruptcy case revealed an inherent conflict between a state's constitutionally protected public employee benefits and federal bankruptcy law, which generally places the public employees at odds with other creditors (Pratt, 2014)[7].

More broadly, pension underfunding poses significant financial challenges to the fiscal health of the sponsoring government employers. Currently, state and local government debt, excluding pension plans, is approaching $3 trillion, and pension underfunding is estimated at a similar magnitude (US Census Bureau, 2016). Despite some structural changes to pension plans including reducing member (retiree) benefits, increasing member contributions and implementing hybrid arrangements that incorporate defined contribution features (GAO, 2012), pension underfunding remains a primary fiscal concern. Pension underfunding contributes to fiscal challenges, and fiscal challenges may also exacerbate pension underfunding, e.g., governments may forego making contributions to pension plans when resources are constrained by making other debt service payments that offer less opportunity for delay.

Conformity with generally accepted accounting principles

GAAP establish the recommended financial reporting model for a set of entities, and, among state and local governments, the GASB promulgates the standards. As its primary standard-setting objective, the GASB (2017) identifies accountability as "the cornerstone on which all other financial reporting objectives should be built." Described in GASB (1987) Concepts Statement No. 1, Objectives of Financial Reporting, as "fundamental to public administration," interperiod equity is a significant element of accountability. Interperiod equity requires that current period revenues be sufficient to pay for services provided in the period, and avoids shifting the burden of current taxpayers to future taxpayers (GASB, 1987, 2017). As an example of the application of the interperiod equity concept, the GASB (2017) requires the recognition of property tax revenues, "in the period for which they are levied regardless of when they are levied." With interperiod equity at the core of the standard-setting process, producing financial statements in conformity with GAAP may serve as a disciplining force, encouraging fiscal sustainability.

Interperiod equity was an objective of GASB Statement No. 34, Basic Financial Statements – and Management's Discussion and Analysis – for State and Local Governments. Issued in 1999 and implemented over the period from 2001 through 2003, this statement required the adoption of a new reporting model, that required two sets of financial statements, including the fund-based statements similar to what was previously required, as well as government-wide financial statements which present a consolidated view of a government's activities[8]. Citing interperiod equity as a guiding principle, the GASB (1999) noted that the newer set of statements, the government-wide statements, provided operational accountability and the opportunity for users to evaluate whether interperiod equity has been achieved.

Empirical evidence suggests some benefits associated with incremental information provided by the new accrual-based statements under GASB 34. This new information is associated with underlying debt ratings (Plummer *et al.*, 2007; Johnson *et al.*, 2012; Pridgen and Wilder, 2013) and with interest costs associated with new bond issues (Reck and Wilson, 2014). In addition, information from other elements of the new reporting model has been linked to debt ratings. Callahan and Waymire (2015) find an association between budget-to-actual variances reporting using the original budget information and bond ratings. Furthermore, Bloch (2016) finds that the GASB 34-required management discussion and analysis (MD&A), when not boilerplate, is valued by analysts. Despite its merits, the GASB 34 reporting model has also been noted to be complex with high costs of adoption (Frank and Gianakis, 2010). These challenges are manifested in the discretion that government managers have in choosing whether to follow GAAP. Fewer than 50 percent of states have requirements for their local governments to follow GAAP (NASACT, 2016)[9].

Comparisons have been made between states requiring and those not requiring GAAP to be followed by its local governments. Baber and Gore (2008) find that debt costs are lower in states that require GAAP. Using two contrasting states, Michigan (which requires GAAP) and Pennsylvania (which does not require GAAP), Gore *et al.* (2004) find that when not required to follow GAAP, debt-issuing governments are more likely to purchase bond insurance. Using the same sample setting (Michigan and Pennsylvania), Gore (2004) notes certain bond market incentives induce disclosure, but that GAAP disclosures are significantly higher in Michigan where GAAP conformity is required.

Determinants of pension underfunding

Intuition suggests that the consequences of government pension underfunding are unfavorable, and empirical evidence follows. Munnell *et al.* (2010) find that pension underfunding is associated with greater budget deficits (Munnell *et al.*, 2010). Furthermore, a stream of research finds that pension underfunding is associated with lower credit ratings and higher cost of debt (Benson and Marks, 2016; Martell *et al.*, 2013; Munnell *et al.*, 2011a; Coggburn and Kearney, 2010). Benson and Marks (2016) also find some modest evidence that pension underfunding is associated with higher bond insurance premiums. The sample settings and sizes in these studies vary significantly, with Munnell *et al.* (2010) using a small sample of only six states and Munnell *et al.* (2011a) using a large sample of 37,500 bond issues for US municipalities. Most of these studies of pension funding determinants are set in the pre-recession period, although Martell *et al.* (2013) cover both the pre- and post-recession periods, with a sample period of 2002 through 2011.

Despite the intuition and empirical evidence that public pension underfunding is associated with negative consequences, research investigating the determinants of pension underfunding is limited. Furthermore, only two of these studies consider GAAP conformity measures as a potential determinant of pension underfunding. First, in a sample of 45 US states, Marks *et al.* (1988) find that conformity with GAAP conformity, measured with a six-point index developed by Ingram (1984), is associated with lower levels of unfunded pension liabilities[10]. Second, in a sample of 233 local governments in Michigan and Pennsylvania that prepare GASB-GAAP financial statements (i.e. those in conformity with GASB 34), Vermeer *et al.* (2012) find that an indexed measure of pension disclosures is positively associated with pension funding[11][12][13]. To our knowledge, no studies have considered whether GAAP, measured as presentation of financial statements in conformity with GASB 34, is associated with pension funding.

Other determinants of pension funding have been considered, including several oversight variables that, similar to GAAP conformity, would be expected to encourage healthier pension funding. For example, Rich and Zhang (2015) find a negative association between citizen oversight and unfunded pension liabilities, i.e., citizen oversight is effective

in improving pension funding. However, some oversight variables have not yielded significant results; used as a proxy for financial reporting quality, Rich and Zhang (2015) do not find a significant effect associated with the Government Finance Officers Association (GFOA) Certificate of Achievement for Excellence in Financial Reporting[14].

Hypothesis statement

Marks *et al.* (1988) and Vermeer *et al.* (2012) examine the impact of indexed measures of GAAP conformity among samples of governments that all follow the GASB (or its predecessor, the National Council on Governmental Accounting) reporting model. Whether GAAP conformity in the form of presentation with GASB 34 contributes to better fiscal management decisions is therefore an unanswered and important empirical question to examine in the governmental setting[15]. We examine whether following the GASB reporting model broadly serves as a disciplining mechanism, contributing to better pension funding. Because the reporting model emphasizes accountability with interperiod equity as a key component, we expect that this measure of GAAP conformity will be associated with better pension funding ratios. Our hypothesis is:

H1. GAAP conformity will be positively associated with pension funding ratios.

Methodology and results

Sample selection

Our sample is comprised of Illinois municipalities over the period from 2009 through 2014. Both the time period and the sample setting are beneficial in addressing the research question whether GAAP conformity is associated with pension funding. The time period immediately precedes the implementation of GASB Statement Nos 67 and 68 relating to pensions, offering the opportunity to evaluate the disciplining effect of broad implementation of GAAP (conformity with GASB 34 presentation) without the requirement to report unfunded pension obligations on the face of the statement of net position. The sample setting offers the opportunity to examine this variation in GAAP conformity as the State of Illinois does not mandate strict conformity[16][17].

This sample offers additional benefits in addressing our research question, most notably, the use of a multi-employer retirement plan, the IMRF. The IMRF pension system began operations in 1941 and currently serves 2,976 units of government and 286,730 employees and retired workers (IMRF, 2014)[18]. While each plan is distinct, the actuarial assumptions are homogeneous across employers, minimizing the potential noise that would otherwise be introduced[19]. Finally, IMRF pension plan parameters are similar to those of other municipal pension plans in the US, and the average pension funding ratio among Illinois municipalities in the IMRF system is strong (in contrast with the State of Illinois), while exhibiting significant variation needed for our analyses[20].

We limit our sample to the municipalities (cities and villages) participating in the IMRF system, and further limit our sample to only include those municipalities with greater than 2,500 population based on US Census Bureau (2012) data. Over the sample period 2009–2014, this results in 2,589 municipality-year observations, all of which were subject to audit[21]. We eliminate 24 observations for missing data, for a final sample of 2,565 municipality-year observations (435 unique municipalities).

Data sources

Our primary data sources are the IMRF, from which we obtained pension funding information, and the Illinois Office of the Comptroller (IOC) Local Government Division, from which we obtained additional financial information. We supplemented these primary

data sources with data from the Bureau of Labor (unemployment data), Unionstats.com (public-sector union membership data) and the Illinois State Board of Elections (election year data). Finally, some data required hand collection and Freedom of Information Act requests. Our variable definitions are provided in Table AI, with data sources for each variable identified.

Empirical models and variables

We use a fixed effects regression model to examine the association between pension funding and conformity with GAAP, including control variables previously studied. The model includes robust, clustered errors on municipality to address the repeated measures over time (Petersen, 2009). In addition, the model was estimated with clusters at the county level because the data includes repeated measurements over time on the same subjects (municipalities), which are clustered within counties. The following model is estimated:

$$\begin{aligned} FUNDEDRATIO_{it} = {} & \beta_0 + \beta_1 GAAP_{it} + \beta_2 PAYPRCAPITA_{it} \\ & + \beta_3 LnPOP_{it} + \beta_4 GOBOND_{it} + \beta_5 LnEAV_{it} \\ & + \beta_6 AUDEXPERTISE_{it} + \beta_7 AUDCHANGE_{it} + \beta_8 UNEMP_{it} \\ & + \beta_9 UNION_{it} + \beta_{10} ELECTIONYR_{it} + \beta_{11} HOMERULE_i \\ & + \beta_{12} VILLAGE_{it} + \beta_{13} OVERFUNDED_{it} + YearFE_t + \varepsilon_{it}. \end{aligned} \quad (1)$$

FUNDEDRATIO represents the measure of pension funding, calculated by dividing actuarial assets by actuarial accrued liabilities, valued closest to the respective calendar year, ranging from 0, i.e., completely unfunded, to over 100 percent, in the case of overfunded plans (Vermeer *et al.*, 2012; Maher *et al.*, 2016). We elect to use the funded ratio rather than unfunded ratio (Rich and Zhang, 2015), i.e., one minus the funded ratio, for ease in interpretation[22].

GAAP is a dichotomous variable, with the value of 1 if the municipality indicates that it uses the GAAP basis of accounting in its filing with the State of Illinois IOC, 0 otherwise. The IOC filing requires the municipality report what basis of accounting it uses for the two sets of financial statements, where GAAP is indicated by the use of modified accrual in the fund statements and accrual in the government-wide statements; therefore, our GAAP variable captures whether GASB 34 presentation is followed. Our hypothesis would be supported with a positive coefficient on *GAAP*.

We control for other variables that have been shown to influence pension funding[23], including plan size, measured as the covered payroll measured on a per capita basis, *PAYPRCAPITA*. The coefficient for this variable could be positive or negative, as larger covered payroll may suggest more difficulty in adequately funding the pension plan, but also may be associated with employers that fund plans in an effort to attract and retain employees (Rich and Zhang, 2015). We control for municipality size with two variables, natural logarithm of the population, *LnPOP*, and natural logarithm of total real property equalized assessment valuation, *LnEAV*. The first size proxy, *LnPOP*, similar to covered payroll, may affect pension funding in either direction. Serving a larger population may increase the pension burden, but there may also be more resources to fund public pensions. A positive coefficient is expected for the second size variable, as higher taxes collected may be used to increase the pension funding ratio (Epple and Schipper, 1981; Gorina, 2013; Rich and Zhang, 2015).

We control for whether the municipality issued general obligation bonds during the fiscal year, *GOBOND*. We expect *GOBOND* to have a negative coefficient because, as a competing liability, general obligation bonds require repayment and may divert resources

that would otherwise be available for pension liabilities (Chaney *et al.*, 2002; Rich and Zhang, 2015).

We also consider monitoring mechanisms that may influence pension funding. Vermeer *et al.* (2012) incorporate a Big 4 variable to capture the monitoring impact of having a Big 4 audit firm on their pension disclosure index. However, in our setting, there are virtually no Big 4 firms in the audit market[24]. Illinois municipalities are more likely to be served by regional and local firms. The proxy we use for audit firm monitoring has been used in the government audit literature as a proxy for expertise, *AUDEXPERTISE*, and is measured as the number of local government audits conducted by the municipality's audit firm in the specified year (Sohl *et al.*, 2018; Lopez and Peters, 2010; Payne and Jensen, 2002). We expect the coefficient for *AUDEXPERTISE* to be positive if the expertise of the firm serves as a monitoring mechanism. We also incorporate a control variable for whether the municipality changed auditors from the prior to the current year, *AUDCHANGE* (Sohl *et al.*, 2018; Lopez and Peters, 2010; Payne and Jensen, 2002). We expect the coefficient for *AUDCHANGE* to be negative, i.e., switching auditors will be associated with lower pension funding[25].

We include variables that control for the fiscal condition of the municipalities. The model includes the unemployment rate at the county level, *UNEMP*. We expect *UNEMP* to be inversely related to pension funding, i.e., the higher the unemployment, the less likely the municipality will be to adequately fund its pension plan (Faulk *et al.*, 2016; Mitchell and Smith, 1994). Public-sector union membership rate (*UNION*) at the major metropolitan area and county level was included to account for influence by union groups. We expect *UNION* to be inversely related with pension funding, as unions advocate for increased compensation benefits, including pensions, that may be difficult for municipalities to fund (Kelley, 2014; Marks *et al.*, 1988; Mitchell and Smith, 1994). We include an indicator variable for whether it is an election year, *ELECTIONR*, and expect it to be positively associated with pension funding (Schneider and Damanpour, 2002; Rich and Zhang, 2015).

We include two variables relating to the organizational form of the municipality. First, we include an indicator variable to capture whether the municipality has home rule status, *HOMERULE*, which allows the municipality to pass legislation independent of the state approval (Gillette, 2009)[26]. We make no prediction about the directional effect of *HOMERULE*. Second, we include an indicator variable that captures whether the municipality is structured as a village, *VILLAGE*, as opposed to a city. Carroll and Marlowe (2009) suggest that structure as a village is associated with greater efficiency and responsiveness to citizens' needs. We therefore expect that *VILLAGE* will be positively associated with pension funding.

Finally, since the dependent variable of pension funding is continuous and unrestricted and the sample includes both over- and underfunded plans, an indicator variable was included in the model to control for overfunded plans, *OVERFUNDED* (Carroll and Niehaus, 1998). Also, to control for economic trends, we include year indicators.

Descriptive statistics

Table I presents descriptive statistics for the variables included in our regression models. The means and distributions for each variable are presented in the aggregate, as well as between GAAP and non-GAAP subsamples and between healthy (i.e. 80 percent + funded ratio) and unhealthy (i.e. under 80 percent funded ratio) pension subsamples. The mean funding ratio for the municipalities in the sample was 74.20 percent, comparable to national averages for this time period (Munnell *et al.*, 2014; Pew, 2013). The non-GAAP municipalities have a higher average pension funding ratio (76.75 percent, as compared to 73.75 percent for GAAP municipalities, $p < 0.05$). Figure 1 depicts this visually over our sample period, with GAAP municipalities consistently report lower pension funding ratios, and both groups declining from 2009 through 2012 and then increasing through 2014.

Variable	Mean	SD	Min.	Max.	Non-GAAP (0)	GAAP (1)	Mean Difference	*t* statistic
FUNDEDRATIO	74.2	17.58	0	200	76.75	73.75	2.99	3.09**
GAAP[a]	0.85	0.36	0	1				
PAYPRCAP	215.97	150.26	9.28	2,310.55	189.79	220.62	−30.83	−3.73**
POPULATION	17,813.23	22,240.14	2,504	197,899	6,054.60	19,902.58	−13,847.98	−11.58**
GOBOND[a]	0.68	0.47	0	1	0.44	0.73	−0.29	−11.16**
EAV (in 1,000 s)	498,891.40	756,783.40	482.072	8,070.00	97,529.4	570,207.8	−472,678.4	−11.61**
AUDEXPERTISE	19.25	21.88	1	63	7.32	21.37	−14.05	−11.96**
AUDCHANGE[a]	0.09	0.29	0	1	0.09	0.09	0.00	−0.04
UNEMP	9.15	1.59	4.7	15.4	9.07	9.16	−0.09	−1.08
UNION	51.44	9.69	25.9	83.3	49.07	51.86	−2.79	−5.25**
ELECTIONYR[a]	0.5	0.5	0	1	0.49	0.50	−0.01	−0.27
HOMERULE[a]	0.38	0.49	0	1	0.14	0.42	−0.29	−10.70**
VILLAGE[a]	0.53	0.5	0	1	0.35	0.56	−0.21	−7.59**
OVERFUNDED[a]	0.05	0.21	0	1	0.09	0.04	0.04	3.84**
Variable	80% + Funded (0)	Under 80% (1)	Mean difference	*t* statistic				
FUNDEDRATIO	91.53	67.06	24.47	41.39**				
GAAP[a]	0.80	0.87	−0.07	−1.74*				
PAYPRCAP	181.70	230.1	−48.40	−7.5**				
POPULATION	13,302.01	19,673.90	−6,371.89	−6.65**				
GOBOND[a]	0.65	0.69	−0.04	−0.88				
EAV (in 1,000 s)	311,193.0	576,306.6	−26,5113.6	−8.17**				
AUDEXPERTISE	14.66	21.15	−6.49	−6.88**				
AUDCHANGE[a]	0.10	0.09	0.01	0.02				
UNEMP	8.99	9.21	−0.22	−3.15**				
UNION	51.38	51.46	−0.08	−0.19				
ELECTIONYR[a]	0.51	0.49	0.02	0.37				
HOMERULE[a]	0.30	0.41	−0.11	−2.46**				
VILLAGE[a]	0.51	0.53	−0.02	−0.44				
OVERFUNDED[a]								

Notes: The sample covers the period 2009–2014. Refer to Appendix A for variable definitions. [a]Indicates a binary variable; *z* statistic and difference in proportions are provided. *$p < 0.10$; **$p < 0.05$

Table I.
Descriptive Statistics

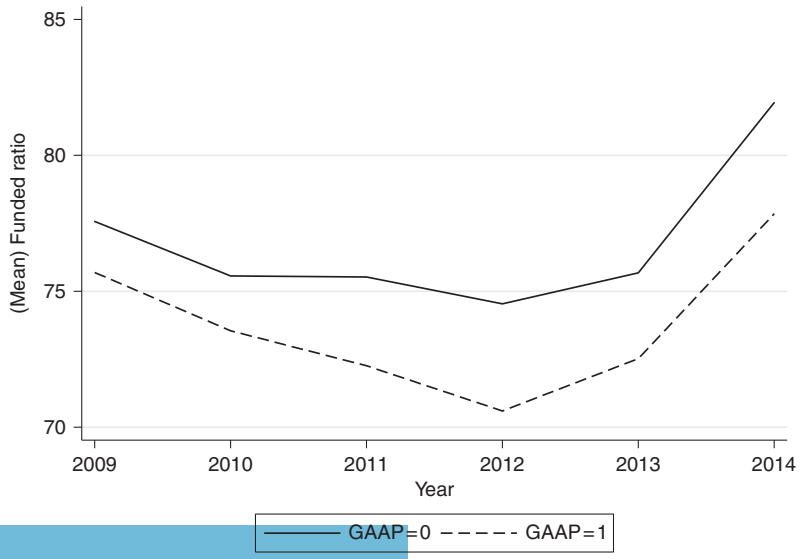

Figure 1.
Pension funding ratios between GAAP and non-GAAP conforming municipalities

Approximately 85 percent of the municipalities in our sample follow GAAP by following required GASB 34 presentation, which is also fairly consistent with Carroll and Marlowe (2009) who report 80 percent GAAP conformity in 2002 for Illinois local governments. The average covered payroll per capita is $215.97, average population is 17,813 residents and average equalized assessed valuation is approximately $498,891m. The average county-level unemployment rate is 9.15 percent, and 68 percent of the municipalities have general obligation bonds outstanding. In terms of organizational structure, 53 percent are villages (as opposed to cities) and 38 percent are home rule municipalities. Union membership is 51.44 percent, and approximately 5 percent of the municipalities had overfunded pensions, both with little change over the sample period.

We include two audit related variables to address the disciplining effect of the audit function on pension funding ratios. On average, the municipalities in our sample have an audit firm that conducts 19.25 municipal audits on an annual basis. However, *AUDEXPERTISE* displays significant variation, with municipalities having audit firms that range in annual municipal clients from only 1 to 63 at the maximum. Consistent with GFOA's recommendations for audit procurement (Gauthier, 2009), very few municipalities report changing audit firms from year to year; the average *AUDCHANGE* is approximately 9 percent.

Pearson pairwise correlations are presented in Table II. Pension funding is negatively correlated with GAAP conformity (−0.0610, $p = 0.002$), contrary to the positive association hypothesized. The size of covered payroll per capita (−0.0886, $p < 0.001$), the size (Ln) of population being served (−0.0385, $p = 0.051$), the size (Ln) of the equalized assessed values of properties under the entity's jurisdiction (−0.104, $p < 0.001$), the number of audit clients in the sample (−0.0631, $p = 0.001$), and having the municipality being incorporated as a village (−0.0365, $p = 0.065$), are all negatively correlated with the funded ratio. Pension funding is positively correlated with issuance of general obligation bonds (0.0361, $p = 0.068$), and being overfunded (0.595, $p < 0.001$). Most correlations are well below 0.70; only the correlation between *LnPOP* and *LnEAV* is above this threshold, at 0.812 ($p < 0.001$). Post-estimation VIFs are well below 10, also mitigating the risk for multicollinearity (Kennedy, 2003)[27].

Primary tests of hypothesis

Table III presents the regression results of Model 1, with the test of *H1* in the full sample presented in Column 3. We present a base model, excluding the test variable, *GAAP*, in Column 1. We present two additional models in Columns 2 and 3, with fixed effects and the test variable, and fixed effects and robust clustered errors (county) with the test variable (Bagchi, 2016; Gorina, 2013; Rich and Zhang, 2015), respectively. The explanatory power increases with the inclusion of the test variable (Columns 2 and 3), with adjusted R^2 of 18.35 percent in Columns 2 and 3[28]. Inconsistent with *H1*, *GAAP* is negative and significant in Columns 2 and 3, i.e., conformity with GAAP is associated with lower pension funding. Specifically, municipalities following GAAP are associated with a 5.93 percent decrease in their pension funding.

The control variables in Model 1 (Columns 2 and 3) are generally consistent with prior research. Covered payroll per capita is positively associated with pension funding (Rich and Zhang (2015). Size, proxied with *LnPOP*, is positively associated with the funding ratio, although it loses significance in Column 3 with the inclusion of robust, clustered errors based on county. Although expected to be negative, *GOBOND* is insignificant, as is *LnEAV*. The scaling of our pension underfunding variable, i.e., measured as the actuarial value of plan assets divided by the acturial value of plan liabilities, may explain these insignificant results associated with *LnPOP* and *LnEAV*. Furthermore, the literature provides some support for the insignificance of these variables. For example, Maher *et al.* (2016) also report insignficant results for these variables[29].

Table II. Pearson correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) *FUNDEDRATIO*	1						
(2) *GAAP*	−0.0610*** (0.002)	1					
(3) *PAYPRCAP*	−0.0886*** (0.000)	0.0734*** (0.000)	1				
(4) *LnPOP*	−0.0385* (0.051)	0.368*** (0.000)	−0.0303 (0.126)	1			
(5) *GOBOND*	0.0361* (0.068)	0.220*** (0.000)	0.0295 (0.135)	0.378*** (0.000)	1		
(6) *LnEAV*	−0.104*** (0.000)	0.371*** (0.000)	0.103*** (0.000)	0.812*** (0.000)	0.364*** (0.000)	1	
(7) *AUDEXPERTISE*	−0.0631*** (0.001)	0.230*** (0.000)	0.0785*** (0.000)	0.378*** (0.000)	0.187*** (0.000)	0.507*** (0.000)	1
(8) *AUDCHANGE*	0.00351 (0.859)	0.000787 (0.968)	−0.00997 (0.614)	0.00833 (0.673)	0.0264 (0.182)	−0.00181 (0.927)	−0.0183 (0.354)
(9) *UNMP*	−0.0186 (0.348)	0.0214 (0.280)	−0.0760*** (0.000)	0.0359* (0.069)	0.0919*** (0.000)	0.0434** (0.028)	−0.0551*** (0.005)
(10) *UNION*	−0.0254 (0.199)	0.103*** (0.000)	−0.0591*** (0.003)	0.170*** (0.000)	0.166*** (0.000)	0.272*** (0.000)	0.256*** (0.000)
(11) *ELECTIONYR*	0.0165 (0.404)	0.00528 (0.789)	0.00349 (0.860)	0.00289 (0.884)	0.00811 (0.681)	−0.00178 (0.928)	0.0103 (0.601)
(12) *HOMERULE*	−0.0111 (0.573)	0.211*** (0.000)	0.115*** (0.000)	0.529*** (0.000)	0.341*** (0.000)	0.457*** (0.000)	0.188*** (0.000)
(13) *VILLAGE*	−0.0365* (0.065)	0.150*** (0.000)	−0.0897*** (0.000)	0.00468 (0.813)	0.0645*** (0.001)	0.248*** (0.000)	0.309*** (0.000)
(14) *OVERFUNDED*	0.595*** (0.000)	−0.0757*** (0.000)	−0.146*** (0.000)	−0.116*** (0.000)	−0.00632 (0.749)	−0.162*** (0.000)	−0.0832*** (0.000)
(15) *YEAR*	0.0225 (0.255)	0.00901 (0.648)	−0.00151 (0.939)	0.00831 (0.674)	0.00893 (0.651)	−0.0429** (0.030)	0.0356* (0.071)

Variable	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(8) *AUDCHANGE*	1						
(9) *UNMP*	−0.00259 (0.896)	1					
(10) *UNION*	0.0417** (0.035)	0.0467** (0.018)	1				
(11) *ELECTIONYR*	0.0697*** (0.000)	−0.270*** (0.000)	−0.0733*** (0.000)	1			
(12) *HOMERULE*	0.0159 (0.420)	0.0319 (0.106)	0.0530*** (0.007)	0.00593 (0.764)	1		
(13) *VILLAGE*	0.0233 (0.238)	0.0698*** (0.000)	0.227*** (0.000)	0.00197 (0.920)	0.0110 (0.577)	1	
(14) *OVERFUNDED*	0.0169 (0.392)	0.0305 (0.123)	−0.0118 (0.552)	0.00928 (0.638)	−0.0454** (0.021)	0.0306 (0.121)	1
(15) *YEAR*	0.0394** (0.046)	−0.628*** (0.000)	0.0453** (0.022)	0.293*** (0.000)	0.0115 (0.560)	0.00197 (0.920)	0.0287 (0.147)

Notes: $n = 2{,}565$. p-values in parentheses. Variables defined in the Appendix. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table III. Regression results – levels analysis

Variables	Funded ratio – Fullsample Base FE (1)	FE (2)	FE + Cluster (3)	Funded ratio – Subsamples Unhealthy (4)	Healthy (5)	Overfunded (6)
GAAP (H)		−5.930** (0.035)	−5.930** (0.041)	−5.266* (0.096)	8.829** (0.016)	−2.205 (0.835)
PAYPRCAP	0.023** (0.044)	0.022* (0.054)	0.022** (0.020)	0.038** (0.019)	−0.007 (0.621)	−0.097 (0.224)
LnPOP	5.957* (0.076)	5.649* (0.078)	5.649 (0.102)	15.047* (0.088)	1.675 (0.862)	3.899 (0.703)
GOBOND	−0.567 (0.622)	−0.584 (0.614)	−0.584 (0.689)	0.089 (0.953)	−0.077 (0.929)	1.450 (0.762)
LnEAV	0.456 (0.448)	0.465 (0.439)	0.465 (0.417)	0.641* (0.066)	−0.763 (0.186)	−5.450 (0.239)
AUDEXPERTISE	−0.023 (0.240)	−0.021 (0.297)	−0.021 (0.214)	−0.025 (0.356)	−0.041*** (0.005)	−0.063 (0.507)
AUDCHANGE	−0.577 (0.285)	−0.558 (0.304)	−0.558 (0.149)	−1.218* (0.058)	−0.135 (0.784)	1.040 (0.786)
UNEMP	−1.490** (0.026)	−1.453** (0.030)	−1.453*** (0.004)	−1.470 (0.125)	−0.120 (0.811)	1.782 (0.469)
UNION	−0.009 (0.733)	−0.014 (0.567)	−0.014 (0.563)	−0.022 (0.502)	−0.013 (0.528)	0.279* (0.060)
ELECTIONYR	−1.961 (0.365)	−1.778 (0.412)	−1.957*** (0.000)	−2.196 (0.466)	1.422 (0.419)	15.076* (0.086)
HOMERULE	0.489 (0.666)	0.365 (0.748)	0.365 (0.729)	0.913 (0.432)	−0.253 (0.754)	
OVERFUNDED	15.055*** (0.000)	15.015*** (0.000)	15.015*** (0.000)			
YEAR FE	Included	Included	Included	Included	Included	Included
Constant	22.026 (0.506)	29.974 (0.346)	29.974 (0.420)	−73.455 (0.360)	82.197 (0.357)	162.261 (0.212)
n	2,565	2,565	2,565	1,816	628	121
Adjusted R^2	0.1796	0.1835	0.1835	0.1005	0.2348	0.3062

Notes: The *p*-values are in parentheses. *FE* stands for fixed effects. The variables are defined in Appendix A. The *VILLAGE* variable dropped due to lack of within group variation. Models 1–3 include the full sample: Model 1 is the base with only the control variables, Model 2 is a fixed effects model, and Model 3 includes fixed effects and clusters by county. The unhealthy subsample (Model 4) includes entities with a funded ratio less than 80 percent. The healthy subsample (Model 5) includes entities with a funded ratio of at least 80 percent but less than 100 percent. The overfunded subsample (Model 6) includes entities with a funded ratio of at least 100 percent and over. The *HOMERULE* variable was excluded due to low variability as it prevented this model from concaving. $^*p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Variables related to auditor expertise and auditor change have not been thoroughly examined in the literature. Vermeer *et al.* (2012) include a Big 4 variable to capture whether the audit firm was a Big 4 CPA firm, but Rich and Zhang (2015) and Marks *et al.* (1988) do not include expertise or auditor change in their analyses. In the absence of empirical evidence to guide a prediction, we expected auditor expertise to be positively associated with pension funding, and auditor change to be negatively associated with pension funding. However, neither is statistically significant.

With the primary hypothesis unsupported in the regression results for the entire sample and different from the full sample results of Marks *et al.* (1988) and Vermeer *et al.* (2012), we partitioned the sample into overfunded (pension funding ratio greater than 100 percent), underfunded (ratio between 80 and 100 percent), and severely underfunded plans (ratio less than 80 percent) based on GAO's (2008) established ranges for healthy and unhealthy pension plans[30]. These results are presented in Columns 4 through 6 in Table III. With this analysis, we note interesting results by subsample. As depicted, *GAAP* is positively associated with pension funding among the municipalities with healthy (but still underfunded) pension plans, consistent with *H1* (Marks *et al.*, 1988; Vermeer *et al.*, 2012). Among these municipalities, *GAAP* is associated with an 8.829 percent increase in the average pension funding ratio. Among the unhealthy subsample, the association between *GAAP* and pension funding is negative, similar to the results presented for the full sample. Among the municipalities with overfunded pensions, *GAAP* is not statistically significant. Although we predicted *GAAP* to be a significant predictor of pension funding in the full sample, the results may yield some insight about the ability (and limits) of financial reporting standards to improve financial performance among entities conforming with GAAP. Among those entities following GAAP presentation, the ones best able to respond to the disciplining force of disclosures are those that have healthy pension funding[31].

We also note that *AUDEXPERTISE* is negative and significant among the municipalities with healthy pension funding ratios. Although having an audit firm with expertise may be expected to increase pension funding, we note that this expertise may also result in more accurate lower pension funding ratio, if there are errors or intentional misstatements that contribute to an overstated pension funding ratio. *AUDCHANGE*, although negative as expected, is only significant in the unhealthy subsample (Column 4), suggesting that an auditor switch introduces risk of a less qualified auditor for those municipalities with pension funding ratios below 80 percent.

Some other control variables which are insignificant in the full model become significant in the partitions, or that were significant in the full model are not significant in one or more of the partitions. For example, *LnPOP*, which was significant in the full sample, is only significant in the unhealthy subsample and *LnEAV*, insignificant in the full sample, becomes significant in the unhealthy subsample. The unemployment rate becomes insignificant in the three partitioned subsamples. The variation in significance from the full sample to the partitioned samples suggests that the groups are fundamentally different and should be examined separately. We note that the *ELECTIONYR*, negative in the full sample, becomes positive in the overfunded sample (i.e. municipalities with overfunded pensions increase their funding ratio in election years), and suggests that variation in response to incentives among the identified sample partitions.

Sensitivity tests

Our primary test uses a levels specification, i.e., the dependent variable is the pension funding ratio at the actuarial valuation date. To address whether conformity with GAAP results in a change in pension funding level, we also model the change in pension funding ratio and measure the change with a dichotomous variable based on two alternatives, whether the pension funding ratio increased from the prior year by at least 3 percent

(*INCREASERATIO3*) and whether the ratio increased by at least 5 percent (*INCREASERATIO5*)[32]. We also measure our test variable with a lagged (one period) measure, *LAGGAAP*, of whether the municipality presents its financial statements in conformity with GAAP to provide the temporal precedence to support causal inferences (Davis, 1985). Table IV presents the results of these logit regressions and reports full sample results as well as results for the healthy and unhealthy partitions. The overfunded partition is omitted for the sake of brevity and because it contains fewer observations. Consistent with the partitioned samples presented in Table III, *LAGGAAP* is positive and statistically significant among the municipalities with healthy pension funding levels, and insignificant among municipalities with unhealthy pension funding levels. This is true for both dependent variable measures. These results support *H1* among the healthy sample partition.

We note in this changes analysis that *AUDEXPERTISE* is positively associated with a pension funding increase of at least 5 percent, but not with an increase of at least 3 percent. *AUDCHANGE* is positive and significant in predicting a pension funding ratio increase of 5 percent, but not an increase of at least 3 percent. Some differences in the behavior of control variables suggest that determinants for significant shocks to the pension funding ratio are different from smaller, more stable increases to the pension funding ratio.

Given the differential effect of our test variable, *GAAP*, depending upon the sample partition, we also tested the sensitivity around the 80 percent threshold for categorizing a municipality as having a healthy pension plan. In Table V, we examine three addition cutoff points, 79 percent, 78 percent and 77 percent. *GAAP* is positively and statistically significant in when the threshold for healthy is set at 79 percent and 78 percent, but not 77 percent. The results are consistent with the notion that within a certain bandwidth, GAAP conformity may be effective in serving as a disciplining mechanism for improving pension funding.

We performed several robustness tests to ensure the validity of our inferences. Although Illinois municipalities, regardless of size, are afforded discretion in whether to follow GAAP (15 ILCS 425/1), GAAP conforming entities tend to be larger (NASACT, 2013), as these entities are more likely to have debt and intergovernmental revenues that induce more oversight (Carroll and Marlowe, 2009). This is the case in our sample of Illinois municipalities ($r = 0.368$ between *GAAP* and *lnPop*, $p < 0.01$, in Table II). Therefore, in addition to controlling for size (using population and EAV) in the primary tests, we replicate the regression results in Tables III, IV and V, bifurcating the sample at the population median. The statistical inferences are mostly unchanged, with the exception that the positive GAAP variable among local governments with healthy pensions is only positive and significant among smaller local governments with healthy pensions. This suggests that the disciplining benefits of GAAP in the form of GASB 34 reporting exist among those governments within a range to be flexible to increase pension funding (already healthy) and that also have more discretion in adopting GAAP (smaller governments are less likely to have other monitoring present to induce GAAP reporting, i.e., debt and intergovernmental revenues). Results for the remainder of Table III, all of Table IV and all of Table V are unchanged statistically.

We also replicate Table III, adding an interaction term for size (using both population and EAV separately) and GAAP in one specification and adding an interaction term for financial flexibility (measured as financial condition, general fund balance scaled by population (Rich and Zhang, 2015; Munnell *et al.*, 2011b; Barth *et al.*, 2016) and GAAP in another specification. The interaction terms were insignificant and main effects hold. We also consider the potential for influential observations by winsorizing our dependent variable, funding ratio, so that studentized residuals are within the absolute value of three; inferences from regression analyses do not change. Finally, we replicate our analyses controlling for the type of pension plan (e.g. fire, police, administrative, suggested by the models used by Eaton and Nofsinger, 2008; Rich and Zhang, 2015). Inferences from our primary tests hold.

Table IV. Regression results – changes analysis

Variables	Full sample (1)	Increase ratio 3% + Unhealthy (2)	Healthy (3)	Full sample (4)	Increase ratio 5% + Unhealthy (5)	Healthy (6)
LAGGAAP	−0.193 (0.816)	−0.850 (0.506)	12.724*** (0.000)	−0.447 (0.729)	−2.189 (0.116)	13.985*** (0.000)
PAYPRCAP	0.001 (0.754)	0.002 (0.633)	0.004 (0.601)	−0.008* (0.061)	−0.006 (0.259)	−0.018 (0.346)
LnPOP	0.574 (0.495)	−3.904 (0.181)	8.494** (0.013)	−0.685 (0.365)	−6.541** (0.040)	5.074 (0.356)
GOBOND	0.058 (0.864)	0.181 (0.661)	0.542 (0.380)	−0.209 (0.628)	−0.215 (0.689)	16.458*** (0.000)
LnEAV	0.017 (0.890)	−0.002 (0.985)	0.857** (0.020)	−0.193 (0.188)	−0.177 (0.300)	−0.265 (0.749)
AUDEXPERTISE	−0.000 (0.998)	−0.006 (0.412)	0.014 (0.435)	−0.005 (0.557)	−0.017** (0.045)	0.049*** (0.008)
AUDCHANGE	0.261 (0.185)	0.334 (0.176)	0.910 (0.112)	0.176 (0.511)	−0.075 (0.813)	1.088* (0.066)
UNEMP	0.195 (0.182)	0.326* (0.061)	−0.034 (0.941)	0.195 (0.268)	0.085 (0.697)	0.606 (0.429)
UNION	−0.003 (0.705)	0.005 (0.678)	−0.004 (0.813)	−0.000 (0.968)	0.004 (0.759)	0.025 (0.311)
ELECTIONYR	5.909*** (0.000)	6.200*** (0.000)	5.439*** (0.006)	5.591*** (0.000)	5.215*** (0.000)	21.461*** (0.000)
HOMERULE	0.843 (0.212)	0.532 (0.477)	16.799*** (0.000)	1.193* (0.053)	1.184 (0.119)	26.663*** (0.000)
OVERFUNDED	1.964** (0.030)			1.907 (0.110)		
YEAR FE	Included	Included	Included	Included	Included	Included
n	2,281	1,388	451	1,657	1,010	269
Pseudo R^2	0.4034	0.3536	0.5071	0.4348	0.3955	0.6752

Notes: The *p*-values are in parentheses. The variables are defined in Appendix A. The *VILLAGE* variable dropped due to lack of within group variation. Models 1 and 4 include the full sample. The unhealthy subsample (Models 2 and 5) includes entities with a funded ratio less than 80 percent. The healthy subsample (Models 3 and 6) includes entities with a funded ratio of at least 80 percent but less than 100 percent. The overfunded subsample is omitted due to small sample size. $^*p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table V.
Sensitivity of healthy range cutoff

Variables	Funded ratio Ratio < 79% (1)	79% < Ratio < 100% (2)	Ratio < 78% (3)	78% < Ratio < 100% (4)	Ratio < 77% (5)	77% < Ratio < 100% (6)
GAAP (H)	−2.975 (0.238)	9.103** (0.011)	−2.848 (0.277)	7.487* (0.061)	−3.329 (0.268)	3.104 (0.446)
PAYPRCAP	0.045** (0.011)	−0.008 (0.527)	0.044** (0.012)	−0.006 (0.634)	0.057*** (0.001)	−0.003 (0.704)
LnPOP	18.437** (0.046)	−0.219 (0.982)	18.851* (0.053)	1.129 (0.909)	20.475** (0.047)	−0.037 (0.997)
GOBOND	−0.280 (0.848)	−0.159 (0.841)	−0.106 (0.947)	−1.027 (0.266)	0.362 (0.839)	−0.701 (0.363)
LnEAV	0.721** (0.040)	−0.274 (0.690)	0.730** (0.035)	−0.413 (0.547)	0.650* (0.060)	−0.587 (0.430)
AUDEXPERTISE	−0.017 (0.541)	−0.038*** (0.005)	−0.014 (0.619)	−0.036** (0.013)	−0.010 (0.723)	−0.025* (0.058)
AUDCHANGE	−1.064* (0.098)	−0.102 (0.820)	−1.031 (0.112)	−0.101 (0.819)	−0.945 (0.160)	0.003 (0.995)
UNEMP	−1.468 (0.137)	−0.254 (0.614)	−1.848* (0.068)	−0.373 (0.414)	−1.981* (0.067)	−0.447 (0.271)
UNION	−0.022 (0.504)	−0.011 (0.593)	−0.030 (0.385)	−0.012 (0.567)	−0.024 (0.493)	−0.023 (0.261)
ELECTIONYR	−2.017 (0.515)	0.909 (0.608)	−3.068 (0.339)	0.113 (0.945)	−3.415 (0.320)	0.324 (0.827)
HOMERULE	0.948 (0.420)	−1.604 (0.164)	0.904 (0.465)	0.581 (0.729)	0.852 (0.540)	0.255 (0.867)
YEAR FE	Included	Included	Included	Included	Included	Included
Constant	−111.221 (0.188)	91.459 (0.299)	−111.823 (0.208)	83.023 (0.368)	−128.454 (0.169)	100.278 (0.240)
n	1,733	711	1,625	819	1,521	923
Adjusted R^2	0.0986	0.2492	0.0966	0.2417	0.1013	0.2373

Notes: The *p*-values are in parentheses. The variables are defined in Appendix A. The *VILLAGE* variable dropped due to lack of within group variation. Models 1 and 2 provide for subsample cut-off at 79 percent. Models 3 and 4 provide for subsample cut-off at 78 percent. Models 5 and 6 provide for subsample cut-off at 77 percent. $^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$

Conclusion

As evaluation of the effectiveness of the implementation of GASB 67 and 68 begins, this study provides a benchmark of the impact of broad GAAP conformity in the pre-implementation period, on pension funding ratios. GASB 67 and 68 bring transparency to government financial reporting with the full value of the unfunded pension liability now reported on the face of the government-wide statement of net position (GASB, 2012a, b; Patton *et al.*, 2014). In the pre-implementation period, our empirical results suggest that GAAP conformity, in the form of following the GASB 34 reporting model, is positively associated with pension funding ratios only among municipalities with pensions in the healthy range, with the result driven by municipalities below the median size. The results suggest entities with healthy pensions and greater discretion in adopting GAAP (i.e. smaller governments) are the ones for which GAAP serves as a disciplining mechanism. In addition, municipalities with unhealthy funding ratios may simply lack the financial flexibility to improve pension funding. When the goal of standard-setting is to improve public outcomes (e.g. increased pension funding ratios), the results suggest that standards may be limited by fiscal constraints within government entities. The differential results between the sample partitions provide a baseline against which a future examination of the effect of the GASB 67 and 68 reporting and disclosure requirements specific to pensions may have on pension funding in the post-implementation period. In addition, the fact that GAAP conformity associated with the presentation format is not positively associated with pension funding in the unhealthy pension sample should be of importance as GASB 34 is reexamined.

Our study is not without limitations. While the sample setting offers benefits in the form of comparable pension funding to national averages, identical actuarial assumptions across observations, and similarity in regulatory and economic conditions across observations, drawing our observations from a single state's multi-employer plan may have implications for generalizability. In addition, although we incorporate a lagged test variable, *LAGGAAP*, to address the temporal precedence necessary, causality may only be suggested, not assured, particularly given GAAP conformity is fairly stable over time. Despite these limitations, the results suggest differential effects between the healthy and unhealthy sample partitions, providing a framework for future examination of the association of GAAP in the period following the implementation of GASB 67 and 68, as well as insight as GASB 34 is reexamined.

Notes

1. Homogeneity in actuarial assumptions is a strength of our study. The variability in optimistic actuarial assumptions is well-documented (Vermeer *et al.*, 2010; Easterday and Eaton, 2012), and pension board governance has also been shown to influence assumptions (Chen *et al.*, 2015). These concerns are mitigated in our sample with the use of governments from a multi-employer plan with homogeneity in actuarial assumptions.
2. Foster (1997) notes that, at that time, 99 percent of all public employees in defined benefit plans enjoyed pension benefits based on final wages, in contrast with only 61 percent of private sector employees.
3. Seburn (1991) notes that the railroad industry offered defined benefit pensions in the early 1800s, and the banking and public utilities industries began offering these plans in the 1890s.
4. The DOL (2016) reports that the number of private sector employees covered by pension plans (either defined benefit or defined contribution) grew from 44,511 in 1975 to 132,434 in 2014. In 1975, 74.1 percent were enrolled in defined benefit plans. By 2014, only 28.5 percent were enrolled in defined benefit plans.
5. Benefit sweeteners are increases or improvements to benefits already promised to members which come with the added costs in the form of increased future liabilities.

6. The GAO (2012) reports that 6.4m of state and local governments are ineligible for Social Security Benefits based on their participation in employer-sponsored plans.
7. As Pratt (2014) notes, public employee plan participants are not protected by ERISA, and the state constitutional protection of their benefits is in direct conflict with federal Chapter 9 bankruptcy provisions. While the State of Michigan protects pensions, federal bankruptcy law prevailed, and public employees and retirees experienced cuts in benefits as a result.
8. The implementation timeline for GASB 34 differed based on the reporting government. Governments with total annual revenues in excess of $100m, between $10 and $100m, and less than $10m were required to implement the standard in periods beginning after June 15, 2001, June 15, 2002 and June 15, 2003, respectively.
9. NASACT (2016) reports that, "Twenty-seven states require financial statements of some or all local governments to be prepared in accordance with generally accepted accounting principles." In a sample comprised of larger entities (population greater than 5,000), Khumawala *et al.* (2014) find that 30 percent do not follow GAAP. Mead (2008) finds that approximately two-thirds of states have requirements for some or all governmental entities within its boundaries to conform with GAAP. However, Mead (2008) notes, no enforcement mechanism is available or is not employed" for non-conformity with GAAP when it is required.
10. Ingram's (1984) measure of financial reporting quality uses data from the Council of State Governments and represents a count of the number of GAAP practices adopted.
11. GASB Statement No. 27, Accounting for Pensions by State and Local Government Employers, was issued in November 1994 and has been superseded by GASB Statement No. 68, Accounting and Financial Reporting for Pensions – An Amendment of GASB Statement No. 27.
12. Similar to Gore (2004) and Gore *et al.* (2004), Vermeer *et al.* (2012) use these two states, Michigan and Pennsylvania, because they are closely matched but contrast in their GAAP requirements.
13. Vermeer *et al.* (2012) identify 43 possible pension-related disclosures in the notes to the financial statements or the required supplementary information (RSI). Their disclosure index variable is the percentage of GASB 27 disclosures applicable to the specific government.
14. The GFOA Certificate is awarded to those governments that go beyond GAAP minimum requirements in the preparation of their comprehensive annual financial reports (CAFRs).
15. For example, Kim and Ebdon (2017) examine the important question of whether infrastructure reporting requirements contained in GASB 34 are associated with improved infrastructure management. They find that governments spend more on infrastructure following the implementation of GASB 34, but they find no evidence of increases in maintenance-related spending post-GASB 34.
16. 15 ILCS 425/1, Local Government Accounting Systems Act, states that the systems of the local governments in the State of Illinois, "shall follow, to the extent practicable, generally accepted accounting principles." As a result, there is variation in the governments that follow GAAP.
17. Recently, in the period following our study, the State of Illinois has made attempts to increase local governments' conformity with GAAP, decreasing the latitude associated with the language, "to the extent practicable," in the statute. In July 2017, the Illinois CPA Society released a regulatory update that the State of Illinois Office of the Comptroller (IOC) would no longer accept financial statements prepared on the cash basis. The Society has opposed these efforts by the IOC to reinterpret the statute as strictly requiring conformity with GAAP. This discretion to adopt GAAP is not limited based on the size of the local government, i.e., Illinois statute does not require GAAP conformity for larger local governments.
18. The IMRF is a multi-employer retirement system in Illinois which represents close to half of all units of government in the state, including municipalities, counties, park districts, libraries, school districts (non-certified staff), and special districts. As of the end of 2014, IMRF covered 286,730 employees and retired workers (IMRF, 2014). Employers join IMRF voluntarily (only School Districts are mandated) with approval of their governing body. The decision to participate in the IMRF is irrevocable.

19. Investment assumptions are the same across IMRF plan participants including discount rate. Board governance characteristics are also identical.

20. Employees participating in the plan contribute a set percentage of their earnings in addition to their contributions to Social Security and Medicare, and the employer's plan sponsors also contribute (rates vary). Employees are categorized as Tier 1 (enrolled prior to January 1, 2011) or Tier 2 (enrolled after January 1, 2011), and vesting occurs at eight years and ten years, respectively.

21. 65 ILCS 5/8-8-3, The Illinois Municipal Auditing Law, requires that municipalities with population greater than 800 must be audited.

22. Since Marks *et al.* (1988) utilized a 1978 data set from another study, a simple pension funding measure was likely not feasible. Their dependent variable was the unfunded projected obligation with some simplified uniform assumptions made by those who created the data set. For this reason, they scaled this projected the projected obligation by two measures of size, population and revenue, rather than pension assets. We separately control for these two measures of size in our main model.

23. There is no need to control for variation in investment assumptions (such as the discount rate) or board governance as these are the same among all municipal employers because of their participation in the IMRF multi-employer plan.

24. The City of Chicago, which is not included in our sample, is the only municipality in the State of Illinois that has a Big 4 auditor.

25. Although mandatory auditor switches are common in the private sector, they may not be as beneficial in the public sector where the audit market may be constrained on the supply side, i.e., fewer specialized auditors willing to conduct these audits (Lowensohn *et al.*, 2007). The GFOA's best practices on audit procurement suggests following multi-year contracts to ensure audit firm expertise (Gauthier, 2009).

26. Present in states like Massachusetts, Iowa, Tennessee and Illinois, to name a few, the provisions of such a rule do differ from state to state: "Illinois requires legislative approval for home rule cities to license for revenue or to impose taxes measured by income" (Gillette, 2009, p. 1245). Thus, local units of government having home rule status may differ in pension funding and GAAP conformity.

27. With the exception of the VIF for *LnPop* and *LnEAV*, all VIFs were below 1.77. The VIF for *LnPop* and *LnEAV* was 4.16.

28. In their study of the effect of political competition on pension funding among Pennsylvania municipalities, Bagchi (2016) reports adjusted R^2 of 21 percent for their funded ratio determinants model and 19 percent for their unfunded actuarial accrued liability per member determinants model in the study of the effect of political competition on pension funding in Pennsylvania municipalities.

29. Rich and Zhang (2015) report significance on a debt variable, measured differently. Specifically, they measure debt as a continuous variable for the amount of debt issued. Gorina (2013) found significance for the population measure only in county fixed effects.

30. It is important to note that the healthy subsample is still underfunded since the funding ratio given a ratio below 100 percent.

31. Marks *et al.* (1988) and Vermeer *et al.* (2012) report a positive association of their respective GAAP index measures and pension funding. Our results are similar, but only among the municipalities with healthy (but still underfunded) pensions. However, our measure of GAAP is whether the municipalities in our sample follow the GASB 34 reporting model and therefore includes governments that do not follow the GASB 34 reporting model (there was no such variation in the previous two studies, as all observations followed presentation requirements). This contributes to the differential results we find by partition.

32. We select the 3 and 5 percent cutoffs based on an analysis of the data. The mean increase among those municipality-years with any increase (excluding those with decreases or no change in pension funding ratio) is 4.76. The median increase among the same subset of municipality-years with any increase is 3.5. The selected cutoff amounts represent rounded percentages that approximate these points and provide sufficient variation for our analysis.

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Appendix

Variable name	Definition	Source
FUNDEDRATIO	Actuarial value of plan assets divided by actuarial accrued liability	Illinois Municipal Retirement Fund [IMRF] data file for funding ratios of its participating entities
INCREASERATIO3	Dichotomous variable coded as 1 if the funded ratio increased by more than 3% from prior year, 0 otherwise	IMRF data file for funding ratios of its participating entities
INCREASERATIO5	Dichotomous variable coded as 1 if the funded ratio increased by more than 5% from prior year, 0 otherwise	IMRF data file for funding ratios of its participating entities
GAAP	Basis of accounting used for quality financial reporting; dichotomous variable coded as 1 or 0 representing accrual (GAAP) or cash (non-GAAP) basis of accounting, respectively	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand collected audited reports, as needed
LAGGAAP	Basis of accounting used in the prior period for quality financial reporting; dichotomous variable coded as 1 or 0 representing accrual (GAAP) or cash (non-GAAP) basis of accounting, respectively	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand collected audited reports, as needed
PAYPRCAPITA	Annual covered member payroll divided by population being served	Annual covered member payroll obtained from the IMRF data file. Population obtained from the Illinois Comptroller's Local Government Division Warehouse data file
LnPOP	The natural log of population being served	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand collected audited reports, as needed
GOBOND	Dichotomous variable coded as 1 if the jurisdiction issues general obligation debt in each year, 0 otherwise	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
LnEAV	The natural log of total equalized assessment valuation (EAV) or real property	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
AUDEXPERTISE	Continues variable representing the number of audit clients an auditor has in a given year within the sample of the local governments in this study	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
AUDCHANGE	Dichotomous variable coded as 1 if the local unit of government changed an auditor from the prior year, 0 otherwise	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
UNEMP	Annual unemployment percentage aggregated at the county level	US Bureau of Labor Statistics (local area unemployment rates by year)
UNION	Annual public-sector union membership aggregated at the county level (extrapolated from major metropolitan)	Unionstats.com
ELECTIONYR	Dichotomous variable coded as 1 if the year is an election year, 0 otherwise	Illinois State Board of Elections data on general election years (even years)

Table AI.
Variable definitions and data sources

(*continued*)

Variable name	Definition	Source
HOMERULE	Dichotomous variable coded as 1 if the municipality has a home rule status in a given year, 0 otherwise	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
VILLAGE	Dichotomous variable coded as 1 if the municipality is a village, coded 0 if a city	Illinois Comptroller's Local Government Division Warehouse data file, matched against hand-collected audited reports, as needed
OVERFUNDED	Dichotomous variable coded as 1 if funded ratio is 100% or higher, suggesting the plan is overfunded, coded 0 otherwise	IMRF data file for funding ratios of its participating entities

Table AI.

Corresponding author
Julia Y. Davidyan can be contacted at: davidyanjy31@uww.edu