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Biased Actuarial Assumptions and SFAS 132R: The Not-for-Profit Response

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ABSTRACT: In 2003, the FASB issued an accounting standard (132R) requiring defined-benefit pension plan sponsors to disclose in the notes the asset allocations of their sponsored pension plans. A motivation for this requirement was to help users evaluate a plan's expected rate of return (ERR) assumption which is supposed to be determined by the allocation of plan assets to risky investments. All else being equal, the higher the assumption, the lower the pension expense and the higher the reported profits of plan sponsors. We hypothesize that not-for-profits used the ERR to inflate their earnings by reducing pension expenses. Using a dataset of audited financial statements and a difference-in-differences design, we find that not-for-profits significantly decreased their ERRs post-SFAS 132R. The results suggest that opportunistic actuarial assumptions by not-for-profits were reduced following the implementation of SFAS 132R.

JEL Classifications: J32; L31; L38; M41.

Keywords: not-for-profits; pension accounting; financial disclosures; accounting choices.

I. INTRODUCTION

Though many of the accounting standards mandated by the Financial Accounting Standards Board (FASB) apply equally to both for-profit and not-for-profit organizations, the effects of the changes in these standards on not-for-profit organizations have received less research attention compared to that on for-profit firms. The not-for-profit sector in the U.S. delivers diverse services in a variety of areas such as arts, culture, education, health, and human services. It also

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has important economic significance given that its total assets are valued at nearly $3.8 trillion and it employs approximately 10 percent of the U.S. labor force (Salamon, Sokolowski, and Geller 2012). Changes in accounting standards create unique opportunities to study not-for-profits' responses, which can allow us to infer not-for-profit managers' financial reporting incentives. There is an extensive for-profit literature documenting that firm executives manage accounting assumptions to inflate performance (for example, Bergstresser, Desai, and Rauh 2006; Asthana 2008). However, the not-for-profit literature on the incidence of and motivation for managing accounting assumptions is relatively nascent.

Unlike for-profit firms, not-for-profit organizations do not have owners to claim profits, resulting in potentially different incentives for not-for-profit managers *vis-à-vis* their for-profit counterparts. The not-for-profit literature finds that managers do have incentives to influence financial disclosure information. For example, Leone and Van Horn (2005) and Eldenburg, Gunny, Hee, and Soderstrom (2011), among others, find that not-for-profit managers engage in earnings management to reduce the political costs of appearing "too wealthy" to important external stakeholders such as donors and public regulators. More directly, Vermeer, Edmonds, and Asthana (2014) find evidence of not-for-profits managing actuarial assumptions of defined benefit pension plans, while Calabrese and Searing (2019) determine not-for-profits use defined benefit pension plan contributions to manage reported financial performance. Because empirical evidence suggests that not-for-profits have incentives to manage both financial disclosures as well as defined benefit assumptions and contributions, it is natural to expect that these same organizations would respond to the FASB's new standards introduced to curb any bias in actuarial assumptions related to defined benefit pensions.

This article uses a credibly exogenous change in accounting standards to analyze the response of not-for-profit organizations to the new financial disclosure requirements. Issued in 2003, Statement of Financial Accounting Standards (SFAS) 132R revised the disclosure requirements for pension plans and other postretirement benefit plans originally required under Statement No. 132 issued in 1998. SFAS 132R retained all the conditions of the original statement but added additional disclosure requirements about the types of plan assets, investment strategy, and plan obligations, among others. Our primary focus is the mandate for defined benefit pension sponsors to disclose the composition of their pension assets across major investment categories which include, but are not limited to, equity securities, debt securities, real estate, and others. FASB stated that this disclosure was selected because it would provide information about a plan's market risk, future cash flows, and "it would enable users to better understand and evaluate management's selection of its expected long-term rate-of-return on assets assumption" (FASB 2003, 14). The last reason is the most important for our research because an unbiased expected rate of return (ERR) assumption should be correlated with the risk profile of underlying pension assets. All else being equal, the ERR of a plan with more assets invested in risky securities (equity) should be higher than the ERR of a plan with more assets in fixed-income securities (bonds). Further, the ERR is directly related to the pension expense reported on the operating statement: all else being equal, increasing the ERR increases the expected dollar return on plant assets and decreases pension expenses, and *vice versa*. This article empirically analyzes how not-for-profit organizations responded to SFAS 132R and offers potential explanations of their response based on the existing not-for-profit literature.

More specifically, we use a difference-in-differences design to examine the effect of SFAS 132R's disclosure requirements on the ERR assumptions of not-for-profit organizations. This methodology provides credibly causal effects. We create a control group of state and local pension plans and compare its ERR assumptions with those of not-for-profit pension plans before and after

SFAS 132R. We find that not-for-profits in general reported abnormally high ERRs prior to SFAS 132R, which lowered reported pension expenses (all else equal). Not-for-profits significantly reduced their ERR assumptions after the new accounting standard went into effect, which would increase reported pension expenses (all else equal). Specifically, we find that the average ERR assumption of not-for-profit plans post-SFAS 132R was 33 basis points lower than before SFAS 132R, after controlling for plan size, funding level, actual returns on plan assets, market performance, etc. SFAS 132R effectively curbed one mechanism that not-for-profits could use to manage reported expenses, and by extension, profitability.

Importantly, despite not-for-profits facing potentially different incentives than their for-profit counterparts, the findings here are similar to those reported in Chuk (2013) who finds for-profit organizations increased allocation to equities and revised their ERRs downward in response to SFAS 132R. Chuk (2013) estimates that firms on average reduced their ERR assumptions by 22 basis points and increased equity allocation by 3 basis points after SFAS 132R. Vermeer et al. (2014) also compare the accounting assumptions of not-for-profit and for-profit organizations and find that the former use more aggressive assumptions. Our study, together with Vermeer et al. (2014), adds to the growing body of evidence that not-for-profits may be just as aggressive, if not more, as for-profits in managing pension assumptions. In this case, not-for-profits reported far more aggressive ERR assumptions than what would have been justified by the composition of plan assets prior to the implementation of SFAS 132R. Our results also contribute to the growing literature on the effects of disclosure (as opposed to recognition) requirements on firm decisions (Chuk 2013; Bonaimé 2015; Iselin and Nicoletti 2017). More generally, our findings have implications for stakeholders in the not-for-profit sector who should be mindful of potential bias in the sector's financial reporting when using accounting information for decision making. Further, because not-for-profit audited financial statements are the only source of data on some pension accounting assumptions, relying only on Form 990 data might lead to incomplete analysis.

This study contributes to the not-for-profit literature in three distinct ways. First, this study uses the choice of actuarial assumptions of pension plans to measure the response of not-for-profits to changes in financial disclosure requirements. Research on not-for-profit financial statement note disclosures is virtually nonexistent and this article begins to fill this important void. Further, research on note disclosures around defined benefit pension plans managed by not-for-profits is also scant. Second, we employ panel data from audited financial statements; these data are of higher quality than the administrative data routinely used in other not-for-profit and pension research which makes our empirical results less susceptible to measurement error. Finally, we employ empirical methods that are able to determine credibly causal effects that are not merely correlational.

II. RESEARCH SETTING: CHANGES IN PENSION ACCOUNTING DISCLOSURES

In March 2003, the FASB began a project to assess the adequacy of pension disclosures in audited financial statements. On September 12, 2003, the FASB issued an Exposure Draft—Employers' Disclosures about Pensions and Other Postretirement Benefits—and sought public comments on the proposed disclosure requirements. After reconsidering the issues raised in public letters, the FASB issued SFAS 132R in early December 2003, and the new requirements were effective after December 15, 2003 (FASB 2003). One of the disclosures SFAS 132R mandated was the allocation of pension plan assets. These data, already available with not-for-profits, were

simply added to the disclosure requirements—in addition to investment strategy explanation and the basis used to estimate the expected long-term rate of return (ERR) on assets (Chuk 2013).

Unlike many disclosure changes, SFAS 132R happened very quickly. In less than nine months from the start of the project, the FASB had announced a potential change to pension disclosures, issued new guidelines, and implemented the new requirement. Therefore, it is unlikely that not-for-profits had opportunities to adjust their ERR assumptions before the exposure draft was released. Chuk (2013) finds that for-profit sponsors with high ERRs tended to increase asset allocation in riskier and higher yielding securities to justify their actuarial assumption. Importantly, she states that the disclosure itself was the cause of the change.

The income statement reports the annual cost of funding a pension plan in the form of the net periodic pension cost (NPPC), which is calculated based on the service cost, interest cost, and the ERR, among others. The ERR is a critical assumption which reflects management's best estimate of the average long-term returns on the plan's asset portfolio. The ERR is multiplied by the market value of plan's assets to arrive at expected dollar return on plan assets which offsets the service and interest costs for the organization, thereby reducing the NPPC. Pension regulations allow organizations to use the expected (rather than actual) rate of return to calculate the NPPC in order to reduce year-to-year volatility in pension contributions. Any difference between the expected and actual return is amortized over several years. A high ERR may reduce current pension expense (the NPPC), but if the actual rate of return falls short of the expected rate, the organization would have to make larger contributions in the future. Therefore, while an inflated ERR can increase short-term reported earnings, an organization can benefit from biased ERRs in the long run only through delayed contributions rather than reduced contributions.

The ERR is one of the few major pension assumptions that are subject to managerial discretion; two others being the discount rate and the rate of compensation increase (Vermeer et al. 2014). Similar to the discount rate used to determine the present value of accrued liabilities, a higher ERR assumption reduces current annual pension expenses, and a lower ERR assumption increases current expenses, assuming all else equal. However, while discount rates generally reflect corporate debt yields and show great convergence across plans, ERRs are subject to managerial discretion and vary widely across plans (Zion and Carcache 2002). Bergstresser, Desai, and Rauh (2006, 165) summarize this difference between the discount rate and the ERR, "the setting of discount rate assumptions is the domain of plan actuaries, whereas firm managers set the assumed return of plan assets."

SFAS 132R did not change how pension sponsors recognized or measured pension costs, assets, or liabilities. Rather, it simply added enhanced disclosure requirements into the financial reports of plan sponsoring organizations. SFAS 87, an earlier accounting standard, permitted pension sponsors (that is, for-profit and not-for-profit organizations who maintain defined benefit pension plans for the benefit of their employees) to use expected rather than actual asset returns to reduce year-to-year volatility. SFAS 132R did not alter this standard and only required the plan sponsoring organization to disclose asset allocation in the notes to the financial statements to help stakeholders evaluate the ERR assumption.

III. MOTIVATION AND HYPOTHESIS DEVELOPMENT

Economic theory states that one objective of for-profit organizations may be to maximize shareholder wealth. In for-profits, managers therefore have incentives to use their discretion to increase reported profits. Existing accounting literature finds ample evidence that managers alter employee benefits, funding, and investments when confronted with standard changes (for

example, Mittelstaedt, Nichols, and Regier 1995; Bens and Monahan 2008; Choudhary, Rajgopal, and Venkatachalam 2009; Amir, Guan, and Oswald 2010). Specifically, Chuk (2013) finds that before SFAS 132R became effective, opportunistic for-profits were exploiting the lack of transparency around the ERR assumption to increase reported earnings, and SFAS 132R induced them to revise their ERR assumptions downward. No study has examined the behavior of not-for-profits in the context of SFAS 132R. Our study contributes to the not-for-profit literature by uniquely examining how not-for-profit managers use their discretion around defined-benefit pension accounting. Further, our study examines an accounting choice that is unrelated to functional expense reporting, which is a common research focus (Khumawala, Parsons, and Gordon 2005; Krishnan, M. Yetman, and R. Yetman 2006; Jones and Roberts 2006; Buchheit and Parsons 2006; Keating, Parsons, and Roberts 2008; M. Yetman and R. Yetman 2012).

As noted by Chuk (2013), the ERR offsets the service cost (for the future retirement benefits earned in the current year by employees) and the interest cost (for the unfunded balance of the pension obligation) in determining annual reported pension expenses. Therefore, the higher the assumed ERR, the lower the reported annual expense (and by extension, the higher the reported profit). All else being equal, the ERR of a plan with higher asset allocation to risky securities should be higher than the ERR of a plan with less risky securities, and *vice versa*. Absent disclosures on asset allocations of pension systems, users of financial statements cannot determine the validity of this key actuarial assumption. In the for-profit setting, Chuk (2013) finds that pre-SFAS 132R, firms were exploiting this lack of transparency around the ERR to inflate earnings. It is not readily predictable whether not-for-profits also used their discretion around the ERR to inflate earnings because they lack shareholders and thus a clear incentive to use accounting choice to inflate reported earnings. There is evidence that not-for-profit managers face incentives, like their for-profit counterparts, to avoid reporting losses and show good financial performance (Brickley and Van Horn 2002; Eldenburg and Vines 2004; Leone and Van Horn 2005).On the other hand, the literature also suggests that not-for-profit executives manage accounting information to decrease reported earnings (Eldenburg et al. 2011; Vermeer et al. 2014).

Leone and Van Horn (2005) suggest that not-for-profit CEOs prefer reporting a small profit rather than a small loss because their employment contracts incentivize financial sustainability of the organization. Brickley and Van Horn (2002) show that CEO turnover is negatively associated with financial performance. To avoid excess scrutiny, not-for-profits manage earnings downward if they are too high, although it is often difficult to anticipate in advance whether these profits would be high enough to necessitate managerial intervention. Managers likely realize that financial performance will exceed their target either at or near the end of the fiscal year and make accounting changes that may be implemented on short notice (Eldenburg et al. 2011). Overall, then, not-for-profits have incentives to use their general discretion to increase the likelihood of reporting a small profit, while having recourse to a limited set of earnings-decreasing devices should profits happen to be too high.

An unbiased ERR assumption is intended to reflect management's view of the long-term performance of their pension plan's investments. Therefore, annual market fluctuations should not affect management's long-term view and thus the ERR assumption should show little volatility. Indeed, our sample shows that the median number of ERR changes (increase or decrease) from 2000 to 2006 is only one per not-for-profit organization. Because the ERR assumption tends to be steady, it is an unlikely candidate for a year-end earnings management device. The likely devices recognized by prior research, such as allowance for doubtful accounts and maintenance expense, tend to be considerably more volatile than the ERR, which may make their use less conspicuous. Frequent changes in the ERR would likely attract scrutiny from stakeholders. Therefore, we are

inclined to think that not-for-profits consider the ERR assumption a long-term accounting choice, to be used for reducing pension expense and increasing the likelihood of reporting a small profit. That would be consistent with Vermeer et al. (2014) who find that not-for-profits use higher ERR assumptions, on average, in their pension plans compared to their for-profit counterparts.

We hypothesize that before SFAS 132R, similar to for-profits, opportunistic not-for-profits were assuming unjustifiably high ERRs given the underlying asset allocation in order to reduce pension expenses. Our control group—public pension plans—are subject to Governmental Accounting Standards Board (GASB) regulations (rather than FASB) and have been required to disclose asset allocations since 1994 (GASB 1994), leading us to hypothesize that controlling for asset allocation, not-for-profits were assuming higher ERRs than public plans before SFAS 132R. Further, we hypothesize that the introduction of asset allocation disclosure requirements under SFAS 132R curbed the scope for misreporting ERRs. In other words, the change in accounting standards forced opportunistic organizations to revise their ERRs downwards.

H1a: Pre-SFAS 132R, not-for-profits reported significantly higher ERRs compared to the control group.

H1b: Post-SFAS 132R, not-for-profits lowered their ERRs more than the control group.

IV. RESEARCH DESIGN

SFAS 132R applied to not-for-profit and for-profit sponsors of defined benefit plans only; public pension plan sponsors were unaffected by the change in standards. Public pension plans have been required to disclose information about the allocation of pension assets since the issuance of GASB Statement No. 25 in 1994 (GASB 1994; Eaton and Nofsinger 2001). Any treatment effect on public plans was likely completely absorbed by the time SFAS 132R went into effect. GASB issued Statement Nos. 37 to 49 during the study period (2000–2006) but none of them made any changes to defined-benefit pension disclosures. Statements No. 43 and 45 deal with financial reporting of other postemployment benefit plans (OPEB) but those plans are not the focus of this study. We exploit this difference between not-for-profit and public plans to create a quasi-experimental design. Specifically, we use a difference-in-differences design to compare the pre- and post-SFAS 132R differences between the ERR assumptions of not-for-profit and public pension plans. A key assumption in difference-in-differences models is that the pre-treatment parallel trends would continue uninterrupted absent any intervention. Our model assumes that the only intervening factor in 2003 was the introduction of the first draft of SFAS 132R. We include additional covariates such as actual realized returns to plan assets, pension obligation size, and investment strategy, etc. to increase the precision of the estimates by controlling for these confounding factors.

While we acknowledge that state and local governments may have different profit motives compared to not-for-profits, our choice of control group would be questionable only if public plans' ERRs had a downward bias. On the contrary, the public pension literature suggests that public plans also inflate their ERRs for fiscal and political reasons (Eaton and Nofsinger 2004; Vermeer et al. 2010; Stalebrink 2014). Easterday and Eaton (2012) report that after adjusting for investment risk, public plans assume even higher ERRs than for-profit plans, on average. While ERR and discount rate often diverge in not-for-profit plans, they are always the same in public plans (Matkin, Chen, and Khalid 2019). Therefore, public plans have strong incentives to assume high ERRs because doing so reduces pension expense (via the ERR) as well as the present value of pension liabilities (via the discount rate). To the extent that public plans' ERRs have an upward bias, our

estimated effect of SFAS 132R on not-for-profits' ERRs would be conservative. Additionally, we employ a robustness test to confirm our main results using an alternative model independent from public plans.

Although our research question is similar to that of Chuk (2013), there are two reasons why we employ a different research design. Most importantly, Chuk's (2013) model requires the use of pre-2003 asset allocation data which she obtains from firms' 10-K filings. The same data for not-for-profits are not reported on their audited financial statements, or anywhere else, and are therefore unobservable. Related to the first point, Chuk (2013) employs a two-stage model due to the jointly determined change in ERR and equity allocations. Because we have no visibility into the equity allocations pre-2003, we cannot estimate whether this decision for not-for-profits is jointly determined or not. Rather, we employ the difference-in-differences design to overcome this data limitation to estimate credibly exogenous effects of the accounting change on the ERR.

The treatment group in our study is not-for-profit organizations that sponsor defined benefit pension plans. No federal law requires not-for-profits in general to make audited financial statements available to the public. Some states require not-for-profit organizations to annually file financial statements audited by an independent CPA or an IRS Form 990, or both (National Council of Nonprofits 2019). Importantly, only a handful of states make those filings publicly available and in most cases these filings contain only a copy of the Form 990, which does not contain any information about the ERR. Massachusetts is one of the only states that makes available audited financial statements from not-for-profits operating within the state from the year 2000 onwards in a downloadable (but not machine-readable) format on the Attorney General's website. We obtain audited financial statements of 76 not-for-profit organizations from 2000 to 2006, and hand-collect data on the ERR and other variables used in this study.[1] The 2000–2006 time period is appropriate because SFAS 132R went into effect at the end of 2003, which is in the middle of the time-series.

Alternative sources of data such as Statistics of Income (SOI) files published by the IRS and Form 5500 datasets published by the Department of Labor have several limitations that make them unfit for our use. SOI files contain financial data extracted from Form 990s which are not audited by an independent auditor and do not follow generally accepted accounting principles. Form 5500 datasets not only contain unaudited data but also lack information on our main variable ERR. As Vermeer et al. (2014) point out, audited financial statements are the only reliable source of data on not-for-profits' ERR assumptions.

To obtain an appropriate counterfactual, we create a control group of state and local defined benefit plans from all 50 states and the District of Columbia which were not impacted by SFAS 132R. State and local pension plan data from 2001 through 2006 are available from the Center for Retirement Research at Boston College from their Public Plans Database (PPD). We gather data for the year 2000 manually from governments' comprehensive annual financial reports (CAFRs).

We create two dummy variables—*TREAT* and *PERIOD. TREAT* is set to 1 for not-for-profit organizations and to 0 for public plans. *PERIOD* is set to 1 for all observations (not-for-profits and public plans) with fiscal years ending on or after June 30, 2003 which was shortly before the release of the exposure draft on September 12, 2003. Not-for-profits often release their audited financial statements several months after the end of the fiscal year.[2] Therefore, organizations with a June 30th fiscal year end may have had the opportunity to revise their 2003 ERR assumptions

[1] Please see the Sample Selection section for information on how the sample was selected.

[2] For example, both Harvard University and the Massachusetts Institute of Technology (MIT) ended their fiscal year 2003 on June 30th. However, PricewaterhouseCoopers, which served as the auditor to both, signed off on Harvard's financial statements on September 25, 2003 and on MIT's on September 17, 2003.

because the exposure draft was released prior to the release of their audited statements. We create an interaction variable of *TREAT* and *PERIOD* which is the main explanatory variable in our model: a negative coefficient on this interaction variable would support the notion that not-for-profits were reporting abnormally high ERRs prior to SFAS 132R, and the required disclosure led them to change ERRs. The interaction variable $TREAT * PERIOD$ is equal to 1 for all post-SFAS 132R not-for-profit observations and 0 for all others. *TREAT* and *PERIOD* are included in the model individually as well to control for ERR trends in the control group and to control for ERR trends among not-for-profits pre-SFAS 132R, respectively.

Organizations may adjust their ERR assumptions based on the actual rate of return on plan assets. To control for variations in the ERR due to actual returns, we include *ARR%* in our model as actual dollar returns scaled by beginning plan assets, multiplied by 100. We control for variations due to funding level of the plan by including *FRATIO%* as ending plan assets scaled by ending pension benefit obligation (PBO), multiplied by 100. State and local pension plans tend to be much larger than most not-for-profit plans. Therefore, we control for pension size by including *LOG_PBO* as the natural log of PBO. Finally, firm fixed-effects are included to control for unobserved time-invariant heterogeneity, as well as year fixed-effects to control for variations occurring over time that are common to both the treatment and control group. The regression model estimated is:

$$ERR\%_{it} = \beta_0 + \beta_1 TREAT_{it} + \beta_2 PERIOD_{it} + \beta_3 TREAT * PERIOD_{it} + \beta_4 ARR\%_{it} + \beta_5 FRATIO\%_{it} + \beta_6 LOG\_PBO_{it} + \sum FIRM_i + \sum YEAR_t + \varepsilon_{it} \quad (1)$$

V. SAMPLE SELECTION

To identify not-for-profit organizations based in Massachusetts that sponsor at least one DB pension plan, we look to the National Center for Charitable Statistics' (NCCS) core data files and the Form 5500 datasets provided by the Department of Labor (DOL). We start by creating a panel dataset of all not-for-profits from 1999 to 2003. From that data, we drop all non-Massachusetts observations, leaving 35,440 observations. Then, we merge the remaining not-for-profit observations with a 1999–2003 panel dataset containing all DOL Form 5500 filings in order to obtain a sample of not-for-profits that manage their own pension plans. After the merge, we arrive at a sample of 767 observations, which is relatively small because only large not-for-profits choose to establish and manage their own pension plans. Because of the high administrative costs of managing a pension plan, many not-for-profits have closed their pension plans, do not have retirement plans at all, are not subject to filing requirements, or have too few participants to meet regulatory thresholds. The Form 5500 datasets have an indicator variable to identify DB plans. We drop non-DB observations and all duplicate observations in terms of EIN, which leaves us with 77 observations. We match these 77 organizations with the Massachusetts not-for-profit filings database to find audited financial statements from 2000 to 2006 for 74 organizations. To ensure coding errors do not cause potential non-selection of eligible organizations, we identify in the 2003 core dataset Massachusetts' top 300 organizations in terms of total firm assets and manually search for them in the Massachusetts not-for-profit filings database. We found two more organizations with defined benefit plans not identified through the Form 5500 filings, bringing our total to 76 organizations. Table 1 summarizes our not-for-profit sample selection.

We obtain data on state and local pension plans (our control group) from the PPD. The PPD dataset contains detailed plan level information on 114 retirement plans administered at the state

TABLE 1

Summary of Not-for-Profit Sample Selection

	Observations
Raw NCCS "Core" files 1999, 2000, 2001, 2002, and 2003	1,235,395
Less: Non-Massachusetts observations	1,194,823
Less: Duplicates in terms of EIN and Year	5,132
Less: Observations not matched with the Form 5500 dataset	34,673
Less: Non-defined benefit plans	489
Less: Duplicates in terms of EIN	201
Less: Missing audited financial statements	3
Add: Manually added observations	2
Not-for-profits identified for manual data collection	76
Total observations collected (2000–2006) (76 × 7)	532

level and 56 plans administered at the local level, for a total of 170 plans across all 50 U.S. states and the District of Columbia. The data start from the year 2001 and are updated annually. We drop plans for which there are missing values in any of the years between 2001 and 2006. To have sufficient pre-treatment data, we hand-collect data for the year 2000 from 2001 CAFRs. Most CAFRs contain information on key variables such as the ERR and funding levels for the previous year but some do not, which results in some attrition. We were unable to find ERR values for ten plans and actual return on plan assets for two plans for 2000, reducing our final sample to 148 public plans and 1,036 (148 times 7) observations. Table 2 summarizes our public plans sample selection.

VI. RESULTS AND DISCUSSION

Descriptive Statistics

Table 3, Panel A presents descriptive statistics for the not-for-profits plans in our sample by year. The mean values of *ERR%* through the years show that before 2003 ERR assumptions were steady. Starting in 2003, not-for-profits started revising their ERR assumptions downward sharply.

TABLE 2

Summary of Public Plans Sample Selection

	Plans
Raw Public Plans Data	170
Less: Plans with some missing values between 2001 and 2006	10
Less: Plans for which 2000 ERR unobtainable	10
Less: Plans for which 2000 ARR unobtainable	2
Final number of groups	148
Final number of observations (148 × 7)	1,036

See Appendix A for variable definitions.

TABLE 3

Summary Statistics by Sample

Panel A: Descriptive Statistics for Not-for-Profit Plans by Year

Row #		2000	2001	2002	2003	2004	2005	2006	All
1	*ERR%*								
	Mean	8.57	8.56	8.53	8.31	8.20	8.07	7.98	8.32
	Median	8.50	8.50	8.50	8.50	8.13	8.00	8.00	8.50
	S.D.	0.75	0.74	0.74	0.67	0.61	0.62	0.65	0.72
	n	76	76	76	76	76	76	76	532
2	*ARR%*								
	Mean	10.01	−3.81	−5.23	7.24	11.69	9.41	9.12	5.46
	Median	10.79	−4.32	−5.45	5.73	11.39	9.05	9.20	7.52
	S.D.	10.03	8.60	5.60	9.40	5.19	5.16	4.59	9.66
	n	64	70	71	72	72	71	71	491
3	*FRATIO%*								
	Mean	115.51	96.70	81.97	74.84	79.91	77.23	85.85	87.42
	Median	112.76	91.30	80.37	73.83	79.47	76.05	84.74	83.10
	S.D.	33.50	26.89	22.69	18.19	17.93	18.65	20.44	26.64
	n	76	75	76	76	76	76	75	530
4	*LOG_PBO*								
	Mean	16.69	16.82	16.91	17.09	17.15	17.28	17.27	17.03
	Median	16.57	16.73	16.86	17.05	17.12	17.26	17.23	16.93
	S.D.	1.57	1.55	1.56	1.56	1.56	1.59	1.61	1.58
	n	76	75	76	76	76	76	76	531
5	% Obs with $\Delta ERR > 0$	—	1.32	3.95	**1.32**	**0.00**	**1.32**	0.00	1.32
	% Obs with $\Delta ERR < 0$	—	3.95	7.89	**28.95**	**19.74**	**19.74**	9.21	14.91
	% Obs with $\Delta ERR = 0$	—	94.74	88.16	**69.74**	**80.26**	**78.95**	90.79	83.77
6	ΔERR%	—							
	Mean	—	0.00	−0.04	**−0.22**	**−0.10**	**−0.13**	−0.09	−0.10
	Median	—	0.00	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00
	S.D.	—	0.12	0.30	**0.41**	**0.25**	**0.34**	0.40	0.32

Panel B: Descriptive Statistics for Public Plans by Year

Row #		2000	2001	2002	2003	2004	2005	2006	All
1	*ERR%*								
	Mean	8.05	8.06	8.04	8.02	7.99	7.97	7.96	8.01
	Median	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
	S.D.	0.43	0.42	0.43	0.41	0.39	0.39	0.38	0.41
	n	148	148	148	148	148	148	148	1036
2	*ARR%*								
	Mean	8.57	−5.26	−5.89	8.19	14.90	10.28	11.50	6.04
	Median	9.40	−5.42	−6.40	4.70	15.09	9.99	11.80	8.69
	S.D.	5.72	4.05	4.07	8.11	3.18	2.26	2.95	8.96
	n	148	148	148	148	148	148	148	1036

(continued on next page)

TABLE 3 (continued)

Row #		2000	2001	2002	2003	2004	2005	2006	All
3	*FRATIO%*								
	Mean	105.68	101.27	94.02	88.81	86.20	84.57	84.45	92.14
	Median	102.35	99.56	93.41	88.66	85.85	85.37	84.57	91.45
	S.D.	32.01	24.14	20.75	18.51	16.87	15.96	15.91	22.64
	n	148	148	148	148	148	148	148	1036
4	*LOG_PBO*								
	Mean	15.57	15.66	15.74	15.81	15.88	15.94	16.01	15.80
	Median	15.62	15.69	15.79	15.85	15.93	15.97	16.07	15.84
	S.D.	1.30	1.29	1.28	1.28	1.27	1.26	1.25	1.28
	n	148	148	148	148	148	148	148	1036
5	**%** Obs with $\Delta ERR > 0$	—	4.73	1.35	**2.03**	**0.68**	**2.03**	1.35	2.03
	% Obs with $\Delta ERR < 0$	—	7.43	4.73	**7.43**	**10.14**	**5.41**	5.41	6.76
	% Obs with $\Delta ERR = 0$	—	87.84	93.92	**90.54**	**89.19**	**92.57**	93.24	91.22
6	ΔERR**%**	—							
	Mean	—	0.00	−0.01	**−0.02**	**−0.03**	**−0.01**	−0.02	−0.02
	Median	—	0.00	0.00	**0.00**	**0.00**	**0.00**	0.00	0.00
	S.D.	—	0.09	0.10	**0.13**	**0.10**	**0.10**	0.09	0.10

See Appendix A for variable definitions.
Numbers in bold highlight the change in ERRs immediately after SFAS 132R.

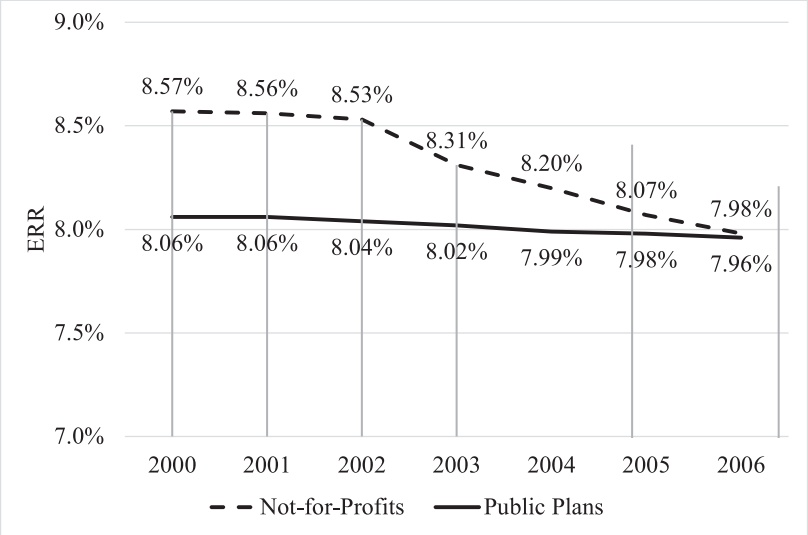
Rows 2 and 3 reflect equity market movements in our study period; high values right before and after 2001–2002 when the dot-com bubble burst. Rows 5 and 6 show that from 2003 to 2005 a significant minority of not-for-profits revised their ERR assumptions downward. About 29 percent of the plans in our sample reduced their ERR assumptions from 2002 levels, which is the highest in any year in our study.

Table 3, Panel B presents descriptive statistics for our control group—state and local pension plans. Compared to Panel A, reported ERRs are lower and we do not see as much downward movement in *ERR%* here. The difference between the mean values of 2000 and 2006 is only 9 basis points while the same for not-for-profits was 59 basis points. The changes in *ARR%* and *FRATIO%* through the years follow the same trend as those in the case of not-for-profits. Rows 5 and 6 also show that public plans did not reduce their ERR assumptions as sharply as not-for-profits did. Only 7.43 percent and 10.14 percent of the public plans in our sample reduced their ERR assumptions in 2003 and 2004, respectively. Table 3 provides descriptive evidence that prior to SFAS 132R, not-for-profits were reporting abnormally high ERRs which increased reported earnings by decreasing reported pension expenses (all else equal).

In Figure 1, we present a line chart of mean ERR assumptions across the not-for-profit and public plan samples for 2000–2006. The chart shows that pre-SFAS 132R there was a significant gap between the means of the two groups which slowly disappeared post-SFAS 132R. This chart provides visual evidence for H1a and H1b. While our not-for-profit sample is drawn only from Massachusetts, our control group comprises public plans from all states. Figure 2 shows that Massachusetts' ERR trend is not significantly different from that of the other states.

Further preliminary evidence for our hypotheses is found in Table 4, which reports the correlation matrix for the variables used in our regression equation. Panel A reports the pairwise

FIGURE 1
Comparing Not-for-Profit and Public Plans' ERR Trends



correlations for the not-for-profit sample and Panel B for the public plans sample. *PERIOD* takes the value 1 for the post-SFAS 132R observations, and 0 otherwise. The significantly negative correlations between *ERR%* and *PERIOD* in Panels A and B show that both not-for-profits and public plans had lower average ERR assumptions post-SFAS 132R, but the decline was much steeper for not-for-profit plans. Another similarity across the panels is that the actual returns on plan assets were higher in the post-SFAS 132R period, and the funding levels were lower. These

FIGURE 2
Massachusetts' versus Other States' Public Plans' ERR Trends

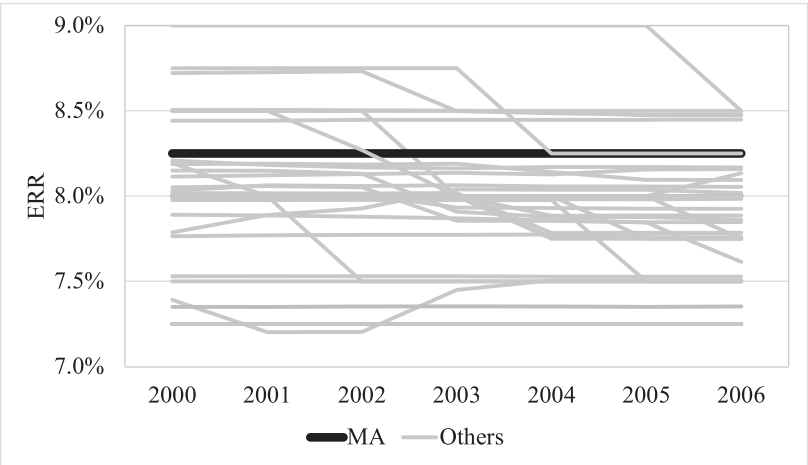


TABLE 4

Correlation Matrix

Panel A: Not-for-Profit Sample (2000–2006)

	ERR%	*PERIOD*	*ARR%*	*FRATIO%*
ERR%				
PERIOD	−0.284***			
ARR%	−0.091*	0.487***		
FRATIO%	0.133**	−0.344***	0.089*	
LOG_PBO	0.255***	0.122**	0.238***	0.195***

Panel B: Public Plans Sample (2000–2006)

	ERR%	*PERIOD*	*ARR%*	*FRATIO%*
ERR%				
PERIOD	−0.080**			
ARR%	−0.052	0.674***		
FRATIO%	−0.046	−0.314***	−0.152***	
LOG_PBO	0.056	0.093**	0.047	−0.183***

*, **, *** Indicate p-values < 0.10, < 0.05, < 0.01, respectively, based on two-tailed t-tests.
See Appendix A for variable definitions.

results make sense because the bursting of the dot-com-bubble lowered equity returns sharply in 2002 and 2003, which had a sustained negative impact on plans' funding levels.

Among dissimilarities across panels, one of the most striking is that *FRATIO%* and *LOG_PBO* are significantly positively correlated in Panel A but significantly negatively correlated in Panel B. This indicates that as a not-for-profit plan gets larger, its funding level improves; but when a public plan gets larger its funding level deteriorates.

Table 5 presents estimations of our regression equation by year. The coefficients on *TREAT* show that after controlling for confounding factors, the gap between the average ERR assumptions of not-for-profit and public plans was more than 40 basis points from 2000 to 2002, and it is statistically significant at the 1 percent level. These results further support hypothesis H1a. Additionally, that difference declined to about 24 basis points in 2003 and 2004 and remained statistically significant at the 5 percent level. The coefficients on *TREAT* for the years 2005 and 2006 are not statistically significant at any conventional level which suggests that there is no evidence that there was a difference between the ERR assumptions of not-for-profit and public plans in that period. The results provide evidence that not-for-profits adjusted their ERRs more than the control group—which supports hypothesis H1b.

Main Results for Tests of Hypotheses

Table 6 reports the results of estimating our regression equation. The coefficient on *TREAT* $*$ *PERIOD* (the primary variable of interest) shows that not-for-profit pension plans revised their ERR assumptions downward post-SFAS 132R by 33 basis points, on average, compared to public

TABLE 5

Regressions Comparing ERR Assumptions of Not-for-Profit and Public Plans

$$ERR\%_i = \beta_0 + \beta_1 TREAT_i + \beta_2 ARR\%_i + \beta_3 FRATIO\%_i + \beta_4 LOG\_PBO_i + \varepsilon_{it}$$

Year	Variable	Coeff.	t-stat	p-value
2000	*TREAT*	0.452	4.35	0.000
	ARR%	0.011	1.94	0.053
	FRATIO%	−0.001	−0.68	0.499
	LOG_PBO	0.065	2.35	0.020
	Intercept	7.026	16.03	0.000
	n		212	
	R^2		23.06%	
2001	*TREAT*	0.468	4.80	0.000
	ARR%	−0.019	−3.10	0.002
	FRATIO%	0.000	−0.06	0.956
	LOG_PBO	0.064	2.62	0.009
	Intercept	6.965	17.91	0.000
	n		218	
	R^2		24.06%	
2002	*TREAT*	0.439	4.44	0.000
	ARR%	−0.021	−2.80	0.006
	FRATIO%	−0.001	−0.35	0.727
	LOG_PBO	0.077	3.14	0.002
	Intercept	6.759	16.49	0.000
	n		219	
	R^2		23.18%	
2003	*TREAT*	0.232	2.46	0.015
	ARR%	0.002	0.53	0.597
	FRATIO%	−0.002	−0.99	0.323
	LOG_PBO	0.048	2.01	0.046
	Intercept	7.402	17.56	0.000
	n		220	
	R^2		10.64%	
2004	*TREAT*	0.245	2.44	0.015
	ARR%	0.019	2.18	0.031
	FRATIO%	−0.004	−1.97	0.050
	LOG_PBO	0.027	1.07	0.287
	Intercept	7.617	20.49	0.000
	n		220	
	R^2		11.09%	

(continued on next page)

TABLE 5 (continued)

Year	Variable	Coeff.	t-stat	p-value
2005	*TREAT*	0.036	0.45	0.653
	ARR%	0.028	3.03	0.003
	FRATIO%	−0.006	−2.63	0.009
	LOG_PBO	0.040	1.94	0.054
	Intercept	7.525	21.73	0.000
	n		219	
	R^2		9.38%	
2006	*TREAT*	0.096	1.01	0.316
	ARR%	0.036	3.36	0.001
	FRATIO%	−0.003	−1.97	0.050
	LOG_PBO	0.041	1.65	0.100
	Intercept	7.177	17.37	0.000
	n		218	
	R^2		10.84%	

See Appendix A for variable definitions.

plans, after controlling for actual returns, funding levels, and pension size. This result is statistically significant at the 1 percent level. The coefficient on *PERIOD* is positive but statistically not significant. Interestingly, the *ARR%* coefficient is not statistically significant, suggesting that ERR assumptions are not related to actual returns in a given year. None of the other coefficients are statistically significant as well. The variable *TREAT* is not part of the results because we employ organization fixed-effects which drop all time-invariant variables.

Overall, these results provide plausibly causal estimates of the treatment effect size from SFAS 132R. Further, the results here support the hypotheses that not-for-profits reported abnormally high ERRs prior to the treatment and revised them downward significantly when required to disclose asset allocations, compared to the control group which was not subject to SFAS 132R.

VII. ROBUSTNESS CHECK

We test the robustness of our results using a simple pre-post comparison without the control group. We attempt to rule out that our results are driven by unresponsiveness or "stickiness" of the ERR assumptions of public plans, because the average ERR of public plans shows low variation during the sample period. We examine the change in the ERR assumptions of our treatment group before and after SFAS 132R.

We control for *ARR%* and *FRATIO%* as we did in the main model because they are known determinants of ERR (Chuk 2013). Following Vermeer et al. (2014), we include *LEV* (total firm liabilities divided by total firm assets) and *PBO*/*TA* (actuarial liabilities divided by total firm assets). Because there is no control group present anymore, we employ additional control variables to control for non-plan specific factors that influence the ERR assumption. Following Chuk (2013), we control for contemporaneous stock and bond market returns—*EQUITY_RET* as annual returns to the CRSP value-weighted market index and *BOND_RET* as annual returns to the Vanguard Total Bond Market Index. We also include AAA-rated corporate bond yields and treasury yields because they are often used as signals for long-term interest rates. We obtain annual yields on Moody's

TABLE 6

Estimation Results for Equation 1

$$ERR\%_{it} = \beta_0 + \beta_1 TREAT_{it} + \beta_2 PERIOD_{it} + \beta_3 TREAT * PERIOD_{it} + \beta_4 ARR\%_{it} + \beta_5 FRATIO\%_{it} + \beta_6 LOG\_PBO_{it} + \sum FIRM_i + \sum YEAR_t + \varepsilon_{it}$$

Variable	Coefficients (t-statistics)
PERIOD	0.35*
	(1.83)
*TREAT * PERIOD*	−0.33***
	(−5.60)
ARR%	0.00
	(0.75)
FRATIO%	0.00
	(−0.77)
LOG_PBO	−0.12
	(−1.07)
Constant	10.29***
	(5.38)
Firm fixed-effects	Yes
Year fixed-effects	Yes
Sample Size	1,526

*, **, *** Indicate p-values < 0.10, < 0.05, < 0.01, respectively.
Clustered-Robust Standard Errors.
See Appendix A for variable definitions.

AAA-rated corporate bonds, three-month U.S. treasury bills, and ten-year U.S. treasury bonds from the Federal Reserve. Finally, we include a dummy variable *PERIOD* which takes the value 0 for pre-SFAS 132R years, and 1 otherwise. We estimate the following regression model using organization fixed effects:

$$ERR\%_{it} = \beta_0 + \beta_1 PERIOD_{it} + \beta_2 ARR\%_{it} + \beta_3 FRATIO\%_{it} + \beta_4 LEV_{it} + \beta_5 PBO/TA_{it} + \beta_6 EQUITY\_RET_{it} + \beta_7 BOND\_RET_{it} + \beta_8 AAA\_CORP_{it} + \beta_9 TSEC\_3M_{it} + \beta_{10} TSEC\_10Y_{it} + \sum FIRM_i + \varepsilon_{it} \quad (2)$$

Table 7 presents descriptive statistics for all the variables in Equation 2 except *ARR%* and *FRATIO%* because they are available in Table 3. Table 7 shows that the yields on fixed income securities like AAA-rated corporate bonds and U.S. treasury bonds are generally lower after 2003 than before. To the extent these securities influence the ERR assumption, excluding them from the model can introduce bias into the results. Thus, Table 7 validates their inclusion in the model.

Short-term treasury securities tend to have lower yields than long-term treasury securities. When that is not true, the yield curve is said to be inverted. Table 7 shows that short-term treasury yields were higher than long-term treasury yields in 2000 and 2006 which makes sense because

TABLE 7

Descriptive Statistics for Equation 2

Row #		2000	2001	2002	2003	2004	2005	2006	All
1	*LEV*								
	Mean	0.37	0.39	0.41	0.42	0.41	0.41	0.39	0.40
	Median	0.37	0.41	0.44	0.45	0.43	0.44	0.42	0.42
	S.D.	0.25	0.25	0.24	0.24	0.23	0.23	0.23	0.24
	n	76	76	76	76	76	76	76	532
2	*PBO/TA*								
	Mean	0.18	0.20	0.22	0.25	0.25	0.27	0.27	0.24
	Median	0.15	0.17	0.20	0.21	0.22	0.22	0.19	0.18
	S.D.	0.19	0.18	0.20	0.22	0.24	0.27	0.31	0.24
	n	76	75	76	76	76	76	76	531
3	*EQUITY_RET*								
	Mean	11.71	−22.73	−17.54	20.72	16.62	12.56	11.72	4.72
	Median	18.66	−29.75	−17.27	27.59	15.30	15.94	10.67	11.05
	S.D.	10.58	7.87	1.62	12.42	3.38	3.81	2.03	17.59
	n	76	76	76	76	76	76	76	532
4	*BOND_RET*								
	Mean	0.11	4.83	0.85	1.24	−1.80	−0.62	−2.51	0.30
	Median	0.10	5.85	0.48	0.48	−1.15	−1.75	−1.29	0.10
	S.D.	2.06	1.45	0.75	1.74	1.57	1.82	2.03	2.79
	n	76	76	76	76	76	76	76	532
5	*AAA_CORP*								
	Mean	7.57	7.11	6.31	5.49	5.63	5.12	5.60	6.12
	Median	7.62	7.17	6.15	5.72	5.46	5.13	5.51	5.89
	Std. Dev.	0.16	0.15	0.22	0.33	0.25	0.13	0.21	0.87
	n	76	76	76	76	76	76	76	532
6	*TSEC_3M*								
	Mean	6.06	2.81	1.61	0.95	1.65	3.43	4.94	3.06
	Median	6.18	2.69	1.66	0.96	1.68	3.49	4.93	2.69
	Std. Dev.	0.15	0.62	0.18	0.02	0.31	0.31	0.03	1.77
	n	76	76	76	76	76	76	76	532
7	*TSEC_10Y*								
	Mean	5.80	4.95	4.22	4.01	4.32	4.19	4.82	4.62
	Median	5.80	4.73	3.87	4.27	4.13	4.20	4.72	4.56
	Std. Dev.	0.28	0.25	0.47	0.43	0.26	0.15	0.20	0.66
	n	76	76	76	76	76	76	76	532

the yield curve was indeed inverted from February 2000 to December 2000 and again in the second half of 2006.

Table 8 presents the pairwise correlation matrix for the variables used in the model. The matrix shows strong correlation between *PERIOD* and *AAA_CORP*. Further, *AAA_CORP* shows almost as strong a correlation with *ERR%* as *PERIOD* does. Taken together, they underscore the

TABLE 8

Correlation Matrix: Equation 2

	ERR%	*PERIOD*	*ARR%*	*FRATIO%*	*LEV*	*PBO|TA*	*EQUITY_RET*	*BOND_RET*	*AAA_CORP*	*TSEC_3M*
ERR%	1.000									
PERIOD	−0.284***	1.000								
ARR%	−0.091*	0.487***	1.000							
FRATIO%	0.133**	−0.344***	0.089*	1.000						
LEV	0.140**	0.034	0.029	−0.192***	1.000					
PBO|TA	0.103*	0.129**	0.051	−0.127**	0.270***	1.000				
EQUITY_RET	−0.145***	0.704***	0.659***	−0.088*	0.035	0.089*	1.000			
BOND_RET	0.204***	−0.511***	−0.493***	0.086*	0.019	−0.044	−0.664***	1.000		
AAA_CORP	0.253***	−0.865***	−0.238***	0.447***	−0.052	−0.151***	−0.402***	0.324***	1.000	
TSEC_3M	−0.014	−0.206***	0.213***	0.372***	−0.056	−0.026	0.119**	−0.198***	0.423***	1.000
TSEC_10Y	0.075	−0.487***	0.107*	0.449***	−0.125**	−0.139**	0.029	−0.116**	0.802***	0.742***

*, **, *** Indicate p-values < 0.10, < 0.05, < 0.01, respectively, based on two-tailed t-tests.
See Appendix A for variable definitions.

TABLE 9

Estimation Results for Equation 2

Variable	Coefficients (t-statistics)
PERIOD	−0.33***
	(−2.88)
ARR%	0.00
	(0.55)
FRATIO%	0.00
	(−0.04)
LEV	−0.49
	(−1.29)
PBO/TA	0.77**
	(2.11)
EQUITY_RET	0.01***
	(3.54)
BOND_RET	0.02**
	(2.22)
AAA_CORP	0.19*
	(1.71)
TSEC_3M	−0.04**
	(−2.22)
TSEC_10Y	−0.10
	(−0.88)
Constant	7.93***
	(20.51)
Firm fixed-effects	Yes
Year fixed-effects	No
Sample Size	490

*, **, *** Indicate p-values < 0.10, < 0.05, < 0.01, respectively.
Clustered-Robust Standard Errors.

importance of including *AAA_CORP* in the model because not doing so could attribute *AAA_CORP*'s effect on *ERR%* to *PERIOD*.

Table 9 shows the estimation results for the regression Equation 2. The sample size is limited to 490 observations due to missing values of *ARR%*. The coefficients on *PBO*|*TA, EQUITY_RET,* and *TSEC_3M* are statistically significant at the 5 percent level or better. The coefficient on the main variable of interest *PERIOD* is −0.33 which is the same coefficient on *TREAT* ∗ *PERIOD* in Table 6. The statistically significant coefficient on *PERIOD* suggests that, controlling for other variables, the ERR declined by 33 basis points on average after SFAS 132R went into effect. Overall, this robustness check lends credence to the validity of the control group in our main model and to our main results.

Next, we check the robustness of our results with a placebo test. We re-assign the introduction of SFAS 132R to 2002 instead of 2003 to see if the downward trend in ERR assumptions started before the actual introduction of SFAS 132R. For this test, we restrict the sample to only two years—2002 and 2003. More specifically, we only include observations with

TABLE 10

Placebo Test Results

Variable	Coefficients (t-statistics)
PERIOD	0.00
	(−0.11)
TREAT ∗ PERIOD	−0.05
	(−1.10)
ARR%	0.00
	(−1.07)
FRATIO%	0.00
	(−0.18)
LOG_PBO	−0.11
	(−0.90)
Constant	9.98***
	(4.85)
Firm fixed-effects	Yes
Year fixed-effects	No
Sample Size	583

*, **, *** Indicate p-values < 0.10, < 0.05, < 0.01, respectively.
Clustered-Robust Standard Errors.
See Appendix A for variable definitions.

fiscal years ending between June 30, 2001 and May 31, 2003 (both inclusive). For the full model, we had set the variable *PERIOD* equal to 1 for all observations with fiscal years ending on or after June 30, 2003. For the placebo test, we set *PERIOD* equal to 1 for all observations (not-for-profit and public plans) with fiscal years ending on or after June 30, 2002, and 0 otherwise. We estimate the model with organization fixed effects and without year fixed effects because we are using only two years of data and year specific trends are captured by the *PERIOD* variable. Table 10 presents the results of the placebo test.

Table 10 shows that the variable of interest *TREAT ∗ PERIOD* is negative but not statistically significant at any conventional level, which confirms that our main results are driven by SFAS 132R rather than chance. The sample size is reduced to 583 observations from 1,526 before because we use a restricted sample. Understanding that using organization fixed effects with such a small sample can lead to very low degrees of freedom, we estimate the model without fixed effects. Even without fixed effects, the results (untabulated) remain qualitatively the same. Overall, these results confirm the robustness of our main results.

VIII. DISCUSSION AND CONCLUSION

Using a credibly exogenous change in accounting reporting standards, this is the first study to exploit changes in the disclosure of asset allocations of pension plans and measures the response to this change by not-for-profits. The analysis uses panel data from audited financial statements which are of higher quality than administrative data and less susceptible to measurement bias. Furthermore, we employ empirical methods that are able to determine credibly causal effects from

this change in FASB reporting requirements, rather than just descriptive or correlational relationships. We hypothesize that not-for-profits would report abnormally high ERR assumptions prior to SFAS 132R, and that they would respond to SFAS 132R by revising their ERR assumptions downward more than a credible control group. Our findings suggest that prior to SFAS 132R, not-for-profits did report significantly higher ERRs, perhaps as one tool to increase the likelihood of reporting small positive profits that could be adjusted by accruals and adjustments at year-end. Following the disclosure requirements of SFAS 132R, not-for-profits reduced their ERR assumptions by 33 basis points on average. The results suggest that SFAS 132R curbed one tool that opportunistic not-for-profits might have used to control reported profitability. As such, while SFAS 132R may have indirectly increased pension expenses for not-for-profits by reducing ERRs, it is possible that the disclosure might have led to better funding for employees' benefits. Future research might examine whether this description is valid.

The similarities between these results and those of Chuk (2013) suggest that large not-for-profit organizations, despite having a different ownership structure, can sometimes behave like their for-profit counterparts. Not-for-profit organizations responded to SFAS 132R by revising their previously inflated ERR assumptions downward, which suggests not-for-profit managers have incentives to use accounting choice to boost financial performance like for-profit managers. Further, our results suggest that the reduction in the ERRs of not-for-profits (33 basis points) was larger than the reduction in for-profits' ERRs (22 basis points) as reported by Chuk (2013). To the extent reductions in ERR are correlated with the degree of bias before SFAS 132R, our findings are consistent with those of Vermeer et al. (2014) that not-for-profits use more aggressive assumptions than for-profits. Although our dataset does not permit an empirical investigation into why not-for-profits use more aggressive assumptions, a conjectural reason may be that not-for-profits are subject to less oversight than their for-profit counterparts. Pension assumptions of large corporations are regularly scrutinized by analysts to determine real (unbiased) profitability, which affects investment decisions of a large number of investors. Such a level of scrutiny is largely absent from the not-for-profit sector. There is some evidence that increased and higher quality oversight by auditors is associated with less aggressive assumptions in not-for-profits (Vermeer et al. 2014). However, more comparative analysis is needed to understand why not-for-profits may employ more aggressive accounting assumptions than for-profits.

Our findings underscore the need for accounting regulations to improve the quality, comparability, and usability of financial information in the not-for-profit sector. The example of SFAS 132R shows that an accounting standard that simply requires new disclosures without altering recognition rules can make a difference. The not-for-profit sector, with its many financially constrained organizations, especially needs such effective regulations that do not place undue burden on the governed. However, the FASB's efforts toward improving financial accountability will not achieve their full potential until audited financial statements of not-for-profits are made easily accessible. Research on not-for-profit pension accounting is scant because access to systematic data from audited financial statements is either difficult or impossible. The data for this paper were difficult to obtain, but the relevance of our findings emphasizes the need for further exploration of this area, which will require considerable improvement in data accessibility.

The financial accountability system in the not-for-profit sector is anchored on Form 990, which contains unaudited and often outdated information and numerous other errors (Gordon et al. 2009). As a result, some have advocated for making audited financial statement information the foundation of the not-for-profit financial accountability system (Keating and Frumkin 2003). Our findings lend support to the idea that audited financial statements are indeed an important part of the accountability system. Some key pension accounting assumptions that are only disclosed in

audited financial statements can be altered to superficially improve an organization's profitability and financial health. Therefore, an implication of our research is that not-for-profit stakeholders should analyze audited financial statements as well as Form 990 data for a better understanding of organizations' financial condition.

A limitation of this study is that it analyzes data from not-for-profits based in Massachusetts only, which reduces generalizability. Few other states make publicly available the audited financial statements filed by not-for-profits in the state. Common data used to analyze not-for-profits, such as the Form 990, and data used to analyze pensions, such as the Form 5500, are not appropriate for this study because they do not report the ERR assumption—the primary variable of interest in this study. However, because Massachusetts is one of the better governance states with respect to not-for-profit oversight (based on Desai and Yetman 2015), our results are likely biased toward the conservative side. In the future, any effort to reform the Form 5500 should consider including disclosures such as the ERR assumption and a breakdown of plan assets across different investment categories based on market risk. Without that information, it will remain difficult to evaluate a plan's market risk and the unbiasedness of the ERR assumption. Future research on mandated accounting disclosures should examine if SFAS 132R had an impact on reported profitability and cash flows of not-for-profit organizations, since it increased annual costs. Another potential area for exploration is whether this accounting standard improved users' understanding of plans' exposure to market risk, which was one of the FASB's objectives behind mandating new disclosures. Finally, we hope not-for-profit researchers will consider additional mechanisms to test firm incentives and inform this still unsettled area.

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APPENDIX A

Variable Definitions

Variable	Definition
AAA_CORP	Annual yield for Moody's AAA-rated corporate bonds obtained from the Federal Reserve.
ARR%	Actual rate of return in percent.
BOND_RET	Annual return on the Vanguard Total Bond Index.
EQUITY_RET	Annual return on the CRSP value-weighted index.
ERR%	Expected rate of return assumption in percent.
FRATIO%	Actuarial liabilities scaled by pension plan assets, multiplied by 100.
LEV	Firm's total liabilities scaled by total assets.
LOG_PBO	Natural logarithm of actuarial liabilities.
PBO/TA	Plan's actuarial liabilities scaled by firm's total assets.
PERIOD	1 for all observations with fiscal years ending on or after June 30, 2003, and 0 otherwise.
TREAT	1 if the plan is sponsored by a not-for-profit, 0 if sponsored by a governmental entity.
*TREAT * PERIOD*	1 for all not-for-profit plan observations with fiscal years ending on or after June 30, 2003, and 0 otherwise.
TSEC_10Y	Annual yield on ten-year U.S. treasury bonds obtained from the Federal Reserve.
TSEC_3M	Annual yield on three-month U.S. treasury bills obtained from the Federal Reserve.