THE UNIVERSITY OF TEXAS AT SAN ANTONIO, COLLEGE OF BUSINESS

Working Paper SERIES

WP # 0007FIN-452 -2013

Date February 27, 2013

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September 10, 2012

Abstract

We examine the effects of state corruption as well as political and governance factors on public pension funds. We find that pension funds in more corrupt states have lower performance; a one standard deviation increase in corruption is associated with a decrease in annual returns between 17 and 25 basis points, and this relation is robust to state-level and pension-level fixed effects. Pensions located in more corrupt jurisdictions also invest a larger fraction of their assets in equities. We find that having a new treasurer decreases the negative effects of corruption, suggesting that frequent changes in administrations are beneficial in corrupt jurisdictions. Governance-related variables and political affiliation variables are by themselves not significantly related to pension returns, although these variables are associated with differences in asset allocation.

JEL Classifications: G23, G28, H75

Key Words: Public Pensions, Corruption, Politics, Governance

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I. Introduction

A growing literature addresses how corruption affects economic activity. An early paper in this literature by Shleifer and Vishny (1993) suggests that the degree of corruption is tied to institutional factors, and that greater corruption is highly detrimental to economic growth. Mauro (1995) confirms this negative effect of corruption on growth, and more recent papers study which institutional factors reduce corruption. For instance, using Brazilian data, Ferraz and Finan (2008) show how greater media attention reduces the probability that incumbents in corrupt jurisdictions will be reelected, and Ferraz and Finan (2011) find that politicians with greater reelection incentives are more likely to reduce corruption.[1]

We instead examine the effect of corruption on public pension plan performance in the U.S., and we find that greater state-level corruption is related to lower public pension plan returns and lower benefit payments. We consider whether these relationships are driven by differences in asset allocation across classes, and test whether differences in pension-level governance measures or state wide political differences mitigate the negative relation between corruption and pension returns.

We find that differences in pension governance measures are not related to pension returns, nor do these governance differences impact the negative effects of corruption. However, we find that a change in political administration in the state treasurer's office, which typically oversees the state pension funds, is able to temporarily eliminate the negative effect of corruption on pension returns. The results suggest that a change in leadership in more corrupt jurisdictions can, at least temporarily, clean house. These

[1] See Rose-Ackerman (1999), particularly p. 130-132, for an overview of the relation between voting and corruption.

results complement Olken (2007), who finds that a top-down approach, specifically increasing government audits, can decrease the effects of corruption. The results also agree with Abbink (2004) who shows that randomly rotating staff can reduce the effects of corruption.

Additionally, this paper contributes to the literature on public pension funds. In the U.S., public pension fund assets amounted to over three trillion dollars in 2008, and more than 26 million Americans including 19 million contributors and 7.7 million beneficiaries participate in public pension plan.[2] There is some evidence that public funds underperform their private counterparts and some commentators suggest that inappropriate political influence is one cause of this poor performance (Coronado, Engen, and Knight, 2003; Bentley, 2009).

Our primary focus is on examining the degree to which funds in more corrupt states underperform, and whether any factors mitigate this underperformance. However, we also examine the relation between corruption and fund asset allocation decisions. Brinson, Hood, and Beebower (1986) and Brinson, Singer, and Beebower (1991) show that a pension fund's portfolio allocation policy across broad asset classes is a more important determinant of its total investment returns than market timing or the selection of specific securities. They find that over 90 percent of the variation in total plan returns is explained by a fund's asset allocation policy. Useem and Mitchell (2000) also show that asset allocation explains a large proportion of the difference in returns among retirement systems.

[2] See Novy-Marx and Rauh (2011) for an overview of US pension funds, and also http://www.census.gov/govs/retire/2008ret01.html and http://www.census.gov/govs/retire/2008ret05a.html.

Empirically we find that pensions in more corrupt states have significantly worse performance than those in less corrupt states. Specifically, a one standard deviation increase in corruption is associated with a decrease in annual returns of 17 to 25 basis points. This result is robust to both state-level controls and pension-level controls, and it suggests that political influence plays an important role in influencing the outcome of pension investment decisions. As one might expect, this negative relation between corruption and pension returns implies a significant negative relation between corruption and the benefits paid to retirees. Thus retirees bear the costs of state corruption.

We examine several political and governance factors to see if they are associated with pension fund performance and if they decrease the impact of corruption on pension returns. In most states, the state treasurers are involved in the governance of public pension plans and provide oversight of public pensions (see Johnson, 2009, and many state treasurers' web pages discuss overseeing the state retirement system).[3] Thus, we examine the political affiliation of the state treasurer (or equivalent office holder), and whether a new treasurer has just taken office. Hutton, Jiang, and Kumar (2010) argue that firms with Republican managers use more conservative policies including lower levels of firm debt, lower levels of capital investment, lower R&D expenditures, less risky investments, and higher dividend payout levels. We therefore test whether pension funds under Republican state treasurers take on less risky investment strategies. Additionally, we test whether a change in state treasurer is associated with differences in returns, as new treasurers may be more likely to reevaluate certain assets.

[3] A counterexample is Texas, where the duties of the treasurer are undertaken by the Comptroller of Public Accounts; however, this person does not oversee Texas public pension funds. Dropping Texas from the study does not change our results.

We examine several governance measures based on the existing literature. Yermack (1996) finds that firms with smaller boards have higher valuations, and a number of studies examine the relation between board composition and firm performance with mixed results (see, for instance, Bhagat and Black, 1998). To control for governance, we include the size of the board, the board composition (measured as the fraction of board members who are plan participants), and whether there is a separate investment council in our analyses.

For our sample of large pension funds, neither state treasurer variables nor governance variables are by themselves related to overall pension performance. Moreover, interactions between political party affiliation and corruption are largely insignificant; corruption affects Democratic and Republican controlled pensions roughly equivalently. However, changes in treasurer are associated with significantly better returns in more corrupt states. Thus, more frequent changes in administration may be beneficial in more corrupt jurisdictions. We also find that pensions overseen by Republican treasurers have greater cash holdings but also greater holdings of risky alternative investments. This finding is only partly consistent Hutton et al. (2010) who find that Republican CEOs are more likely to follow conservative investment strategies. Further, new treasurers are more likely to undertake risky investments, investing more in stocks and alternative investments and less in bonds.

Additionally, we find that corruption is significantly related to pension fund allocation decisions. Specifically, public pensions in states with greater corruption are more likely to hold risky assets such as stocks and alternative investments. However, holding these risky investments does not lead to higher returns in more corrupt states. This evidence is consistent with Hochberg and Rauh (2011) who show that pension funds overweight

home-state private equity investments, that these investments underperform on average, and that this overweighting is more severe if corruption is greater.

Our empirical results are based on a panel of pension funds from the Public Plans Database (PPD) from the Center for Retirement Research at Boston College, and we also verify some of our results using the State and Local Public Retirement Systems Database from the Census Bureau. Our paper is the first paper to examine the impact of state corruption on overall pension performance, and our findings of a negative relation between corruption and pension returns, and of the mitigating influence of changes in treasurers, are consistent for both data sets.

The remainder of the paper is organized as follows. Section II provides a brief literature review. Section III discusses the data and methodologies that we use. Section IV presents the results of our empirical analysis. Section V concludes.

II. Prior Literature

The degree of corruption differs markedly across states in America. Glaeser and Saks (2006) investigate the causes and consequences of corruption and conclude that states with higher levels of education and greater wealth have less corruption. Butler, Fauver, and Mortal (2009) demonstrate that state corruption and political connections strongly affect several aspects of municipal bond sales and underwriting. In particular, higher state corruption is related to greater credit risk, higher bond yields, greater use of external credit enhancements, and a greater likelihood of using lower quality underwriters.

Romano (1993) provides an overview of the governance of public pension funds and how it relates to their investment decisions. She provides several examples of how

political pressure increased in-state investment. Brown, Pollet, and Weisbenner (2009) investigate how 20 state pension plans allocate their equity portfolios. They find that the state pension plans significantly overweight the stocks of companies that are headquartered in the state where they manage their portfolio. Their evidence shows state pension plans in more corrupt states are more likely to hold stocks of firms dociled in the home state, and they point out that political influence likely plays a role in the stock selection process.

Hochberg and Rauh (2011) examine the allocations and performance of institutional investor investments including those by public pensions in private equity funds. They also find that institutional investors allocate more of their portfolio to funds in their home state and that this home bias is greater for public pension funds. In contrast to Brown et al. (2009), Hochberg and Rauh find that the performance of public pension funds' own-state investments is much worse than their out-of-state investments. In addition, Hochberg and Rauh find that pension funds in states with higher levels of corruption overweight own-state investments, suggesting that political pressures may be associated with the tendency to invest disproportionally in local funds.

A related literature explores the relationships between governance policies, investment strategies, and investment performance. Useem and Mitchell (2000) provide evidence that governance policies including investment restrictions, performance evaluations, board purview, board composition, and board size have little direct effect on the financial performance of public pension plans but have strong effects on investment strategies, implying that governance has an indirect impact on performance through investment strategies. Harper (2008) examines the influence of pension fund board structure on investment and funding policy decisions. He shows that the composition of

the board of trustees is not associated with investment returns but is strongly associated with the funding status (i.e., the ratio of the assets to liabilities) and asset allocation.

Bauer, Cremers, and Frehen (2010) note that pension size plays an important role in US pension fund returns on US equities. They provide evidence that smaller funds outperform large funds. Dyck and Pomorski (2010) point out that Bauer et al. (2010) only look at US plan returns on US equities but ignore other possible impacts of fund scale on alternatives assets and at the overall plan level. Using a defined benefit pension plan database, they document that larger plans outperform smaller plans, suggesting substantial positive scale economies in asset management. They attribute most of the larger plans' higher returns to an increased allocation to alternative investments and to the greater returns from this asset class.

III. Data and Method

Our primary measure of state corruption is the number of per capita corruption convictions of local, state, and federal officials, a widely adopted measure of corruption (see Fisman and Gatti, 2002; Fredricksson et al., 2003; Depken and Lafountain, 2006; Glaeser and Saks, 2006; Butler et al., 2009; Brown et al., 2009). The number of per capita convictions is defined as the number of state corruption convictions divided by the state population in the same period.

We collect the number of state corruption convictions and the state population from 1993 through 2009. The state corruption convictions are available from the U.S. Department of Justice Public Integrity Section. The corresponding state population is gathered from the Census Bureau database.

We obtain data on pension plans from two sources: the Public Plans Database (PPD) at the Center for Retirement Research at Boston College and the State and Local Public Retirement Systems Database compiled by the Census Bureau. The data on the PPD are collected from plans, annual reports, actuarial valuations, member handbooks, and contact with plan administrators. This database contains comprehensive financial, governance, and plan design data for 126 state and local defined benefit plans from 2001 through 2009. These include 107 state-level pension plans and 19 local pension plans, and these pensions represent more than 85 percent of all state and local government pension assets and members.[4]

For the pensions available through PPD, we collect several variables including time-weighted returns, a widely adopted return for public pension plans. This performance measure negates the effect of investor flows and thus provides a good measure of fund performance (see Feibel 2003). We also collect administrative and investment expenses, benefit payments, funding ratios, market values of assets, the number of retirees, the number of board members, the total participants on the board, a dummy variable for whether the pension fund has a separate investment council, and the fraction of pension assets placed in various asset categories such as stocks, bonds, cash and other short term investments, alternative investments, and other investments. The advantage of this data is that it includes variables related to pension governance (total board members, total participants on the board, and whether the fund has a separate investment council), and funding status (funding ratio) which do not appear in the Census Bureau data.

[4] According to the Center for Retirement Research at Boston College, the 107 state plans represent more than 90 percent of all state government pension assets and members, and the 19 local plans represent more than 20 percent of all local government pension assets and members.

The total participants on the board equals the number of trustees who are themselves participants (active or retired members) in the plan. These board members may act more directly in the interest of the pension members. The separate investment council dummy indicates whether there is a separate investment board, usually appointed from members of the overall pension board (see Harper, 2008). The funding ratio is defined as actuarial assets divided by actuarial accrued liabilities. Since annual reports of pension funds vary in format, presentation, and content, alternatives or other investments do not represent the same assets for each pension plan. For example, private equity is sometimes classified as an alternative investment and sometimes as other investments. According to several annual reports that we examine, alternative investments are risky assets such as private equity or venture capital investments.

The Census Bureau pension data has information on revenues, benefit payments, assets, holdings, and membership of public employee retirement systems from 1993 to 2008. These data encompass more than 2,000 administered public pension plans, the most complete list of plans sponsored by a public entity. However, the Census Bureau data may be less accurate since the data relies upon voluntary participation in surveys. Additionally, many observations are missing in this data set. Moreover, there are no variables available on pension funding status or pension governance.

We collect data on state treasurers between 2001 and 2009 from Wikipedia, state treasurers' offices, and using Google search. There are 41 states plus the District of Columbia which have the title treasurer, and 10 states that have other titles. For example, the treasurer's duties are undertaken by the Commissioner of the Department of Revenue

in Alaska and by the Chief Financial Officer in Florida.[5] Data on changes in state treasurer (or the person with similar responsibilities) and on the political party affiliation of the treasurer are also collected from these sources. For state treasurers, we use whoever is in place at the end of the state fiscal year as the state treasurer for that year.[6]

Our primary regressions are:

$$Depvar_{i,t} = \alpha + \beta_1 * Corruption\ Measure_{i,t} + \beta_2 * \text{Log}\ Retirees_{\text{i,t}} + \sum_{i=1}^{n} \emptyset_i * Control_{i,t} + \varepsilon_{i,t}$$

where $\text{Depvar}_{\text{i,t}}$ is our dependent variable for pension i at time t: total investment return, asset class holding, and the benefit payment per retiree. Control includes our control variables: funding ratio (actuarial assets divided by actuarial liabilities), size (the log of the market value of total assets), board size, board composition (pension participants on the board/board size), and dummy variables such as investment council, political party of state treasurers, and change in state treasurer. All regressions include year dummies and, to control for fund size effects and, because the number of retirees is highly skewed, the log of the number of retirees. In additional fixed effect regressions, we control for unobserved state effects with state-level dummy variables and pension effects with pension-level dummy variables. We conduct ordinary least squares regressions for all dependent variables other than the asset class holding regressions. The asset holding regressions use a tobit analysis because these variables are censored at zero. In all cases, we calculate robust standard errors adjusted for clustering by pension fund.

[5] http://en.wikipedia.org/wiki/State_treasurer

[6] Comprehensive Annual Financial Report (CAFR) of the state pension systems are reported at the end of each state's fiscal year, usually on September 30 or June 30.

IV. Empirical Results

IV.A Descriptive Statistics and Correlations

Panel A of Table I provides descriptive statistics for the 126 state and local defined benefit plans (data from PPD) for our variables from 2001 through 2009. Observations with any missing data are excluded from the analysis. Most pensions in this sample are large, with a median asset size of 8.8 billion dollars and a mean asset size of 17.8 billion dollars. The asset holdings of public pension plans are dominated by equities, with a median equity share of 57.9% and a mean share of 56.3%.

The descriptive statistics for the variables from the Public Employee Retirement Systems from 1993 through 2008 (the Census Bureau data) are shown in panel B of Table I. Because of the large number of outliers in the Census Bureau data, we winsorize all variables in this data set at 0.5 percent of each tail. The sample consists of more than 2,000 comprehensive pension systems including many small plans. The median and mean market value of total assets is 59 million and 2.04 billion dollars, respectively, much smaller than the assets sizes of the plans covered by the PPD data.

Panel C provides correlations between our primary measures for the PPD data. Returns exhibit a negative correlation with corruption, expenses, benefit payments, and all asset investment categories except equities. Returns exhibit a positive correlation with equity investments, pension size, and board size. Interestingly, although asset size and number of retirees are highly correlated (coefficient of 0.89), returns are positively correlated with pension size but negatively correlated with the number of retirees.

Both investment and administrative expenses exhibit a positive correlation with alternative investments and a negative correlation with cash and stock investments. Also,

probably because of economies of scale, administrative costs exhibit markedly negative correlations with size and retirees.

Corruption has a positive correlation with administrative expenses, equities and alternatives, and a negative correlation with bonds. This suggests that pension funds in more corrupt states tend to incur higher administrative costs and invest more in more risky securities such as stocks and alternative investments. Over the period that we examine, alternative investments were relatively costly (the correlation between administrative expenses and alternatives is 0.026) and their performance was weak (the correlation between returns and alternatives is -0.095). We next examine these relations in a multivariate setting.

IV.B Corruption and Investment Performance

Panel A of Table II presents regressions with returns as the dependent variable using the PPD data.[7] We employ ordinary least squares regressions on the entire pooled cross section (9*126=1,134 plan-year observations) for columns 1 through 4. To adjust for autocorrelated errors, we report a White heteroskedastic consistent estimator with clustering at the pension plan level. We present a state level fixed-effects regression in column 5 to examine whether unobserved state effects affect our results. In columns 6 and 7, we examine the robustness of our results by using pension plan level fixed-effects regressions; thus for these regressions the coefficients are determined only by changes in the variables over time for a given pension system.

[7] As our data is annual, we do not have sufficient observations to calculate a Sharpe ratio or other risk-adjusted annual measure of returns. In unreported regressions, we examine the relation between corruption and the standard deviation of returns over the entire time period. We find no statistically or economically significant relation between this risk measure and corruption. Additionally, as we show below, greater corruption is positively related to holdings of some riskier types of investment.

The regression in Column 1 includes the corruption measure as well as the log of the number of retirees as independent variables. The specification in column 2 adds the funding status of the pension plan, governance variables such as the board size, board composition (measured as the fraction of members who are plan participants), and the existence of a separate investment council, and our political variables, whether there is a change in treasurer and the treasurer's political party. Column 3 replaces the log of the number of retirees to size with the log of the fund's total assets to examine the impact of size effects on pension performance (See Bauer et al., 2010; Dyck and Pomorski, 2010). Column 4 considers asset allocations, investment and administrative expenses, and interactions between the governance variables and corruption, and between the political variables and corruption.

Corruption is negatively related to public pensions' investment returns at the 5% significance level for the regressions in column 1, 2, and 4; and at the 10% significance level for the regression in column 3. The magnitude of the estimated coefficients on corruption is similar in all these specifications. Using the estimate from column 1, a one standard deviation increase in corruption implies a decline in average returns of roughly 17 basis point (-0.0221*.0782). The number of retirees is negatively related to investment performance (significant at the 10% level for column 1 and 2 and at the 5% level for column 4). The funding ratio, the governance variables (board size, board composition, and investment council dummy) and the state treasurer variables (whether there is a change in state treasurer and which political party the state treasurer belongs to) have no statistically significant relation with investment performance. These findings are consistent with the other existing empirical papers which show no relationship between

board composition and investment returns (Munnell and Sunden, 2001; Coronado et al., 2003; Harper, 2008). However, we do find a positive significant coefficient on the interaction between corruption and treasurer changes. Thus, having a new treasurer is associated with significantly higher returns in more corrupt jurisdictions.

Corruption is still significantly negatively related to pensions' returns after controlling for asset classes and investment and administrative expenses (column 4). This finding suggests that corruption affects returns not only through expenses but also through asset choice; and moreover, by inferior asset choice within a class. That is, returns in corrupt jurisdictions are not only worse because of a greater investment in a particularly unfavorable class of assets, but because of poor choice within that asset class. This finding complements Hochberg and Rauh (2011), who find inferior performance for in-state investments, and greater in-state investment by public pension funds in more corrupt jurisdictions.

We test whether our results are robust to a state-level fixed effects specification in column 5 of Table II. Adding state-level fixed effects increases both the significance level and magnitude of the estimated coefficient on corruption. Columns 6 and 7 consider several specifications with pension-level fixed effects. We exclude the governance variables from these specifications as these variables have negligible within-plan variation. Corruption continues to be significant at the 10% level in the simplest specification in column 6. In column 7, we add additional controls such as funding ratio, treasurer changes, the treasurer's political party, asset allocations, investment and administrative expenses, and interactions between a change in treasurer and corruption, and between political party and corruption. In this specification, the overall effect of corruption is again significantly

negative, and the interaction between corruption and a change in treasurer is significantly positive. Thus pensions in more corrupt states do significantly worse, but having a new treasurer helps to ameliorate this negative performance.

For our control variables, we find that the estimated coefficient on asset size is not significantly different from zero. Thus we do not find support for the notion that "bigger is better" (see Dyck and Pomorski, 2011) or "small is beautiful" (see Bauer et al., 2010). However, the PPD data set only considers the largest U.S. pension funds, and these results change when we consider the Census Bureau sample which includes smaller pension funds. We also find that funds with a greater fraction of assets in alternative investment strategies had better performance, and increases in stock, bond, alternatives, and cash investments were associated with improved performance in the fixed effect regressions.[8]

As a robustness check, we verify the effect of state corruption on investment performance using the Census Bureau data. Note that this data set has no governance variables, and the asset allocation variables are much more limited in terms of scope and coverage. Also, time-weighted returns are not available in the Census Bureau data, thus we define returns as earnings on investments divided by total assets for this data set. Controlling for year dummies and either the number of retirees or the pension size in regressions 1 and 2 of Table II, Panel B, we again find that pension funds in more corrupt states underperform those in less corrupt states. This finding holds either for the whole sample comprised of over 2,000 pension systems or, in unreported regressions, for the state sample comprised of 222 state pension plans. Using the estimate in column 1 of Panel B, a one standard deviation increase in corruption is associated with a 17 basis point decline in

[8] The excluded investment category in these regressions is real estate.

returns (-0.0738*0.0233), similar to our findings in the PPD sample. The effect of corruption is similar or somewhat larger in the other specifications.

We examine the relation between political variables and corruption in regressions 3 and 4 of Table II, Panel B. As in the smaller PPD sample, a change in treasurer is associated with more negative returns, but more positive returns in more corrupt jurisdictions. Unlike in our PPD sample, we find evidence that Republican treasurers have significantly better rates of return when the smallest funds are included, and some evidence (significant at the 10% level) that Republican treasurers have been less affected by corruption.

In contrast to the findings on size in Panel A, both the number of retirees and pension size are positively and significantly related to pension returns, suggesting that "bigger is better" as in Dyck and Pomorski (2011). This change in results appears to be driven by the difference in the composition of the two data sets. The Census Bureau database represents a wide variety of fund sizes while the PPD only includes the largest funds. Limiting the sample to just the larger state funds in the Census data reduces the coefficient on asset size, and this coefficient becomes significant at only the 10% level. Thus bigger funds do better, but only if really small funds are included in the sample.

Overall, our empirical findings demonstrate that state corruption has a significant association with returns that is robust to a variety of controls. In unreported regressions, we also consider the relation between corruption and administrative expenses. We find some evidence that fund administrative expenses are higher in more corrupt jurisdictions; however, the magnitude of these results is small relative to the loss of returns. Moreover, the negative relation between corruption and returns is maintained even if we control for

differences in expenses directly. We next investigate whether our corruption and governance variables are also associated with investment strategy choice.

IV.C Corruption and Investment Strategy

Table III examines how state corruption is associated with the investment decisions of pension plans. These regressions include several control variables, namely, the log of the number of retirees, the funding ratio, board size, the number of board members who are participants as a fraction of total board members, an investment council dummy, a treasurer changes dummy, whether the treasurer is Republican, whether the treasurer belongs to a third party, and year dummies. The dependent variables are listed in the column headers. Because there are a significant number of zero-valued observations for our dependent variables, the fraction of pension assets in the various asset classes, we employ tobit regressions.

The tobit regressions suggest that state corruption is associated with investment behavior; pension funds in more corrupt states tend to hold more risky assets such as stocks and alternative investments. However, as we show above, the additional investment in these risky assets does not improve performance for funds in corrupt jurisdictions.

Public pension funds with a greater number of retirees also allocate more of their assets to stocks and alternatives and less to bonds. We obtain similar results after replacing the log of the number of retirees with size (not reported), suggesting that larger pension funds are more likely to take on risky investments. The regressions also suggest that funding ratios have no impact on asset allocation.

While our governance variables, including board size, board composition, and the

investment council dummy, have little direct impact on investment performance, Table III provides evidence that governance variables are associated with differences in investment strategies. Plans with a large proportion of plan participants on the board have lower holdings of alternative assets. The other two governance variables, board size and the investment council dummy, are not associated with asset allocation strategies.

Our evidence shows that a new treasurer tends to take on more risky investment strategies such as increasing the allocation to stocks and alternatives and decreasing the fund's investment in bonds. However, according to Table II, changes in treasurer are not by themselves significantly associated with pension returns; instead they affect returns only when interacted with corruption. Thus these changes in investment allocations are not necessarily beneficial. We also find that political ideology has a limited effect on investment decisions. The evidence in the Table III shows that cash investments are greater when a Republican treasurer is in power, consistent with the finding that Republican managers have more conservative policies and undertake less risky investments (see, Hutton et al., 2010). However, funds overseen by Republican treasurers also hold more risky alternative investments.

In unreported regressions we consider investment strategy for the smaller sample from the Census Bureau data where investment category variables are available. State corruption is positively related to risky investments such as stocks and alternatives or other investments (which includes venture capital, partnerships, real estate investment trusts, and leveraged buyouts). The Census Bureau data also classifies bond holdings into corporate bonds and federal government securities. Funds in states with higher corruption hold more corporate bonds and fewer government bonds, again suggesting an investment preference

toward more risky assets as well as potentially increasing investments in local companies.

IV.D Corruption and Benefit Payments

We next examine whether the cost of state corruption is borne by plan participants. Panel A of Table IV examines whether state corruption is associated with benefit payments per retiree in the PPD data. Column 1 only includes the number of retirees as a control variable; governance variables and investment and administrative expenses are added in column 2. Column 3 adds treasurer dummy variables including the political party dummies and the treasurer change dummy. Columns 4 and 5 add state level dummies, and columns 6 and 7 add pension level dummies. Cross-sectional results suggest that state corruption significantly is associated with a significant reduction in benefit payments per retiree; however, benefit payments do not vary sufficiently over time in this sample to find any effect of corruption on benefits in the fixed effect regressions. Additionally, as expected, administrative expenses are negatively and significantly associated with retirees' payments in the cross-sectional regressions. Having more representatives on the board who are participants is positively associated with benefit payments. Board size has no significant relation with payments, although adding members is associated with an increase in payouts. Having an investment council is negatively associated with payments, although this negative relation is only significant at the 10% level in one specification. A new treasurer is associated with an increase in benefit payments in the fixed effect regressions, and Republican treasurers are associated with lower benefit payments when state dummies are included. In unreported regressions, we consider the interactions between corruption and treasurer changes and political affiliation, but these are not

significantly related to benefit payments.

We also use the Census Bureau data to verify the relation between state corruption and benefit payments in Panel B of Table IV. We consider only those pensions in the Census Bureau data where the number of retirees is more than 100. Columns 1 through 3 of Panel B, Table IV, consider cross-sectional regressions; columns 4 and 5 add state-level dummies, and columns 6 and 7 add pension-level dummies. Note that the treasurer variables are only available from 2001 on, thus the regressions with treasurer change and political affiliation variables have a much smaller sample size.

We again find lower benefit payments in more corrupt jurisdictions in all the cross-sectional regressions. For the regressions with state or pension fixed effects, we also find a negative and significant effect of corruption; however, this coefficient is not significant in the smaller sample fixed effect regressions with treasurer variables included. Additionally, the relation between treasurer political affiliation and benefit payments varies with specification. Republican treasurers are associated with higher payouts in the cross-sectional regressions, but a change to a Republican treasurer is associated with lower benefit payments in the state and pension-level fixed effect regressions.

In unreported regressions, we include asset allocations in benefit payment regressions, and the results are unaltered. This suggests that asset allocation does not explain the effect of corruption on benefit payments.

V. Conclusion

Corruption is associated with underperformance for public pension funds, and pension

funds in more corrupt jurisdictions are more likely to have more equity investments. These findings are consistent with funds in more corrupt states taking on more risky, poorly performing, investments. As such, these results complement the prior literature (see, for example, Romano, 1993; and Hochberg and Rauh, 2011) that finds political pressure can increase public pension funds' inferior in-state investments. Moreover, beneficiaries in more corrupt states receive lower benefit payments. These results suggest that in order to maintain high-quality pension performance and benefits, policy makers need to better control the effects of state corruption on pension plans.

The governance variables we consider (board size, board composition and the investment council dummy) and the state treasurer dummy variables (whether there is a change of state treasurer or which political party a state treasurer belongs to) have little impact by themselves on investment performance. However, having a new treasurer is associated with superior performance in more corrupt jurisdictions. This result suggests that more frequent changes in who oversees the pension fund can curb some of the negative effects of corruption.

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Table I. Summary Statistics

Panel A provides summary statistics for 126 state and local defined benefit plans on our variables. The sample is drawn from the Center for Retirement Research at Boston College from 2001 through 2009. Return is the time-weighted annual fund return. Investment and administrative expenses are the amount of these expenses divided by market value of total assets and then multiplied by 100. Benefit payments equal the ratio of total payments to the number of retirees divided by 100. All asset categories including stocks, bonds, cash & short term, alternatives and other securities are measured as the market value of these holdings as a percentage of the market value of total assets. Alternatives typically represent more risky investments such as private equity or venture capital. Other investments may include relatively less risky assets such as absolute return or inflation protection investments. The market value of total assets is in billions of dollars. Size is the log of the market value of total assets (in thousands dollars). Board size equals the number of board members. Board composition is the number of participants on the board divided by the total number of board members. Funding ratio is defined as actuarial assets divided by actuarial accrued liabilities. Corruption is equal to the number of federal corruption convictions divided by state population (in millions) in the same period and then divided by 100.

Panel B provides summary statistics for the full sample and state pension plan sample only from the Census Bureau's Public Employee Retirement Systems from 1993 through 2008. This data is winsorized at 0.5% in each tail. Returns are defined as earnings on investments divided by total assets. Other variables are defined as in panel A.

Panel C provides correlations on our key variables for the data from the Center for Retirement Research.

Variables	Obs.	Mean	Median	SD	Min.	Max.
Panel A: PPD Data from the Center for Retirement Research at Boston College						
Return	1,133	0.0327	0.0530	0.1238	-0.2963	0.2883
Investment expenses	1,091	0.3122	0.2456	0.2720	0.0010	1.9844
Administrative expenses	1, 106	0.0997	0.0766	0.1242	0.0038	2.1561
Benefit Payment	985	0.1914	0.1747	0.0869	0.0037	0.6682
Stocks	1,133	0.5634	0.5790	0.1041	0.0000	0.8200
Bonds	1,133	0.2884	0.2700	0.1014	0.1000	1.0000
Cash & Short Term	1,133	0.0225	0.0130	0.0278	0.0000	0.2250
Alternatives	1,133	0.0285	0.0000	0.0506	0.0000	0.4200
Other Investment	1,133	0.0435	0.0136	0.0566	0.0000	0.2910
Total assets	1,132	17.8000	8.8014	27.4000	0.1799	251.0000
Size	1,132	15.9353	15.9904	1.2618	12.1003	19.3415
Ln(Retirees)	1,119	10.1185	10.2601	1.2641	5.2149	13.0918
Board Size	1,129	9.8840	9.0000	3.4505	1.0000	20.0000
Board Composition	1,129	0.5655	0.5556	0.2308	0.0000	1.0000
Funding Ratio	1,111	0.8601	0.8720	0.1629	0.1910	1.4770
Democrats Treasurers	1,134	0.5635	1.0000	0.4962	0.0000	1.0000
Republican Treasurers	1,134	0.3554	0.0000	0.4788	0.0000	1.0000
Third Party Treasurers	1,134	0.0811	0.0000	0.2732	0.0000	1.0000
Treasurer Changes	1,134	0.1852	0.0000	0.3886	0.0000	1.0000
Corruption	1,134	0.0408	0.0266	0.0782	0.0000	1.1152

Panel B: U.S. Census Bureau Data

Return	13,404	0.0674	0.0707	0.0693	-0.1467	0.3837
Return (State)	2,750	0.0708	0.0778	0.0692	-0.1467	0.3837
Ln(Retirees)	20,193	4.8449	4.5326	2.5962	0.6931	11.8110
Ln (Retirees) (State)	3,183	8.0062	8.1870	2.5524	0.6931	11.8110
Total assets	13,657	2.0407	0.0593	7.8999	0.0001	71.8000
Total assets (State)	2,759	8.3580	1.2308	2.4709	0.0001	71.8000
Size	13,613	11.2514	10.9995	2.6096	5.4293	18.0896
Size (State)	2,757	13.9124	14.0312	2.4709	7.0851	18.0896
Benefit Payment	20,102	0.1649	0.1414	0.1161	0.0052	0.8685
Benefit Payment (State)	3,181	0.1932	0.1570	0.1465	0.0052	0.8685
Democrats Treasurers	7,958	0.5322	1.0000	0.5000	0.0000	1.0000
Republican Treasurers	7,958	0.3556	0.0000	0.4787	0.0000	1.0000
Third Party Treasurers	7,958	0.1122	0.0000	0.3156	0.0000	1.0000
Treasurer Changes	7,958	0.2217	0.0000	0.4154	0.0000	1.0000
Corruption	20,193	0.0356	0.0322	0.0233	0.0000	0.1417

Panel C. Selected Correlations for PPD Data

	Return	Corrupt. measure	Inv Expense	Admin Expense	Benefit Payment	Stocks	Bonds	Cash	Alter.	Other Inv,	Size	Ln (Retirees)
Corruption	-0.0343	1.0000										
Invest. Expenses	-0.1178	-0.0259	1.0000									
Admin. Expenses	-0.0146	0.0501	0.1625	1.0000								
Benefit Payment	-0.0390	-0.2382	0.0084	-0.1481	1.0000							
Stocks	0.2301	0.0671	-0.0482	-0.0324	0.0183	1.0000						
Bonds	-0.0900	-0.0360	-0.0994	0.0001	-0.1901	-0.5792	1.0000					
Cash	-0.0270	-0.0138	-0.1435	-0.0694	0.0343	-0.3392	0.0877	1.0000				
Alternatives	-0.0953	0.0421	0.1927	0.0255	0.1072	-0.1827	-0.2450	0.0899	1.0000			
Other Inv.	-0.0941	-0.0459	0.0278	-0.0000	0.0478	-0.3370	-0.2180	-0.0187	-0.1592	1.0000		
Size	0.0337	-0.1578	0.0104	-0.2630	0.2813	0.0850	-0.1780	0.0000	0.1397	-0.0257	1.0000	
Ln(Retirees)	-0.0171	-0.0843	0.0295	-0.2093	0.0345	0.1173	-0.1292	0.0200	0.1571	-0.1080	0.8932	1.0000
Board	0.0086	0.0832	0.0954	-0.1098	-0.0047	0.0245	-0.0719	-0.0751	-0.0259	0.0471	-0.0064	-0.0050

Table II. Return Regressions

Panel A: PPD Data from the Center for Retirement Research at Boston College

	Pooled Regressions				Fixed-Effects		
					State Dummies	Pension Dummies	
	1	2	3	4	5	6	7
Corruption	-0.0221[b]	-0.0237[b]	-0.0226[a]	-0.0317[b]	-0.1250[c]	-0.0903[a]	-0.1087[c]
	(-2.04)	(-2.10)	(-1.86)	(-2.28)	(-3.76)	(-1.84)	(-3.32)
Ln (Retirees)	-0.0023[a]	-0.0020[a]		-0.00285[b]	-0.0038[a]	0.0120[a]	0.0229[b]
	(-1.95)	(-1.70)		(-2.02)	(-1.81)	(2.22)	(2.38)
Funding ratio		0.0018	0.0028	-0.0050	-0.0192		0.01560
		(0.15)	(0.34)	(-0.51)	(-1.34)		(0.41)
Size			-0.0007				
			(-0.56)				
Board size		0.0004	0.0004	0.0004	0.0001		
		(1.11)	(1.06)	(0.89)	(0.11)		
Board Composition		-0.042	-0.0030	-0.0049	0.0131		
		(-0.70)	(-0.49)	(-0.68)	(0.83)		
Investment Council		0.0014	0.0019	0.0039	0.0013		
		(0.45)	(0.62)	(0.83)	(0.18)		
Treasurer Changes		-0.0070	-0.0071	-0.0182[b]	-0.0182[b]		-0.0181[b]
		(-1.28)	(-1.29)	(-2.39)	(-2.20)		(-2.35)
Republican Treasurer		0.0028	0.0027	0.0166	-0.0136		-0.0039
		(0.74)	(0.72)	(0.29)	(-1.42)		(-0.43)
Third Party Treasurer		0.0022	0.0019	-0.0002	-0.0182[b]		0.0197[b]
		(0.66)	(0.57)	(-0.03)	(-2.25)		(2.07)
Stocks				0.0465	0.2539[b]		0.6221[c]
				(1.09)	(2.34)		(2.76)
Bonds				0.0427	0.2430[b]		0.4157[b]
				(1.35)	(2.46)		(2.13)
Alternatives				0.1195[b]	0.2838[c]		0.5993[c]
				(2.66)	(2.71)		(2.71)
Other Investments				0.0670	0.2687[b]		0.5857[b]
				(1.14)	(1.99)		(2.23)
Cash				-0.0671	0.1401		0.3883[a]
				(-1.14)	(0.97)		(1.66)
Investment Expenses				-0.0103[b]	-0.0202[b]		-0.02157
				(-2.14)	(-2.39)		(-1.48)
Administrative Expenses				-0.0084	-0.0629		-0.0674
				(-0.73)	(-1.26)		(-1.05)
Corruption× Investment Council				-0.1128	0.0202		
				(-1.41)	(0.17)		

Corruption× Treasurer Changes				0.3159[b] (2.10)	0.3202[a] (1.90)		0.3427[b] (2.17)
Corruption× Republican Treasurer				0.0171 (0.17)	0.1563 (1.06)		0.1051 (0.69)
Corruption× Third Party Treasurer				-0.0432 (-0.266)	0.0785 (0.43)		0.0861 (0.53)
State dummies	No	No	No	No	Yes	No	No
Observations	1, 118	1,103	1,105	1,051	1,051	1, 118	1,055
R^2	0.7118	0.7151	0.7150	0.7094	0.7237	0.7213	0.7365

Panel B: Census Bureau Data

	Pooled Regressions				Fixed- Effects		
					State Dummies		Pension Dummies
	1	2	3	4	5	6	7
Corruption	-0.0738[c]	-0.0735[c]	-0.0924[c]	-0.1457[c]	-0.1752[c]	-0.1079[c]	-0.1619[c]
	(-3.05)	(-3.03)	(-3.17)	(-3.22)	(-2.82)	(-3.54)	(-3.45)
Ln (Retirees)	0.0021[c]		0.0012[c]	0.0012[c]	0.0012[c]	0.0030	0.0013[c]
	(9.84)		(4.90)	(5.00)	(4.14)	(1.24)	(5.23)
Size		0.0017[c]					
		(8.09)					
Treasurer Changes			-0.0059[c]	-0.0135[c]	-0.0125[c]		-0.1315[c]
			(-3.48)	(-4.43)	(-3.67)		(-4.29)
Republican Treasurer			0.0090[c]	0.0053[a]	0.0126[c]		0.0057[b]
			(5.68)	(1.89)	(3.21)		(2.02)
Third Party Treasurer			-0.0002	0.0107[c]	0.0350[c]		0.0012[c]
			(-0.10)	(3.10)	(4.92)		(3.53)
Corruption×				0.2543[c]	0.2362[c]		0.2488[c]
Treasurer Changes				(3.40)	(2.92)		(3.31)
Corruption×				0.1013[a]	0.0734		0.1171[a]
Republican Treasurer				(1.65)	(0.97)		(1.88)
Corruption×				-0.4409[c]	-0.5896[c]		-0.4608[c]
Third Party Treasurer				(-3.88)	(-4.77)		(-4.06)
State dummies	No	No	No	No	Yes	No	No
Observations	13, 404	13,404	7,831	7,831	7,831	13,404	7,831
R^2	0.3385	0.3369	0.3960	0.3976	0.4087	0.3593	0.4412

The dependent variable, Return, is the time-weighted rate of return for Panel A, and earnings on investments divided by total assets in Panel B. Corruption is equal to the number of federal corruption convictions divided by state population in the same period and then divided by 100. The funding ratio is defined as actuarial assets divided by actuarial accrued liabilities. Size is the log of the market value of total assets (in thousands of dollars). Board size equals the number of board members. Board Composition is the number of participants on the board divided by the number of board members. Investment Council and Treasurer Changes are dummy variables equal to one if the pension fund has a separate investment council, and whether there are changes in state treasurer, respectively. Republican Treasurer and Third Party Treasurer are dummy variables equal to one if the treasurer belongs to the Republican or third party; these variables equal zero for Democratic Treasurers. Stocks, bonds, alternatives, other investments and cash are a fraction of total fund market values. For most pension plans alternatives represent more risky investments such as private equity and venture capital. Other investments typically include relatively less risky assets which target absolute return or inflation protection. Year dummies are included in all regressions. Investment and administrative

expenses are the amount of these expenses divided by market value of total assets and then multiplied by 100. The data in Panel B is winsorized at 0.5% in each tail. t-statistics are reported in parentheses. The notation a, b, c denotes significance at the 10% level, 5%, 1% level, respectively. Column 5 of panel A employs state level fixed-effects regressions, and Columns 6 through 8 of panel A employ pension level fixed-effects regressions with robust standard errors clustered by pension systems. The other models use OLS regressions with standard errors robust to heteroskedasticity and clustering by pension system.

Table III. Asset Class Holding Regressions

	Stocks	Bonds	Alternatives	Other Investments	Cash
Corruption	0.1136[c]	-0.0575	0.0659[a]	-0.0540	-0.0008
	(2.97)	(-1.60)	(1.67)	(-1.35)	(-0.04)
Ln (Retirees)	0.0111[a]	-0.0113[b]	0.0159[b]	-0.0050	0.0007
	(1.82)	(-2.10)	(2.44)	(-0.94)	(0.32)
Funding ratio	-0.0015	-0.0344	-0.0090	0.0441	0.0037
	(-0.03)	(-0.72)	(-0.22)	(1.05)	(0.23)
Board size	0.0001	-0.0027	0.0020	-0.0006	-0.0003
	(-0.03)	(-0.91)	(0.82)	(-0.29)	(-0.42)
Board Composition	0.0473	-0.0411	-0.0731[a]	0.0542[a]	-0.0148
	(1.23)	(-1.39)	(-2.11)	(1.79)	(-1.00)
Investment Council	-0.0183	-0.0060	0.0084	0.0149	0.0047
	(-0.78)	(-0.25)	(0.53)	(1.07)	(0.75)
Treasurer Changes	0.0106[a]	-0.0202[c]	0.0198[b]	-0.0002	-0.0010
	(1.68)	(-3.28)	(2.47)	(-0.03)	(-0.36)
Republican Treasurer	0.0000	0.0040	0.0302[b]	-0.0335[c]	0.0068[a]
	(0.00)	(0.22)	(2.06)	(-2.58)	(1.77)
Third Party Treasurer	0.0060	0.0000	0.0539	-0.0686[c]	0.0075
	(0.38)	(0.00)	(1.99)	(-2.90)	(1.03)
Observations	1,103	1,103	1,103	1,103	1,103
R^2	0.1304	0.0974	0.1619	0.1528	0.0498

The dependent variables are the market values of stocks, bonds, alternatives, other investments and cash, as a fraction of total fund market values. For most pension plans alternatives represent more risky investments such as private equity and venture capital. Other investments typically include relatively less risky assets which target absolute return or inflation protection. Corruption is equal to the number of federal corruption convictions divided by state population in the same period and then divided by 100. The funding ratio is defined as actuarial assets divided by actuarial accrued liabilities. Board size equals the number of board members. Board Composition is the number of participants on the board divided by the number of board members. Investment Council and Treasurer Changes represent dummy variables for whether the pension fund has a separate investment council, and whether there are changes in treasurer, respectively. Democratic Treasurer and third party Treasurer are dummy variables equal to one for republican and third party treasurers. Year dummies are included in all regressions. t-statistics are reported in parentheses. The notation a, b, c denotes significance at the 10% level, 5%, 1% level, respectively. These regressions use a Tobit model where the standard errors are clustered by pension system. The reported R^2 are obtained from an OLS model with the same independent and dependent variables.

Table IV. Benefit Payment Regressions

Panel A: PPD Data from the Center for Retirement Research at Boston College

	Pooled Regressions			Fixed-Effects			
				State Dummies		Pension Dummies	
	1	2	3	4	5	6	7
Corruption	-0.2628[c]	-0.2616[c]	-0.2644[c]	-0.0100	-0.0010	0.0013	0.0048
	(-10.52)	(-9.99)	(-9.96)	(-0.95)	(-0.09)	(0.21)	(0.75)
Ln (Retirees)	0.0000	-0.0014	-0.0016	-0.0121	-0.0165[b]	-0.1113[c]	-0.1136[c]
	(0.00)	(-0.22)	(-0.27)	(-1.54)	(-2.14)	(-4.49)	(-4.80)
Board size		-0.0009	-0.0012		0.0099[b]		
		(-0.38)	(-0.52)		(2.10)		
Board		0.0490	0.0564[a]		0.0238		
Composition		(1.63)	(1.87)		(0.41)		
Investment Council		-0.0251	-0.0287[a]		-0.0211		
		(-1.65)	(-1.92)		(-0.86)		
Investment Expenses		-0.0016	-0.0008		-0.0195		0.0051
		(-0.08)	(-0.04)		(-1.04)		(1.31)
Administrative		-0.0965[c]	-0.0955[b]		-0.1373		-0.0025
Expenses		(-2.26)	(-2.22)		(-1.49)		(-0.28)
Treasurer Changes			0.0063		0.0053[a]		0.0033[a]
			(0.97)		(1.97)		(1.98)
Republican Treasurer			-0.0144		-0.0079[b]		-0.0021
			(-1.22)		(-2.13)		(-0.54)
Third Party Treasurer			0.0089		0.0017		0.0088[a]
			(0.53)		(0.25)		(1.96)
State dummies	No	No	No	Yes	Yes	No	No
Observations	985	937	937	985	937	985	937
R^2	0.1047	0.1585	0.1674	0.4712	0.5277	0.5887	0.5942

Panel B: Census Bureau data

	Pooled Regressions			Fixed-Effects			
				State Dummies		Pension Dummies	
	1	2	3	4	5	6	7
Corruption	-0.3099[c]	-0.3652[c]	-0.6308[c]	-0.1896[c]	-0.0483	-0.1481[c]	-0.0105
	(-3.37)	(-3.67)	(-4.98)	(-4.40)	(-1.19)	(-4.13)	(-0.37)
Ln (Retirees)	-0.0038[c]		-0.0044[b]	-0.0090[c]	-0.0104[c]	-0.0585[c]	-0.1332[c]
	(-2.47)		(-2.29)	(-5.02)	(-4.57)	(-3.95)	(-4.61)
Size		0.0066[c]					
		(4.89)					
Treasurer Changes			0.0054		-0.0010		0.0000
			(1.23)		(-0.47)		(0.02)
Republican Treasurer			0.0161[b]		-0.0073[b]		-0.0076[c]
			(2.16)		(-2.22)		(-3.02)
Third Party Treasurer			0.0029		0.0157[a]		0.0015
			(0.29)		(1.70)		(0.32)
State dummies	No	No	No	Yes	Yes	No	No
Observations	9,801	8,381	4,221	9,801	4,221	9,801	4,221
R^2	0.1601	0.1497	0.0497	0.3226	0.2618	0.5048	0.3834

The dependent variable is Benefit payments, equal the ratio of total payments to the number of retirees divided by 100. Corruption equals the number of federal corruption convictions divided by state population in the same period and then divided by 100. Board size equals the number of board members. Board Composition is the number of participants on the board divided by the number of board members. Administrative expenses are the amount of these expenses divided by market value of total assets and then multiplied by 100. Investment Council and Treasurer Changes are dummy variables equal to one if the pension fund has a separate investment council, and of there are changes in treasurer, respectively. Republican Treasurer and Third Party Treasurer are dummy variables equal to one if the Treasurer is a Republican or from a third party. Investment and administrative expenses are the amount of these expenses divided by market value of total assets and then multiplied by 100. Year dummies are included in all regressions. t-statistics are reported in parentheses. The notation a, b, c denotes significant at the 10% level, 5%, 1% level, respectively. Columns 1 through 3 of Panel A and Panel B report OLS regressions with standard errors robust to heteroskedasticity and clustering by pension system. Columns 4 and 5 report state level fixed-effects regressions, and Columns 6 and 7 report pension level fixed-effects regressions with robust standard errors clustered by pension systems.