

Public choice theory (PCT) assumes that elected officials and public administrators act in their self-interest, not in the public interest. This article tests the theory regarding the effects of public governance on U.S. public pension plans, which are increasingly important socioeconomic institutions. The authors develop several PCT-based hypotheses regarding the dependent variable of plan funding, a measure of plan performance. Data sources include biennial PENDAT survey data for 1992-1996. The results indicate limited support for PCT. A positive relationship between the presence of boards of trustees and plan funding is found, but no relationship between citizen voting and plan funding.

PUBLIC CHOICE ECONOMICS AND PUBLIC PENSION PLAN FUNDING An Empirical Test

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Within the past few decades, earlier projections regarding the potential growth and impact of institutional owners (Berle, 1959; Drucker, 1976; Herman, 1981) have come to fruition. Nearly 60% of the equity of the thousand largest U.S. companies is now owned by financial institutions (Useem, 1998). This relatively concentrated ownership enables institutional owners to be a significant force in financial markets, where institutional trading has been associated with increased price swings and market volatility (Brown & Brooke, 1993; Norris, 1996; Schwartz, 1991). Studies indicate that some institutional owners, particularly public pension plans and select mutual funds, actively assert their power by influencing the strategy of targeted firms in hopes of improving corporate performance (Nesbitt, 1997; Smith, 1996; Useem, Bowman, Myatt, & Irvine, 1993; Wahal, 1996).

In part due to institutional owner pressures, there is now great emphasis on corporate performance, evidenced in the focus on maximizing shareholder value (MSV) (Hoskisson & Hitt, 1994; Useem, 1993, 1995). Curiously, given the institutions' influential role in the focus on MSV, there has been relatively less emphasis on institutional owner performance, particularly that of pension plans. This article addresses this gap in the research by presenting an empirical study of public pension plan funding, a dimension of plan performance. Public pension plans, which include state and municipal plans, are among the largest of institutional owners ("The Largest Pension Plans," 1998), and some, such as CalPERS, have been the most vocal of institutions in corporate performance and governance debates. Plan funding, also known as plan stock funding, is a measure of a plan's estimated ability to meet its financial obligations, the stream of current and future payments due to retirees. Previous funding problems among state and municipal plans have been largely ameliorated in the past two decades (Schwimmer, 1993; Zorn, 1997), but there is still a troubling level of underfunding among a number of plans (Dulebohn, 1995; Rubin, 1996).

The article addresses the following research question: How does the public governance of public pension plans affect plan funding? The study's theoretical grounding is public choice theory (PCT), a theory rooted in the assumptions and methodology of the field of economics that is applied to political science and public administration. One of the basic tenets of PCT is that elected officials and public administrators tend to act in their own self-interest, rather than in the interest of the public. Thus, we test whether an economic theory based on such an assumption offers prediction regarding the behavior of elected officials and public administrators in terms of public pension plans. The study makes use of *PENDAT* (pension data) survey data of several hundred pension plans, the *Statistical Abstract of the United States*, and *America Votes*.

This study makes two contributions. First, it develops an empirical test of public choice theory. Second, it increases our understanding of public pension plans, one of the major types of institutional owners that has heralded migration from the age of "managerial capitalism" (Berle & Means, 1932/1991) to that of "investor capitalism" (Useem, 1995). Adequate funding of pension plans is important not simply to plan members but to society as well, due to the potential liabilities that loom with underfunding (E. P. Davis, 1995; Lynn, 1983; Schwarz, 1995).

PUBLIC CHOICE THEORY

Public choice theory uses the assumptions and techniques of the field of economics to describe, analyze, and predict behavior in public-sector democracies. The theory is associated with the mid-20th-century seminal works of Nobel prize winner James Buchanan and Gordon Tullock. It has been credited as a major theoretical foundation inciting reflection on the size and functioning of government. Indeed, the theory has been both praised and condemned for sparking the worldwide movement toward government reform (Aucoin, 1990; Brudney, Herbert, & Wright, 1999; Gray & Jenkins, 1995).

Behavioral assumptions in PCT rest on the tenets that characterize the field of economics within the social sciences. The theory focuses on the individual as the unit of analysis (known as methodological individualism) and assumes that individuals demonstrate rational behavior by seeking to maximize their utility (Mueller, 1976, 1989). It is thus thought that individuals are motivated by their own self-interest (Buchanan & Tullock, 1962). Importantly, and in direct tension with traditional theories within political science and public administration, PCT views other units of analysis as neither distinct from, nor greater than, the individuals who comprise the unit. Accordingly, society as a unit of analysis, couched in terms of public interest, cannot be treated as distinct from the aggregate public interests of individuals within the society, which are expressed through the voting process. PCT holds that elected officials and government bureaucrats who claim to be motivated by public interests expressed outside of the voting process are instead seeking to maximize their self-interest and are using the public sector as their venue for doing so under the guise of the public interest.

As an economic theory, PCT is characterized by a contractual approach to relationships, principal-agent models, and a focus on hierarchical control (Moe, 1984). Agency theory is based on a dyadic contract between two parties, the principal and the agent. There may be a divergence in the self-interests of the parties, referred to as the agency problem, which results in agency costs to the principal. Agency costs can be reduced by both principal monitoring of the agent and incentive systems that align the principal's and agent's self-interests (Arrow, 1985; Eisenhardt, 1989; Jensen & Meckling, 1976).

CONSTITUTIONAL DEMOCRACY AND THE ELECTION PROCESS

Public choice theory determines that constitutional democracy rests on informed citizen voting. If citizens vote and put sufficient effort into researching voting choices, democracy will work in the manner prescribed by the U.S. Constitution. However, several severe flaws emerge in voting processes. First, there is a substantial private cost to citizens in researching the issues, and individual citizens may have little, if any, direct benefit from the voting outcome. Many citizens make less investment in researching voting issues than is optimal based on their self-interests, and this may result in ill-conceived decisions. Second, democracy is plagued with low voter turnout, as citizens realize they know little about the issues and will be little affected by voting decisions. The end result is that voters will make choices that are socially nonoptimal (Tullock, 1971). Voting may distort citizen preferences and promote fragmentation and co-optation by special interests (Shepsle & Weingast, 1981).

A large focus of PCT has been on voting patterns and outcomes (Mueller, 1976). Although much of this is outside the scope of this study, two conclusions are relevant here. First, voter apathy allows elected officials to engage in self-interested behavior. This is manifested in tendencies to increase the size, scope, and autonomy of government and hence the politicians' power (Rehfuss, 1973). Second, as elected officials often seek reelection, they have a self-interest in being sensitive to voters (Rehfuss, 1973). The voting process, although highly flawed, provides a check on elected officials' tendencies toward maximizing their self-interest at the expense of voter concerns. Voting thus serves as an agency control exercised by citizens (principals) over their elected officials' (agents') tendency toward self-serving behavior.

PUBLIC-SECTOR TRANSACTIONS AND PUBLIC BUREAUCRACIES

In addition to its theorizing on constitutional democracy and voting, PCT is also a theory of public bureaucracy (Levy, 1995; Niskanen, 1971). PCT contrasts with other theories in management and public administration, including rational models, in which bureaucrats will heed the directives of those in authority positions (Simon, in C. R. Davis, 1996), and public administration models, in which bureaucrats will act in the public interest (Cook, 1998; Selden, Brewer, & Brudney, 1999). Public administration theory holds that there is a dichotomy in the public sector; those who are elected to office make policy based on voting outcomes, and those

who are employed in public bureaucracies or agencies administer the policies established by elected officials. Although this dichotomy is a mainstay of public administration, there is a sense that the distinction between the two areas of responsibility is often breached (Box, 1999; Cook, 1998). First, elected officials are often dependent on the experience and expertise of government bureaucrats, and this may give the bureaucrats power over the officials. Second, administrative considerations should rightfully inform policy making, so that bureaucrats will thus wield some influence in policy making.

In contrast to public administration theories that interpret bureaucratic influence on policy making as acceptable if not desirable, PCT views bureaucratic influence in agency terms. At issue, from a PCT perspective, is that bureaucrats (agents) are often running the government, and it is assumed that they are motivated to maximize their self-interest. Current government reform movements are based on increasing the distinction between the elected polity and nonelected administration (Gray & Jenkins, 1995). Furthermore, any government bureaucracy has several principals, including voters, elected politicians, congressional committees, and those citizens using the bureaucracy's services. Control is undermined by multiple-agent relationships (Moe, 1984), as the myriad of relationships clouds the bureaucrat's accountabilities to its various principals or stakeholders and allows for greater latitude in pursuing the bureaucrat's goals (Johnson, 1991).

From a PCT perspective, although their role is to administer policy, bureaucrats are often involved in policy setting, using their specialized knowledge to influence and constrain legislators' options (Moe, 1984; Niskanen, 1971). And, unlike elected officials and political appointees involved in administration, who do have some accountability to voters, public-sector career bureaucrats have virtually no controls on their self-serving behavior. Government bureaucrats are generally protected by civil service, so their positions and compensation are shielded from market forces (Migue & Belanger, 1974). They are not primarily concerned with the efficiency of their bureau or agency; compounding this is the difficulty of defining, measuring, and monitoring the outputs of public bureaucracies (Niskanen, 1971). Because of their self-interests, bureaucrats favor program expansion, larger budgets, and increased opportunities to exert power and influence (Moe, 1984; Niskanen, 1971; Rehfuss, 1973). Given that both elected officials and bureaucrats will tend toward their own self-interests but that the voting process serves as a control on elected officials, whereas bureaucrats face no such control, PCT favors centralization

of government power under elected officials, rather than decentralization toward bureaucrats (Aucoin, 1990).

PUBLIC PENSION PLANS

U.S. pension plans, both public and private, have a legal obligation to provide income to participants during their retirement (Kidwell, Peterson, & Blackwell, 1993). The inception of public plans, which cover state, county, and municipal workers, including administrators, teachers, police, and firefighters, is traced to the influence of the Carnegie Foundation. The foundation espoused that the plans would be in the best interests of society, through the improvement in education and other government services (Pritchett, 1930). Public pension plans have come to total approximately \$1,306 or 23.2% of the \$5,625 billion in equity owned by institutions (Securities Industry Association, 1999).

Public pension plans are sponsored by the involved government body, are generally governed by a board of trustees, and are administered either by the sponsor or by an independent legal entity. They generally accrue contributions made by the plan sponsor (i.e., the state or municipality) and beneficiaries to an investment portfolio. Income earned through investment of the portfolio generates an additional source of funds available for required retirement payments. Uses of plan funds consist of current and estimated future payments to retired beneficiaries. The estimate of sources and uses of funds is inexact in nature, resting on a series of economic and demographic actuarial assumptions, such as expected investment return, employee longevity, and employee turnover, as well as the actuarial methods that are selected by plan management (Ives, 1996; Mitchell & Smith, 1994; National Governors Association, 1978; Patterson, 1982). A plan's ability to meet its obligations to members is measured by its funding level, the ratio of its financial assets at market value to the present value of its estimated liabilities. The lower the ratio, the lower the plan funding.

Compared to private-sector organizations, public-sector organizations are subject to a wider variety of political interests, which tends to result in greater goal ambiguity (Perry & Rainey, 1988; Ring & Perry, 1985). As public-sector organizations, public pension plans are largely financed by tax dollars through a budgetary appropriation process that places them in competition with other government programs. The public nature of the plans means that many stakeholders believe they have a right to influence

plan policies and will seize the opportunity to do so. The result is that decisions that might seem to be clear-cut (e.g., to contribute to the plan as is actuarially determined) are far from clear. In this regard, several state plans have taken legal action against their sponsors, with the goal of establishing beneficiary rights over the plan and outlawing government raids on public pension plans (Naese, 1996; Woods, 1996).

Unlike private pension plans governed by federal Employee Retirement Income Security Act (ERISA) regulations, the legal environments governing public plans widely vary; there is no equivalent federal standard (Martin, 1990; Romano, 1993a, 1993b). Public plan requirements are often less stringent than ERISA and may thus result in underfunding (Clark, 1991; Greenwich Associates, 1996; Kidwell et al., 1993). In recent years, the corporate sector has experienced great momentum in pension plan movement from *defined benefit plans*, in which investment risk is borne by the plan sponsor, to *defined contribution* or *hybrid plans*, in which investment risk is shifted and is borne by the plan member (Bodie, Marcus, & Merton, 1988; Bodie & Papke, 1992). Although some public plans are defined contribution (Crane, 1995; Darby, 1995), the vast majority of public plans remain defined benefit (Zorn, 1996, 1997). This means that shortfalls in public plan funding will ultimately be the responsibility of the plan sponsors, who will have to fill the future gap that will be due to current, inadequate accruals.

PUBLIC CHOICE THEORY AND PUBLIC PENSION PLAN FUNDING

As the investment risk of public pension plans is borne by the plan sponsor, and as sponsor contributions to public pension plans are indeed funded by taxpayer/voters, the risk of pension plan underfunding greatly affects taxpayer/voters. The looming negative effects of underfunding of pension plans and Social Security, given the trend of an aging population, have received much exposure (Gotschall, 1998; Mitchell & Quinn, 1996; Mitchell & Zeldes, 1996). We offer that based on their burden in funding public pension plans, as well as the publicity regarding the negative effects of underfunding, taxpayer/voters will, in general, favor full funding of the plans. However, the tendency to favor full funding will decline when the level of plan benefits is high (i.e., when the plan is relatively costly to taxpayers).

THE ADMINISTRATION AND GOVERNANCE OF PUBLIC PENSION PLANS

According to PCT logic, although there are agency costs associated with elected officials, these officials are also assumed to desire reelection to their positions and thus may be somewhat inclined toward full funding of pension plans in response to voter concerns. Elected officials will tend to favor centralized control of the plan by the state or municipal government sponsor, placing the plan under greater control by themselves, rather than decentralized control under plan bureaucrats or administrators. In contrast, bureaucrats involved in pension plan administration will tend to favor decentralization of public pension plans, with less plan policy made by elected officials and more by themselves. They will also tend to favor larger, more generous plan benefits for public employees that tend to result in underfunding. Decentralization of public pension plan administration will thus be associated with relatively greater agency costs, manifested in greater pension plan underfunding, than will centralization.

The boundary or demarcation between a sponsor and its pension plan has historically not been defined clearly in law, despite early discussions that this should be so to protect the plan and its assets from misuse (Harbrecht, 1959; Pritchett, 1930). ERISA legislation created a more discernible boundary for private plans by requiring the clear separation and management of pension funds from sponsor funds. Its features include fiduciary standards, minimum funding standards, and portability, vesting, and reporting requirements ("ERISA Turns 20," 1994; Hawksley & Wells, 1996). However, boundaries generally remain indistinct for public pension plans. Although some are administered by a legal entity that is separate from the sponsor, others are administered by the sponsor. In the former case, there is a greater degree of plan autonomy, but in the latter, the plan is under the control of the sponsor.

Williamson (1991) theorizes that among the governance structures of market, hierarchy, and hybrid modes, hierarchy (or organization) is characterized by the greatest degree of administrative control. In our application of PCT to public pension plans, hierarchy occurs when the plan is administered within the sponsor's organization rather than when the plan is administered by an autonomous unit. Hierarchy will tend to be associated with greater control by elected officials, lower agency costs, and thus greater plan funding. Administrative autonomy, meaning greater control by plan administrators, will tend to be associated with less control by elected officials and more control by plan bureaucrats, relatively greater agency costs, and thus lower plan funding.

Hypothesis 1: There will be a negative relationship between the autonomy of plan administration from the plan sponsor and plan funding.

Public-sector and nonprofit organizations' boards of trustees have significant roles and responsibilities in the governance of their organizations, as boards of directors do in the private sector (Miller & Ropp, 1999). In the case of public pension plans, approximately 80% of the plans are governed by a board of trustees, who generally have responsibility for plan investment and benefits policy (Zorn, 1996).

From the perspective of public choice theory, public pension plan boards will tend to move plan decision making away from elected officials and government bureaucrats toward board members and also will monitor officials and bureaucrats to reduce agency costs. Although, per Hypothesis 1, agency costs associated with elected officials are expected to be less than those associated with bureaucrats, both groups' self-interests may represent significant agency costs. Due to their tendencies to overspend on projects more closely aligned with their self-interests, elected officials and bureaucrats may make decisions that lead to underfunded public pension plans. However, an autonomous board of trustees that is involved in and responsible for plan governance may tend to lobby for plan funding in the budgetary process, exemplifying how boards help to link their organization with its environment (Mintzberg, 1983) and serve to obtain resources (Pfeffer & Salancik, 1978). Thus, according to PCT, plans that are governed by a board of trustees will be better funded than plans without a board of trustees.

Hypothesis 2: There will be a positive relationship between the presence of a plan board of trustees and plan funding.

Public choice theory advances that elected officials do tend to respond to voter concerns. However, this response is not from a sense of altruism or dedication to the public good but rather from an interest in maintaining their elected positions. We put forth that given the recently well-publicized retirement cost burden brought about by an aging population (Gotschall, 1998; Mitchell & Quinn, 1996; Mitchell & Zeldes, 1996; U.S. General Accounting Office, 1996), there is some voter concern about the adequacy of plan funding. Accordingly, recent legislative action regarding public pension plans will be associated with greater or more adequate plan funding, as elected officials seeking to maintain their positions will address this voter concern.

Hypothesis 3: There will be a positive relationship between legislative action regarding public pension plans and plan funding.

PUBLIC PENSION PLAN FINANCIAL REPORTING

The close alignment of agency and public choice theories (Moe, 1984) allows us to include an agency-based proposition within a public choice study. As advanced by agency theorists, financial reporting tends to reduce agency costs by reducing information asymmetries, which favor agents over principals (Antle, 1982; Baiman, 1982). But there is no clear reporting standard for public pension plans. Unlike mutual funds that follow Securities & Exchange Commission (SEC) regulation or private pension plans that adhere to ERISA reporting standards, public plans may engage in surprisingly little financial disclosure (March, 1980). Although public pension plans do disclose their financial condition to local government bodies, this information may not be made readily available to plan stakeholders.

We propose that to the degree that public pension plan financial information is made readily available to stakeholders such as pension plan members, the greater will be the tendency for the reporting to serve as effective monitoring and the greater will be plan funding. Accordingly, public pension plans that disseminate their financial reports to stakeholders will tend to have lower agency costs and therefore greater funding than other plans. Inadequate report dissemination, on the other hand, shields agents from exposure and allows for increased information asymmetries, agency costs, and plan underfunding.

Hypothesis 4: There will be a positive relationship between greater pension plan financial reporting and plan funding.

PUBLIC PENSION PLAN MEMBER COMPOSITION

PCT assumes that public-sector employees will act to maximize their own self-interest and that those who are in powerful positions will tend to use their power toward this end, despite voter interests. In many states, public pension plan funding continues to be a discretionary budget item, which places plan funding in competition with other government programs. According to PCT, elected officials who are involved in decision making regarding discretionary budget items will tend to ensure that their own pension plans are well funded relative to the pension plans of other

public-sector employees such as teachers, police, and bureaucrats. Thus, pension plans whose membership consists of a greater proportion of elected officials will tend to have greater funding than pension plans with larger concentrations of other public-sector employees.

Hypothesis 5: There will be a positive relationship between the proportion of plan members who are elected officials and plan funding.

CITIZEN VOTING

PCT advances that elected officials respond to voter concerns not from a sense of altruism or dedication to the public good but rather from an interest in maintaining their elected positions. The voting process thus serves as a control on elected officials' self-serving tendencies. We offer that although adequate funding of public pension plans is neither a primary nor a unified issue among voters, pension plan funding is nonetheless a concern of voters, given that the financial scope of baby boomer retirement is well publicized and that taxpayers will largely bear the burden of underfunded public pension plans.

Participation of citizens in the voting process will influence the behavior of elected officials regarding pension plan funding, propelling elected officials toward plan governance structures and policies that are associated with full funding. We propose that the greater the degree to which eligible citizens engage in the voting process within a state, the greater will be the tendency for elected officials to heed citizens' concerns, and the greater will be the tendency toward full funding of public pension plans. If a relatively small proportion of citizens votes in local elections, the voting process will become less effective as a control on elected officials. This will be associated with greater spending on the part of elected officials, as this is their tendency according to PCT (Buchanan, in Levy, 1995), and will lead to lesser plan funding.

Hypothesis 6: There will be a positive relationship between citizen voting in local elections and public pension plan funding.

THE LEVEL OF PLAN BENEFITS

Public choice theory holds that elected officials and bureaucrats will tend toward program expansion requiring larger expenditures (Moe, 1984; Niskanen, 1971; Rehfuss, 1973). This tendency may be manifested

in relatively generous public pension plan benefits to plan members, leading to equity issues with taxpayers who fund the plans. Equity issues regarding the plans may indeed be significant. Although almost all civil servants have pension plan coverage, only about 40% of private-sector employees do, and the benefits paid under public plans are often higher (Zorn, 1995). The average cost of retirement benefits as a percentage of total compensation is greater for public than private plans (Zorn, 1995). Thus, we advance that the tendency of taxpayer/voters to favor full funding of public pension plans will be affected by the plans' level of benefits to plan members. If public plan benefits are very costly to taxpayers, the taxpayers will be less inclined to favor full funding. We propose that the more costly are public pension plan benefits to sponsors and hence to taxpayer/voters, the greater will be plan underfunding.

Hypothesis 7: There will be a negative relationship between the level of public pension plan benefits to members and plan funding.

THE FISCAL STATUS OF THE PLAN SPONSOR

As aforementioned, PCT holds that there is a tendency toward public-sector overexpenditures. This general tendency may tend to have a negative effect on plan funding, due to overexpenditures on other public budget items and a tendency to view pension plan funding as a discretionary rather than mandated budget item. In some states, there is either recent or pending legislation that requires that annual contributions be made to public pension plans at the actuarially determined amount (Woods, 1996). But in other states, contributions continue to be a discretionary budget item; it is not mandated that the sponsor contribute to the plan at the determined amount. Thus, public pension plan contributions may suffer due to the plan sponsor's expenditures in other programs.

As plan contributions are often at the discretion of the sponsor, we propose that the fiscal status of the sponsor (i.e., its level of indebtedness) will be a factor affecting plan funding. On one hand, sponsors facing a negative fiscal status, or greater indebtedness, have greater difficulty in balancing their budgets. State budget deficits impose economic pressure on plan contributions (Mitchell & Smith, 1994). Indeed, as stated earlier, several state plans have taken legal action against their sponsors to outlaw government raids on plans (Naese, 1996; Woods, 1996). Under this condition, contributions to the pension plan will tend to be less than the actuarially determined amount. Plan funding will therefore tend to be at less than the

full funding level, due to the inadequacy of contributions to the plan. On the other hand, budgetary pressures will be less acute for sponsors with a positive fiscal status, or less indebtedness. Under this condition, annual contributions to the plan will tend toward the actuarially determined amount, and plan funding will tend toward full funding.

Hypothesis 8: There will be a positive relationship between the fiscal status of the plan's sponsor and plan funding.

METHODS

DATA

We used three sources of archival data: *PENDAT* (Pension Data), the *Statistical Abstract of the United States*, and *America Votes* (Scammon, McGillivray, & Cook, 1996). *PENDAT* data are collected by the Government Finance Officers Association (GFOA), which conducts a biennial census of its members' pension plans. This study makes use of survey data for the years 1992, 1994, and 1996. The survey was mailed to approximately 800 systems and generated response rates that range from 40% in 1992 and 1994 to 32% in 1996. In general, respondents represent approximately 80% of state and local retirement system assets and 80% of plan members. The survey collects objective data on system administration and governance; accounting data regarding funding, investment, and expenses; and data on benefits to plan members. *PENDAT* offers better and more comparable information on public pension plans than was previously available (Mitchell & Smith, 1994). The *Statistical Abstract of the United States* was used for economic data. Data regarding state-level voting were obtained from *America Votes*.

MEASURES

Plan funding. We measured pension plan funding by the plan's assets at market value as a percentage of the AAL (actuarial accrued liability), referred to as PERAAL, and as a percentage of the PBO (pension benefit obligation), PERPBO. Both are accepted measures of plan funding (Bodie & Papke, 1992; Zorn, 1996). A value of 100 indicates full funding. As a result of the Government Accounting Standard Board's decision, plans were

no longer required to report on a PBO basis in 1996 (Dulebohn, 1995), despite that this was a more standardized measure. Thus, we make use of AAL data for 1992, 1994, and 1996 and PBO data for 1992 and 1994.

Plan governance. The autonomy of plan administration was measured by a categorical variable (ADMAUTO), indicating whether a plan is administered by an independent legal entity (ADMAUTO = 1) or not (ADMAUTO = 0). Plan governance autonomy was measured by a categorical variable (BOARD), indicating whether a plan is governed by an independent board of trustees (yes = 1, no = 0). Legislative action regarding plan contributions is measured by the categorical variable LEGCONRT; a value of 1 indicates recent legislative action, and 0 indicates no recent legislative action.

Other independent variables. The categorical variable STATEMEM indicates whether a plan sends (STATEMEM = 1) or does not send (STATEMEM = 0) an annual statement of account to its members. We put forth that plan members are a party interested in monitoring plan funding based on their self-interests, so that the measure serves as an effective one regarding plan financial monitoring. TOTELECT is the percentage of plan members who are elected officials or are in the judicial branch of the government. VOTELOC is the percentage of eligible citizens who vote in local elections per state. We used the percentage that voted in 1994 local elections for the three time periods of the study: 1992, 1994, and 1996. We did this because 1992 and 1996 were presidential election years, and available voting data are for the national election. These data are not as relevant for our study as is citizen participation in local elections. The years in the study are sufficiently close that major changes in voting patterns should not be an issue.

We measured the level of plan benefits (PLANRATE) as the percentage of plan members' compensation contributed by the plan sponsor toward the pension plan. The average cost of retirement benefits as a percentage of total compensation is greater for public plans (Zorn, 1995), indicating the measure to be a legitimate one regarding the largesse of plan benefits.

The variable selected to measure the sponsor's fiscal status is STATEDBT, the per capita dollar amount of state debt. Local government debt is generally attributed to specific large-scale expenditures and excesses of expenditures over revenues (Reed & Swain, 1997). As overexpenditures are

associated with increased local debt, we propose that the greater is STATEDBT, the lower is the state's fiscal status. Given that state governments vary tremendously in size and that this size will be positively related to state population, we put forth that the per capita measure of state debt will provide a better comparison across the states than would the unadjusted state debt measure. Although many *PENDAT* survey plan sponsors are counties and municipalities, not states, we expect that the state-level economic indicator will also be applicable in these cases, measuring the general economic condition of the pension plan sponsor.

Control variables. LASTAAL is the percentage of AAL funding 2 years prior to the current year's measure, and LASTPBO is the similar measure of PBO funding. We anticipate that LASTAAL and LASTPBO will account for a significant percentage of the variance in their respective measures.

RISK is the standard deviation in plan investment return over the most recent 3 years, a measure of the risk of the plan's investment portfolio. A greater standard deviation indicates a greater level of risk. We employed a measure of plan investment risk because finance theory indicates that the greater the risk of the portfolio, the greater should be plan investment return (Berkowitz & Rowe, 1988; Miller, 1987), a component of plan funding. The standard deviation of return over time is the most common measure of volatility (Berkowitz & Finney, 1990; Gustofson & Lummer, 1996).

We controlled for plan size with LOGMEM, the log of plan membership. We used membership rather than plan asset value as a measure of plan size because the AAL and PBO funding measures include asset value.

We used two variables to control for plan membership composition for specific categories of public employees. TOTED is the percentage of members who are employed in education, and TOTSAFE is the percentage employed in public safety—generally, police officers and firefighters. This will allow us to ascertain the effect of plan membership composition on plan funding. Specifically, we will develop a comparison of the respective proportions of membership consisting of elected officials (TOTELECT), educators and safety personnel (both heavily unionized groups of public employees), and general administrators (the baseline case) with plan funding.

DATA ANALYSIS

The hypotheses were tested using pooled data from 454 plans in 1992, 460 plans in 1994, and 379 in 1996. The use of data for nonconsecutive years reduces the possibility of a spurious event damaging the study's internal validity; this method was also used in a recent private pension plan study (Datta, Iskandar-Datta, & Zychowicz, 1996). We used ordinary least squares (OLS) multiple-regression modeling. Models include data for defined benefit plans and exclude the few defined contribution plans in *PENDAT*.

Although some plans did respond to the survey in all 3 years, many others responded in 1 or 2 years only. Most *PENDAT* survey respondents failed to answer all questions in the survey, reflecting the missing observations typical of complex survey data (Lee, Forthofer, & Lorimor, 1989). Our regressions were run under the condition of no replacement of the missing dependent variable and the corresponding LASTAAL or LASTPBO measure, but with replacement of missing values for other independent variables with the mean for the variable. This condition generated an *n* of 593 for PERAAL and 314 for PBO, which are predictably below the full sample size. However, the sample size is sufficiently large to represent a sizable number of plans from which to make statistical inference.

RESULTS

Table 1 reports descriptive statistics and the correlation matrix. Table 2 lists the regression models that emerged from the data for the AAL and PBO measures (columns 1 and 2, respectively). The beta values and standard errors (within parentheses) are included. The Durbin-Watson statistics for the two models are 1.615 and 1.773, respectively, indicating that autocorrelation is low enough to avoid rejection of the null hypothesis of no autocorrelation (Kmenta, 1986).

As anticipated, we found that the previous funding measures (LASTAAL and LASTPBO) were positively related to current funding (see Table 2) for the AAL and PBO measures. We found no relationship between portfolio risk and plan funding. There was partial support of a negative relationship between plan size and funding (AAL measure), indicating that pension plans with greater membership may experience greater underfunding, as was found by Mitchell and Smith (1994). Neither of the pension plan membership control variables was significant.

TABLE 1
Descriptive Statistics and Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AAL, PBO measure (PERAAL, PERPBO)														
2. Previous AAL/PBO (LASTAAL, LASTPBO)	.76***													
3. Portfolio risk (RISK)	.06	.04												
4. Size (LOGMEM)	-.02	.01	.08											
5. % Education (TOTED)	-.04	.00	-.05	.51***										
6. % Safety (TOTSAFE)	-.07	-.08	-.01	-.38***	-.34***									
7. Administrative autonomy (ADMAUTO)	-.01	-.05	.10	.09*	.13**	.00								
8. Board of trustees (BOARD)	-.11**	-.31***	.00	-.05	-.04	-.02	.10*							
9. Legislative activity (LEGCONRT)	.08	.02	-.06	-.04	.01	.07	-.07	-.16***						
10. Statement to member (STATEMEM)	-.10	-.16**	.04	-.06	.00	.11	-.08	-.24***						
11. % Elected/judicial (TOTELECT)	.14**	.08	.14**	.21***	.14**	-.21***	.08*	.00	.04					
12. % Local voting (VOTELOC)	.13*	.17**	-.01	.18**	.16**	-.19**	.00	-.01	-.01					
	-.20**	-.15***	.01	-.34***	-.14**	-.20***	-.08	.01	.04	.04				
	-.20**	-.15**	-.09	-.33***	-.14*	-.21***	-.07	-.06	.11	-.01				
	-.04	-.01	.05	-.04	.04	-.04	-.12**	-.02	.06	.14**	.05			
	-.07	.00	.05	.00	.06	-.06	-.17**	-.01	.17**	.15**	.05			

TABLE 1 Continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
13. % Sponsor contribution (PLANRATE)	-.28***	-.23***	-.03	-.19***	-.05	.18***	-.02	.04	.15**	-.11**	.21***	-.02		
	-.42***	-.40***	.10	-.28***	-.18**	.30***	.02	.00	.16**	-.19**	.27***	.01		
14. State per capita debt (STATEDBT)	-.07	.01	-.07	-.01	.04	-.03	-.13**	-.11**	-.03	.10*	.04	.18***	-.01	
	-.19**	-.05	-.15	.01	.05	-.06	-.16**	-.03	-.07	.13*	.07	.21***	.04	
Mean	86.66	85.84	8.70	3.66	.16	.32	.21	.94	.24	.88	.07	38.75	15.51	1596.46
	87.35	86.62	6.99	3.49	.16	.33	.17	.92	.30	.87	.08	39.00	16.74	1598.38
Standard deviation	27.26	34.26	3.42	1.14	.33	.45	.41	.24	.43	.32	.26	8.13	18.63	1102.12
	27.18	32.19	2.68	1.15	.33	.45	.38	.27	.46	.34	.26	8.29	15.70	1106.21
Number	593	593	353	584	582	576	593	593	520	583	587	591	563	589
	314	314	148	314	306	301	314	314	308	311	310	312	292	310

NOTE: AAL correlations appear first, with PBO correlations directly underneath. AAL = actuarial accrued liability; PBO = pension benefit obligation.
* $p < .05$. ** $p < .01$. *** $p < .001$.

TABLE 2
Regression Results

	<i>AAL Measure</i> (1992, 1994, 1996)	<i>PBO Measure</i> (1992, 1994)
Control variables		
Previous AAL, PBO measure (LASTAAL, LASTPBO)	.596*** (.022)	.606*** (.032)
Portfolio risk (RISK)	.172 (.263)	.938 (.520)
Size (LOGMEM)	-2.249** (.810)	-1.774 (1.087)
% Education (TOTED)	-2.814 (2.469)	2.633 (3.508)
% Safety (TOTSAFE)	-3.151 (1.899)	-2.056 (2.657)
Independent variables		
Administrative autonomy (ADMAUTO)	.589 (1.743)	-4.994 (2.579)
Board of trustees (BOARD)	14.022*** (3.078)	7.669* (3.652)
Legislative activity (LEGCONRT)	6.817*** (1.762)	2.988 (2.218)
Statement to members (STATEMEM)	7.875*** (2.281)	1.312 (2.925)
% Elected/judicial (TOTELECT)	-12.429*** (3.192)	-7.771 (4.358)
% Local voting (VOTELOC)	-.123 (.087)	-.191 (.120)
% Sponsor contribution (PLANRATE)	-.146*** (.041)	-.212** (.073)
State per capita debt (STATEDBT)	-.002* (6.439E)	-.004*** (8.922E)
Number	593	314
Adjusted R^2	.63	.63
F	78.7***	42.5***
Durbin-Watson test statistic	1.615	1.773

NOTE: Entries are beta values, and numbers in parentheses are standard errors. AAL = actuarial accrued liability; PBO = pension benefit obligation.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 1, which predicted that plan administrative autonomy would be negatively related to plan funding, was not supported, but Hypothesis 2, which predicted a positive relationship between the presence of a board of trustees and funding, was supported for both measures.

We found partial support for Hypothesis 3 (AAL measure only), which predicted a positive relationship between recent legislative action regarding plan contributions and plan funding. Thus, there is some suggestion that state legislators do respond to their constituencies' position favoring plan funding. We also found partial support for Hypothesis 4 (AAL measure only), with a positive relationship between pension plan financial statements sent to plan members and plan funding.

Hypothesis 5 predicted a positive relationship between the percentage of members who are elected officials and plan funding. We instead found evidence of a negative relationship for the AAL measure. This indicates, surprising in terms of PCT, that elected officials may not act in their own self-interest in pension plan funding because their pension plans are the least well funded of public employees. Furthermore, despite the importance of voting in PCT, Hypothesis 6 was not supported. Our data suggest no evidence that the greater the percentage of eligible citizens who vote, the greater will be elected officials' response to voters' position favoring pension plan funding.

There was support for Hypothesis 7, as we found a negative relationship between the level of plan benefits paid by the sponsor as a percentage of plan member salary and plan funding. Plans that provide more generous benefits to members tend to suffer from greater plan underfunding. Hypothesis 8 was also supported, as states with less per capita debt, having a better fiscal status, had greater plan funding.

For some independent variables, our analysis yielded different results for the AAL and PBO measures. In particular, Hypotheses 3 and 4 were supported based on the AAL measure but not based on the PBO measure. We offer three possible explanations for this result. The AAL measure is associated with a larger sample size, which might account for the statistical significance of some independent variables using this measure compared to PBO. The 1996 data, available for AAL but not for PBO, might tend to better support the hypotheses than data for 1992 and 1994, possibly due to events in that year vis-à-vis the other years. Last, the AAL measure of funding may be more sensitive to the independent variables than is the PBO measure of funding.

DISCUSSION

Public pension plans have used their sizable economic power to become the most active of institutional owners in pressing for improvements

in corporate governance and performance (Del Guercio & Hawkins, 1999; Smith, 1996; Useem et al., 1993; Wahal, 1996). Yet studies regarding the performance of public pension plans—using both a long-term measure of performance (plan funding) and short-term measures (plan expenses and plan investment return)—suggest that performance issues are significant in scope. Although the funding of public pension plans has improved greatly in the most recent decades, as indicated by the mean funding ratios in this study of 86.66% (AAL) and 87.35% (PBO), there is a troubling level of underfunding among a number of plans (Dulebohn, 1995; Rubin, 1996). Public pension plans have also been found to be administratively inefficient, resulting in unnecessarily large administrative expenses (Hsin & Mitchell, 1997). Regarding investment return, internally managed pension funds, particularly public ones, have been found to earn less than mutual funds, even when risk and return are held constant (Berkowitz, Finney, & Logue, 1988).

The purpose of this study was to test the ability of public choice theory to predict public pension plan funding. We did find support for some of our hypotheses. As was predicted, the presence of a board of trustees was associated with greater funding, indicating that boards are effective in guiding and constraining plan administrators. We also found that greater plan benefits and greater per capita state indebtedness were associated with lesser plan funding. Thus, there are limits to taxpayers' largesse regarding public pension plan funding. If elected officials and public administrators act irresponsibly with public-sector expenditures, resulting in pension plans that are very generous to plan members and costly to taxpayers or resulting in greater government indebtedness, pension plan funding will tend to suffer.

However, we did not find support for most of our hypotheses, including ones that we view as representing the basic tenets of PCT theory. Although the presence of boards of trustees was found to have a positive relationship with funding, there was no relationship between plan structure and funding. If elected officials are more responsive to voter concerns than are nonelected administrators, an assumption of PCT, structure should matter—that is, plans that are administered by the sponsor or governmental unit should have greater funding than plans that are administratively autonomous of the sponsor and therefore are less responsive to voters. Yet we found no relationship between autonomy and funding. Similarly, we found that citizen voting did not have a positive relationship with funding, and elected officials' self-interest was not manifested in a positive effect on pension funding; indeed, we found partial support of a negative

relationship between a greater proportion of elected officials as plan members and plan funding. The last two findings reflect the results of testing two of the basic tenets of PCT—that elected officials tend to act in their own interests more so than in the interests of others and that citizen voting serves as a curb on elected officials. Although our results reflect only one study and should not be the basis for generalizing about public-sector activity, they do cast some doubt on the appropriateness of the tenacity of PCT's behavioral assumptions.

Several other theoretically based rationales found in the literature regarding public pension plan performance focus on hypothesized influences or motivations affecting the plans' management process. We have categorized these rationales into political, fund value maximization, and institutional explanations of plan performance. Some researchers have theorized that public pension plans are unduly subject to the political interests of the plan sponsor. An early Carnegie Foundation report on public pension plans warned that political pressures could lead to problematic lending to constituents, the potential for unloading of troubled securities, and investment restrictions that could lead to lower investment return (Pritchett, 1930). Mitchell and Smith (1994) and Mitchell and Hsin (1995) found support of a negative relationship between local investing of the plan's portfolio and return. Romano (1993a, 1993b) hypothesized that political influence by the plan sponsor has a negative effect on plan return and found a negative relationship between politicians and their appointees serving on boards of trustees and plan return. Although Useem and Mitchell (1998) found no direct effect of political influence through plan boards, they offer that there may be indirect effects through board investment policies.

Fund value maximization, similar to shareholder value maximization in the private sector, has been discussed as a motivator affecting plan performance. Studies regarding the activism of public pension plans as institutional owners (Del Guercio & Hawkins, 1999; Smith, 1996; Wahal, 1996) note that by acting to improve the performance of the corporations whose equities they own, public pension plans are endeavoring to improve their own performance. The studies are inconclusive regarding the effectiveness of activism on improving the performance of either corporations or public pension plans. However, Del Guercio and Hawkins (1999) find that fund value maximization may indeed be a motivator influencing pension plan activism, although the efficacy of the activism is unclear at this point.

Institutional explanations of plan performance focus on the plans as public-sector institutions and how their public context affects their goals and performance. It has been noted that, based on self-reported survey data, some public administrators see themselves as stewards of the public interest and are committed to social goals and the formulation of good public policy (Selden et al., 1999). In this regard, public pension plan activism has extended into social investing. To exemplify this stewardship, some pension plans face legal constraints and/or plan policy mandating social investing, most notably prohibitions regarding investment in South Africa during the 1980s and early 1990s. Although the effect of the South Africa prohibitions on investment return is unclear (Meznar, Nigh, & Kwok, 1994; Posnikoff, 1997), it is clear that the social benefit of the policies was significant—namely, a democratic South Africa that supports equal rights. Public pension plans represent a form of local government ownership of industry within the United States, a country that traditionally has had little public-sector ownership of industry compared to other capitalist countries (Pedersen & Thomsen, 1997). They are institutions that represent a fairly unique linkage across the public and private sectors and are a promising area of study for management, finance, and public administration scholars.

LIMITATIONS, CONCLUSIONS, AND RECOMMENDATIONS

Several limitations to the current study should be taken into account in interpreting its results. The first reflects that although PCT has led to significant policy changes in the public sector, there has been little quantitative testing of either the theory's assumptions or the effects of PCT-based policy changes on public-sector organizations and their constituents. Accordingly, this study is limited in being an initial, somewhat exploratory, empirical investigation of PCT. Its contributions rest on an innovative approach to PCT that encourages the generation of additional empirical research. Second, the current study's domain is public pension plans. The results of this study should not be generalized to the public sector at large. However, we do suggest additional study of PCT across different contexts. Such broad-based empirical study may ascertain that PCT does not provide a strong explanation of citizen voting or public-sector activity under various contexts. Third, there are some biases in the *PENDAT*

sample. There is response bias toward large funds, as is indicated by the 40% response rate for 1992 and 1994, which translates into 80% of plan assets and members. It is also probable that underperforming plans tend to underrespond, given the general hesitancy to divulge financial information in surveys (Tomaskovic-Devey, Leiter, & Thompson, 1994). But these biases do not negate the quality of the sample and data.

We conclude that PCT provides limited prediction regarding public pension plan funding. The strict assumption of self-interested behavior of elected officials and public pension plan administrators, which has been criticized as an atomistic view of human behavior (Lowndes, 1996), is not supported by the data. The focus on individuals' fixed preferences ignores that political systems are in part about changing preferences and determining collective purpose (Cook, 1998), which are driven by values (C. R. Davis, 1996). The issue of resolving the political dimension to public administration/management is key to effective theory building regarding the public sector (Gray & Jenkins, 1995). Alternative theories within public administration (which assume that public-sector employees function as stewards of the social interest) and within finance (which assume fund value maximization as a motivator) may provide additional support regarding public pension plan performance.

Specific to public pension plans, more study is needed regarding the effects of plan boards of trustees, board composition, and other board-related variables on public pension plan performance, given the varying results between our study and those discussed regarding investment return. The scope of public pension plans' impact on financial markets, corporate governance, public-sector expenditures, and the retirement plans of tens of millions of plan participants (and their families) warrants additional study of these institutions.

In terms of policy, the negative effect of local indebtedness on plan funding indicates that plan contributions may be viewed as a discretionary rather than as a mandated budgetary item to some plan sponsors. A number of states have enacted statutory requirements regarding plan contributions (Woods, 1996; Zorn, 1996), so that the contribution is no longer at the discretion of the state budget makers. Although many factors, including the rate of return earned on the portfolio and employee longevity, influence funding, annual contributions made at the actuarially determined amount will undoubtedly promote full funding (Mitchell & Smith, 1994). We recommend this prudent accrual policy as being in the best interests of taxpayers and plan members.

Both the cited literature and the study's findings may seem to suggest that the level of public pension plan benefits should be reduced because it is high vis-à-vis private plan benefits and contributes to plan underfunding. But such a conclusion would be ill conceived because it would fly in the face of additional crucial information. Given public plans' relatively low-paying civil service environment, many public employers have offered pension plans to attract employees who are otherwise relatively poorly compensated compared to their private-sector counterparts. Furthermore, approximately one fourth of public-sector employees are legally not covered by Social Security (Zorn, 1996). Thus, public-sector employees are particularly dependent on their pension for retirement income due to their low annual income and frequent lack of Social Security coverage. Rather than cutting the level of benefits, a better tentative recommendation is to shift some of the investment risk of public pension plans from sponsors to plan members, as has occurred in the private sector. We recommend study of the impact of the gradual movement away from defined benefit plans toward hybrid plans and supplemental-defined contribution plans because this may be in the best interests of both taxpayers and plan members.

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