Public Pension Governance and Investment Returns in Michigan: A quantitative correlation

study

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PUBLIC PENSION GOVERNANCE AND INVESTMENT RETURNS IN MICHIGAN: A

QUANTITATIVE CORRELATION STUDY

by

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February 2012

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Abstract

Declining asset values and increased under funding indicates that the structure of pension board of trustees has not produced a sufficient annual investment return to fully fund pension**s**. The specific problem of underfunded public pension systems in the state of Michigan appeared to be partially related to relationship of the board governance and annual investment return of the fund. The purpose of this quantitative correlation study was to examine if a significant correlation relationship existed between independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return of municipal pension funds in the state of Michigan. The numeric data for the variables came from public information obtained from the internet. The population was 138 public pension systems in Michigan as identified in the 2008 US Census report. This study had a sample size of 66. To address the problem and purpose statements two research questions were identified. The first research question sought to identify a statistically significant association between the variables. The second research question sought to determine if a predictive model could be developed based on the association between the variables. The results of the data analysis did not support a significant correlation relationship between any of the independent variables and annual investment return. Since a significant correlation was not found between the independent and dependent variables a predictive model could not be developed. The descriptive data obtained in this study provided useful information for pension trustees, local government officials and legislatures to evaluate board governance.

Dedication

I dedicate this dissertation to the Lord Jesus Christ for showing me the path, giving me the faith and the strength to achieving my goals. My family has been a source of support and encouragement. My parents, Gerald and Sylvia Scales, my sons, Andrew and Rhasean, my brothers and their wives, Gerald, Patricia, Thomas, and Regina, and my nephew and nieces, Gerald III, Carmen, and Jessica, who remind me every day of the meaning of true family, I dedicate this work and effort to each of you.

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My sons Andrew and Rhasean have been a true inspiration to me. They have understood when I was not able to do everything with them. They learned how to quietly play so I could work. They got used to my laptop with me everywhere I went. They have been an example to me of how to support and encourage even when it means sacrifices for you.

I have to thank my family, Gerald, Thomas, Patricia, Regina, and Gerald III for picking up the slack for me when I needed. Without question they would respond when asked. Each has been a good sounding board for me when I needed support. I have to thank my co-workers, Floyd Stanley and Donna McAlister for doing more than their share so I could finish reading, writing a paper, or doing research. They shared in my dream and supported me along the way. Thanks to all the people at the School of Advanced Studies. Everyone was always willing to assist me and help through the process.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Public pension management has a significant impact on governmental funding. In 2004, mismanagement of the San Diego public pension plan resulted in a $1.4 billion shortfall in available funds in the pension system (Walsh, 2006). This deficit caused a serious impact on San Diego's government fiscal condition because the city was responsible for covering the loss of funds. Pension funds throughout the country are underfunded for a variety of reasons (Pew, 2010). As governments lose 16% percent of their tax revenue because of economic conditions, increased pension costs were not funded. Pew (2010) estimated that every household in the United States would have to pay $8,800 to cover the funding gap between benefits and available assets in public pension funds.

The impact of these funding shortfalls will affect a number of stakeholders (Hess, 2005). Citizens, employees, companies, and retirees are affected by insufficient funding of the pension funds. Retirees are concerned with the pension system's ability to make promised benefit payments, whereas citizens are concerned with diminished services resulting from increased pension contributions (Hess, 2005). This quantitative correlation study consisted of an examination of the possible relationship among independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return. Chapter 1 includes an overview of the problem, the purpose of this study and the theoretical framework the study was based on.

Background

Public employee pensions are fiduciary funds that contain contributions from the plan's sponsor, investment earnings, and employee contributions in an investment portfolio (United States Government Accounting Office (GAO), 2010). The purpose of the fund is to maintain a level of cash flow funding for current and future pension payments to retired beneficiaries. Public employees earn the retirement benefits through their employment service to the governmental entity (Kemp & Overstreet, 1988). The government pays into the pension fund to cover partially this obligation. The source of funding generally comes from the plan sponsor, employee contributions, and investment income (GAO, 2010). To determine the required funding, actuarial assumptions consisting of economic and demographic information, the expected investment return, employee longevity, and employee turnover are used (Schneider & Damanpour, 2002).

The majority of public pension funds are defined benefit plans **(**Hess, 2005; Pew, 2010**).** Defined benefit plans pay a specific benefit, based on years of service and highest income earned by the participant, to the employee once he or she retire for the rest of his or her lives (Peng, 2008). The Citizen Research Council of Michigan (CRC) (2009) stated that "in Michigan … government pension plan benefits are protected by Article IX, Section 24 of the 1963 State Constitution, which provides the each pension plan … shall be a contractual obligation thereof which shall not be diminished or impaired" (p.1). If the fund was short, the sponsor was required to cover the shortfall (CRC, 2009; Easterday & Eaton, 2010).

Public pension funds are not governed by the same type of federal regulations as private pension funds. Public pension funds are not subject to the Federal Employee Retirement Income Security Act (ERISA) regulations like private pension funds. The limited federal regulations can

lead to underfunding (Schneider & Damanpour, 2002). Governments do not have specific funding requirements and faced with economic challenges; choose to reduce payments to the pension fund. During recessionary times public pension funds have become increasingly underfunded. Pew (2010) contributed the lack of funding on a variety of factors. Pension plan investments were volatile. States were not making full payments into the fund while increasing pension benefits. Pension systems had structural issues such as early retirements, sharing excess returns of the funds with beneficiaries, cost of living adjustments, and increased salaries during the final years of employment.

Problem Statement

Trejos (2009) posited 77.7% of pension funds are underfunded with projections of further decreases in 2009. To be fully funded, pension funds would need actuarial value of pension assets to equal accrued liabilities. Pew (2010) stated that in 2000, more than 50% of states were fully funded. By 2008, four states were fully funded. United States Government Accounting Office (GAO) (2010) stated that 58% of pension funding comes from investment returns. In 2008, approximately 80% of pension plans had a decline in asset value of more than 20% (GAO, 2010). The declines in asset values correspond with the underfunding of the pension funds. Public pensions are controlled by board of trustees that are responsible for governance and investment decisions for the fund. The present organizational structure for the pension board of trustees has not resulted in an annual investment return that provides an actuarial fully funded pension fund (GAO, 2010). Mitchell, Piggott, and Kumru (2008), Schneider and Damanpour (2002), and Albrecht, Shamsub, and Giannatasio (2007) have shown a relationship between board governance and investment returns of the pension fund. Clark and Urwin (2008) indicated that good pension governance can result in a 100-300 basis points improvement in investment

return. Hess (2005) found that trustees responsible for investment decisions resulted in worse investment performance than trustees who did not make investment decisions.

The specific problem of underfunded public pension systems in the state of Michigan appeared to be partially related to relationship of the board governance and annual investment return of the fund. In 2008, the state of Michigan pension system was 84% funded with $11.5 billion in unfunded liabilities (Pew, 2010). In 2009, the Municipal Employees' Retirement System in Michigan had investment losses of 24.8% (CRC, 2009). Citizen Research Council of Michigan (2009) considered board composition important because of the potential conflict of interests and limited financial expertise of the board members who could impact funding status of the fund.

Purpose of the Study

The purpose of this quantitative correlation study was to explore if a significant correlation relationship existed between independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return of municipal pension funds in the state of Michigan. This study included numeric data that was used to determine if a relationship existed between specific variables. The use of numeric data was consistent with quantitative method of research. Correlation design was used to explore the possible significant relationship between the variables using statistical tools (Creswell, 2005). The quantitative method and correlation design will provide information relating to the relationship between investment return and board governance.

Board governance was communicated through the composition of the board and the governance policies that impact funding levels. The dependent variable was the annual

investment return of the fund identified through information in the year end annual report from the pension fund. The independent variables relate to the composition of the board, the policies of the board that impact the use of fund assets, funding requirements, and funding sources. The variables relating to composition of the board are board size and board member's affiliations such as elected, appointed, ex officio, and independent. Percent of economically targeted investment of total fund assets and asset allocation determined by the percent of total fund assets of stocks, bonds, cash, property, and other categories not identified was related to use of assets. Additional independent variables are the annual contribution amount by the fund sponsor, the funding sources of the annual contribution such as general fund, property tax mills or employee contributions, and the funding status at year end.

The study used annual reports and annual valuation reports from the public pension funds in the state of Michigan. The data was public information and was obtained through each pension systems website or the website for the state of Michigan Treasurer's Office. The 2008 US Census report identified 138 public pension systems in Michigan. For correlation research a sample size of more than 30 pension funds was needed for use of multiple regression analysis to analyze the possible correlation relationship (Creswell, 2005). The sample size was determined using power analysis. Power analysis determines sample size based on the level of statistical significance, the amount of power needed and the effect size (Creswell, 2005). Using the statistical level of significance of .05, power at .80, and effect size of .5, the minimum sample needed was 65. These levels were chosen based on Creswell's (2005) indication that they are typical for hypothesis testing.

Study Significance

Development of a possible correlation relationship model between governance structure and annual investment return provided information to the trustees and government officials that enable more effective decisions. Trustees are responsible for governance and leadership within the pension system. Hopkins, O'Neil, and Williams (2007) stated that all boards should function under six board practice domains. The six areas are identified as "making decisions, functioning as a group, exercising authority, connecting to the community, working toward board improvement, and acting strategically" (Hopkins, O'Neil, & Williams, 2007, p. 689). Each board will have a variety of stakeholders with competing expectations. Pension systems are long-term funds that trustees are responsible for managing. Board members need to be strategic leaders as well (Bass, 2007). Effective strategic leaders can manage diverse opinions, conflicting information, and dynamic events (Bass, 2007). High performing boards use power, information, knowledge, and time (Hopkins, O'Neil, & Williams, 2007). Knowledge is considered functional, such as investment and finance, and specific to the organization. Pension trustees will be more effective if they have a greater understanding of the relationship between governance structure and their investment decisions. Understanding how each variable impacts the annual investment return adds to their overall knowledge and allows for more informed decisions. This information was useful in the strategic decision-making boards make on behalf of the pension fund. Improved decision making may impact the overall annual investment return of the fund with the goal of becoming fully funded. A fully funded pension fund will meet the needs of many stakeholders. Retirees and employees could be more secure in the ability of the fund to cover obligations. The plan sponsor could experience reduced risk of increased pension

contribution. Citizens will experience less risk of losing needed public services or increased tax burden.

The results of this study provided valuable information to a number of leaders and stakeholders. Public pension funds in Michigan are governed by state and local laws. Understanding the relationship between board governance and investment returns aids lawmakers in their decisions regarding pension board governance. This study provided actionable information to state and local lawmakers. State lawmakers can amend legislation relating to board governance. If union affiliation of pension board members has a negative relationship to investment returns, lawmakers can consider that information when acting on legislation that determines board composition. Unfunded pension funds impact the financial health of the local government and services to citizens. Pension contributions are in direct competition with services to citizens. As local leaders make overall funding decisions, they need to be equipped with as much information as possible. Knowing the relationship between board composition and investment return allows these leaders to adjust board composition in a manner favorable to investment returns. Minimally, the leaders can use this information when selecting their members to the pension board. The policies and decisions of the pension board can be evaluated based on the type of association to investment returns. These changes can result in improved investment return for the pension funds (Pew, 2010).

Stakeholders are concerned with the strength of the pension fund. When the pension fund becomes unfunded the local government has to contribute more funding to the pension fund. Increased pension contributions will result in reduced funding available for services or higher taxes paid by citizens. Employees and retirees are concerned with the health of the pension fund for security of their pension payments. Board governance that has a positive

relationship to investment return provides citizens and plan participants with information they can use to influence lawmakers in their decision making.

Nature of Study

This study was focused on a potential significant correlation relationship between governance structure and annual investment return. To address the problem and research questions in this study a quantitative method was best suited. Quantitative studies focus on specific questions, uses numeric data, and statistical methods to determine trends or associations between variables. Quantitative studies use deductive reasoning to locate a gap of information that the analysis can address (Creswell, 2005). The data involved in this study was numeric, consistent with quantitative research. This Pension Governance study included an examination of the relationship between pension governance and investment return.

The correlation research design was most appropriate for this quantitative research. Research designs are the procedures used for data analysis and collection (Creswell, 2005). Correlation research designs describe the association between variables. This study used existing public information that was not manipulated. Experimental research design was not consistent with this information. Survey design focuses on trend data instead of relationship between variables. Correlation studies "seek to relate two or more variables to see if they influence each other" (Creswell, 2005, p. 325).

Board governance was communicated through the composition of the board and the governance policies that impact funding levels. The dependent variable was the annual investment return of the fund calculated from information in the year end annual report from the pension fund. The annual investment return demonstrated the effectiveness of investment decisions made by the board. The independent variables related to the composition of the board,

the decisions of the board that impact the use of fund assets, funding requirements, and funding sources. Each variable was a result of or impacted the decision making of the trustees. Determining if a statistically significant relationship existed between each combination of variables provides essential information to trustees and lawmakers. The relationship information influences future policies and decision making that impact annual investment returns. Improved investment returns contribute to reducing underfunded pension funds. Secondary data was used because of the accessibility and reliability of the data. Annual reports and annual valuation reports are certified by outside public accountants and actuaries (GAO, 2009). The third party review of the documents provided increased reliability of their accuracy. The annual reports and valuations are public and accessible through the state of Michigan or each pension system.

Research Questions and Hypothesis

The research involved exploring a correlation relationship between pension governance and annual investment return. The first research question sought to identify a statistically significant association between the variables. Understanding this relationship would provide the leadership of the pension systems with additional information to enhance their decision making. The second research question sought to determine if a predictive model could be developed based on the association between the variables. A predictive model would provide leadership with additional tools to forecast the impact of specific governance policies.

Research Question 1

1. Does a significant correlation relationship exist between the independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return?

Hypothesis

Creswell (2005) indicated that hypothesis is used to narrow the research question and attempts to predict what is expected to be found. Prior research has found a relationship between the variables (Albrecht & Hingorani, 2004; Albrecht, Shamsub & Giannatasio, 2007; Clark, Caerlewy-Smith & Marshall, 2006). The hypothesis attempted to determine if a significant relationship can be found between the independent and dependent variables.

H_1: There was significant correlation, R^2 of .7 and above, between investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and annual investment return.

H_0: There was not a significant correlation, R^2 of .7 and above, found between investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and annual investment return.

The board of trustees is responsible for investment policies of the pension fund. The investment funds are used in combination with sponsor funding to fund the pension system. When the investment earnings are lower than anticipated, a funding shortage would occur. The deficiency in funding becomes the responsibility of the sponsor. Determining a correlation between investment policies and returns would demonstrate the importance of those policies on the funding status of the pension system.

Board members have a fiduciary responsibility to the pension fund. Some board members are union members and government employees with responsibility to their respective groups. The relationship with the union or employer can cause conflicts to the fiduciary responsibility of board members. Union members participate in negotiations for additional

benefits for employees. Increases in pension benefits cause an under funding of the pension fund (Pew, 2010). The underfunding results in a conflict between what is appropriate for employees and the pension fund (Peng, 2008). Government employees have a responsibility to citizens to manage the governmental general fund in a manner that provides for the highest level of service. Because the pension contributions compete with other service needs the government employees may have a conflict between reducing pension payments and reducing services to citizens. The conflict between citizens and the pension system may impact investment decisions made by the trustees.

The majority of pension contributions are funded   through the general fund of the governmental unit. Some governments use property tax mills as a source for pension contributions. The use of the mills relieves the general fund of the burden of making pension payments. The local residents have a direct impact of increased pension contributions through increased property taxes each year due to changing pension funding requirements. The different funding sources may influence the investment decisions of the board of trustees impacting the annual the return.

In economic downturns, governments have to make decisions about what will be funded. Pension contribution amounts compete with other governmental services for funding each year. Funding for pensions comes from investment returns and sponsor contributions. If investment returns decline, the sponsor's contribution amount should increase to make up the difference, at the expense of other activities of the governmental unit. Governments also have the choice of reducing contribution amounts to fund other governmental activities. Reduced pension contributions can impact the soundness of the pension fund and contribute to underfunding.

Trustees sympathetic to the economic changes of the government may make investment decisions to compensate for any loss.

Research Question 2

2. If a significant correlation was found between any of the independent variables and the dependent variable of annual investment return, can a predictive model be developed?

Hypothesis

This hypothesis was attempting to determine if a predictive model could be developed based on the association between the independent and dependent variables at the confidence level of 95%.

H_2: If a significant correlation was found with at least one of the independent variables and the dependent variable, a predictive model using a confidence level of 95% can be developed.

H_0: A predictive model cannot be developed with a confidence level of 95% if a significant correlation was found among variables.

If a significant correlation was found between the variables, it would be useful to the trustees and other leaders to predict the impact of their governance decisions. Robertson, Boehler, and Hansel (2007) discussed the benefits of predictive models as a method to equip leaders with information to identify behavior or reaction. The use of the model would be beneficial to leaders as an early warning system for decisions that are made. The benefit of this information would provide trustees with additional resources they can use to make the best, informed decisions. "Researchers set a confidence interval around this mean value of the sample to illustrate the potential range of scores that are likely to occur" (Creswell, 2005, p. 194). The

confidence level was included in the hypothesis to establish that 95% of the data fall within the

confidence interval.

Theoretical Framework

Public Choice theory originates from the work of James Buchanan (Schneider &

Damanpour, 2002). Ideally in government, participants are working for the common good.

Public officials are involved in government to serve and focus on the needs of citizens and other

stakeholders. Public Choice theory assumes that public employees work in their own self

interest as any other employees in private industry (Shughart, 2008). Participants are motivated

by their personal well being instead of the greater good concept. Even though government works

for a community of people, the decision making is based on individual choices. The individual

choices can be demonstrated in voting. An example is a tax increase ballot proposal. Some

people would benefit from the additional revenue generated by the tax increase whereas others

would not. If the measure passes people disadvantaged by the tax increase will still pay the tax

for the greater good of the community. Individually they would vote for their best interest. The

government arena does not permit this degree of independence and self interest. The decision

may be based on a majority vote but does not change the motives of the individual who

participates in the process. To balance the natural conflict between general good of the society

and individual needs, institutional structures are put in place as the system is developed**.** The set

of rules, such as the state constitution and laws, promote predictable behavior from participants

(Kliemt, 2005). Development of institutional systems is similar to the market reactions to

irrational behavior. The market will tend to move to a rational, benign behavior even if the

participants are typically irrational (Kliemt, 2005). In the public sector the political nature of the

environment may impact the ability for the sector to function in a rational manner even if the participants are not rational.

In Public Choice theory the premise that the individual needs can be managed by rules is not always the case. Participants can act in a selfish manner to produce an outcome in their favor (Kliemt, 2005). Many social causes have direct and indirect relationship to participants. Some participants can try to persuade others for their own personal gain instead of the greater good concepts. The goal in constitutional changes is to reduce the prevalence of self interest (Rowley, Schneider, & Tollison, 1993). However, the theory considers that the majority of the participants will work in a rational manner. Interest groups can replace the self interest goals in decision making. In the political arena the pressure exerted by interest groups can substitute the rational self interest motives of participants. Interest groups can impact the outcome of political process.

The Public Choice theory can be applied to the governance of the pension funds. The behavior of trustees will impact the governance and decision making of the pension funds. If participants act in their own self interest this could lead trustees not to work in the best interest of the beneficiaries. Conflicts could exist between these interests. A union member who desires to increase pension benefits would work counter to his or her obligation to make sure the pension fund was financially sound. The government official would be tempted to reduce the required payment to maintain essential services for the government. Knowledge of funding from property tax could impact decisions on funding requirements. Because trustees may not be directly impacted by tax increases, they would focus decisions on benefits that impact them.

Public Choice theory is grounded in economics to analyze behaviors in the public sector (Schneider & Damanpour, 2002). The focus is on the individual as the unit and their behavior to maximize his or her utility. The behavior of the individual impacts the economic outcome. The

Public Choice theory assumes the actions of the individual can impact the economic outcome. The rational, self interest actions of the trustees can impact the investment returns of the pension funds through its governance structure. The policies and investment decisions made by individual with conflicting interests may have an impact on the investment returns.

Understanding the implications of the theory on the trustees will assist decision makers in establishing criteria to maximize the investment return of the pension fund. Rules need to be established to help promote the greater good scenario. Policies, laws, and regulations used to establish and govern the pension board should be used to counter the self interest motive of participants. By evaluating the correlation between independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return, in context of the Public Choice theory, board members will have additional knowledge to make appropriate governance decisions.

The conceptual framework, for this study, was similar to the one used by Albrecht and Hingorani (2004). Figure 1 is an illustration of the conceptual framework used in this study. The governance practices of the trustees influence the investment strategies. The governance practices are the composition of the board, the decisions of the board that impact the use of fund assets, funding requirements, and funding sources. The investment strategies determine the financial performance of the pension funds. Indirectly, the board governance has an impact on the financial performance of the pension fund determined as investment returns. Albrecht and Hingorami (2004) and Useem and Mitchell (2000) considered governance practices, investment strategies, and financial performance. Financial performance, in those studies, was determined as abnormal return or total return. The literature supported the relationship between annual

investment returns and governance practices. This study was exploring if the relationships exist among public pension funds in Michigan.

Figure 1. Conceptual Framework for this study reflecting governance practices influencing investment strategies that influence financial performance of the pension system.

Definitions

Actuarial value of Assets – value of assets are calculated using a multi-year moving average of investment returns (Peng, 2008).

Actuarial Assumptions – "The set of assumptions regarding rate of return, inflation, increase in earnings, and mortality used by the actuary in an actuarial valuation or other actuarial calculations" (Pension Management Institute, 2007, p. 8).

Actuarial Report – "…a report on an actuarial valuation, or actuarial advice on the financial effects of changes in an occupational pension scheme. Under P.A.2004, actuarial report refers to annual reports (updates) for years between full actuarial valuations" (Pension Management Institute, 2007, p. 9).

Actuarial Liability – the value of benefits already earned (American Academy of Actuaries, 2004).

Defined Benefit - A plan where benefits are "linked through a formula to the members' earnings or length of pensionable employment" (Pension Management Institute, 2007, p. 40).

Diversification – "Spreading investment funds among different types of assets, markets, and geographical areas reduce risk. Diversification is more effective when there is little or no correlation between the change in the value of the various assets when they are exposed to market or economic events" (Pension Management Institute, 2007, p. 43).

Fiduciary - A fiduciary is "a person who occupies a position of such power and confidence with regard to the property of another that the law requires him to act solely in the interest of the person whom he represents" (Encyclopedia Britannica, 2010).

Generally Accepted Accounting Principles (GAAP) – "The canon of accounting methods, including accounting standards, which together constitute best practice in different accounting situations, especially where alternative methods are available" (Pension Management Institute, 2007, p. 57).

Governance – Public employee post retirement benefit plans are governed by board of trustees subject to legal constraints and fiduciary duties. Plan governance refers to the processes used to administer the benefits and manage the investments of pension revenues by maximizing returns, minimizing risks, and avoiding potential conflict of interests (GAO, 2010). Governance structure provides clarity of roles and responsibilities. Governance includes the size of the board, board composition, board education, code of ethics, succession planning, investment policy, professional, and contractual services, and procedures for monitoring policies (GFOA, 2010).

Independent Trustee – "An individual or corporate body with no direct or indirect involvement with the pension plan, employer or members, other than performing the duties of the trustee" (Pension Management Institute, 2007, p. 62).

Plan Sponsor – The plan sponsor is the public employer whose employees participate in the employee pension system.

Statistical significance – Statistical significance represents "probability of obtaining a test result that occurs by chance and not by systematic manipulation of data" (www.businessdictionary.com, 2010). The study will use $R^2 > .7$ or more as the measure for statistically significant.

Trustee – "A person who has ultimate authority to manage a retirement system or to invest or manage its assets" (UMPERSA, 2010, p. 4).

Unfunded Actuarial Accrued Liability (UAAL) – "The actuarial liability minus the actuarial value of the assets" (American Academy of Actuaries, 2004, p. 8).

Assumptions

A major assumption was that the independent variables chosen would assist in determining a relationship to annual investment returns. The information provided in the annual financial reports and annual valuation reports of the pension systems were assumed to be complete and correct. The numbers in the annual reports were believed to be consistently compiled over the three-year study period, and that the data derived from each Michigan Public Pension Fund was validly compared with that of each of the other funds.

Scope, Limitations, and Delimitations

This correlation study was limited by the geographic area. The study was only reviewing information from the state of Michigan. The population was based on information provided to

the US Census for the public retirement survey. The total population may be different based on

pension systems not responding to the US Census survey and changes in the pension system

since the information was submitted to the survey. Other variables not included in the study may

have a relationship to the dependent variable. Information used was limited to information

available in annual reports and annual valuation reports that are available to the public.

Chapter Summary

Public employee pension funds were established as a fiduciary fund to maintain a level of

cash flow funding for current and future pension payments for retired beneficiaries. Over the

past five years public pension funds have increasingly become underfunded. Pew Center (2010)

estimates a trillion dollar gap between assets and liabilities in pension funds throughout the

country. This gap will impact a number of stakeholders. Retiree benefits are at risk and

governments face a tremendous financial liability. According to GAO (2010) the present

organizational structure for the Pension Board of Trustees has not resulted in an annual

investment return that enables Employee Pension Funds to accrue an actuarial fully funded

pension fund. The specific problem appeared to be the relationship between the governance

structure of the board of trustees of public pension funds and the investment returns to the fund

in the state of Michigan. The purpose of this quantitative correlation study was to determine if a

relationship existed between annual investment returns of municipal pension funds in the state of

Michigan and governance structure of the board of trustees. This study included the examination

of a relationship between board governance and investment return. The research questions for

this study were:

1. Does a significant correlation relationship exist between the independent variables of

    investment policies, governance structure, funding status, annual pension contribution

amount, and pension contribution funding source and the dependent variable of annual

investment return?

2. If a significant correlation was found between any of the independent variables and the

dependent variable of annual investment return, can a predictive model be developed?

Determination of a correlation relationship between governance policies and investment

return provided information to the trustees and government officials on the impact of their

decisions. The results could be used to improve the structure of the pension fund and improve

financial performance. The theoretical framework in this study was the Public Choice theory

that could be applied to the governance of the pension funds. If participants act in their own self

interest this could lead trustees not acting in the best interest of the beneficiaries. Conflicts could

exist between these interests. By evaluating the correlation between variables, this study could

provide evidence that these elements could establish a framework against self interest

motivations.

This research is continued with a discussion of the literature. Chapter 2 is comprised of

literature review into the subject of public pension governance and investment returns. Each

variable was researched with a focus on historical information, current studies and the gap that

exists in the literature. Alternative viewpoints are included and highlighted in the discussion to

give a full presentation of prior work into this topic.

Chapter 2: Literature Review

This study contains information to address the specific problem of underfunded public pension systems in the state of Michigan. Under funding may be partially due to the relationship of the board governance, pension fund investment decisions, source of pension funds and annual investment return of the fund. Plan governance refers to the processes used to administer the benefits and manage the investments of pension revenues by maximizing returns, minimizing risks, and avoiding potential conflict of interests (GAO, 2010). Nationally, there were 2,550 state and local pension systems in 2008 with more than 19 million members (US Census Bureau, 2010). In Michigan, there are 138 separate pension systems. Trustees are responsible for $3 trillion dollars of asset nationwide (Pew, 2010). Exploring the possible correlation relationship between board governance and annual investment return focuses on who makes policy decisions and the impact those governance decisions have on investment return. Investment policies determined through asset allocation and targeted investments will examine the impact of the trustee decisions on annual investment return. Annual contribution, pension contribution funding source, and funding status are variables that influence the decision of the trustees, which impact the annual investment return. Providing additional information of the impact of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source on the annual investment return of the pension fund will assist trustees, lawmakers, and administers in deciding appropriate board structure.

This study used a quantitative correlation research design. Chapter 2 incorporated articles, journals, public acts, studies, and trade publications to provide a historical view, current discoveries and gaps in the literature regarding pension governance, pension asset decisions, sourcing of pension funds, and investment returns. The review contains alternative viewpoints

on the topic. Many of the documents are from state laws and trade publications. Many of the predominant studies occurred prior to 2006. This has resulted in overall literature review consisting of 75% current studies. The older documents provided essential insight into the topic of pension governance and investment return. The technical information on laws and definitions provided the framework that pension trustees operate from and are needed to provide a thorough understanding of the topic. Appendix A highlights the literature review sources by type, less than five years, and more than five years.

Governance Structure

Public pension funds are governed by state and local legislation and Governmental Accounting Standards Board (GASB), United States Internal Revenue Code, and Uniform Management of Public Employees Retirement System Act (UMPERSA). State and local governments establish laws that determine additional authority and restrictions on investing. Private pension funds are governed by Employee Retirement Income Security Act of 1974 (ERISA) and Pension Benefit Guaranty Association (PBGA). ERISA provides minimum standards and funding requirements for private pension (Clark & Urwin, 2008). Public pensions are not subject to this act. PBGA provides insurance to protect continuation of pension benefits. Public pension do not participate in PBGA. In 1997 the Uniform Law Commissioners proposed an act for state governments to enact. The goal of this act was to provide standard requirements for public pension plans like ERISA has done for private pension plans. UMPERSA defines the duties of the board of trustees, and establishes a trust for the assets of the retirement system. Under the act, trustees who manage assets are encouraged to consider economic conditions and diversification of the investments. Trustees may consider benefits in addition to investment

returns when selecting investments (UMPERSA, 2006). Wyoming and Maryland are the only states to enact UMPERSA as of 2010 (Uniform Law Commissioners, 2010).

Annual Investment Return

Public employee pension funds receive revenue from employer contributions, employee contributions, and investment returns. Investment returns account for 58% of the revenue in the pension system (GAO, 2010). Employer and employee contributions account for 42% of the revenue. Investment returns account for the majority of funding in the pension system and plays a critical part in the fund's stability. Trustees are responsible for investment decisions. Asset allocation choices impact the investment return earned each year. Investment returns are subject to substantial swings annually due to economic conditions (Giertz & Papke, 2007). In 2008, public pension funds experienced extreme market fluctuations like many investors. The market declines resulted in a median investment return of negative 25.3% (Brainard, 2009). Investment losses become incorporated in the valuation of the pension fund causing increases in unfunded liabilities. This emphasizes the importance of the investment returns and its use as a dependent variable in many studies (Clark & Urwin, 2008; Hess, 2005; Impavido, 2002; Mitchell & Hsin, 1997; Useem & Mitchell, 2000; Yang & Mitchell, 2005).

Investment returns can be researched in a number of ways. Albrecht and Hingorani (2004) examined the relationship between pension governance practices and financial performance. Instead of total annual investment returns, Albrecht and Hingorani (2004) used abnormal return. Abnormal return was chosen to reflect the risk-taking that occurs in pension systems. Abnormal return was calculated as the sum of total return minus benchmark return. Benchmark return was the weighted average return of several financial market indexes. Albrecht and Hingorani (2004) found in 1998 that public pension funds under-performed the composite

market indexed by 410 basis points. During this time, pension funds realized a total return of

14.4% but that return did not compensate for the risk assumed by the plan sponsor. Useem and

Mitchell (2000) examined the relationship between investment return and retirement investment

strategies. Investment return was measured as annual rate of return on assets. A variety of

investment strategies occurred with independent investors, board investing, and local investment

restrictions. Independent investors increased equity allocation by 14% while local investment

restrictions resulted in a seven percent decrease in equity allocation (Useem & Mitchell, 2000).

In 1993, this allocation difference resulted in 3.2% increase in investment earnings. Yang and

Mitchell (2005) explored public plan funding and investment performance over a 10-year period

focusing on the link between past and present performance. Yang and Mitchell (2005) found

that investment restrictions impact investment returns negatively. Increases in equity allocation

tended to increase the performance of the investment portfolio. In 1990, Mitchell and Hsin

(1997) noted the extreme range of investment returns for public pension funds. The highest yield

was 25.4%, while the lowest was a negative 5.5%. Mitchell and Hsin (1997) accounted for the

differences as variation in asset allocation by each fund.

 Creswell (2005) described dependent variables as an attribute influenced by independent

variables. Prior studies have shown that investment return was influenced by a number of

variables (Albrecht & Hingorani**,** 2004; Mitchell & Hsin, 1997; Useem & Mitchell, 2000; Yang

& Mitchell, 2005). This study will explore the association board composition, investment

decisions, annual contribution amounts, sources of annual contributions, and funding status has

on the annual investment return of public pension fund in the state of Michigan. Prior studies

have consisted of the association on a national basis. This research focused on Michigan and the

impact these variables have in this environment.

Board composition - board size and board member's affiliations

Historical Overview

No federal standard exists for the composition of public pension boards, so throughout the country there was large variety of board size and composition. Researchers have examined the relationship between different board compositions to determine the most effective structure (Albrecht & Hingorni, 2004; Useem & Mitchell, 2000). The research was conflicting on the relationship between board composition and financial performance of the pension fund. Useem and Mitchell (2000) found no statistically significant direct relationship between board composition and size with rate of return on assets. Albrecht and Hingorni (2004) found risk adjusted returns are reduced as the percent of appointed board members increases. Despite their findings, Useem and Mitchell (2000) considered the board composition as an indirect relationship with financial performance. Board members determine asset allocations, which does have an impact on financial performance. Albrecht and Hingorani (2004) found that board size had a negative association with abnormal returns, but the results were not statistically significant.

Current Theories

Public pension boards have a variety of groups represented by board trustees. The 2010 GAO survey of large and medium pension funds found that 72% had retiree trustees, 68% current employees, 56% elected officials, 43% independent citizens, 26% management, 58% appointed officials, 1% separated employees, 20% union representatives, and 32% other. Board composition can have an impact on investment returns (Albrecht, Shamsub & Giannatasio, 2007). Retirees as board trustees tend to reduce financial performance of the pension fund due to a tendency to invest in more fixed income instruments (Mitchell, Piggott & Kumru, 2008). Hess

(2005) found that trustees with direct responsibility of asset allocation resulted in reduced performance, based on 1996 and 1998 data. Adding additional active members as pension trustees resulted in a 0.7% reduction in stock funding while adding a retiree as pension trustee resulted in a 1.7% reduction in stock funding (Yang & Mitchell, 2005). Increased retiree representation resulted in lower investment yields. Mismanagement of pension funds generates insignificant penalties for trustees. Trustees could be un-appointed or not re-elected if the performance was not as expected, but suffer no further consequence. The funding unit was responsible for the result of their financial decisions through increased pension contributions. The funding unit faces the consequences for poor decision of the board of trustees.

Trustee affiliations can impact contribution requirements of the sponsor with riskier investment strategies. Union member trustees can trade wage increases to employees for appropriate pension contributions by the sponsor (Kazak, 2008). Modest changes in pension rules can result in tens of thousands of dollars in benefit increases to employees (Hess & Squire, 2009). These details do not appear to have immediate impact on taxpayers so they generally are not active stakeholders in benefit decisions. The impact to employees was notable so they actively negotiate for benefit changes. Increased benefits have to be funded in the pension fund and result in higher actuarially unfunded liabilities, negatively impacting the funding status of the pension fund. The plan sponsor was responsible for covering these additional costs. The funding ultimately comes from the taxpayers. Trustees with union affiliation are torn between higher benefits to themselves and fellow employees and preserving the funding strength of the pension fund.

Conflict of interest occurs with elected officials and union members. Elected officials tend to view pension liabilities in a short-term versus long-term perspective (Hess & Squire,

2009). This leads to reduced funding of pension contributions in favor of maintaining other government services. Elected officials are influenced by employees wanting increased pension benefits. These benefits decrease the funding status of the pension fund. The public does not have a strong enough voice to counter the demands of employees. These benefits appear insignificant on the surface but have a tremendous impact on funding status. Citizen Research Council of Michigan (2009) agreed with Hess and Squire (2009) that board members who are beneficiaries of the pension system do not take the long-term view of investing. Trustees may be more sensitive to political pressures because of their union membership or appointment status. The other associations have expectations that the trustee will consider their special interests instead of managing the interests of the pension fund.

Hess (2005) found that appointed trustees had a positive impact on performance. Hess (2005) found an inverted U shaped relationship with elected trustees and performance. The discoveries demonstrated that at 47% elected trustees to the entire board, investment returns began to diminish. Aronson, Dearden, and Munley (2009) discovered that a statistically insignificant relationship existed between boards with trustees who are plan beneficiaries and the asset mix of the pension system. Aronson et al. (2009) used 2002 data from the Characteristics of 100 Large Public Pension plans in their analysis. Weller and Wenger (2008) found that pension plans followed performance leader allocation mix and were not influenced by conflict of interest by the plan sponsor or trustee. Weller and Wenger (2008) used data from Census' State Retirement System database for the periods 1993 to 2005 and the Federal Reserve's Flow of Funds from 1952 to 2007. Albrecht, Shamsub, and Giannatasio (2007) compared governance practices and abnormal returns. Abnormal returns were defined as total return minus benchmark return. Surveys for three years were compared. This study found the percent of appointed

boards was only statistically significant in one survey year. Albrecht et al. (2007) study

extended a 2004 study by Albrecht and Hingornai. The results of the 2004 study demonstrated a

reduction in risk adjusted returns by two basis points for board appointed trustees.

Despite these inclusive findings, many states have adjusted their board composition in

response to the unfunded status of the pension funds. Many states have reduced the number of

trustees who will receive benefits from the fund. Utah has four of seven board members who are

independent. In 2003, Oregon changed its board composition to three of five independent

members. Oregon found that the change in board composition resulted in board members more

focused on the financial performance than member benefits (Pew, 2010). Vermont created a

committee that handles investment oversight for the pension board. The members of the

investment committee have more financial expertise than board members. South Carolina

outlined specific education and experience requirements to become a member of the investment

committee.

Experts generally hold that board membership should be drawn from different

constituencies, including the employer, employees, management, taxpayers, and unions

(when applicable), to ensure that varied interests are represented and balanced.

Additionally, experts said that governing bodies should be composed of individuals with

a range of skills, especially those that allow the group to make responsible, informed

investment decisions (GAO, 2010, p. 11).

Albrecht et al (2007) found that board size was not statistically or substantively

significant in any of the survey years in predicating investment returns. The 2009 Public Fund

Survey found that larger pension funds could reduce asset management costs through the size of

their assets (Brainard, 2009). The number of board members was not analyzed in this study.

Gaps

The research regarding board composition has resulted in mixed findings. The researchers reviewed in this study agree that there was at least an indirect relationship of board composition and annual return. Trustees have the responsibility to determine investment strategy and asset allocations. These variables do have a direct relationship to annual return. Hess (2005) found the inverted U shaped relationship with board composition. When elected trustees comprise more than 47% of the board, investment returns began to decline. Mitchell, Piggott, and Kumru (2008) found that retiree board members tend to invest in more fixed assets, which would result in lower investment returns. Kazak (2008) found that union member trustees were torn between increased benefits and pension fund health. Increased benefits results in higher unfunded liabilities of the funds. Countering those losses with additional investment return would promote investing in riskier assets. The number of board members has not shown to have a significant impact on annual investment returns. Despite these findings, governments are changing board composition to respond to investment losses and increased employer contributions.

The majority of the studies were conducted using national surveys. Michigan was one of five states that have more than 100 pension systems (GAO, 2010). The current economic conditions have reduced municipalities' ability to fund shortfalls in the pension systems. Understanding the relationship of board composition at a micro level will assist governments in determining appropriate structure and requirements for pension trustees. Comparing pension systems nationally do not take into account the differences with state law requirements and local economic conditions. Examining pension systems in Michigan provided missing data on the impact locally of board composition and investment return.

Asset size

Historical Overview

Earlier research has found a relationship between pension asset size and annual return. Albrecht and Hingorani (2004) found that system assets had a positive statistically significant association with abnormal returns. The size of the pension fund allows for economy of scale benefits, which would reduce costs and increase available assets.

Current Theories

Asset size can impact the rate of return on the investments of the pension fund. Large asset-sized pension funds have a 1.4 percentage higher return than smaller pension funds (Kazak, 2008). The size of the pension plan may impact the asset mix (Aronson, Dearden & Munley, 2009). Transactions costs tend to be higher for smaller pension plans than larger plans. The additional expense would tend to reduce investments in equity for small plans. Albrecht et al. (2007) also found that larger asset-sized pension funds had a higher abnormal return. The results were statistically significant for two out of three years studied.

Gaps

Previous studies agree that asset size has an impact on annual investment performance (Albrecht, Shamsub & Giannatasio, 2007; Aronson, Dearden & Munley, 2009; Kazak, 2008). The size allows pension trustees to invest in instruments that may not be available to smaller funds. The transaction cost decrease for traditional allocations but may increase for nontraditional investments. The size impacts the risk that pension trustees take in investment decisions. Larger pension funds have more room for error than small pension funds. These studies look at pension funds based on survey data. Examining the impact of asset size within a

specific area will test the results found at the macro level. Michigan allows specific investment

allocation based on asset size. Exploring the impact of size and investment returns with these

restrictions will assist lawmakers in appropriate investment strategies to maximize return

potential of the pension funds.

<div align="center">**Asset allocation**</div>

Historical Overview

Public employment retirement systems within the state of Michigan are authorized to

invest pension funds under Michigan's Public Act 314 of 1965, Public Employee Retirement

System Investment Act (PERSIA). This act was last amended in 2007. Section 38.1134 (14) of

PERSIA (2007) allow pension boards to invest no more than 70% of their assets in stocks

(Public Employee Retirement System Investment Act (PERSIA), 2007). The board can invest

up to 5% of assets in real estate investment trusts or in real or personal property. Boards with

assets exceeding $250 million may invest up to 2% of assets in debt, warrant, or equity interest

in small business, small business Investment Company, or venture capital firms. No more than

20% of assets can be invested in foreign securities. PERSIA (2007) allows for investments not

specifically designated in the act based on asset size. Pension funds with assets of more than $1

billion can invest up to 15% of their assets in investments not specifically outlined in PERSIA

(2007). Pension funds with assets of at least $250 million can invest up to 10% of assets in non-

designated investments. Pension funds with assets less than $250 million can invest no more

than 5% of assets in non-designated investments. Based on GAO (2010) survey, 58% of pension

revenues come from investment income. Because investment income was impacted by asset

allocation, the choice of asset allocation was important to the overall investment portfolio.

Useem and Mitchell (2000) studied the relationship between board governance and financial performance of the pension fund. Their research indicated a link between investment strategy and financial performance. Tactical investments that changed with economic conditions and equity investments had higher annual returns. Twenty percent increase in equities will result in an additional 3.2% improvement in returns (Useem & Mitchell, 2000). Governance policies had limited independent impact on financial performance. Governance policies examined were investment restrictions, performance evaluations, board purview, and board composition/size. Useem and Mitchell (2000) used the Public Pension Coordinating Council survey and a follow-up survey. Albrecht and Hingorani (2004) had similar results when examining the results of abnormal returns when board members determine asset allocation.

Current Theories

Based on GAO (2010) survey, 86% of governing bodies are responsible for asset allocations. Seventy one percent of these boards used investment committees to determine asset allocation. Twenty percent of the plans had asset allocation determined by state investment body, agency, or boards. Aronson, Dearden, and Munley (2009) studied the impact on asset mix of influences by employees and taxpayers, and sharing of excess earnings. Taxpayers and employees have different preferences to risky investments. Taxpayers are obligated to cover any shortfall in the pension funds through their local government. Conservative allocations provide less risk for the taxpayers. Employees desire more risky investments to increase the return to the fund. The additional returns can be used for profit sharing among employees and retirees. For employees, the risk of losing value does not impact them directly. Their benefit was fixed and tends not to decline with investment losses. A riskier asset mix poses limited risk to the employee and retiree. The funding unit, through taxpayer dollars, was obligated to make up the

difference. This creates a real risk to the taxpayer. Trustees are influenced by the different stakeholders when making asset allocation choices (Aronson et al., 2009). The approach to asset allocation will have an impact on overall investment return.

Aronson et al. (2009) used percent of equity, profit sharing rules, asset size, vesting period of benefits, dependency ratio of retirees to total plan membership, and Americans for Democratic Action voting index to determine a relationship between equity share of asset allocation and investment returns. The variables used in this study were attempting to determine a relationship of the board governance through the decision of asset mix to investment returns. The share of equity allocation was a decision of the trustees. The study found that the asset size and profit sharing rule has a positive and statistically significant relationship to the equity share of the asset mix. Boards that had the majority of plan members as trustees were found to have a statistically insignificant impact on asset mix. However, boards with majority of employee plan members impacted the decision to have profit sharing rules (Aronson et al., 2009). Profit sharing rules determine how the pension board will allocate investment returns over the assumed rate of return. These returns can be shared with retirees, active employees and the plan sponsor, depending on the rules established by the board. The presence of profit sharing rules had a positive impact on higher equity percent of the asset mix, resulting in riskier investments. Trustees have an impact on asset mix through the decisions he or she make. The study found that some characteristics of the pension fund impacts the profit sharing rules. Pension plans that had longer vesting periods were less likely to have profit sharing rules. Pension systems with higher dependency ratio, ratio of retirees to total plan membership, and states with more liberal voting records of United States senators were more likely to have profit sharing rules. Pension funds with high dependency ratios tend to be more mature plans with higher liabilities and

contribution amounts. A lower risk asset mix would protect the government from higher unfunded liability.

Investment risk by public pension trustees can be considered a transfer of wealth from current to future taxpayers (Ennis, 2007). Trustees will engage in increased risk for current gains in their returns. If they are successful, current taxpayers benefit from the gain through the potential of reduced contributions and increased benefits to compensate employees. Because the excess earnings are not considered reserves against future losses and left in the fund, this diminishes any benefit for future taxpayers. If the investment was not successful the future taxpayer was responsible for covering the shortfall through increased obligations. Because all funding shortfalls are the obligation of the plan sponsor, the taxpayer pays through increased taxes or diminished services. Albrecht et al. (2007) found that boards with authority to determine asset allocation produced lower returns, estimated as 136 basis points.

Gaps

The research agrees that asset allocation impacts the annual rate of return of pension funds. Portfolios with a higher percent of equity allocation produce higher rates of returns (Aronson et al., 2009; Kazak, 2008; Mitchell et al., 2008; Weller & Wenger, 2008). Even though equity investment produces higher returns, they also generate higher risk. Pension trustees are willing to take this risk because there was no negative impact for the board. If returns are higher than the expected annual returns, the boards can decide to distribute the excess returns to retirees, employees, and the plan sponsor. If the returns are lower than the expected annual return, the plan sponsor and taxpayers are responsible for covering the losses. All the risk was bore by the plan sponsor. Investment earnings comprise 58% of the revenue for pension funds (GAO, 2010). Losses in investment earnings have a tremendous impact on contributions

from plan sponsors. Examining the impact of asset allocations for pension funds in Michigan

will provide new information to this topic. Michigan has specific restrictions on asset allocation.

Exploring the impact of those restrictions on annual return will assist lawmakers in establishing

appropriate requirements for pension funds. The majority of these studies used data based on

national surveys compared to micro data from a specific location with similar legal requirements

and economic conditions.

Targeted investments

Historical Overview

Michigan Public Acts provide some guidance to pension boards on prohibited social

investments and targeted investments. PERSIA (2007) encourages pension trustees to consider

investments that will enhance the welfare of the state and citizens with the stipulation that the

investment has returns consistent with other investments of the fund. PERSIA (2007) prohibits

investments in Iran and Sudan companies. Useem and Mitchell (2000) found that restrictions on

asset allocation policies resulted in lower investment returns. The restrictions do not allow the

trustees to focus investment on the best returns. Munnell and Sunden (2001) (as cited in Yang &

Mitchell, 2005) study found no impact on returns. The focus on specific investments still

requires the trustees to compare the return to other returns. If this comparison was done, total

return should not be impacted**.**

Current Theories

Targeted investments may impact the investment returns. Trustees consider investments that provide local benefits other than investment returns. The 2009 public fund survey of 125 public pension funds found 8.6% of the asset allocation was for alternative investments (Brainard, 2009). The targeted investments can promise to increase job creation locally, resulting in a benefit to the area and not specifically the pension fund. These investments are not judged by their marketplace value and could provide less investment return than other investments would. The trustees are faced with a conflict between civic responsibility and fiduciary responsibility to the pension fund (Woods & Urwin, 2010). Ennis (2007) was concerned that trustees are pressured into investing in economically targeted investments. Some of these investments may benefit local needs but may not fulfill pure financial merits. Albrecht et al. (2007) found the pension systems not subject to investment restrictions earned higher returns during their study period. Investment restrictions were considered required instate investments, use of prudent person rule for investments, and constitutional restrictions on investments. These results were statistically significant in the latest year of the survey. Albrecht et al. (2007) considered the results substantive enough to be considered a concern in relationship to returns of the fund. GAO (2010) survey found that 62% of large pension plans had investment strategy influenced by socially directed investments. Forty percent of large pension funds reported investment strategy influenced by targeted investment requirements. The respondents indicated the investment decisions were made in part to comply with state requirements. Hess (2005) found that economically targeted investments did not have an impact on market return. Hess (2005) assumed the trustees followed the requirement that targeted investments had to generate similar returns of other investments. If that occurred, there should not be an impact

from this investment. Hess (2005) used data from 1996 and 1998 PENDAT survey conducted by Government Finance Officers Association and Public Pension Coordinating Council.

Gaps

The research indicates inconsistent impact of targeted investments on annual investment return. Hess (2005) found no impact on annual returns while Albrecht et al. (2007) found pension funds without targeted investment requirement with higher annual investment returns. A significant number of pension funds are influenced by targeted investments. The amount of assets available to assist local economies presents a potential conflict for trustees. Trustees have to balance the fiduciary responsibility to the pension fund with conflicting desire to support the local environment. Michigan does not require targeted investments but encourages consideration of those types of investments. Recently, there has been a concern in Michigan that targeted investments have been used for personal gain of the trustee (CRC, 2009). Targeted investments have generated significant losses in comparison to other investments because appropriate due diligence of the investment was not occurring. Michigan allows targeted investments as long as they provide comparable returns as other investments in the portfolio. Several cases indicate that this may not have occurred (CRC, 2009). Examining the relationship of targeted investments to investment return in Michigan would provide lawmakers and trustees additional information on the impact of these investments. If trustees evaluate targeted investments with same return requirements as other investments there should be no impact on investment return. Prior research used national studies and examined the impact at a macro level versus the micro level proposed in this study.

Annual contribution amount

Historical Overview

In Michigan, PERSIA (2007) vests the pension board with the authority to set employer contribution rates. The annual contribution should consist of normal cost and any unfunded actuarial liability of the fund. The amortization period used to determine annual contribution cannot exceed 40 years. The board should rely on advice of the actuary in determining the contribution amount. According to GAO (2010), employer contributions make up 28% of the pension fund revenue.

A number of studies examined the relationship between pension funding and financial strain (D'Arcy, Dulebon & Oh, 1999; Kemp & Overstreet, 1988; Useem & Mitchell, 2000). Pension contribution per capita was found to be significantly related to financial strain of the municipality (Kemp & Overstreet, 1988). Increase pension contributions and unfunded liabilities resulted in declining financial health of the municipality. Municipalities have to choose between fully funding the pension fund and providing services to residents.

Current Theories

Prior to 2000, pension funds had returns higher than the assumed rate (Yang & Mitchell, 2005). This resulted in decreased contributions for the plan sponsor. The funds were typically fully funded and did not require additional funding. The growth of stock market resulted in very high rate of returns for pension funds (Weller & Wenger, 2008). Since 2000 there was a link to employer contributions and investment in stocks. As the stock market returns diminished the pension funds became increasingly underfunded. Pension funds heavily invested in the market experienced losses, which increased the funding requirement of the plan sponsor.

The board determines the funding method used to calculate the contribution amount by the plan sponsors. Private sector pension funds have specific requirements to follow regarding contribution amounts. Public sector pension funds do not have those requirements. The contribution amount can be determined by factors other than actuarial requirements of the fund. The financial condition of the plan sponsor can determine the amount of the contribution. Reduced contribution amounts based on financial strain of the sponsor defers the funding issues for future taxpayers (Kazak, 2008). Public pension funds are excluded from the Pension Benefit Guaranty Corporation (PBGC) insurance coverage. Public employers can generate revenue to cover pension obligations through their tax authority. Plan sponsors can also reduce expenditures to cover the additional costs. These reductions will lead to reduced services to taxpayers. However, these items will not produce an endless funding source. Increases in taxes can lead to taxpayers leaving, which would reduce the base to tax. Increases in taxes will drive down property valuations (Lashgari, 2009). Real estate buyers would consider the higher taxes in determining the value of property. Reduction in services can have the same result. Plan sponsors have to be mindful of this possibility when determining amount of annual contribution paid. Kazak (2008) looked at optimal funding of pension contributions based on pension growth rates and tax base growth rates. If pension growth over time was lower than tax base growth, a contribution rate below 100% would be optimal. However, if pension growth was expected to be higher than the growth of the tax base, the contribution rate should provide for over funding. D'Arcy, Dulebohn, and Oh (1999) developed an optimal funding factor (OFF) for funding status. The OFF incorporates interest rate, pension growth factor, population growth factor, and weighted average growth rates in per capital income and real estate property tax revenue factor.

Gaps

The research indicated there was a relationship with annual contribution amount and annual investment return. Financial strain in governments resulted in reduced contributions to pension funds (Kazak, 2008; Kemp & Overstreet, 1988). Pension funds are funded from investment earnings, employer contributions, and employee contributions. Reduced returns in investment earnings causes increased under funding. The underfunding results in higher employer contributions. This demand for increased funding occurs when governments are experiencing financial strain. The choice for governments was to increase taxes, reduce services, or not fund 100% of pension contributions. D'Arcy et al. (1999) and Kazak (2008) developed formulas to determine optimal pension funding. These formulas suggest appropriate funding for pension funds that have reduced growth in taxes which would result in increased contributions to the pension funds. Practically, governments are not in a financial position to increase pension contributions when their revenues are declining. In 2008, 88% of pension funds paid 100% of the annual contribution (Brainard, 2009). As trustees develop investment strategies and allocations, they have to consider the financial condition of the sponsor. If the sponsor cannot pay pension contributions the pension fund will be more underfunded and jeopardize the stability of the fund. Validating the relationship of annual contributions and annual investment return with Michigan pension funds will provide useful information for lawmakers, pension trustees, and municipal leaders. Risks associated with investment strategy have far-reaching impact to the pension fund. Employer contributions are 28% of the revenues for the pension fund (GAO, 2010). Employer's ability to make annual contributions will have an impact on pension revenue. Trustees have a fiduciary obligation to maintain the stability of the pension fund. Annual contributions are important elements of that stability.

Different funding sources for the annual contribution

Historical Overview

In Michigan, police and fire pension boards are established under Public Act 345 of 1937, Fire Fighters and Police Officers Retirement Act (P.A. 345). The act allows municipalities to tax citizens the amount required for the annual contribution. The police and fire pension tax was in addition to any other tax charged by the municipality. This applies only to pension funds for Police and Firefighters.

Current Theories

No peer reviewed research was found on the relationship of tax levy funding of annual contributions and the relationship to annual returns or board composition. Michigan, Illinois, and Nebraska allow municipalities to levy property tax mills to cover police and fire pension annual contributions. In Michigan, municipalities that levy mills have seen dramatic increases over the last several years. The levy ranges from 1.6 mills to 5.3 mills for pension payments (Wisely, 2010). Southfield, Michigan, experienced a 43% increase in the levy since 2002. Dekalb, Illinois, increased pension contribution resulted in a 32% increase in the levy from 2007 (Unknown, 2010). Norridge, Illinois, paid for pension contribution through the general fund until fiscal year 2009-10. The 103% increase in the annual contribution amount could no longer be funded through the general fund so Norridge imposed a tax levy. Norridge paid pension contributions from the general fund in the past to reduce the burden on taxpayers (Whitney, 2010). With the levy, all residents are directly impacted by increases in the contribution amount. When municipalities pay through general fund the impact can be less visible to taxpayers. Service reductions will impact each taxpayer differently. An increase in general taxes will cover

the pension contribution and other governmental expenses. Hess and Squire (2009) noted that taxpayers are not considered major stakeholders in decisions regarding pension benefit changes. Benefit changes directly impact the amount of pension contribution due to increases in unfunded liabilities. Retirees and employees are active stakeholders because they have a direct benefit from small changes.

Gaps

This research was the first scholarly review of the relationship between annual contributions funded through tax levies or general fund. Taxpayers have a direct impact on increased annual contributions through increase tax levies. The impact was less obvious when funded through the general fund. Taxpayers provide the funding for the general fund however many other services are funded through this same source. Trustees are concerned with the impact of annual contributions to municipalities. Lashgari (2009) found that increases in taxes or diminished services will reduce the tax base. Residents will move when the tax rate becomes too high. New residents will consider the higher tax levy and reduce the value of the property. A lower tax base will result in higher tax levies to generate the same funding. The relationship between annual returns and funding sources was important for municipalities. Trustees are influenced by financial conditions of the plan sponsor and the employees in the fund. Increased employer contributions have an impact on the stability of the pension fund. Employer contributions directly paid by taxpayers can have an impact on the plan sponsor indirectly. Citizens may react to increased property taxation through movement to other locations. This would result in reduced revenue for the plan sponsor impacting his or her ability to pay his or her contribution to the pension plan. If trustees are influenced by this knowledge, it may impact the

annual investment return of the fund. This research provided additional information that can be used to determine the appropriate funding source for the municipality.

<div align="center">**Funding Status**</div>

Historical Overview

Public pension funds do not have a requirement for specific funding status. Funding status was determined by assets divided liabilities of the pension system. Typically, funding status of at least 80% was considered appropriate (Brainard, 2009). Since 2001, funding status has decreased from 101.9% to 85.3% in 2008 (Brainard, 2009). To change the funding status, pension assets have to rise or pension liabilities decline. Research has found a positive relationship with funding ratios and risky asset allocations. Riskier investments tend to increase annual investment return at specific time frames. Schneider and Damanpour (2002) find that the plan's sponsor fiscal stress results in not contributing annual contribution payments to the pension fund. Annual contributions generally increase as revenue from the municipality decline. Annual contributions have to increase because investment returns are lower than anticipated resulting in lower funding status. Funding status was related to investment returns of the pension fund through the decisions of the trustees.

Current Theories

Weller and Wenger (2009) examined the relationship between the drop in funding ratio for public sector pension funds and prudent investment behavior by pension funds. When funding ratios drop, employer contributions increase. To offset the additional funding requirement on the employer, a pension fund could increase their asset mix to riskier investments. The risky investments would generate higher returns, reducing the contribution

from the employers. The opposite approach can also occur. When funding ratios are low, pension funds could engage in more prudent investments fearing the fund could not afford to take the risk of a loss. Riskier investments would be used when the funding ratio was high and the trustees believe they can afford the risk. Weller and Wenger (2009) found a positive relationship between riskier allocations and funding status. GAO (2010) survey found that 58% of pension plans indicated that funding status influenced the investment strategy. Investment strategies that generate higher returns result in lower employer contributions. Conversely, strategies that produce lower returns increase employer contributions.

Brainard (2009) found that the market declines during the years of 2000 -2002 resulted in declines in funding levels from 2001 through 2006. Funding levels increased in 2007 as a result of market improvements. In 2008, funding levels declined after investment losses in October 2007. The use of smoothing has limited some of the volatility of investment gain and losses. Investment gains and losses are phased in through actuarial smoothing over a specific period. Many employers are not paying the required contribution amount. In 2001, Public Fund Survey respondents paid an average of 104% of the annual required contribution compared to 88% in 2008 (Brainard, 2009). In 2001, 87% of respondents paid at least 90% of the annual contribution compared to 60% in 2008. This reduction in payments to the pension fund was a contributor to the unfunded liability of the fund (Brainard, 2009). Brainard (2009) stated the pension funds are perpetual organizations and do not require full funding. The concern with funding status was the ability of the plan sponsor to make annual contributions in the future.

Investment returns were 3.3 times larger than employer contributions and 5.8 times larger than employee contributions (Giertz & Papke, 2007). Pension funds depend on proceeds from investments to help fund commitments. Volatility in the equity market will reflect swings in

annual returns. Revenues generated by the sponsor are impacted during this same period. The reduced revenues led to limited pension contributions. Annual investment returns have varied since 1990. From 1990 to 2006, there were two years of negative returns, two years when returns were below the expected rate of return and four years with returns that exceeded 15% (Giertz & Papke, 2007). The returns would suggest that under funding was a result of declining sponsor revenues and cyclical investment returns. Giertz and Papke (2007) suggest that the pension funding goals could be obtained with discipline from the states by maintaining annual contributions and not overreacting to investment returns.

Gaps

Researchers found a relationship between annual contribution amounts, funding status, and annual investment return (Brainard, 2009; Giertz & Papke, 2007; Weller & Wenger, 2009). Pension fund investment returns have declined for a number of years. Investment returns are a major revenue component of pension funds. The declines resulted in unfunded pension obligations. State and local pension plans lost 22% of the market value from June 2008 to December 2008 (GAO, 2010). Based on the GAO (2010) survey 79% of pension funds lost more than 20% of their asset value. From 2000 to 2008 state and local governments experienced 135% increase in annual contributions (Pew, 2010). Funding status was reported at 84% with substantial unfunded liability (Pew, 2010). Pew (2010) evaluated the relationship between funding status and annual investment return as part of the review of governance practices. Trustees are responsible for investment policies and determining annual contributions from plan sponsors. These items impact the funding status of the pension fund. Prior research has used national surveys and reviewed data from an aggregate perspective. This study focused on defined benefit plans in the state of Michigan to confirm the results of the aggregate data.

Chapter Conclusion

The research into pension board governance and investment returns have resulted in mixed findings. A clear relationship between asset allocation and investment return has been demonstrated. An association with board composition and investment return was less clear. Hess (2005) found an inverted U shaped relationship with elected trustees and financial performance. Kazak (2008) and Hess and Squire (2009) stated that trustees have a conflict of interest, which impacts their investment decisions. Dearden and Munley (2009) found the association between governance and investment return was statistically insignificant while Albrecht and Hingornai (2004) had conflicting results. The Pew (2010) study highlighted how states are changing pension governance structure based on the belief the structure impacts investment returns of the pension funds.

Funding status was impacted by investment returns (GAO, 2010). Investment earnings account for 58% of the revenue in pension funds. Any decline in investment earnings will greatly impact the revenue of the pension fund. The reduced revenue will lower funding status. Reduced funding status results in higher employer contributions. Most states have requirements that public pension fund benefits cannot be diminished (CRC, 2009). Plan sponsors are financially responsible for funding the pension system. The board of trustees was responsible for investment strategies that impact investment return and funding status. Most research has focused on the financial strain of governments resulting from increased pension contributions. Researchers have not reviewed the impact of alternative funding sources of pension contributions.

A gap exists in the literature regarding the association between pension governance and investment return. Many researchers used national survey data to review the association between

these variables. This study will focus on the state of Michigan. This will exclude any

differences in the data would result from varying state and local requirements on pension funds.

Because no national standard exists, states establish laws that each municipality was following.

Focusing on pension systems operating under the same laws and economic conditions may have

an impact on the results found in other studies. The inclusion of alternative funding sources of

pension contribution will result in new data that has not been evaluated before. Trustees are

influenced by a variety of information, and this information may impact governance decisions.

Chapter Summary

Public pension funds cover 79% of state and local employees (GAO, 2010). In 2008

pension plans covered more than 19 million members and made payments to 7.5 million

beneficiaries. Appropriate funding of these accounts has far-reaching impact. Board of trustees

has the authority to establish key policies that will impact the funding status of pension funds.

Governance of these boards was crucial in determining the best arrangements for maintaining

pension funds. Unlike private pension funds, the federal government does not have specific

requirements of public pension funds. States and local governments develop laws that govern

the administration of pension funds. Many researchers have studied the impact of governance on

the annual investment rate of return. Fifty eight percent of revenue for pension funds comes

from investment earnings. Twenty eight percent of revenue for pension funds comes from

sponsor contributions. Trustees establish policies that impact both of these sources. Research

into these areas provided lawmakers and trustees additional information about the relationship of

their choices.

Board composition has generated mixed research conclusions. Generally, research has

not found a direct relationship between board size and composition with annual returns.

However, an indirect relationship has been determined or projected through prior studies. The research does show a relationship between asset allocation and annual return. Trustees determine the asset allocation mix. The composition of the board influences how trustees determine the allocation. Appointed and elected trustees may have a conflict of interest between other affiliations and their fiduciary responsibilities. Aggressive investment allocation can generate surpluses distributed to employees, retirees, and plan sponsors. When investment allocations generate losses the plan sponsor was solely responsible for covering the loss. Researchers have a relationship between annual contributions, funding status, and annual investment return. Trustees determine the amount of the annual contributions through policies adopted by the trustees. Funding status was a result of plan assets lower than liabilities. Trustees have the responsibility of determining asset allocation mix and annual contribution amounts, which impact plan assets and in turn impact funding status. This study will examine these variables to determine if a relationship exists within Michigan municipalities that have defined benefit plans.

Funding sources of annual contributions has not been researched. Many states allow local governments to levy property taxes to control the cost of police and fire pension annual contribution payment. This relieves the general fund of the expense but taxpayers directly pay the expense through their tax bill. Trustees consider the financial status of the sponsor when determining annual contribution amounts. When governments pay annual contributions from the general fund any increased payment results in reductions of service or increased taxes. Reduction in services and increased taxes increases the financial distress of the government through taxpayers moving out. Financial distress impacts the future ability of governments to make annual contribution payments. If trustees knew that increases in annual payments would

not have this same impact would it change their decision making**.** This study proposes to look at these variables and determine if a relationship exists between variables. This information will assist lawmakers in policy making choices of how pensions should be funded.

Chapter 3 contains the research method and design appropriateness of the study. The study was a non-experimental, explanatory correlation research design. The design was appropriate because the study examined if a significant correlation relationship existed between the independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return. Chapter 3 includes the population, sampling, and data collection procedures used for this study. The data analysis performed is described.

Chapter 3: Research Methodology

This study incorporated examining the relationship between governance structure of board of the trustees and investment return of municipal pension funds in the state of Michigan. Board governance was communicated through the composition of the board and the governance policies that impact funding levels. The dependent variable was the annual investment return of the fund calculated using yearend annual report information from the pension fund. The independent variables were investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source. The research questions focused on the possible correlation between the independent and dependent variables. Prior research has focused on pension funds in the United States. Albrecht and Hingorani (2004), Clark, Caerlewy-Smith, and Marshall (2006), and Hess (2005) found that some components of board governance have a relationship with investment returns. Public pension funds are governed by state and local laws. ERISA governs private pension funds but does not apply to public pension funds. Each state has different requirements for governance of the public pension funds. The variety of requirements may impact the annual investment return of these funds (Pew, 2010; Powell, 2010; Yang & Mitchell, 2005). This study contained information on the public pension funds in the state of Michigan to determine the relationship that occurs in this environment between investment return and board governance. A non-experimental, explanatory correlation research design was chosen to evaluate this relationship (Creswell, 2005). Chapter 3 includes the appropriateness of this method and design. Data collection and analysis are discussed.

Research Method

Research studies can be done using qualitative or quantitative research methods. Qualitative research relies on the viewpoints of the study participants and uses words as the data to determine themes (Creswell, 2005). Quantitative research studies focus on scientific analysis, descriptive, and correlation relationships. The general problem in this study was the organizational structure of the board of the trustees appeared to influence annual investment returns that cannot fully fund the pension fund. The study examined a potential relationship between the governance structure of the trustees and investment returns in the state of Michigan. In quantitative research numeric variables are measured to provide broad explanations or predictions of their relationship (Creswell, 2005). Qualitative research focuses on exploration of information while quantitative research focuses on explanation of information (Creswell, 2005). The problem in this study was focused on the relationship between numeric variables associated with public pension plans in the state of Michigan. The study was more aligned with quantitative research than qualitative research.

Design Appropriateness

Quantitative research has three primary research designs: experimental, correlation, and survey (Creswell, 2005). The research questions in this study focused on the relationship between variables. Experimental design would not be appropriate because this design seeks to determine if an activity makes a difference in the outcome. Experimental design is suited for studies that seek to determine if the intervention influences the results of one group to another (Creswell, 2005). Survey design is used to determine trends by administering a survey to a small group of participants. This research used secondary data and not primary data from a survey. Correlation design looks at the association or relationship between variables. The degree of

association between the variables will suggest if they are related or can confidently predict the other variable. To address the question of relationship between the variables in this study, a correlation design was best suited to provide those results (Creswell, 2005). The purpose of this study was to determine if a relationship existed between annual investment returns of municipal pension funds in the state of Michigan and governance structure of the board of trustees.

This study used the quantitative non- experimental, explanatory, correlation research design. This method was chosen to explore a statistical relationship between board governance and investment return. The goal was to determine if a pattern and association exist between the variables. Creswell (2005) stated that "in correlation research designs, investigators use the correlation statistical test to describe and measure the degree of association between two or more variables" (p. 325). This study sought to use pre-existing information over three years to assess a relationship between independent variables and the dependent variable.

Population

The population chosen for this study was the state and local public pension funds in the state of Michigan. This population was based on pension funds that responded to the U.S. Census 2008 report. The 2008 US Census report identified 138 pension systems in Michigan with total membership of 426, 804. This study's target population was pension systems that meet the following requirements:

1. "The system is comprised of plans offering defined benefits" (Albrecht & Hingorami, 2004, p. 677) or defined contribution plans invested by the board of trustees.

2. "The system is governed by a board of trustees or retirement board" (Albrecht & Hingorami, 2004, p. 677).

3. "The system is open and investing system assets" (Albrecht & Hingorami, 2004,

p. 677).

These requirements are based on the study requirements of Albrecht, Shamsum, and Giannatasio

(2007) and Albrecht and Hingorani (2004). The first two requirements were included to remove

any influences from outside decision makers such as defined contribution participants and boards

managed by outside professional money managers (Albrecht, Shamsum & Giannatasio, 2007).

The third requirement ensured that the pension funds are still investing and not drawing down

assets only.

Sampling

This study used convenience sampling and probability sampling. Convenience sampling

was chosen because the study used public information. Availability of the information was

essential for inclusion in the study. Probability sampling was performed on the available data to

ensure it was representative of the target population. Available information was evaluated to

ensure it met the three criteria stated in the population. For correlation research a sample size of

more than 30 pension funds is needed for use of the multi-regression analyses (Creswell, 2005).

The actual sample size was determined using power analysis. Power analysis determines sample

size based on the level of statistical significance, the amount of power needed and the effect size

(Creswell, 2005). Using the statistical level of significance of .05, power at .80, and effect size

of .5, the minimum sample needed was 65 for this study. Based on a review of available

secondary data the sample size of 66 was achieved.

Data Collection Procedures and Rationale

This study incorporated information on the potential association between the independent

variables and the dependent variable among state of Michigan pension systems operating under

the same state regulations. The 2008 US Census report identified 138 pension systems in

Michigan with total membership of 426, 804. Annual valuation reports and annual financial

statements of each system were used for data collection for the fiscal years of 2009, 2008, and

2007. This data was public information and obtained through each pension systems website or

the website for the state of Michigan Treasurer's Office. The Treasurer's Office website was the

primary source used to obtain the annual financial reports. Michigan Public Act 2 of 1968

(Uniform Budgeting and Accounting Act) requires that pension systems submit their annual

financial report to the state of Michigan Treasurer's Office. This information was assumed

reliable and valid because the reports contain a statement from an independent auditor or an

actuary attesting to the validity of the information contained (GAO, 2007). The annual valuation

report was obtained from the pension system through their website. The reports were

downloaded, saved on a USB device, and printed. The printed information and electronic

information saved on a USB device stored in a safe classified Underwriter's Laboratories (UL)

and has a fire resistance rating class of 350. Appendix B includes information that identifies the

variables used for this study and the associated secondary data source.

Informed consent and confidentiality was not required because the data obtained in public

documents. Annual valuation reports and annual financial reports were chosen as the primary

data source because these documents contain the information needed for this study and were

available in a variety of locations. Instruments used in this study were the annual valuation

reports and annual financial reports from each pension system. Annual valuation reports and

annual financial reports are completed by the pension systems and audited by an outside auditor

hired by each system. The auditor verifies the data contained in the reports as accurate (GAO,

2007). The role of the outside auditor is to provide independent certification of the data based on

their knowledge and skill to validate the information contained in the reports (GAO, 2007). This verification by the auditor attests to the reliability of the data used in this study. Appendices C, D, and E include the name of the pension systems used in the sample and the website addresses of the secondary data.

<div align="center">**Validity – Internal and External**</div>

Validity in research represents the ability to depict meaningful inferences about the data for the population. Belli (2009) stated that "validity relates to whether it is measuring what we intend it to measure, and represents the overarching quality of the measure" (p. 62). The independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return provided the intended information. The data was obtained from reports that are audited by third parties attesting to their credibility. The reliability of the data was based on the assumption that the auditors and actuaries have performed the necessary review to attest to the compliance of the report.

Internal

This study was non-experimental using public data, so several of internal validity threats were not relevant. History, maturation, testing, differential selection of participants, mortality, and interaction effects did not impact this study. Onwuegbuzie (2000) stated instrumentation cannot be eliminated as a threat because outcome measures can never produce perfectly reliable scores. Creswell (2005) stated the measuring instrument may change during the course of the study resulting in a potential validity threat. Standardization of procedures can correct for this problem. This study included annual financial reports and annual valuation reports. Reviewing the auditor's opinion letter or the actuary letter contained in each document, highlighted any

material changes to the document from the previous year and limits any validity threat. The auditor's opinion letter expresses the compliance with generally accepted accounting principles in preparation of the financial statements.

Statistical regression can cause an internal validity threat at the data analysis stage of the study. The threat occurs as groups are being statistically equated**,** change scores are analyzed, and longitudinal data is analyzed (Onwegbuzie, 2000). Most groups have pre-existing differences that can impact comparisons. Those differences can impact the internal validity of the findings.

External

Population and ecological external validity threats exist. Population validity relates the extent that the discoveries can be generalized to the larger population. Increasing the samples will increase the population validity. This study incorporates power analysis to determine sample size based on the level of statistical significance, the amount of power needed and the effect size (Creswell, 2005). Using the statistical level of significance of .05, power at .80, and effect size of .5, the minimum sample needed was 65 for this study. This sample size addressed the population validity within the study. Ecological validity relates to the extent the discoveries can be generalized beyond the target population. Ecological validity would assume the discoveries would extend from individual pension plans, the state of Michigan, other states, and the United States.

The specificity of variables can be an external validity threat. Each variable is specific in the location, time, type, definition, and use of measuring instruments (Onwegbuzie, 2000). The distinctive variables may result in a reduced ability to generalize the findings. To offset the threat of specificity the variables have been defined in a way that provided meaning outside of

the study. Each variable was defined using meanings obtained in past research. Onwegbuzie (2000) noted this threat was common in most studies.

<div align="center">**Data Analysis**</div>

This study contained information relating to the correlation between governance structure and annual investment return. In analyzing data, multiple-regression analyses were employed to report applicable descriptive statistics and inferential statistics (Aczel & Sounderpandian, 2009**).** Descriptive statistics were used to describe responses and provide trend and distribution of the data (Creswell, 2005). Insight and understanding into how the data varies and compares to each other was provided through descriptive statistics. Inferential statistics were used to make inferences from the data collected to more general population.

Descriptive Statistics

The study used descriptive statistics to give insight and understanding into how the data varies and compares among data. The type of descriptive statistics used was central tendency measures, such as mode, mean, and median (Steinberg, 2008). Dispersion was used to measure the variability within the data values (Steinberg, 2008). The dispersion data provided a more detailed set of information and characteristics about the data from the pension systems. Dispersion information was provided through the range, variance, and standard deviation.

Inferential Methods

Steinberg (2008) stated that inferential statistics are "used to draw a conclusion from the characteristics of a larger group for which the sample is drawn" (p. 139). The population in this study was the public pension systems in the state of Michigan. The sample data was determined

through convenience sampling and probability sampling. The sample size used power analysis
to determine a minimum size of 65 was sufficient to apply the results to the entire population.

The data analysis was used to address the two research questions in the study. The first
research question examined whether a significant correlation relationship exist between the
independent variables and the dependent variable of annual investment return. The F-statistic,
Pearson r correlation coefficient, and t-tests were used to test for correlation among the variables.
The F-statistic was used to test the null hypothesis. The F-statistic examined if a significant
correlation existed between the dependent variable and with at least one of the independent
variables (Aczel & Sounderpandian, 2009). The formula for F-Statistic is F=MSTR/MSE.
MSTR represents mean square treatment. MSE represents mean square error. If the correlation
was found, R^2 statistic determines the significance of the correlation coefficient. The t-statistic
was used to examine the possible correlation among each of the variables in the relationship
(Creswell, 2005). If correlation was found between the dependent variable and each of the
independent variables, the Pearson r coefficient describes the relationship (Creswell, 2005).

Correlation is measuring the strength of the association between two different variables.
The correlation coefficient was used in this study to determine the strength of the association
between the variables. A correlation coefficient value close to one would indicate a perfect
degree of association among the two variables used. Values closer to zero would indicate a weak
or no association. Values close to a minus one indicate negative correlation. This type of value
would indicate that when one variable increases, the other variable will decrease. The variables
move in opposite direction. Values close to a plus one would indicate a positive correlation.
These values indicate as one variable increases, the other variable would increase. These
variables are moving in the same direction. This analysis, using the t-statistic, assisted in

addressing the research questions by determining the strength of any correlation (Aczel &

Sounderpandian, 2009).

The Pearson r correlation was used in this study. This study had more than two variables

that will be measured on an interval level. In this study the Pearson r correlation measured the

degree of association between annual investment return and each independent variable if a

significant correlation was found. Statistical software was used for the statistical calculations.

The second research question examined if a predictive model be developed if a

significant correlation was found between any of the independent variables and the dependent

variable of annual investment return. Multiple regression analysis was used to address this

question. To determine the impact of multiple variables on a dependent variable regression

analysis was used in correlation statistics. "In (multiple) regression the dependent variable is

explained by the variance of each independent variable as well as the combined effect of all

independent variables" (Creswell, 2005, p. 336). A test for multicollinearity would have been

conducted if a statistically significant correlation was found. Multicollinearity occurs when a

correlation exists between the independent variables (Aczel & Sounderpandian, 2009).

Multicollinearity can reduce the explanatory power of the independent variables.

Chapter Summary

This study consisted of the quantitative, non- experimental, explanatory, correlation

research design. The research involved the relationship between governance structure of board

of the trustees and investment return of municipal pension funds in the state of Michigan. Public

data from public pension systems in the state of Michigan was used to examine the relationship.

The correlation method was chosen because it examines associations between variables. The

data was not manipulated so the study was non- experimental. The information was from the past three years.

The population came from responses to a study conducted by the US Census bureau (2010). The Census study indicated that the state of Michigan had 138 public pension systems. The annual valuation reports and annual financial reports of the public pension system provided the data necessary for the research. These reports were available on the state of Michigan's website or through each individual pension system. A convenience sample was used in the study based on the availability of information with the goal of retrieving a high percentage of pension data. Data analysis was conducted with descriptive and inferential statistics through a statistical software program. The descriptive statistics provided foundation information about the data and the inferential statistics provided information about the association between the independent and dependent variables.

Chapter 4: Analysis and Results

This study focused on the relationship between governance structure of board of the trustees and investment return of municipal pension funds in the state of Michigan. Board governance was communicated through the composition of the board and the governance policies that impact funding levels. The dependent variable was the annual investment return of the fund calculated from information in the year end annual report from the pension fund. The independent variables were investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source. The research questions concentrated on the possible correlation between the independent and dependent variables. This study focused on the public pension funds in the state of Michigan to determine if a relationship occurs in this environment between investment return and board governance. A non-experimental, explanatory correlation research design was chosen to evaluate this relationship (Creswell, 2005). Data collection, data analysis, and results of this correlation study are included in Chapter 4.

Population and Sampling

The population for this study was based on the pension systems in Michigan identified by the U.S. Census 2008 report. The report identified 138 pension systems in Michigan. The target population was pension systems had to meet the following requirements:

1. "The system is comprised of plans offering defined benefits" (Albrecht & Hingorami, 2004, p. 677) or defined contribution plans invested by the board of trustees.

2. "The system is governed by a board of trustees or retirement board" (Albrecht &
   Hingorami, 2004, p. 677).

3. "The system is open and investing system assets" (Albrecht & Hingorami, 2004,
   p. 677).

These requirements were identified in the studies of Albrecht, Shamsum, and Giannatasio
(2007) and Albrecht and Hingorani (2004). The purpose of the requirements was to identify
pension systems that had board of trustees who are still actively investing the system assets and
not drawing down assets which would eliminate the need for trustees to make investment
decisions.

The study used convenience and probability sampling. The pension systems were chosen
based on availability of information. Power analysis was used to determine the actual sample
size. Creswell (2005) indicated that a statistical level of significance of .05, power at.80, and
effect size of .5 was typical for hypothesis testing. Using the statistical level of significance of
.05, power at .80, and effect size of .5, the minimum sample size needed was 65. The study had
a sample size of 66. The 66 pension systems were chosen randomly based on the availability of
information and meeting the three requirements of governed by board of trustees, each pension
offered a defined benefit plan invested by the board of trustees, and each system was actively
investing the systems assets. Power analysis was chosen to determine sample for group
comparisons. The sample size allowed for inferring information to the entire population.
Multiple regression analysis requires a minimum sample size of 30. The sample size of 66
allowed for multiple regression analysis and inferences relating to the population.

Data collection

Public information was used to obtain the data for independent and dependent variables. The data was found in annual financial reports, annual valuations, and the plan sponsor's website. The annual reports for 2010, 2009, 2008, and 2007 were obtained from the state of Michigan Treasurer's Office website. Michigan Public Act 2 of 1968 (Uniform Budgeting and Accounting Act) requires public pension systems to submit their annual reports to the state of Michigan's Treasurer's Office. The state published this information on their website. The annual reports contained investment policy data, funding status, annual pension contribution amounts, and pension contribution funding sources. The data was manually input into a Microsoft Excel 2007 spreadsheet.

Investment policies were determined through asset allocation and targeted investments. Asset allocation was determined by dollar amount invested in common stock, government securities, bonds, and other investments divided by the total amount of assets invested per year. This resulted in a percentage invested in each category totaling to 100%. Microsoft Excel 2007 data analysis tool was used for statistical information. The annual reports and annual valuations did not specify the value of targeted investments. Targeted investment information was not available through public information on the plan sponsor's website. The lack of numeric information resulted in targeted investment information not being analyzed as part of this study.

Governance structure was determined by board composition of ex-officio, elected, and independent. The governance structure was found in annual valuations, charters, ordinances, and board meeting minutes. This information was obtained from the plan sponsor's website. The

number of trustees in each category was divided by the total number of trustees in the pension system. This resulted in a percent of trustees in each category which totaled 100%.

The annual investment return was not consistently found in any of the public sources reviewed. When the annual investment return was found, it was calculated using a variety of different methods. For consistency, the annual investment return was calculated for each pension system. Below is the formula used each year.

FY 2007 Annual Return

UAAL FY 2006 minus UAAL FY 2007 equal Gain/Loss FY 2007

Gain/Loss FY 2007 divided by AAL FY 2006 equal FY 2007 Annual Return

FY 2008 Annual Return

UAAL FY 2007 minus UAAL FY 2008 equal Gain/Loss FY 2008

Gain/Loss FY 2008 divided by AAL FY 2007 equal FY 2008 Annual Return

FY 2009 Annual Return

UAAL FY 2008 minus UAAL FY 2009 equal Gain/Loss FY 2009

Gain/Loss FY 2009 divided by AAL FY 2008 equal FY 2009 Annual Return

This formula was based on the Experience Gain/Loss formula used in the FY 2010 City of Ypsilanti Fire and Police Retirement System Annual Valuation Report (p. B-3) and FY 2010 City of Royal Oak Retirement System Annual Valuation Report (p. A-3). The data for the

unfunded actuarial accrued liability (UAAL) and the actuarial accrued liabilities (AAL) was found in the annual reports for FY 2010, 2009, 2008, and 2007. The data was manually input into an Excel spreadsheet with calculations completed using Excel formulas.

Data Analysis

Multiple regression analysis was used to determine the possible significant correlation. Descriptive statistics were used to provide an understanding of how the data varies, compares to each other, and describes the data in the sample (Steinberg, 2009). Statistics were used inferentially to determine conclusions about the population from the sample data in the study.

Descriptive Statistics

The descriptive statistics used in this study were central tendency measures, such as mode, mean, and median. The dispersion was analyzed through the range, variance, and standard deviation. The study looked at each of the three years separately and together. Reviewing each year separately reflected any changes that were occurring year to year.

Governance Structure

The data for governance structure reflected the same number for median and the mode relating to governance structure. Forty percent of pension trustees were ex-officio, 40% were elected, and 20% were independent, as reflected in the median and mode. The mean results were similar. The minimum, maximum, and range for ex-officio indicated that some pension funds had no ex-officio trustees, and some had 100% of their trustees as ex-officio. The minimum, maximum, and range for elected and independent indicated that some pension funds had no elected trustees and some had up to 75.00% of their trustees elected. Appendix F provides additional information on descriptive statistics for governance structure.

Investment Policies

Reviewing mode, median, and mean for common stock, government securities, bonds and other investments indicated the relative allocation of investment funds for the sample. The mode for common stock, government securities, and bonds were zero percent for FY 2009, 2008, and 2007 indicating the most frequent value was zero for each the investment allocation. The mode for other investments was 100% for FY 2009 and 2008, and zero percent for FY 2007. For each year, the median for common stock reflected the highest percent of all four variables. Based on the sample data, the average score for each year indicated that common stock had the highest percent of all variables followed by other investments, bonds, and government securities. Appendices G, H, and I provide additional information on descriptive statistics for investment policies for 2009, 2008, and 2007.

Appendix J reflects the descriptive statistics considered using all years of data for each variable. The most frequent value indicated was 100% for other investments and 0% for common stock, government securities, and bonds. The average score was 41.81% of common stock, 37.21% for other investments, 12.10% for bonds, and 8.89% for government securities. The middle score was consistent with the average score results. The standard deviation measured the dispersion from the mean. A low standard deviation indicates the data was less spread apart from the mean (Creswell, 2005). Government securities had the lowest standard deviation of 0.08 compared to other investments that had the highest standard deviation of 0.27. This indicates the data was more varied for other investments compared to government securities.

Funding Status

Funding Status reflects the percent of actuarial value of assets divided by actuarial accrued liability. A percent lower than 100% indicates the pension system has more liabilities than assets resulting in an unfunded accrued liability. Appendix K reflects the median and mean number declining for funding status from FY 2007 to FY 2009. However the most frequent value, mode, in FY 2007 was lower than FY 2008 and FY 2009.

Table 1 indicates that 30 out of the 66 pension funds had a funding status of greater than 100% in 2007. By 2009 this number was reduced to 15 of the pension funds with funding status of greater than 100%. The number of pension funds with funding status of less than 80% increased from seven in 2007 to 17 in 2009.

Table 1

Number of Pension Funds in Funding Ranges over 3 years

Range	2009	2008	2007
> 100%	15	28	30
100% - 80%	34	28	29
< 80%	17	10	7
Total	66	66	66

Annual Pension Contribution Amount

The annual pension contribution amount was the amount of funding the plan sponsor was required to fund the pension system annually. The annual contributions had a range of $1 billion in FY 2009. The mean and median increased from FY 2007 to FY2008. From FY 2008 to 2009 the mean and median declined. The most frequent amount for each year was $0, no pension

contribution amount. Appendix L provides additional information on descriptive statistics for annual pension contribution.

Pension Funding Source

The pension funding source indicated if a plan sponsor funds the pension contribution through general fund or a pension property tax millage. Funded through general fund was coded with the number two. Funded through property tax millage was coded with the number one. Appendix M contains data that reflects the general fund as the most frequent data value with the median and mode of 2.00 and a mean of 1.83. The histogram in Figure 2 graphically indicated the majority of the pension funds have a general fund contribution source. Eleven pension systems had a pension property tax millage while 55 pension systems or 83% of the sample were funded through the general fund.
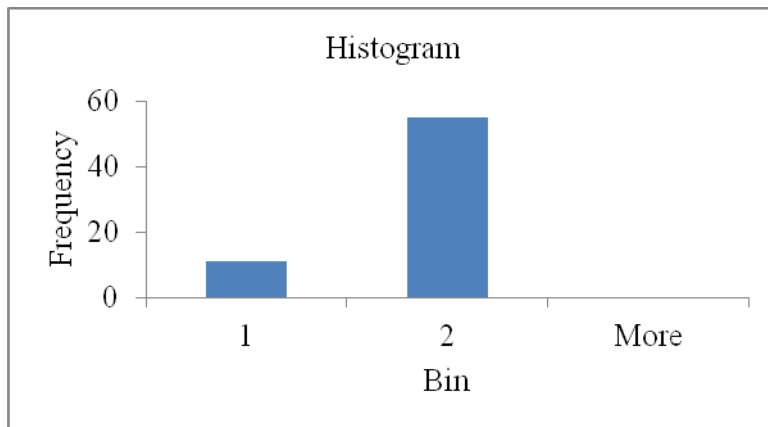
Figure 2. Histogram for Pension Funding Source where 1 represents pension systems funded by property tax and 2 represents pension systems funded by the plan sponsor.

Annual Investment Return

Annual investment return was computed for each system. The data did not have a value that occurred more than once resulting in the N/A for the mode. The mean and median reflected a decline in annual investment returns from FY 2007 to FY 2009. The maximum gain over the three year period was 11.84% in FY 2007 while the minimum was -84.85% in FY 2009. Table 2 indicates that in 2007 four pension funds had annual investment returns of over 7% and three had annual investment of returns of less than 5%. In 2009, one pension fund had annual investment returns of over 7% and 32 had annual investment returns of less than 5%. FY 2009 reflects a 967% increase in pension funds with returns less than 5% and a 75% decrease in funds over 7% compared to FY 2007. Appendix N provides additional information on descriptive statistics for annual investment return.

Table 2

Number of Pension Funds in Annual Investment Return ranges over 3 years

Range	2009	2008	2007
> 7%	1	0	4
7% - 0%	2	17	41
-1% - -5%	31	29	18
< -5%	32	20	3
Total	66	66	66

Hypotheses Testing

This study included two research questions. The first research question sought to identify a statistically significant association between the variables. Understanding this relationship would provide the leadership of the pension systems with additional information to

enhance their decision making. The second research question sought to determine if a predictive

model could be developed based on the association between the variables. A predictive model

would provide leadership with additional tools to forecast the impact of specific governance

policies.

Research Question 1

Does a significant correlation relationship exist between the independent variables of investment

policies, governance structure, funding status, annual pension contribution amount, and pension

contribution funding source and the dependent variable of annual investment return?

H_1: There was significant correlation, R^2 of .7 and above, between investment policies,

governance structure, funding status, annual pension contribution amount, and pension

contribution funding source and annual investment return.

H_0: There was not a significant correlation, R^2 of .7 and above, found between investment

policies, governance structure, funding status, annual pension contribution amount,

and pension contribution funding source and annual investment return.

H_1 is used to determine if a linear relationship exists between any of the independent variables

and dependent variable. If no linear relationship exists then the null hypothesis was true. To

determine a linear relationship the analysis of variances has to be conducted. The degree of

freedom for regression was k= 11, the number of independent variables. The degree of freedom

for error was n - (k +1). This resulted in $66 - (11 + 1) = 54$. N represents the number of data

points for each variable. Total degree of freedom was n-1. For this study, the total degree of

freedom was $66 - 1 = 65$. Tables 3, 4, and 5 indicate the multiple regression and ANOVA results

for each year. If the p-value was less than .05 the null hypothesis should be rejected (Creswell, 2005). The p- value for 2009 and 2008 are greater than .05. The p-value for 2007 was less than .05. The F-test indicates if there was evidence of a relationship between the dependent variables and at least one independent variable (Aczel & Sounderpandian, 2009). The result of the 2007 data would indicate that "the data presents statistical evidence to conclude that a relationship exists between" (Aczel & Sounderpandian, 2009, p. 475) annual investment return and at one of the independent variables. The R^2 indicates the amount of variability in the annual investment return associated with the independent variables. The multiple coefficient of determination value (R^2) measures the strength of the regression prediction compared to using the mean. As the number of variables increase for the number of data points, the R^2 will increase (Aczel & Sounderpandian, 2009). The adjusted R^2 represents the R^2 corrected for the degrees of freedom in the equation. For 2009 using a 95% confidence level, the level of correlation was 0.25 and the strength of the correlation was 0.25. For 2008 using a 95% confidence level, the level of correlation was 0.05 and the strength of the correlation was .20. For 2007 using a 95% confidence level, the level of correlation was 0.04 and the strength of the correlation was 0.42. It appeared from 2009 to 2007 the level of correlation was declining.

The p- value for 2009 and 2008 are greater than .05 and the R^2 was less than .7 each year. These results suggest the H_0 cannot be rejected. Even though 2007 p – value indicates statistical evidence that a relationship exists. The R^2 of less than .7 indicate that the relationship was not statistically significant so the H_0 cannot be rejected. Table 3 reflects the result of the multiple regression and ANOVA analysis for 2009. Table 4 reflects results for 2008 and Table 5 for 2007.

Table 3

Multiple Regression and ANOVA Table for 2009 data

Source	SS	df	MS	*F*	F_{Critical}	*p*-value
Regression	0.25	11	0.02	1.23	1.97	0.29
Error	1.00	54	0.02			
Total	0.99	65	0.02			

R^2	0.25	
Adjusted R^2	-0.21	
s	0.14	

Variable	*b*	*s(b)*	*t*	*p-value*
Intercept	-2.44E+11	223520.56	-1.37E+12	<.001
pension funding source	-0.14	0.05	-0.70	.01
annual pension contribution amount	9.83E-10	1.03E-09	-0.30	.34
(Funded Ratio) funding status	0.11	0.10	-0.27	.27
Common Stock	2.44E+11	0.17	1.30E+12	0
Government Securities	2.43E+11	0.23	#DIV/0!	0
Bonds	2.43E+11	0	1.09E+12	#DIV/0!
Other Investments	2.43E+11	0.14	1.51E+12	0
Asset size (Actuarial Value of Assets)	-2.30E-11	2.36E-11	0.28	.34
# ex-officio	0.16	268493.90	2.81E-07	1

# elected	0.30	268493.90	4.83E-07	.99
# independent	-0.04	268493.90	6.37E-07	1

Table 4

Multiple Regression and ANOVA Table for 2008 data

Source	SS	df	MS	F	$F_{Critical}$	p-value
Regression	0.05	11	0.00	1.16	1.97	.34
Error	0.21	54	0.00			
Total	0.24	65	0.00			

R^2	0.20
Adjusted R^2	-0.04
s	0.06

Variable	b	$s(b)$	t	p-value
Intercept	-1.44E+11	0.11	-1.37E+12	<.001
pension funding source	-0.02	0.02	-0.70	.01
annual pension contribution amount	-1.32E-10	4.46E-10	-0.29	.34
(Funded Ratio) funding status	-0.01	0.05	-0.27	.27
Common Stock	1.44E+11	0.11	1.30E+12	0
Government Securities	1.44E+11	0	#DIV/0!	0
Bonds	1.44E+11	0.13	1.09E+12	#DIV/0!
Other Investments	1.44E+11	0.10	1.50E+12	0

Asset size (Actuarial Value of Assets)	2.82E-12	1.02E-11	0.28	.34
# ex-officio	0.02	65935.65	2.81E-07	1
# elected	0.03	65935.65	4.83E-07	.99
# independent	0.04	65935.65	6.37E-07	1

Table 5

Multiple Regression and ANOVA Table for 2007 data

Source	SS	df	MS	F	F_{Critical}	p-value
Regression	0.04	11	0.00	3.47	2.00	.001
Error	0.06	54	0.00			
Total	0.09	65	0.00			

R^2	0.42
Adjusted R^2	0.28
s	0.03

Variables	b	$s(b)$	t	*p-value*
Intercept	-7.17E+10	44357.85	-1617095	<.001
pension funding source	-0.02	0.01	-1.44	.16
annual pension contribution amount	-1.83E-11	2.05E-10	-0.09	.93
(Funded Ratio) funding status	0.11	0.02	4.68	<.001
Common Stock	7.17E+10	0.05	1.36E+12	0
Government Securities	7.17E+10	0.07	9.81E+11	0

Bonds	7.17E+10	0	65535	<.001
Other Investments	7.17E+10	0.05	1.48E+12	0
Asset size (Actuarial Value of				
Assets)	-2.37E-13	3.83E-12	-0.06	.95
# ex-officio	0.01	0.03	0.32	.75
# elected	-0.01	0.04	-0.30	.77
# independent	0.02	0	65535	<.001

The Pearson r was calculated for each of the independent variables. The results in Table 6 indicated that pension funding source, annual pension contribution amount, common stock, government securities, bonds, asset size, and number of independent trustees had a negative correlation to annual investment return. Funding status, other investments, ex-officio trustees, and elected trustees had a positive correlation to annual investment return. Results close to -1 or +1 indicate a linear relationship between the variables. Results close to zero indicate a weak or no relationship (Steinberg, 2008). All independent variables have a result close to zero indicating a weak relationship to annual investment return.

Table 6

Correlation Statistics (Pearson r)

Variable	Annual Investment Return (calculated)
Pension Funding Source	-0.04
Annual Pension Contribution Amount	0.00

(Funded Ratio) Funding Status	0.17
Common Stock	-0.09
Government Securities	-0.01
Bonds	-0.13
Other	0.12
Asset size (Actuarial Value of Assets)	-0.01
# Ex-Officio	0.06
# Elected	0.04
# Independent	-0.10

Research Question 2

If a significant correlation was found between any of the independent variables and the

dependent variable of annual investment return, can a predictive model be developed?

H_2:   If a significant correlation was found with at least one of the independent variables

and the dependent variable, a predictive model using a confidence level of 95% can

be developed.

H_0:   A predictive model cannot be developed with a confidence level of 95% if a

significant correlation was found among variables.

Tables 3, 4, and 5 indicate R^2 of less than .7 for each independent variable. Table 3 indicated a

R^2 of 0.25 and p-value of .29 for 2009. The R^2 of 0.25 means that 25.19% of the variation in

annual investment return was explained by pension funding sources, annual pension contribution

amount, funding status, investment policies, asset size, and governance (Borsch & Dahl, 2010).

This result reflected a very weak correlation. Every year the R^2 did not produce a result of .7

and above indicating a weak prediction value for the combination of independent variables. In 2007 the highest R^2 was shown at 0.42 with a p-value of .001. If the p-value was less than .05 the null hypothesis should be rejected. If the p-value was greater than .05 the null hypothesis should be accepted (Creswell, 2005). Annual pension contribution amounts, funding status, asset size, ex-officio, elected, and independent had p-values greater than .05. For these variables the null hypothesis H_0 should be accepted. Common stock and other investments had p-values less than .05 in all three years. Pension funding source had a p-value of less than .05 in 2009. Government securities had a p-value of less than .05 in 2009 and 2007. Bonds had a p-value of less than .05 in 2008. A t-statistic that was greater than 2 indicates statistical significance of the association between the independent variable and the dependent variable (Creswell, 2005). Funding status had a t-stat of greater than 2 in 2007. Independent variables with low p-values show that those variables are improving the fit of the model (Hoyt, Leierer, & Millington, 2006). If these variables were omitted the fit of the model would be worse. Since the R^2 indicated a weak correlation the null hypothesis H_0 should be accepted despite p-values of less than .05 and t-stat greater than 2.

Summary

The data used in this study was all public information. Sixty six pension systems were used based on the availability of information relating to all variables. The power analysis indicated that a minimum sample size of 65 was needed based on a statistical level of significance of .05, power at .80, and effect size of .5. The sample size used in the study was sufficient to meet this criterion. Annual financial reports and annual valuation reports were the primary source of the data. The sources used for governance structured varied from board

minutes, annual valuations, charters, and ordinances that were available on the plan sponsor's website. Targeted investment information was not available through public information on the plan sponsor's website. The lack of numeric information resulted in targeted investment information not being analyzed as part of this study. The annual investment return was calculated using an experience gain and loss formula. The calculation was needed because of the inconsistency and variance of annual investment return calculations among pension systems. Microsoft Excel 2007 was used to analyze the data.

The descriptive statistics reflected a median board governance structure of 40% ex-officio, 40% elected, and 20% independent. The investment policies for all years had a median of 45.85% for common stock, 8.67% for government securities, 10.86% for bonds, and 32.56% for other investments. The median funding status declined from 2007 to 2009. The mean annual contribution amount for 2007 was $23,659,029, $28,790,641 for 2008, and $28,761,449 for 2009. Eighty three percent of the pension systems were funded through the general fund of their plan sponsor. Annual investment returns declined from 2007 to 2009 with a median return of -2.17% for all years.

The hypothesis testing for both research questions indicated no statistically significant correlation existed between any of the variables. The first research question sought to identify a statistically significant association between the variables. The multiple regression for each year did not produce a R^2 of .7 and above, so the H_0 cannot be rejected. The Pearson r for each of the independent variables was close to zero indicating a very weak relationship to annual investment return. The second research question sought to determine if a predictive model could be developed based on the association between the variables. The p-value for pension funding

source, annual contribution amount, common stock, government securities, asset size, and ex-officio was greater than .05. A p-value was greater than .05 indicated that the null hypothesis should be accepted. The p-value for funding status, other, and independent had p-values less than .05. The highest R^2 was .42 in 2007, significantly less than the required R^2 of .7 or greater. The R^2 indicates 42.26% of the variability in annual investment return can be explained by the independent variables. The null hypothesis was accepted because the R^2 was less than .7 every year. Chapter 5 summarizes the results of the data analysis and provides recommendations for leadership of pension boards, plan sponsors, and legislative members.

Chapter 5: Summary and Recommendations

The majority of public pension funds are defined benefit plans (Hess, 2005; Pew, 2010). Defined benefit plans provide a specific payment to retirees based on years of service and salary levels. Public pensions are funded by plan sponsors, investment earnings, and employee contributions (GAO, 2010). If the fund does not have sufficient dollars to cover the obligation of pension payments to retirees the plan sponsor is responsible for making up the difference. Most governmental entities use their general fund to support the contribution to the pension funds. The risk of an underfunded pension plan can impact many stakeholders. Chapter 5 includes a restatement of the problem statement, purpose, and methodology of the study. A discussion on the implication of findings included in Chapter 4, limitations of the study, and recommendations for leaders are included in Chapter 5.

Problem Statement

The goal of all public pension funds is to be fully funded. Full funding occurs when the actuarial value of pension assets equal the accrued liability. Trejos (2009) found that 77.7% of pension funds were under funded. In 2008, four states had fully funded pension funds compared to 50% of states in 2000 (Pew, 2010). In 2008, approximately 80% of pension plans had a decline in asset value of more than 20% (GAO, 2010). Board of trustees is responsible for governance and investment decisions for the public pension funds. Declining assets and increased under funding indicates that the structure of pension board of trustees has not produced a sufficient annual investment return to fully fund pension. Mitchell, Piggott, and Kumru (2008), Schneider and Damanpour (2002), and Albrecht, Shamsub, and Giannatasio (2007) have shown a relationship between board governance and investment returns of the pension fund. The

specific problem of underfunded public pension systems in the state of Michigan appeared to be partially related to relationship of the board governance and annual investment return of the fund. In 2008, the state of Michigan pension system was 84% funded with $11.5 billion in unfunded liabilities (Pew, 2010). The largest public pension system in Michigan experienced a 24.8% investment loss in 2009 (CRC, 2009). The underfunding problem existed in Michigan like the rest of the United States.

Purpose and Methodology of the study

The purpose of this quantitative correlation study was to explore if a significant correlation relationship existed between independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return of municipal pension funds in the state of Michigan. The independent variables related to the composition of the board, the policies of the board that impact the use of fund assets, funding requirements, and funding sources. The numeric data for the variables came from public information obtained from the internet. Annual financial statements and annual valuation reports were the primary source of data. The plan sponsor's website was used to obtain charter, ordinance, and board meeting minutes that contained some of the variable information. The population was 138 public pension systems in Michigan as identified in the 2008 US Census report. The sample size was determined by using power analysis. Power analysis resulted in a minimum sample size of 65 based on a statistical level of significance of .05, power at .80, and effect size of .5 (Creswell, 2005).

Implications of the Findings

Determining a possible correlation relationship model between independent variables of investment policies, governance structure, funding status, annual pension contribution amount, and pension contribution funding source and the dependent variable of annual investment return would provide information to the trustees and government officials to enable more effective decisions. Leadership and governance for public pension funds are primarily the responsibility of the board of trustees. Hopkins, O'Neil, and Williams (2007) identified the use of power, information, knowledge, and time as effective traits of high performing boards. This study produced descriptive and inferential data that add to the knowledge and information available to board of trustees.

To address the problem and purpose statements two research questions were identified. The first research question sought to identify a statistically significant association between the variables. The second research question sought to determine if a predictive model could be developed based on the association between the variables. The results of the data analysis did not support a statistically significant correlation relationship between any of the independent variables and annual investment return. Since a statistically significant correlation was not found between the independent and dependent variables a predictive model could not be developed. Determining a statistically significant correlation between the variables would provide specific direction to the leaders of pension funds, however the data from this study provided useful data that can influence decision makers.

This study used the Public Choice Theory as the theoretical framework. The board of trustees has responsibility for the governance of the public pension funds. Public Choice theory stated that people work in their own self interest (Shughart, 2008). In a government setting the

focus should be working for the common good versus individual gain (Shughart, 2008). To balance the conflict between common good and individual self interest structures are developed. The board of trustees forms a structure that should balance the trustee's self interest and the interest of the public pension fund as a whole. The data for board composition in this study did not find a statistically significant correlation between the type of board trustee and the annual investment return. Prior research indicated a conflicting relationship between board composition and investment return. Useem and Mitchell (2000) did not find a statistically significant relationship. Albrecht and Hingorni (2004) found a statistically significant relationship with risk adjusted investment returns. Hess (2005) found an inverted U shaped relationship between trustees and investment return. Useem and Mitchell (2000) considered the indirect relationship that board composition has on investment. Trustees determine asset allocation which Useem and Mitchell (2000) found to impact financial performance of the fund. The descriptive data for board governance was consistent with the 2010 GAO survey with a high percentage of elected, ex-officio, and independent board members. The data showed that the percent of ex-officio and elected trustees had a positive association with annual investment return. Percent of independent trustees had a negative association with annual investment return. This would indicate a higher percent of independent trustees could result in a lower investment return. This information would be useful to trustees as they determine the allocation of board members. Despite the inconsistent results of prior research many public pension funds are adjusting their board composition to impact investment return and unfunded status (Pew, 2010). The potential conflict of interest and lack of specific financial knowledge was thought to impact investment returns. This is consistent with the Public Choice theory that assumes people work in their self interest and structures help balance the conflicts. This study did not review the impact of financial

knowledge of board trustees. A future study should review the impact of financial literacy and training of board trustees and the impact on investment returns in Michigan to support the changes that are occurring with board composition.

Yang and Mitchell (2005) and Mitchell, Piggot, and Kumru (2008) specifically examined the impact of retiree representation on the board. Yang and Mitchell (2005) focused on active beneficiaries as trustees. These studies found an association to investment yields. This study restricted the categories to elected, ex-officio, and independent without including active or retiree classification. A future study should expand the classification of board trustees to determine if the results received by Yang and Mitchell (2005) and Mitchell, Piggot, and Kumru (2008) are consistent in the Michigan public pension funds.

Fifty eight percent of pension revenue comes from investment income (GAO, 2010). Aronson et al. (2009) found that the board governance impacted the asset mix of public pension funds. Albrecht et al (2007) found that boards who determined asset allocations produced a lower rate of return on investments.

 Michigan has specific requirements on asset allocation for public pension funds. This study found no statistically significant correlation between board governance and annual investment return. The percent of allocation for common stock, government securities, and bonds had a negative association with annual investment return. Other investments had a positive association with annual investment returns. Other investments included mutual funds, real estate, and other items. The median and mean for common stock declined from 2007 to 2009. The median for bonds increased from 2007 to 2009. Government securities and other investments reflected an inconsistent median percentage over this three year period. Common

stock had the highest percentage of total investment each of the three years, followed by other investments, bonds, and government securities. During this same time period the stock market had very volatile returns. The Dow Jones Industrial Average had a -25.76% return in 2009, -15.14% return in 2008, and 20.25% in 2007 comparing June results each year (Yahoo! Finance, 2011). The decline in the stock market was reflected in the annual investment return for the pension funds. With more than 40% of the funds invested in common stock, the results are expected. The losses in investment return correspond with a decline in funding status. This unprecedented change in the stock market could have impacted the normal decision making that trustees use concerning investment allocation. In a changing environment with so many external factors impacting investment returns, determining a correlation between board governance and investment return could be challenged. Future research should include the overall return in the stock market as a variable to determine the impact the market has on this relationship.

The data reflected the lowest standard deviation in government securities compared to other investments, which had the highest standard deviation. For securities analysis, a lower standard deviation implies less risk (Dent, 2011). The smaller variance of the government securities implies a smaller variance risk of the plan but will result in lower overall returns over time (Dent, 2011). This study demonstrated an investment loss over the three year period studied due to the overall losses in the stock market. However, the Standard and Poor's stock index has outperformed corporate bonds index by about 1.5% over time. Despite the results of this three year period, a mix of investment allocation will be effective for overall returns.

The descriptive data provided useful data for leaders. From 2007 to 2009 the funding status had a median decrease from 98.35% to 89.10%. In 2007, 36 out of 66 Michigan pension funds had a funding status of less than 100%. In 2009 the number of pension funds that was

under funded increased to 51. The number of pension funds with funding status of less than 80%

more than doubled from 2007 to 2009. Brainard (2009) stated that a funding status of 80% was

appropriate for public pension funds. Brainard's data indicated that a number of pension funds

were falling below an appropriate funding. Seven percent was a typical assumed rate of return

for pension funds (GAO, 2010; Pew, 2010). In 2007 only four pension funds met the typical rate

of return. In 2009, only one pension fund achieved a return of over 7%. The number of pension

funds with negative returns increased each of the three years, 32% in 2007, 74% in 2008, and

95% in 2009. Pension trustees need to understand the trends in funding status and annual rate of

returns. Funding status and annual investment data can enhance informed decision making by

trustees.

Michigan allows public pension funds to use property tax mills to cover the cost of police

and fire pension contributions. Seventeen percent of the pension systems have property tax

mills. The median annual investment return for systems that are funded with property tax mills

was -1.19%. This compares to systems that were funded with general fund, which has median

annual investment return of -2.32%. The median was based on all three years of data. The

Pearson r and R^2 did not reflect a statistically significant correlation to annual investment return.

The data still provides plan sponsors with additional information when deciding how to fund

pension obligations. Property tax mills would relieve the general fund of the expenses.

However, residents will have an increase in their property tax payments. Local officials have to

consider the impact of their choices to all stakeholders. This data provided additional

information to assist in making the funding source decision. Future research should expand the

years studied. Taking account of years when the stock market was not as volatile may provide

different results.

Limitations

This study was limited to public information obtained through the internet. Targeted investments were not contained in public documents posted on the internet and was not analyzed in this study. The state of Michigan allows public pension funds to invest in targeted investments. PERSIA (2007) encourages pension trustees to consider investments that will enhance the welfare of the state and citizens with the stipulation that the investment has returns consistent with other investments of the fund. The economic climate in Michigan has suffered due to high unemployment and dramatic reductions in the auto industry (RSQE, 2010). Any local investment in this economic climate could produce negative returns. Determining a correlation between targeted investments and annual return would provide useful information to trustees as they make investment decisions. Future research should use other data methods such as surveys or interviews to obtain this information.

This study did not consider any external conditions. The impact of the external changes in the stock market, government securities, and overall economic conditions could have an impact on overall annual investment returns. Without considering those external items, the predictability of the variables are limited. The limit of three years of data was also a limitation to the study. A future study should consider a more longitudinal timeframe of at least 20 years. This would exclude the possibility of selecting a timeframe during a down stock market and poor economic conditions which could impact the results.

Future Research

This study did not find a statistically significant correlation between annual investment return and board governance variables. There are several areas that can be explored in future

research to determine if a correlation does exist. Pension systems in Michigan are allowed to choose targeted investments in their investment allocation. Determining a correlation between targeted investments and annual return would provide information to trustees as they make investment decisions. Future research should use other data methods such as surveys or interviews to obtain this information. This study did not review the impact of financial knowledge of board trustees or potential conflict of interests. A future study should review the impact of financial literacy, training of board trustees, and potential conflicts on investment returns in Michigan to support the changes that are occurring with board composition.

In a changing economic environment many external factors can impact investment returns. Future research should include the overall return in the stock market as a variable to determine the impact the market has on the relationship of annual investment return and board governance. Future research should expand the years studied. Taking account of years when the stock market was not as volatile may provide different results. This study used three years of data. A future study should consider a more longitudinal timeframe of at least 20 years. This would exclude the possibility of selecting a timeframe during a down stock market and poor economic conditions which could impact the results.

The external changes in economy can impact the trustee's decision making. Financial decisions are made by perception, knowledge, and emotion. "The economic system is an expectation's feedback system, thus decisions made by economic agents are based on their expectations about the future state of the economy" (Kuzmina, 2010, p. 295). The board of trustees was impacted by a volatile stock market and poor economic conditions. The significant decline in the market impacted their perception of future returns generated by the market. As decision makers for asset allocations, the trustee's perception and emotions contributed to the

asset allocation decisions of the pension system. Understanding the impact of the trustee's reaction to the economic climate on asset allocation and how it ultimately impacted investment returns will provide additional information to decision makers. Trustees have to be focused on making rational decisions that maximize the annual investment returns. Boards could determine methods to acknowledge and explore any irrational perceptions held by individual trustees. Future research should explore the impact of trustee's perception of the economy on investment decisions to determine any impact on overall investment return.

Increasingly underfunded pension systems impact local government's ability to continue to fund defined benefit plans. Private sector companies have increased the number of defined contribution plans fivefold over a 17 year period (McCourt, 2006). Governments have begun to offer defined contribution plans to employees but not the degree of private sector companies. The state of Michigan has stood out as an example to governments by not offering defined benefit plan to new hires. As governments move to defined contribution plans the amount of asset in defined benefit plans will begin to decrease. The decrease in asset could impact the overall investment return of the pension plans. Future research should consider the impact of defined contribution plans on the investment return of defined benefit plans.

Recommendations to Leaders

Trustees for pension systems have governance responsibility. Boards function as a group that make decisions and act strategically (Hopkins et al, 2007). Pension systems have long term funds which require effective strategic leadership. To be effective, leaders have to manage conflicting information, diverse opinions, and dynamic events (Bass, 2007). Knowledge and information are critical for a successful strategic leader. Pension trustees are more effective if they have a greater understanding of governance and annual investment returns. Investment

decisions are important to functionality of the pension system. Investment income constitutes 58% of pension funding (GAO, 2010). Poor investment returns will result in lower investment income. Lower investment income impacts the funding status of the pension systems. The goal of all pension systems is to be fully funded. Pension trustees make the decisions that impact achieving the full funding goal. A fully funded pension fund impacts the needs of many stakeholders. Retirees and employees would be more secure in the ability of the fund to cover pension obligations. The plan sponsor would experience reduced risk of increased pension contribution. Citizens would experience less risk of losing needed public services or increased tax burden through increased pension contributions of their local government.

The data in this study can be used by pension trustees to impact their decision making. As strategic leaders, trustees need to increase their knowledge of the environment they work. Even though this study did not find a statistically significant correlation between the variables, the data provides a wealth of information. The decline in funding status and annual investment return from 2007 to 2009 impacts the goal of full funding. The trustees should examine this trend against the performance of their pension systems to improve performance. The data relating to board composition was useful information. Ex-officio and elected board members had a positive association with annual investment return. Independent board members had a negative association with annual investment return. The data indicates that as independent board members increase the annual rate of return decreases. These results are inconsistent with the prior research. Trustees should examine who was selected as the independent member. A person who was not a beneficiary of the pension system should look at governance more objectively than ex-officio and elected trustees. However, if the independent board members have no financial background they may bring no additional value to the board.

Orlikoff and Totten (2007) stated "raising the bar on board performance and accountability has become a governance mantra in recent years… all of these initiatives are aimed at engaging boards in more active and independent oversight of the organizations they govern" (p. 68). With declining investment returns, pension trustees have to engage in active and independent oversight of the pension system. Michigan does not have any requirements for pension board membership. Each pension system selects members based on city charters, ordinances, or collective bargaining agreements. With a variety of backgrounds and knowledge sets, trustees have to actively pursue information to be effective. The sample data reflected pension systems with asset sizes ranging from $10 million to $44 billion. Board membership varies from four to twelve members. Each board member must raise the bar on their individual performance. This only occurs through actively pursuing education. The study did not provide a predictive model for trustees but provided specific descriptive data on board governance in the state of Michigan. Prior research was highlighted to provide board members an understanding of what has been found in US public pension systems. Local officials and state legislatures should examine the need for specific requirements for board membership and investment policies. The current investment requirements should be reviewed to determine the impact on annual returns for the pension systems. Every stakeholder benefits from a fully funded pension system. Active review and monitoring of Michigan pension systems' specific results and national results will be an aid for effective policy and decision making.

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Appendix A

Literature Review Sources

Type	Less than 5 years	More than 5 years
Peer Reviewed Journal	26	12
Books	6	1
Websites	8	0
Professional Organizations	7	2
Government Entities	5	2
Total Number of References: 69	52 = 75.4%	17 =24.6%

Appendix B

Identification of Variables and Data Source Proposed

Variable	Data source
Annual investment return	Annual financial report (calculated)
Investment policies	Annual financial report
Governance structure	Annual valuation report, Board minutes, Plan sponsor's website
Funding status	Annual financial report
Annual pension contribution amount	Annual financial report
Pension contribution funding source	Annual financial report

Appendix C

Website Addresses for Secondary Sources Proposed in the Sample for 2009

Name of Pension Systems	Website Address
Battle Creek Policemen and Firemen Retirement System	http://www.battlecreekmi.gov/Assets/finance/audit+reports/FY+2009/Police+$!26+Fire+Retirement+Fund+Financial+Statements+FY09.pdf
Genesee County Employees Retirement System	http://www.co.genesee.mi.us/retirement/index.htm
Madison Heights Police and Fire Retirement System	http://www.madison-heights.org/departments/finance/financial_reports.jsp
Michigan Municipal Employees Retirement System	http://www.mersofmich.com/index.php?option=com_content&task=view&id=145&Itemid=178
Alpena Employees Retirement System	http://www.michigan.gov/documents/treasury/042010AlpenaCityandsingleaudit20091224revised_312818_7.pdf
Bay County Employees Retirement System	http://www.michigan.gov/documents/treasury/090000BayCo20100630_326774_7.pdf
Berrien County Employees Retirement Plan	http://www.michigan.gov/documents/treasury/110000BerrienCo20100630_326783_7.pdf
Flint City Employees Retirement System	http://www.michigan.gov/documents/treasury/252040FlintCity20091222revised_314534_7.pdf
Lansing Employees Retirement System	http://www.michigan.gov/documents/treasury/332020LansingCity20091219revised_318984_7.pdf
Lansing Police and Fire Retirement	http://www.michigan.gov/documents/treasury/332020La

System	nsingCity20091219revised_318984_7.pdf
Lansing Board of Water and Light Pension Fund	http://www.michigan.gov/documents/treasury/337551LansingCityBWLPlanforEmployeesPensionDefinedBenefitPlan20091006_295747_7.pdf
Jackson County Retirement	http://www.michigan.gov/documents/treasury/380000JacksonCorevised20110316_347901_7.pdf
Kalamazoo City Retirement Annuity System	http://www.michigan.gov/documents/treasury/397513KalamazooCityEmployeesRetirementSystem20100630_326893_7.pdf
Grand Rapids Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity200912231_306271_7.pdf
Grand Rapids Policemen and Firemen Retirement Plan	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity200912231_306271_7.pdf
Wyoming City Retirement System	http://www.michigan.gov/documents/treasury/412090WyomingCity20091207_303597_7.pdf
Kent County Retirement Plan	http://www.michigan.gov/documents/treasury/417542KentCoEmployeesRetirementPlan20100615_326900_7.pdf
Macomb County Employees Retirement System	http://www.michigan.gov/documents/treasury/500000MacombCo20100630revised_335759_7.pdf
Shelby Township Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/501110ShelbyChTwp20100604_323846_7.pdf
Mount Clemens Employees Retirement System	http://www.michigan.gov/documents/treasury/502050MtClemensCity20091023_298747_7.pdf

Roseville Employees Retirement System	http://www.michigan.gov/documents/treasury/502080RosevilleCity20091231_306362_7.pdf
St Clair Shores Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502090StClairShoresCity20091117_301060_7.pdf
Sterling Heights City General Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20091203_303186_7.pdf
Sterling Heights Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20091203_303186_7.pdf
Warren Employee Retirement System	http://www.michigan.gov/documents/treasury/502120WarrenCity20091217_305358_7.pdf
Warren Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/507539WarrenCityPoliceandFireRetirementSystem20100629_326931_7.pdf
Monroe County Employees Retirement System	http://www.michigan.gov/documents/treasury/587508MonroeCoEmployeesRetirementSystem20100525_322331_7.pdf
Birmingham Employees Retirement System	http://www.michigan.gov/documents/treasury/632020BirminghamCity20091201_302824_7.pdf
Farmington Hills Employees Retirement System	http://www.michigan.gov/documents/treasury/632055FarmingtonHillsCity20091118_301722_7.pdf
Ferndale Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632060FerndaleCity20091215_304793_7.pdf
Royal Oak Employees Retirement	http://www.michigan.gov/documents/treasury/632190Ro

System	yalOakCity20101221_341499_7.pdf
Southfield Employees Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20091221revised_306940_7.pdf
Southfield Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20091221revised_306940_7.pdf
Troy Employees Retirement System	http://www.michigan.gov/documents/treasury/632230TroyCity20091211_304512_7.pdf
Pontiac City General Retirement System	http://www.michigan.gov/documents/treasury/637565PontiacCityGeneralEmployeesRetirementSystem20100625_326973_7.pdf
Pontiac City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/637568PontiacCityPoliceandFireRetirementSystem20100625_326977_7.pdf
Oakland County Road Commission Retirement System	http://www.michigan.gov/documents/treasury/637576OaklandRoadRetirementSystem20100607_324053_7.pdf
Sturgis Employee Retirement System	http://www.michigan.gov/documents/treasury/752010SturgisCity20100330_316655_7.pdf
Washtenaw County Employees Retirement System	http://www.michigan.gov/documents/treasury/817534WashtenawCoEmployeesRetSystem20100406_317410_7.pdf
Ann Arbor City Employees Retirement System	http://www.michigan.gov/documents/treasury/817545AnnArborCityEmployeesRetirementSystem20091218_305419_7.pdf

Ypsilanti City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/817557YpsilantiCityPoliceandFireRetirementSystem20091215_304566_7.pdf
Redford Township Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/821080RedfordChTwp20090909_291628_7.pdf
Dearborn General Employees Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20091118_302176_7.pdf
Dearborn Police and Fire Revised Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20091118_302176_7.pdf
Dearborn Heights Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822040DearbornHeightsCity20091113_301032_7.pdf
Garden City Employee Retirement System	http://www.michigan.gov/documents/treasury/822080GardenCityCity20091117_301033_7.pdf
Grosse Pointe City Employees Retirement System	http://www.michigan.gov/documents/treasury/822100GrossePointeCity20091110_301034_7.pdf
Grosse Pointe Farms General Employees Retirement System	http://www.michigan.gov/documents/treasury/822110GrossePointeFarmsCity20091222_306533_7.pdf
Grosse Pointe Shores Employees Retirement System	http://www.michigan.gov/documents/treasury/822125GrossePointeShoresVillageCityof20100315was82-3010_314647_7.pdf
Inkster Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/822170InksterCity20091230_308699_7.pdf
Lincoln Park Policemen and Firemen	http://www.michigan.gov/documents/treasury/822180Lin

Retirement System	colnParkCity20091229_306537_7.pdf
Livonia Employees Retirement System	http://www.michigan.gov/documents/treasury/822190LivoniaCity20100429_319716_7.pdf
River Rouge Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822230RiverRougeCity20091231_306539_7.pdf
Southgate Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20091022_298346_7.pdf
Southgate Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20091022_298346_7.pdf
Westland Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822310WestlandCity20091211_304569_7.pdf
Wyandotte City Employees Retirement System	http://www.michigan.gov/documents/treasury/822330WyandotteCity20100330_316671_7.pdf
Detroit Employees General Retirement System	http://www.michigan.gov/documents/treasury/827588DetroitCityGeneralRetSystem20091228_306541_7.pdf
Detroit Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/827639DetroitCityPoliceandFireRetirementSystem20091222_306548_7.pdf
Wayne County Employees Retirement System	http://www.michigan.gov/documents/treasury/827661WayneCoERSDefinedBenefitPlan20100121_308551_7.pdf
Michigan State Employees Retirement System	http://www.michigan.gov/ors/0,1607,7-144-6183_34726-109600--,00.html
Michigan State Judges Retirement	http://www.michigan.gov/ors/0,1607,7-144-6185_39616-

System	133060--,00.html
Michigan State Police Retirement System	http://www.michigan.gov/orsmsp/0,1607,7-224-40862-133062--,00.html
Michigan Public School Employees Retirement Fund	http://www.michigan.gov/orsschools/0,1607,7-206-36585-117850--,00.html
Clinton Township Firemen's and Policemen's Retirement System	http://www.michigan.gov/documents/treasury/501040ClintonChTwp20090923_295666_7.pdf

Appendix D

Website Addresses for Secondary Sources Proposed in the Sample for 2008

Name of Pension Systems	Website Address
Battle Creek Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/137515BattleCreekCityPoliceandFireRetirementSystem20081217_260356_7.pdf
Genesee County Employees Retirement System	http://www.co.genesee.mi.us/retirement/index.htm
Madison Heights Police and Fire Retirement System	http://www.madison-heights.org/departments/finance/financial_reports.jsp
Michigan Municipal Employees Retirement System	http://www.mersofmich.com/index.php?option=com_content&task=view&id=145&Itemid=178
Alpena Employees Retirement System	http://www.michigan.gov/documents/treasury/042010AlpenaCity20081219revised_268397_7.pdf
Bay County Employees Retirement System	http://www.michigan.gov/documents/treasury/090000BayCo20090630_286442_7.pdf
Berrien County Employees Retirement Plan	http://www.michigan.gov/documents/treasury/110000BerrienCo20090625_285213_7.pdf
Flint City Employees Retirement System	http://www.michigan.gov/documents/treasury/252040FlintCity20081231_262456_7.pdf
Lansing Employees Retirement System	http://www.michigan.gov/documents/treasury/332020LansingCity20081222REVISED_266916_7.pdf
Lansing Police and Fire Retirement	http://www.michigan.gov/documents/treasury/332020L

System	ansingCity20081222REVISED_266916_7.pdf
Lansing Board of Water and Light Pension Fund	http://www.michigan.gov/documents/treasury/337551LansingBWLEmployeesPensionDefinedBenefitPlan20080926_252238_7.pdf
Jackson County Retirement	http://www.michigan.gov/documents/treasury/380000JacksonCo20090626_285360_7.pdf
Kalamazoo City Retirement Annuity System	http://www.michigan.gov/documents/treasury/397513KalamazooCityEmployeesRetirementSystem20090629_285369_7.pdf
Grand Rapids Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity20081223_260959_7.pdf
Grand Rapids Policemen and Firemen Retirement Plan	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity20081223_260959_7.pdf
Wyoming City Retirement System	http://www.michigan.gov/documents/treasury/412090WyomingCity20081217_260382_7.pdf
Kent County Retirement Plan	http://www.michigan.gov/documents/treasury/417542KentCoEmployeesRetirementPlan20090618_283358_7.pdf
Macomb County Employees Retirement System	http://www.michigan.gov/documents/treasury/500000MacombCo20090702revised_303338_7.pdf
Shelby Township Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/501110ShelbyChTwp20090608_281846_7.pdf
Mount Clemens Employees	http://www.michigan.gov/documents/treasury/502050

Retirement System	MtClemensCity20080929_252326_7.pdf
Roseville Employees Retirement System	http://www.michigan.gov/documents/treasury/502080RosevilleCity20081230_262607_7.pdf
St Clair Shores Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502090StClairShoresCity20081107_255919_7.pdf
Sterling Heights City General Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20081112revised_259376_7.pdf
Sterling Heights Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20081112revised_259376_7.pdf
Warren Employee Retirement System	http://www.michigan.gov/documents/treasury/502120WarrenCityrevised_267283_7.pdf
Warren Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/507539WarrenCityPoliceandFireRetirementSystem20090629_285443_7.pdf
Monroe County Employees Retirement System	http://www.michigan.gov/documents/treasury/587508MonroeCoEmployeesRetirementSystem20090604_281471_7.pdf
Birmingham Employees Retirement System	http://www.michigan.gov/documents/treasury/632020BirminghamCity20081113_258305_7.pdf
Farmington Hills Employees Retirement System	http://www.michigan.gov/documents/treasury/632055FarmingtonHillsCity20081201_259588_7.pdf
Ferndale Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632060FerndaleCity20090303_269327_7.pdf

Royal Oak Employees Retirement System	http://www.michigan.gov/documents/treasury/632190RoyalOakCity20081223_262667_7.pdf
Southfield Employees Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20090626_285497_7.pdf
Southfield Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20090626_285497_7.pdf
Troy Employees Retirement System	http://www.michigan.gov/documents/treasury/632230TroyCity20081222_262668_7.pdf
Pontiac City General Retirement System	http://www.michigan.gov/documents/treasury/637565PontiacCityGenEmployeesRetirementSystem20090629_285556_7.pdf
Pontiac City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/637568PontiacCityPoliceandFireRetirementSystem20090629_285563_7.pdf
Oakland County Road Commission Retirement System	http://www.michigan.gov/documents/treasury/637576OaklandRoadRetirementSystem20090610_282204_7.pdf
Sturgis Employee Retirement System	http://www.michigan.gov/documents/treasury/752010SturgisCity20090331_273328_7.pdf
Washtenaw County Employees Retirement System	http://www.michigan.gov/documents/treasury/817534WashtenawCoERS20090324_273355_7.pdf
Ann Arbor City Employees Retirement System	http://www.michigan.gov/documents/treasury/817545AnnArborCityEmployeesRetirementSystem20081218_262809_7.pdf

Ypsilanti City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/817557YpsilantiCityPoliceandFireRetirementSystem20081230_262813_7.pdf
Redford Township Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/821080RedfordChTwp20080916revised_268410_7.pdf
Dearborn General Employees Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20081124_258334_7.pdf
Dearborn Police and Fire Revised Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20081124_258334_7.pdf
Dearborn Heights Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822040DearbornHeightsCity20081117_258335_7.pdf
Garden City Employee Retirement System	http://www.michigan.gov/documents/treasury/822080GardenCityCityof20081208_259641_7.pdf
Grosse Pointe City Employees Retirement System	http://www.michigan.gov/documents/treasury/822100GrossePointeCity20081110_256031_7.pdf
Grosse Pointe Farms General Employees Retirement System	http://www.michigan.gov/documents/treasury/822110GrossePteFarmsCity20081231_262818_7.pdf
Grosse Pointe Shores Employees Retirement System	http://www.michigan.gov/documents/treasury/823010GrossePointeShoresVillage20080721_242796_7.pdf
Inkster Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/822170InksterCity20081223revised_273375_7.pdf
Lincoln Park Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/822180LincolnParkCity20081229_262821_7.pdf

Livonia Employees Retirement System	http://www.michigan.gov/documents/treasury/822190LivoniaCity20090327_273376_7.pdf
River Rouge Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822230RiverRougeCity20081231_262822_7.pdf
Southgate Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20081022_256036_7.pdf
Southgate Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20081022_256036_7.pdf
Westland Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822310WestlandCity20081209_259648_7.pdf
Wyandotte City Employees Retirement System	http://www.michigan.gov/documents/treasury/822330WyandotteCity20090330_273380_7.pdf
Detroit Employees General Retirement System	http://www.michigan.gov/documents/treasury/827588DetroitCityGeneralRetirementSystem20081216_262830_7.pdf
Detroit Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/827639DetroitCityPoliceandFireRetirementSystem20081217_262854_7.pdf
Wayne County Employees Retirement System	http://www.michigan.gov/documents/treasury/820000WayneCo20090209_266987_7.pdf
Michigan State Employees Retirement System	http://www.michigan.gov/ors/0,1607,7-144-6183_34726-109600--,00.html
Michigan State Judges Retirement	http://www.michigan.gov/ors/0,1607,7-144-

System	6185_39616-133060--,00.html
Michigan State Police Retirement System	http://www.michigan.gov/orsmsp/0,1607,7-224-40862-133062--,00.html
Michigan Public School Employees Retirement Fund	http://www.michigan.gov/orsschools/0,1607,7-206-36585-117850--,00.html
Clinton Township Firemen's and Policemen's Retirement System	http://www.michigan.gov/documents/treasury/501040ClintonChTwp20080906_249344_7.pdf

Appendix E

Website Addresses for Secondary Sources Proposed in the Sample for 2007

Name of Pension Systems	Website Address
Battle Creek Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/137515BattleCreekCityPoliceandFirePension20071128_217407_7.pdf
Genesee County Employees Retirement System	http://www.co.genesee.mi.us/retirement/index.htm
Madison Heights Police and Fire Retirement System	http://www.madison-heights.org/departments/finance/financial_reports.jsp
Michigan Municipal Employees Retirement System	http://www.mersofmich.com/index.php?option=com_content&task=view&id=145&Itemid=178
Alpena Employees Retirement System	http://www.michigan.gov/documents/treasury/042010AlpenaCity20071221_220300_7.pdf
Bay County Employees Retirement System	http://www.michigan.gov/documents/treasury/090000BayCo20080628_240797_7.pdf
Berrien County Employees Retirement Plan	http://www.michigan.gov/documents/treasury/110000BerrienCo20080630_240813_7.pdf
Flint City Employees Retirement System	http://www.michigan.gov/documents/treasury/110000BerrienCo20080630_240813_7.pdf
Lansing Employees Retirement System	http://www.michigan.gov/documents/treasury/332020LansingCity20071220revised_229608_7.pdf
Lansing Police and Fire Retirement	http://www.michigan.gov/documents/treasury/332020La

System	nsingCity20071220revised_229608_7.pdf
Lansing Board of Water and Light Pension Fund	http://www.michigan.gov/documents/treasury/337537LansingCityBWLEmployeesDefinedBenefitPlan20071005_211486_7.pdf
Jackson County Retirement	http://www.michigan.gov/documents/treasury/380000JacksonCo20080630_241024_7.pdf
Kalamazoo City Retirement Annuity System	http://www.michigan.gov/documents/treasury/397513KalamazooCityEmployeesRetirementSystem20080807_244951_7.pdf
Grand Rapids Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity20071218Part1_220362_7.pdf
Grand Rapids Policemen and Firemen Retirement Plan	http://www.michigan.gov/documents/treasury/412030GrandRapidsCity20071218Part1_220362_7.pdf
Wyoming City Retirement System	http://www.michigan.gov/documents/treasury/412090WyomingCity2007_219591_7.pdf
Kent County Retirement Plan	http://www.michigan.gov/documents/treasury/410000KentCo20080625_241041_7.pdf
Macomb County Employees Retirement System	http://www.michigan.gov/documents/treasury/500000MacombCo20080630_241079_7.pdf
Shelby Township Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/501110ShelbyChTwp20080613_238628_7.pdf
Mount Clemens Employees Retirement System	http://www.michigan.gov/documents/treasury/502050MtClemensCity20071018_213067_7.pdf

Roseville Employees Retirement System	http://www.michigan.gov/documents/treasury/502080RosevilleCity20071231_220404_7.pdf
St Clair Shores Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502090StClairShoresCity20071115_215717_7.pdf
Sterling Heights City General Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20071024_213641_7.pdf
Sterling Heights Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/502100SterlingHeightsCity20071024_213641_7.pdf
Warren Employee Retirement System	http://www.michigan.gov/documents/treasury/502120WarrenCityrevised_233252_7.pdf
Warren Police and Firemen Retirement System	http://www.michigan.gov/documents/treasury/507539WarrenCityPoliceandFireRetirementSystem20080630_241082_7.pdf
Monroe County Employees Retirement System	http://www.michigan.gov/documents/treasury/587508MonroeCoEmployeesRetirementSystem20080624_241126_7.pdf
Birmingham Employees Retirement System	http://www.michigan.gov/documents/treasury/632020BirminghamCity20071115_215722_7.pdf
Farmington Hills Employees Retirement System	http://www.michigan.gov/documents/treasury/632055FarmingtonHillsCity20071218_220492_7.pdf
Ferndale Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632060FerndaleCity20071227_220495_7.pdf
Royal Oak Employees Retirement	http://www.michigan.gov/documents/treasury/632190Ro

System	yalOakCity20071227_220586_7.pdf
Southfield Employees Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20081027revised_263328_7.pdf
Southfield Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/632200SouthfieldCity20081027revised_263328_7.pdf
Troy Employees Retirement System	http://www.michigan.gov/documents/treasury/632230TroyCity20071128revised_220591_7.pdf
Pontiac City General Retirement System	http://www.michigan.gov/documents/treasury/637565PontiacCityGenEmployeesRetSystem20080630_241148_7.pdf
Pontiac City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/637568PontiacCityPoliceandFireRetirementSystem20080630_241150_7.pdf
Oakland County Road Commission Retirement System	http://www.michigan.gov/documents/treasury/637576OaklandRoadRetirementSystem20080627_241154_7.pdf
Sturgis Employee Retirement System	http://www.michigan.gov/documents/treasury/752010SturgisCity20080325_229266_7.pdf
Washtenaw County Employees Retirement System	http://www.michigan.gov/documents/treasury/817534WashtenawCoEmployeesRetirementSystem20080327_229681_7.pdf
Ann Arbor City Employees Retirement System	http://www.michigan.gov/documents/treasury/817545AnnArborCityEmployeesRetirementSystem20071221_220920_7.pdf

Ypsilanti City Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822040YpsilantiCity20071130_217452_7.pdf
Redford Township Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/821080RedfordChTwp20070912_208404_7.pdf
Dearborn General Employees Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20071120revised_217456_7.pdf
Dearborn Police and Fire Revised Retirement System	http://www.michigan.gov/documents/treasury/822030DearbornCity20071120revised_217456_7.pdf
Dearborn Heights Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822040DearbornHeightsCity20071111_215552_7.pdf
Garden City Employee Retirement System	http://www.michigan.gov/documents/treasury/822080GardenCityCity20071203_217451_7.pdf
Grosse Pointe City Employees Retirement System	http://www.michigan.gov/documents/treasury/822100GrossePointeCity20071102_214593_7.pdf
Grosse Pointe Farms General Employees Retirement System	http://www.michigan.gov/documents/treasury/822110GrossePointeFarmsCity20071231_220924_7.pdf
Grosse Pointe Shores Employees Retirement System	http://www.michigan.gov/documents/treasury/823010GrossePointeShoresVillage20070816_205908_7.pdf
Inkster Police and Fire Pension Fund	http://www.michigan.gov/documents/treasury/822170InskterCity20071221_220932_7.pdf
Lincoln Park Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/822180LincolnParkCity20071130_217449_7.pdf
Livonia Employees Retirement	http://www.michigan.gov/documents/treasury/822190Liv

System	oniaCity20080519_234966_7.pdf
River Rouge Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822230RiverRougeCity20071231_221103_7.pdf
Southgate Municipal Employees Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20071022_213120_7.pdf
Southgate Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822270SouthgateCity20071022_213120_7.pdf
Westland Police and Fire Retirement System	http://www.michigan.gov/documents/treasury/822310WestlandCity20071218_221107_7.pdf
Wyandotte City Employees Retirement System	http://www.michigan.gov/documents/treasury/822330WyandotteCity20080328_229955_7.pdf
Detroit Employees General Retirement System	http://www.michigan.gov/documents/treasury/827588DetroitCityGeneralRetirementSystem20071231revised_225793_7.pdf
Detroit Policemen and Firemen Retirement System	http://www.michigan.gov/documents/treasury/827639DetroitCityPoliceandFireRetirementSystem20071231revised_225797_7.pdf
Wayne County Employees Retirement System	http://www.michigan.gov/documents/treasury/820000WayneCo20080229_226879_7.pdf
Michigan State Employees Retirement System	http://www.michigan.gov/ors/0,1607,7-144-6183_34726-109600--,00.html
Michigan State Judges Retirement System	http://www.michigan.gov/ors/0,1607,7-144-6185_39616-133060--,00.html

Michigan State Police Retirement System	http://www.michigan.gov/orsmsp/0,1607,7-224-40862-133062--,00.html
Michigan Public School Employees Retirement Fund	http://www.michigan.gov/orsschools/0,1607,7-206-36585-117850--,00.html
Clinton Township Firemen's and Policemen's Retirement System	http://www.michigan.gov/documents/treasury/501040ClintonChTwp20070829_207258_7.pdf

Appendix F

Descriptive Statistics for Governance Structure

Governance Structure	# ex-officio	# elected	# independent
Mean	36.70%	41.06%	22.24%
Median	40.00%	40.00%	20.00%
Mode	40.00%	40.00%	20.00%
Standard Deviation	0.19	0.15	0.18
Sample Variance	0.04	0.02	0.03
Range	100.00%	75.00%	75.00%
Minimum	0.00%	0.00%	0.00%
Maximum	100.00%	75.00%	75.00%
Count	66	66	66

Appendix G

Descriptive Statistics for Investment Policies 2009

2009	Common Stock	Government Securities	Bonds	Other Investments
Mean	41.32%	9.08%	13.03%	36.57%
Median	44.27%	7.41%	12.24%	32.51%
Mode	0.00%	0.00%	0.00%	100.00%
Standard Deviation	0.20	0.09	0.12	0.27
Sample Variance	0.04	0.01	0.01	0.07
Range	78.53%	34.19%	43.56%	100.00%
Minimum	0.00%	0.00%	0.00%	0.00%
Maximum	78.53%	34.19%	43.56%	100.00%
Count	66	66	66	66

Appendix H

Descriptive Statistics for Investment Policies 2008

2008	Common Stock	Government Securities	Bonds	Other Investments
Mean	40.00%	9.26%	13.02%	37.72%
Median	43.32%	9.40%	12.19%	33.97%
Mode	0.00%	0.00%	0.00%	100.00%
Standard Deviation	0.20	0.09	0.11	0.27
Sample Variance	0.04	0.01	0.01	0.07
Range	75.13%	30.45%	49.70%	100.00%
Minimum	0.00%	0.00%	0.00%	0.00%
Maximum	75.13%	30.45%	49.70%	100.00%
Count	66	66	66	66

Appendix I

Descriptive Statistics for Investment Policies 2007

2007	Common Stock	Government Securities	Bonds	Other Investments
Mean	44.11%	8.31%	10.24%	37.33%
Median	48.60%	8.43%	10.18%	32.16%
Mode	0.00%	0.00%	0.00%	0.00%
Standard Deviation	0.23	0.078	0.09	0.28
Sample Variance	0.05	0.01	0.01	0.08
Range	88.31%	27.42%	43.34%	100.00%
Minimum	0.00%	0.00%	0.00%	0.00%
Maximum	88.31%	27.42%	43.34%	100.00%
Count	66	66	66	66

Appendix J

Descriptive Statistics for Investment Policies All Years

All Years	Common Stock	Government Securities	Bonds	Other Investments
Mean	41.81%	8.89%	12.10%	37.21%
Median	45.84%	8.67%	10.86%	32.58%
Mode	0.00%	0.00%	0.00%	100.00%
Standard Deviation	0.21	0.08	0.11	0.27
Sample Variance	0.04	0.01	0.01	0.07
Range	88.31%	34.19%	49.70%	100.00%
Minimum	0.00%	0.00%	0.00%	0.00%
Maximum	88.31%	34.19%	49.70%	100.00%
Count	198	198	198	198

Appendix K

Descriptive Statistics for Funding Status

Funding Status	2009	2008	2007	All Years
Mean	91.87%	97.88%	100.94%	96.90%
Median	89.10%	94.50%	98.35%	93.55%
Mode	97.00%	103.80%	89.60%	97.00%
Standard Deviation	0.20	0.20	0.21	0.21
Sample Variance	0.04	0.04	0.04	0.04
Range	122.80%	121.20%	113.90%	129.20%
Minimum	42.00%	50.00%	54.00%	42.00%
Maximum	164.80%	171.20%	167.90%	171.20%
Count	66	66	66	198

Appendix L

Descriptive Statistics for Annual Pension Contribution Amount

Annual Pension Contribution Amount	2009	2008	2007	All years
Mean	$28,761,449	$28,790,641	$23,659,029	$26,323,817
Median	$2,684,317	$2,901,746	$2,762,201	$2,573,354
Mode	$0	$0	$0	$0
Standard Deviation	1.31E+08	1.32E+08	1.08E+08	1.22E+08
Sample Variance	1.73E+16	1.73E+16	1.17E+16	1.48E+16
Range	$1,000,375,355	$999,374,879	$835,366,382	$1,000,375,355
Minimum	$0	$0	$0	$0
Maximum	$1,000,375,355	$999,374,879	$835,366,382	$1,000,375,355
Count	66	66	66	198

Appendix M

Descriptive Statistics for Pension Funding Source

Pension Funding Source	
Mean	1.83
Median	2.00
Mode	2.00
Standard Deviation	0.38
Sample Variance	0.14
Range	1.00
Minimum	1.00
Maximum	2.00
Count	66

Appendix N

Descriptive Statistics for Annual Investment Return dependent variable

Annual Investment Return	2009	2008	2007	All Years
Mean	-7.47%	-3.52%	1.34%	-3.22%
Median	-4.87%	-2.15%	1.57%	-2.17%
Mode	#N/A	#N/A	#N/A	0.00%
Standard Deviation	0.12	0.06	0.04	0.09
Sample Variance	0.02	0.00	0.00	0.01
Range	94.12%	39.26%	23.44%	96.69%
Minimum	-84.85%	-34.01%	-11.60%	-84.85%
Maximum	9.27%	5.25%	11.84%	11.84%
Count	66	66	66	198