Report to the Mississippi Legislature

2017 Update on Financial Soundness of the Public Employees' Retirement System

#619
April 11, 2018

PEER
MISSISSIPPI
Joint Legislative Committee on Performance Evaluation and Expenditure Review

PEER: The Mississippi Legislature's Oversight Agency

The Mississippi Legislature created the Joint Legislative Committee on Performance Evaluation and Expenditure Review (PEER Committee) by statute in 1973. A joint committee, the PEER Committee is composed of seven members of the House of Representatives appointed by the Speaker and seven members of the Senate appointed by the Lieutenant Governor. Appointments are made for four-year terms, with one Senator and one Representative appointed from each of the U.S. Congressional Districts and three at-large members appointed from each house. Committee officers are elected by the membership, with officers alternating annually between the two houses. All Committee actions by statute require a majority vote of four Representatives and four Senators voting in the affirmative.

Mississippi's constitution gives the Legislature broad power to conduct examinations and investigations. PEER is authorized by law to review any public entity, including contractors supported in whole or in part by public funds, and to address any issues that may require legislative action. PEER has statutory access to all state and local records and has subpoena power to compel testimony or the production of documents.

PEER provides a variety of services to the Legislature, including program evaluations, economy and efficiency reviews, financial audits, limited scope evaluations, fiscal notes, special investigations, briefings to individual legislators, testimony, and other governmental research and assistance. The Committee identifies inefficiency or ineffectiveness or a failure to accomplish legislative objectives, and makes recommendations for redefinition, redirection, redistribution and/or restructuring of Mississippi government. As directed by and subject to the prior approval of the PEER Committee, the Committee's professional staff executes audit and evaluation projects obtaining information and developing options for consideration by the Committee. The PEER Committee releases reports to the Legislature, Governor, Lieutenant Governor, and the agency examined.

The Committee assigns top priority to written requests from individual legislators and legislative committees. The Committee also considers PEER staff proposals and written requests from state officials and others.

PEER Committee
Post Office Box 1204
Jackson, MS 39215-1204

(Tel.) 601-359-1226
(Fax) 601-359-1420
(Website) www.peer.ms.gov

The Mississippi Legislature

Joint Committee on Performance Evaluation and Expenditure Review

PEER Committee

TELEPHONE:
(601) 359-1226

FAX:
(601) 359-1420

Post Office Box 1204
Jackson, Mississippi 39215-1204

James A. Barber
Executive Director

www.peer.ms.gov

OFFICES:
Woolfolk Building, Suite 301-A
501 North West Street
Jackson, Mississippi 39201

April 11, 2018

Honorable Phil Bryant, Governor
Honorable Tate Reeves, Lieutenant Governor
Honorable Philip Gunn, Speaker of the House
Members of the Mississippi State Legislature

On April 11, 2018, the PEER Committee authorized release of the report titled ***2017 Update on Financial Soundness of the Public Employees' Retirement System.***

Videt Carmichael

Senator Videt Carmichael, Chair

This report does not recommend increased funding or additional staff.

Table of Contents

List of Exhibits

2017 Update on Financial Soundness of the Public Employees' Retirement System

Executive Summary

Introduction

The PEER Committee, under its authority found in MISS. CODE ANN. § 5-3-51 et seq. (1972), carried out the statutorily required review of the financial condition of the Public Employees' Retirement System (PERS). Actuarial reviews authorized by this section are discretionary.

Background

Mississippi's Retirement System currently consists of seven plans, or programs:

- The Public Employees' Retirement System of Mississippi (PERS);
- The Mississippi Highway Safety Patrol Retirement System (MHSPRS);
- The Mississippi Government Employees' Deferred Compensation Plan and Trust (MDC);
- Municipal Retirement Systems (MRS);
- The Supplemental Legislative Retirement Plan (SLRP); and
- The Optional Retirement Plan (ORP).

All of these plans are under the administration of a 10-member PERS Board of Trustees created in MISS. CODE ANN. § 25-11-15 (1972). Board members administer the laws governing the various benefit plans, adopt rules and regulations necessary to implement policies enacted by the Legislature, address federal issues, and work with both state and federal bodies. All assets, proceeds, and income of the system as defined herein are held in trust for the exclusive purpose of providing benefit payments and refunds and providing for the system's administrative expenses. Assets of the various plans, excluding the MDC and ORP, are invested collectively at the direction of the PERS Board of Trustees and their advisers. Assets of each member of the MDC and ORP are invested at the direction of the member.

A primary responsibility of the PERS Board is to ensure adequate funding of the plans it administers. One means of accomplishing this is by setting contribution rates for employers participating in the plans. For assistance setting these rates, the PERS Board receives actuarial reports annually and works with its actuarial consultants to create comprehensive models that are used to project the financial position of the various plans. These models include such factors as investment return assumptions, wage inflation assumptions, retirement tables, and retiree mortality tables.

Update on Financial Soundness of PERS

Actuarial Soundness and Sustainability

"Actuarial soundness" and "sustainability" are two of the major components of financial soundness. The focus of these concepts should be to create a system and actuarial assumption models that can be upheld and defended in view of all relevant environmental conditions, including contractual obligations involved and the potential economic consequences of abrogating those obligations.

Update: PERS Actuarial Soundness

As a result of the most recent experience study, as of June 30, 2016, the PERS Board adopted a decrease of 0.50% to the wage inflation assumption for the PERS plan, reducing it from 3.75% to 3.25%. Even with the adoption of this change, over the past five- and 10-year periods the PERS actual average annual payroll increase has fallen below the actuarial model's projected rate of salary increase. Continued analysis of variation between actual and assumed is warranted.

From FY 2007 through FY 2017, the ratio of active members to retired members has decreased by approximately one-third, driven by the increasing number of retirees and the decreasing number of active members. A lower number of active members to retired members results in funding future pension obligations over the payroll of fewer active members.

Although the PERS ratio of active members to retired members has declined over the past 10 fiscal years, the PERS active/retiree ratio remained above the national average ratio for other pension plans across the nation. However, in deviation from the national average plan, which has seen active member growth, PERS active membership continues to decline.

Update: PERS Sustainability

The current PERS funding policy is designed to address the past volatility of employer contribution rates within the system by setting the employer contribution rate percentage to a fixed rate of 15.75% of annual compensation. The policy also targets an 80% funding level by 2042 while still reducing the plan's unfunded actuarial accrued liability. In addition to reducing the unfunded actuarial accrued liability, the funding policy should result in more long-term sustainability within the system.

Risk Management and Investment Management

Risk management and investment management should provide a long-term framework for the system that will control the plan's long-term risk environment and allow it a reasonable opportunity to collect or earn sufficient assets to meet its benefit obligations.

Update: PERS Risk Management

As of June 30, 2017, the PERS funding ratio was 61.1%, an increase from 60% as of June 30, 2016. Even with the increase in funding ratio, actuarial projections show that the PERS Board's originally adopted model's funding goals of an 80% minimum funding ratio in 2042 will not be achieved. Furthermore, the plan has been below its 75% funding threshold for two consecutive periods. There are several options the PERS Board and/or the Legislature could consider to address this issue (see pages 19–20).

Update: PERS Investment Management

For fiscal year 2017 the PERS Board of Trustees continued to adhere to the asset allocation model put in place in June 2015. This model continues to set investment level targets for the PERS investment portfolio.

For fiscal year 2017 the PERS plan's combined investment portfolio experienced a return of 14.96%, and the market value of the system's assets was approximately $26.9 billion.

PERS paid $95.6 million to investment managers during fiscal year 2017, which represents a combined investment expense rate of 0.36% of the PERS plan's total assets (the expense rate for fiscal year 2016 was 0.36%).

Study of the Causes of the PERS Plan's Unfunded Liability

As of June 30, 2016, the Public Employees' Retirement System of Mississippi pension plan had an unfunded actuarial accrued liability[1] of approximately $16.8 billion. According to the study conducted by PERS actuaries, the unfunded actuarial accrued liability, as of June 30, 2016, results from several factors as detailed in the following table:

Source	Approximate Liability	Percentage of Total
Present Value of Initial UAAL	$2.2 billion	13%
Plan Benefit Changes	3.7 billion	22%
Changes to Plan Assumptions	1.4 billion	9%
Asset Gains/Losses	6.3 billion	37%
Liability Experience	3.2 billion	19%
Total	**$16.8 billion**	**100%**

SOURCE: *Analysis of the Funded Status Changes to the Public Employees' Retirement System of Mississippi from June 30, 1998, to June 30, 2016*, Cavanaugh Macdonald Consulting, LLC.

[1]An unfunded actuarial accrued liability (UAAL) occurs when a pension system's current actuarial value of assets is less than the present value of benefits earned by retirees, inactive members, and current employees as of the valuation date. UAAL takes into consideration the expected investment return of present assets but does not consider future employee or employer contributions.

For more information or clarification, contact:

PEER Committee
P.O. Box 1204
Jackson, MS 39215-1204
(601) 359-1226
peer.ms.gov

Senator Videt Carmichael, Chair
Meridian, MS

Representative Becky Currie, Vice Chair
Brookhaven, MS

Representative Timmy Ladner, Secretary
Poplarville, MS

2017 Update on Financial Soundness of the Public Employees' Retirement System

Introduction

Authority, Scope, and Purpose

MISS. CODE ANN. § 25-11-101 (1972) directs the PEER Committee to

> *…have performed random actuarial evaluations, as necessary, of the funds and expenses of the Public Employees' Retirement System and to make annual reports to the Legislature on the financial soundness of the system.*

The PEER Committee, under its authority found in MISS. CODE ANN. § 5-3-51 et seq. (1972), carried out the statutorily required review of the financial condition of the Public Employees' Retirement System (PERS). Actuarial reviews authorized by Section 25-11-101 are discretionary.

This 2017 report includes an update on the financial performance of the System and projected funding levels.

Method

To conduct this assessment, PEER

- reviewed financial reports of the Public Employees' Retirement System;
- reviewed actuarial reports and projections and experience studies prepared for the Public Employees' Retirement System;
- reviewed investment assessments prepared for the Public Employees' Retirement System; and
- interviewed personnel of the Public Employees' Retirement System.

Background

Like all other states in the country, Mississippi provides a retirement system for public employees; and, as is the case in most states, this plan is overseen by an agency of state government that is responsible for the investment and administration of the benefit payment process.

This chapter will present

- an overview of the Public Employees' Retirement System;
- the composition and responsibilities of the PERS Board of Trustees; and
- requests for proposals (RFPs) for consulting services issued subsequent to fiscal year-end 2017.

Overview of the Public Employees' Retirement System

Under MISS. CODE ANN. § 25-11-101 (1972), the Legislature created a retirement system to provide retirement allowances and other benefits for officers and employees in the state's service and their beneficiaries. The Board of Trustees of the Public Employees' Retirement System is responsible for the administration of the System.

Mississippi's retirement systems (hereinafter collectively referred to as "System") currently consist of seven types of plans, or programs:

- The Public Employees' Retirement System of Mississippi (PERS) is a defined benefits[2] retirement plan for state agencies, counties, cities, school districts, and other participating political subdivisions.
- The Mississippi Highway Safety Patrol Retirement System (MHSPRS) is a defined benefits retirement plan designed exclusively for Mississippi Highway Safety Patrol sworn officers.
- The Mississippi Government Employees' Deferred Compensation Plan and Trust (MDC) is an IRS Section 457(b)[3] voluntary government employees' deferred compensation plan.[4]
- Municipal Retirement Systems (MRS) are retirement plans created by 17 municipalities prior to the establishment of

[2]Defined benefit plans, the most prevalent type of plan used by public employers, pay retired employees, or their beneficiaries, a defined amount through a calculation based on the plan's benefits and the employee's salary and years of service.

[3]Plans eligible under IRS Section 457(b) allow employees of sponsoring organizations (state and local governments and some nongovernmental entities) to defer income taxation on up to $18,500 (for calendar year 2018) of retirement contributions. Catch-up provisions allow an additional $6,000 in tax deferrals or up to $24,500.

[4]MDC is sponsored by the State of Mississippi and administered by the PERS Board. The PERS Board contracts with Empower Retirement (the nation's second-largest retirement services company) as a third-party administrator to perform recordkeeping and administrative functions.

PERS whose membership was closed; the administration and members of the plans was transferred to PERS in 1987.

- The Supplemental Legislative Retirement Plan (SLRP) is a separate plan designed to provide additional benefits to members of the Legislature and the President of the Senate. It is funded by employee and employer contributions in addition to contributions to the PERS plan.
- The Optional Retirement Plan (ORP) is a 401(a) defined contribution plan[5] that certain teaching and administrative faculty at the state's universities can elect to join in lieu of becoming members of PERS.
- The PERS Board is also responsible for the administration of an optional retiree Medicare supplemental insurance program, the premiums of which are paid by the individuals who participate.

All assets, proceeds, and income of the System as defined here are held in trust (as provided for in MISSISSIPPI CONSTITUTION Section 272A) for the exclusive purpose of providing benefit payments and refunds and providing for the system's administrative expenses. Assets of the System, excluding the MDC and ORP, are invested collectively at the direction of the PERS Board of Trustees and its advisers. Assets of each member of the MDC and ORP are invested at the direction of the member.

Composition and Role of the PERS Board of Trustees

The System described herein is under the administration of the 10-member PERS Board of Trustees created in MISS. CODE ANN. § 25-11-15 (1972). In addition to administrative oversight provided by the PERS Board and staff, the MHSPRS is governed by its own administrative board.

Composition of the PERS Board of Trustees

The current membership of the PERS Board includes

- the State Treasurer,
- a gubernatorial representative,
- two state employees,
- one municipal employee,
- one county employee,
- one Institutions of Higher Learning (IHL) employee,
- one public school/junior college employee, and
- two retiree members of the PERS system.

[5]The ORP is a defined contribution plan that has fixed employee and employer contributions. These contributions are the sole financial requirement of the employer.

With the exception of the State Treasurer and the Governor's appointee, all trustees are elected by the various constituency employee groups they represent (i.e., state municipal, county, institutions of higher learning, public schools, and junior colleges, as well as retirees).

In addition to those members, state law provides for four legislative advisers to assist the PERS Board (two each from the Mississippi Senate and House).

The PERS Board establishes policies and procedures for the administration of the System in accordance with the laws governing the various benefit plans. This includes adopting rules and regulations necessary to implement those laws and comply with federal regulations.

Role of the PERS Board of Trustees

A primary responsibility of the PERS Board is to ensure adequate funding of the plans it administers. One means of accomplishing this task is by setting contribution rates for employers participating in the plans. For assistance setting these rates, the PERS Board receives actuarial reports annually and works with its actuarial consultants to create comprehensive models that are used to project the financial position of the various plans. These models include such factors as investment return assumptions, wage inflation assumptions, retirement tables, and retiree mortality tables.

For FY 2017 the PERS Board continued its contractual relationship with Cavanaugh Macdonald Consulting, LLC, a nationwide actuarial and health-care consulting firm that works with state and municipal retirement systems in 25 states, the District of Columbia, and Puerto Rico.

In addition to annual actuarial valuation and projection reports, the PERS Board biennially reviews the experiences of the various plans to expected experience for reasonableness and adjusts, as necessary, the assumptions used.

The PERS Board also contracts with an investment consultant to conduct asset-liability studies, provide quarterly performance reports and economic updates, and assist the PERS Board and staff in establishing the System's asset allocation policy and selection of investment management firms. The PERS Board currently contracts with Callan LLC, one of the nation's largest independently owned investment consulting firms.

PERS Board members have a fiduciary duty to manage and invest the funds of the various plans for the exclusive benefit of the members and beneficiaries in the manner provided by law. MISS. CODE ANN. § 25-11-121 provides guidelines and limitations on the types of assets the PERS Board may use as investments for the PERS plan.

Events Subsequent to Fiscal Year-End 2017

Subsequent to fiscal year-end 2017, the PERS Board released multiple RFPs for consulting services:

- **Investment consulting services:** The PERS Board released an RFP for investment consulting services on November 1, 2017. As a result of this process, Callan LLC (the PERS Board's existing investment consultant) was retained. The PERS Board executed a new contract effective April 2, 2018, for a five-year term.
- **Actuarial consulting services:** The PERS Board released an RFP for actuarial consulting services on October 2, 2017. The current contract for actuarial services expires on June 30, 2018. The PERS Board will select an actuarial firm during its April 2018 meeting.
- **Selection of a new Executive Director:** At its February 2017 meeting, the ad hoc committee of the PERS Board made the official announcement of the intention of long-time Executive Director, Ms. Pat Robertson, to retire in 2018. The PERS Board solicited bids from executive search consultants and ultimately contracted with Korn/Ferry International Futurestep, Inc. for this process. In a press release dated March 20, 2018, the PERS Board announced the hiring of its new Executive Director Ray Higgins, effective July 1, 2018.

Update on Financial Soundness of the Public Employees' Retirement System

"Financial soundness" should be defined not as a point-in-time comparison of assets and liabilities, but as a multifaceted construct involving an understanding of the role of actuarial soundness in judging financial health, a broadly defined view of affordability that encompasses sustainability in consideration of all relevant environmental conditions, and an understanding of the role of risk and investment management in the long-term financial health of the system.

The Public Employees' Retirement System Board has adopted and implemented policies and procedures that allow it to address the major areas that contribute to the plan's financial well-being and to carry out its fiduciary responsibilities to its active members and retirees. These policies and procedures fall into the following areas:

- actuarial soundness and sustainability, and
- risk and investment management.

This chapter will discuss each of these areas, highlight relevant activity and changes to PERS for the past fiscal year, and discuss future projections.

Actuarial Soundness and Sustainability

"Actuarial soundness" and "sustainability" are two of the major components of financial soundness. The focus of these two concepts should be to create a system and actuarial assumption models that are able to be upheld and defended in view of all relevant environmental conditions, including contractual obligations involved and the potential economic consequences of abrogating those obligations.

Actuarial Soundness

As a result of the most recent experience study, as of June 30, 2016, the PERS Board adopted a decrease of 0.50% to the wage inflation assumption for the PERS plan, reducing it from 3.75% to 3.25%. Even with the adoption of this change, over the past five- and 10-year periods the PERS actual average annual payroll increase has fallen below the actuarial model's projected rate of salary increase. Continued analysis of variation between actual and assumed is warranted.

The PERS Board, in consultation with its actuaries, creates an actuarial model based on such assumptions as projected investment returns, payroll increases, inflation, retirement ages, mortality rates, marriage rates, and accrued leave to project the system's future assets and liabilities. Although the PERS Board sets plan assumptions based on biennial experience studies, the plan's actual experience (e.g., investment returns or mortality rates) is a product of environmental and demographic factors.

Variances in the actual experience of the plan compared to the model's assumptions have an impact on the plan's financial condition. Therefore, the PERS Board, with assistance from its staff and other contractual advisers, endeavors to maintain the actuarial soundness of the plan by monitoring all components used in the PERS actuarial model through quarterly updates on the performance of the System's assets and annual actuarial updates in conjunction with annual projections and biennial experience reports.

Assumption Changes Based on the Most Recent Experience Study

As a result of the most recent four-year experience study, ending June 30, 2016, the PERS Board adopted a decrease of 0.50% to the wage inflation assumption for the PERS plan, reducing it from 3.75% to 3.25%. In addition, the PERS Board also adopted changes to demographic assumptions of the PERS plan.

As a result of the most recent experience study conducted by the independent actuarial firm Cavanaugh Macdonald, for the four-year period ended June 30, 2016, the PERS Board adopted, at its April 2017 meeting, changes to economic and demographic actuarial assumptions effective July 1, 2018, for future years and elected to use the new assumptions in the calculation of the PERS plan's liabilities for fiscal year 2017. The cumulative effect of these changes for the FY 2017 valuation was a one-time increase to the plan's unfunded actuarial accrued liability of $24.1 million.

The PERS Board adopted changes to one of the PERS plan's economic assumptions (pertaining to wage inflation) and to the plan's demographic assumptions. For more information, see the following sections for the economic and demographic assumption changes.

Economic Assumptions

The economic assumptions of the model seek to explain the overall environment in which the plan will operate and to estimate the broad effects on the plan for the future. The PERS Board reduced the wage inflation actuarial assumption by 0.50% reducing it from 3.75% to 3.25%.

The economic assumptions of the model seek to explain the overall environment in which the plan will operate and estimate the broad effects on the plan. The economic assumptions of the model include factors for wage inflation, price inflation, and investment returns.[6] Following the most recent experience study, the PERS Board voted to leave the assumptions for price inflation and investment return at their existing levels and to adopt a change to the wage inflation assumption, lowering it from 3.75% to 3.25%. Exhibit 1, page 8, shows a breakdown of the economic assumptions both before and after the most recent changes.

[6]The *investment return assumption* is a combination of the price inflation and real rate of return assumptions and is reported net of investment expense (i.e., expenses and fees charged by the PERS Board's hired investment managers).

Exhibit 1: PERS Economic Assumptions (before and after) the Experience Study as of June 30, 2016

Assumption	FY 2018 and Future Years*	Most Recent Rate Prior to FY 2018
Wage Inflation	**3.25%**	**3.75%**
Price Inflation	3.00%	3.00%
Investment Return**	7.75%	7.75%

*The revised economic assumptions were also used in the valuation of system liabilities for FY 2017.
**Net of investment expense.

SOURCE: *State of Mississippi Retirement Systems Experience Investigation for the Four-Year Period Ending June 30, 2016*, Cavanaugh Macdonald Consulting, LLC.

Wage Inflation

Based on the recommendation of its independent actuarial adviser, the PERS Board, at its April 2017 meeting, reduced the projected wage inflation rate from 3.75% to 3.25%.

The wage inflation assumption of the actuarial model accounts for projected salary growth over time. Salary growth is composed of two parts: the inflation component, which will be discussed in this section, and promotion or merit increases,[7] which will be described in the Demographic Assumptions section.

The inflation component is composed of the impact of inflation and the real rate of wage inflation,[8] which seek to account for the overall increases in the value of labor over time.

The PERS Board's actuarial advisers considered both real wage growth figures derived from information reported by the Social Security Administration and future projections in assessing the real rate of wage inflation. According to the historical information, real rates of wage growth have been 0.81% and 0.69% for the past 10 and 50 years, respectively. Additionally, the Social Security Administration projects a real rate of wage growth of approximately 1.12% per year.

In view of these two sources, and actual continued lower than expected salary growth (for more information see pp. 12–13), the PERS Board, on the recommendation of its actuarial adviser, lowered the wage assumption from 3.75% to 3.25%, by reducing the real wage growth component by 0.50%.

[7]Merit increases refer to salary increases given for a defined goal (such as receiving additional certifications or training) or for educational attainment (earning a new degree).

[8]The *real rate of wage inflation* is the actual rate of inflation wages experience after the effects of price inflation are removed.

Price Inflation

In conjunction with the June 2016 Experience Study presented at the PERS Board's April 2017 meeting and based on a recommendation from its independent actuarial adviser Cavanaugh Macdonald, the PERS Board made no changes to the price inflation assumption of 3.00% for FY 2018 and future years. The purpose of the price inflation assumption is an attempt to address the effect that inflation has on the cost of living over time. In other words, this assumption tries to quantify exactly how much more it will cost to live on in the future than it does today. The assumption for price inflation is important because it is used as a component in both the investment return and wage inflation assumptions.

In assessing the recommendation for price inflation, the PERS Board's independent actuarial advisers considered several factors, including historical rates over the past 50 years of the U.S. Department of Labor's Consumer Price Index, U.S. City Average, All Urban Consumers; yields of U.S. Treasury Inflation Protected Securities; and the Social Security Administration's old age, survivor, and disability insurance trustee reports. Based on these factors, and the action of the PERS Board to lower the inflation assumption from 3.5% to 3.0% at its April 2015 meeting, Cavanaugh Macdonald recommended no change in the price inflation assumption in conjunction with the 2016 Experience Study.

PERS Board policy stipulates that an actuarial audit will be conducted every five years. An actuarial audit is a peer review or evaluation of the work of the current actuary by a separate, unrelated actuary and is employed to maintain standards of quality, improve performance, and provide credibility.

During its August 2017 meeting, the PERS Board heard the results of its most recent actuarial audit, performed by Gabriel, Roeder, Smith & Company (GRS).[9] The audit was conducted on the results of the fiscal year ended June 30, 2016.

In the results of its audit, GRS recommended that the PERS Board consider lowering its rate of price inflation into the range of 2.00% to 2.50%, a rate it considered to be more reasonable. However, the audit did not find that Cavanaugh Macdonald had reached its previous conclusion of 3.00% through any misapplication of actuarial standards.

Cavanaugh Macdonald, in response to the actuarial audit, again stated that considering current estimates and the recent change of the price inflation rate (as a result of the experience study conducted as of June 30, 2014) that the PERS Board should keep the price estimate at 3.00%. It also stated that this was an assumption that would again be reevaluated during the next experience study (to be conducted on the period ending June 30, 2018).

---

[9]Gabriel, Roeder, Smith and Company (GRS) is a national actuarial and benefits consulting firm with more than 75 years of experience.

Investment Return

In conjunction with the June 2016 Experience Study presented at the PERS Board's April 2017 meeting and based on the recommendation from its independent actuarial adviser, the PERS Board made no changes to the investment return assumption for the PERS plan of 7.75%, effective for FY 2018 and future years. Changes in the investment assumption have the largest effect on PERS unfunded actuarial accrued liabilities; a lower investment assumption demonstrates a more conservative estimate of the future performance of the plan.

The investment return assumption is used in the actuarial model to project the investment performance of the assets in the plan (i.e., what rate of return will current and future investments earn in the future) and to assign the rate at which expected benefits for active, inactive, and retired members will be discounted to the present,[10] which is important in the calculation of the system's unfunded actuarial accrued liability percentage. This assumption is designed to demonstrate the long-term perspective of investments in combination with the long-term perspective of the liabilities.

The investment return assumption is the sum of the real investment rate of return assumption[11] and the price inflation assumption. When considering PERS real investment rate of return assumption, the PERS Board considers the results of its actuarial advisers' forward-looking modeling system (calculations of estimated future investment returns of current and future investments), which are guided by the current market assumptions of the PERS Board's investment consultants and PERS asset allocation model (see pp. 22–23 for a discussion of the PERS asset allocation model) that is set by the PERS Board. In addition to the forward-looking modeling system, the PERS Board considers the investment assumptions of other state and local pension systems in the United States:

- Forward-looking modeling (using information provided by Callan's March 2017 Asset/Liability Study) yielded a median real investment rate of return of 4.30%.
- Forward–looking modeling (using information provided by Horizon Actuarial Services, LLC's *2016 Survey of Capital Market Assumptions)*[12] produced a median real-investment rate of return of 4.76% (the median return of the survey's 20-year projections was 5.62%).

---

[10]Given the effect of price inflation as discussed, if price inflation is less than 3.0%, a dollar today is worth more than it will be worth in future years. Conversely, if price inflation is more than 3.0%, a dollar today is worth less than it will be in the future. Discounting is the method used to determine how much future contribution and benefit payments are worth today.

[11]The *real investment rate of return* is the return earned on investments after the effects of price inflation have been removed.

[12]Horizon Actuarial Services, LLC is an independent consulting firm specializing in providing actuarial and consulting services to multiemployer benefit plans. The 2016 Capital Market Assumptions report is a survey of 35 investment firms' outlooks on short/long-term investment returns.

- Both the National Association of State Retirement Administrators February 2017 Issue Brief, titled *Public Pension Plan Investment Return Assumptions*, and the November 2017 Public Fund Survey[13] reported the median investment return assumption of public pension plans in their databases as 7.50%.

Based on analysis of these data points, and in conjunction with the facts that the PERS plan's assumptions are reviewed every two years and that the PERS Board lowered the investment return assumption following the previous experience study (ending June 30, 2014), Cavanaugh Macdonald recommended no changes to the real investment rate of return. The real investment rate of return remains at 4.75%, which when combined with the price inflation rate (3.00%) results in a projected investment rate of return of 7.75%.

PERS revised projected investment rate of return of 7.75% is slightly higher than the median projected investment rate of return for other state and local pensions. According to information from the Public Fund Survey dated November 2017, overall projected investment rates of return have trended downward over approximately the past 15 years, with the median projected investment rate of return now at 7.50%.

The PERS Board and its independent actuarial adviser plan to continue to monitor the investment return assumption in future years in an effort to ensure that the investment return assumption accurately reflects market conditions and the PERS investment allocation model.

Demographic Assumptions

Subsequent to the experience study for the period ending June 30, 2016, the PERS Board adopted changes to all of its demographic assumptions. The demographic assumptions of the model seek to explain the effects of retirements (service and disability), withdrawals, mortality, and salary increases on the plan.

The demographic assumption levels are based on subsets of the plan members, grouped by age, gender, and years of service.

The purpose of a demographic experience study is to compare what actually happened to the membership of the plan during the evaluation period (the four-year period ended June 30, 2016) with what was expected to occur based on the assumptions used in the most recent actuarial valuations.

Detailed tabulations by age, gender, and years of service are performed for all active and retired members. If actual experience does not follow the expected results, new assumptions are recommended to better align PERS assumptions with actual experience.

---

[13]The Public Fund Survey is an online compendium of key characteristics of 126 of the nation's largest public retirement systems. The survey is sponsored by the National Association of State Retirement Administrators.

For the PERS plan, the following demographic assumptions were used and evaluated:

- rates of withdrawal,
- pre-retirement mortality,
- rates of disability retirement,
- rates of service retirement,
- post-retirement mortality, and
- rates of salary increase.

Subsequent to the experience study for the period ending June 30, 2016, the PERS Board adopted changes to all its demographic assumptions.[14] A full version of the actuarial valuation may be found on the PERS website.[15]

As noted previously, each demographic assumption's values may be striated by age, gender, and years of service. In an effort to provide an example of these changes, PEER elected to discuss the changes made to the rate of the salary increase actuarial assumption, which is the only aspect that can be influenced by the employers of the plan, whereas the other assumptions are not.

Differences Between Actual and Assumed Wage Inflation

As a result of its most recent experience study (as of June 30, 2016), the PERS Board adopted a change to the wage inflation assumption, reducing it from 3.75% to 3.25%. Even with the adoption of this change, over the past five- and 10-year periods the PERS actual average annual payroll increase has fallen below the actuarial model's projected rate of salary increase. Continued analysis of variation between actual and assumed is warranted.

As discussed previously, the wage inflation assumption is the estimate of the amount that PERS members' wages will increase annually in future years. This rate affects the amount of funds contributed annually for investment to meet future plan liabilities and the calculation of the amount of future plan liabilities.

The PERS system receives employee and employer contributions[16] from seven sources:

- state agencies,
- state universities,
- public school districts,
- community and junior colleges,
- counties,

[14]While the demographic assumptions used for rates of salary increase were changed as a result of the most recent experience study, these changes were due to the reduction in the overall wage growth assumption.

[15]http://www.pers.ms.gov/Content/ExpStudies/PERS_Experience_Investigation_Report_2016.pdf?

[16]The current rate each employee and his or her employer must contribute to PERS is 9% and 15.75% of the total employee's salary, respectively.

- municipalities, and
- other political subdivisions (e.g., water or sewer utility districts).

The wage inflation assumption is composed of the impact of inflation and the real rate of wage inflation, which seeks to account for the overall increases in the value of labor over time. Wage inflation figures can be affected both by changes in payments to an individual (e.g., salary increases due to pay or merit raises) and the payments to the total number of individuals (e.g., growing or shrinking workforces). For more information on the numbers of active employees currently participating in PERS, see pages 15–16.

As a result of the most recent experience study, ending June 30, 2016, the PERS Board adopted changes that reduced the plan's wage inflation rate from 3.75% to 3.25% annually.

For the periods FY 2013 through FY 2017 and FY 2008 through FY 2017, the PERS average annual payroll increase has fallen below the projected 3.25% annual rate of salary increase. For the past 10 fiscal years, the average annual payroll increase was 1.55%, and during the past five fiscal years the average annual payroll increase was 0.61%. Exhibit 2, page 14, shows total payroll reported to PERS for fiscal years 2016 and 2017. As this exhibit shows, for FY 2017 alone, PERS experienced salary growth of 0.26%, attributable to increases in total payroll in community/junior colleges, counties, municipalities, and other political subdivisions and to decreases in total payroll in state agencies, state universities, and public schools. Also shown in Exhibit 2, salaries of employees of state agencies, which represented approximately 18% of PERS-covered salaries, experienced a decrease of 0.47% for FY 2017. Appendix B, page 31, shows the PERS payroll growth for fiscal years 2012 through 2017.

Employee and employer contributions represent an important component of the PERS plan funding structure. According to the most recent *Pensionomics* (for 2016) report on Mississippi from the National Institute on Retirement Security,[17] for the 10-year period ended June 30, 2014, approximately 45% of PERS revenue came from contributions. According to PERS *Facts and Figures* (as of June 30, 2017), contributions comprise approximately 46% of total revenues.

[17]The National Institute on Retirement Security is a nonprofit research and education organization established to contribute to informed policymaking by fostering an understanding of the value of retirement security to employees, employers, and the economy.

Exhibit 2: Public Employees' Retirement System Plan Salary Growth (by Source) for the Years Ended June 30, 2017, and June 30, 2016

Salary Source	Total Payroll		Increase (Decrease)	Percentage Change
	FY 2017	FY 2016		
State Agencies	$1,094,365,643	$1,099,584,186	$ (5,218,543)	(0.47%)
State Universities	963,343,669	965,647,659	(2,303,990)	(0.24%)
Public Schools	2,264,501,603	2,281,800,861	(17,299,258)	(0.76%)
Community & Junior Colleges	296,503,962	295,021,260	1,482,702	0.50%
Counties	480,693,802	462,827,688	17,866,114	3.86%
Municipalities	583,092,494	570,531,026	12,561,468	2.20%
Other Political Subdivisions	355,727,535	347,120,253	8,607,282	2.48%
Total	**$6,038,228,708**	**$6,022,532,933**	**$ 15,695,775**	**0.26%**

SOURCE: PEER Analysis of the *Report on the Annual Valuation of the Public Employees' Retirement System of Mississippi as of June 30, 2017.*

An Update on the Financial Soundness of the Mississippi Public Employees' Retirement System and Related Legal Issues: 2014 (PEER Report #591, January 5, 2015) noted that PERS actuaries stated that payroll growth (either through increases in existing salaries or through the creation of new positions) that is less than expected can cause upward pressure on the amortization period attributed to the unfunded accrued liability. However, the upward pressure on the unfunded accrued liability may be partially or totally offset due to the decrease in the amount of future liabilities resulting from a lower payroll amount than assumed in the actuarial model.

The PERS Board adopted changes based on its most recent experience studies (as of June 30, 2012; June 30, 2014; and June 30, 2016), which help PERS actuarial assumptions align more closely with actual experience. For example, the PERS Board has adopted changes to the wage inflation assumption as recommended in both the June 30, 2014, and June 30, 2016, experience studies by reducing the wage inflation assumption from 4.25% to 3.75% based on the 2014 study and then from 3.75% to 3.25% based on the 2016 study.

Although the PERS Board has in the past made changes to the actuarial assumptions, continued analysis, particularly as it relates to the wage inflation assumption, between actual and assumed is warranted.

Active and Retired Employee Assumptions

From FY 2007 through FY 2017, the ratio of active members to retired members has decreased by approximately one-third, driven by the increasing number of retirees and the decreasing number of active members. A lower number of active members to retired members results in funding future pension obligations over the payroll of fewer active members.

The PERS plan, and all other plans administered by the PERS Board, have three types of members: active, inactive, and retired. Each type of member is considered within the actuarial model of the plans; however, because liabilities associated with inactive members account for only 0.94% of the overall PERS plan's present value of future benefits, active and retired members and the ratio between them are of primary importance. As shown in Exhibit 3 on page 16, the ratio of active members to retired members in the PERS plan fell from 2.22:1 in FY 2007 to 1.46:1 in FY 2017, or approximately one-third. The declining ratio is attributable to a decrease in the number of active members and an increase in the number of retired members. This decrease results in funding future pension obligations over the payroll of fewer active members, a factor made more important because contributions from active members and their employers make up approximately 46% of PERS revenues (as of FY 2017).

Active PERS members are current employees who are contributing to the plan through monthly withholding from pay. As noted previously, employee contributions represent an important revenue stream to the plan. As they continue to work, active members accrue service credits that will be used in calculating their annual payment when they become eligible to receive retirement benefits. The plan accounts for the cost of these accruals (the normal costs[18]) and funds them on a yearly basis through both employee and employer contributions.

Retired PERS members are individuals who are no longer working in a PERS-covered position and have begun receiving payments based on their retirement calculations. Inactive members no longer work in a PERS-covered position and have not retired nor received a refund of their contributions. Inactive members retain their right to future benefits either as a refund with interest of their contributions, or, if vested, a deferred retirement benefit.

---

[18]Normal cost is the annual cost of providing retirement benefits for services performed by current members. This is a shared responsibility between the member and employer. Since 2013, PERS has included an estimated budgeted administrative expense of 0.23% of payroll in the normal cost calculation.

Exhibit 3: PERS Active and Retiree Members for FY 2007 through FY 2017 (in Thousands)

Member Type	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Active	164	167	168	166	162	163	162	162	158	155	153
Retiree	74	76	79	82	86	90	93	96	99	102	105
Ratio	2.22	2.20	2.13	2.02	1.88	1.81	1.74	1.69	1.60	1.52	1.46

SOURCE: PERS FY 2017 *Facts and Figures.*

Although the PERS ratio of active members to retired members has declined over the past 10 fiscal years, the PERS active member to retired member ratio of 1.52:1 at the end of FY 2016 was above the average ratio for other pension plans across the nation. According to the November 2017 report of the Public Fund Survey, when looking at the membership of the pension plans tracked by the database, the overall active to retiree ratio is 1.42:1 as of the end of FY 2016, the most recent nationwide information available. This indicates that PERS has a higher ratio of members paying into the plan compared to retirees than the average pension plan in the United States.

Additionally, the Public Fund Survey stated that a lower ratio of active members to retired members results in funding future obligations over a smaller payroll base, and although a declining active members to retired members ratio does not automatically pose an actuarial or financial problem, such a decline may increase financial pressures on a pension system provider.

As with all of the actuarial model's assumptions, the assumptions for active and retired members are evaluated every two years during the PERS Board's experience study. As a result of the most recent experience study (as of June 30, 2016), the PERS Board adopted recommended changes to the rates of retirement for most age groups for both male and female employees. While the majority of changes were to increase expected rates of retirement, seven of the 26 total recommendations (approximately 27%) were recommendations to keep or reduce the expected rates of retirement.[19]

As a maturing plan, increasing retirements are expected, and the model attempts to account for these changes. Although the PERS ratio of active members to retirees may be above the national average, the PERS experience differs from the average plan of the Public Funds Survey database. PERS active membership has continued to decline, whereas the national average plan's membership has grown over the past two fiscal years. As such,

[19]PERS assumptions for rates of service retirements are striated for both male and female members, across eight age brackets, and differentiate between members who retire with under or over 25 years of service (30 years of service for members on Tier IV).

continued analysis of the assumptions for active and retired members is warranted.

Sustainability

The current PERS funding policy is designed to address the past volatility of employer contribution rates within the system by setting the employer contribution rate percentage to a fixed rate of 15.75% of annual compensation. The policy also targets an 80% funding level by 2042 while still reducing the plan's unfunded actuarial accrued liability. In addition to reducing the unfunded accrued liability, the funding policy should result in more long-term sustainability within the system.

To help address the past volatility of the employer contribution rate, the PERS Board of Trustees adopted a funding policy in October 2012, modified in December 2013, that changed the employer contribution rate percentage from an annually calculated actuarial valuation to a fixed rate of 15.75% of annual compensation. For the five fiscal years prior to the implementation of that change in FY 2014 (FY 2009 through FY 2013), the employer contribution rate changed in four of the five years and rose from 11.85% to 14.26%.

The revised funding policy targets an 80% funding level by 2042 while still reducing the plan's unfunded actuarial accrued liability. Included in the policy are contingency steps for prospective action if the funding level of the plan is projected to be less than 60% in 2042 or if the funding ratio is projected to be less than 75% following two consecutive annual actuarial valuations. If one of these conditions exists, Cavanaugh Macdonald will determine a contribution rate increase that will be sufficient to generate a funding ratio of 85% in 2042. For more information on PERS funding policy, see pp. 18–20.

As of June 30, 2017, the PERS anticipated accrued liability payment period[20] was 38.4 years, an increase from 36.6 years as of June 30, 2016. The PERS Board's independent actuarial adviser attributes the increase primarily to the adoption of the lower wage inflation assumption. However, the increase in the anticipated accrued liability payment period was also partially offset by realization of gains in three of the past five fiscal years in the actuarial valuation of assets. By using the accepted practice of actuarial value of assets, PERS recognizes actuarial investment gains and losses[21] over a five-year period. This allows the calculation of the anticipated accrued liability payment period and the accrued liability funding percentage to be based on a five-year period rather than on a one-year period, reducing the chance of large fluctuations in these figures. In FY 2017, actuarially

---

[20]The *anticipated accrued liability payment period* is the estimated length of time under current actuarial assumptions that is required to pay the unfunded actuarial accrued liability. An *unfunded actuarial accrued liability* occurs when the total of present value of future benefits associated with prior years' service and the present value of future administrative costs is greater than the actuarial present value of the System's current assets.

[21]The actuarial value of PERS investments is calculated on a five-year smoothing average in which gains and losses are recognized over five years.

smoothed investment returns were approximately $368 million higher than the actuarial projected returns for FY 2013 through FY 2017.

Risk Management and Investment Management

Risk management and investment management should provide a long-term framework for the system that will control the plan's long-term risk environment and allow it a reasonable opportunity to collect or earn sufficient assets to meet its benefit obligations.

Risk management and investment management represent the other major contributing factors of financial soundness. These concepts are utilized to provide a long-term framework for the system that will manage the plan's long-term risk environment in ways that allow it a reasonable opportunity to collect or earn sufficient assets to meet its benefit obligations.

Risk Management

As of June 30, 2017, the PERS funding ratio was 61.1%, an increase from 60% as of June 30, 2016. Even with the increase in funding ratio, actuarial projections provided by Cavanaugh Macdonald show that the PERS Board's originally adopted model's funding goals of an 80% minimum funding ratio in 2042 will not be achieved. Furthermore, the plan has been below its 75% funding threshold for two consecutive periods. There are several options the PERS Board and/or the Legislature could consider to address this issue.

To calculate the funding ratio, or funding level, of a plan, the current value of all projected future obligations of the plan (such as future pension payments) is determined. In other words, the cost of all of the plan's future obligations is calculated in today's dollars. The total of the current value of future obligations is compared to the plan's assets on hand today and a funding ratio (the funding level) is derived.

The calculation of a plan's funding level is an accounting measure that quantifies the plan's ability to meet its projected future obligations, based on service already performed, with assets currently available. However, this measure, like most accounting measures, assesses the plan in a conservative manner and does not take into account such items as future investment growth and/or loss or contributions from employees and participating employers. Additionally, this measure also does not reflect the ability of the plan to meet its current obligations.

For FY 2017 the actuarial value of assets in PERS increased in relation to the actuarial value of its liabilities—from 60% in FY 2016 to 61.1% in FY 2017. The relationship between these two valuations strengthened because actual experience varied from expected experience regarding investment returns, salary increases, and mortality. The actuarial gain on investments for FY 2017 was 9.31%, which represents the actuarial smoothing of gains and losses for the period of FY 2013 through FY 2017.

According to projections as of June 30, 2017, the plan's funding ratio was projected to be 70.1% by 2042, as compared to 62.6% as reported for FY 2016. This difference is also primarily due to the variation of actual experience from expected experience in higher investment returns for FY 2017. Projections as of June 30, 2017, show that the PERS Board's funding goals of an 80% minimum funding ratio in 2042 will not be achieved. Furthermore, the plan has been below the 75% funding threshold for two consecutive periods. The PERS Board and/or the Legislature could consider the following actions regarding the PERS plan:

- **Request additional employer contributions (PERS Board):** According to the most recent projection report, a contribution rate increase of 1.90% (from 15.75 to 17.65%) would be required for the PERS plan to reach the funding policy target of 85% plan funding by 2042. The change in contribution rate would be effective for the fiscal year ending June 30, 2020. To accomplish this change, the PERS Board would have to set the new contribution rate for PERS participating employers, and under MISS. CODE ANN. § 25-11-124 (1972) each employer would be required to pay this amount.
- **Make adjustments to the funding policy (PERS Board)**: The PERS funding policy, although not legally binding, was adopted with a direction toward ensuring adequate growth in both investment earnings and contributions so that the plan will reach an 80% funding status by 2042. The PERS Board could make changes to the existing funding policy or adopt a new funding policy. These changes could potentially delay the need to make adjustments to the plan or require additional contributions to meet funding goals.
- **Maintain the current employer contribution rate and funding policy (PERS Board):** In theory, a good year in the market could help the plan grow out of any funding deficiency experienced in prior years. Nonetheless, the funding policy is intended to set out the minimum requirements of prudent management that a fiduciary, such as the PERS Board, should follow.
- **Making adjustments to the plan (Legislature)**: Making changes to the PERS existing plan structure is also an option. In its 2012 report *The Public Employees' Retirement System of Mississippi: A Review of Selected Issues Related to Financial Soundness*, the PEER Committee reminded PERS and the Legislature that Mississippi pension benefits are viewed as a contractual right. Persons who become employees have an expectation that their benefits will not be diminished while they are employees. This expectation is called the California Rule[22] of public pension management. Consequently, reductions in benefits might be problematic. Adjustments possibly could be made in compensation policy, including the amount of overtime that can be factored into a retiree's income, but such an adjustment could require legislative rather than administrative action.

[22]Report #564, December 11, 2012, pp. 25–43.

- **Changing the plan for new members (Legislature)**: The PERS Board could advocate for legislative action that would make changes to the PERS plan for new members. These changes could include such actions as increasing the employee contribution rate or lowering new members' benefits. The approach of lowering benefits for new members has been taken before with PERS employees who joined the system after July 2011 having to work longer to receive full retirement benefits than those who joined before July 2011. The impact of these types of changes are difficult to quantify because they depend on the parameters adopted by the Legislature for the new plan tier and can only be measured by a comprehensive actuarial feasibility study. These types of changes could help to lower the costs of the PERS plan over the long term but will do little to resolve the current funding problems of the PERS plan, as existing members with contractual rights will need to have adequate pension funding for their benefits.

For the projected 2042 funding level information to be accurate, all actuarial assumptions must be met exactly for all fiscal years forecasted. As past performance shows, this mark can be missed on both the high and low sides, creating variability from the model.

Regardless of the direction chosen by the PERS Board, it is logical to assume that the funding status of the plan will need to be a topic of discussion in the near future.

Investment Management

For fiscal year 2017 the PERS plan's combined investment portfolio experienced a return of 14.96%, and the market value of the system's assets was approximately $26.9 billion.

Having realized a return of approximately 14.96% in the PERS plan's combined investment portfolio, the market value of assets grew from approximately $24.5 billion to $26.9 billion during FY 2017, an increase of approximately $2.4 billion.

As seen in Exhibit 4 on page 21, according to investment consultants Callan LLC, PERS investment performance for FY 2017 was above the current actuarial model's target investment return of 7.75% and placed it above the median return for its peer group[23] of 13.30%. Additionally, PERS investment performance has exceeded its peer group median for each of the past three-, five-, and 10-year periods.

[23]The PERS peer group is composed of other nationally based very large pension plans (plans with greater than $10 billion in assets).

Exhibit 4: Comparison of PERS Investment Performance to Peer Group of Public Pension Plans with Assets of More Than $10 Billion

Category	FY 2017	3-Year Return	5-Year Return	10-Year Return
PERS Return	14.96%	6.34%	10.08%	5.58%
Peer Group Median (midpoint)	13.30%	6.00%	9.38%	5.48%
PERS Percentile Rank	13*	29*	17	37
25th Percentile*	14.34%	6.36%	10.01%	5.75%
10th Percentile*	15.22%	6.56%	10.24%	6.61%

*Percentile of 13 means PERS outperformed 87% of peer group funds; 25th percentile means these returns were greater than 75% of peer group funds; 10th percentile means these returns were greater than 90% of peer group funds.

SOURCE: Callan Investment Performance Review as of June 30, 2017.

During the past 10 years, the PERS investment return on assets averaged 5.58%. Investment returns ranged from a negative 19.4% during FY 2009 to 25.4% during FY 2011. Historically, PERS investment returns have averaged 6.73% during the past 20 years, 7.94% over the past 25 years, and 8.34% over the past 30 years.

According to the November 2017 report of the Public Funds Survey, the median public pension annualized investment 10-year return for the period ending December 31, 2016, was 5.2% and the 25-year return was 7.8%.[24] PERS investment returns have exceeded the median for other public pension plans over the past 10- and 25-year periods. The volatility of the recent years' returns reinforces the principle of viewing investment returns over a long period and comparing long-term returns to investment return goals rather than focusing on a single year's returns or returns over a short period.

The PERS projected investment rate of return of 7.75% is comparable to other state and local pensions' projected investment rate of return.[25] Additional information from the Public Funds Survey's November 2016 report shows overall projected investment rates of return have trended downward over approximately the past 15 years, with the median projected investment rate of return now at 7.50%.

Because investment returns are the largest piece of a pension's projected assets, when actual returns fall below projections, over time the plan must lean on other sources (contributions) to provide for the difference, which could lead to decreases in the plan's assets. The PERS Board and its independent actuarial adviser plan to continue to monitor the investment return assumption in future years in an effort to ensure that the

[24]At the time of publication of this report, the Public Funds Survey had not released information for the period ending June 30, 2017.

[25]In conjunction with the June 2014 experience study, the PERS Board reduced the investment return assumption from 8.00% to 7.75%. This adjustment reflects a decrease in the price inflation assumption from 3.50% to 3.00% and an increase from 4.50% to 4.75% for the real rate of return.

investment return assumption accurately reflects market conditions and the system's investment allocation model.

Asset Allocation Model

For fiscal year 2017 the PERS Board of Trustees continued to adhere to the asset allocation model put in place in June 2015. This model continues to set investment level targets for the PERS investment portfolio.

The PERS independent investment consultant periodically performs an asset/liability allocation study that considers projected future liabilities of the System, expected risk, returns of various asset classes, and statutory investment restrictions. For fiscal year 2017 the PERS Board continued to adhere to the overall asset allocation model adopted in June 2015. The asset allocation model determines the mix of asset classes in which PERS will invest and the overall weight of each asset class within the portfolio as a whole.

The PERS Board of Trustees and PERS staff use this model to mitigate investment risk through diversification and to establish risk and rate of return expectations for the adopted target asset allocation mix. On a quarterly basis, the PERS Board and its staff review the performance of each investment manager relative to the asset class's target performance level.

Exhibit 5 shows the actual 2017 investment allocation compared to the model.

Exhibit 5: PERS Actual Asset Allocation Compared to Allocation Model as of June 30, 2017

Year	U.S. Equity	Non-U.S. Equity	Debt Investments	Real Estate	Private Equity	Global Equity	Cash
Model	27%	22%	20%	10%	8%	12%	1%
2017	32%	22%	19%	10%	7%	9%	1%

SOURCE: Callan LLC.

Instances in which current investment levels do not agree with the model do not automatically constitute a cause for alarm or create the need for an immediate change in investment levels. The investment model represents targeted investment levels designed to prevent the investment portfolio from becoming too heavily weighted in a certain investment type. Market conditions may, at times, cause a prudent manager to call for slight departures from target goals. For these reasons, the PERS Board monitors investment performance, strategies, and weights throughout the year and manages the investment portfolio based on input from professional money managers, advisers, and its professional staff.

The PERS Board's decision to utilize numerous investment managers minimizes investment risk as it prevents a large portion of plan assets being under the management of any one investment manager. For FY 2017, the PERS Board paid asset-management fees to 53 investment managers (including three that were terminated and two that were hired during FY 2017). PERS paid $95.6 million to investment managers on PERS plan assets of $26.9 billion, a combined investment management expense rate of 0.36% (the expense rate for the fiscal year ended June 30, 2016, was 0.36% as well).

As of June 30, 2017, Eagle Capital, a manager in the large cap equity sector, had the most assets under management as a percentage of the total portfolio by any one active investment manager[26] with 3.70% (approximately $996 million) of the PERS plan's $26.9 billion in assets. For more information on investment management fees and assets under management, see Appendix A on pages 29–30.

[26]Active investment management refers to a portfolio management strategy by which the manager uses various investment research, models, and systems to select the fund's specific investments with the goal of outperforming the fund investment's benchmark index (the market).

Study of the Causes of the PERS Plan's Unfunded Liability

As of June 30, 2016, the Public Employees' Retirement System of Mississippi pension plan had an unfunded actuarial accrued liability of approximately $16.8 billion.

This chapter examines the following:

- What is unfunded actuarial accrued liability?
- How did Mississippi develop unfunded actuarial accrued liability?

What is "unfunded actuarial accrued liability?"

***Unfunded actuarial accrued liability (UAAL)* occurs when a pension system's current actuarial value of assets is less than the present value of benefits earned by retirees, inactive members, and current employees as of the valuation date. UAAL takes into consideration the expected investment return of present assets but does not consider future employee or employer contributions.**

A frequently cited measure of a pension system's financial health is its "funded ratio," the ratio of a system's current actuarial value of assets[27] compared to accrued benefits payable.[28] If the actuarial value of a pension system's assets exceeds the future benefits payable, a funding surplus exists, and if the actuarial value of a pension system's assets is less than the future benefits payable, an unfunded actuarial accrued liability exists. When considering a pension system's funded ratio, one should keep in mind that it is a measure of a plan's status *at one point in time* and a system's funded ratio at one point in time should not be the basis for determining or changing a system's funding policies.

In simpler terms, an unfunded actuarial accrued liability occurs when a pension plan does not have all the assets on hand required to pay the future benefits that have been earned by retirees, inactive employees, and current employees as of a particular date, such as fiscal year-end. Determining the funded ratio of a plan requires more complex calculations.

When determining the funded ratio of a pension system, an actuary calculates the value of benefits earned by employees as of the valuation date by considering such factors as how many employees are expected to receive benefits, how long the employees are expected to work for the government, and how long employees are expected to receive benefits after retirement. The actuary discounts these benefits to their present value using the government's expected return on investments set aside to pay the benefits. These calculations yield the present value of benefits earned by employees as of the valuation date. If the current

[27]As allowed under current accounting guidelines, the value of PERS current assets is based on a five-year smoothing average in which gains and losses are recognized over five years.

[28]*Accrued benefits payable* is the present value of benefits earned by retirees, inactive employees, and current employees as of a particular date.

actuarial value of assets on hand is less than the present value of these benefits, a pension plan has an unfunded actuarial accrued liability.

Unfunded actuarial accrued liability calculations take into consideration the expected investment return of assets on hand but do not consider future contributions of the employer or employees. On a personal finance level, calculating a plan's unfunded actuarial accrued liability is similar to a homeowner calculating the present value of a mortgage's principal and interest payments and comparing that obligation to the value of the homeowner's investments. In other words, this process measures whether a homeowner's savings and investments will grow fast enough to meet the future obligation of his or her mortgage without considering the homeowner's future salary.

How did Mississippi develop an unfunded actuarial accrued liability?

According to the study conducted by the PERS Board's actuaries, the unfunded actuarial accrued liability, as of June 30, 2016, results from the present value of the initial UAAL as of June 30, 1998; plan benefit changes; changes to plan assumptions; asset gains/losses; and liability experience.

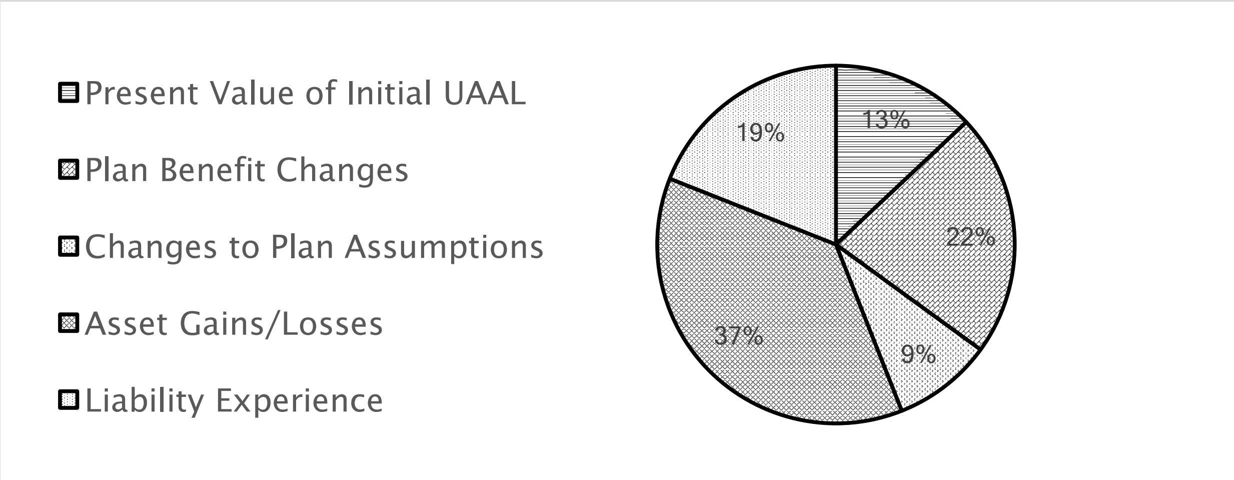
In fiscal year 2017 the PERS Board requested that its actuarial consultants produce a report analyzing the actuarial funding position of the PERS plan from June 30, 1998, to June 30, 2016. As of June 30, 2016, the unfunded actuarial accrued liability totaled approximately $16.8 billion, as follows:[29]

- present value of initial UAAL $2.2 billion
- plan benefit changes $3.7 billion
- changes to plan assumptions $1.4 billion
- asset gains and losses $6.3 billion
- liability experience $3.2 billion

Exhibit 6, page 26, shows the composition of the plan's unfunded actuarial accrued liability by percentage share.

[29]As of June 30, 2016, the PERS plan's unfunded actuarial accrued liability was $16,812,434,711.

Exhibit 6: PERS Unfunded Actuarial Accrued Liability Components as of June 30, 2016



SOURCE: *Analysis of the Funded Status Changes to the Public Employees' Retirement System of Mississippi from June 30, 1998, to June 30, 2016*, Cavanaugh Macdonald Consulting, LLC.

Present Value of Initial UAAL

As of June 30, 2016, the present value of the initial UAAL (from June 30, 1998) had grown to approximately $2.2 billion and represented approximately 13% of the PERS plan's total UAAL as of June 30, 2016.

As of June 30, 1998, the unfunded actuarial accrued liability was $1,945,461,228. However, the value of a dollar today is greater than the same dollar as of June 30, 1998, and, as such, the initial UAAL's total was revalued in today's dollars using the plan's assumed investment rate of return over the analyzed periods. Just as the initial value would have changed over the reviewed period, the PERS plan also made payments on the initial UAAL through portions of its annual contributions.

Accounting for the effects of these two types of adjustments, the value of the initial UAAL as of June 30, 2016, had grown to $2,189,102,107, and represents approximately 13% of the plan's overall UAAL.

Plan Benefit Changes

As of June 30, 2016, the PERS plan's 14 benefit changes resulted in an increase in the PERS UAAL of approximately $3.7 billion, which represents approximately 22% of the PERS plan's total UAAL.

During the period of the analysis (from June 30, 1998, to June 30, 2016), the PERS plan experienced approximately 14 benefit changes that affected membership eligibility, member benefit accrual, and vesting requirements. These changes were the effect of changes to state law enacted by the Mississippi Legislature and changes in Internal Revenue Service regulations.

The plan's actuaries note that none of these benefit changes were funded through increases to the existing contribution rates at the time of the benefit change.

Accounting for the growth of these additional liabilities (at the discount rate), the value of benefit changes as a part of the UAAL at June 30, 2016, was $3,676,281,041, which represents approximately 22% of the plan's total UAAL.

Assumption Changes

As of June 30, 2016, the cumulative effect of assumption changes on the PERS plan was an increase in the UAAL of approximately $1.4 billion, which represents approximately 9% of the PERS plan's total UAAL.

As noted previously, in order to value and account for the assets and liabilities of the PERS plan, the actuaries must utilize various economic and demographic assumptions. Changes to these assumptions can increase or decrease the actuarial liability of the PERS plan. The frequent experience studies conducted by the PERS Board has meant the majority of the changes adopted to the plan's assumptions represent minor changes to the plan's liability.

During the period of the analysis, the PERS plan experienced two significant actuarial changes that, in the opinion of the actuaries, had major effects on the plan's liabilities. The first was a one-year deviation from the five-year asset-smoothing method utilized by the plan when the assets were "marked-to-market." This change was adopted by the PERS Board in 2006 and represented a decrease in the UAAL of approximately $511.1 million.

The second major actuarial change during the period reviewed was a reduction of the PERS plan's assumed investment return rate from 8.00% to 7.75%, made effective by the PERS Board as of June 30, 2015. This change represented an increase in the UAAL of approximately $1.8 billion.

The cumulative impact of the actuarial changes over the period was $1,441,273,161, which represents approximately 9% of the plan's total UAAL as of June 30, 2016.

Asset Gains and Losses

Differences between assumed and actual returns on investments over the period between June 30, 1998, and June 30, 2016, resulted in an increase in the PERS plan's UAAL of approximately $6.3 billion, which represents approximately 37% of the PERS plan's total UAAL as of June 30, 2016.

One of the actuarial assumptions that must be used to value pension plans is the assumed investment rate of return. This rate is an integral component of the plan's valuation because it is the projected rate of investment growth and is also utilized as the discount rate for valuing the plan's future liabilities. As discussed on page 27, the PERS system has an assumed investment rate of return of 7.75%.[30]

For the period reviewed, June 30, 1998, to June 30, 2016, the amalgamated assumed rate of return was 7.99%, with an actuarial rate of return for the same period of 4.67%. Because of the differences in these returns, the component piece of the plan's total UAAL as of June 30, 2016, was $6,315,107,355, which represented approximately 37% of the plan's total UAAL.

Liability Experience

The cumulative effect of increases and decreases caused by differences between the PERS plan's actual and assumed experience, for the period between June 30, 1998, and June 30, 2016, was an increase in the PERS plan's UAAL of approximately $3.2 billion, which represented approximately 19% of the PERS plan's UAAL as of June 30, 2016.

Gains and losses due to differences between the plan's actual experience and its demographic assumptions also contributed to the plans total UAAL. The differences can both increase and decrease the plan's UAAL. For example, if active members of the plan work longer than assumed (and retire at a later age), the plan experiences a decrease in its UAAL (the member will be assumed to draw fewer future pension payments, and, as such, the plan will retain more assets). The cumulative impact of these increases and decreases for the period reviewed was $3,190,671,048 at June 30, 2016, which represents approximately 19% of the plan's total UAAL.

[30]The 7.75% rate of return was adopted as of June 30, 2015. For all fiscal years prior to that year, the plan used an assumed investment rate of return of 8.00%.

Appendix A: PERS Investment Management Fees, FY 2017 & FY 2016

CLASS	MANAGER	FY 17 (thousands)	FY 16 (thousands)
U.S. Equity	ARTISAN PARTNERS (MID CAP EQUITY)	2,469	2,346
U.S. Equity	BOSTON COMPANY - MID CAP	2,743	2,558
U.S. Equity	DIMENSIONAL FUND ADVISORS US SMALL CAP EQUITY	1,704	1,412
U.S. Equity	EAGLE CAPITAL	5,874	5,208
U.S. Equity	FAYEZ SAROFIM — Terminated Q1 FY 2016	-	205
U.S. Equity	NORTHERN TRUST	268	261
U.S. Equity	RIVERBRIDGE	3,162	2,697
U.S. Equity	STATE STREET GLOBAL ADVISORS US LARGE CAP EQUITY	102	98
U.S. Equity	WEDGEWOOD PARTNERS	2,254	2,226
U.S. Equity	WELLINGTON MID CAP EQUITY	2,438	2,291
U.S. Equity	WELLINGTON SMALL CAP EQUITY	2,266	1,889
Non-U.S. Equity	ARROWSTREET CAPITAL	2,990	2,205
Non-U.S. Equity	ARTISAN PARTNERS (EMERGING MARKETS) — Terminated Q4 FY 2016	-	1,558
Non-U.S. Equity	BAILLIE GIFFORD	2,555	1,998
Non-U.S. Equity	BLACKROCK HEDGED EAFE EQUITY	762	580
Non-U.S. Equity	DIMENSIONAL FUND ADVISORS - EAFE EQUITY — Terminated Q3 FY 2016	-	729
Non-U.S. Equity	FIDELITY INSTITUTIONAL ASSET MANAGEMENT	1,829	1,666
Non-U.S. Equity	FISHER INVESTMENTS — Hired Q4 FY 2016	2,725	537
Non-U.S. Equity	JARISLOWSKY FRASER — Terminated Q3 F 2016	-	471
Non-U.S. Equity	LAZARD ASSET MANAGEMENT	2,599	2,376
Non-U.S. Equity	MARATHON — Hired Q4 FY 2016	2,062	288
Non-U.S. Equity	MONDRIAN	1,849	1,689
Non-U.S. Equity	NEW STAR — Terminated Q3 FY 2016	88	799
Non-U.S. Equity	RUSSEL IMPLEMENTATION SERVICES	-	804
Debt Investments	ABERDEEN — Terminated Q3 FY 2017	492	757
Debt Investments	ALLIANCEBERNSTEIN	1,463	1,499
Debt Investments	BLACKROCK PASSIVE US CORE FIXED INCOME	191	194
Debt Investments	LOOMIS SAYLES	1,580	1,520
Debt Investments	MANULIFE — Hired Q3 FY 2017	242	-
Debt Investments	PACIFIC INVESTMENT MANAGEMENT CO.	738	747
Debt Investments	PACIFIC INVESTMENT MANAGEMENT CO. - GLOBAL	1,524	1,602
Debt Investments	PRUDENTIAL	1,277	1,249
Debt Investments	WELLINGTON EMERGING MARKETS DEBT	2,386	2,407

Real Estate	AEW PARTNERS V, LP	–	38
Real Estate	AEW PARTNERS VI, LP	303	360
Real Estate	AEW PARTNERS VII, LP	400	400
Real Estate	AEW PARTNERS VIII, LP	363	–
Real Estate	AG CORE PLUS FUND II LP	25	62
Real Estate	AG CORE PLUS FUND III LP	301	350
Real Estate	AG CORE PLUS FUND IV LP	428	152
Real Estate	CENTERSQUARE — Hired Q4 FY 2017	68	–
Real Estate	COHEN & STEERS	1,252	1,441
Real Estate	DEUTSCHE ASSET MGMT — Terminated Q4 FY 2017	876	1,135
Real Estate	HANCOCK TIMBER FUND	1,171	1,239
Real Estate	HEITMAN VALUE PARTNERS II LP	2	108
Real Estate	HEITMAN VALUE PARTNERS III LP	293	209
Real Estate	INVESCO VALUE ADD FUND IV LP	324	138
Real Estate	JP MORGAN STRATEGIC PROPERTY FUND	3,988	3,074
Real Estate	PRINCIPAL GLOBAL INVESTORS	4,734	4,596
Real Estate	TA REALTY ASSOCIATES FUND X LP	992	1,048
Real Estate	TA REALTY ASSOCIATES FUND XI LP	425	249
Real Estate	UBS TRUMBULL PROPERTY FUND	3,643	3,775
Real Estate	UBS TRUMBULL PROPERTY GROWTH & INCOME FUND	1,650	1,450
Real Estate	WESTBROOK X LP	558	487
Private Equity	GROSVENOR & PATHWAY CAPITAL MAN – PRIVATE EQUITY	12,388	12,007
Global Equity	ACADIAN	2,638	2,365
Global Equity	EPOCH	3,086	2,856
Global Equity	HARDING LOEVNER	2,761	2,453
Global Equity	LONGVIEW PARTNERS	2,289	1,570
		95,590	88,428

SOURCE: PERS CAFR, Fiscal Years 2017 AND 2016.

Appendix B: PERS Payroll Growth for FY 2012–FY 2017

	Payroll for the Fiscal Year Ending June 30,						Percent Change in Payroll From Fiscal Year
Employer Group	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2012 - 2017**
State Agencies	$ 1,119,478,546	$ 1,113,271,357	$ 1,100,393,122	$ 1,090,118,458	$ 1,099,584,186	$ 1,094,365,643	-2.24%
State Universities	$ 873,539,345	$ 868,183,113	$ 917,826,885	$ 928,826,800	$ 965,647,659	$ 963,343,669	10.28%
Public Schools	$ 2,215,375,191	$ 2,196,453,153	$ 2,173,388,716	$ 2,237,050,354	$ 2,281,800,861	$ 2,264,501,603	2.22%
Community/ Jr. Colleges	$ 287,592,117	$ 290,146,471	$ 290,065,961	$ 286,804,447	$ 295,021,260	$ 296,503,962	3.10%
Counties	$ 457,546,263	$ 442,782,098	$ 449,055,561	$ 455,989,117	$ 462,827,688	$ 480,693,802	5.06%
Municipalities	$ 607,688,461	$ 555,811,830	$ 559,174,715	$ 567,478,696	$ 570,531,026	$ 583,092,494	-4.05%
Other Political Subdivisions	$ 296,569,453	$ 356,929,956	$ 344,781,695	$ 338,559,309	$ 347,120,253	$ 355,727,535	19.95%
Total Payroll Reported to PERS	$ 5,857,789,376	$ 5,823,577,978	$ 5,834,686,655	$ 5,904,827,181	$ 6,022,532,933	$ 6,038,228,708	3.08%
Actuarial Assumed Rate of PERS Plan Salary Growth		4.25%	4.25%	3.75%	3.75%	3.25%	
Actual Rate of PERS Plan Salary Growth		-0.58%	0.19%	1.20%	1.99%	0.26%	

SOURCE: PERS annual valuations for years ending June 30, 2012, through June 30, 2017.

PERS
of MISSISSIPPI

Providing Benefits for Life

April 5, 2018

Mr. James Barber
Executive Director
Joint Committee on Performance Evaluation and Expenditure Review
Woolfolk Building, Suite 301-A
501 North West St.
Jackson, MS 39201

Dear Mr. Barber:

Thank you for the opportunity to review the draft of the PEER Report titled *2017 Update on Financial Soundness of the Public Employees' Retirement System* (PERS). As acknowledged in the Report, the PERS Board of Trustees has adopted and implemented policies and procedures that allow it to address the major areas that contribute to the plan's financial well-being and to carry out its fiduciary responsibilities to its active members and retirees. PERS strives to be above reproach in handling the funds entrusted to us because we understand how significantly our work affects families across the state of Mississippi.

In the spirit of prudence, the PERS Board and staff routinely review the current funding and future projections for each of the retirement plans we administer. Earlier this year, PERS released a white paper titled *Public Employees Retirement System: State of the Plan*, which provides additional details regarding the current status of PERS and available options for strengthening the funding of PERS. PERS will continue to monitor the overall soundness of the retirement plans and work to administer the benefits designed by the Legislature.

We acknowledge and appreciate the diligence and effort you and your staff expended in compiling this report, and we respect the professional manner in which the review was conducted. Please contact me at 601-359-2241 if you need further information. Thank you.

Sincerely,

Pat Robertson
Executive Director

cc: PERS Board of Trustees

Public Employees' Retirement System of Mississippi
429 Mississippi Street, Jackson, MS 39201-1005 601.359.3589 800.444.PERS www.pers.ms.gov

PEER Committee Staff

James A. Barber, Executive Director

Legal and Reapportionment
Ted Booth, General Counsel
Ben Collins
Barton Norfleet

Administration
Alicia Russell-Gilbert
Deborah Hardy
Gale Taylor

Quality Assurance and Reporting
Tracy Bobo
Kelly Saxton

Performance Evaluation
Lonnie Edgar, Principal Analyst
David Pray, Principal Analyst
Jennifer Sebren, Principal Analyst
Kim Cummins
Matthew Dry
Samuel Hearn
Matthew Holmes
Sarah Williamson
Julie Winkeljohn
Ray Wright

Performance Accountability
Linda Triplett, Director
Kirby Arinder
Debra Monroe-Lax
Meri Clare Steelman