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STATE OF MINNESOTA
Office of the State Auditor

Rebecca Otto
State Auditor

LARGE PUBLIC PENSION PLAN INVESTMENT REPORT

For the Year Ended December 31, 2016

Description of the Office of the State Auditor

The mission of the Office of the State Auditor is to oversee local government finances for Minnesota taxpayers by helping to ensure financial integrity and accountability in local governmental financial activities.

Through financial, compliance, and special audits, the State Auditor oversees and ensures that local government funds are used for the purposes intended by law and that local governments hold themselves to the highest standards of financial accountability.

The State Auditor performs approximately 150 financial and compliance audits per year and has oversight responsibilities for over 3,300 local units of government throughout the state. The office currently maintains five divisions:

Audit Practice - conducts financial and legal compliance audits of local governments;

Government Information - collects and analyzes financial information for cities, towns, counties, and special districts;

Legal/Special Investigations - provides legal analysis and counsel to the Office and responds to outside inquiries about Minnesota local government law; as well as investigates allegations of misfeasance, malfeasance, and nonfeasance in local government;

Pension - monitors investment, financial, and actuarial reporting for approximately 650 public pension funds; and

Tax Increment Financing - promotes compliance and accountability in local governments' use of tax increment financing through financial and compliance audits.

The State Auditor serves on the State Executive Council, State Board of Investment, Land Exchange Board, Public Employees Retirement Association Board, Minnesota Housing Finance Agency, and the Rural Finance Authority Board.

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Large Public Pension Plan Investment Report

For the Year Ended December 31, 2016

April 12, 2018

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Office of the State Auditor
State of Minnesota

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Scope and Methodology

This report reviews the investment performance of Minnesota's large local public pension plans for the 2016 calendar year. The public pension plans included in this report are the Bloomington Fire Department Relief Association (Bloomington Fire), and the St. Paul Teachers' Retirement Fund Association (St. Paul Teachers'). The State Board of Investment (SBI), which is referenced frequently, is not a pension plan, but invests the assets of certain public employee pension plans administered by the Minnesota State Retirement System, the Public Employees Retirement Association, and the Teachers Retirement Association.

These pension plans and the SBI held over $61.1 billion in assets as of December 31, 2016, which represents the future retirement benefits of hundreds of thousands of public employees.

Limited information for the University of Minnesota Supplemental Benefits Plan is also included in this report. This plan has a total market value of less than $25 million, so its statutory reporting requirements are less than the reporting requirements for the other plans included in this report. Therefore, only a brief description of activities for the plan is provided, and the plan is not included in the report tables.

The pension plans are required under Minnesota Statutes, section 356.219, to annually report investment information to the Office of the State Auditor (OSA), and the State Auditor is required to provide a report to the legislature on the investment performance of these plans. One way to measure investment performance is to calculate a rate of return which can then be used to compare a plan against a benchmark or against other plans. The methodologies used by the large plans to calculate rates of return may vary from one another and from the methodology used by the OSA. To obtain analogous comparisons of investment performance, the OSA calculates rates of return using a uniform calculation method.[1] Using a uniform calculation method allows for a fair comparison of performance among plans.

The purpose of this report is to inform lawmakers of the large plans' investment performance, educate fiduciaries and members of the plans, and provide transparency to the public.

[1] Minnesota Statutes, section 356.219, requires the OSA to compute and report total portfolio and asset class time-weighted rates of return, net of all costs and fees. The State Board of Investment is permitted by this statute to submit limited reporting information. Therefore, the rates of return included in this report for the State Board of Investment are provided by the State Board of Investment and are not re-calculated by the OSA.

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Executive Summary

Current Trends

- During 2016, rates of return for the large plans were 7.6 percent (Bloomington Fire Department Relief Association), and 9.5 percent (St. Paul Teachers' Retirement Fund Association). Bloomington Fire and St. Paul Teachers' exceeded their benchmark rates of return. The rate of return for the State Board of Investment's Combined Funds was 7.6 percent. (Pages 9 through 13)

Long-Term Trends

- The ten-year period from January 2007 through December 2016 was a period of market volatility. Bloomington Fire and St. Paul Teachers' both failed to exceed their actuarial assumed rates of return over this period. The State Board of Investment's Combined Funds returned 6.1 percent for the period. St. Paul Teachers' earned 5.2 percent over the ten-year period, while Bloomington Fire returned 4.9 percent. (Pages 15 and 16)

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Understanding Investment Performance Terms

Rate of Return

Rate of return is the gain or loss on an investment over a specified time period, usually expressed as a percentage increase over the fair market value at the beginning of the period.

Asset Allocation

Asset allocation describes the practice of distributing the assets of a portfolio among different types of investment classes, such as stocks, bonds, cash, and real estate. By diversifying assets, the goals are to minimize risk and to create a favorable risk/reward ratio for a portfolio. When one asset class declines, the expectation is another will increase and offset the loss.

Passive Investment Strategy

Passive investment strategy or passive management is more commonly called indexing. Indexing is an investment management approach based on investing in the same securities, and in the same proportions, as a specific index. The management style is considered passive because portfolio managers do not make decisions about which securities to buy and sell. Instead, managers simply copy the index by purchasing the same securities included in a particular stock or bond market index.

Active Investment Strategy

Active investment strategy or active management is an attempt to outperform the market as measured by a particular benchmark or index. The aim of active fund management is to outperform, after fees are paid, the index that a particular fund is benchmarked against. Prevailing market trends, the economy, political and other current events, and company-specific factors, such as earnings growth, all affect an active manager's decisions. Active investing often has higher costs than passive investing. These extra expenses may reduce any extra gains an active manager might earn.

Enhanced Indexing Investment Strategy

Enhanced indexing investment strategy, or enhanced indexing, is a hybrid strategy used by many of the large plans. Enhanced indexing combines both passive and active investment strategies, and attempts to generate rates of return that are slightly higher than that of an index fund or other passive management techniques.

Benchmark

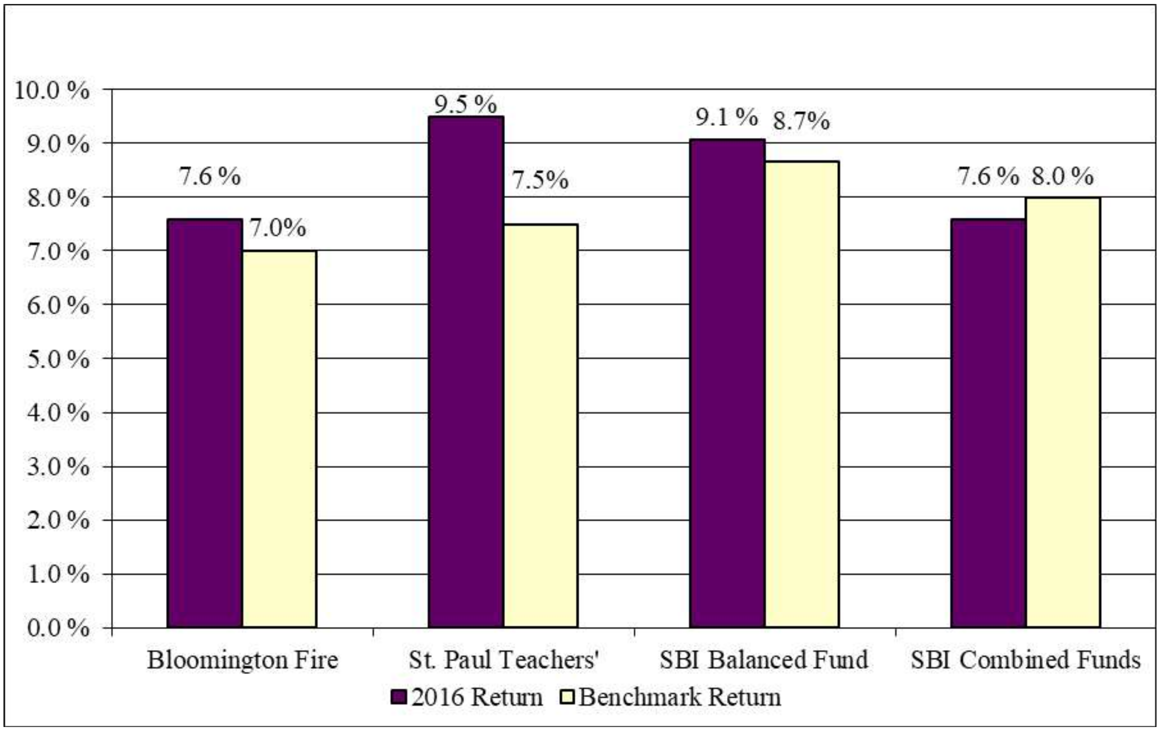
A benchmark is an index to which a plan compares its investments. Market benchmarks are used by individual investors, portfolio managers, and market researchers to determine how well a particular market or market sector performs. Investors look to broad indices as benchmarks to help them gauge not only how well the markets are performing, but also how well the investors are performing as investors.

Why Benchmarks are Important

Measuring investment returns against an appropriate benchmark encourages prudent investment decisions, and gives trustees another method of evaluating investment performance. The key to establishing the most accurate benchmark for a portfolio is determining which indices best track investments similar to the asset allocation of the investment policy. An ideal benchmark return would consist of a hypothetical portfolio of indices, invested in the same asset classes and in the same proportion as the actual holdings of the entire portfolio. Indices track different asset classes, such as domestic equity or bonds. An index may also track subsets of an asset class, such as small-capitalization growth domestic equity. Although benchmark indices are not directly available for investment purposes, mutual and collective index funds which hold the same securities as the index can be obtained. Known as "index funds," these funds are managed with a passive style.

Figure 1, on the next page, compares the 2016 rates of return and benchmark returns for the large plans and the State Board of Investment.

Figure 1: 2016 Rates of Return and Benchmark Return



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2016 Performance Analysis

Investment returns varied by asset class in 2016. The S&P 500 Index, which is a gauge of the large-capitalization U.S. equities market, returned 12.0 percent in 2016. The Russell 3000 Index measures the performance of the largest 3,000 U.S. companies, representing nearly all of the U.S. equity market. The Russell 3000 Index returned 12.7 percent.

International equities returned 4.5 percent as measured by the Morgan Stanley Capital International (MSCI) All Country World Index excluding the United States (ACW Index ex. U.S.). This index measures the performance of both developed and emerging markets.

Domestic bonds returned 2.7 percent as measured by the Barclays Aggregate Index. The 2016 returns for bonds outperformed the 0.5 percent return for this asset class during 2015.

In 2016, economic indicators improved as unemployment dropped to 4.7 percent and consumer spending increased by 2.4 percent. The Consumer Price Index, which measures inflation, rose 2.1 percent.

Bloomington Fire Department Relief Association

The Bloomington Fire Department Relief Association (Bloomington Fire) consists of retired and active firefighters of the City of Bloomington. Bloomington Fire is the administrator of a single-employer defined-benefit pension plan available to firefighters, which was established April 1, 1947.[2] Bloomington Fire is governed by a Board of Trustees made up of six members elected by the members of the plan for three-year terms, one elected City official, one elected or appointed City official, and the Fire Chief, who serve as ex officio voting members of the Board.

Bloomington Fire returned 7.6 percent in 2016, as calculated by the Office of the State Auditor (OSA). The return exceeded the plan's benchmark return of 7.0 percent.

Bloomington Fire's investment policy allocates 35.0 percent to domestic equities, 10.0 percent to developed international equities, 5.0 percent to emerging market international equities, 38.0 percent to bonds, 5.0 percent to private equity, 5.0 percent to real estate, and 2.0 percent to cash. The plan's actual allocations for 2016 varied slightly from the policy allocations, with increases in international equities, fixed income,

[2] *See* Bloomington Fire Department Relief Association December 31, 2016, Financial Statements and Management Letter, page nine.

domestic equities, and a reduction in cash. From 2015 to 2016, Bloomington Fire increased its allocations to fixed income and domestic equities by 3.0 percent and 2.5 percent, respectively. Bloomington Fire increased its allocation to international equities by 2.4 percent from 2015 to 2016. International developed equity and emerging market equity comprised 10.3 percent and 5.1 percent, respectively, of the total international equities allocation. Bloomington Fire decreased its allocation to cash for the same period by 7.9 percent.

At the end of 2016, 96.1 percent of Bloomington Fire's total assets were held in the State Board of Investment's (SBI) Supplemental Investment Fund: 36.3 percent of the plan's assets with the SBI were invested in the U.S. Stock Index Fund; 31.6 percent in the Bond Fund; 18.2 percent in the U.S. Stock Actively Managed Fund; 12.8 percent in the Broad International Fund; and 1.1 percent in the Money Market Account.

The SBI's U.S. Stock Index Fund is a Russell 3000 Index fund that returned 12.8 percent for the year. The SBI's Actively Managed Fund is an actively-managed domestic equity fund that returned 10.5 percent for the year. The benchmark for both funds was the Russell 3000 Index, which returned 12.7 percent. The Broad International Stock Fund, consisting of active, semi-passive, and passive managers, returned 2.7 percent for the year. This account is compared to the MSCI ACWI ex-U.S. (net) Index that returned 4.5 percent. The Bond Fund, an actively-managed account, returned 3.6 percent, and exceeded its benchmark Barclays Aggregate Index return of 2.7 percent.

Bloomington Fire liquidated its holdings with Wells Fargo Advisors by the end of May 2016. This account was invested in cash, individual stocks, fixed-income, and mutual funds. The Wells Fargo account returned 3.4 percent through May 2016.

Starting in November 2016, Bloomington Fire began investing in the GQG Partners Emerging Markets Equity Fund. The GQG Emerging Markets Equity Fund returned negative 4.8 percent during the last two months of 2016.

Bloomington Fire also held investments in an internally-managed account. The account held 0.8 percent of the plan's assets and was entirely invested in short-term cash investments. Assets held by the internally-managed account decreased by 37.1 percent from the 2015 holdings.

St. Paul Teachers' Retirement Fund Association

The St. Paul Teachers' Retirement Fund Association (St. Paul Teachers') is a non-profit organization formed in 1909.[3] At the direction and oversight of a ten-member Board of Trustees, the St. Paul Teachers' staff manage two tax-qualified, defined-benefit pension programs: a Basic Plan, and a Coordinated Plan. These plans cover licensed personnel

[3] *See* St. Paul Teachers' Retirement Fund Association June 30, 2016, Financial Statements and Management Letter, page five.

of Independent School District (ISD) No. 625, which is the central administrative body for public schools within the City of St. Paul. Basic Plan members do not participate in Social Security through their employment with the ISD. In 1978, the Coordinated Plan commenced, and it provides retirement benefits for members who simultaneously participate in Social Security.

St. Paul Teachers' returned 9.5 percent in 2016, as calculated by the OSA, exceeding its benchmark return of 7.5 percent. The plan's market value increased by $29.5 million.

The domestic equity holdings of St. Paul Teachers' returned 14.5 percent, which outperformed its S&P 500 Index benchmark return of 12.0 percent. The SBI Equity Fund, which is St. Paul Teachers' largest large-capitalization fund, returned 12.8 percent and exceeded the Russell 3000 Index benchmark of 12.7 percent. The BlackRock S&P Fund returned 12.0 percent, matching its S&P 500 Index benchmark return of 12.0 percent. The Barrow & Hanley Fund's rate of return of 12.9 percent failed to match the Russell 1000 Value Index benchmark return of 17.3 percent. The lone mid-capitalization fund managed by Wellington Management returned 5.2 percent. The small-capitalization fund managed by Boston Company returned 20.3 percent. The Dimensional Fund Advisors 6-10 Value Fund returned 28.5 percent, compared to its 31.7 percent benchmark return.

Fixed-income investments returned 4.6 percent, falling short of the Barclays Aggregate excluding Treasury Index benchmark return of 2.7 percent. The Guggenheim Fund, which is St. Paul Teachers' largest fixed-income fund, returned 6.2 percent, exceeding the custom benchmark return of 3.2 percent for the Barclays U.S. Aggregate plus 50 basis points. The Brandywine Fund returned 5.2 percent, exceeding its Citigroup World Government Bond benchmark rate of return of 1.6 percent. In May 2016, St. Paul Teachers' liquidated its T. Rowe Price Global Fixed-Income Fund. St. Paul Teachers' also held investments in the Allianz Cash Overlay Account, which returned 5.3 percent. Fixed-income investments made up 16.9 percent of the total portfolio, after accounting for 20.3 percent of the portfolio in 2015.

St. Paul Teachers' international equity portfolio consisted of the SBI International Equity Fund, which returned 2.5 percent, failing to exceed its benchmark rate of return of 5.0 percent. International equity investments made up 7.5 percent of the total portfolio, after accounting for 8.4 percent of the portfolio in 2015.

Global equity investments for St. Paul Teachers' returned 7.2 percent. Morgan Stanley's Global Franchise Fund and JP Morgan's Focus Fund returned 5.6 percent and 8.8 percent, respectively. Both funds are compared to the MSCI World Index benchmark, which returned 8.2 percent in 2016.

Real estate holdings for St. Paul Teachers' returned 9.4 percent, as calculated by the OSA, compared to the NCREIF Fund Index (NFI) Open End Diversified Core Equity (ODCE) (net) Index benchmark return of 7.8 percent. The UBS Trumbull Fund returned

6.1 percent in 2016, underperforming the NFI ODCE (net) Index benchmark return of 7.8 percent. The UBS Trumbull Growth and Income Fund returned 15.5 percent in 2016, outperforming the NCREIF Property benchmark of 6.1 percent for the same period. The Tortoise MLP Fund returned 16.1 percent in 2016, failing to exceed the Alerian MLP benchmark return of 18.3 percent. The Advantus Fund returned 4.7 percent, which underperformed the benchmark Wilshire Real Estate Securities Index return of 7.2 percent.

Private equity investments returned 6.4 percent in 2016, as calculated by the OSA. Private equity investments included funds managed by RWI Group, North Sky Capital, Parametric Defensive Equity Fund, and Franklin Park. St. Paul Teachers' uses the Russell 3000 plus 3 percent as a benchmark for its private equity funds. The 2016 benchmark rate of return was 16.1 percent.

St. Paul Teachers' alternative investments portfolio returned negative 22.4 percent in 2016, as calculated by the OSA. TCW Asset Management - DL Fund and VIA Energy were the only alternative investment held by St. Paul Teachers during the 2016 calendar year.

Opportunistic investments returned 5.0 percent for 2016, as calculated by the OSA. The Corvex Master Fund LP and EnTrust Special Opportunities Fund III, Ltd., returned 2.3 percent and 9.8 percent, respectively.

St. Paul Teachers' cash portfolio returned 3.8 percent. The cash portfolio includes a cash overlay account managed by the Clifton Group. The cash overlay account overlaid equity returns on cash, contributing to the strong rate of return for the cash portfolio.

St. Paul Teachers' U.S. Treasury Bills portfolio consisted of the Clifton Group Treasury Inflation Protected Securities (TIPS) Fund. The fund returned 4.6 percent.

State Board of Investment

The State Board of Investment (SBI) was established by Article XI of the Minnesota Constitution to invest state funds. The SBI is responsible for the investment management of various retirement funds, trust funds, and cash accounts. Its membership, as specified in the Constitution, is comprised of the Governor (who is designated as chair of the Board), the State Auditor, the Secretary of State, and the State Attorney General. All investments undertaken by the SBI are governed by the prudent person rule and other standards codified in Minnesota Statutes, Chapter 11A and Chapter 356A.

The SBI's Combined Funds returned 7.6 percent in 2016, failing to meet its benchmark return of 8.3 percent.

The SBI's domestic equity portfolio returned 11.5 percent, which was below the benchmark Russell 3000 Index return of 12.7 percent. The portfolio is managed by 15 active money managers, four semi-passive managers, and one passive manager. Each active manager is expected to add value over the long run relative to the Russell Style Index, which reflects its investment approach or style. The semi-passive managers are expected to add incremental value relative to the Russell 1000 Index, employing a strategy that more closely tracks the benchmark than that of the active managers. The passive manager consistently tracks the Russell 3000 Index.

The fixed-income portfolio of the SBI returned 3.6 percent for the year, compared to the 2.7 percent benchmark return of the Barclays Aggregate Index. A 20.0 percent allocation to fixed income is provided for in the SBI's investment policy, and the fixed-income portfolio made up 20.2 percent of the SBI's total assets at the end of the year. The SBI targets no more than half of the fixed-income portfolio for active management, while having at least half managed semi-passively. The objective of the five active managers is to outperform the Barclays Aggregate Index by focusing on high quality fixed-income securities across all sectors of the market. The three semi-passive managers have the goal of adding incremental value through superior bond selection and sector allocation rather than through interest rate exposure.

The SBI's international equity portfolio returned 2.7 percent, failing to exceed its benchmark MSCI ACW Index ex. U.S. return of 4.5 percent. The SBI allocates 58.0 percent to public equities in its investment policy, and at year-end, international and domestic equities accounted for 63.8 percent of the total assets. The SBI's international equity portfolio has eight active managers, three semi-passive managers, and one passive manager. Six of the eight active managers and the three semi-passive managers invest entirely in developed markets. The remaining two active managers invest solely in emerging markets. The SBI's target is to have at least one-third of the portfolio managed actively, no more than one-third managed semi-passively, and at least one-quarter managed passively.

The alternative investments of the SBI returned 7.6 percent in 2016. The actual rate of return is used as the benchmark for this asset class. A target allocation of 20.0 percent is established in the investment policy, with an actual allocation of 13.2 percent to alternative investments at the end of 2016. The majority of the portfolio is allocated to private equity, with assets also being held in yield-oriented investments, resource investments, and real estate.

University of Minnesota Supplemental Benefits Plan

The University of Minnesota Supplemental Benefits Plan is a University-funded defined-benefit plan designed to provide additional retirement benefits for certain groups of individuals.[4] As of July 1, 2016, the plan had four active members and 101 retirees and survivors who were receiving or were entitled to receive benefits. No additional participants in the plan are expected, as the eligible population is a closed group.

The Supplemental Benefits Plan is invested in the University of Minnesota Group Income Pool (GIP). The GIP is invested in a diversified bond fund, which is measured against the Barclays Aggregate Index (after taxes and un-hedged). The Barclays Aggregate Index returned 2.7 percent during 2016. The GIP returned 3.1 percent during the same period. The Supplemental Benefits Plan had a rate of return of 1.8 percent for 2016, as calculated by the OSA. The rate of return calculated by the OSA was for the Supplemental Benefits Plan only, and not for the entire GIP.

Beginning Market Value	$1,091,947
Net Cash Flows	$0
Investment Returns	$19,340
Ending Market Value	$1,111,287
OSA One-Year Rate of Return	1.8%
OSA Three-Year Rate of Return	1.7%
OSA Five-Year Rate of Return	3.2%
Group Income Pool One-Year Rate of Return	3.1%
Benchmark Rate of Return	2.7%

[4] Plan and membership information was obtained from the University of Minnesota Supplemental Benefits Plan July 1, 2016, Actuarial Valuation, and from the Supplemental Benefits Plan Administrative Policy.

Ten-Year Performance Analysis

The rates of return over the last ten years have remained fairly consistent despite three years of limited or negative growth in 2008, 2011, and 2015. The investment returns of Minnesota's large plans over the ten-year period ending December 31, 2016, can be assessed by using market indices as benchmarks. The U.S. stock market, as measured by the Russell 3000 Index, posted positive returns during seven of the ten years. The Russell 3000 Index returned 7.1 percent over the ten-year period. Domestic equity represented the largest asset allocation for each of the large plans.

International equity, as measured by the MSCI EAFE Index, averaged 0.8 percent annually over the ten-year period.

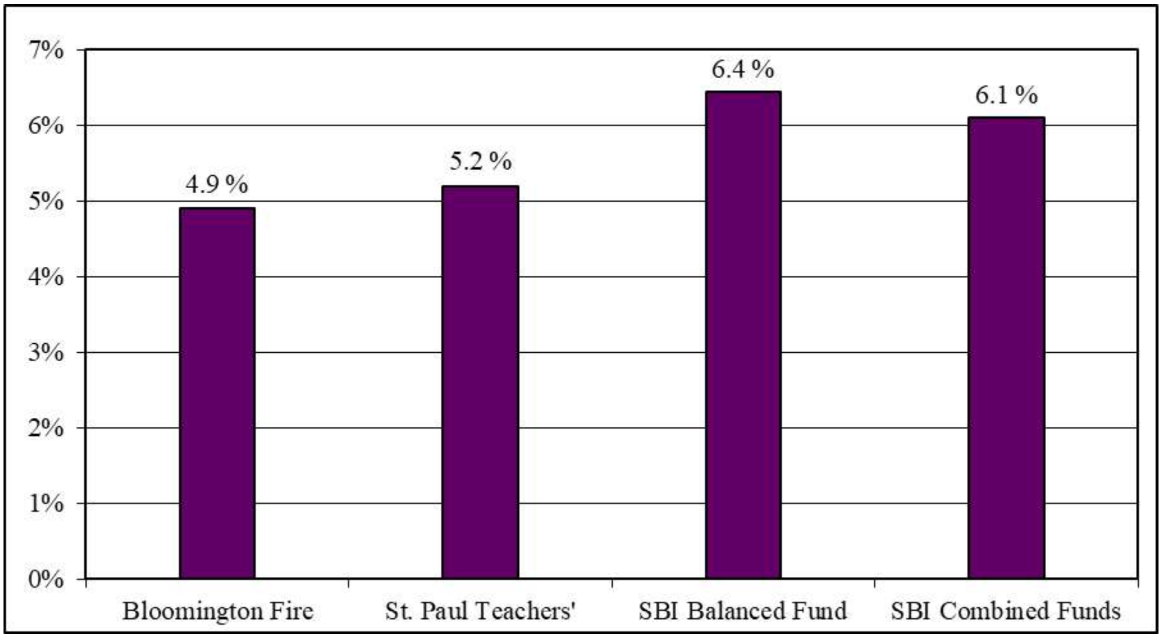
The average bond market return over the ten-year period was 4.3 percent, as measured by the Barclays Aggregate Index.

An example of a return that was calculated over the ten-year period is the SBI's Balanced Fund. The target asset allocations for this account were 60.0 percent domestic equities, 35.0 percent bonds, and 5.0 percent cash. The stock component of this account is indexed to the Russell 3000 Index. The bond portion of this account is actively managed and includes corporate bonds, mortgage securities, and government-issued bonds. Over time, this account is expected to average higher rates of return than a fixed-income or money market account. The Balanced Fund's average annual rate of return for the ten-year period was 6.4 percent. Bloomington Fire and St. Paul Teachers' did not meet the Balanced Fund's ten-year rate of return.

St. Paul Teachers' returned 5.2 percent over the ten-year period. For comparison purposes, the SBI had a ten-year return of 6.1 percent. Bloomington Fire had a ten-year return of 4.9 percent. Bloomington Fire's actuarial assumed rate of return of 6.0 percent is lower than the actuarial assumed rate of return for St. Paul Teachers', so Bloomington Fire's rate of return is due to different investment and risk objectives. Bloomington Fire and St. Paul Teachers' both failed to meet their actuarial assumed average annual rates of return over the ten-year period.

Figure 5 below shows the ten-year rates of return for the large plans and for the SBI.

Figure 2: Ten-Year Average Annual Rates of Return (2007-2016)



2016 Plan Summaries

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How to Read the Plan Summaries

The plan summaries on pages 21 through 23 of this report contain various acronyms and investment terms that are defined below.

Rates of Return (ROR)

- **OSA One-Year ROR -** The pension plan's total return on its assets, as calculated by the OSA. *Note: Under State law, the SBI submits only limited reporting information. The rates of return for the SBI are provided by the SBI and are not re-calculated by the OSA.*

- **Plan One-Year ROR -** The pension plan's return on its assets as calculated by the plan or its consultant.

- **Benchmark ROR -** The rate of return of a hypothetical portfolio invested in the plan's chosen benchmark components in the percentages dictated by the plan's investment policy. Although not perfect, it is a good measure of what return the plan could have achieved during the year.

- **Actuarial Assumed ROR -** The rate of return required for the plan to meet its actuarial assumptions.

- **Three-, Five-, and Ten-Year ROR -** The average annual returns earned by the plan over the specified time period, either calculated by the OSA or reported by the plan. *Note: Under State law, the SBI submits only limited reporting information. The rates of return for the SBI are provided by the SBI and are not re-calculated by the OSA.*

Asset Class

Asset class is a group of similar investments, such as domestic equity, bonds, cash, or alternative investments. Pension plans invest in different asset classes for diversification purposes. When returns for one asset class decline, another may increase, offsetting the loss. In this report, any account or fund that holds investments from more than one asset class is reported as its own asset class.

Benchmark Components and Rates of Return

Benchmark components are the different indices to which the plan compares its investments. Indices track different asset classes, such as domestic equity or bonds. They may also track subsets of an asset class. To evaluate investment performance, it is important to use appropriate indices. The rates of return for each benchmark component are also provided.

Policy Asset Allocation

Policy asset allocation is the percentage allocated to each asset class in the investment policy.

Actual Asset Allocation

Actual asset allocation is the percentage actually invested in each asset class. In the plan summaries that follow, the actual asset allocation is measured at year-end.

Beginning Market Value/Ending Market Value

The market value is the price as determined by buyers and sellers in an open market. The dollar amount in the asset class or investment as of the beginning/end of 2016 is the beginning market value/ending market value.

Net Cash Flows

Net cash flows are the net amount of cash (or securities) deposited or withdrawn from the asset class or investment during the year.

Investment Return

Investment return is the net amount of interest, dividends, and appreciation or depreciation the asset class or investment gained or lost during the year.

Rate of Return

Rate of return is the net (after fees) return of the asset class or investment during the year.

Bloomington Fire Department Relief Association

For theYear Ended December 31, 2016

(Dollars in Thousands)

Rates of Return (ROR)	
OSA One-Year ROR	7.6 %
Plan One-Year ROR	7.6 %
Benchmark ROR	7.0 %
Actuarial Assumed ROR	6.0 %
OSA Three-Year ROR	4.7 %
OSA Five-Year ROR	9.0 %
OSA Ten-Year ROR	4.9 %

Benchmark Components and Rates of Return	
Russell 3000	12.7 %
MSCI EAFE	1.0 %
MSCI Emerging Markets	11.2 %
Cambridge Associates PE	9.4 %
NCREIF Property Index	8.0 %
Barclays Aggregate Index	2.7 %
90-Day U.S. Treasury Bill	0.3 %

Policy Asset Allocation	
U.S. Equity	35.0 %
Intl. Developed Equity	10.0 %
Intl. Emerging Equity	5.0 %
Private Equity	5.0 %
Real Estate	5.0 %
Investment Grade Bonds	38.0 %
Cash	2.0 %

Actual Asset Allocation	
Domestic Equities	52.3 %
Intl. Developed Equity	10.3 %
Intl. Emerging Equity	5.1 %
Fixed Income	30.4 %
Cash	1.9 %

Asset Class	Investment Type	Beginning Market Value	Net Cash Flow (Net of Fees)	Investment Return	Ending Market Value	Rate of Return
Domestic Equities	Domestic Equities	$ 67,398	$ 5,000	$ 9,095	$ 81,493	12.1 %
International Equities	International Equities	16,455	7,200	300	23,955	1.8 %
Fixed Income	Fixed Income	33,801	12,600	997	47,398	3.6 %
Cash	Cash	11,582	(9,904)	27	1,705	0.3 %
Internally Managed	Balanced	1,974	(738)	5	1,241	0.4 %
Wells Fargo	Balanced	17,418	(17,915)	497	0	3.4 %
	Total	**$ 148,628**	**$ (3,757)**	**$ 10,921**	**$ 155,792**	

St. Paul Teachers' Retirement Fund Association

For the Year Ended December 31, 2016

(Dollars in Thousands)

Rates of Return (ROR)	
OSA One-Year ROR	9.5 %
Plan One-Year ROR	9.4 %
Benchmark ROR	7.5 %
Actuarial Assumed ROR	8.0 %
OSA Three-Year ROR	4.9 %
OSA Five-Year ROR	9.1 %
OSA Ten-Year ROR	5.2 %

Benchmark Components and Rates of Return	
MSCI All Country World	8.5 %
Barclays Aggregate Index	2.7 %
NFI ODCE (net)	7.8 %
Russell 3000 +3%	16.1 %
HFRI FOF Composite Index	0.5 %

Policy Asset Allocation	
Global/Domestic Equity	55.0 %
Global/Domestic Fixed-Income	20.0 %
Inflation Hedged/Real Assets	11.0 %
Private Equity/Alternatives	9.0 %
Opportunistic	5.0 %

Actual Asset Allocation	
Domestic Equities	41.2 %
Domestic Fixed-Income	16.9 %
Real Estate	11.5 %
International Equities	7.5 %
Global Equities	10.7 %
Alternative Assets	1.0 %
Private Equity	6.0 %
Cash	1.4 %
Treasury Bills	1.1 %
Opportunistic	2.7 %

Asset Class	Investment Type	Beginning Market Value	Net Cash Flow (Net of Fees)	Investment Return	Ending Market Value	Rate of Return
Domestic Equities	Domestic Equities	$ 373,350	$ (19,000)	$ 52,615	$ 406,965	14.5 %
Domestic Fixed-Income	Domestic Fixed-Income	194,107	(35,576)	8,434	166,965	4.6 %
Real Estate	Real Estate	111,413	(7,995)	10,114	113,532	9.4 %
International Equities	International Equities	79,994	(7,500)	1,705	74,199	2.5 %
Global Equities	Global Equities	99,077	0	7,152	106,229	7.2 %
Alternatives	Alternative Assets	5,391	2,562	1,423	9,376	22.4 %
Private Equities	Private Equities	47,180	8,286	3,485	58,951	6.4 %
Cash	Cash	13,731	(219)	10	13,522	3.8 %
Treasury Bills	Treasury Bills	14,559	(4,000)	574	11,133	4.6 %
Opportunistic	Opportunistic	19,534	6,005	1,429	26,968	5.0 %
	Total	**$ 958,336**	**$ (57,437)**	**$ 86,941**	**$ 987,840**	

State Board of Investment

For the Year Ended December 31, 2016

(Dollars in Thousands)

Rates of Return (ROR)	
Plan One-Year ROR	7.6 %
Benchmark ROR	8.3 %
Actuarial Assumed ROR*	8.0 %
Plan Three-Year ROR	5.3 %
Plan Five-Year ROR	9.8 %
Plan Ten-Year ROR	6.1 %

Benchmark Components and Rates of Return	
Russell 3000	12.7 %
Barclays Aggregate Index	2.7 %
MSCI ACWI ex. U.S. (net)	4.5 %
90-Day U.S. Treasury Bill	0.3 %

Policy Asset Allocation	
Public Equity	58.0 %
Fixed Income	20.0 %
Alternative Assets	20.0 %
Cash	2.0 %

Actual Asset Allocation	
Public Equity	63.8 %
Fixed-Income	20.2 %
Alternative Assets	13.2 %
Cash	2.8 %

Asset Class	Investment Type	Beginning Market Value	Net Cash Flow (Net of Fees)	Investment Return	Ending Market Value	Rate of Return
Domestic Equities	Domestic Equities	$ 26,898,633	$ (1,594,155)	$ 2,943,267	$ 28,247,745	11.5 %
Fixed Income	Fixed-Income	14,218,388	(2,657,684)	544,630	12,105,334	3.6 %
International Equities	International Equities	8,275,894	1,452,327	238,405	9,966,626	2.7 %
Alternatives	Alternative Assets	7,166,251	205,416	560,174	7,931,841	7.6 %
Cash & Disbursement Account	Cash	1,163,103	350,239	53,785	1,567,127	0.6 %
Cash - CD Repo	Cash	151,474	(31,508)	915	120,881	0.7 %
	Total	**$ 57,873,743**	**$ (2,275,365)**	**$ 4,341,176**	**$ 59,939,554**	

* The actuarial assumed rate of return for TRA at the end of December 2016 was calculated using Select and Ultimate rates of return (8.0% for five years beginning July 1, 2012, and 8.5% thereafter). The actuarial assumed rates of return for the other plans for which the SBI invests were 8.0%.