

# *Investment Section*

Report by Investment Consultant

Letter from TCRS Chief Investment Officer

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October 11, 2016

Attn: Ms. Jill Bachus, Director  
 Tennessee Consolidated Retirement System  
 Andrew Jackson Building  
 Nashville, TN 37243-0230

Re: 2016 CAFR Performance Letter

Dear Jill:

For the year ended June 30, 2016, TCRS earned a return of 2.79%, underperforming its policy index (3.51%) and its as-allocated index (3.59%). Strong returns in Real Estate (12.62%), Private Equity (10.27%) and an unusually robust US Fixed Income market (10.58%) were additive for the year, whereas, International and Emerging Markets Equity (-7.20%) and Domestic Equities (0.08%) were detractors from portfolio returns. Active management in U.S. Equity underperformed the index but was a median peer performer.

Despite underperforming its policy benchmark for the fiscal year, TCRS ranked in the top decile of large public plans (InvestorForce’s Public DB > \$1 billion) over the past year, and was in the top quartile of its peer group for the three- and five- year periods ended June 30. Recent results were aided by TCRS’ longer duration positioning in US Fixed Income.

As of June 30, 2016, the System’s asset allocation and one-year respective returns were:

Asset Class	% of Assets	One Year Return
Domestic Equity	33.2%	0.08%
Canada Index Fund	3.5%	-4.21%
International Developed Market	12.3%	-7.50%
International Emerging Market	4.5%	-6.39%
Domestic Fixed Income	26.6%	10.58%
Inflation-Indexed Fixed Income	4.9%	4.80%
Real Estate	7.5%	12.62%
Private Equity	3.4%	10.27%
Strategic Lending	3.6%	1.59%
Cash and Cash Equivalents	0.4%	1.15%
<b>Total</b>	<b>100.0%</b>	<b>2.79%</b>

The fiscal year was characterized by the outperformance of U.S. financial markets relative to the rest of the world. U.S. equity markets were resilient and managed positive returns, while international developed and emerging markets experienced losses. The U.S. fixed income market saw positive returns as yields fell, despite the Fed raising interest rates 25 bps in December. Meanwhile, the ECB and BOJ continued to pursue aggressive monetary stimulus programs to combat anemic growth and low inflation. The fiscal year ended with the surprise outcome of the United Kingdom voting to leave the European Union.

Verus anticipates modest equity returns globally due to slow global economic growth. Bond yields are very low by historical standards. Future Fed decisions and changes to non-U.S. quantitative easing policies will be carefully scrutinized and could result in increased market volatility. TCRS’ well-funded, cost-effective Plan incorporates sensible diversification in order to weather a variety of market environments.

Best regards,



Margaret Jadallah  
 Managing Director

DAVID H. LILLARD, JR.  
STATE TREASURER

STATE OF TENNESSEE

MARYJO PRICE  
CHIEF OPERATING OFFICER

MICHAEL BRAKEBILL  
CHIEF INVESTMENT OFFICER



JILL BACHUS  
DIRECTOR OF TCRS

TREASURY DEPARTMENT  
STATE CAPITOL  
NASHVILLE, TENNESSEE 37243-0225

December 23, 2016

Dear Members:

I am pleased to present the Investment Section of the TCRS Comprehensive Annual Financial Report for the fiscal year ended June 30, 2016.

With over \$43.2 billion in assets, TCRS is one of the largest public pension plans in the United States. TCRS assets are invested to preserve principal value, to achieve a superior rate of return within acceptable risk levels and to provide the liquidity necessary to pay beneficiaries in a timely manner.

The TCRS portfolio is diversified among domestic and international stocks and bonds, real estate, private equity and short term securities. A diversified portfolio is used to manage risk and to minimize significant exposure to unpredictable events. Staff consults with the TCRS general investment consultant periodically to determine the optimal, long-term mix of assets to best meet the plan's investment objectives. TCRS has adopted a conservative investment strategy that has yielded excellent returns with a low level of risk. The investment performance for TCRS was computed using a market value based, time-weighted rate of return.

The 2016 fiscal year was challenging for investors and TCRS gained 2.79% for the fiscal year with an annualized gain of 7.54% for the trailing five-year period. While the one-year figure trailed the actuarially required return, the five-year number has exceeded the target and the portfolio was still managed in a manner to protect capital in an adverse environment.

The experienced investment staff of TCRS is committed to providing superior investment returns in a financially-sound manner with the highest ethical and professional standards. With the leadership of our Board, our Treasurer and our dedicated staff, this goal will be met.

Sincerely,



Michael Brakebill  
Chief Investment Officer

### ***Statutory Investment Authority***

The investment authority for the Board of Trustees of TCRS is set out in Tennessee Code Annotated, Section 8-37-104. Pursuant to this authority and the investment terms, conditions and limitations outlined therein, the Board of Trustees approves the TCRS' investment policy. The Board approved TCRS' revised and restated investment policy on March 31, 2015.

TCRS' primary investment objective, as set by the Board, is to establish a stable, diversified investment portfolio that, in the long-term, will meet or exceed the assumed actuarial rate of return, as adopted by the Board, in order to provide sufficient liquidity to pay beneficiaries in a timely manner.

TCRS' policies and the strategies implemented by the Treasury Investment Division staff serve to benefit plan members in several ways. The emphasis on a conservative asset allocation and high quality securities helps to ensure the soundness of the system and the ability to provide the needed funds upon a member's retirement.

Funds in the retirement system are actively managed, primarily by the Treasury Investment Division, through a diversified portfolio of high-quality domestic and international bonds, domestic and international stocks, real estate, private equity, and short-term instruments. From time to time, pursuant to Tennessee Code Annotated, Section 8-37-114, the Treasury Investment Division engages outside investment managers to manage a limited number of asset classes or subclasses. In those instances, the Investment Division endeavors to use emerging investment managers to the greatest extent feasible within the bounds of financial and fiduciary prudence, as prescribed under Tennessee Code Annotated, Section 8-37-113. During fiscal year 2015-2016, no assets were under the control of emerging investment managers.

To assist in the fiduciary responsibility for managing the TCRS portfolio during fiscal year 2016, Verus served as the general investment consultant for TCRS. The Townsend Group served as the real estate investment consultant and Torrey Cove served as the private equity consultant.

State Street Bank and Trust Company was the master bank custodian for TCRS, providing safekeeping and accounting services for the investment portfolio during fiscal year 2016.

### ***Cost of Investment Operation***

The cost to operate the investment program for TCRS is about twelve basis points (0.12%). This cost includes the cost of personnel, operational cost, master bank custodian cost, record keeping, and external manager fees. Commission costs for publicly listed securities and management fees for private equity investments are capitalized, meaning commission costs and management fees are not included in the expenses, but are recorded in the value of the assets. Recent peer comparisons of investment management fees and expenses indicate the investment program is managed very cost effectively.

### ***Performance Measurement***

TCRS' independent external investment consultant, Verus (formerly Strategic Investment Solutions), provided performance measurement for TCRS. TCRS had a total return of 2.79% during the fiscal year. Real estate led with a 12.62% return for the year versus 11.84% for the NCREIF index. Fixed Income gained 10.58% versus the Citigroup Large Pension Fund benchmark. Private equity contributed 10.27% and led the benchmark return of 4.78% considerably. Key areas reducing the overall performance of the fund were International and Canadian equities with declines of 7.20% and 4.21% respectively.

## INVESTMENT PERFORMANCE REVIEW

PERIODS ENDING JUNE 30, 2016

	Annualized Returns		
	Current Year	3-Year	5-Year
<b>Pension Plan Portfolio</b>			
TCRS Performance	2.79%	7.41%	7.54%
Policy Index	3.51%	7.59%	7.58%
As-Allocated Index	3.59%	7.41%	7.23%
<b>Domestic Equity</b>			
TCRS Performance	0.08%	10.55%	11.31%
S & P 1500 Index	3.64%	11.52%	11.94%
<b>Canadian Equity</b>			
TCRS Performance	-4.21%	1.49%	-1.47%
S & P TSX 60 Index	-4.21%	1.49%	-1.54%
<b>Domestic Fixed Income</b>			
TCRS Performance	10.58%	6.97%	7.02%
Citigroup LPF Index	10.83%	6.81%	6.49%
<b>Inflation Hedge Bonds</b>			
TCRS Performance	4.80%	2.59%	2.79%
Citigroup TIPS Index	4.66%	2.51%	2.78%
<b>International Equity</b>			
TCRS Performance	-7.20%	2.60%	2.58%
International Equity Custom Index	-8.74%	1.54%	0.61%
<b>Real Estate</b>			
TCRS Performance	12.62%	12.05%	11.25%
NCREIF Index	11.84%	11.91%	11.93%
<b>Short-Term Securities</b>			
TCRS Performance	0.10%	0.85%	0.88%
<b>Private Equity</b>			
TCRS Performance	10.27%	16.23%	15.01%
S & P 500 + 3%	4.78%	14.83%	14.58%

## Verus

Ranking of TCRS Portfolio	Risk Adjusted	
	Percentile Rankings	Basis
Last three years	23	21
Last five years	17	13

The percentile ranking is the position of the TCRS portfolio as compared with other public funds with one being the best and 100 being the worst. The investment performance for TCRS was computed using a market, time weighted rate of return by an independent consultant.

**ASSET ALLOCATION**

*As of June 30, 2016*

*Expressed in Thousands*

<b>Asset Class</b>	<b>Fair Value</b>	<b>Percentage</b>
Domestic Equity	\$13,983,690,889	33%
Domestic Fixed Income	13,673,135,658	32%
International Equity	6,689,686,400	15%
International Fixed Income	18,443,906	1%
Short-Term Securities	2,306,455,869	5%
Real Estate	3,163,804,942	7%
Private Equities & Strategic Lending	2,883,408,959	7%
Totals	<u>\$42,718,626,623</u>	<u>100%</u>

*This schedule classifies Canadian investments as domestic securities, convertible bonds as fixed income securities and preferred stock as fixed income securities. For investment purposes, convertible bonds and preferred stock are considered equity securities. Accordingly, the asset allocation percentages in this schedule will vary from the investment consultant's asset allocation percentages.*

## LARGEST STOCK HOLDINGS

as of June 30, 2016

by Fair Value

Shares	Security Name	Fair Value
4,458,631	APPLE INC	\$426,245,124
3,116,800	EXXON MOBIL CORP	292,168,832
4,575,014	MICROSOFT CORP	234,103,466
1,746,976	JOHNSON + JOHNSON	211,908,189
3,267,380	JPMORGAN CHASE + CO	203,034,993
4,654,244	AT+T INC	201,109,883
5,509,354	PFIZER INC	193,984,354
1,604,763	FACEBOOK INC A	183,392,316
5,806,415	GENERAL ELECTRIC CO W/D	182,785,944
244,958	AMAZON.COM INC	175,296,844

## LARGEST BOND HOLDINGS

as of June 30, 2016

by Fair Value

Par Value	Security Name	Yield	Maturity	Moody's Rating	Fair Value
\$264,235,000	United States Treasury Note	1.50%	2/15/2026	Aaa	\$267,207,644
203,503,358	United States Treasury Index Linked Note	-0.09%	1/15/2023	Aaa	206,200,795
183,328,992	United States Treasury Index Linked Note	-0.71%	4/15/2018	Aaa	186,050,328
158,590,000	United States Treasury Note	2.29%	5/15/2045	Aaa	182,285,566
157,500,000	GNMA II TBA 30 YR 3	2.31%	7/15/2043	NR	164,676,708
175,000,000	United States Treasury STRIPS	1.37%	8/15/2023	Aaa	158,646,425
152,305,000	FED HOME LN DISCOUNT NT	0.50%	10/11/2016	NR	152,149,649
130,946,000	United States Treasury Note	1.48%	11/15/2025	Aaa	139,703,014
135,889,867	United States Treasury Index Linked Note	-0.63%	4/15/2019	Aaa	138,761,627
111,300,000	United States Treasury Note	2.29%	11/15/2045	Aaa	127,977,637

A complete portfolio listing is available upon request

**Key to Ratings:** All ratings presented are from Moody's Investors Service with the exception of some of the government agency securities. Moody's does not rate these securities. Standard & Poor's does provide rating for the securities (AAA is Standard & Poor's highest rating.) Government Securities are not rated per se' but are considered the best quality securities.

Moody's rates securities as follows:

Aaa	Best Quality
Aa	High Quality
A	Upper Medium Quality
Baa	Medium Quality
NR	Not Rated



INVESTMENT SUMMARY  
JUNE 30, 2016

	Domestic		International		Total	
	Fair Value	%	Fair Value	%	Fair Value	%
<b>Fixed Income</b>						
Government Bonds	\$4,877,682,085	11.32%		0.00%	\$4,877,682,085	11.32%
Corporate Bonds	4,098,867,059	9.51%		0.00%	4,098,867,059	9.51%
Municipal/Provincial Bonds	173,321,491	0.40%		0.00%	173,321,491	0.40%
Total Bonds	9,149,870,635	21.23%	0	0.00%	9,149,870,635	21.23%
Lehman Brothers Escrow Adjustment		0.00%		0.00%	0	0.00%
Corporate Asset Backed	505,354,340	1.17%		0.00%	505,354,340	1.17%
Commercial Mortgage Backed	330,333,713	0.77%		0.00%	330,333,713	0.77%
Government Agencies	361,746,868	0.84%		0.00%	361,746,868	0.84%
Government Mortgage Backed Securites	3,252,991,950	7.55%		0.00%	3,252,991,950	7.55%
Government Asset Backed	38,867,402	0.09%		0.00%	38,867,402	0.09%
Preferred Stock	33,970,750	0.08%	18,443,906	0.04%	52,414,656	0.12%
Total Fixed Income	13,673,135,658	31.73%	18,443,906	0.04%	13,691,579,564	31.77%
<b>Common Stock</b>						
Consumer Discretionary	1,774,520,065	4.12%	820,879,119	1.90%	2,595,399,184	6.02%
Consumer Staples	1,405,219,602	3.26%	668,509,951	1.55%	2,073,729,553	4.81%
Energy	1,039,056,226	2.41%	516,766,674	1.20%	1,555,822,900	3.61%
Financials	1,860,397,609	4.32%	1,320,926,190	3.06%	3,181,323,799	7.38%
Healthcare	2,095,233,811	4.86%	555,463,686	1.29%	2,650,697,497	6.15%
Industrials	1,530,968,527	3.55%	992,080,451	2.30%	2,523,048,978	5.85%
Information Technology	2,840,858,679	6.59%	423,694,878	0.98%	3,264,553,557	7.57%
Materials	480,609,557	1.11%	536,709,657	1.25%	1,017,319,214	2.36%
Private Placements	0	0.00%	1,920,370	0.00%	1,920,370	0.00%
Rights/Warrants		0.00%	252,028	0.00%	252,028	0.00%
Telecommunication Services	356,024,949	0.83%	292,461,903	0.68%	648,486,852	1.50%
Utilities	520,042,079	1.21%	130,151,313	0.30%	650,193,392	1.51%
REITS	80,759,785	0.19%	429,870,180	1.00%	510,629,966	1.18%
Total Common Stock	\$13,983,690,889	32.45%	\$6,689,686,400	15.51%	\$20,673,377,289	47.96%

(Continued)



INVESTMENT SUMMARY  
JUNE 30, 2016 (CONTINUED)



	Domestic		International		Total	
	Fair Value	%	Fair Value	%	Fair Value	%
Short-Term Investments						
Commercial Paper	\$375,532,198	0.87%	\$0	0.00%	\$375,532,198	0.87%
Pooled Funds and Mutual Funds	2,318,632,241	5.38%	0	0.00%	2,318,632,241	5.38%
Total Short term investments	<u>2,694,164,439</u>	<u>6.25%</u>	<u>0</u>	<u>0.00%</u>	<u>2,694,164,439</u>	<u>6.25%</u>
Real Estate	3,163,804,942	7.34%	0	0.00%	3,163,804,942	7.34%
Private Equities & Strategic Lending	<u>2,805,817,198</u>	<u>6.50%</u>	<u>77,591,761</u>	<u>0.18%</u>	<u>2,883,408,959</u>	<u>6.69%</u>
Total Investments	<u>36,320,613,126</u>	<u>84.27%</u>	<u>6,785,722,067</u>	<u>15.73%</u>	<u>43,106,335,194</u>	<u>100.00%</u>
					0	
Derivatives & Options	5,267,951					
Short Term Investments classified as cash equivalents	<u>(387,708,570)</u>				<u>(387,708,570)</u>	
Total investments as Shown on the Statement of Fiduciary Net Position	<u>\$35,938,172,507</u>		<u>\$6,785,722,067</u>		<u>\$42,723,894,574</u>	

This schedule classifies Canadian investments as domestic securities, convertible bonds as fixed income securities and preferred stock as fixed income securities. For investment purposes convertible bonds and preferred stock are considered equity securities. Accordingly, the asset allocation percentages in this schedule will vary from the investment consultant's asset allocation percentages.



**SCHEDULES OF INVESTMENT FEES AND COMMISSIONS  
FOR THE YEAR ENDED JUNE 30, 2016**

**Schedule of Fees**

	Average Assets Under Management	Fees
<b>Asset Management</b>		
External Investment Manager Fees	\$5.5 Billion	\$21,669,986
Real Estate Asset Management	3.1 Billion	13,314,204
Private Equities & Strategic Lending Asset Management	2.8 Billion	0
Total Asset Management		<u>\$34,984,190</u>
<b>Other Investment Services Fees</b>		
Custodian Bank	\$43.1 Billion	\$650,004
General Investment Consultant	43.1 Billion	323,000
Real Estate Investment Consultant	3.1 Billion	231,750
Private Equities & Strategic Lending Investment Consultant	2.8 Billion	833,830
Total Investment Services Fees		<u>\$2,038,584</u>

**Schedules of Commissions**

**Domestic Exchange Traded Shares**

Broker Name	DOMESTIC		
	Number of Shares Traded	Total Commissions	Commission per Share
Instinet, LLC	81,073,261	\$1,621,483	0.020
Capis	8,505,759	340,230	0.040
Barclays Capital	11,992,173	239,843	0.020
Other Brokers-Instinet CCA Balance	10,657,482	213,150	0.020
RBC Capital Markets Corporation	9,404,499	188,090	0.020
Wells Fargo	6,420,965	128,419	0.020
Sanford C. Bernstein & Company, Inc.	5,179,807	103,596	0.020
OTHER BROKERS*	51,089,882	996,206	0.019
<b>Totals</b>	<u><u>184,323,828</u></u>	<u><u>\$3,831,017</u></u>	

\*LESS THAN \$100,000 TOTAL COMMISSION PER BROKERAGE FIRM

(continued)

**SCHEDULES OF INVESTMENT FEES AND COMMISSIONS  
FOR THE YEAR ENDED JUNE 30, 2016 (CONTINUED)**



**Schedules of Commissions (Continued)**

Program Trades where total commission cost includes trading commission, liquidity fees, and market impact fees.

Broker Name	DOMESTIC		
	Number of Shares Traded	Total Commissions	Commission per Share
Capis	58,473,765	\$935,680	0.016
Barclays Capital	25,930,719	499,568	0.019
Morgan Stanley & Company, Inc.	64,611,204	484,585	0.008
Deutsche Bank Securities, Inc.	62,028,646	465,216	0.008
Goldman Sachs Group, Inc.	44,576,517	334,325	0.008
Bank of America Merrill Lynch	30,285,090	227,139	0.008
Credit Suisse	16,841,433	213,853	0.013
UBS Securities LLC	24,154,977	181,163	0.008
Evercore Group LLC	20,187,337	144,345	0.007
Wells Fargo	18,461,194	138,460	0.008
JP Morgan Chase & Company	15,622,893	117,172	0.008
OTHER BROKERS*	39,310,712	278,491	0.007
<b>Totals</b>	<b>\$420,484,487</b>	<b>\$4,019,997</b>	

*International Exchange Traded Shares*

Broker Name	INTERNATIONAL		
	Number of Shares Traded	Total Commissions	Commission per Share
UBS Securities LLC	98,142,268	\$664,757	0.007
Bank of America Merrill Lynch	33,714,367	374,733	0.011
Citigroup Global Markets, Inc.	27,792,654	294,224	0.011
HSBC Bank PLC	42,262,350	289,291	0.007
JP Margan Chase & Company	26,415,448	287,787	0.011
Barclays Capital	16,404,672	283,981	0.017
Goldman Sachs Group, Inc.	25,460,223	273,587	0.011
Credit Suisse	14,039,895	265,011	0.019
Morgan Stanley & Company, Inc.	32,076,415	259,654	0.008
Deutsche Bank Securities, Inc.	11,945,139	199,534	0.017
Jefferies LLC	15,052,158	181,659	0.012
Instinet, LLC	14,057,066	160,774	0.011
Exane	4,618,809	103,114	0.022
OTHER BROKERS*	140,070,763	1,320,931	0.009
<b>TOTALS</b>	<b>502,052,227</b>	<b>\$4,959,037</b>	

Shares for international stocks are based on the actual foreign shares traded while the commission is expressed in U.S. dollars. Therefore, commissions per share between domestic and international are not comparable.

\*LESS THAN \$100,000 TOTAL COMMISSION PER BROKERAGE FIRM