

INVESTMENT REVIEW

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Public Pension Oversight Board

October 28, 2019

INVESTMENT REVIEW

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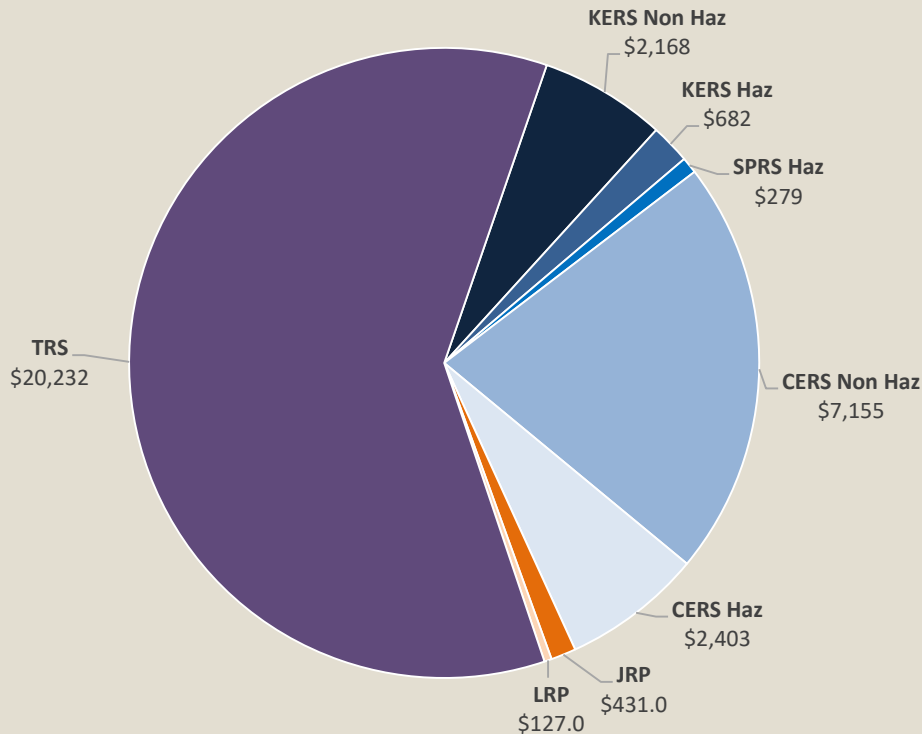
- Review of Total Assets
- Fiscal Year 2019 Market and Index Review
- Performance Review and Peer Comparison
- Allocation Review and Peer Comparison
- Investment Fees, Expenses, and Carried Interest Review
- Net Cash Flow Review and Discussion
- Other Required Review Topics (benchmarks, policies, etc.)

ASSETS UNDER MANAGEMENT → All KY Plans

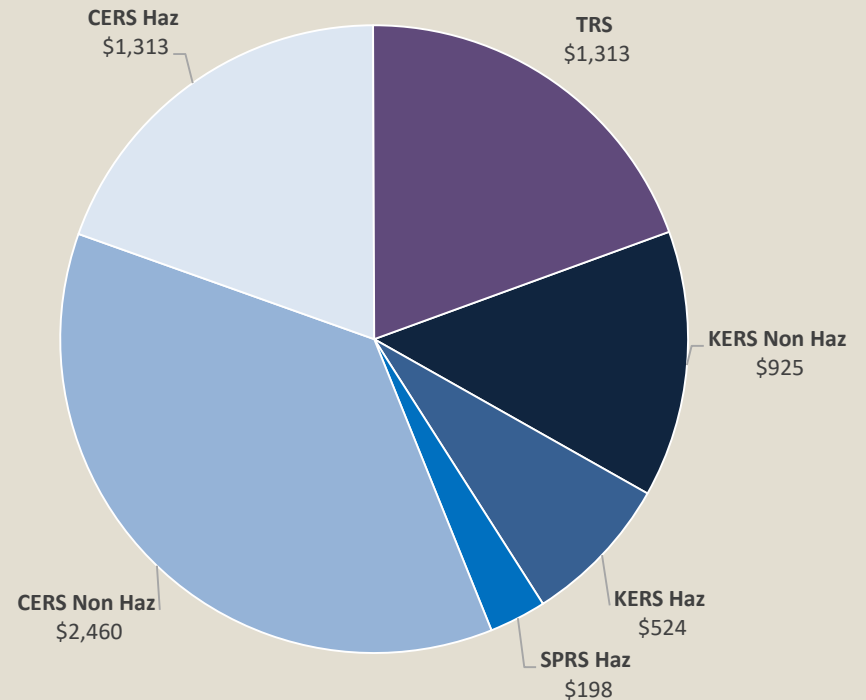
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Total Assets Under Management - \$40.2 Billion By Retirement Plan As of June 30, 2019

Pension – \$33.5B



Insurance - \$6.7B



* Includes both JRP/LRP pension and insurance assets

PERFORMANCE → *Market Review*

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Fiscal Year 2019 Returns

12.7	Private Equity
10.5	Public Real Estate
10.4	US Large Cap
8.5	US Gov't/Credit
7.5	US High Yield
6.4	Private Real Estate
4.5	Non-US Fixed Income
2.3	T-Bill
1.4	Absolute Return/FOF
1.2	Emerging Markets
1.1	Developed Non-US
(3.3)	US Small Cap
(5.5)	Non-US Small Cap
(6.8)	Commodities

- **Positive, but Less Exuberant Year**

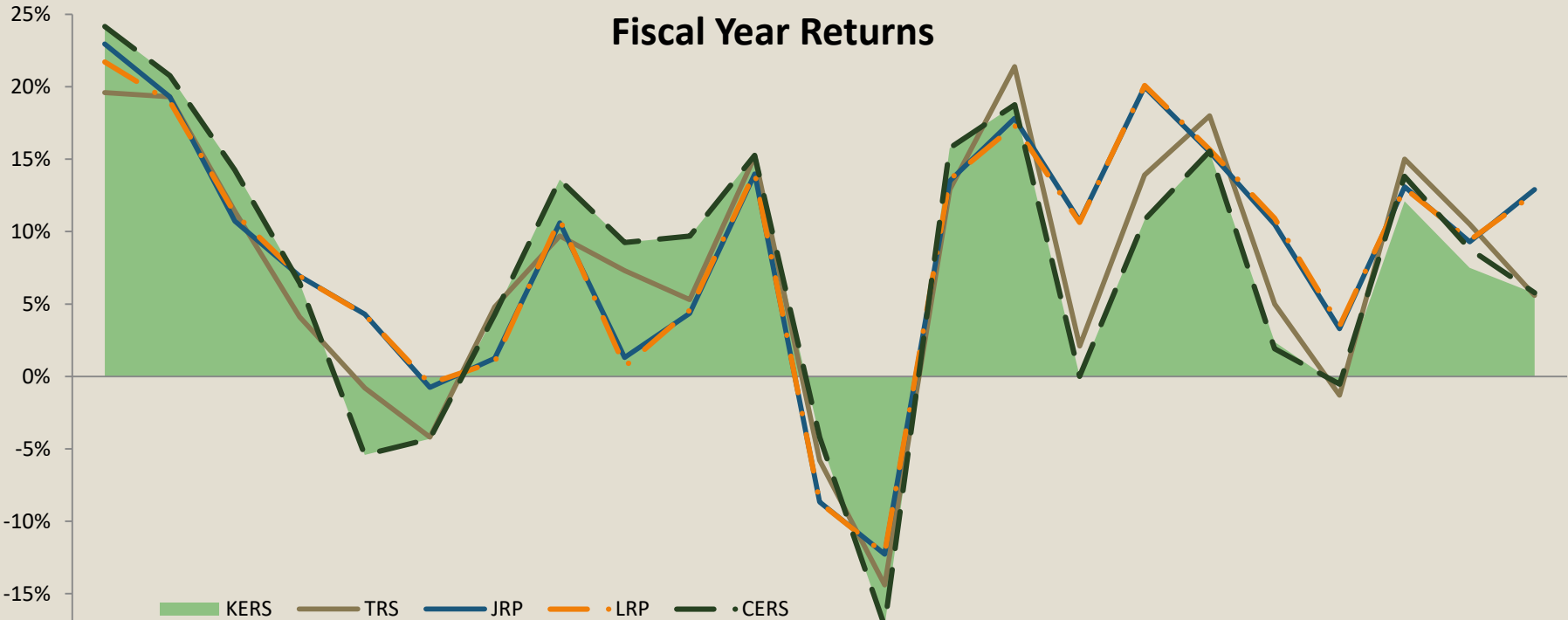
- Markets drew back significantly in Q2
- Last half (Q3/Q4) closed year positive
- Returns across industry largely falling slightly below assumed levels

- **Felt a lot more like 2016 than 2017-18**

- Larger asset classes struggled
- Real Estate, Bonds led way
- US Large Cap equities strong, but Small Cap disappointing
- Non US equities provided minimal return

PERFORMANCE → *FY Returns By System*

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	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY 19
KERS	24.2%	20.8%	14.3%	6.4%	-5.4%	-4.3%	4.3%	13.6%	9.3%	9.7%	15.3%	-4.2%	-17.2%	15.8%	18.8%	0.0%	10.8%	15.5%	2.4%	-0.7%	12.1%	7.5%	5.7%
TRS	19.6%	19.3%	11.4%	4.1%	-0.8%	-4.2%	4.8%	9.7%	7.3%	5.3%	15.2%	-5.8%	-14.4%	12.9%	21.4%	2.1%	13.9%	18.0%	5.0%	-1.3%	15.0%	10.5%	5.6%
JRP	23.0%	19.3%	10.7%	6.9%	4.3%	-0.8%	1.2%	10.6%	1.3%	4.4%	14.0%	-8.7%	-12.3%	13.5%	17.8%	10.7%	20.0%	15.5%	10.5%	3.3%	13.1%	9.3%	12.9%
LRP	21.7%	19.0%	11.3%	6.9%	4.3%	-0.5%	1.0%	10.8%	0.7%	4.6%	14.1%	-8.7%	-12.2%	13.6%	17.3%	10.6%	20.1%	15.7%	10.9%	3.5%	13.0%	9.4%	12.7%
CERS	24.2%	20.8%	14.3%	6.4%	-5.4%	-4.3%	4.3%	13.6%	9.3%	9.7%	15.3%	-4.2%	-17.2%	15.8%	18.8%	0.0%	10.8%	15.6%	1.9%	-0.5%	13.8%	8.8%	5.8%

NOTE: Returns beginning in FY2015 are Net of Fee, while returns prior are Gross of Fee.

INVESTMENTS → Pension

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<i>As of June 30, 2019</i>	MV	1 –Year	3-Year	5-Year	10-Year	20-Year	AROR
KERS Pension (N)	\$2.2B	5.7%	8.4%	5.3%	8.60%	5.4%	5.25%
Policy Benchmark		6.2%	8.4%	5.6%	8.7%	5.5%	
KERS-Haz Pension (N)	\$681.8M	5.7%	9.2%	5.8%	8.8%	5.5%	6.25%
Policy Benchmark		6.0%	9.2%	5.7%	8.8%	5.5%	
SPRS Pension (N)	\$278.7M	5.7%	8.6%	5.1%	8.5%	5.3%	5.25%
Policy Benchmark		6.1%	8.7%	5.5%	8.7%	5.5%	
CERS Pension (N)	\$7.2B	5.8%	9.4%	5.8%	8.9%	5.5%	6.25%
Policy Benchmark		6.0%	9.2%	5.7%	8.8%	5.5%	
CERS-Haz Pension (N)	\$2.4B	5.8%	9.4%	5.9%	8.9%	5.5%	6.25%
Policy Benchmark		6.0%	9.2%	5.7%	8.8%	5.5%	
TRS Pension (N)	\$20.2B	5.6%	10.3	6.8%	10.1%	5.9%	7.50%
Policy Benchmark ¹		7.4%	10.2%	7.0%	10.2%	-	
LRP DB Pension (N*)	\$429.7M	12.7%	11.7%	9.9%	12.6%	7.1%	6.50%
Policy Benchmark		9.8%	10.6%	8.3%	11.4%	5.7%	
JRP DB Pension (N*)	\$126.7M	12.9%	11.8%	9.8%	12.6%	7.1%	6.50%
Policy Benchmark		9.8%	10.6%	8.3%	11.4%	5.7%	

Peer Groups Median Returns

LRC Calculated <i>45 plans</i>	6.5%	9.4%	6.6%	9.8%	-
Wilshire TUCS (<i>Gross of Fee</i>)	6.8%	9.3%	6.4%	9.7%	-
BNY Mellon (<i>Gross of Fee</i>)	6.4%		6.0%	9.4%	-

(N) Net of Fee Return * JFRS 1- and 3- year returns are net of fee, longer term are gross

¹ TRS did not benchmark overall performance prior to July 1, 2008

ASSET ALLOCATION → *Drives 90% of Returns*

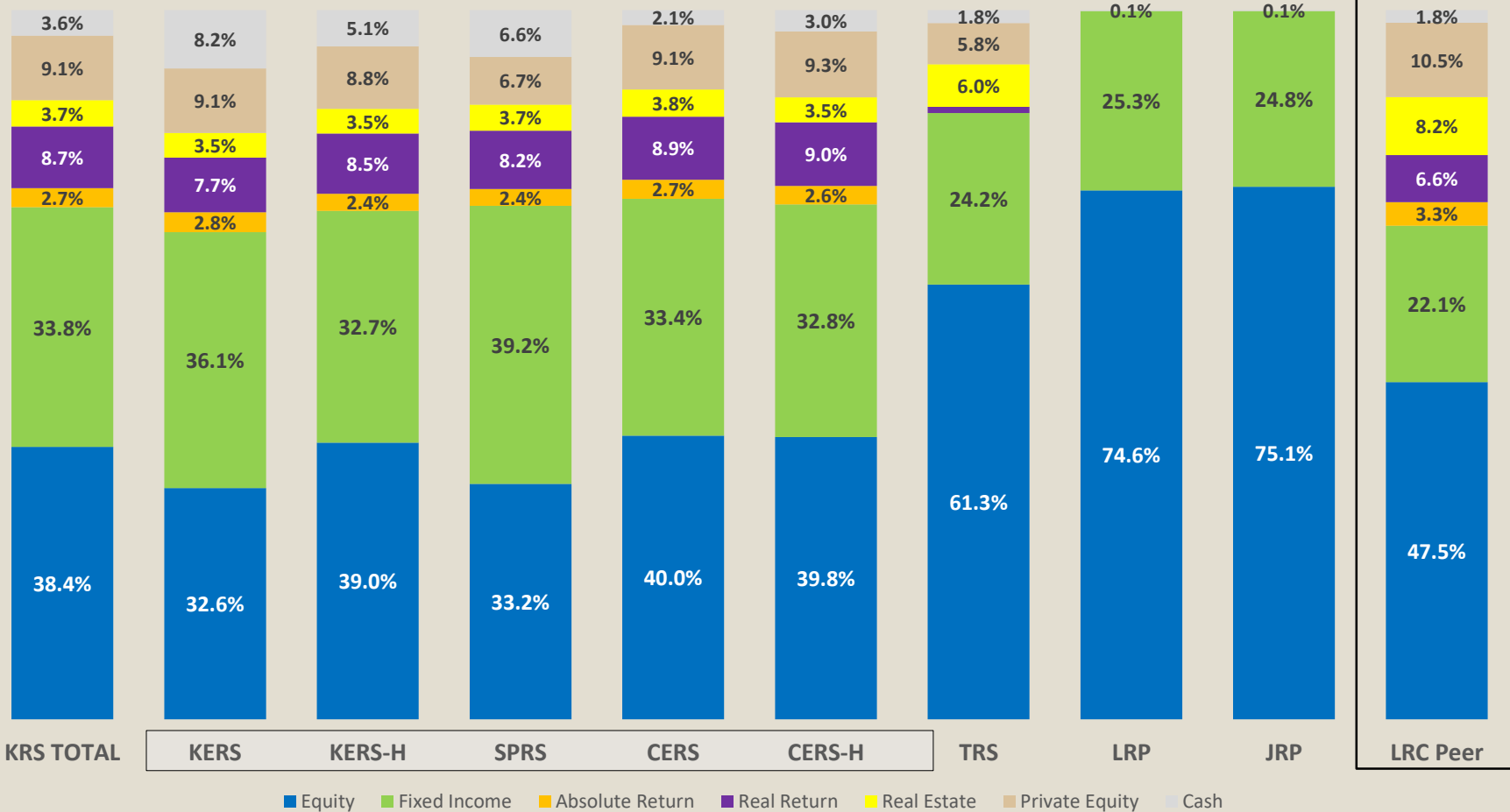
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	Asset Class	Description	Avg Peer %
Traditional Assets	U.S. Equity	Publicly traded stocks listed on U.S. exchange. Includes Large, Middle, and Small Capitalization companies. Very liquid, but tend to have higher volatility.	50%
	Non-U.S. Equity	Public stocks listed outside U.S. in local currency. Includes developed and emerging countries. Liquid, have higher return & risk expectation than U.S.	
	Fixed Income	Bonds and other assets with yield component. Includes investment grade (high quality), sovereign debt (global), and high yield (riskier) assets. Have lower expected return than equity, but less volatility given income component.	25%
Alternative Assets	Real Estate	Includes both private and public real estate investment trusts (REITs). Larger plans tend to invest in more private real estate, which consists of both core & non-core holdings. Illiquid in nature, but has provided stable returns over time.	25%
	Private Equity/Credit	Includes private equity, venture capital, distressed or other private debt strategies. Generally in form of limited partnership agreements. Illiquid in nature and have long investment horizon (7-12 years). Have higher expected return, but also can exhibit higher levels of risk.	
	Real Return	Includes real assets, such as commodities or timber, as well as inflation-linked securities, such as Treasury Inflation Protected Securities (TIPS). Tend to have low correlation to stocks and bonds. Can be less liquid than traditional assets.	
	Absolute Return	Funds that seek positive return regardless of market condition. Can include equity, fixed income, real estate, commodities, or other assets. Can include buying or "shorting" underlying securities. Expected to provide less volatile stream of positive returns over long term.	

ASSET CLASSES → *Current Allocations*

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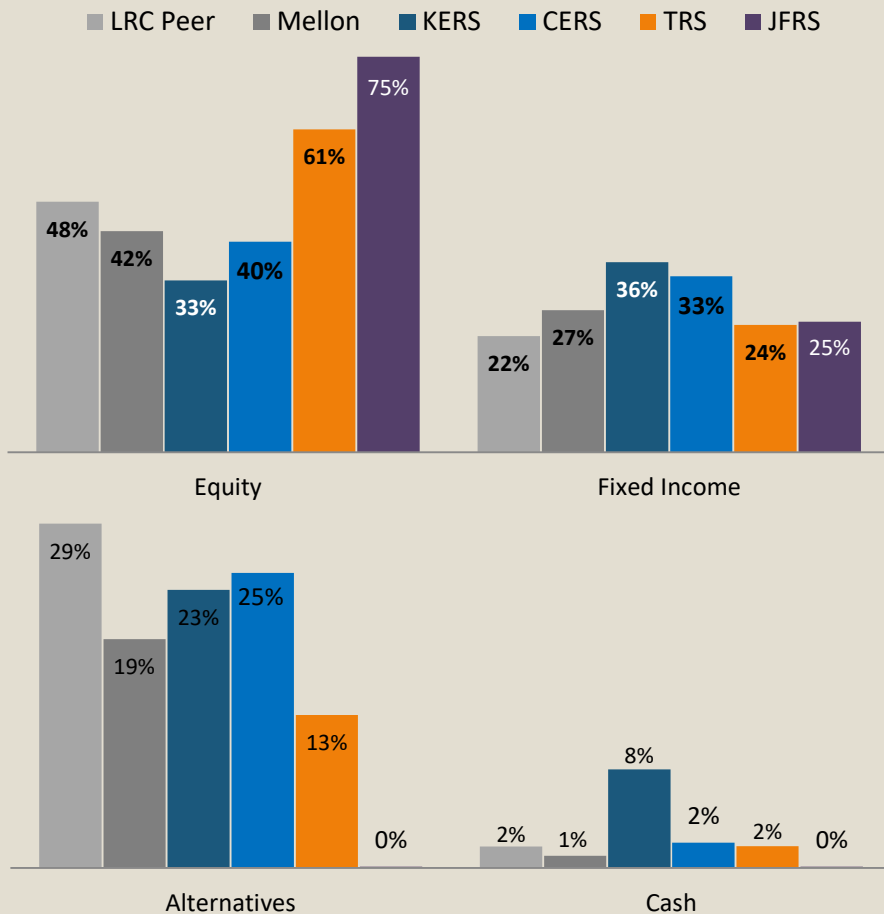
As of June 30, 2019



ASSET ALLOCATION → KY Pension Comparisons

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Peer Comparison



KERS/CERS

- ↓ Have reduced Equity, below average
- ↑ More Fixed Income, but not all Core US
- ▤ Alts similar to peer group, have reduced exposures over several years

TRS

- ↑ Above average Equity exposure
- ↓ Growing alternatives, but below peers

LRP & JRP

- ↑ Above average equity allocation
- Only US Equity & Fixed Income
- 🚫 No alternative exposure

NOTE: LRC and Mellon Peer Groups are averages while KERS, TRS, JFRS are actual as of 6/30/2019

FEES → Kentucky Plans

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Pension Fund Investment Fees and Expenses*

As of June 30, 2019 (In thousands)

	KRS			TRS			JFRS		
	AVG MV ¹	Fees	BPS	AVG MV ¹	Fees	BPS	AVG MV ¹	Mgmt Fees	BPS
Global Equity	\$4,793,629	\$8,795	18.3	\$12,534,020	\$16,437	13.1	\$394,186	\$313	7.9
Private Assets	\$1,256,705	11,237	89.4	\$1,244,336	19,345	155.5	-	-	-
Real Return	\$1,081,465	6,034	55.8	\$185,066	1,555	84.0	-	-	-
Real Estate	\$446,758	7,142	159.9	\$1,186,878	10,239	86.3	-	-	-
Fixed Income	\$4,005,395	13,330	33.3	\$4,569,825	9,508	20.8	140,819	112	7.9
Absolute Return	\$460,139	2,457	53.4	\$0	-	-	-	-	-
Cash/Custody/Consultant	\$451,523	3,140	-	\$297,828	4,098	-	296	28	-
Total Mgmt Fees	\$12,716,902	\$52,135	41.7	\$20,017,952	\$61,182	30.6	\$556,396	\$453	8.5
Other Fees or Incentives: <i>Includes Carried Interest, Profit Sharing</i>	\$12,495,614	\$34,148 ²	27.3	<i>See Footnote³</i>			<i>N/A – Does not utilize alternatives</i>		
Total PENSION	\$12,716,902	\$86,283	69.1	\$20,232,609	\$61,182	30.6	\$556,396	\$453	8.5

Insurance Fund Investment Fees and Expenses

	AVG MV ¹	Fees	BPS	AVG MV ¹	Fees	BPS	MV	Mgmt Fees	BPS
	Management Fees	\$5,282,459	\$24,191	45.8	\$1,187,125	\$5,295	44.6	<i>N/A - Assets managed along side Pension Funds</i>	
Other Fees or Incentives	\$5,282,459	16,173	30.6	<i>See Footnote³</i>					
Total INSURANCE	\$5,437,274	\$40,364	76.4	\$1,312,957	\$5,295	40.3			
COMBINED PEN/INS	\$18,154,176	\$126,647	71.2	\$20,864,589	\$66,477	30.9			

* NOTE: Preliminary and unaudited

¹ Calculated using Average of Beginning and Ending of Year Plan Asset Values

² Includes \$16.5m (Private Equity/Oppportunistic), \$9.8m (Real Estate), \$1.2m (Real Return), \$0.6m (Absolute Return), and \$5.9m (Fixed Income).

³ TRS has been notified by managers that carried interest information is proprietary and can not be publically reported.

FEES → *Trend of Kentucky Plans*

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- **KRS – Management Fees have declined, incentive fees more variable**
 - Incentive fees not tied to market value, but return or performance of asset and tend to be back loaded as investment period closes.
 - Reduction of absolute return, public equity and addition of core fixed income have helped lower management fees in terms of BPS
- **TRS – Remain low, but allocation & markets have led to slight increase**
 - Management fees tied to market value, so increased fund size = more dollars
 - As allocation to private equity and specialty credit (more expensive) has increased, so have fees in terms of BPS
 - Fees reported do not include any profit sharing or carried interest
- **JFRS – Remain on flat fee agreement, increased after FY 2017 renewal**

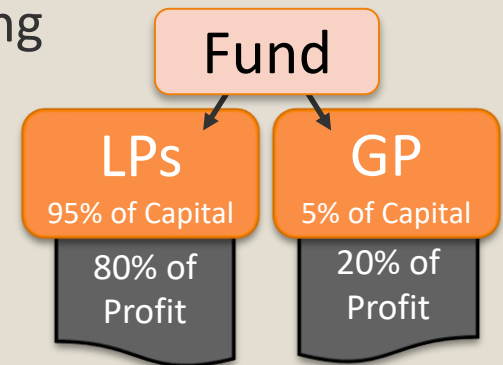
Year	KRS – PENSION						TRS – PENSION		JFRS - DB	
	Total Fees		Mgmt Fees		Incentive Fees		Dollars	bps ¹	Dollars	bps ¹
	Dollars	bps ¹	Dollars	bps ¹	Dollars	bps ¹				
2015	\$81,790	69.1	\$53,253	45.0	\$28,537	24.1	\$44,727	24.8	\$277	6.7
2016	88,779	78.8	54,578	48.5	34,201	30.4	47,792	27.4	279	6.4
2017	85,522	75.0	55,828	49.0	29,694	26.0	57,836	32.6	284	6.2
2018	92,597	76.1	53,497	44.0	39,100	32.1	55,500	28.7	408	8.2
2019	86,283	69.1	52,135	41.7	34,148	27.3	61,182	30.6	453	8.5

¹ Calculated using Average of Beginning and Ending of Year Plan Asset Values

SPECIAL TOPIC → *Carried Interest*

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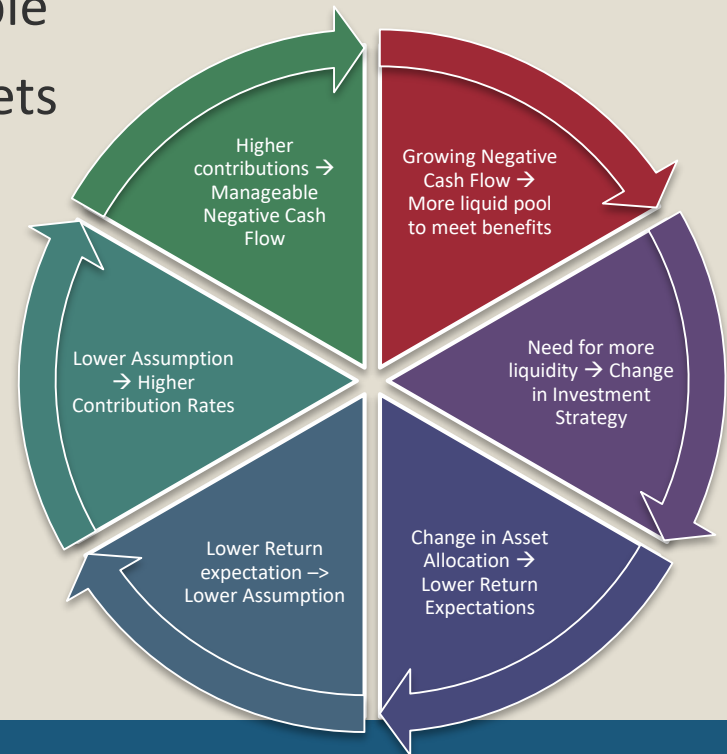
- Carried Interest, or Carry, is method of compensating General Partners (GPs) for fund performance.
 - Agreement of LPs to allocate a portion of fund's net profit to the GP *in excess* of the amount GP contributes to the partnership.
 - GPs prefer Carry due to tax treatment
 - If Carry did not exist, management fees would increase
- Other plans have been required to report:
 - California Public Employees'/Teacher Retirement Systems
 - Pennsylvania Public School Employees' Retirement System
 - South Carolina Retirement System
 - Missouri State Employees' Retirement System
 - Maryland recently required disclosure
- Examples of disclosure included in member packets



SPECIAL TOPIC → *Net Cash Flow*

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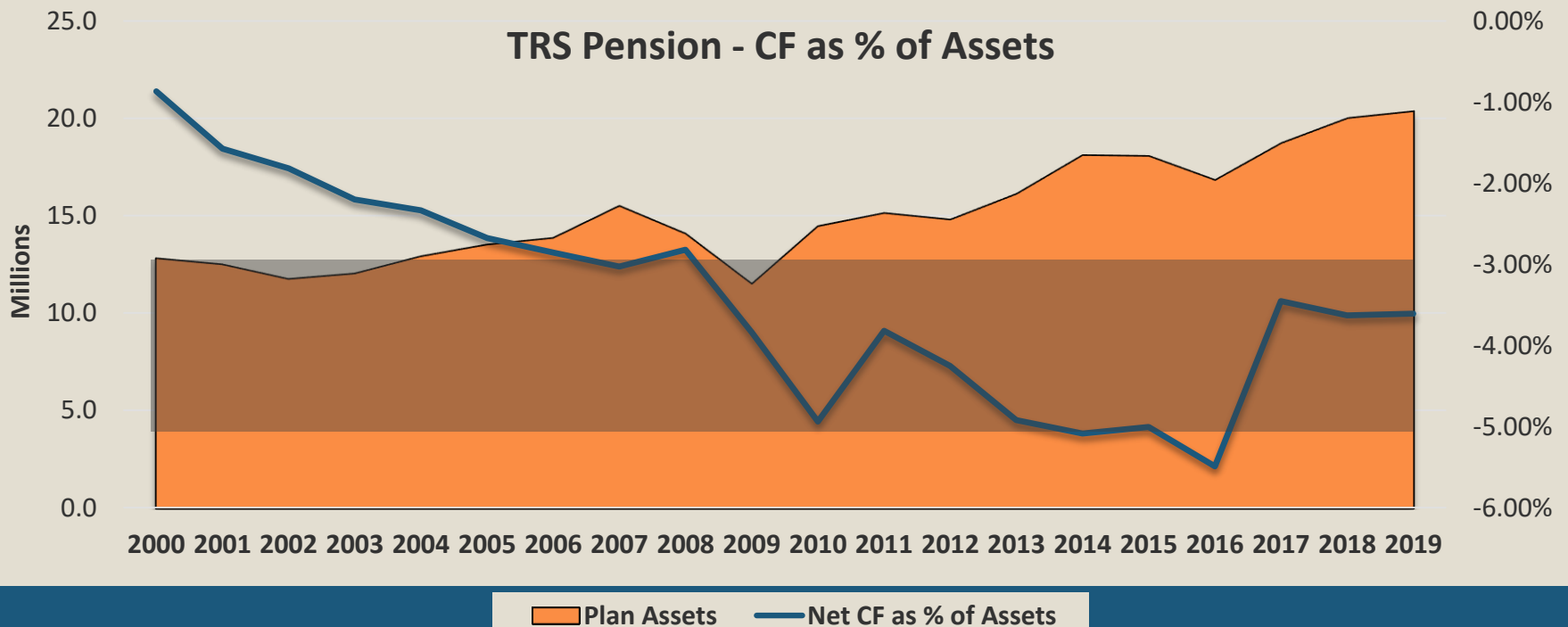
- Net Cash Flow = **Contributions** – **Benefits** - **Expenses**
- More plans having to manage Negative Net Cash Flow
 - Plans are maturing, retirees and benefit amounts increasing
- Negative CF not necessarily implying trouble
- Measuring negative CF as a percent of assets can serve as warning
 - As funding declines, assets decline
 - Negative CF becomes larger %
- At what level is negative CF okay?
 - No specific standard, depends on plan/actuary
 - Research has indicated range of negative 3-5%
 - Portfolio income can offset majority, allow asset growth/funding to remain stable



SPECIAL TOPIC → *Cash Flow Example*

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- Plan has experienced negative CF for several years, but has remained consistently within recommended range
- CF exceeded threshold in 2016, but additional contributions received & strong asset gains moved back within manageable range
- Portfolio yield/income has offset, plan assets have been allowed to appreciate.



SPECIAL TOPIC → *Current Plan Cash Flows*

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- Mix of negative and positive cash flow
 - KERS – Additional contributions have led to positive CF after several years of growing negative cash flow. Had exceeded negative 3-5% threshold since 2004
 - CERS – Negative cash flow has fell within range of negative 3-5% since 2009
 - TRS – Additional contributions have help reduce negative cash flow back within manageable range.

<i>As of June 30, 2019</i>	KERS	CERS	SPRS	TRS	JRP	LRP
Net Plan Assets BOY	\$2,048.9	\$7,086.3	\$287.2	19,981.6	\$397.6	\$118.0
Cash Flow	\$122.8	(\$237.9)	\$3.9	(\$720.8)	(\$15.9)	(\$5.1)
CF as % Assets	6.0%	(3.3%)	1.4%	(3.6%)	(4.0%)	(4.3%)
Investment Income ¹	\$32.50	\$119.80	\$4.90	\$379.16	\$9.14	\$2.62
Yield as % of Assets	1.6%	1.7%	1.7%	1.9%	2.3%	2.2%

¹ Does not include asset gains or losses

STATUTORY REVIEW → *Other Topics*

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- To meet statutory requirements, staff has reviewed the following:
 - Total Fund Objectives
 - ✦ Desire to meet Actuarial Return target of 5.25% (KERS and SPRS), 6.25% (CERS, KERSH), 6.5% (LRP/JRP), or 7.5% (TRS)
 - ✦ Desire to exceed Policy Benchmarks over market cycle (5 and 10 year periods)
 - Policies and Oversight
 - ✦ KRS –Policies available online
 - ✦ TRS – Investment Policy recorded as Administrative Regulation (102 KAR 1:175). Board Governance manual, which includes several policies, available online
 - ✦ LRP/JRP - Policy available online
 - Securities Litigation and Annual Recoveries
 - ✦ KRS – Filed 55 claims. \$1,702,272 proceeds received
 - ✦ TRS – Filed 22 claims. \$1,942,961 proceeds received
 - ✦ LRP/JRP – No claims filed. \$33,413.75 proceeds received

INVESTMENT REVIEW → *Benchmarks*

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- **Asset Class and Total Fund Benchmarks**

- All plans using recognized and industry known indices
- Alternative indices limited, most plans using a public index + model

TRS	BM%	Benchmark
US Equity	40.0%	87.5% S&P500 +7.5% S&P400 +5.0% S&P600
Non US Equity	22.0%	MSCI ACWI Ex US
Fixed Income	15.0%	Barclays Government/Credit
Real Estate	7.0%	35.7% CPI + 2% +35.7% NCREIF ODCE +28.7% NCREIF
Timberland	1.0%	NCREIF Timberland
Private Equity	6.0%	58.3% Actual Perf (< 5Yrs) +71.4% S&P500 + 3% (>5+ Yrs)
Additional Categories	7.0%	Merrill Lynch High Yield
Cash	2.0%	90 Day T-Bill

JFRS	BM%	Benchmark
US Equity	70%	S&P 500
Fixed Income	30%	Barclays US Gov't/ Credit Interm.

KRS Non-Haz Plans			
Asset Class	KERS BM%	CERS BM%	Benchmark
US Equity	15.75%	18.75%	Russell 3000
Non US Equity	15.75%	18.75%	MSCI ACWI Ex US IMI
Private Equity	7.00%	10.00%	Russell 3000 + 300 bps [^]
High Yield/ Specialty Credit	15.00%	15.00%	Bloomberg Barclays US High Yield
Core Fixed	20.50%	13.50%	Bloomberg Barclays US Aggregate
Cash	3.00%	1.00%	Citigroup 3-Mo Treasury Bill
Real Estate	5.00%	5.00%	NCREIF ODCE [^]
Absolute Return	3.00%	3.00%	HRFI Diversified
Real Return	15.0%	15.0%	US CPI + 3%

[^]1 Quarter in Arrears Index

INVESTMENT REVIEW → Allocation & Targets

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- Current Asset Allocation, Targets, and allowable ranges
 - Additional Categories from TRS primarily high yield credit, non-investment grade fixed income and/or specialty credit
 - KERS/CERS have continued to transition to revised targets
 - JFRS unchanged from prior year, no changes

KRS Non-Hazardous Plans						
	KERS			CERS		
	Actual	Target	Target	Actual	Target	Range
GROWTH	55.6%	53.50%	50%-65%	65.4%	62.50%	60%-66%
US Equity	15.7%	15.75%	10%-25%	19.0%	18.75%	10%-25%
Non US Equity	16.9%	15.75%	10%-25%	21.0%	18.75%	10%-25%
Private Equity	9.1%	7.00%	5%-15%	9.1%	10.00%	7%-13%
HY/Credit	13.8%	15.00%	10%-25%	16.3%	15.00%	5%-20%
CREDIT	30.4%	23.50%	15%-26%	19.2%	14.50%	10%-18%
Core Fixed	22.3%	20.50%	15%-36%	17.1%	13.50%	7%-18%
Cash	8.2%	3.00%	0%-5%	2.1%	1.00%	0%-5%
DIVERSIFYING	17.6%	23.00%	15%-26%	18.0%	23.00%	15%-26%
Real Return	7.7%	15.00%	5%-20%	8.9%	15.00%	5%-20%
Real Estate	3.5%	5.00%	0%-10%	3.8%	5.00%	0%-10%
Absolute Return	2.8%	3.00%	0%-10%	2.7%	3.00%	0%-10%

TRS			
	Actual	Target	Range
US Equity	39.4%	40.0%	34%-48%
Non US Equity	21.9%	22.0%	18%-25%
Fixed Income	17.0%	15.0%	12%-19%
Real Estate	6.0%	7.0%	4%-10%
Alternative Investments ¹	6.7%	7.0%	4%-10%
Additional Categories	7.2%	7.0%	4%-10%
Cash	1.8%	2.0%	1%-3%

¹ Includes PE, Venture Capital, Timber, and Infrastructure Investment

JFRS Plans					
	JRP		LRP		Range
	Actual	Target	Actual	Target	
US Equity	75.1%	70.0%	74.6%	70.0%	60%-80%
Fixed Income	24.8%	30.0%	25.3%	30.0%	20%-40%
Cash	0.1%	0.0%	0.1%	0.0%	

INVESTMENT REVIEW

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Questions?

APPENDIX A

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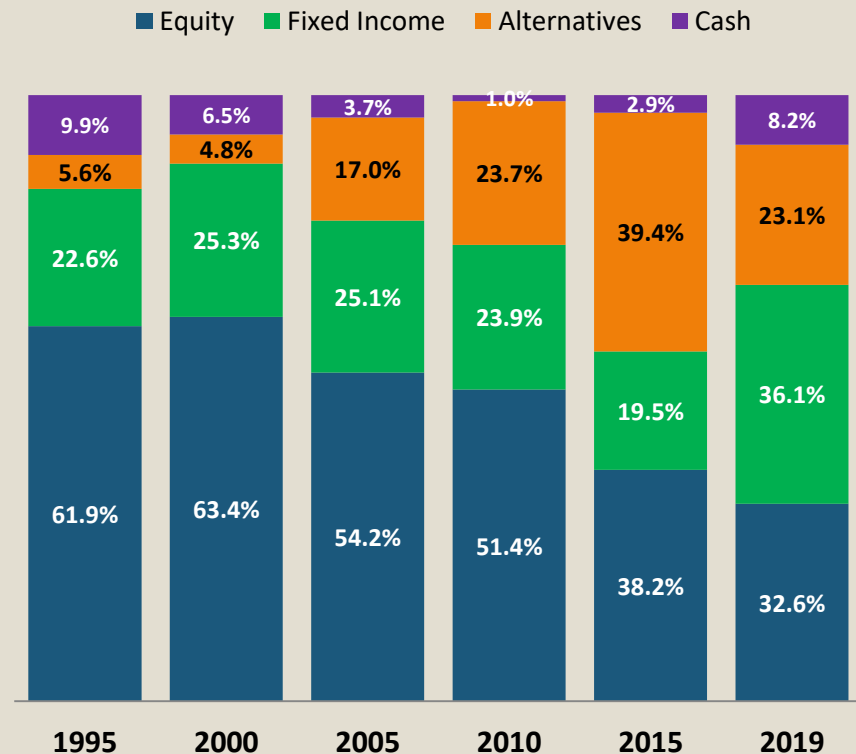
Historical Asset Allocation by Plan

ASSET ALLOCATION TREND → *KERS*

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- **Historic Cash Flow has limited**
 - No new PE investments since 2012
 - Has increased allocation to Fixed
 - Reduced Absolute Return
 - Reduced Public Equity exposure
- **Alternative Allocation includes**
 - 2.8% Absolute Return/Hedge Funds
 - 9.1% Private Equity
 - 3.5% Real Estate
 - 7.7% Real Return

Kentucky Employees Retirement System
Non-Hazardous
Historical Asset Allocation



ASSET ALLOCATION TREND → CERS

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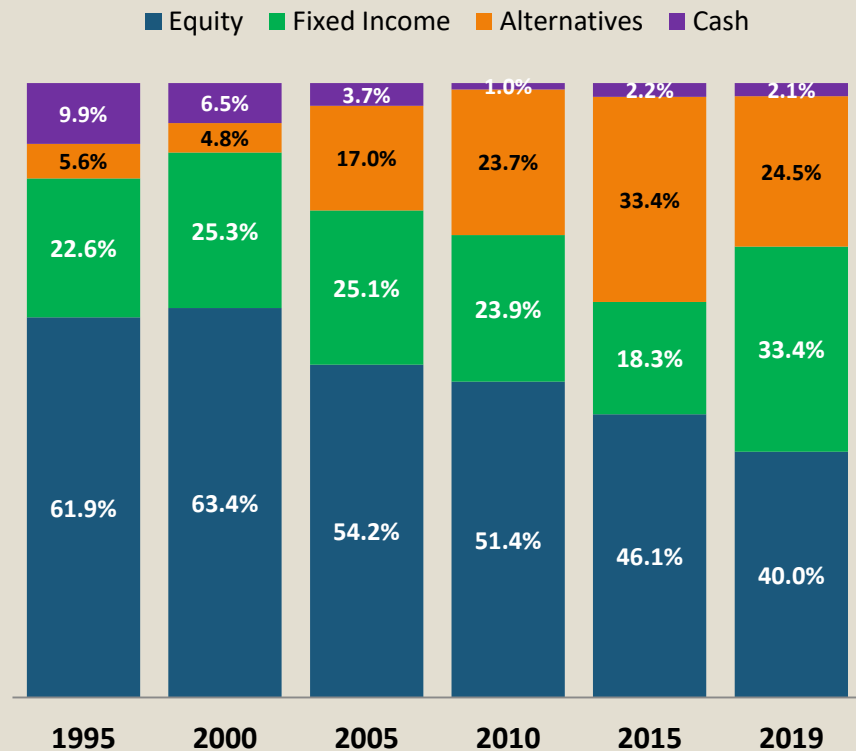
- **CERS more like Peer Group**

- Has reduced Equity recently
- Added to fixed income, specialty credit
- Reduced exposure to alternatives, primarily absolute return

- **Alternative Allocation includes**

- 2.7% Absolute Return/Hedge Funds
- 9.1% Private Equity
- 3.8% Real Estate
- 8.9% Real Return

County Employees Retirement System
Non-Hazardous
Historical Asset Allocation



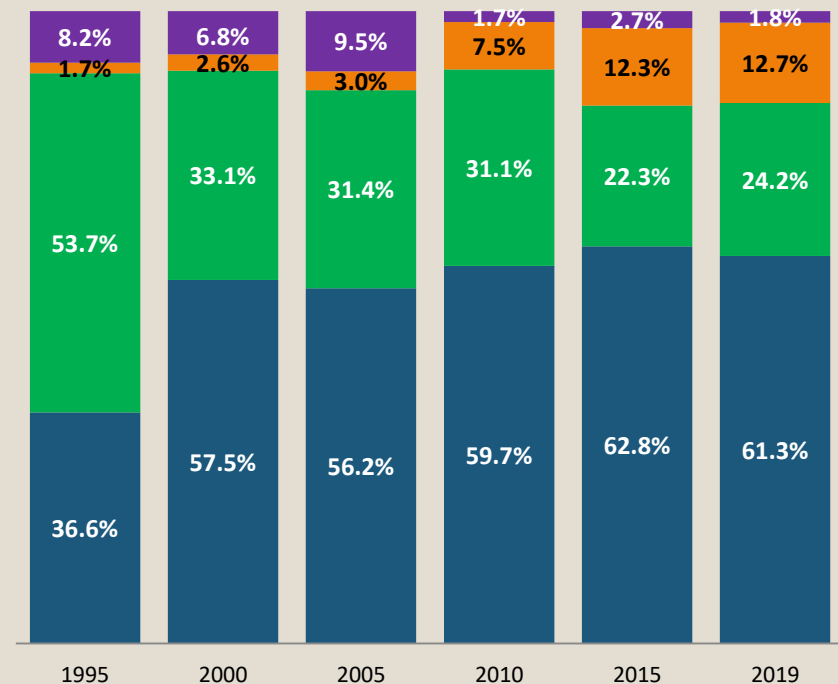
ASSET ALLOCATION TREND → TRS

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- **TRS similar, but slower trend**
 - Continue to add alternatives slowly
 - Private equity and real estate
 - Fixed income has declined, but more diversified than just US
 - Historically, consistent equity exp.
- **Alternative Allocation includes**
 - 6.9% Private Equity/Credit
 - 6.0% Real Estate
 - 0.9% Real Return
 - No Absolute Return/Hedge Funds

Teachers' Retirement System
Historic Asset Allocation

■ US Equity ■ Fixed Income ■ Alternatives ■ Cash



ASSET ALLOCATION TREND → JFRS

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- **Plans allocated in traditional assets**

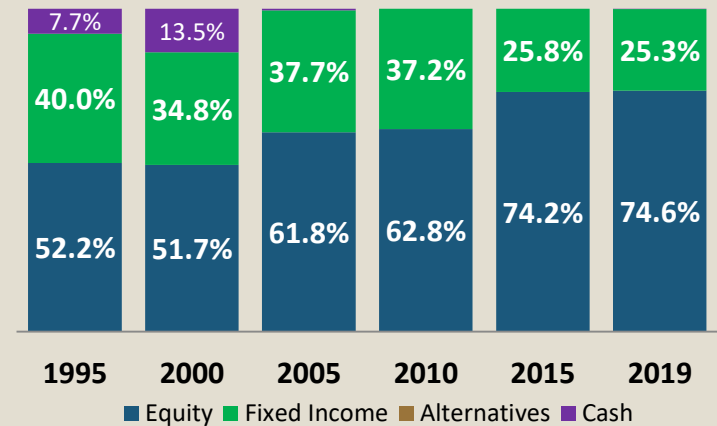
- Only U.S. Equity, primarily Large Cap
- Shorter term bonds, investment grade
- 70/30 Target Allocation

- **Peer Comparison**

- High Equity allocation
- Limited diversification by size, geography
- No alternatives

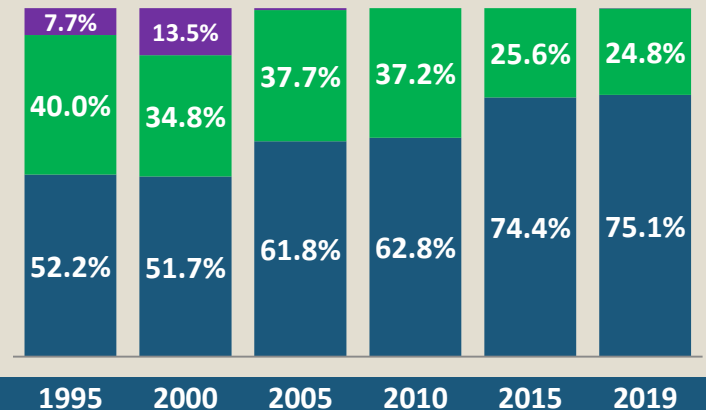
Legislators Retirement

Historic Asset Allocation



Judicial Retirement

Historic Asset Allocation



APPENDIX B

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Insurance Portfolio Performance

INVESTMENT PERFORMANCE → Insurance

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<i>As of June 30, 2019</i>	MV	1 –Year	3-Year	5-Year	10-Year	AROR
KERS	\$924.8M	5.0%	8.8%	5.4%	8.7%	6.25%
Policy Benchmark		5.9%	9.4%	5.8%	9.4%	
KERS – H	\$524.0M	5.6%	9.4%	5.9%	9.0%	6.25%
Policy Benchmark		5.9%	9.4%	5.9%	9.4%	
CERS	\$2.46B	5.7%	9.5%	6.0%	9.0%	6.25%
Policy Benchmark		5.9%	9.3%	5.9%	9.5%	
CERS – H	\$1.31B	5.8%	9.6%	6.1%	9.1%	6.25%
Policy Benchmark		5.9%	9.3%	5.9%	9.5%	
SPRS	\$197.9M	5.7%	9.5%	6.0%	9.0%	6.25%
Policy Benchmark		5.9%	9.3%	5.9%	9.5%	
TRS Insurance	\$1.31B	6.2%	9.6%	5.5%	-	8.0%
Policy Benchmark ¹		6.2%	9.9%	-	-	

Net of Fee Returns ¹ TRS did not have target asset allocation prior to June 30, 2014, thus no benchmark return was calculated

APPENDIX C

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LRC Staff Calculated Peer Group

System	Return Data				Asset Allocation						
	1 Year	3 Year	5 year	10 Year	Pub. Equity	Priv Eq	Credit/FI	Real Estate	Real Assets	HF	Cash
Public Employee or Consolidated State Plans											
Retirement Systems of Alabama											
Alaska Public Employee Retirement System											
Arizona State Retirement System	9.40%	7.80%	8.90%	7.40%	50.70	8.60	26.60	10.70	2.10	0.00	1.30
Arkansas Public Retirement System	5.78%		6.16%	10.14%							
California Public Employees Retirement System	6.70%	8.80%	5.80%	9.10%	50.20	7.10	28.70	0.00	11.00	1.90	1.10
Colorado Public Employees Retirement Association	6.30%	10.00%	6.80%	9.80%	55.50	8.60	23.10	8.90	3.50	0.00	0.40
Connecticut State Employees Retirement System											
Delaware Public Employees Retirement System											
Florida Retirement System	6.26%	9.63%	6.55%	9.80%	54.80	15.90	18.80	9.40	0.00	0.00	1.10
Georgia Employees Retirement System											
Hawaii Employees Retirement System											
Public Employees Retirement System of Idaho	8.40%	9.90%	7.80%	6.90%	57.10	5.90	18.60	9.30	8.80	0.00	0.30
Illinois State Employees Retirement System											
Indiana Public Employment Retirement Fund											
Iowa Public Employees Retirement System	8.35%	9.33%	6.77%	9.63%							
Kansas Public Employees Retirement System	6.70%	9.40%	6.40%	10.10%	49.30	7.90	18.90	9.60	11.00	0.00	3.30
Kentucky Employee Retirement Systems	5.73%	8.00%	5.31%	8.59%	31.70	9.50	35.60	5.00	7.80	2.80	7.60
Louisiana State Employees' Retirement System	4.40%	9.80%	5.60%	9.80%	54.70	15.40	15.70	0.00	7.20	6.20	0.80
Maine Public Employees Retirement System	7.30%	10.00%	6.40%	9.30%	30.80	15.10	19.30	9.40	16.70	8.40	0.30
Maryland State Retirement and Pension System	6.46%			8.60%	36.40	14.10	27.00	0.00	13.30	8.70	0.50
Massachusetts State Employees Retirement System	6.10%	9.80%	7.00%	9.90%	43.20	11.30	21.50	9.40	3.90	10.00	0.70
Michigan State Employees Retirement System	7.90%	11.00%	8.10%	10.50%	38.80	18.00	12.70	9.40	10.70	5.70	4.70
Minnesota State Retirement System	7.30%	10.90%	7.30%	10.90%	62.20	14.60	20.30	0.00	0.00	0.00	2.90
Public Employees' Retirement System of Mississippi	6.87%	10.38%	7.06%	10.53%	60.35	8.47	19.86	10.20	0.00	0.00	1.12
Missouri State Employees Retirement System											
Montana Public Employees Retirement	5.70%	8.80%	6.57%	9.87%	47.51	12.32	20.55	7.73	8.84	0.00	3.05
Nebraska Public Employees Retirement System	6.70%	9.50%	6.70%	10.10%	58.40	5.50	29.70	6.40	0.00	0.00	0.00
Nevada Public Employees Retirement System	8.50%	9.70%	7.10%	9.90%	64.50	5.40	25.30	4.60	0.00	0.00	0.20
New Hampshire Retirement System	5.70%	9.30%	6.40%	9.90%	46.50	12.00	30.30	10.10	0.00	0.00	1.10
New Jersey Public Employees Retirement System	6.27%	9.43%	6.21%	9.22%	47.62	10.97	19.17	6.17	6.96	1.68	7.43
New Mexico Public Employees Retirement Association	6.38%	8.11%	5.29%	9.17%							
New York State Common Retirement Fund											
North Carolina Retirement Systems	6.60%	8.20%	5.50%	8.40%	39.50	5.30	35.20	8.80	6.20	2.00	3.00
North Dakota Public Employees Retirement System	5.52%	9.21%	6.22%	9.41%	54.20	3.90	22.80	11.20	7.00	0.00	0.90
Ohio Public Employees Retirement System											
Oklahoma Public Employees Retirement System											
Oregon Public Employees Retirement System	6.52%	9.34%	6.65%	10.17%	56.50	0.00	23.00	10.80	9.60	0.00	0.10
Pennsylvania State Employees Retirement System	5.67%	8.73%	5.66%		55.00	13.60	14.50	6.40	5.60	0.10	4.80

System	Return Data				Asset Allocation						
	1 Year	3 Year	5 year	10 Year	Pub. Equity	Priv Eq	Credit/FI	Real Estate	Real Assets	HF	Cash
Public Employee or Consolidated State Plans											
Employees' Retirement System of Rhode Island	6.50%	8.70%	5.60%	8.80%	45.90	6.90	22.90	7.00	3.40	10.60	3.30
South Carolina Retirement System	5.84%	8.48%	5.26%	8.33%							
South Dakota Retirement System											
Tennessee Consolidated Retirement System	7.54%	9.02%	6.60%	9.41%	50.40	6.30	31.60	8.80	0.90	0.00	2.00
Employee Retirement System of Texas	5.20%	9.10%	6.20%	8.90%	50.70	14.20	16.70	10.70	2.70	3.40	1.60
Utah Retirement System											
Vermont State Employees Retirement System											
Virginia Retirement System	6.70%	8.80%	6.50%	9.40%	40.10	12.80	30.40	0.00	13.50	2.70	0.50
Washington Public Employees Pension System	8.36%	10.65%	7.85%	10.31%	32.80	21.50	21.20	18.30	5.10	0.10	1.00
West Virginia Public Employees Retirement System	5.40%	10.20%	6.50%	10.10%	50.60	10.80	15.60	11.30	0.00	11.50	0.20
Wisconsin Retirement System											
Wyoming Retirement System											

Standalone Teacher/Public School Retirement Plans											
Arkansas Teachers Retirement System	5.30%	10.90%	7.40%	10.30%							
California State Teachers' Retirement System	6.80%	9.70%	6.90%	10.10%	50.00	9.00	12.00	14.00	4.00	9.00	2.00
Connecticut Teachers Retirement Board											
Teacher's Retirement System of Georgia											
Teachers Retirement System of Illinois											
Kentucky Teachers Retirement System	5.59%	10.31%	6.82%	10.08%							
Teacher's Retirement of Louisiana	6.16%	11.14%	7.36%	10.53%	47.00	15.00	24.00	10.00	4.00	0.00	0.00
Public School Retirement System of Missouri	7.00%	9.40%	6.90%	9.10%	44.50	11.40	17.60	7.90	3.20	11.80	3.60
Montana Teacher's Retirement System											
School Retirement System for Nebraska	6.70%	9.50%	6.80%	10.10%	58.70	5.60	29.20	6.50	0.00	0.00	0.00
New Mexico Educational Retirement Board	7.29%	9.11%	6.73%	9.63%	31.30	15.10	25.90	6.80	19.80	0.00	1.10
New York State Teacher's Retirement System											
North Dakota Teacher's Fund for Retirement	5.54%	9.15%	6.18%	9.57%	54.20	3.90	22.80	11.20	7.00	0.00	0.90
State Teachers Retirement System of Ohio	7.13%	10.29%	7.38%	10.44%	51.50	7.80	20.30	9.90	8.50	0.00	2.00
Oklahoma Teacher's Retirement System											
Public School Employees' Retirement System of Pennsylvania	6.68%	8.71%	6.04%	9.02%	14.00	12.90	17.90	8.60	32.80	9.60	4.20
Teacher Retirement System of Texas	6.40%	9.50%	6.70%	9.90%	36.40	14.60	10.20	13.20	13.90	11.40	0.30
Vermont State Teachers' Retirement System											
West Virginia Teachers Retirement System	5.40%	10.20%	6.80%	10.00%	50.60	10.80	15.60	11.30	0.00	11.50	0.20

LRC State Plan Peer Group Summary											
Count	45	43	44	44	39	39	39	39	39	39	39
Average	6.6%	9.5%	6.6%	9.6%	47.54	10.46	22.08	8.18	6.64	3.31	1.78
Median	6.5%	9.4%	6.6%	9.8%	50.20	10.80	21.20	9.30	5.60	0.10	1.10

INVESTMENT REVIEW

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Questions?