



Kentucky Retirement Systems

Public Pension Oversight Board

February 24, 2019



Wilshire Consulting

ASSET CLASS PERFORMANCE

ASSET CLASS RETURNS - BEST TO WORST						ANNUALIZED 5-YEAR AS OF 12/2019
2014	2015	2016	2017	2018	2019 YTD	
REITs 31.8%	REITs 4.2%	MLPs 18.3%	Emrg Mrkts 37.7%	T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 11.4%
U.S. Equity 12.7%	U.S. Equity 0.7%	High Yield 17.1%	Developed 25.6%	Core Bond 0.0%	REITs 25.8%	REITs 6.9%
Core Bond 6.0%	Core Bond 0.6%	U.S. Equity 13.4%	U.S. Equity 21.0%	U.S. TIPS -1.3%	Developed 22.7%	Developed 6.2%
MLPs 4.8%	T-Bills 0.1%	Commodities 11.8%	High Yield 7.5%	High Yield -2.1%	Emrg Mrkts 18.9%	High Yield 6.1%
U.S. TIPS 3.6%	Developed -0.4%	Emrg Mrkts 11.6%	REITs 4.2%	REITs -4.8%	High Yield 14.3%	Emrg Mrkts 6.0%
High Yield 2.5%	U.S. TIPS -1.4%	REITs 7.2%	Core Bond 3.6%	U.S. Equity -5.3%	Core Bond 8.7%	Core Bond 3.1%
T-Bills 0.0%	High Yield -4.5%	U.S. TIPS 4.7%	U.S. TIPS 3.0%	Commodities -11.2%	U.S. TIPS 8.4%	U.S. TIPS 2.6%
Emrg Mrkts -1.8%	Emrg Mrkts -14.6%	Core Bond 2.6%	Commodities 1.7%	MLPs -12.4%	Commodities 7.7%	T-Bills 1.1%
Developed -4.5%	Commodities -24.7%	Developed 1.5%	T-Bills 0.8%	Developed -13.4%	MLPs 6.6%	Commodities -3.9%
Commodities -17.0%	MLPs -32.6%	T-Bills 0.3%	MLPs -6.5%	Emrg Mrkts -14.2%	T-Bills 2.3%	MLPs -7.0%

Data sources: Wilshire Compass

Note: Developed asset class is developed equity markets ex-U.S., ex-Canada



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Asset Allocation Bucketing

KRS Pension Plan

Periods Ended As of December 31, 2019

	Actual		Target	Difference	
	\$	%		\$	%
Growth	\$8,582,361,468	64.1%	60.7%	\$457,315,620	3.4%
U.S. Equity	\$2,613,928,930	19.5%	18.2%	\$177,753,733	1.3%
Non-U.S. Equity	\$2,735,016,510	20.4%	18.2%	\$298,841,313	2.2%
Private Equity	\$1,116,015,335	8.3%	9.4%	-\$142,228,997	-1.1%
High Yield/Specialty Credit	\$2,117,400,693	15.8%	15.0%	\$109,563,992	0.8%
Liquidity	\$2,721,466,214	20.3%	16.3%	\$539,616,999	4.0%
Core Fixed Income	\$2,489,660,834	18.6%	15.9%	\$361,353,931	2.7%
Cash	\$231,805,380	1.7%	1.4%	\$44,407,288	0.3%
Diversifying	\$2,081,750,322	15.6%	23.0%	-\$996,932,619	-7.4%
Real Estate	\$734,492,570	5.5%	5.0%	\$65,213,670	0.5%
Real Return	\$1,147,108,341	8.6%	15.0%	-\$860,728,360	-6.4%
Absolute Return	\$200,149,411	1.5%	3.0%	-\$201,417,929	-1.5%

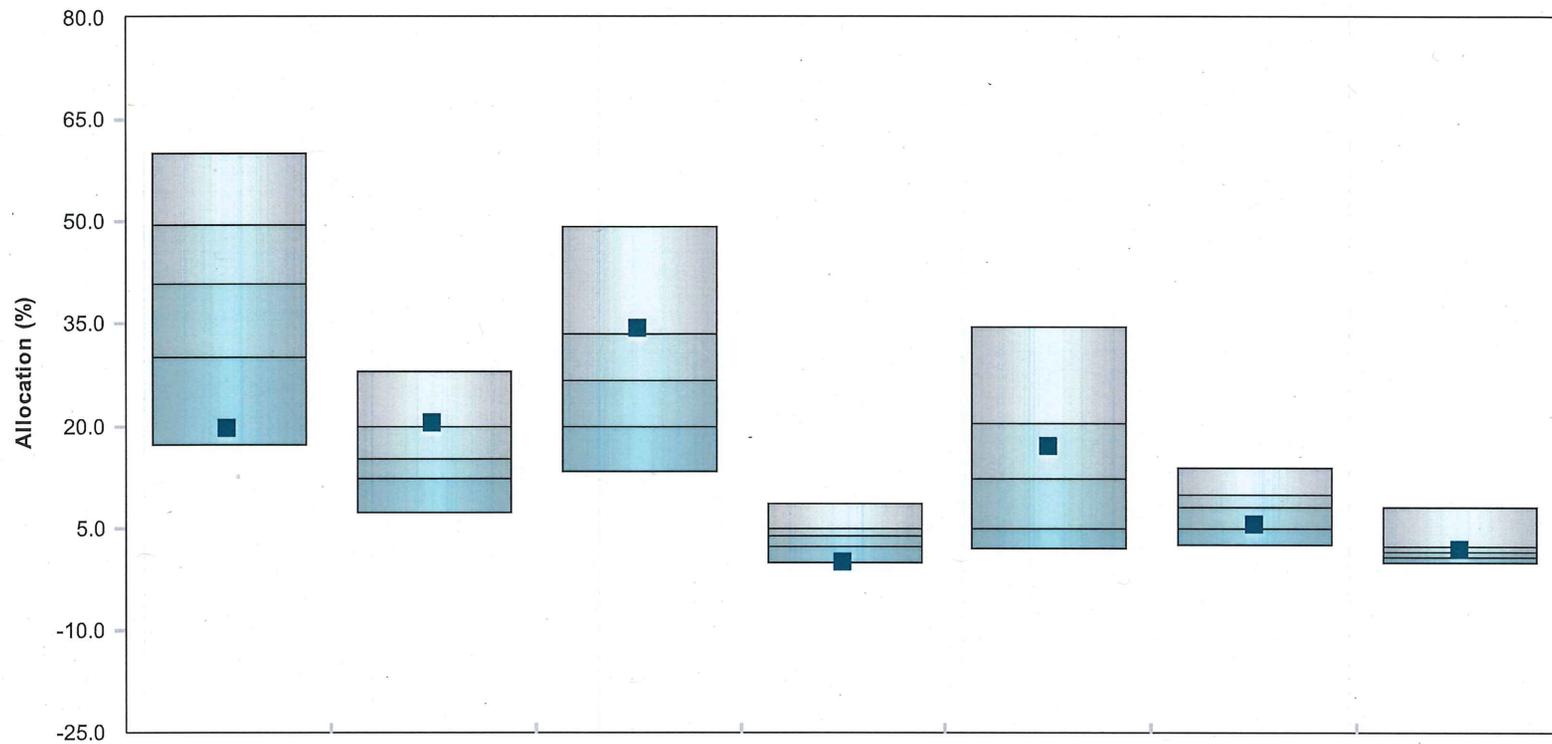
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Plan Sponsor TF Asset Allocation

KRS Pension Plan vs All Public Plans-Total Fund

Periods Ended December 31, 2019



	US Equity	Intl. Equity	US Fixed Income	Intl. Fixed Income	Alternative Inv.	Real Estate	Cash
■ KRS Pension Plan	19.53	20.43	34.42	0.00	16.91	5.49	1.73
5th Percentile	60.14	28.10	49.34	8.71	34.54	13.73	8.17
1st Quartile	49.51	19.84	33.50	4.81	20.46	9.80	2.43
Median	40.85	15.17	26.64	3.92	12.31	8.16	1.39
3rd Quartile	30.19	12.33	19.94	2.36	5.02	5.01	0.61
95th Percentile	17.17	7.32	13.22	0.06	2.01	2.66	0.06

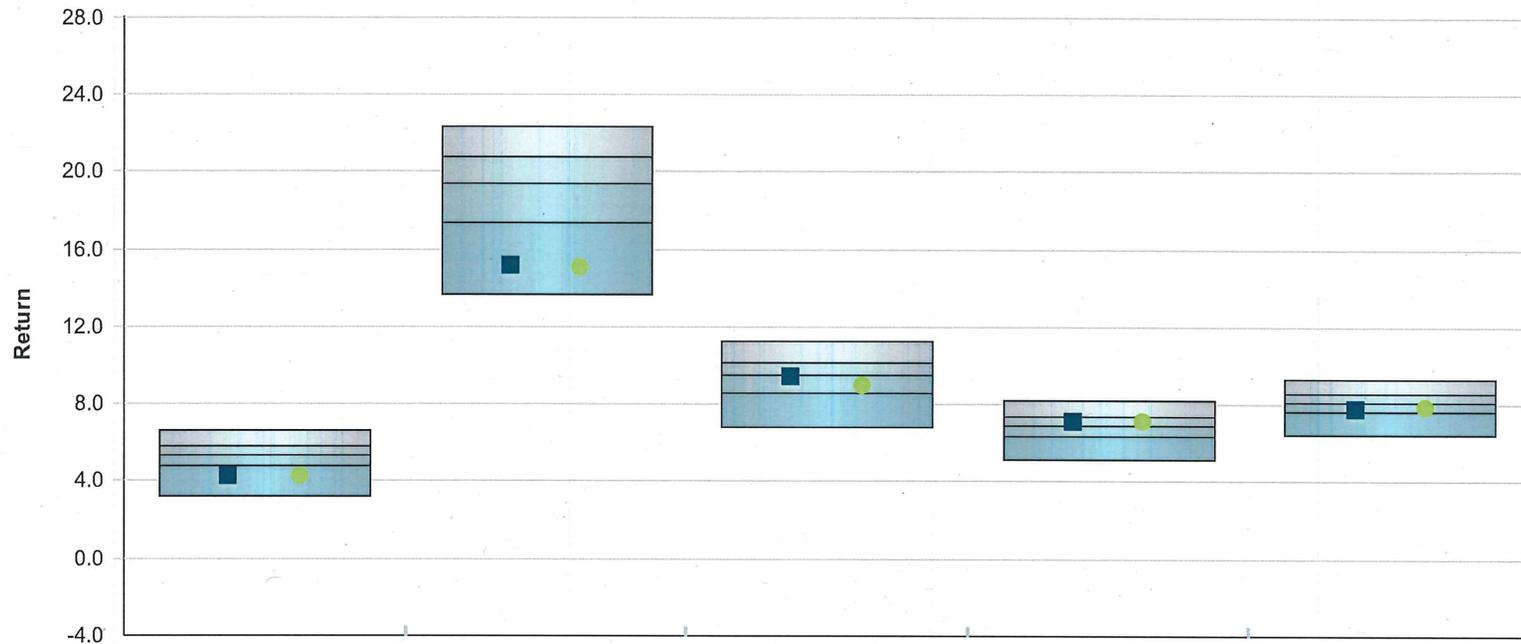


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Plan Sponsor Peer Group Analysis

KRS Pension Plan vs All Public Plans-Total Fund

Periods Ended December 31, 2019



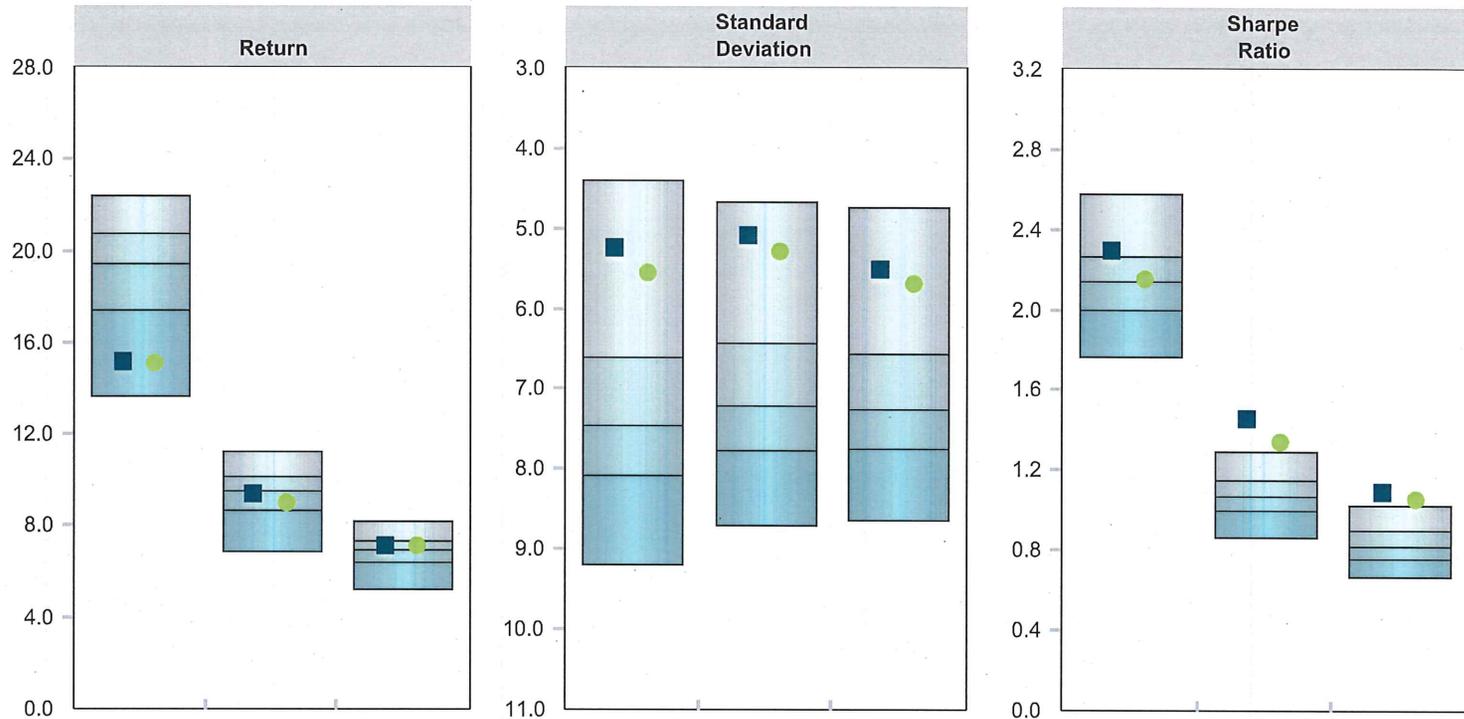
	QTD	1 Year	3 Years	5 Years	10 Years
■ KRS Pension Plan	4.23 (89)	15.16 (91)	9.37 (55)	7.12 (38)	7.76 (66)
● KRS Allocation Index	4.23 (89)	15.06 (92)	8.99 (66)	7.09 (39)	7.86 (63)
5th Percentile	6.61	22.38	11.26	8.18	9.30
1st Quartile	5.85	20.77	10.14	7.34	8.62
Median	5.37	19.44	9.50	6.92	8.10
3rd Quartile	4.81	17.36	8.62	6.39	7.62
95th Percentile	3.19	13.65	6.87	5.19	6.44
Population	425	419	398	366	300

Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

Plan Sponsor Peer Group Analysis-Multi Statistics

KRS Pension Plan

Periods Ended December 31, 2019



	1 Year	3 Years	5 Years	1 Year	3 Years	5 Years	1 Year	3 Years	5 Years
■ KRS Pension Plan	15.16 (91)	9.37 (55)	7.12 (38)	5.26 (8)	5.10 (6)	5.52 (7)	2.29 (21)	1.45 (2)	1.09 (3)
● KRS Allocation Index	15.06 (92)	8.99 (66)	7.09 (39)	5.56 (10)	5.30 (7)	5.69 (9)	2.15 (47)	1.34 (4)	1.05 (4)
5th Percentile	22.38	11.26	8.18	4.40	4.66	4.75	2.57	1.29	1.03
1st Quartile	20.77	10.14	7.34	6.62	6.44	6.56	2.27	1.15	0.90
Median	19.44	9.50	6.92	7.46	7.22	7.25	2.14	1.07	0.82
3rd Quartile	17.36	8.62	6.39	8.07	7.78	7.76	2.00	1.00	0.76
95th Percentile	13.65	6.87	5.19	9.20	8.71	8.63	1.76	0.86	0.67

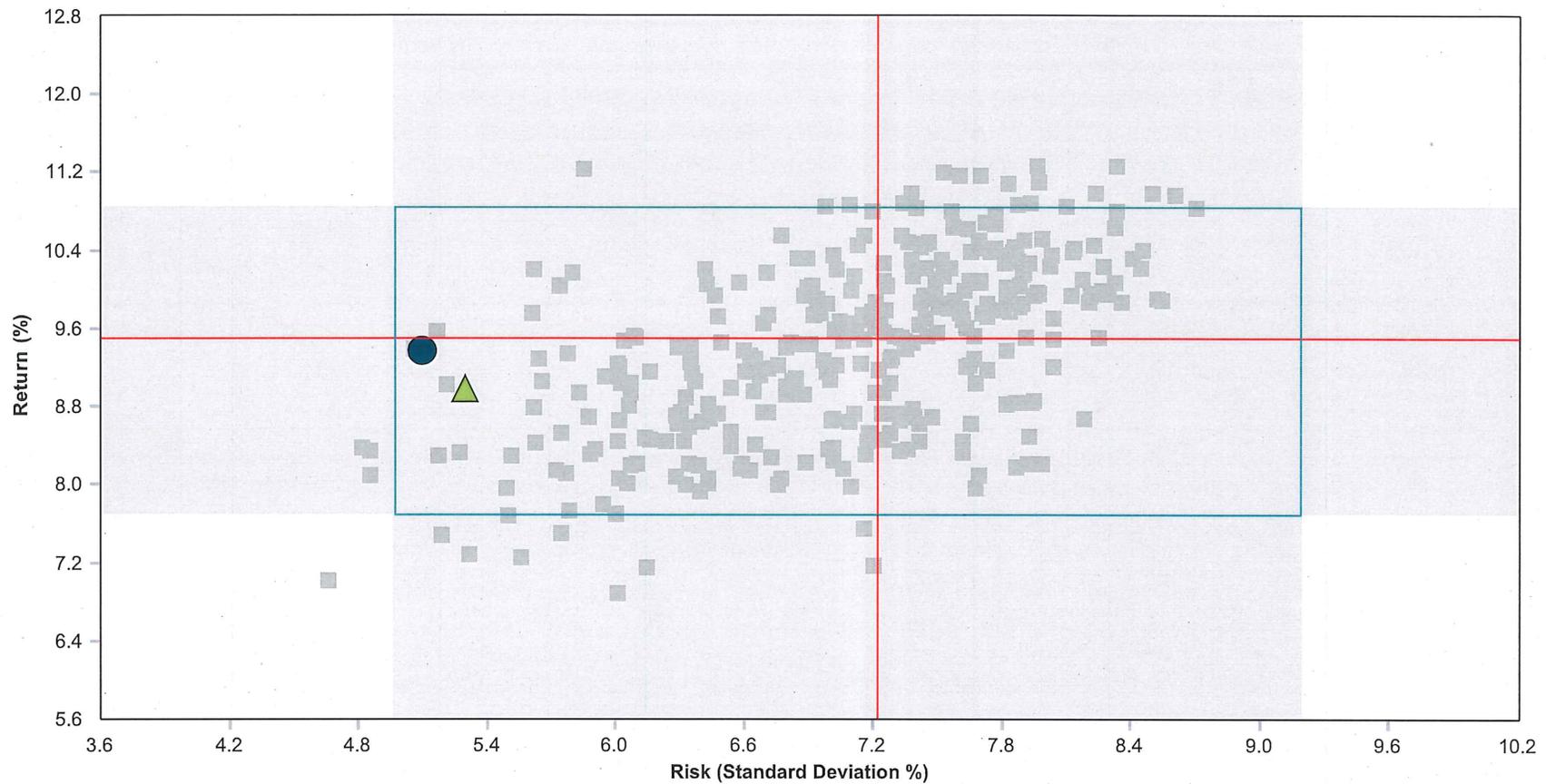
Parentheses contain percentile rankings.
Calculation based on monthly periodicity.

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Plan Sponsor Scattergram

KRS Pension Plan vs All Public Plans-Total Fund
 Periods Ended January 1, 2017 To December 31, 2019



	Return	Standard Deviation
● KRS Pension Plan	9.37	5.10
▲ KRS Allocation Index	8.99	5.30
— Median	9.50	7.22

Calculation based on monthly periodicity.



Pension - Investment Update 12/31/19

Net of Fees Rates of Return

	Market Value (in \$Millions)	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years
CERS Non-Hazardous	\$7,480.6	15.5%	9.5%	7.2%	7.8%	5.5%	8.1%
<i>Plan Index</i>		15.6%	9.3%	7.0%	7.8%	5.5%	8.0%
CERS Hazardous	\$2,521.6	15.4%	9.5%	7.2%	7.8%	5.5%	8.1%
<i>Plan Index</i>		15.6%	9.3%	7.0%	7.8%	5.5%	8.0%
KERS Non-Hazardous	\$2,364.5	13.2%	8.5%	6.5%	7.5%	5.3%	8.0%
<i>Plan Index</i>		14.4%	8.5%	6.7%	7.6%	5.4%	8.0%
KERS Hazardous	\$722.4	15.2%	9.4%	7.2%	7.8%	5.5%	8.1%
<i>Plan Index</i>		15.6%	9.3%	7.0%	7.8%	5.5%	8.0%
SPRS	\$296.5	14.0%	8.7%	6.4%	7.4%	5.3%	8.0%
<i>Plan Index</i>		14.4%	8.7%	6.6%	7.6%	5.4%	8.0%



Insurance - Investment Update 12/31/19

Net of Fees Rates of Return

	Market Value (in \$millions)	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years
CERS Non-Hazardous	\$2,609.5	15.1%	9.6%	7.3%	7.6%	5.0%	7.5%
<i>Plan Index</i>		15.5%	9.4%	7.1%	8.0%	5.2%	7.7%
CERS Hazardous	\$1,381.6	15.2%	9.7%	7.4%	7.6%	5.0%	7.6%
<i>Plan Index</i>		15.5%	9.4%	7.1%	8.0%	5.2%	7.7%
KERS Non-Hazardous	\$1,007.0	15.2%	8.8%	6.7%	7.2%	4.8%	7.4%
<i>Plan Index</i>		15.5%	9.3%	7.0%	8.0%	5.2%	7.6%
KERS Hazardous	\$547.8	15.1%	9.4%	7.2%	7.5%	5.0%	7.5%
<i>Plan Index</i>		15.5%	9.3%	7.1%	8.0%	5.2%	7.7%
SPRS	\$209.4	15.1%	9.6%	7.4%	7.6%	5.0%	7.5%
<i>Plan Index</i>		15.5%	9.4%	7.1%	8.0%	5.2%	7.7%



CASH FLOW – Pension Fund
(CERS Non-Haz and CERS-Haz)
December 31, 2019 compared to December 31, 2018
 (\$ in millions)

				
Contributions	FY19	FY20	FY19	FY20
<i>Member Contributions</i>	\$80.3	\$81.9	\$31.1	\$32.4
<i>Employer Contributions</i>	187.4	226.4	70.5	84.8
<i>Investment Income (Net of Expenses)</i>	58.8	73.9	19.9	25.1
Contribution Inflow	326.5	382.2	121.5	142.3
<i>Benefit Payments/Refunds</i>	385.3	403.6	129.5	137.9
<i>Administrative Expenses</i>	10.2	10.6	0.7	1.0
Contribution Outflow	395.5	414.2	130.2	138.9
NET Cash Flow Before Gains/(Losses)	(69.0)	(32.0)	(8.7)	3.4
<i>Investment Gains/Losses</i>	<i>(284.1)</i>	325.3	<i>(95.0)</i>	107.9
Change in Net Position	(353.1)	293.3	(103.7)	111.3
<i>Beginning of Period</i>	7,086.3	7,243.0	2,361.0	2,429.6
<i>End of Period</i>	\$6,733.2	\$7,536.3	\$2,257.3	\$2,540.9



CASH FLOW – Pension Fund
(KERS Non-Haz, KERS Haz & SPRS)
December 31, 2019 compared to December 31, 2018
 (\$ in millions)

						
Contributions	FY19	FY20	FY19	FY20	FY19	FY20
<i>Member Contributions</i>	\$50.2	\$51.8	\$9.3	\$9.5	\$2.6	\$2.4
<i>Employer Contributions/Appropriations</i>	512.7	520.5	30.4	32.4	32.9	33.5
<i>Investment Income (Net of Expenses)</i>	14.3	22.3	5.5	7.2	2.3	3.0
Total Cash Inflows	577.2	594.6	45.2	49.1	37.8	38.9
<i>Benefit Payments/Refunds</i>	497.8	505.9	35.8	37.7	30.4	31.1
<i>Administrative Expenses</i>	5.4	5.6	0.5	0.6	0.1	0.1
Total Cash Outflows	503.2	511.5	36.3	38.3	30.5	31.2
NET Cash Flow Before Gains/(Losses)	74.0	83.1	8.9	10.8	7.3	7.7
<i>Investment Gains/Losses</i>	(53.3)	89.8	(26.0)	30.8	(9.0)	11.4
Change in Net Position	20.7	172.9	(17.1)	41.6	(1.7)	19.1
<i>Beginning of Period</i>	2,048.9	2,286.6	651.2	687.8	268.4	287.2
<i>End of Period</i>	\$2,069.6	\$2,459.5	\$634.1	\$729.4	\$266.7	\$306.3



**CASH FLOW – Insurance Fund
(CERS Non-Haz and CERS-Haz)
December 31, 2019 compared to December 31, 2018
(in \$millions)**

				
	FY19	FY20	FY19	FY20
Contributions				
<i>Employer Contributions</i>	\$64.3	\$59.4	\$31.1	\$28.6
<i>Insurance Premiums</i>	3.9	0.3	0.5	-
<i>Health Insurance Contributions</i>		6.1		1.4
<i>Retired Reemployed Healthcare</i>	2.3	2.7	0.6	0.6
<i>Investment Income (Net of Expenses)</i>	20.6	24.9	10.9	13.1
Contribution Inflow	91.1	93.4	43.1	43.7
<i>Healthcare Premiums</i>	71.2	67.4	39.2	40.0
<i>Administrative Expenses</i>	0.4	0.5	0.2	0.2
Contribution Outflow	71.6	67.9	39.4	40.2
NET Cash Flow Before Gains/(Losses)	19.5	25.5	3.7	3.4
<i>Investment Gains/Losses</i>	<i>(93.1)</i>	111.4	<i>(49.5)</i>	58.4
Change in Net Position	(73.6)	136.9	(45.8)	61.8
<i>Beginning of Period</i>	2,346.8	2,486.5	1,268.3	1,324.8
<i>End of Period</i>	\$2,273.2	\$2,623.4	\$1,222.5	\$1,386.6



CASH FLOW – Insurance Fund
(KERS Non-Haz, KERS Haz & SPRS)
December 31, 2019 (compared to December 31, 2018)
 (\$ in millions)

						
	FY19	FY20	FY19	FY20	FY19	FY20
Contributions						
<i>Employer Contributions</i>	\$87.8	\$86.1	\$1.7	\$2.2	\$6.8	\$6.8
<i>Insurance Premiums</i>	3.2	0.1	0.2	-	0.1	-
<i>Health Insurance Contributions</i>		3.0		0.5		-
<i>Retired Reemployed Healthcare</i>	1.9	2.2	0.6	0.6	-	-
<i>Investment Income (Net of Expenses)</i>	7.8	10.4	4.3	5.4	1.6	2.0
Contribution Inflow	100.7	101.8	6.8	8.7	8.5	8.8
<i>Healthcare Premiums</i>	67.2	61.7	9.7	9.7	7.2	7.1
<i>Administrative Expenses</i>	0.5	0.4	-	-	-	-
Contribution Outflow	67.7	62.1	9.7	9.7	7.2	7.1
NET Cash Flow Before Gains/(Losses)	33.0	39.7	(2.9)	(1.0)	1.3	1.7
<i>Investment Gains/Losses</i>	(42.7)	41.9	(20.9)	22.5	(7.4)	8.8
Change in Net Position	(9.7)	81.6	(23.8)	21.5	(6.1)	10.5
<i>Beginning of Period</i>	846.8	942.1	513.4	527.1	190.0	200.1
<i>Ending of Period</i>	\$837.1	\$1,023.7	489.6	\$548.6	183.9	210.6