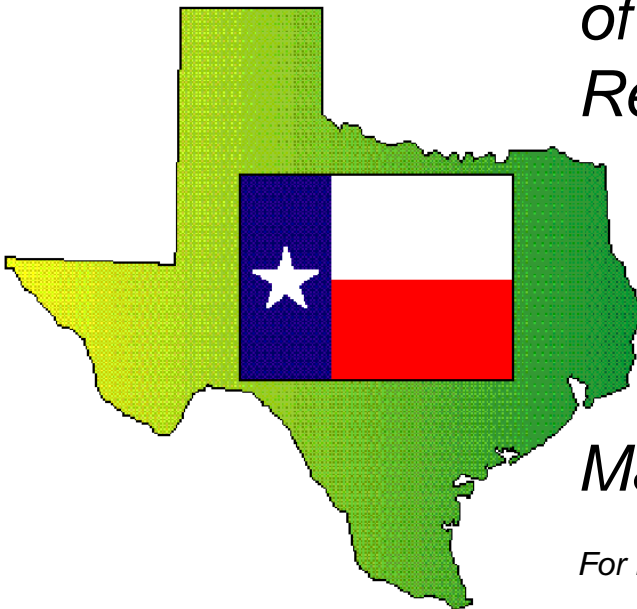


TEXPERS

Report on the Asset Allocation And Investment Performance of Texas Public Employee Retirement Systems

*The Texas Association
of Public Employee
Retirement Systems*



March 2019

For Periods Ending September 30, 2018

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Key Findings

Sixty-three participating members contributed data for the fiscal year 2018 Asset Allocation and Investment Performance of Texas Public Employee Retirement Systems, and represented approximately \$58.45 billion in total assets. Ninety-four percent of members who contributed data this year also participated in last year's Study, lending to the integrity of the data.

- Participating TEXPERS members' FY 2018 dollar-weighted asset allocation (for the fiscal year ending September 30, 2018) was: equities (domestic and international), 51%; alternative strategies, 28%; fixed income, 20%; and short-term securities/cash/other, 1%.
- When measuring investment performance for survey respondents as a group over the 20-year period ending September 30, 2018, the respondents' composite investment return was 7.3%, compared to the average actuarial investment return assumption of 7.4%.
- For the trailing 15-year period ending September 30, 2018, survey respondents' 7.5% return slightly underperformed the 7.6% return for the Wilshire Median Public Fund for the same period. However, the respondents 7.5% return outperformed the Global 60/40 portfolio return of 6.5%.
- For the trailing 10-years ending September 30, 2018, survey respondents' 7.6% return underperformed the 8.1% return for the Wilshire Median Public Fund for the same period. However, the respondents 7.6% return outperformed the Global 60/40 portfolio return of 6.3%.
- Among all TEXPERS members, the weighted average trailing five-year return was 7.3%, while the weighted average trailing three-year return was 9.5%.

Introduction

This report reviews the asset allocation and investment performance for local pension systems that are members of the Texas Association of Public Employee Retirement Systems (TEXPERS) for the trailing one-, three-, five-, 10-, 15- and 20-year periods ending September 30, 2018. Both the aggregate TEXPERS and individual systems' asset allocation as well as investment performance will be examined.

The purpose of this report is to document TEXPERS member systems' diversification with respect to the types of assets invested in, and the investment performance of these systems with respect to their actuarially assumed returns, market benchmarks and other public funds. This will demonstrate that local systems are being managed in compliance with the "prudent expert" rule, which requires that fiduciaries of the system exercise their duties with the care, skill, prudence and diligence under the prevailing circumstances that a prudent person acting in a like capacity and familiar with matters of the type would use in the conduct of an enterprise with a like character and like aims.

Individual pension system data in this report was obtained from a December 2018 survey requesting asset allocation and investment return information from TEXPERS members. A total of seventy-three surveys were sent to TEXPERS members. Sixty-three were completed and returned, an eighty-six percent response rate. The member systems responding represent approximately \$58.45 billion in total assets. A copy of the survey is contained in Appendix 1 and a listing of TEXPERS members responding to the survey is contained in Appendix 2. Respondents who agreed to have their names disclosed in this report are listed in Appendix 3. A listing of actuarial return and inflation assumptions is in Appendix 4.

This year this survey was carried out by the Maples Group, continuing a partnership for this annual reporting.

Thanks to Wilshire CompassSM for providing the peer group comparison data.

TEXPERS Composite

Asset Allocation

Figure 1 illustrates the average dollar-weighted* asset allocation of survey respondents as a composite group. The Domestic and International Equity asset classes include investments such as U.S. and Non-U.S. common stocks. Fixed Income includes investments such as government and corporate bonds from domestic and international issuers. Alternative Strategies include private equity, real estate, venture capital, marketable alternative strategies and commodities.

Figure 1

Market Value \$58.45 Billion
As of September 30, 2018

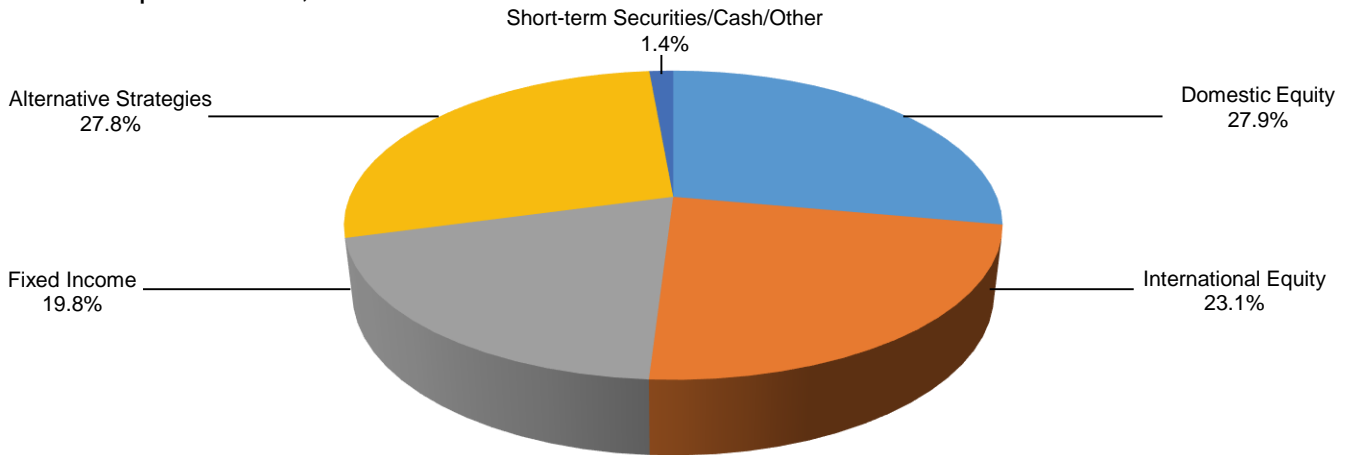
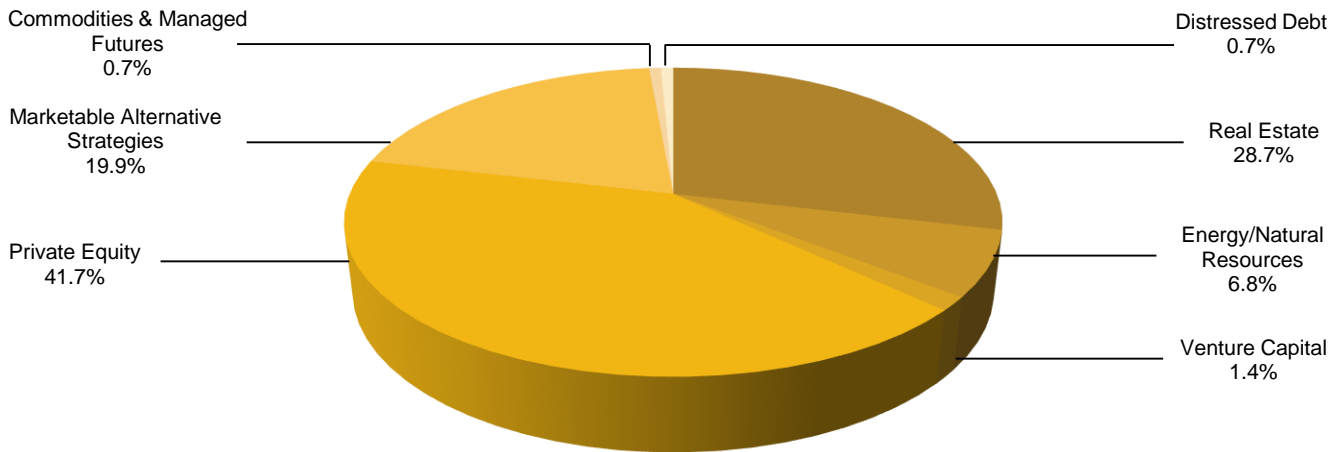


Figure 2

Alternative Strategies Breakout



The asset allocation demonstrates that, in aggregate, the respondents have a level of diversification within the norm for public pension systems.

* Dollar-weighted means that individual responses are weighted according to size of the asset base when calculating the average results – meaning that responses from large participants have a greater impact on average results than those of smaller participants.

Investment Performance

Trailing Period Returns - Table

Table 1

Annualized Returns for the Periods Ending 9/30/2018	One Year	Three Years	Five Years	Ten Years	Fifteen Years	Twenty Years
TEXPERS Weighted Average	7.8	9.5	7.3	7.6	7.5	7.3
Actuarial Assumption*	7.4	7.4	7.4	7.4	7.4	7.4

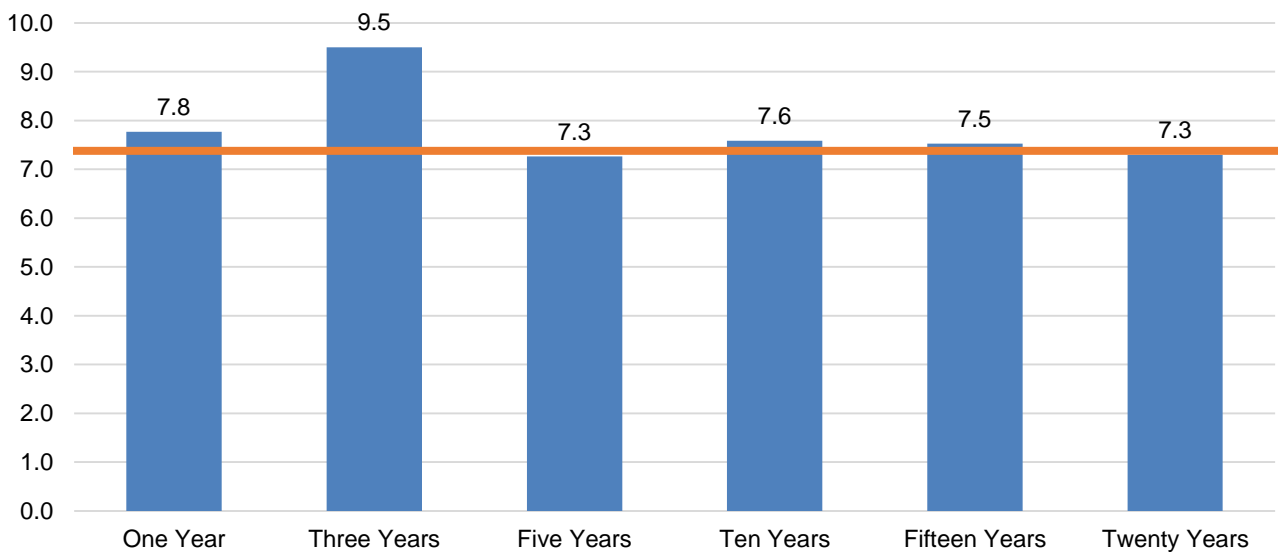
Table 1 and Figure 3 compare the survey respondents' average investment return over the one-, three-, five-, 10-, 15- and 20-year periods ending September 30, 2018 to their average actuarial investment return assumption of 7.4%.

Trailing Period Returns - Chart

Figure 3

Returns vs. Average Actuarial Assumption*

For periods ending September 30, 2018



* This year's actuarial assumption of 7.4% is the average of what was reported among participating TEXPERS members.

Actuarially Required Contribution (ARC)

Table 2

TEXPERS members were asked if their funds received their full actuarially required contribution for fiscal year 2018.

Period Ending 9/30/2018	Yes	No	Uncertain
Number Responded	43	3	1
Percentage	91	6	2

Individual Pension Systems

Asset Allocation

Table 3 details percentage allocation to the major asset classes by each survey respondent.

Table 3

	1	3	4	5	6	7	8	9	10
Domestic Equity	26.20	27.36	36.40	41.80	40.00	30.60	11.93	47.11	33.40
Fixed Income	31.00	17.60	32.00	27.30	19.20	38.20	25.80	37.43	34.20
International Equity	24.40	16.21	31.50	14.30	20.90	30.40	12.88	10.17	31.10
Alternative Strategies	17.60	38.10	0.00	15.20	19.60	0.70	46.80	2.94	0.50
Private Equity	5.40	8.35	0.00	0.00	0.00	0.70	14.10	0.00	0.50
Marketable Alternative Strategies	9.40	15.85	0.00	9.10	15.50	0.00	0.00	0.00	0.00
Venture Capital	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Real Estate	2.80	9.07	0.00	6.10	0.00	0.00	22.80	0.00	0.00
Commodities & Managed Futures	0.00	0.00	0.00	0.00	4.10	0.00	0.00	2.94	0.00
Energy/Natural Resources	0.00	4.83	0.00	0.00	0.00	0.00	8.40	0.00	0.00
Distressed Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00
Cash and Other	0.80	0.73	0.10	1.40	0.30	0.10	2.60	2.35	0.80
Cash, Money Market, Treasuries	0.80	0.73	0.10	1.40	0.30	0.10	2.60	2.35	0.80
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	11	12	14	15	16	17	18	20	22
Domestic Equity	29.75	35.25	74.24	60.00	29.40	48.93	45.60	39.60	35.40
Fixed Income	16.50	29.53	18.53	13.00	10.30	28.17	25.90	31.90	30.50
International Equity	22.00	11.32	0.00	15.00	26.80	21.12	20.10	16.30	24.40
Alternative Strategies	41.50	20.90	0.00	11.00	33.20	0.00	5.40	12.20	7.80
Private Equity	15.00	5.40	0.00	0.00	4.10	0.00	0.00	0.00	0.00
Marketable Alternative Strategies	14.00	13.16	0.00	0.00	9.40	0.00	5.40	0.00	0.00
Venture Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	10.00	2.34	0.00	0.00	17.90	0.00	0.00	12.20	7.80
Commodities & Managed Futures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy/Natural Resources	2.50	0.00	0.00	0.00	1.80	0.00	0.00	0.00	0.00
Distressed Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash and Other	-9.75	3.00	7.23	1.00	0.30	1.78	3.00	0.00	1.90
Cash, Money Market, Treasuries	-9.75	3.00	7.23	0.00	0.30	1.78	3.00	0.00	1.90
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	23	24	25	26	27	28	29	30	31
Domestic Equity	19.72	41.60	20.60	52.60	34.70	44.86	19.52	51.83	31.44
Fixed Income	18.11	18.40	29.20	22.00	32.00	27.69	28.44	27.47	22.99
International Equity	19.46	19.60	19.50	14.20	33.20	21.31	31.54	19.78	28.49
Alternative Strategies	41.53	20.40	30.30	10.60	0.00	3.73	19.76	0.00	16.23
Private Equity	10.32	0.00	18.80	0.00	0.00	0.00	6.00	0.00	7.52
Marketable Alternative Strategies	15.87	9.20	0.00	5.50	0.00	0.00	0.00	0.00	0.00
Venture Capital	2.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	10.31	0.90	8.90	5.10	0.00	0.00	6.50	0.00	4.39
Commodities & Managed Futures	1.12	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy/Natural Resources	1.71	7.10	2.60	0.00	0.00	3.73	7.26	0.00	4.32
Distressed Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash and Other	1.18	0.00	0.40	0.60	0.10	2.41	0.74	0.92	0.85
Cash, Money Market, Treasuries	1.18	0.00	0.40	0.60	0.10	2.41	0.74	0.92	0.85
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	32	34	36	37	38	39	40	41	42
Domestic Equity	45.85	39.72	62.59	51.68	21.24	46.70	34.40	34.70	45.31
Fixed Income	23.77	37.00	26.06	27.48	20.59	20.50	32.40	29.90	23.00
International Equity	13.56	10.60	8.43	20.01	19.95	19.40	32.20	24.60	9.01
Alternative Strategies	14.58	9.88	0.91	0.00	29.39	8.50	0.00	7.80	22.45
Private Equity	0.00	0.00	0.00	0.00	5.22	0.00	0.00	0.00	0.00
Marketable Alternative Strategies	4.45	0.00	0.00	0.00	10.58	0.00	0.00	0.00	10.35
Venture Capital	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.13
Real Estate	10.13	9.88	0.00	0.00	7.65	4.50	0.00	7.80	11.28
Commodities & Managed Futures	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.68
Energy/Natural Resources	0.00	0.00	0.00	0.00	3.32	4.00	0.00	0.00	0.00
Distressed Debt	0.00	0.00	0.00	0.00	1.77	0.00	0.00	0.00	0.00
Cash and Other	2.24	2.80	2.01	0.83	8.83	4.90	1.00	3.00	0.23
Cash, Money Market, Treasuries	2.24	2.80	2.01	0.83	0.24	0.00	1.00	3.00	0.23
Other	0.00	0.00	0.00	0.00	8.58	4.90	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	43	44	45	47	48	49	50	51	52
Domestic Equity	33.76	49.67	11.93	24.50	43.85	44.00	64.10	47.57	39.70
Fixed Income	23.03	27.79	25.80	13.90	27.20	32.00	21.15	17.03	14.90
International Equity	20.06	21.03	12.88	12.50	19.05	12.00	14.31	29.28	23.20
Alternative Strategies	22.65	0.00	46.80	39.80	7.36	10.45	0.00	4.82	21.20
Private Equity	5.37	0.00	14.10	14.90	0.00	0.00	0.00	0.00	0.00
Marketable Alternative Strategies	5.05	0.00	0.00	5.20	0.00	0.00	0.00	0.00	0.00
Venture Capital	0.00	0.00	1.00	4.30	0.00	0.00	0.00	0.00	0.00
Real Estate	12.23	0.00	22.80	6.30	0.00	5.00	0.00	0.00	0.00
Commodities & Managed Futures	0.00	0.00	0.00	2.00	0.00	5.45	0.00	0.00	0.00
Energy/Natural Resources	0.00	0.00	8.40	5.40	7.36	0.00	0.00	4.82	0.00
Distressed Debt	0.00	0.00	0.50	1.70	0.00	0.00	0.00	0.00	0.00
Cash and Other	0.50	1.51	2.60	9.30	2.54	1.55	0.44	1.30	1.00
Cash, Money Market, Treasuries	0.50	1.51	2.60	0.00	2.54	1.55	0.44	1.30	0.00
Other	0.00	0.00	0.00	9.30	0.00	0.00	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	56	57	58	59	62	63	64	65	66
Domestic Equity	29.50	44.10	44.77	33.49	58.10	44.60	47.53	44.00	28.00
Fixed Income	28.90	30.20	27.86	33.28	32.80	30.30	24.35	27.00	25.00
International Equity	24.50	15.40	20.49	31.89	8.30	14.30	20.58	14.00	20.00
Alternative Strategies	16.70	8.10	4.16	0.00	0.00	10.80	6.70	10.00	25.00
Private Equity	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00
Marketable Alternative Strategies	11.10	0.00	0.00	0.00	0.00	5.50	6.70	9.70	4.00
Venture Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	2.60	3.60	0.00	0.00	0.00	5.30	0.00	0.30	7.00
Commodities & Managed Futures	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Energy/Natural Resources	0.00	4.50	4.16	0.00	0.00	0.00	0.00	0.00	0.00
Distressed Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash and Other	0.40	2.20	2.72	1.33	0.80	0.00	0.84	5.00	2.00
Cash, Money Market, Treasuries	0.40	2.20	2.72	1.33	0.80	0.00	0.84	5.00	2.00
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Individual Pension Systems

Asset Allocation

Table 3 - continued

	73	77	78	80	81	82	83	84	85
Domestic Equity	40.00	73.68	50.05	53.00	35.10	60.09	22.23	61.60	69.20
Fixed Income	41.00	22.82	24.07	23.00	32.00	22.74	23.92	27.20	28.20
International Equity	10.00	0.00	15.20	15.00	32.70	12.09	17.48	0.00	0.00
Alternative Strategies	7.00	0.00	0.00	9.00	0.00	3.54	34.12	9.50	0.00
Private Equity	0.00	0.00	0.00	0.00	0.00	0.00	16.08	0.00	0.00
Marketable Alternative Strategies	0.00	0.00	0.00	9.00	0.00	0.00	0.00	9.50	0.00
Venture Capital	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	0.00	0.00	0.00	0.00	0.00	0.00	10.36	0.00	0.00
Commodities & Managed Futures	0.00	0.00	0.00	0.00	0.00	3.54	0.00	0.00	0.00
Energy/Natural Resources	7.00	0.00	0.00	0.00	0.00	0.00	7.68	0.00	0.00
Distressed Debt	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cash and Other	2.00	3.50	10.68	0.00	0.20	1.54	2.25	1.70	2.60
Cash, Money Market, Treasuries	2.00	3.50	0.94	0.00	0.20	1.54	2.25	1.70	2.60
Other	0.00	0.00	9.74	0.00	0.00	0.00	0.00	0.00	0.00

Investment Performance

Table 4 lists investment returns for survey respondents over the one-, three-, five-, 10-, 15- and 20-year periods ending September 30, 2018. For comparison purposes the benchmark of 60% of the MSCI ACWI equity index and 40% of the Bloomberg Barclays Global Aggregate fixed income index is represented by the "Index".

Table 4

Fund	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
1	7.62%	6.70%	5.82%	5.64%	5.01%	n/a
3	7.41%	9.29%	7.19%	8.25%	7.65%	6.88%
4	7.40%	9.18%	6.52%	7.62%	7.26%	6.65%
5	7.23%	9.19%	5.78%	6.53%	n/a	n/a
6	7.35%	9.18%	6.17%	7.07%	6.50%	4.69%
7	7.70%	8.33%	5.53%	7.38%	n/a	n/a
8	3.30%	1.90%	0.00%	2.20%	4.80%	5.30%
9	7.19%	6.38%	n/a	n/a	n/a	n/a
10	8.57%	9.37%	6.28%	8.03%	7.04%	6.58%
11	9.30%	11.01%	7.92%	7.78%	8.25%	7.75%
12	8.63%	7.59%	4.31%	5.66%	5.15%	4.20%
14	16.20%	14.10%	n/a	n/a	n/a	n/a
15	7.22%	8.36%	6.01%	4.61%	n/a	8.20%
16	9.69%	9.92%	7.25%	7.85%	7.83%	n/a
17	5.84%	8.80%	6.10%	6.76%	n/a	n/a
18	7.51%	9.43%	7.09%	7.69%	7.98%	7.58%
20	7.77%	8.45%	7.15%	8.20%	7.53%	6.64%
22	4.84%	9.39%	6.48%	7.84%	6.85%	6.17%
23	6.46%	9.02%	6.92%	6.80%	7.17%	6.59%
24	5.77%	8.14%	5.60%	7.10%	6.73%	5.84%
25	6.90%	10.20%	7.90%	7.80%	7.65%	7.58%
26	10.56%	11.67%	7.71%	7.46%	n/a	n/a
27	7.81%	8.45%	6.07%	8.09%	n/a	n/a
28	6.02%	8.59%	6.08%	6.19%	5.15%	n/a
29	6.56%	9.33%	7.03%	8.34%	7.97%	7.14%
30	5.70%	8.63%	5.91%	6.71%	n/a	n/a
31	7.30%	10.11%	7.57%	8.20%	8.53%	7.88%
32	10.64%	11.36%	9.34%	8.70%	7.55%	7.20%
34	5.88%	8.41%	6.97%	6.82%	6.36%	n/a
36	11.25%	11.02%	8.87%	8.83%	7.57%	n/a
37	5.71%	8.65%	6.04%	6.95%	6.95%	5.79%
38	5.88%	9.15%	6.93%	6.48%	6.92%	6.66%

Fund	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
39	8.85%	10.39%	n/a	n/a	n/a	n/a
40	8.35%	n/a	n/a	n/a	n/a	n/a
41	5.04%	9.11%	5.93%	7.61%	6.67%	6.04%
42	8.59%	10.71%	7.89%	8.47%	7.57%	8.33%
43	7.43%	9.20%	5.59%	6.92%	7.28%	6.88%
44	5.61%	8.54%	5.97%	6.82%	7.34%	6.94%
45	3.30%	1.90%	0.00%	2.20%	4.80%	5.30%
47	8.31%	9.98%	8.05%	8.08%	9.06%	8.71%
48	5.91%	5.20%	3.56%	6.20%	6.91%	5.65%
49	6.36%	9.72%	n/a	n/a	n/a	n/a
50	7.51%	9.43%	6.55%	7.20%	7.49%	6.90%
51	7.94%	9.91%	5.73%	6.17%	6.24%	6.47%
52	2.52%	7.49%	4.91%	5.97%	6.45%	5.75%
56	7.13%	8.22%	6.35%	n/a	n/a	n/a
57	8.99%	10.87%	6.90%	n/a	n/a	n/a
58	5.52%	8.52%	n/a	n/a	n/a	n/a
59	5.96%	9.21%	7.47%	n/a	n/a	n/a
62	9.60%	10.26%	8.48%	n/a	n/a	n/a
63	7.62%	9.35%	7.79%	n/a	n/a	n/a
64	5.11%	8.75%	7.00%	6.36%	n/a	n/a
65	-1.77%	7.36%	6.16%	8.03%	n/a	n/a
66	8.27%	9.69%	7.66%	7.94%	7.44%	n/a
73	6.58%	8.69%	6.58%	8.00%	n/a	n/a
77	8.42%	9.49%	8.44%	n/a	n/a	n/a
78	5.63%	8.06%	6.35%	n/a	n/a	n/a
80	6.29%	9.15%	6.41%	6.34%	4.86%	n/a
81	7.45%	2.49%	n/a	n/a	n/a	n/a
82	9.17%	9.06%	n/a	n/a	n/a	n/a
83	5.14%	n/a	n/a	n/a	n/a	n/a
84	8.47%	9.92%	6.97%	7.65%	n/a	n/a
85	7.28%	7.63%	5.28%	6.50%	n/a	n/a
Index	5.28%	8.81%	5.55%	6.30%	6.50%	5.47%

Five Year Return versus Standard Deviation

Figure 4

For the Five Years Ending September 30, 2018

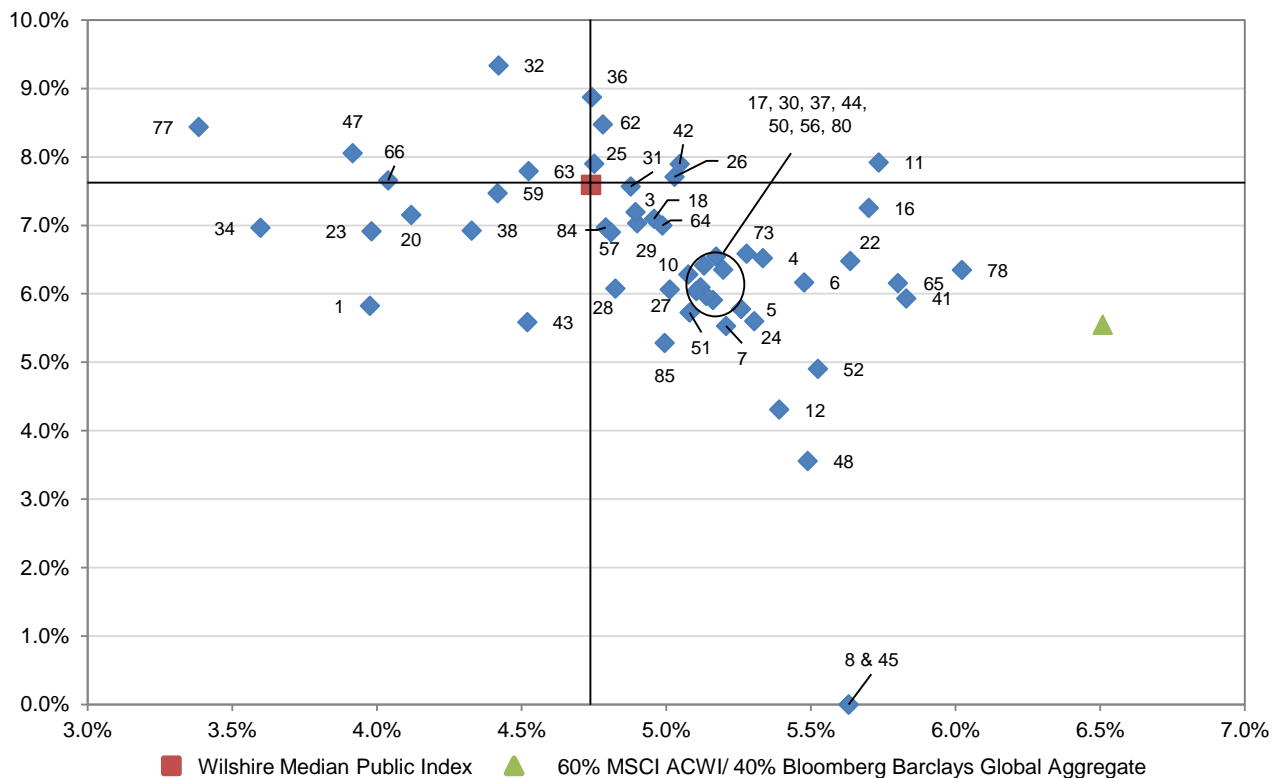


Figure 4 shows the five-year return and standard deviation characteristics of the individual TEXPERS survey respondents versus two benchmarks. The first benchmark defines the four quadrants and is the Wilshire Public Funds Universe, representing the returns of Wilshire’s public fund clients. The second benchmark is a combination of 60% of the MSCI ACWI equity index and 40% of the Bloomberg Barclays Global Aggregate fixed income index. Annualized return and standard deviation are based on quarterly returns for the period. Standard deviation is a measure of the dispersion or volatility of the quarterly returns around their average value.

The points representing the performance of the TEXPERS survey respondents are located in all four quadrants of the chart. Five respondents are located in the most desirable northwest quadrant, indicating higher returns with less standard deviation than the benchmark. Fourteen respondents are located in the northeast or southwest quadrants, indicating reasonable return versus standard deviation trade-offs. That is, they have either a higher return with a higher standard deviation, or a lower return with a lower standard deviation, than the benchmark. Thirty-five respondents are located in the least desirable southeast quadrant, where return is lower and standard deviation is higher than the benchmark.

Ten Year Return versus Standard Deviation

Figure 5

For the Ten Years Ending September 30, 2018

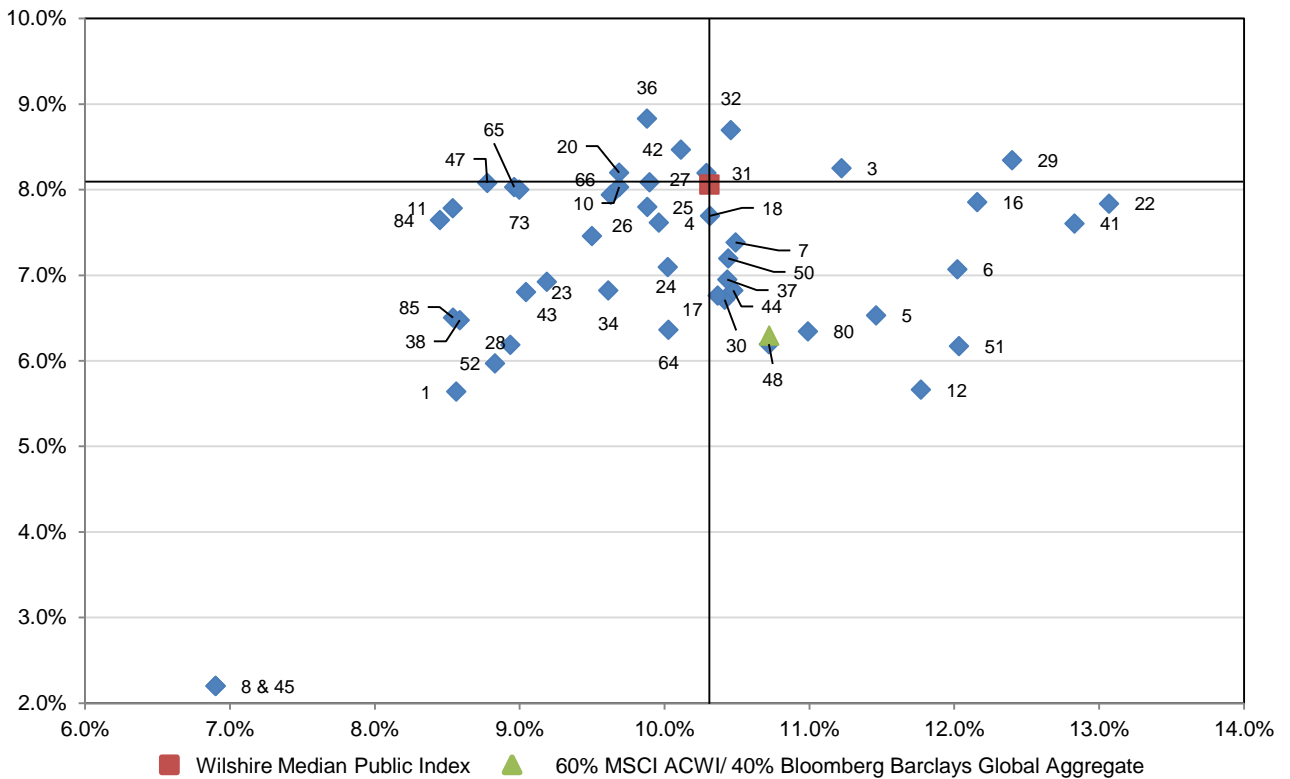


Figure 5 shows 10-year return and standard deviation characteristics of individual TEXPERS survey respondents versus two benchmarks. The first benchmark defines the four quadrants and is the Wilshire Public Funds Universe, representing the returns of Wilshire’s public fund clients. The second benchmark is a combination of 60% of the MSCI ACWI equity index and 40% of the Bloomberg Barclays Global Aggregate fixed income index. Annualized return and standard deviation are based on quarterly returns for the period. Standard deviation is a measure of the dispersion or volatility of the quarterly returns around their average value.

The points representing the performance of the TEXPERS survey respondents are located in all four quadrants of the chart. Six respondents are located in the most desirable northwest quadrant, indicating higher returns with less standard deviation than the benchmark. Twenty-five respondents are located in the northeast or southwest quadrants, indicating reasonable return versus standard deviation trade-offs. That is, they have either a higher return with a higher standard deviation, or a lower return with a lower standard deviation, than the benchmark. Sixteen respondents are located in the least desirable southeast quadrant, where return is lower and standard deviation is higher than the benchmark.

Fifteen Year Return versus Standard Deviation

Figure 6

For the Fifteen Years Ending September 30, 2018

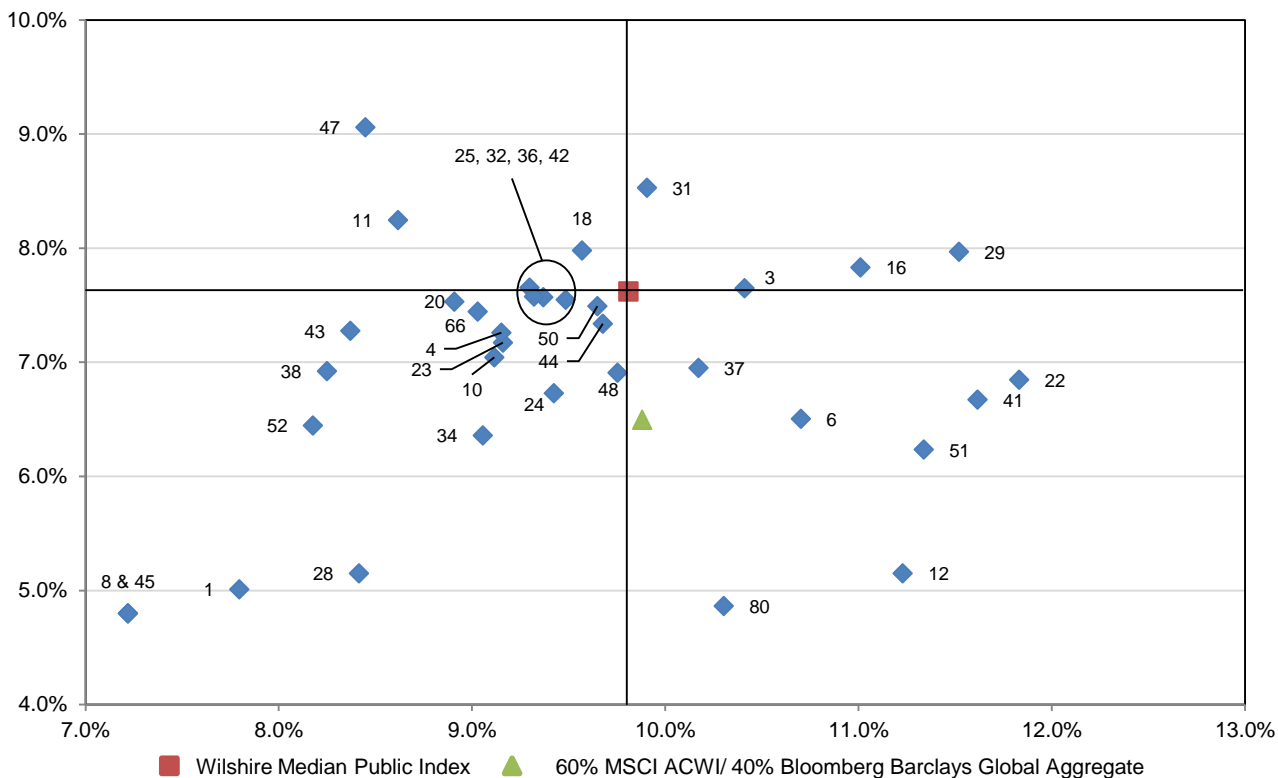


Figure 6 shows 15-year return and standard deviation characteristics of individual TEXPERS survey respondents versus two benchmarks. The first benchmark defines the four quadrants and is the Wilshire Public Funds Universe, representing the returns of Wilshire’s public fund clients. The second benchmark is a combination of 60% of the MSCI ACWI equity index and 40% of the Bloomberg Barclays Global Aggregate fixed income index. Annualized return and standard deviation are based on quarterly returns for the period. Standard deviation is a measure of the dispersion or volatility of the quarterly returns around their average value.

The points representing the performance of the TEXPERS survey respondents are located in all four quadrants of the chart. Four respondents are located in the most desirable northwest quadrant, indicating higher returns with less standard deviation than the benchmark. Twenty-four respondents are located in the northeast or southwest quadrants, indicating reasonable return versus standard deviation trade-offs. That is, they have either a higher return with a higher standard deviation, or a lower return with a lower standard deviation, than the benchmark. Seven respondents are located in the least desirable southeast quadrant, where return is lower and standard deviation is higher than the benchmark.

Twenty Year Return versus Standard Deviation

Figure 7

For the Twenty Years Ending September 30, 2018

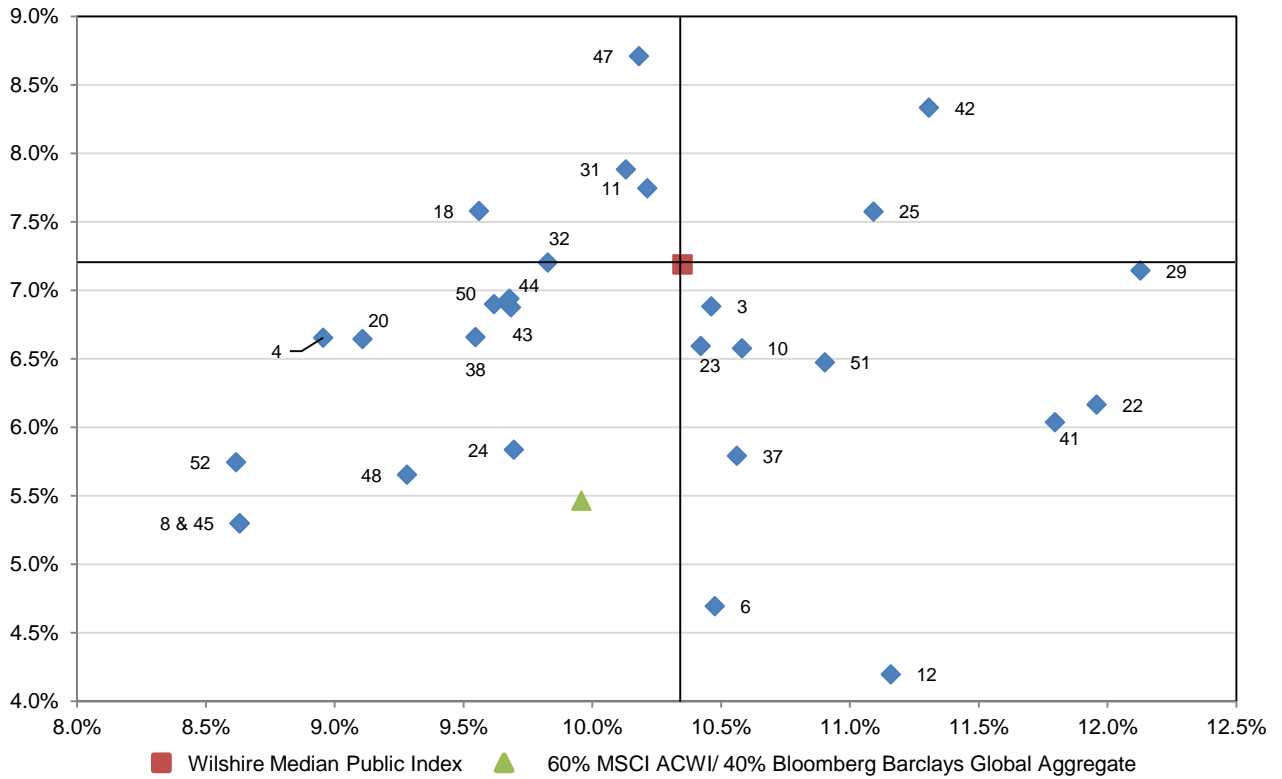


Figure 7 shows 20-year return and standard deviation characteristics of individual TEXPERS survey respondents versus two benchmarks. The first benchmark defines the four quadrants and is the Wilshire Public Funds Universe, representing the returns of Wilshire’s public fund clients. The second benchmark is a combination of 60% of the MSCI ACWI equity index and 40% of the Bloomberg Barclays Global Aggregate fixed income index. Annualized return and standard deviation are based on quarterly returns for the period. Standard deviation is a measure of the dispersion or volatility of the quarterly returns around their average value.

The points representing the performance of the TEXPERS survey respondents are located in all four quadrants of the chart. Six respondents are located in the most desirable northwest quadrant, indicating higher returns with less standard deviation than the benchmark. Thirteen respondents are located in the northeast or southwest quadrants, indicating reasonable return versus standard deviation trade-offs. That is, they have either a higher return with a higher standard deviation, or a lower return with a lower standard deviation, than the benchmark. Ten respondents are located in the least desirable southeast quadrant, where return is lower and standard deviation is higher than the benchmark.

Appendix 1

Asset Allocation and Investment Performance Study of TEXPERS Members

TEXPERS 2018 SURVEY

Name of Plan

Total Fund Rates of Returns (%)

Quarter Ending	Gross Return	Net Return
September 30, 2018		
June 30, 2018		
March 31, 2018		
December 31, 2017		

Historical Net Rates of Return (%) (only required if this is the first year that you are responding to the survey)

Quarter Ending	Mar 31	Jun 30	Sep 30	Dec 31
2017				
2016				
2015				
2014				
2013				
2012				
2011				
2010				
2009				
2008				
2007				
2006				
2005				

Actuarial Investment Return Assumption (%)
Inflation Assumption (%)

Total Fund Value (\$) \$ -

Expected Employer Contribution (Optional Questions)

Did your fund receive its full expected employer contribution for the last fiscal year? (Y / N / Uncertain)

Please provide thoughts / commentary as to why you did not receive the full contribution for last fiscal year:

Funded Ratio as at 9/30/2018 (%)

Asset Allocation and Investment Performance Study of TEXPERS Members

Asset Allocation (total should equal 100%)		Percentage Invested at 9/30/2018
Domestic Equities		
Total Domestic Equities		0.00%
<i>Active (Include REITs)</i>		
<i>Index (Passive/Enhanced)</i>		
<i>Multi-Strategy Equity Fund</i>		
Fixed Income		
Total Fixed Income		0.00%
<i>Domestic (U.S.) Investment Grade (Active) (Include TIPS)</i>		
<i>Domestic (U.S.) Investment Grade (Passive)</i>		
<i>Domestic (U.S.) Non-Investment Grade (Active or Passive)</i>		
<i>International (Non-U.S.) Investment Grade (Active or Passive)</i>		
<i>Emerging Markets (Active or Passive)</i>		
<i>Multi-Strategy Bond Fund</i>		
<i>Other Credit Strategies</i>		
International Equities		
Total International Equities		0.00%
<i>Active MSCI EAFE®</i>		
<i>Passive/Index MSCI EAFE®</i>		
<i>Emerging Markets</i>		
Alternative Strategies		
Total Alternative Strategies		0.00%
<i>Real Estate (excl REITs)</i>		
<i>Venture Capital</i>		
<i>Private Equity (LBOs, Mezzanine, M&A Funds)</i>		
<i>Commodities & Managed Futures</i>		
<i>Marketable Alternative Strategies (Hedge Funds, Derivatives)</i>		
<i>Energy/Natural Resources</i>		
<i>Distressed Debt</i>		
Cash and Other		
Total Cash and Other		0.00%
<i>Cash, Money Market, Treasuries</i>		
<i>Other (Please Specify Below)</i>		
TOTAL		0.00%

Ok to identify your fund by name in the annual performance report? (Y/N)

Appendix 2

List of TEXPERS Survey Respondents

Abilene Firemen's Relief & Retirement Fund	Irving Supplemental Benefit Plan
Amarillo Firemen's Relief & Retirement Fund	Killeen Firefighter's Relief & Retirement Fund
Atlanta Firemen's Relief & Retirement Fund	Laredo Firefighters Retirement System
Austin Firefighters Relief & Retirement Fund	Longview Firefighters' Relief & Retirement Fund
Austin Police Retirement System	Lubbock Fire Pension Fund
Beaumont Firemen's Relief & Retirement Fund	Lufkin Firemen's Relief & Retirement Fund
Big Spring Firemen's Relief & Retirement Fund	Marshall Firemen's Relief & Retirement Fund
Brazos River Authority R Plan for Employees	MTA of Harris County Workers Non Union Pension Plan
Brownwood Firemen's Relief & Retirement Fund	MTA of Harris County Workers Union Pension Plan
Capital MTA Retirement Plan for StarTran Bargaining Unit Empl.	Odessa Firefighters Relief & Retirement Fund
Capital MTA Retirement Plan for Administrative Employees	Orange Firemen's Relief & Retirement Fund
Conroe Firefighter Relief & Retirement Fund	Paris Firefighters' Relief & Retirement Fund
Corpus Christi Firefighters' Retirement System	Plainview Firemen's Relief & Retirement Fund
Corsicana Firefighter's Relief & Retirement Fund	Plano Retirement Security Plan
CPS Energy Employees' Benefit Trust	Port Arthur Firemen's Relief & Retirement Fund
Dallas Employees' Retirement Fund	Port of Houston Authority
Dallas Fort Worth International Airport Board Retirement Trust	San Antonio Fire & Police Pension Fund
Dallas Police & Fire Pension System	San Benito Firemen Relief and Retirement Fund
Dallas Police & Fire Pension System Supplemental Plan	Sweetwater Firemen's Relief & Retirement Fund
DART Employees' Def. Ben. R Plan & Trust	Temple Fire Fighter's Relief & Retirement Fund
El Paso City Employees' Pension Fund	Texarkana Firemen's Relief & Retirement Fund
El Paso Firemen & Policemen's Pension Fund	Texas Emergency Services Retirement System
Floresville Electric Light & Power Pension Plan	Texas Employees Retirement System
Fort Worth Employees' Retirement Fund	Travis County ESD#6 Firefighters' R & R Fund
Galveston Employees Retirement Fund	Tyler Firefighter's Relief & Retirement Fund
Galveston Firefighter's Pension Fund	University Park Firefighter Relief & Retirement Fund
Galveston Retirement Plan for Police	VIA Metropolitan Transit Retirement Plan
Guadalupe Blanco River Auth. Def. B R Plan	Waxahachie Firefighter's Relief & Retirement Fund
Harlingen Firemen's Relief & Retirement Fund	Weslaco Firemen's Relief & Retirement Fund
Houston Municipal Employees Pension System	Wichita Falls Firemens Relief & Retirement Fund
Houston Police Officers' Pension System	Woodland Firefighters' Retirement System
Irving Firemen's Relief & Retirement Fund	

Appendix 3

Respondent Fund Number – Name Cross Reference

Number	Name
24	Abilene Firemen's Relief & Retirement Fund
14	Amarillo Firemen's Relief & Retirement Fund
30	Atlanta Firemen's Relief & Retirement Fund
25	Austin Firefighters Relief & Retirement Fund
15	Austin Police Retirement System
26	Beaumont Firemen's Relief & Retirement Fund
18	Big Spring Firemen's Relief & Retirement Fund
78	Brazos River Authority R Plan for Employees
27	Brownwood Firemen's Relief & Retirement Fund
64	Capital Metro Retirement Plan for StarTran, Inc. Bargaining Unit Employees
65	Capital Metropolitan Transportation Authority Retirement Plan for Administrative Employees
20	Corpus Christi Firefighters' Retirement System
8	Dallas Police & Fire Pension System
45	Dallas Police & Fire Pension System Supplemental Plan
83	Dallas Fort Worth International Airport Board Retirement Trust
34	DART Employees' Def. Ben. R Plan & Trust
31	El Paso Firemen & Policemen's Pension Fund
3	El Paso City Employees' Pension Fund
23	Fort Worth Employees' Retirement Fund
84	Galveston Employees Retirement Fund
56	Galveston Firefighter's Pension Fund
85	Galveston Retirement Plan for Police
5	Guadalupe Blanco River Auth. Def. B R Plan
50	Harlingen Firemen's Relief & Retirement Fund
11	Houston Police Officers' Pension System
16	Irving Firemen's Relief & Retirement Fund
6	Laredo Firefighters Retirement System
12	Longview Firefighters' Relief & Retirement Fund
43	Lubbock Fire Pension Fund
28	Lufkin Firemen's Relief & Retirement Fund
17	Marshall Firemen's Relief & Retirement Fund
41	MTA of Harris County Workers Non Union Pension Plan
22	MTA of Harris County Workers Union Pension Plan
51	Odessa Firefighters Relief & Retirement Fund
4	Orange Firemen's Relief & Retirement Fund
58	Paris Firefighters' Relief & Retirement Fund
36	Plano Retirement Security Plan
59	Port Arthur Firemen's Relief & Retirement Fund
73	Port of Houston Authority
38	San Antonio Fire & Police Pension Fund
81	San Benito Firemen Relief and Retirement Fund
44	Sweetwater Firemen's Relief & Retirement Fund
52	Temple Fire Fighter's Relief & Retirement Fund
48	Texarkana Firemen's Relief & Retirement Fund
39	Texas Emergency Services Retirement System
66	Texas Employees Retirement System
62	Travis County ESD#6 Firefighters' R & R Fund
49	Tyler Firefighter's Relief & Retirement Fund
32	VIA Metropolitan Transit Retirement Plan
10	Waxahachie Firefighter's Relief & Retirement Fund
77	Weslaco Firemen's Relief & Retirement Fund
63	Wichita Falls Firemens Relief & Retirement Fund

Appendix 4

Respondent Fund Number – Return Assumptions

Fund	Nominal	Inflation	Real
1	7.00%	2.50%	4.50%
3	7.50%	3.00%	4.50%
4	7.75%	2.00%	5.75%
5	7.00%	3.00%	4.00%
6	7.90%	3.25%	4.65%
7	7.00%	3.00%	4.00%
8	7.25%	2.75%	4.50%
9			
10	7.00%	2.00%	5.00%
11	7.00%	2.75%	4.25%
12	8.00%	3.00%	5.00%
14	7.50%	2.50%	5.00%
15	7.70%	3.00%	4.70%
16	7.50%	2.75%	4.75%
17		2.30%	
18	8.00%	3.00%	5.00%
20	7.75%	3.50%	4.25%
22	6.75%	2.30%	4.45%
23	7.75%	2.75%	5.00%
24	8.00%	3.00%	5.00%
25	7.70%	3.50%	4.20%
26	8.00%	2.50%	5.50%
27	7.25%	3.25%	4.00%
28	7.50%	2.30%	5.20%
29	7.75%	2.75%	5.00%
30	7.40%	3.00%	4.40%
31	7.75%	3.00%	4.75%
32	7.25%	2.75%	4.50%
34	6.75%	2.50%	4.25%
36	7.00%	2.50%	4.50%
37	7.75%	2.30%	5.45%
38	7.25%	3.00%	4.25%

Fund	Nominal	Inflation	Real
39	7.75%	3.00%	4.75%
40	7.50%		
41	6.75%	2.30%	4.45%
42	7.25%	3.00%	4.25%
43	7.75%	3.00%	4.75%
44	8.00%	3.00%	5.00%
45	7.25%	2.75%	4.50%
47	7.00%	2.25%	4.75%
48	7.75%	3.25%	4.50%
49	7.50%	3.40%	4.10%
50	7.75%	2.30%	5.45%
51	7.75%	3.50%	4.25%
52	7.75%	2.75%	5.00%
56	7.75%	3.00%	4.75%
57	7.75%		
58	7.50%	2.30%	5.20%
59	8.00%	3.00%	5.00%
62	7.00%	2.50%	4.50%
63	7.75%	3.00%	4.75%
64	7.25%		
65	6.75%		
66	7.50%	2.50%	5.00%
73	6.75%	2.50%	4.25%
77	7.25%	3.25%	4.00%
78	6.50%	3.50%	3.00%
80	6.50%	2.50%	4.00%
81	7.50%		
82			
83	4.75%	2.50%	2.25%
84	7.25%	2.75%	4.50%
85	7.50%	2.45%	5.05%