Supplemental Report for the State of Connecticut

Introduction

In our original report, among other things, we compared the risk and return characteristics of the State of Connecticut Model portfolios to those of model portfolios recommended by TIAA-CREF in some of its literature. At the time of that report, the State of Connecticut provided two different sets of model portfolios that were created by TIAA-CREF based on using its variable annuity funds. The first set was described in a document identified as G10.1.3N-1004, and the second was included in a document entitled "Building Your Retirement Portfolio A30211 (05/06)". Because the first set of model portfolios provided asset allocations based on specific TIAA-CREF Retirement Annuities, we compared those portfolios to the State of Connecticut model portfolios in our original report. The State of Connecticut has now requested that we also examine the performance of its model portfolios relative to those contained in the second document, as it appears to reflect the current recommendations of TIAA-CREF. In this supplemental report, we present the results of that comparison.

Methodology

As explained in the original report, in lieu of the TIAA-CREF Traditional Annuity (which is not fully liquid), we substitute the fully liquid CREF Money Market Retirement Annuity. We also substituted the CREF Money Market Annuity for the CT Stable Value Fund. Although the fund is fully liquid and offers a 3% guarantee similar to the TIAA Traditional Account, it is not marked to market. Because the TIAA Real Estate Annuity is invested in assets that are not consistently marked to market, not disclosed to investors, and has restrictions on trading, we used the Vanguard REIT Index in lieu of the TIAA Real Estate Annuity.

In this supplemental report, we continue to substitute the CREF Money Market Fund for the Traditional Annuity and the CT Stable Value Fund. However, despite the above stated concerns, we have used the TIAA Real Estate Annuity risk and return characteristics (mean and variance) as described in the historical price data on the TIAA-CREF website. In this report, we replicate part of the prior analysis, and we refer to the allocations in the original report as Model I.

The second above-referenced document, "Building Your Retirement Portfolio" is less clear than the first in describing the investment recommendations for the TIAA-CREF Model Portfolios. Whereas the first document uses the CREF Stock Annuity for equity allocations, and uses either the CREF Inflation-Linked Bond Annuity or the CREF Bond Market Annuity for debt allocations, the second document refers generically to "Fixed-Income" and "Equities". When ARP participants use the TIAA-CREF website to complete an asset allocation questionnaire and receive a resulting model portfolio the results are based upon the same models contained in this document. In those models, the equity portion of the portfolio is allocated among large cap, small/mid-cap and international equities. Because large cap, small/mid-cap and international asset classes are not available in the TIAA-CREF variable annuity fund line-up, and because no explicit allocations to TIAA-CREF annuities are offered, we construct model portfolios in 5

different ways: (i) Model IIA uses the CREF Stock Annuity, (ii) Model IIB uses the CREF Global Equities Annuity, (iii) Model IIC uses the CREF Growth Annuity, (iv) Model IID uses the CREF Equity Index, and Model IIE uses the average returns of each of the prior four. Because the fixed income allocations also were not explicit we used the average of the return on the CREF Inflation-Linked Bond Annuity and the CREF Bond Market Annuity for the fixed income allocation in all models.

Results

Supplemental Table 7 is an update to Table 7 in the original report, adding the Model IIA-E results and using the TIAA Real Estate Annuity in Model I. Supplemental Figure 1 is a new figure that graphically shows the mean annualized returns of the State of Connecticut models and for TIAA-CREF Model 1 and Models IIA-E. In terms of average returns by risk tolerance category (Conservative through Aggressive), the average annualized returns of the State of Connecticut model portfolios are consistently higher.[1]

Supplemental Figure 6 updates Figure 6 in the original report by adding the Model IIA-E results and changing Model I to the CREF Real Estate Annuity. The figure shows risk and return comparisons of the model portfolios, as well as the efficient frontiers (not updated) and the naïve strategies (not updated). In general, the Model II strategies span a wider range of volatilities than do the Model 1 strategies. However, at any given risk level, the Model II returns generally are lower than those of Model I (which, in turn, are lower than the Model I results in the original report, due to the change in how real estate is incorporated. All versions of the TIAA-CREF models indicate risk-return trade-offs that are below those of the State of Connecticut models. Supplemental Table 7 shows that over investment horizons of from 5 to 20 years, the differences in average returns between State of Connecticut models and those of TIAA-CREF generally are economically important, especially for the higher risk strategies.

Supplemental Figure 3 is an update of the cumulative performance of buy-and-hold returns for the various Aggressive model portfolio strategies. Consistent with the other results, the State of Connecticut Aggressive model portfolio yields cumulative returns that are substantially higher.

Supplemental Table 7

[1] See the original report for discussion on interpretation of this comparison.

Comparison of Portfolio Opportunites with Naïve (1/n) Investing and Model Portfolios

Annualized expected returns and standard deviations based on equal investments in all available investment funds and implied cumulative trturns over various holding periods. Results are based on monthly realized returns from April 1, 1997 through March 31, 2007.

Annualized Expected Return and Risk

	TIAA + Van (1/n)	TIAA-CREF (1/n)	State of Connecticut (1/n)	TIAA-CREF - Conservative Model I	TIAA-CREF - Moderately Conservative Model I	TIAA-CREF - Moderately Aggressive Model I	TIAA-CREF - Aggressive Model I
Expected Return	**8.96%**	**7.37%**	**11.63%**	**6.33%**	**7.53%**	**8.43%**	**9.30%**
Standard Deviation	**9.50%**	**8.86%**	**10.46%**	**4.33%**	**7.20%**	**8.64%**	**10.82%**
Year							
Cumulative Expected Values							
5	1.54	1.43	1.73	1.36	1.44	1.50	1.56
10	2.36	2.04	3.01	1.85	2.07	2.25	2.43
15	3.62	2.91	5.21	2.51	2.97	3.37	3.80
20	5.57	4.15	9.03	3.42	4.27	5.04	5.92

	TIAA-CREF - Conservative Model IIA	TIAA-CREF - Moderately Conservative Model IIA	TIAA-CREF - Moderate Model IIA	TIAA-CREF - Moderately Aggressive Model IIA	TIAA-CREF - Aggressive Model IIA
Expected Return	**5.74%**	**6.78%**	**7.72%**	**8.80%**	**9.33%**
Standard Deviation	**3.01%**	**5.87%**	**8.60%**	**10.78%**	**12.88%**
5	1.32	1.39	1.45	1.52	1.56
10	1.75	1.93	2.10	2.32	2.44
15	2.31	2.68	3.05	3.54	3.81
20	3.05	3.72	4.42	5.40	5.95

	TIAA-CREF - Conservative Model IIB	TIAA-CREF - Moderately Conservative Model IIB	TIAA-CREF - Moderate Model IIB	TIAA-CREF - Moderately Aggressive Model IIB	TIAA-CREF - Aggressive Model IIB
Expected Return	**5.57%**	**6.44%**	**7.21%**	**8.17%**	**8.57%**
Standard Deviation	**3.17%**	**6.28%**	**9.23%**	**11.58%**	**13.84%**
5	1.31	1.37	1.42	1.48	1.51
10	1.72	1.87	2.01	2.19	2.28
15	2.26	2.55	2.84	3.25	3.43
20	2.96	3.48	4.02	4.81	5.18

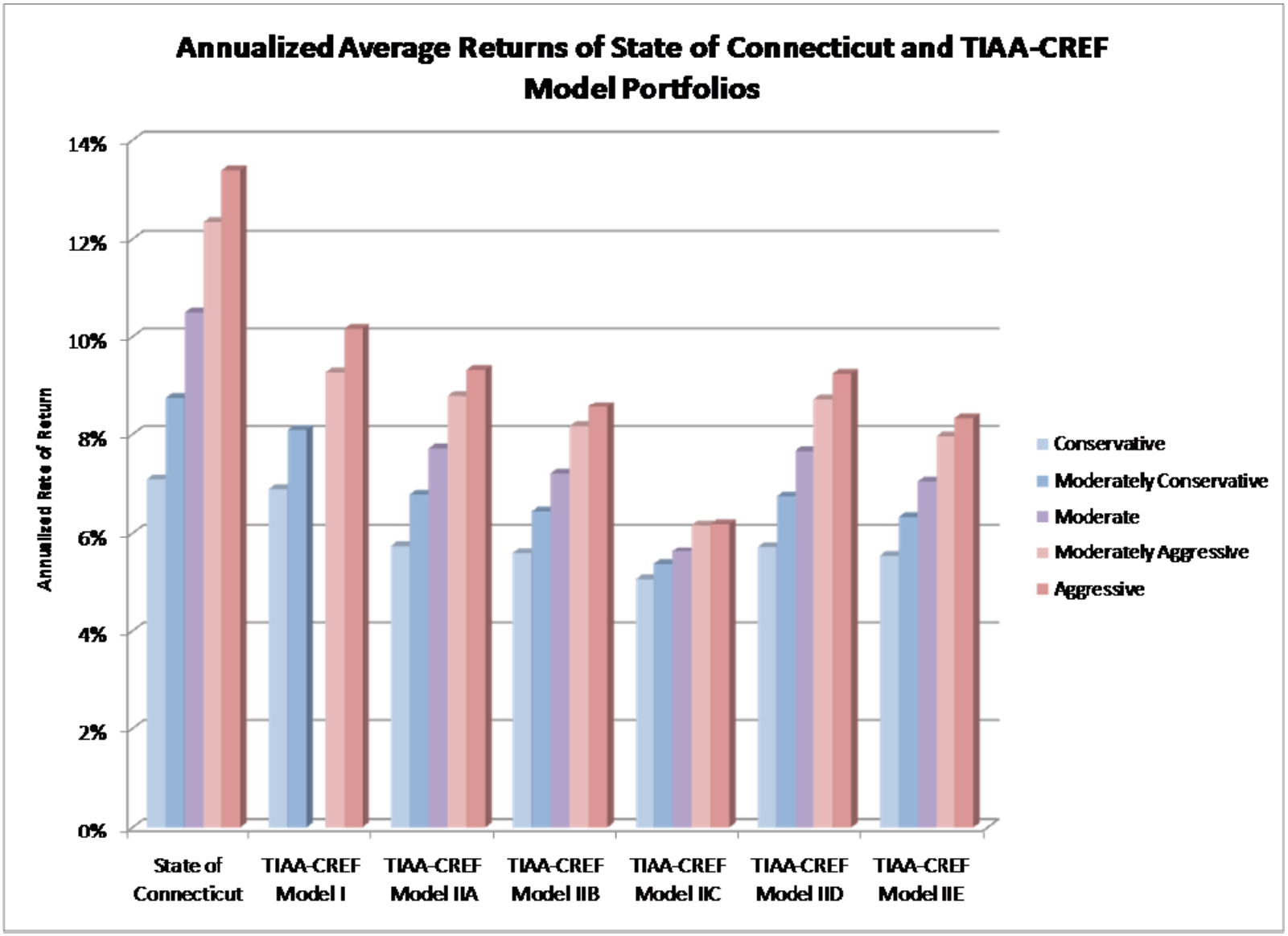
	TIAA-CREF - Conservative Model IIC	TIAA-CREF - Moderately Conservative Model IIC	TIAA-CREF - Moderate Model IIC	TIAA-CREF - Moderately Aggressive Model IIC	TIAA-CREF - Aggressive Model IIC
Expected Return	**5.05%**	**5.35%**	**5.61%**	**6.16%**	**6.19%**
Standard Deviation	**4.07%**	**8.20%**	**12.04%**	**15.09%**	**17.99%**
5	1.28	1.30	1.31	1.35	1.35
10	1.64	1.68	1.73	1.82	1.82
15	2.09	2.19	2.27	2.45	2.46
20	2.68	2.84	2.98	3.30	3.32

	TIAA-CREF - Conservative Model IID	TIAA-CREF - Moderately Conservative Model IID	TIAA-CREF - Moderate Model IID	TIAA-CREF - Moderately Aggressive Model IID	TIAA-CREF - Aggressive Model IID
Expected Return	**5.72%**	**6.75%**	**7.66%**	**8.74%**	**9.25%**
Standard Deviation	**3.05%**	**5.97%**	**8.74%**	**10.96%**	**13.09%**
5	1.32	1.39	1.45	1.52	1.56
10	1.74	1.92	2.09	2.31	2.42
15	2.30	2.66	3.03	3.51	3.77
20	3.04	3.69	4.38	5.34	5.87

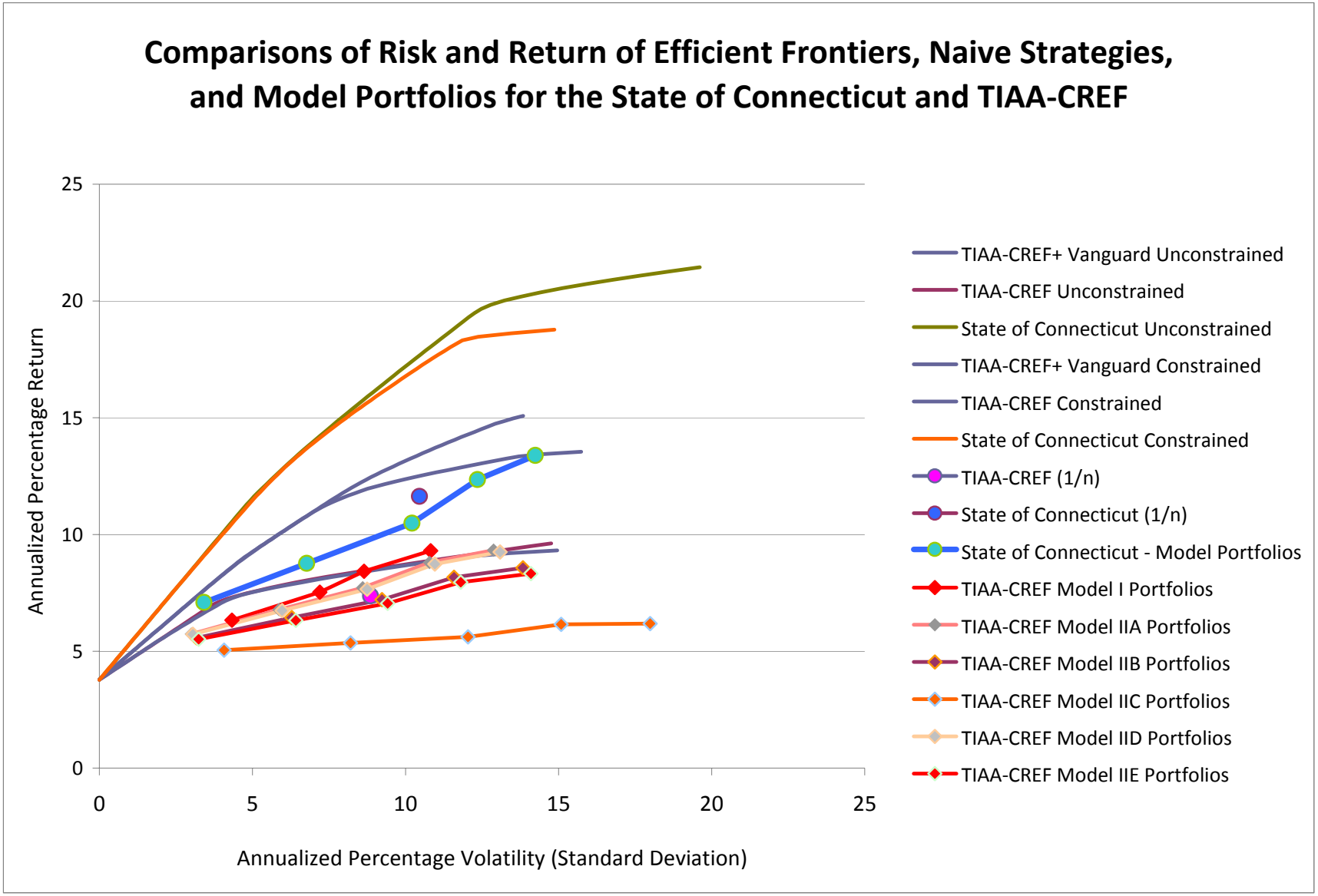
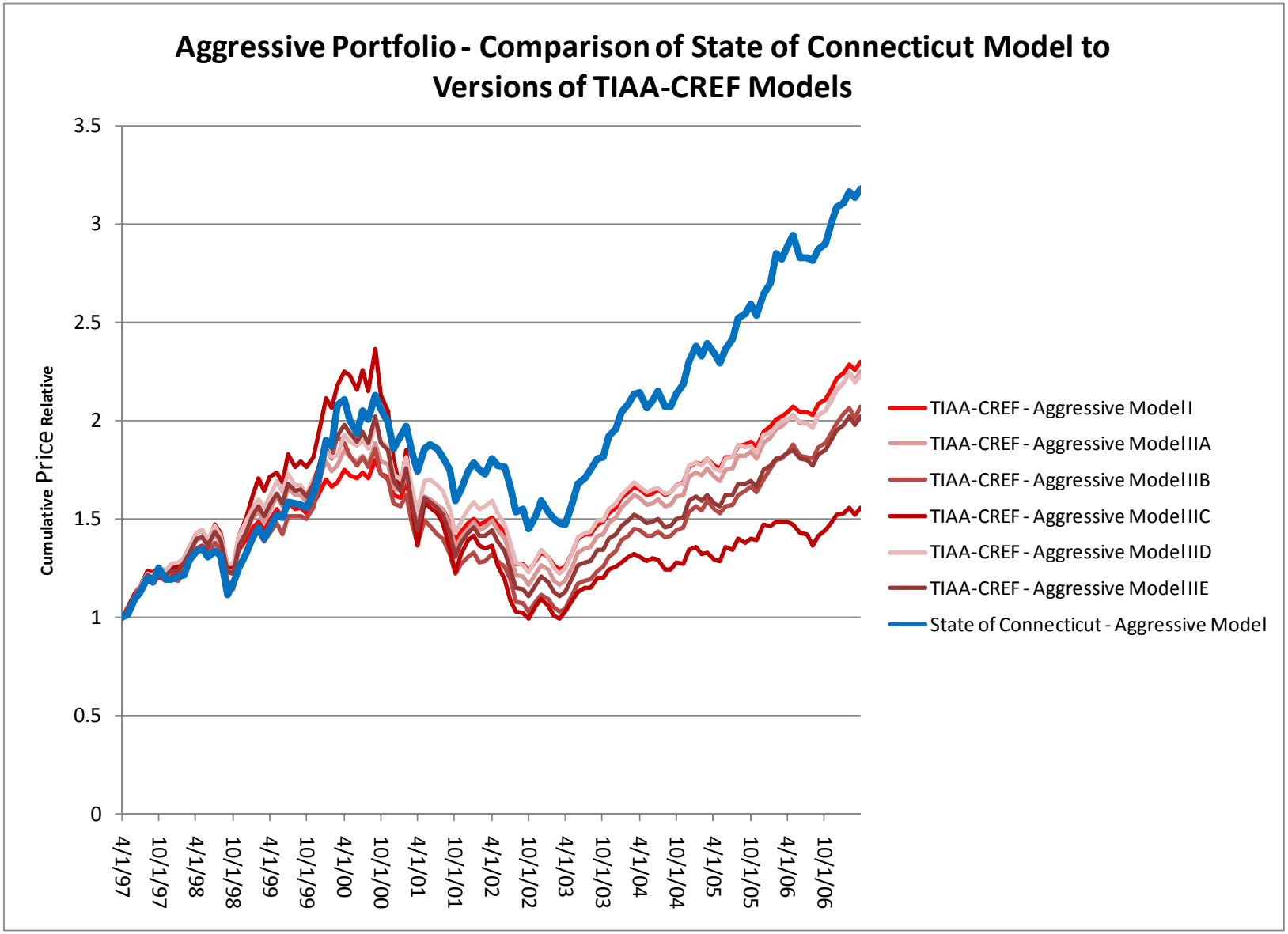
	TIAA-CREF - Conservative Model IIE	TIAA-CREF - Moderately Conservative Model IIE	TIAA-CREF - Moderate Model IIE	TIAA-CREF - Moderately Aggressive Model IIE	TIAA-CREF - Aggressive Model IIE
Expected Return	**5.52%**	**6.33%**	**7.05%**	**7.96%**	**8.33%**
Standard Deviation	**3.24%**	**6.41%**	**9.41%**	**11.80%**	**14.09%**
5	1.31	1.36	1.41	1.47	1.49
10	1.71	1.85	1.98	2.15	2.23
15	2.24	2.51	2.78	3.16	3.32
20	2.93	3.41	3.90	4.63	4.95

	State of Connecticut - Conservative Model	State of Connecticut - Moderately Conservative Model	State of Connecticut - Moderate Model	State of Connecticut - Moderately Aggressive Model	State of Connecticut - Aggressive Model
Expected Return	**7.09%**	**8.76%**	**10.49%**	**12.35%**	**13.39%**
Standard Deviation	**3.42%**	**6.77%**	**10.21%**	**12.35%**	**14.24%**
5	1.41	1.52	1.65	1.79	1.87
10	1.98	2.32	2.71	3.20	3.51
15	2.79	3.53	4.46	5.73	6.59
20	3.94	5.37	7.35	10.26	12.35

Supplemental Figure 1



Supplemental Figure 6



Supplemental Figure 3