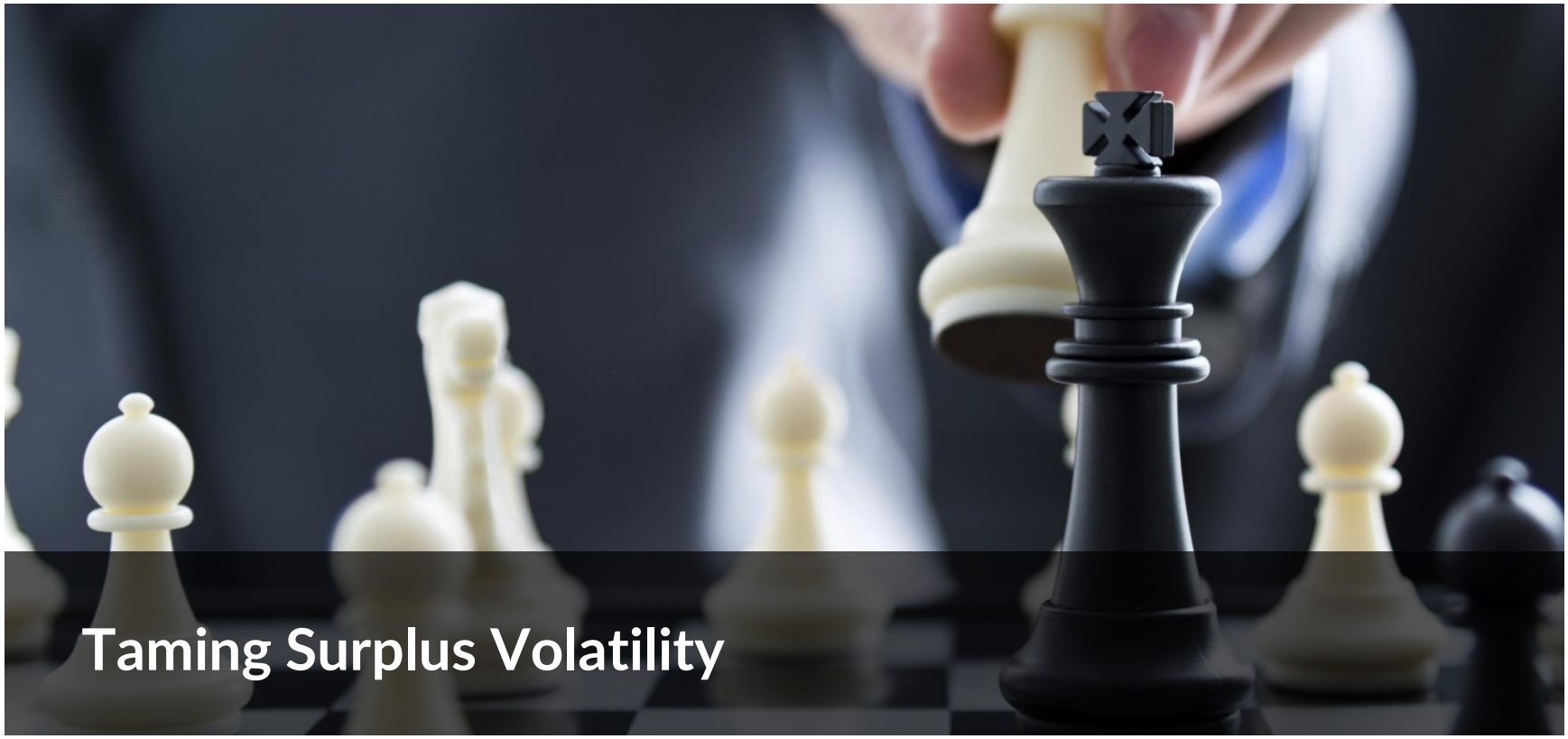

Taming Surplus Volatility

March 3, 2016

Mr. Alton Cogert, CFA, CPA, CAIA, CGMA
President & CEO

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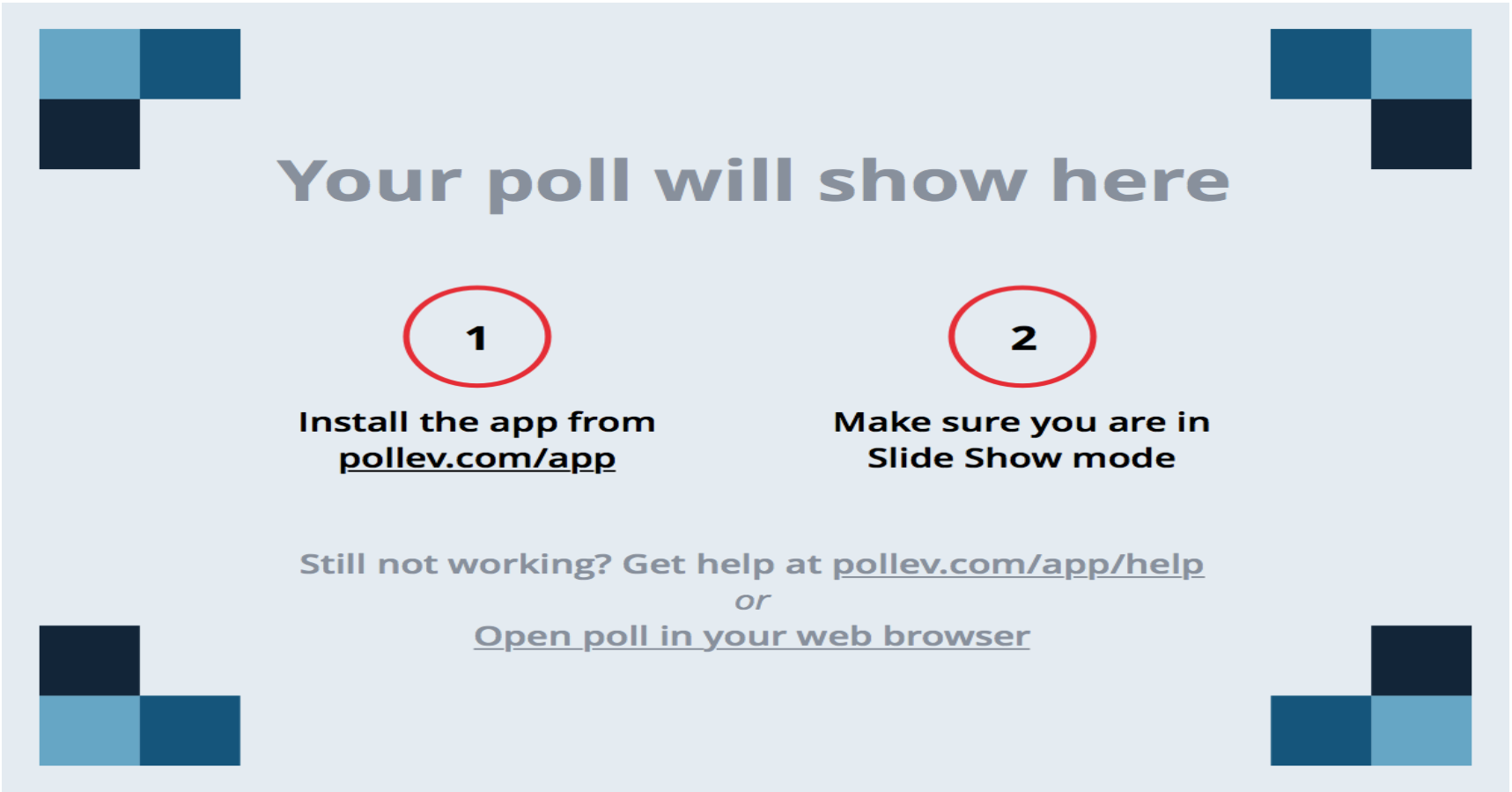
Taming Surplus Volatility

- Surplus Volatility or Surplus Vulnerability?
  - How do you feel about your company's current surplus volatility?
- How are Insurers Positioned for Surplus Volatility
  - How does your company compare to your overall industry?
- How do Insurers set Risk Asset Allocations?
- Where to Start Taming Surplus Volatility?
  - Two Major Approaches
- What About Your Company?

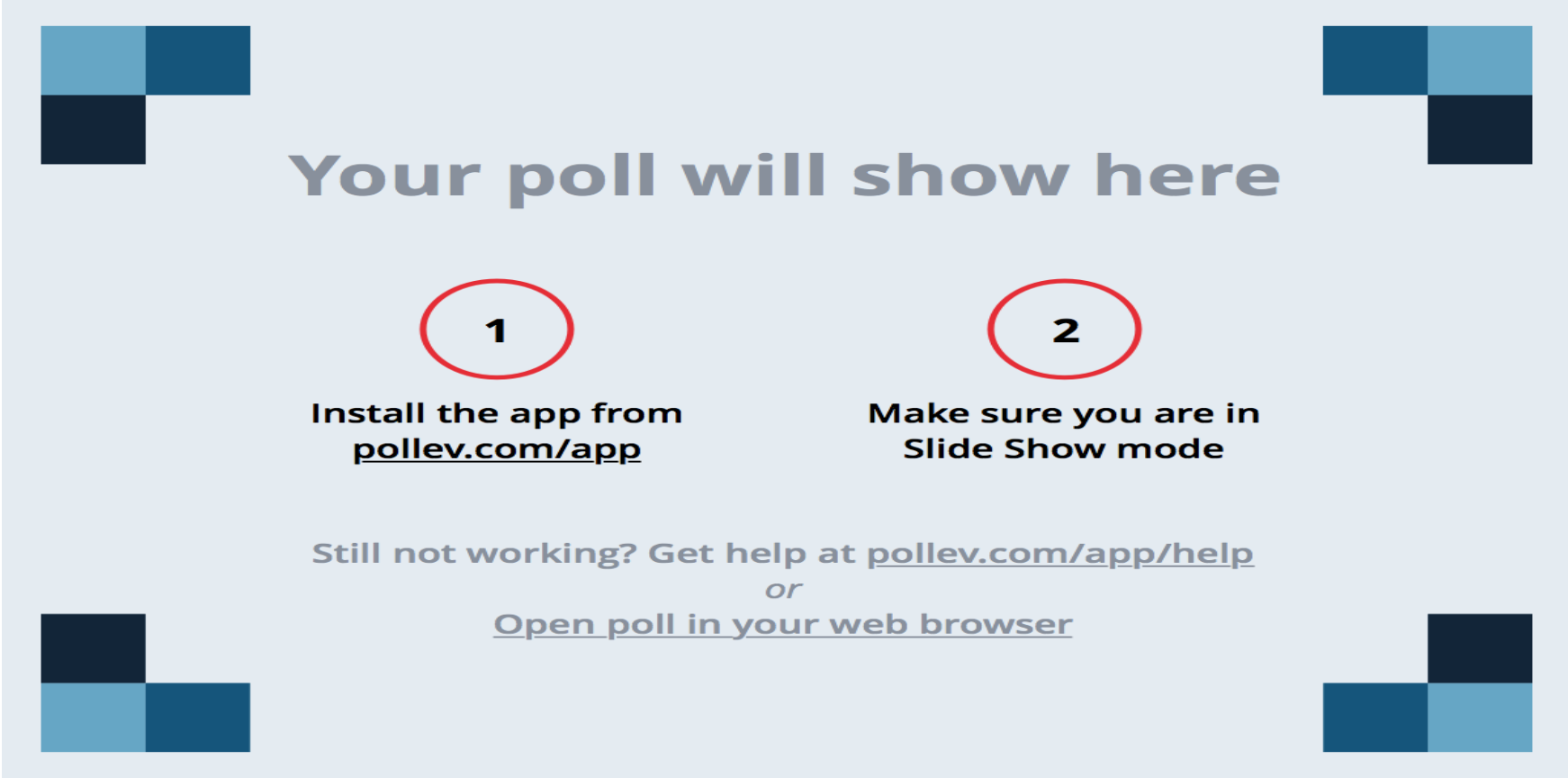
Surplus Volatility or Surplus Vulnerability?

How Do You Feel About Your Company's Current Risk Asset Allocation as Compared to its Surplus Level?



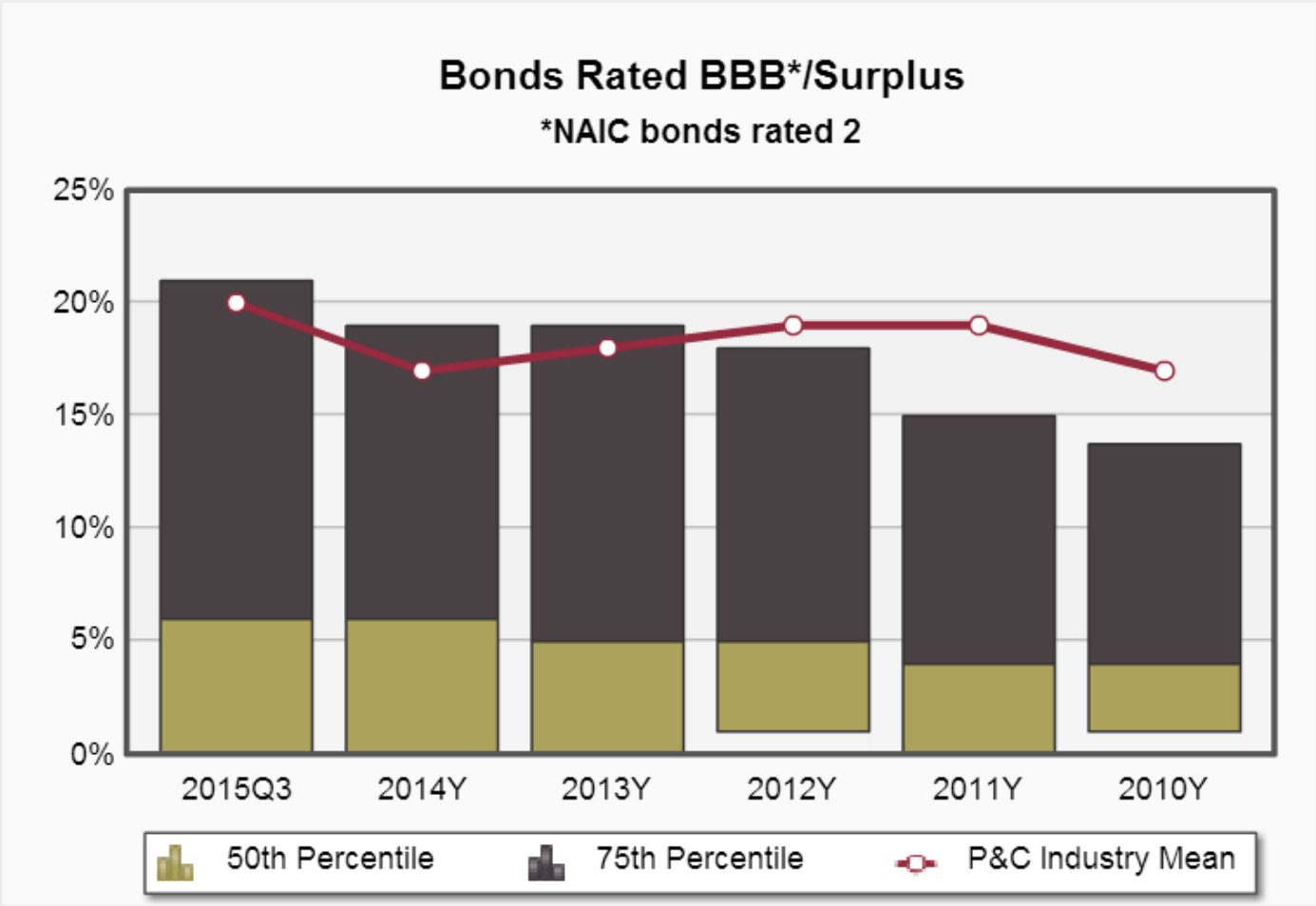
How Do You Think Your Company Compares to Your Peers?

In Measuring Your Company's Current Risk Asset allocation as Compared to its Surplus Level, How Would You Say It Compares with its Peers?



HOW ARE INSURERS POSITIONED FOR SURPLUS VOLATILITY?

How have P/C insurers reacted thus far?



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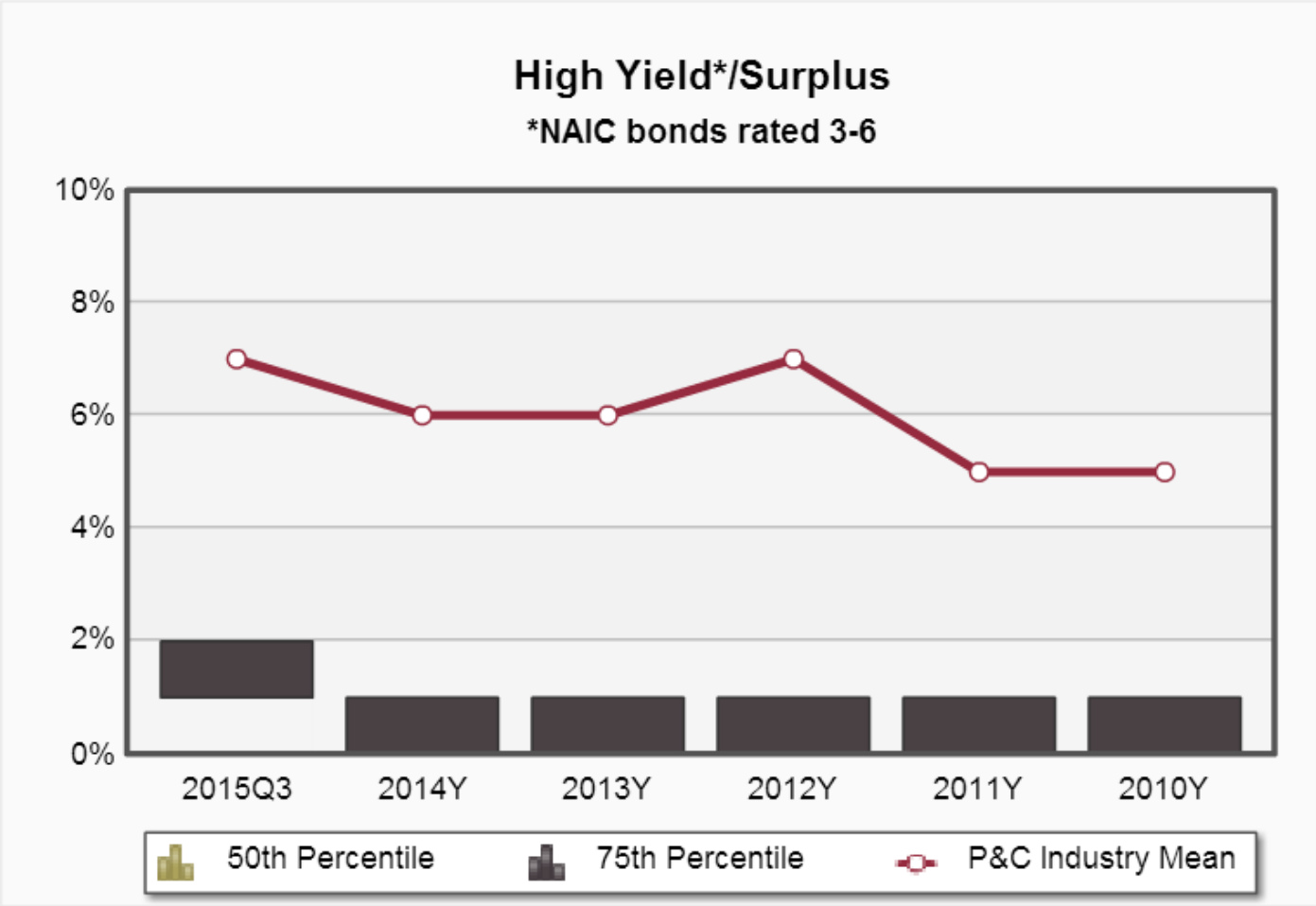

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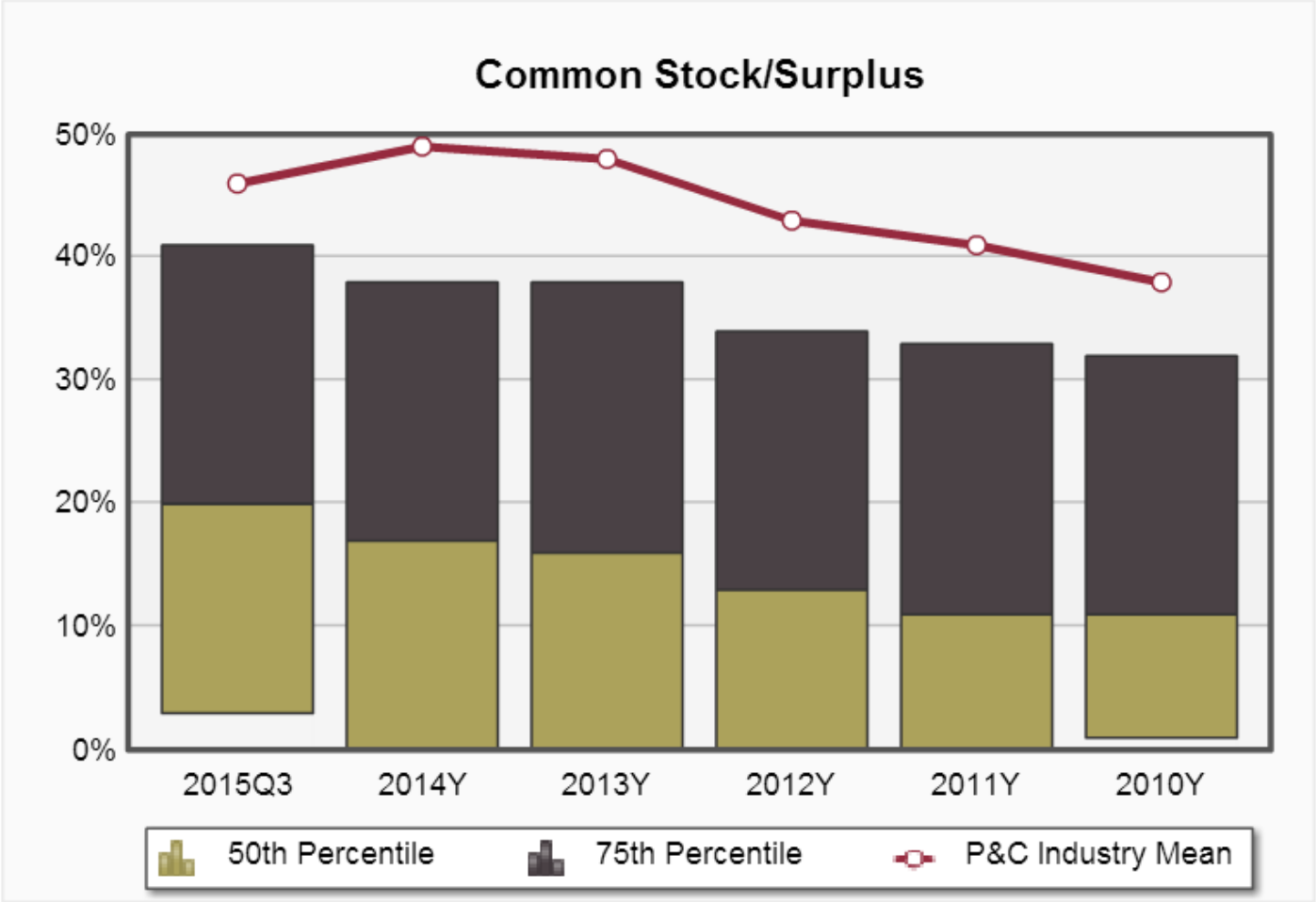

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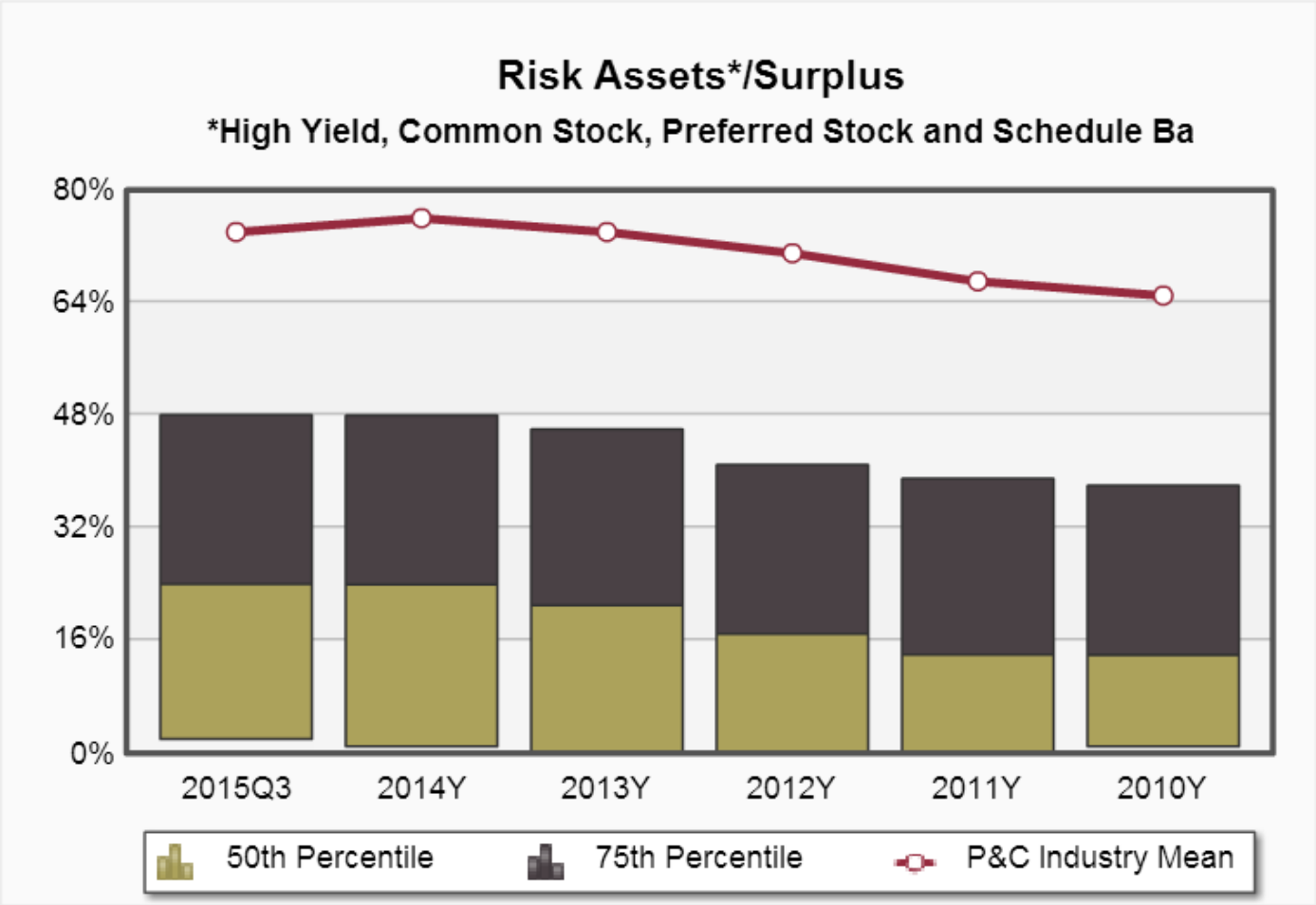

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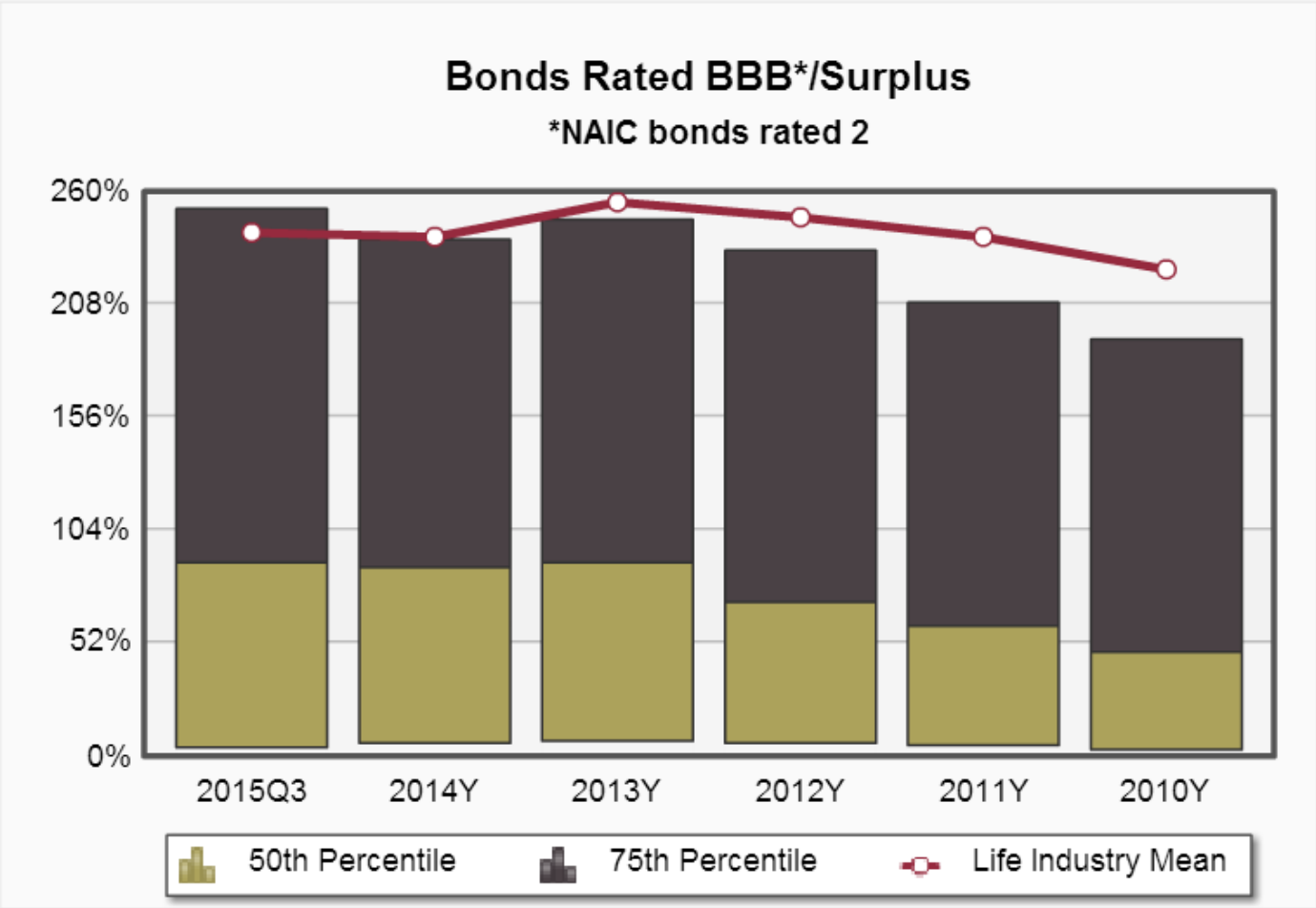
How have Life insurers reacted thus far?



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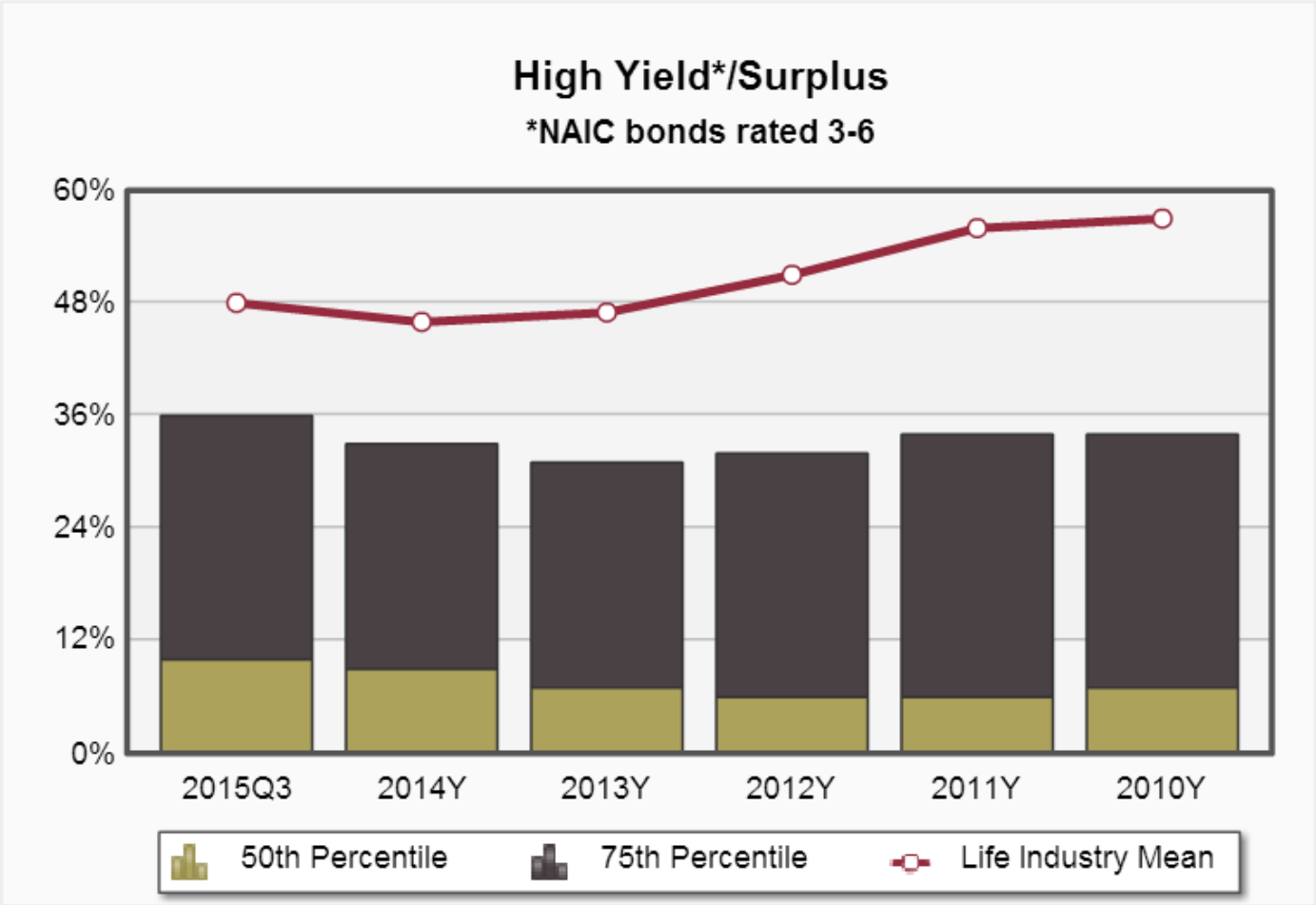

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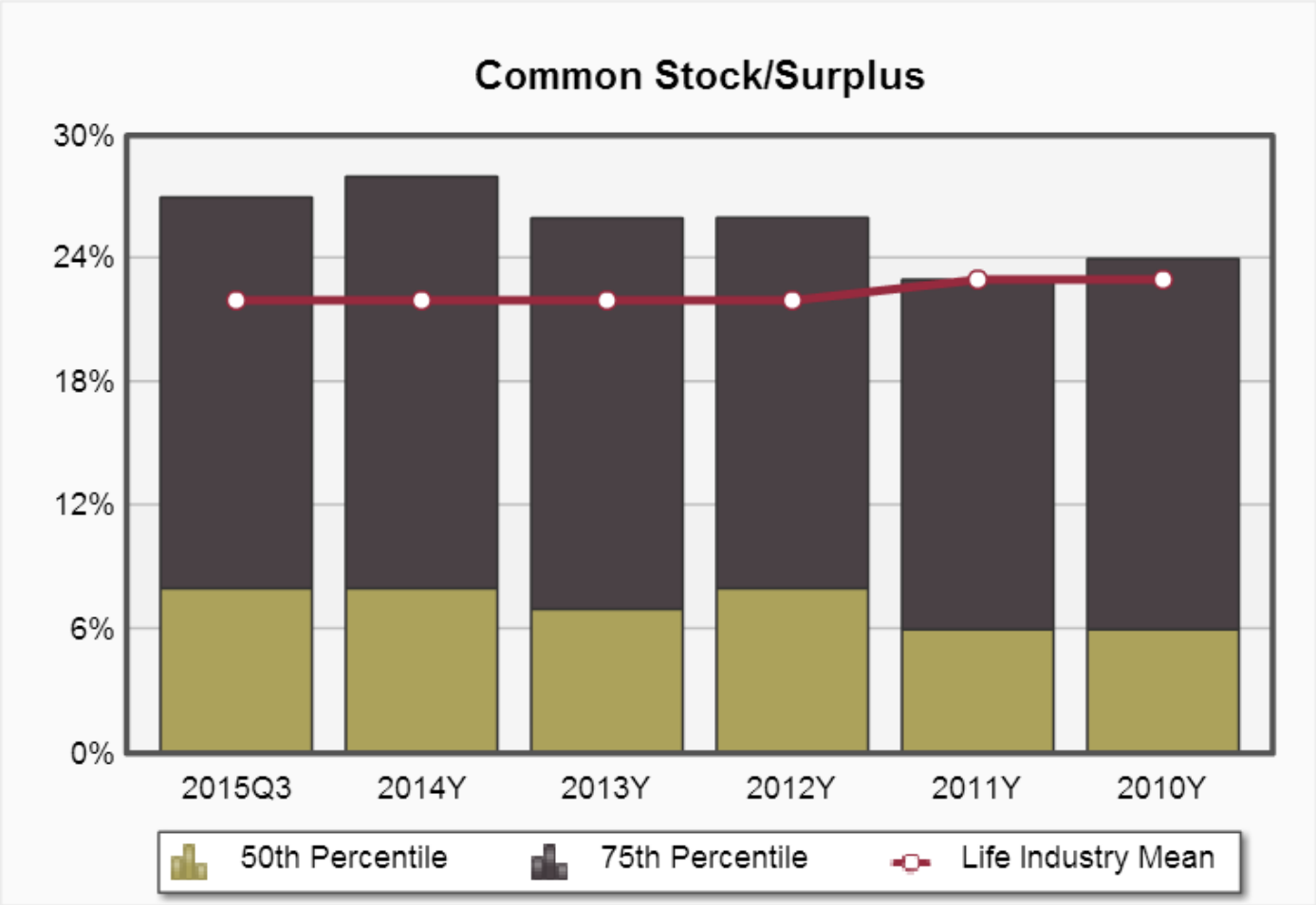

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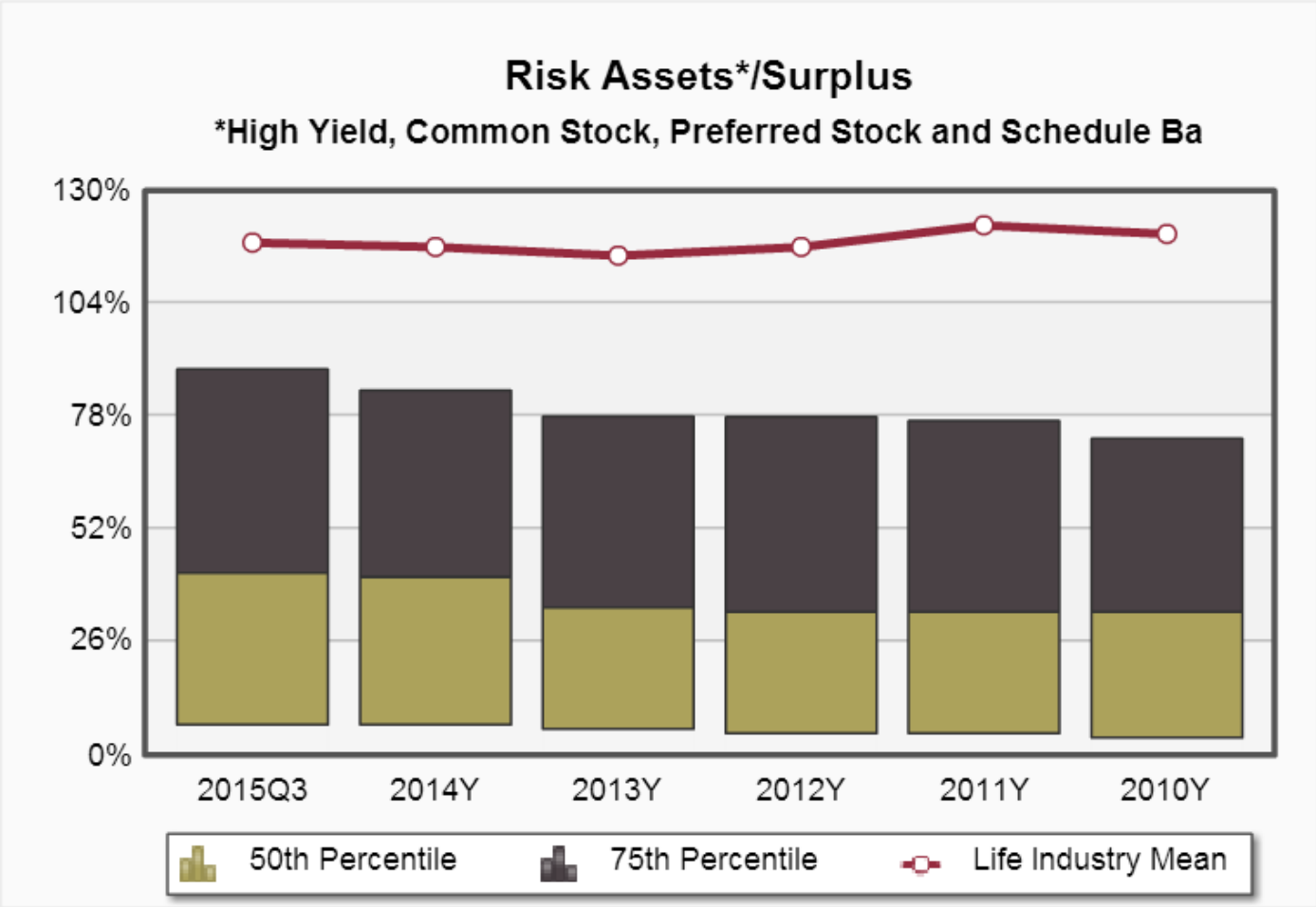

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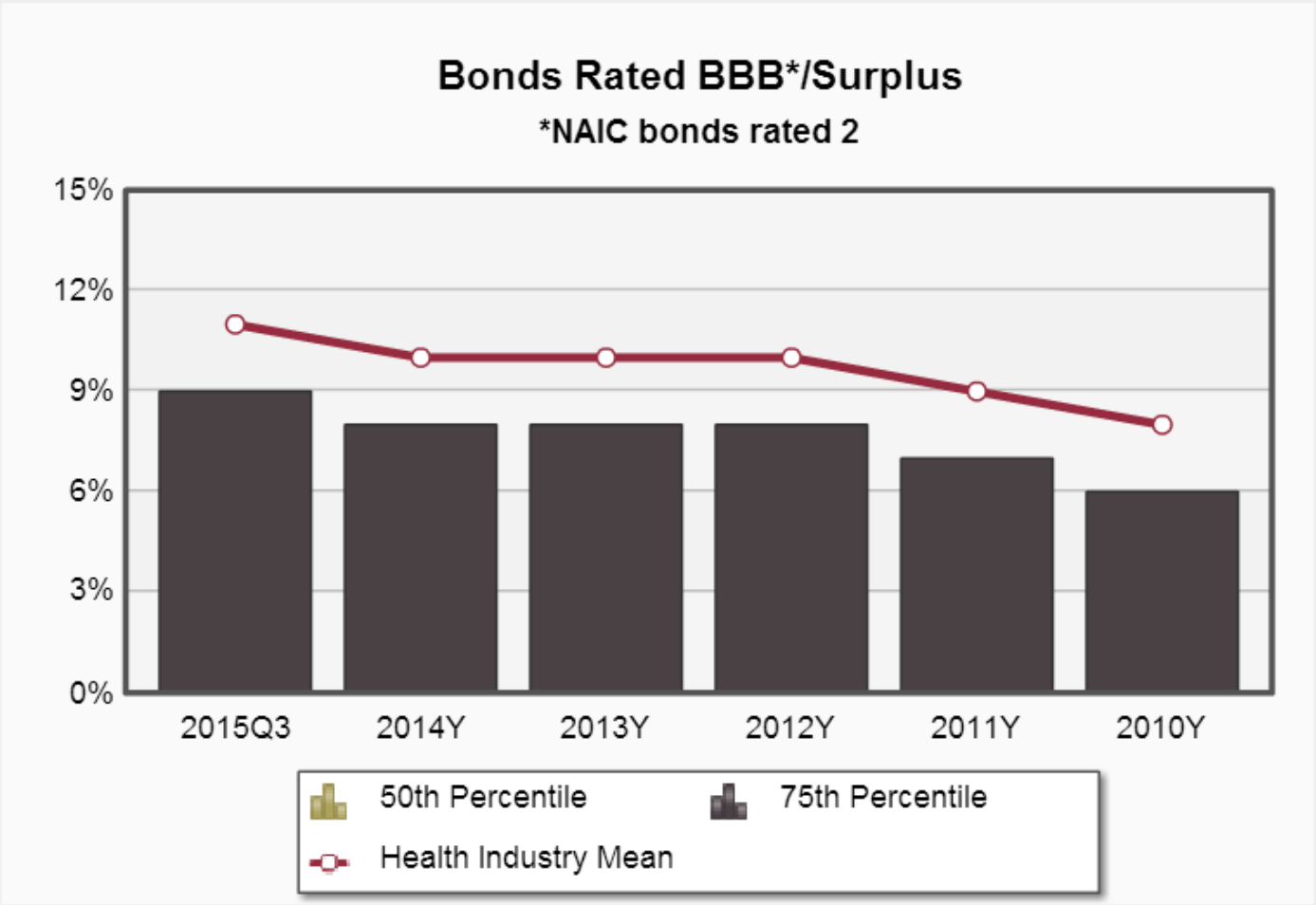

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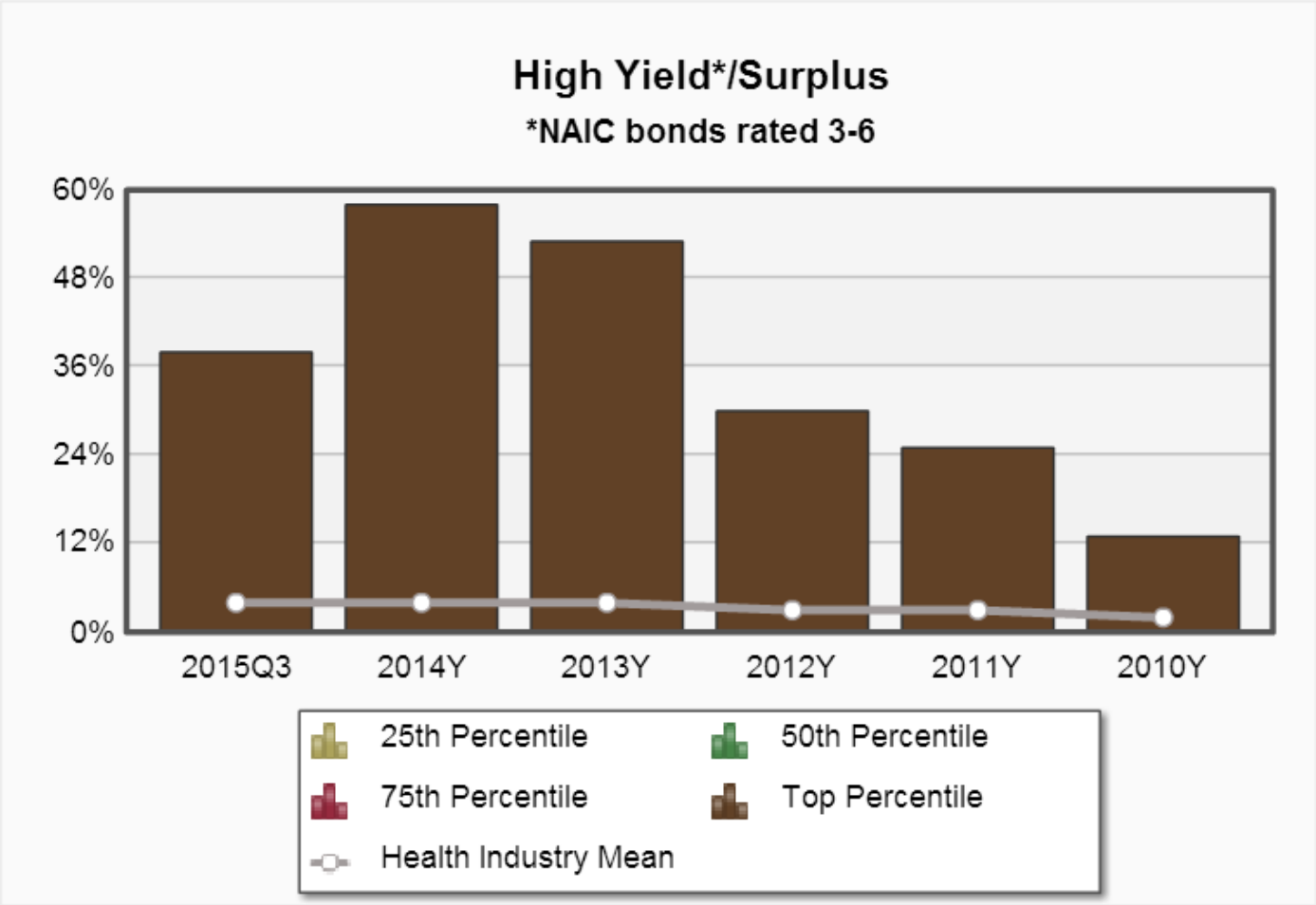

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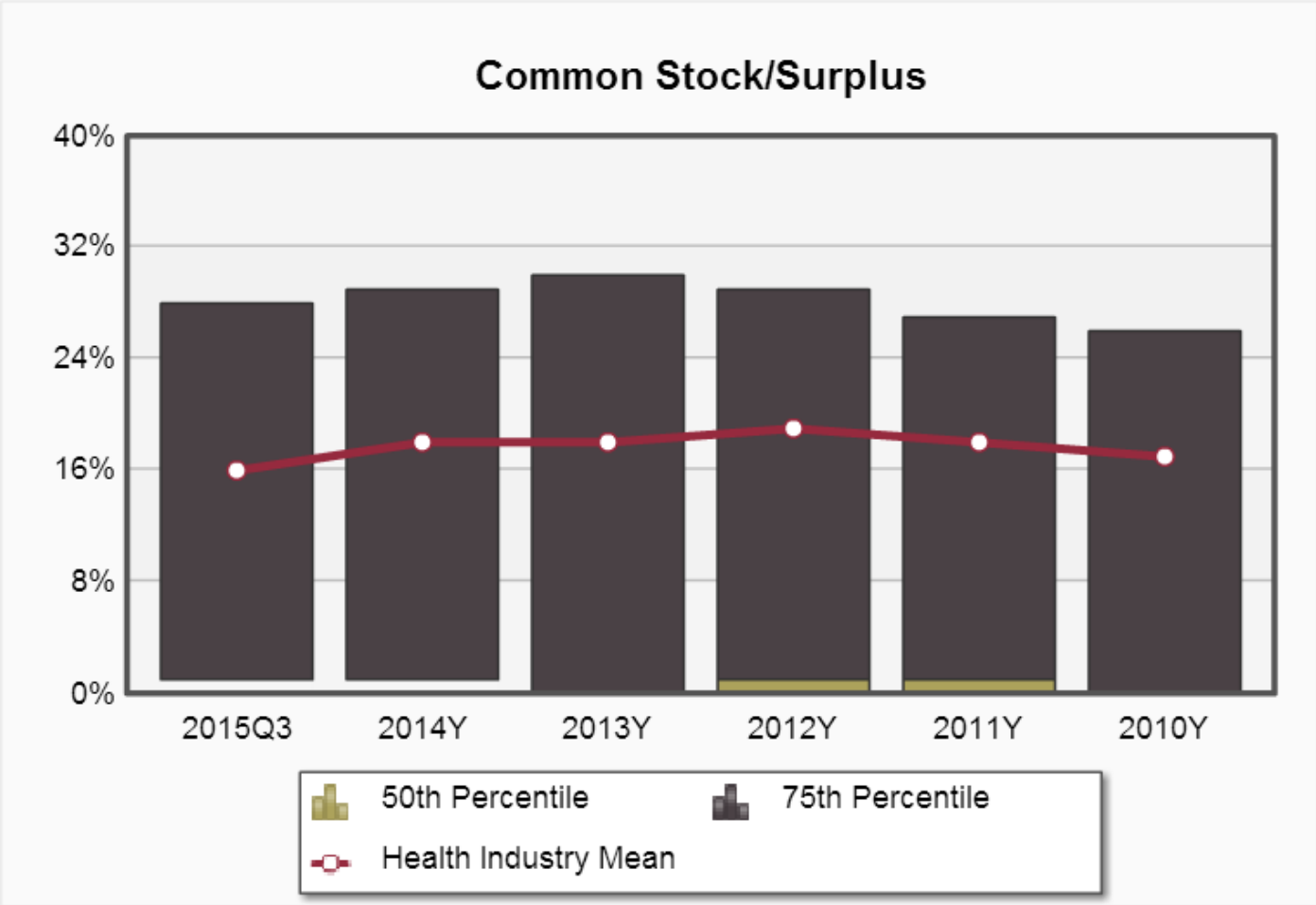

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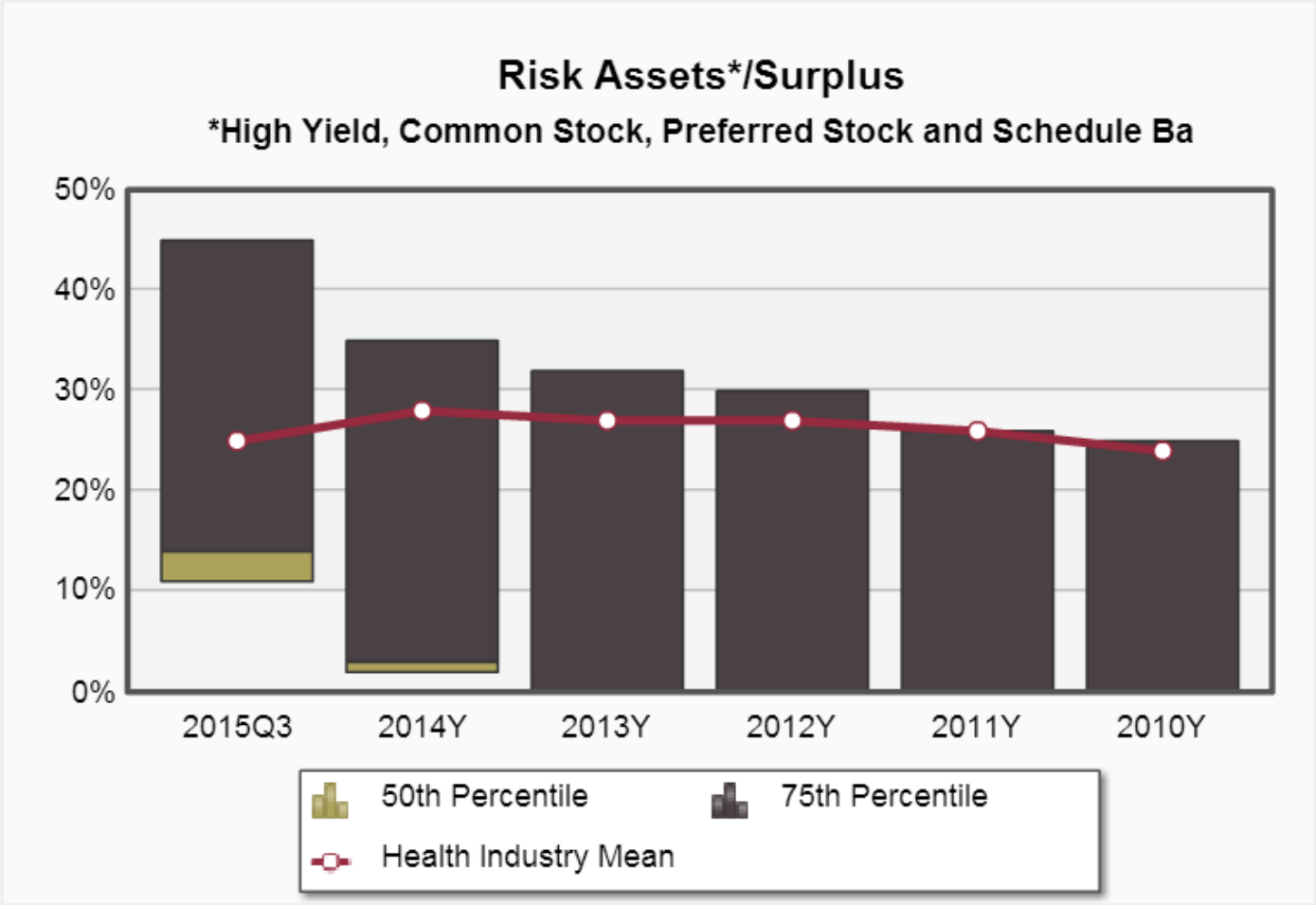

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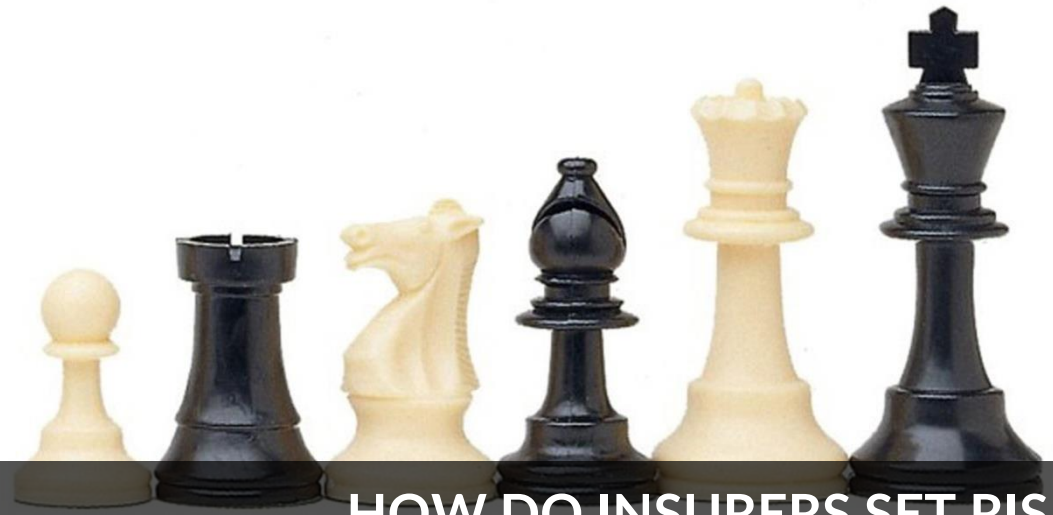

HOW DO INSURERS SET RISK ASSET ALLOCATIONS?

How Are Risk Asset Allocations Determined?

- Evidence from 2014 Annual Statement Filings

  - Why Risk Assets?
    - Long Term Risk Adjusted Growth of Surplus
    - Directly Impact Surplus Size (net of tax effect)
    - Portfolio Diversification – 'the only free lunch…'

  - A Logical Starting Point – Balance versus Other Risk Factors
    - Underwriting Risk (PC and Health) – Combined Ratio
    - Operating Leverage – NWP to Surplus
    - Financial Leverage – Liabilities to Surplus

How Are Risk Asset Allocations Determined?

- Perform single and multi-variate regressions
  - Are Combined Ratio, Operating Leverage and/or Financial Leverage correlated with Risk Assets/Surplus? To what degree?
  - Do the relationships hold when considering largest insurers versus all insurers?
    - Top 20 (asset size) insurers in Life, Health, P&C
    - Compare top 20 to all insurers in Life, Health, P&C
  - Do the relationships hold across time and/or within product line focus?

Life Insurance Industry

Life Industry - Top 20	
	R Square
Operating Leverage	0.0626
Financial Leverage	0.3472
Financial & Operating Leverage	0.6861

Life Industry - 279 entities	
	R Square
Operating Leverage	0.0003
Financial Leverage	0.0048
Financial & Operating Leverage	0.0168

* Dependent Variable is Risk Assets/Surplus

- **For the Top 20 largest life insurers (>$54 billion in assets), over 2/3 of the allocation of Risk Assets/Surplus can be explained by a combination of Operating and Financial Leverage.**

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.976	0.25	3.87	0.00	0.44	1.51	0.44	1.51
Financial Leverage	0.054	0.01	5.81	0.00	0.03	0.07	0.03	0.07
Operating Leverage	-0.462	0.11	-4.28	0.00	-0.69	-0.23	-0.69	-0.23
Equation:	$Y= (0.05X_f)+(-0.46X_o) + 0.98$							
R-squared:	0.6861							

- **Biggest impact seems to be Operating Leverage: The more Operating Leverage the less Risk Assets/Surplus**

Life Insurance Industry

Life Industry - Top 20	
	R Square
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Life Industry - 279 entities	
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* Dependent Variable is Risk Assets/Surplus

- **But, for the Life Industry as a whole, there appears to be little or no correlation between these three ratios and Risk Assets/Surplus.**
- **Comparisons across multiple years and lagged by a year, produced similar results – little to no correlation.**
- **Comparisons within a given product line focus produced similar results – little to no correlation.**

Health Insurance Industry

Health Industry - Top 20	
	R Square
Combined Ratio	0.0792
Operating Leverage	0.3085
Financial Leverage	0.1610
Financial & Operating Leverage	0.3499
Financial Lev & Combined Ratio	0.2617
Operating Lev & Combined Ratio	0.3190
Fin & Oper Lev & Comb Ratio	0.3747

Health Industry - 323 entities	
	R Square
Combined Ratio	0.0132
Operating Leverage	0.0009
Financial Leverage	0.0014
Financial & Operating Leverage	0.0037
Financial Lev & Combined Ratio	0.0146
Operating Lev & Combined Ratio	0.0143
Fin & Oper Lev & Comb Ratio	0.0151

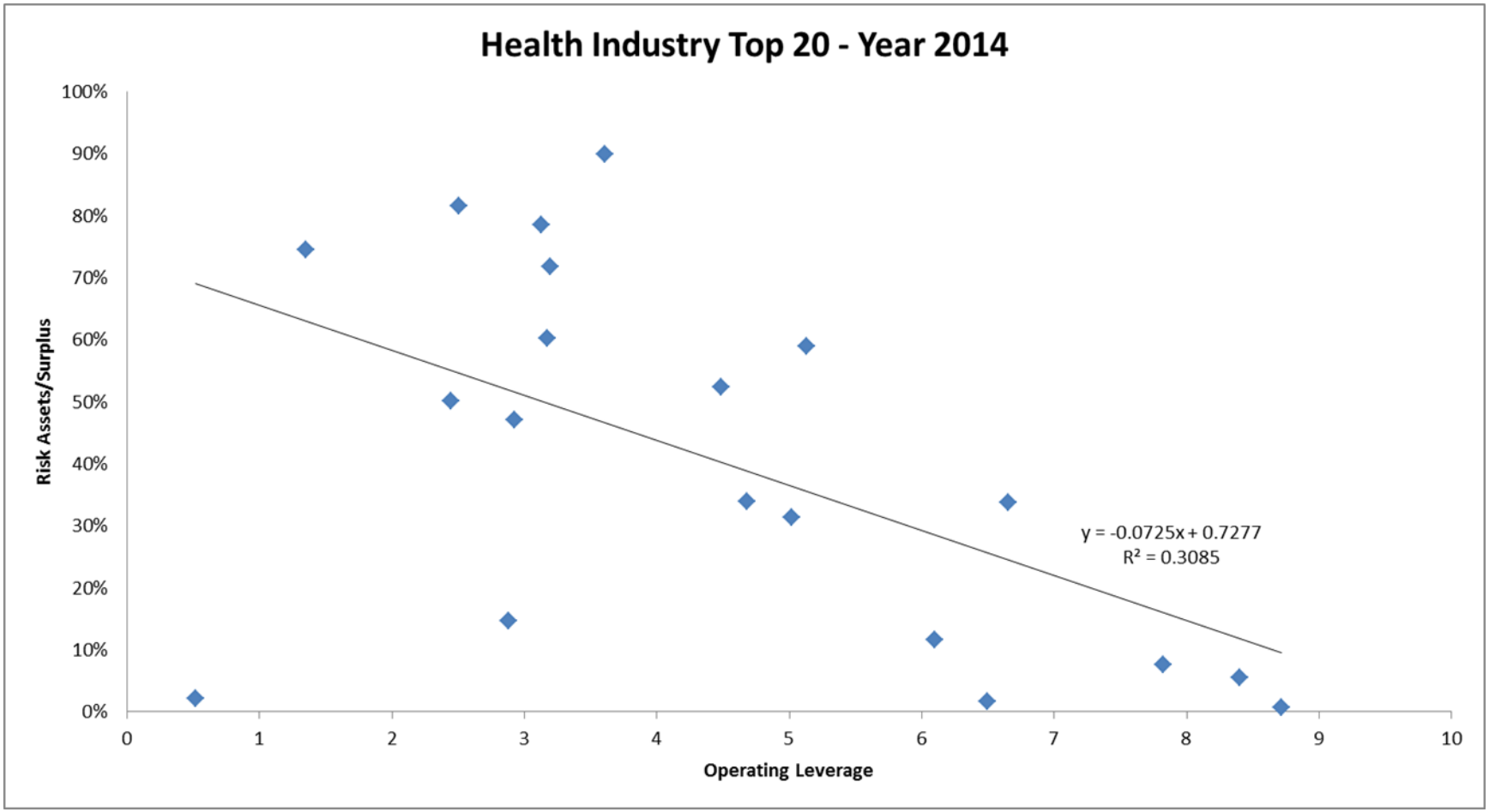
* Dependent Variable is Risk Assets/Surplus

- **For the Top 20 largest health insurers (> $2 billion in assets), about 31% of the allocation of Risk Assets/Surplus can be explained by Operating Leverage. Adding the Combined Ratio and Financial Leverage serves to increase correlations to about 37%.**

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0.728	0.13	5.69	0.00	0.46	1.00	0.46	1.00
Operating Leverage	-0.073	0.03	-2.83	0.01	-0.13	-0.02	-0.13	-0.02
Equation:	$Y= (-0.07X_o) + 0.73$							
R-squared:	0.3085							

- **But, Operating Leverage impact is still small.**

Health Insurance Industry



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* Dependent Variable is Risk Assets/Surplus

- **But, for the Health Industry as a whole, there appears to be little or no correlation between these three ratios and Risk Assets/Surplus.**
- **Comparisons across multiple years and lagged by a year, produced similar results – little to no correlation.**
- **Comparisons within a given product line focus produced similar results – little to no correlation.**

P&C Insurance Industry

P&C Industry - Top 20	
	R Square
Combined Ratio	0.0532
Operating Leverage	0.0230
Financial Leverage	0.2613
Financial & Operating Leverage	0.2771
Financial Lev & Combined Ratio	0.2931
Operating Lev & Combined Ratio	0.0903
Fin & Oper Lev & Comb Ratio	0.2965

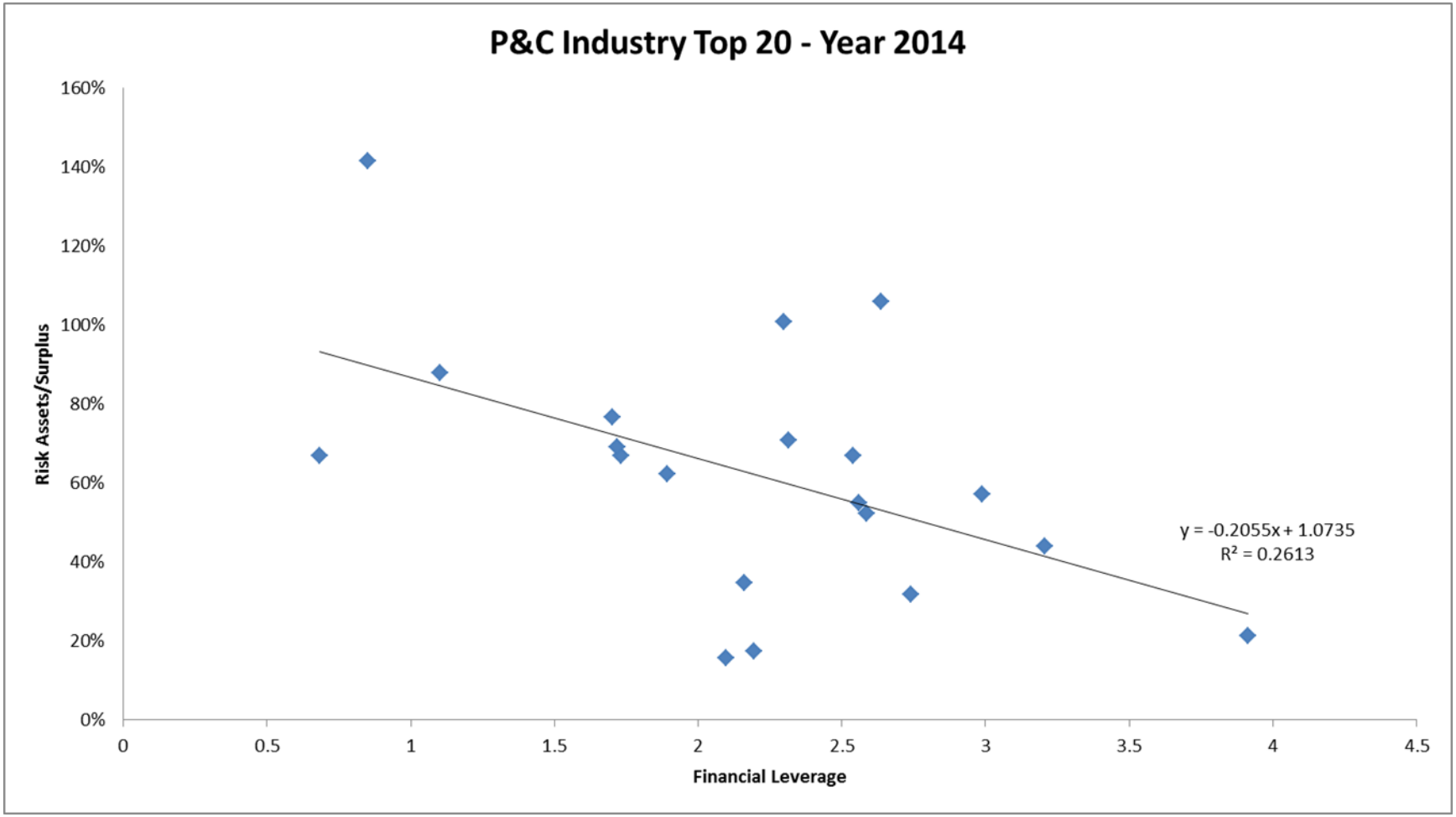
P&C Industry - 1005 entities	
	R Square
Combined Ratio	0.0015
Operating Leverage	0.0017
Financial Leverage	0.0109
Financial & Operating Leverage	0.0111
Financial Lev & Combined Ratio	0.0109
Operating Lev & Combined Ratio	0.0033
Fin & Oper Lev & Comb Ratio	0.0111

* Dependent Variable is Risk Assets/Surplus

- **For the Top 20 largest P&C insurers (> $16 billion in assets), about 26% of the allocation of Risk Assets/Surplus can be explained by Financial Leverage. Adding the Combined Ratio and Operating Leverage serves to increase correlations to about 30%.**

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	1.076	0.18	6.00	0.00	0.70	1.45	0.70	1.45
Financial Leverage	-0.206	0.08	-2.64	0.02	-0.37	-0.04	-0.37	-0.04
Equation:	$Y= (-0.21X_f) + 1.08$							
R-squared:	0.2613							

P&C Insurance Industry



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* Dependent Variable is Risk Assets/Surplus

- **But, for the P&C Industry as a whole, there appears to be little or no correlation between these three ratios and Risk Assets/Surplus.**
- **Comparisons across multiple years and lagged by a year, produced similar results – little to no correlation.**
- **Comparisons within a given product line focus produced similar results – little to no correlation.**

Initial observations

- When it comes to risk asset allocation, top 20 largest companies are managed vastly differently from the industry as a whole.
  - Each insurer given equal weight when analyzing overall industry, so this is unsurprising. But, it does raise other issues…
- For the top 20 largest companies, life insurance industry's risk asset allocation seems to be much more sensitive to operating and financial leverage than P&C or health insurance industry.
  - Unsurprisingly, the largest life insurers, tend to be much more highly levered institutions than P&C or health insurers.
- Even for the top 20 largest insurers, these three major risk factors are not as closely aligned with risk asset allocation as what might be expected.

Why these results?

- **'Good' Reasons – Which do you think are most likely?**
  - **We analyzed the wrong risk factors**
    - **What other publicly available statistics should be considered?**
  - **What insurers really use to determine risk asset allocations have less to do with these factors and more to do with their sophisticated ERM analyses.**
  - **Insurers consider very long term financial ratios when investing in risk assets for the long term.**

Why these results?

- ‘Bad’ Reasons – Which do you think are most likely?
  - Top 20 insurers are more attuned to understanding their overall risks when setting risk asset allocations. Their ERM models are just better than that found in the overall industry.
  - Insurers are investing closer to the ‘efficient frontier’ which results in risk asset allocations, without consideration of company leverage, financial performance, nature of reserves, etc.
  - Insurers tend to view risk assets as % of assets, not surplus, when determining the allocation.
  - The overall industry is hamstrung by a ‘silo’ approach to management.
  - Insufficient investment discipline with regards to re-balancing.
  - Insufficient corporate governance.
  - Inadequate external independent advice, that does not relate investment decisions to financial management and the insurer’s corporate goals and objectives.
  - Other

WHERE TO START TAMING SURPLUS VOLATILITY?

Where to Start Taming Surplus Volatility? – Two Major Approaches

- Rational Expectations Hypothesis
  - Agents inside the model, on average, assume the model's predictions are valid.
  - Normative returns, risk, standard deviation

- NEW Rational Expectations Hypothesis
  - There is not one true model
  - Agents don't always act in their best interests (behavioral finance, 'black swans')
  - 'Worst case' returns – scenario based

- There is more than one appropriate model

Where to Start Taming Surplus Volatility? – Two Major Approaches

- Rational Expectations Hypothesis
  - Use Markowitz Efficient Frontier
    - Test Your Assumptions
    - Internally Consistent
    - Use Forecast, but Compare to Historical

- NEW Rational Expectations Hypothesis
  - 'Worst Case' Since the Depression
    - Impact on Surplus
    - Impact on BCAR
    - Excellent tool for supporting Rating Agency visit

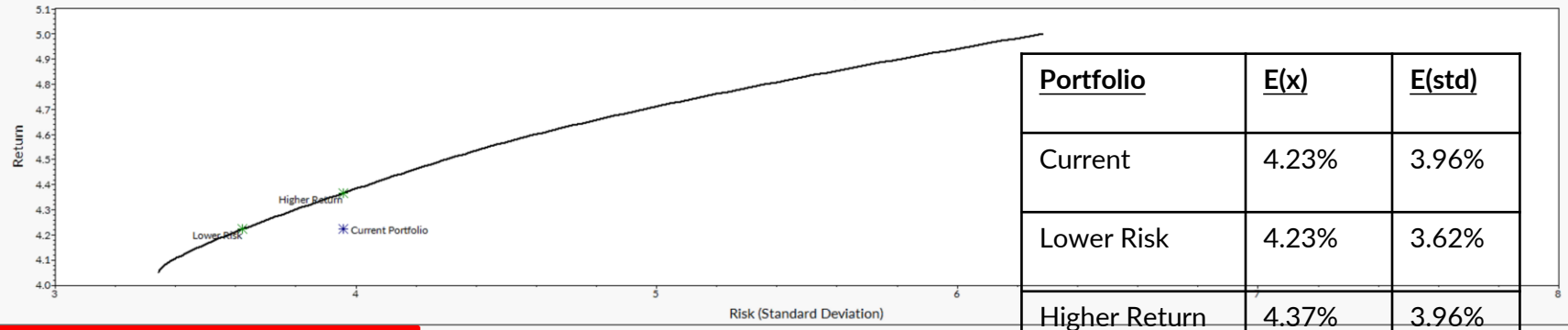
Markowitz Efficient Frontier

Asset Allocation Analysis

Zephyr AllocationADVISOR: Strategic Asset Alliance

Efficient Frontier

Case: Base Case - PreTax Return vs. Risk (Standard Deviation)



Portfolio	E(x)	E(std)
Current	4.23%	3.96%
Lower Risk	4.23%	3.62%
Higher Return	4.37%	3.96%

The Dividend Discount Model applied to the broad U.S. equity index estimates a current implied U.S. equity risk premium of nearly 5% (slide 5). However, the current advisor lowers this estimate slightly when crafting this year's asset allocation analysis. Why?

Portfolio Statistics

Case: Base Case - PreTax Target Return: 5.00% - 10 Year Time Horizon - 95% of Projected Return Distribution

Assets	Forecast Return	Risk
U.S. Aggregate	3.75%	4.00%
U.S. High Yield	6.75%	9.30%
U.S. Leveraged Loans	5.25%	6.30%
U.S. Large Cap	7.00%	15.50%
U.S. Mid Cap	7.25%	18.50%
U.S. Small Cap	7.25%	21.30%
EAFE	7.75%	18.00%
EM Equity	10.00%	25.50%

Portfolio Allocations

Asset Allocations	Current Portfolio	Lower Risk	Higher Return
U.S. Aggregate	85.0%	80.0%	80.0%
U.S. High Yield	5.0%	0.5%	8.0%
U.S. Leveraged Loans	0.0%	14.7%	6.9%
U.S. Large Cap	10.0%	0.9%	1.4%
U.S. Mid Cap	0.0%	0.0%	0.0%
U.S. Small Cap	0.0%	1.3%	0.1%
EAFE	0.0%	0.0%	0.0%
EM Equity	0.0%	2.6%	3.6%

General trend in return/risk assumptions is for lower expected returns with similar or higher volatility when compared to historical results.

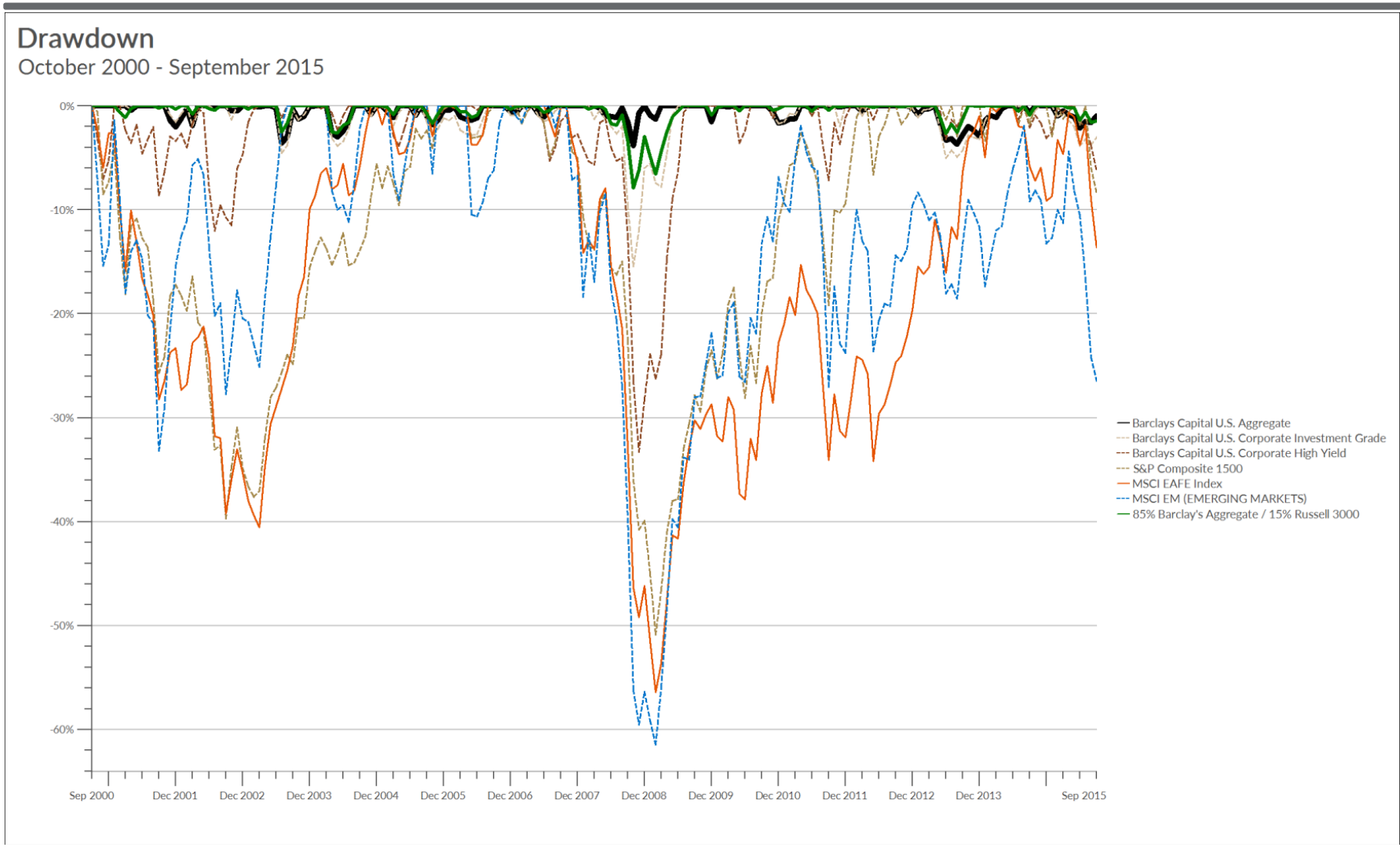
Diversification benefits are assumed to be strong prospectively even as returns expectations fall.

Correlations

	1	2	3	4	5	6	7	8
1. U.S. Aggregate	1.00							
2. U.S. High Yield	0.19	1.00						
3. U.S. Leveraged Loans	-0.08	0.80	1.00					
4. U.S. Large Cap	-0.01	0.69	0.55	1.00				
5. U.S. Mid Cap	-0.01	0.74	0.59	0.96	1.00			
6. U.S. Small Cap	-0.08	0.66	0.51	0.91	0.95	1.00		
7. EAFE	0.09	0.72	0.55	0.88	0.86	0.77	1.00	
8. EM Equity	0.10	0.69	0.51	0.76	0.77	0.70	0.88	1.00

Even though current policy allows the recommended allocations, the Board has serious reservations about making either of these significant changes. In after-tax analysis, aggregate and municipal allocations fluctuate based on profitability.

‘What Keeps You Up At Night’ – Stress Testing Data



Risk Asset Stress Testing

Surplus Growth Assets As % of Total Portfolio[3]	Surplus Growth Assets-to-Surplus Ratio	STAT Surplus[1]	Risk Assets[2]	Surplus Level ($): 47.4% Decline Surplus Growth Assets[4]	Downside Impact: As % of STAT Surplus
59%	100%	174.1	174.1	91.5	-47.4%
50%	84%	174.1	146.7	104.5	-40.0%
41.2%	69.4%	174.1	120.8	116.8	-32.9%
40%	67%	174.1	117.3	118.5	-32.0%
35%	59%	174.1	102.7	125.4	-28.0%
30%	51%	174.1	88.0	132.4	-24.0%
25%	42%	174.1	73.3	139.3	-20.0%
20%	34%	174.1	58.7	146.3	-16.0%
15%	25%	174.1	44.0	153.2	-12.0%
10%	17%	174.1	29.3	160.2	-8.0%

1) Using STAT surplus at 12/31/2013.

2) Surplus Growth Assets as of 12/31/2013.

3) Using total portfolio market value as of 12/31/2013 (less operating cash).

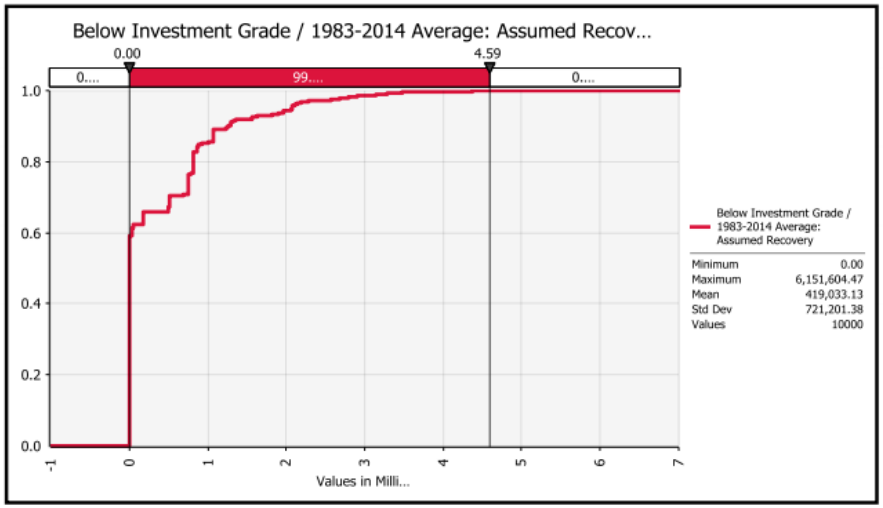
4) Lowest cumulative surplus growth asset return from peak to trough during 2008/2009 for U.S. equity markets

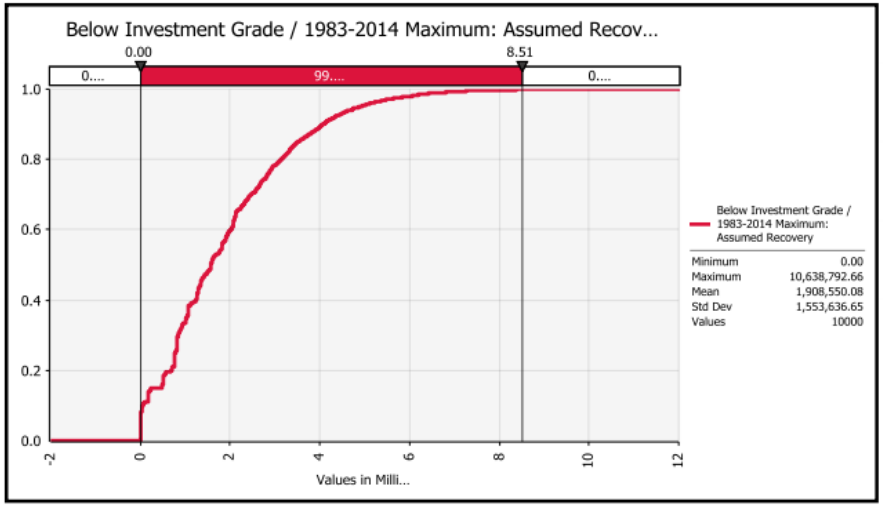
Corporate Bond Stress Testing – BIG Example

Moody's Rating	Annual Default Rates % (By Issuer)			Average Default Rates % Through 2014 (By Issuer)			Average Default Rate By Credit Rating	Max Calendar Year Default Rate By Credit Rating
	2014	2013	▲	10 Year Average	20 Year Average	▲	1983-2014 Average Default Rate	1983-2014 Max Issuer Default Rate
Aaa	-	-	-	-	-	-	-	-
Aa1	-	-	-	-	-	-	-	-
Aa2	-	-	-	-	-	-	-	-
Aa3	-	-	-	0.214	0.107	0.11	0.11	2.14
A1	0.495	-	0.50	0.248	0.124	0.12	0.08	1.55
A2	-	-	-	0.030	0.040	(0.01)	0.02	0.50
A3	-	-	-	0.091	0.071	0.02	0.04	0.62
Baa1	-	0.239	(0.24)	0.205	0.196	0.01	0.15	1.26
Baa2	-	-	-	0.214	0.179	0.03	0.14	0.89
Baa3	0.215	-	0.22	0.170	0.230	(0.06)	0.33	3.65
Ba1	-	-	-	0.244	0.357	(0.11)	0.62	3.79
Ba2	-	-	-	0.061	0.346	(0.29)	0.54	2.96
Ba3	0.418	1.344	(0.93)	0.979	1.164	(0.19)	1.81	9.26
B1	-	-	-	0.769	1.397	(0.63)	2.44	8.20
B2	0.830	1.255	(0.43)	1.441	2.816	(1.37)	5.23	23.16
B3	-	1.551	(1.55)	1.921	4.497	(2.58)	8.85	28.76
Caa-C	7.026	9.573	(2.55)	11.807	15.141	(3.33)	22.11	100.00
Investment-Grade	0.078	0.041	0.04	0.136	0.113	0.02	0.09	0.55
Speculative-Grade	2.044	3.010	(0.97)	3.589	4.294	(0.71)	4.57	13.32
All Corporates	1.044	1.446	(0.40)	1.639	1.802	(0.16)	1.75	6.02
				Scenario #1	*Scenario #2*		*Scenario #3*	*Scenario #4*

Source: Moody's Investor Services

Corporate Bond Stress Testing – BIG Example

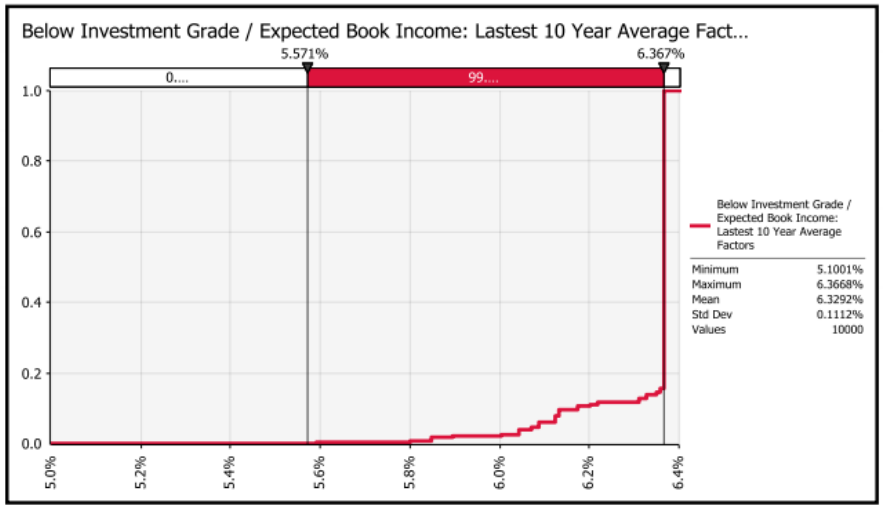


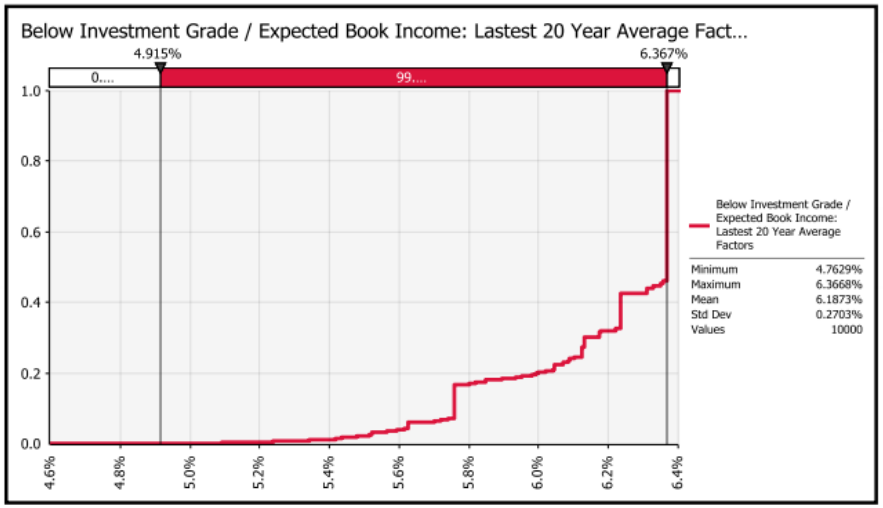


- **Average Annual Default Rates 1983-2014**
- Expected Values, Net of Recovery
- Mean Credit Exposure = $0.42M
  - 0.06% of 12/31/2014 GAAP Equity
- 99.9th Percentile Exposure = $4.59M
  - 0.62% of 12/31/2014 GAAP Equity

- **Maximum Annual Default Rates 1983-2014**
- Expected Values, Net of Recovery
- Mean Credit Exposure = $1.91M
  - 0.26% of 12/31/2014 GAAP Equity
- 99.9th Percentile Exposure = $8.51M
  - 1.15% of 12/31/2014 GAAP Equity

Corporate Bond Stress Testing – BIG Example





- **Average Annual Default Rates Latest 10 Years**
- Expected Book Yield
  - 6.37%
- Expected Credit-Adjusted Book Yield
  - 6.33%
- 99.9th Percentile Credit-Adjusted Book Yield
  - 5.57%

- **Average Annual Default Rates Latest 20 Years**
- Expected Book Yield
  - 6.37%
- Expected Credit-Adjusted Book Yield
  - 6.19%
- 99.9th Percentile Credit-Adjusted Book Yield
  - 4.92%

WHAT ABOUT YOUR COMPANY?

What about your company? Have you Tamed Surplus Volatility?

- Efficient frontier analysis to set allocation within 'rational expectations'
- Stress Testing Analyses, using 'NEW rational expectations'
- Risk Appetite Quantification
- Comparison with Structured Peer Group
- Risk Asset Allocation
  - What size?
  - What asset mix?
- Imbedded OTTI Risk
  - Investment Grade
  - Below Investment Grade

THANK YOU