

# IASA 2018 POWER UP!

**EDUCATIONAL CONFERENCE & BUSINESS SHOW**  
JUNE 3 - 6, 2018 | GAYLORD OPRYLAND | NASHVILLE, TN

## Session 505: Enterprise Risk Management: Applications for Insurers

PLEASE USE THE CONFERENCE APP TO  
EVALUATE THIS SESSION:

1. GO TO "EVENTS" OR "MY SCHEDULE"
2. SELECT THE SESSION,
3. CLICK THE "CLIPBOARD" ICON  
LOCATED ON THE LEFT MENU BAR.

OR COMPLETE AN EVALUATION ONLINE:  
[HTTP://APP.CORE-APPS.COM/IASA2018](http://app.core-apps.com/iasa2018)

#IASA2018

# Session 505: Enterprise Risk Management: Applications for Insurers

## **Carl Terzer**

Carl Terzer is Founder and Principal of CapVisor Associates, LLC, He brings more than 32 years of insurance asset management experience to the task of correlating clients' investment strategy with their business objectives, risk tolerance, liability structure and accounting and regulatory environments. His expertise encompasses investment plan design, strategic asset allocation and tactical portfolio optimization and manager search/evaluation and after tax, risk adjusted performance analysis. Mr. Terzer's experience spans insurers in all sizes and lifecycle stages: from 831B's to multi-billion dollar internationals and from start-ups to run-offs.



## **Raghu Ramachandran**

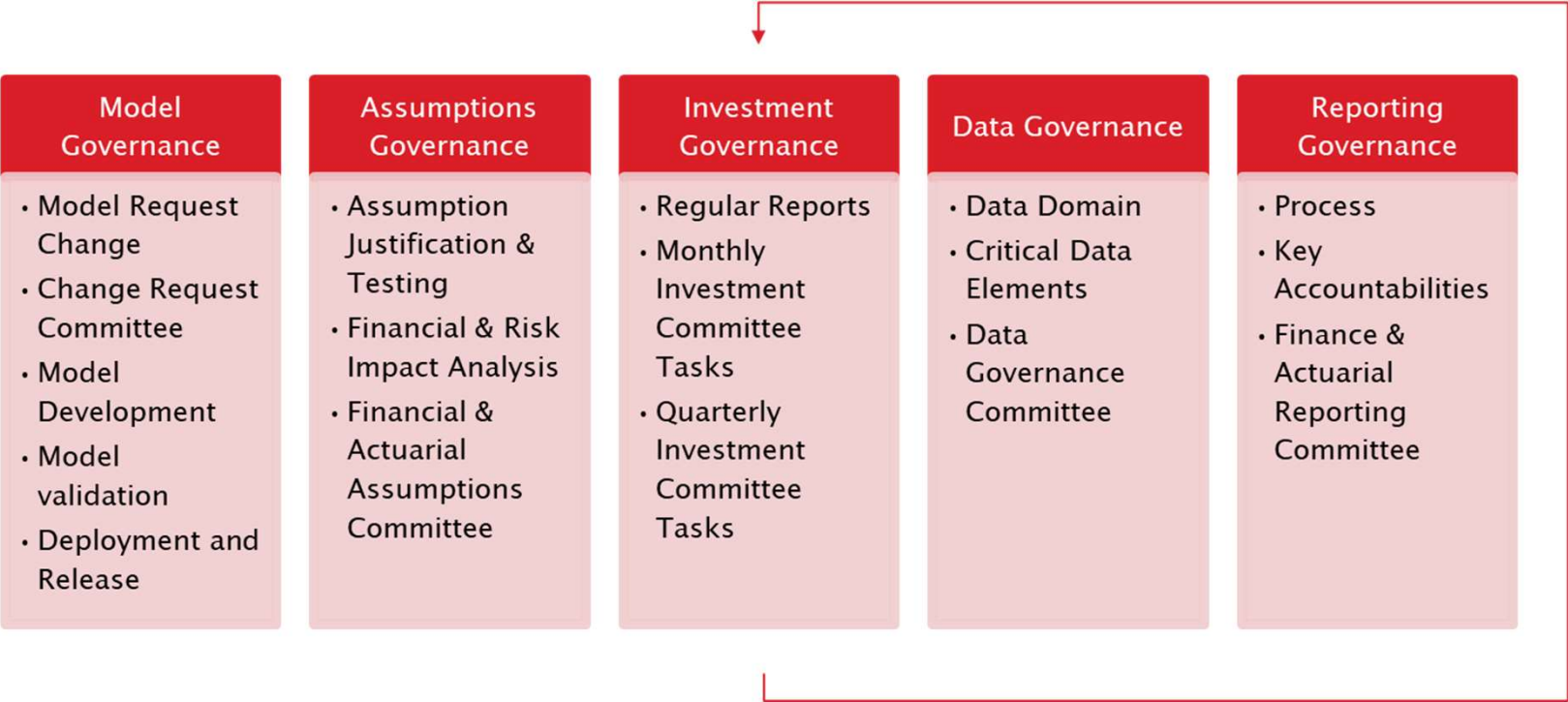
Raghu Ramachandran is the Head of S&P Dow Jones Indices' (S&P DJI) Insurance Asset Channel. In this role, he is responsible for applying S&P DJI resources to solve problems for insurance companies. Raghu works on how indices are used to create innovative products for insurance companies, benchmarking general account portfolios and the use of ETFs by insurance companies.



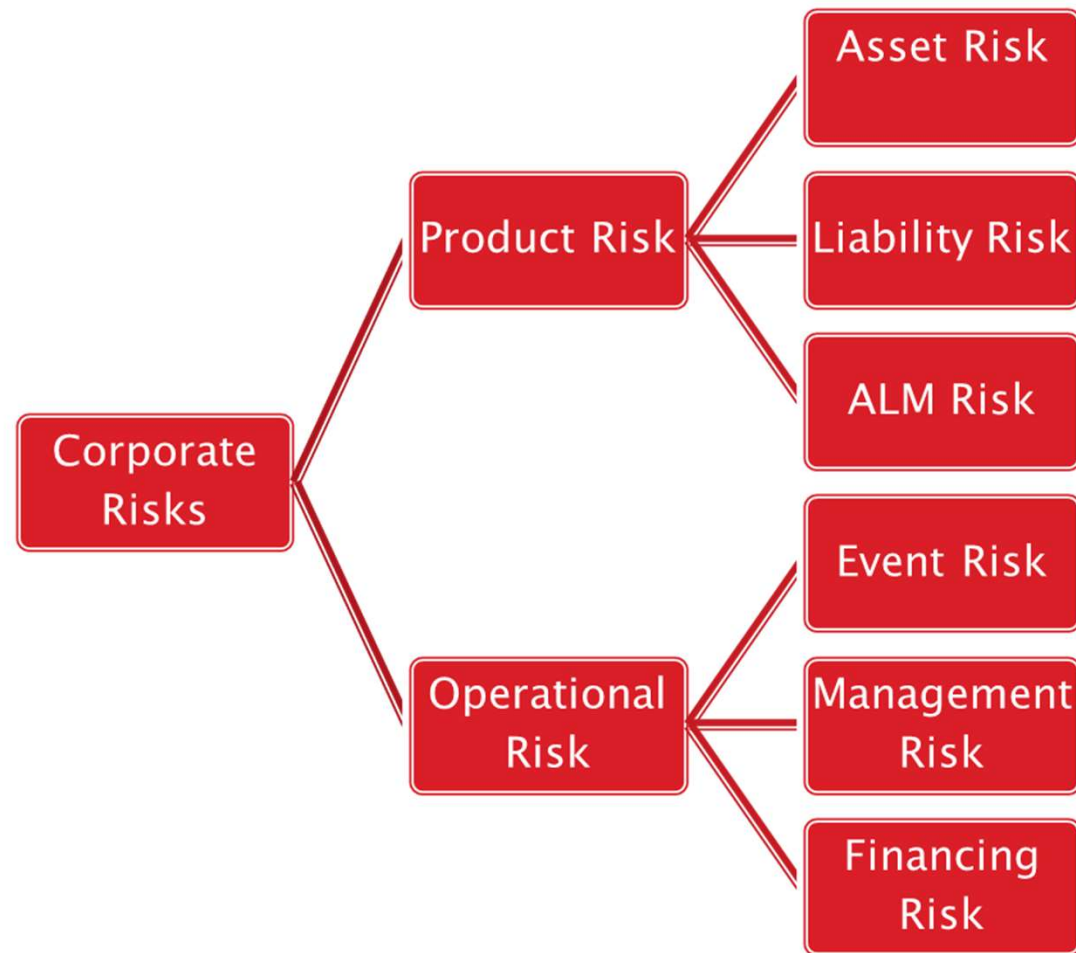
# What is Enterprise Risk Management?

- Understanding , quantifying and correlating risk across the enterprise
- Enterprise risk management (ERM or E.R.M.) in business includes the methods and processes used by organizations to manage risks and seize opportunities related to the achievement of their objectives. ERM provides a framework for risk management, which typically involves identifying particular events or circumstances relevant to the organization's objectives (risks and opportunities), assessing them in terms of likelihood and magnitude of impact, determining a response strategy, and monitoring progress. By identifying and proactively addressing risks and opportunities, business enterprises protect and create value for their stakeholders, including owners, employees, customers, regulators, and society overall.
- ERM can also be described as a risk-based approach to managing an enterprise, integrating concepts of internal control, the Sarbanes–Oxley Act, Dodd-Frank , and strategic planning.
- ERM is evolving to address the needs of various stakeholders, who want to understand the broad spectrum of risks facing complex organizations to ensure they are appropriately managed. Regulators and debt rating agencies have increased their scrutiny on the risk management processes of companies. Source :Wikipedia
  - Often used for liability –side analysis of risks such as:
    - Reinsurance
    - Capital Allocation
- Principals and applications for the asset- side of the balance sheet
  - Asset Allocation

# Elements of ERM Process



# Insurer Risks



# Asset Risk

---

Market  
Risk

Price

Liquidity

Foreign Exchange

---

Interest  
Rate Risk

Change in economic value of cash flows

Reinvestment/Disinvestment risk

---

Credit  
Risk

Transaction risk

Concentration risk

---

# Measures of Risk - Coherence

- Translation invariance: if each loss is increased by an amount,  $x$ , the total assets needed are increased by the same amount, “ $x$ ”.
- Subadditivity: captures the meaning of diversification. When two insurers merge, they do not need to increase their total assets. In fact, if the merger is effective, they can reduce their total assets.
- Positive homogeneity: if an insurer buys “ $x$ ” percent quota share reinsurance contract on its entire book of business, it can reduce its assets by “ $x$ ” percent.
- Monotonicity: if Insurer A always has losses, “ $x$ ”, that are less than Insurer B losses, “ $y$ ”, then A will need less total assets than B.

# Measures of Risk

- Standard Deviation
- Value at Risk
- Probability of surplus decline in year 5
- Probability of negative investment income



# Role of Dynamic Financial Analysis

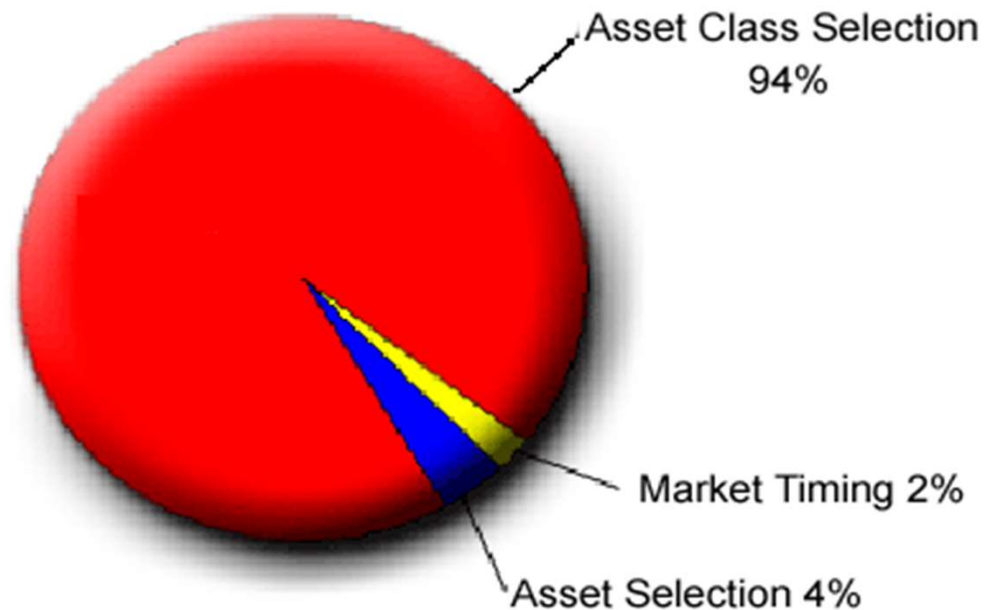
- What is DFA?
  - Dynamic financial analysis (DFA) is a simulation approach that looks at an insurance enterprise's risks holistically as opposed to traditional actuarial analysis, which analyzes risks individually. Specifically, DFA reveals the dependencies of hazards and their impacts on the insurance company's financial well being such as business mix, reinsurance, asset allocation, profitability, solvency, and compliance.
  - In addition to projecting stochastic future economic scenarios through using scenario generators such as interest rate, underwriting cycle and jurisdictional risk models, DFA also links the scenarios with the financial models of the targeted insurance company that is being analyzed. Such models not only reveal the operation and the business structure of the company, but also uncover the dependencies among its business practices. Because DFA tries to account for every aspect of the company, it produces a vast amount of data. As a result, analyzing and presenting the outputs effectively is of great importance.
- Organizational inputs
  - Accounting
  - Actuarial
  - Financial
- Optimizing asset allocation around the unique liability structure of an insurance company
- Setting parameters
  - Objective functions
  - Risk budget
  - Etc.

# Improving Company Performance

- Develops a better asset allocation
- Understanding of the alternatives
- Contingency plan
  
- Not an auto-pilot

# The Importance of Strategic Asset Allocation Optimization

Determinants of long term investment results



Sources: Ibbotson and Kaplan entitled "Does Asset Allocation Policy Explain 40%, 90% or 100% of Performance?" (2000).

# Study Methods and Assumptions

- Asset class expected returns are forward-looking projections generally based upon mean reversion theory of 20+ years of historical return data and applying forward looking research metrics based upon back-tested scenario analysis/Monte Carlo simulations
- Asset class volatilities, correlations and covariances are derived from long-term historical data
- Assumptions are based upon the following:
  - Investment returns are normally distributed
  - Reversion to mean takes place over the tested investment horizon
- Optimized portfolios are built around Modern Portfolio Theory (MPT) concepts

# Asset Class Assumptions

Asset Class	Expected Return	Volatility
Inflation		
Cash		
Short Dur. Govern't. Credit		
Intermediate Gov/Credit		
U.S. Aggregate (Core)		
Muni Bonds (1-15 blend)		
Core Plus		
Emerging markets sovereig		
Leveraged Loans		
TIPs- Treas. Inflation-Prote		
High Yield		
Convertibles		
EAFE Unhedged		
MLPs		
Private Equity		
Hedge Funds - Diversified		
Hedge Funds - Global Macr		
High Yield Muni		
Hedge Funds - Event Driver		
Global Infrastructure Debt		
REITS		
Commodities		
Gold		
U.S Large Cap (S&P 500)		
Dividend Achievers		
Mid Cap		
Small Cap		
Def Equity/Covered Call		
Euro Large Cap		
Asia ex-Japan Equity		
Emerging markets equity		
AC World Equity		
Risk Free Rate		

\*proprietary CapVisor data

Source: J.P.  
Morgan Research-  
Sample Long Term  
Asset Assumptions

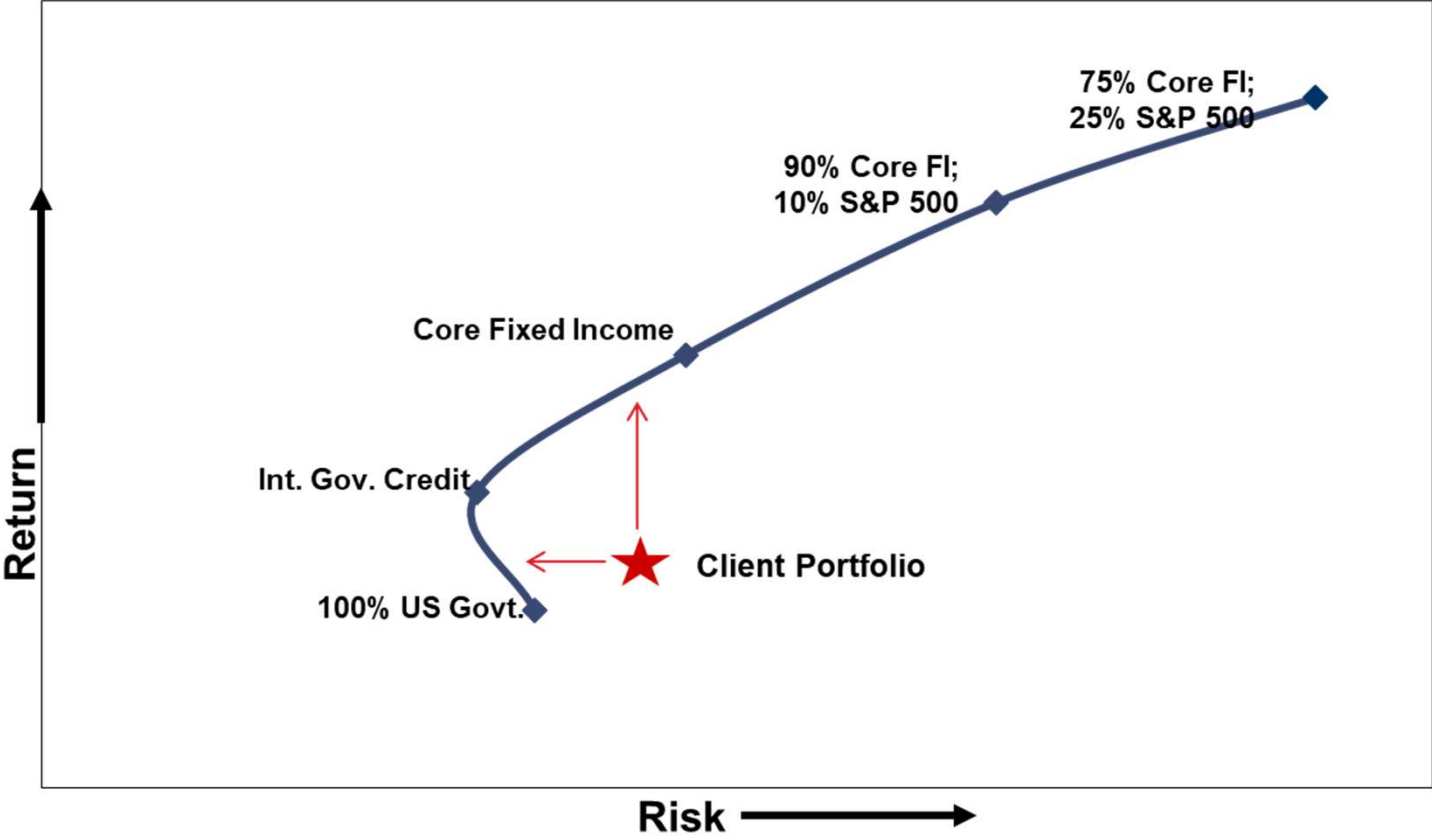
# Sample Abridged Asset Class Correlations

	Short Duration Government Credit	Cash	U.S. Aggregate (Core)	U.S. Large Cap (S&P 500)	High Yield	Core Plus	EAFE Unhedged	Intermediate Gov/Credit	MLPs	Convertibles	REITS	US 10 Year Gov (Long)	Commodities	Hedge Funds - Diversified	Small Cap	Municipal Bonds (1-15 blend)	Defensive Equity/Call
Short Dur. Govern't. Credit	1.00																
Cash	0.33	1.00															
U.S. Aggregate (Core)	0.74	0.01	1.00														
U.S. Large Cap (S&P 500)	-0.04	-0.06	-0.01	1.00													
High Yield	0.13	-0.13	0.19	0.69	1.00												
Core Plus	0.76	0.00	0.91	0.22	0.57	1.00											
EAFE Unhedged	0.11	0.04	0.09	0.88	0.72	0.37	1.00										
Intermediate Gov/Credit	0.75	0.07	0.93	-0.06	0.28	0.90	0.14	1.00									
MLPs	0.21	-0.22	0.04	0.54	0.60	0.28	0.49	0.04	1.00								
Convertibles	0.43	-0.02	-0.01	0.86	0.80	0.33	0.85	0.10	0.48	1.00							
REITS	0.03	-0.04	0.21	0.74	0.63	0.61	0.66	0.41	0.32	0.52	1.00						
US 10 Year Gov (Long)	0.40	-0.01	0.77	-0.36	-0.28	0.59	-0.31	0.69	-0.16	-0.41	-0.05	1.00					
Commodities	0.19	0.12	0.07	0.45	0.45	0.11	0.59	-0.08	0.49	0.62	0.26	-0.26	1.00				
Hedge Funds - Diversified	-0.07	0.10	-0.10	0.65	0.58	0.52	0.72	0.34	0.37	0.71	0.35	-0.40	0.57	1.00			
Small Cap	-0.10	-0.07	-0.08	0.91	0.66	0.22	0.77	-0.06	0.56	0.87	0.78	-0.37	0.37	0.58	1.00		
Muni Bonds (1-15 blend)*	0.44	-0.03	0.65	0.02	0.28	0.69	0.03	0.74	0.01	-0.10	0.17	0.46	0.07	-0.06	-0.04	1.00	
Def Equity/Covered Call	0.25	-0.13	-0.09	0.87	0.74	0.23	0.78	-0.05	0.50	0.72	0.62	-0.38	0.46	0.59	0.87	-0.10	1.00

Source: JPMorgan Sample 10-15 year forward-looking correlations table

# Efficient Frontier Analysis

## Optimizing Your Investment Result









# Investment Data Comparison

## Heat Map

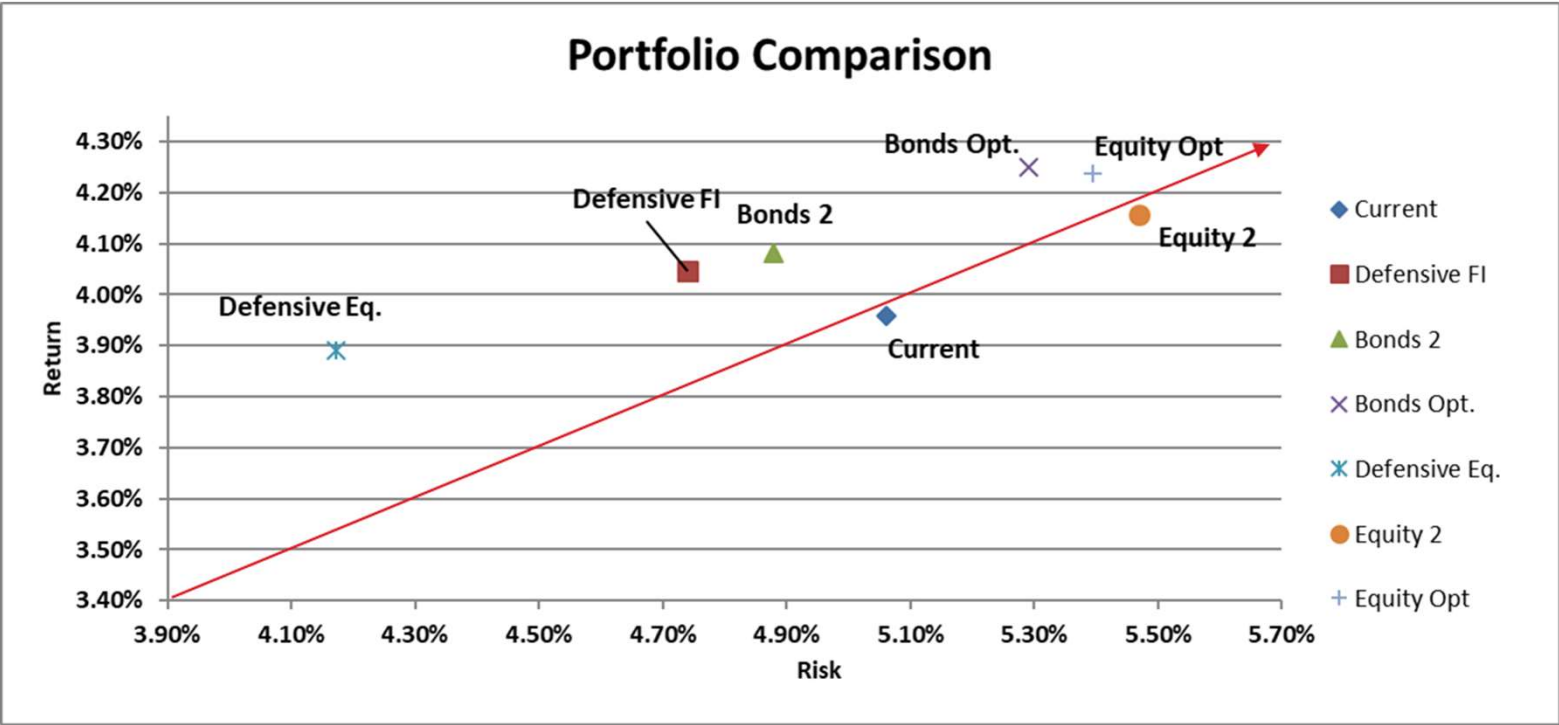
Portfolio Comparison								
Portfolio	Mean	St.dev	Sharpe	1 Year	3 Year	5 Year	7 Year	10 Year
Current	3.96%	5.06%	0.227	3.96%	12.35%	21.43%	31.23%	47.44%
Defensive FI	4.05%	4.74%	0.261	4.05%	12.64%	21.94%	32.01%	48.69%
Bonds 2	4.08%	4.88%	0.260	4.08%	12.75%	22.14%	32.31%	49.18%
Bonds Opt.	4.25%	5.29%	0.272	4.25%	13.30%	23.13%	33.81%	51.61%
Defensive Eq.	3.89%	4.17%	0.259	3.89%	12.13%	21.02%	30.62%	46.47%
Equity 2	4.16%	5.47%	0.246	4.16%	12.99%	22.58%	32.99%	50.27%
Equity Opt	4.24%	5.39%	0.265	4.24%	13.26%	23.06%	33.71%	51.43%

**Mean= expected return**

**Standard Deviation= measurement of volatility around expected return or “risk” (square root of the variance)**

**Sharpe Ex Ante ratio indicating return per unit of risk above the risk free rate.** The Sharpe ratio is calculated by subtracting the risk-free rate - such as that of the 10-year U.S. Treasury bond - from the rate of return for a portfolio and dividing the result by the standard deviation of the portfolio returns.

# Risk/Reward Analysis

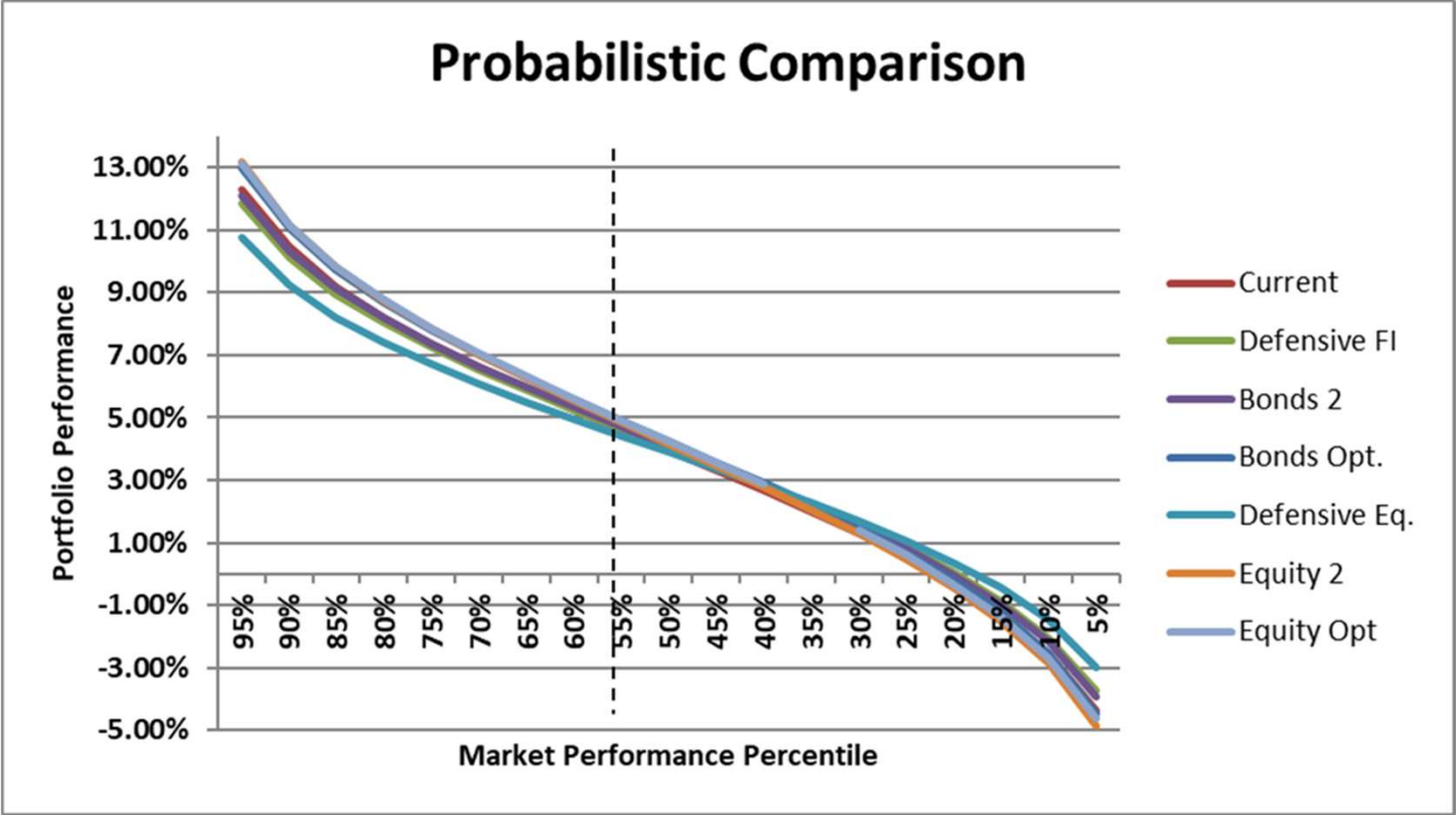


# Probabilistic Comparison

<b>Tail Risk Comparison</b>					
	<b>Standard Deviation</b>				
<b>Portfolio</b>	<b>+2</b>	<b>+1</b>	<b>Mean</b>	<b>-1</b>	<b>-2</b>
Current	14.08%	9.02%	3.96%	-1.10%	-6.16%
Defensive FI	13.53%	8.79%	4.05%	-0.69%	-5.43%
Bonds 2	13.84%	8.96%	4.08%	-0.80%	-5.68%
Bonds Opt.	14.83%	9.54%	4.25%	-1.04%	-6.33%
Defensive Eq.	12.24%	8.06%	3.89%	-0.28%	-4.46%
Equity 2	15.10%	9.63%	4.16%	-1.31%	-6.78%
Equity Opt	15.03%	9.63%	4.24%	-1.16%	-6.55%

## Heat Map

# Probabilistic Comparison



# Case Study – Client and Model Inputs

- 5 year projection
  - Gross written premiums, by LOB
  - Projected premium increase
  - Assumed (Quota Share Participation Ratio)
  - Unearned Premium
  - Loss ratios- direct written business, by LOB
  - Loss Ratios- Adverse Loss Ratio: 90th Percentile
  - Insurance Agency Rate:
  - Other fees
  - Capital
  - Investment management fees
  - Portion of Admin expenses attributable to Investment activities

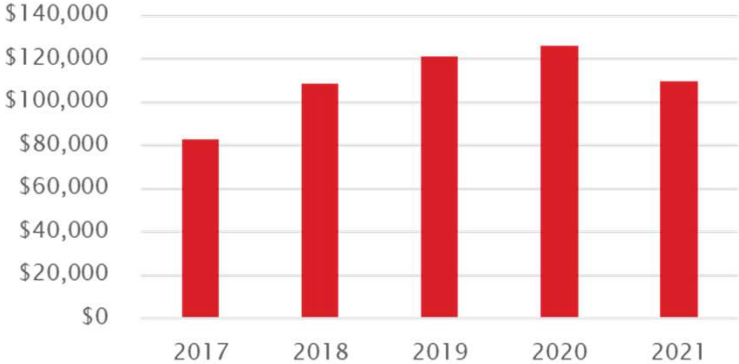
Portfolio:	Original				
Scenario:	Mean				
	Year 1	Year 2	Year 3	Year 4	Year 5
Risk Free Return	2.450%	2.450%	2.450%	2.450%	2.450%
Portfolio Return	3.048%	3.048%	3.048%	3.048%	3.048%
Cash % of Portfolio	10%				

# Case Study- Model Output

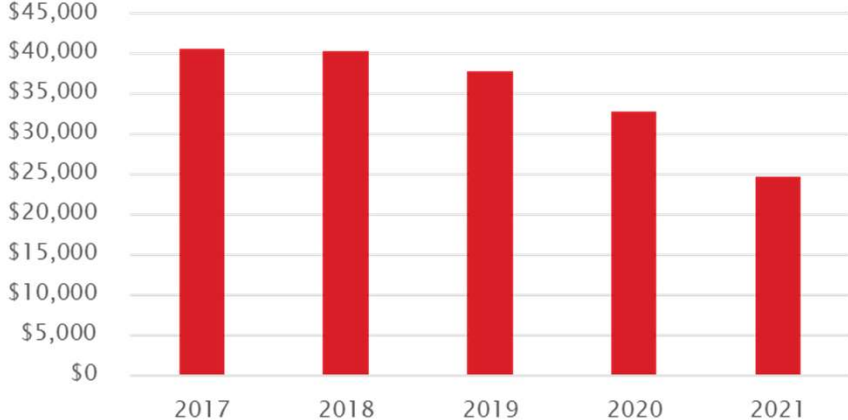
Output	2017	2018	2019	2020	2021
Ending Assets	\$83,121	\$108,862	\$121,447	\$126,056	\$109,750
Ending Equity	\$40,625	\$40,316	\$37,882	\$32,874	\$24,710
Total Investment Income	\$1,228	\$4,046	\$7,407	\$11,014	\$14,445
Total Net Income	\$625	\$316	(\$2,118)	(\$7,126)	(\$15,290)

# DFA Output

Total Asset Growth



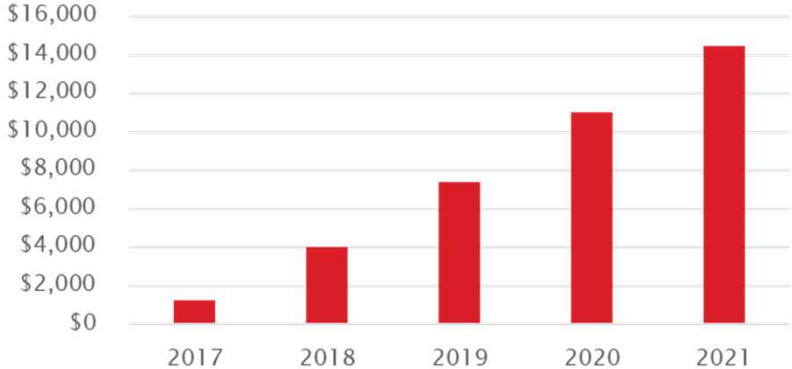
Total Surplus Growth



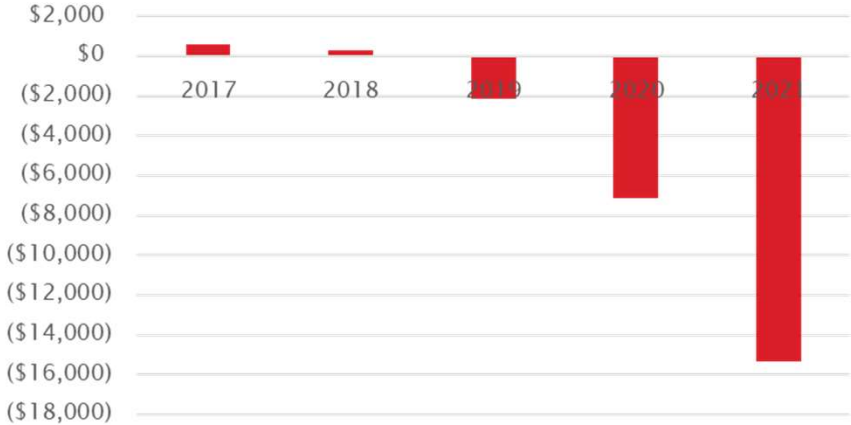


# DFA Output

Total Investment Income



Total Net Income





**IASA 2018**  
**POWER UP!**  
EDUCATIONAL CONFERENCE & BUSINESS SHOW  
JUNE 3 - 6, 2018 | GAYLORD OPRYLAND | NASHVILLE, TN

Questions & Answers

Thank you!

#IASA2018