



**Session 84 PD, Management of Actuarial Risks for  
Deferred Annuities**

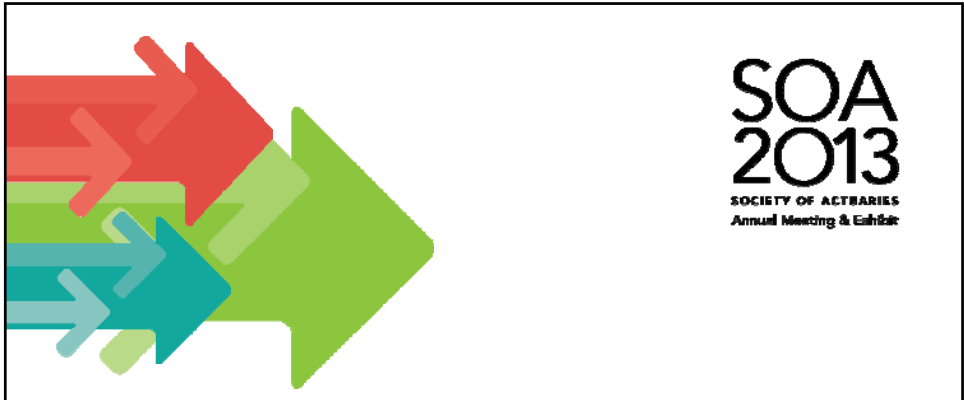
**Moderator:**

Kenneth Scott Birk, FSA, CERA, MAAA

**Presenters:**

Timothy S. Paris, FSA, MAAA

Nathan Daniel Wilbanks, FSA, MAAA




**SOA**  
**2013**  
SOCIETY OF ACTUARIES  
Annual Meeting & Exhibit

**Management of Actuarial Risks for  
Deferred Annuities**

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Management of Actuarial Risks for  
Deferred Annuities



Nathan D. Wilbanks, FSA, MAAA  
Brian Grinnell, FSA, MAAA, CQF  
Session 84 - 2013 SOA Annual Meeting  
October 12, 2013

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## What is the return on your top selling product?

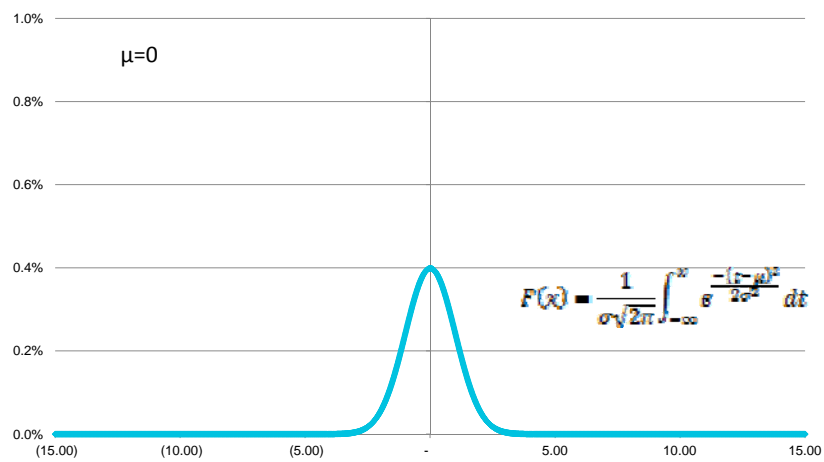


Image courtesy of Stuart Miles / FreeDigitalPhotos.net

## Distribution Matters



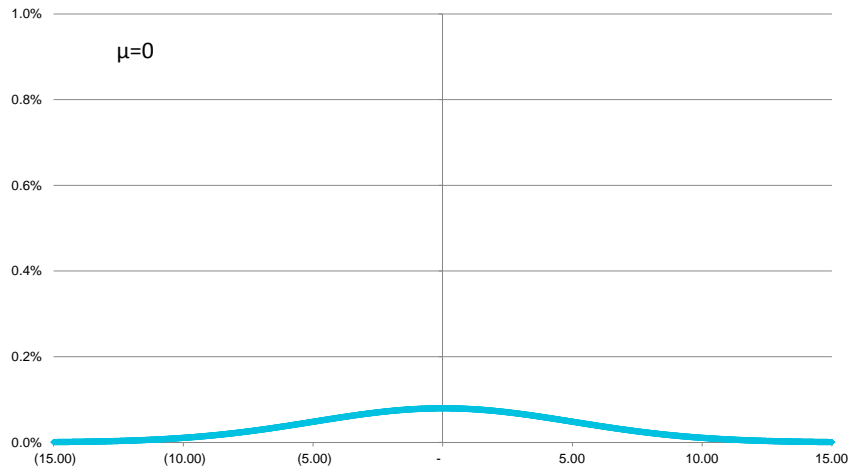
### Standard Normal



## Distribution Matters



### Also Normal



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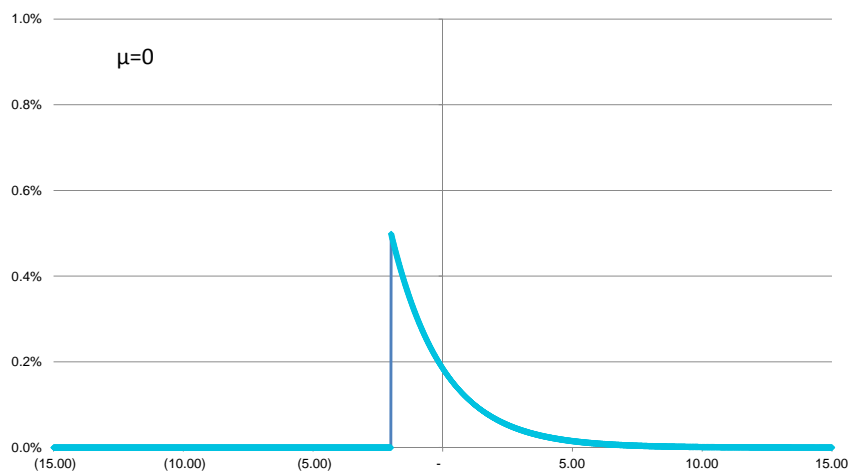
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## Distribution Matters



### Exponential



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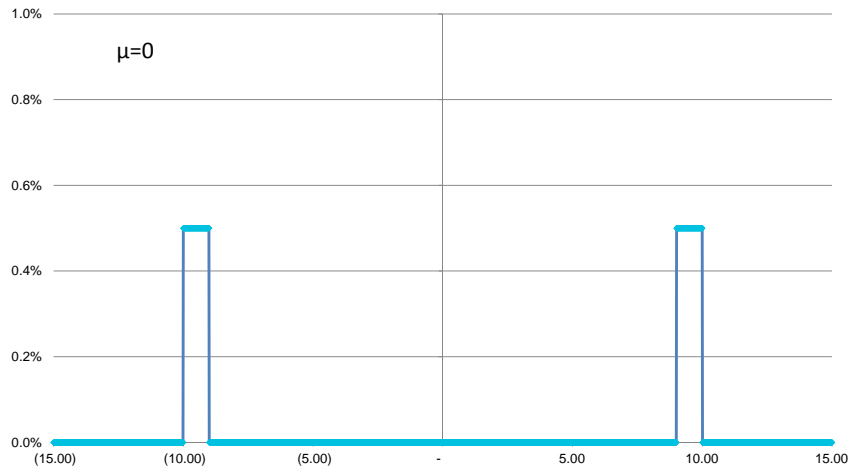
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## Distribution Matters



### Barbell



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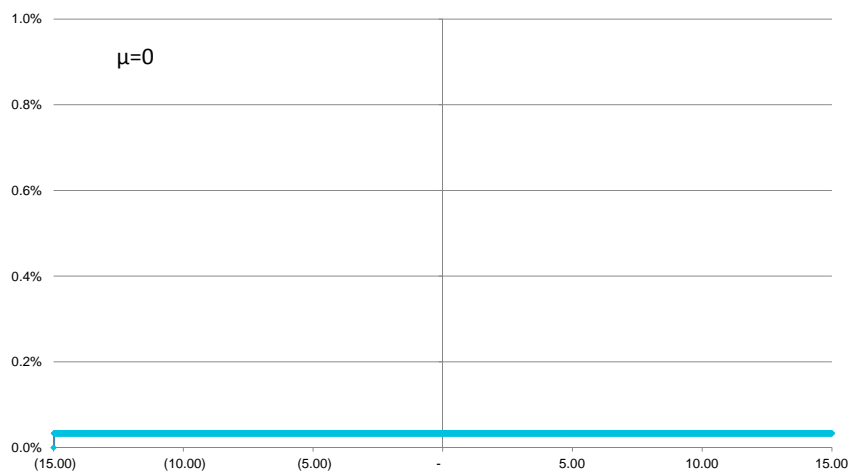
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## Distribution Matters



### Uniform



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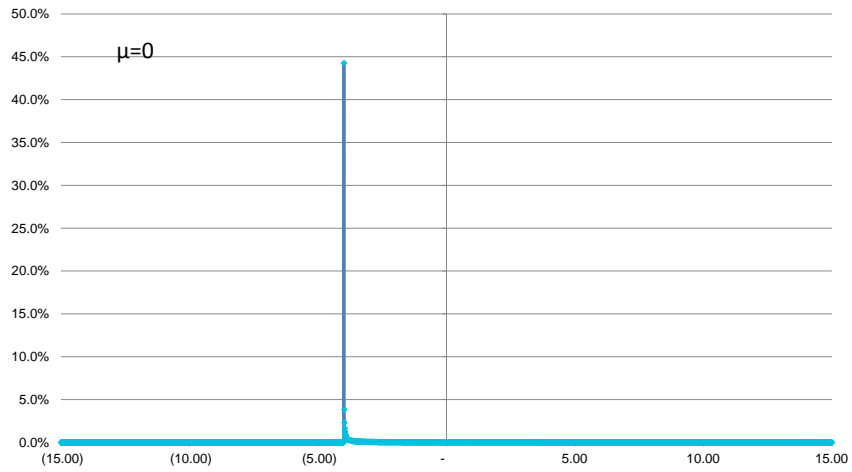
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## Distribution Matters



### Weibull

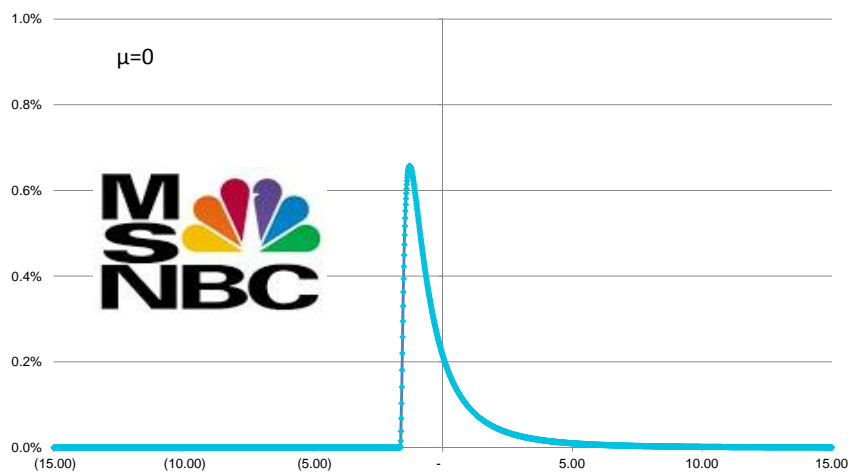


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## Distribution Matters



### Lognormal

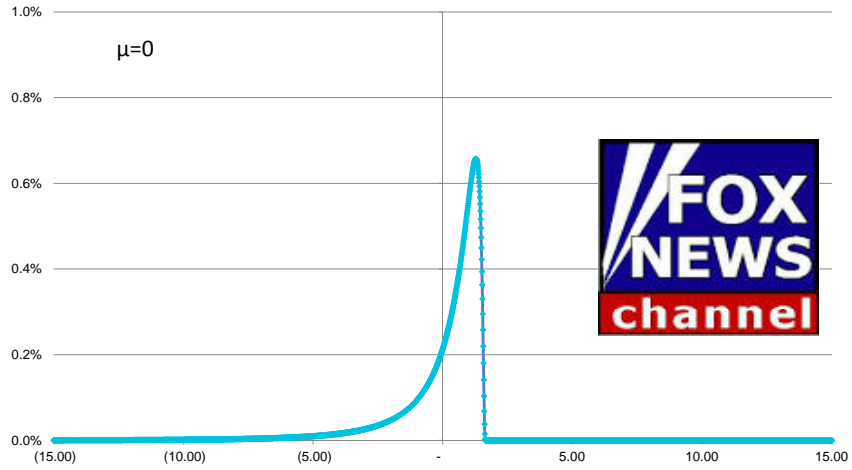


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# Distribution Matters



## Lognormal

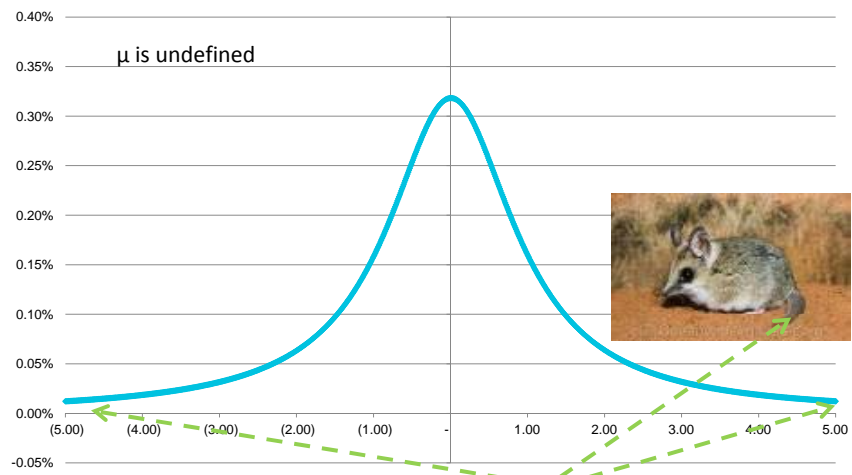


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# Distribution Matters



## Cauchy

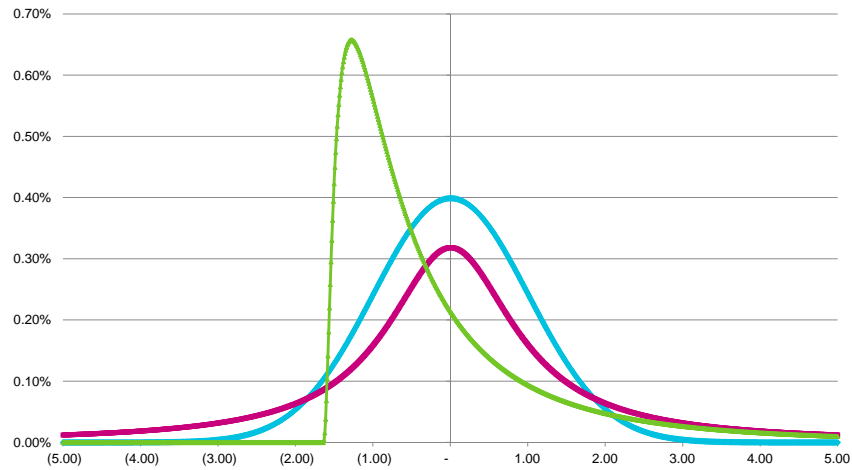


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## Distribution Matters



### Normal vs. Cauchy vs. Lognormal



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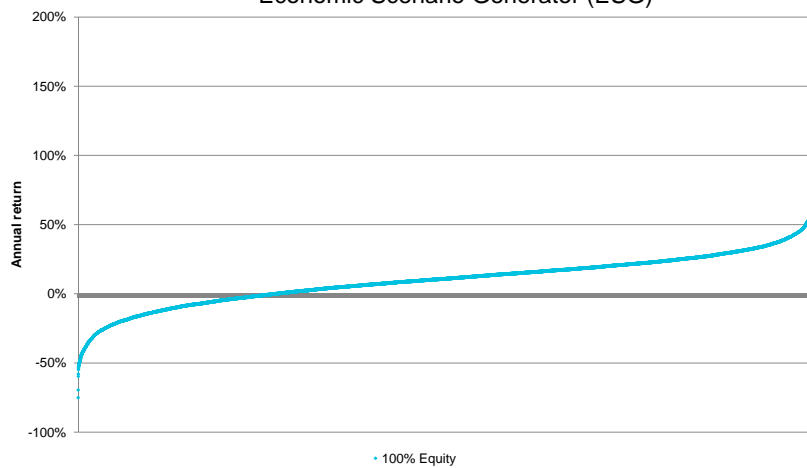
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## Distribution Matters



### 1-year Equity Returns from Nationwide's Economic Scenario Generator (ESG)



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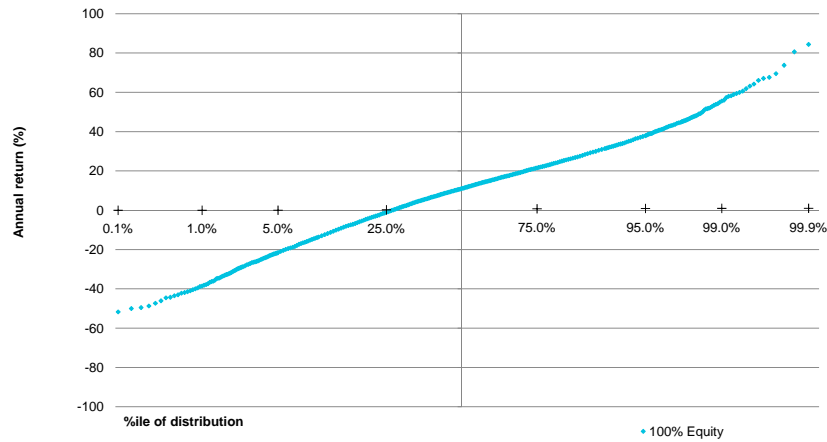
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## Distribution Matters



1-year Equity Returns from Nationwide's  
ESG – Emphasis on Tails

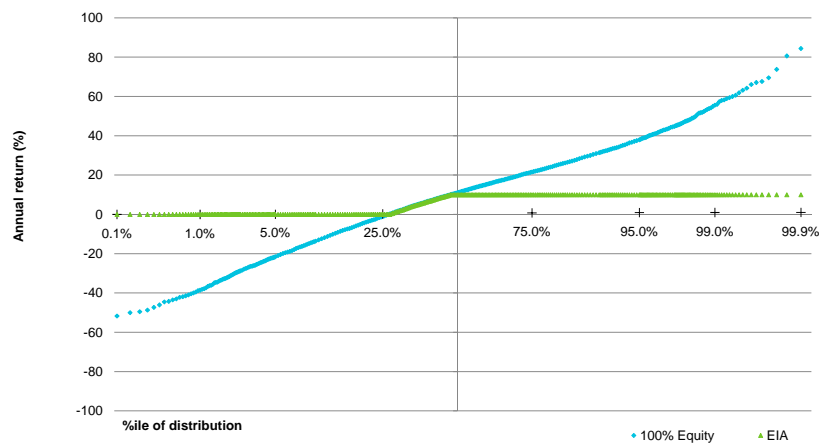


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## Engineering a Better Distribution



Equity Indexed Annuity (EIA) Returns

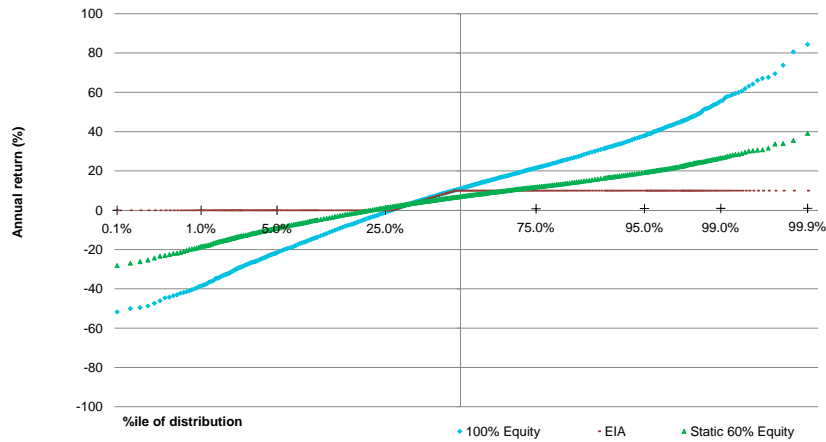


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# Engineering a Better Distribution



## Static 60% Equity Fund

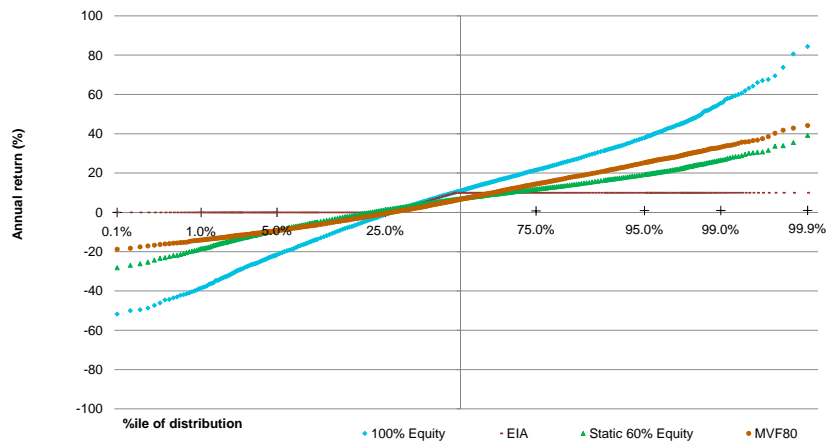


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# Engineering a Better Distribution



## Managed Volatility Fund up to 80% Equity



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## What is a Managed Volatility Fund?



Aka Target Vol Fund, Volatility Controlled Fund, in some cases Tactical Asset Allocation Fund

May or may not include an element of principal protection

Seeks to modify equity exposure (through tactical allocations or the use of derivatives) in order to limit the volatility of the underlying

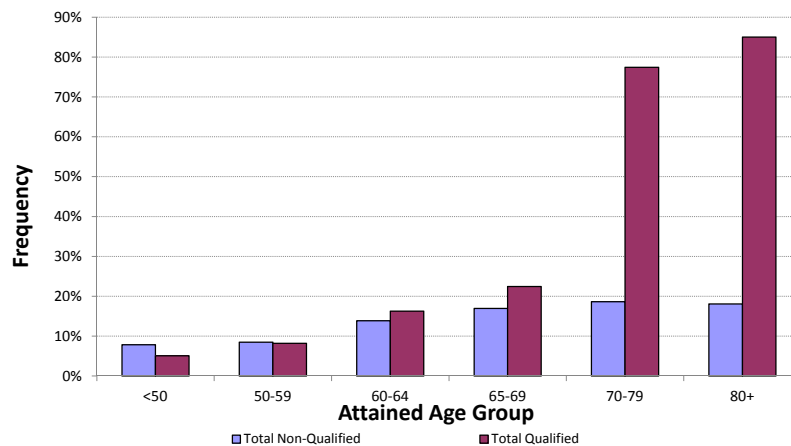
Can be used for both Variable Annuities and Fixed Indexed Annuities

- Limits downside risk for Variable Annuities
- Limits option cost volatility for Fixed Indexed Annuities

## Cellular Results: Free Withdrawals



FIA Withdrawal Frequency by Age & Tax Status



Source:

# Cellular Results: Arbitrage Opportunities



**Guaranteed Annual Income Starting in 3 Years (on a \$500,000 Premium)**  
 Single-Premium annuity (SPIA) vs. Equity-Indexed Annuity (EIA)

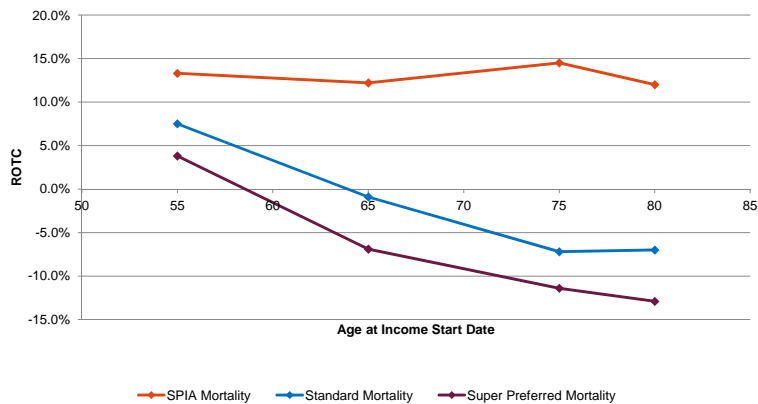
	SPIA*	EIA**	SPIA/EIA	
<b>Age 55</b>	Single Lifetime Male	29,760	28,505	4.4%
	Single Lifetime Female	28,320	28,505	-0.6%
	Joint 100% to Spouse	25,590	25,250	1.3%
<b>Age 60</b>	Single Lifetime Male	32,940	32,785	0.5%
	Single Lifetime Female	31,050	32,785	-5.3%
	Joint 100% to Spouse	27,600	28,500	-3.2%
<b>Age 65</b>	Single Lifetime Male	37,320	35,880	4.0%
	Single Lifetime Female	34,890	35,880	-2.8%
	Joint 100% to Spouse	30,390	31,750	-4.3%
<b>Age 70</b>	Single Lifetime Male	43,080	38,975	10.5%
	Single Lifetime Female	40,260	38,975	3.3%
	Joint 100% to Spouse	34,260	35,000	-2.1%
<b>Age 75</b>	Single Lifetime Male	50,400	42,065	19.8%
	Single Lifetime Female	47,550	42,065	13.0%
	Joint 100% to Spouse	39,450	38,250	3.1%

Source: QWEMA Group. Tim Foley and Dan Slater at CORE Income (April 2013)  
 \* Based on the average of top 3 payout quotes (credit rating A or better.)  
 \*\* Indicative based on leading EIA Manufacturers (credit rating A or better)

# Cellular Results: Arbitrage Opportunities



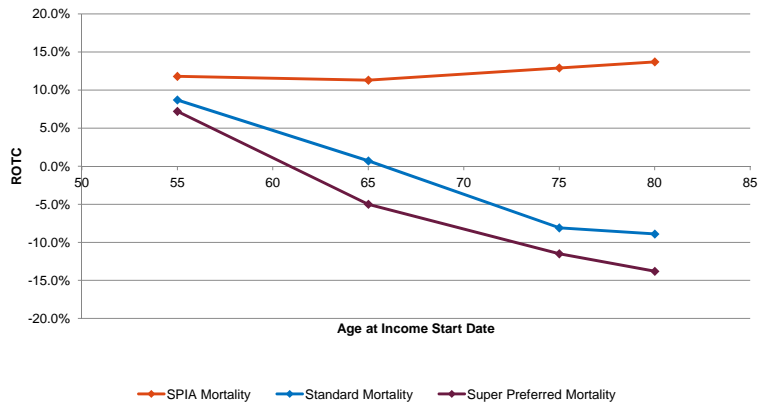
**SPIA Returns by Age: Males**



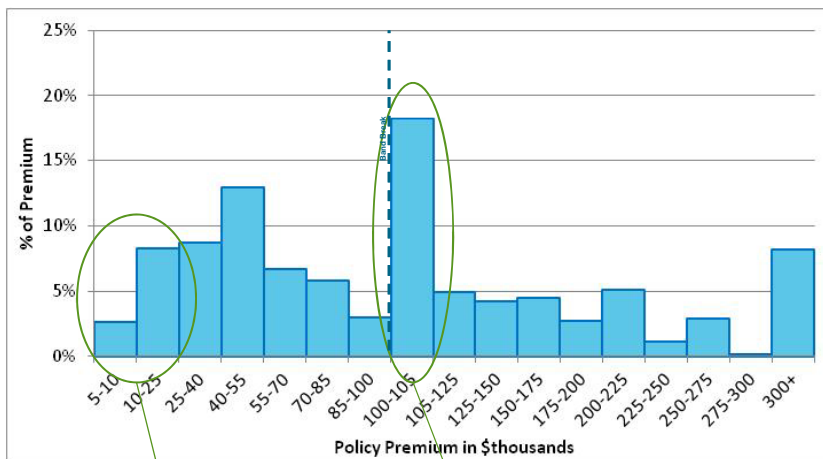
## Cellular Results: Arbitrage Opportunities



### SPIA Returns by Age: Females



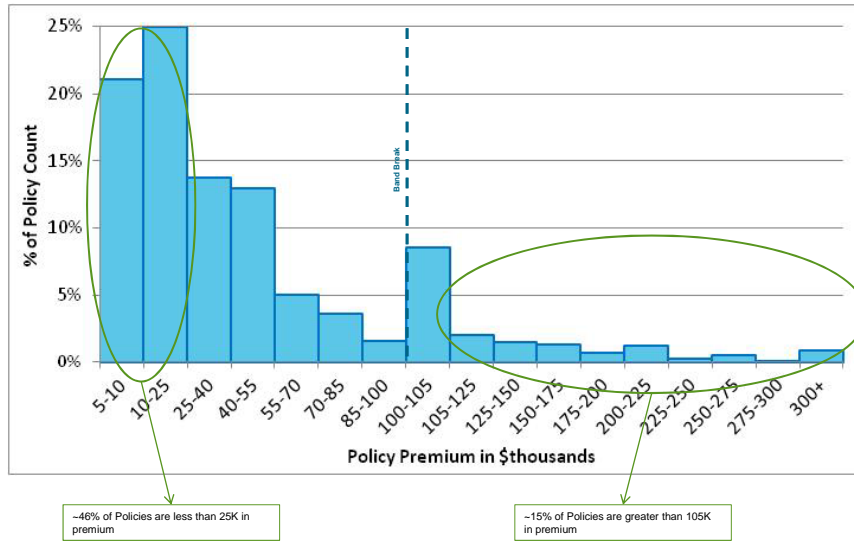
## Cellular Results: Average Size



-11% of Premium is less than 25K. Premium less than 10K only consists of 3% of production.

Note that almost 20% of premium is right on the cusp of the band break

## Cellular Results: Average Size



## What's Next?




Distribution Matters

How granular should results be?

Compare like competitor products

Arbitrage Avoidance



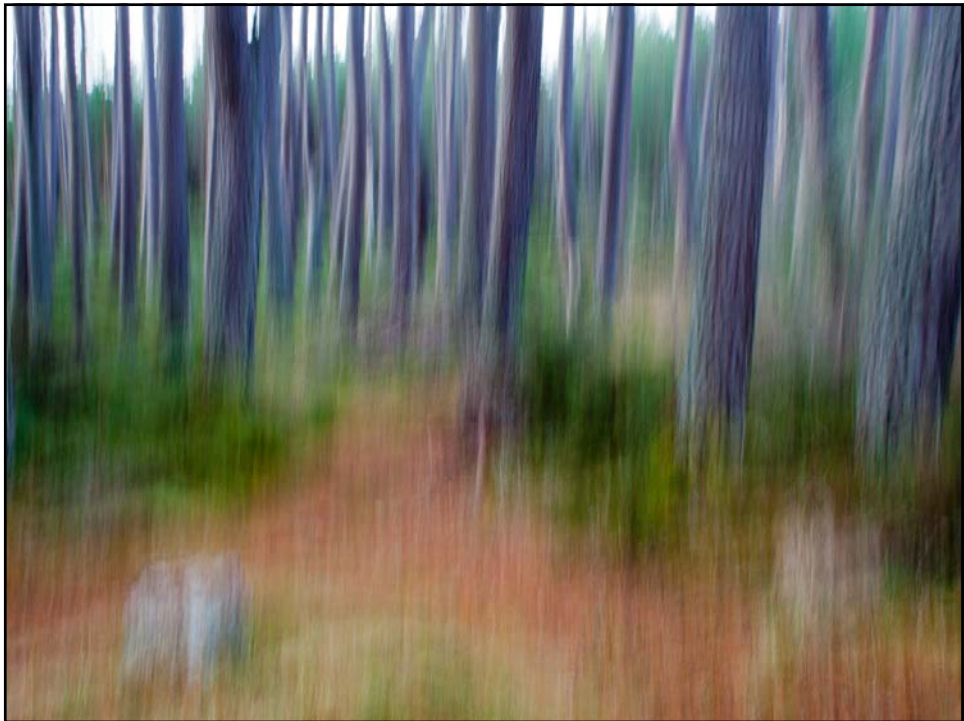
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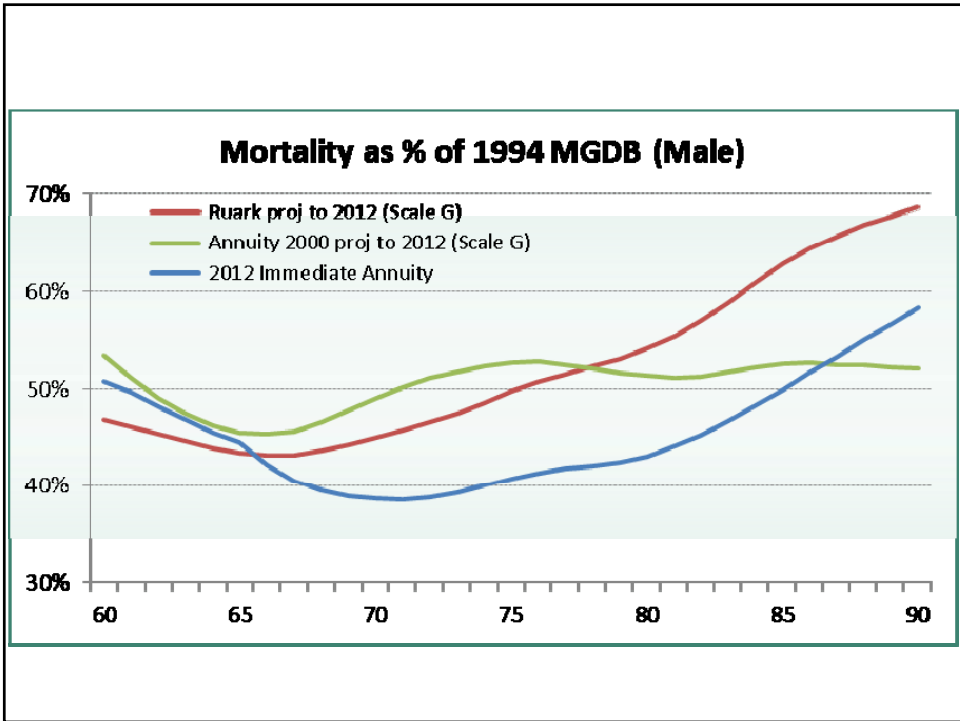
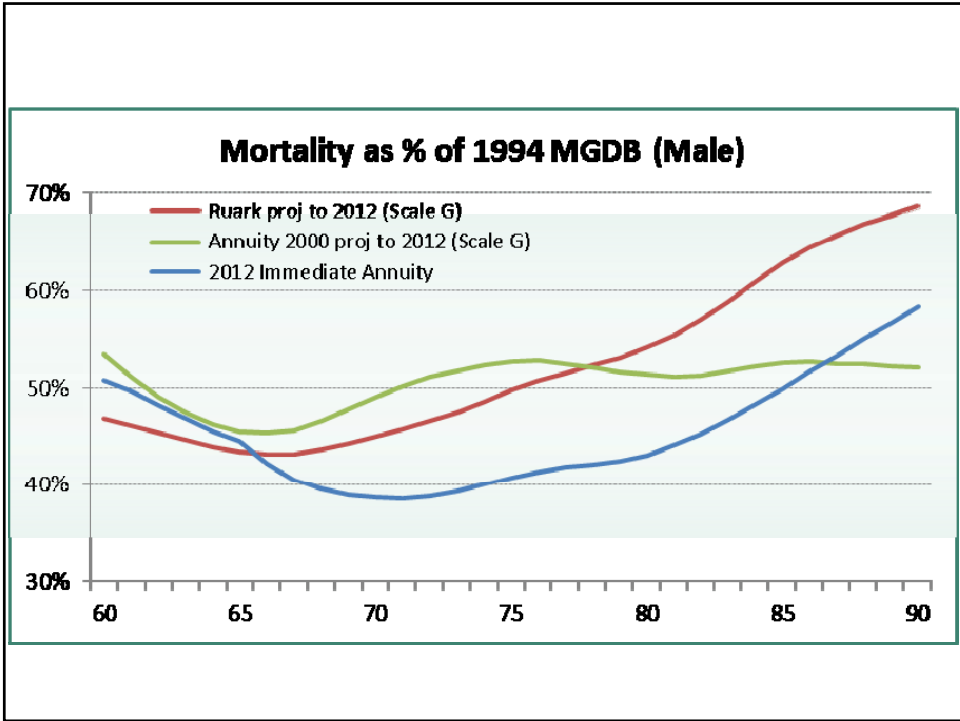
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Deferred Annuities**

Session 84, October 22 2013, 8:30-9:45am

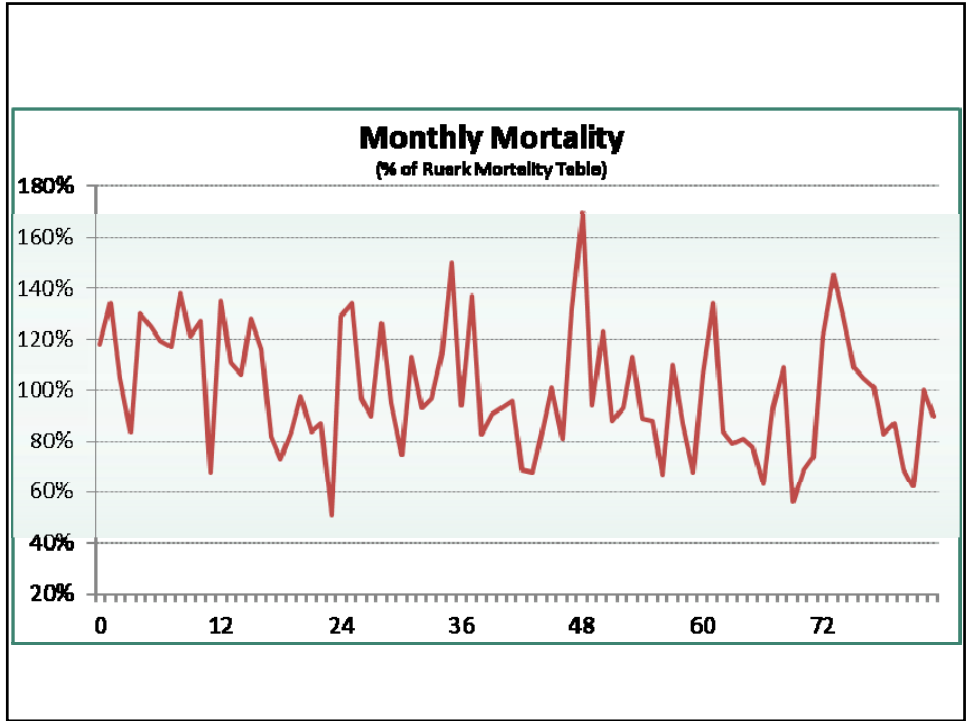
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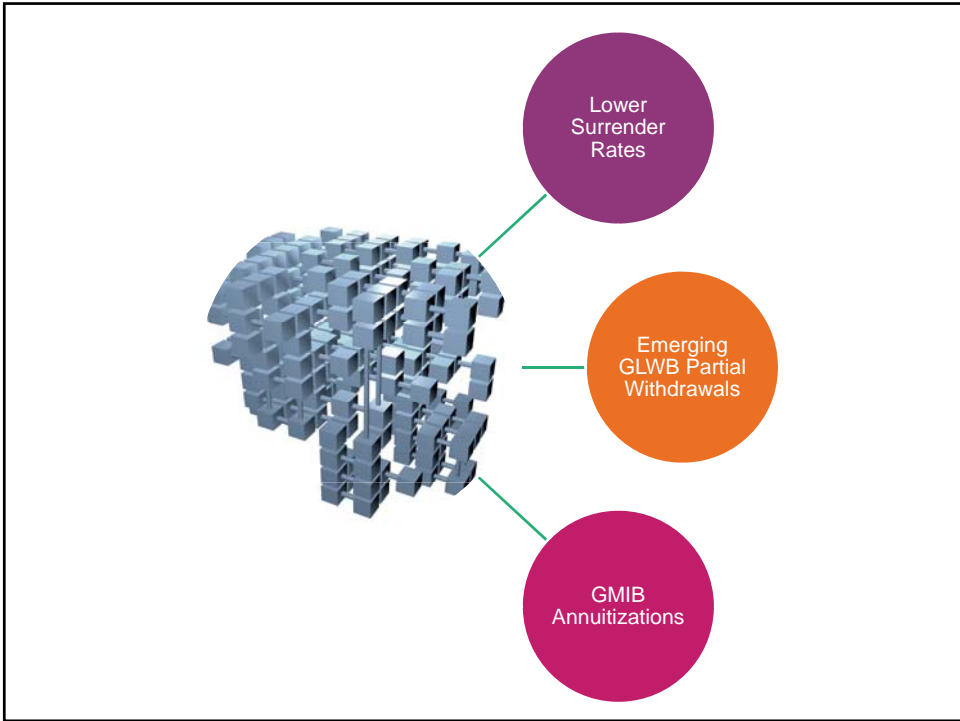
Timothy Paris, FSA, MAAA  
Ruark Insurance Advisors, Inc.











## Policyholder Behavior Rears Its Head

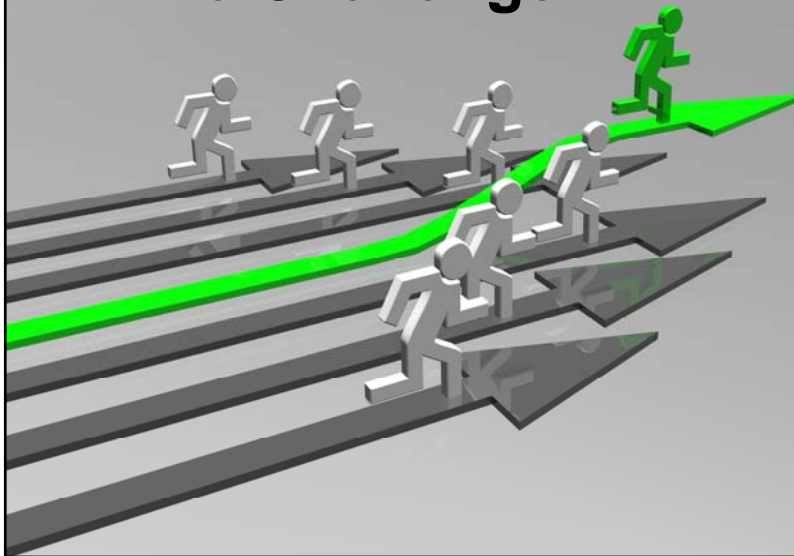
USD 1.1b Surrenders

EUR 0.6b Mortality and surrenders

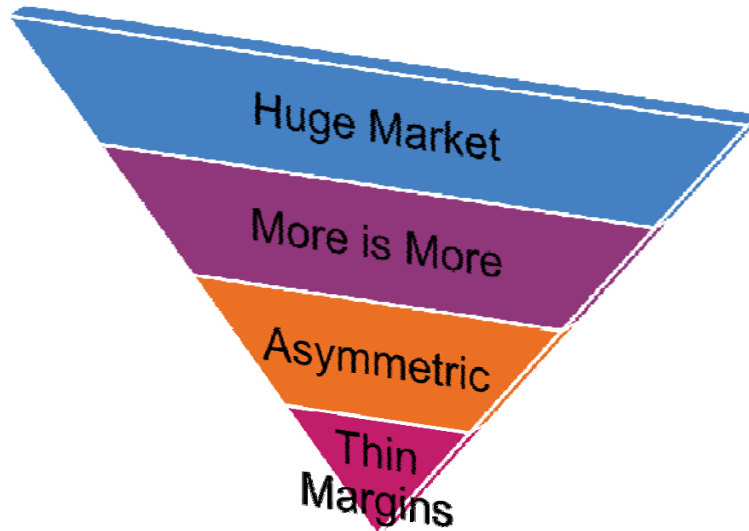
USD 0.3b Surrenders

CAD 0.3b Surrenders and other behavior

## The Challenge



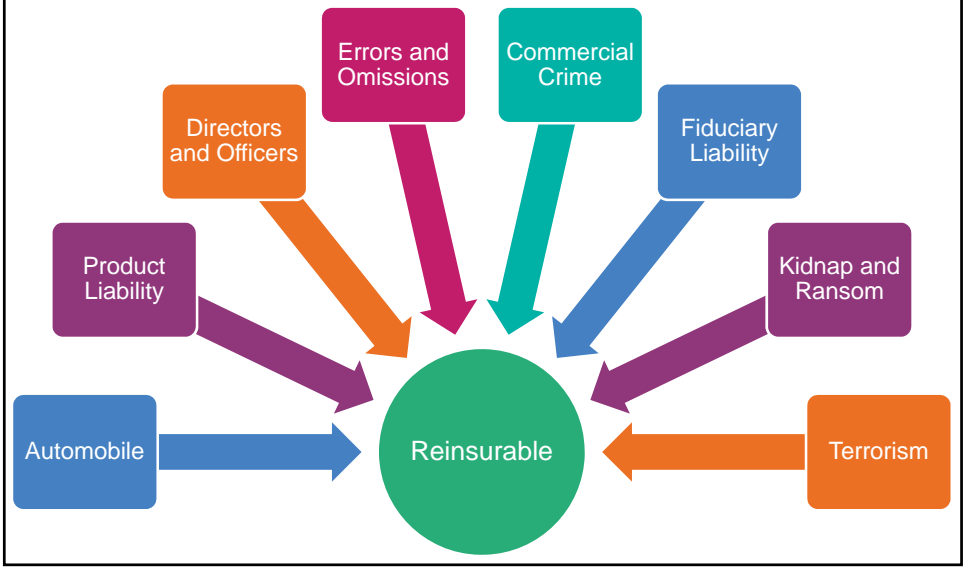
## Guarantees Are Fragile



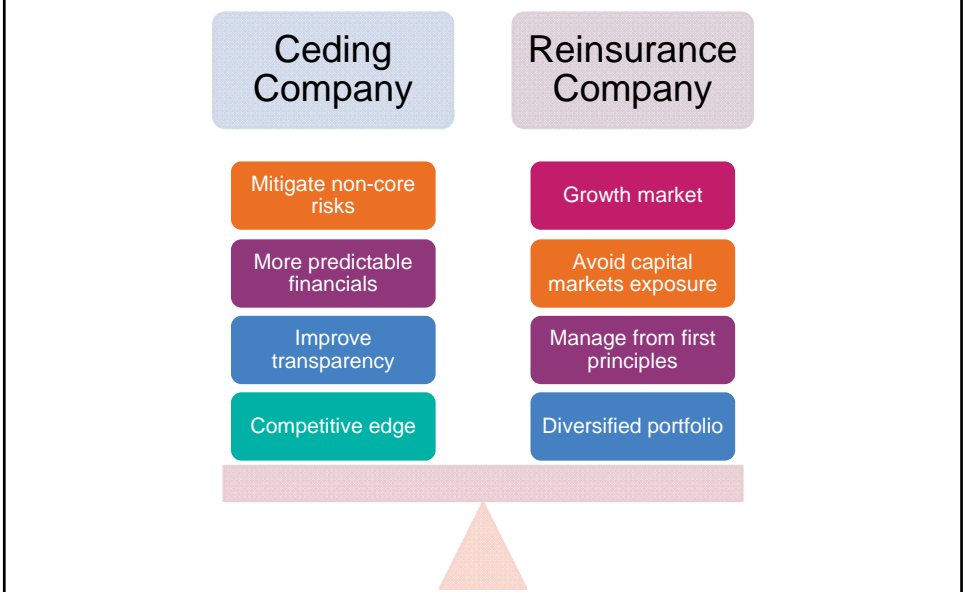
### Active Risk Management

Interest Rates	✓
Equity Indices	✓
Currency Exchange Rates	✓
Legal and Reputational Risks	✓
Operational Risks	✓
Policyholder Behavior Risks	✗

# Is Behavior Reinsurable?



# Advantages

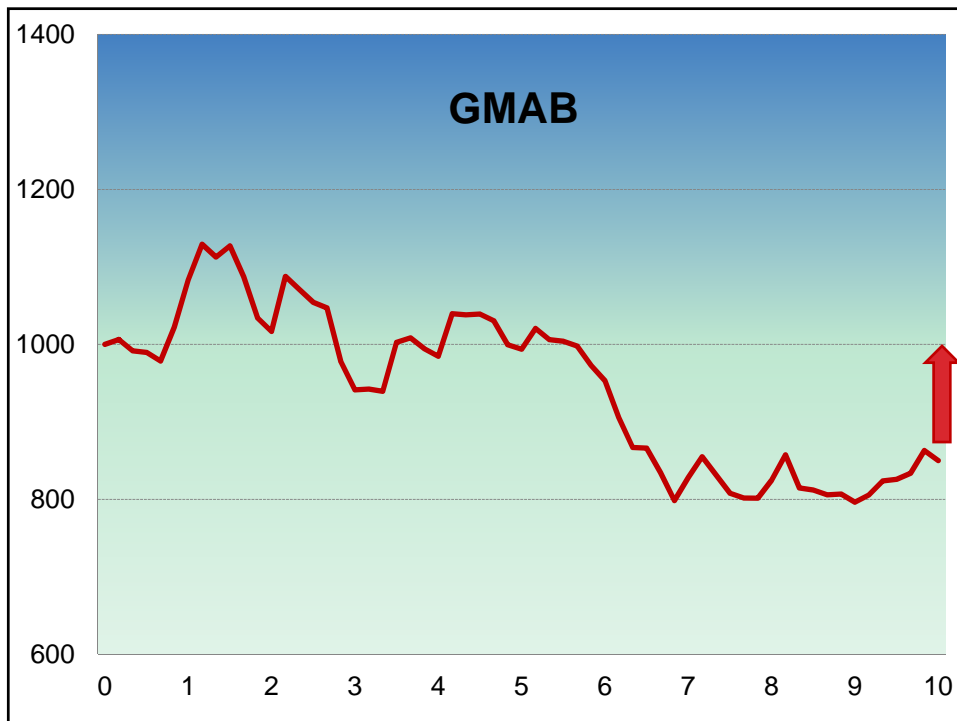
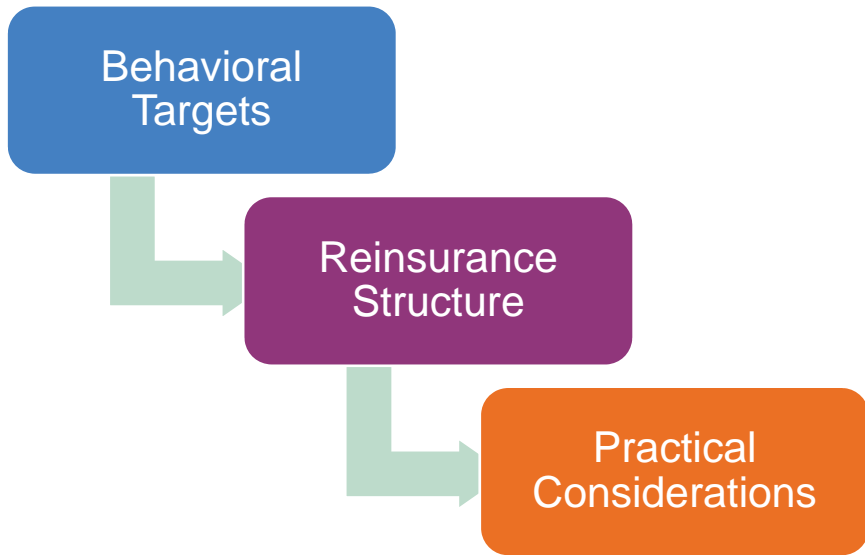




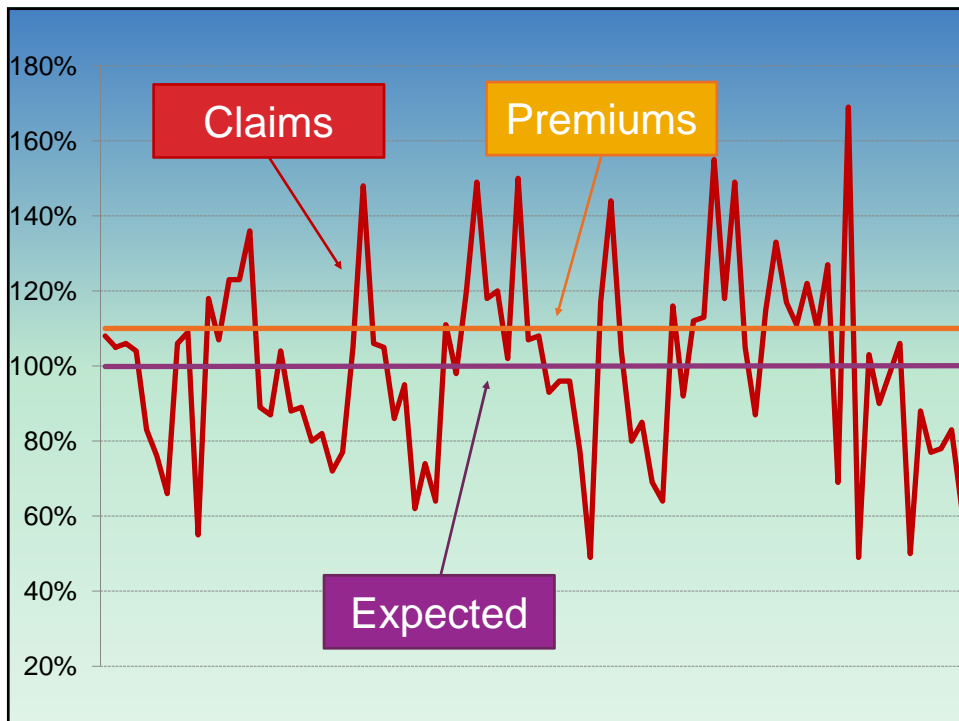
**Bespoke**

Hedging Attribution Report	Gain/(Loss)
<b>Hedged Market Risks</b> Delta, Rho, Gamma, Vega, Theta	
<b>Unhedged Market Risks</b> Unhedged Funds, Basis Risk	
<b>Program Administration</b> Model Differences, Expenses	
<b>Policyholder Behavior</b> Mortality, Elective Behavior	
<b>Total</b>	

# Policyholder Behavior Reinsurance

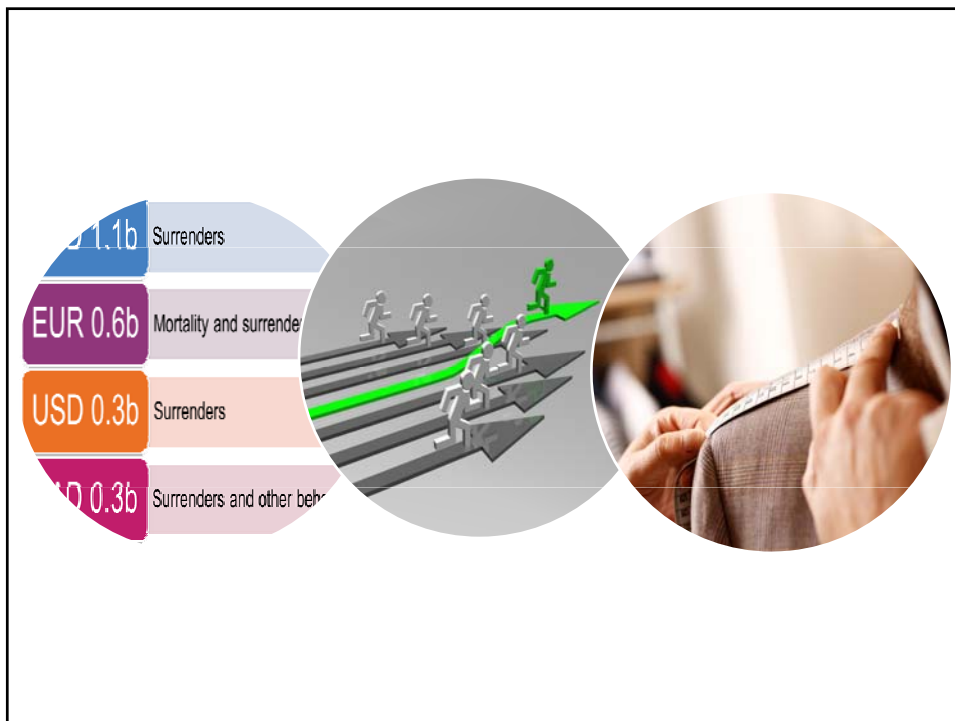
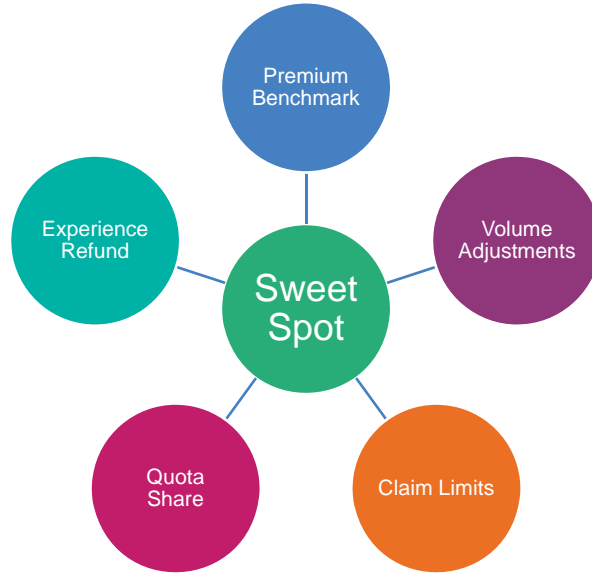


**Claims = Frequency X Severity**





# Practical Considerations





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**Thank You!**

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