Allocating Economic Capital to Drive Business Decisions

June 9, 2014

An Application of the Shared Asset Framework by Allstate

- **Original paper – 2005 ASTIN Bulletin (reprinted in the 2006 CAS Forum): *"Insurance Capital as a Shared Asset"***
  www.casact.org/library/astin/vol35no2/471.pdf
- **One example of presentation:**
  www.casact.org/education/reinsure/2005/handouts/mango.ppt
- **It is the foundational text for the Cost of Capital portion of the Institute of Actuaries (UK) syllabus**

Symptoms of Problems with Current Capital Allocation

- Too much allocated to catastrophe-prone lines, not enough to attritional
- Too much to Property, not enough to Casualty
- Discounting Casualty and treating it like Property makes it look better
- Changes to model inputs produce non-intuitive changes in allocations
- Difficulty explaining method and building understanding with leadership team
- Manual intervention required to adjust or correct for allocation anomalies

Solvency II and ORSA *Use Test*

- **Demonstrate that Senior Management (key opinion leaders)…**
- **…understand the Model**
  - Inputs
  - Process and
  - Outputs,
- **…and believe in its results to a sufficient degree to allow its use in critical strategic decisions, e.g.:**
  - Planning
  - Rating agency discussions
  - Reinsurance purchasing
  - Bonuses
- **First and foremost is Capital Allocation**

Capital (Cost) Allocation

Leading Practice Process

Leading Practice Step	Rationale
1) Design driven approach	Decide what to reflect and ignore Employ sensitivity testing
2) Realistic capital usage costs	Insurer capital is a shared asset with two distinct types of usage, Rental and Consumption Allocate the costs of its true usage to contributing lines
3) Consumption Costs via Risk Preference function	Every risk metric has an implicit risk preference function underlying it Assess capital consumption costs using risk preference function
4) Key sensitivity tests: the Three R's	Reserves, reinsurance and return periods
5) Create an operational buffer between the capital model and the field	Use a sophisticated method to produce percentage allocations which are then applicable to any total Only allocate cost of capital as far down in the organization as necessary Translate cost of capital into familiar terms – e.g., % load in target combined ratios

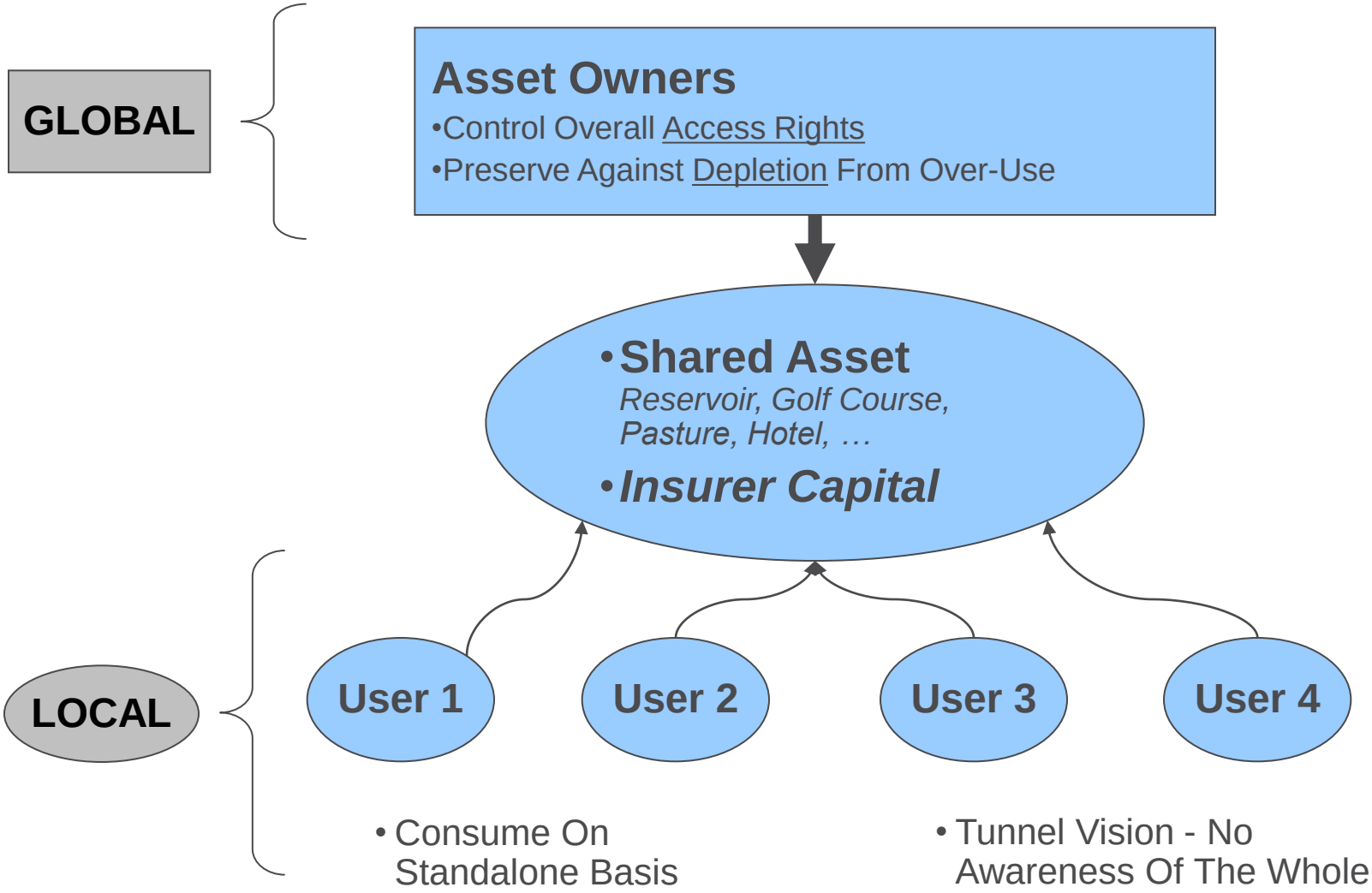
Realistic Capital Usage Cost Framework:

Insurance Capital as a Shared Asset

Valuing Parental Guarantees

- Merton & Perold (1993): "risk capital" for a financial services profit center is the cost of parental guarantee to make up any shortfalls
- Insurer provides these shortfall guarantees to every policy, product segment, profit center, operating company, etc.
- Guarantees are backed by the entire capital pool
- Everyone has simultaneous rights to (potentially) use up all the capital
- Company must manage the timing and size of guarantee exercises:
  - Concentrations
  - Correlation
  - Reserve deficiencies
- Too many calls for cash and the common pool of capital gets drained

Insurer Capital is a Shared Asset



Shared Assets Can Be Used Two Different Ways

Consumptive Use

- **Example: RESERVOIR**
- ***Permanent*** **Transfer To The User**

Non-Consumptive Use

- **Example: GOLF COURSE**
- ***Temporary*** **Grant Of Partial Control To User For A Period Of Time**

Both Consumptive and Non-Consumptive Use

- Example: HOTEL
- ***Temporary*** Grant Of Room For A Period Of Time
- Guest could destroy room or entire wing of hotel, which is ***Permanent Capacity Consumption***

An Insurer Uses Its Capital Both Ways

1. "Rental" Or Non-Consumptive

- Returns Meet Or Exceed Expectation
- Capacity Is Occupied, Then Returned Undamaged
- A.k.a. *Room Occupancy*

2. Consumptive

- Results Deteriorate
- Reserve Strengthening Is Required
- A.k.a. *Destroy Your Room, Your Floor, Or Even The Entire Hotel*

Charge Each Segment for Its Capital Usage

Capital Usage Cost Calculation

Paying for the Parental Guarantee

Two Kinds Of Charges:

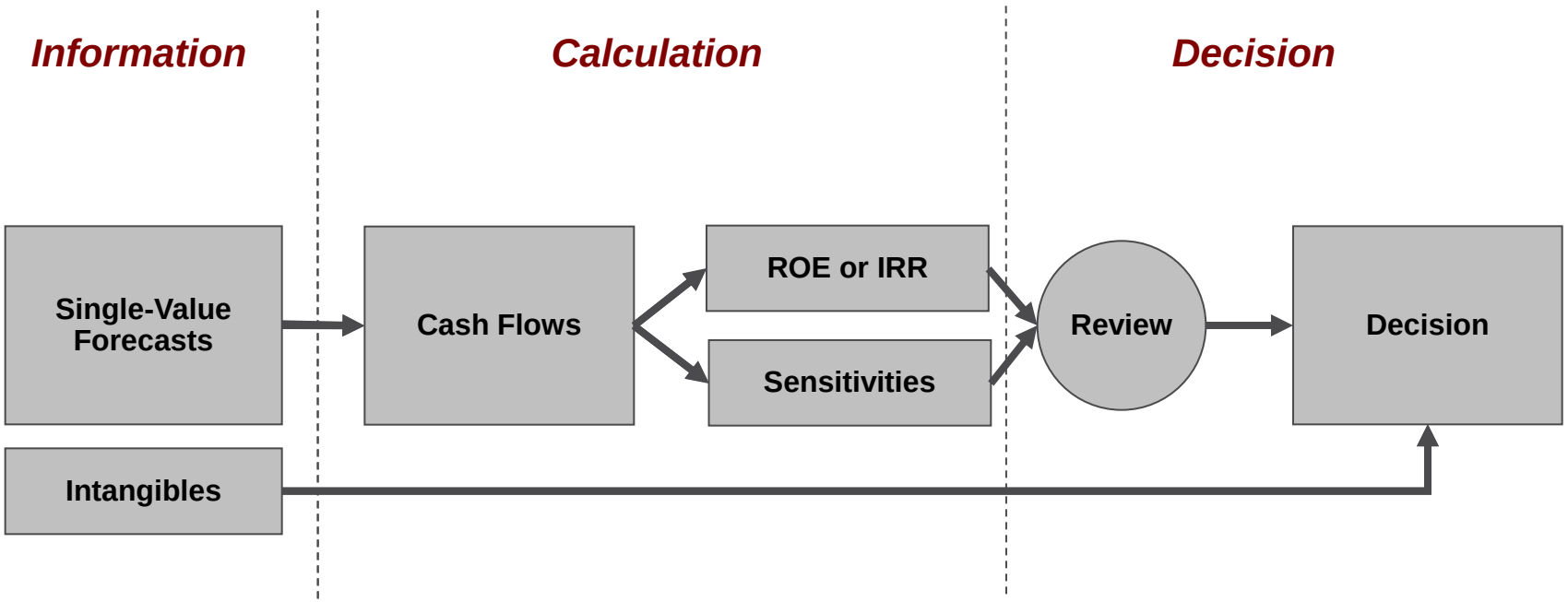
1. **Rental = upfront fee for right to (possibly) use the Guarantee**
   → ***Occupying underwriting capacity***
   → ***BCAR, SPCAR, RBC, SCR, …***

2. **Consumption = contingent fee for using the Guarantee**
   → **Function of *Potential for Deficit (Consumption)***
   → ***Risk appetite / preference / riskiness leverage function***

Explicit Risk Preferences

Evolution of Decision Making

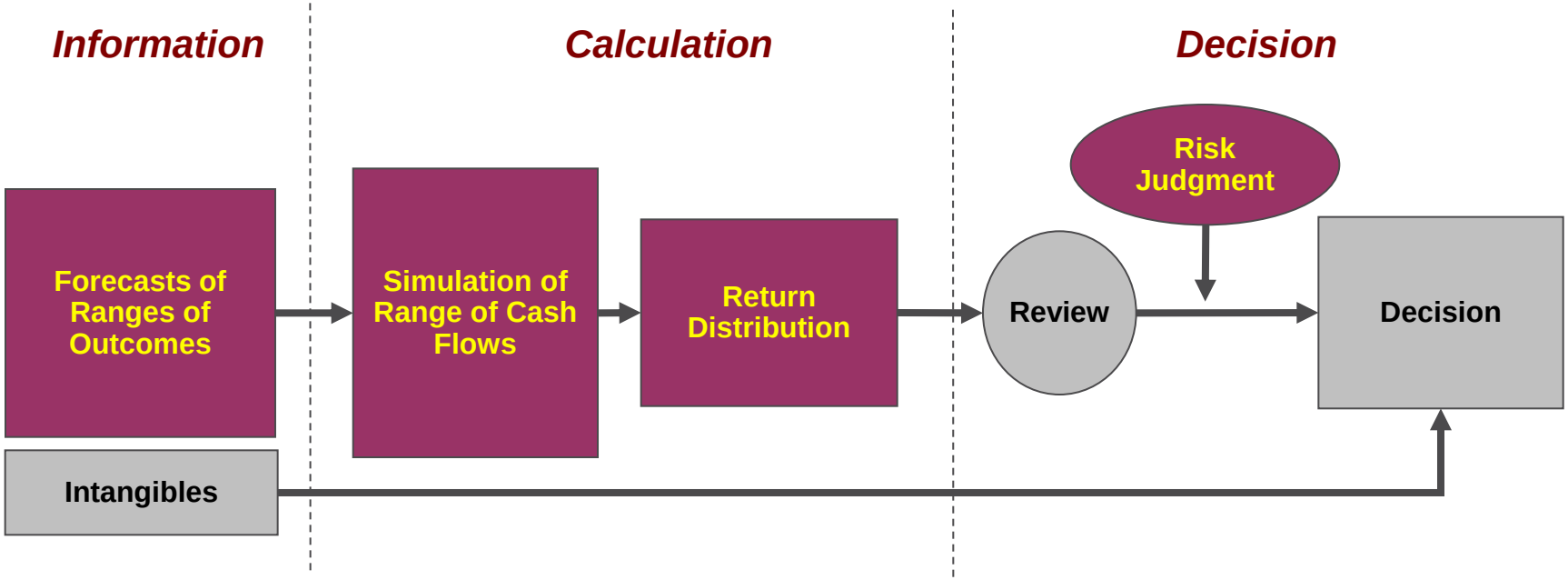
#1: Deterministic Project Analysis



- **Carl Spetzler, "The Development of a Corporate Risk Policy for Capital Investment Decisions," *IEEE Transactions on Systems Science and Cybernetics*, Sept 1968**

Next Step: Risk Analysis

#2: Risk Analysis

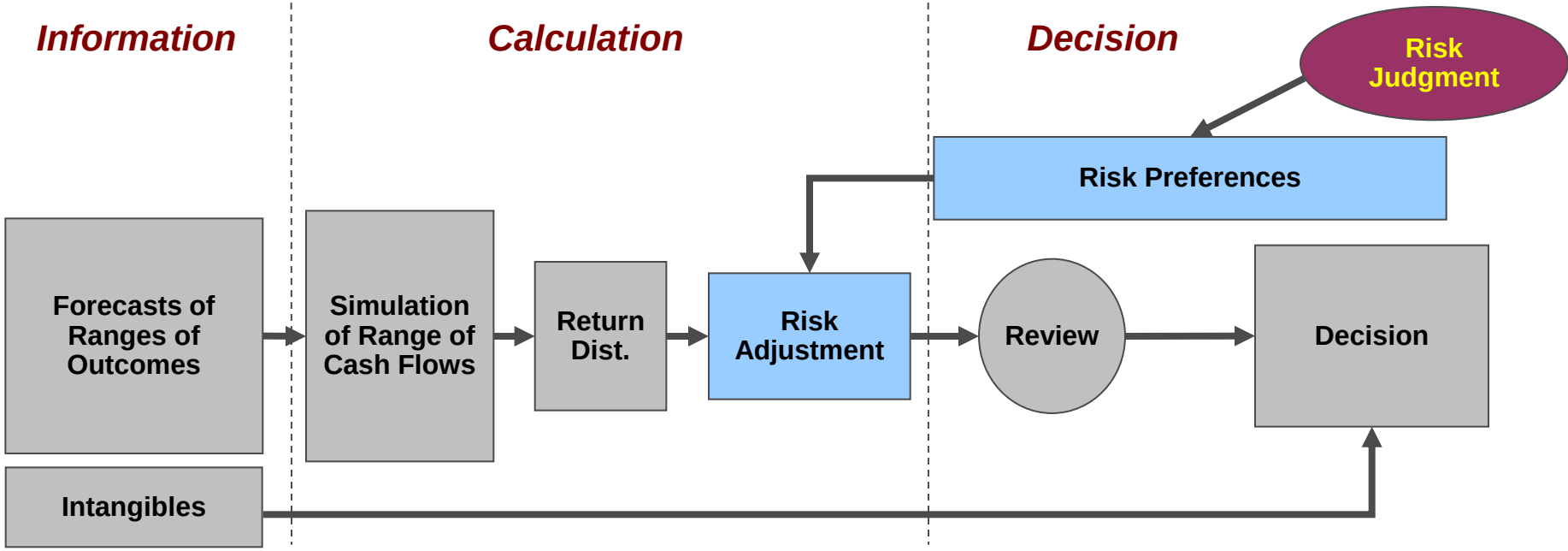


- **Similar to DFA or Monte Carlo processes**
- **Uncertainty in variables is quantified**
  - Only info which is impossible/too costly to quantify remains intangible

- **Judging the acceptability of alternatives ("Risk Judgment") is intuitive and specific to the decision maker**

Next Step: Risk Preference Function

#3: Risk Preferences

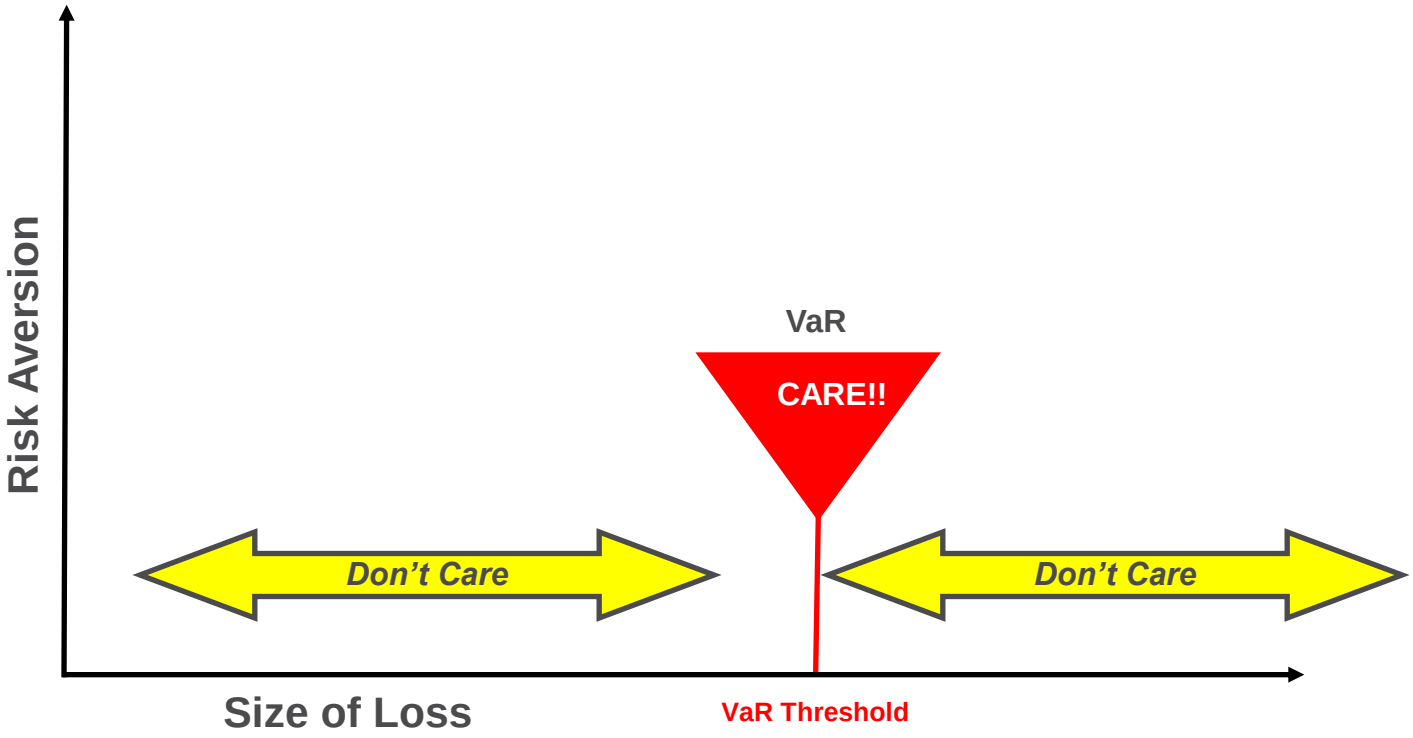


- An extension of Risk Analysis
- Intuitive risk judgment, which is applied in Risk Analysis, is quantified by means of a *corporate Risk Preference function*

- Risk preference function does not replace judgment, but simply formalizes it so it can be *applied consistently*

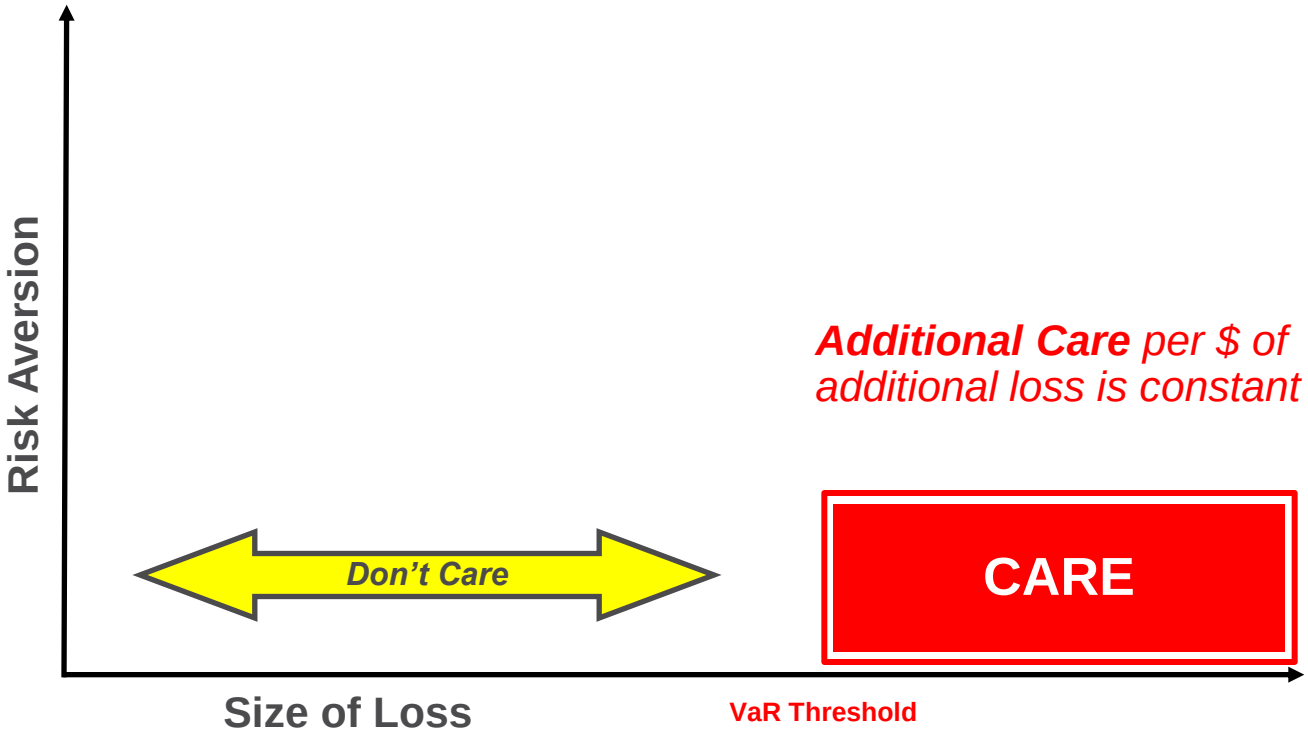
Every Approach Has an IMPLICIT Risk Preference

VaR



Every Approach Has an IMPLICIT Risk Preference

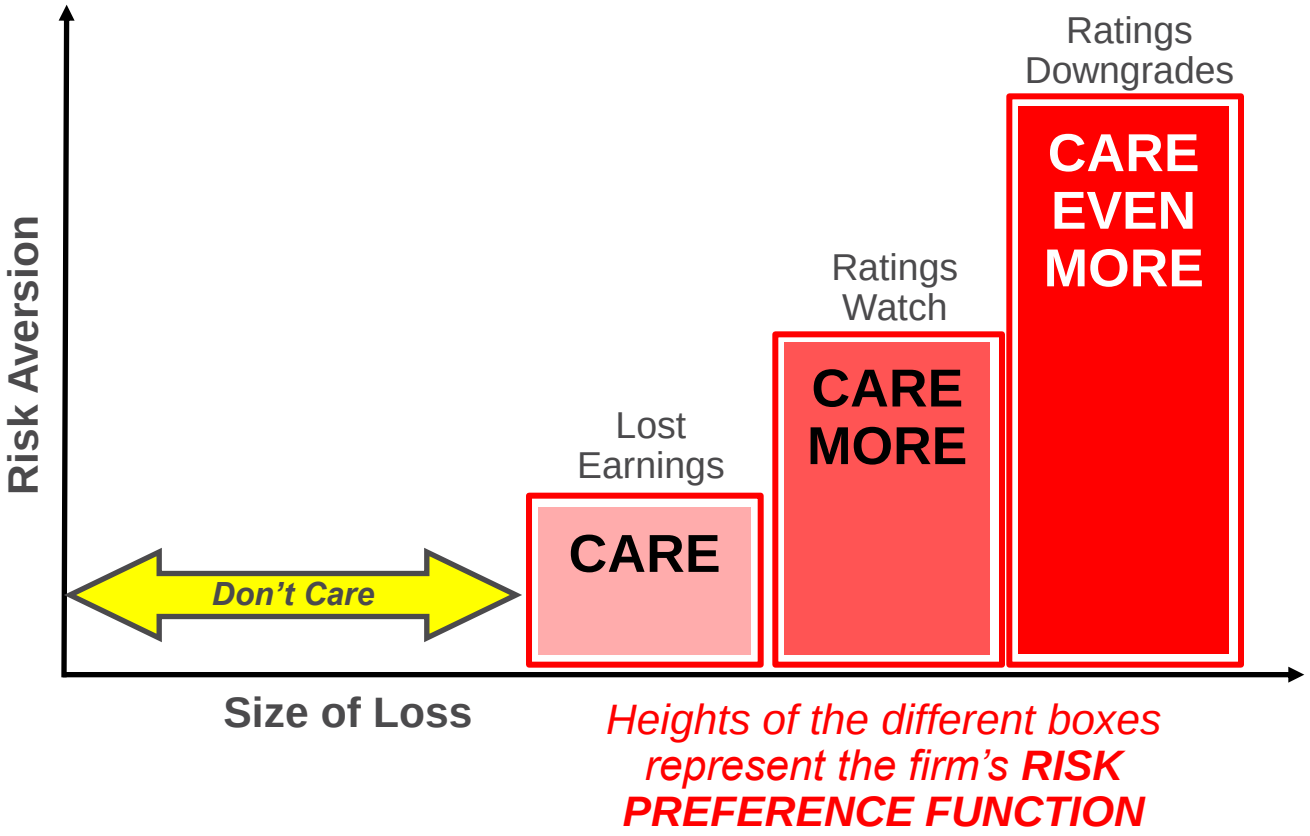
TVaR



Additional Care *per $ of additional loss is constant*

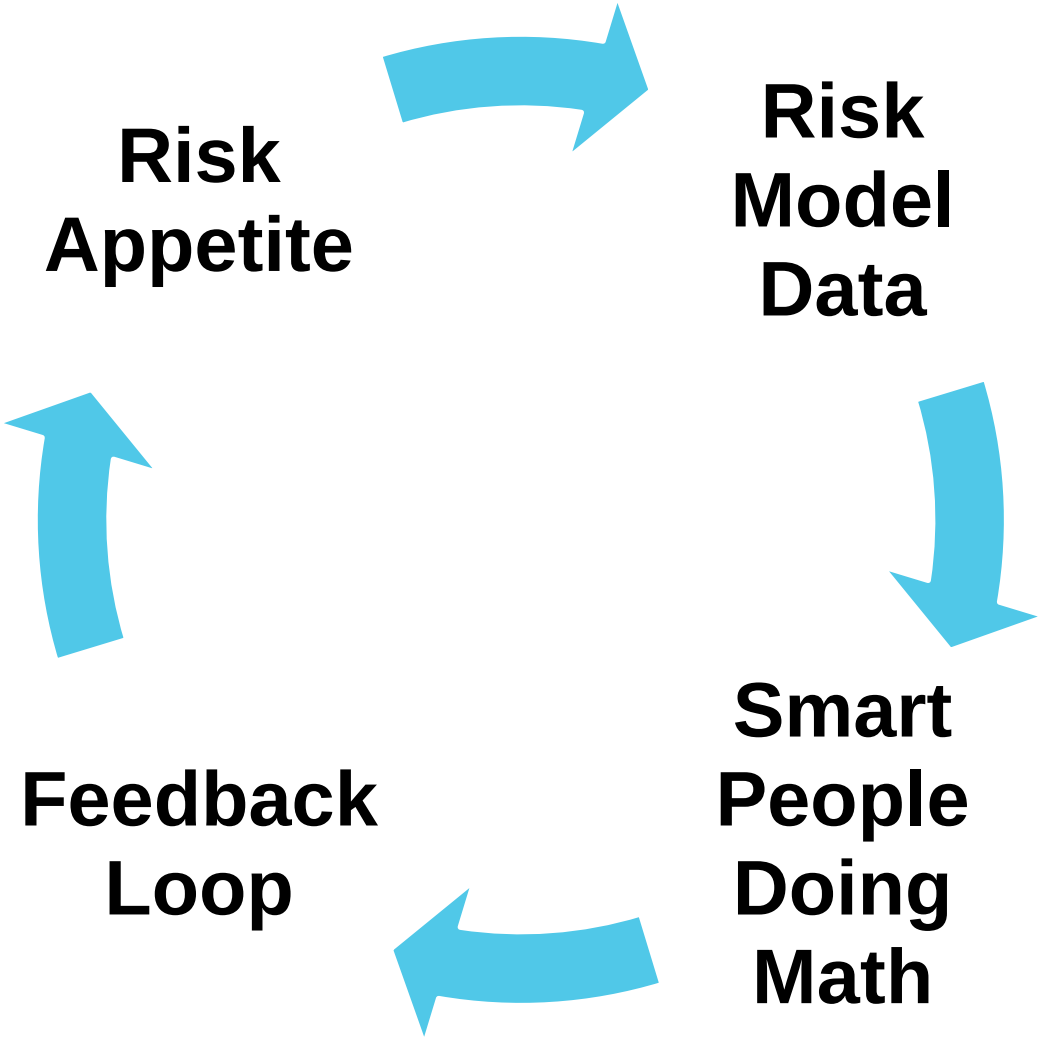
Every Approach Has an IMPLICIT Risk Preference

"Zones of Impact" of Capital



Using the Shared Asset Framework to allocate capital within a company

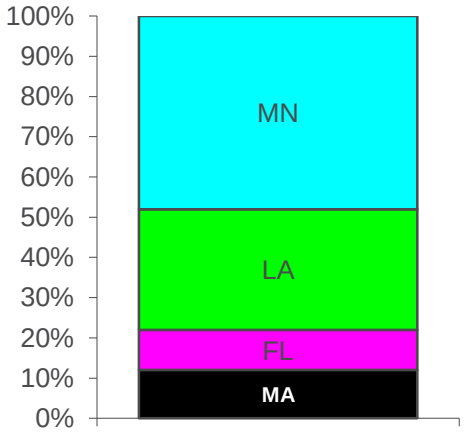
Allocating capital is an iterative process



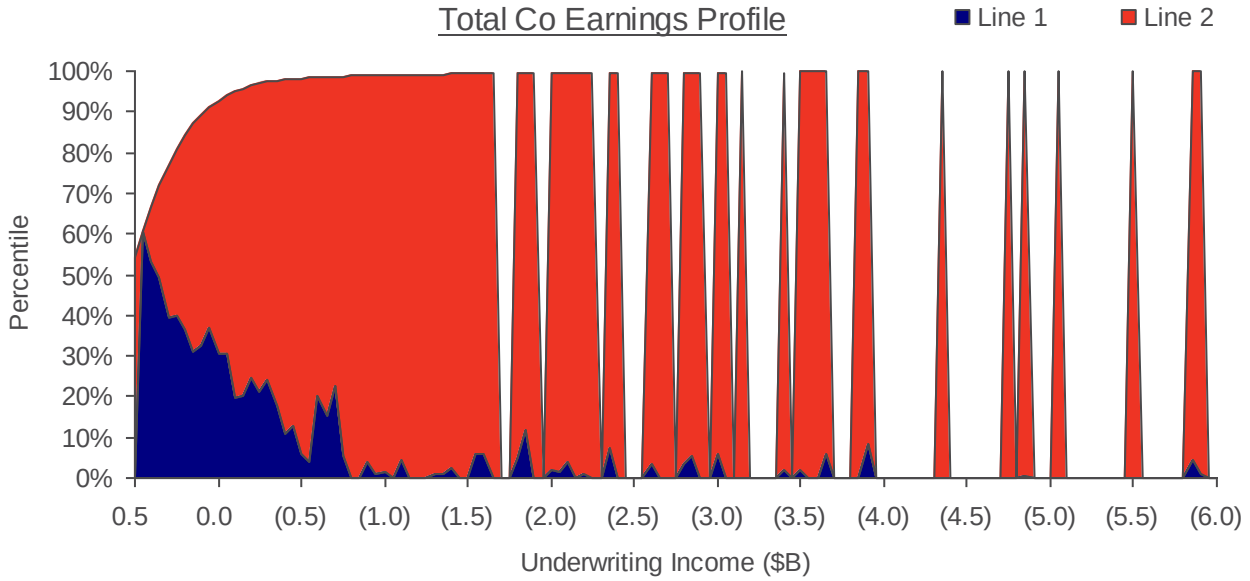
Risk model data

- **Illustrative Company**
  - $10B Premium
  - 4 States
  - 2 lines (non-volatile & volatile)

Premium Distribution



Total Co Earnings Profile

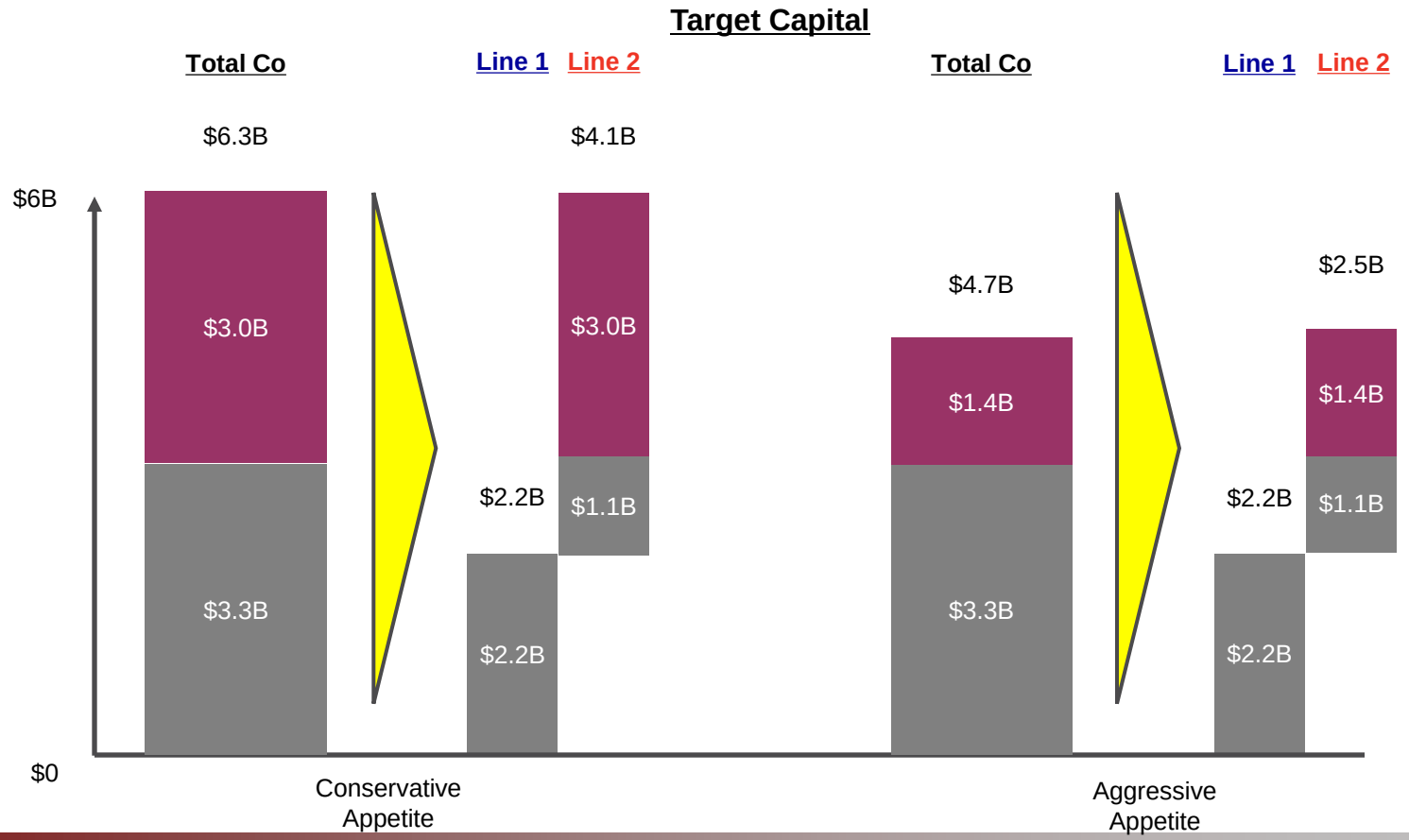


				Risk Metrics				
	Risk Type	Premium	C/R	Prob. of Profit	Std Dev Profit	1/100	1/250	1/1,000
Line 1	Non-volatile	$7B	96.0	94%	$0.2B	($0.2B)	($0.2B)	($0.3B)
Line 2	Volatile	$3B	94.0	83%	$0.6B	($1.4B)	($2.6B)	($6.2B)
Total Co		$10B	95.0	93%	$0.6B	($1.1B)	($2.3B)	($6.2B)

Risk appetite informs target capital

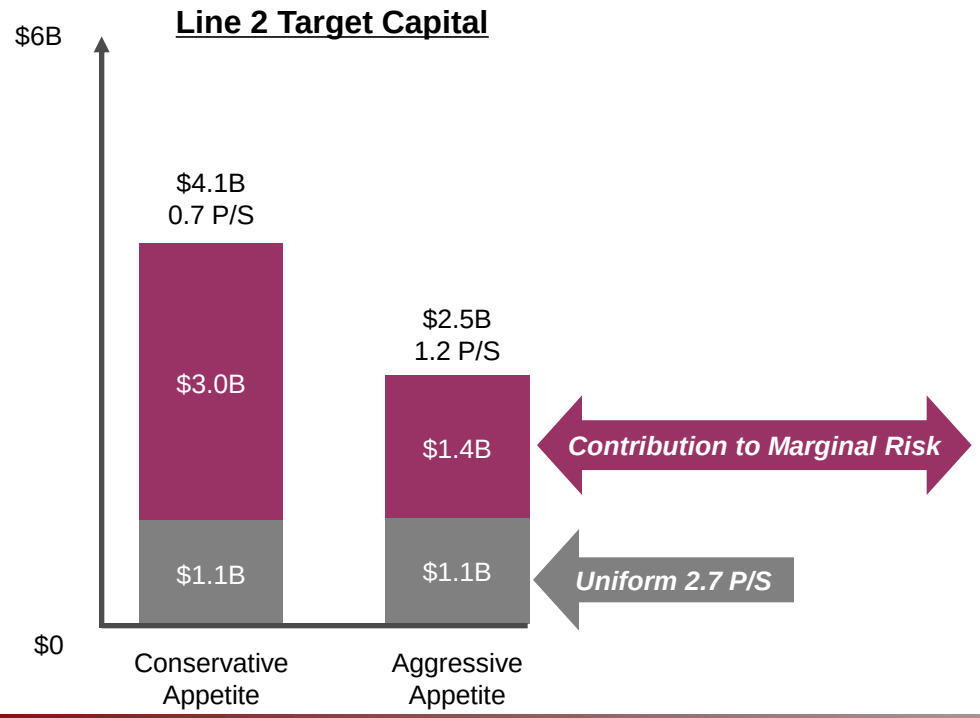
- **Risk appetite + Shared Asset Framework = target capital**

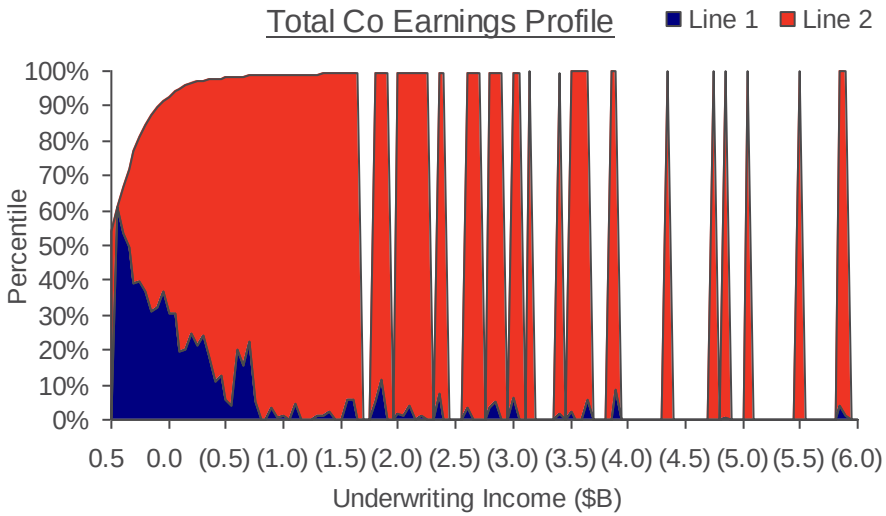
- **Everyone's appetite is different, let's examine two choices**
  - Conservative: withstand 2x 1/250 years without losing "secure" rating
  - Aggressive: withstand 2x 1/100 years without losing "secure" rating



Allocating to state

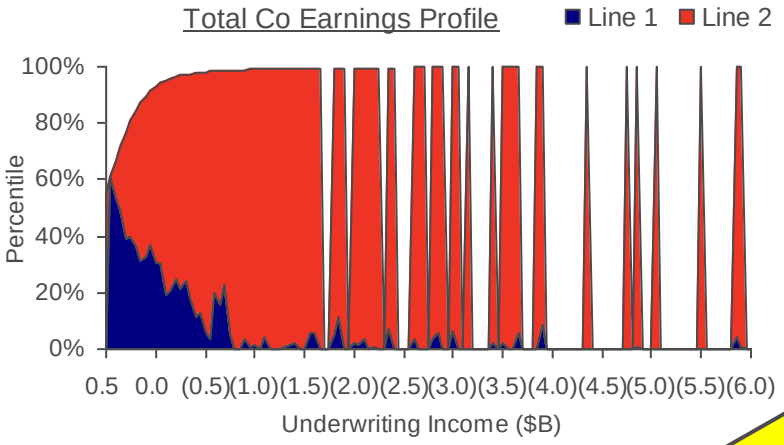
- **Guiding Principles:**
  - Fundamental before technical
  - Keep it simple
- **Rental charge applied to states via uniform P/S ratio**
- **Consumption charge will vary, but how?**
  - Could use same approach as assigning to line segments (fixed point)
  - Or, could vary according to contribution to marginal portfolio risk (continuous)

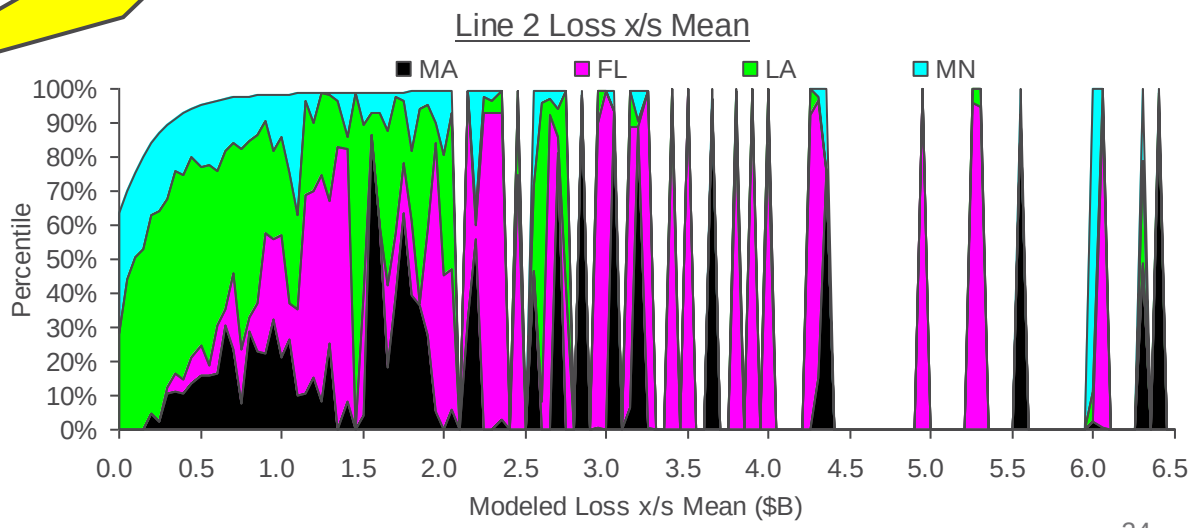




Contribution to marginal risk

- **Definition of marginal risk?**
  - Total loss
  - Worse then expected (excess of mean)

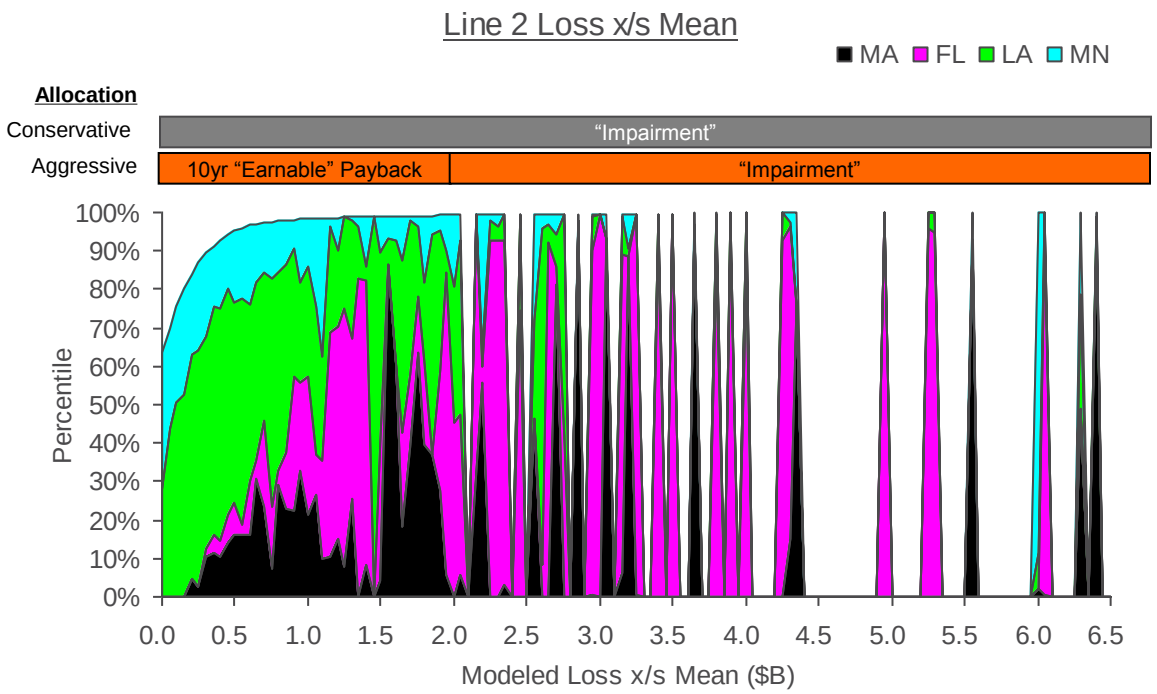


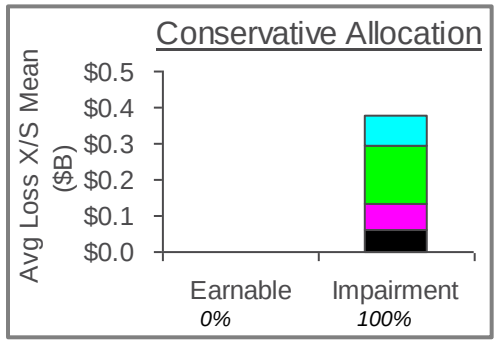


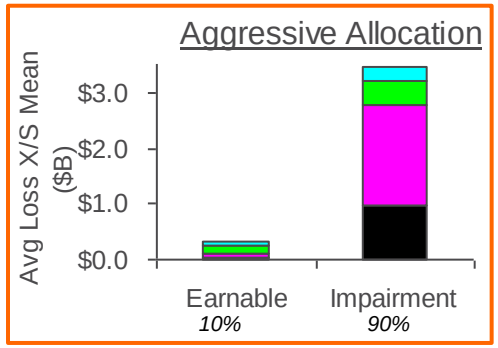
Allocation mechanics

- **Some outcomes are worse than others, differentiate consumption charge accordingly**
  - E.g. losses that you earn your way out of ("earnable") vs. those you don't ("impairment")
  - Simple approach is segment TVaR (co-x TVaR)
  - Lot's of options for fine tuning: financial triggers (earnings, rating), weights / transforms

- **These preferences can have big downstream implications…**

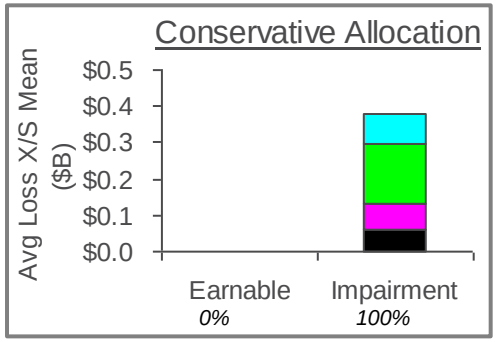


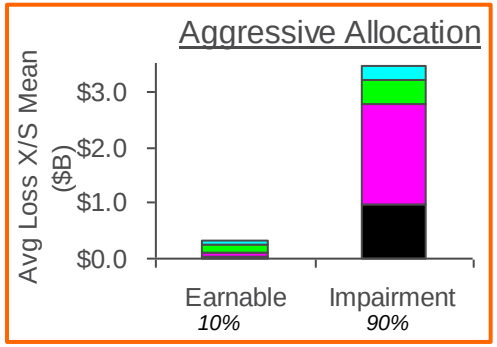


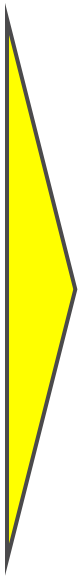


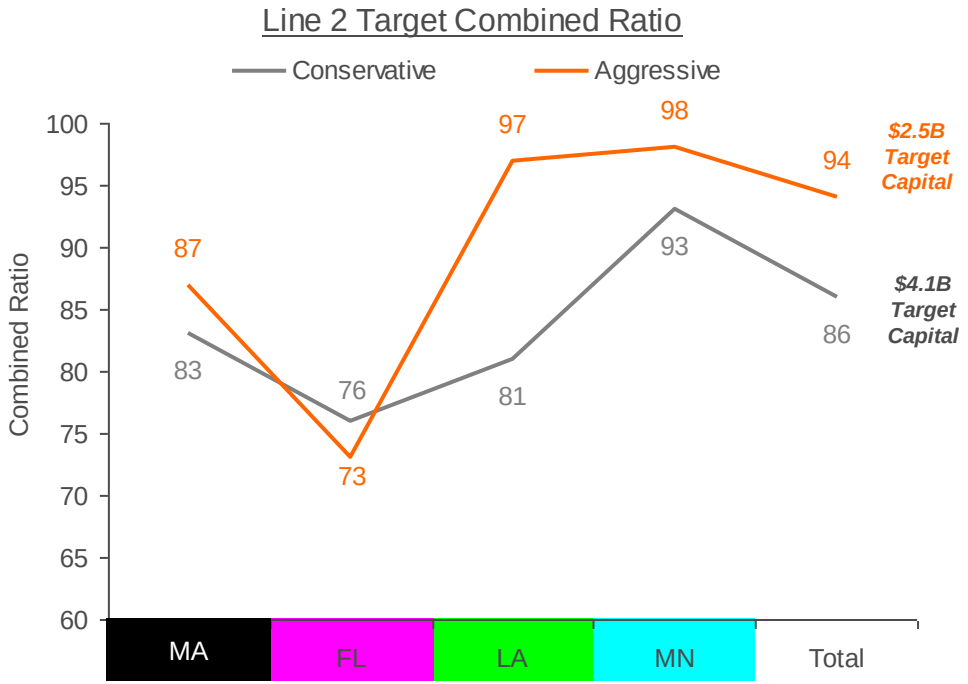
Results

- **Capital allocation translated into target combined ratio**
  - Target return 10%
  - Credit for investment income
- **These results are an important feedback loop**
  - Risk preferences are hard to articulate
  - If you can't accept these results, revisit your risk appetite







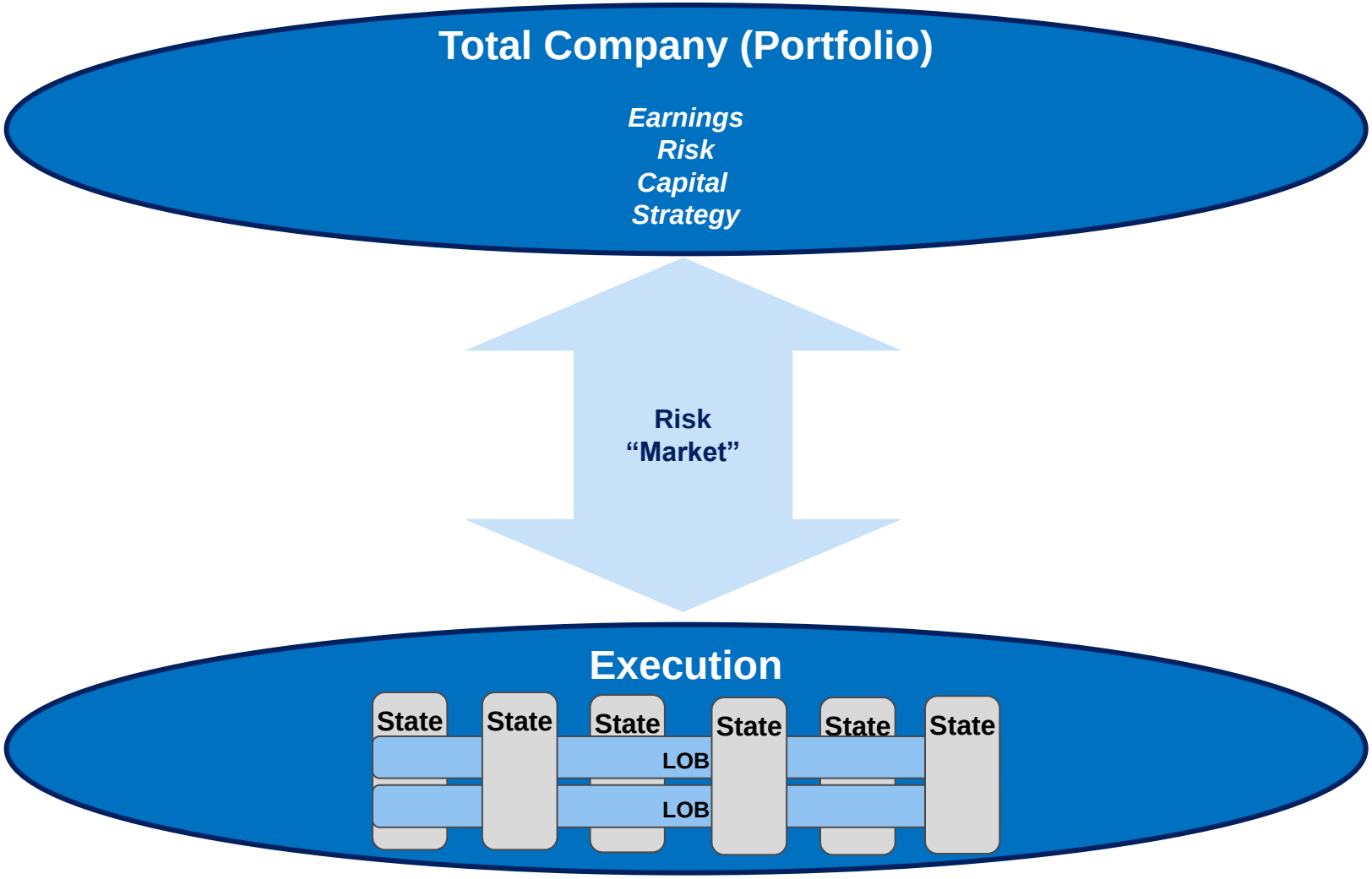


Leading Practice Benchmarking

Leading Practice Step	
1) Design driven approach	✓
2) Realistic capital usage costs	✓
3) Consumption Costs via Risk Preference function	✓
4) Key sensitivity tests: the Three R's	✓
5) Create an operational buffer between the capital model and the field	✓

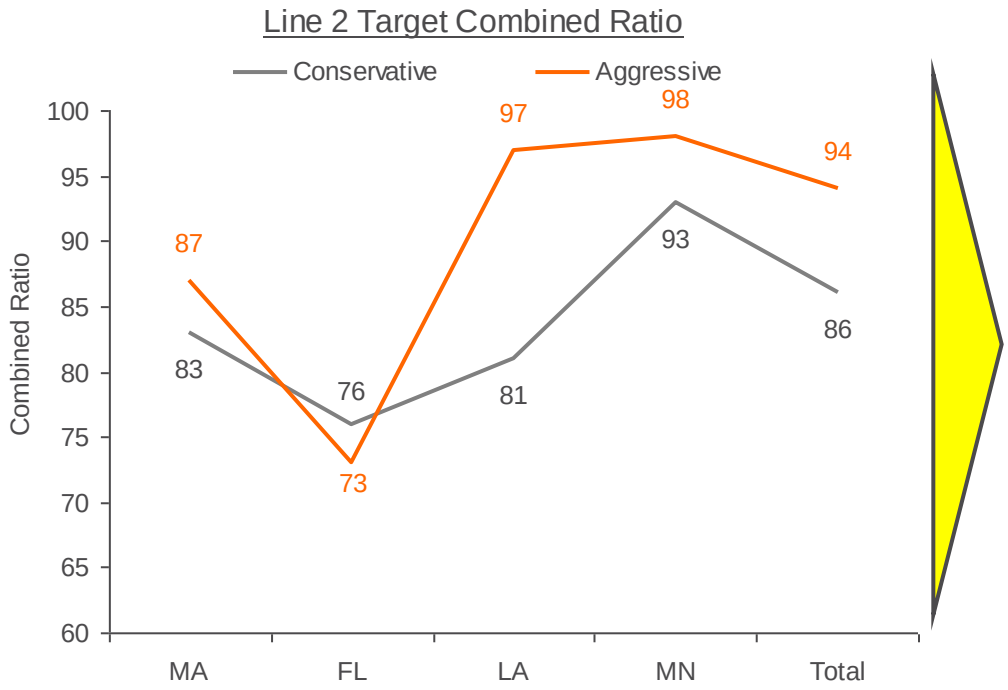
Driving business decisions with economic capital

Operating Paradigm

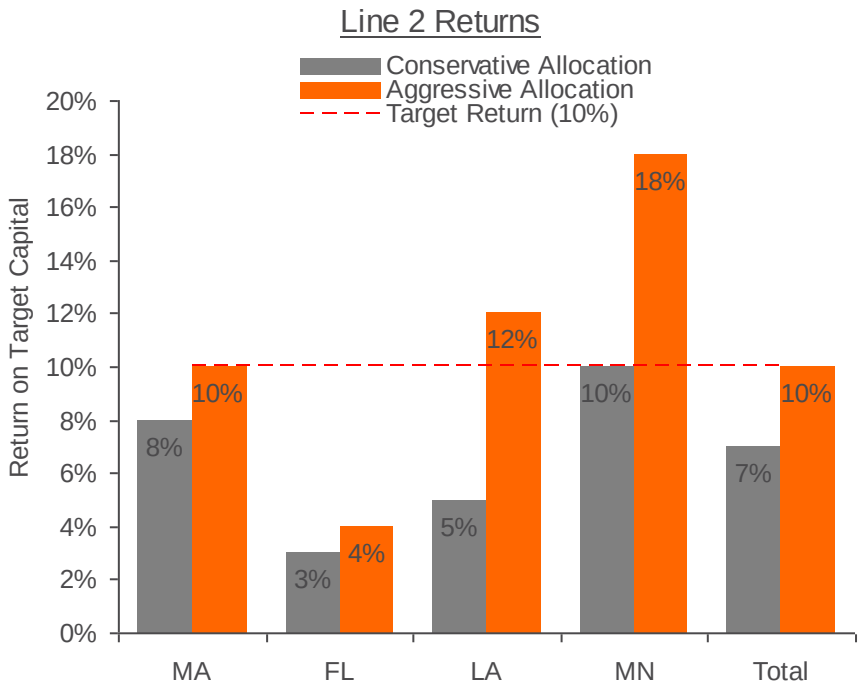


Risk market in action

- **Target combined ratios are the "price" in our risk market**
- **Prices send signals**
- **How would you respond to these signals?**



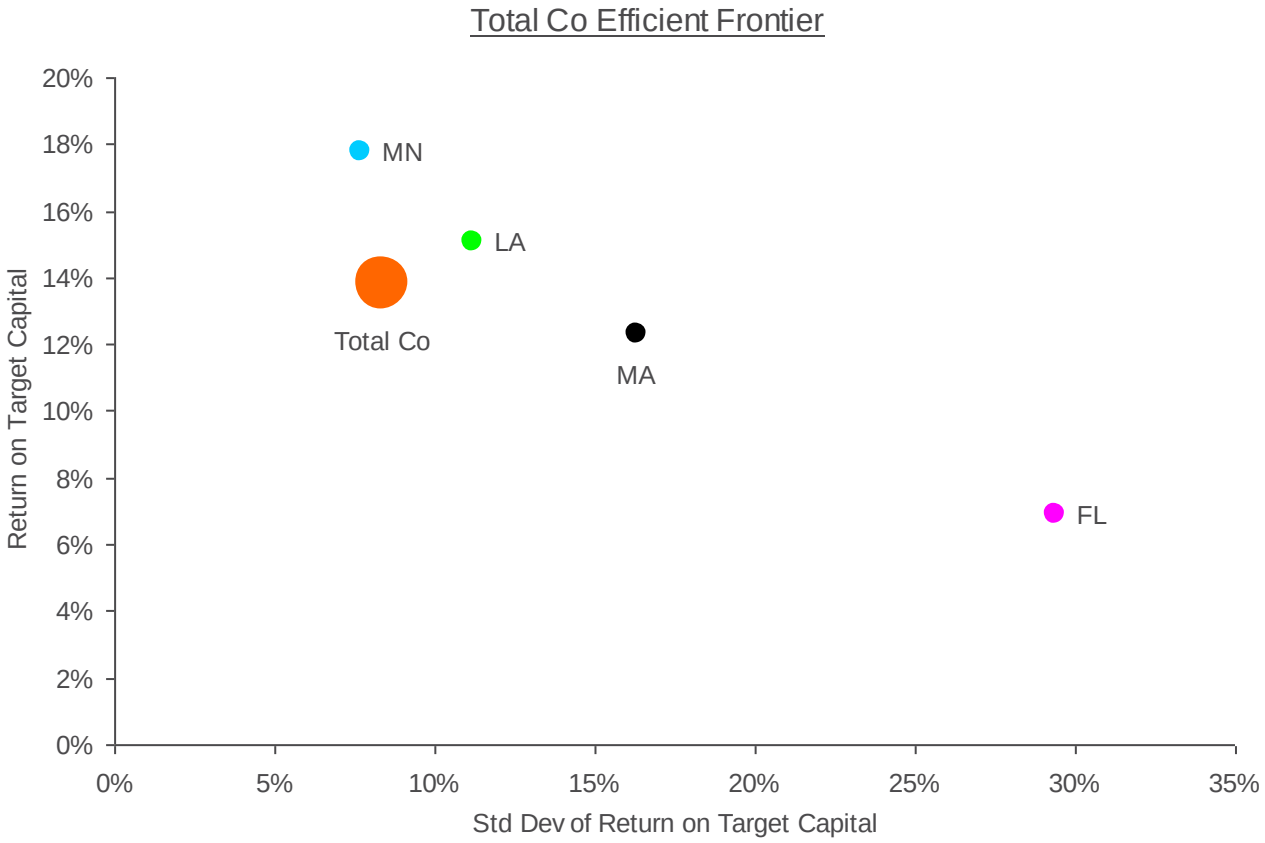
Actual C/R	MA	FL	LA	MN	Total
	88	98	95	93	94



	MA	FL	LA	MN	Total
	?	Shrink	?	Grow	?

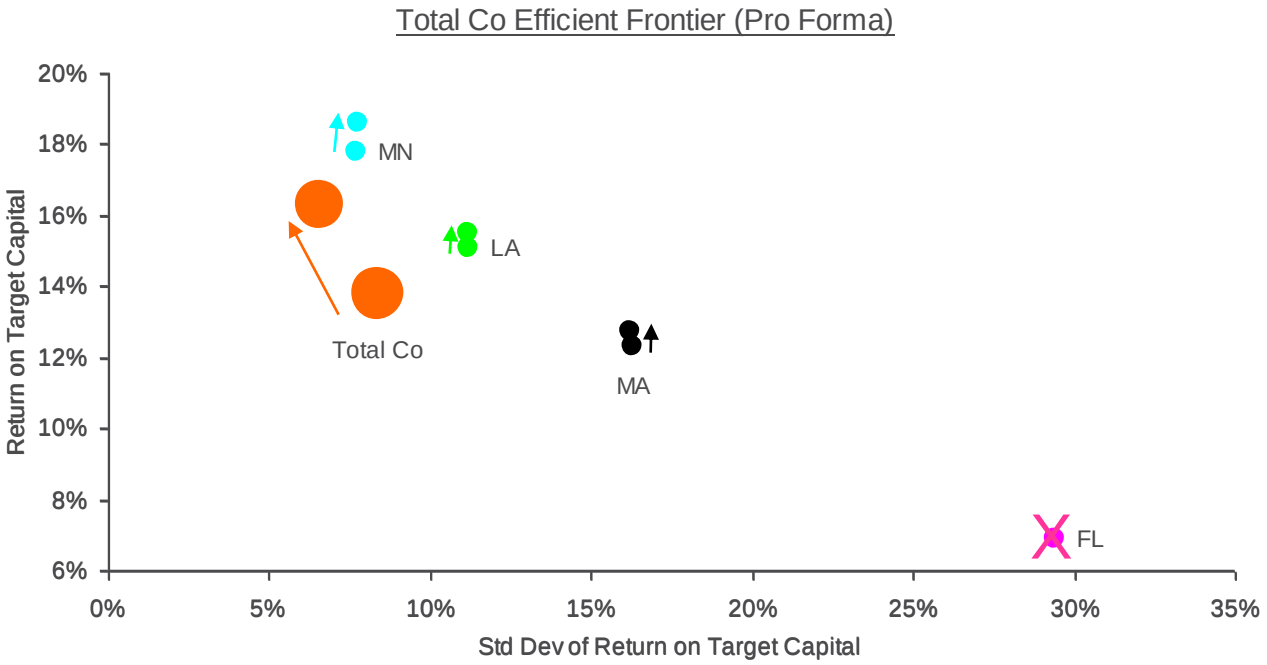
The final frontier

- **Managing as a portfolio requires ability to make trades**
  - Profit
  - Growth
  - Return
  - Volatility



Optimizing

- **Diversification has multiple benefits in optimizing portfolio**
  - Can make new risks look good
  - Can make existing risks look better
- **Risk appetite and current portfolio define possibilities**
- **Example: Remove FL**

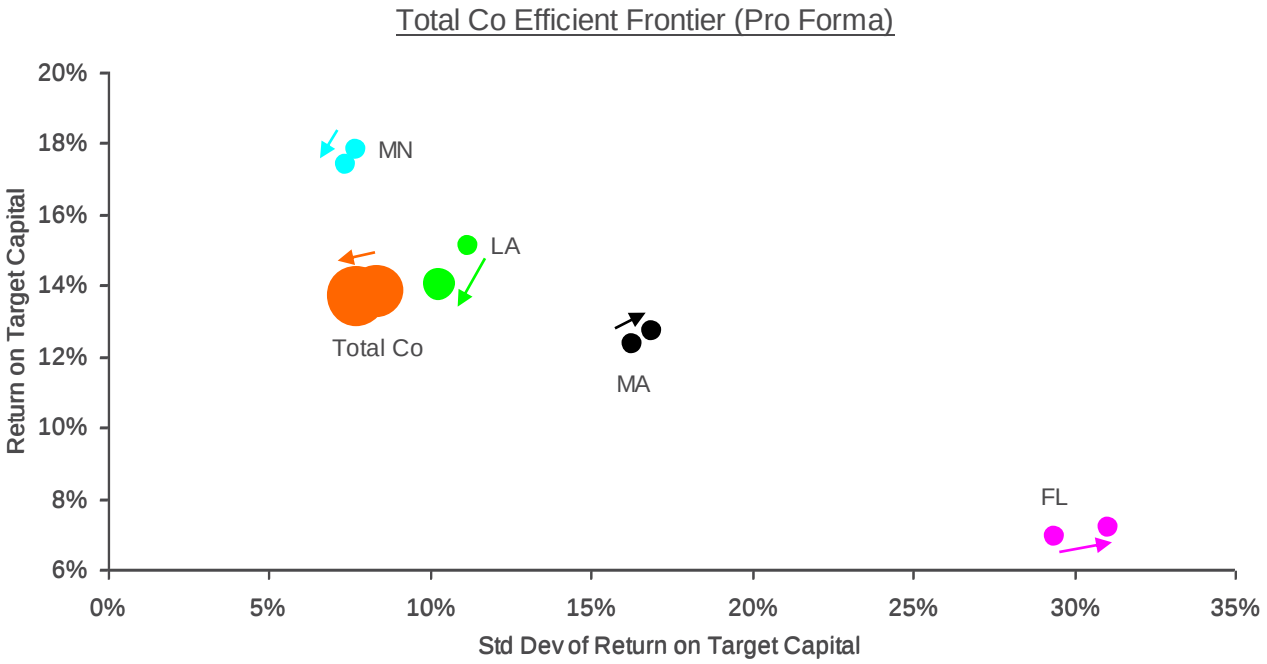


Target Combined Ratio (Base)					
	MA	FL	LA	MN	Total
Line 1	100	100	100	100	100
Line 2	87	73	97	98	94

Target Combined Ratio (Pro Forma)				
MA	FL	LA	MN	Total
100	-	100	100	100
88	-	98	100	97

Optimizing…Round 2

- **Example: Increase LA by 50%**



Target Combined Ratio (Base)					
	MA	FL	LA	MN	Total
Line 1	100	100	100	100	100
Line 2	87	73	97	98	94

Target Combined Ratio (Pro Forma)				
MA	FL	LA	MN	Total
100	100	100	100	100
88	75	95	98	94

Q&A