Allocating Economic Capital to Drive Business Decisions

November 4, 2013

Capital (Cost) Allocation

Leading Practice Benchmarking

Leading Practice	Rationale
1) Allocate cost of capital as opposed to capital	Realities of insurance capital usage support capital cost approach (i.e., Shared Asset Framework)
2) Away from sole reliance on extreme tail metrics to a blend of short, medium and long return period metrics	Focus on e.g., Volatility, Impairment and (Franchise) Ruin
3) Integrate explicit, formal statements of risk preference	Every risk metric has an implicit risk preference function underlying it
4) Design the capital allocation process based on performance criteria	Employ design process (from engineering) to implement the preference framework, rather than selecting a mathematical formula and living with the implied preference
5) Create an operational buffer between the capital model and local users	• 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

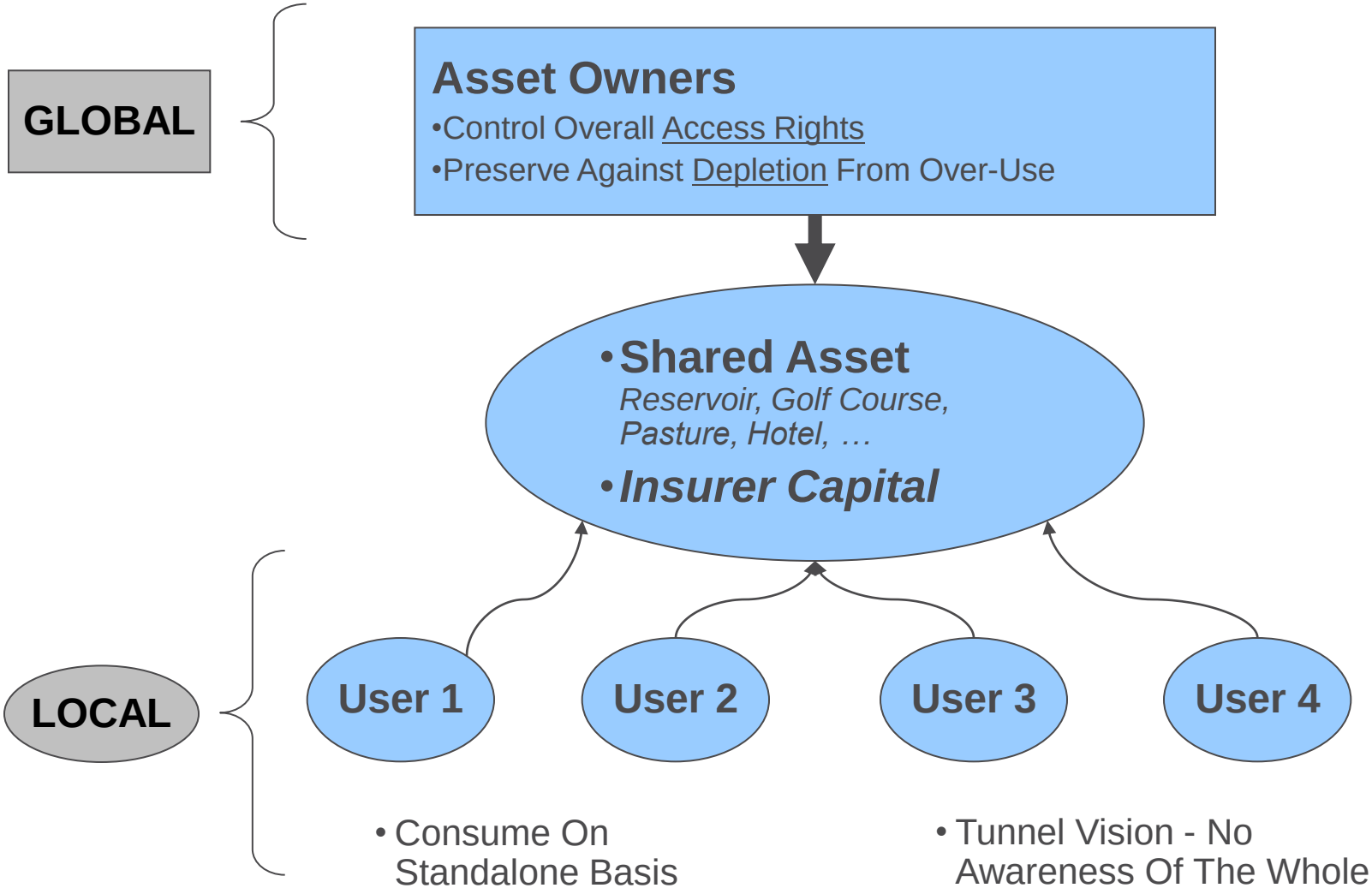
Realistic Capital Usage Cost Framework:

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:

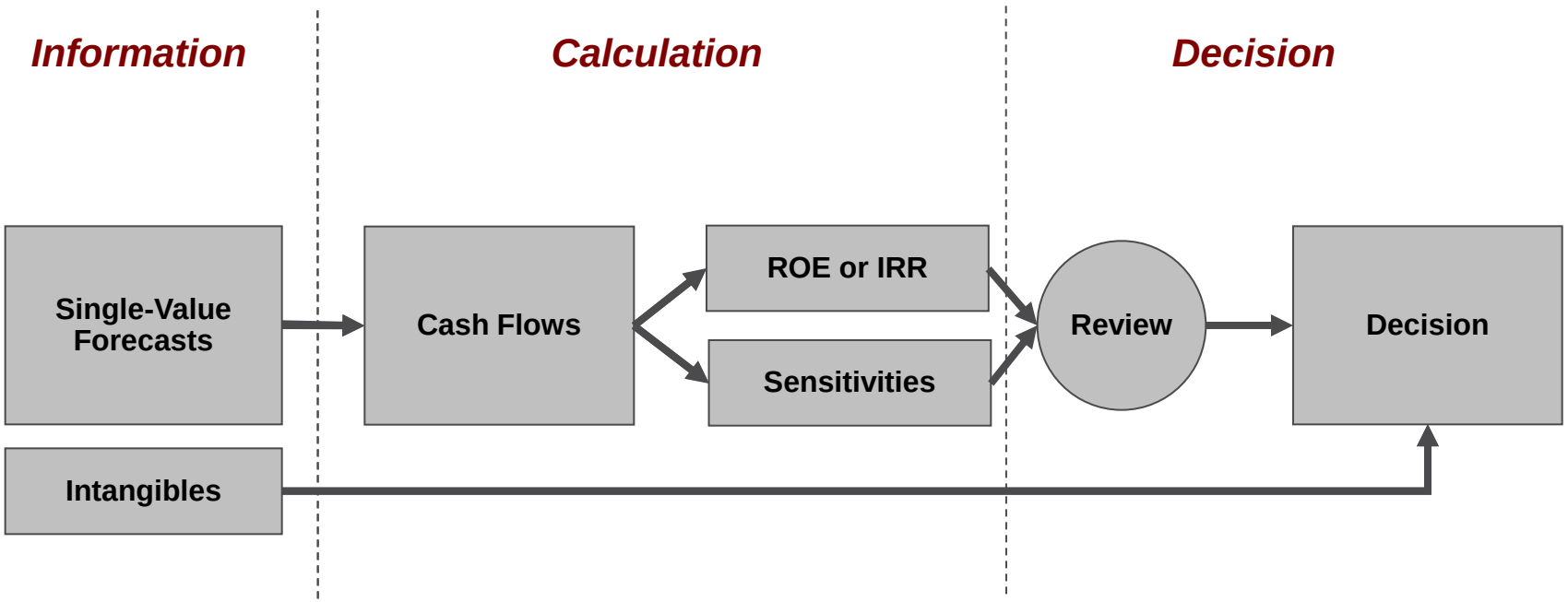
1. **Rental = upfront fee for right to (possibly) use the Guarantee**
   → ***Occupying underwriting capacity***
   → ***BCAR, SPCAR, RBC, SCR, …***

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

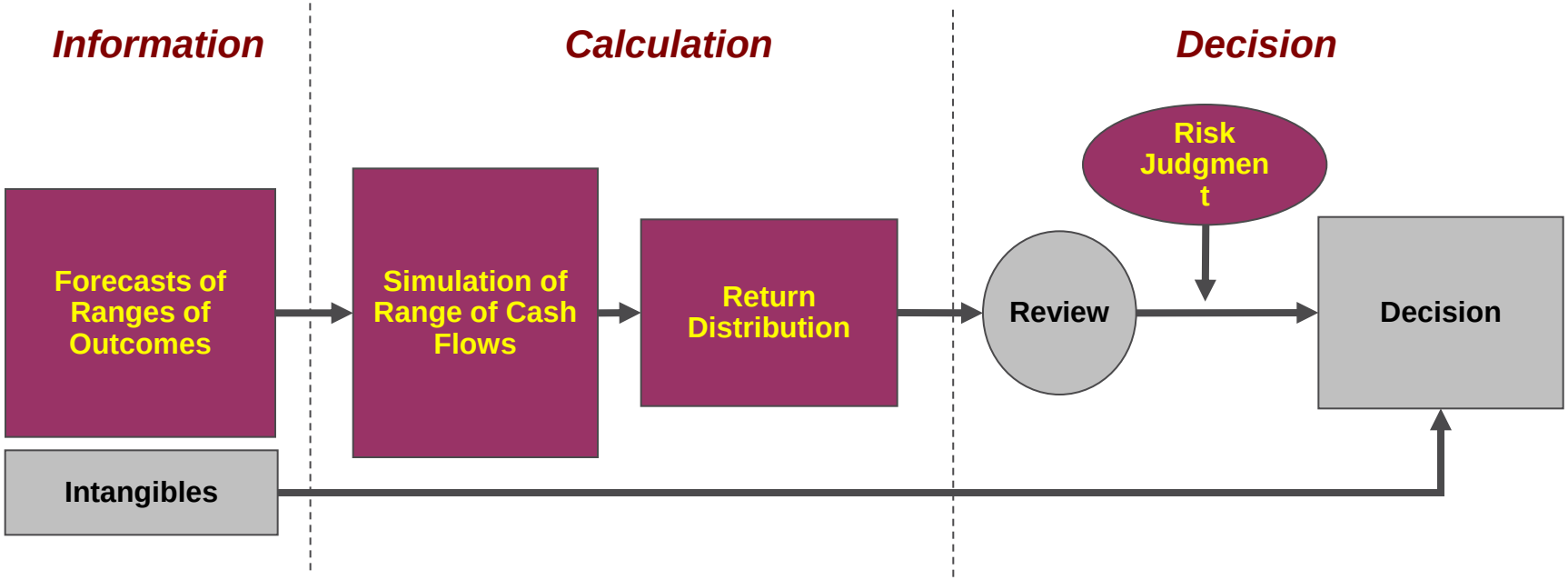
#1: Deterministic Project Analysis



- **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

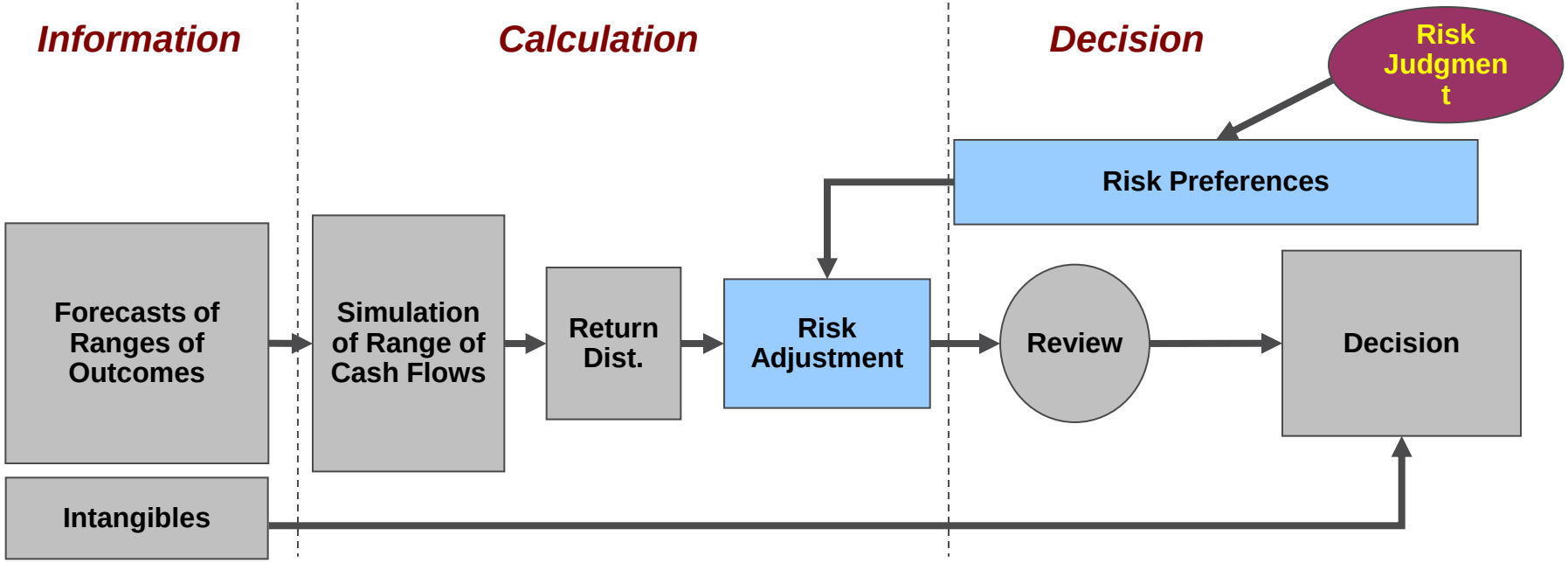


- **Similar to DFA or Monte Carlo processes**
- **Uncertainty in variables is quantified**
  - Only info which is impossible/too costly to quantify remains intangible

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

Next Step: Risk Preference Function

#3: Risk Preferences

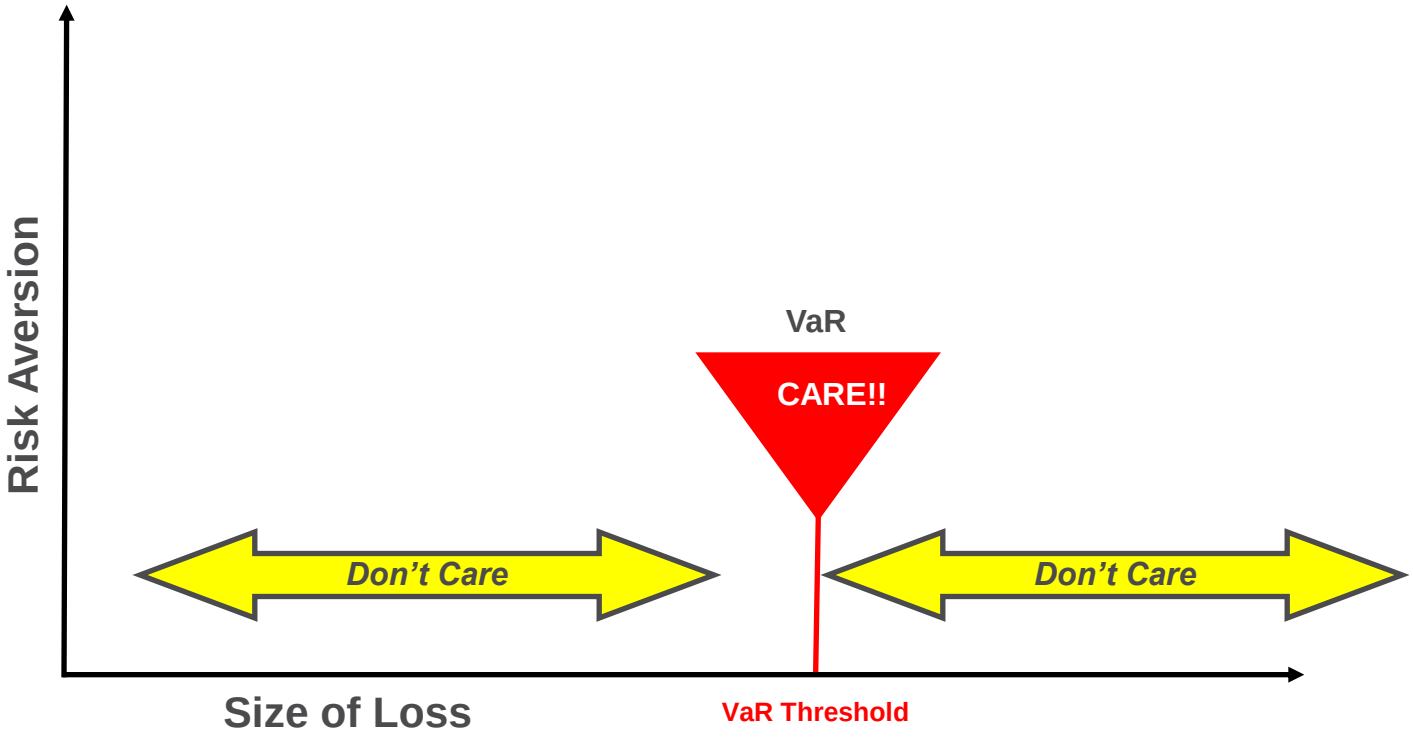


- An extension of Risk Analysis
- Intuitive risk judgment, which is applied in Risk Analysis, is quantified by means of a *corporate Risk Preference function*

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

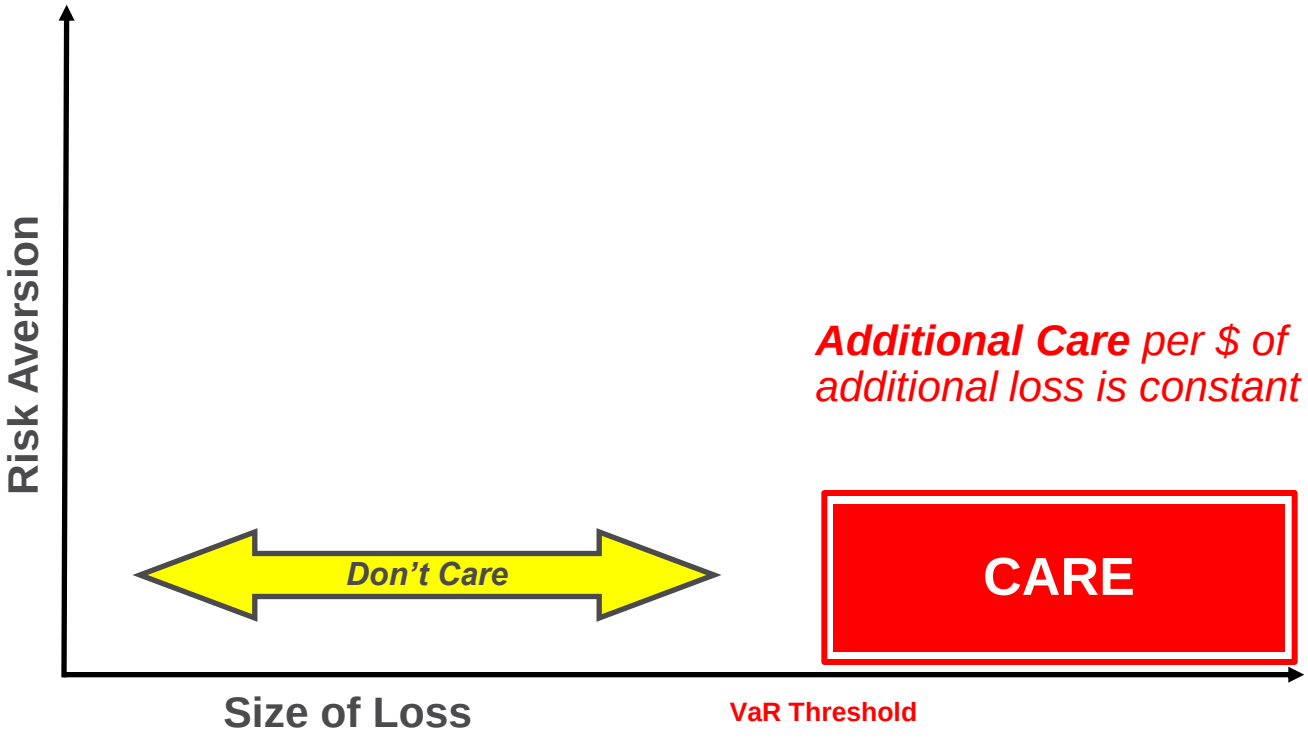
Every Approach Has an IMPLICIT Risk Preference

VaR



Every Approach Has an IMPLICIT Risk Preference

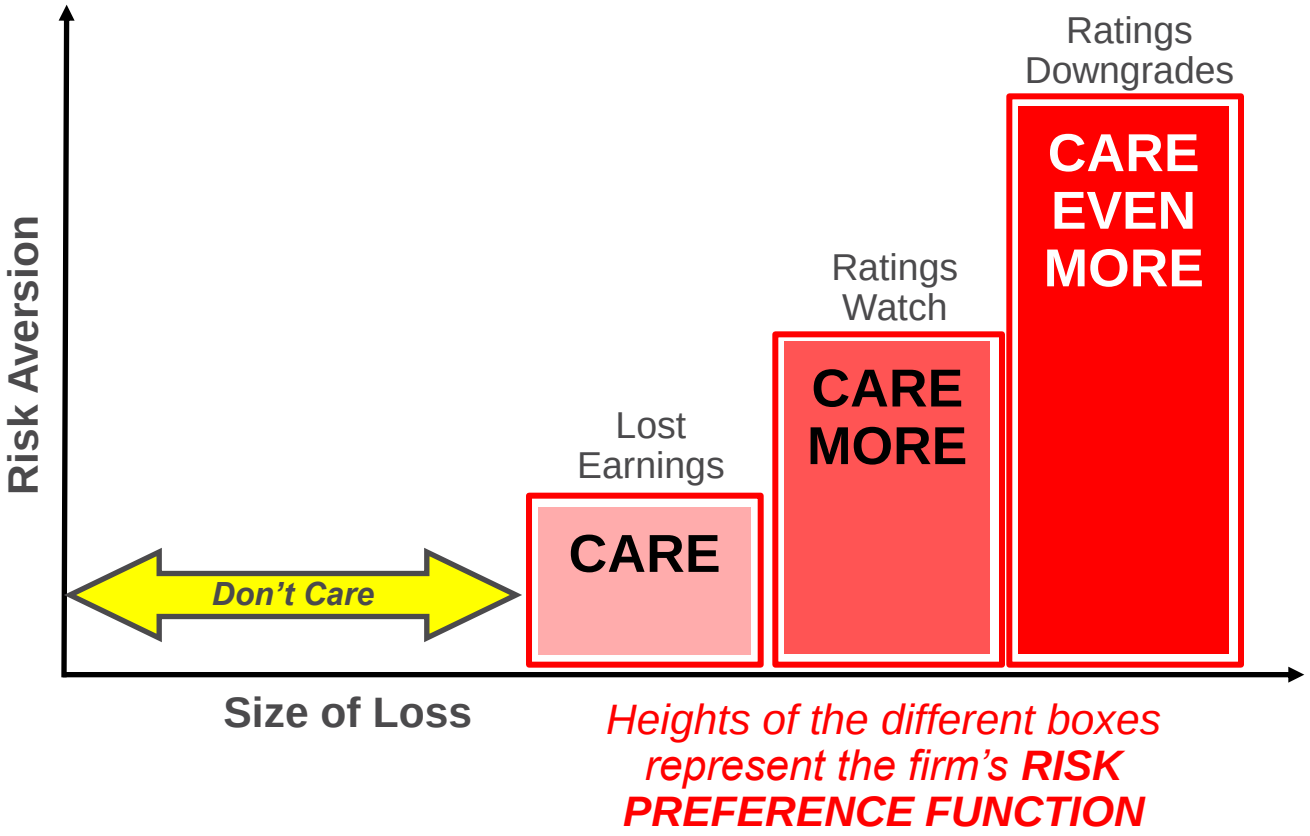
TVaR



Additional Care *per $ of additional loss is constant*

Every Approach Has an IMPLICIT Risk Preference

"Zones of Impact" of Capital

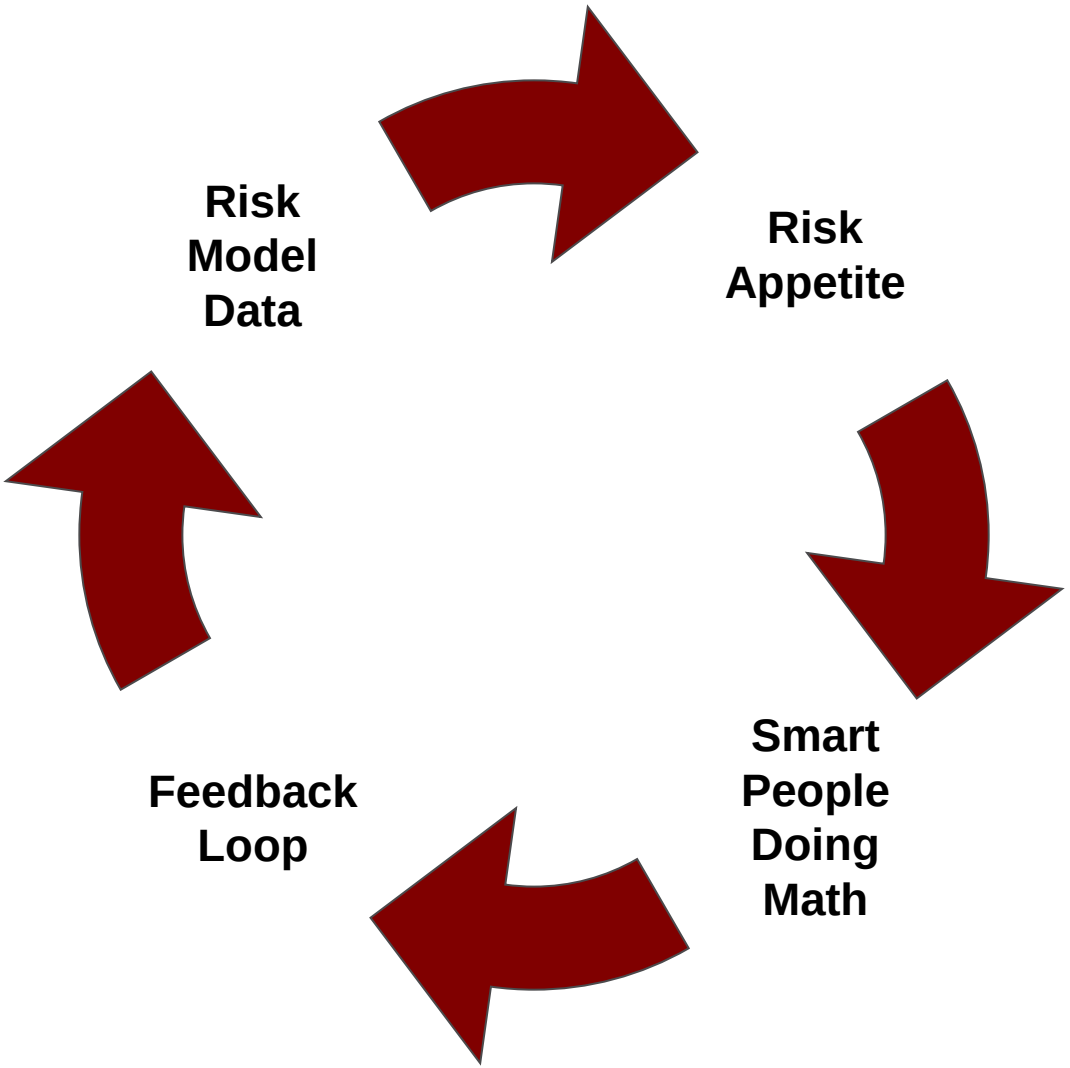


How does the Shared Asset Approach stack up?

Your Company May Consider	Shared Asset Framework
Focus primarily on the underlying economics	Can use any performance metric from capital model (e.g., discounted U/W result)
Multiple degrees of risk: both tail risk and volatility contribution matter	Can use any combination of return periods or entire downside distribution
Expected profitability matters in capital since it provides a buffer against losses	Use underwriting result
There is a level of base capital required to operate business	Rental charge
Desire to reflect: •***Performance accountability of each line*** •***Enterprise impact of material change in business mix***	Transparently handled through the concentration charge approach (using your risk preferences to determine cost of capital at enterprise level and share of responsibility at event level)
Acknowledge external constraints	Use BCAR for rental charge
Transparent enough to support "what-if" analysis and cascading throughout the business	Built for transparency and ease of implementation and testing

Using the Shared Asset Framework to allocate capital within a company

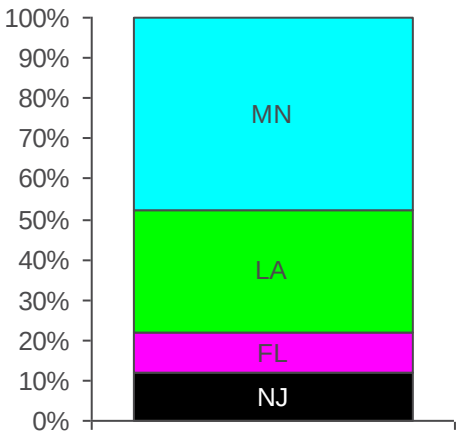
Allocating capital is an iterative process



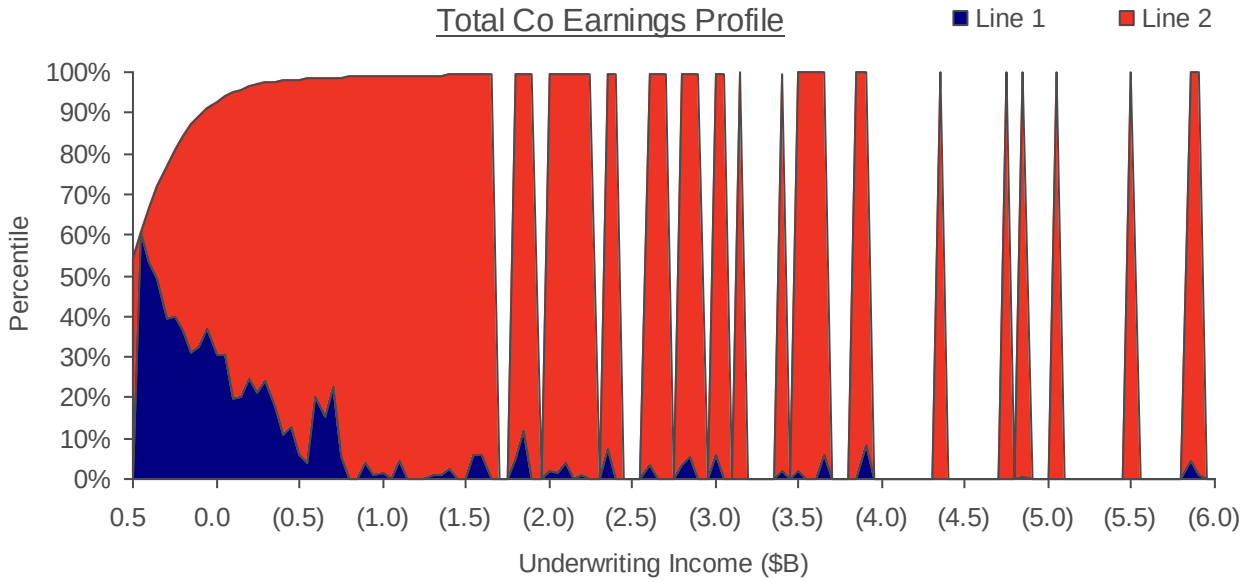
Risk model data

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

Premium Distribution



Total Co Earnings Profile

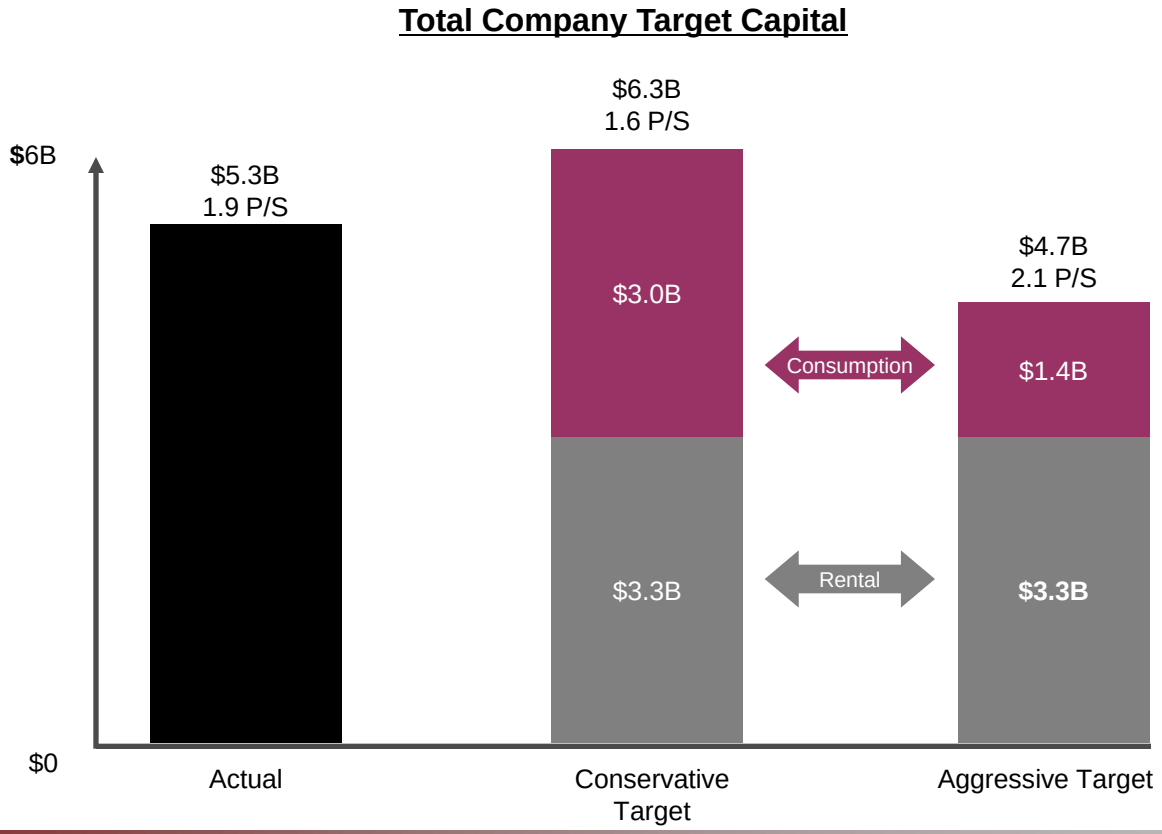


				Risk Metrics				
	Risk Type	Premium	C/R	Prob. of Profit	Std Dev Profit	1/100	1/250	1/1,000
Line 1	Non-volatile	$7B	96.0	94%	$0.2B	($0.2B)	($0.2B)	($0.3B)
Line 2	Volatile	$3B	94.0	83%	$0.6B	($1.4B)	($2.6B)	($6.2B)
Total Co		$10B	95.0	93%	$0.6B	($1.1B)	($2.3B)	($6.2B)

Risk appetite informs target capital

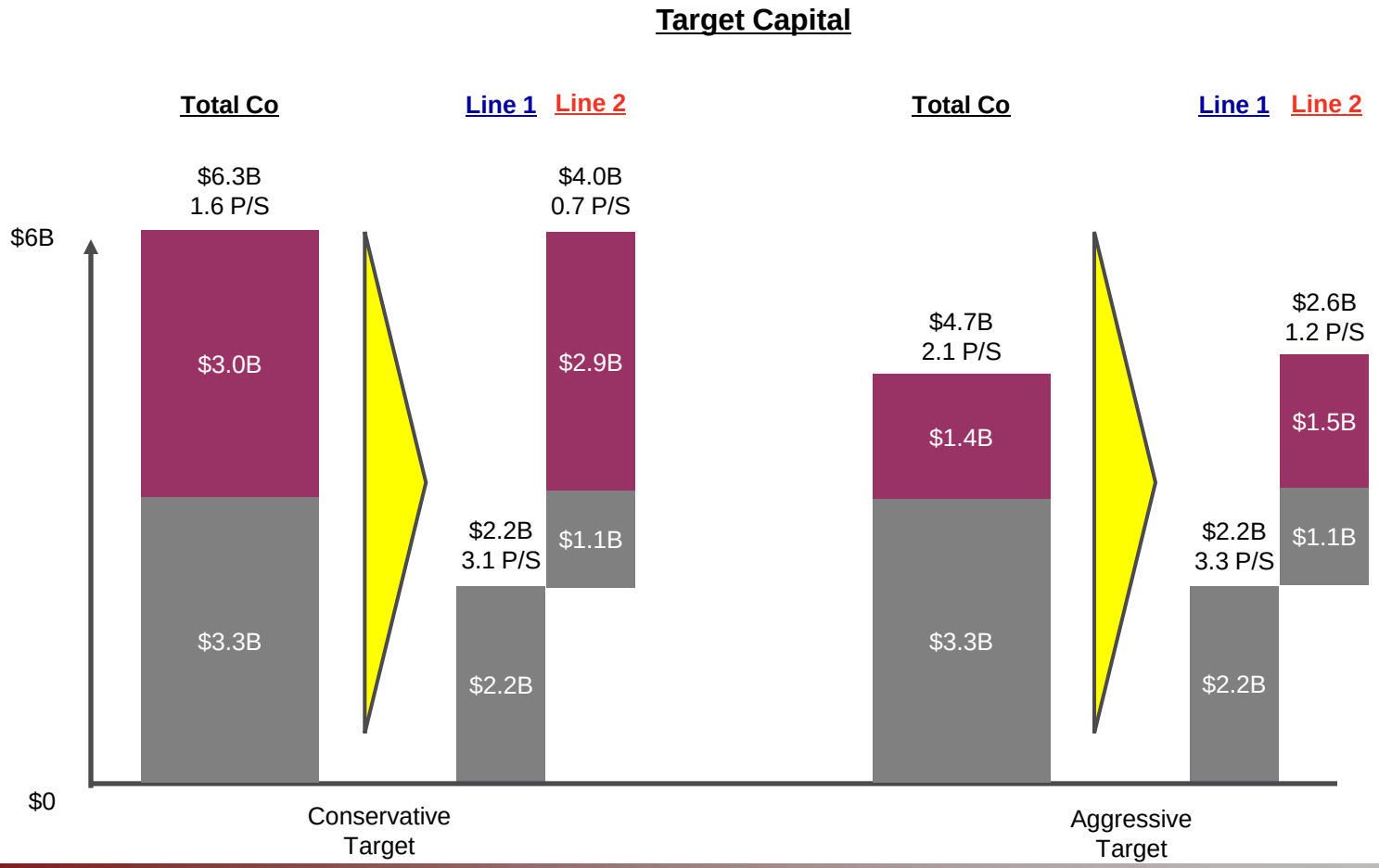
- **Risk appetite + Shared Asset Framework = target capital**

- **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



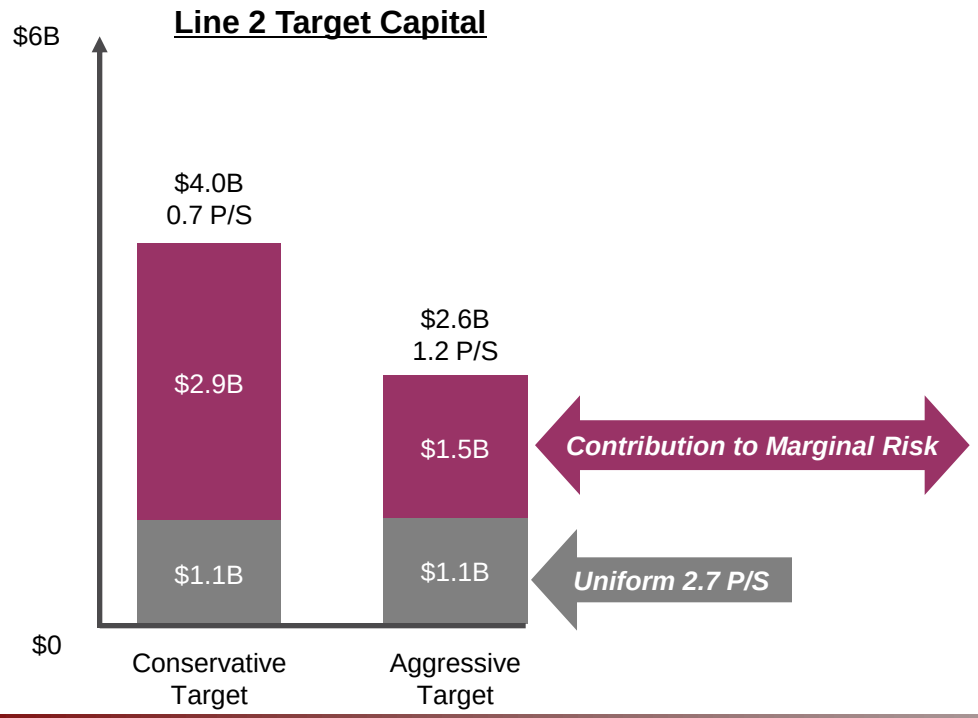
Assigned to line of business

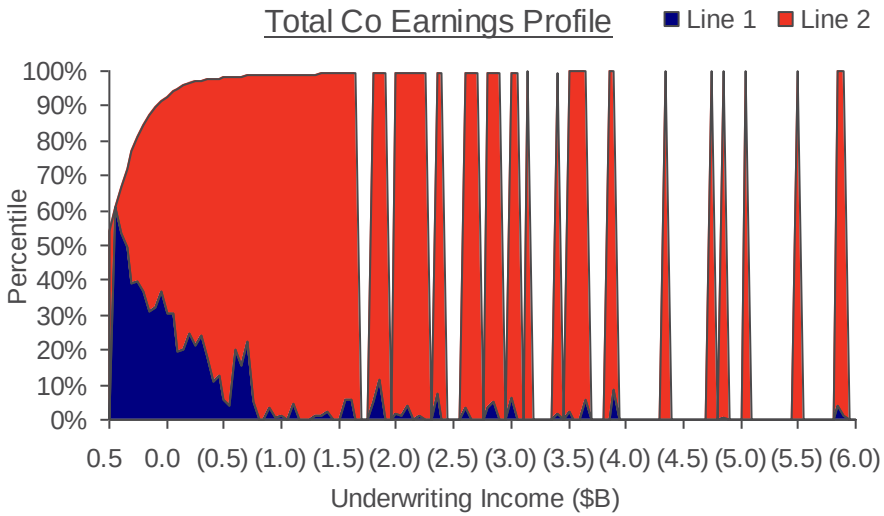
- **Same approach for Total Co works for lines as well**
  - Illustrated approach leverages proportion of stand-alone consumption capital
  - Mix of rental & consumption capital varies across lines



Allocating to state

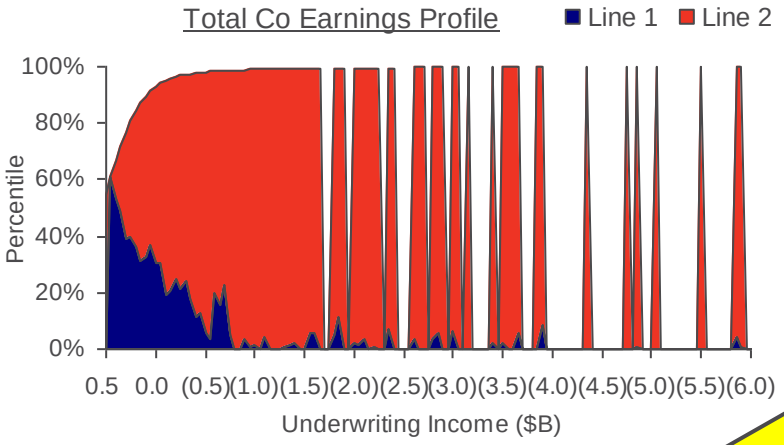
- **Guiding Principles:**
  - Fundamental before technical
  - Keep it simple
- **Rental charge applied to states via uniform P/S ratio**
- **Consumption charge will vary, but how?**
  - Could use same approach as assigning to line segments (fixed point)
  - Or, could vary according to contribution to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

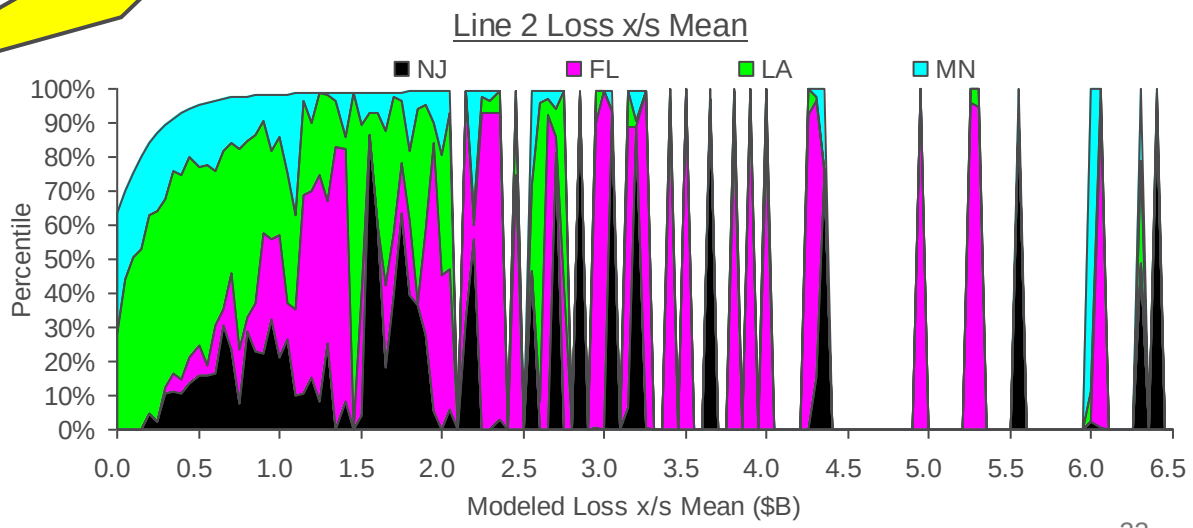




Contribution to marginal risk

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

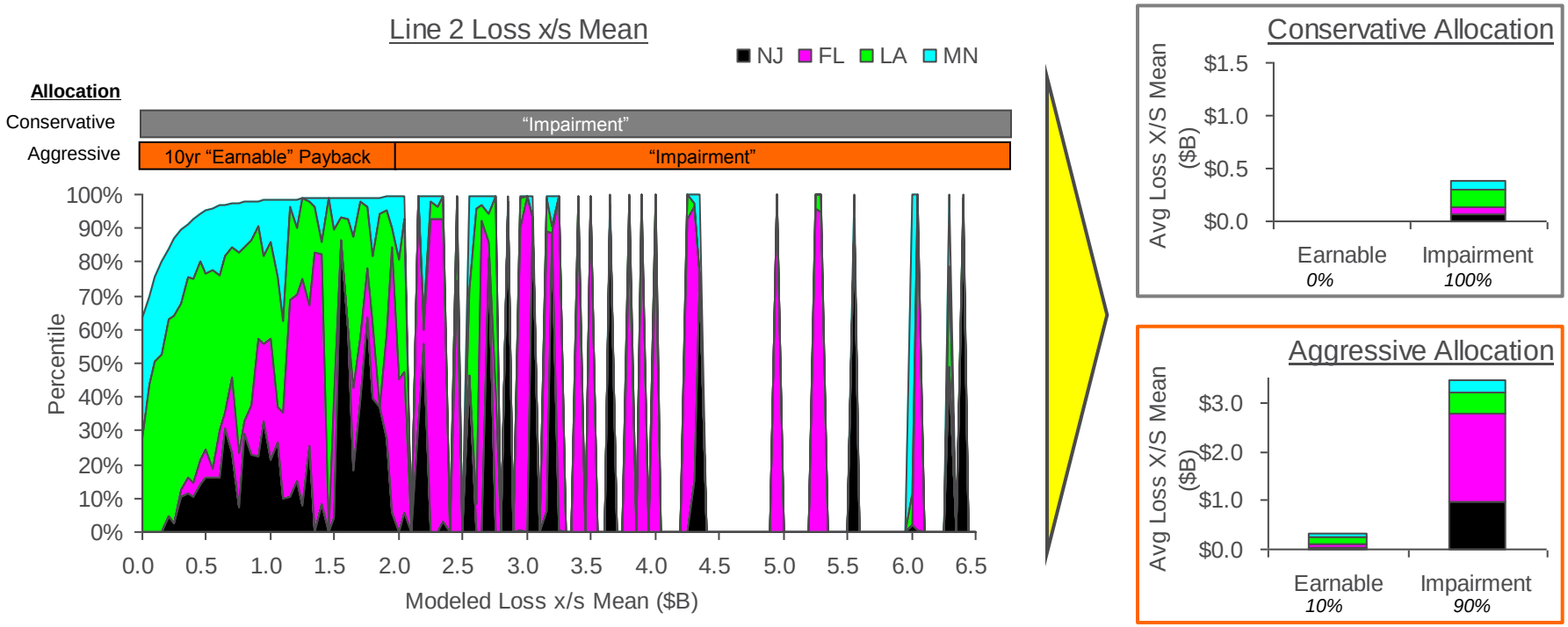




Allocation mechanics

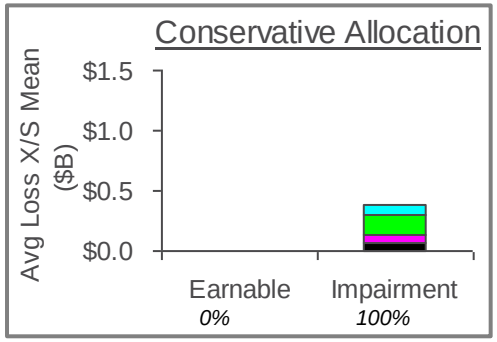
- **Some outcomes are worse than others, differentiate consumption charge accordingly**
  - E.g. losses that you earn your way out of ("earnable") vs. those you don't ("impairment")
  - Simple approach is segment TVaR (co-x TVaR)
  - Lot's of options for fine tuning: financial triggers (earnings, rating),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

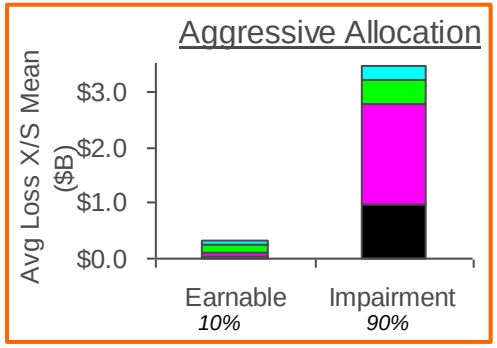
- **These preferences can have big downstream implications…**

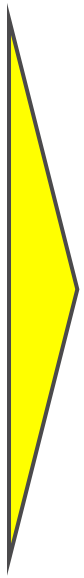


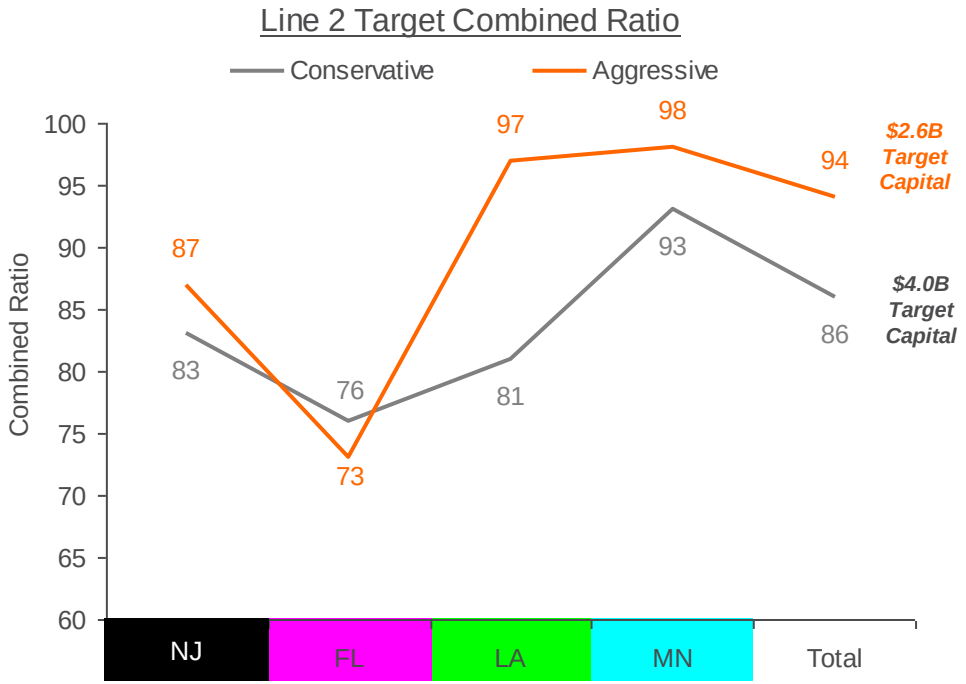
Results

- **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







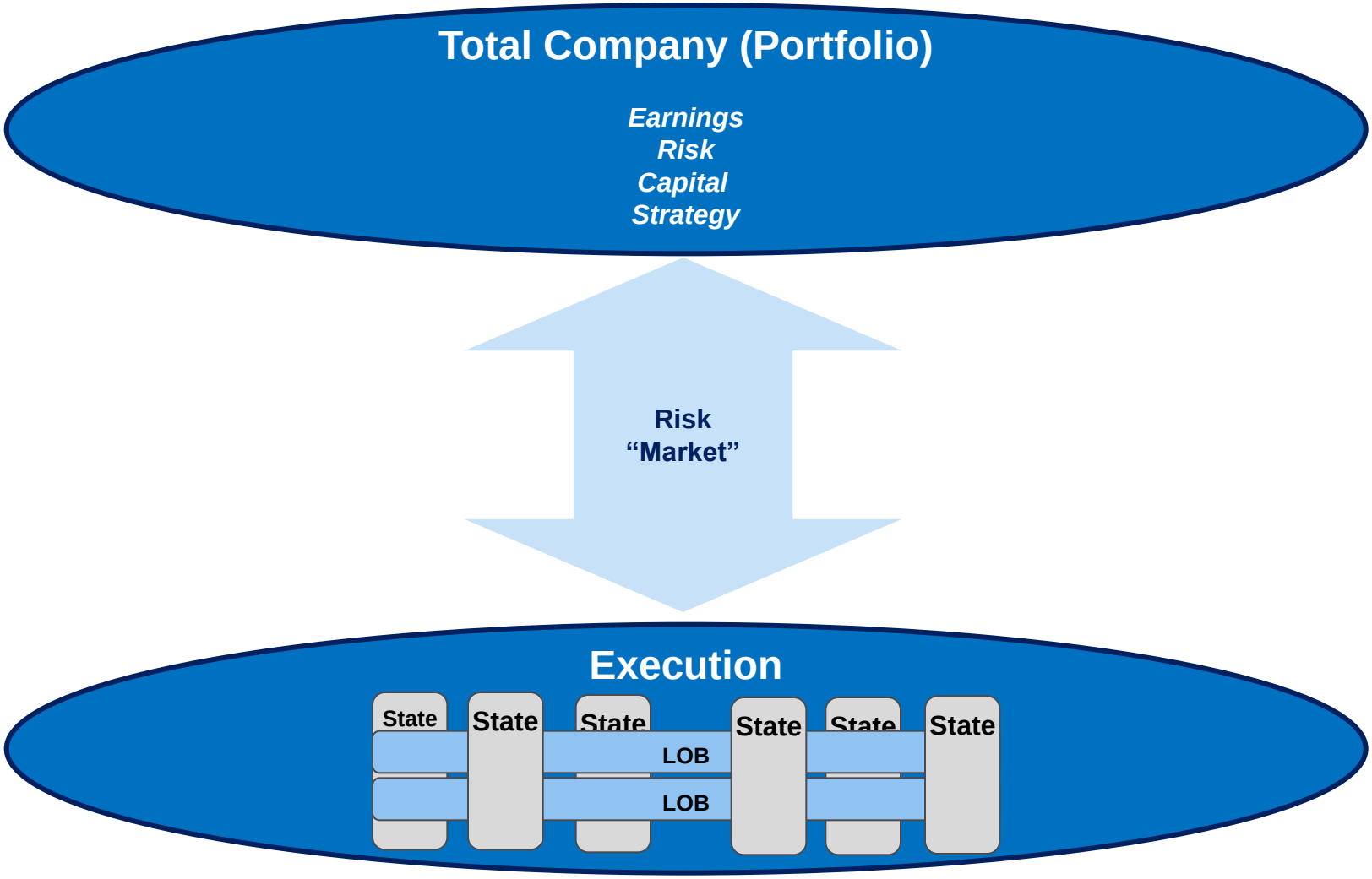


Leading Practice Benchmarking

Leading Practice	This Approach
1) Allocate cost of capital as opposed to capital	**Allocates Capital**
2) Away from sole reliance on extreme tail metrics to a blend of short, medium and long return period metrics	✓
3) Integrate explicit, formal statements of risk preference	✓
4) Design the capital allocation process based on performance criteria	✓
5) Create an operational buffer between the capital model and “executors”	✓

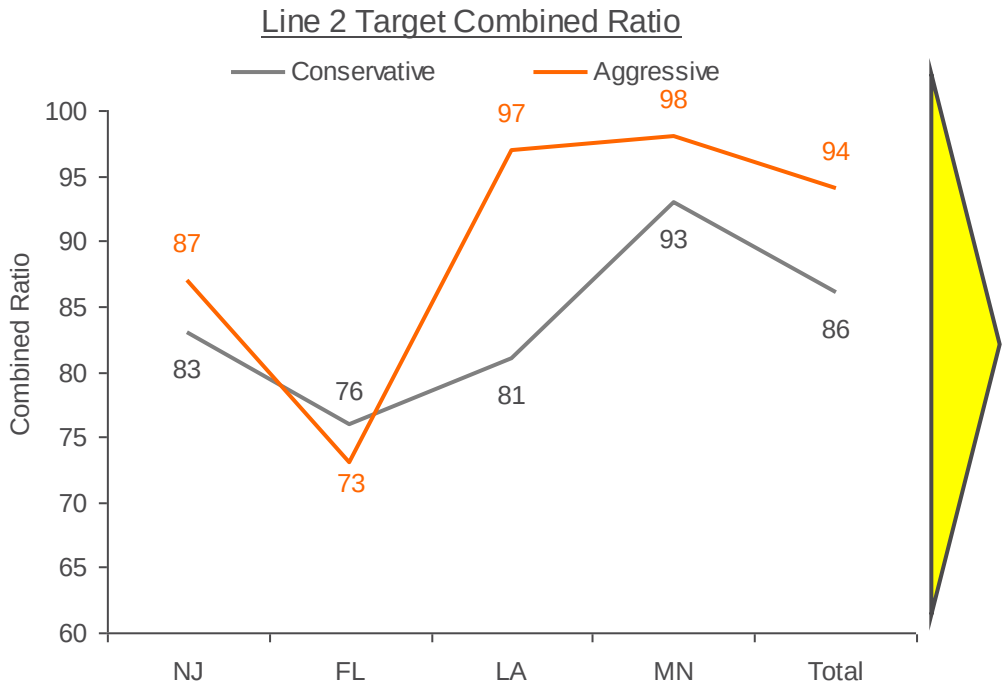
Driving business decisions with economic capital

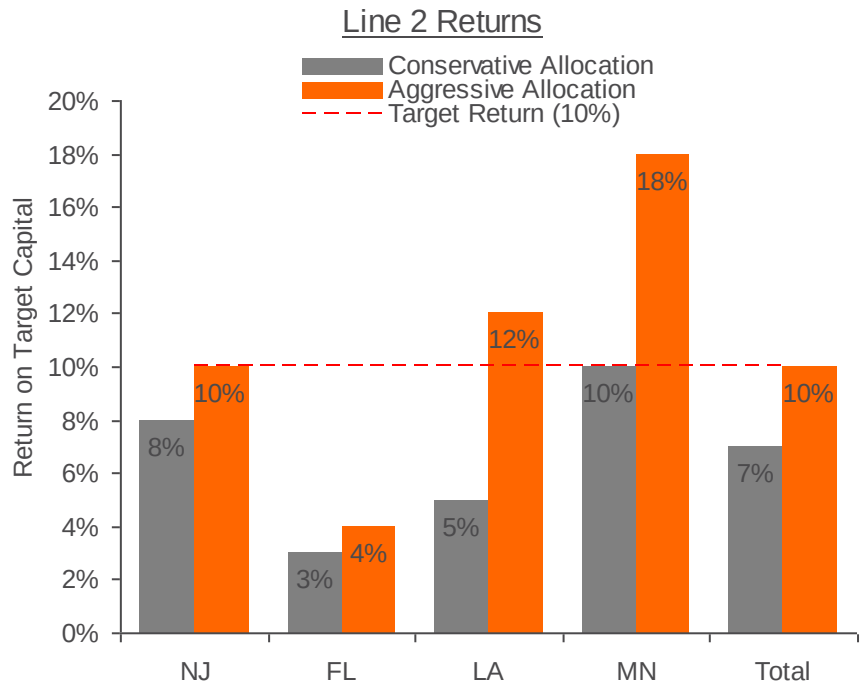
Operating Paradigm



Risk market in action

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

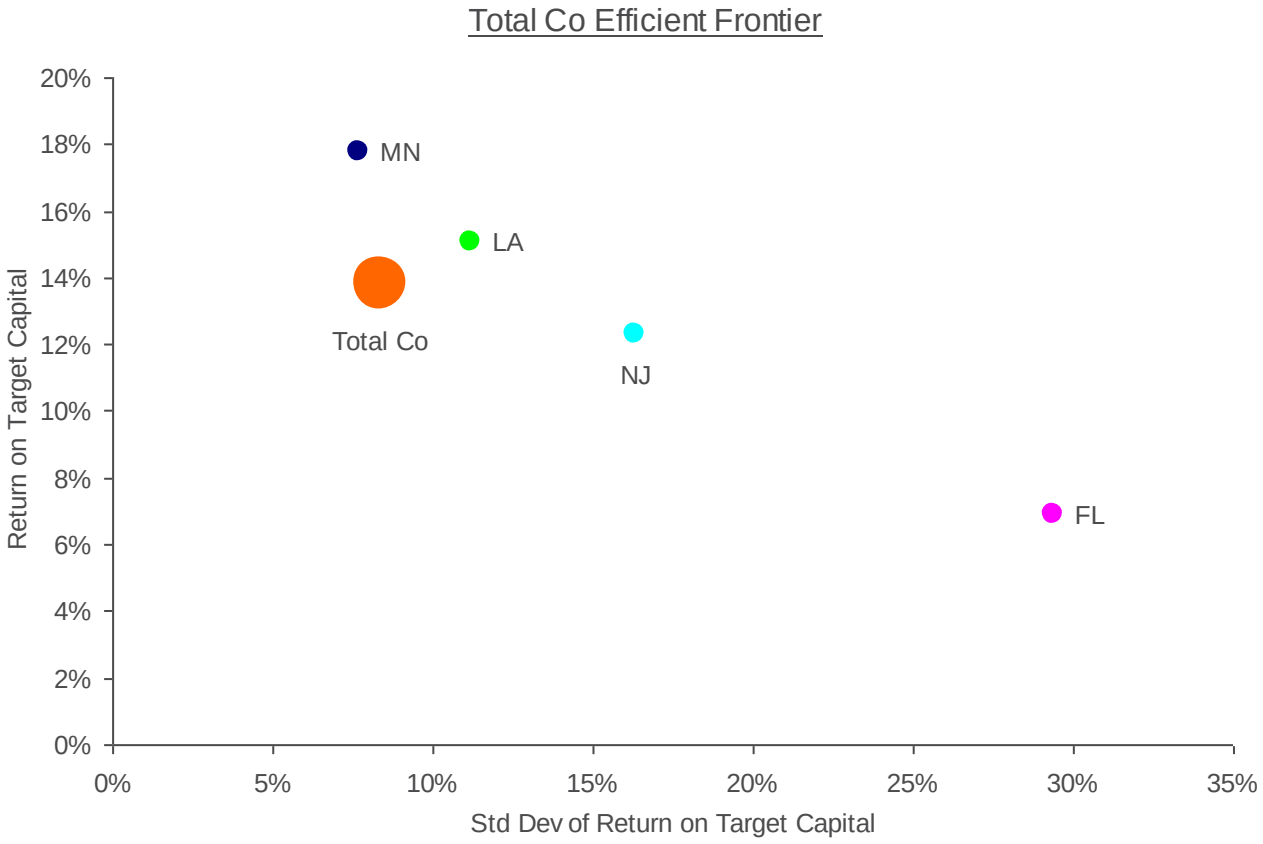




	NJ	FL	LA	MN	Total
Actual C/R	88	98	95	93	94
	?	Shrink	?	Grow	?

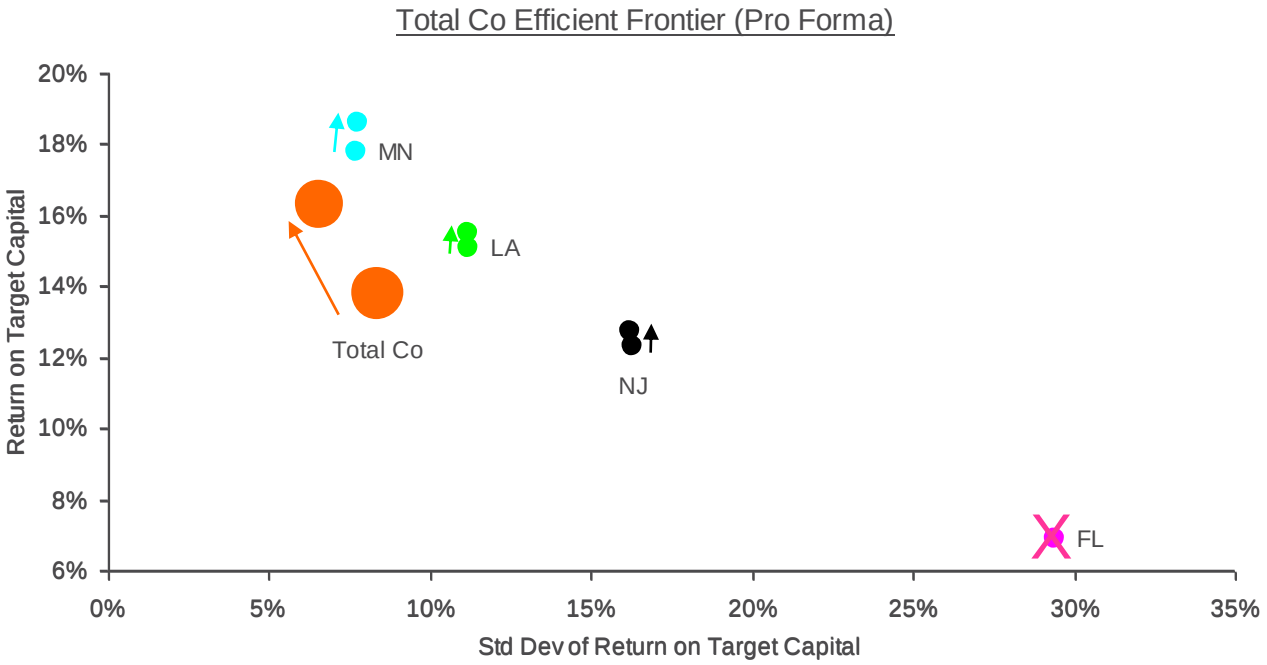
The final frontier

- **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**

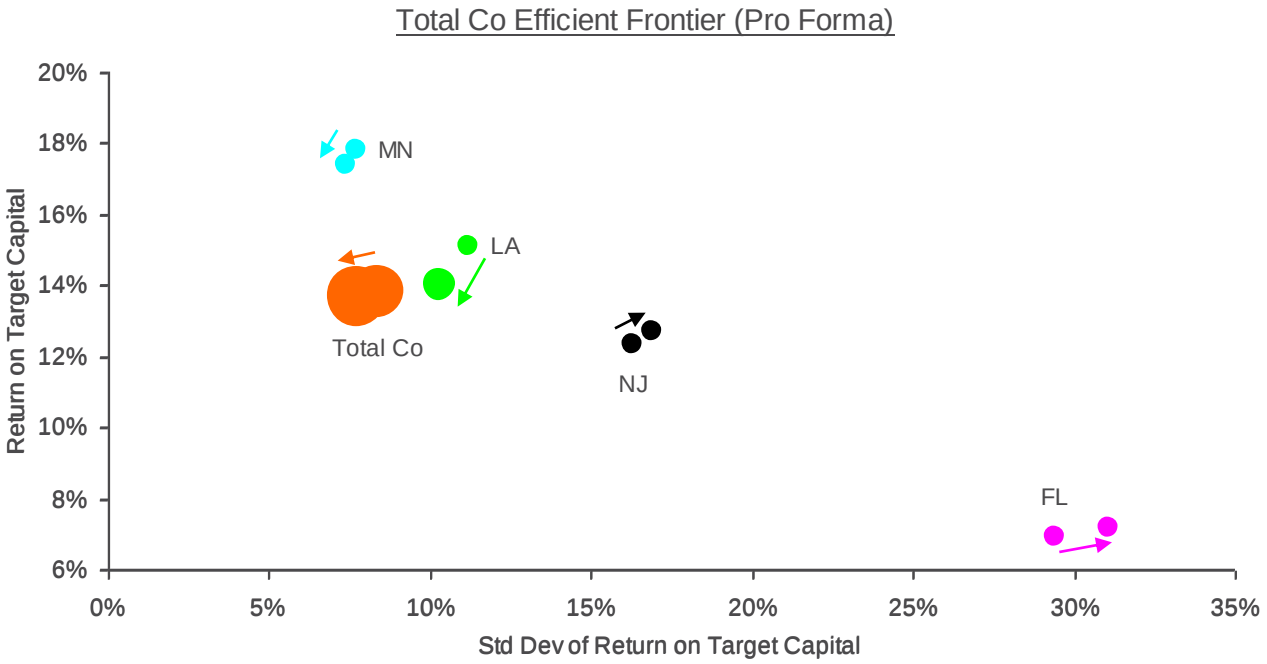


Target Combined Ratio (Base)					
	NJ	FL	LA	MN	Total
Line 1	100	100	100	100	100
Line 2	87	73	97	98	94

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

Optimizing…Round 2

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



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

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

Q&A