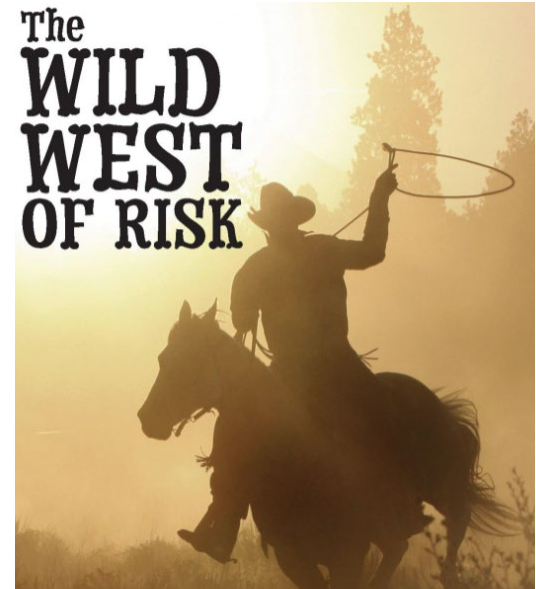# Choosing Your SIR
It's More Than A Number

presented by

Marcus Beverly
FVP, Alliant Insurance Services

and

Mike Harrington
President and Principal, Bickmore Actuarial

PARMA Conference 2021

Purpose

Outline the objective and subjective criteria used to evaluate an appropriate

Self-Insured Retention (SIR)

or *retained risk*

for your agency.

Outline

Risk Financing Objectives

Objective Criteria – "the numbers"

Subjective Criteria – "the gut feeling"

Putting them all together
◦ Case studies – *In the LIVE Q&A*

From there it's a *crapshoot!*
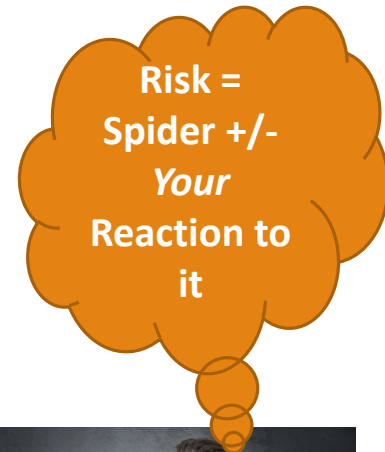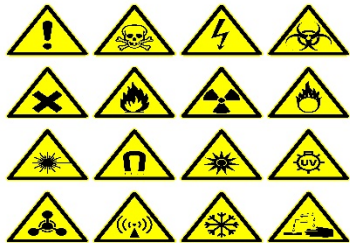
To Answer Your Question

There is no single "correct" answer to the SIR question...

...but we will present some guidelines to help you come to a "reasonable" answer

NOTE - ALL Risk Analysis Has Objective and Subjective Components!
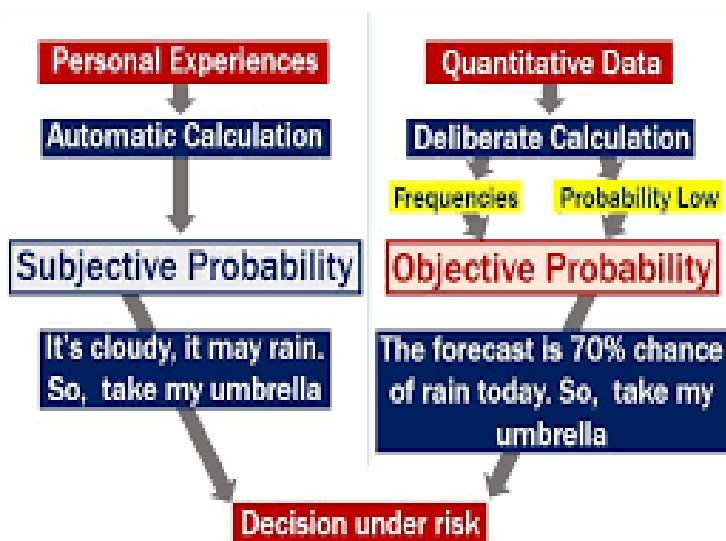
RISK=

Hazard + Outrage*

Objective and Subjective Components

Peter Sandman: www.psandman.com

Risk = Spider +/- *Your* Reaction to it

Objective v. Subjective *Probability*

Objective Probability is the likelihood of the outcome of any event based upon recorded measurements rather than subjective analysis.

Subjective Probability comes from our personal judgment of an event occurring, using our beliefs, hunches, gut feelings, instincts, and anecdotal evidence.

Subjective probability varies from person to person. Objective probability does not.

However, in either case – subjective or objective probability – the calculation is just a guide.

Neither one can tell us with certainty what the outcome will be.

No one is an expert on the future!

Common Risk Financing Objectives

Money to pay the claims!

Stability – *avoid swings* in funding or assets

Efficiency – *lower cost of risk* than insurance

Services – *choice of* risk control, claims, admin, other

Compliance - regulatory or business/contractual needs
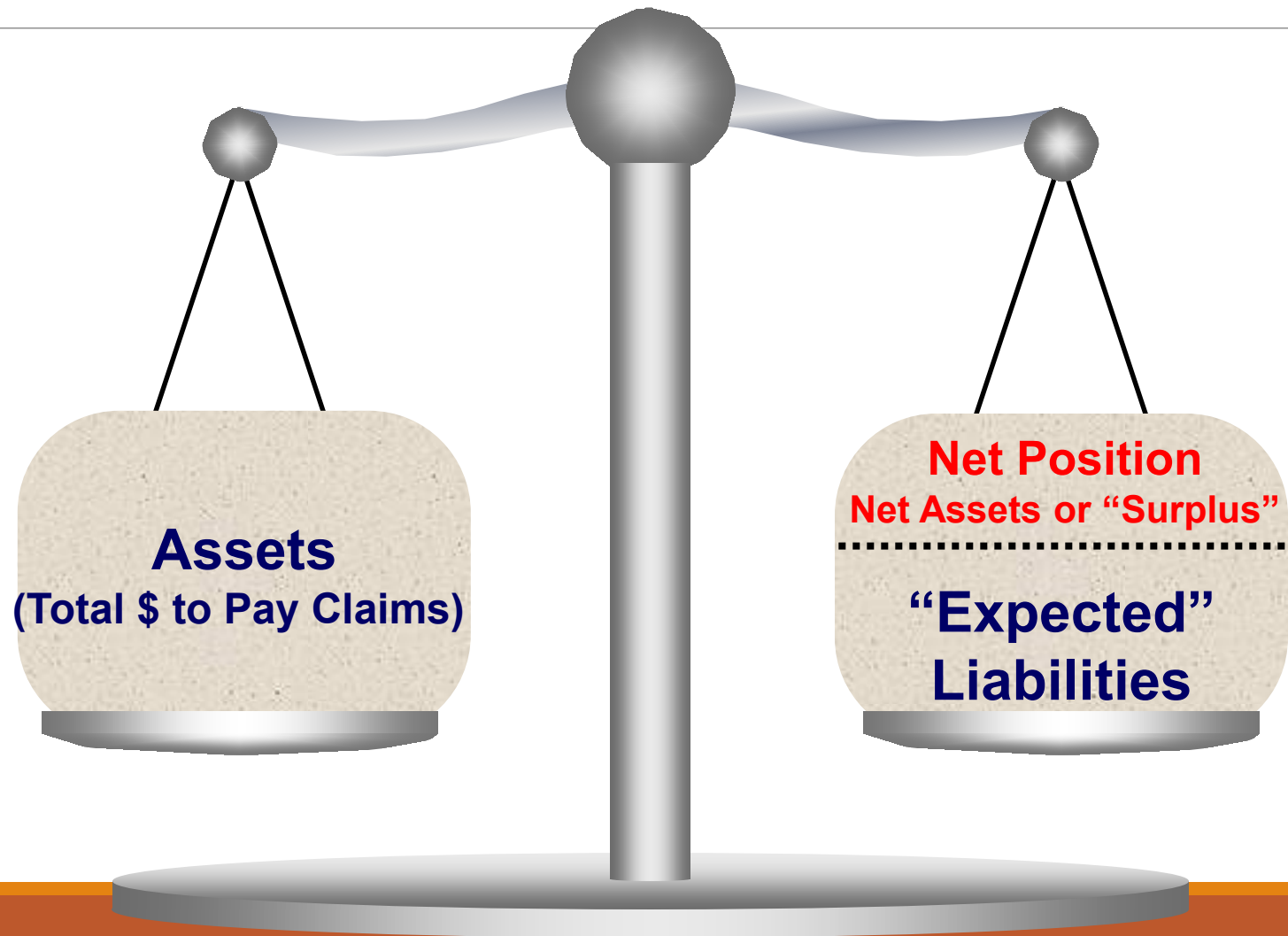
Objective Criteria
"The Numbers"

- **Liabilities (Ultimate Losses)**

- **Net Position/Assets/Surplus**

- **Funding Benchmarks**

- **Financial Ratios**

- **Claims**
  - **Stratification**
  - **Simulation**

Balance Sheet
(Statement of Net Position or Net Assets)

Assets
(Total $ to Pay Claims)

Net Position
Net Assets or "Surplus"

"Expected"
Liabilities

At Least Cover Your 'Expected" Liabilities

Assets

Liabilities

With any sizeable SIR or accumulation of long-tail liabilities your financial auditors will expect you to have reserves at least equal to "Expected" Liabilities (actuary estimate at @ 50% Confidence Level).

If you have sufficient cash flow, "pay as you go" is the least expensive risk financing option but usually the least practical, mainly due to additional *funds needed to absorb variance* in losses.

Variance...

When you see it online vs When it arrives in the mail

True😂😂😂

Loss estimates are inherently *variable*

Confidence Level is a statistical measure

Varies by coverage
- Excess Liability – very variable
- WC – indemnity less variable than medical part
- Auto Liability – generally more stable

The greater the SIR, the greater the potential for variability

Funding Benchmarks

Outstanding Liabilities
- ◦ "Must have" "Expected" @50% Confidence Level
- ◦ "Should have" 70% - 90% CL
- ◦ "Nice to have" above 80%-90% CL = **Leverage**

Yearly Funding
- ◦ At least "Expected", goal of 80% *or higher*
- ◦ OL Above or below 90% = dividend or assessment **("retro")**

Discount Factors in Line

With Investment Policy & Returns?

Surplus is Key Measure

Assets minus Liabilities = Surplus

Surplus a.k.a.:

◦ Net assets

◦ Net position

◦ Retained earnings

Reserves in excess of Expected Liabilities

Uses of Surplus

Absorb adverse/catastrophic development

Rate/funding stabilization

Increase SIR

Expand coverage

Excess coverage "failures"
   ◦ *even 36 years later!*

Key Ratios
Used to Assess Surplus

Focus on 3 Risk Exposures:
Losses, Reserves & Pricing

1. Surplus to SIR

2. Liabilities (Loss Reserves) to Surplus

3. Premium (Annual Funding) to Surplus
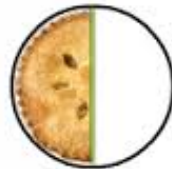
1:2   2:4   4:8

How Many "Hits" Can You Take?
Surplus to SIR

Measures **exposure to large <u>losses</u>**

High Ratio Desirable, > 5:1

Varies based on SIR level

How Good is Your Actuary?
Liabilities to Surplus
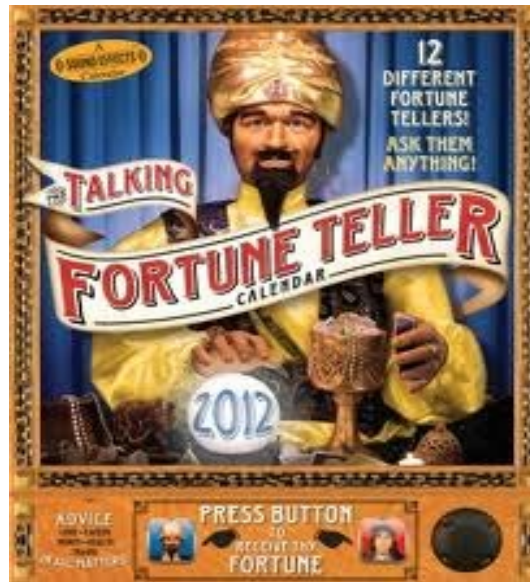
Measures **exposure to reserving errors**

Low ratio desirable, < 1.5:1

How Good Is Your Underwriter?
"Premium" to Surplus

Measures **exposure to pricing errors**.

A *low ratio* is desirable, < 1:1

What Are the Trends?

Surplus: No more than 10% decrease

Reserves: No more than 20% increase

Premium: No more than 10% increase

p.s. *One year's result is not a trend!*

Claims Stratification
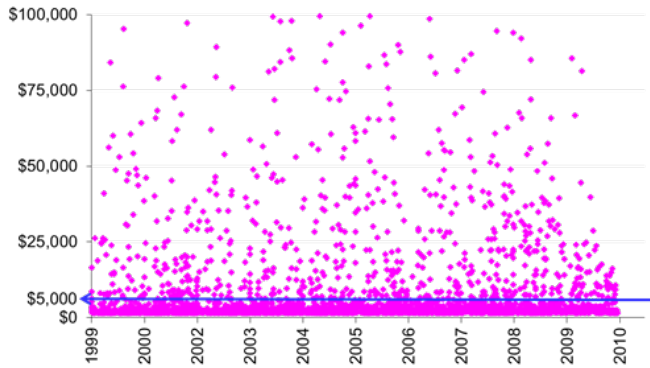
◦ Provides insights into magnitude and distribution of claims

◦ Facilitates alternative SIR analysis

◦ Focus on the big $ claims

◦ Use to set up loss control metrics

Distribution of Incurred Losses
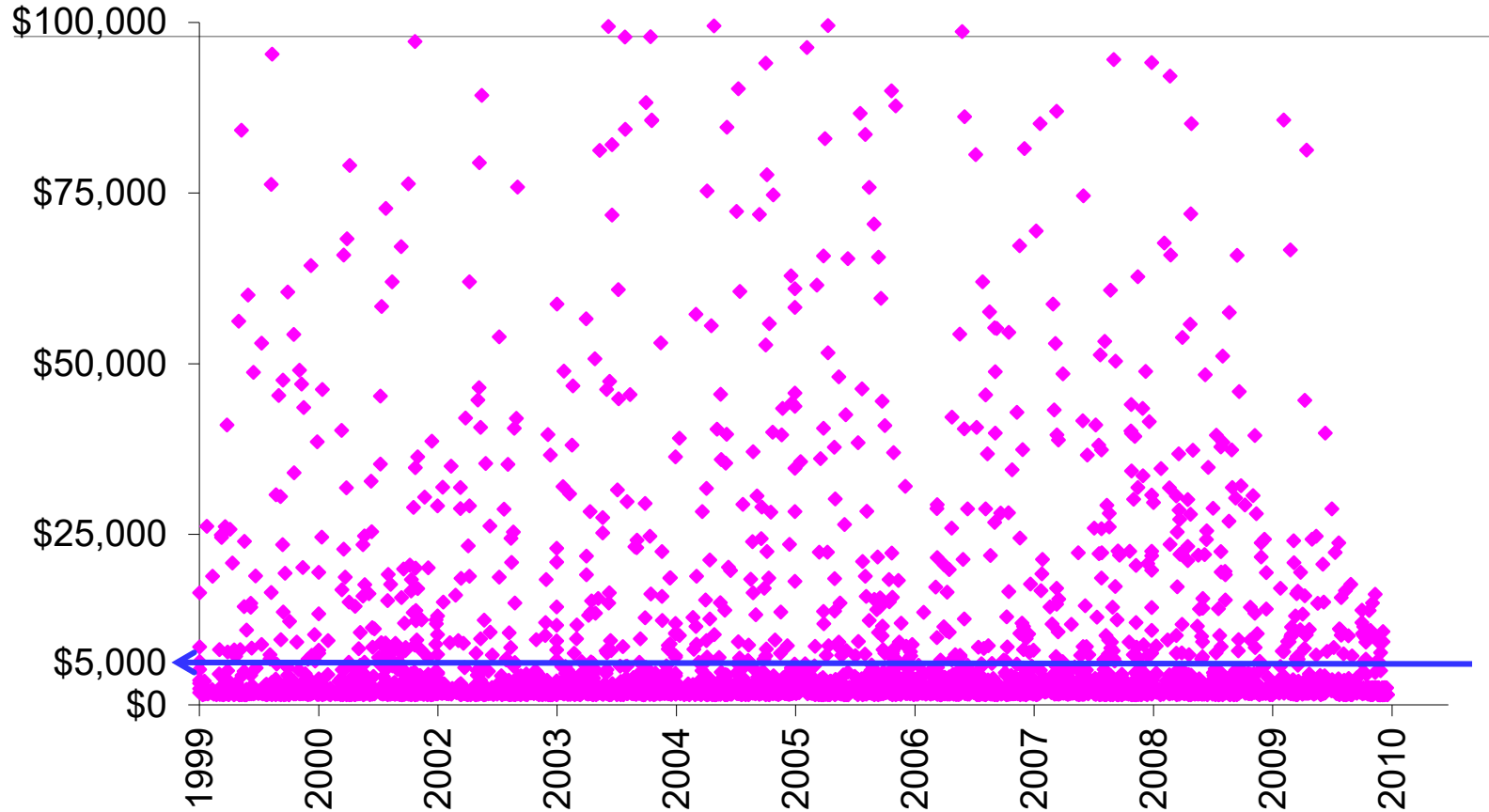
Stratified Losses – histogram, used to fit a curve

Monte Carlo Simulation

Use claim stratification information to simulate claims process
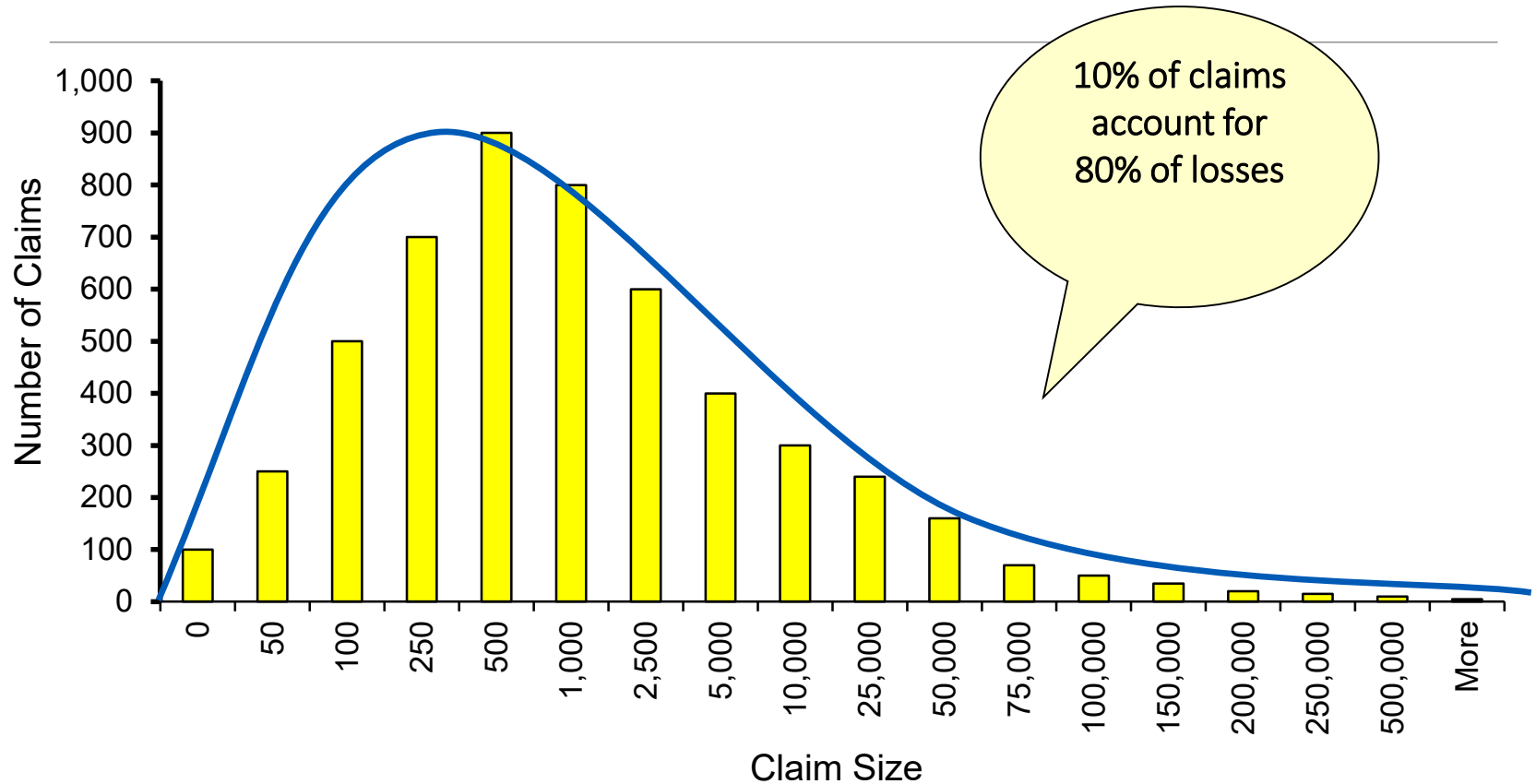
Select number of claims

For each claim, select size

1. Number of claims (frequency)
2. Average claim size (severity)

Monte Carlo Simulation
Number of Claims

**Uniform Distribution,
i.e. equally likely to occur**
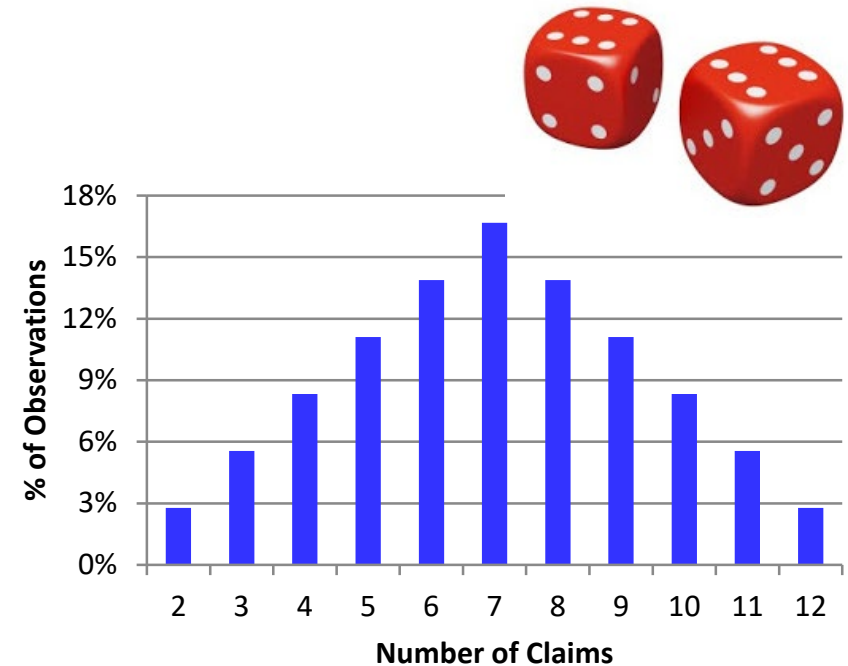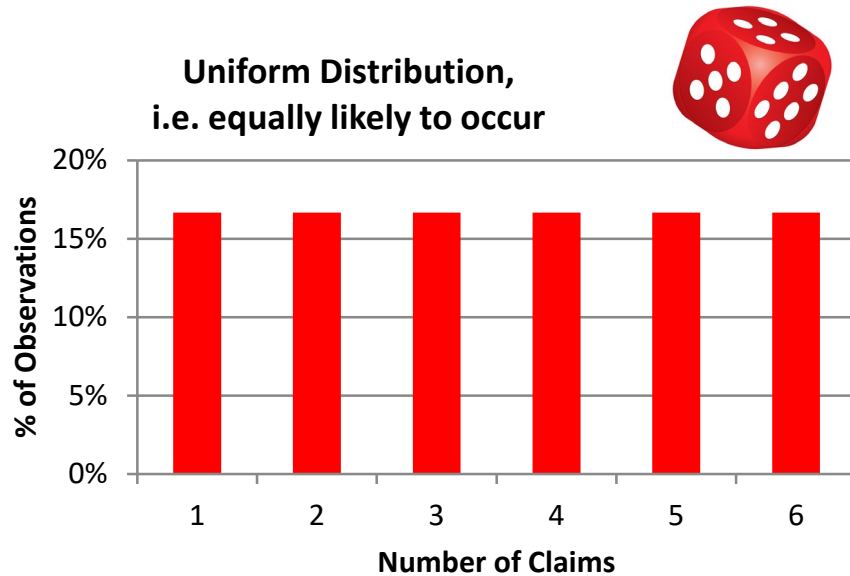
Monte Carlo Simulation Claim Size
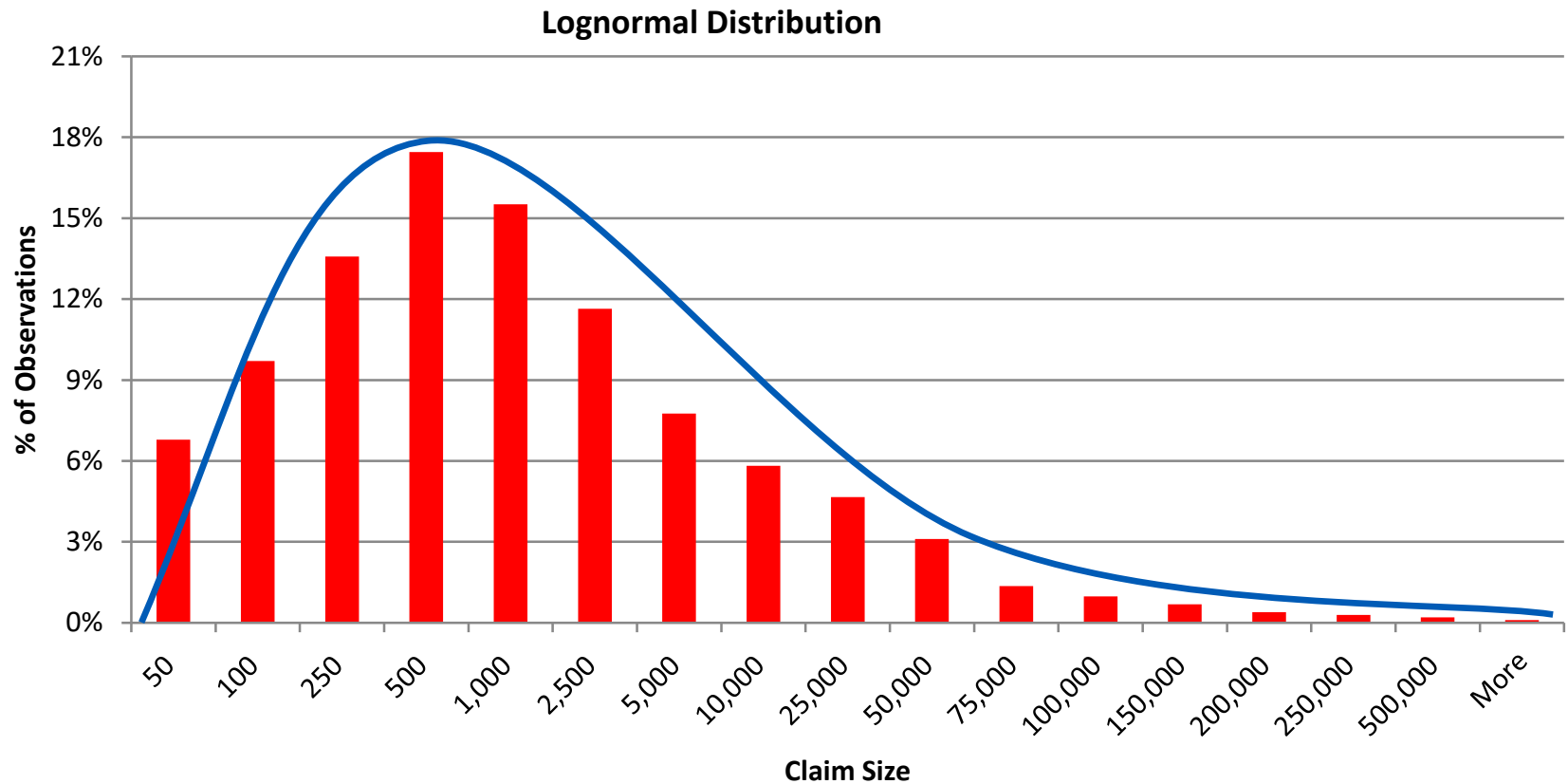
Monte Carlo Simulation
Example – Simulated Unlimited Claims

Simulation Number	Number of Claims	Unlimited Claim Amount for Claim #						Aggregate Losses
		1	2	3	4	5	6	
1	5	$9,000	$12,000	$3,000	$4,000	$11,000		$39,000
2	3	7,000	3,000	11,000				21,000
3	4	3,000	6,000	4,000	11,000			24,000
4	2	13,000	12,000					25,000
5	5	4,000	8,000	12,000	4,000	4,000		32,000
…	…	…	…	…	…	…	…	…
9,999	2	9,000	9,000					18,000
10,000	3	10,000	8,000	13,000				31,000
Average	3.5							$25,000

Monte Carlo Simulation
Example – Ranked Simulated Claims

Simulation Number	Aggregate Losses
1	$8,401,712
2	1,497,651
3	3,516,291
4	1,797,246
5	2,870,778
6	4,187,925
7	1,029,627
…	
9,999	1,954,018
10,000	2,509,543
Average	$4,293,260

Rank	Aggregate Losses
1	$1,020,320
2	1,024,065
3	1,029,627
…	
5,000	4,025,944
…	
7,000	5,353,140
…	
9,000	8,849,910
10,000	155,734,676
Average	$4,293,260

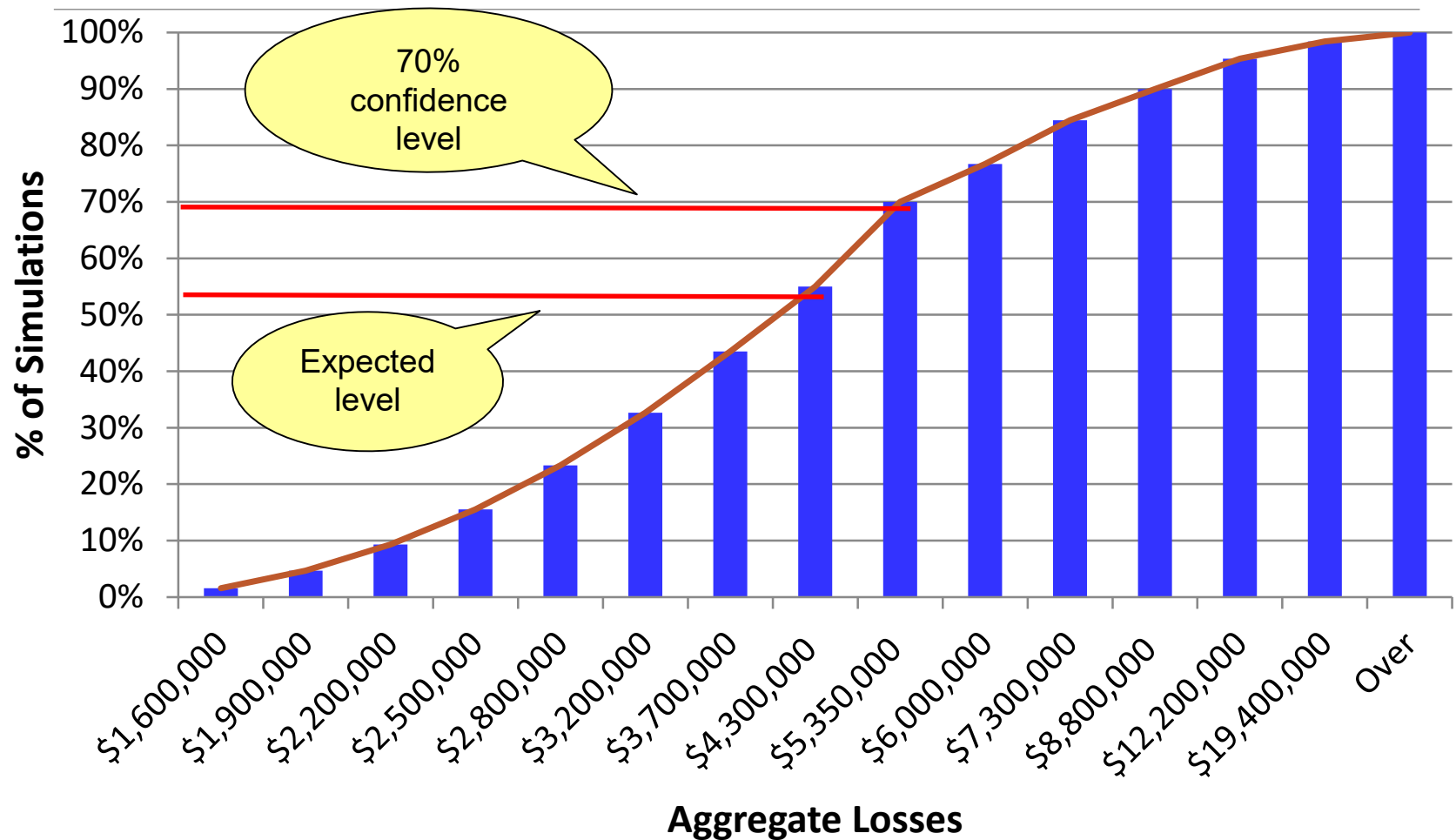| Percentile	Confidence Level Factor
70%	1.25
90%	2.06

$5.35M / $4.3M =

$8.8M / $4.3M =

Monte Carlo Simulation
Example – Confidence Level

Monte Carlo Simulation
Example – Simulated Limited Claims

Simulation Number	Number of Claims	Unlimited Claim Amount for Claim #						Aggregate Losses
		1	2	3	4	5	6	
1	5	$9,000	$10,000	$3,000	$4,000	$10,000		$36,000
2	3	7,000	3,000	10,000				20,000
3	4	3,000	6,000	4,000	10,000			23,000
4	2	10,000	10,000					20,000
5	5	4,000	8,000	10,000	4,000	4,000		30,000
…	…	…	…	…	…	…	…	…
9,999	2	9,000	9,000					18,000
10,000	3	10,000	8,000	10,000				28,000
Average	3.5							$23,000

Monte Carlo Simulation
Example – Ranked Limited Claims

Limited to $250,000 per Claim		Unlimited		Increased Limits Factor
Rank	**Aggregate Losses**	**Rank**	**Aggregate Losses**	
1	$1,020,320	1	$1,020,320	
2	1,024,065	2	1,024,065	
3	1,029,627	3	1,029,627	
4	1,049,633	4	1,049,633	
5	1,093,764	5	1,093,764	
…		…		
9,999	4,124,779	9,999	107,523,846	
10,000	4,381,136	10,000	155,734,676	
Average	$2,370,449	Average	$4,293,260	1.81

$4.3M / $2.4M =

Monte Carlo Simulation
Example – Alternative SIRs

So Which SIR Do We Pick?

You have $3,500,000 in surplus.

Surplus Requirements

SIR	Losses	Premiums	Reserves	SIR 5:1	Prem 1:1	Resv 1.5:1
150,000	1,934,000	2,321,000	4,642,000	750,000	2,321,000	3,094,667
250,000	2,370,000	2,844,000	5,688,000	1,250,000	2,844,000	3,792,000
350,000	2,671,000	3,205,000	6,410,000	1,750,000	3,205,000	4,273,333
500,000	2,938,000	3,526,000	7,052,000	2,500,000	3,526,000	4,701,333
1,000,000	3,339,000	4,007,000	8,014,000	5,000,000	4,007,000	5,342,667

Numbers Indicate:
$150K passes all three tests
$250K passes two tests, close on third
$350K passes two tests, not so close on third
$500K and up look too high

Cost / Benefit Analysis

Compare Total Cost of Retained Losses and Excess Insurance.

	Self-Insured Retention (SIR)		
	150,000	250,000	350,000
Retained Losses	1,934,000	2,370,000	2,671,000
Excess Insurance	2,750,000	2,200,000	1,750,000
Total Cost	4,684,000	4,570,000	4,421,000
Savings at Higher SIR		(114,000)	(263,000)
		-2.4%	-5.6%

Higher SIRs are expected to cost less, but…
"Do you feel lucky??"

Subjective Criteria
"The Gut Feeling"

"Appetite"

Claims

Exposures

Coverage

Finances

Projections

Trends of above criteria

ID Your **Philosophy**
What is your Risk "Appetite"?

Most Public Agencies are conservative by nature and by regulation, including in their investment choices, and that limits their risk-taking ability.

But taking on too little risk in the long term is more expensive and not a good use of public funds.

Finding the right balance, or appetite, for risk is as much art (gut) as science (numbers).

Claims

Losses above SIR
Nature & scope of individual claims
Major causes of loss
Predictability
Reserve changes
Reserving practices
Administration
"Social Inflation"

Trends of above

Exposures

New/emerging

Existing and unknown

Claims v. other agencies/companies

Legislation

Case law

"But there are also unknown unknowns—the ones we don't know we don't know."
- Donald Rumsfeld

Coverage

Change in coverage

Change in self-insured retention level

Change in excess insurers

Industry rating of excess insurers

Total limits, aggregates, stop-loss

Reputation of and relationship with excess *insurers*

◦ *Layered programs now necessary*

Market Conditions

	HARD	SOFT
	Raise SIR?	Lower SIR?
	Lower Limit?	Higher Limit?
	Less Coverage?	More Coverage
	Less Service?	More Service?
	Shorter Term?	Longer Term?

Hard Market
Tougher Underwriting
Reduced Capacity
Higher Premiums
Restricted Coverage

Soft Market
Easier Underwriting
Increased Capacity
Lower Premiums
Broader Coverage

If you are not evaluating your SIR regularly you are missing out on taking advantage of market cycles!

Finances

Financial objectives & strategies

Financial position as compared to benchmarks

Stability of funding, cash flow

Premiums/funding levels currently

Interest Income

Trends of above

Projections

Actuary projections

- ◦ Do the numbers make common sense?
- ◦ Do they line up with your financials?

How compare to insurance/other options?

- ◦ **Number of years to fully fund the various SIRs**

Change in actuary?

Confidence levels

Full extent of actual ultimate liabilities known?

Will the future look like the past?

Risk Pool Membership

Attitude & Ability re Assessments/Retros

How are their ratios & benchmarks?

Size – numbers and trends

SIR – size and type(s)

Excess insurance stability

Board engaged, experienced, *get along*

Common Vision?

Long-term commitment?

Other Factors

Strategic Objectives

Change in administration/programs/staff;

Political

Services desired/needed

Money

Others?

When In Doubt
Run it through your mission statement

What's Your Objective?

Stable, long-term funding of losses

And in the end ...

It's a crapshoot!

Please join us for the
live Q&A after this session
for **case studies** and your
chance to roll the dice and
be a hero!

Summary – "The Numbers"

Losses are inherently ***variable***

Variability cushioned by surplus

Set target financial measures:
◦ Reserves, premium and SIR to Surplus
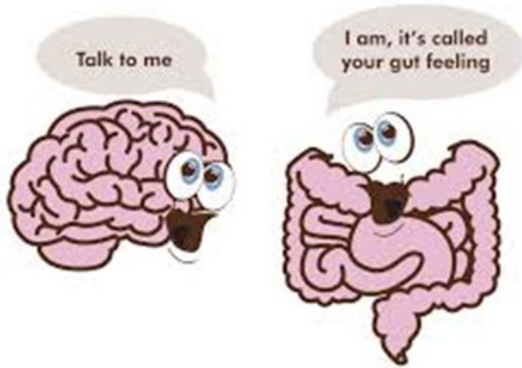
Understand and apply ratios judiciously

Review plan periodically:
◦ Details change
  (e.g., SIRs, membership, etc.)
◦ Compare to peer groups

Summary – "The Gut"

Numbers aren't the entire picture

What are your goals? Mission?

Does it make sense?

Manage expectations

Get buy-in from others

Put it all together and *have a reason for your decision*

Roll the dice and hope for the best!

In the end,

Gutsy move ...for a brain!

Do what you feel in your heart to be right—

for you'll be criticized anyway.

—Eleanor Roosevelt

Just have your "reasoning" ready for the critics!

Questions & Case Studies Next!

THANK YOU!

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mharrington@bickmoreactuarial.net

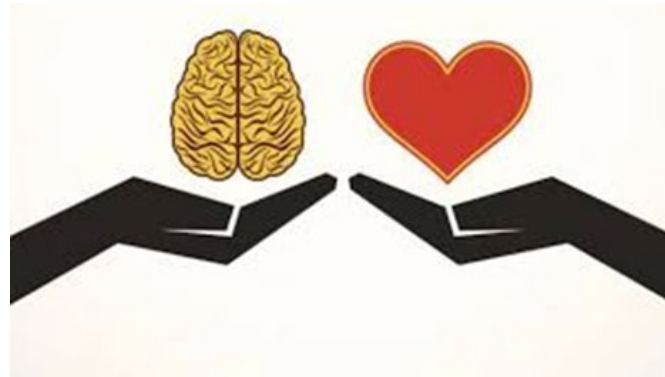# Choosing Your SIR LIVE Session Questions & Case Studies

THANK YOU!

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mharrington@bickmoreactuarial.net

Case Studies

Review the numbers and subjective criteria and make decision

Roll the die!

See how your decision plays out under three scenarios

Case Study 1 - Work Comp
Let's Revisit Mike's Scenario

Small entity with $150K SIR

Considering increasing SIR

Conservative Reserve Funding (>90% CL)

Losses fluctuate *+/- 10% to 40% per year*

Average 24 claims per year

So Which SIR Do We Pick?

You have $3,500,000 in surplus.

Surplus Requirements

SIR	Losses	Premiums	Reserves	SIR 5:1	Prem 1:1	Resv 1.5:1
150,000	1,934,000	2,321,000	4,642,000	750,000	2,321,000	3,094,667
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350,000	2,671,000	3,205,000	6,410,000	1,750,000	3,205,000	4,273,333
500,000	2,938,000	3,526,000	7,052,000	2,500,000	3,526,000	4,701,333
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Numbers Indicate:
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Cost / Benefit Analysis

Compare Total Cost of Retained Losses and Excess Insurance.

Self-Insured Retention (SIR)

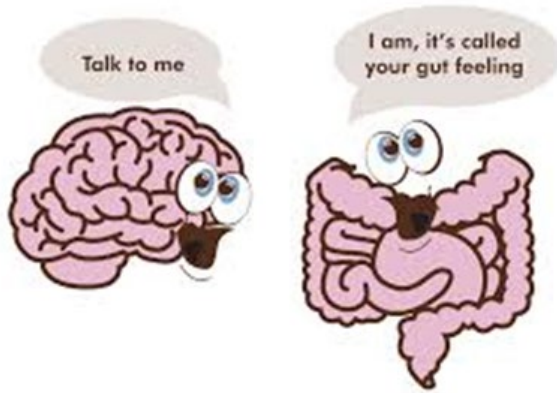|	150,000	250,000	350,000
Retained Losses	1,934,000	2,370,000	2,671,000
Excess Insurance	2,750,000	2,200,000	1,750,000
Total Cost	4,684,000	4,570,000	4,421,000
Savings at Higher SIR		(114,000)	(263,000)
		-2.4%	-5.6%

How many years will it take to fund the increased risk with the savings?

Higher SIRs are expected to cost less, but…
"Do you feel lucky??"

Subjective/Other Factors

- ➤ Sharing risk in excess pool
- ➤ Legislative reforms increasing TD rates
- ➤ Desire for more risk control services
- ➤ Pressure to raid surplus for general fund
- ➤ Conservative funding philosophy
- ➤ *Maintain potential to raise SIR if needed*
- ➤ Frequency down, severity creeping up
- ➤ Market is unsettled to increasing

What SIR Do You Choose?
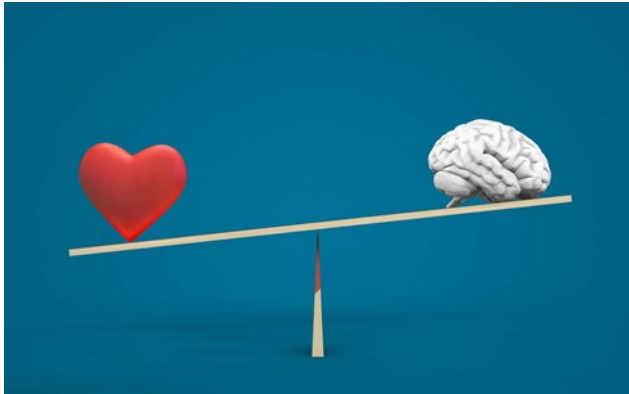
Say at $150K?

Go to $350K?

Now …let's roll the die!

Results

Optimistic – <u>total losses less than expected</u> – ***you're a "Hero!"***

- $150k SIR = + $170k
- $350k SIR = + $210k

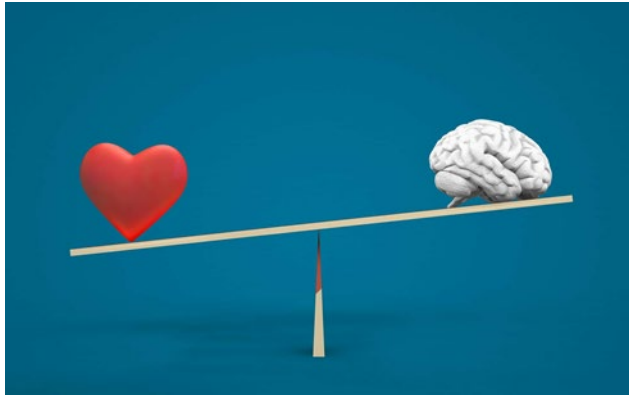**Expected** – <u>total losses about what's expected</u> – *your actuary's a "Genius"*

- $150k SIR = + $10k
- $350k SIR = + $50k

Pessimistic – <u>total losses way more than expected</u> – *start circulating resume*

- $150k SIR = (-$180k)
- $350k SIR = (-$480K)

Case Study 2 – General Liability

- Medium-sized entity
- $1 Million GL SIR since 2015, was $500K
- Never had a claim over $500K
- Had 3 claims over $1M since raising SIR
- Conservative, with assets > 90%CL, though they are projected to disappear
- Considering going back to $500K SIR

Recent Trends

What's your gut feeling?

➢ Losses were trending down with more focus on risk management

➢ RM training and funds cut in recent years

➢ Recent >$1MM losses = 2 EPL & 1 MVA

➢ EPL related to budget cuts, morale low

➢ EPL defense costs > $500k per claim

➢ Budget is stabilizing after years of cuts, want to restore RM funding

Other Factors

➢ Political pressure to reduce EPL and overall "bleeding" from big losses

➢ Excess Pool - recent member disputes over coverage, net assets declining

➢ Insurance Market is hardening

Lower SIR from $1 mil to $500,000?

Liability Program Balance Sheet

Liability Program Balance Sheet Comparison	Actual 6/30/2020	Projected 6/30/2021	Difference 2020 to 21	Change 2020 to 21
Assets/GL Reserves	**$26,000,000**	**$22,000,000**	**($4,000,000)**	**-15%**
Less				
Liabilities at "Expected" CL	$17,000,000	$18,000,000	$1,000,000	6%
Equals				
Net GL Assets/Surplus	**$9,000,000**	**$4,000,000**	**($5,000,000)**	**-56%**

Liability Benchmarks

Benchmarks (Min & Goal Ratio)	Actual 6/30/2020	Projected 6/30/2021
Net Assets/$1mil SIR (5-10:1)	9	4
Net Assets/$500K SIR (5-10:1)	18	8
Liabilities to Net Assets < 1.5:1, Goal 1:1 or less	1.88	4.5
Net Premium to Net Assets < 1:1, Goal 0.5:1 or less	0.17	0.20

Liability Funding Options

Future Loss Funding	2020-21	2021-22	Difference 21 to 22	% Change	
Loss Funding $1M SIR (80% CL)	$3,500,000	$4,000,000	$500,000	14%	
Excess Coverage $9M	$800,000	$950,000	$150,000	19%	
Total Funding $1M SIR	$4,300,000	$4,950,000	$650,000	15%	
$500K SIR Options			Difference From $1M SIR		Years to fund
Loss Funding $500K SIR (80% CL)	n/a	$3,750,000	($250,000)	-6%	2.00
Excess Coverage $9.5M	n/a	$1,350,000	$400,000	42%	1.25
Total Funding $500K		$5,100,000	$150,000	-7%	n/a

What Do You Choose?

SIR: $1 Mil or $500K?

Now …let's roll the die!

Results

"Maybe your gut feeling was just indigestion after all"

Optimistic – <u>Losses = $2.0 Mil</u>   "Hero"!
- $1 Mil SIR = + $2 Mil
- $500K SIR = + $1.75 Mil

Expected – <u>Losses = $3.8 Mil</u>   "Employed"
- $1 Mil SIR = + $200,000
- $500K SIR = - $50K
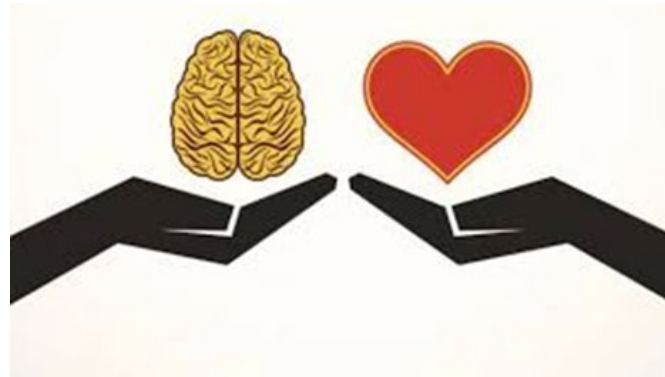
Pessimistic – <u>Losses = $7.0 Mil</u>   "It depends"
- $1 Mil SIR = - $1 Mil   ($5 mil capped)
- $500K SIR = + $750,000   ($3 mil capped)
  With one "Limit" loss on the excess, no matter the limit!

Choosing Your SIR LIVE Session Questions & Case Studies

THANK YOU!

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mharrington@bickmoreactuarial.net