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LONGEVITY 10
Future Capital Requirements That Should Be Imposed on Annuity Writers

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Future Capital Requirements that should be imposed on Annuity Writers

Why it matters: Enabling a stable, robust annuity market

Risks: Focus on Longevity Improvement

Principles: Risk-sensitive stresses

Rewards sound risk management

Why this topic?

$60,000,000,000

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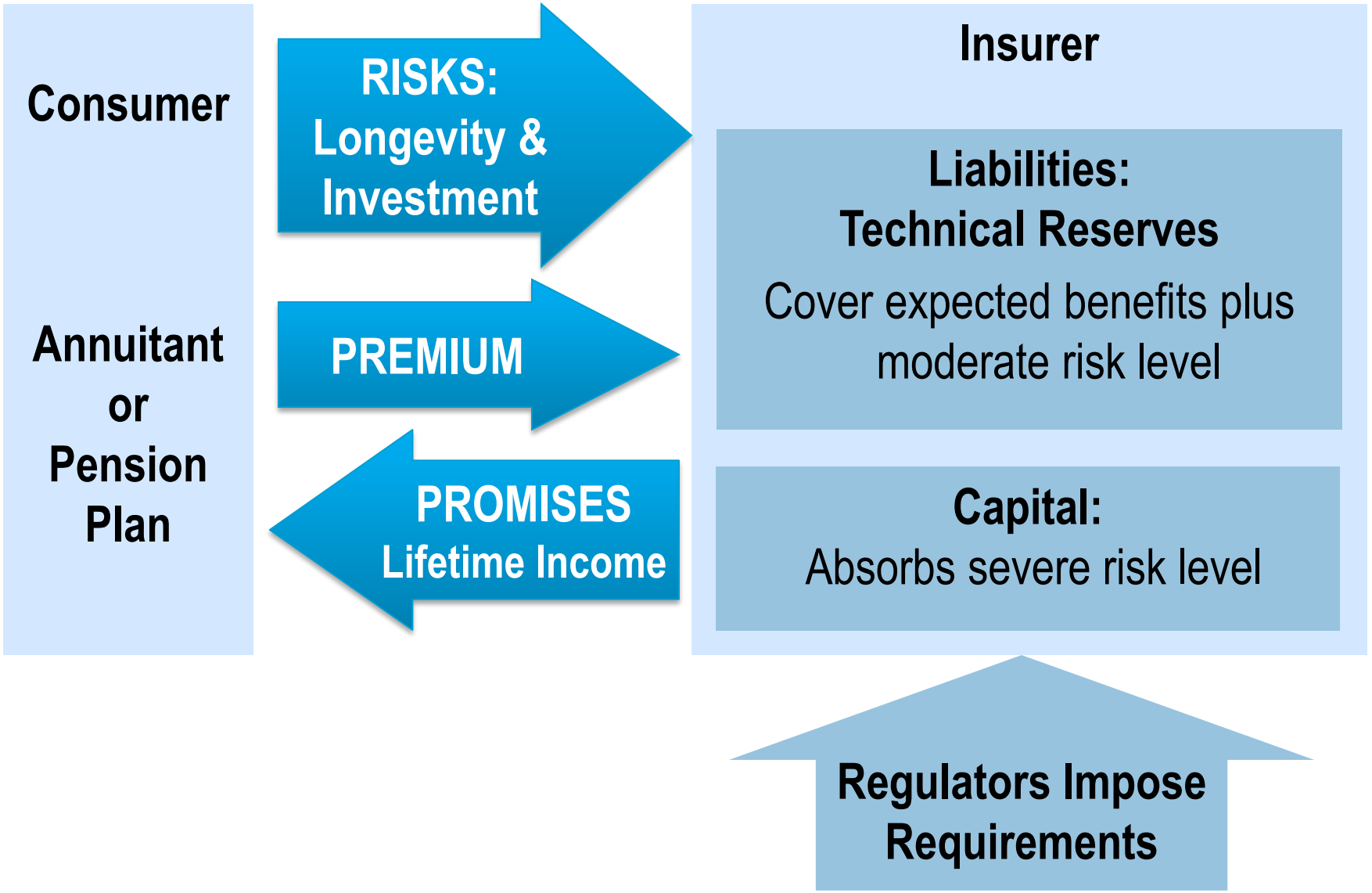
Future Capital Requirements that should be **Imposed** on Annuity Writers

Why “Imposed”: Money, Risk, and Promises



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Principles

Annuity Risks

Annuity writers face three primary risks:

(1) Longevity Risk

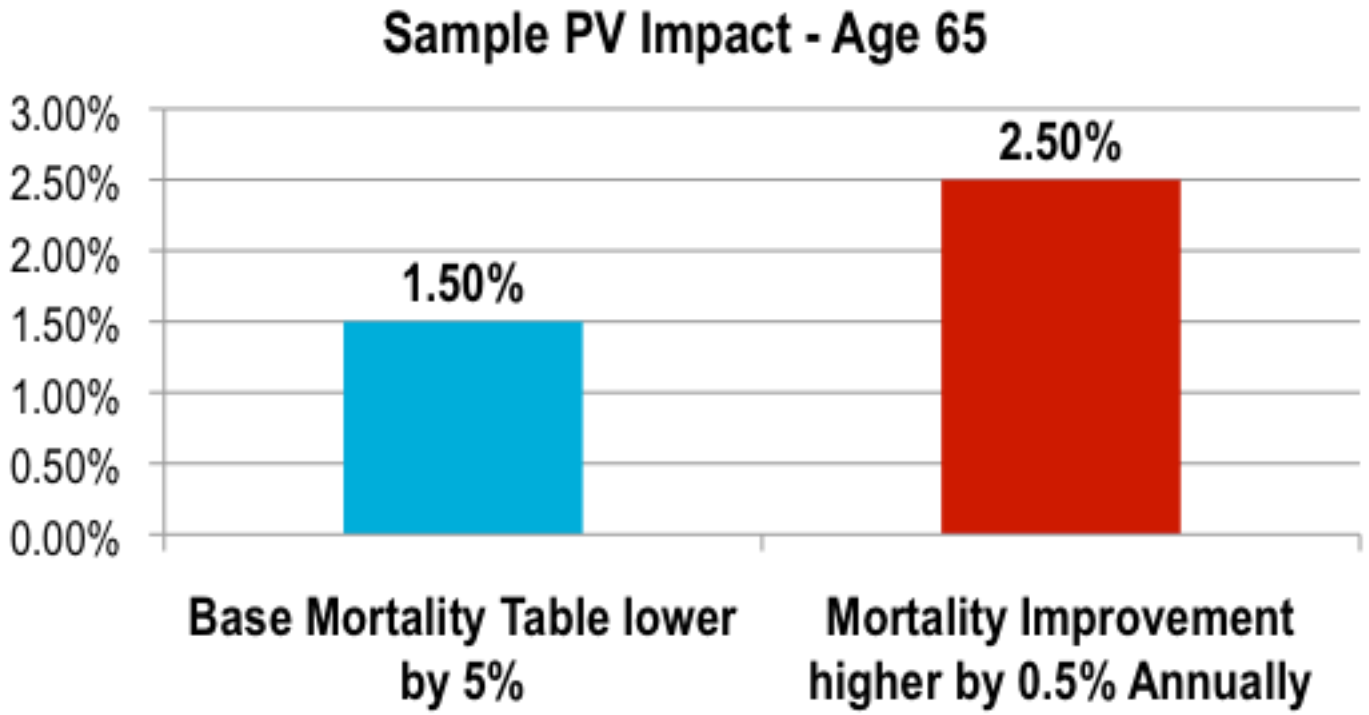
(2) Asset Default

(3) Asset-Liability Mismatch (Interest Rate)

Longevity Risks

(a) **Initial Mortality Rates lower than expected**

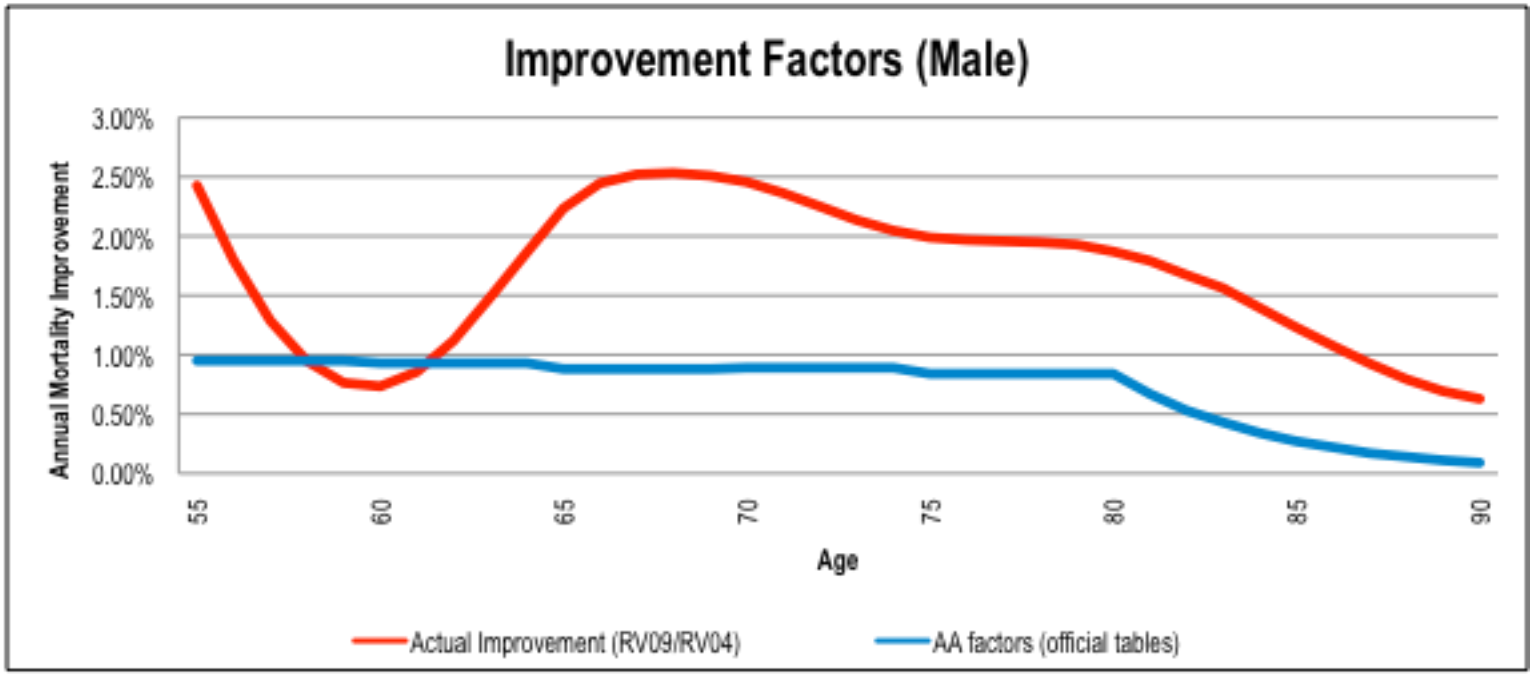
(b) **Mortality rates improve (decline) faster than expected**



All calculations are illustrative approximations using various mortality basis and a 3.5% discount rate.

Longevity Risk: Chilean example

Actual vs. Projected Improvement: RV 2004 vs. RV 2009 table



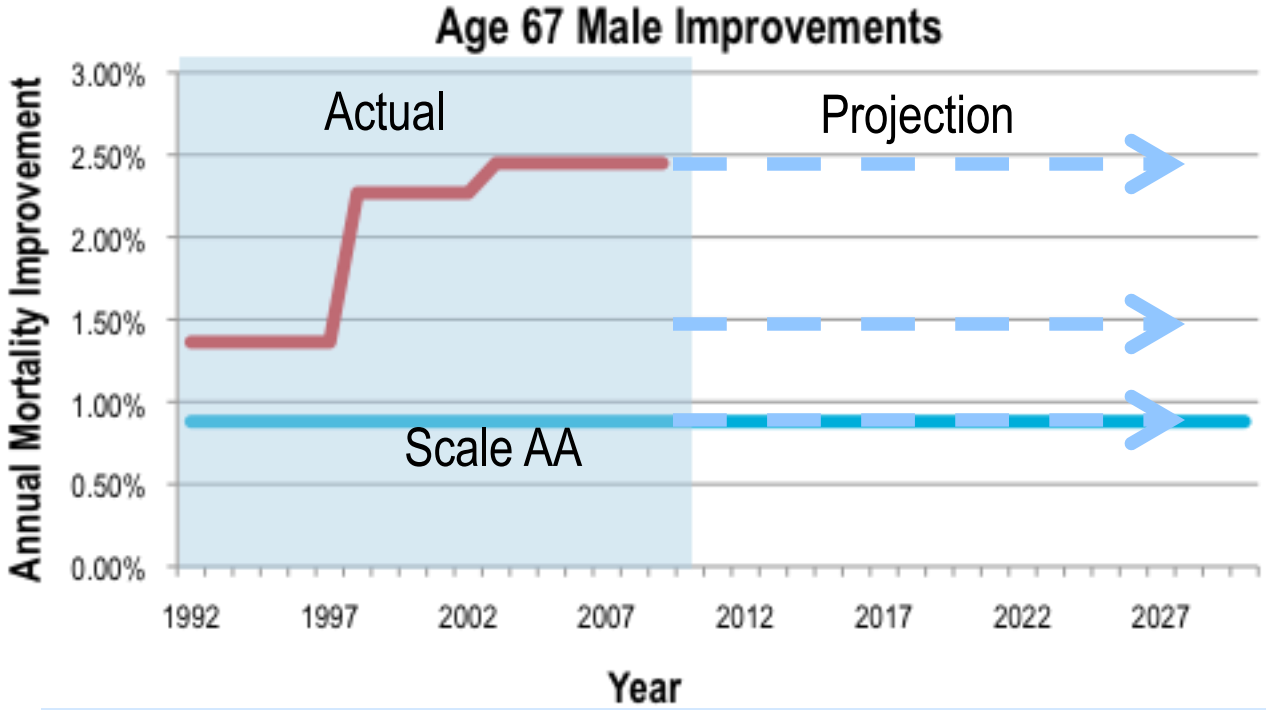
Approximate PV Impact	Age 65
Impact of '04-09 Actual vs. Projected	+ 2.0%
Additional impact if difference persists	+ 5.0%

Source: Implied improvements from official tables RV 2004 and RV 2009

Longevity Risk: Chilean example

A longer look at history…

Approximate comparison of historical averages vs. projection



If you were an insurer, what would you project?

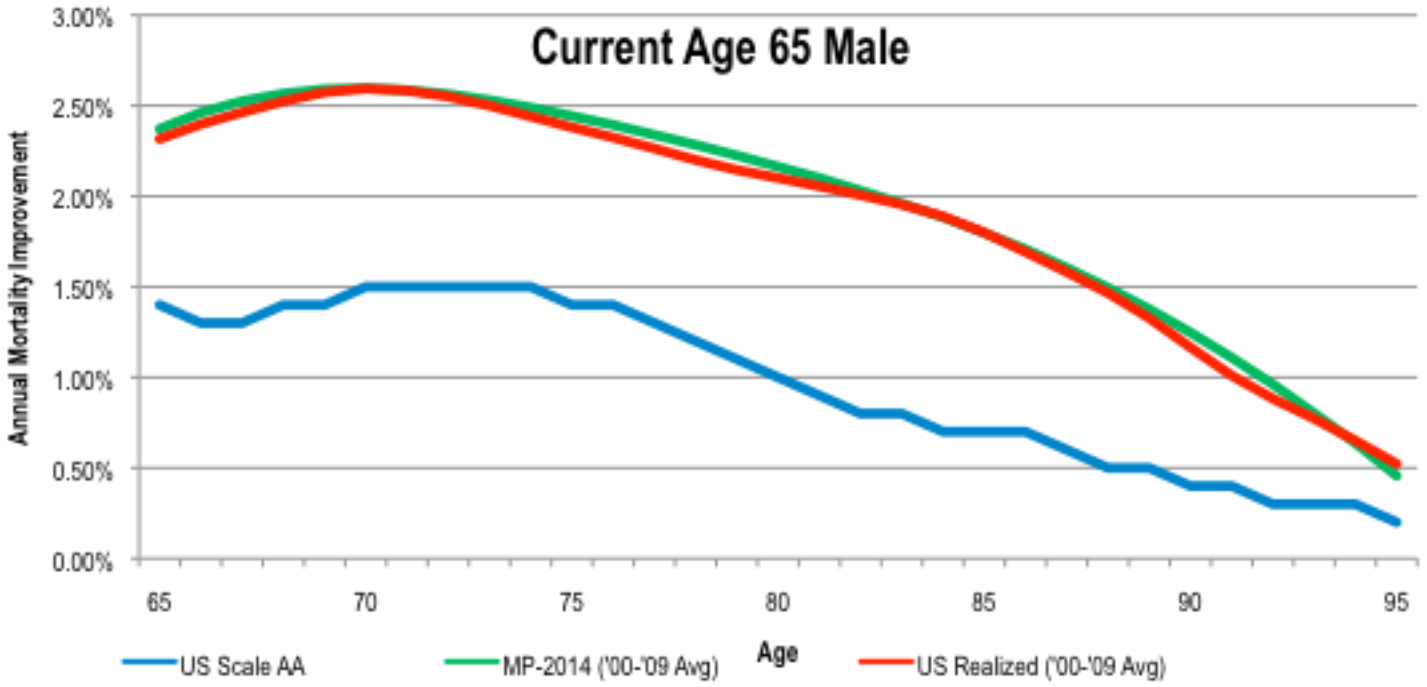
Approximate PV Impact	Age 65
Increase scale by 0.5%	+ 2.0%
Increase scale based on last 5-10 years	+ 5.0%

'92-'02 Source: Implied improvements from CELADE (Demographic Bulletin Nº 74, July 2004)

Longevity Risk: U.S. Example

A similar experience

U.S. Scale AA was far insufficient compared to the new SOA mortality table and projection scale.



Sample PV Impact - Male	Age 65
Impact of new table vs. GAM94 w/ AA	+6.0%

All calculations are illustrative approximations using various mortality basis and a 3.5% discount rate.
US Realized Improvements based on SSA and HMD smoothed by Prudential

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Guiding Principles for Capital Requirements:
The Basics

Capital Adequacy Ratio =

$$\frac{\textbf{Available Capital:}}{\textbf{Required Risk-Based Capital}}$$

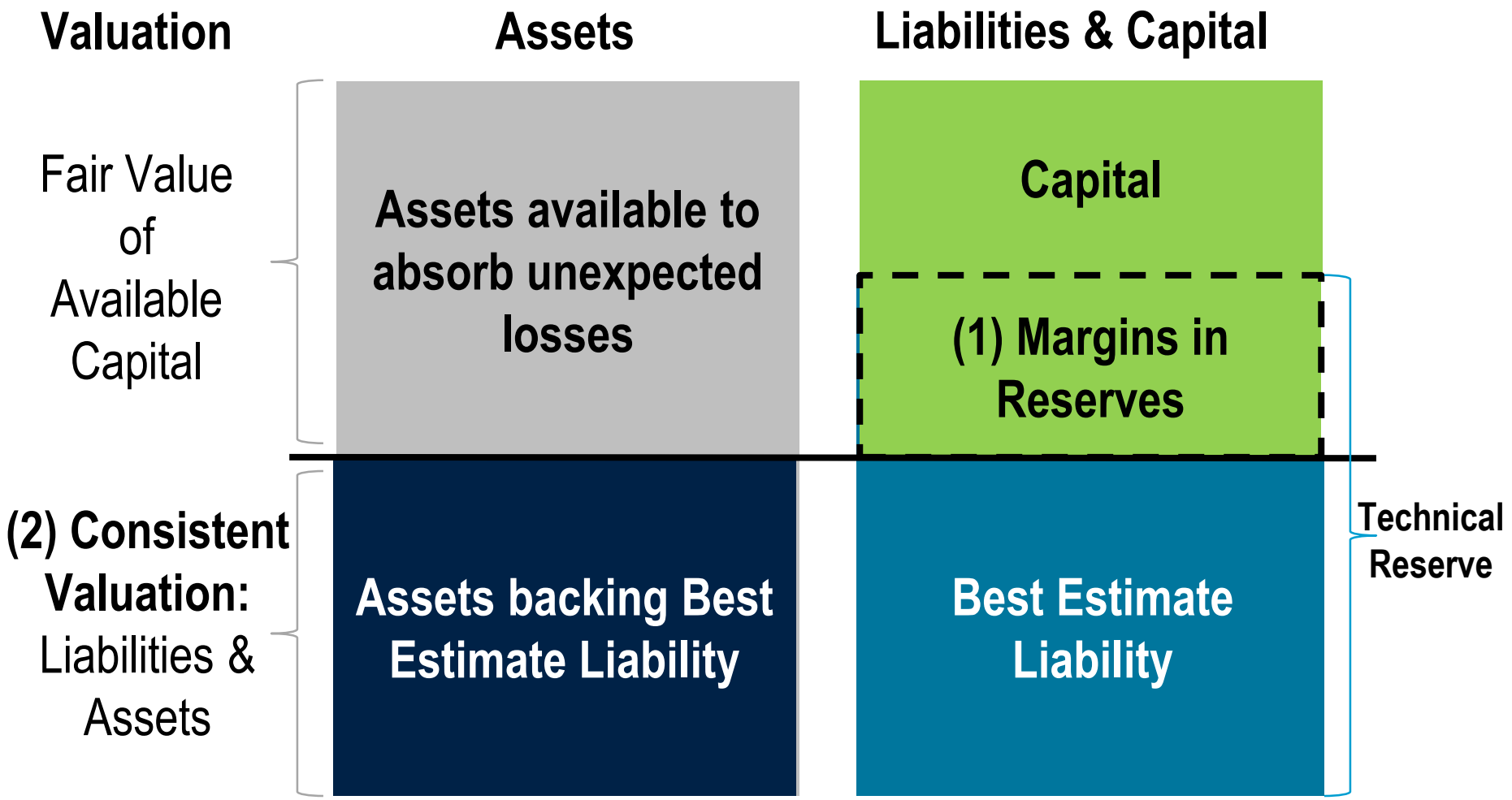
Available Capital:

How much capital is available to cover risks?

Required Risk-Based Capital

How much capital should be required, based on the risks?

Determining Available Capital:
How much capital is available to cover risks?



Summary Principles

Capital Adequacy Ratio =

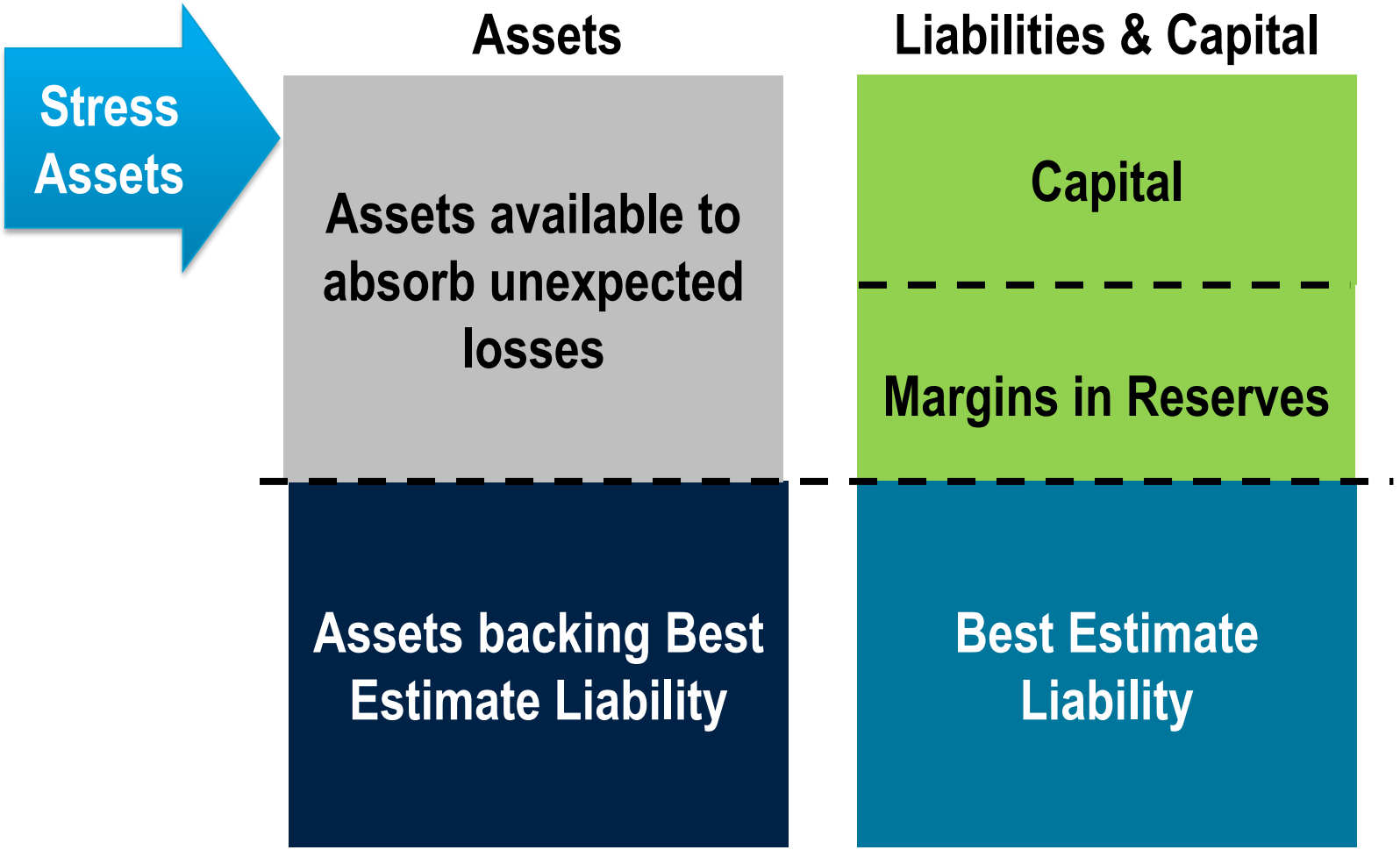
Available Capital

- Include Margins in Reserves through Best Estimate Liability calculation
- Consistent Valuation of liabilities and assets

Required Risk-Based Capital

- How much capital should be required, based on the risks?

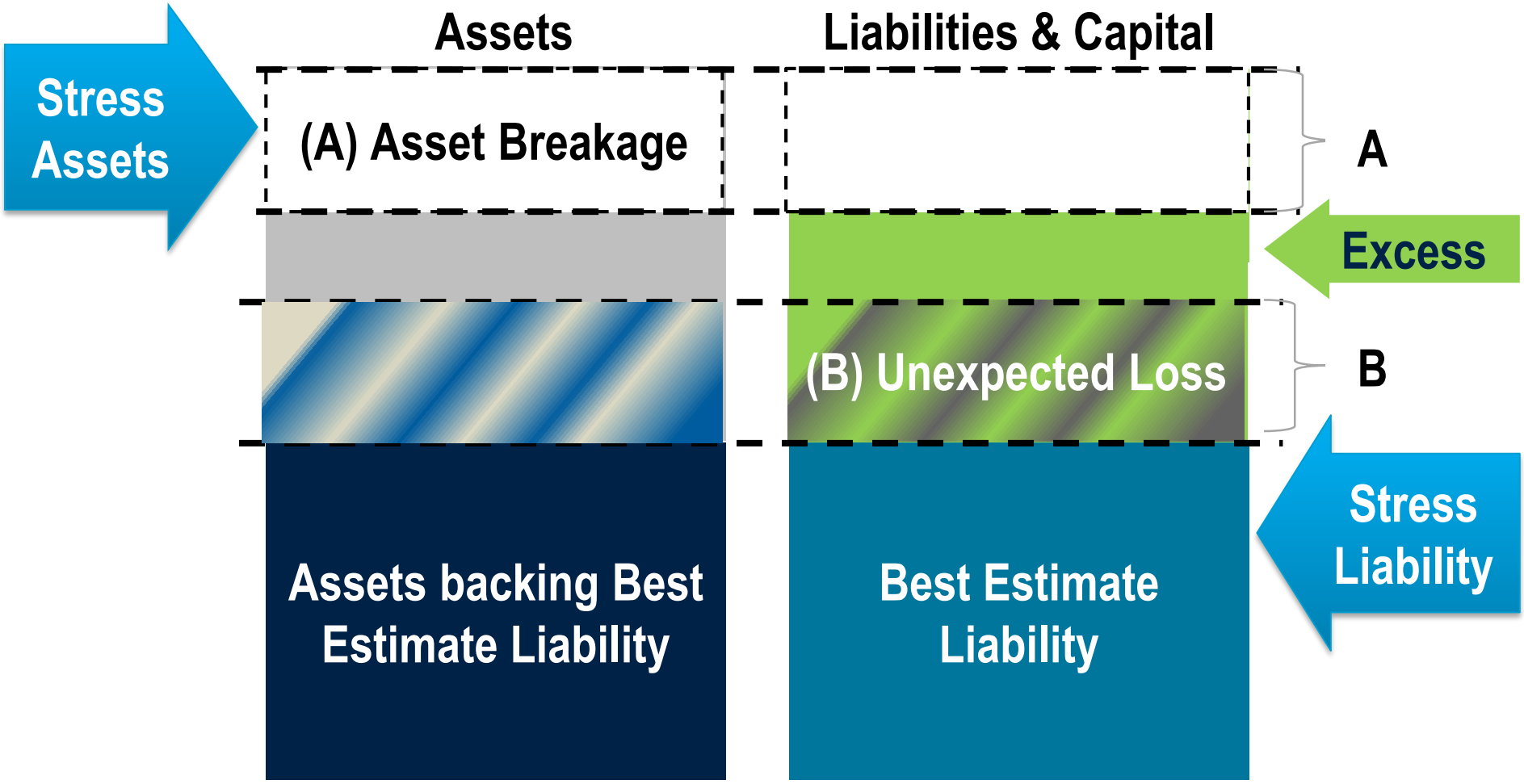
Determining Required Capital:
How much capital should be required to cover risks?



Determining Required Capital:

How much capital should be required to cover risks?

Required Capital = (A) Asset Breakage + (B) Unexpected Liability Loss



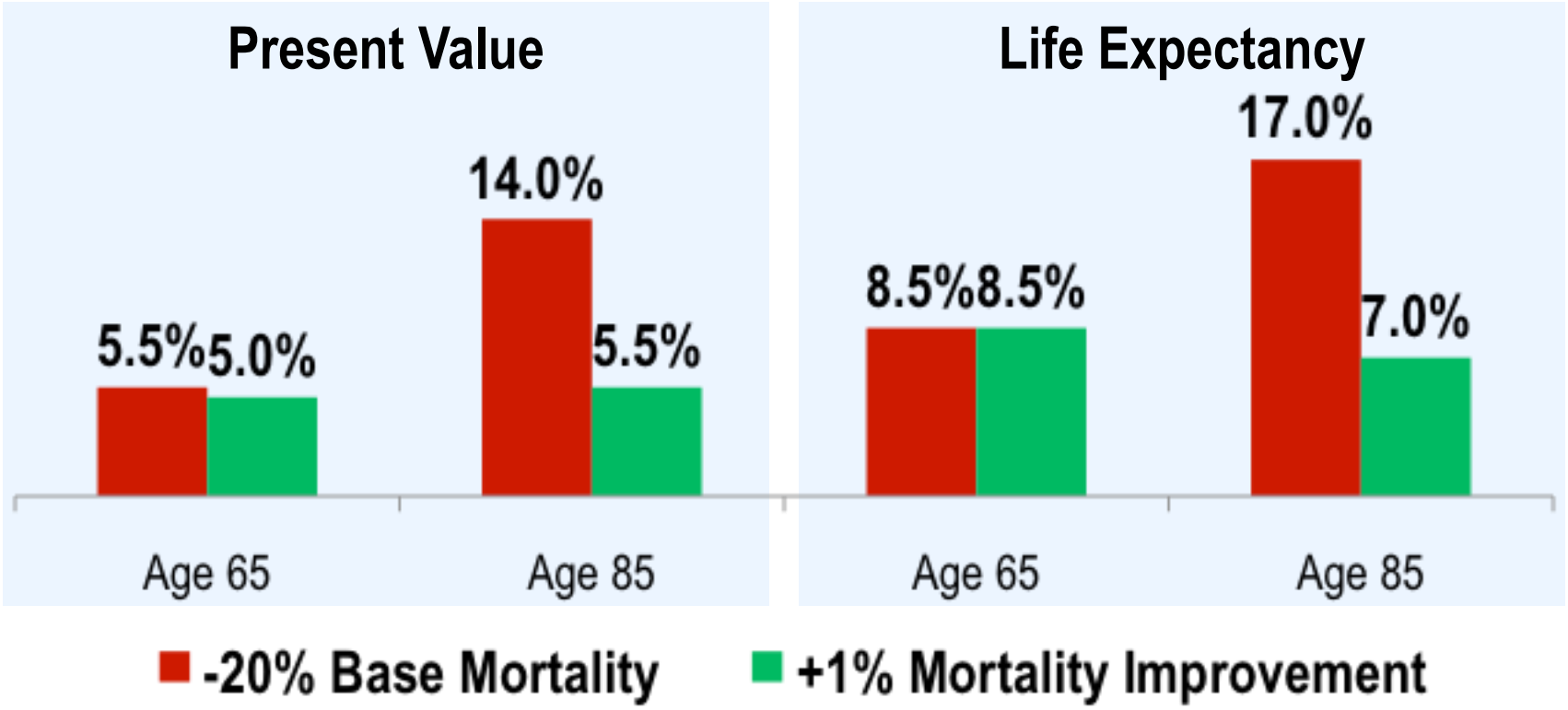
* Stresses include mortality, default, ALM mismatch, etc.

Determining Required Capital:
How much capital should be required to cover risks?

- RISK-based: reflect risks and how they are manifested
- Risk-sensitive stresses
  - Asset default: probability, severity, duration
  - Longevity shocks: focus on longevity improvement
  - Asset-liability mismatch: Interest rate shock
- Total with diversification
- Factor approach: caution

Determining Required Capital:
Longevity Risk

Longevity Risk Shocks	• Type of shock matters (Base vs. Mortality Improvement) • Difficult to calibrate Mortality Improvement shock • Consider multiple types of shock, level of independence



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Summary Principles

Capital Adequacy Ratio =

Available Capital

- Include Margins in Reserves through Best Estimate Liability calculation
- Consistent Valuation of liabilities and assets

Required Risk-Based Capital

- Risk-sensitive Stresses
- Longevity Improvement Shock

Determining Required Capital:
Annuity Example

Hypothetical Annuity	
Premium (Age 65)	100
Technical Reserve	100
Best Estimate Liability	95
Margin in Reserve	5

Capital Build-up	
Asset Default Risk	5
Longevity Risk	6
Asset-Liability Mismatch	3
Total before Diversification	14
Total Required Capital (After Diversification and Operational Risk)	10
Margin in Reserve	5
Additional Required Capital	5

Future Capital Requirements:
Progress in Chile

- **Regulators recognize current shortfalls**
- **Very good progress in drafting a Risk-Based capital framework**

Observations (from several thousand miles away)…

Insurers & Regulators	• Mortality improvement scale and risk • Actuarial Modeling Expertise
Insurers	• Pricing sufficiency?
Regulators	• Margins in reserves / best estimate liabilities • Priority / Focus

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Detailed Principles

Available Capital	**1.** A 'best estimate liability' (BEL)-based balance sheet, where **margins in reserves** over best estimate liabilities are counted in available capital
	2. **Consistency** in valuation of cash flows from BEL and assets supporting BEL
	A. Liability discount curve aligned with expected cash flow from asset portfolio
	B. Assets supporting insurance liabilities valued consistently (MV vs. BV)
	C. Market consistent valuation of all available capital
Risk-Based Required Capital	**3.** **Risk-Sensitive Determination of Required Capital:** reflect the risks to which an insurer is exposed, and the way these risks manifest themselves
	A. Asset Default based on accepted methods, linked to duration
	B. Longevity risk shocks focused on mortality improvement
	C. Interest rate shocks to capture asset-liability mismatch
	D. Total Required Capital calculated with Diversification and Operational risk

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