2010 Joint Regional Seminar

By Society of Actuaries, Faculty Institute of Actuaries, Institute of Actuaries of Australia

Pricing for Risks: Ideals and Reality

Presented by:

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Principal
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Agenda

- Review of pricing techniques in practice
- Pricing practice around the world: Overview of an SoA survey
- Illustrative case of impact of pricing techniques chosen
- Practical considerations

Common profit measures

- Internal rate of return (IRR)
- Return on equity (ROE)
- Return on asset (ROA)
- Premium margin (either before or after CoC)
- Break-even year
- Embedded value (TEV, EEV, or MCEV)
- Risk adjusted return on capital

Pricing for risks techniques

- Classic approach – deterministic with stress tests
  - Best estimate
  - Stress scenarios on various risk factors
  - Stresses can be based on historical experience
  - Somehow arbitrary

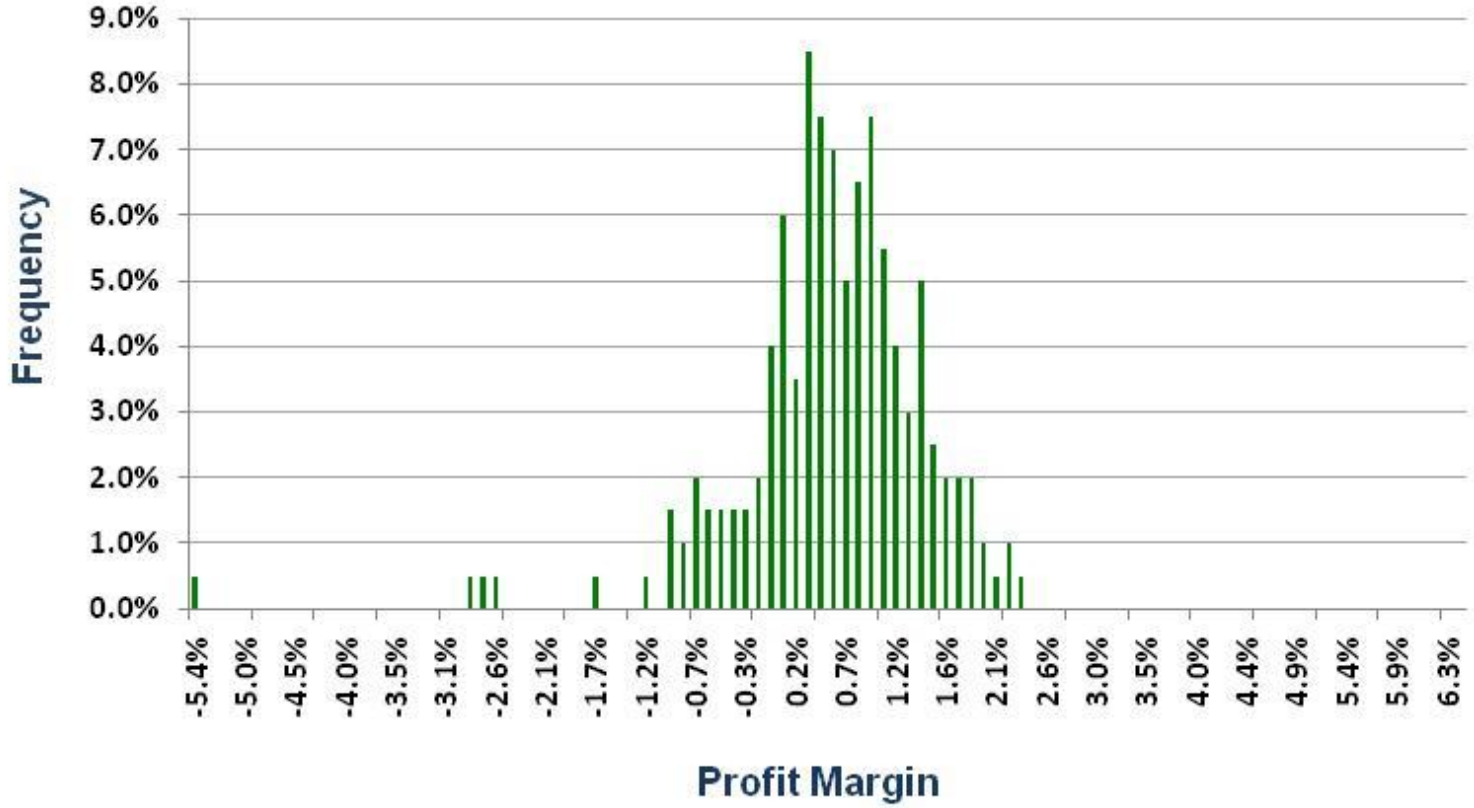
Pricing for risks techniques

- The rise of stochastic pricing
  - ALM mismatch is a source of potential loss
  - Products more complex due to embedded options
  - VA with GMXB mispricing and rise of VA
  - Minimum crediting rates in Universal Life and Annuity
  - Dynamic lapse behavior as an option
  - Rise of MCEV/Solvency II

Illustrative cases

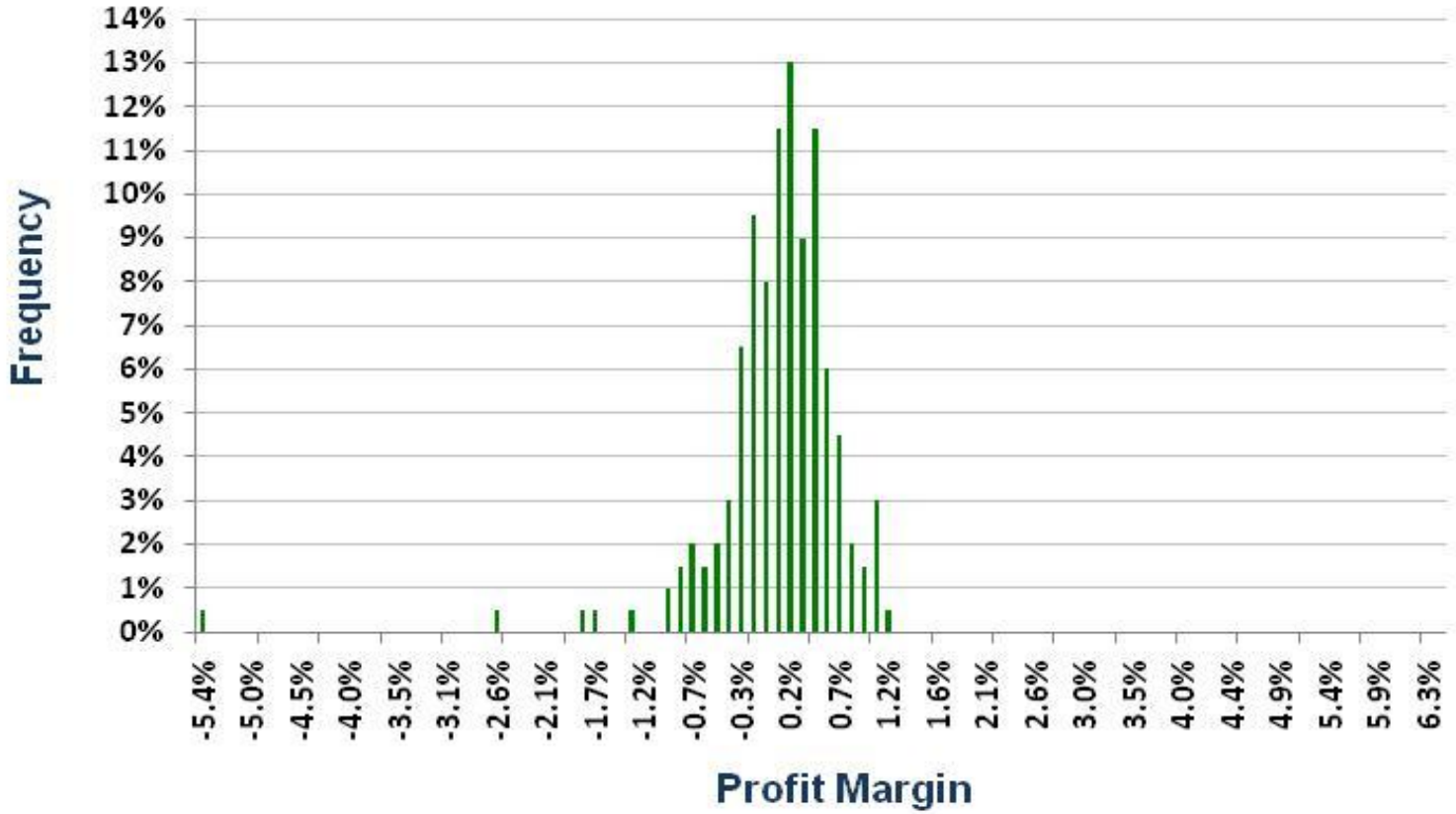
- Universal life product with 6-year maturity
  - Look at pretax profit margin
    - ✓ PV Profit/PV Premium
    - ✓ Stochastic interest rate model – 200 scenarios
  - Impact of
    - ✓ Dynamic lapse
    - ✓ ALM mismatch

Case 1 - Investing in 5-year Bonds without Dynamic Lapse

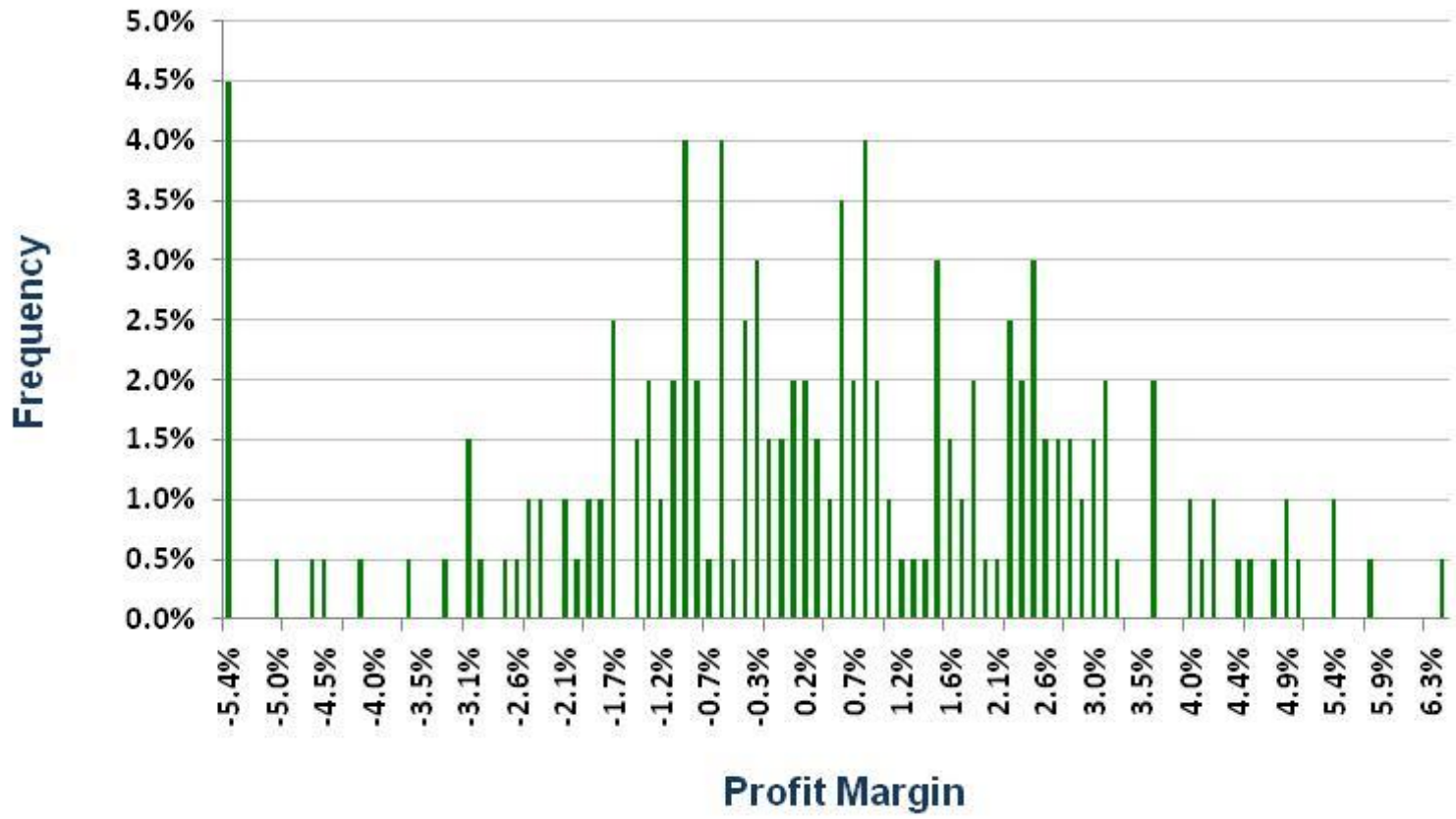


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Case 2 - Investing in 5-year Bonds with Dynamic Lapse



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Case 3 - Investing in 10-year Bonds with Dynamic Lapse
Frequency
5.0%
4.5%
4.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
-5.4%
-5.0%
-4.5%
-4.0%
-3.5%
-3.1%
-2.6%
-2.1%
-1.7%
-1.2%
-0.7%
-0.3%
0.2%
0.7%
1.2%
1.6%
2.1%
2.6%
3.0%
3.5%
4.0%
4.4%
4.9%
5.4%
5.9%
6.3%
Profit Margin

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Illustrative cases

- Observations
  - Dynamic lapse “dampens” the upside
  - ALM mismatch greatly expands diversion of results
  - Both are risks must be tested and pricing allowed for
  - Deterministic projection can be too simplistic
  - Have to decide a threshold,
    - say 75% chance to make money?
    - The rest of the risk, leave to capital support

Pricing for risk survey highlights

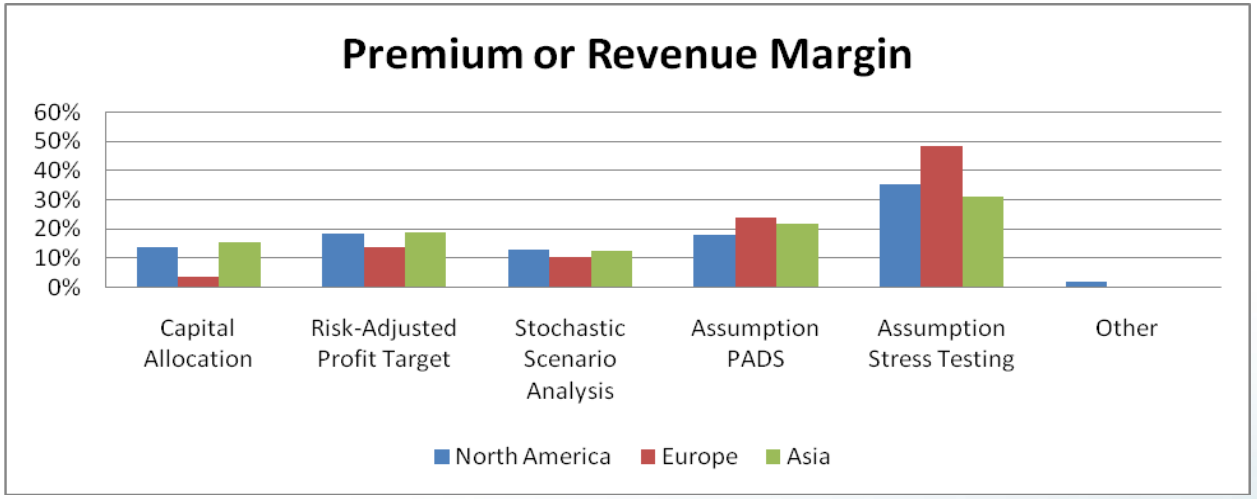
- 2010 survey for SoA/CAS/CIA conducted by Milliman
- 374 participating companies globally
  - 76% parents in North America
  - 15% Europe
  - 8% Asia

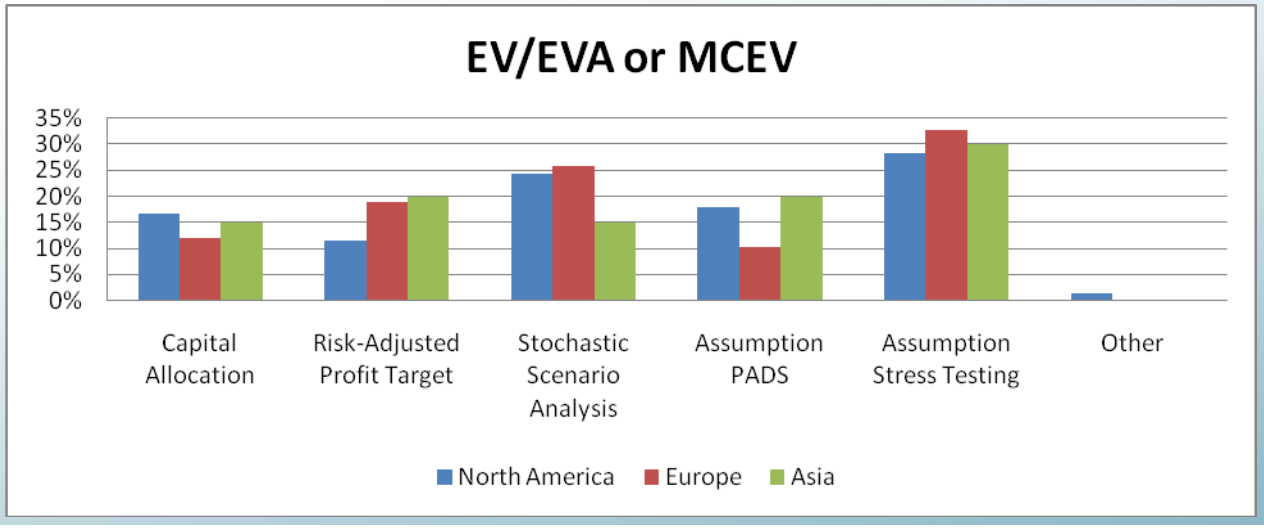
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Which profit measure ranks first?

Profit Measures - Life	North America	Europe	Asia
Return on Investment	6	7	13
Return on Equity	*4*	*6*	*10*
Return on Liabilities	14	-	-
Risk Adjusted Return on Capital	8	**3**	7
Premium Margin	***2***	*8*	***1***
Embedded Value/Economic Value Added	5	**1**	4
Expected Loss Ratio	15	-	15
Combined Loss Ratio	-	-	14
Break Even Year	***3***	*9*	***2***
Internal Rate of Return	***1***	***2***	***3***
Return on Assets	13	-	8
Return on Capital	10	-	9
Contribution to Surplus	7	9	6
Revenue Margin	12	11	12
Market Consistent Embedded Value	9	4	5
Other	11	4	11

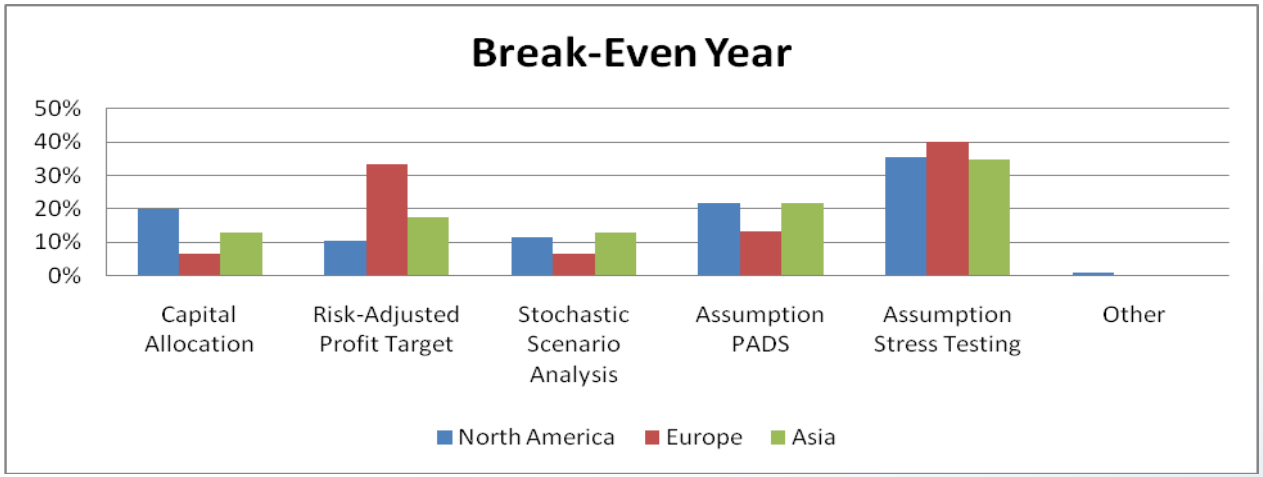
How risks are reflected in given profit measure?

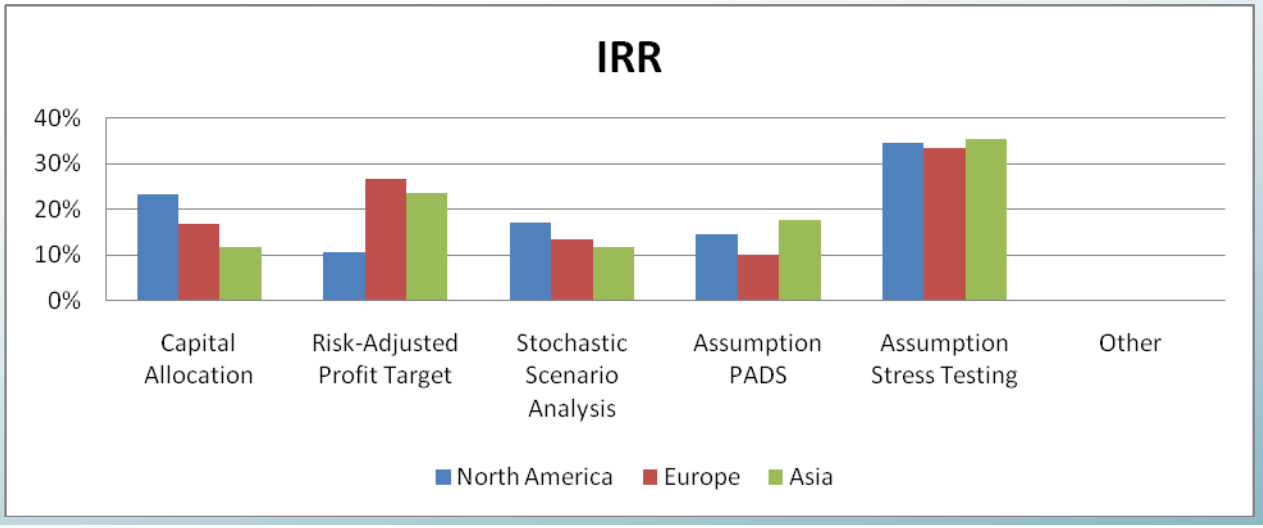




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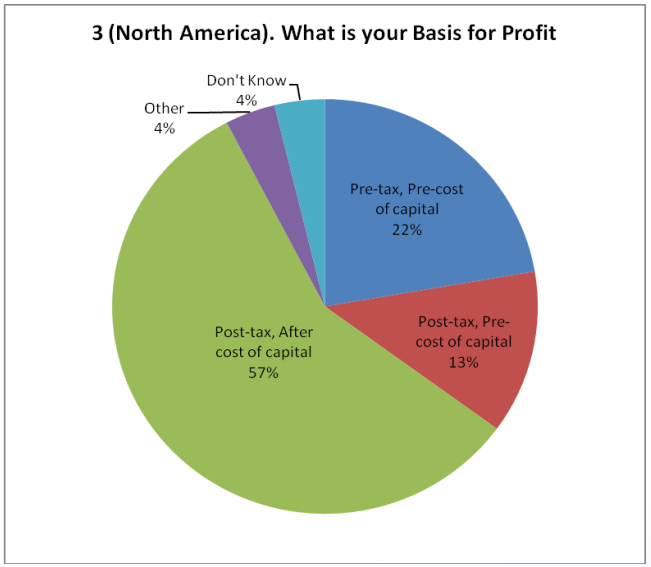
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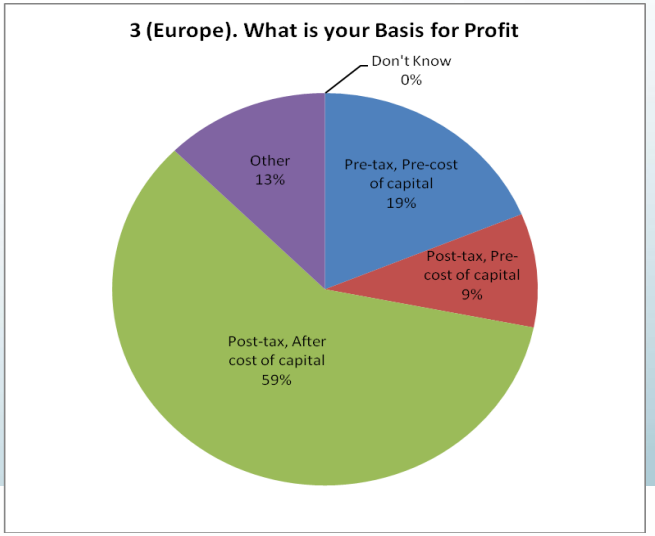


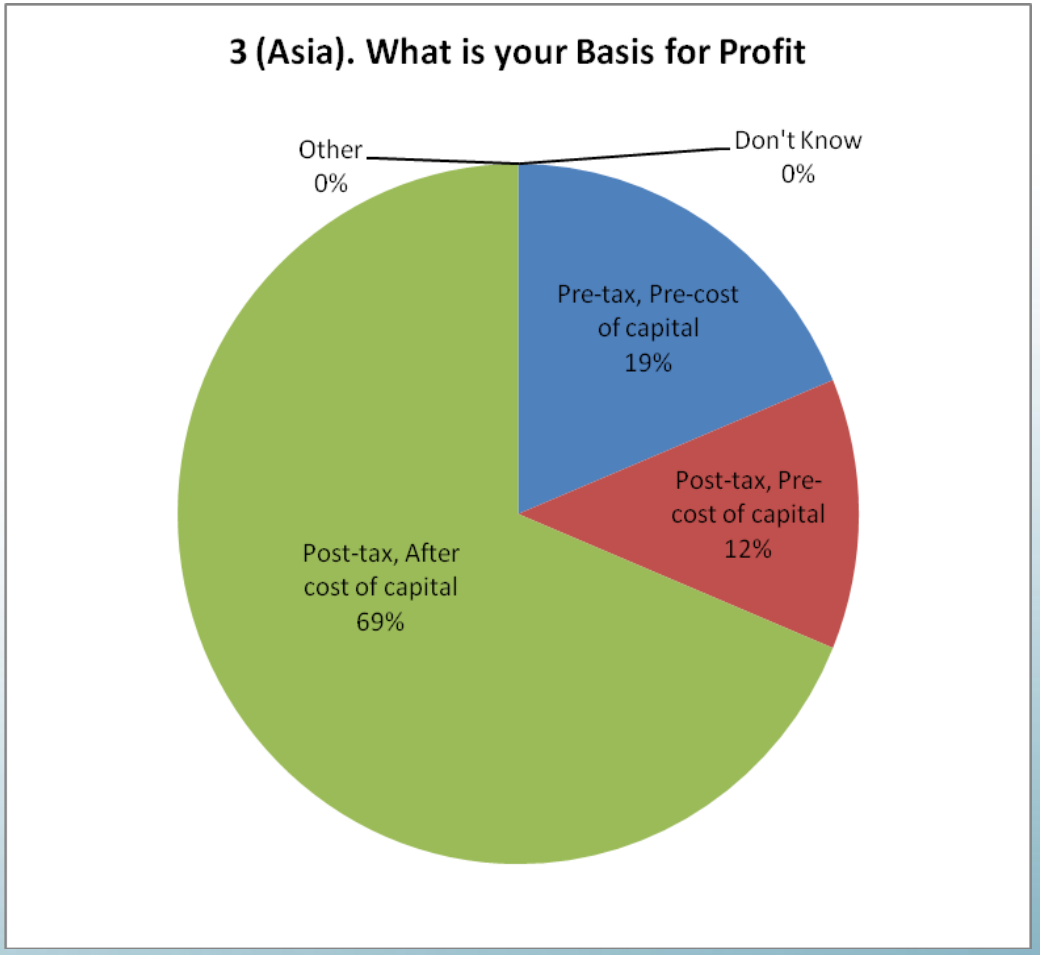


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What is the profit basis?

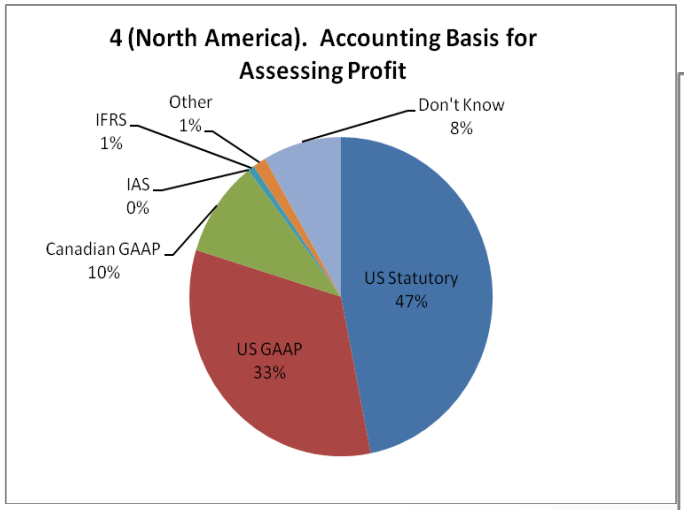


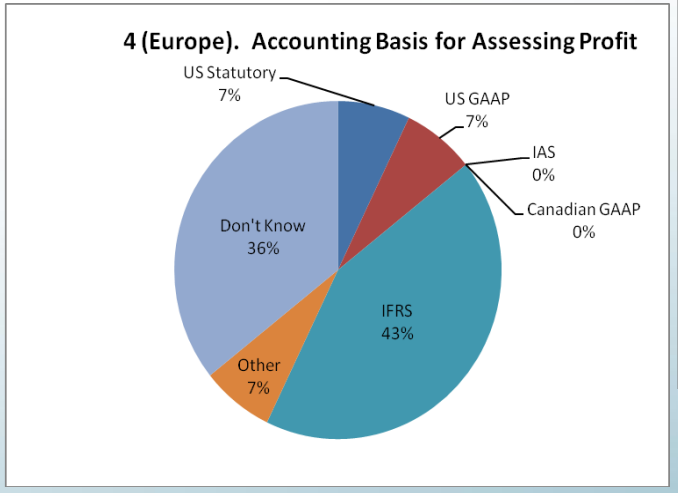


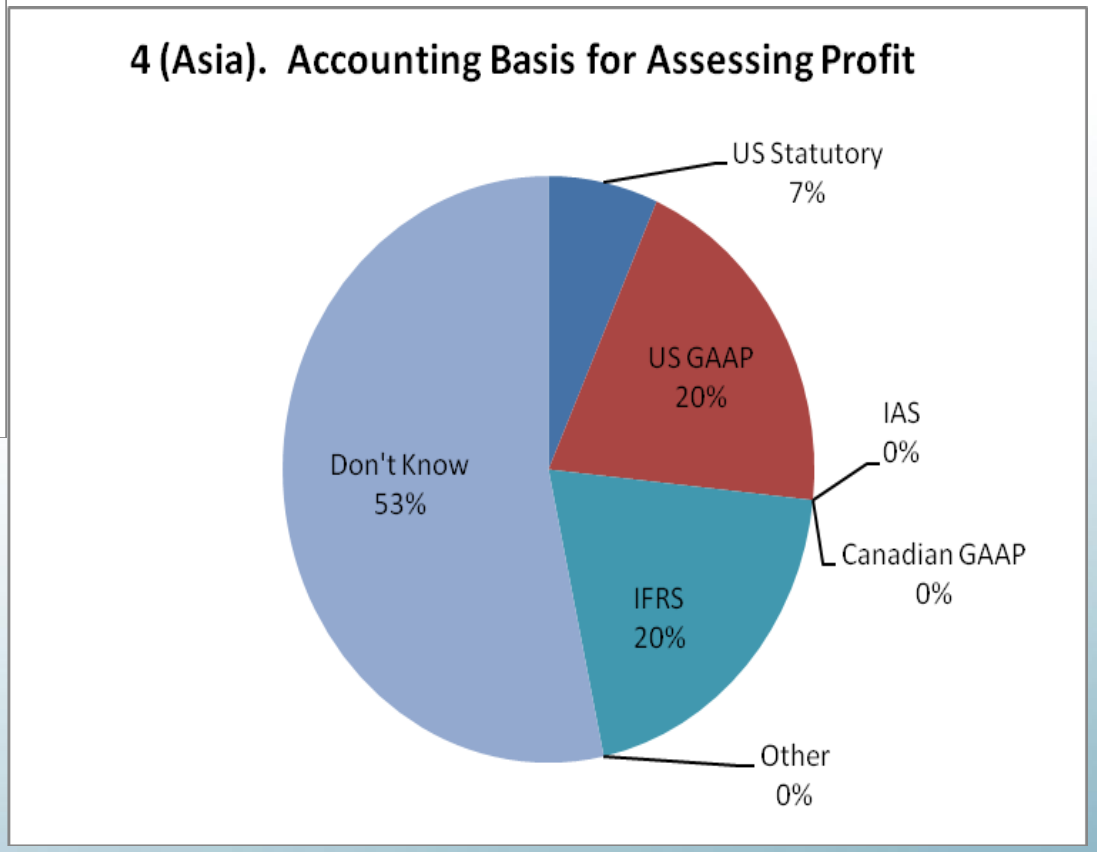


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What accounting basis?

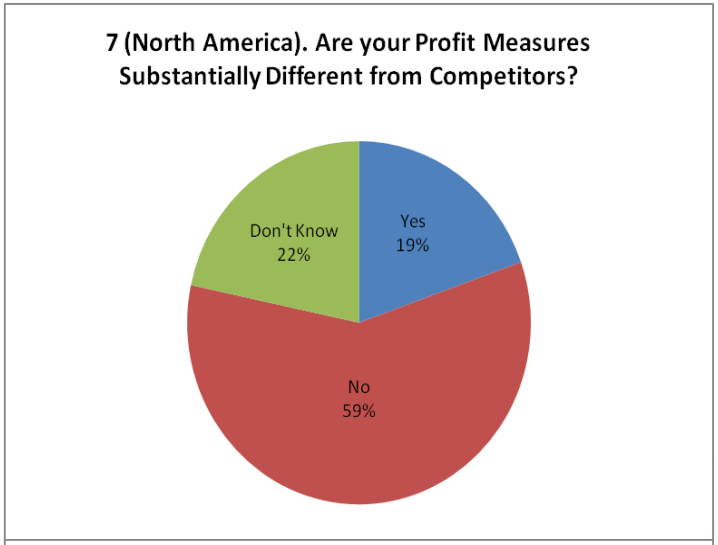


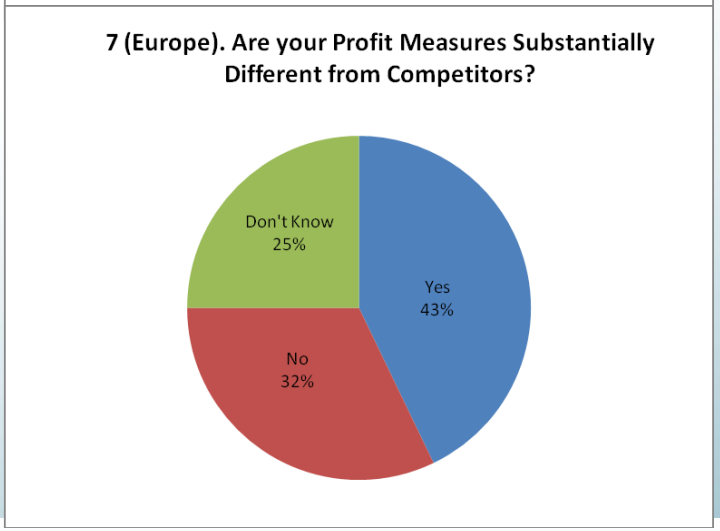


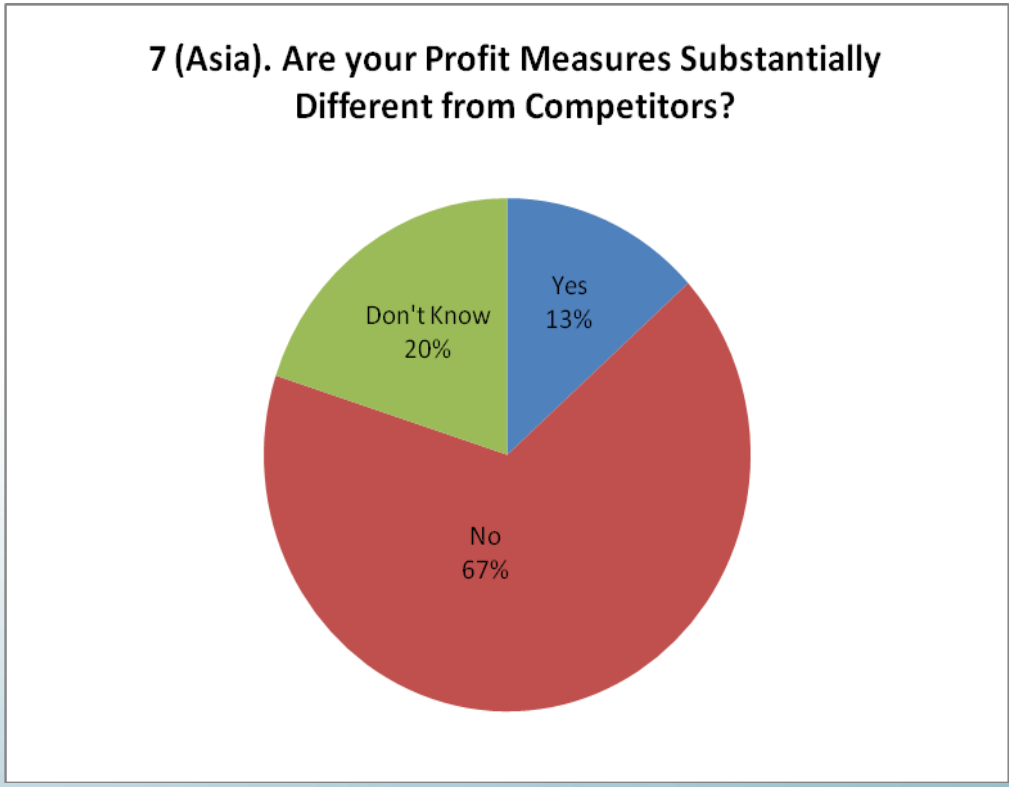


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Competitor uses a different profit measure?

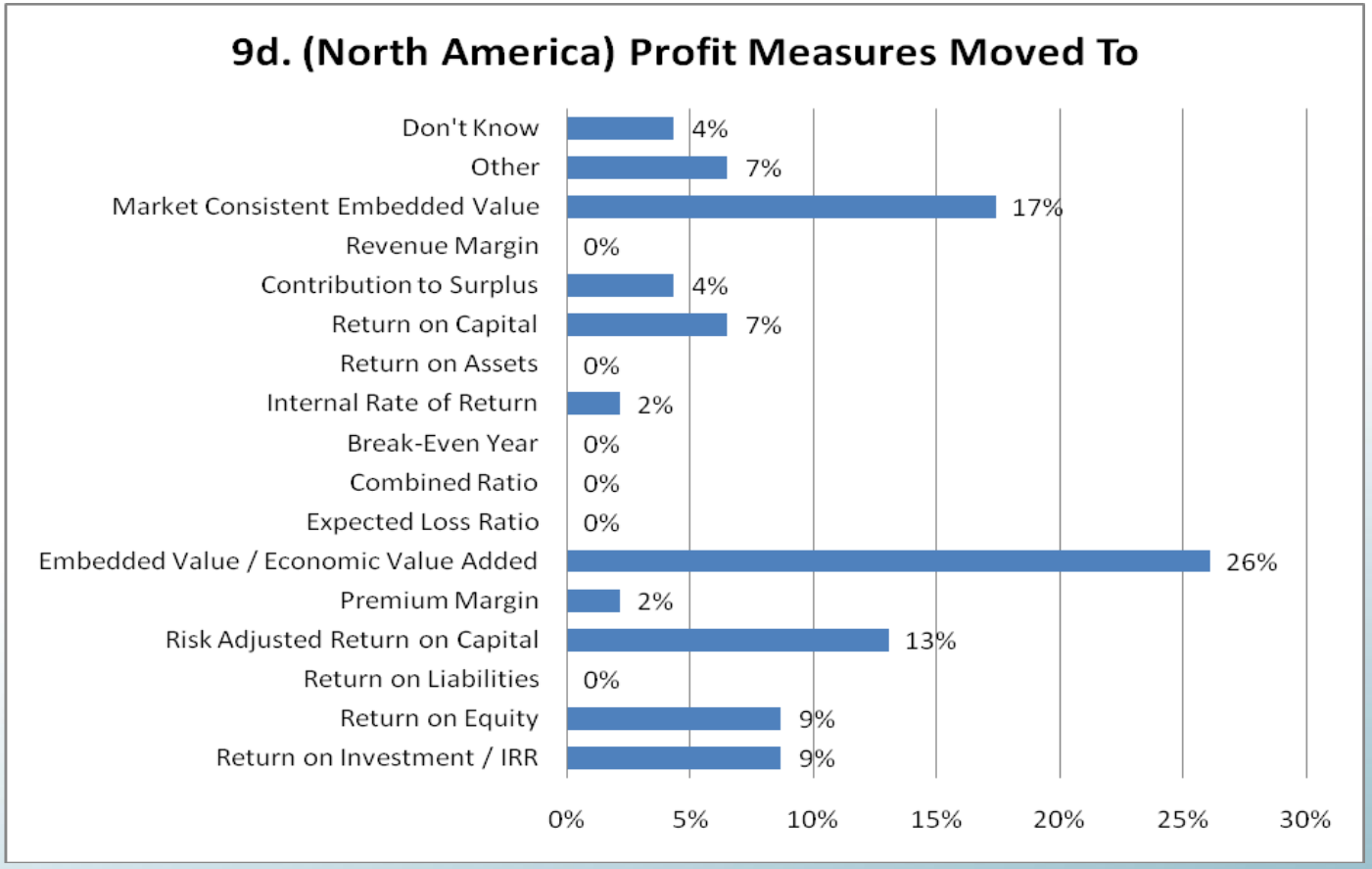






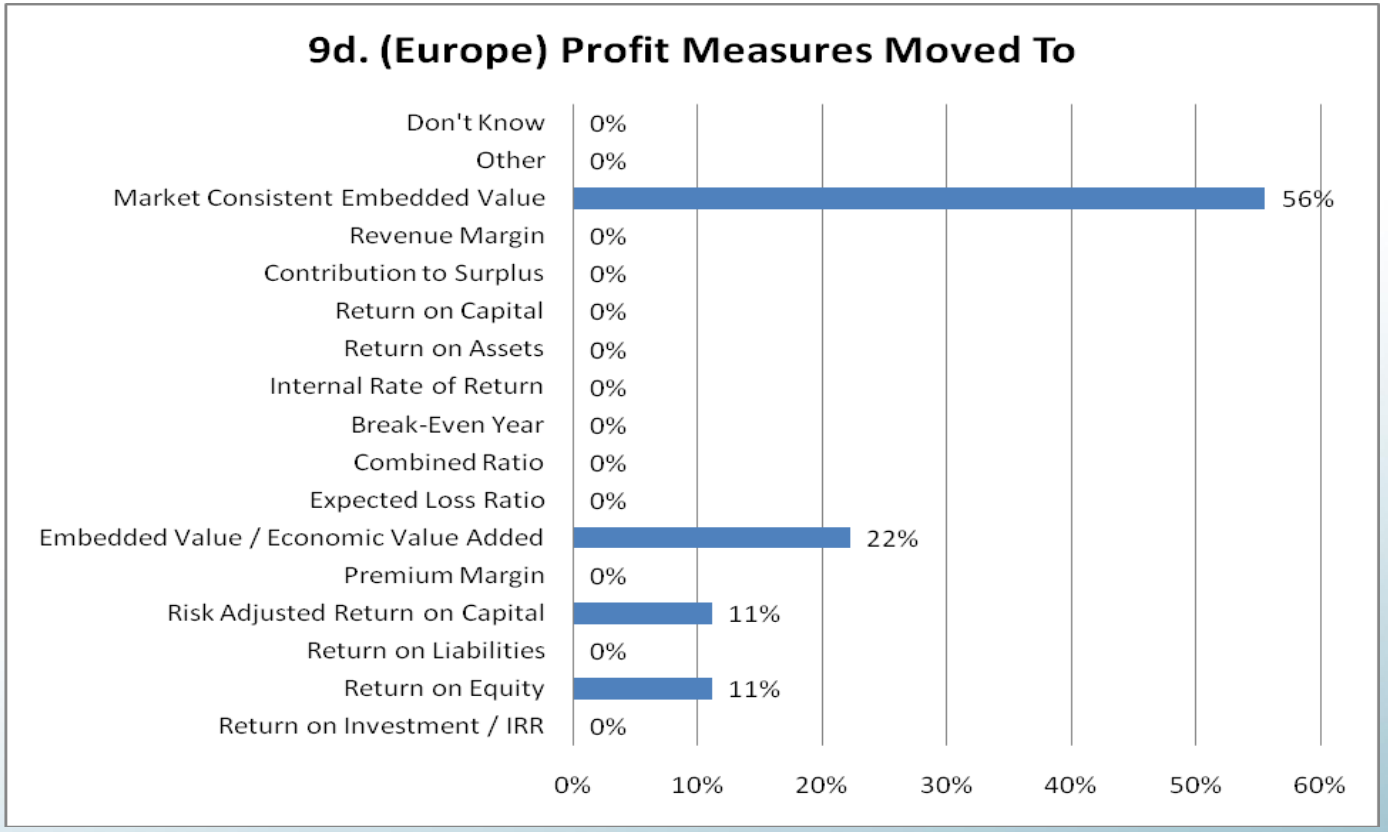
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Financial crisis makes you change profit measure?



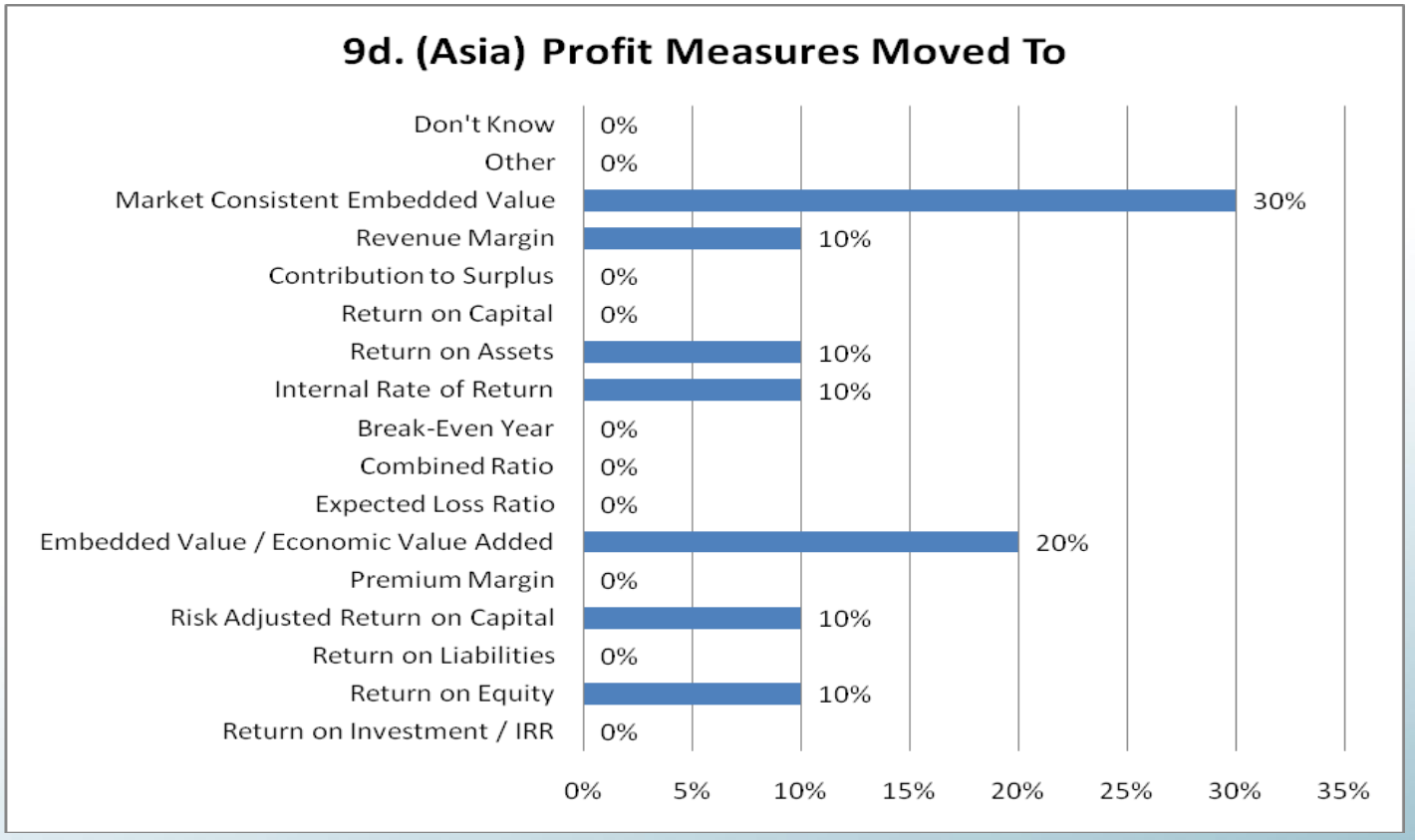
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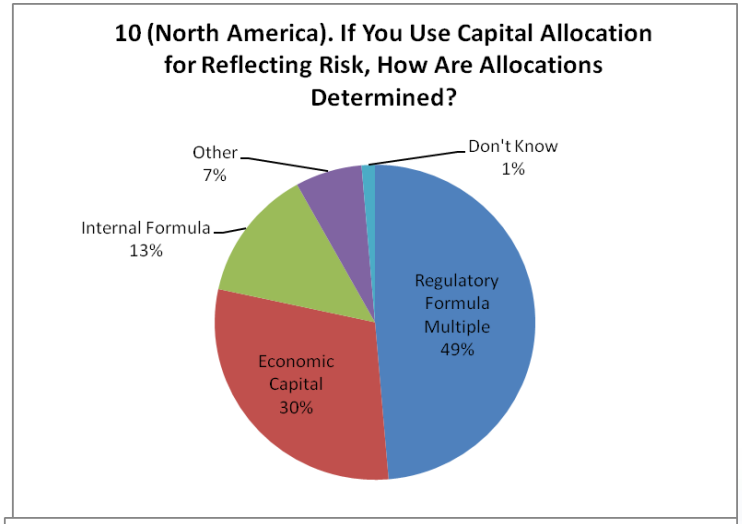
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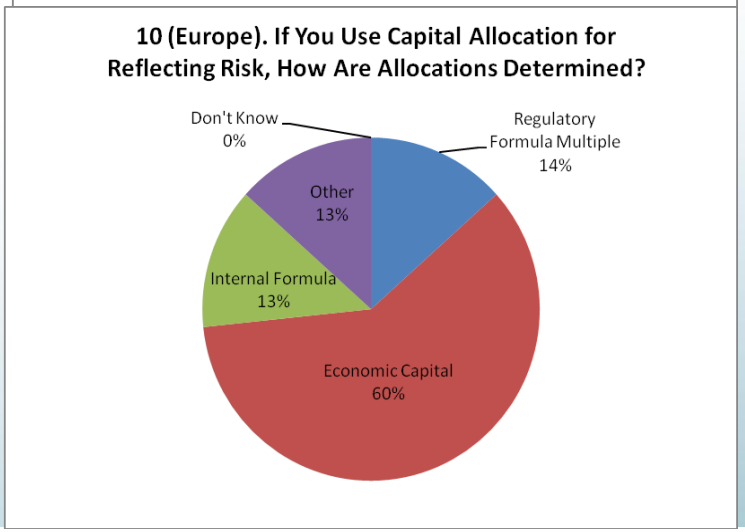
Financial crisis makes you change profit measure?

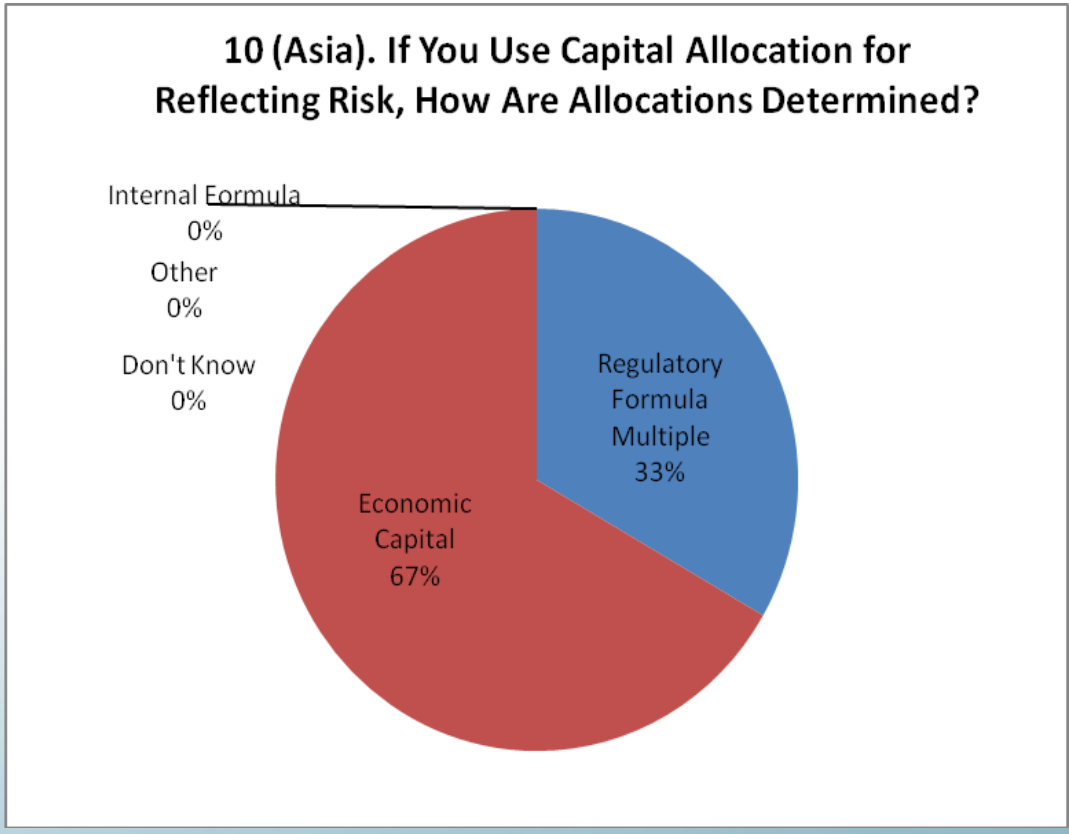


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What capital basis?

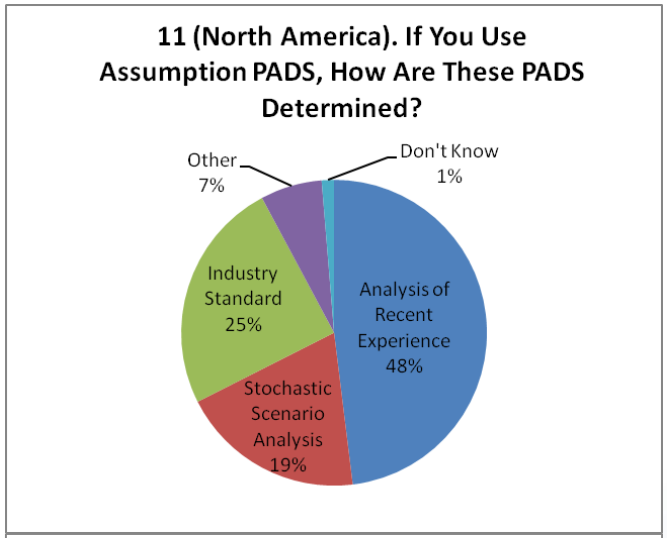


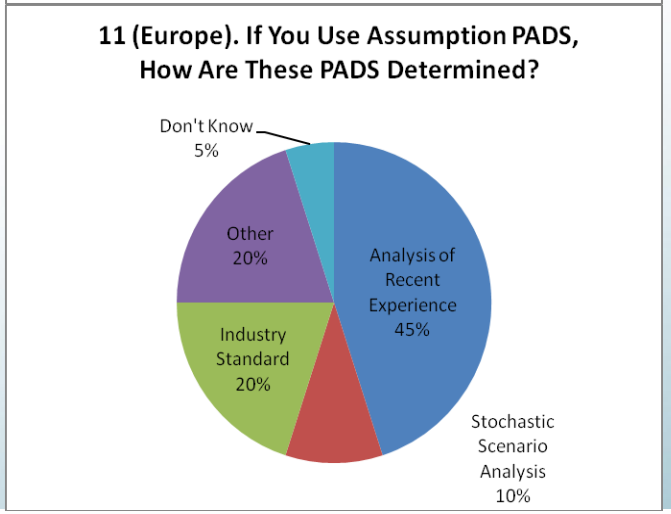


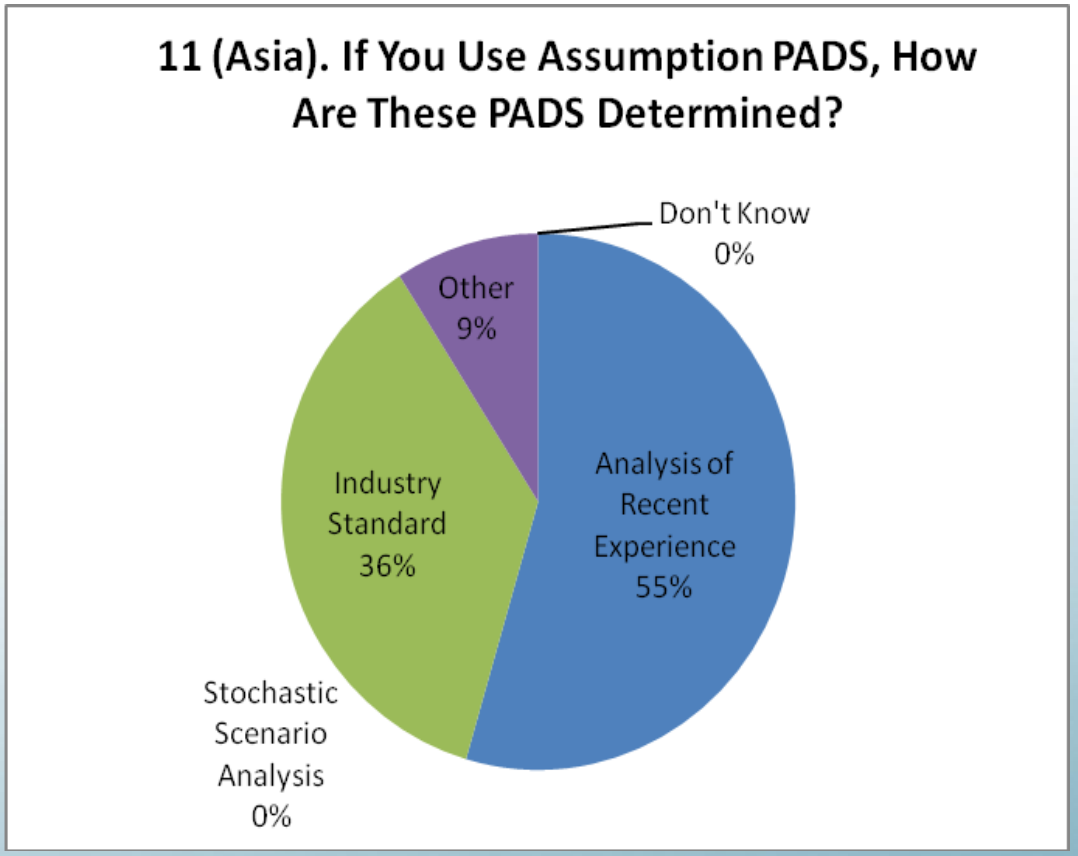


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How to decide assumption PAD?

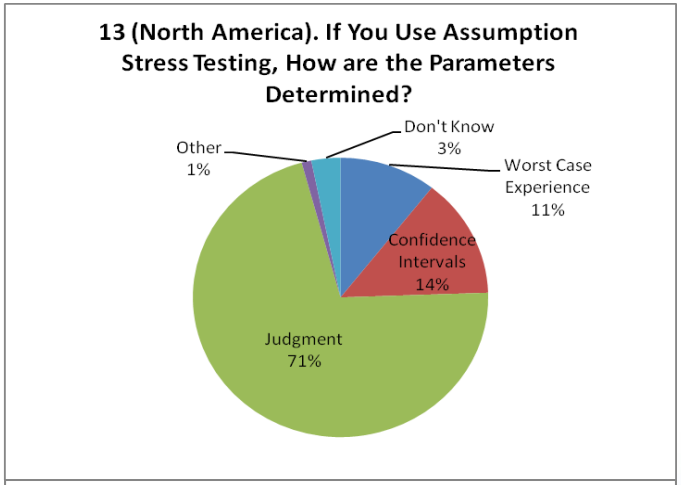


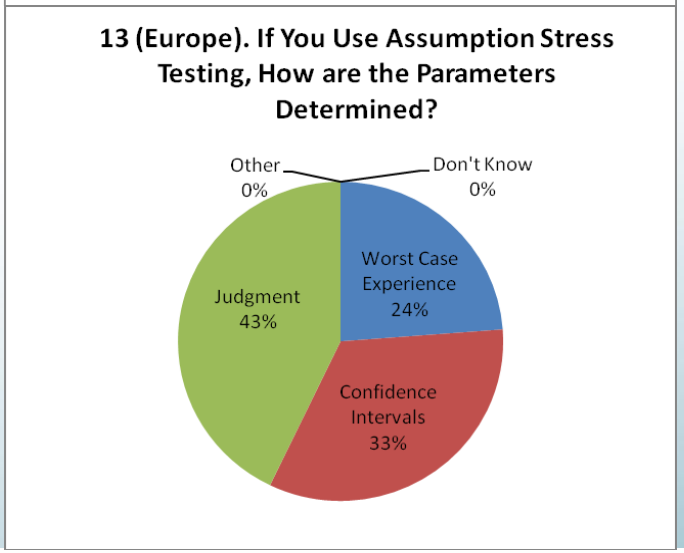


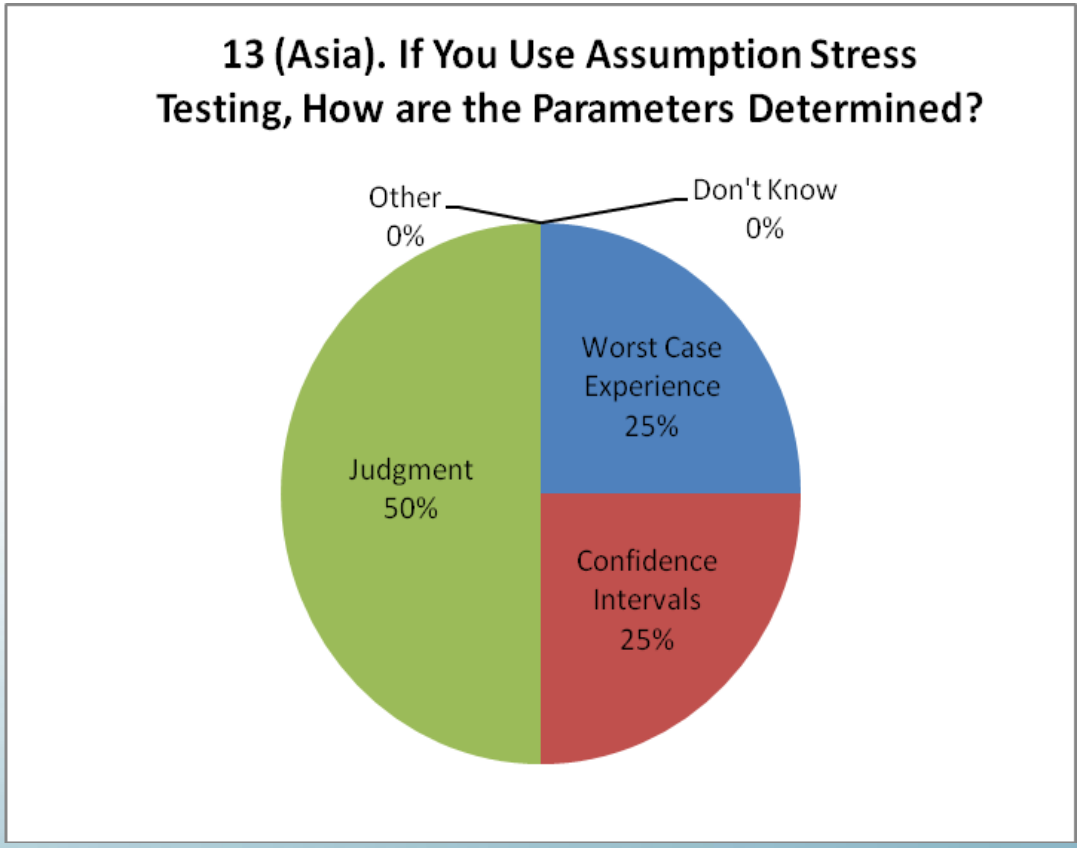


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How stressful is stress test?

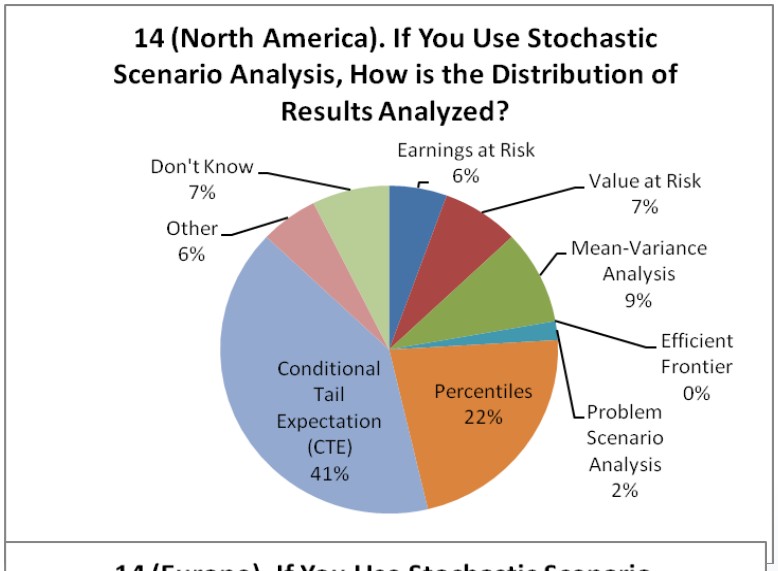


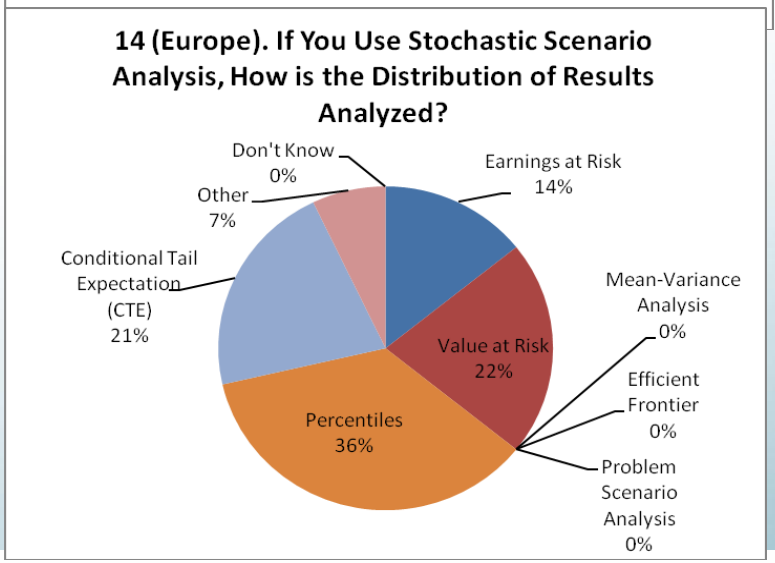


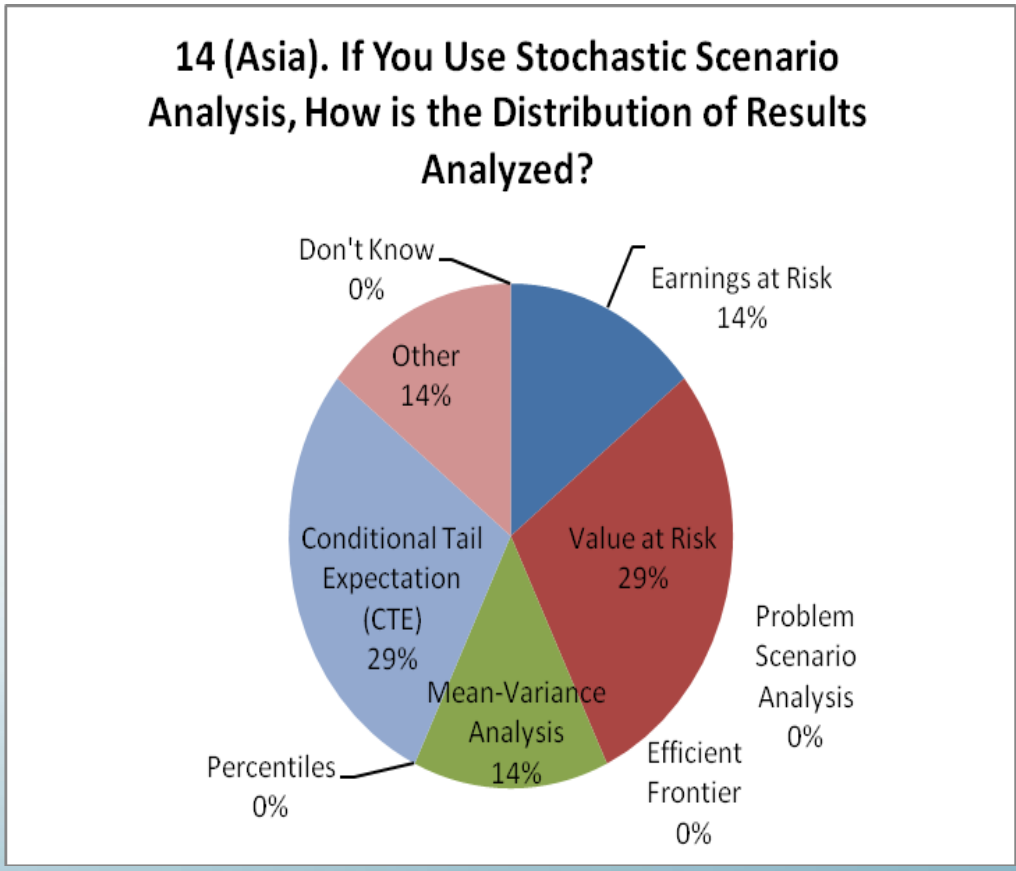


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What stochastic measure to use?

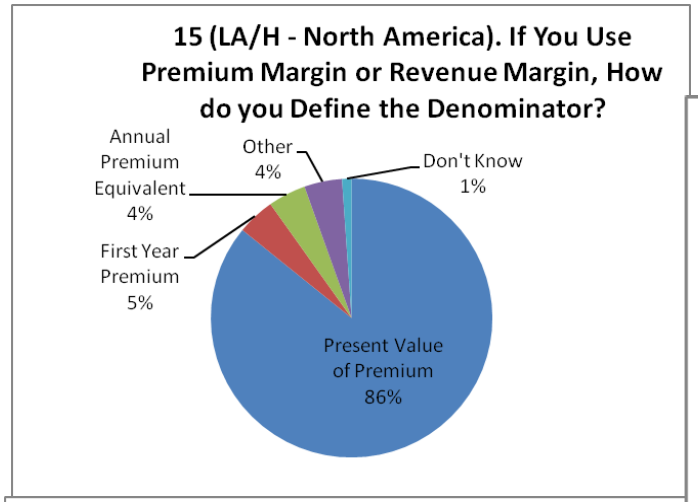


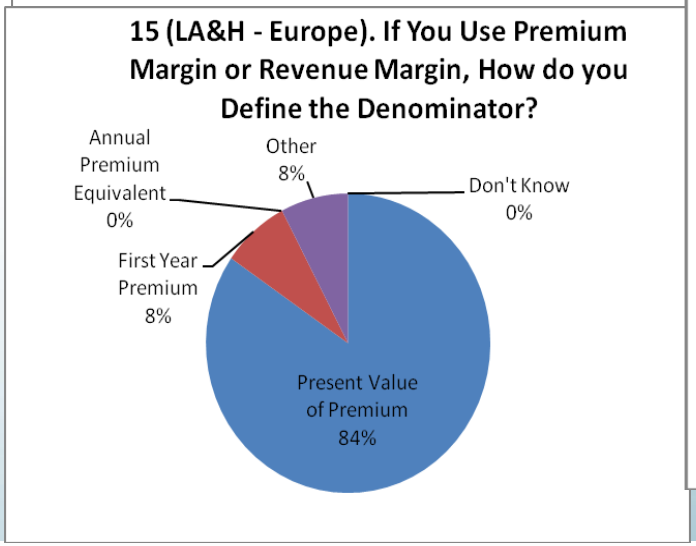


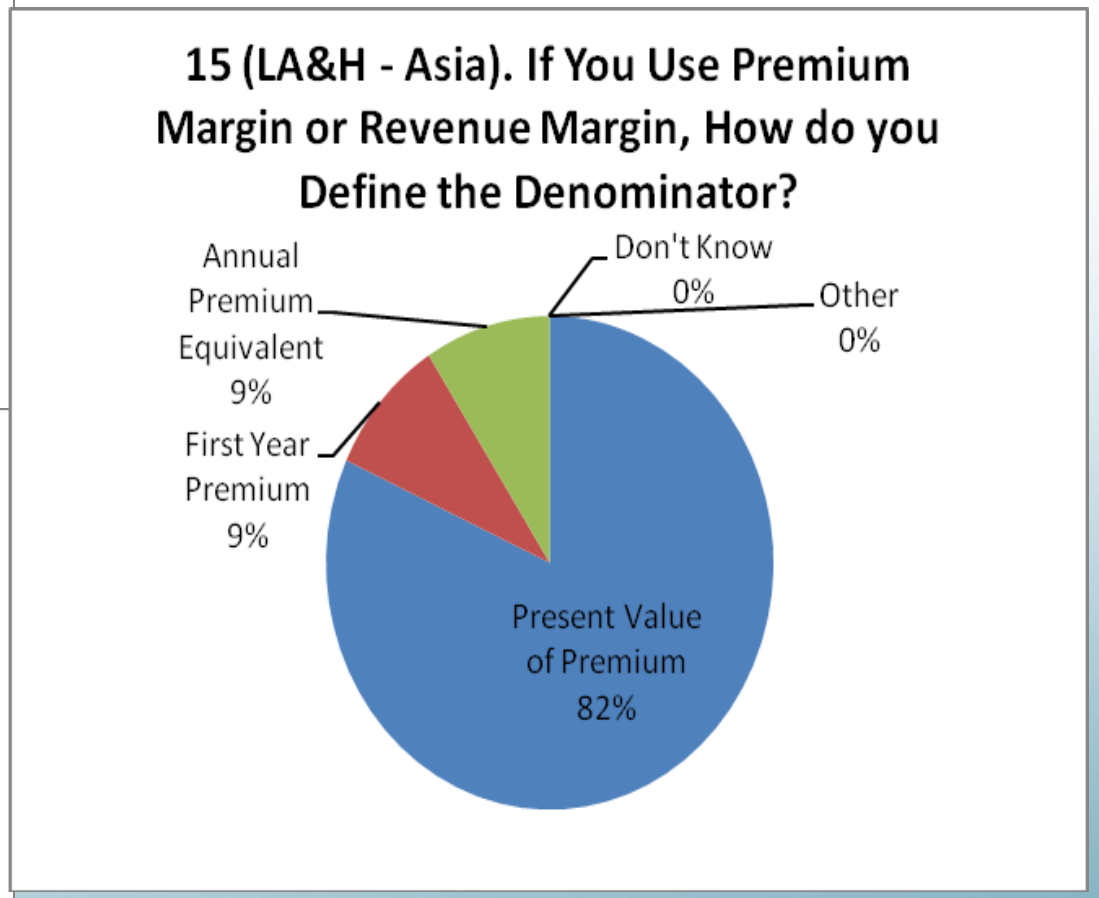


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What is the “premium” in premium margin?

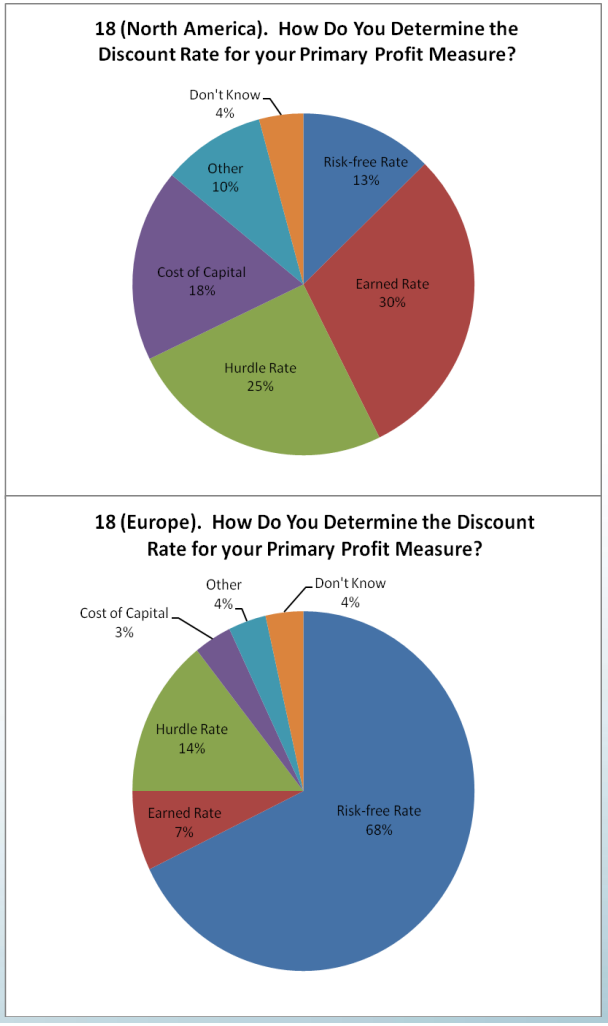


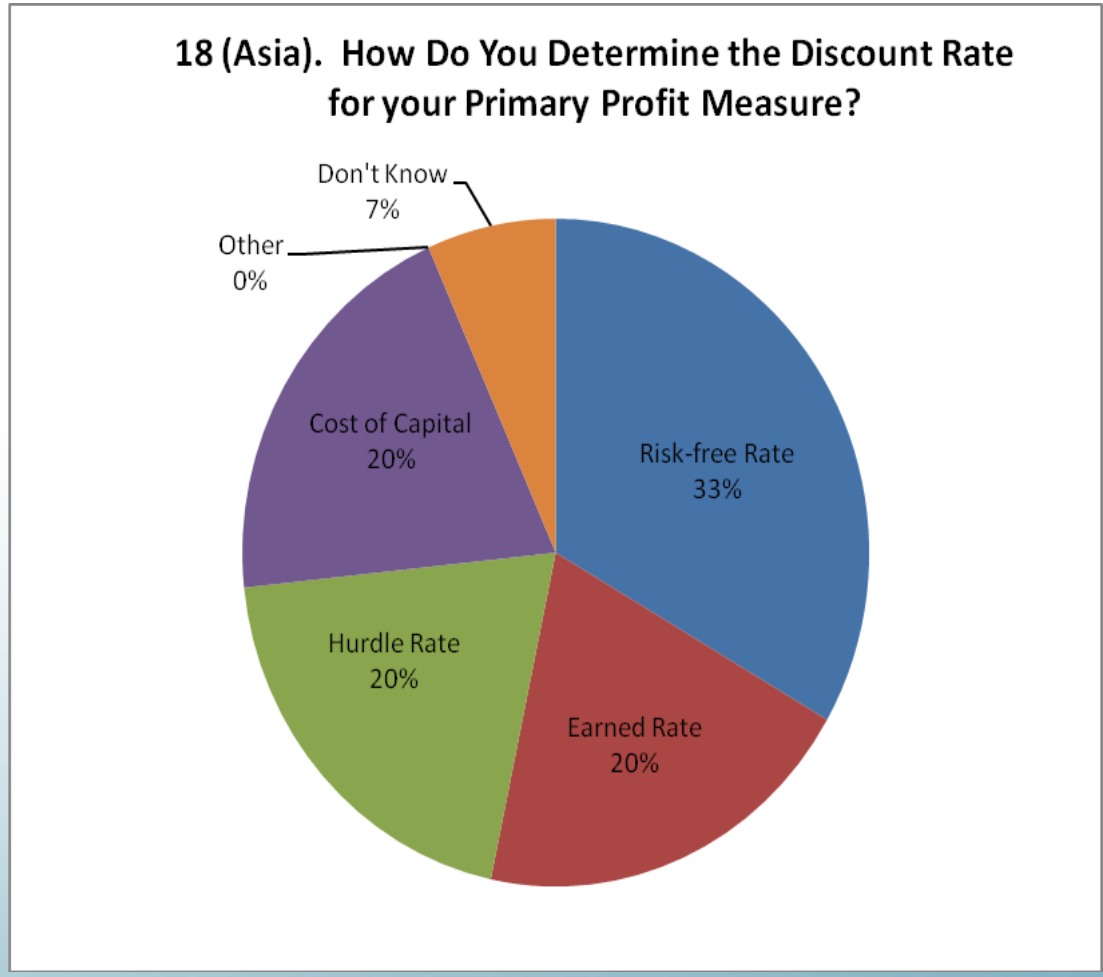




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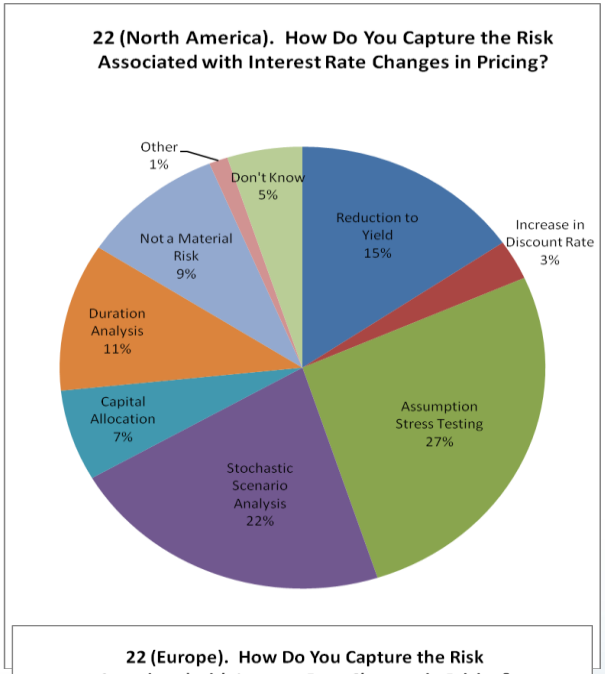
What discount rate?

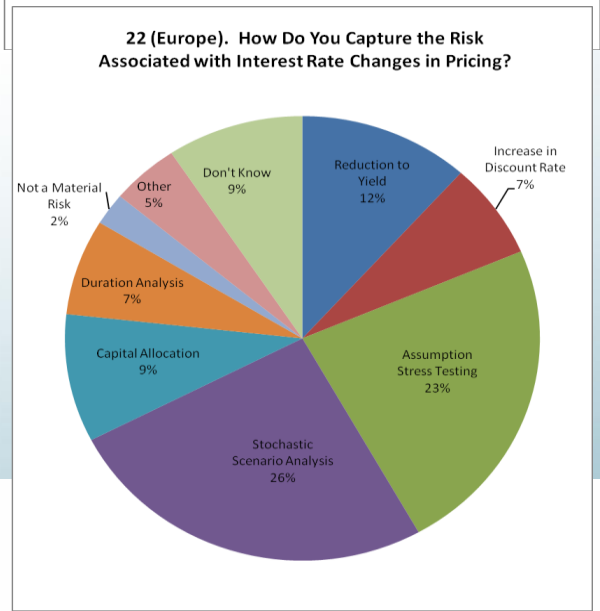


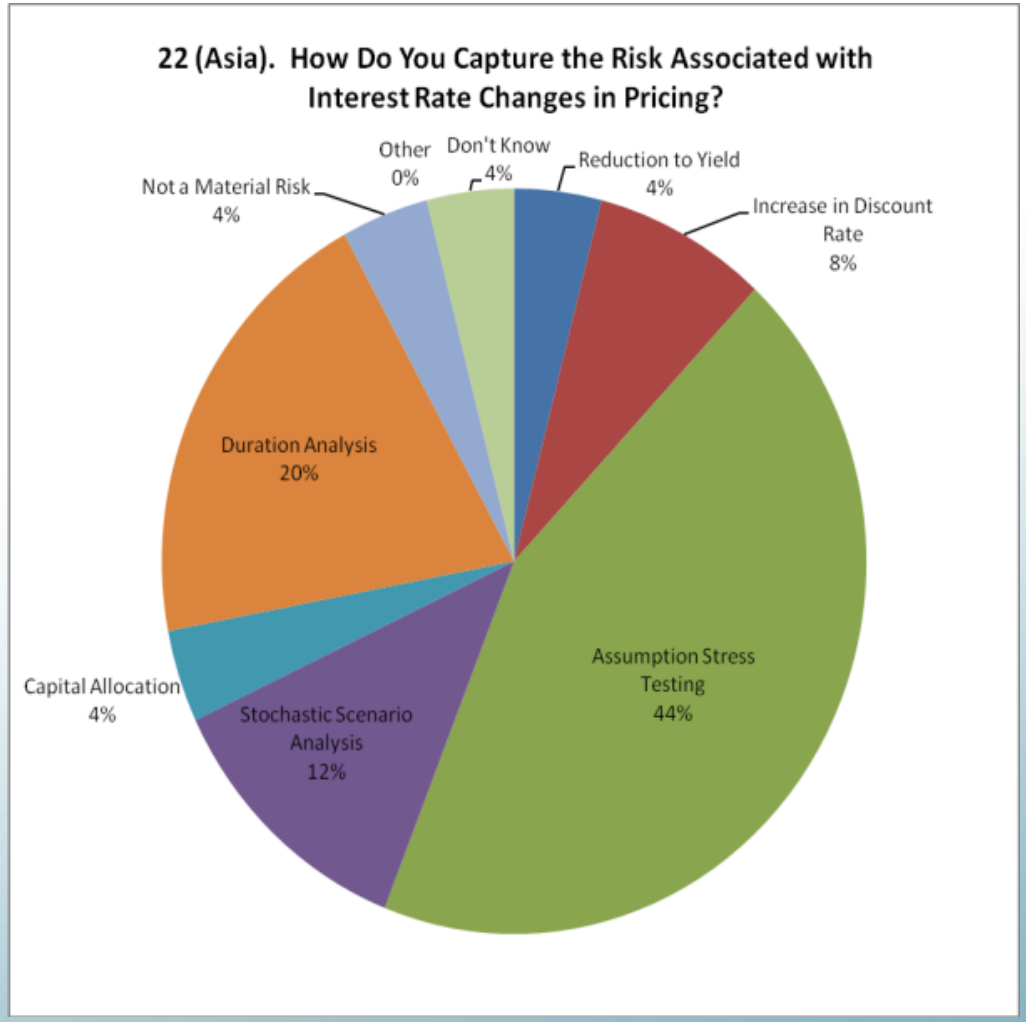


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How to reflect interest rate risk?

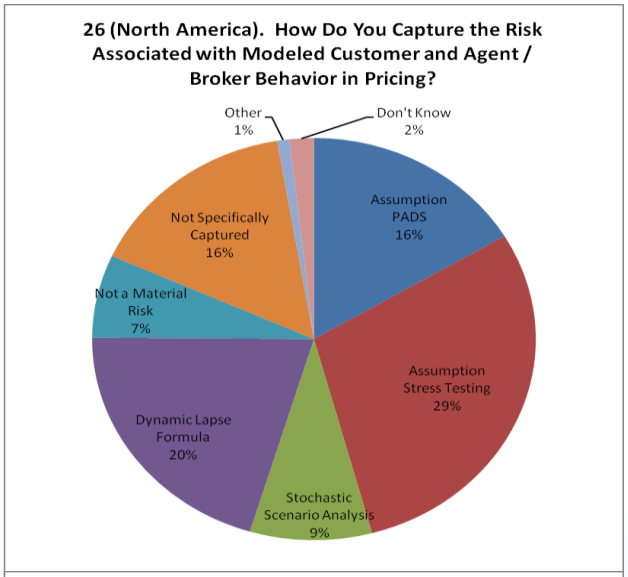


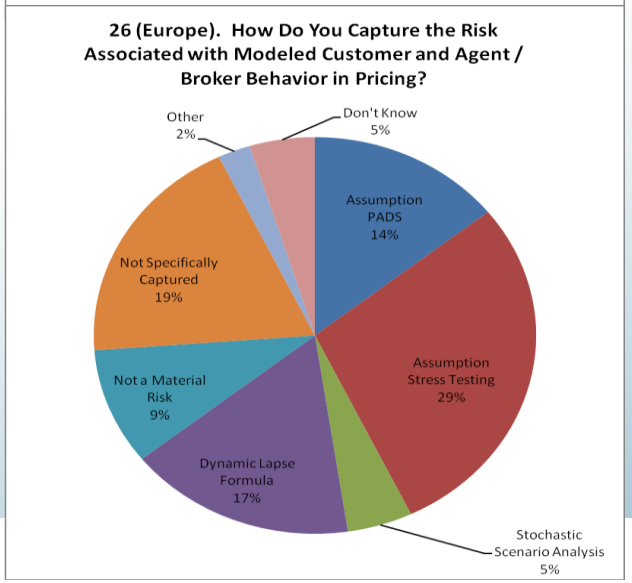


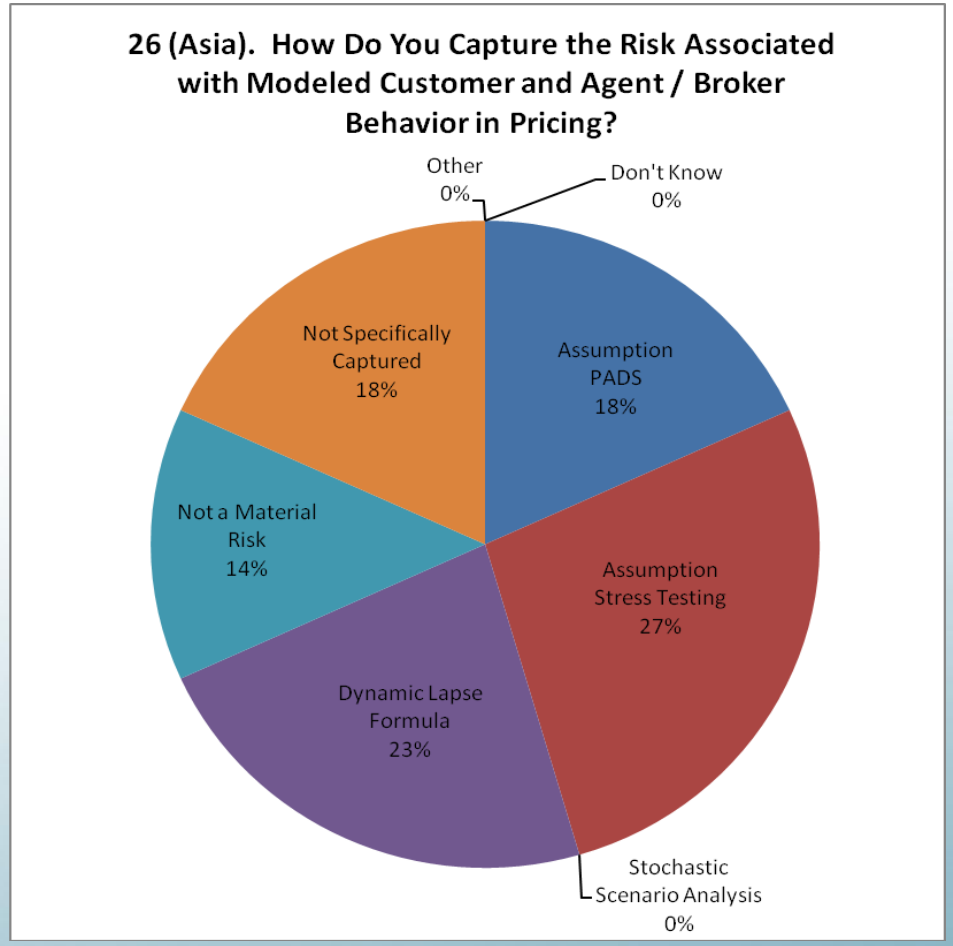


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How to capture policyholder behavior?

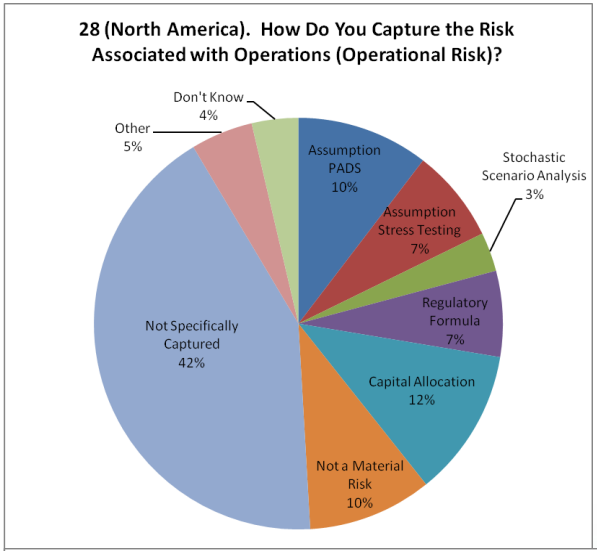


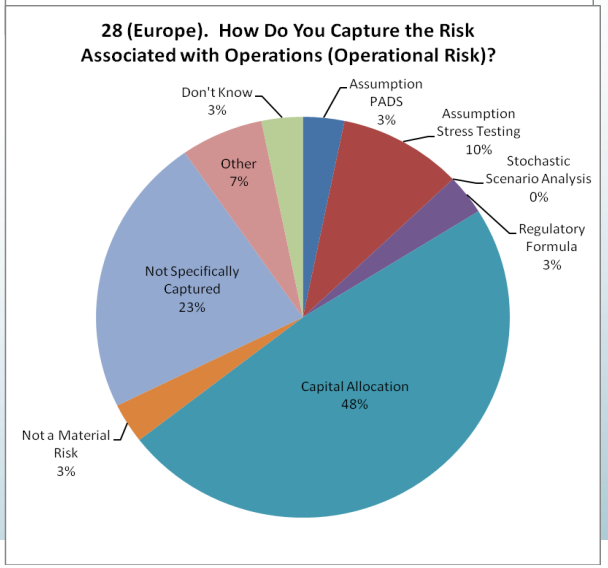


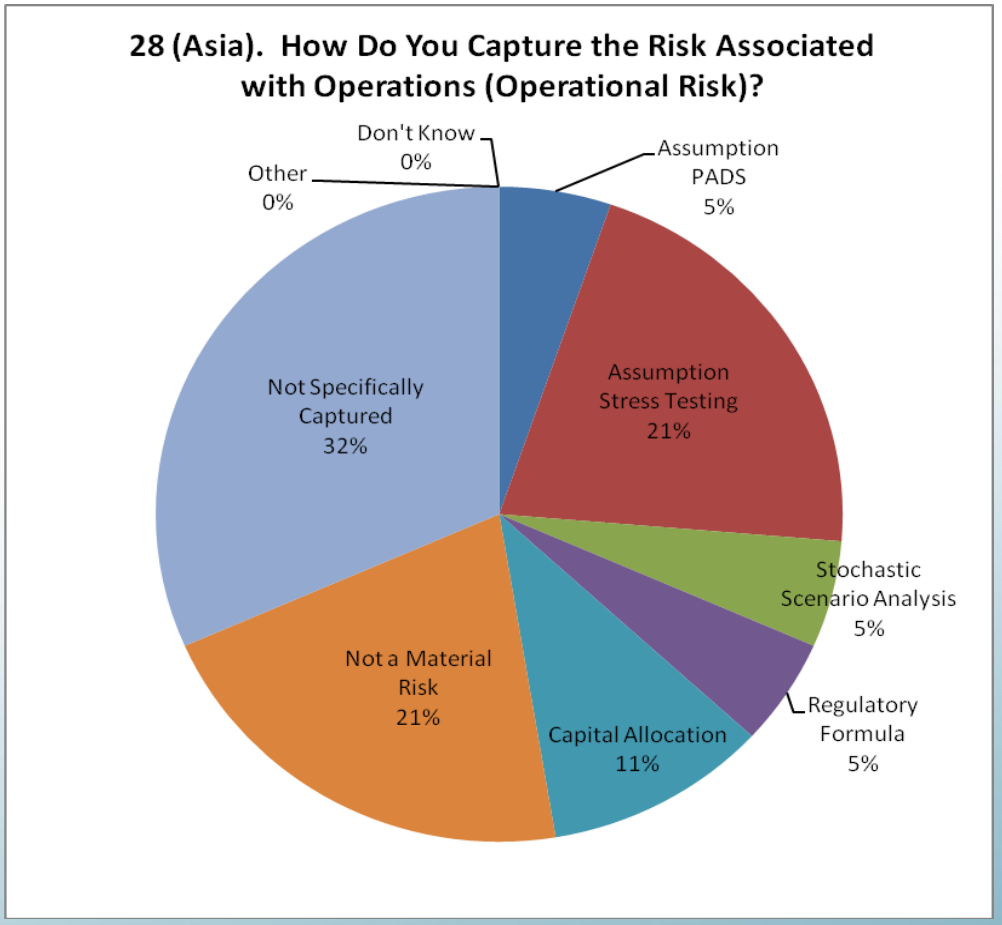


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Do you care for operational risk?

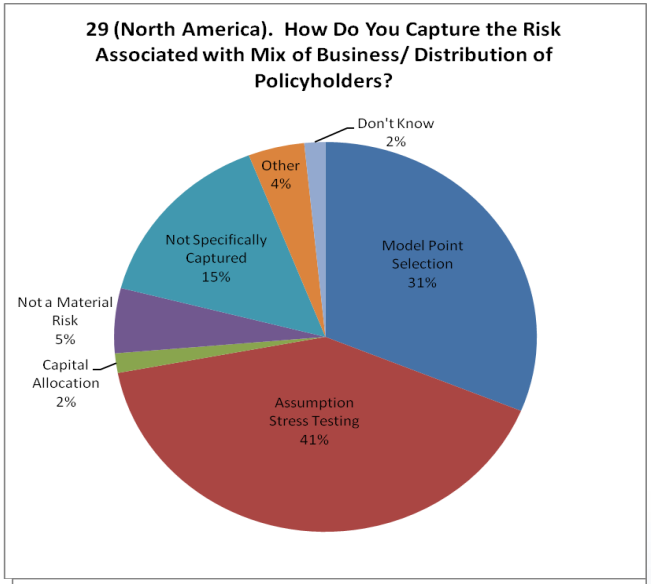


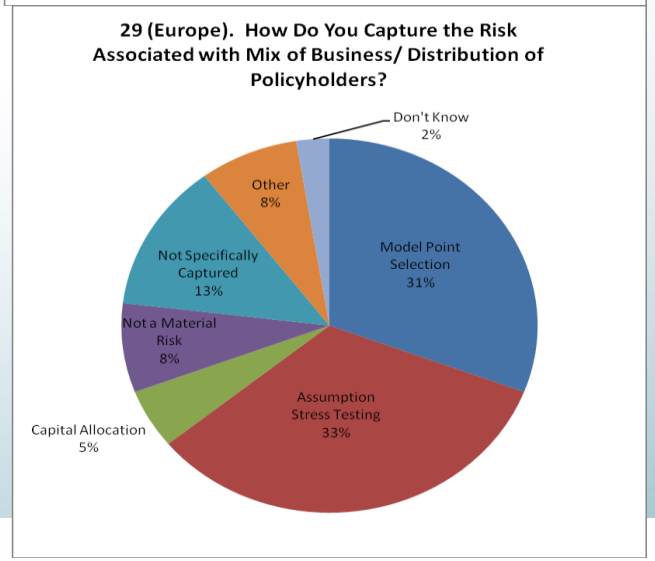


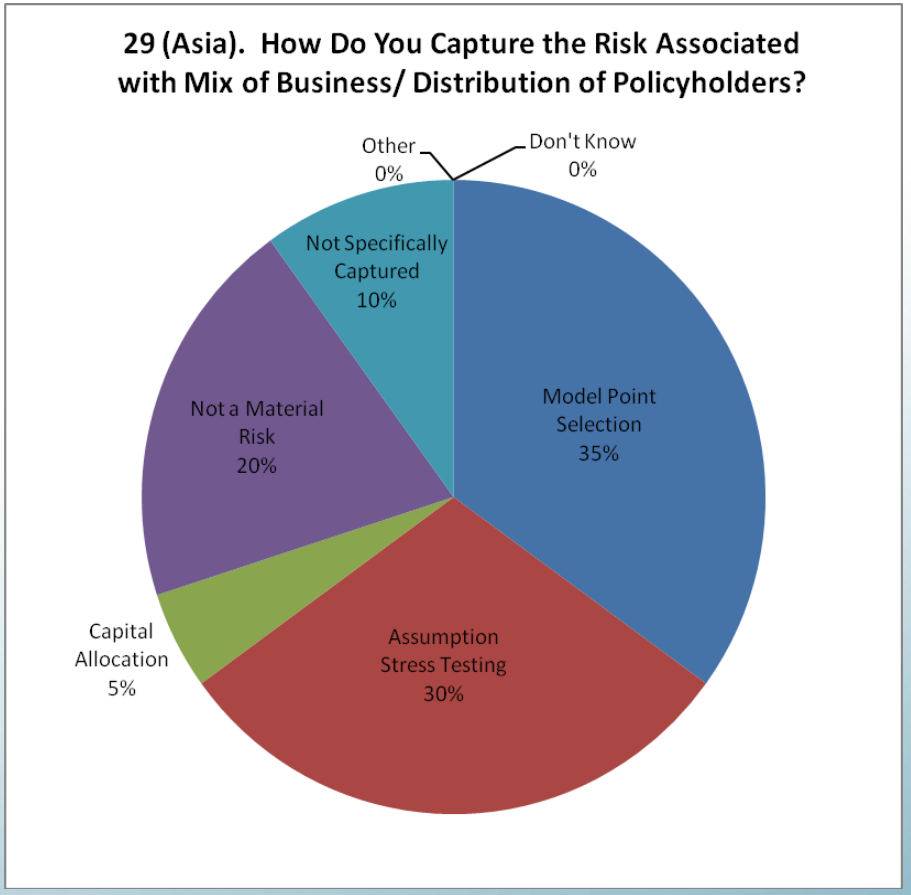


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How about mix of business?







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Practical Considerations

- So many pricing standards in one market!
- What pricing measures to use?
  - Depends on if you are European, American, or “local”?
- How to price for risk?
  - Scenario testing is useful, but hard to put probabilities on scenarios
  - Trend in valuation and risk capital - moving to stochastic models
  - Best move to stochastic models – useful to put a range of results with probabilities

Practical Considerations

- What if your pricing standard puts you in disadvantage?
  - Did you properly reflect the risks?
  - If so, avoid compete on price
    - ✓ Easier said than done
    - ✓ Product innovation leads to pricing power
    - ✓ Or rely on distribution channel advantage, if you can

Practical Considerations

- Reflect risks in pricing might lead to un-competitive premiums?
  - Pressure from distribution channel
  - Pressure from CEO too!
  - Well, tell the story of risks!
    - Use back test (historical events) to show how dangerous
    - Stochastic model helps to tell that story
    - Remind people past lessons of miss-pricing
      - ✓ High return guarantees in Japan, Taiwan, etc
      - ✓ Early miss-pricing of VA guarantees in US
      - ✓ Trend toward risk based capital - will make you pay eventually

Thank You!

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