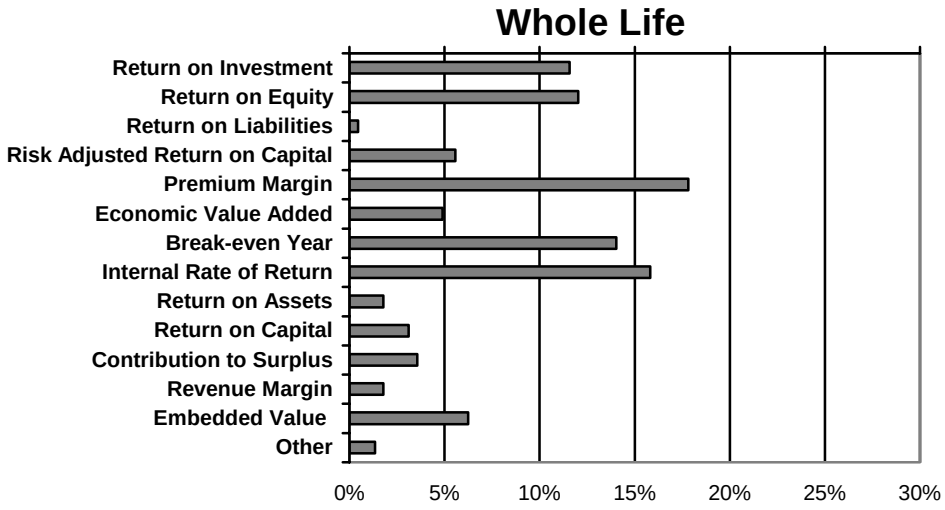
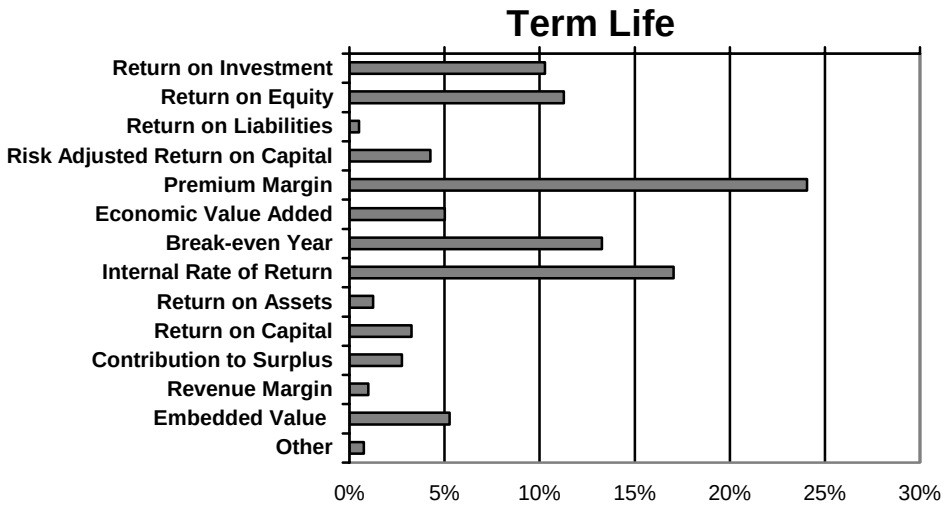
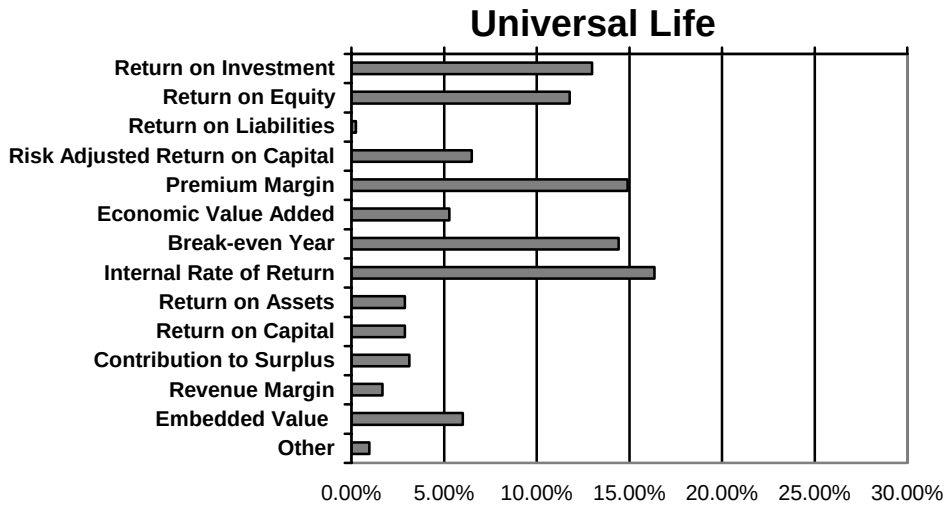
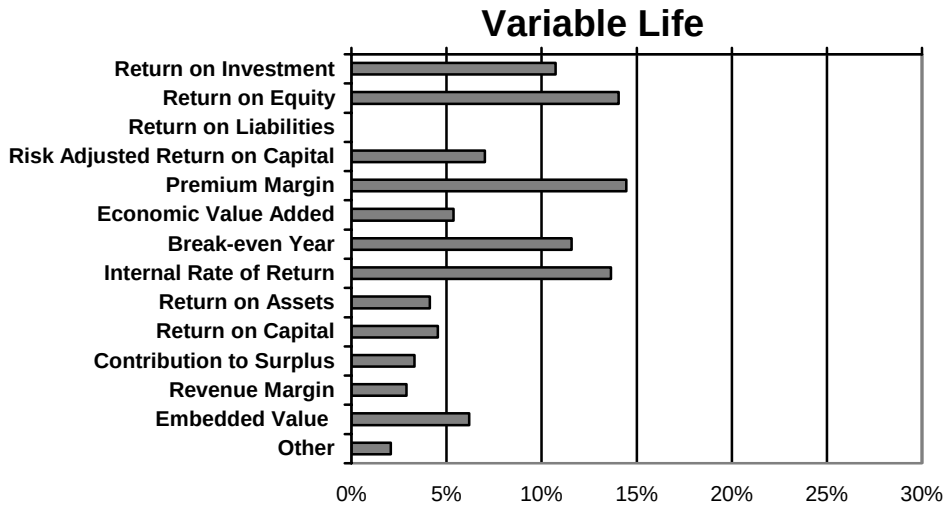
Questions 1 – 2, Profit Measures

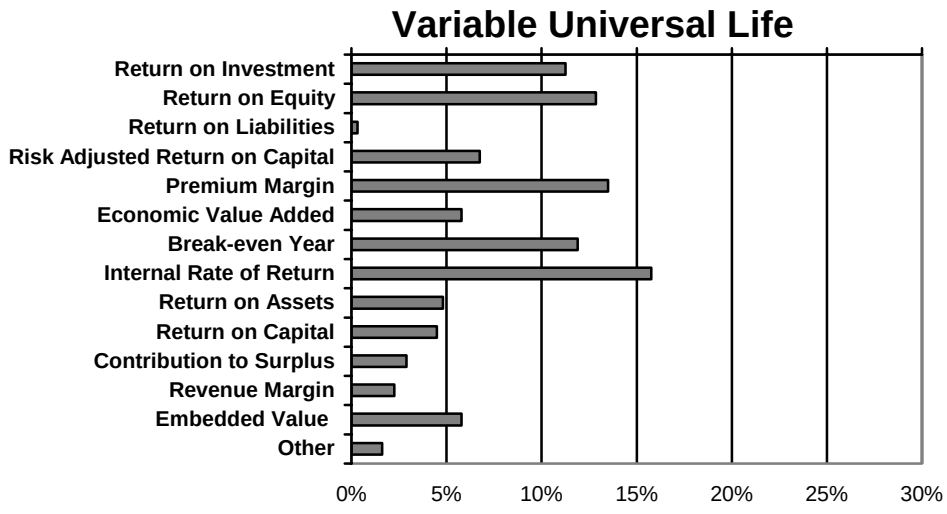
1. If you are involved in pricing any of the following product lines what profit measures are the main decision drivers for the following:



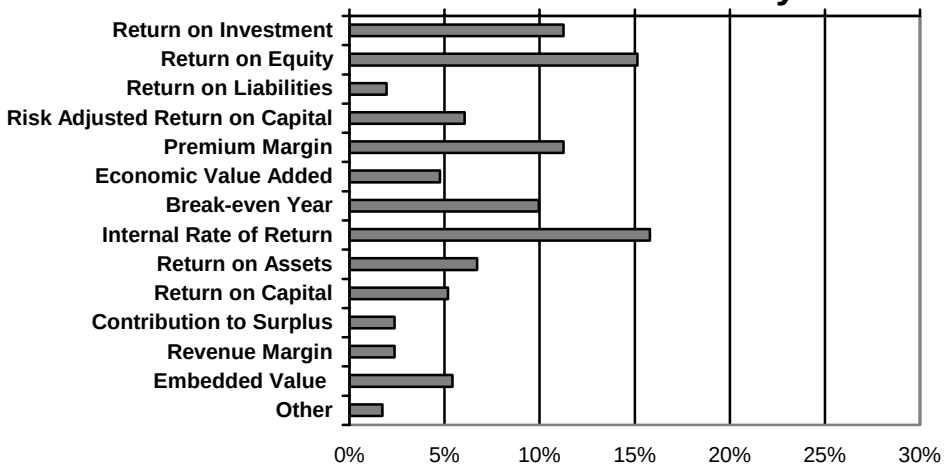



Universal Life
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0.00%
5.00%
10.00%
15.00%
20.00%
25.00%
30.00%

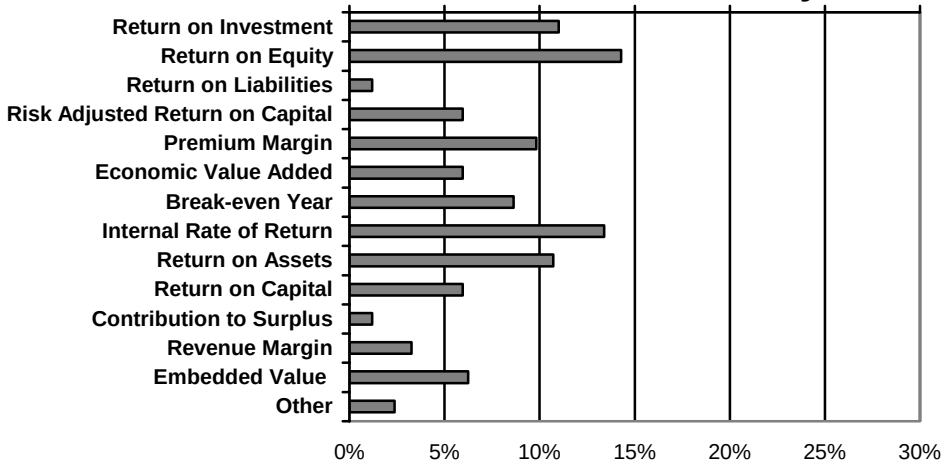

Variable Life
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Variable Universal Life
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%

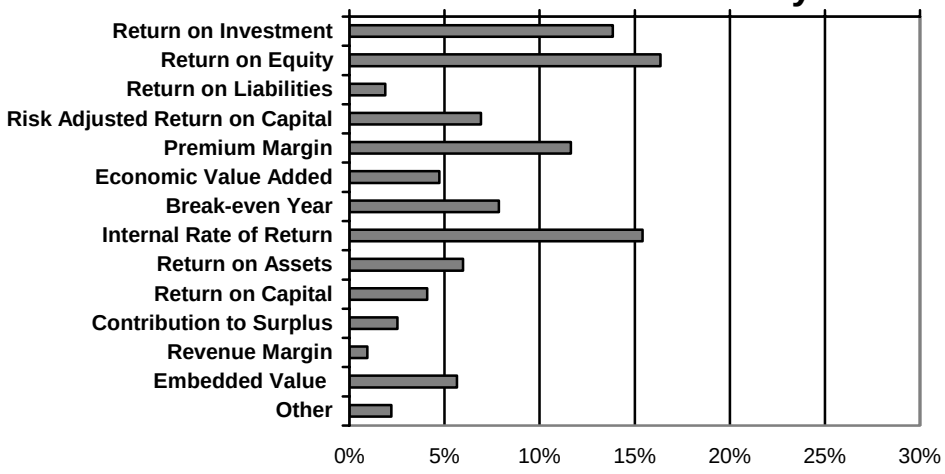
Fixed Deferred Annuity

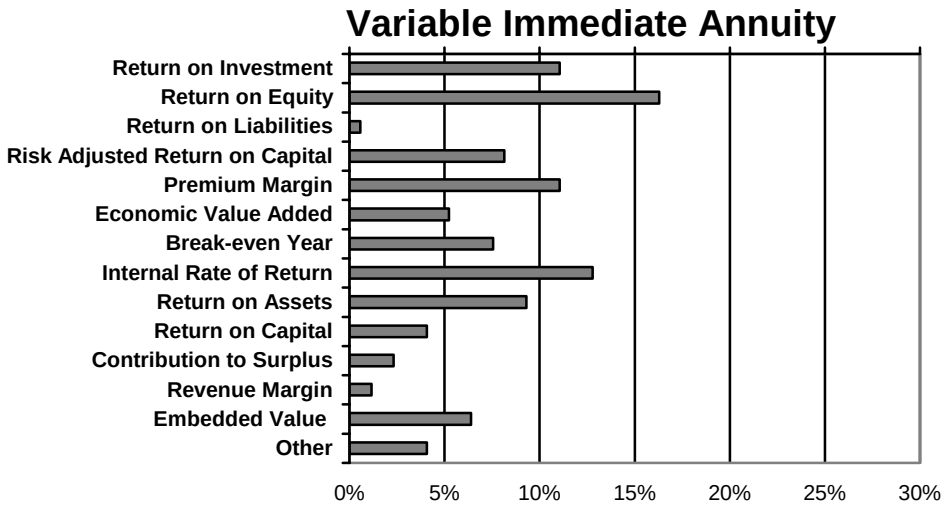


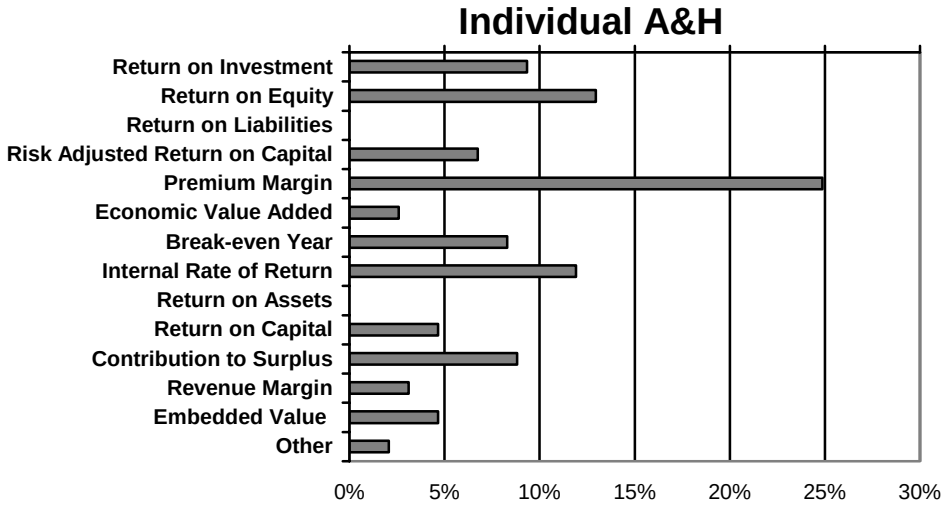
Variable Deferred Annuity

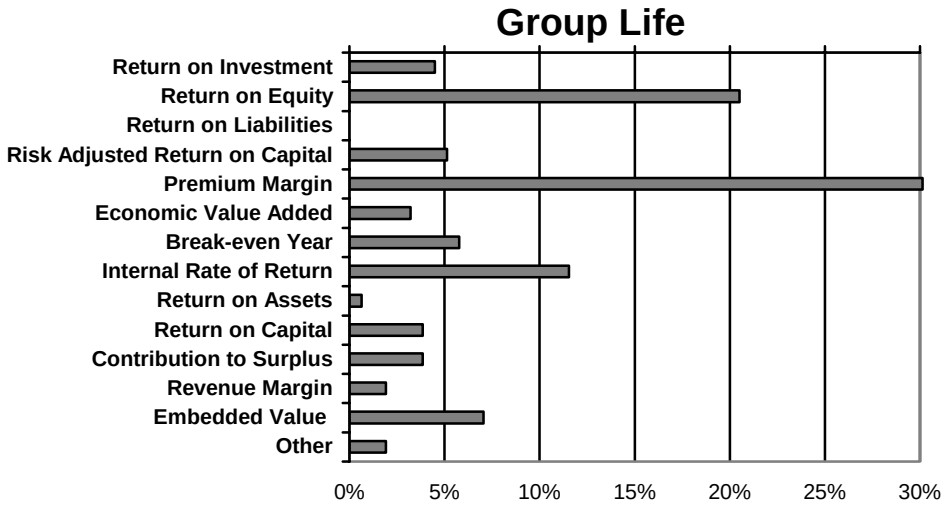


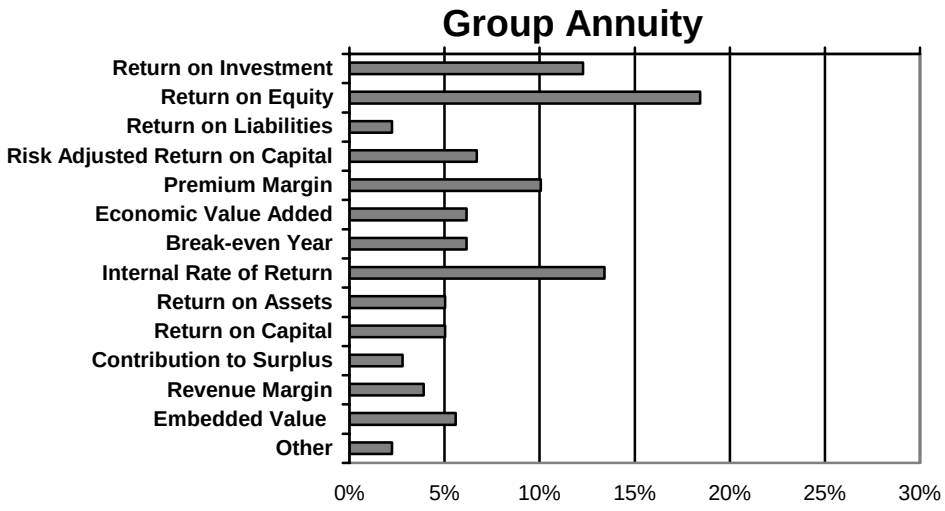
Fixed Immediate Annuity

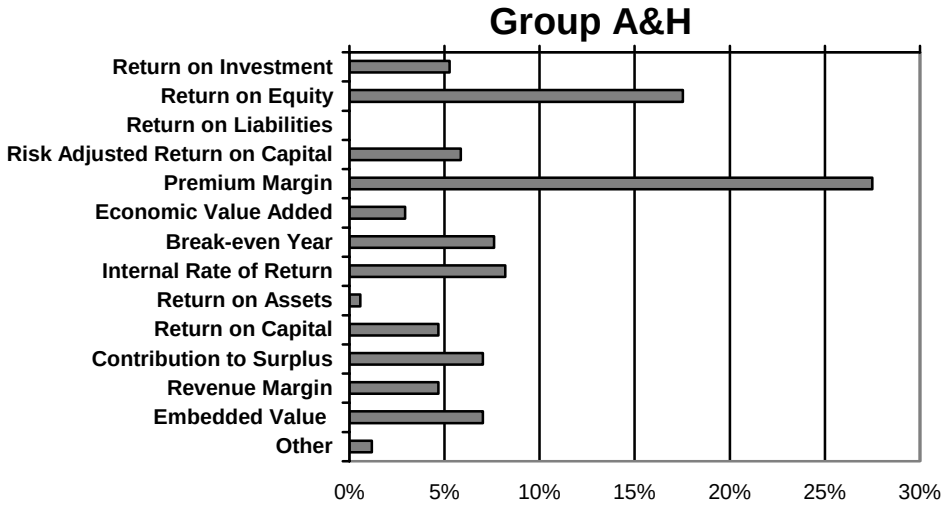


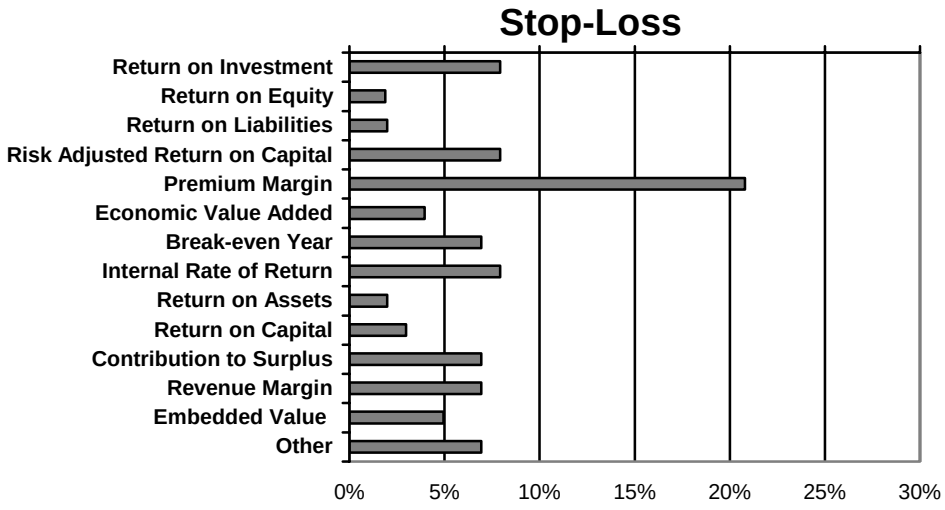

Variable Immediate Annuity
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%

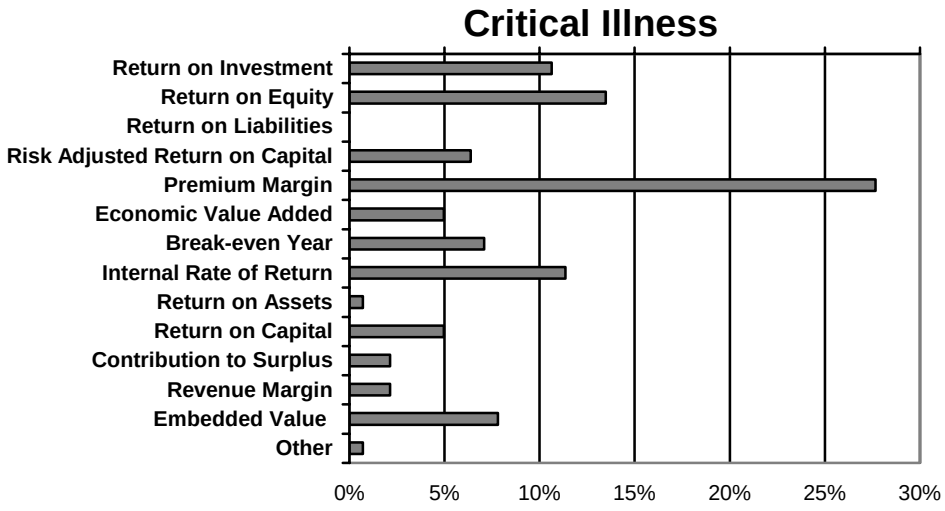

Individual A&H
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%

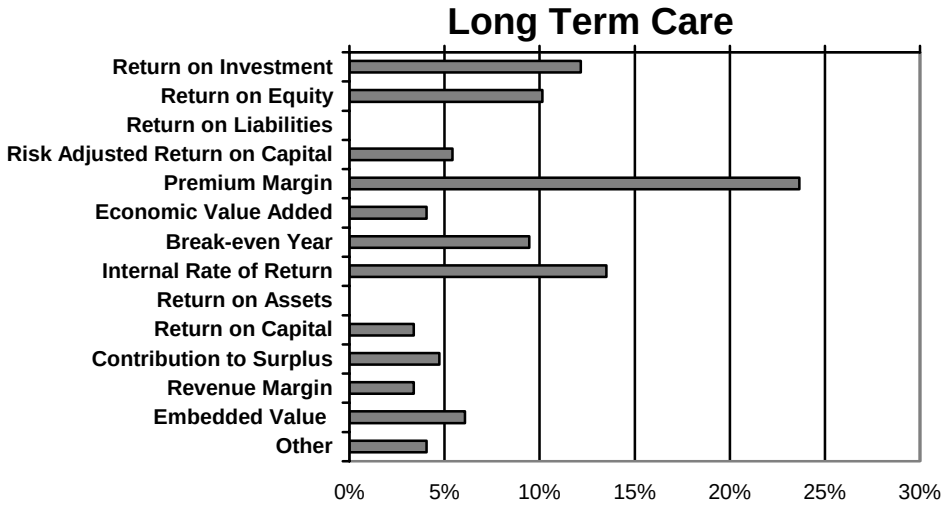

Group Life
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%

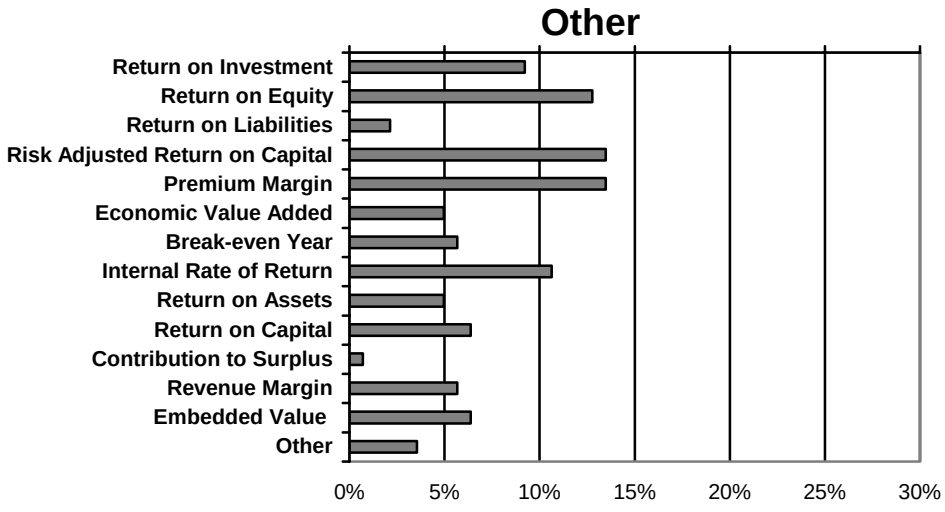

Group Annuity
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Group A&H
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Stop-Loss
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Critical Illness
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Long Term Care
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%


Other
Return on Investment
Return on Equity
Return on Liabilities
Risk Adjusted Return on Capital
Premium Margin
Economic Value Added
Break-even Year
Internal Rate of Return
Return on Assets
Return on Capital
Contribution to Surplus
Revenue Margin
Embedded Value
Other
0%
5%
10%
15%
20%
25%
30%

Observations

- Of thirteen profit measures the top three for all product lines were;
    - Premium Margin;
    - Internal Rate of Return; and
    - Return on Equity

- When subdivided into groupings of permanent life (Term, UL, VL , VUL), group life, annuity (VDA, FDA, VIA, FIA, Groul Annuity) and health business (CI, LTC), the top profit measure for each grouping are:

Internal Rate of Return	Permanent Life
Return on Equity	Annuity
Premium Margin	Group Life
Premium Margin	Health

For permanent life, Premium Margin followed by Breakeven Year are the second and third selections respectively.

- When examined by business affiliation, 70.8% of the respondents were affiliated with an insurance company. That sub-group selected the same three top choices as the full group of respondents. The distribution among the three was almost even with Return on Equity the first choice by a slight margin.

    - Respondents from consulting firms were a distant second and reinsurance company affiliation was a much smaller segment of the respondents.

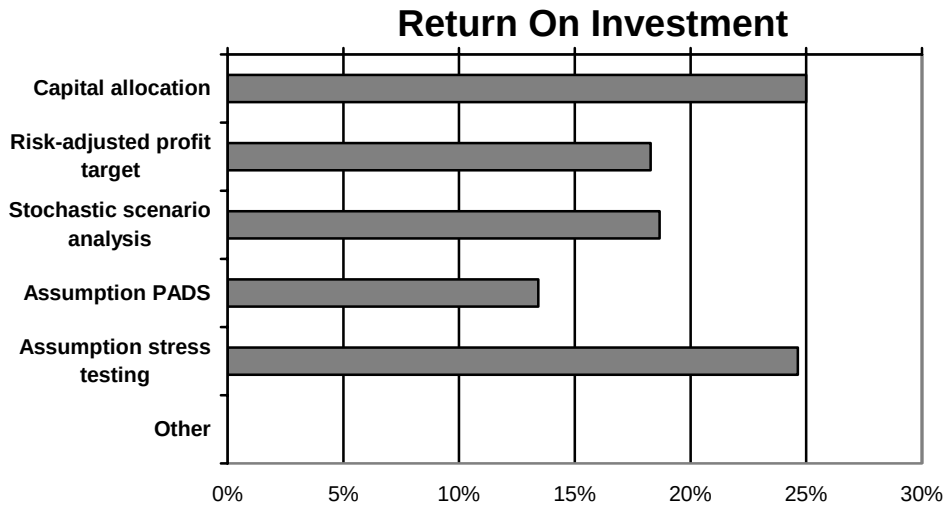
    - No significant difference in the type of profit measure by type of employment was noted.

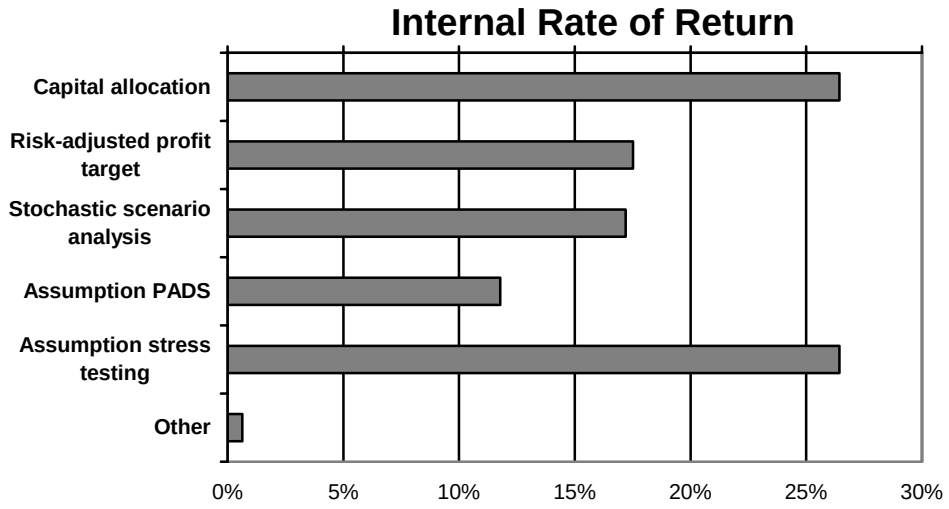
- When broken down by country of practice (U.S., Canada, Other) there were no significant differences in choice of profit measure. Whereas one might expect that business affiliation might not have an impact on the profit measure used, one would have expected differences by country of practice. Differences should arise because of divergence in accounting rules but no such pattern emerged.

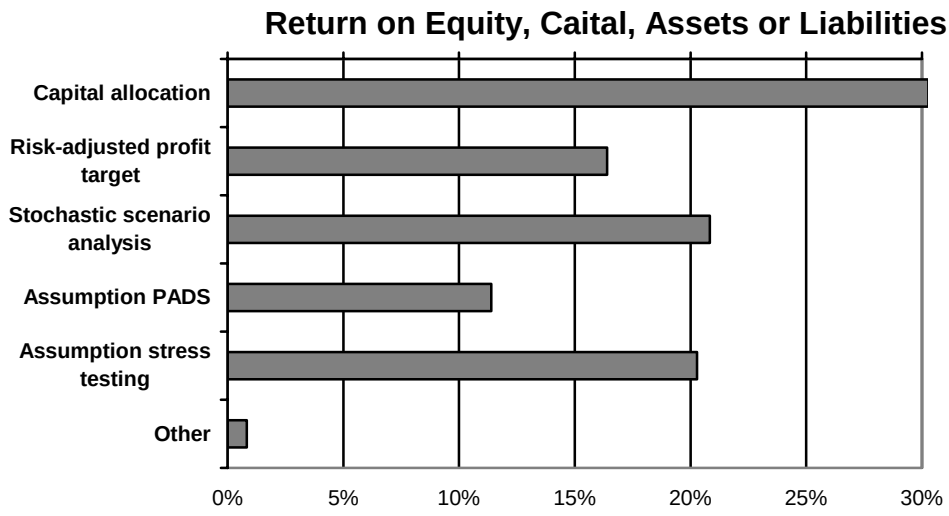
- Many actuaries use multiple profit measures

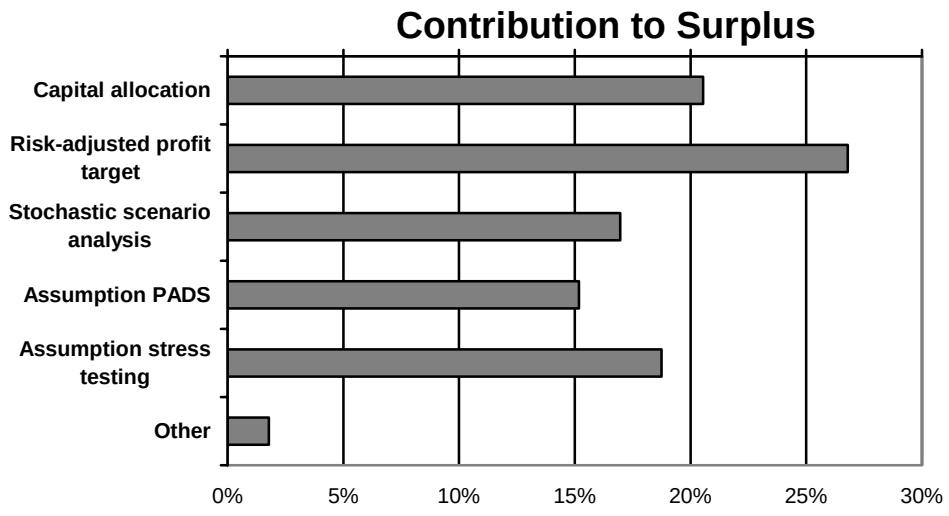
- Embedded Value is more important among large companies although it only was selected by 7.5 % of those respondents.

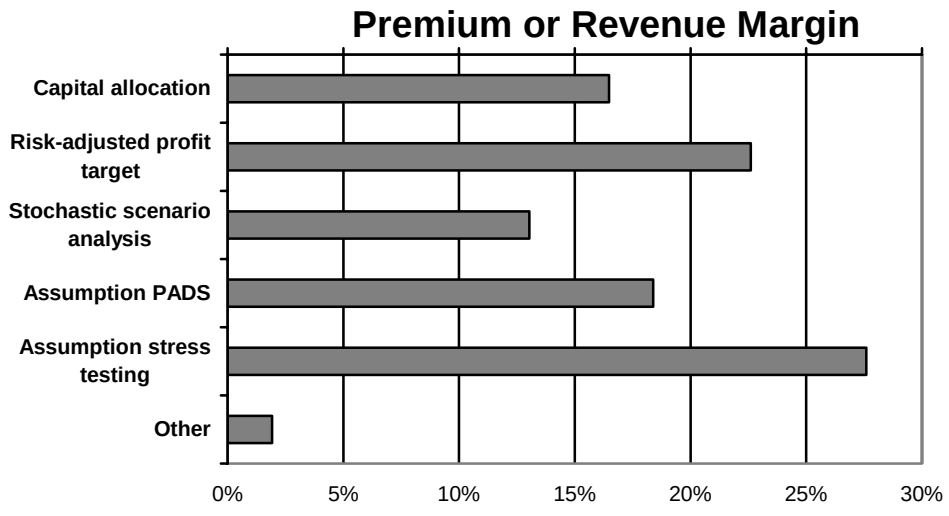
2. If you use any of the following profit measures, how is risk reflected in the calculation?






Return on Equity, Caital, Assets or Liabilities
Capital allocation
Risk-adjusted profit target
Stochastic scenario analysis
Assumption PADS
Assumption stress testing
Other
0%
5%
10%
15%
20%
25%
30%


Contribution to Surplus
Capital allocation
Risk-adjusted profit target
Stochastic scenario analysis
Assumption PADS
Assumption stress testing
Other
0%
5%
10%
15%
20%
25%
30%


Premium or Revenue Margin
Capital allocation
Risk-adjusted profit target
Stochastic scenario analysis
Assumption PADS
Assumption stress testing
Other
0%
5%
10%
15%
20%
25%
30%

Observations

- When Return on Investment and Internal Rate of Return profit measures are used in pricing, risk is mostly reflected by Stress Testing Assumptions and Adjusting Capital Allocation. When broken down by country of practice, actuaries in Canada prefer using Assumptions Pads.

- When the Return on Equity profit measure is used, Adjusting Capital Allocation is used more often than Stress Testing Assumptions to reflect risk in pricing. When broken down by area of practice, actuaries in the Investment Department and in Risk Management prefer using Stochastic Analysis. Also actuaries in the Individual Annuity product line prefer using Stochastic Analysis over Stress Testing Assumptions as their second choice after Adjusting Capital Allocation.

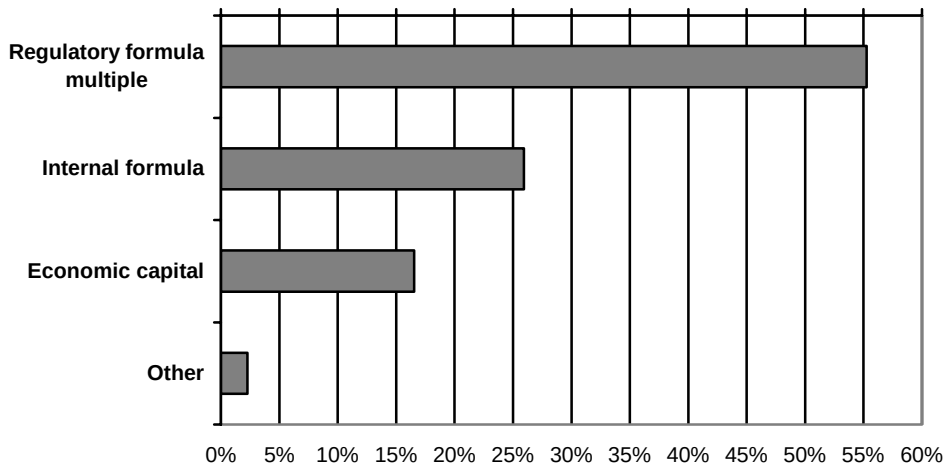
- When the Contribution to Surplus profit measure is used, Risk Adjusting Profit Targets followed by Adjusting Capital Allocation are used to reflect risk. Actuaries in the Pricing Department prefer Stress Testing Assumptions to Adjusting Capital Allocation as their second choice, with Risk Adjusting Profit Targets as their first choice. Actuaries practicing in Canada prefer to use Assumptions Pads over any other choice. When broken down by Product Area, actuaries in Individual Health prefer Stress Testing Assumptions to Adjusting Capital Allocation as their second choice with Risk Adjusting Profit Targets as their first choice. Actuaries in Individual Life prefer Adjusting Capital Allocation to Risk Adjusting Profit Targets, which is the opposite for the "general population".

- If the Premium or Revenue Margin is used as the profit measure, Stress Testing Assumptions followed by Risk Adjusting Profit Targets are used. Actuaries practicing in Canada prefer to use Assumptions Pads followed by Stress Testing Assumptions. When broken down by Product Area, actuaries in Individual Health are evenly split between Stress Testing Assumptions, Adjusting Capital Allocation and using Assumptions Pads.

- Stochastic scenario analysis is the "middle" choice for reflecting risk, except for when the Margin profit measure is used, where it is the least chosen method.

Questions 3 – 7, Reflecting Risk

3. If you use capital allocations for reflecting risk, how are these allocations determined?

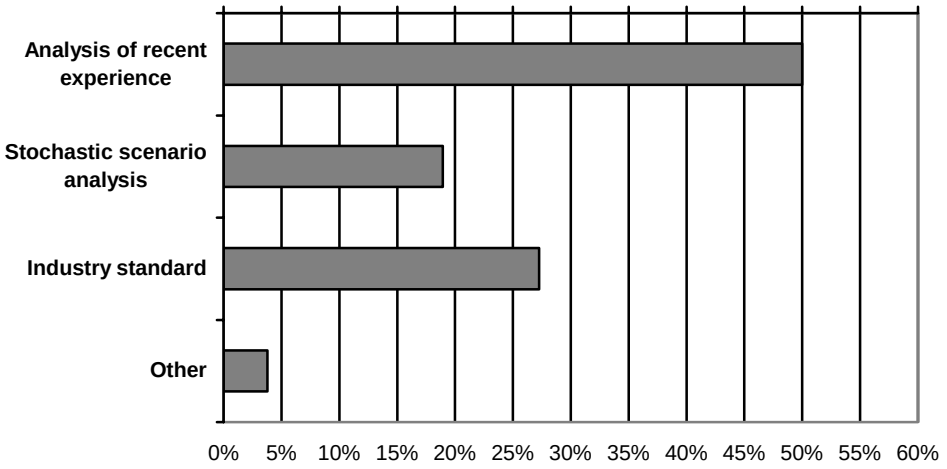


Observations

- Majority use Regulatory formula (55%), then Internal formula (26%) and Economic capital (17%).

- The use of Economic capital is a little more prevalent in Canada (22%) than U.S (16%) and Other (6%). It is also not surprisingly used more in larger companies (80+actuaries), where 21% use it, than smaller companies (<30actuaries) where only 9% use it. In terms of business affiliations, it is used most in Reinsurance (39%) and Investment Companies (38%), although based on a small sample base of 18 and 8 respectively. It is also used more by Consultants (22%) than in Insurance Companies (12%)

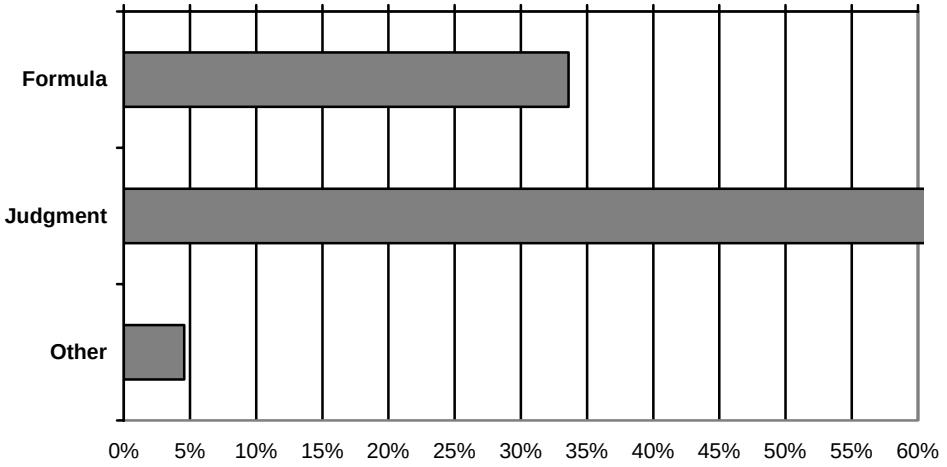
4. If you use assumption PADS, how are these PADS determined?



Observations

- 50% use analysis of recent experience while 27% use industry standard and 19% use stochastic analysis
- The use of stochastic analysis is more prevalent in Canada (29%) than in the U.S. (16%). It is also used more by consultants (29%) than insurance companies (15%).

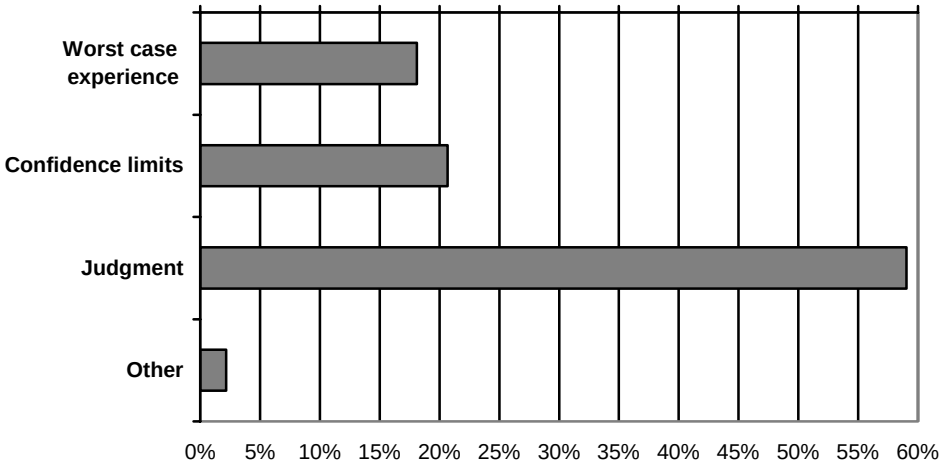
5. If you use a risk-adjusted profit objective, how is it determined?



Observations

- 62% use judgment while only 34% use a formula
- Actuaries in investments or marketing seemed to lean more toward using formula than judgment, but it is a small sample size.

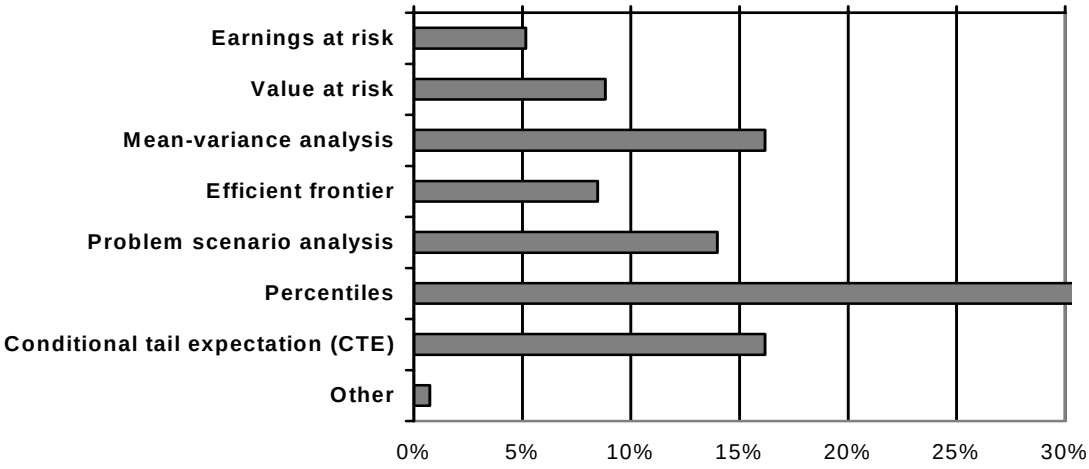
6. If you use assumption stress testing, how are the parameters determined?



Observations

- 60% use judgment, 21% use confidence limits and 18% use worst-case experience analysis.
- Very large companies (>150 actuaries) tend to use confidence limits more often than average (32%) although they too primarily use judgment (49%).

7. If you use stochastic scenario analysis, how is the distribution of results analyzed?



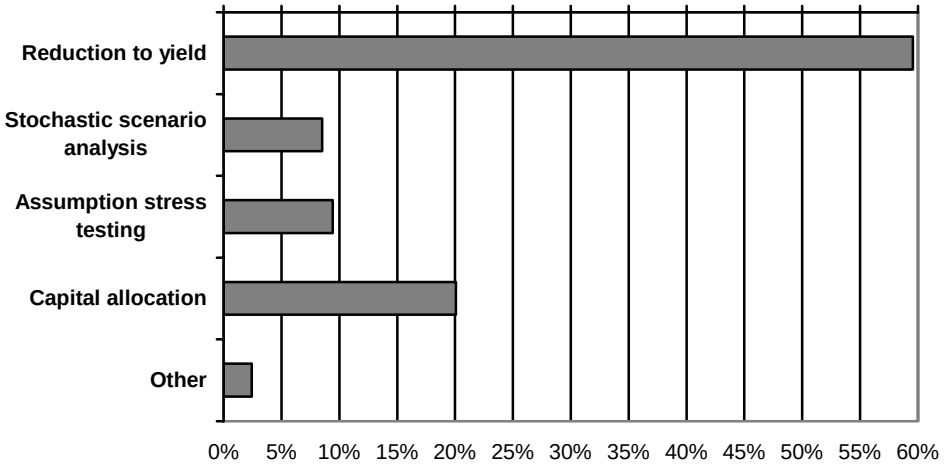
Observations

- 31% use percentiles, 16% use conditional tail expectations (CTE), 16% use mean-variance analysis, 14% use problem scenario analysis, 9% use value at risk, 8% use efficient frontier, and 5% use earnings at risk.

- Percentiles are more popular than CTE's in the U.S. (48% vs. 19%) while in Canada it is the other way (32% vs. 45%) as Canadian Institute of Actuaries standards use CTE.

Questions 8 - 10, Asset Risks

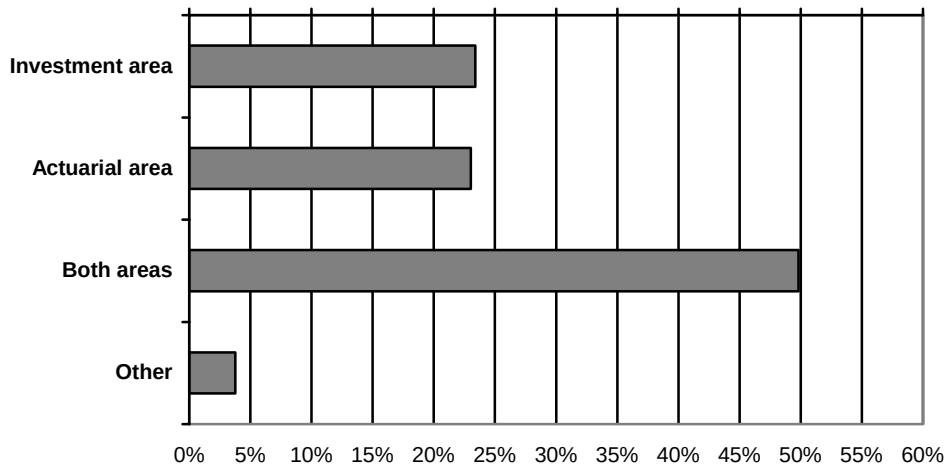
8a. How do you capture the risk associated with asset default in pricing?



Observations

- The majority reduce the yield which presumably is simple, easy to model with no added run time
- Actuaries working in areas other than pricing tended to do more Stochastic Scenario Analysis.
- Consulting Actuaries also do more Stochastic Scenario Analysis
- There is not much variation between product lines
- There tends to be more Stochastic Scenario Analysis and Assumption Stress Testing in Canada than in the US.
- There is not much variation by size of company

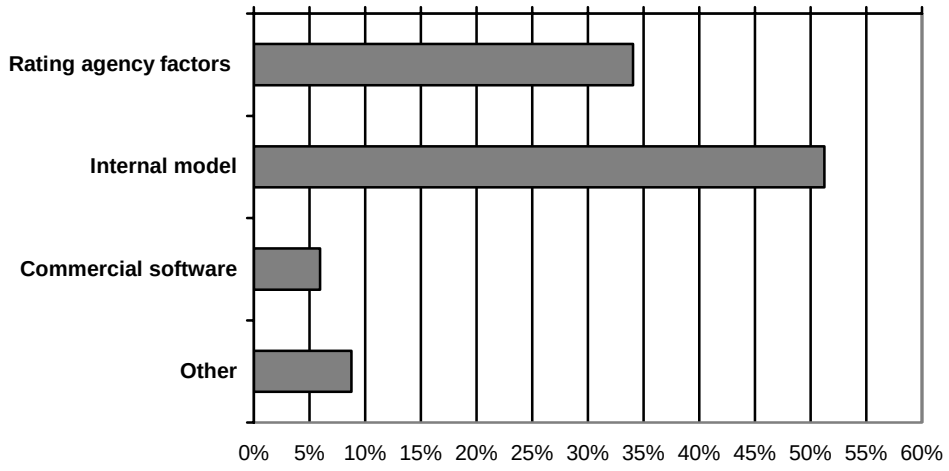
8b. Who determines parameters and magnitude of this provision?



Observations

- Almost ¾ of responses favor some investment area input
- Larger companies favor the investment area input
- Annuity lines use more input from the investment area than do the Life and Health lines
- Reinsurers tend to place less emphasis on investment area input
- Others use “ALM” or “Risk Management” Areas

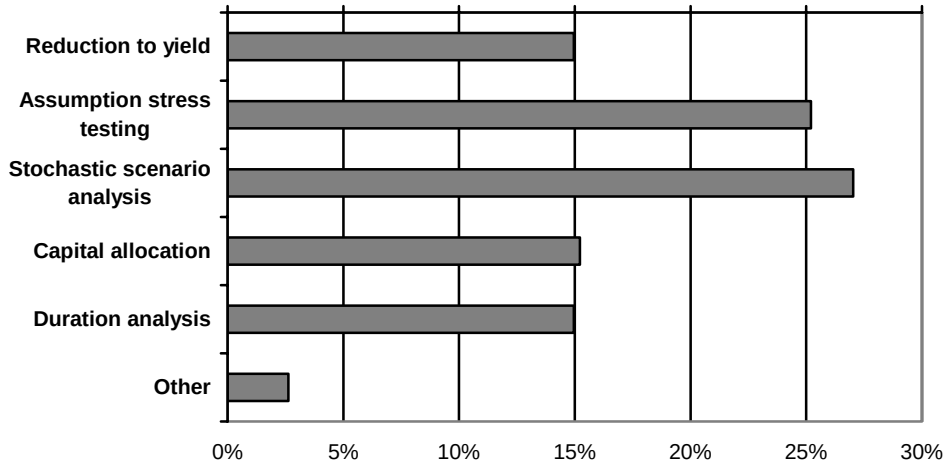
8c. How is the amount of the adjustment determined?



Observations

- High use of internal models would seem to indicate variation in the amount of adjustment from company to company
- Not much variation across lines, size of company, business affiliation or area of practice
- Canadian Actuaries tend to favor internal models

9. How do you capture the risk associated with interest rate changes in pricing?

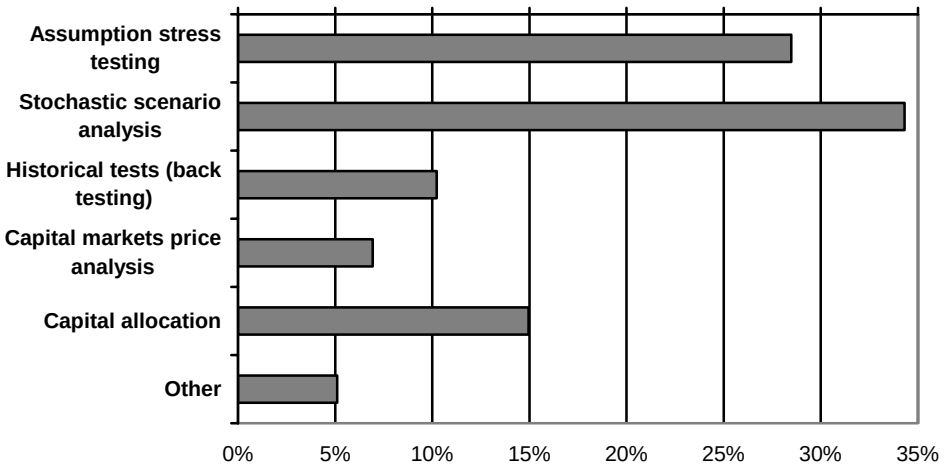


Observations

- Most do some kind of scenario analysis
- Those practicing in the Annuity Lines tended to favor Stochastic Scenario Analysis more than those in the Life Lines
- Consultants tended to do more Assumption Stress Testing
- Reinsurers showed the highest propensity to use Capital Allocation to capture risk associated with interest rate changes in pricing.

.

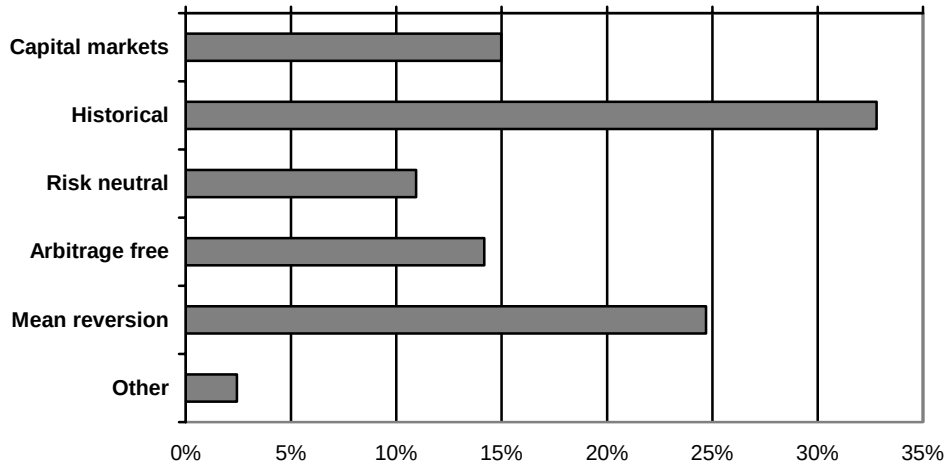
10a. How do you capture the risk associated with the volatility of equity returns?



Observations

- Most do some kind of scenario analysis
- Those practicing in the Annuity Lines tended to favor Stochastic Scenario Analysis more than those in the Life Lines
- Consultants tended to do more Assumption Stress Testing
- Larger companies tend to do more Stochastic Scenario Analysis

10b. If you use stochastic scenario analysis, what manner of assumptions do you use?

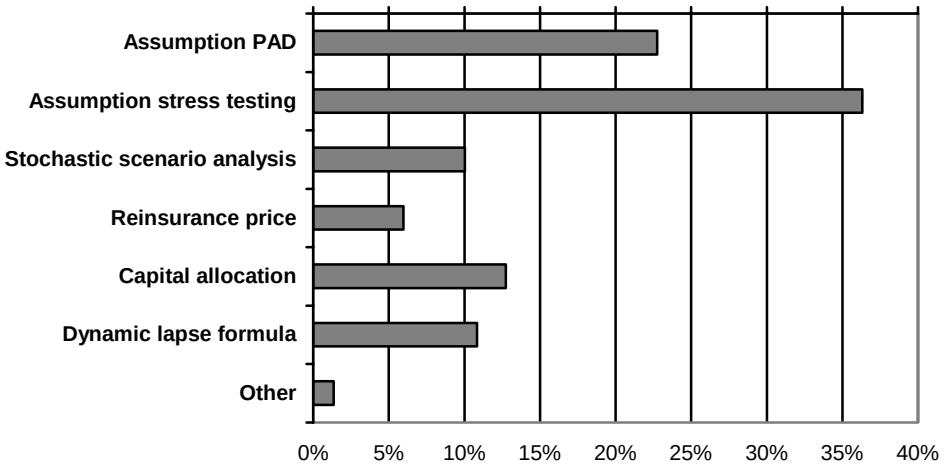


Observations

- Using historical assumptions is the highest response across all categories
- Consultants and Canadian Actuaries tended to eschew Arbitrage Free assumptions in favor of risk neutral

Questions 11 – 14, Liability Risks

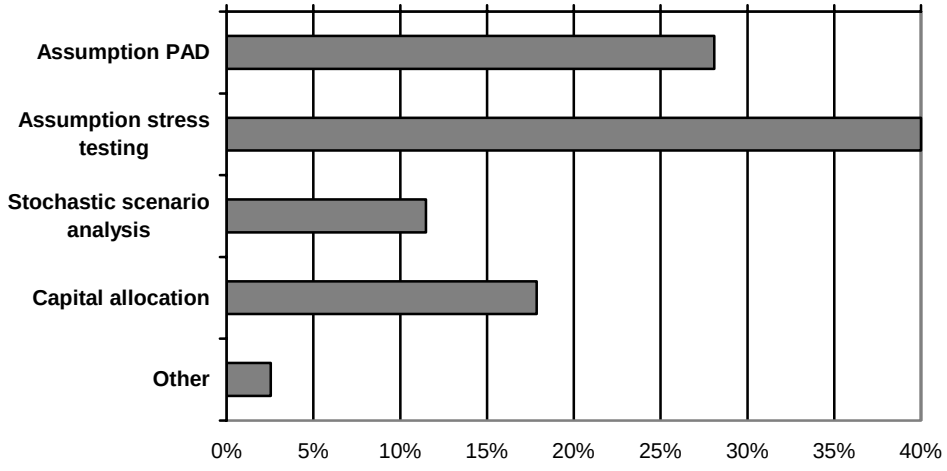
11. How do you capture the risk associated with adverse claim deviation in pricing?



Observations

- Overall actuaries employ assumptions stress testing followed by including assumption pads, adjusting capital allocation and modeling dynamic lapses.
- Results do not vary by demographic profile except for Group Life and Health practices with slightly more emphasis on using assumption pads.

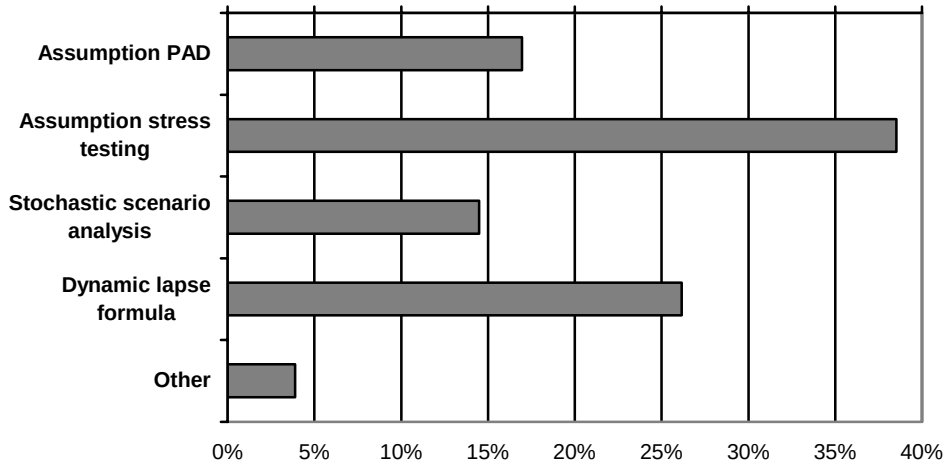
12. How do you capture the risk associated with short-term claim fluctuation in pricing?



Observations

- Overall actuaries employ assumptions stress testing, followed by including assumption pads, adjusting capital allocation and performing stochastic analysis.
- Actuaries practicing in Group Life and Health have slightly more emphasis on using assumption pads
- For actuaries practicing in Canada, there is more emphasis on using assumption pads.

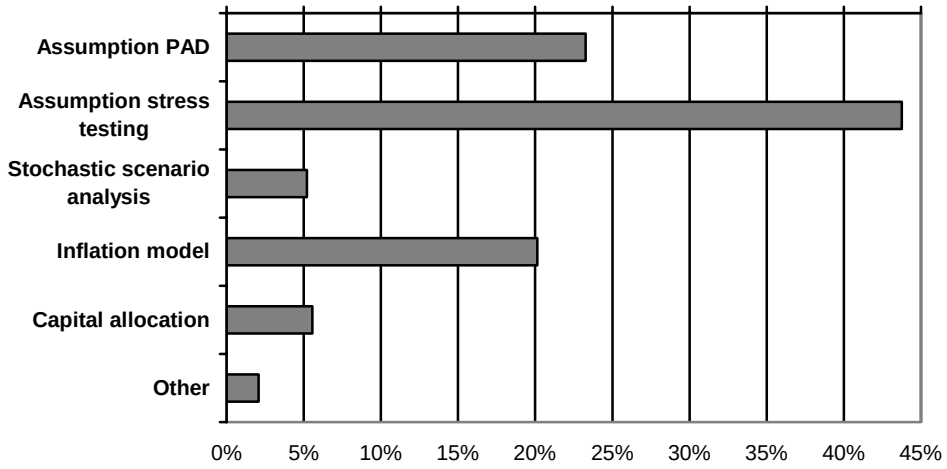
13. How do you capture the risk associated with modeled customer and agent behavior in pricing?



Observations

- Overall actuaries employ assumptions stress testing, followed by modeling dynamic lapses, including pads in assumptions and performing stochastic analysis.
- Group Life and Health practices employ more use of assumptions pads than modeling dynamic lapses
- Actuaries practicing in Canada also employ more use of assumptions pads than modeling dynamic lapses.

14. How do you capture the risk associated with the expense assumptions used?



Observations

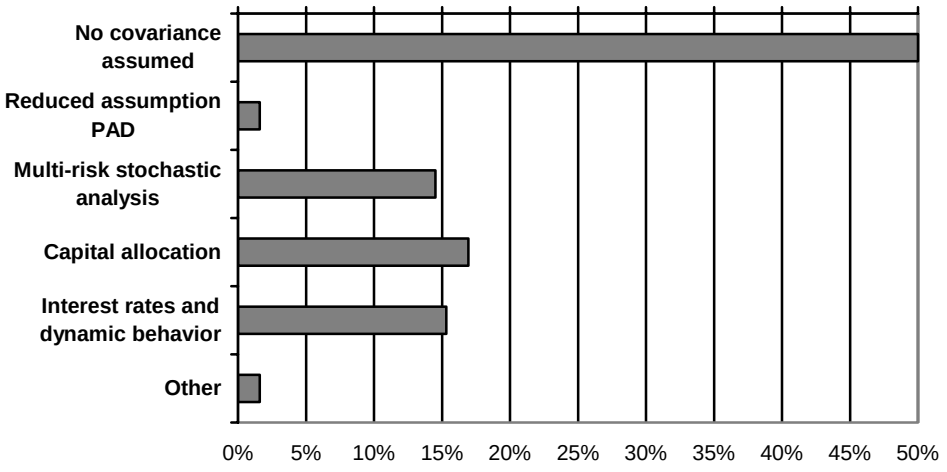
- Overall actuaries employ assumptions stress testing, followed by including pads in assumptions and modeling inflation. A minority perform stochastic scenario analysis and adjust capital allocations.

- Actuaries working in Individual Annuity lines employ more use of inflation models than assumptions pads

- Group Life and Health actuaries employ more use of assumptions pads than assumptions stress testing

Questions 15 - 16, Miscellaneous

15. What additional explicit work is done to capture the covariance of risks?



Observations

- Majority of actuaries do not employ covariance assumptions but some adjust capital allocation, interest rates and dynamic behavior and perform multi-risk stochastic analysis.

- Results do not vary by demographic profile.