

Linkage between Risk Appetite and Strategic Planning

ERM Symposium 2012

By

Mary Neumann, CUNA Mutual Group

Kailan Shang, Manulife Financial

April 2012

Agenda

- Research Background
- Risk Appetite Framework and Strategic Planning
- Case Studies
 1. Risk Appetite and Asset Allocation
 2. Risk Appetite and Liquidity Management
 3. Risk Appetite and Business Planning
 4. Risk Appetite and Performance Measurement
- Recap

I. Research Background

Project Background and Motivation

Research Project

Topic: Linkage between risk appetite and strategic planning.
Authored by Kailan Shang and Zhen Chen

It is sponsored by the Joint Risk Management Section of the CAS, the CIA, and the SOA.

Project Team: 17 professionals (2 authors and 15 members on the POG) and 1 coordinator

Motivation

- Risk appetite framework has been built in many leading financial institutions.

- However, there is still a lack of integration of risk appetite and business decisions.

- It is necessary to address this potential inconsistency for better corporate governance and help practitioners to understand it.

What has been done?

The report "Risk Appetite: Linkage with Strategic Planning" is available online.



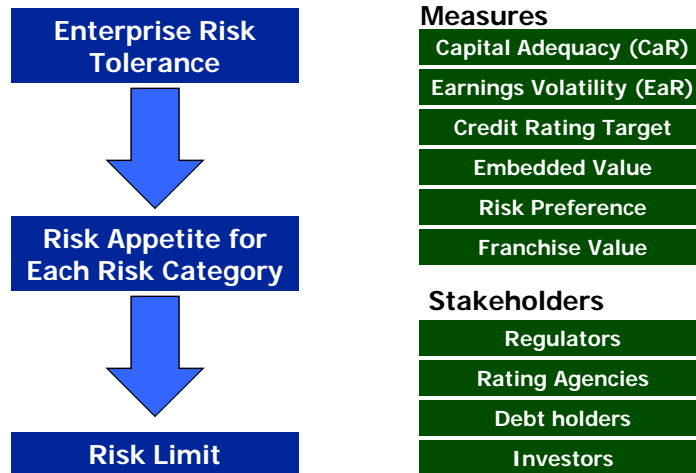
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II. Risk Appetite and Strategic Planning

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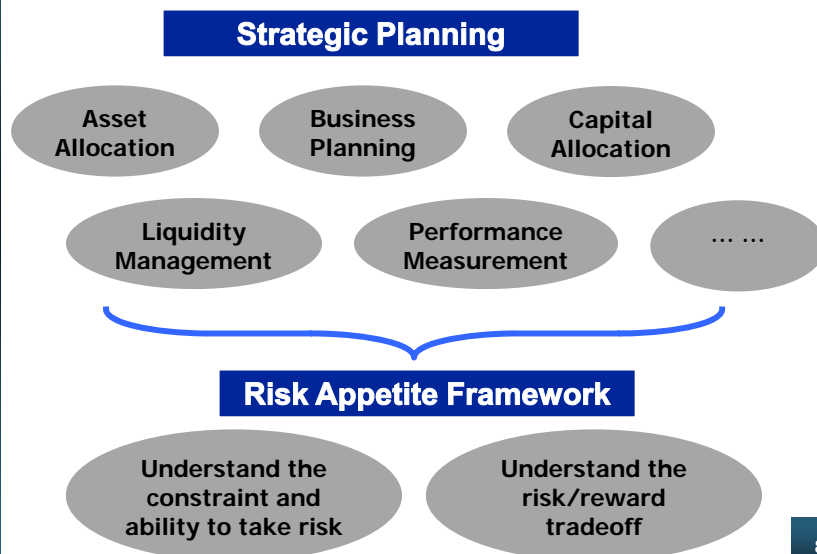
Risk Appetite Framework

Risk appetite articulates the level of risk a company is prepared to accept to achieve its strategic objectives.



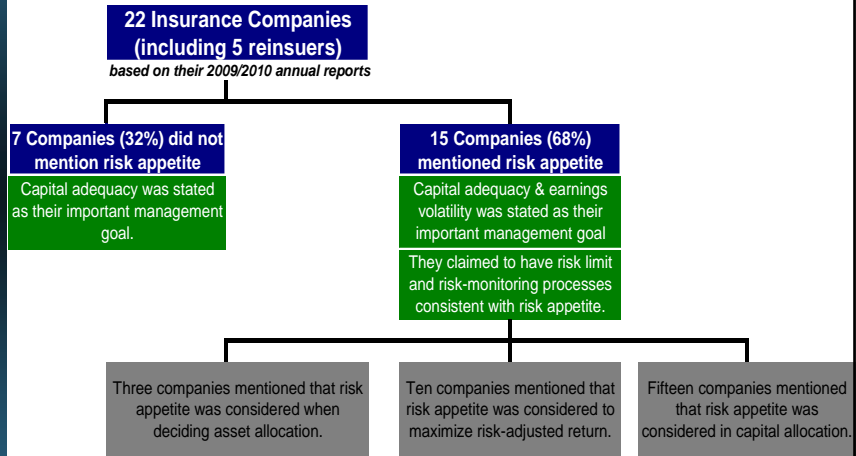
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Risk Appetite and Strategic Planning



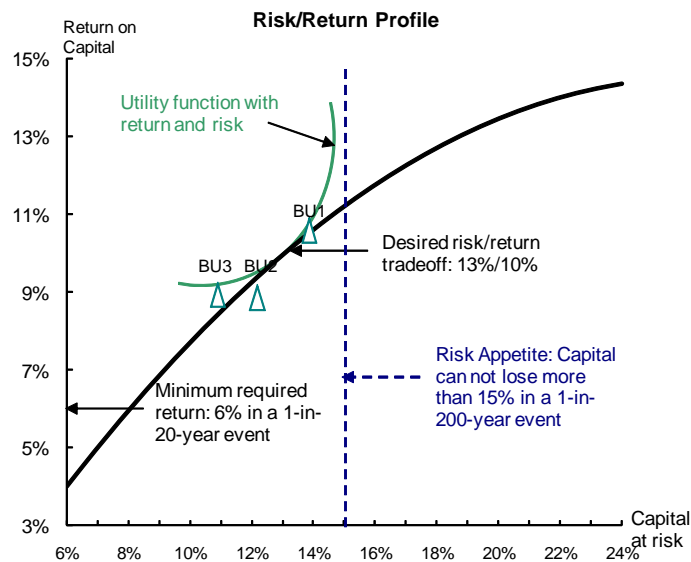
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Current Practices



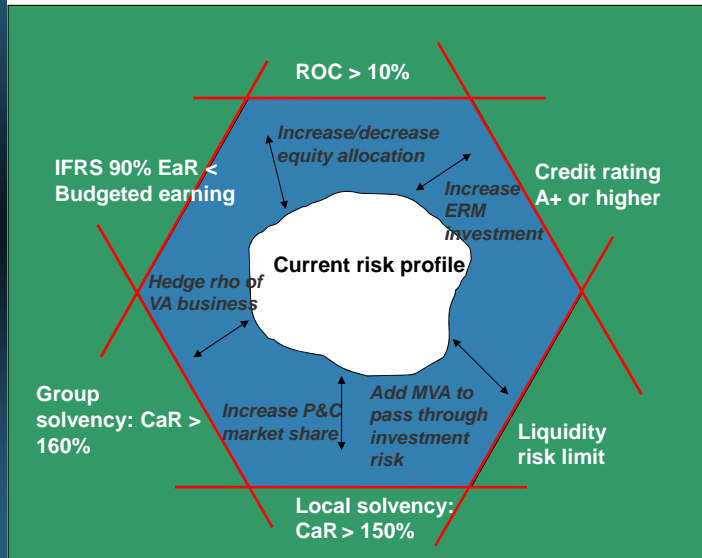
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Risk Appetite Framework and Business Analysis



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Constraints



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Risk Categories

Sample risk appetite for each risk category

Equity Risk

Credit Risk

Insurance Risk

CAT Risk

Liquidity Risk

Concentration Risk

Operation Risk

Interest Rate Risk

FX Risk

Terrorism Risk

Emerging Risk

Diversification

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Sample Risk Appetite and Risk Limit (1)

Insurance Risk

Risk Appetite

- 1.The company cannot lose more than 5 percent of IFRS equity in a 1-in-200-year event due to the insurance risk's impact on reserve.
- 2.The company cannot lose more than 50 percent of VoNB in a 1-in-200-year event due to the insurance risk's impact on pricing.

Illustrative Insurance Risk Monitoring Report

Risk Metric for insurance risk	Risk Limit	Current position
A&H* Loss ratio deviation from pricing**	+5%	+7%
A/E mortality rate for life	115%	108%
A/E mortality rate for annuity	90%	94%
A/E Lapse rate for non-lapse supportive	130%	135%
A/E Lapse rate for lapse supportive	90%	95%
Expense overrun	\$2.5 million	\$2.36 million

A&H Loss ratio and lapse rate exceed risk limit and need mitigation plan

*A&H: Accident and health products

** pricing target ratio may float from 35-90%, depending on mix of business

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Sample Risk Appetite and Risk Limit (2)

Terrorism risk

Risk Appetite

- 1.The company cannot lose more than 20 percent of IFRS equity in a terrorism event.
- 2.The company has a contingency plan in place for continuing business operations in the event of terrorism.

Risk Limit

- 1.Concentration of policyholders' locations.
- 2.For example, the company may stop underwriting life insurance coverage for additional lives working in the same building once the total sum assured on the lives in the building reaches \$100 million.

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III. Case Study

a. Risk Appetite and Asset Allocation

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Asset Allocation

- **Strategic Asset Allocation (SAA):** A long-term policy portfolio reflecting the desired systematic risk exposure.
- **Tactical Asset Allocation (TAA):** Deviation from SAA to take advantage of short-term market opportunities.
- **Example**

Asset Class	SAA	TAA
Bond	50%	+/-7% (43%~57%)
Equity	30%	+/-10% (20%~40%)
Cash	20%	+/-3% (17%~23%)

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Traditional Approach

Return Objective

- Minimum return: Statutory rate to fund statutory reserve
- Enhanced margin: Competitive return to fund liability and a reasonable profit
- Surplus account: Riskier asset allocation to achieve higher return

Risk Consideration

- Valuation concerns
- Cash flow volatility
- Reinvestment risk
- Credit risk
- Disintermediation risk
- Regulatory and legal constraints

Sometimes, it is hard to consider all the risks together to understand the risk return tradeoff on an aggregated basis.



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Traditional Approach – Mean Variance Analysis

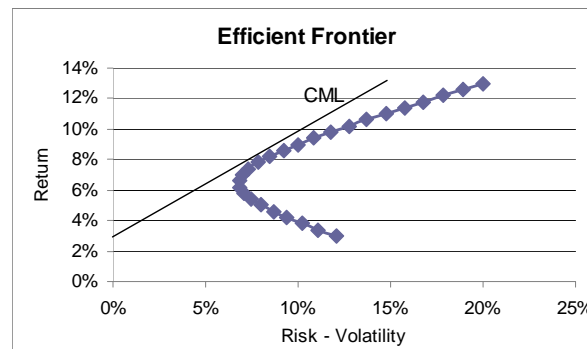
Two available asset classes:

	Expected return	Risk (Volatility)
Bond	5%	8%
Equity	9%	10%

Risk free rate: 3%

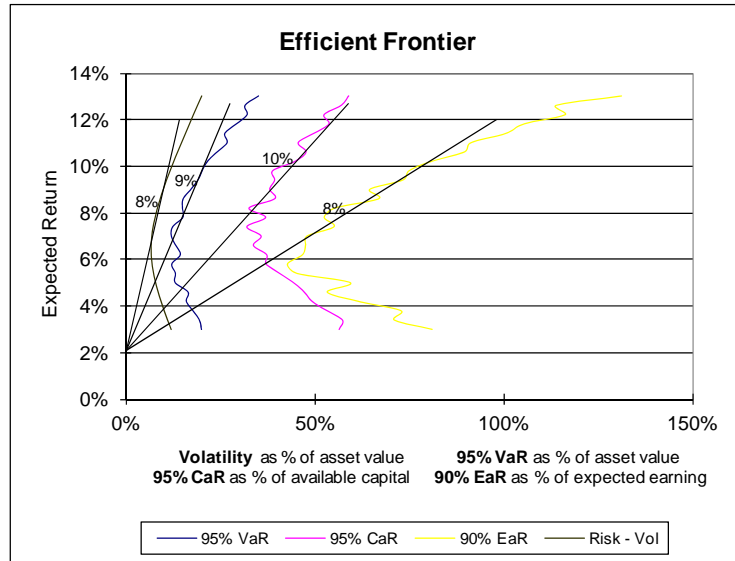
Correlation between bond return and equity return: 20%

Required return: 8.5%



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Risk Appetite in the Picture



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CaR and EaR

Tangent Risk Portfolios under Different Risk Measures

Risk Measures	Expected Return	Bond	Equity
Volatility	8%	25%	75%
95% VaR	9%	0%	100%
95% CaR	10%	-25%*	125%
90% EaR	8%	25%	75%

*Negative means short selling, which might be forbidden for some financial institutions. The final decision shall consider all the constraints and suboptimal allocation plan may be used.

CaR and EaR are risk measures that consider all the identified risks including their relationship, both on the asset side and liability side.

They may serve better as risk objective and therefore provide a more appropriate view of risk return trade off.

They also act as constraints for SAA and TAA.

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III. Case Study

b. Risk Appetite and Liquidity Management

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Liquidity Risk Management

Without a clearly defined guideline, liquidity risk management usually has oversimplified rules or overconservative strategies.

Examples

1. Cash balance is no less than the maximum weekly cash payment in the past three months.
2. Cash balance is no less than Y times the maximum daily cash payment in the past month.
3. Liquid assets cannot be less than 50 percent of the total asset balance.

Problems

1. The underlying risks may not be identified and correctly quantified. The risks may be caused by both the liability structure and the exogenous market changes.
2. Too conservative means lower yield due to more liquid asset holding.

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Risk Appetite for Liquidity Risk

Sample risk appetite for liquidity risk

1. The company maintains liquidity in a 1-in-200-year event over a time horizon of three months.
2. The company maintains liquidity at the confidence level of 95 percent while the liquidity cost to meet cash payments at the confidence level of 99.5 percent (1 in 200 years) is less than 25 percent of capital.

Considerations

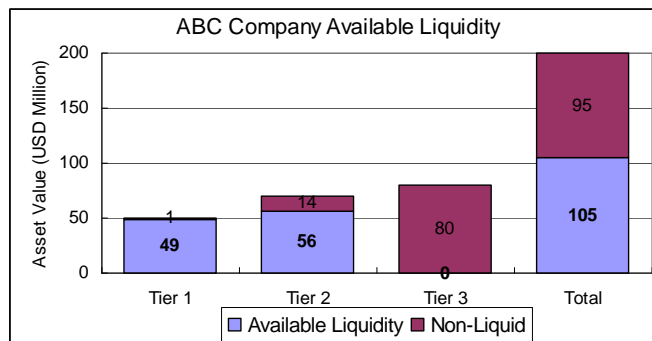
1. It requires a bottom up approach to identify and quantify all the factors that affect required liquidity and available liquidity.
2. In business planning, the projected overall liquidity position has to remain consistent with risk appetite.
3. Liquidity requirements need to be considered when allocating capital to different risks.
4. Strategic asset allocation should consider the liquidity of assets and the likely liquidity cost.

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Liquidity Management Case Study (1)

Risk appetite for liquidity risk

Company ABC needs to maintain a liquidity level to meet payment requirement for a 1-in -200-year event for a continuing period of three months.



Tier 1: Highly liquid, like cash and government bonds.

Tier 2: Liquid, like bond coupons and redemption, equity dividends, rental income.

Tier 3: Not liquid, with big market impact and significant liquidity cost.

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Liquidity Management Case Study (2)

Required Liquidity

1. *Credit rating downgrade impact*: the additional cash payment requirement due to a credit rating downgrade.

2. *Normal operational cash flow volatility (99.5th percentile - expected)*: Use historical data of net cash flow (benefit outgo + expense – premium income for an insurance company).

3. *Catastrophe event impact*: Stress test the business portfolio using some extreme events like the 2011 Japan earthquake and the 1918 Spanish flu pandemic.

4. *Funding commitments*.

5. *Interest rate risk*: disintermediation risk due to interest rate spike.

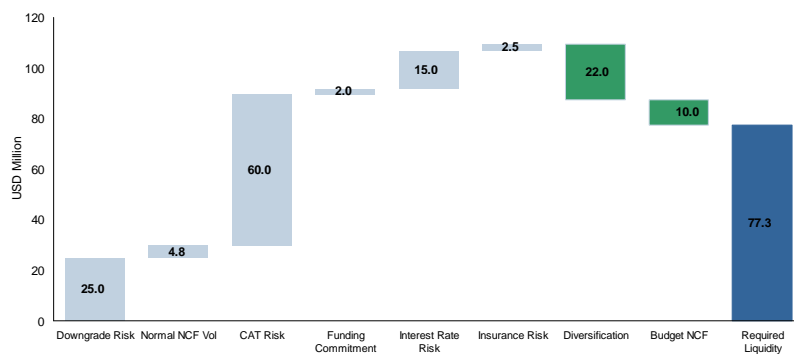
6. *Insurance risk* such as adverse mortality and morbidity experience.

7. *Correlation* among the above factors.

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Liquidity Management Case Study (3)

Required Liquidity (1st Case)



Required liquidity (\$77 million) < available liquidity (\$105 million)

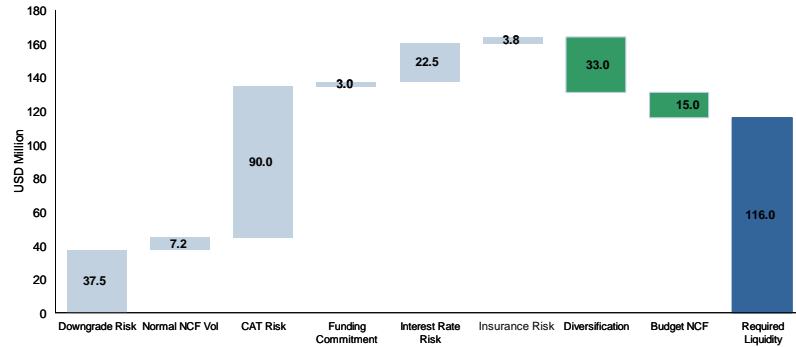
Possible actions

Switch some liquid low-yield assets to less liquid high-yield assets.

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Liquidity Management Case Study (4)

Required Liquidity (2nd Case)



Required liquidity (\$116 million) > available liquidity (\$105 million)

Possible actions

1. Decrease the underwriting of CAT coverage and/or have it reinsured.
2. Shift business mix by selling policies with market value adjustment.
3. Adjust asset allocation to have more liquid assets.

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III. Case Study

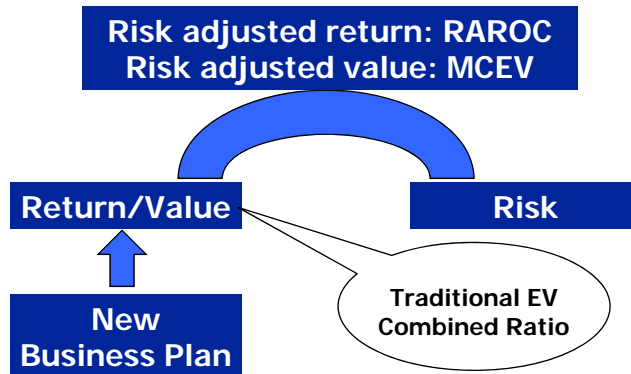
c. Risk Appetite and Business Planning

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New Business Planning and Risk Appetite

Insurance companies normally prepare new business budgets of certain return or value measures each year.

Clients, shareholders, employees and regulators are also interested in understanding the amount of risk the company will take in the future.



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Business Planning Case Study (1)

2012 New Business Plan

- New business mix projection for 2012
- Total premium target of 2012 for each business unit

2011 Reinsurer ABC Business Mix (USD million)

Year 2011	Premium income	Underwriting profit	Profit margin
Auto liability	10	0.9	9.0%
Specialty liability	15	1.5	10.0%
CAT (catastrophe)	50	7.5	15.0%
Homeowners/farm owners	25	0.8	3.2%
Company	100	10.7	10.7%

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Business Planning Case Study (2)

Return and Required Capital as of Dec. 31, 2011 (USD million)

Year 2011	Premium	Required capital	PV (required capital)	[PV (underwriting profit) + PV (invest. income on capital)] × (1-t)	RAROC
Auto liability	10	5	10	1.8	18%
Specialty liability	15	10	20	3	15%
CAT	50	125	250	15	6%
Homeowners/farm owners	25	20	40	1.6	4%
Company	100	144	289	21.4	7.4%

$$\text{RAROC} = \frac{\text{PV (underwriting profit)} + \text{PV (investment income on capital)}}{\text{PV (required capital)}} (1-t)$$

Where PV stands for present value

$$\text{PV (underwriting profit)} = \text{PV (premium)} - \text{PV (claims)} - \text{PV (acquisition costs)} - \text{PV (other expenses)}$$

Required capital is the required economic capital

t: effective corporate tax rate

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Business Planning Case Study (3)

Economic Capital Position

Available Capital @ Jan. 1, 2012 \$250 Million

Required Capital @ Jan. 1, 2012 \$72 Million

Available Capital for new business \$178 Million

Reinsurer ABC's risk appetite statement

1. Economic capital adequacy: The company has sufficient economic capital with a probability of 99.95 percent (available economic capital is no less than the required economic capital in a 1-in-2,000-year event).

2. Economic earning volatility: Reinsurer ABC has a long-term target 10 percent RAROC (hurdle rate) over the cycle. The company does not want to see drops in earnings by more than 40 percent in a 1-in-20-year event. In other words, the company should earn at least 6 percent RAROC with a probability of 95 percent.

Other objective: Maintain a minimum 20% premium growth rate

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Business Planning Case Study (4)

Things to Address

1. The economic capital adequacy requirement needs to be met. Capital available for new business is \$178 million.
2. The overall target RAROC of 10 percent needs to be met.
3. Long-term client relationships need to be maintained; therefore, reducing undesired lines of business needs to be gradual.
4. The new business projection should also consider the phase of cycles for different lines of business (hard market or soft market).
5. Other constraints such as appetite for catastrophe risk and concentration risk need to be assessed.

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Business Planning Case Study (5)

2012 New Business Plan (USD Million)

2012	Premium	Required capital	PV (required capital)	[PV (underwriting profit) + PV (invest. income on capital)] × (1-t)	RAROC
Auto liability	50	25.0	50.0	9.0	18%
Specialty liability	30	20.0	40.0	6.0	15%
CAT	45	112.5	225.0	13.5	6%
Homeowners/ farm owners	20	16.0	32.0	1.3	4%
Company	145	148.4	296.8	29.8	10.0%

45% Premium Increase

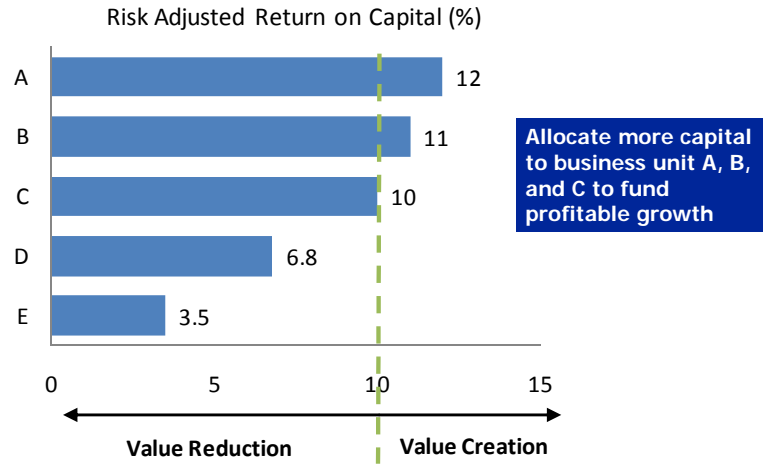
< Available Capital (\$178 Million)

= long-term Hurdle rate

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Business Planning Case Study (6)

2011 RAROC for Each Business Unit



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III. Case Study

d. Risk Appetite and Performance Measurement

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Risk Appetite and Performance Measurement

Linking performance measurement with risk appetite helps foster a healthy risk culture.

Step 1: Find appropriate measures

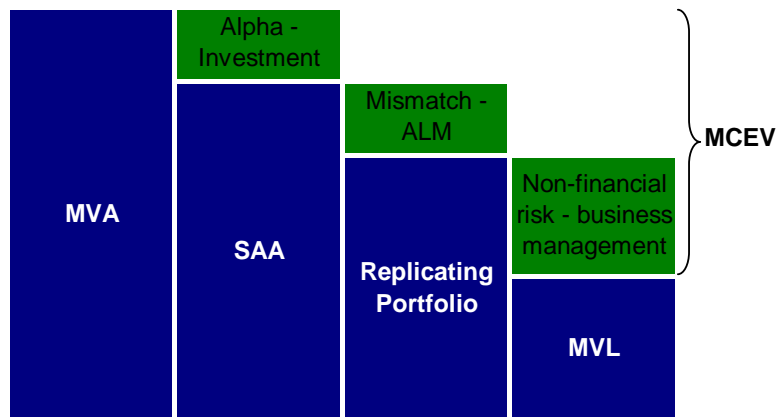
- The gap between current risk profile and risk tolerance.
- Risk-adjusted return
- Risk-adjusted value

Step 2: set the appropriate target. It should be consistent with strategic planning.

Step 3: Communication with the management team and getting their buy in and agreement on all the assumptions used in the determination of the target. However, it is practically difficult.

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MCEV Decomposition



EVA_{inv} = extra investment income over SAA – Δ cost of capital

EVA_{bus} = MCEV of new business + expected return on replicating portfolio + experience G/L – cost of capital

EVA_{ALM} = return on SAA – return on replicating portfolio

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Liability Replication Portfolio

It uses the available liquid assets in the market to replicate the value and sensitivities of liability.

Under risk appetite framework, it needs to replicate the cash flows, economic value (MVL), sensitivities, and the earnings, value and capital requirement under statutory and rating agency frameworks.

Ideal Characteristics

1. It mimics the liability characteristics as much as possible.
2. The replication is valid for a wide range of market situations.
3. Its value is easy to track.

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Performance Measurement Case Study (1)

Asset Portfolio – SAA (USD Million)

Asset Class	MVA	Duration	Expected Return
Short-term bond	100	5	3%
Long-term bond	100	20	5%
Total	200	12.5	4%

Liability Portfolio (USD Million)

MVL = 160 Duration = 15

Cost of Capital Rate: 4%

Active Asset Management

An expectation of the bond yield curve flattening.

A \$10 million short-term bond is sold for long-term bond investment.

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Performance Measurement Case Study (2)

Interest Rate Movement

- 5-year interest rate increases by 1 percent
- 20 year interest rate decreases by 1 percent.
- 15-year interest rate decreases by 1/3 percent

EVA for Investment

ΔMVA based on SAA	\$15 Million
ΔMVA based on actual portfolio	\$17.5 Million
Asset duration	14.1 years
Reduction in required capital	\$20 Million

$$\begin{aligned} \text{EVA}_{inv} &= \text{extra investment income over SAA} - \Delta \text{ cost of capital} \\ &= (17.5 - 15) - (-20 \times 0.04) = \$3.3 \text{ Million} \end{aligned}$$

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Performance Measurement Case Study (3)

EVA for ALM

$$\Delta \text{MVL (replicating portfolio)} = \text{MVL} \times (1/3)\% \times 15 = \$8 \text{ Million}$$

$$\begin{aligned} \text{EVA}_{ALM} &= \text{return on SAA} - \text{return on replicating portfolio} = 15 - 8 \\ &= \$7 \text{ million} \end{aligned}$$

EVA for Business

$$\begin{aligned} \text{EVA}_{bus} &= \text{MCEV of new business [10]} \\ &+ \text{expected return on replicating portfolio [(4\%) \times (160)]} \\ &+ \text{experience G/L [0]} \\ &- \text{cost of capital [1.6]} = \$14.8 \text{ Million} \end{aligned}$$

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V. Recap

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Conclusion

Disconnection between risk appetite and strategic planning is not uncommon.

Risk appetite framework provides a holistic view of the company's willingness and ability to take risk.

It helps make wise strategic decision

a) Emphasize the risk perspective in decision making.

b) Provide information about risk reward trade off.

c) Encourage better corporate governance.

d) Think in the context of the big picture.

e) Influence business management almost everywhere.

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Thank you!

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