Risk Measures
What is the best way to describe a risk and does it matter?

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Contents

Risk measure concepts

• Why do we want to measure risk?
• Multiple risk measures
• Introducing an example
• Different stakeholders
• Translation systems
Why do we want to measure risk?

• You measure risk to differentiate risk.
• Some industries like financial services want articulated risk statements.
• Most non-financial industries still have risk management and need a way to report on it.
• For business that actively take on risk, adverse selection will occur if you don’t differentiate risk.
Multiple risk measures
Introducing an example

• Let’s stay out of context to something that I think about daily...

• What risks and risk measures do I care about?
  – That I get sued...
  – That my team leave...
  – That the client is unhappy...

• Who are the stakeholders
  – My team
  – Me
  – My wife!
Different stakeholders

• Risk measures are everywhere and designed for different purposes and people.
• The right risk measures depends on purpose. This is why there are so many good and equally effective risk measures.
• Many excellent risk measures already exist within developed businesses and should be utilised.
• Is there a compelling need to remove excess risk measures?
Translation systems

• The problem should be split into:
  – What is the right risk measures for stakeholder one?
  – What is the right risk measures for stakeholder two?
  – How do we translate between the two stakeholders?

Stakeholder one risk measure

Risk Measure Translation Systems

Stakeholder two risk measure

We need this!
Joining Up Thinking For Improved Performance: How Risk Measures Can Be Tolerably Aligned

A. What stakeholders are worried about
B. Why risk measure alignment is important
C. A survey of risk and reward measures
D. How do we align measurements?
E. How tolerance comes into play
F. Examples
A: WHAT INSURANCE STAKEHOLDERS ARE WORRIED ABOUT:

<table>
<thead>
<tr>
<th>Financial Goals:</th>
<th>Non Financial Goals:</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Return</td>
<td>– Customer Satisfaction</td>
</tr>
<tr>
<td>– Growth</td>
<td>– Reputation</td>
</tr>
<tr>
<td>– Shareholder Value</td>
<td>– Employee Excellence</td>
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<tr>
<td>– Controlled Aggregations</td>
<td>– Strategic Initiatives</td>
</tr>
<tr>
<td>– Cash Flow</td>
<td>– Compliance</td>
</tr>
<tr>
<td>– Financial Stability</td>
<td>– Operational Excellence</td>
</tr>
<tr>
<td>– Survival</td>
<td>– Pricing Accuracy</td>
</tr>
</tbody>
</table>

Other Dimensions: Short Vs. Long Term; and Individual vs. In-Aggregate
B: WHY RISK MEASURE ALIGNMENT IS IMPORTANT

- Mutual support of mutual objectives
- Minimize conflict of interest
- Common risk adjusted reward metrics
- Timely reporting

- Relative efficiencies
- Honesty
- More effective challenge
- Supports positive risk culture
## C: Example Quantitative Risk Measures:

### Top Down
- Combined ratio relative to peers
- Market capital
- RAROC volatility
- Aggregate loss probability
- Liquidity Scenarios
- Premium shortfall VAR at 50%, 80% etc.
- TVAR at 95%, 99.5% etc.

### Bottom-Up
- Price vs. Target
- Premium
- ROE
- XS AAL
- Amounts past due
- MPL to Premium
- Specific Risk Tolerances
## C: Example of Quantitative Reward Measures

<table>
<thead>
<tr>
<th>Top Down</th>
<th>Bottom-Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Expected profit</td>
<td>• Rate changes</td>
</tr>
<tr>
<td>• Premium growth</td>
<td>• Market share</td>
</tr>
<tr>
<td>• RAROC</td>
<td>• Price vs technical price</td>
</tr>
<tr>
<td>• Max single or probable aggregate loss</td>
<td>• Limits profile</td>
</tr>
<tr>
<td>• Free cash flow</td>
<td>• Cash flow</td>
</tr>
<tr>
<td>• Market beta</td>
<td>• 5 year operating ratio</td>
</tr>
<tr>
<td>• Capital strength</td>
<td>• Contingency planning</td>
</tr>
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# Putting It All Together

<table>
<thead>
<tr>
<th>Financial Goal</th>
<th>Risk Measure</th>
<th>Risk Meas.</th>
<th>Goal M.</th>
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<tr>
<td>Profitability</td>
<td>Combined Ratio Relative to Peers</td>
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<td>Expected profit</td>
<td>Rate changes</td>
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<tr>
<td>Growth</td>
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<td>Survival</td>
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<td>Contingency planning</td>
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C: Example Qualitative Risk And Reward Measures

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<tr>
<th>Non-Financial Goals:</th>
<th>Risk Measures</th>
<th>Return Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cust. Satisf.</td>
<td>Complaints</td>
<td>Retention Rates</td>
</tr>
<tr>
<td>Reputation</td>
<td>Reputation Risk</td>
<td>Business Model Effectiveness</td>
</tr>
<tr>
<td>Empl. Excellence</td>
<td>Exit Interview Profile</td>
<td>Values Alignment</td>
</tr>
<tr>
<td>Strat. Initi</td>
<td>Complexity</td>
<td>Project Success Metrics</td>
</tr>
<tr>
<td>Compl'ce</td>
<td>Issues Detected</td>
<td>Issue resolution speed</td>
</tr>
<tr>
<td>Op Excell.</td>
<td>Strategic and Operational Risks</td>
<td>Innovation Levels</td>
</tr>
<tr>
<td>Price Acc.</td>
<td>Process Coherence Measures</td>
<td>Reserve Development</td>
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</table>
D: How do we align measurements?

Think top down, bottom up and side to side

In Order Presented Try:

1. Substitution
2. Translation
3. Adoption
Substitution: replace local metric with another (or replace both with a new better all-rounder!)

Advantages:
- Easy to administer and monitor
- The review process may bring better understanding of goals clash.
- May be more robust than an ad-hoc local solution

Disadvantages:
- May be less goal aligned than original local metric
- May reduce buy-in
- May require additional processes to be put in place to administer
- May require secondary monitoring as a guard against false positives/ negatives
- May lose “history”
Translation: keep the two metrics, but find a factor or formula that relates them

(This can extend to composite measures like: \( (2 \times \text{VAR} + \text{TVAR} + \text{MPL} \times 1.5) / 3 \))

Advantages:

- Allows separate areas to manage in units that are most direct to their BAU processes
- Translation process can uncover inconsistencies between different goals/benchmarks/appetites
- Can be good validation of capital model reasonableness
- Possibly more efficient than substitution with respect to alignment of risk measure and goals

Disadvantages:

- Only works for quantitative metrics that fit a loss distribution
- May not be appropriate for stressed situations which are possibly the most important ones
- Still may require supplemental monitoring
- Requires additional capital modelling resource
- May require more model granularity to effect
Adoption: rather than substitute or translate: take on an additional measure (top or bottom)

Advantages:

- Demonstrates effective risk culture
- Fullest alignment with goals is maintained
- Allows easier conversations
- Puts incentive to understand aggregation of the new statistic
- Works with most/all quantitative and qualitative measures

Disadvantages:

- Additional effort of maintaining adopted measure
- Complexity of managing and reconciling more measures
- Risk of misalignment may be increased if the measure is too much of a force fit against differing objectives
E: How Tolerance Comes Into Play

Tolerance: how much background change will be accepted

This may involve

– Extreme events above stated size
– Environmental changes
– Goals changes
– Model Change
– “Other”

When exceeded, the risk metrics may need to be realigned.
F: Examples

The risk measure for a production area is total and average limits which it to be aligned with the insurance risk capital measure for the company as a whole.
Example: Substitution

Instead of tracking average ant total limits have a premium based capital allocation (relatively easy) and a modelled maximum probable loss (hard).
Example: Translation

track average and total limits at the business unit level, but undertake modelling to determine the sensitivity of the capital requirement in relation to changes in these variables. Then select a scaling adjustment factor that projects the change in capital requirement as the metrics change.
Example: Adoption

Make average and total limits a metric for senior management. This may require collection from other business units and thought about how they should be aggregated.
Group Example
Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.