Attitudes face au risque et face aux modèles en assurance

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Formation ERM
Joint work with David Ingram
Plan

• Présentation des attitudes face au risque (slides de David Ingram, summer school de Lausanne 2013)
• Attitudes face aux modèles en assurance
• Questionnaire et compléments: exposé d’étudiants de Cornell sur le surprise game
Introduction

- Willis Re analytics research revealed some basic ideas about risk attitudes (propensities) and risk strategies
  - Many of you already use these ideas every day
  - This session will offer some structure and terminology
- We will discuss applications of these ideas to
  - Risk management strategy
  - Managing through the insurance cycle
  - Enterprise risk management
Introduction

The theory of plural rationalities
Risk attitudes and risk strategies
Seasons of risk & the insurance cycle
Risk attitudes & ERM
Four views of risk

Maximizers

Conservators

Pragmatists

Managers
Maximizers’ view

- Risk is not very important – profits are important
- It’s fine to accept large risks, as long as the price is right
- Risk is mean reverting:
  - Gains will always follow losses
  - The best companies will have larger gains and smaller losses over time
Conservators’ view

- Increasing profit is not as important as avoiding loss
- Need to **tightly limit** risks
- The world is in a delicate balance
  - Any major change could send things into ruin
Managers’ view

- Risk is measurable and controllable
- Risk and reward should be **carefully balanced**
- Experts are best suited to
  - Help find risks offering the best rewards
  - Manage these risks to keep firm safe
Pragmatists’ view

- The future is totally unpredictable
- You can’t control risk so there is no point in trying
- It is usually best to
  - Avoid major commitments
  - Keep options open
  - Seek freedom to react to changing conditions
What stock market model would you believe?

- In the next 20 years,
  - Risk is **high**
    - Chance of loss > 20% is 10% or more
  - Risk is **moderate**
    - Chance of loss > 20% is about 5%
  - Risk is **low**
    - Chance of loss > 20% is much less than 5%
  - Do not believe we can know the risk level
Poll question

Would you say that your own risk attitude is:

- Manager
- Maximizer
- Pragmatist
- Conservator
### Other Groups

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Directors</th>
<th>Top Management</th>
<th>Underwriters</th>
<th>Risk Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximizer</td>
<td>21%</td>
<td>29%</td>
<td>18%</td>
<td>11%</td>
</tr>
<tr>
<td>Manager</td>
<td>38%</td>
<td>41%</td>
<td>42%</td>
<td>62%</td>
</tr>
<tr>
<td>Conservator</td>
<td>9%</td>
<td>4%</td>
<td>23%</td>
<td>9%</td>
</tr>
<tr>
<td>Pragmatist</td>
<td>33%</td>
<td>26%</td>
<td>18%</td>
<td>17%</td>
</tr>
</tbody>
</table>
TODAY’S AGENDA

Introduction
The theory of plural rationalities
Risk attitudes and risk strategies
Seasons of risk & the insurance cycle
Risk attitudes & ERM
Risk strategies

- Diversification
- Loss controlling
- Risk trading
- Risk steering
Diversification

• Oldest type of risk strategy
  – Spread exposures across different classes of risks
  – Avoid large risk concentrations

• Formal diversification programs set targets for the spread of risk
  – Maximums and minimums for various classes of risk

• Even growth
Loss controlling

- Most traditional form of risk strategy
  - Identify and mitigate the most significant risks
- Commonly practiced by non-financial firms
  - Also applies to financial risk
    - Careful underwriting of loans / insurance policies
    - Claims management & credit workout
- Low growth
Risk trading

- Newer risk strategy
  - Arose from trading desks and the (re)insurance industry
- Focus on getting the price of risk correct
  - Requires complicated models of risk, reward, and economic capital
- Can be applied on a transaction-by-transaction or other “silooed” basis
  - If these firms use Economic Capital, they allocate it to the case level
- Seek high growth
Risk steering

- Applies the ideas of risk trading at a macro level to the major strategic decisions of the firm
  - Seeks the optimal risk / reward balance
  - Tries to steer the firm in that ideal direction
- Fundamentally an enterprise-wide approach
- Almost always tied to Economic Capital Model
- Some seem to think that only risk steering is “real” ERM
- Moderate growth – grow with market
Favorite risk strategies

- **Conservators** favor Loss Controlling
- **Maximizers** favor Risk Trading
- **Managers** favor Risk Steering
- **Pragmatists** favor Diversification
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Why do these four risk attitudes exist?

- Four contradictory views of the world
  - But the world doesn’t hold still

- No one view is right all of the time…

- But each of the views is right some of the time
In the insurance industry, this shifting can be delayed due to the time it takes to recognize losses – especially for long-tailed lines.

<table>
<thead>
<tr>
<th>During the <strong>BOOM</strong></th>
<th>During the <strong>BUST</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes shift towards <strong>Maximizer</strong></td>
<td>Attitudes shift towards <strong>Conservator</strong></td>
</tr>
<tr>
<td><strong>In UNCERTAIN</strong> times</td>
<td><strong>In MODERATE</strong> times</td>
</tr>
<tr>
<td>Attitudes shift towards <strong>Pragmatist</strong></td>
<td>Attitudes shift towards <strong>Manager</strong></td>
</tr>
</tbody>
</table>
Four seasons of risk
Four seasons of risk

- Trends are reliable
- Hedging works

Nominal House Prices

- Recession
- Case-Shiller National Index (Quarterly)
- CoreLogic HPI
- Case-Shiller Composite 20 Index

http://www.calculatedriskblog.com/
Four seasons of risk

- Risky decisions pay off handsomely
- Unhedged positions beat out carefully hedged positions

Nominal House Prices

- Recession
- Case-Shiller National Index (Quarterly)
- CoreLogic HPI
- Case-Shiller Composite 20 Index

http://www.calculatedriskblog.com/
Four seasons of risk

- Many risks have turned into LOSSES
- Risk management focuses on survival
Four seasons of risk

Suddenly, things get really unpredictable
Almost any course of action looks flawed
Insurance cycle and risk attitudes

Approximate Industry Gross UW Margin
Other Liability Occurrence

Manager
Maximizer
Pragmatist
Conservator

Accident Year

Introduction

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Risk attitudes and ERM

- Risk Attitudes can be used to enhance ERM program design and development
  - When first creating an ERM program
    - Align ERM program to predominant risk attitude
    - Instead of using a textbook version of ERM that does not fit with risk attitude
      - Usually rejected as irrelevant or even dangerous
  - When enhancing an existing ERM program
    - To recognize and support multiple risk attitudes
## Rational adaptability

A perfect ERM program will adapt to the risk environment

<table>
<thead>
<tr>
<th>Risk Environment</th>
<th>BOOM</th>
<th>BUST</th>
<th>UNCERTAIN</th>
<th>MODERATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Attitude</td>
<td>Maximizer</td>
<td>Conservator</td>
<td>Pragmatist</td>
<td>Manager</td>
</tr>
<tr>
<td>Risk Management Strategy</td>
<td>Risk Trading</td>
<td>Loss Controlling</td>
<td>Diversification</td>
<td>Risk Steering</td>
</tr>
</tbody>
</table>
Be realistic

- Rational adaptability is an ideal strategy
- Almost impossible to simultaneously
  - Know when the risk environment shifts
  - Do what it takes to
    - Shift the firm's risk attitude
    - Execute the new risk strategy competently
Harmonization

- Practical alternative to Rational Adaptability “perfection”
  - An inelegant solution
- Keep all four risk attitudes in the discussion
  - Create compromise strategies
- Must be more than superficial
  - Important to truly value all views of risk
  - Really believe that there is no totally wrong view
- Keep your eye on the rational adaptability ideal
  - Operate somewhere between “stay the course” and rational adaptability
  - Over time getting closer and closer to the ideal
The Surprise Game: a demonstration of Plural Rationalities

- Agent-based model of a closed economy with 30 participants
- Rules come from Plural Rationalities
- Dynamic world and dynamic players
  - Players’ risk attitudes are set at the start and then vary over time according to experiences
  - The overall risk environment is set at the start and varies based upon performance of the economy

- Developed by Michael Thompson & Paul Tayler, 1985
  - Adapted by David Ingram, 2010
Surprise Game: sample outcome
Surprise Game rules (excerpts)

- **Investment rate**
  - Maximizers: 30%
  - Managers: 15%
  - Pragmatists: 5%
  - Conservators: 0%

- **Expected returns**
  - Boom: 30%
  - Moderate: 15%
  - Uncertain: -10% or 10%
  - Bust: -5%

- **Triggers for changing risk attitudes**
  - Return < -10% (all)
  - Top 5 firms returns >20% (all but Max.)
  - Return < 20% (Maximizers)
  - Return < 0% (Managers)
  - 3+ periods w. returns the same sign (Prag.)
  - Return > 10% (Conservators)

- **Triggers for changing environment**
  - Cash in bank > cash in companies
  - Profits > cash in system (once)
  - Profits > cash in system (repeatedly)
  - Too many bankruptcies
## Stay the Course

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Average Return</th>
<th>Std Dev Return</th>
<th>Failure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pragmatists</td>
<td>0</td>
<td>15.3</td>
<td>10.61%</td>
</tr>
<tr>
<td>Conservators</td>
<td>0</td>
<td>5.39</td>
<td>0.01%</td>
</tr>
<tr>
<td>Maximizers</td>
<td>4.28</td>
<td>32.08</td>
<td>26.96%</td>
</tr>
<tr>
<td>Managers</td>
<td>2.88</td>
<td>17.96</td>
<td>12.90%</td>
</tr>
</tbody>
</table>

## Adaptation

<table>
<thead>
<tr>
<th>Adaptability</th>
<th>Average Return</th>
<th>Std Dev Return</th>
<th>Failure Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>-1.69</td>
<td>19.35</td>
<td>19.97%</td>
</tr>
<tr>
<td>25%</td>
<td>1.94</td>
<td>20.12</td>
<td>16.09%</td>
</tr>
<tr>
<td>50%</td>
<td>5.56</td>
<td>20.21</td>
<td>12.19%</td>
</tr>
<tr>
<td>75%</td>
<td>9.19</td>
<td>19.64</td>
<td>8.32%</td>
</tr>
<tr>
<td>100%</td>
<td>12.81</td>
<td>18.46</td>
<td>4.76%</td>
</tr>
</tbody>
</table>
The survey

• 5 questions about personal details
• 40 questions about risk attitudes (identical to the ones of David’s initial survey)
• 25 questions about attitudes w.r.t. models
• Different populations have been surveyed
  – Cardif (28)
  – April Santé Prévoyance (42)
  – Club ERM (mainly FR) + INARM (worldwide): 154
  – Labo SAF (14)
  – Bank of Ghana (20)
• So far, 205 out of 266 respondants took the survey up to the end.
Goals & Schedule

• Compare risk attitudes in XYZ vs FR, in France vs US, vs world

• Same for attitudes w.r.t. models, but without the input from David’s initial survey (which was only about risk attitudes)

• Check whether risk attitudes strongly determine or not attitudes w.r.t. models
Initial idea about attitudes wrt models

• Starting point: test whether risk attitude determines attitude wrt models
• For each risk attitude, we choose 6 sentences that correspond to foreseen attitude wrt models.
• Example: Conservators are expected to be reluctant to trust models because they think that they tend to often underestimate extreme risks, and would prefer to use stress tests than sophisticated risk models.
• Pool of questions proposed by J.P. Félix, B. Bolle-Rédat, P. Baudier, C. Robert, D. Ingram & S. Loisel
• Selection and edition of question by D. & S.
**Attitudes face au risque aux US**

<table>
<thead>
<tr>
<th>Risk Attitudes</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSERVATORS</td>
<td>20.1%</td>
<td>10.1%</td>
</tr>
<tr>
<td>MANAGERS</td>
<td>57.2%</td>
<td>0.0%</td>
</tr>
<tr>
<td>MAXIMIZERS</td>
<td>42.8%</td>
<td>1.3%</td>
</tr>
<tr>
<td>PRAGMATISTS</td>
<td>32.7%</td>
<td>18.2%</td>
</tr>
</tbody>
</table>
Attitudes face au risque aux US

**Risk Preferences**

- MAX/MGR, 29.6%
- MAX, 9.0%
- MGR/PRAG, 7.2%
- MGR, 17.0%
- CONS/MGR, 8.5%
- CONS/PRAG, 2.7%
- CONS/MAX, 1.8%
- CONS, 3.6%
Attitudes face au risque aux US
First results, next steps & discussion

• More conservators and pragmatists for our survey than in David’s initial survey (in the US, more maximizer/manager)
• Predominant attitude w.r.t. models with the current (basic) scoring technique: MANAGER
• Except in some boards/executive committees
• Bias: actuaries are over-represented, and they seem to (too much) like models!
• Europe vs US, Solvency II effect, time effect, language interpretation issue
• Other stat. treatment: remove people who won’t give you an opinion (39% vs 15% of people choose neutral more than 25% of the time -> Pragmatist bias for risk attitude)
First results, next steps & discussion

• Scoring principle and statistical analysis, blended groups
• Analysis by number of years of experience, by position
• Determine the answers with the highest explanatory power
• Blended attitudes and feedback from participants: context is very important to answer survey questions.
• Small group and short survey: more a debate ignition tool about risk and ERM action plans than statistical truth.
OVERVIEW

• REVIEW OF ORIGINAL WORK
• PERCEIVED SHORTCOMINGS
• PROPOSED ADDITIONS
• METHODOLOGY
• RESULTS
RISK ATTITUDES

Manager

Maximizer

Pragmatist

Conservator

As proposed by Ingram, Tayler, and Thompson
SHORTCOMINGS

• 30 “COMPANY” ECONOMY

• PSEUDO-ECONOMY GOVERNED ONLY BY BEHAVIOR OF SMALL GROUP OF INVESTORS

• INSULATED FROM OUTSIDE MARKET SHOCKS. BUBBLES, CRASHES, WARS, EMBARGOS, ETC.
PROPOSED ADDITIONS

• CHOSE A “REAL” MARKET INDEX AS A BASE

• MAKE PROBABILITY TRANSITION MATRICES TO MODEL INVESTOR BEHAVIOR

• EMPLOY KNOWN IDEAS FROM BEHAVIORAL FINANCE (DECISION THEORY, ANCHORING ETC.)
Poll question

Would you say that your own risk attitude is:

- Manager
- Pragmatist
- Maximizer
- Conservator
# TRANSITION MATRICES

**Boom:** (>20%)

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>Man</th>
<th>Prag</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>99</td>
<td>0.8</td>
<td>0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>Man</td>
<td>40</td>
<td>55</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Prag</td>
<td>20</td>
<td>30</td>
<td>45</td>
<td>5</td>
</tr>
<tr>
<td>Cons</td>
<td>5</td>
<td>20</td>
<td>10</td>
<td>65</td>
</tr>
</tbody>
</table>

**Bust:** (< -10%)

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>Man</th>
<th>Prag</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>65</td>
<td>20</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Man</td>
<td>1</td>
<td>55</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Prag</td>
<td>5</td>
<td>30</td>
<td>45</td>
<td>20</td>
</tr>
<tr>
<td>Cons</td>
<td>0.05</td>
<td>0.8</td>
<td>0.15</td>
<td>99</td>
</tr>
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</table>

**Moderate:** (10% - 20%)

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>Man</th>
<th>Prag</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>90</td>
<td>8</td>
<td>1.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Man</td>
<td>3.5</td>
<td>95</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>Prag</td>
<td>3</td>
<td>15</td>
<td>80</td>
<td>2</td>
</tr>
<tr>
<td>Cons</td>
<td>2</td>
<td>10</td>
<td>3</td>
<td>85</td>
</tr>
</tbody>
</table>

**Unknown:** (-10% - 10%)

<table>
<thead>
<tr>
<th></th>
<th>Max</th>
<th>Man</th>
<th>Prag</th>
<th>Cons</th>
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<tr>
<td>Max</td>
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<td>Man</td>
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<td>2.5</td>
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<tr>
<td>Prag</td>
<td>2</td>
<td>5</td>
<td>90</td>
<td>3</td>
</tr>
<tr>
<td>Cons</td>
<td>0.5</td>
<td>1.5</td>
<td>3</td>
<td>95</td>
</tr>
</tbody>
</table>
Poll question

Would you say that your own risk attitude is:

Manager

Pragmatist

Maximizer

Conservator
RESULTS
FED UP?!
PRAGMATIST BIAS (90%)
PRAGMATIST BIAS (80%)
TRANSITION FROM INITIAL CATEGORY

Maximizer

Manager

Pragmatist

Conservator
## FINAL COUNT:

Profit/Loss of Market Participants vs. S&P 500

<table>
<thead>
<tr>
<th></th>
<th>INITIAL INVESTMENT</th>
<th>ENDING WEALTH</th>
<th>ANNUALIZED RETURN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AVERAGE PARTICIPANT</strong></td>
<td>$1000</td>
<td>$200,399.50</td>
<td>6.32%</td>
</tr>
<tr>
<td><strong>S&amp;P 500</strong></td>
<td>$1000</td>
<td>$102,813.70</td>
<td>5.50%</td>
</tr>
</tbody>
</table>

**AVERAGE ANNUAL ALPHA** 0.82%
CONCLUSION

• UNIQUE INVESTIGATION OF INVESTOR BEHAVIOR

• REGARDLESS OF INDIVIDUAL INVESTOR SENTIMENT, OVERALL MARKET BEHAVED SIMILARLY.

• CHANGING ATTITUDES SEEM TO IMPROVE INVESTMENT RESULTS