CHOICES & CHOOSING
PLURAL RATIONALITIES & ERM

Dave Ingram / Alice Underwood / Michael Thompson / Paul Tayler

June 2011
"Our greatest foes, and whom we must chiefly combat, are within." Miguel de Cervantes
Choices & Choosing Conclusions

- Plural Rationalities
  - Risk is an Opinion
  - Four Risk Attitudes
  - Four Risk Strategies
  - Four Risk Environments

- Choices
  - Stay the Course
  - Reactionary Changes
  - Rational Adaptability
  - Harmony

- Choosing
  - Different Choices for Different Risks
  - Different Choices for Different Environments
  - Different Choices for Different Companies
Introduction Risk Opinions

The theory of plural rationalities
Risk attitudes and risk strategies
Risk attitude survey
Seasons of risk & the insurance cycle
Surprise Game Agent Based Model
Choices - Risk attitudes & ERM
Choosing ERM Strategies – Case Studies
## Observations

Six sets of 20 observations from the same underlying loss distribution

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Stock market total returns: loss > 20%

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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 know the risk level
You May also have a **belief** about how to best measure risk...

- Risk is best measured by...
  - Using a market consistent model
  - Using a model that is consistent with historical experience
  - Using stress tests of worst case scenarios
  - It is a waste of time to measure risk
And if nothing else…

The historical track record tells us…

That you are **ALL CORRECT** in your beliefs

Sometimes.
Introduction Risk Opinions
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Plural Rationalities

- From Social Anthropology (aka Cultural Theory)
Four beliefs of risk

Managers

Maximizers

Pragmatists

Conservators
Maximizers’ belief

- 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

World has High Drift, Low Vol
Conservators’ belief

- 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

**World has Negative Drift, Low Vol**
Managers’ belief

- 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

World has Moderate Drift, Moderate Vol
Pragmatists’ unbelief

- 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

*World has Unknown Drift, Unknown Vol*
Poll question

Would you say that your own risk attitude is:

- Manager
- Maximizer
- Pragmatist
- Conservator
Poll results

Would you say that your own risk attitude is:

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Risk Managers</th>
<th>Single Insurer Employees</th>
<th>Actuaries</th>
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<tr>
<td>Maximizer</td>
<td>9%</td>
<td>9%</td>
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<td>Manager</td>
<td>72%</td>
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<td>66%</td>
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<td>Conservator</td>
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<td>Pragmatist</td>
<td>11%</td>
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## Poll results

Would you say that your firm’s predominant risk attitude is:

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<tr>
<th>Attitude</th>
<th>Risk Managers</th>
<th>Single Insurer Employees</th>
<th>Actuaries</th>
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<tr>
<td>Maximizer</td>
<td>23%</td>
<td>9%</td>
<td>17%</td>
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<tr>
<td>Manager</td>
<td>40%</td>
<td>52%</td>
<td>47%</td>
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<td>Conservator</td>
<td>29%</td>
<td>30%</td>
<td>28%</td>
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<tr>
<td>Pragmatist</td>
<td>7%</td>
<td>8%</td>
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TODAY’S AGENDA

Introduction
The theory of plural rationalities
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Risk strategies

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

- Oldest type of risk
  - 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
- Uneven growth
Loss controlling

- Most traditional form of risk
  - 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 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 “siloed” 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
Poll Results

The predominant risk strategy of my firm is:

<table>
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<tr>
<th>Firm Strategy</th>
<th>Risk Managers</th>
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<tr>
<td>Diversification</td>
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<td>Loss Controlling</td>
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<td>Risk Steering</td>
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Risk attitude survey

- Adapted survey from Dake

- And Oltedal, Moen, Klempe, Rundmo
  - Explaining risk perception. An evaluation of cultural theory. Rotunde no. 85, 2004. Norwegian University of Science and Technology, Department of Psychology
<table>
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<tr>
<th>Risk Attitudes</th>
<th>Agree</th>
<th>Disagree</th>
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<tr>
<td>CONSERVATORS</td>
<td>23.8%</td>
<td>10.0%</td>
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<td>MANAGERS</td>
<td>57.7%</td>
<td>0.0%</td>
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<td>MAXIMIZERS</td>
<td>40.8%</td>
<td>1.5%</td>
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<tr>
<td>PRAGMATISTS</td>
<td>25.4%</td>
<td>29.2%</td>
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Introduction

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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
Four seasons of risk

http://calculatedrisk.blogspot.com/
The Human Dynamics of the Insurance Cycle and Implications for Insurers: An Introduction to the Theory of Plural Rationalities

David Ingram, FSA, CERA, FRM, PRM
Alice Underwood, PhD, FCAS

Presented at
2010 Enterprise Risk Management Symposium
Society of Actuaries
April 12-15, 2010
Insurance cycle and risk attitudes

Approximate Industry Gross UW Margin
Other Liability Occurrence

-60.0%
-50.0%
-40.0%
-30.0%
-20.0%
-10.0%
0.0%
10.0%
20.0%
30.0%

Accident Year

Manager
Maximizer
Pragmatist
Conservator
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Agent Based Model

- Based Upon Thompson/Tayler

- Closed World of 30 firms
- Start with firms following all four strategies
- Start in a random environment

Dynamics

- Stresses from firms cause changes in environment
- Success and failure of firms cause them to change strategies (Surprises)
### A Typology of Surprises

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<th>Actual World</th>
<th>UNSETTLED</th>
<th>RECESSION</th>
<th>BOOM</th>
<th>NORMAL</th>
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<tr>
<td>PRAGMATIST (Fatalism)</td>
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<td>Expected windfalls don't happen</td>
<td>Unexpected runs of good luck</td>
<td>Unexpected runs of good and bad luck</td>
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<tr>
<td>CONSERVATOR (Egalitarianism)</td>
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<td>Caution does not work</td>
<td>ALIGNED No Surprises</td>
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<td>Others prosper (especially hierarchical strategists)</td>
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<tr>
<td>PROFIT MAXIMIZER (Individualism)</td>
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<td>Skill is not rewarded</td>
<td>Total collapse (when none was expected)</td>
<td>ALIGNED No Surprises</td>
<td>Partial collapse</td>
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<td>RISK REWARD MANAGER (Hierarchy)</td>
<td></td>
<td>Unpredictability</td>
<td>Total collapse (when only partial was expected)</td>
<td></td>
<td>Competition</td>
</tr>
</tbody>
</table>

**Note:** The table represents different strategies or worldviews in response to economic conditions, highlighting the differences in how individuals or organizations perceive and react to changes in the economy.
Pro-cyclical factors

- During each environment
  - Companies following a strategy that aligns with environment achieve their objectives
  - The other groups do not have experience as they expect
  - Timing across firms not synchronized, but close enough to magnify the ups and downs of the market as a whole
Agent-based model
Introduction
The theory of plural rationalities
Risk attitudes and risk strategies
Risk attitude survey
Seasons of risk & the insurance cycle
Surprise Game Agent Based Model
Choices - Risk attitudes & ERM
Choosing ERM Strategies – Case Studies
Risk attitude 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
Favorite risk strategies

- **Conservators** favor Loss Controlling
- **Maximizers** favor Risk Trading
- **Managers** favor Risk Steering
- **Pragmatists** favor Diversification
# ERM development objectives

<table>
<thead>
<tr>
<th>Risk Management Systems</th>
<th>LOSS CONTROLLING</th>
<th>RISK TRADING</th>
<th>RISK STEERING</th>
<th>DIVERSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Management Systems</td>
<td>Strict limits</td>
<td>Flexible Opportunities</td>
<td>Formal policies and standards CRO</td>
<td>Flexible High communication</td>
</tr>
<tr>
<td>Risk Models</td>
<td>Strict authorities</td>
<td></td>
<td></td>
<td>Simplified economic capital</td>
</tr>
<tr>
<td>Risk Management Reports</td>
<td>Stress testing</td>
<td>Pricing models Rating agency</td>
<td>Economic capital &amp; value</td>
<td>Risk aggregates &amp; concentrations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Focus on strengths or weaknesses?**
Rational adaptability

<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</td>
<td>Risk Trading</td>
<td>Loss Controlling</td>
<td>Diversification</td>
<td>Risk Steering</td>
</tr>
</tbody>
</table>

A perfect ERM program will adapt to the risk environment
Agent-based model: preliminary findings

### 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>
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
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CASE STUDIES

- Eight Insurers from Canada, Peru, UK, Australia, Korea, Germany, Bermuda and USA
- How do they choose to manage specific risks
  - Insurance, Investment, Reserves, Operational
- How do they approach Enterprise Risks
Investment Risk - Approaches

- Large Investment team. Active management and trading. Exploit opportunities in the market. Within risk tolerance framework.
- Need assets to back liability risks - low risk investment portfolio could actually increase total risk – need to match liabilities
- Favor Indexing. Do not believe that there is any additional reward to be had without additional risk. Low risk investment portfolio. Do not want to lose any money from taking investment risk.
- High scrutiny of largest exposures.
- Diversification Targets (secondary approach)
Insurance Risk Approaches

- Set boundaries within our risk appetite as well as zero tolerance qualitative risks - where we will not go. If warranted, the risk appetite could be revised, would require exec and board approval first

- Written in risk appetite that we will not accept any risk that is not understood at senior exec level (regardless of potential return)

- Consult models for all risk related decisions, but no longer rely solely on models

- Aspire to calculate and allocate capital by line of business for risk reward decision making
Reserve Risk Approaches

- Very proud of track record of few or no reserve strengthenings needed.

- Reserve process is highly technical

- Will tend to set initial reserves close to pricing assumptions, presuming that they got it right.

- Set reserves conservatively for cat prone book, small margin for short tailed non-cat book
Operational Risk Approaches

- Limits and Control Cycle
- Have formal methodology to deal with Reputation Risk.
  - Crisis management committees.
  - Polling of execs and public.
  - Proactive for negative press.
  - Not part of risk management function.
- Zero tolerance for operational losses. Take extra care even if it costs more and slows things down.
- No Operational Risk approach articulated by 4 firms
Enterprise Risk Approach

• Have or will soon have a formal Economic Capital Model and Capital Budgeting process.

• Use Regulatory risk factor formula to estimate aggregate risk and allocate capital.

• Current focus is on Maximum Loss and keeping a wide margin above that level.

• ERM not exclusively about Economic Capital
  — None had a strong belief in the accuracy of their correlation assumptions.

• Collaborating across risk silos to proactively mitigate effects of combinations of risk and interactions of risks.
One Firm’s Choices

- Cat Risk – Diversification of Exposures – Quake, Wind, Flood – diverse locations
- Other Insurance Risks – Trading – sell at the right price – risk is low concern
- Operational Risk - Loss Controlling – not paid for risk
  - Choose controls based upon cost benefit
- Credit & Investment Risk – Steering using efficient frontier – with a long term view for strategic asset allocation.
- Credit & Investment Risk – Tactical variations on SAA will be based upon short term view of markets
CHOICES & CHOOSING
CONCLUSIONS
Choices & Choosing Conclusions

- Plural Rationalities
  - Risk is an Opinion
  - Four Risk Attitudes
  - Four Risk Strategies
  - Four Risk Environments

- Choices
  - Stay the Course
  - Reactionary Changes
  - Rational Adaptability
  - Harmony

- Choosing
  - Different Choices for Different Risks
  - Different Choices for Different Environments
  - Different Choices for Different Companies
"Our greatest foes, and whom we must chiefly combat, are within." Miguel de Cervantes
Recent Papers & Articles

- **Wilmott Magazine**
  - The Human Dynamics of the Credit Crisis and Implications for the Afterlife. January 2010 (Ingram)
  - A Universe in Four Parts. March 2010 (Ingram, Thompson)
  - Surprise, Surprise May 2010. (Ingram, Thompson, Tayler)
  - Eyes Wide Open: Towards Rational Adaptability. July 2010 (Ingram, Thompson)

- **Actuary Magazine**
  - Four Seasons of Risk Management. December 2009 (Ingram)
  - Full Spectrum of Risk Attitude. August 2010 (Ingram, Underwood)
  - Fabric of ERM. December 2010 (Ingram, Underwood)
  - Changing Seasons of Risk Attitudes. April 2011 (Ingram, Thompson)

- **ERM Symposium/SOA Monograph**

- **Unpublished**
  - SURPRISE, SURPRISE: From Neoclassical Economics To E-Life (Thompson, Ingram, Tayler)
  - Collective Approaches to Risk in Business: An Introduction to Plural Rationalities (Ingram, Bush)
Thank you!

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CHOICES & CHOOSING
PLURAL RATIONALITIES & ERM

Dave Ingram / Alice Underwood / Michael Thompson / Paul Tayler

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