

Attitudes face au risque et face aux modèles en assurance

Stéphane Loisel

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

MANAGING EXTREMES

Willis Re

RISK ATTITUDES AND ENTERPRISE RISK MANAGEMENT

Dave Ingram / Alice Underwood

May 2013



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

TODAY'S AGENDA

Willis Re

MANAGING EXTREMES

Introduction

The theory of plural rationalities

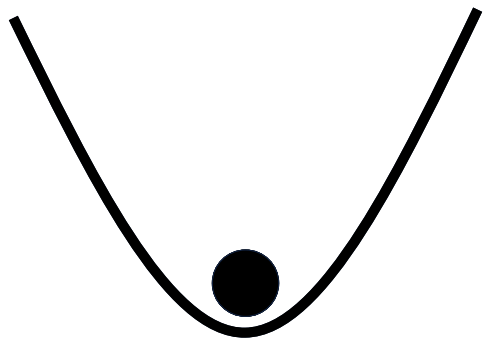
Risk attitudes and risk strategies

Seasons of risk & the insurance cycle

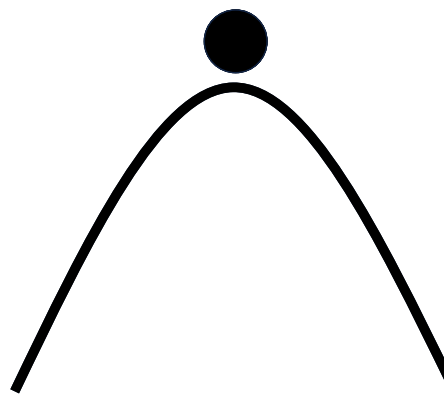
Risk attitudes & ERM



Four views of risk



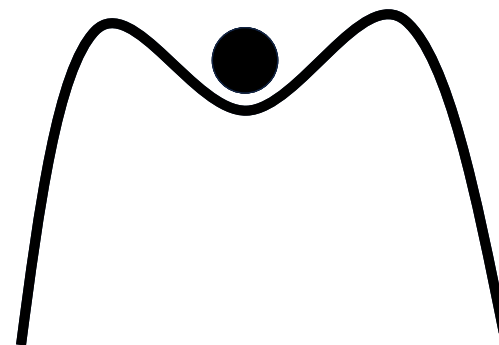
Maximizers



Conservators



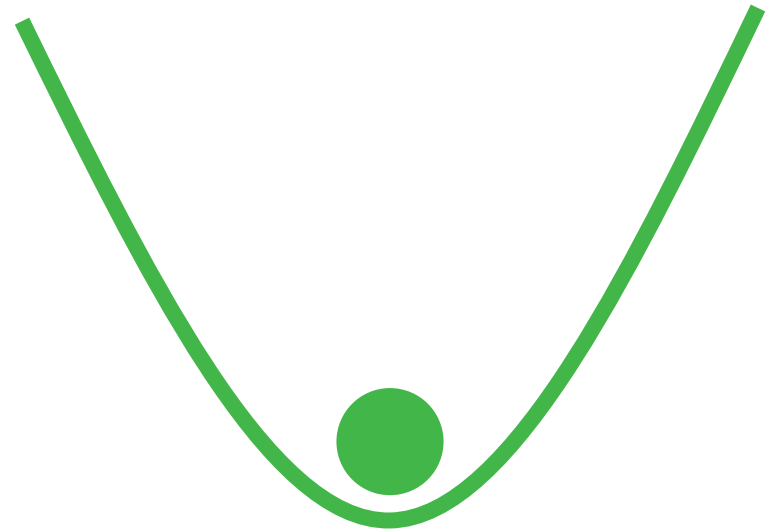
Pragmatists



Managers

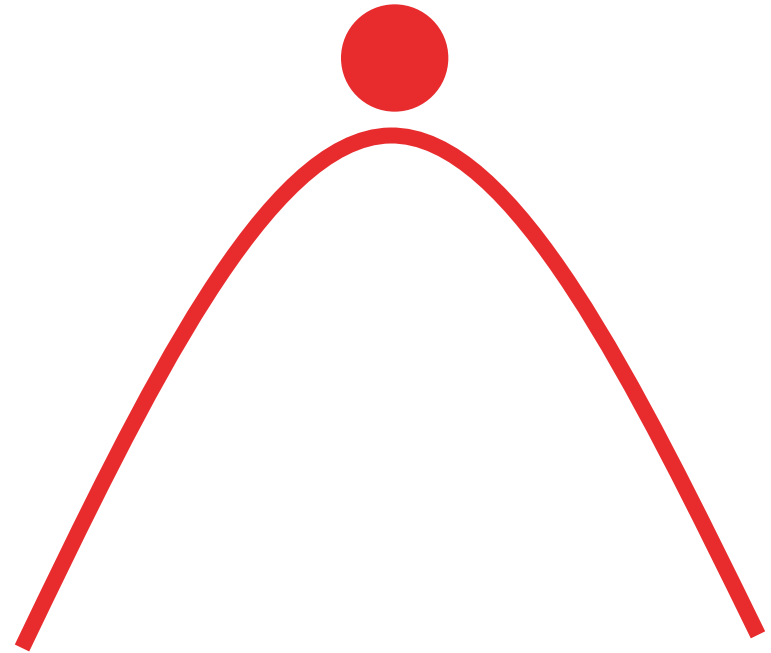
Maximizers' view

- 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



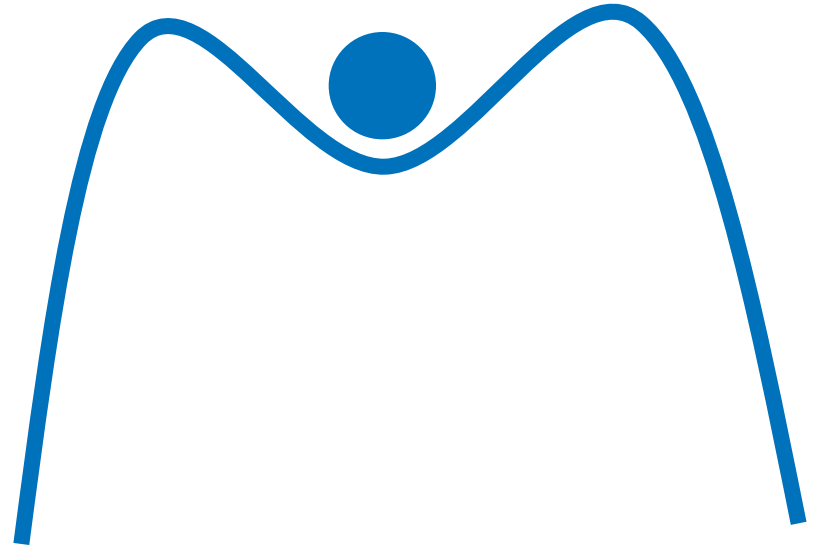
Conservators' view

- 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

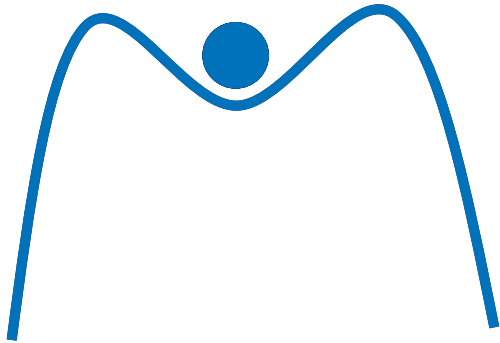


What stock market model would you believe?

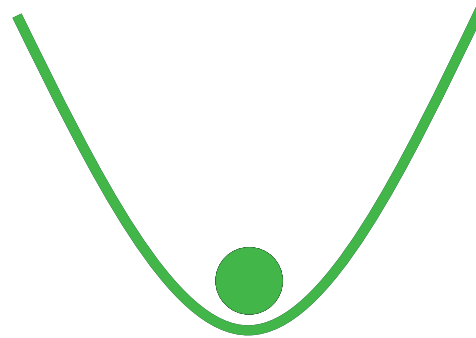
- In the next 20 years,
 - Risk is **high**
 - Chance of loss $> 20\%$ is 10% or more
 - Risk is **moderate**
 - Chance of loss $> 20\%$ is about 5%
 - Risk is **low**
 - Chance of loss $> 20\%$ is much less than 5%
 - **Do not believe we can know** the risk level

Poll question

- Would you say that your own risk attitude is:



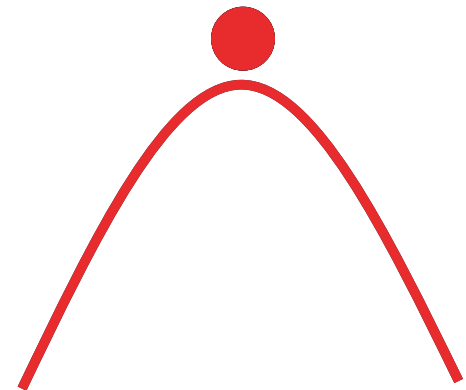
Manager



Maximizer



Pragmatist



Conservator

Other Groups

Attitude	Directors	Top Management	Underwriters	Risk Managers
Maximizer	21%	29%	18%	11%
Manager	38%	41%	42%	62%
Conservator	9%	4%	23%	9%
Pragmatist	33%	26%	18%	17%

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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 “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



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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

Risk environment impacts risk attitude

During the **BOOM**

Attitudes shift towards
Maximizer

During the **BUST**

Attitudes shift towards
Conservator

In **UNCERTAIN** times

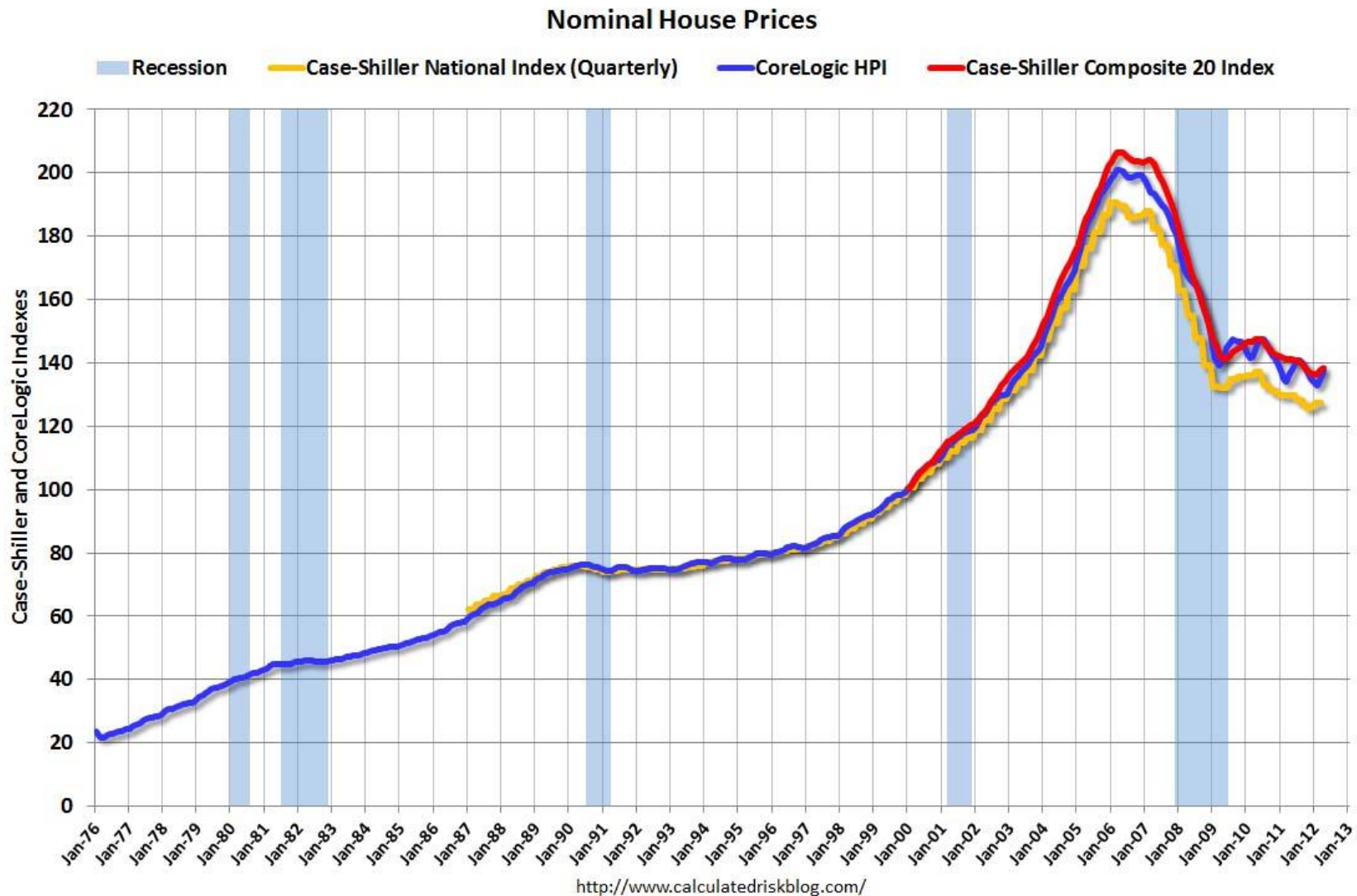
Attitudes shift towards
Pragmatist

In **MODERATE** times

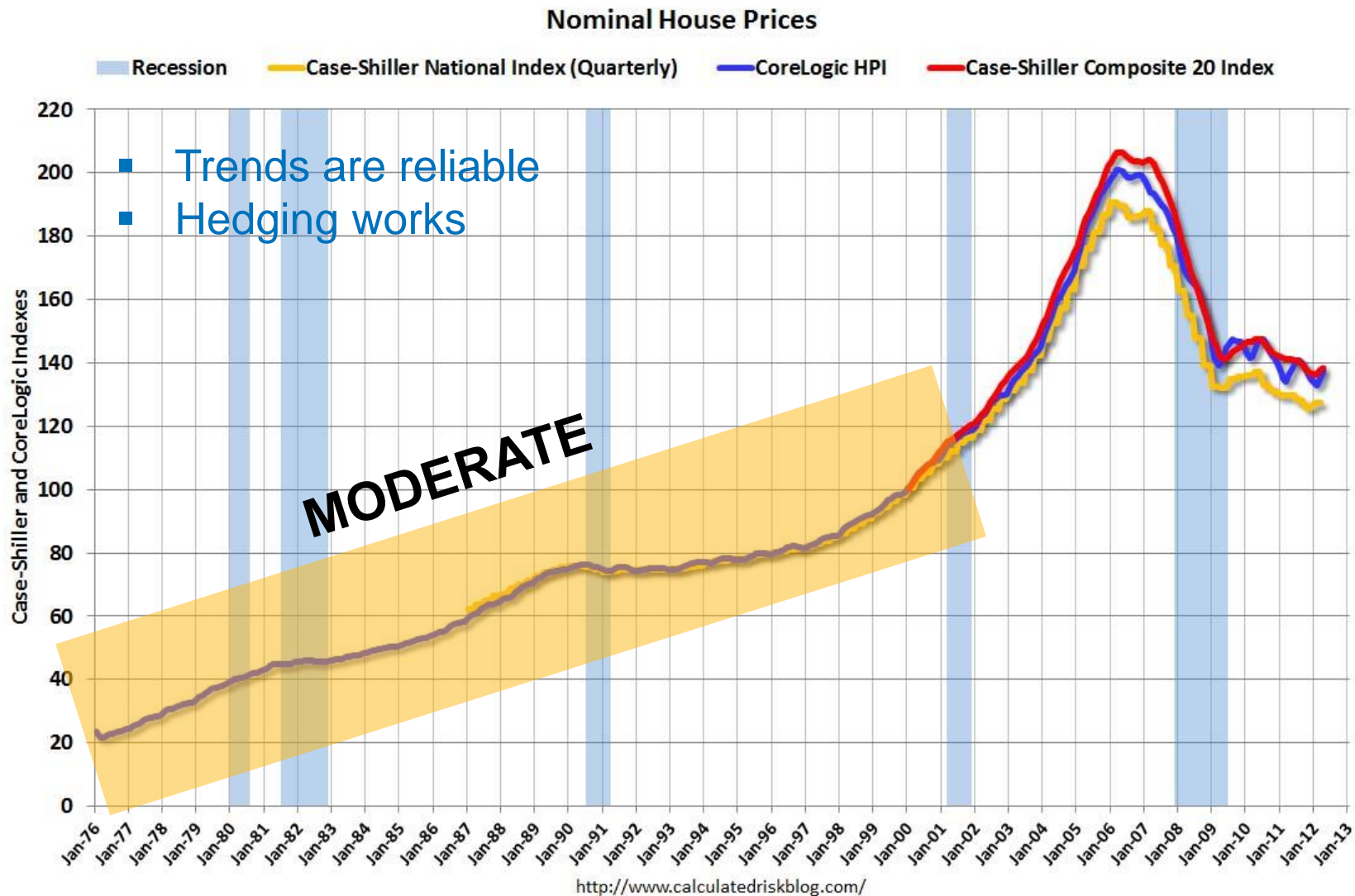
Attitudes shift towards
Manager

- In the insurance industry, this shifting can be delayed due to the time it takes to recognize losses – especially for long-tailed lines

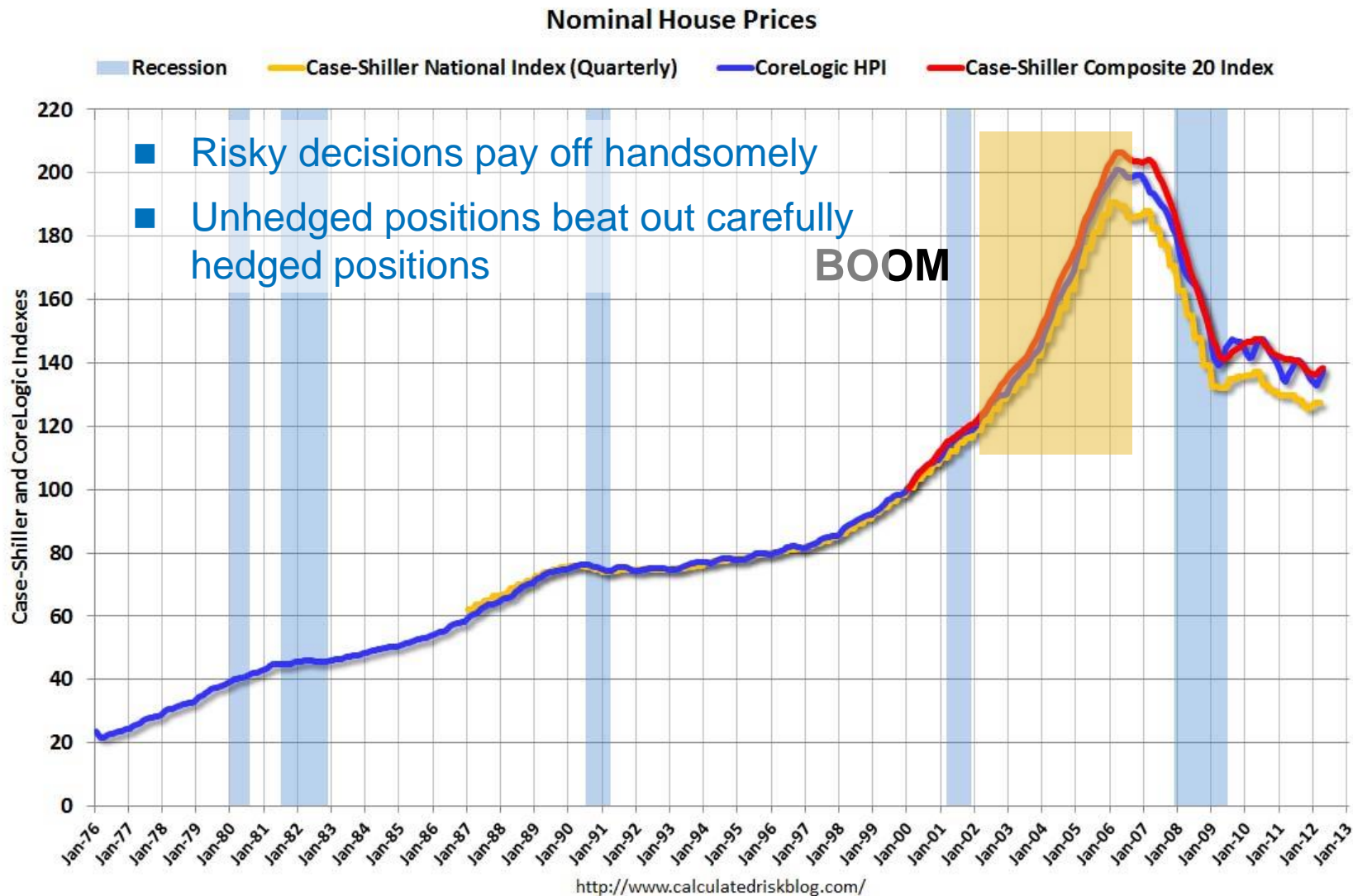
Four seasons of risk



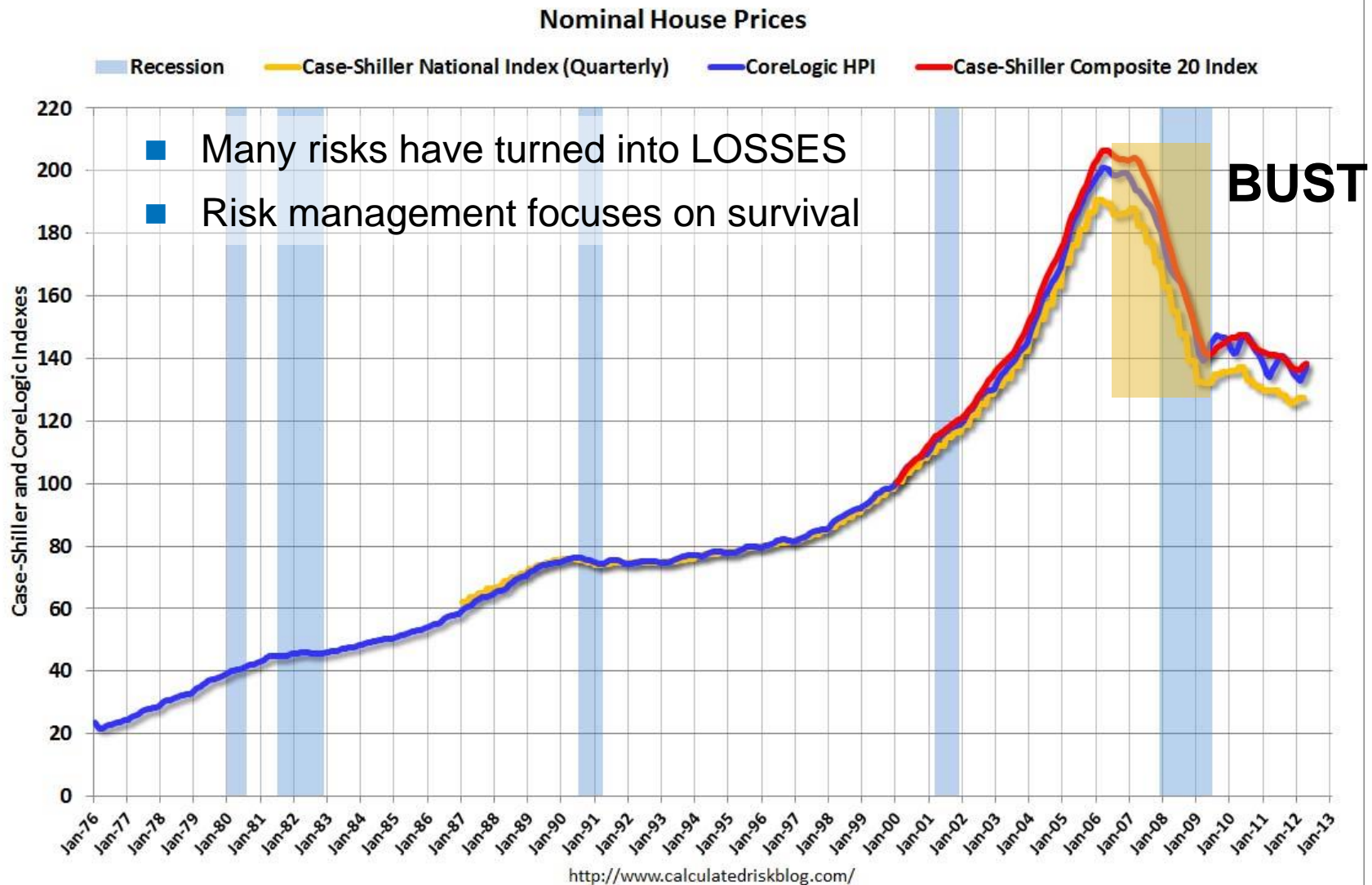
Four seasons of risk



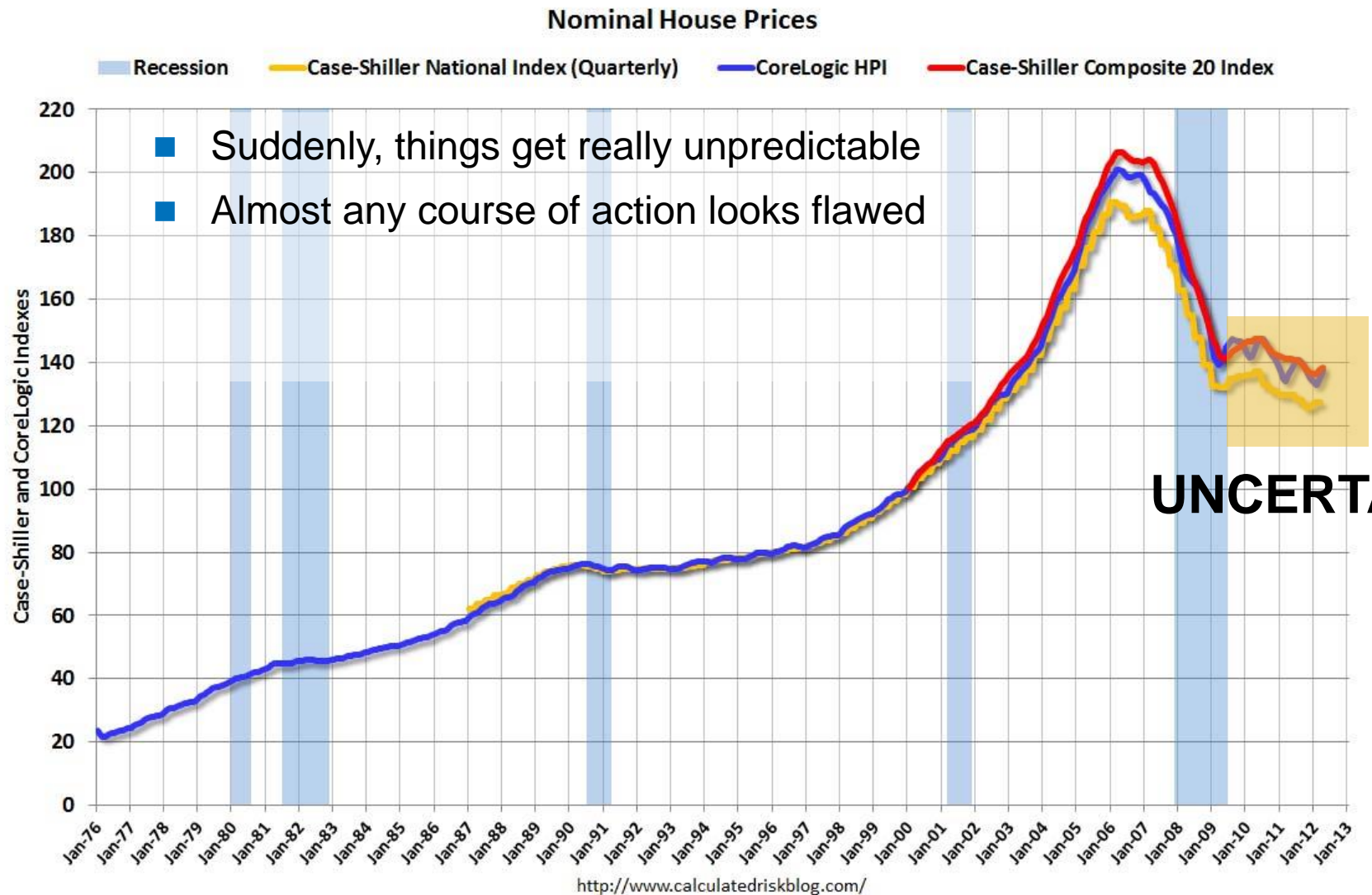
Four seasons of risk



Four seasons of risk

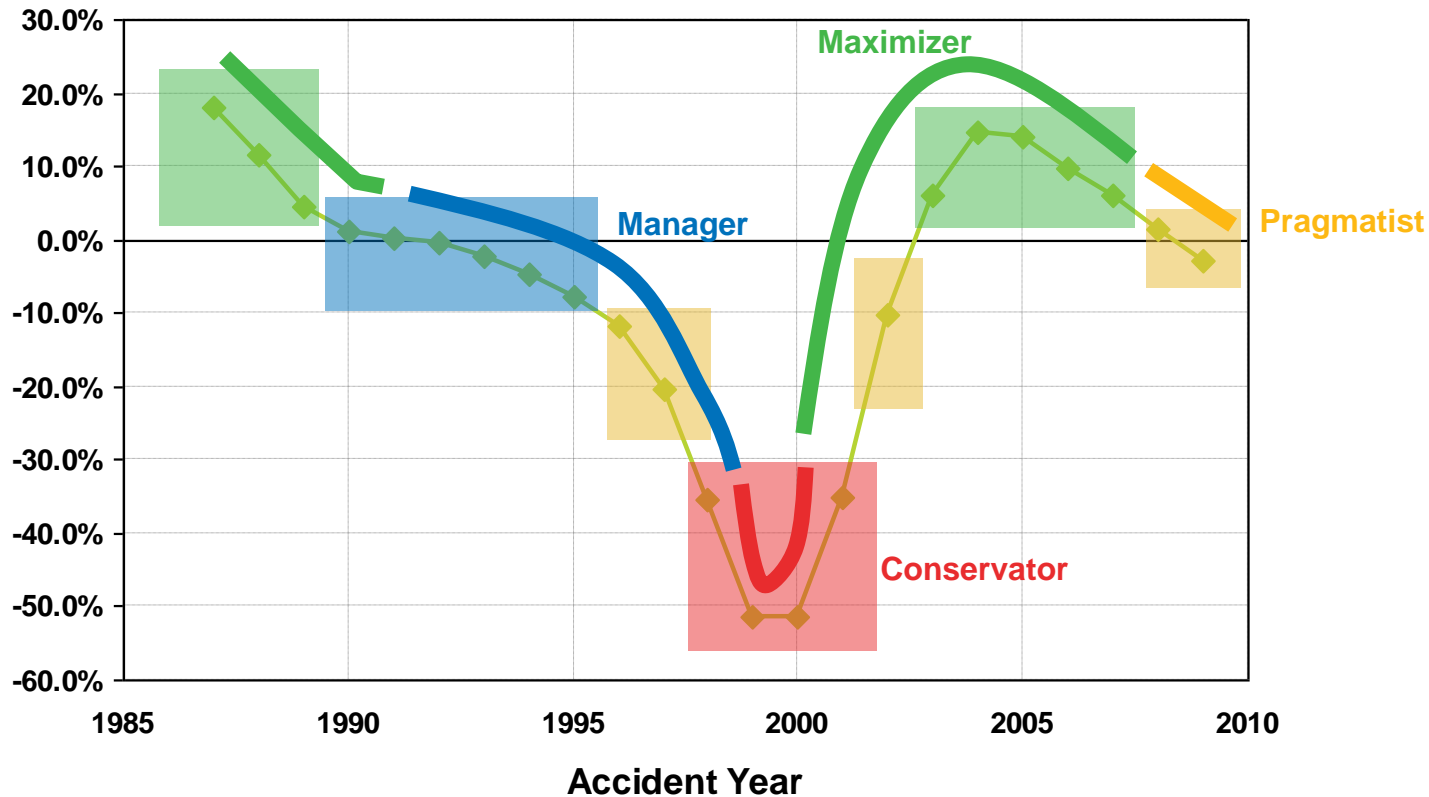


Four seasons of risk



Insurance cycle and risk attitudes

Approximate Industry Gross UW Margin Other Liability Occurrence



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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

Risk Environment	BOOM	BUST	UNCERTAIN	MODERATE
Risk Attitude	Maximizer	Conservator	Pragmatist	Manager
Risk Management Strategy	Risk Trading	Loss Controlling	Diversification	Risk Steering

A perfect ERM program will adapt to the risk environment

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

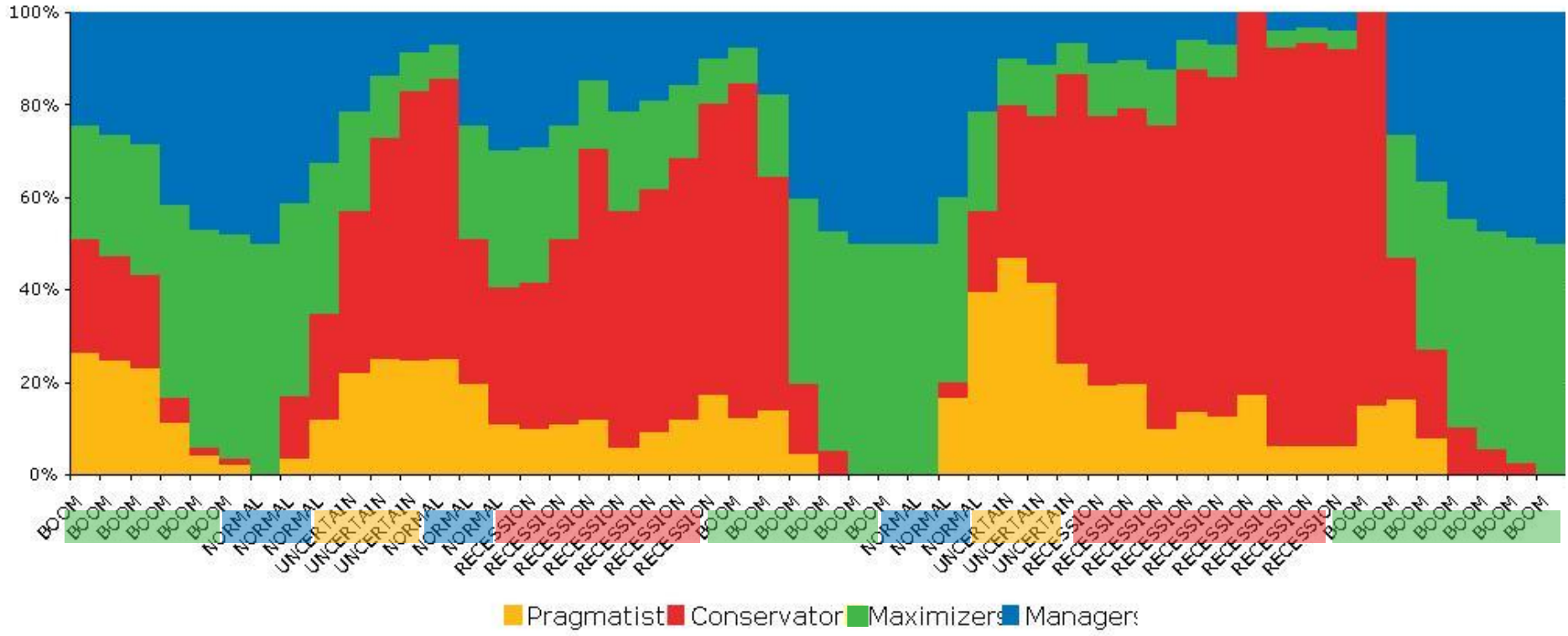
Harmonization

- 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 Talyer, 1985
 - Adapted by David Ingram, 2010

Surprise Game: sample outcome



Surprise Game rules (excerpts)

- Investment rate
 - Maximizers 30%
 - Managers 15%
 - Pragmatists 5%
 - Conservators 0%
- 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)
- Expected returns
 - Boom 30%
 - Moderate 15%
 - Uncertain -10% or 10%
 - Bust -5%
- Triggers for changing *environment*
 - Cash in bank > cash in companies
 - Profits > cash in system (once)
 - Profits > cash in system (repeatedly)
 - Too many bankruptcies

Surprise Game: preliminary findings

Stay the Course

Attitude	Average Return	Std Dev Return	Failure Rate
Pragmatists	0	15.3	10.61%
Conservators	0	5.39	0.01%
Maximizers	4.28	32.08	26.96%
Managers	2.88	17.96	12.90%

Adaptation

Adaptability	Average Return	Std Dev Return	Failure Rate
0%	-1.69	19.35	19.97%
25%	1.94	20.12	16.09%
50%	5.56	20.21	12.19%
75%	9.19	19.64	8.32%
100%	12.81	18.46	4.76%

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 respondents 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

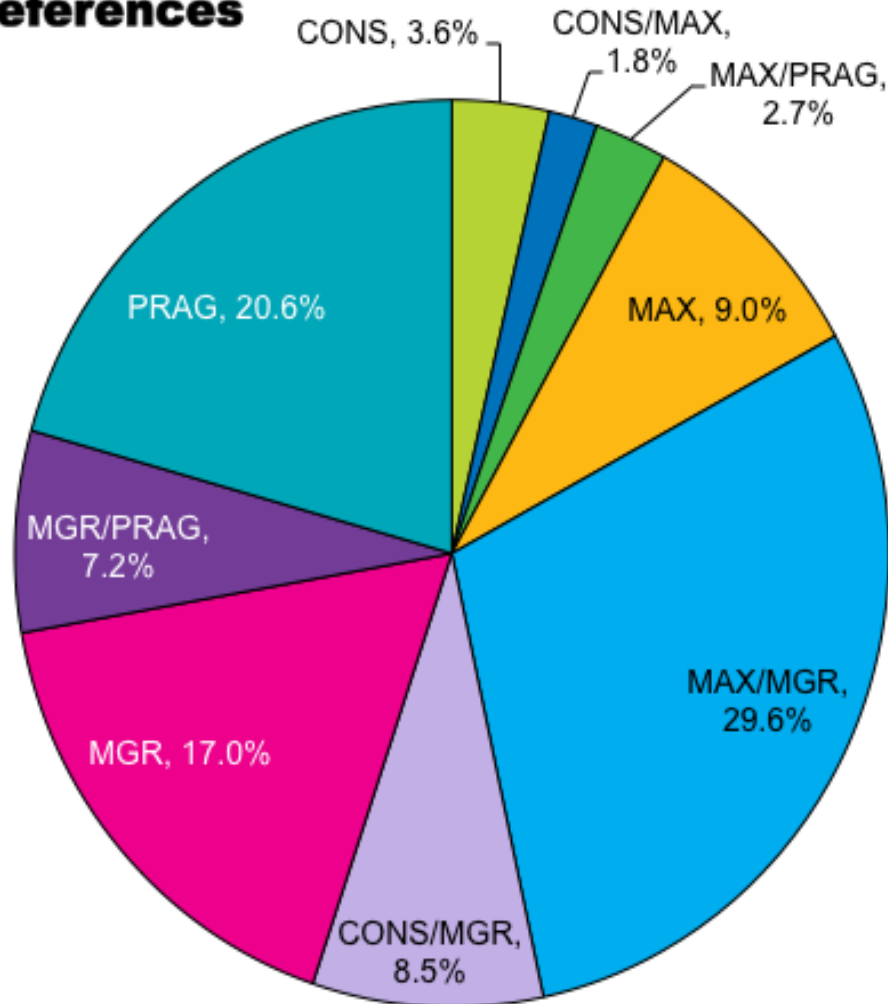
- Starting point: test whether risk attitude determines attitude wrt models
- For each risk attitude, we choose 6 sentences that correspond to foreseen attitude wrt models.
- Example: Conservators are expected to be reluctant to trust models because they think that they tend to often underestimate extreme 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

Risk Attitudes		
	Agree	Disagree
CONSERVATORS	20.1%	10.1%
MANAGERS	57.2%	0.0%
MAXIMIZERS	42.8%	1.3%
PRAGMATISTS	32.7%	18.2%

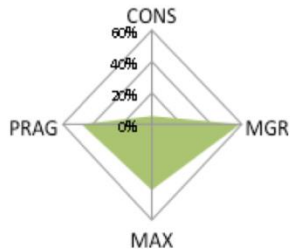
Attitudes face au risque aux US

Risk Preferences

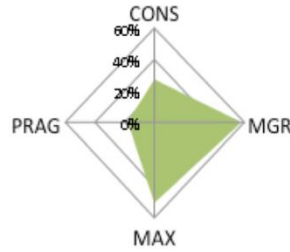


Attitudes face au risque aux US

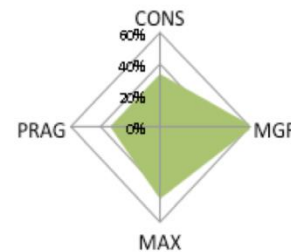
Company 1



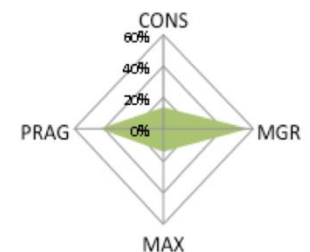
Company 2



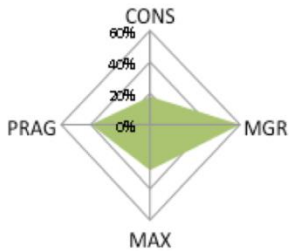
Company 3



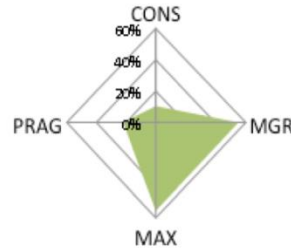
Company 4



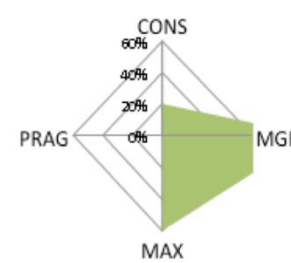
Company 5



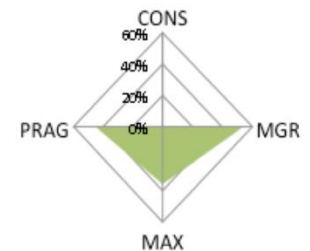
Company 6



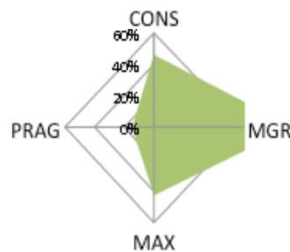
Company 7



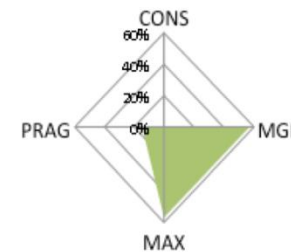
Company 8



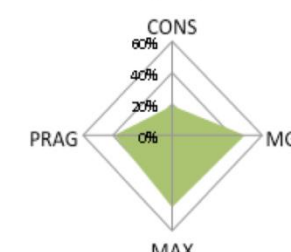
Company 9



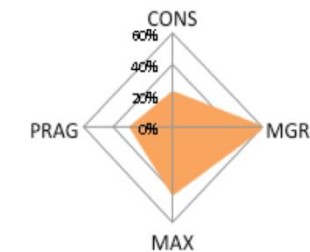
Company 10



Company 11



AVERAGE ALL



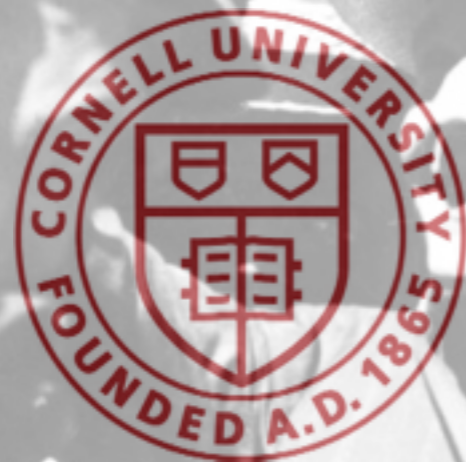
First results, next steps & discussion

- 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.

INVESTOR'S BELIEFS AND FEEDBACK EFFECT ON THE MARKET



**ORIE 5650:
FINAL PROJECT**

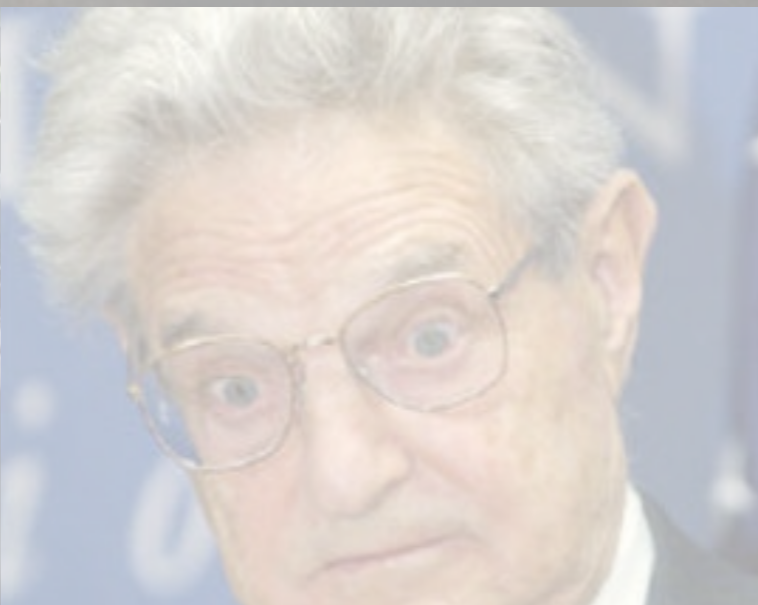
**JOSEPH DAY, ROBERT IVANOV, FELIPE OSTERLING,
BEN PICKETT**

OVERVIEW

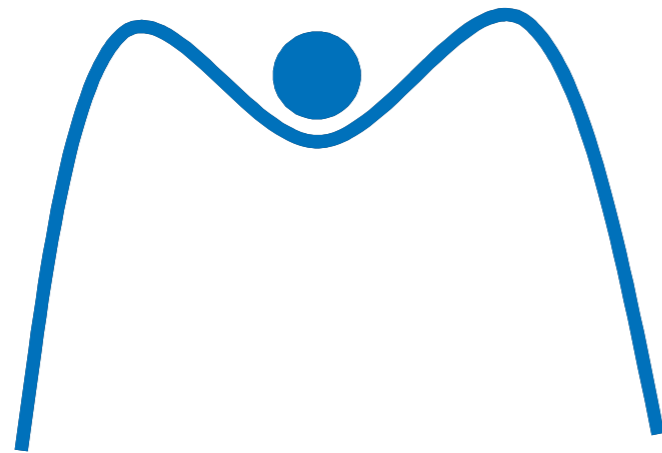
- REVIEW OF ORIGINAL WORK
- PERCEIVED SHORTCOMINGS
- PROPOSED ADDITIONS
- METHODOLOGY
- RESULTS



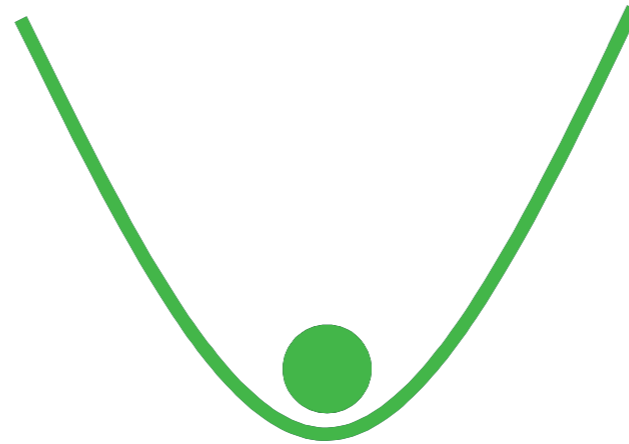
RISK ATTITUDES



RISK ATTITUDES



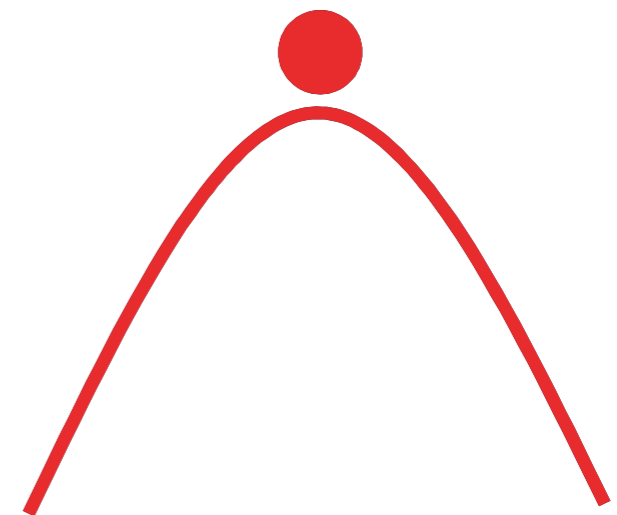
Manager



Maximizer



Pragmatist



Conservator

As proposed by Ingram, Tayler, and Thompson

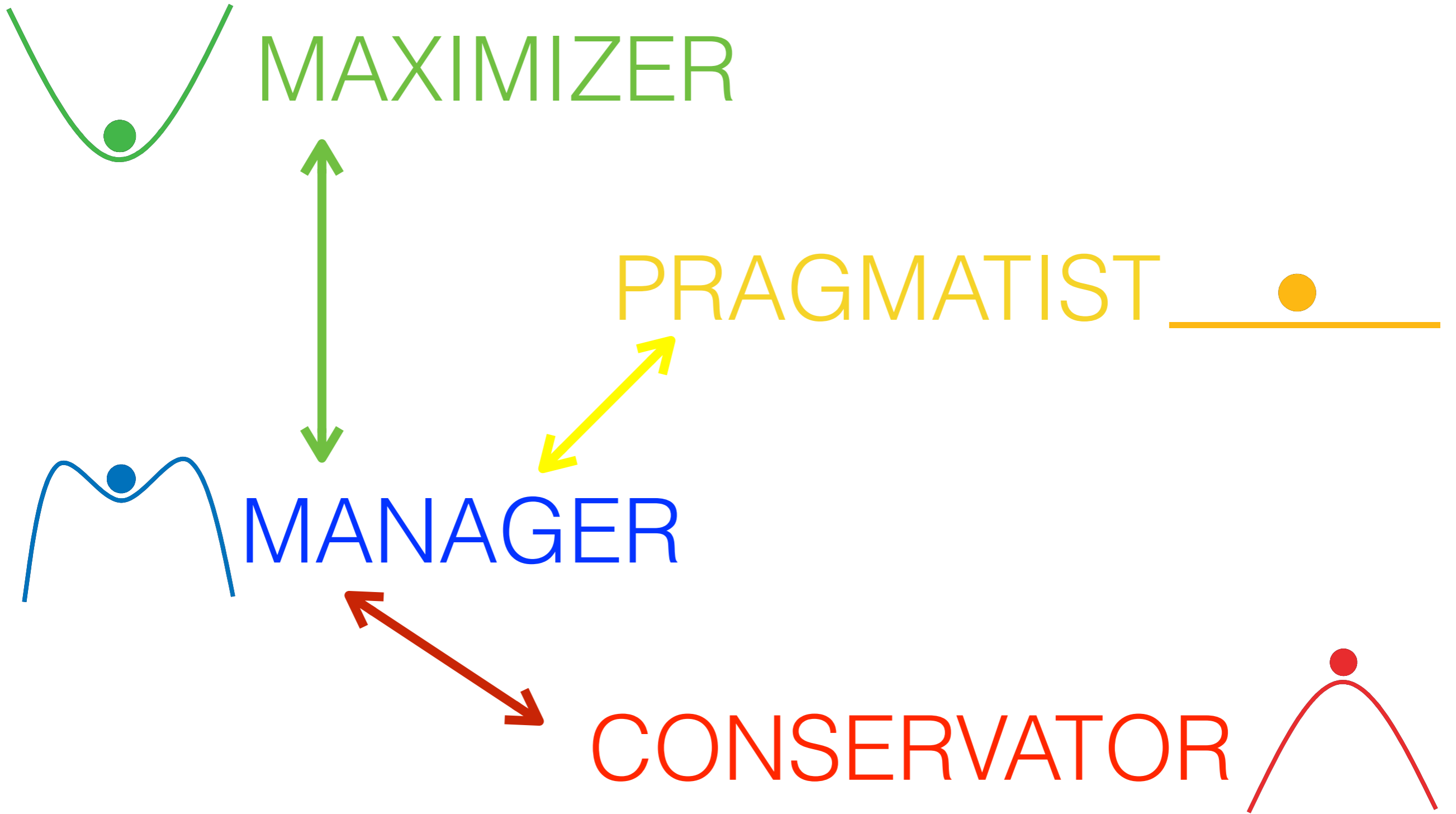
SHORTCOMINGS

- 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.)

HIERARCHY



TRANSITION MATRICES

Boom: ($>20\%$)

	Max	Man	Prag	Cons
Max	99	0.8	0.15	0.05
Man	40	55	4	1
Prag	20	30	45	5
Cons	5	20	10	65

Moderate: (10% - 20%)

	Max	Man	Prag	Cons
Max	90	8	1.5	0.5
Man	3.5	95	0.75	0.75
Prag	3	15	80	2
Cons	2	10	3	85

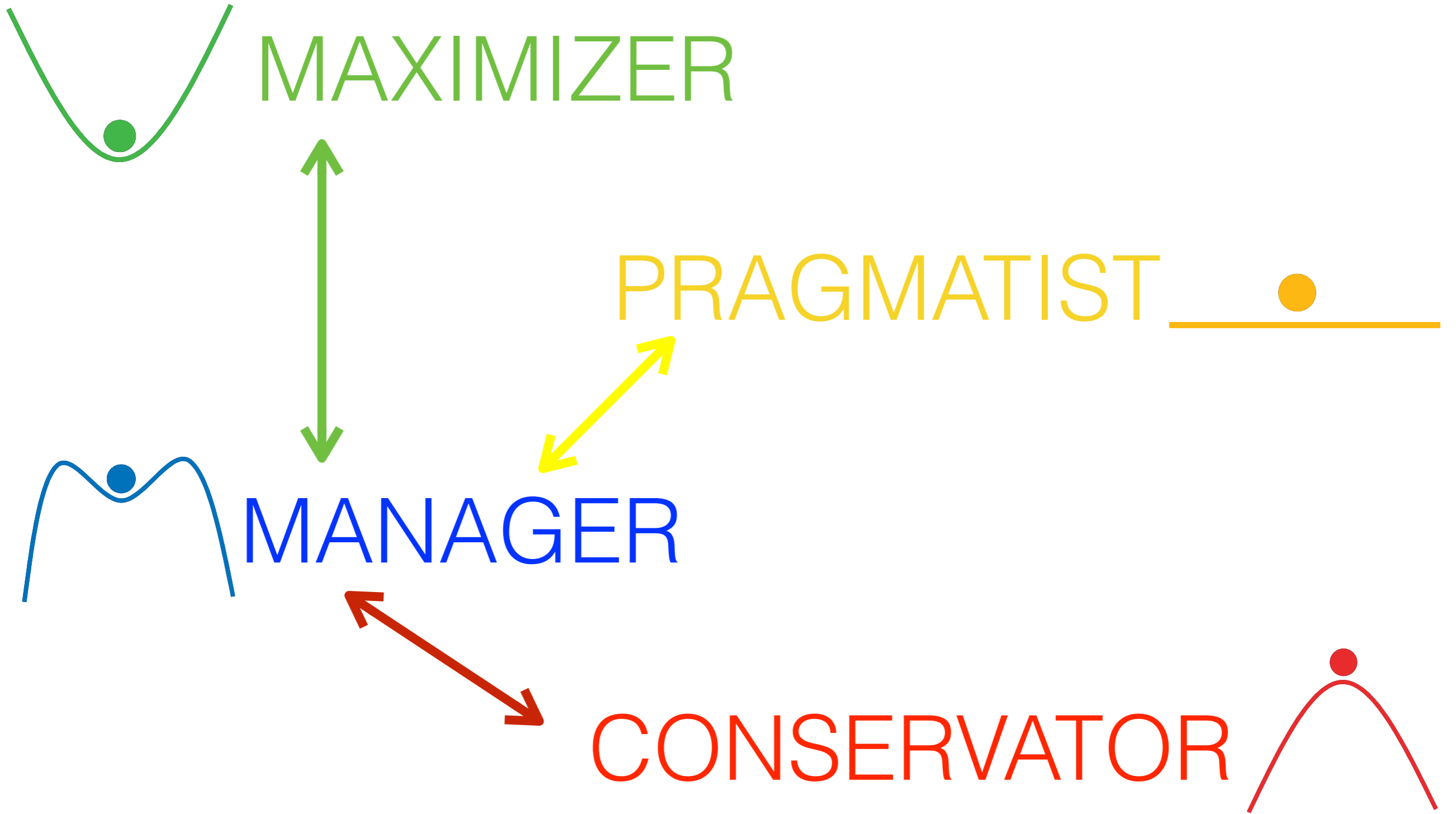
Bust: ($< -10\%$)

	Max	Man	Prag	Cons
Max	65	20	10	5
Man	1	55	4	40
Prag	5	30	45	20
Cons	0.05	0.8	0.15	99

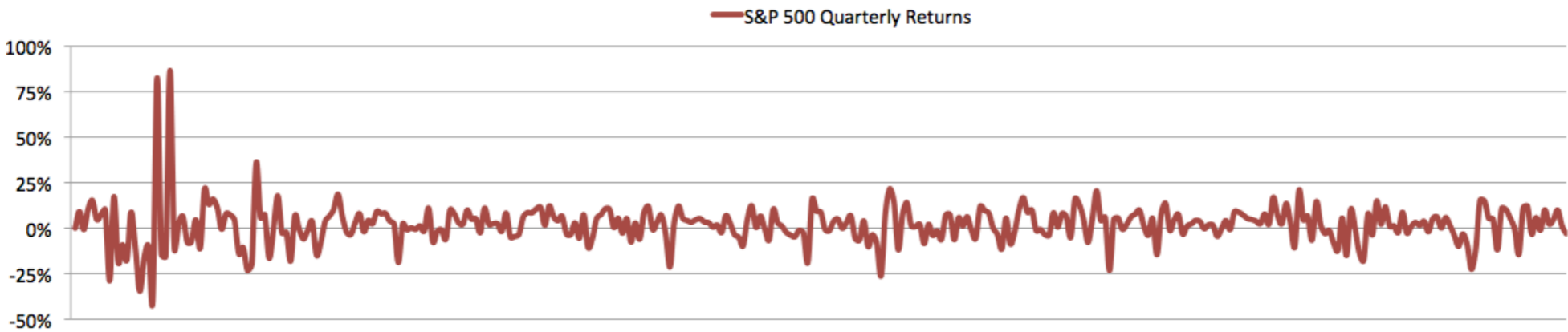
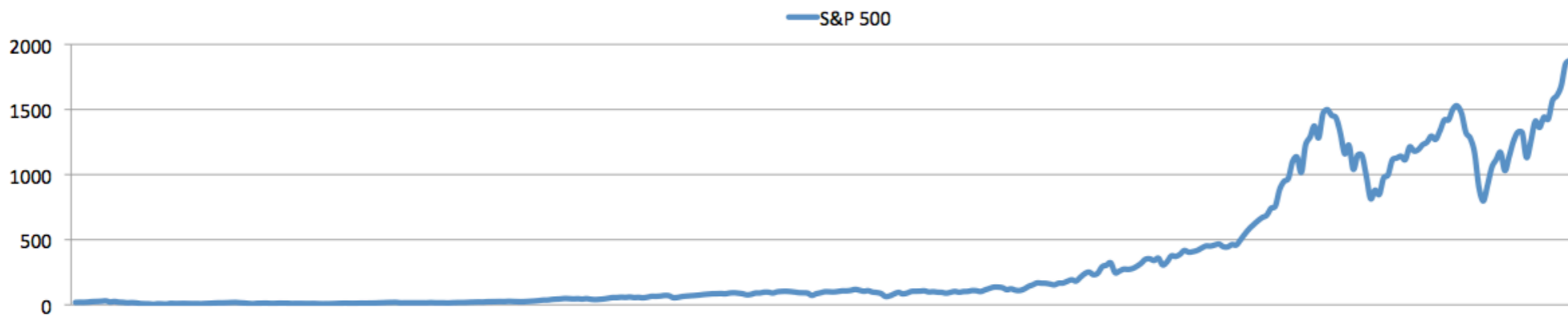
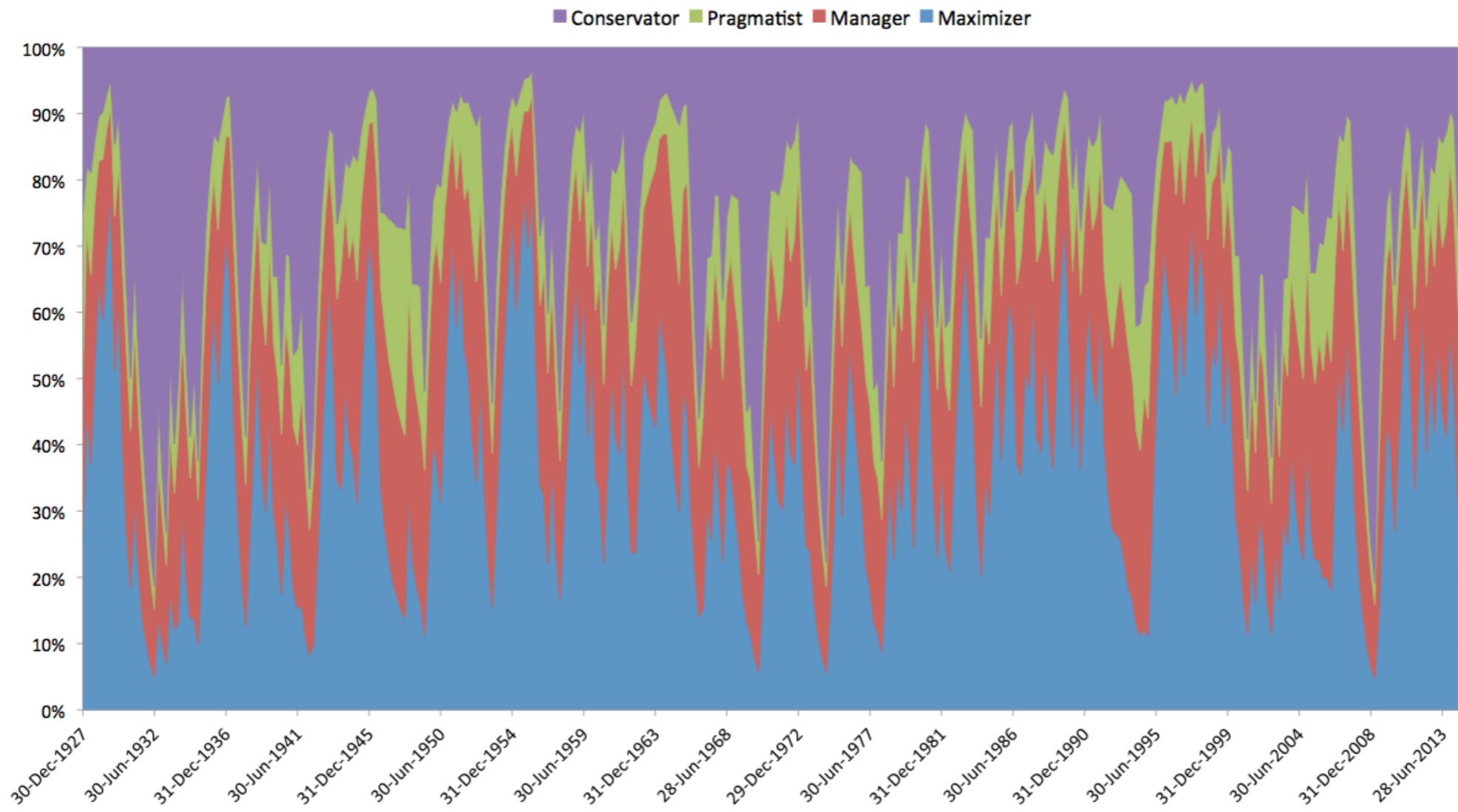
Unknown: (-10% - 10%)

	Max	Man	Prag	Cons
Max	80	10	8	2
Man	2.5	85	10	2.5
Prag	2	5	90	3
Cons	0.5	1.5	3	95

HIERARCHY



RESULTS

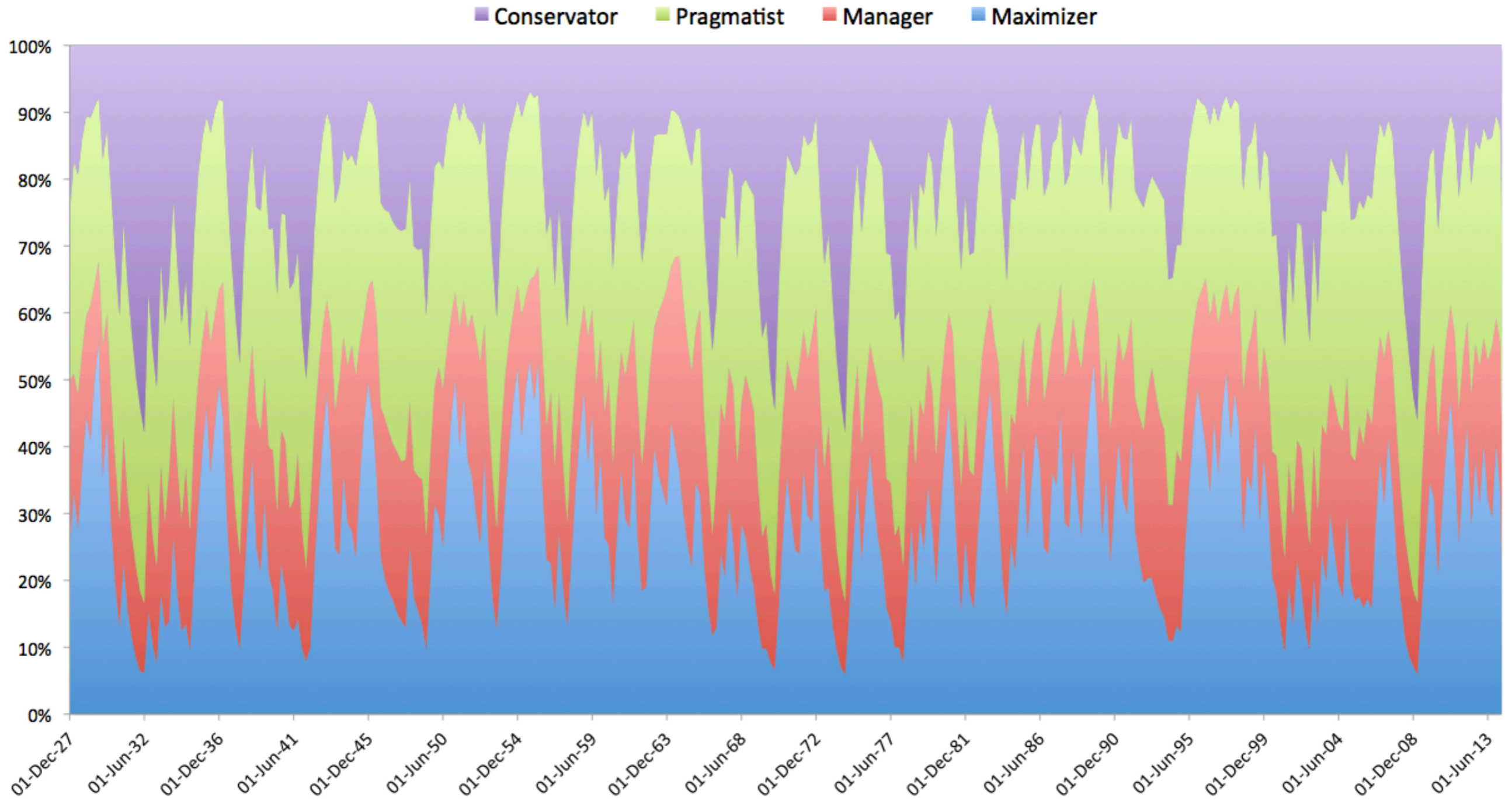


A man in a dark suit, white shirt, and pink tie is covering his face with both hands. The background is a plain, light-colored wall. The text 'FED' is overlaid in large, bold, red letters across the center of the image.

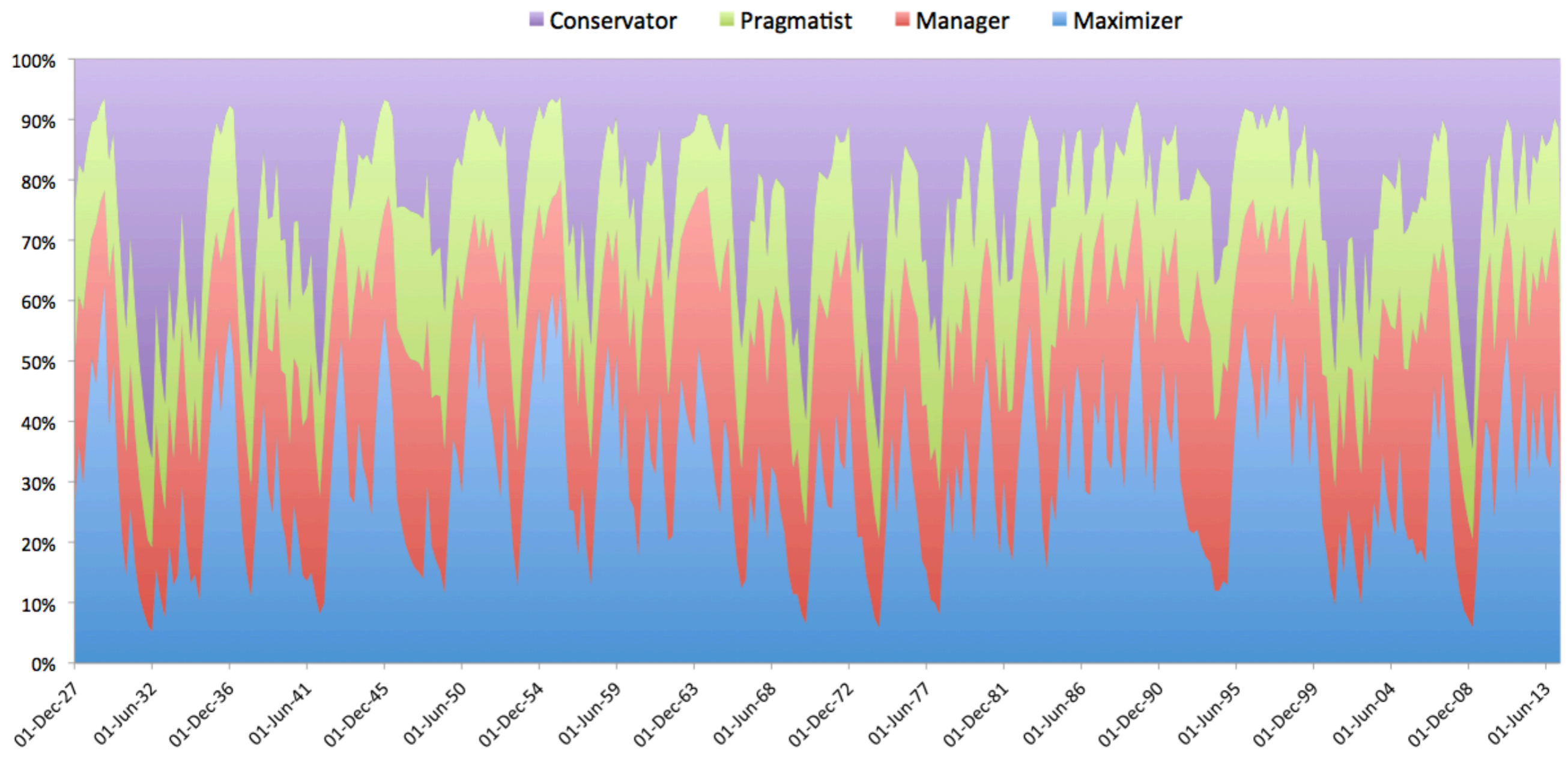
FED

UP?!

PRAGMATIST BIAS (90%)



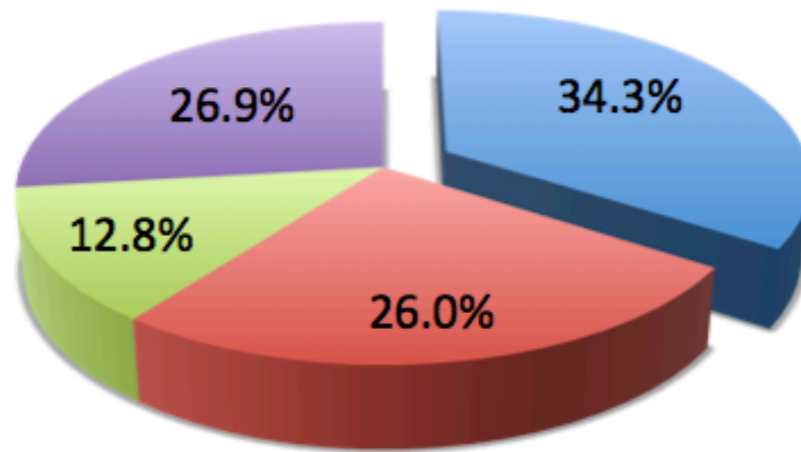
PRAGMATIST BIAS (80%)



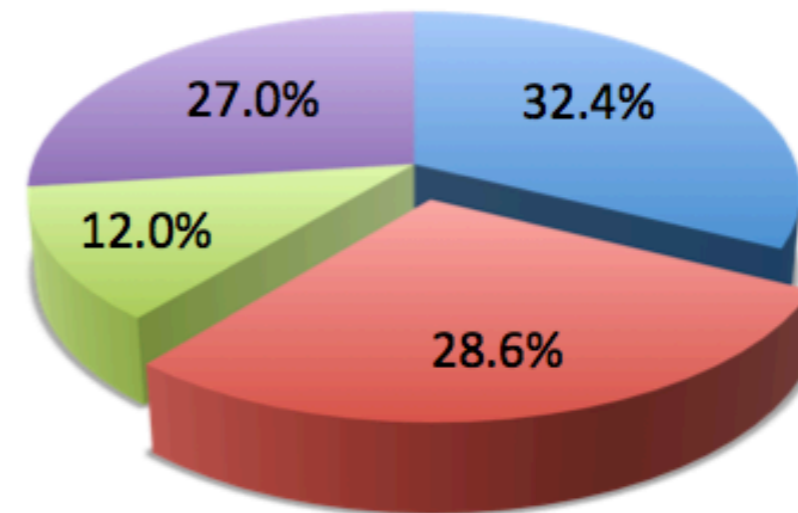
TRANSITION FROM INITIAL CATEGORY

■ Maximizer ■ Manager ■ Pragmatist ■ Conservator

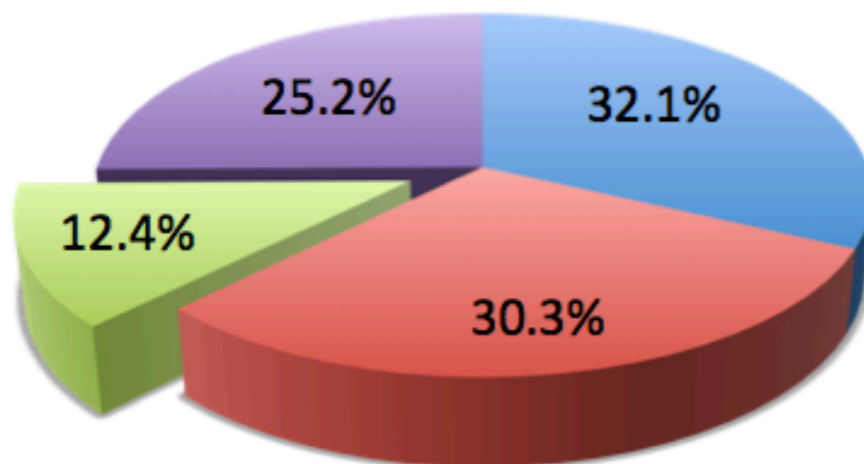
Maximizer



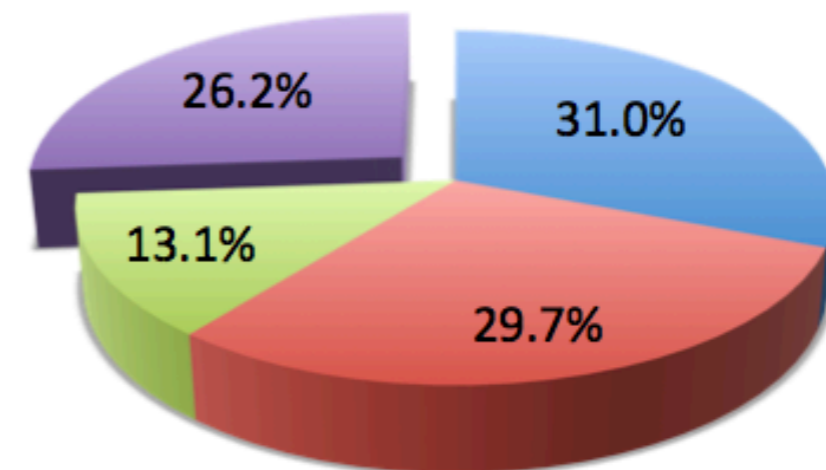
Manager



Pragmatist



Conservator



FINAL COUNT:

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

	INITIAL INVESTMENT	ENDING WEALTH	ANNUALIZED RETURN
AVERAGE PARTICIPANT	\$1000	\$200,399.50	6.32%
S&P 500	\$1000	\$102,813.70	5.50%

AVERAGE ANNUAL ALPHA	0.82%
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CONCLUSION

- UNIQUE INVESTIGATION OF INVESTOR BEHAVIOR
- REGARDLESS OF INDIVIDUAL INVESTOR SENTIMENT, OVERALL MARKET BEHAVED SIMILARLY.
- CHANGING ATTITUDES SEEM TO IMPROVE INVESTMENT RESULTS