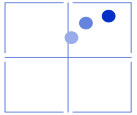


**Dr. Holm Gero Hümmler
Dipl.-Phys./Dipl.-Wirt.-Phys.
Bad Homburg**

6th World Skeptics' Congress, May 19, 2012

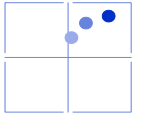
**Risk Perception and Risk
Management in Companies
and Management Science**

Observations about Managers Confronted with an Uncertain Future



Topics

Some Basics	2
Observation 1: Denial	7
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Companies Should and Do Take Risk Seriously

The Importance of Risk in Management

- Responsibility for thousands of jobs
- Billions at stake from millions of investors

Companies ought to be more rational about risk than individuals

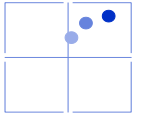
- Decisions prepared/made by more than one person
- Planning and risk management departments

Companies work to be more rational about risk than individuals

- Risk management as research subject
- Risk reports in companies' annual reports

Companies claim to be more rational about risk than individuals

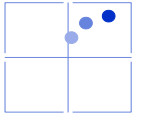
So are they more rational or just irrational in a different way?



„Risk“ in Business is not Quite what it Seems

Uncertainty and Risk

	Uncertainty	Risk
Normal Life	Any unknown future development	Potentially harmful future development
Risk Management (ISO 31000)		Effect of uncertainty on objectives (positive or negative)
Decision Theory	Any unknown future development with effect on decision	Uncertainty with a probability



Not Everything that Happens is Relevant...

Relevance in Management Decisions

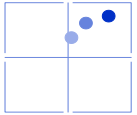
**What makes
a factor
relevant for a
business
decision?**

**The factor has
an impact on
business results**

- Managers get paid to get business results
- What can be repaired later is less relevant than what is final

**The decision
has an impact
on the factor**

- Sunk cost is not relevant
- Administration cost is not relevant for operational decisions
- For strategic decisions, more factors are relevant than for operational decisions



...so not Every Risk is Relevant

Relevance of Risk in Management Decisions

**What makes
a risk
relevant for a
business
decision?**

**Has significant
impact on
results**

- Bag of rice falling in China not relevant

**Impact differs
from already
planned risks**

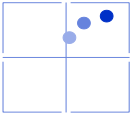
- Earthquake in Tokio and Typhoon in Shanghai may not be relevant difference for local German company

**Can be prepared
for**

- Nuclear war not relevant

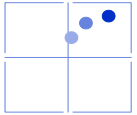
**Is reasonably
realistic**

- Meteorite hitting company HQ not relevant (mostly harmless...)



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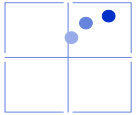
CEOs are Expected to Foresee (and Prevent) the Future

Pfizer CEO Jeff Kindler and Share Prices During his Time in Office



- Wikipedia: "Kindler resigned in December, 2010 after Pfizer stock lost 35% of its value under Kindler and underperformed 97% of all S&P Stocks."
- Reasons for stock losses:
 - Patents running out: Lipitor, Viagra (known)
 - Failure of product pipeline development projects (bad luck) → reduced expectations

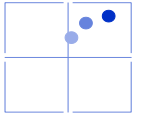
Source: Comdirect Bank Informer



The People with the Crystal Balls

Whom Companies Expect to Overcome Uncertainty

Uncertain about the Future? Experts must know!	CEOs	<ul style="list-style-type: none">• See Mr. Kindler
	Planning Departments	<ul style="list-style-type: none">• „We don't want uncertainty in our planning. We use it to measure the performance of our sales people, and we don't want them to be able to wiggle out.“ (Corporate planner, German insurance company)
	Consultants	<ul style="list-style-type: none">• E.g. Siemens study „Horizons 2020“ (2005): Based on interviews with 116 experts, 10 megatrends considered certain, predicts several competing world wide webs...
	Scientists	<ul style="list-style-type: none">• Sponsored chair for futurology, RWTH Aachen• Study course future research, FU Berlin• Most popular German futurologist: Matthias Horx, former journalist, comic artist, science fiction writer



Some Expert Predictions are just Wrong...

Famous Words from Famous Experts (1)

"There is not the slightest indication that nuclear energy will ever be obtainable. It would mean that the atom would have to be shattered at will."

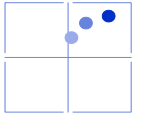
**Albert Einstein,
1932**

"It will be years -- not in my time -- before a woman will become Prime Minister."

**Margaret
Thatcher, 1974**

"I think there is a world market for maybe five computers."

**Thomas Watson,
chairman of IBM,
1943**



...Others Really Hurt

Famous Words from Famous Experts (2)

"There is no reason anyone would want a computer in their home."

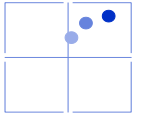
**Ken Olson,
founder of Digital
Equipment Corp.,
1977**

"Hey, we don't need you. You haven't got through college yet."

**Hewlett Packard,
when offered
Apple Computer
by Steve Jobs**

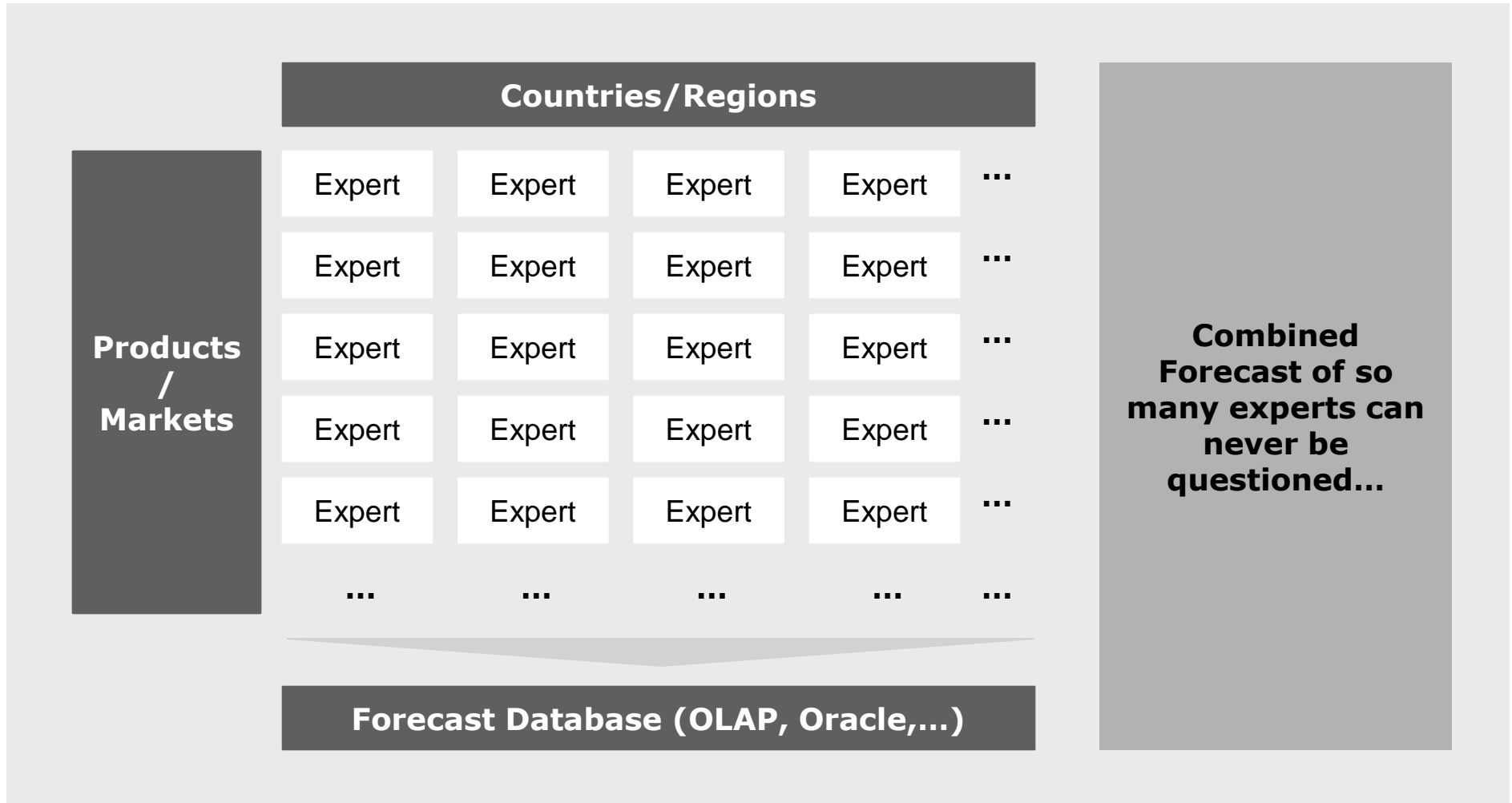
"We don't like their sound, and guitar music is on the way out."

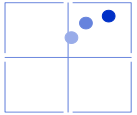
**Decca Records,
about the Beatles,
January 1962**



Spend More Money to Make it Worse

Current Trend: Increase the Number of Experts





Some Companies even Tell the Experts what to Predict

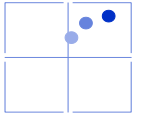
Preparing for the Future in German Companies

"We don't make our decisions in such a quantitative manner.
We make our decisions in a political process.
And then, we calculate the numbers to fit the decision.
And we've always been successful that way, haven't we?"

**Head of Corporate
Strategy, recently
privatized
German company**

"You analyze our business uncertainties? Okay, but what will
the result be?
If you won't tell me before what you will recommend,
I don't know if I want to hire you."

**Corporate
strategists in
various
companies**



Should we all be Google?

The Founder Fallacy

"In the 1920s, our founder decided to invest in a huge [...] that was totally oversized for that era.

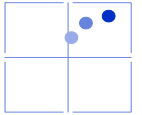
If he had thought about the risk, we wouldn't be here today."

**Head of Segment
Strategy, German
Utility Group**

**We hear of many successful companies that started
with bold, daring decisions by bold, daring founders**

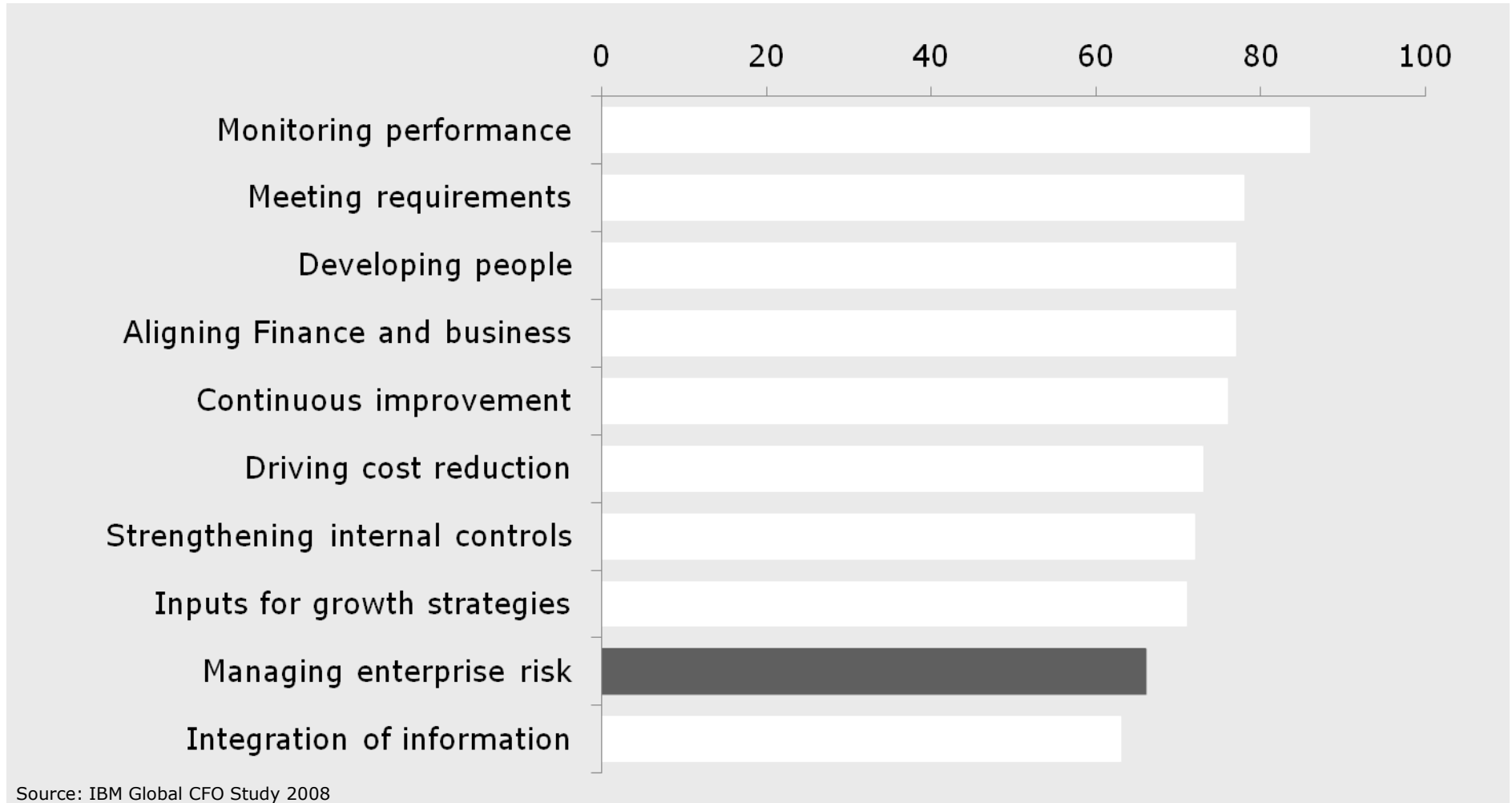
**We never hear of the many more bold, daring founders
that went bankrupt**

**Do we really want a company with thousands of employees
to act that way?**

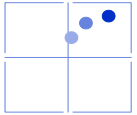


The Managers in Charge Find Risk Less Important

How Important do Chief Finance Officers Find Risk?

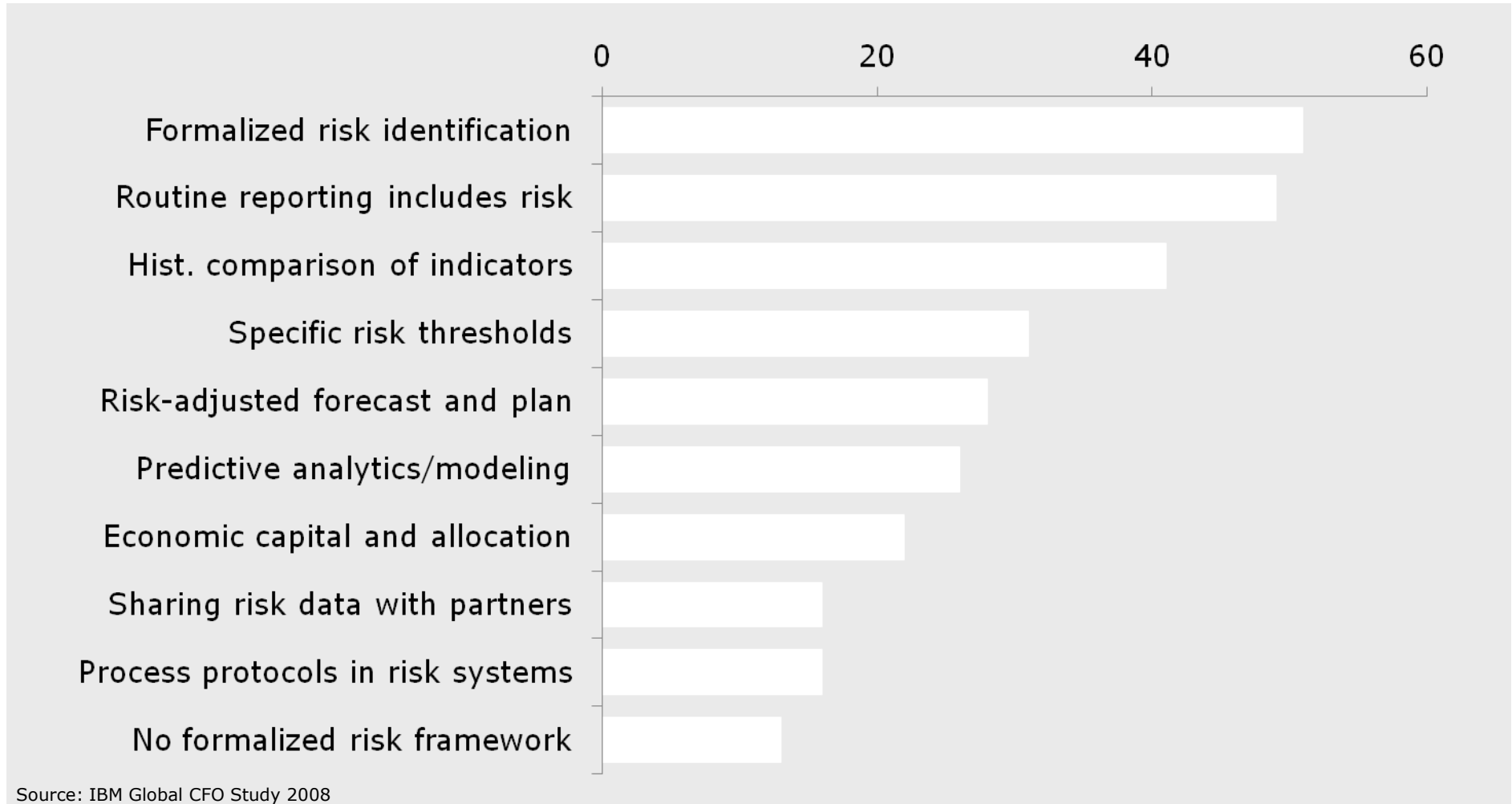


Source: IBM Global CFO Study 2008

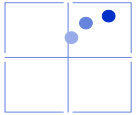


Many Companies don't even Look at Risk Systematically

Which Activities do Companies do to Manage Risk?



Source: IBM Global CFO Study 2008

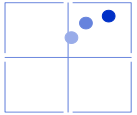


Strategies often Developed without Looking at Uncertainties

How do Companies Account for Uncertainties in Making Decisions?

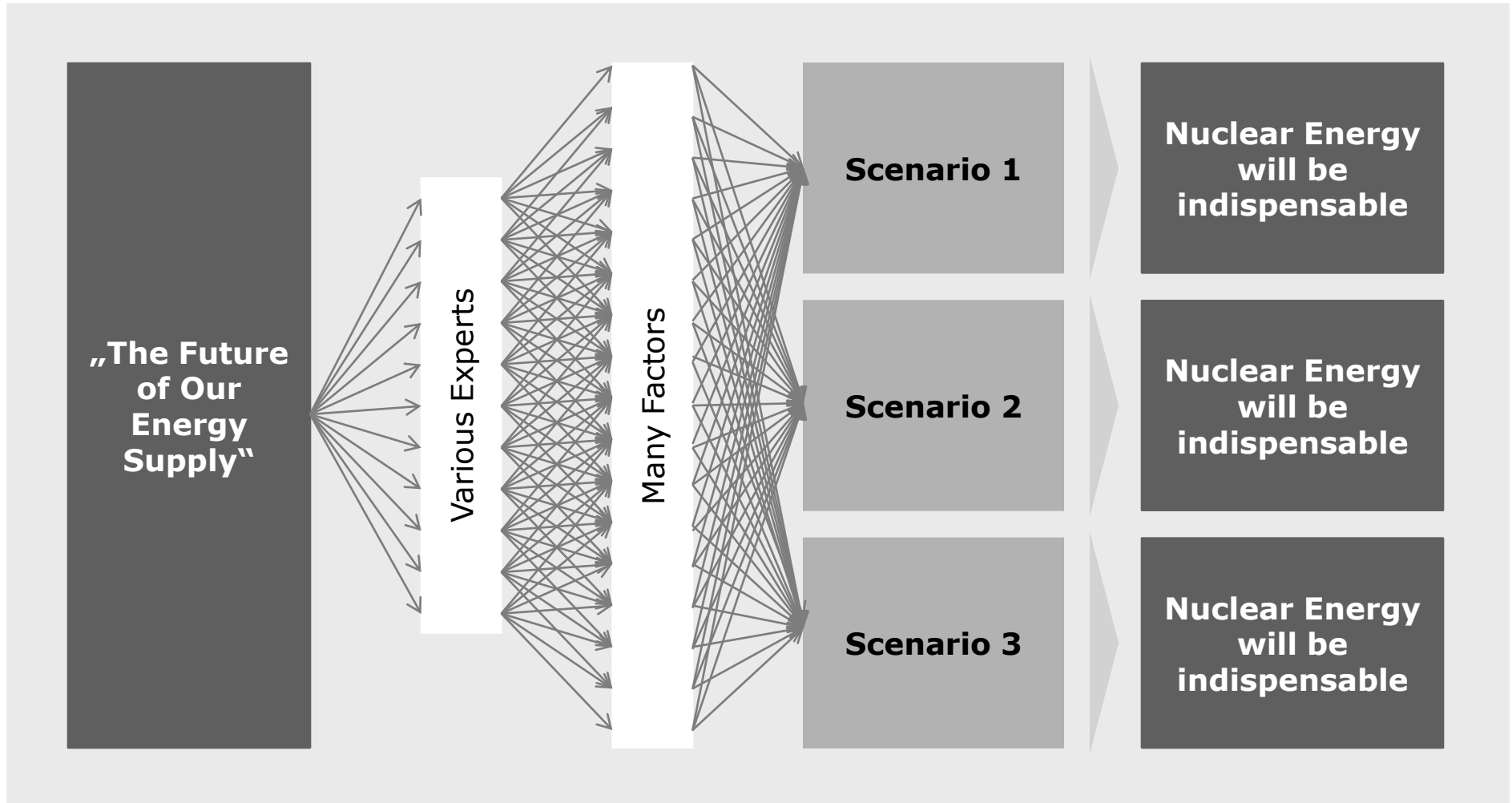


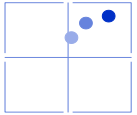
Source: Strategic Issues in German Industries, The Galileo Consulting Group, 2002



Followed the Rules, but Reckoned Without the Host...

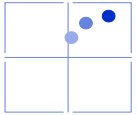
Energy Scenarios done by a German Unitily Company





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The Bible of Defeatism

The Black Swan by Nassim Taleb

NEW YORK TIMES BESTSELLER

THE BLACK SWAN

The Impact of the
HIGHLY IMPROBABLE

„The most prophetic voice of all.“

– GQ

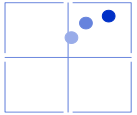
Nassim Nicholas Taleb

Nassim Taleb: The Black Swan

- Probably the most often cited book in discussions on corporate planning today
- 32 languages, >3 mio. copies sold 2008-early 2011

What it says

- Almost everything in the world is caused by unexpected and unpredictable events with extreme impact
- These events are explained in hindsight
- Examples: WW 1, 9/11, Google
- Risk management based on statistics, particularly Gaussian distributions, doesn't help
- Black swans depend on perspective
- Strategy to cope: Be robust to new developments



A Well-Marketed Collection of Trivial Content

The Black Swan by Nassim Taleb

NEW YORK TIMES BESTSELLER

THE BLACK SWAN

The Impact of the
HIGHLY IMPROBABLE

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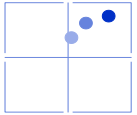
Nassim Nicholas Taleb

What people make of it

- Planning is futile
- „Have you thought of black swans?“

What must be said about it

- In hindsight everything can be declared a black swan by requiring enough detail (9/11, Fukushima)
- The argument confounds foreseeing a possibility with predicting a certainty (black swans in Australia) and causes with triggers (WW 1)
- Niels Bohr: „Prediction is very difficult, especially about the future.“
So, anything new?



What Seems Dynamic is Actually Rather Static

A Management Approach Influenced by The Black Swan

Premise: Planning ahead is futile

Navigate by sight

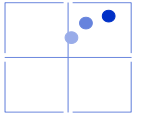
- No planning, no target figures, just commonly accepted values
- Empower people to make their own decisions, minimal hierarchy
- Develop corporate culture and recruiting accordingly
- Idols: New economy companies

Planning is needed for external investors, anyway

Misunderstands true dynamics of new economy companies

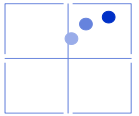
Left to themselves, people will usually avoid any change

“No planning” because of uncertainty is really just planning without uncertainty



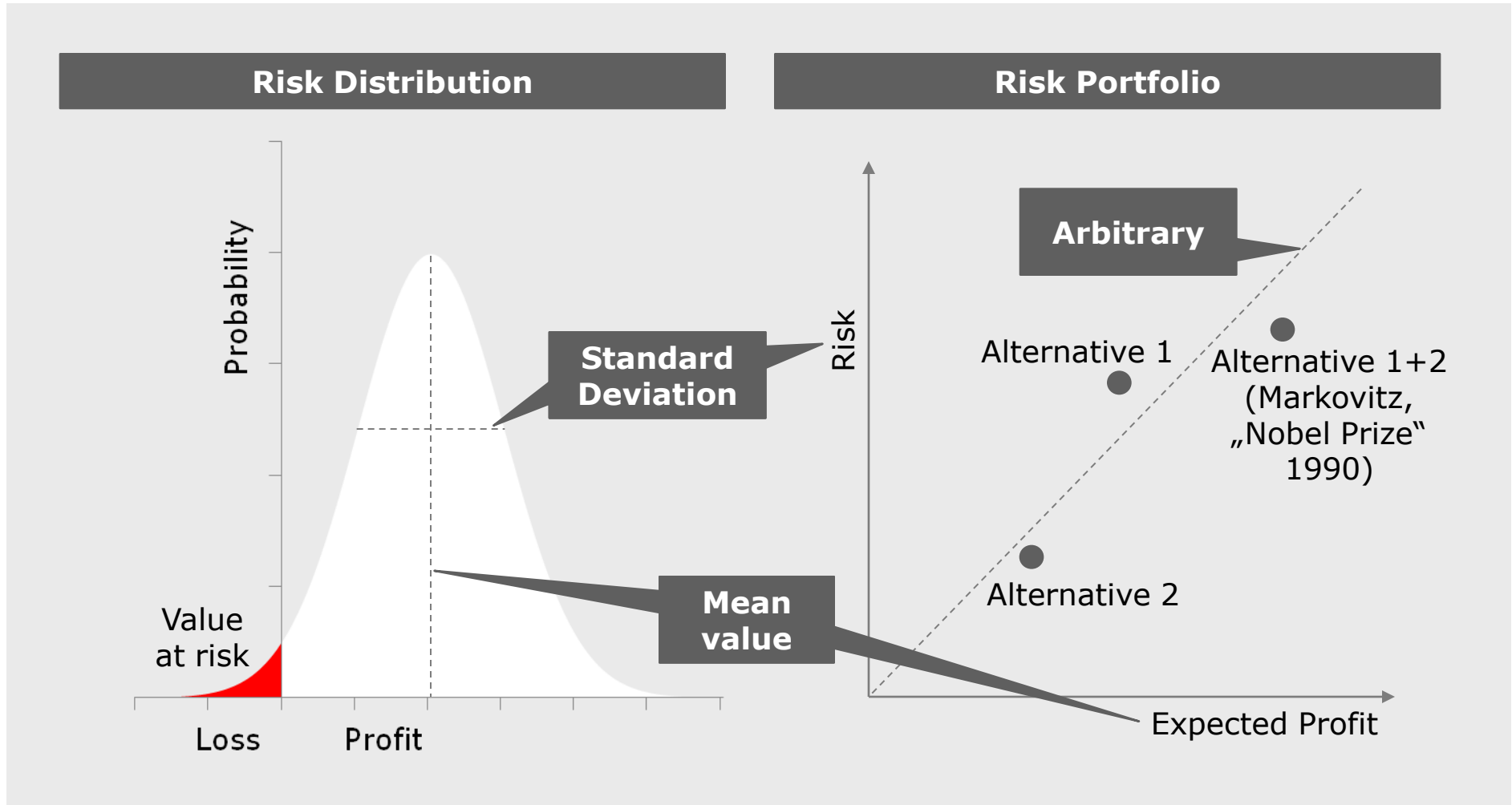
Topics

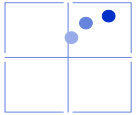
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Risky Decisions can Look so Simple...

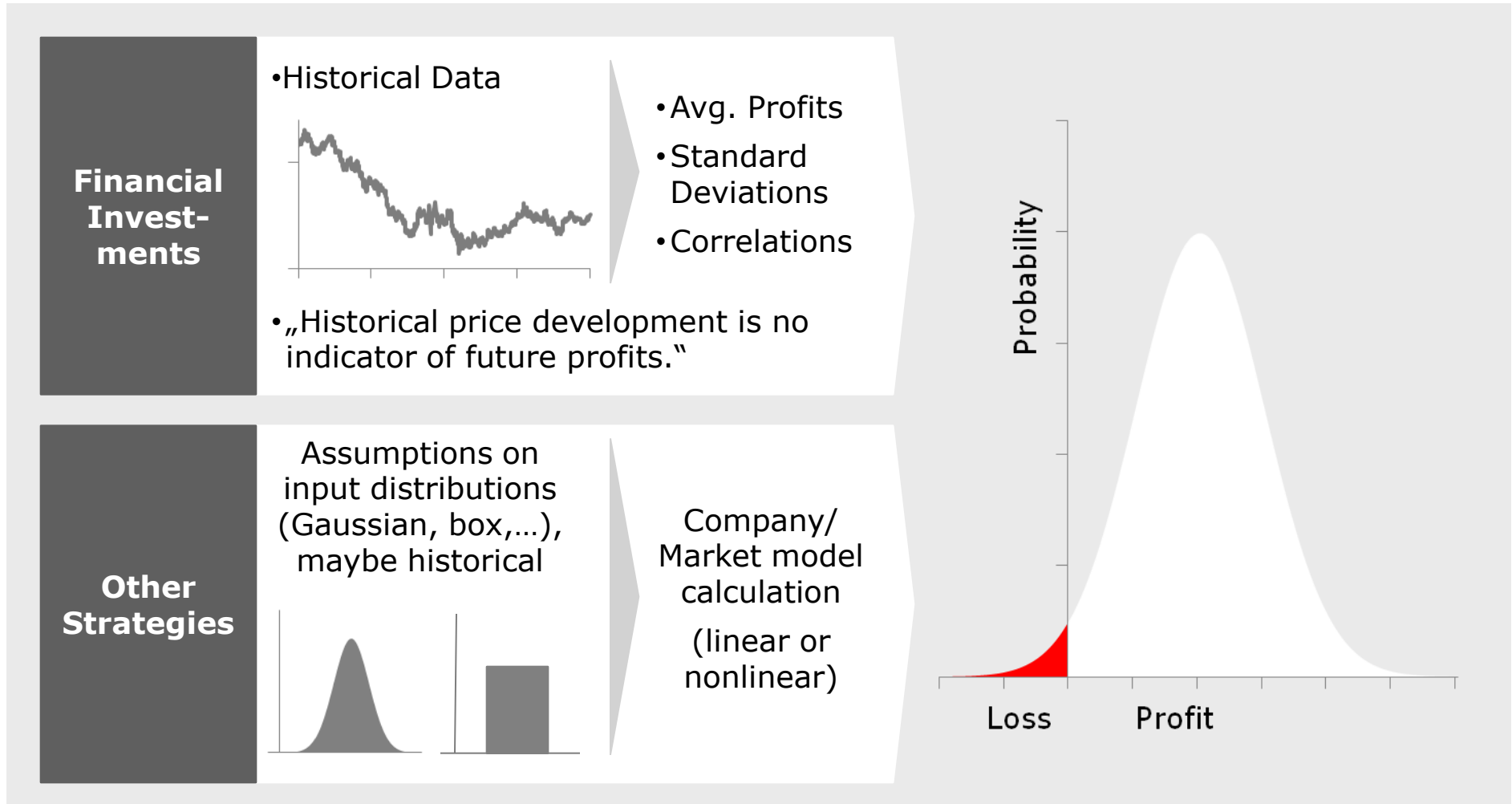
Typical Decision Tools in Financial Risk Management

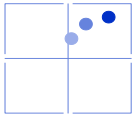




...but Where does the Information Come from?

Information Sources for Risk Distributions in Financial Risk Management





Sophisticated Calculation on Guessed Parameters

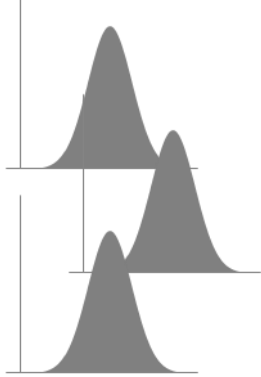
The Worries of a Major Industrial Group

„The only problem that you could possibly help us with is to find a better random number generator for our Monte Carlo simulations.“

**Head of Risk Management,
globally operating industrial
group**

Cost

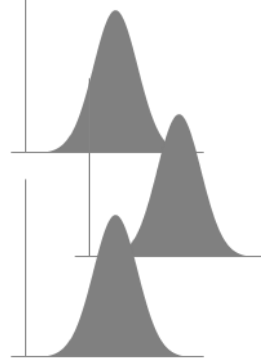
Factor Prices,
e.g. Oil,
Electricity,
Labor,...



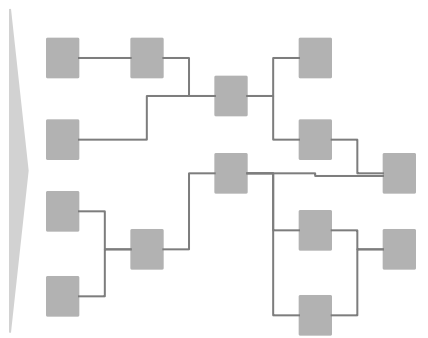
Own Business

Factor use in processes (nonlinear, complex)
➔ Monte Carlo Simulation

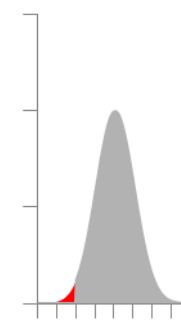
Random numbers



Process model

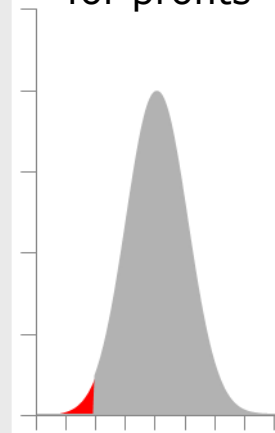


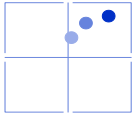
Reiterate,
sum up



Results

Probability
distribution
for profits





A Well-Proven Concept

The Results of Financial Risk Management Based on Statistics

„The risk sustainability assessment shows that even extremely unexpected risks under worst case assumptions are covered by the risk coverage capital. Risks from the single risk types hampering our corporate development or endangering our rating were not and are not in sight.“

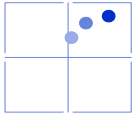
Conclusion of 22-page risk chapter in the financial report of IKB Deutsche Industriebank published June 28, 2007

IKB needs immediate billion-Euro bailout by public co-owner KfW

July 30, 2007

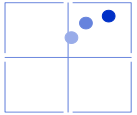
Total bailout sum exceeds €11 bn (pre-crisis net equity was €1.4 bn)

Until October 2008



Topics

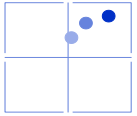
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Life is so Simple if you have Someone to Blame

The Financial Crisis According to the German Media





Risk Management Deemed too Restrictive

How the Bad Securities came to Exist



Home Loans in 1930s America

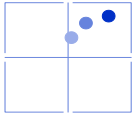
- Risk Management: Trust, Share of own equity in credit sum
- Depression: Equity reduced
 - No new loans



Picture Source: Wikimedia Commons

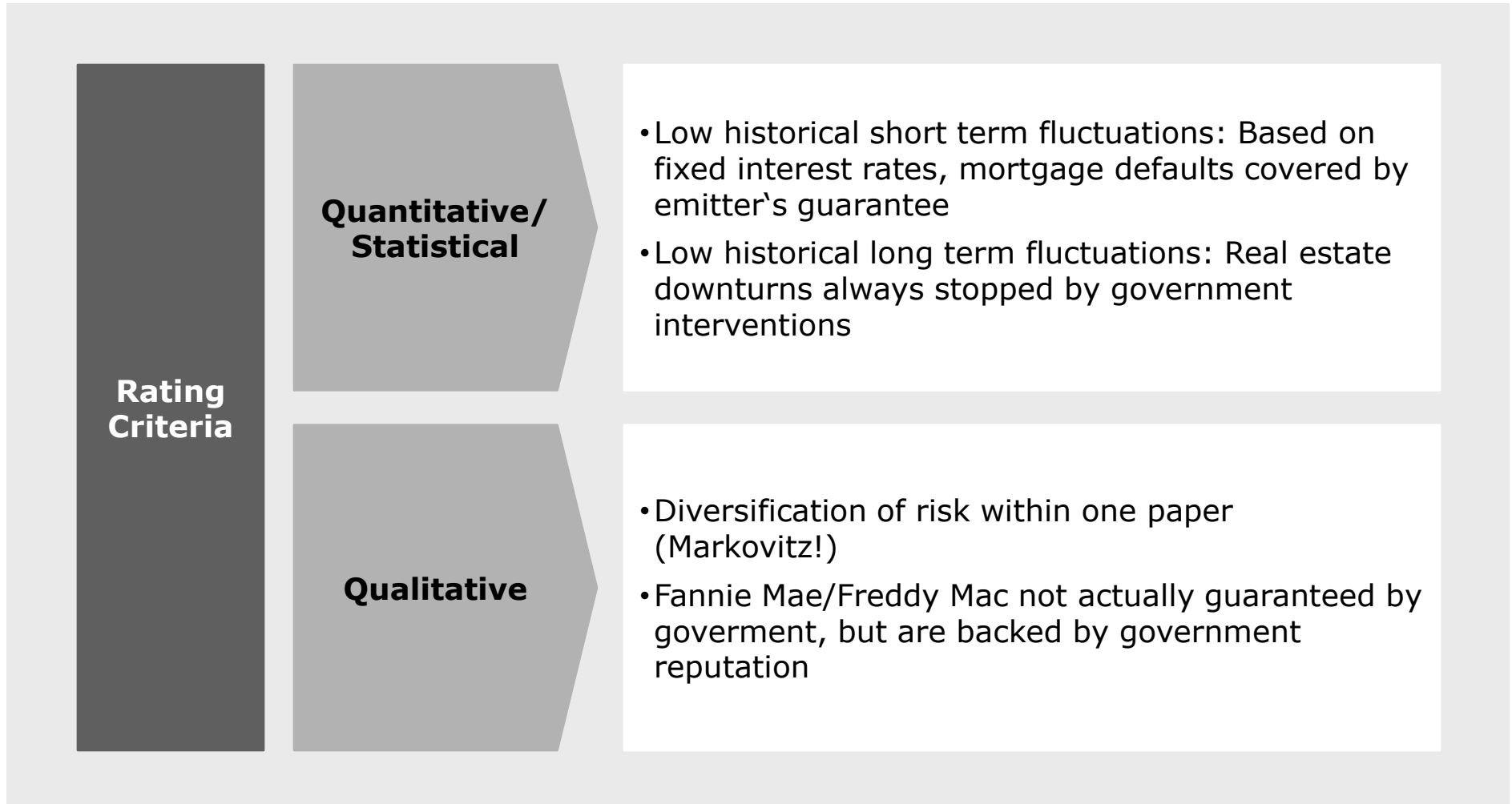
Reactions

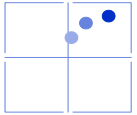
- 1930s: Federal Home Loan Banks, Credit Insurances, Fannie Mae: Buy mortgages from local banks (government sponsored, tax exempt)
- System expanded every time real estate market stalled
- 1970s: FHLMC (Freddie Mac), mortgages resold as mortgage backed securities, sold through investment banks, guaranteed by FHLMC, not government
- 1990s: increasing government pressure to buy more subprime mortgages
- Other banks also emit mortgage backed securities, sometimes not guaranteed



Failure by the Books

How the Bad Securities got their Excellent Ratings



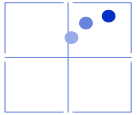


No Lack of Risk Management or Regulation

How Germany was Affected by the Crisis

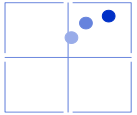


Private Real-Estate Banks	Private Universal Banks	Some Semi-Public Banks
E.g. HypoRealEstate, Eurohypo	E.g. Deutsche Bank, Commerzbank	E.g. IKB, WestLB
Limited or no investments in mortgage backed securities, mostly affected by following banking crisis, collapse of partners, loss of trust in banking system (→ refinancing)		Pressure to maintain profits above standard for business model, while losing competitive advantages Massive investments in mortgage backed securities to compensate
Risk well known, but inevitable part of business model		Problem not visible for quantitative risk management, failure of sound judgement



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Looks easy...

Six Rules Companies Could and Should Follow about Risk

1. Acknowledge it is there

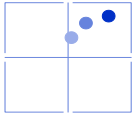
Uncertainty exists, the only way to avoid it is to stop doing business, so it should be included in planning, too

2. Do not be overwhelmed by the possibilities

Nobody can know for certain what will happen in the future, but if something is relevant for your business, you should be able to at least think of it

3. Look from inside out

Very different causes can have very similar impacts on your business, but why something bad happens to you is not that important



...but must be Followed Through

Six Rules Companies Could and Should Follow about Risk

4. Use scenarios and game structures to learn, not to make decisions

Scenarios help to get some order into risks you cannot influence and game situations make interplay with others transparent, but don't expect instructions what to do from scenario technique or game theory

5. Calculate impact on things to decide

The probability of bad things happening can often not be calculated, but their impact on decisions you have to make usually can

6. Follow strategies that are robust to your findings

Strategies that are particularly robust to potential problems you thought about will also be robust to many things you have not thought about

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