



Meeting the Challenge of Project Predictability

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What Are We Thinking About Risk?

- **How many of you are:**
 - Owners?
 - E&C Contractors or Suppliers?
 - Developers?
 - Lenders?
 - Academics?

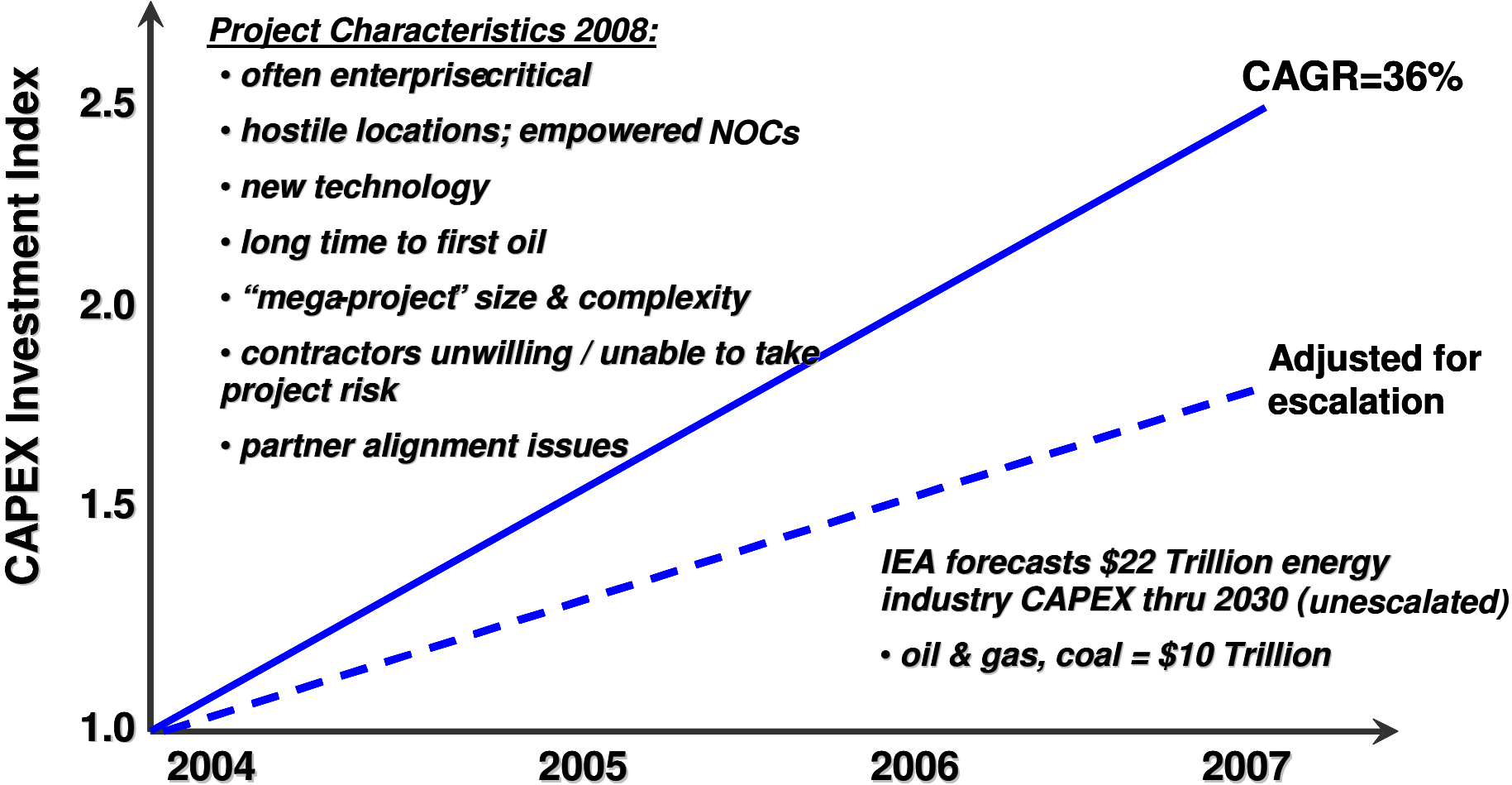
What Are We Thinking About Risk?

OWNERS: Has your view of project risks changed in the past 3 years? How? What are you doing about it?

CONTRACTORS: Has your willingness to take risks changed in the past 3 years? Why? What are you doing about it?

Developers – Lenders – Academics: Comments?

Current Conditions Unlikely to Change



Examples of CAPEX Volatility

- Upstream
 - Kashagan (offshore production - Caspian) \$10G -> \$19G
 - Sakhalin II \$10G - > \$22G
- Midstream
 - Long Lake (SAG-D oil sands - Alberta) \$3.4G -> \$6.1G
 - Snovhit LNG (Norway) \$2G -> \$8.8G
- Downstream
 - Pearl (GTL – Qatar) \$5G -> \$20G
 - Syncrude Upgrader Expansion: \$4.1G -> \$8.4G

These major increases in cost and time to first production were announced long after sanction.

Management is NOT Amused

- **Poor project performance is not acceptable when capital markets are looking for predictability & strong returns**
- **>50% of execs are dissatisfied with project performance (eg 40% of projects overrun) – more-so than ever**
- **... cannot afford to miscalculate capital project risks – yet do not have a good grasp of how to manage (them)**

Source: Capital Project Execution in the Oil & Gas Industry – Booz Allen Hamilton

THE
BLACK SWAN



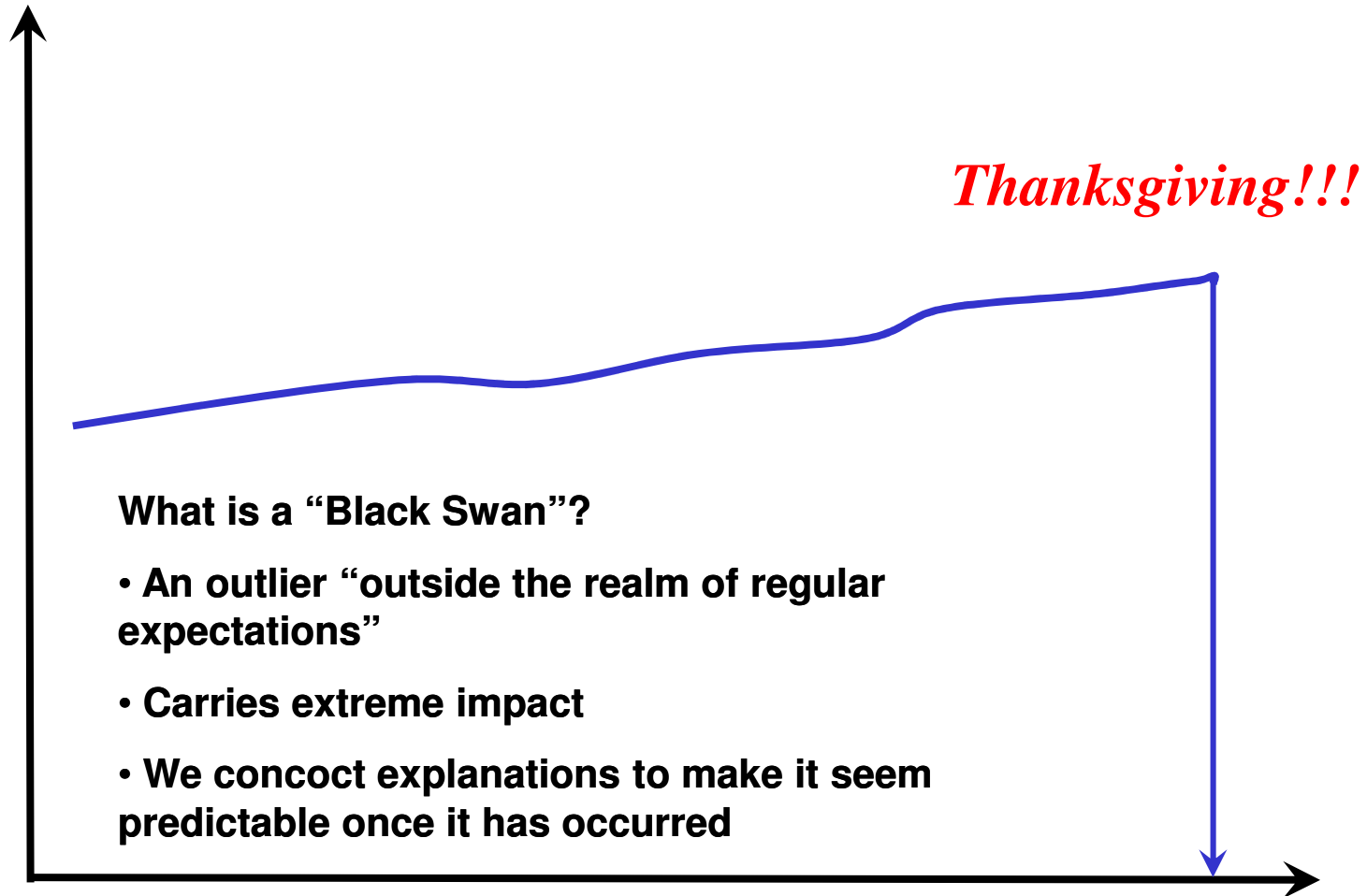
*The Impact of the
Highly Improbable*

Nassim Nicholas Taleb

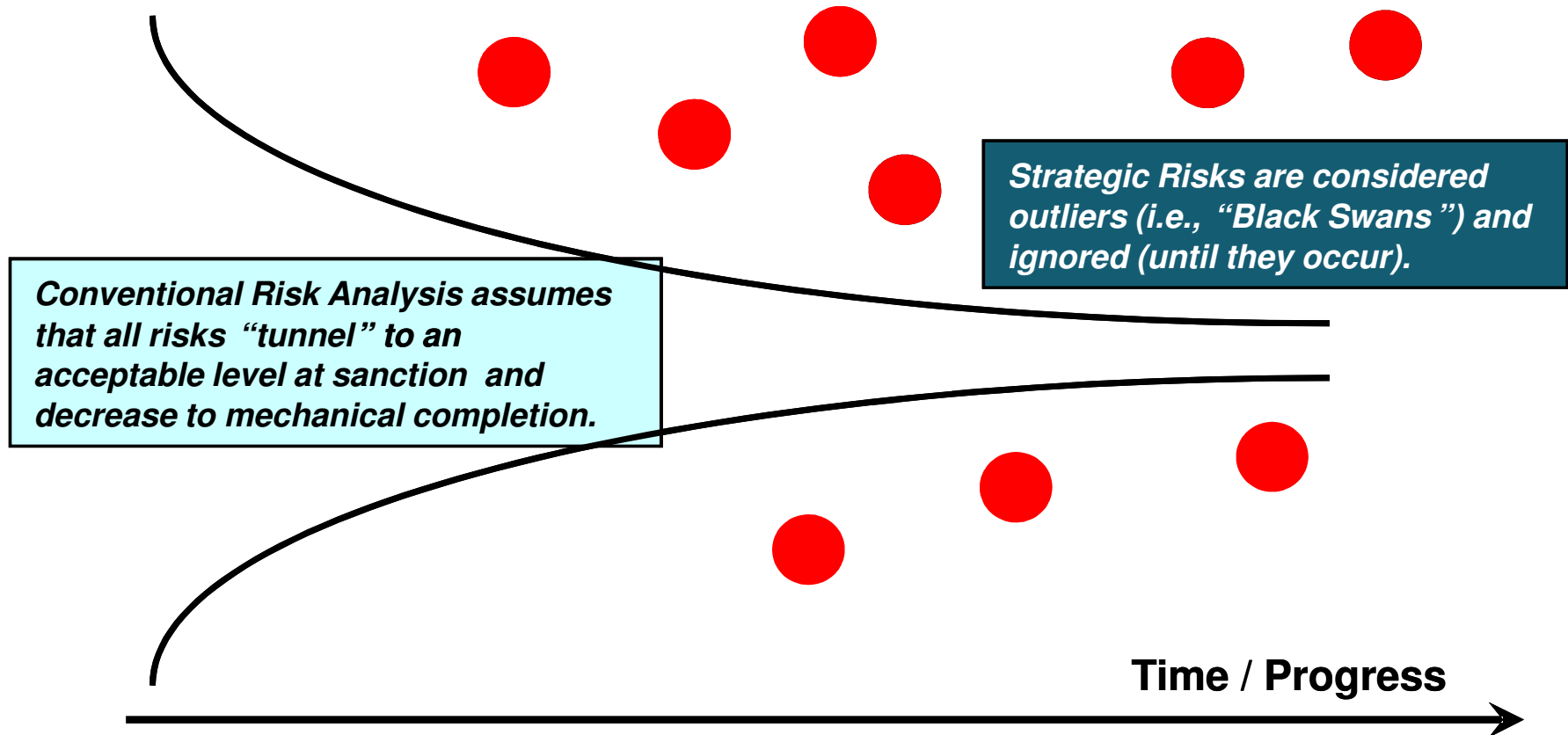
HUNTING BLACK SWANS



Are We Thinking Like Turkeys?



Conventional Approach Ignores Outliers



Consider Kashagan (per WSJ 8/28/07)

- Shell operator for Exploration – logistics challenges etc.
- 2001: Eni=operator, 1st Oil 2005 – lack of benchmarks for estimating
- issue of artificial islands delays project
- 2004: new plan approved, 1st Oil 2008, \$10G
- 2007: update: 1st Oil end 2010, \$19G (Life \$57G->\$136G)
 - LQ too close to treatment plant, weak \$, lack of benchmarks, inflation
 - Cost of drilling rigs, “soaring steel prices”, lack of engineers, PMs
 - Kashagan: deny permits, project on hold, fire Eni

RISK FACTORS:

- Reservoir: H₂S, pressure (“costly stress-resistant pipes”)
- Location: Caspian freezes 5 mo./yr. (“rig-wrecking ice-packs”), cold winter, logistics, 10’WD
- No export pipeline
- Environmental: beluga, sturgeon, seals (no spills!) – permitting issues
- Partners: strong, misaligned, dysfunctional
- Kazakh government new at this ...

What Do You Think?

- **Were these really Black Swan risks?**
 - Could they have been predicted?
 - If so, why weren't they?
- **If you were the Kazakhs, would you fire Eni? If so, why? If not, why not?**

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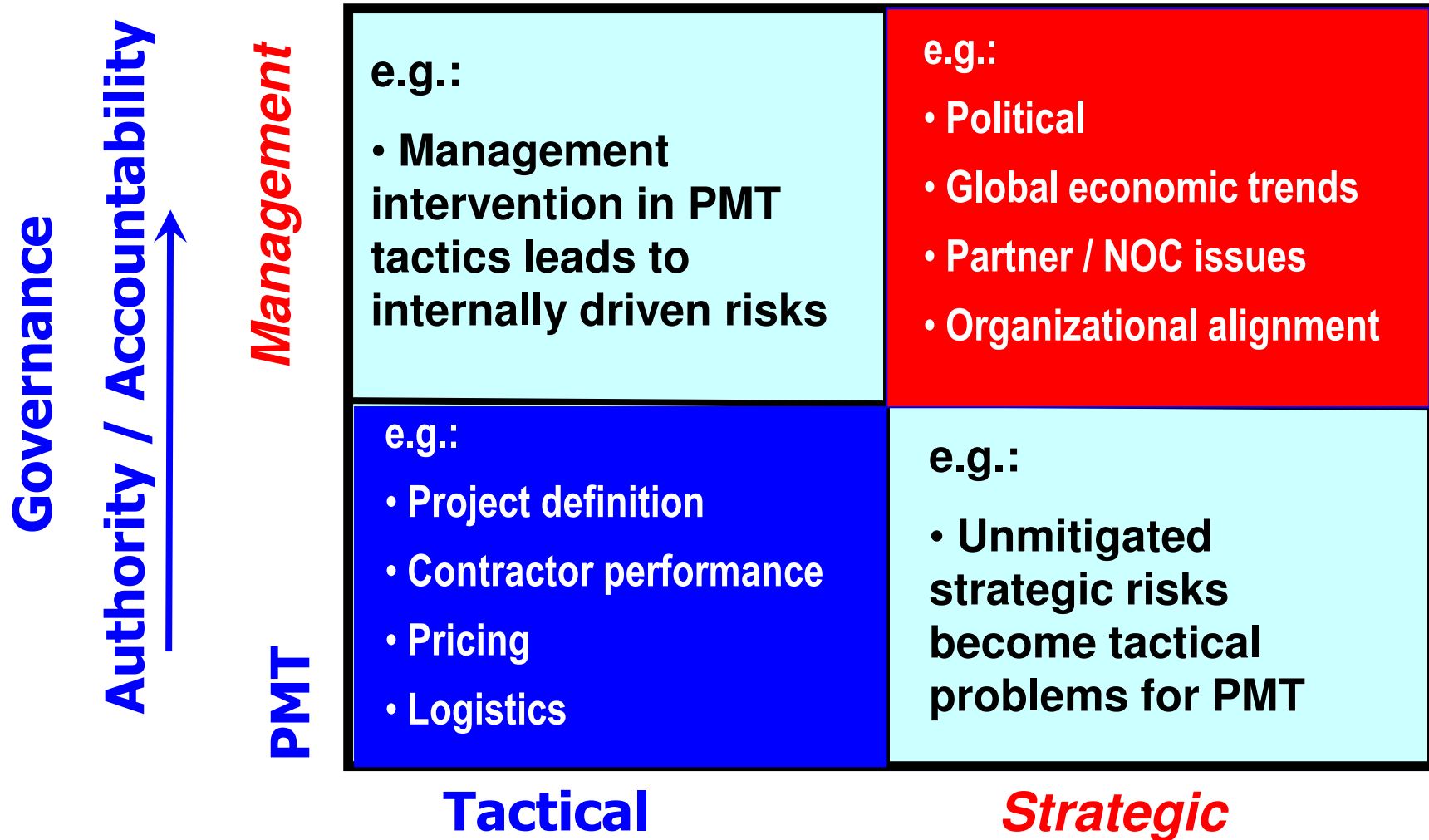
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- **Kazakh government new at this ...**

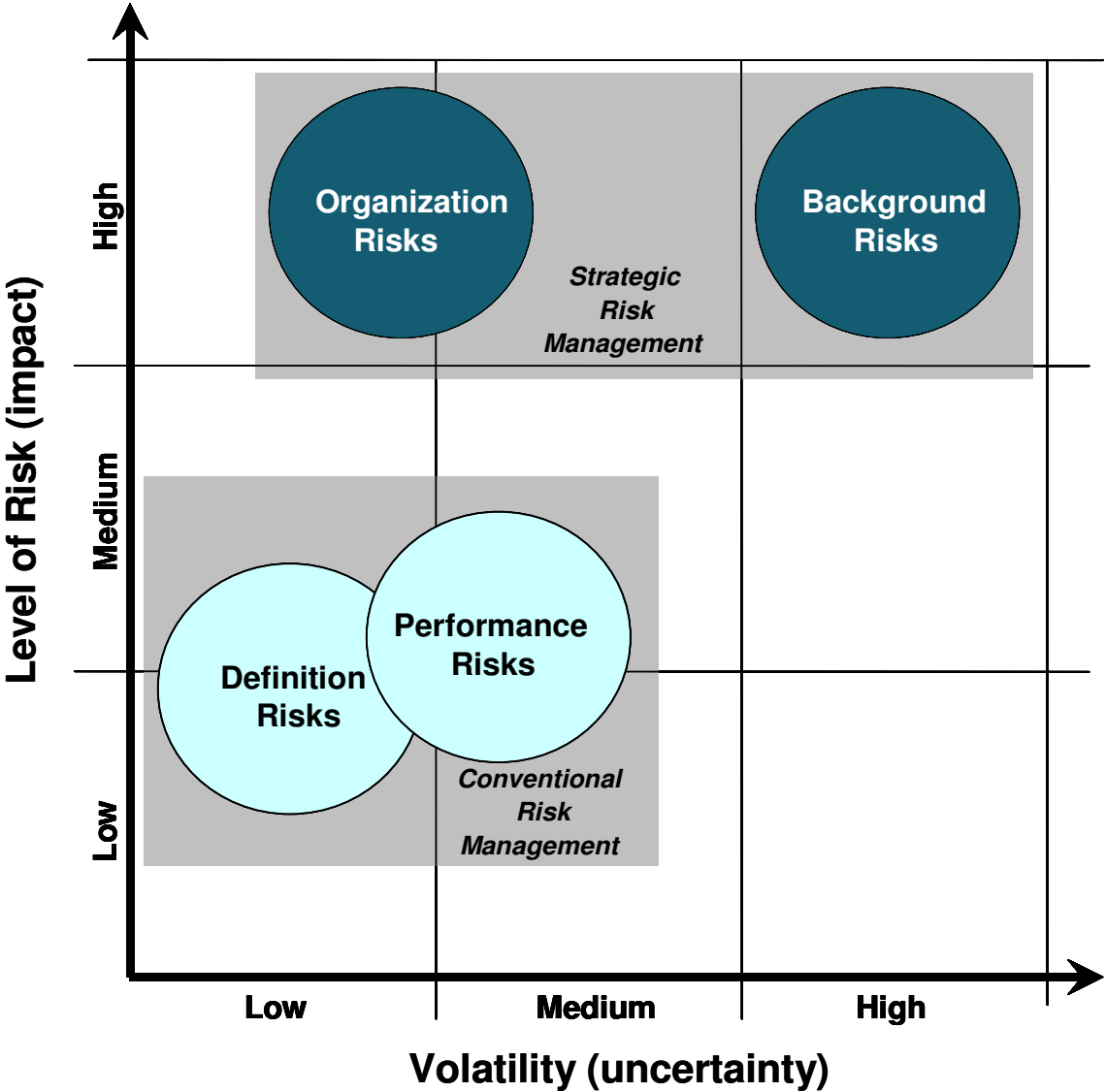
Consider Your Projects

- **What are some examples of Black Swans?**
 - What was the project?
 - What risk was experienced and what was the impact?
 - Could it have been predicted at the start?
 - If so, why wasn't it?
 - What is the lesson learned?
- **Is “delusion necessary for projects to proceed?”** (see “Megaprojects and Risk”, Bent Flyvbjerg)

Managing Risks at the Right Level



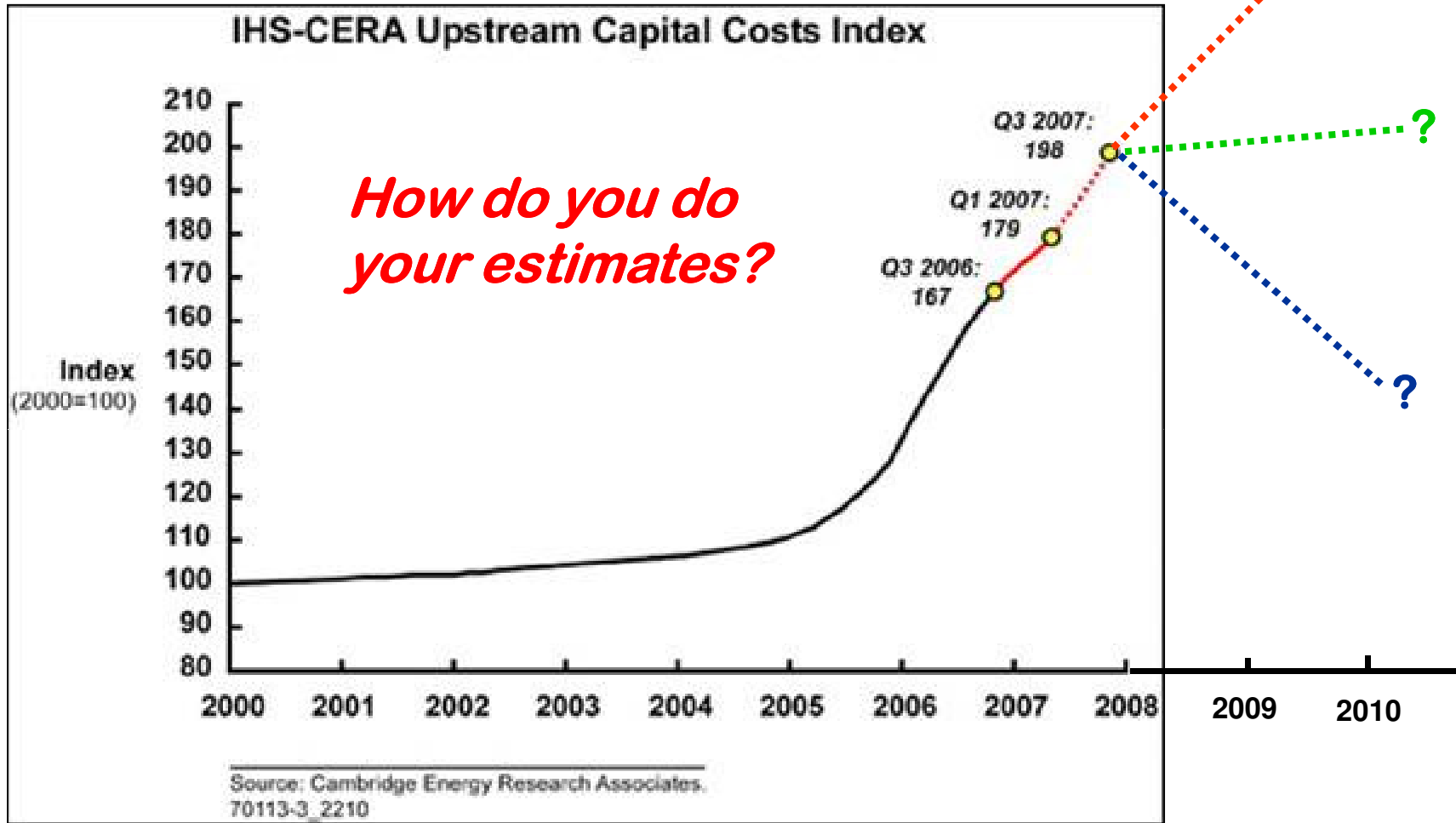
We Must Manage Both Strategic Risk & Volatility



Are Estimating Techniques Part of the Problem?



What do YOU Think?



Projects Overrun Because...

Most organizations lack a practical and disciplined approach to understanding, monetizing and managing:

- **Strategic Risks**
- **Volatility**

Those that address these new aspects of Project Risk Management will improve predictability & performance.

A Closing Thought ...



One of the best lessons children learn through video games is that standing still will get them killed quicker than anything else.

Jinx Milea, USC