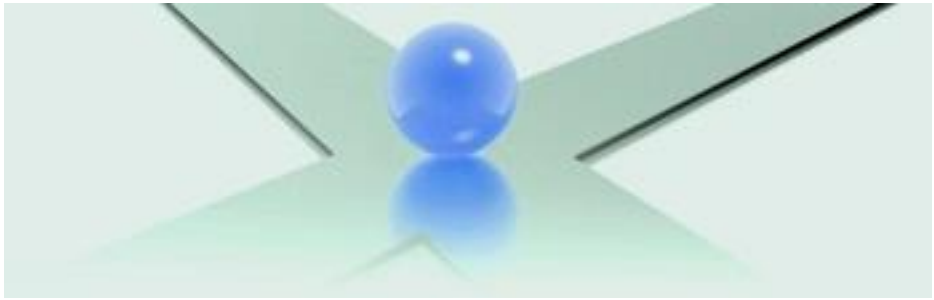
Military Strategy and Economics
can Teach Us about
Risk-Management and Uncertainty

Yakov Ben-Haim
Technion-Israel Institute of Technology



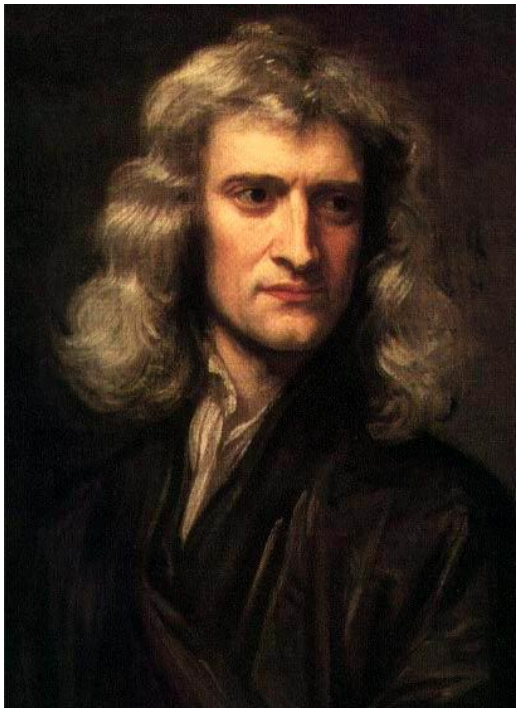
Outline

- Two paradigms, two world views.
- Uncertainty: info-gaps.
- Implications for risk management.

The Newtonian paradigm

Laws of nature:

- Exist.
- Stable and universal.
- Discoverable.



Jomini's theory of war and operational art

- "War in its ensemble is not a science, but an art."
- "Combats [are] often ... quite independent of scientific combinations".
- "Strategy ... may indeed be regulated by fixed laws resembling those of the positive sciences."

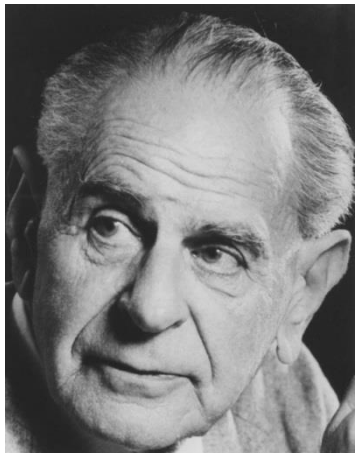
Some fixed laws of war:

- Force concentration and preponderance.
- Geometrical analysis.
- Napoleonic patterns.

2nd paradigm: Shackle-Popper indeterminism

- Intelligence:
  What people know,
  influences how they behave.
- Discovery:
  What will be discovered tomorrow,
  cannot be known today.
- Indeterminism:
  Tomorrow's behavior cannot be
  modeled completely today.

GLS Shackle



Karl Popper

Clausewitz's theory of war and operational art

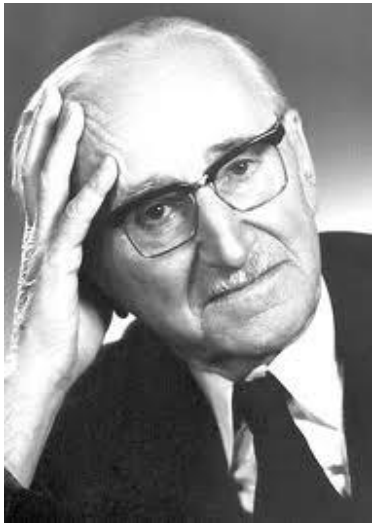
"War is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty."

- Chance: Unexpected event.
- Uncertainty: psychological discomfort and confusion.
- Friction: endless petty circumstances.
- Rules and formulas are useless.
- Take initiative, exploit uncertainty.
- Auftragstaktik (Moltke).

Hayek's theory of the economy

"Dispersed bits of incomplete and frequently contradictory knowledge."

- Patterns are fleeting.
- Probabilities are unknown.
- Central planning is infeasible.
- Economic growth from innovation.
- Entrepreneurial profits for initiative.



Two world views
"Nomological" vs "Spontaneous"

Newton

Law-like, predictable

- Jomini (mostly)
- (Comte)
- (Rayleigh)
- (Samuelson)
- (Many others)

Shackle-Popper

Spontaneous, uncertain

- Clausewitz
- Hayek
- (Knight)
- (Simon)
- (Many others)

Where does risk management fit in?
Consider uncertainty.

Urban disasters: Thames flood barrier

- 1953: worst storm surge of century.
- Flood defences breached. 307 dead. 1000s evacuated.
- Current barrier opened May 1984.
- Re-design? Vast uncertainties:
- Climate change, urban development, cost of damage.

Technological disasters: Fukushima

Fukushima sea wall breach:

Hydrogen explosion:

No-fail design? Disaster recovery?

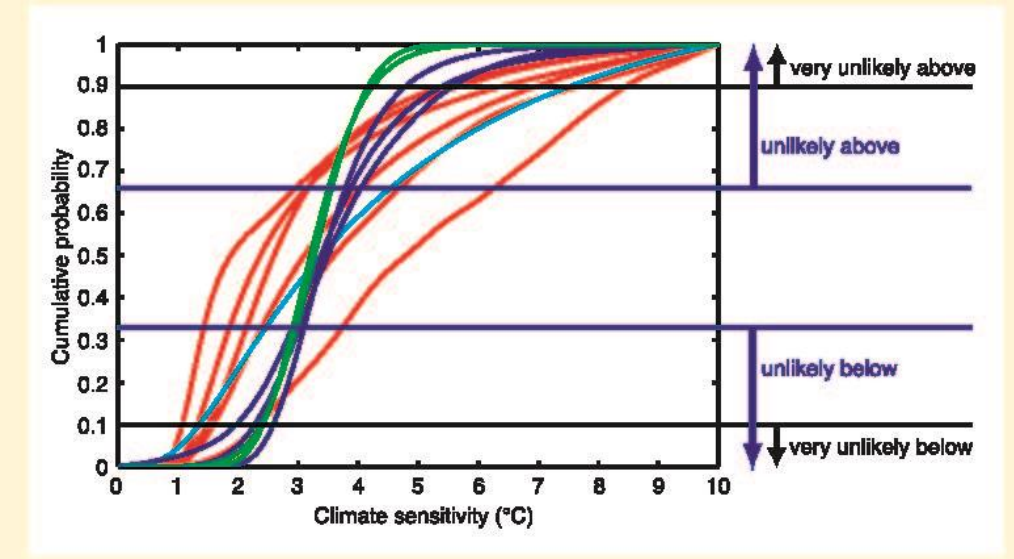
Vast uncertainties.

Climate change

Use data and models for prediction and policy:

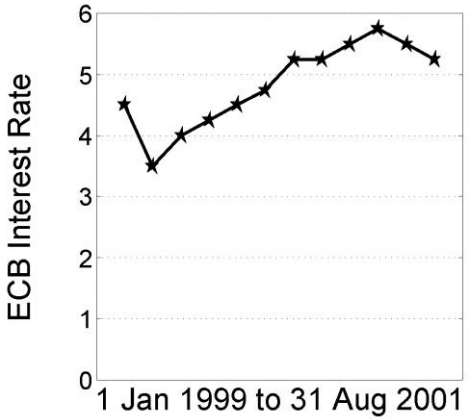
- Greenhouse gas causes temperature change.
- Temperature change has economic impact.

Vast uncertainties in data and models:



Economic forecasting

ECB patterns and fluctuations:



Things happen:

What's next?

Law enforcement: Profiling

Crime demographics:

- Minority: relatively more crime.
- Majority: absolutely more crime.

Profiling with limited budget:

- Catch more criminals.
- Total crime may increase.
- Why? Elasticity of response.
- Difficulty of prediction and policy:
  Uncertain elasticity of response.

Implications for risk management

Risks: uncertain, indeterminate: Shackle-Popper.

Unknown or uncertain hazard. E.g.:

- E.g. Ashtabula bridge: brittle failure, 1879.
- Liberty ships: stress concentration, 1940.
- Arab Spring: geo-politics, 2011.

Routines: repeated, law-like: Newtonian.

Standards and regulations: good for routines.

ASCE standards committees. Legislation.

Innovation, initiative: good for risks.

Quandary: Can we standardize innovation?

Maybe. My main hope: Education.

What do you think?