

Evidence-based forecasting for competitors and regulators

**New Zealand Institute for the Study
of Competition and Regulation Inc.**

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Kesten C. Green

Business & Economic Forecasting Unit, Monash University
& Decision Research Ltd
ForPrin.com & AdPrin.com

kestencgreen.comkestenc@me.com

Scientific* forecasting methods

Procedures for making predictions about matters currently unknown, based on:

- empirical comparisons of proper alternatives
- ex ante tests
 - of accuracy
 - of conditions
 - (e.g. level of knowledge about the situation)

*Used interchangeably with "evidence-based"

Principles for the selection and application of forecasting methods

Mid-1990s: Scott Armstrong started the “principles of forecasting project” to summarize all knowledge about forecasting in the form of scientific principles.

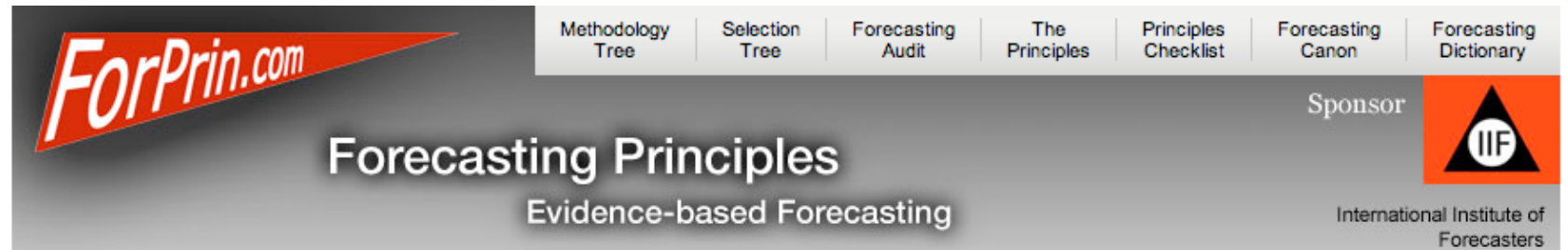
A principle is a condition-action statement.

This project led to 139 principles as described in the *Principles of Forecasting* handbook.

39 authors & 123 reviewers

The principles (currently 140 in number) can guide the selection and application of methods


ForPrin.com features



Methodology Tree | Selection Tree | Forecasting Audit | The Principles | Principles Checklist | Forecasting Canon | Forecasting Dictionary

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Principles of Forecasting

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- Descriptions of 140 forecasting principles
- The Forecasting Canon with 9 key rules
- Answers to *Frequently Asked Questions*
- The *Forecasting Dictionary*
- Forecasting Methodology & Selection Trees
- [Forecasting Audit Software](#)
- Resources for practitioners, educators, researchers
- Special Interest Groups (SIGs)
 - E.g. [PublicPolicyForecasting.com](#)

Why not just ask an expert what will happen?

Most decisions in business based on managers or other experts judgments about what will happen, but...

Tetlock (2005): evaluated

- 82,361 forecasts
- made over 20 years
 - by 284 professional commentators and advisors on politics and economics

Expertise did not lead to better forecasts...

(but their excuses are better than novices')

Tetlock's finding is consistent with other findings from research on forecasting by unaided experts.

Experts and bailouts*

Think of an investment being promoted to you that would dominate your portfolio and about which there are...

- Dramatic claims
- Great uncertainties
- Diverse expert opinions

Note that...

- Promoters have a 50/50 record
- Confidence has no relationship to accuracy

*See Armstrong & Green 2008

**Would you make the bailout
investment...**

**with your own
money?**

Forecasting decisions in conflicts: Research problems

Artists protest: Artists stage sit-in & demand funding	Nurses dispute: Demand same pay increase
Distribution channel: Novel proposal to market appliances	Telco takeover bid: Bid for all after rejecting mobile offer
55% pay plan: NFL players demand 55% of revenue	Water dispute: Troops mass & threat to bomb dam
Employee grievance: Mediation when job down-graded	Zenith investment: Investment decision with politics

Methods for forecasting decisions in conflicts

	Novices	Experts
Guessing	28%	28%
Unaided judgment		
Role thinking		
Game theory		
Structured analogies (2+)		
Simulated interaction		

Forecasting decisions in conflicts: Accuracy of forecasts (%)

	Novices	Experts	Mode*	
Guessing		28	28	-
Unaided judgment		29	32	-
Role thinking	34	31		-
Game theory	-	31		-
Structured analogies (2+)		-	56	
	63**			
Simulated interaction		62		-
	88			

*Modal (combined) forecast for each of the 8 conflicts

Possible applications of SA and SI for business and government

Forecast responses to alternative strategies in conflict situations:

- Labour-management disputes
- Competitor, supplier, and distributor behavior
- Customer reactions to major changes in product, price or service (e.g., new Coke)
- Behavior in response to new laws or regulations
- Diplomatic and national security problems

Forecasts for climate policy

- Climate model outputs: Scenarios based on modelers' opinions
- Audit of IPCC* forecasting procedures: 72 principles violated
- Conditions for long-term climate forecasting:
 1. Climate is *complex*.
 2. Much *uncertainty* over causes, feedbacks, data.
 3. No clear

* Intergovernmental

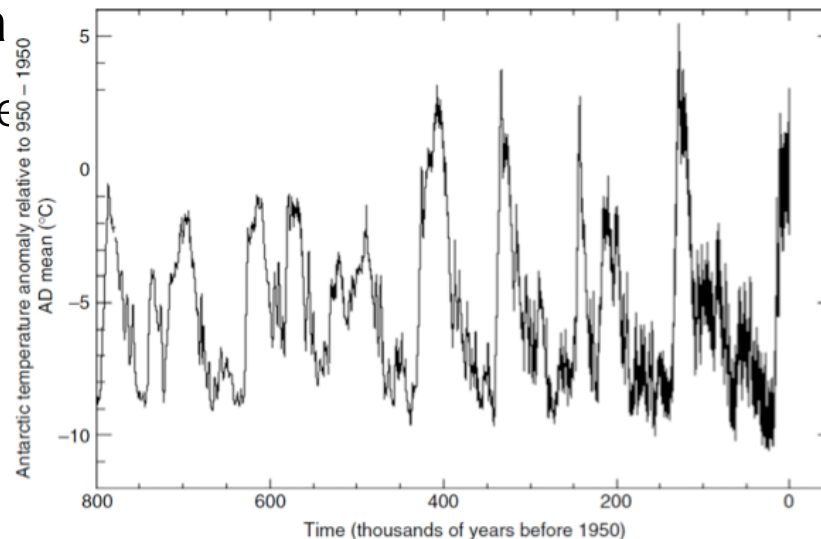


Fig. 1. 800,000-year record of Antarctic temperature change.

Simple benchmark vs IPCC forecasts

- Given the conditions, a simple no-change model, which assumes complete ignorance about climate is appropriate (it violates one principle and that is correctable—and is expected to be minor).
- The IPCC forecasts 0.03° C per annum

Historical correlations between global temperatures and upwardly trending time series

SeriesCorrelation

Atmospheric CO ₂ 1850-2008	0.86
U.S. Price Index 1850-2009	0.85
NOAA* expenditure 1970-2006	0.82
Benchmark no-change model	0.00

*National Oceanic and Atmospheric Administration

IPCC performance 1851-1975*

IPCC/No-change error ratio** < 1 means forecast errors are smaller (better) than no-change errors

IPCC/No-change Error Ratio

	<u>Ration</u>	
1-10 years	1.5	1,205
41-50 years	6.8	805
91-100 years	12.6	305

* Green, Armstrong and Soon (2009)

** A.k.a. Cumulative Relative Absolute Error or CumRAE

Absolute errors from benchmark forecasts*

Horizon

Mean

Up to 10 years < 0.15° C

Up to 70 years < 0.30° C

Up to 100 years < 0.40° C

*From Fig. 3. in Green, Armstrong, & Soon
(2009)

Forecasts for polar bear policy

- Our audit* of the two key government reports on the effects of global warming on polar bear forecasts showed that they properly followed only 13% of relevant forecasting principles.
- Rather than a sharp decrease, we forecast a modest increase in numbers.

*Armstrong, Green, Soon (2008)

What is needed to properly evaluate the effects of climate change policies?

Scientific forecasts for plausible alternative policies:

- as they are actually implemented
- all their effects
- all the costs and benefits of all their effects

Summary

- Do not rely on experts' unaided judgmental forecasts
- Do require forecasts:
 - That are scientific (i.e. from evidence-based methods – see ForPrin.com)
 - For alternative policies or strategies
 - Of all effects
 - Of all costs and benefits

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