



Gold Brand Software LLC



- **George Mason University (Mason)**
 - Charles Twardy (PI), Kathryn Laskey (Co-PI), Robin Hanson
- **Gold Brand Software (Website)**
 - Brandon Goldfedder
- **Australian Center of Excellence in Risk Analysis**
 - Mark Burgman
- **KaDSCi LLC (Decision Analysis)**
 - Dan Maxwell
- **Mercyhurst University**
 - Kristan Wheaton
- **James Madison University**
 - Noel Hendrickson
- **DRDC Toronto**
 - David Mandel

And a supporting cast of thousands, and counting....



The problem: how best to aggregate?

- ACE: How to improve on the unweighted average for predicting future events?



- Aggregates should outperform individuals.
- Weighted should outperform unweighted.
- Past performance

They do.

They don't.

Promising!

5 Teams Compete Against MITRE

- Good Judgment Berkeley/UPenn + ...
 - SP♠DE MIT/Draper + ...
 - INFORMED Jacobs/SRI + ...
 - ACES ARA + 7 Universities
 - **DAGGRE** **Mason + ...**
-

Year 1 Goal: beat MITRE by **20%**

Year 3 Goal: beat MITRE by 50%

The DAGGRE Approach: Crowdsourced Forecasting

DAGGRE AdminExchangeAdminHelp

989.27Balance 985.33

TEGORY

Sort By

SEARCH FOR CLAIMS

All

Default

Enter a Keyword

127

Will Asif Ali Zardari resign, lose re-election/confidence vote, or vacate the office of President of Pakistan before 1 June 2012?

1.0%

172

Will Amr Moussa win the next Egyptian presidential election?

58.0%

132

Will a North Korean or multinational military force fire on, invade, or enter South Korea before 1 June 2012?

6.0%

109

Will Greece remain a member of the EU through 1 June 2012?

99.0%

124

Will Australia formally transfer Uranium to India by 1 June 2012?

3.0%

Category: Elections

Will Asif Ali Zardari resign, lose re-election/confidence vote, or vacate the office of President of Pakistan before 1 June 2012?

Current Estimate

-1%+

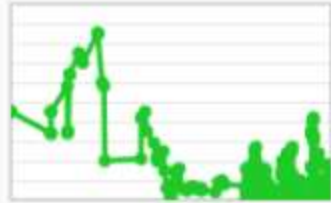
Edit History

Entire History

25 edits this week. Last edit: Sat May 12

Question created Wed Dec 14 22:42:54 2011.

Settlement on Thu May 31 00:00:00 2012.



Description

Most Invested

Comments (7)

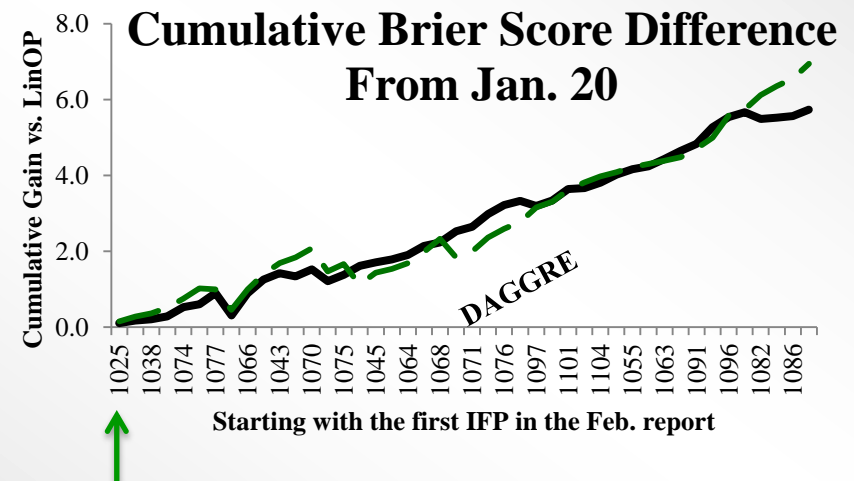
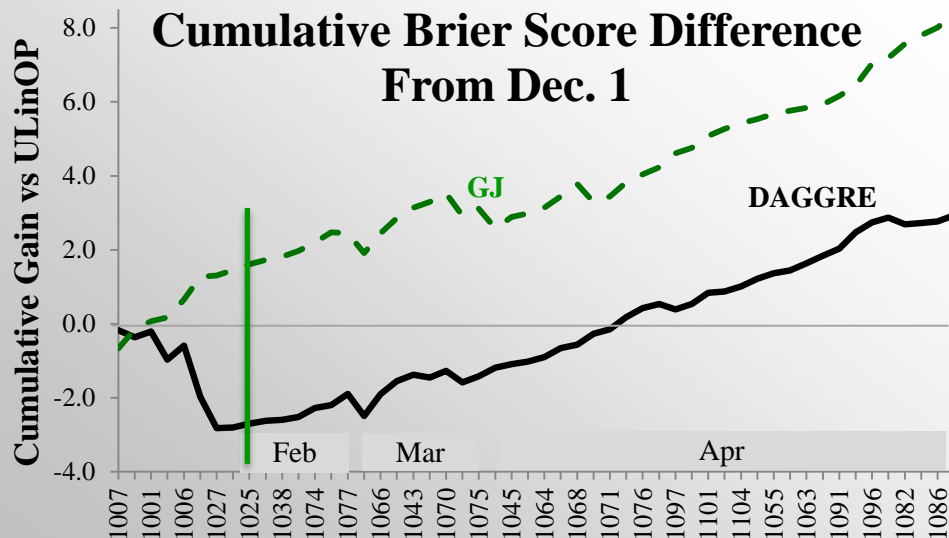
History

Before should be interpreted to mean at or prior to the end (11:59:59 ET) of the previous day (31 May 2012). Outcome will be resolved "no" if Zardari holds the position of President at this time and has not resigned or suffered

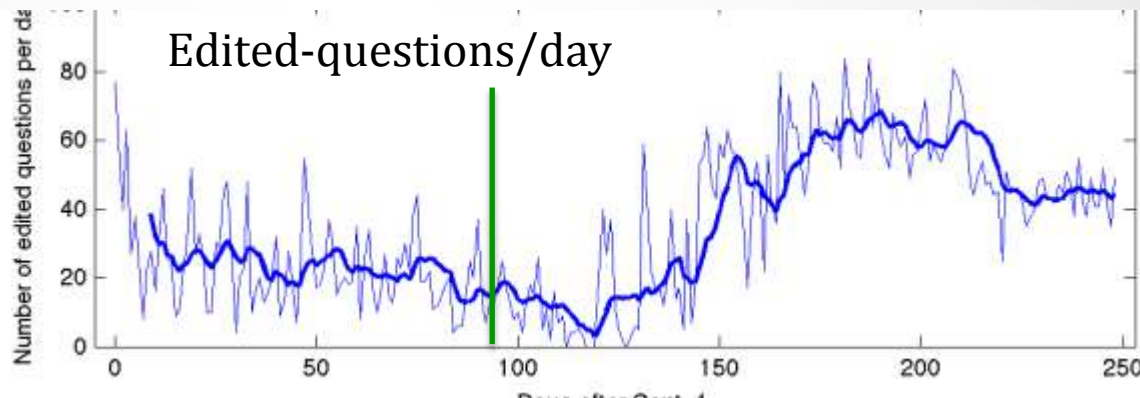
DAGGRE Forecasting Accuracy

	MITRE	DAGGRE	Gain	Rank
All Data Average:	0.370	0.313	17%	3
Feb-Mar-Apr Average:	0.350	0.220	46%	2

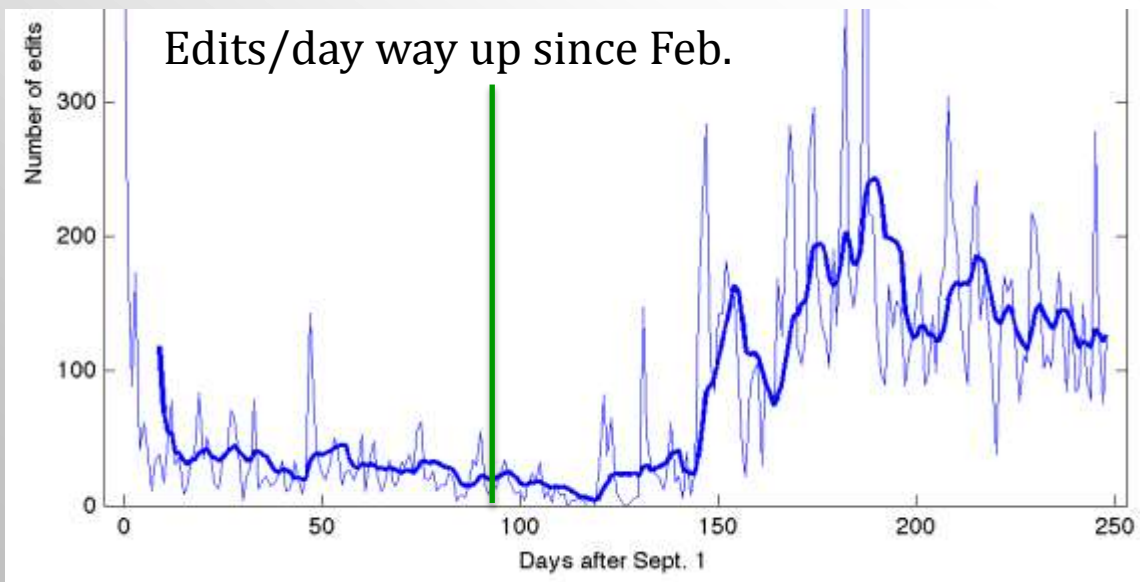
Lower is better



Participant recruiting and demographics



Dec. 1



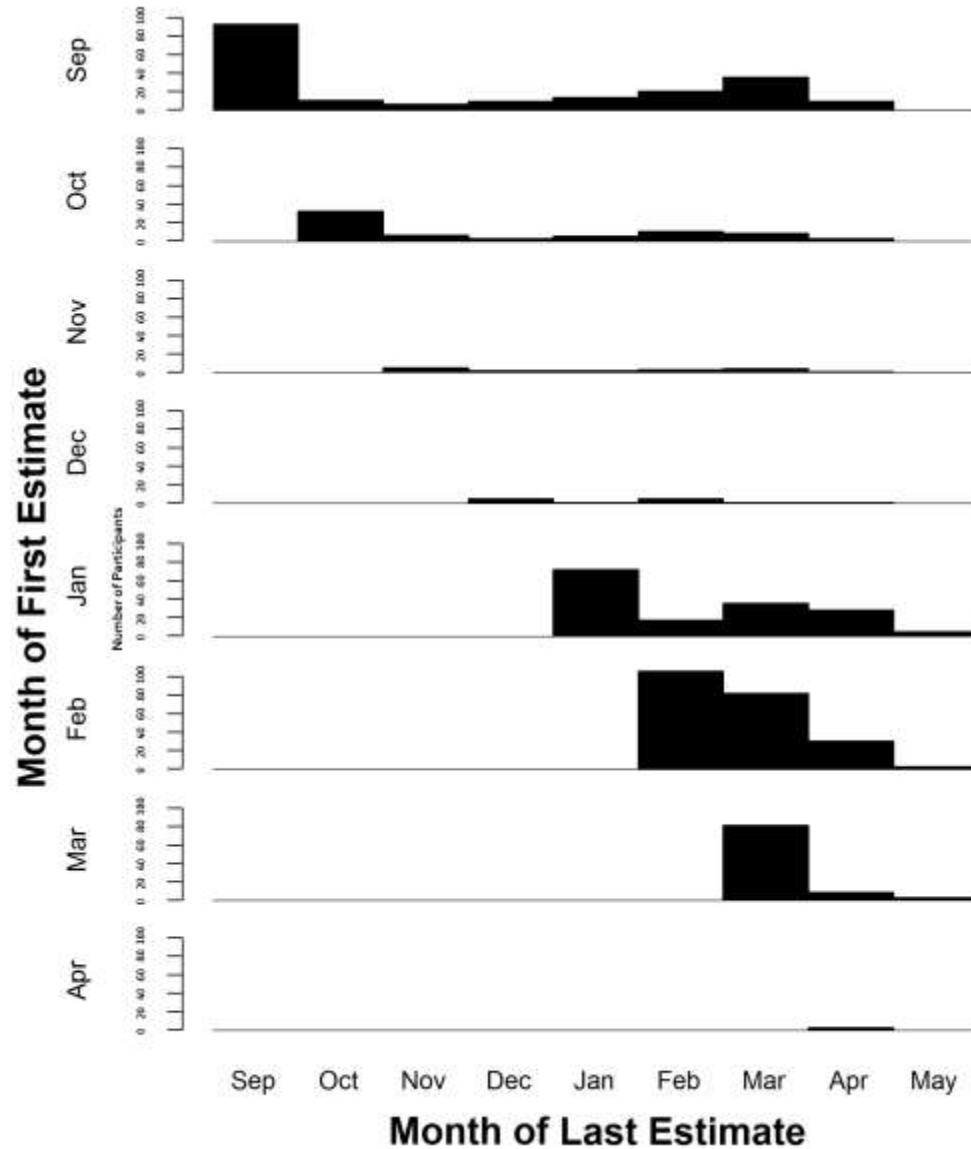
Participation:

After recruiting in earnest starting in February:

- >840 edits/week
- ~40 users/day @ 2-3 edits/user
- >40-60 Qs/day edited
- >2 edits/Q/day

Demographics (N=1375)

- Age
 - Mean=33; StDev=12
- | Gender | Jan. | Mar. |
|--------|------|------|
| • Male | 92% | 68% |
- | Education | Jan. | Mar. |
|--------------|------|------|
| • Doctorate | 11% | 5% |
| • Master's | 20% | 20% |
| • Bachelor's | 36% | 36% |
| • Other | 33% | 39% |



Delphi groups

3 Delphi groups in US

1 x Mercyhurst

2 x George Mason University

1 x University of Maryland (a very recent addition)

4 Delphi groups in Australia

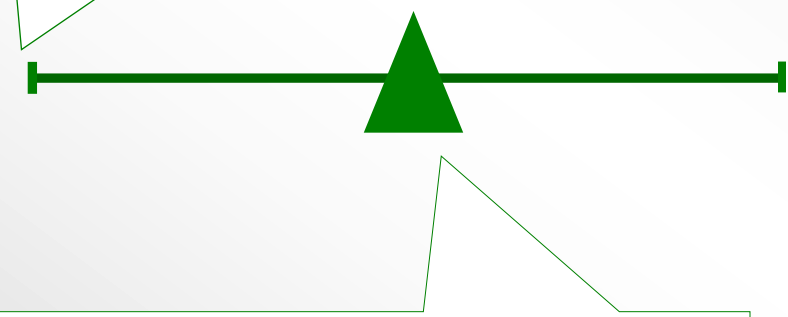
4 x ACERA, University of Melbourne

These groups answered unofficial ‘matched’ questions

IARPA 3-step question format...

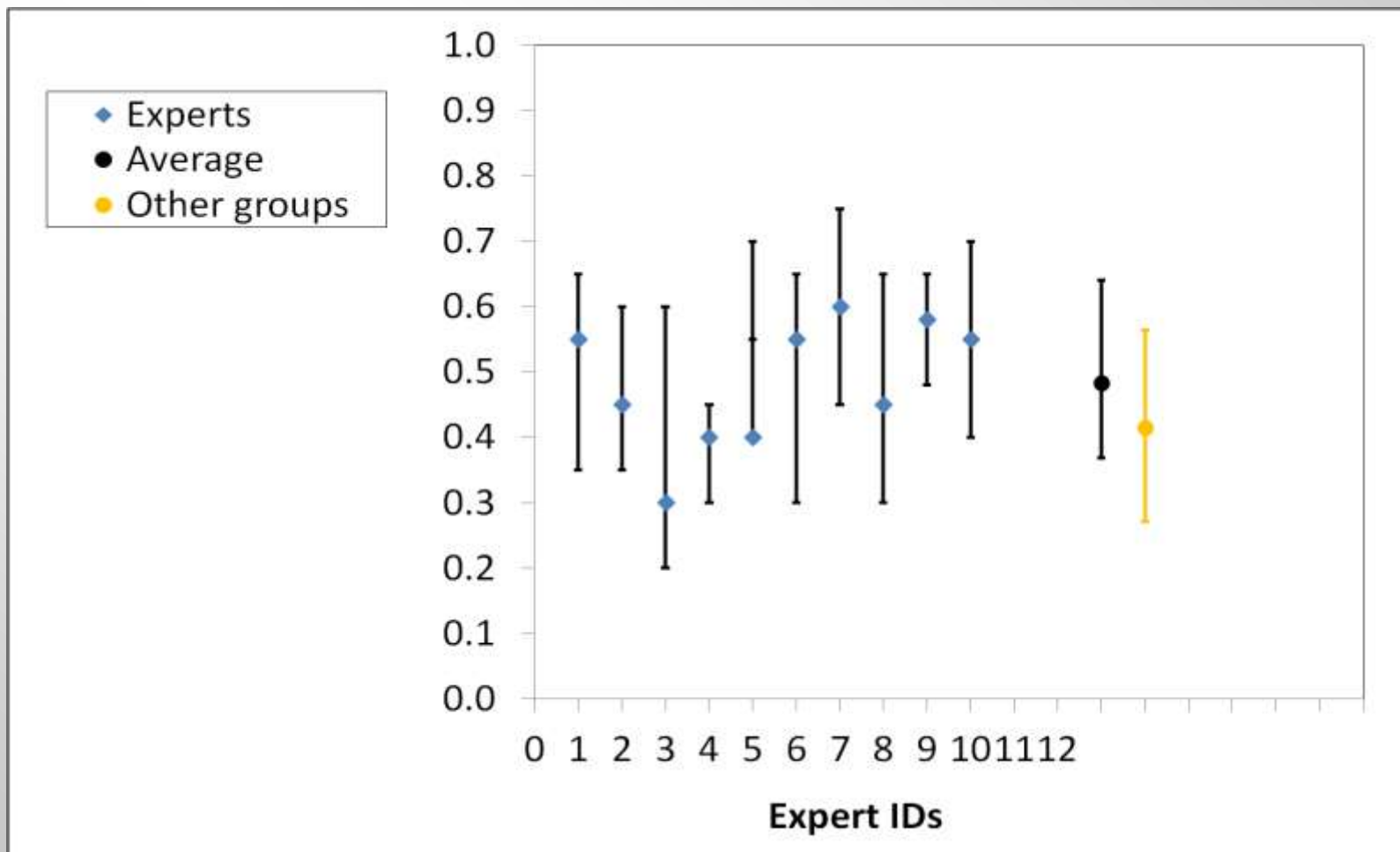
2. Second, think of the evidence that suggests this will NOT occur. What is the lowest probability you would assign to the outcome?

1. First, think of the evidence that suggests this will occur. What is the highest probability you would assign to the outcome?

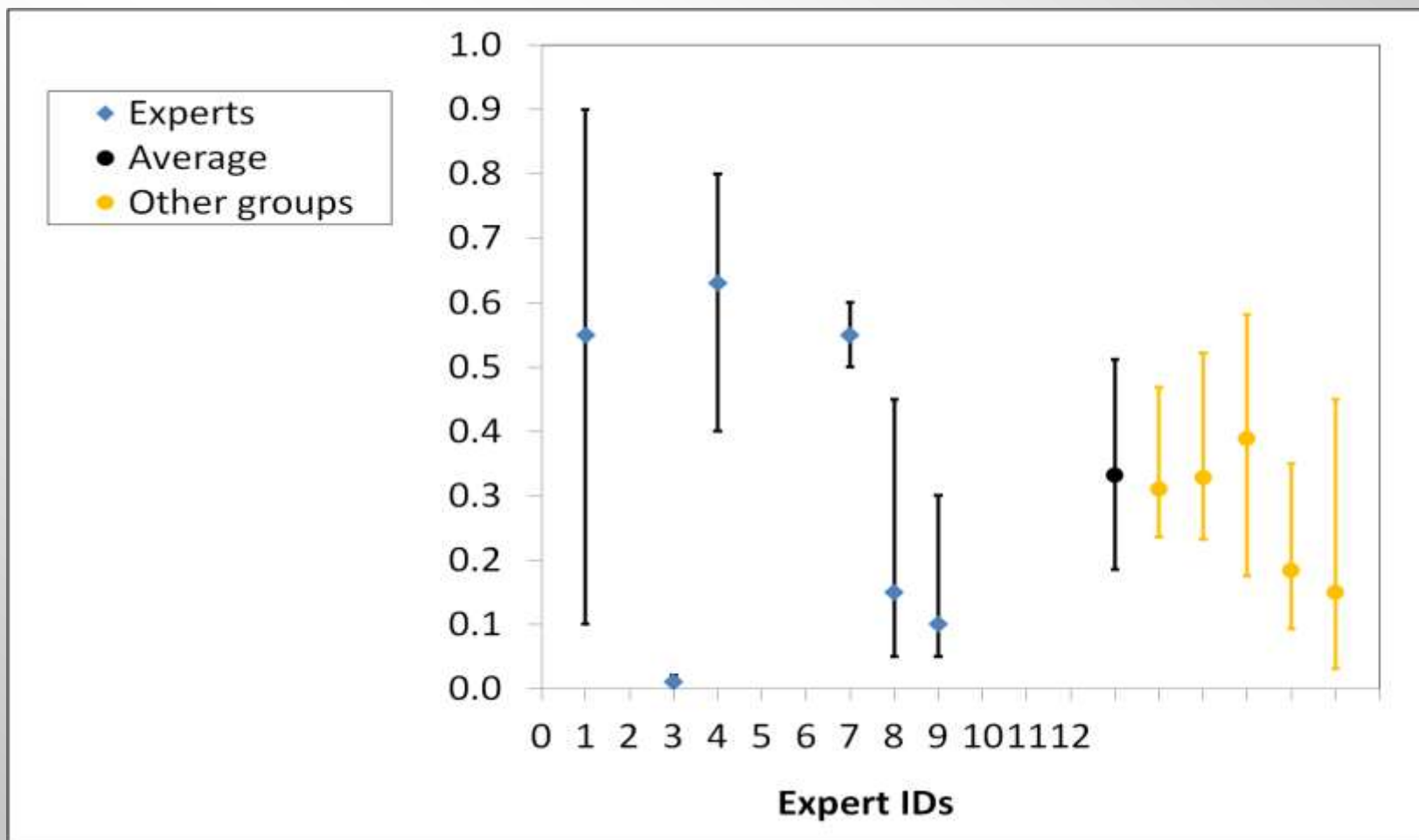


3. Finally, consider the balance of evidence. If you had to put a single figure on your opinion of this outcome, what would it be?

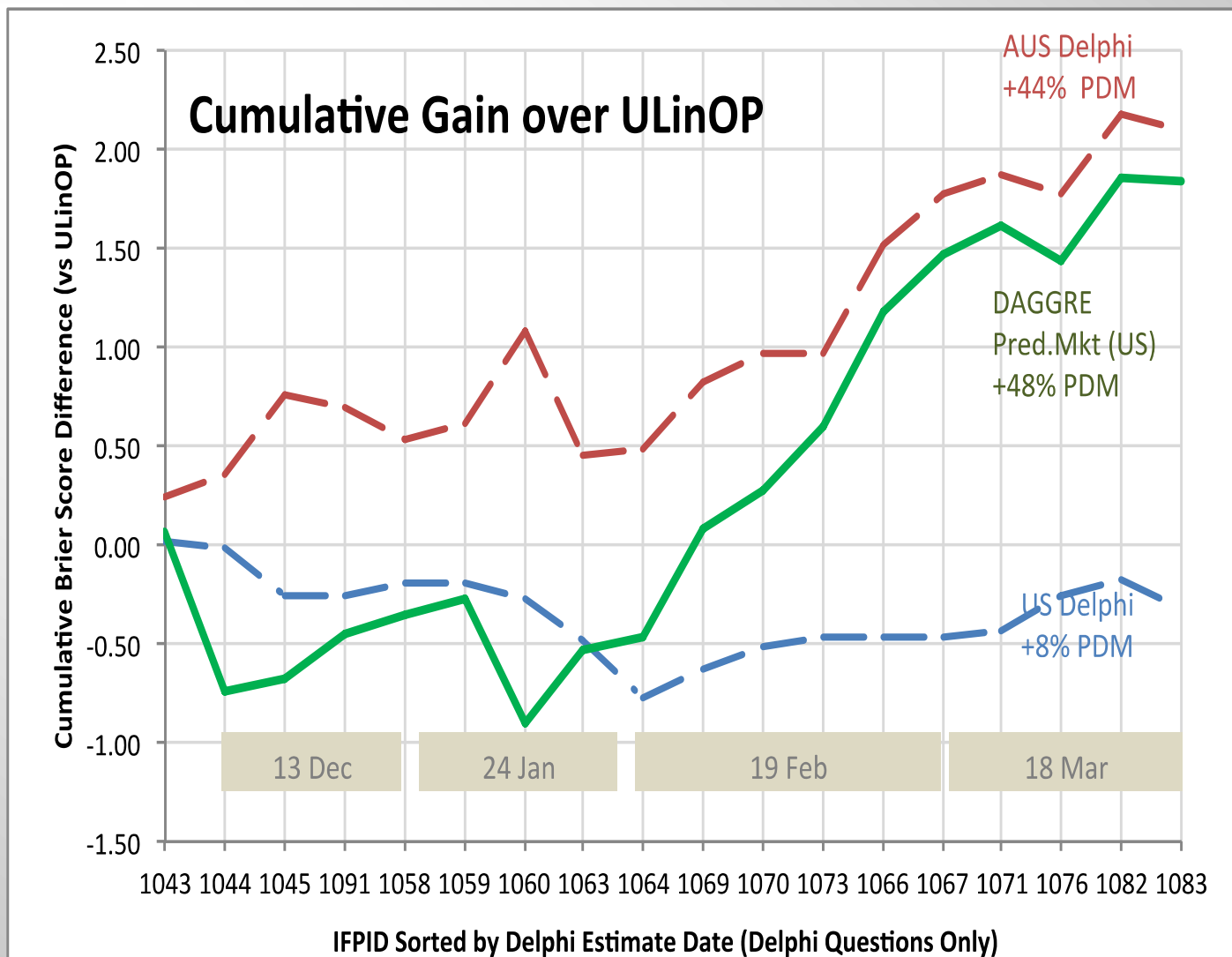
Estimate-feedback-estimate



A harder question



Delphi group performance



What's next? Uncertainty information in markets

Nightly ▾

DAGGRE

localhost33/estimate/#cixacera&c=2

Exchange About Preferences Help Blog Logout Steven Mascaro Score 1000.00 Committed 0.00 Balance 1000.00

Open Claims

Active Estimates Leaderboard

category: (All) sort by: Default search for claims: Enter a keyword

1 The forces of Alassane Outtara defeat the forces of Laurent Gbagbo in the Ivory Coast before 1 SEP 2011

2 One or more non-African countries enter on the side of Outtara's forces before 1 SEP 2011

3 Libyan leader Moammar Khaddafi remains in power in Libya on 1 AUG 2011

4 The Assad regime remains in power in Syria on 1 AUG 2011

5 Talks re-start between Yemeni President Saleh and opposition leaders before 1 JUN 2011

6 Saudi Arabia increase its troop presence in Bahrain before 1 JUL 2011

7 The UAE increase its troop presence in Bahrain before 1 JUL 2011

Category: Foreign Policy
One or more non-African countries enter on the side of Outtara's forces before 1 SEP 2011

Think of the evidence that suggests this will occur. What is the **highest** ↑ probability you would assign? (0-100)

Think of the evidence that suggests this will **NOT** occur. What is the **lowest** ↓ probability you would assign? (0-100)

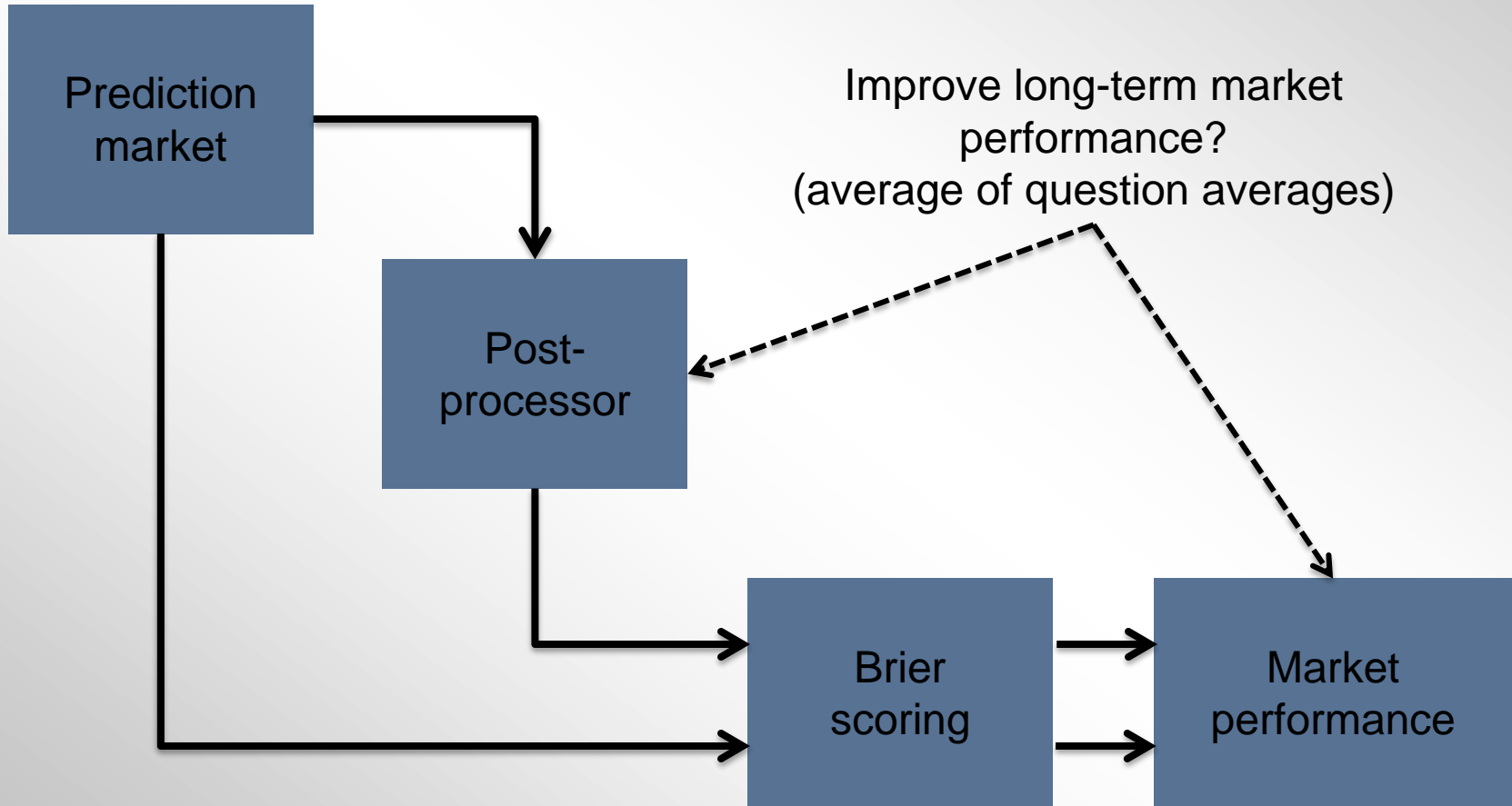
Consider the balance of evidence. If you had to put a **single figure** on your opinion of this outcome, what would it be? (0-100)

Commit >

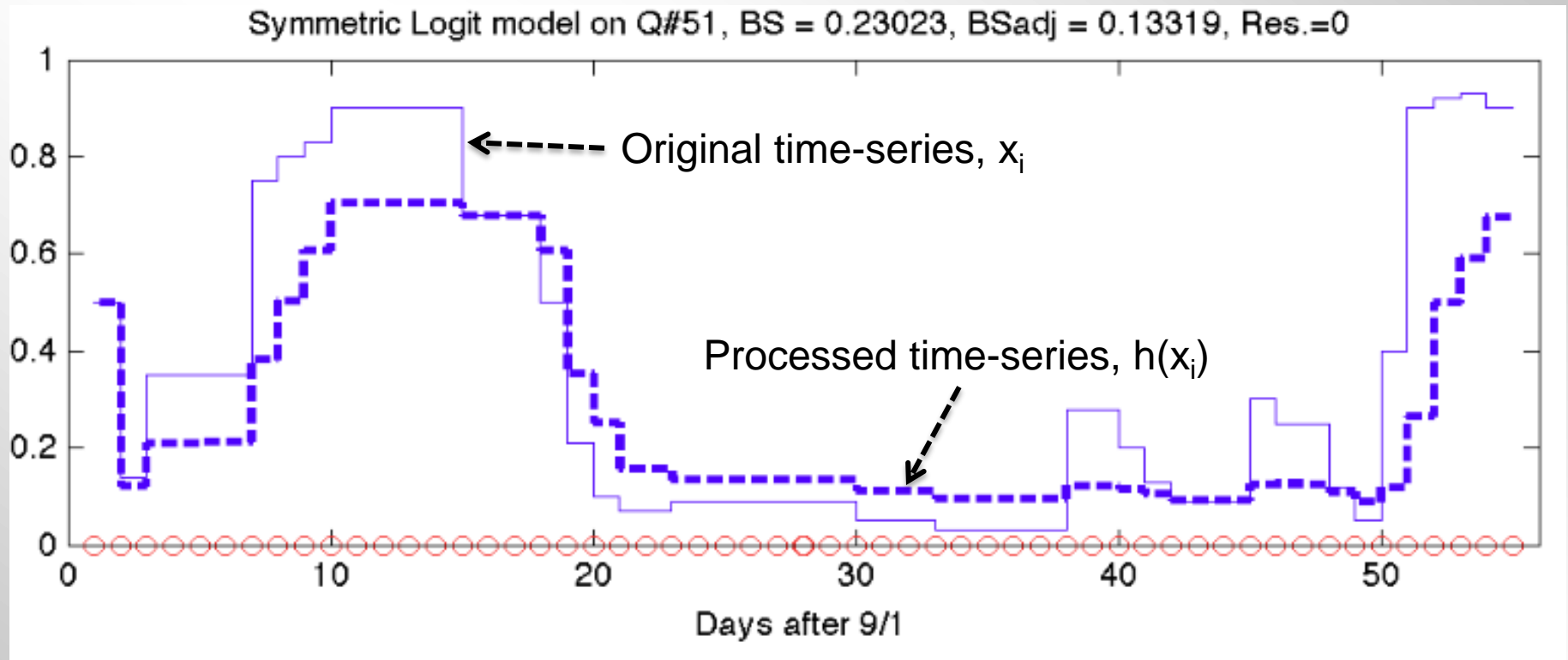
Description Comments (0)

Version 1.5 | 210 Help

Goal



“Restricted” Logistic



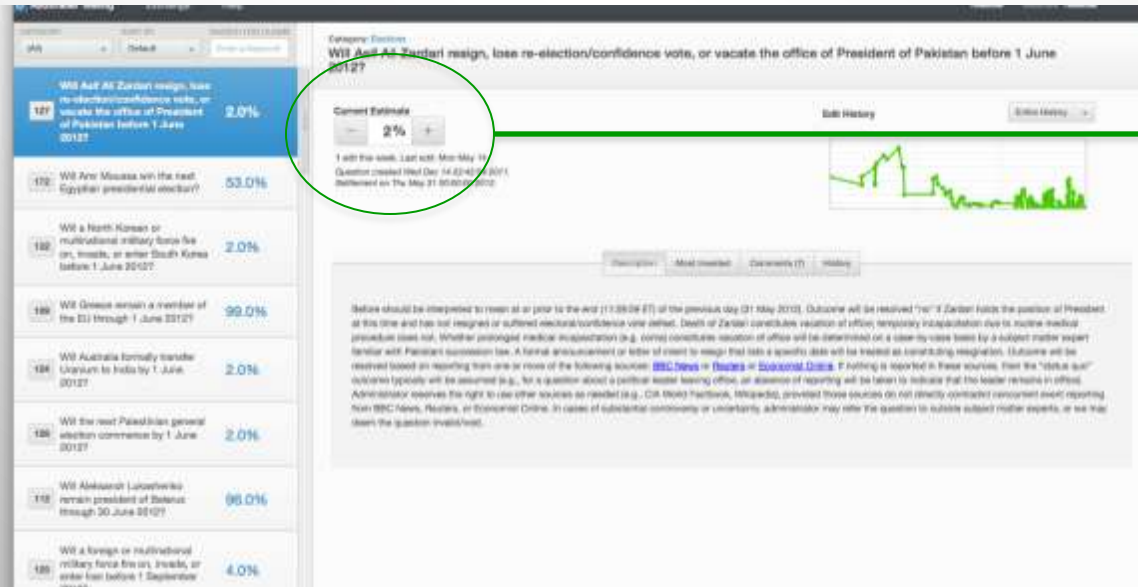
Results: Out-of-sample

36 binary questions (all but three resolved as zero),
with 6236 total forecasts

	Raw forecasts	“Best-fit” Logistic	“Restricted- fit” Logistic	Bayesian forecasting
Individual forecasts (avg(BS**))	0.0984 --	0.1110(- 12.8%)	0.0820 (16.7%)	0.1045 (-6.2%)
MITRE 8:30 scoring system (average of time-series averages)	0.0949 --	0.1094 (-15.3%)	0.0800 (15.8%)	0.1002 (-5.6%)

**Brier score is (resolution-forecast)²

Autotrader Operation



Extracts Probability Data

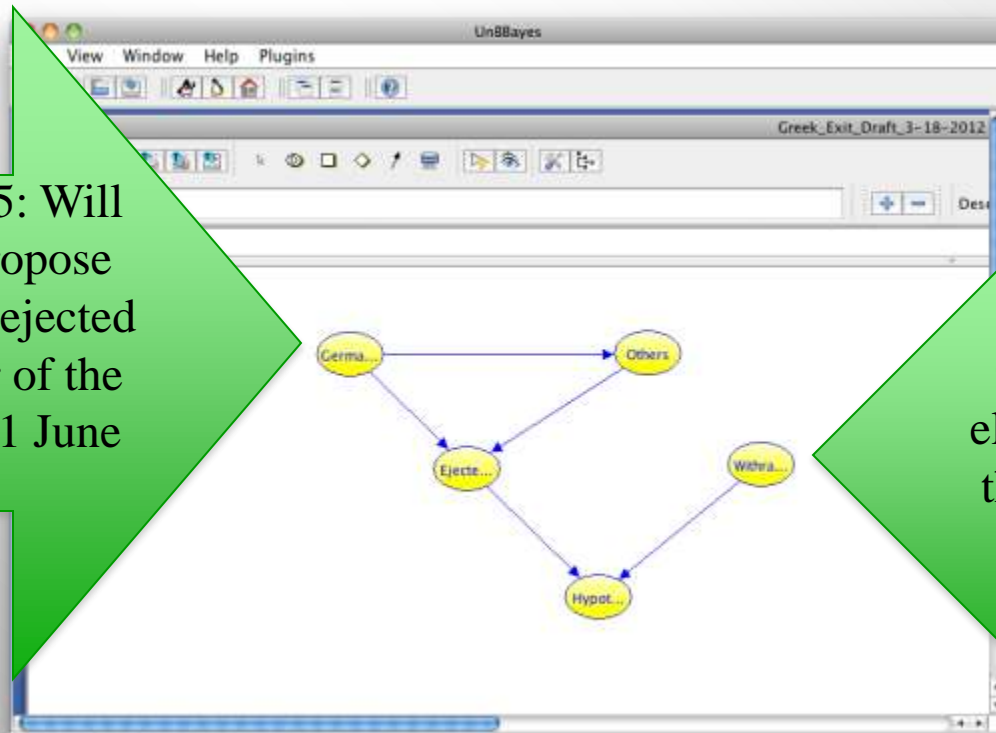
Informs an algorithm

Trade in Market
Do Nothing

Forecast Directly

Initial Model – Greece Exit from EU

Question 195: Will Germany propose Greece to be ejected as a member of the EU through 1 June 2012?



Question 196: Will the Greek elections winning party propose the withdrawal of Greece from the EU through 1 June 2012?

Core Question 109: Will Greece remain a member of the EU through 1 June 2012?

Next Year: Conditional Forecasts & Assumptions

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[Open Claims](#) [Active Estimates](#) [Leaderboard](#)

CATEGORY

(All)

SORT BY

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SEARCH

Enter a Keyword

Assumptions: 17% Probability

ON

21

Will there be an official announcement of a new sovereign debt restructuring program for Greece between 1 September 2011 and 31 December 2011?

True

x

22

Will there be an official announcement of a new sovereign debt restructuring program for Ireland between 1 September 2011 and 31 December 2011?

True

x

17

Will Greece be able to form a stable government before 31 DEC 2011?

25%

19

Will Greece still have the largest maritime fleet in the world on 31

78%

Category: [European Union](#)

Will Greece be able to form a stable government before 31 DEC 2011?

Current Estimate

If True

If False

-

28%

+

2859.0

2803.5

My Estimate: 28%

1 edit this week. Last edit: Thu Dec 1

Question created Wed Aug 31 18:55:01 2011.

Edit History

En

Description

Most Invested

Comments (0)

History

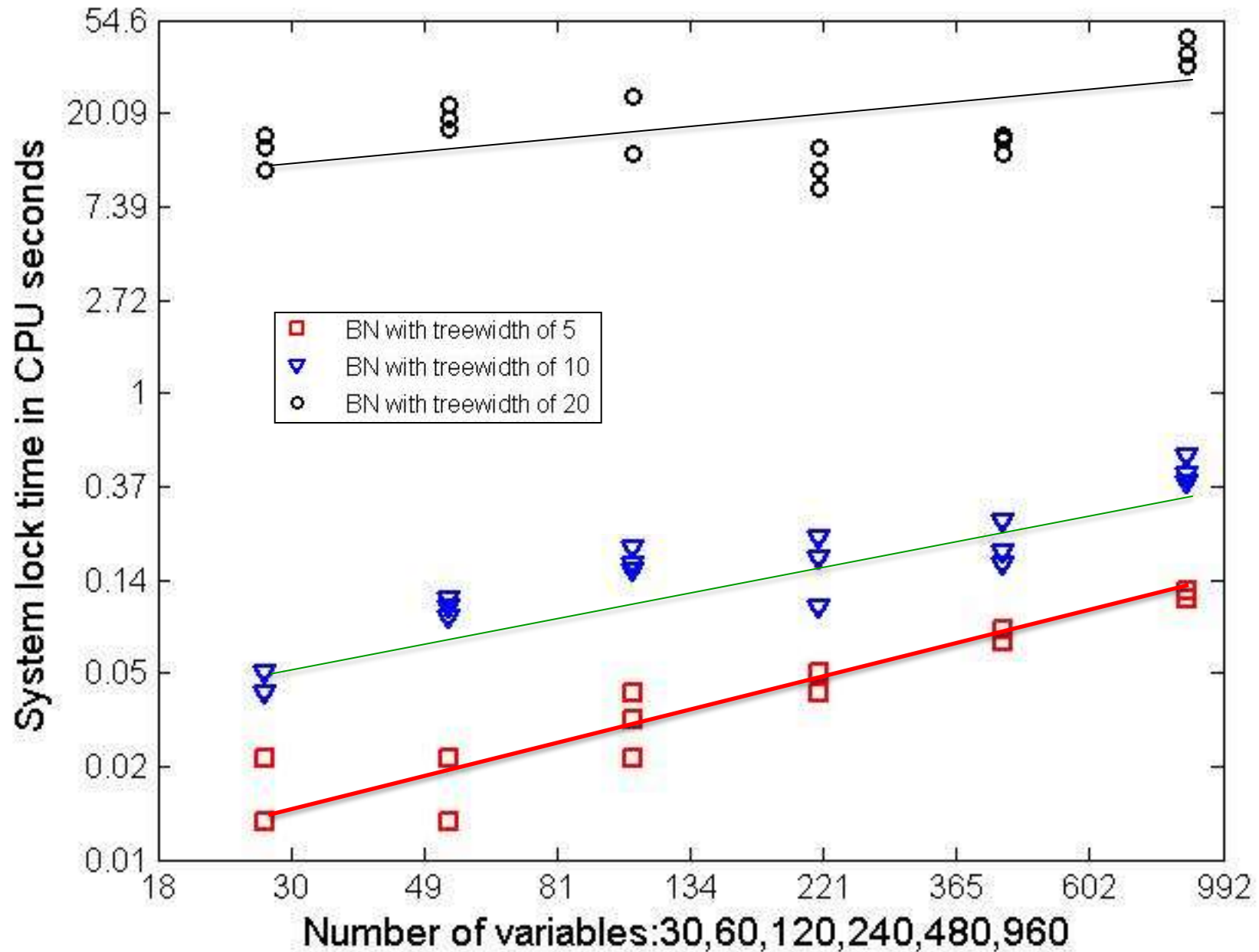
Estimate chance of 'Yes'. **Definitions:** "Stable government" means a government that remains in power for 30 days or more before 31 DEC (i.e. effective cutoff date = 30 OCT).

Background: [VOA News article](#).

Reference: [Google News](#)

Problem: Combinatorial Explosion for $>\sim 20$ variables

Markov Engine Scalability Test



Summary

- DAGGRE Prediction Market (plus Delphi) is now $>40\%$ above baseline unweighted average, matching the leader.
- Recalibration could gain 15% more.
- *Conditional* forecasts allow richer knowledge, but suffer combinatorial explosion.
- Markov network can efficiently store/update 1000s of interdependent variables: probabilities *and* assets.

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Charles R.



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▪ Australian

23
Thursday
FEB 2012

Venezuelan Presidential Primary Results Are Here!

Posted by andreaahooker in ACE, DAGGRE, Forecasting

≈ 2 Comments

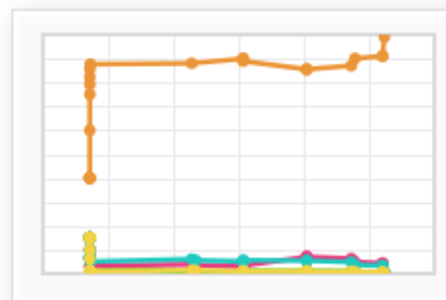
☆☆☆☆☆ Rate This

The Venezuelan primary resolved Feb. 13, in favor of Henrique Capriles Radonski. We did well.

[Edit]

Tags

Forecasting, brier, score,
Venezuela, Brier score



— Market forecasts from the