



# Zocalo

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Open Source Prediction Market Software

SD Forum August 9, 2006

# Outline

- Intro to Prediction Markets
- Benefits
  - Uses in Business
- Legal Issue
  - Is it gambling?
- How to get started
- Zocalo Demo
- Q&A
  - compare to other mechanisms, history, play money, advanced formats

Who I am, What I do

Intro: What (how to think about them), how they work, examples

Benefits: why use them, accuracy (elections, business)

# What are prediction markets?

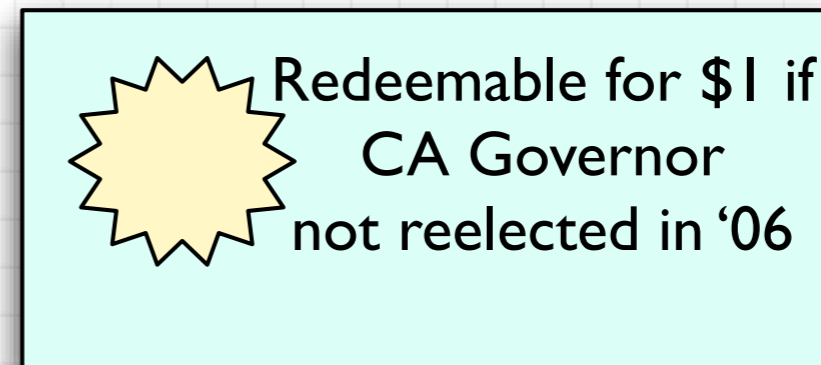
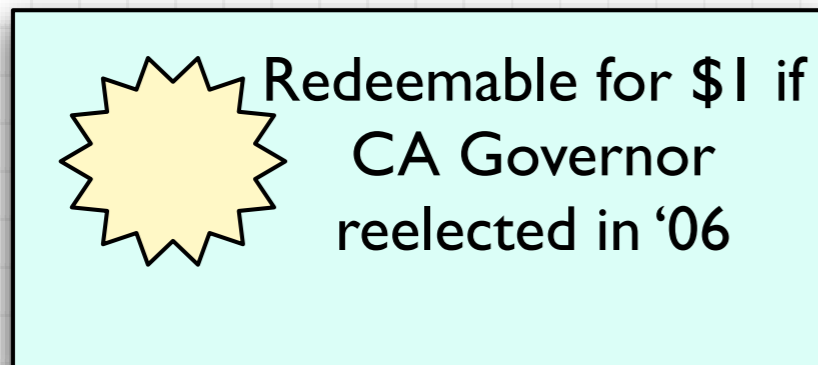


- Tool for answering questions
- Alternative to surveys, focus groups, experts
- Advantage: incorporate info from other sources
  
- PMs work well when:
  - Relevant info is accessible, though dispersed
  - Answer will become known
  - Experts are polarized
  - Many people are interested

# How do they work?



- Create a pair of financial assets, and commit to redeem them



- Make it easy to buy, sell, and trade.
- Price is a good indication of the likelihood

SDForum August 9, 2006

4

If republican partisans are confident, they will be happy to pay 60c per coupon that would be worth \$1 if Schwarzenegger wins. Confident Democrats will pay up to 40c for a coupon that will be worth \$1 if the election goes their way. Whenever the total amount bid for a pair reaches \$1, the market will sell pairs of coupons. The market isn't taking any risk; it collects \$1 and issue securities that it knows it will later redeem for \$1

Each trader buys securities that seem underpriced or sells ones that are overpriced. The market structure makes buying and selling isomorphic, unlike short selling in a stock market. In both cases you are buying an asset with non-negative value. If you want me to say more about the comparison to short-selling, ask me in the Q&A

# Example: Filibuster Rules



## Claim Description

### Supreme Court

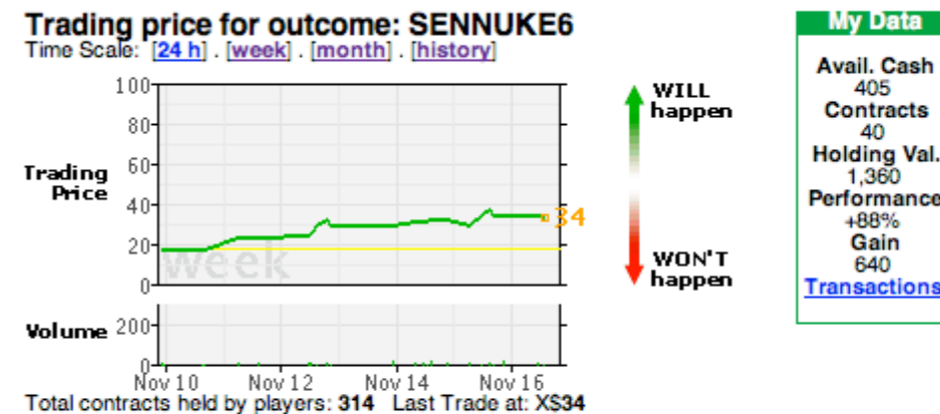
#### The Republicans will nuke the Senate to confirm Alito

Each SENANUKE contract that you buy will be worth **x\$100** if the Senate Republicans cut short a Democratic filibuster of Samuel A. Alito Jr.'s nomination to the Supreme Court with a simple majority vote rather than the 60 votes traditionally required. Otherwise, the contract will be worth **nothing**.

For background info, read this New Yorker article: [Blowing Up the Senate](#).

You might also want to check out the market for the [opposite outcome](#) (*The Republicans won't nuke the Senate to confirm Alito*).

## History Chart



## Current Offers Enter Your Order

Traders willing to SELL			My SELL Order	
jeremystein	1 contracts	at XS38	number of contracts:	unit price:
antholis	7 contracts	at XS38	<input type="text"/>	<input type="text"/>
boskodepompo	5 contracts	at XS37		<input type="button" value="Sell"/>
jeremystein	10 contracts	at XS35		
Traders willing to BUY			My BUY Order	
paulo.sousa	20 contracts	at XS30	number of contracts:	unit price:
pawnter	8 contracts	at XS23	<input type="text"/>	<input type="text"/>
123579	5 contracts	at XS17		<input type="button" value="Buy"/>
goldenshroom	100 contracts	at XS11		

[All Orders] . [Opposite Outcome] . [I Need Help!]

# Claim Description

- Summary/Short Name
- Detailed Terms
- Deadline (absent here)
- Background Pointers



## Supreme Court

### **The Republicans will nuke the Senate to confirm Alito**

Each SENANUKE contract that you buy will be worth **x\$100** if the Senate Republicans cut short a Democratic filibuster of Samuel A. Alito Jr.'s nomination to the Supreme Court with a simple majority vote rather than the 60 votes traditionally required. Otherwise, the contract will be worth **nothing**.

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## Price History Chart

### Trading price for outcome: SENNUKE6

Time Scale: [\[24 h\]](#) . [\[week\]](#) . [\[month\]](#) . [\[history\]](#)



↑ WILL happen  
↓ WON'T happen

My Data	
Avail. Cash	405
Contracts	40
Holding Val.	1,360
Performance	+88%
Gain	640
Transactions	640

## Account Balance

## Current Offers

Sell  
Buy

### The Republicans will nuke the Senate to confirm Alito

Traders willing to SELL			My SELL Order	
jeremystein	1 contracts	at <a href="#">XS38</a>	number of contracts:	unit price:
antholis	7 contracts	at <a href="#">XS36</a>	<input type="text"/>	<input type="text"/>
boskodepompo	5 contracts	at <a href="#">XS37</a>		<input type="button" value="Sell"/>
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[\[All Orders\]](#) . [\[Opposite Outcome\]](#) . [\[I Need Help!\]](#)

## Enter Orders

# Example: CA Governor's race



Logged in as:  
"ChrisHibbert"  
Logout

7:45:34PM IST

		Best to Sell		Best to Buy			
Contract	BQty	Bid	Offer	AQty	Last	Vol	
Trade CA.GOVERN06.DEM	10	30.1	44.9	10	37.0	506	
Trade CA.GOVERN06.GOP	20	63.0	69.9	10	63.0	821	
Trade CA.GOVERN06.FIELD	0	-	0.1	1	0.1	4	
		93.10	114.90				

Order Book			
CA.GOVERN06.DEM			
Bid		Offer	
Qty	Price	Price	Qty
10	30.1	44.9	10
		45.0	10
		47.0	100
		53.0	36
		55.0	25

Order Ticket		?
Quantity	<input type="text"/>	
Limit Price	<input type="text"/> 0-100	
Lifetime	<input type="text" value="Good Till Cancelled"/>	
<input type="button" value="Clear"/>		<input type="checkbox"/> Advanced Order
<input type="button" value="Buy"/>		<input type="button" value="Sell"/>

- Multiple Candidates
- Prices are probabilities
- If the prediction seems wrong, you can do something about it





## Prediction Markets

- Trade with other players
- Odds result from trade
- House is market neutral
- Resale Market exists

## Standard Betting

- Buy bets from House
- Odds set to limit house risk
- House loses some bets
- No reselling bets



- PMs reward
  - expertise, research, insight, good prediction ability
- PMs penalize
  - closed-mindedness, unwarranted optimism/pessimism
- Not blocked by organizational boundaries
- Publicize info as it is produced
- PMs allow impolitic views to be heard

# Accuracy

- Calibrated Predictions (X% chance of Y)
- How good are Prediction Markets?
  - Elections
  - Sports (Play money & real money)
  - Business

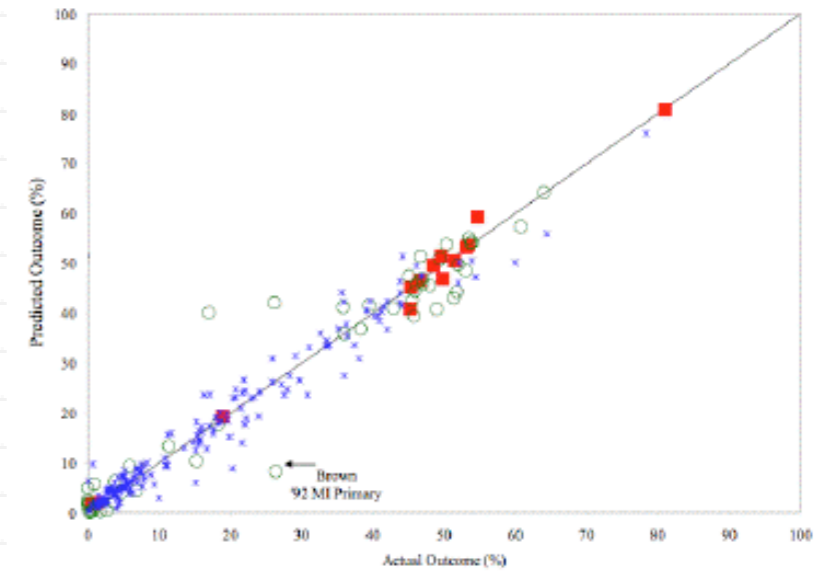
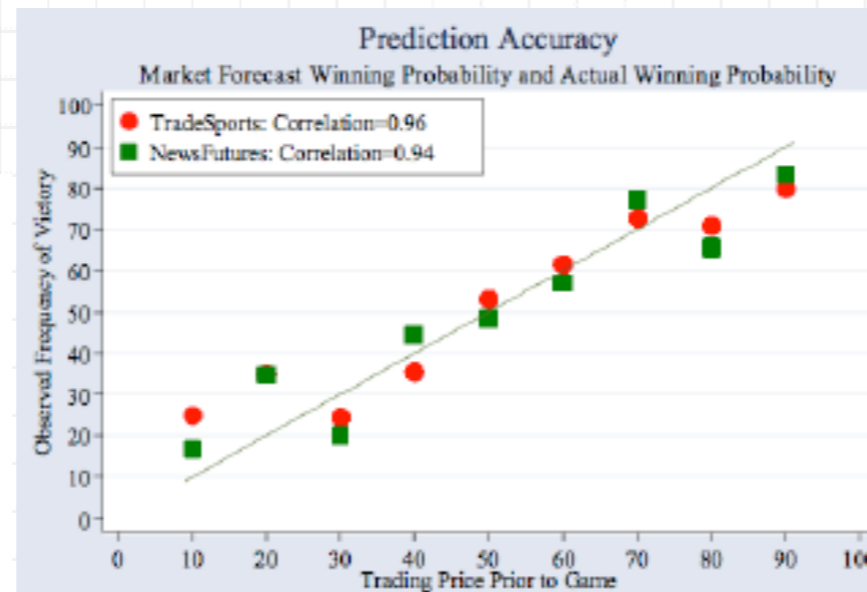
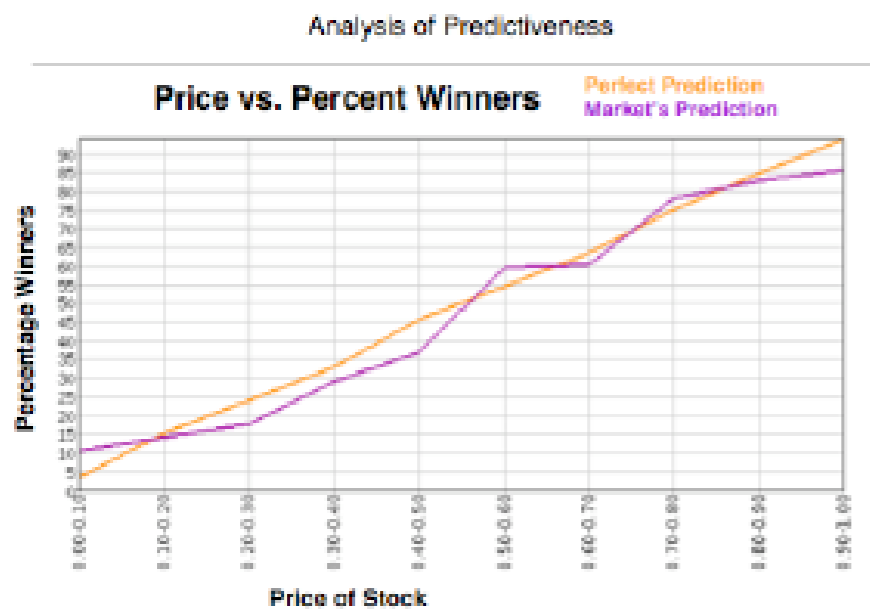


Figure 1: IEM election eve predictions versus actual vote-share outcomes.

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11

Evaluate as Weather predictions:

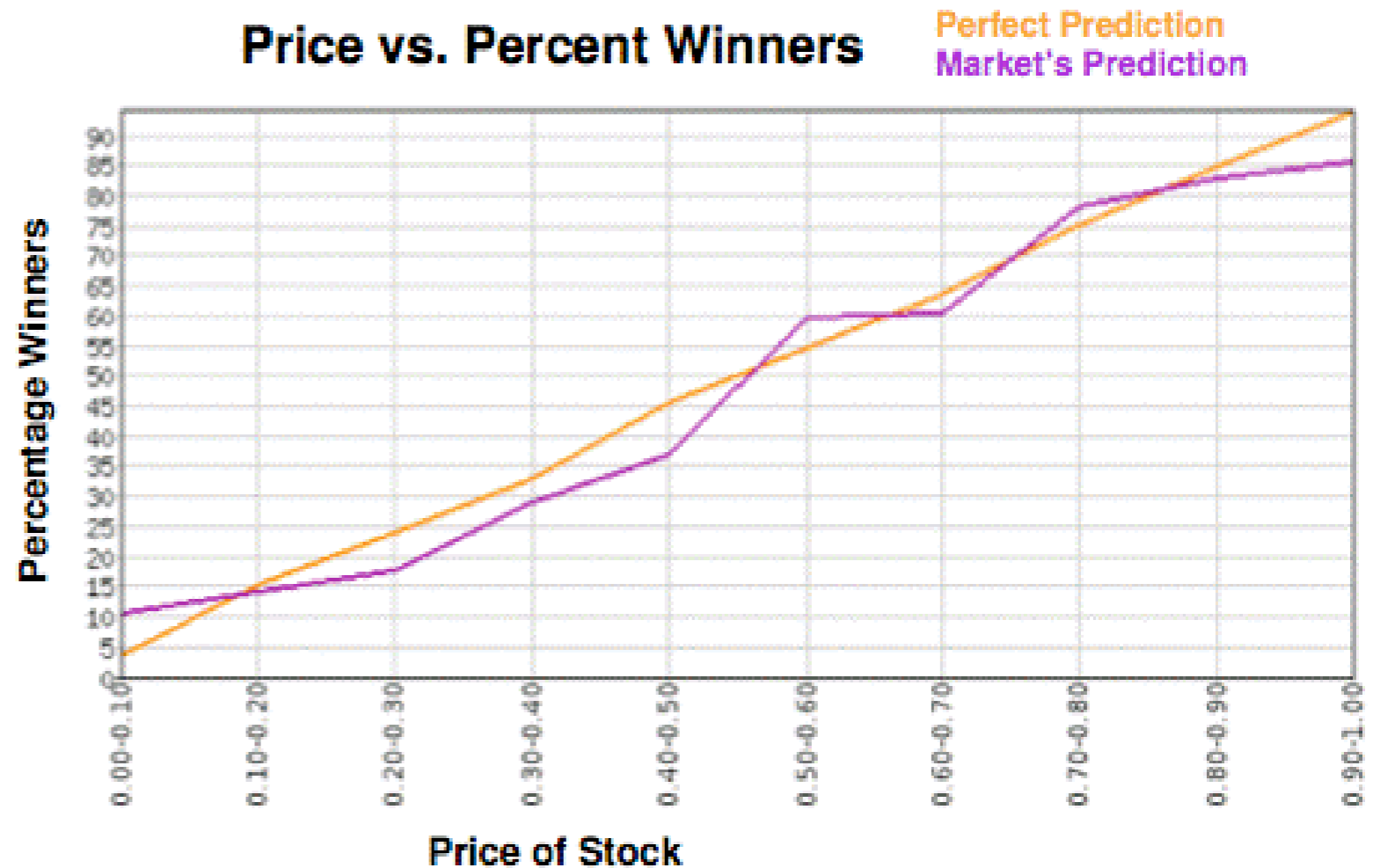
should rain 20% of the times when there's a 20% chance and  
90% of the time when there's a 90% chance

# Predictiveness at Google



- ~150 markets in 45 subject areas
- Good predictions
- Notice non-linearity near 100% and near 0%.

Analysis of Predictiveness 

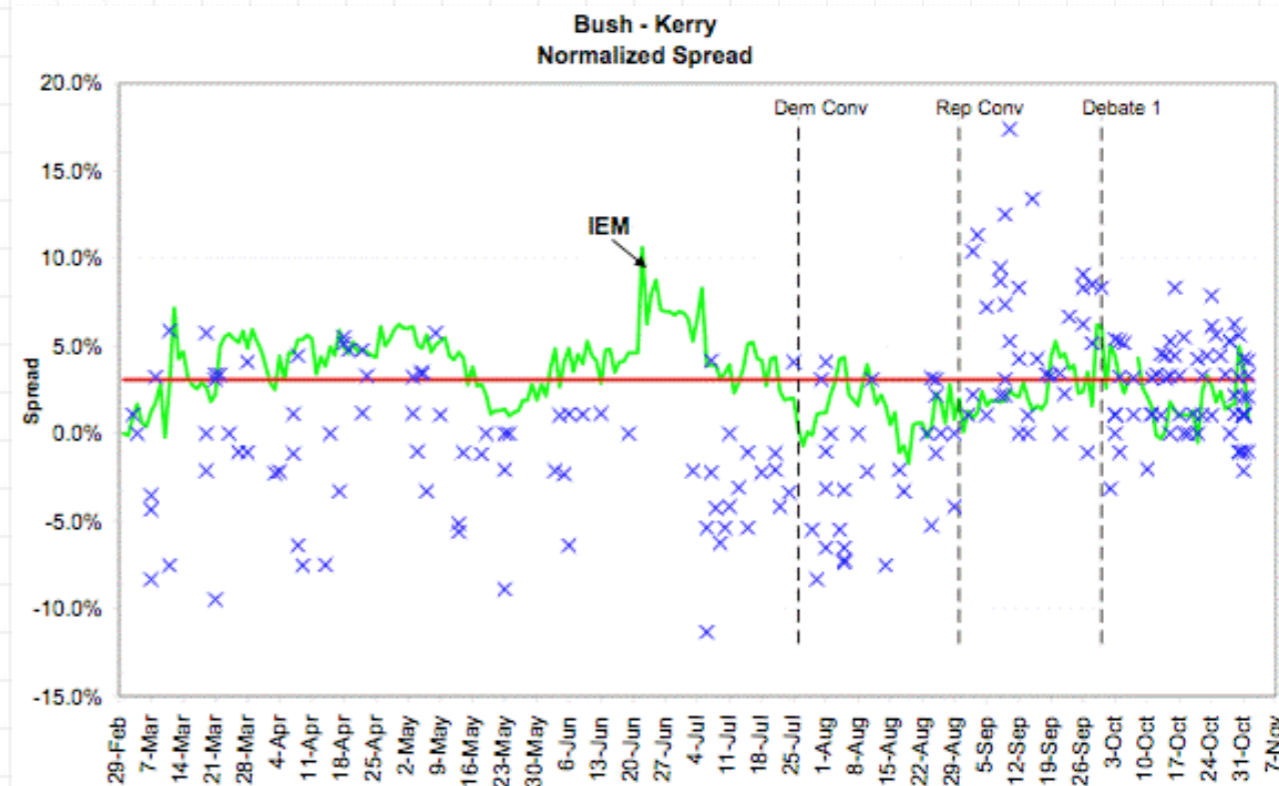
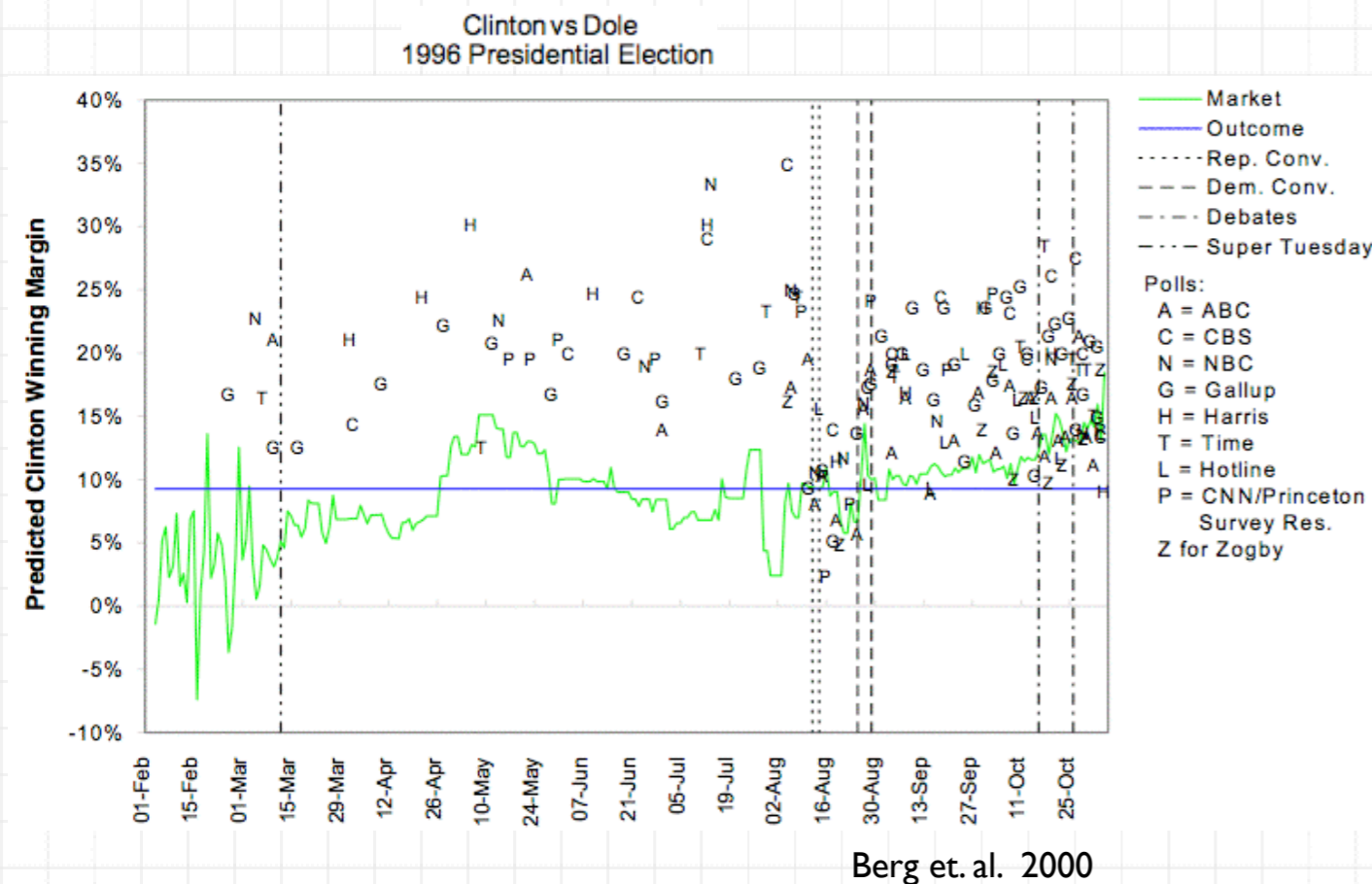


<http://googleblog.blogspot.com/2005/09/putting-crowd-wisdom-to-work.html>

# Election Markets and Polls



- IEM swayed less than polls by conventions
- IEM gives continuous feedback; Polls sporadic
- Most polls predicted Kerry until September
- Polls over-predicted Clinton's margin



# Why do they work?

- Everyone has an incentive to improve the prediction
- If the current price/probability seems wrong, improve the market's prediction and earn money by correcting it.
- The possibility of profit gives people an incentive to learn more and invest based on their research
- People who are bad predictors learn; get better or get out
- "noise traders" make market more lucrative for those with info

# Other Benefits

- Insurance, hedging
- Provide incentive to develop, discover, invent
- Predictions update quickly in reaction to news
- Intermediate estimates for quarterly/semi-annual/etc. data

- **Gambling:** TradeSports, others
- **Entertainment:** ProTrade, Foresight Exchange
- **Business Info:** Microsoft, HP, Google, Inkling, CrowdIQ
  - **News Futures:** Dentsu, Lilly, PennState, Siemens, WEF
  - **Consensus Point, Common Knowledge**
- **Forecasting Elections:** US (IEM), Germany, Canada, Japan
- **Market Information:** LCD Screens, Movies(HSX), Tech Sector
- **Predicting Epidemics:** Influenza in Iowa, Bird Flu



# Uses in Business

- forecasting sales
- project completion
- technology availability
- demand for new product

- Prediction Markets are in a legal gray area.
- Insurance, stock, commodities were illegal once
- Sports gambling: off-shore
  - Legal in Britain, other places
  - World Court

# Legality: Work-Arounds



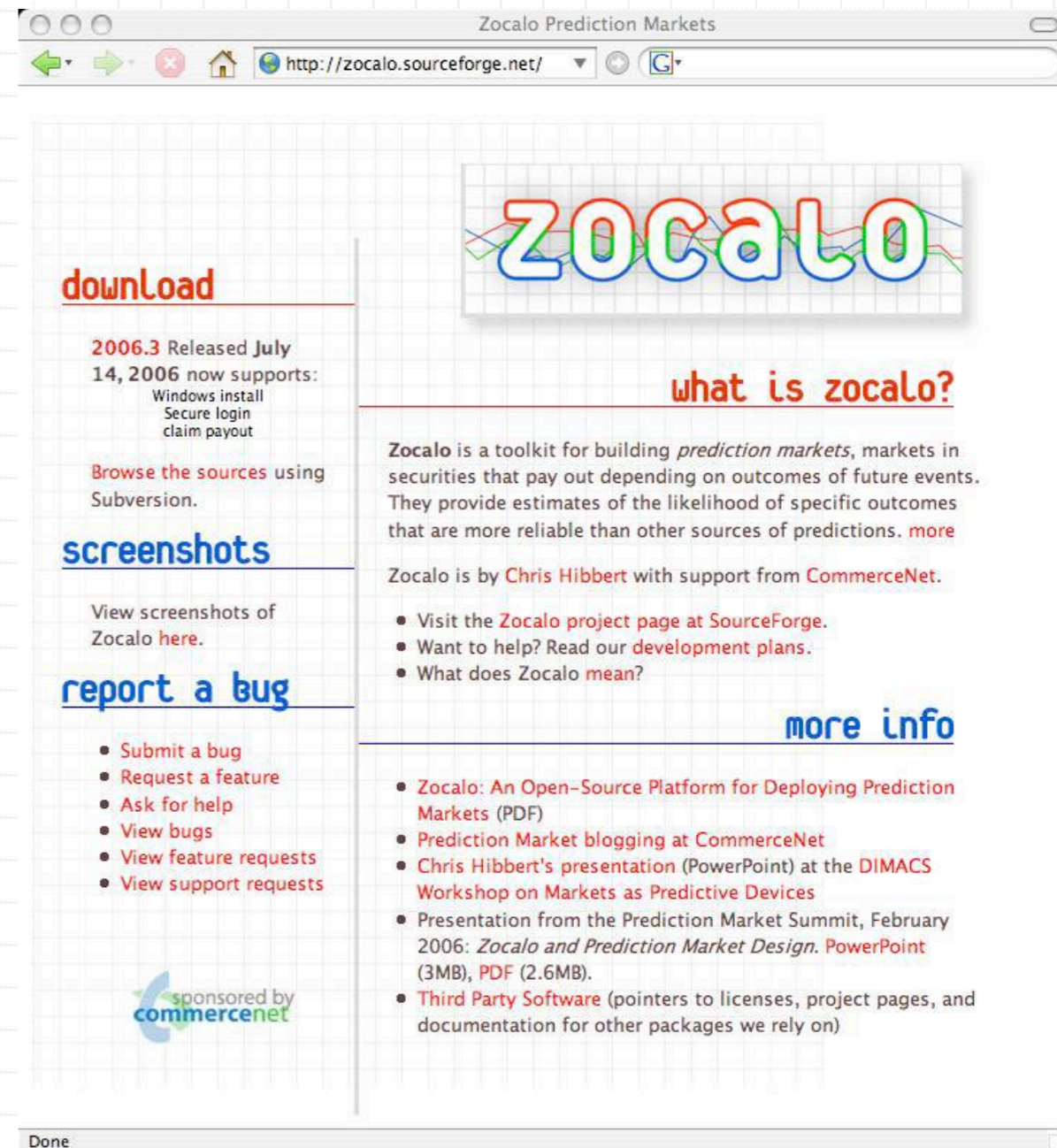
- Elections: IEM has a special exemption
- Business use: company puts up money
- Entertainment: play money or prizes
- Public policy: currently play money only

# How to get started?



- Join an existing market
  - FX, HSX, IEM, TradeSports, ProTrade,
- Hire a consulting company
  - NewsFutures, ConsensusPoint, Common Knowledge
- Use a web 2.0 market
  - Inkling, CrowdIQ
- Build it yourself
  - Microsoft, Google, & HP
- Use Zocalo

- Open Source Prediction Markets
- Uses Java, Hibernate, Jetty, Apache commons, jFreeChart, Javascript
- Customizable Markets
- Quick demo
- No restrictions on use



The screenshot shows a web browser window titled "Zocalo Prediction Markets" with the URL "http://zocalo.sourceforge.net/". The page content includes:

- download**
  - 2006.3 Released July 14, 2006 now supports:
    - Windows install
    - Secure login
    - claim payout
  - Browse the sources using Subversion.
- screenshots**
  - View screenshots of Zocalo [here](#).
- report a bug**
  - Submit a bug
  - Request a feature
  - Ask for help
  - View bugs
  - View feature requests
  - View support requests
- what is zocalo?**

Zocalo is a toolkit for building *prediction markets*, markets in securities that pay out depending on outcomes of future events. They provide estimates of the likelihood of specific outcomes that are more reliable than other sources of predictions. [more](#)

Zocalo is by [Chris Hibbert](#) with support from [CommerceNet](#).

  - Visit the [Zocalo project page](#) at SourceForge.
  - Want to help? Read our [development plans](#).
  - What does Zocalo [mean](#)?
- more info**
  - [Zocalo: An Open-Source Platform for Deploying Prediction Markets \(PDF\)](#)
  - [Prediction Market blogging at CommerceNet](#)
  - [Chris Hibbert's presentation \(PowerPoint\) at the DIMACS Workshop on Markets as Predictive Devices](#)
  - Presentation from the Prediction Market Summit, February 2006: [Zocalo and Prediction Market Design. PowerPoint \(3MB\)](#), [PDF \(2.6MB\)](#).
  - [Third Party Software](#) (pointers to licenses, project pages, and documentation for other packages we rely on)

At the bottom of the page, there is a logo for "sponsored by [commercenet](#)".

# How You Can Help



- Download software ([zocalo.sourceforge.net](http://zocalo.sourceforge.net))
- Send me Suggestions, Bug Reports, etc.
- Write new code
  
- Use Prediction Markets



# Compare to experts

- Markets outperform in general
- Experts outperform when decision is closed
- Experts more subject to narrow viewpoint
  
- Markets give continuous feedback
  
- Use of experts allows predictions to be secret



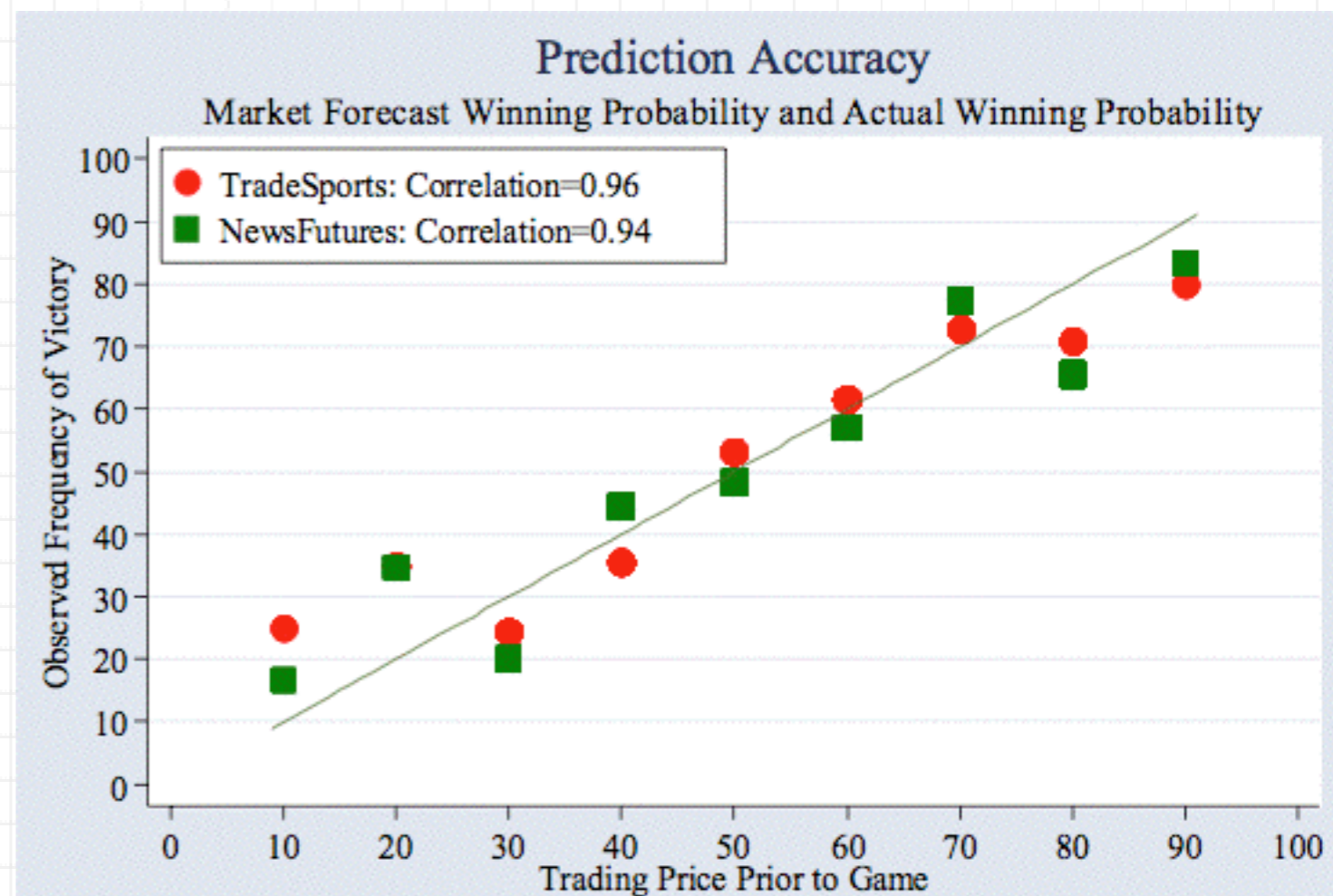
# Compare to focus groups

- Subject to groupthink
- Loudest voices dominate
- Only qualitative results
  
- Occasionally provide wild ideas
- Can give insight into zeitgeist
  - (with skilled operator)

# Play Money versus Real Money



- Equal when info is ubiquitous (sports, elections)
- Comparable results when prestige matters
- Play money doesn't provide:
  - hedging
  - insurance
  - financial incentive for new research
  -



# Short Selling Explained

- In a stock market, short seller collects money and take on a potential liability. The other party spends money and gains an asset.
- Prediction Market traders spend money and gain an asset. Bank ensures that
  - \$\$ collected now == value redeemed later.
- There's no potential liability (both parties pay up front), so the market doesn't have to monitor your exposure.

# When Not to use PMs

- Predicting random events
  - earthquake, hurricanes
  - They give plausible odds,
  - No early warning; early notice possible *after*
- Predicting Papal Elections
  - All the insiders believe it's a sin to reveal info
- Predict “most popular”
  - Bettors often follow early leader
  - Need an external standard for bettors & judges