



Zocalo and Prediction Markets Design

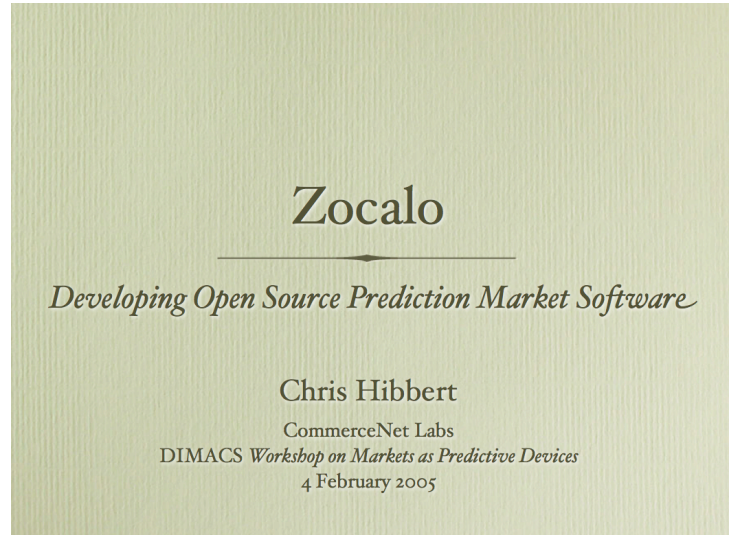
Chris Hibbert
Principal Investigator
CommerceNet

Prediction Markets Summit
UCSF Mission Bay
December 2, 2005

Overview



- Work at CommerceNet related to PMs
 - Zocalo status report
 - Enhancing PM visibility on the Web (Prediction Markets & Web 2.0)
- Adding liquidity in existing prediction markets



Opportunity



- My Objective:
 - Promote broader use of Prediction Markets
- One Key Obstacle:
 - No common software platform for prediction markets yet.
- Working at CommerceNet provides:
 - More Visibility for my Views
 - More Collaboration possibilities

Software Development

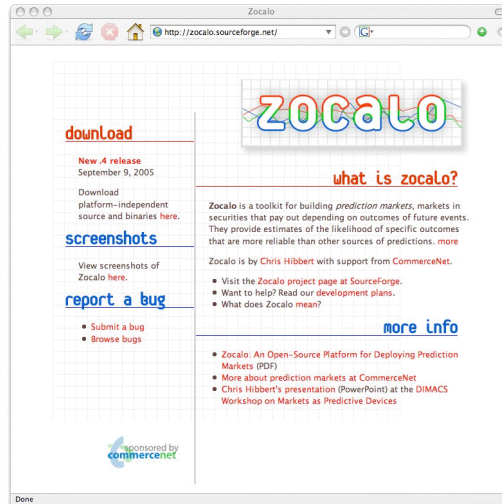


- Support for Experiments
 - Instrument all Activity
 - Export Data in Useful Formats for Analysis
 - UI updates asynchronously
 - Flexible Support for UIs

Zocalo Released as Open Source



- Released on SourceForge in July <http://zocalo.sourceforge.net>
- New releases in August and September
- In use at GMU
 - Others in planning



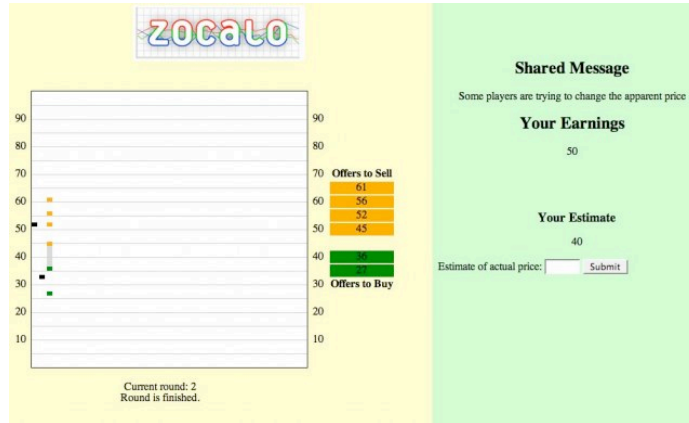
Open source means you can freely download the source code, use it, modify it, build on it, sell it, whatever

An Experiment at GMU using Zocalo



- The question:
 - Do Manipulators effect the market price
- An innovation:
 - Forecasters interpret the price signal

Zocalo Screenshot: Forecaster's view



Zocalo Screenshot: Trader's view



Zocalo Demo



See
<http://labs.commerce.net/~hibbert/test/replay.html>
(browse with FireFox!)



© 2005 CommerceNet | www.commerce.net

10

I've been working with economists at GMU on an experiment using Zocalo to study manipulation in markets.

This is a replay of one round of a session that we ran of our experiment in Fairfax, Virginia in early November.

I sped it up by a factor of 4.

Zocalo configurability



- Rounds in a session
 - Number of Rounds, duration, asset values
- Participants
 - Number, type (Trader, Manipulator, Forecaster)
 - Hints, Manipulation target
 - Reward structure
- Asset types

Project Phases



- Short Term:
 - Support Experiments; Work with Experimenters
 - Demonstrate Reuse
 - Ensure Easy Configurability
 - Expand Variety of Market Institutions
- Medium Term:
 - Deploy Internal Pilots to Businesses
 - Continue to collaborate and proselytize
- Long Term:
 - Deploy Public Markets with Partners

I'm working on the Medium term goals now.



Enhancing Prediction Market Visibility

Making Prediction Markets more Visible



- CommerceNet is working on UIs for Web 2.0
- Aggregating info to present in context
 - Like Pennock's GreaseMonkey script that inserts prices and a link to the Buzz Game when it sees relevant content
- Current PM **prices** would be valuable addition
- Success of Search Engines shows that making your information assets visible increases their value
- Current Prediction Markets aren't very visible to Search Engines

Common Formats for PM Price Info



- Prediction Markets should publish data
 - Either microformats or RSS
- Some markets already provide access
 - Yahoo! Tech Buzz publishes RSS
 - Foresight Exchange has a telnet interface
- 1. Publish info so search engines find it.
- 2. Use common formats so information is reusable
- Let's develop common formats!



Adding Liquidity in Multi-Outcome PMs

Missing A Bet



- Lack of liquidity is a problem
 - Wide spreads mean fewer trades
 - Traders are less willing to bet against things
 - Many (most?) traders are Price Takers
- Failing to display best possible prices means potential trades don't happen
 - Arbitrage doesn't address this problem

TradeSports offers a price incentive to encourage traders to list standing orders

Price taking makes sense when you are worried about sudden price movements due to new information.

Price Taking is expensive, due to the wide spread on many of these markets.

Prediction Markets



- Pose a question, specify a judging date
- Securities pay \$1 depending on outcome
- Bank sells pair when total bid reaches \$1
- Allow people to buy and sell the security
- Price reflects Probability

Binary Outcome Market



Trading price for outcome: SENNUKE6
 Time Scale: [\[24 h\]](#) . [\[week\]](#) . [\[month\]](#) . [\[history\]](#)

Trading Price

Volume

Nov 6 Nov 13 Nov 20 Nov 27

Total contracts held by players: **520** Last Trade at: XS15

The Republicans will nuke the Senate to confirm Alito

Traders willing to SELL		
grnstn2	17 contracts	at XS30
jeremystein	17 contracts	at XS29
traderid	10 contracts	at XS28
jmazey	5 contracts	at XS23

Traders willing to BUY		
traderid	10 contracts	at XS12
goldenshroom	100 contracts	at XS11
haprho	45 contracts	at XS8
goldenshroom	100 contracts	at XS6

[\[All Orders\]](#) . [\[Opposite Outcome\]](#) . [\[I Need Help!\]](#)

My Data

Avail. Cash: 185
 Contracts: 40
 Holding Val.: 600
 Performance: -17%
 Gain: -120
[Transactions](#)

IEM | Iowa Electronic Markets



Prediction Market as Double Auction



- Buy Long or Sell **Short**

- Shorts are liabilities



- Issue **Pair** when bid/ask match

- Bets against are assets



- Buy **basket** in order to sell

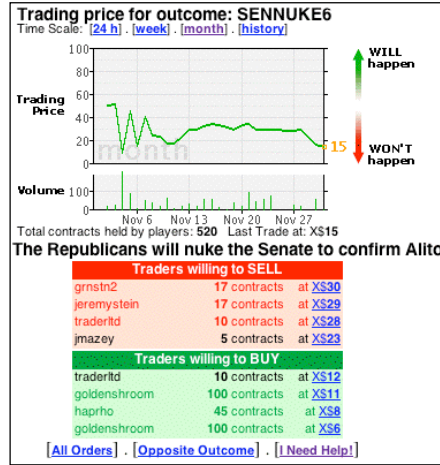
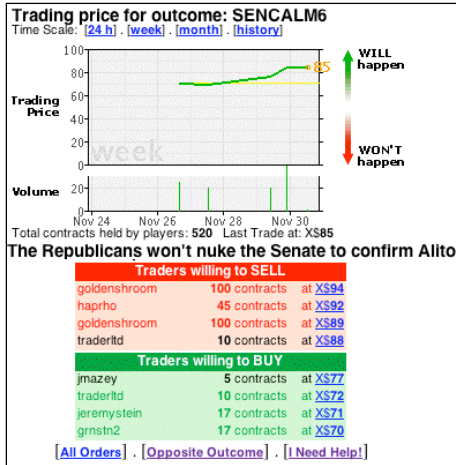


- Isomorphic in 2-outcome case except for psychology

- Investors have good reason to be wary of short selling in the stock market

In order to bet against a proposition on TradeSports, you sell the asset short. Selling short is bizarre: you collect a payment, and then hold a liability. The similarity with the stock market is confusing. People are familiar with the terminology, but with stocks, people are (and should be) worried about short selling: the liability is unlimited. With defined payouts, selling short is an accounting practice that is nearly symmetric with buying.

Complementary Views



This UI shows how you can present the information so all parties bet for a positive outcome

The same trick works in n-way claims

Parallel Double Auctions for N-way claims



 **HEDGE Street.** Trade Things That Matter™

Crude Oil Inventory November 17, 2005 4:51 PM ET

Yes/No Hedgelets		Bid	Ask	Trade
22 Nov 05				
Crude Oil Inventory < 318.4	Yes	1.60	2.59	Buy Sell
	No	7.41	8.40	Buy Sell
Crude Oil Inventory 318.4 to 321.4	Yes	2.78	3.77	Buy Sell
	No	6.23	7.22	Buy Sell
Crude Oil Inventory 321.5 to 324.4	Yes	2.73	3.72	Buy Sell
	No	6.28	7.27	Buy Sell
Crude Oil Inventory > 324.4	Yes	1.79	2.78	Buy Sell
	No	7.22	8.21	Buy Sell

© 2005 CommerceNet | www.commerce.net

22

This seems to be 4 parallel double auctions, not 8!

Notice that the buy and sell prices are inverted for each pair of matched yes and no claims.

(I.e. $1.60 + 8.40 = 10.00$ and $2.59 + 7.41 = 10.00$)

Parallel Double Auctions for N-way claims



- Separate Double Auction in each outcome
 - Each Outcome has a separate bid/ask list
- Combined Auction
 - Allow offers to buy or sell each position (like now)
 - Short on A = Long on all but A
 - Sell a set when combined bids total \$1.00
 - Sell Not-A when combined asks fall to \$1.00
 - => increased liquidity

Most exchanges that support multi-outcome (exclusive) claims manage them as parallel Double Auctions

Parallel Double Auctions for N-way claims



- In an n-way market, bank sells a set when bids total \$1.00
- If bids total $\$1.00 - \epsilon$, you can buy any coupon by improving the bid by ϵ .
- When Asks fall to \$1.00, buyers get the complementary coupons.

Parallel Double Auctions for N-way claims



Tradesports.com
A Trade Exchange Network Company | Start Trading

2008 US Presidential Election Win ▾ 9:17:38PM GMT


		Best to Sell		Best to Buy				
Contract		BQty	Bid	Offer	AQty	Last	Vol	Chge
Trade	PRESIDENT.DEM2008	17	48.1	48.4	5	49.1	2690	-0.5
Trade	PRESIDENT.REP2008	825	50.0	51.9	1	50.0	3033	0
Trade	PRESIDENT.FIELD2008	200	1.9	2.0	1	1.8	1629	0
			100.00	102.30				

The bid prices already add up to \$1. The offers should be accepted (17 shares worth)

Parallel Double Auctions for N-way claims



SupremelyIrrational.xls

	A	B	C	D	E	F	G	H	I	J	K
1			bid	Imputed bid			Spread			Imputed ask	ask
2		Can.Elect.Liberals	72.5				2.5				75
3		Can.Elect.Tories	24.5				2.9			27.1	27.4
4		Can.Elect.Other	0.4				3.4			3.0	3.8
5			97.4				8.8				106.2
6											
7											
8											
9											
10		A Trade Exchange Network Company Start Trading									
11											
12											
13											
14											
15											
16											
17											
18											
19											

	Best to Sell		Best to Buy		7:48:19PM GMT		
Contract	BQty	Bid	Offer	AQty	Last	Vol	Chge
Trade CAN.ELECT.LIBERALS	50	72.5	75.0	72	-	3702	0
Trade CAN.ELECT.TORIES	20	24.5	27.4	50	-	3623	0
Trade CAN.ELECT.OTHER	48	0.4	3.8	10	-	175	0
		97.40	106.20				

When the bid prices are within Epsilon (2.6 here) of \$1, the asks can be improved whenever their respective spread is more than epsilon.

In this case, Tories and Other have large spreads, so the market can offer to sell “Tories” if anyone is willing to improve the price by 2.6 to 27.1.

Parallel Double Auctions for N-way claims



SupremelyIrrational.xls

	A	B	C	D	E	F	G	H	I	J
1										
2		bid	Imputed bid			Spread				ask
3	FR up 12.05	98.6	98.9			0.4				99
4	FR same 12.05	0.8	0.9			0.2				1
5	FR down 12.05	0.1				0.0				0.1
6		99.5				0.6				100.1
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										

Market Quotes: FedPolicyB.html

Quotes current as of 13:45:01 CST, Friday, November 11, 2005.

Symbol	Bid	Ask	Last	Low	High	Average
FRup1205	0.986	0.990	0.990	---	---	---
FRsame1205	0.008	0.014	0.010	---	---	---
FRdown1205	0.001	0.002	0.001	---	---	---

Site maintained by [Iowa Electronic Markets](#)

The same effect can be seen on the sell side.

The asks are closer to \$1 than some of the spreads, so the market should offer to sell FR-up for 98.9 (or FR-same for .9) if anyone is willing to improve on the existing sell offers

A Graphical Version of the Argument



- In a combined market, bids on each good add liquidity for the others



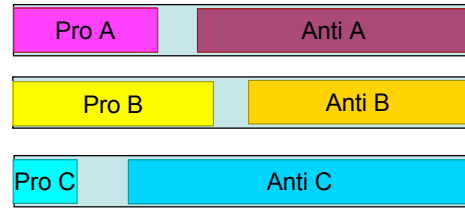
A Graphical Version of the Argument



- In a combined market, bids on each good add liquidity for the others



- When separated into distinct markets, each trade relies on a separate set of bets against



N-way Claims



- Manage as a Combined Market
- Display Best Available Price & Quantity
- One trade may involve N traders

→ More Trading from Same Participation

Conclusions



- One purpose of building Zocalo is to demonstrate this kind of improved interface
- Simple changes can make Prediction Markets more visible to Search Engines

