



PREDICTION MARKETS: A NEW INVESTMENT TOOL

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The Business of Change: 2010 and Beyond



What is a Prediction Market?

An exchange for 'bets' on whether an event occurs or not

Example events:

Barrack Obama next US president

Gold pm fixing on 24 Oct 2008 greater than \$900

Credit event on Morgan Stanley before 1 Jan 2009

FTSE/ALSI 40 closes below 20 000 on 18 Dec 2008

One can buy the contract if one believes the event will occur
or sell the contract if one thinks the event won't occur

- Usually prices will be between, say, R0 and R100
- A price can be viewed as a probability – a price of R15 implies a probability of 15% that the event occurs
- Example: There is a contract that the next CPIX reading will be greater than or equal to 13.0. Trevor believes that this will not be the case so he offers to sell the contract for R50; someone else has a more pessimistic view and takes his price. The CPIX reading turns out to be 13.4
- Trevor has a profit of R50 ($= R50 - R0$) and his counterparty has a loss of R50 ($= -R50 + R0$)



- Prediction Markets are computerized exchanges which are run on the Internet
- Order book paradigm – continuous double auction
- Buyers and Sellers are anonymous to other users
- Prices may be ‘good until cancel’, ‘fill or kill’ or have a time limit on them
- Contract must be clearly and unambiguously defined
- Should be no possibility of ‘insider’ knowledge



History of Prediction Markets

- Iowa Electronic Market (IEM) run by University of IOWA since 1988 – US presidential election outcomes
- IEM has correctly called every election since its inception and has always been within 1% of winners vote %
- IEM now also does economic data & equity earnings
- CBOT offers bets on Fed Funds Rate
- Prediction Markets have grown in number and size (volume of trades) over the last decade or so.

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Existing Prediction Markets

- InTrade – based in Ireland since 2001, 80k+ users, 400 million trades – finance, forex, commodities, weather, politics
- Hedge Street Prediction Market – currencies and commodities
- Ideosphere Prediction Market – focus on scientific and technological advances
- Many others

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Contract Information

Contract

USA and/or Israel to execute an overt Air Strike against Iran by 31MAR07

Contract Symbol: AIRSTRIKE.IRAN.MAR07

Category: Current Events / Iran

Event: US/Israeli Overt Air Strike against Iran

Event time: Nov 9 - Dec 31

Trade

Show other contracts:

USA and/or Israel to execute an overt Air Strike against Iran by 31MAR07

Statistics

Currency: USD

Session lo/hi: ---

Life lo/hi: 2.1 - 42.9

Previous Close: 5.9

Open Price: -

Last Price: 5.9

Last trade Time: -

Today's Volume: 0

Total Volume: 11997

Lifetime

Last Week

Last Day

Closing price chart

AIRSTRIKE.IRAN.MAR07

Nov 10, 2005 - Feb 27, 2007

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Source: www.intrade.com ©

[Add this chart to your website/blog](#)

[Advanced Charting on this Contract](#)

[Inform me of trades / prices in this Contract](#)

Add Contract to my Portfolios: [P1](#) [P2](#) [P3](#)

[Download Closing price data](#)

[Download Time and Sales data](#)

Order Book

AIRSTRIKE.IRAN.MAR07

Bid		Offer	
Qty	Price	Price	Qty
4	3.1	5.9	18
151	3.0	6.0	10
29	2.5	10.0	20
40	2.4	13.0	50
69	1.7	32.6	3
32	1.0	32.7	2
260	0.5	32.8	2
10	0.3	32.9	3
50	0.2	33.0	10
30	0.1	34.3	1
		34.6	3
		35.0	10
		36.7	4
		39.0	10
		45.4	5



Trading Categories

- All Markets
- Current Events
- Iran
- US/Israeli Overt Air Strike against Iran

Next Event to Start >
 In-Running Events >
 Closed Contracts >

Contract Search:

Suggest a Contract >

- Refer A Friend
- Affiliates
- Bonus
- Exchange News
- Live Help
- Quick Links
- Intrade V1
- Set Your Preferences Here

-Visited Events-

[Add to Google](#)

12:50:56AM GMT Refresh

Contract	Best to Sell			Best to Buy			Last	Vol	Chge
	BQty	Bid	Offer	AQty					
Trade AIRSTRIKE.IRAN.MAR07	4	3.1	5.9	18	5.9	12.0k		0	
Trade AIRSTRIKE.IRAN.JUN07	20	10.5	13.0	10	10.2	1095		-0.0	
Trade AIRSTRIKE.IRAN.SEP07	10	15.7	17.5	4	16.7	1102		0	
Trade AIRSTRIKE.IRAN.DEC07	5	20.5	24.9	1	23.2	1412		-1.8	

[Cancel All Orders in Event](#)

Exchange Messages

New Transaction

All Contracts

Balance (USD)
 Available: 47.05
 Frozen: 99.10

Refresh

Contract	Posn	Avg	Last	TrdPL \$	Bid	Ask
Stanley Cup Outright Winner 2006/07 Cancel all						
NHL.CANADIENS	+50	4.0	-	-		
NHL.FLAMES	+19	5.0	-	-	1	All
NHL.WILD	+50	2.7	-	-		
2008 Democratic Pres Nominee(Others on Request) Cancel all						
2008DEM.NOM.CLINTON	-10	44.4	49.0	-4.60		

Order Book

AIRSTRIKE.IRAN.MAR07

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4	3.1	5.9	18
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40	2.4	13.0	50
69	1.7	32.6	3

USA and/or Israel to execute an overt Air Strike against Iran by 31MAR07

Contract Rules & Info

Order Ticket

Quantity:

Limit Price: 0-100

Lifetime:


Advanced Order

Risk Reward Profile

Risk	Buy	Sell
Reward:		

*Zero Fees for price makers.



-Visited Events- 

1:22:27AM GMT  Refresh

 Add to Google

Best to Sell Best to Buy

Contract	BQty	Bid	Offer	AQty	Last	Vol	Chge
Trade AIRSTRIKE.IRAN.MAR07	4	3.1	5.9	18	5.9	12.0k	0
Trade AIRSTRIKE.IRAN.JUN07	20	10.5	12.5	10	10.2	1095	-0.0
Trade AIRSTRIKE.IRAN.SEP07	10	15.7	17.4	7	16.7	1102	0
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Internal Prediction Markets for Corporates

- Generate predictions which aggregate employees views on sales and other business variables
- Google, Yahoo, Microsoft, Hewlett Packard, Siemens
- US intelligence services wanted to start prediction market for timing and location of terrorist attacks etc – public outcry



Predictions Market Industry and Community

- Journal of Prediction Markets
- Academic Papers
- Prediction Markets Industry Association
- Many vendors of software to run a Prediction Market
- BLOGS – Midas Oracle (www.midasoracle.org)



Advantage of Prediction Market vs. Futures/Options /Spread Bets etc

- Client places funds in trust account
- Client bets R30 (from a R0 to R100 range) that an event occurs
- Margin of R30 i.e. the full extent of his possible loss is posted – margin earns money market rate – 1%
- Transaction fee is deducted form his trust account (typically about R1)
- No DealStream or GT247 type risks – no further margin calls



Accuracy of Prediction Markets – ‘The Wisdom of Crowds’

- Suroweicki (2005) *The Wisdom of Crowds* (Anchor Books New York) suggests PM’s better than any other forecasting tool.
- Francis Dalton observed that the crowd at a cattle show very accurately guessed the weight of an ox when the mean of all their estimates was taken.
- Prediction markets at Hewlett-Packard Labs beat official forecasts of printer sales most of the time.



Financial and Commodity based Prediction Market Contracts

- Are binary options - Let S be the stock price, K the strike price, T the time to expiry, q the dividend yield, r the risk-free interest rate and σ the volatility. Φ denotes the cumulative distribution function of the normal distribution,

$$\Phi(x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^x e^{-\frac{1}{2}z^2} dz.$$

and,



$$d_1 = \frac{\ln \frac{S}{K} + (r - q + \sigma^2/2)T}{\sigma \sqrt{T}}, \quad d_2 = d_1 - \sigma \sqrt{T}.$$

Binary Call

This contract pays one unit of cash if the underlying of the contract is above the strike level at expiry:

$$C = e^{-rT} \Phi(d_2).$$



- Binary Put

This contract pays one unit of cash if the underlying of the contract is below the strike level at expiry:

$$P = e^{-rT} \Phi(-d_2).$$

- Oversimplifies – need to take volatility skew into account
- Problems with r and d



Simple Arbitrage in Prediction Markets

- Suppose we have two contracts

Contract A: Gold price \geq \$1000 last pm fix of 2008

Contract B: Gold price $<$ \$1000 last pm fix of 2008

- Suppose contract A bid at R 50 and contract B bid at R60

I can sell both contracts and I will be sure to make R110 –
R100 = R10

- More complex examples exist



What information can we extract from prediction market prices?

- Prices imply probabilities based on aggregate estimates
- Simple to extract implied volatility from a binary option price
- Contracts based on the occurrence of credit events for some entity with different expiries would enable the construction of a credit spread curve.



Using Prediction Markets to Hedge

- Example: General Insurance company has funds invested in liquid short term money market instruments. Suppose the company stands to lose R600 if the MPC cuts Repo rates by 50 basis points. Suppose the contract MPC cuts Repo rate by 50 basis points or more is offered at R60.
Buy 6 contracts
- Outcomes
Rates cut loss R600 - R240 profit = R360 loss.
Rates not cut lose R360 loss.



InterMarket Arbitrage

- In particular we have a diverse universe of equities, JSE listed warrants on these equities, Single Stock futures and options on these equities.
- The various forms of options all imply volatilities and we could construct a volatility vs. expiry vs. strike surface and look for anomalies.
- Can be used to alter risk/reward profiles

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Longevity swaps and binary contracts

- I give you R50 for every one of your annuitants who is alive in 10 years time – you give me R50 for every of my underwritten lives which is no longer alive after 10 years
- We could have contracts based on future estimates of AIDS infection rates by some reputable body
- We could have contracts based on forthcoming mortality measures
- We could have contracts based on Medical Inflation.



BESA's Justrade Prediction Market

- Bond Exchange of South Africa has recently launched a Predictions Market – Justrade (www.justrade.com) contracts on equities, indices, bonds, commodities, MPC decisions, total maize harvest estimates, CPIX etc.
- Contracts R0 – R100, R1.50 transaction, fee margin earns SAFEX overnight -1%.
- FSB has forbidden 'political' contracts at this stage

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