Bitcoin Prediction Markets

Bitcoin Asia

May 9, 2024

Hong Kong

Paul Sztorc

BitcoinHivemind.com
LayerTwoLabs.com

Civilization Tech

Writing

The Printing Press

The Internet

The Blockchain

Predictlon Markets

Information...

Save info
Spread info

Sort & immortalize info

Unite info

Writing

The Printing Press

The Internet

The Blockchain

Predictlon Markets

Agenda

1. About me

2. Seeing the Future -- What are **Prediction Markets**

3. Getting Advice – Multi-dimensional **Prediction Markets**

4. A Bitcoin L2 Specializing in **Prediction Markets**

About Me

- Joined in 2012
- Yale Econ Department
- Code for prediction markets – 2013
- "truthcoin" white paper – 2014
- Renamed **BitcoinHivemind.com**
- …

Paul's 1000+ Pages About Bitcoin

AUGUST 2015
Nothing is Cheaper than Proof of Work   04 Aug 2015

JULY 2015
The Win-Win Blocksize Solution   14 Jul 2015

MAY 2015
Bitcoin and Deflation, The Last Word   15 May 2015

JANUARY 2015
BitUSD Isn't Worth The Trouble   29 Jan 2015

NOVEMBER 2014
The Limits of Blockchain Tech   28 Nov 2014
Altcoins Aren't Money, They're Bitcoin's Casino/Laundroma
Long Live Proof-of-Work, Long Live Mining   16 Nov 2014
Active Decentralization   09 Nov 2014
Three Basics   06 Nov 2014

MARCH 2016
The Peer Database ("Private Blockchains" Done Right)   17 Mar 2016
Private Blockchains, Demystified   16 Mar 2016
The Trusted 3rd Party Doesn't Scale (But Blockchains Do)   08 Mar 2016
One Chain to Rule Them All   07 Mar 2016

DECEMBER 2015
Salvaging the Blocksize Discussion, in Two Questions   28 Dec 2015

NOVEMBER 2015
Drivechain - The Simple Two Way Peg   24 Nov 2015

OCTOBER 2015
The Hashing Heart Attack   28 Oct 2015
PSA - Linking to a Blog Section   05 Oct 2015

SEPTEMBER 2015
Oracles are the Real Smart Contracts   21 Sep 2015
Measuring Decentralization   09 Sep 2015

OCTOBER 2017
Fork Futures (via the Exchanges)   12 Oct 2017

JULY 2017
Proof of Stake is Still Pointless   07 Jul 2017

JANUARY 2017
Blind Merged Mining   30 Jan 2017
Mining - Threat Model and Equilibrium Analysis   29 Jan 2017
The Mirage of Miner Centralization   28 Jan 2017
Upgrading 'Smart Contracts' to 'Wise Contracts'   11 Jan 2017
Two Types of Blockspace Demand   10 Jan 2017

DECEMBER 2016
Against the Hard Fork   06 Dec 2016
Better Fork Terminology   05 Dec 2016

MAY 2016
BTC Codex - The Digital Identity Sidechain   21 May 2016
The Drivechain OP Code   14 May 2016

SEPTEMBER 2018
Expensive Privacy is Useless Privacy   11 Sep 2018
Five Lies and the Truth   11 Sep 2018

JUNE 2018
BitAssets - A Digital Assets Sidechain   21 Jun 2018

APRIL 2018
Meditations on Fraud Proofs   14 Apr 2018
Blockchain Fusion (via Compensated Sidechains)   07 Apr 20
Bitcoin Post-Maximalism   07 Apr 2018

MARCH 2018
GigaChain   20 Mar 2018

2021

NOVEMBER 2017
The UASF Contradiction   02 Nov 2017
The MAHF And Replay "Protection"   02 Nov 2017
More Terminology -- Forks and Splits   02 Nov 2017
Miners Don't Control Tx-Selection   02 Nov 2017
ASICBoost is Worthless   02 Nov 2017

JANUARY 2021
OpenVote - Auditable, Fast, Private, Secure Voting   10 Jan 2021

JUNE 2019
The Consent of the Governed   21 Jun 2019
Map-Territory Epistemology (Part 5)   21 Jun 2019
Map-Territory Epistemology (Part 4)   21 Jun 2019
Map-Territory Epistemology (Part 3)   21 Jun 2019
Map-Territory Epistemology (Part 2)   21 Jun 2019
Map-Territory Epistemology (Part 1)   21 Jun 2019

FEBRUARY 2019
Security Budget in the Long Run   14 Feb 2019

DECEMBER 2018
Imposed Mutual-Exclusivity (IMEX) for Hard Forks   20 Dec 2018

NOVEMBER 2018
Gradually Activated Replay Protection (GARP) - Toward Hard Forks that D
Suck   13 Nov 2018
Deniability - Unilateral Transaction Meta-Privacy   09 Nov 2018

APRIL 2023
Small Transactions   08 Apr 2023

JUNE 2022
The "Sidechain Vision" for Bitcoin   27 Jun 20

APRIL 2022
Lightning Network -- Fundamental Limitatic

OCTOBER 2021
Security Budget II, Low Fees, and Merged Mi

FEBRUARY 2021
Sidechain For BitNames/Logins/DNS, Taking
Sidechains for Scaling -- Thunder Network
Sidechains for Privacy -- zSide and Melt/Cast

Bitcoin Blog -- **truthcoin.info**

My Big Break

Adam Back links to my blog – Dec 2014

ada... ..., lack of price/supply feedback & long run electrical cost

December 29, 2014, 12:21:39 AM

#1

Sr. Member

Activity: 404
Merit: 318

in bitcoin we trust

Some hypothetical thoughts about price stability, (lack of) price/supply feedback and long run electrical cost.
Not a call to change anything just some thoughts.

One observation people often make about the difference between bitcoin & gold is that gold reacts to price changes, by rate of supply increasing when price is high, and rate of supply decreasing when price is low. This effect has some positive feedback loop in the direction of stabilising gold price. Products with an inelastic supply function (like bitcoin or farming with long production lead times) result in gluts and shortages which take longer to self-correct than something with an elastic supply function.

While bitcoin cant directly know its price as that is an externality, one related thing it does know is the rate of difficulty change. An indication that supply is too high would be that difficulty is slowing, or similarly an indication that supply is too high difficulty increasing too fast.

So we could (hypothetically) change bitcoin to decrease subsidy per block if difficulty increase is above 10% per 2016 block period (2 week retarget). What could we do with the unclaimed subsidy? We could defer it so that bitcoin subsidy lasts for longer, and/or we could bring it forward again if difficulty slowed, eg for example increase the subsidy per block if difficulty increase falls below 0%.

If subsidy is not deferred, just deleted, that saves electricity and reduces the supply.

One might even speculate that the absence of price or rate of difficulty change feedback is currently causing price drops as mining difficulty is falling for the first time while the production cost (mining) is efficient (close to market price of coins) even for the most efficient operators. Or put it another way miners in todays market would be happy to get another 5% at 13.125 btc/block over 12.5 btc/block.

A second question is if bitcoin is $10,000/btc or $100k or $1mil which would be supported by various real-life uses eg see page 5 of report comparing to different aspects of gold ownership https://cdn.panteracapital.com/wp-content/uploads/Bitcoin-vs-Gold.pdf then at those prices, what happens to electrical use and mining investment. Is the result sustainable.

Now one argument is more security is needed for higher market cap $21 tril? And another argument is you cant have mining cost artificially pulled below market price or people will expend that amount of money anyway to bypass, bribe, hack etc the artificial factor. (eg Paul Sztorc makes that argument in his blog post http://www.truthcoin.info/blog/pow-and-mining/) I notice Nick Szabo made a similar point in an old blog post also. The cynic may like to think of the lack of mining for USD (or other fiat) leading to huge expended effort for people to lobby, bribe etc to get access to government funds, where those funds partly come from inflation (which is a form of taxation) and also quantitative easing and bailouts. The resources arent actually saved, they they just go into lobbying efforts and create cost via inefficient allocation of capital that arises as a cost of moral hazard.

Since Then

- Technical Talks
    - Scaling Bitcoin 1 2 & 3 -- Program Committee for #4
    - TabConf every year – keynoted in 2018
    - Bitcoin Wednesday – all around the globe (Toronto, Chicago, Amsterdam, etc)
    - BitDevs – Summer 2014 (NYC), Austin (May 2018), Miami (covid), etc
    - Consensus Construct (2017, 2019); American Banker ; Qcon London (2017)
    - Bitcoin Miami 2019/2021/2022/2023 & Amsterdam & Asia

- Countless Podcasts – see **truthcoin.info/rss/**

- Drivechain – Nov 2015 -- BIPs 300/301 – **drivechain.info**

- Dec 2022 -- Raised $3M to start LayerTwo Labs & help Bitcoiners dominate the world.
    - We have WORKING zCash sidechain, Ethereum sidechain, largeblock-scaling L2 sidechain "Thunder", Namecoin sidechain, Bit-Asset sidechain.
      With GUI for all operating systems.
    - Try it yourself! – **LayerTwoLabs.com/download**

Drivechain Screenshot
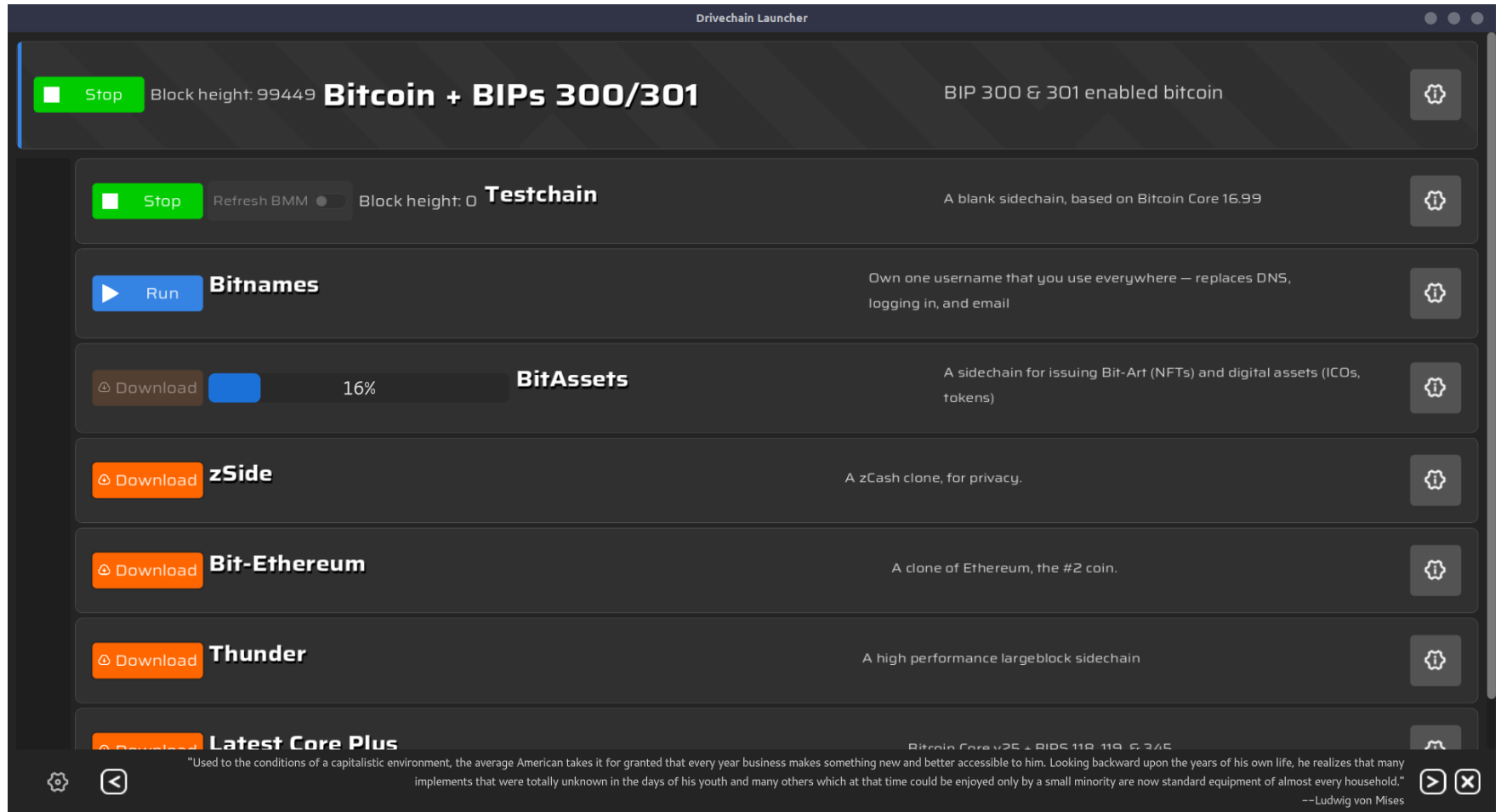
What is the shaded area?
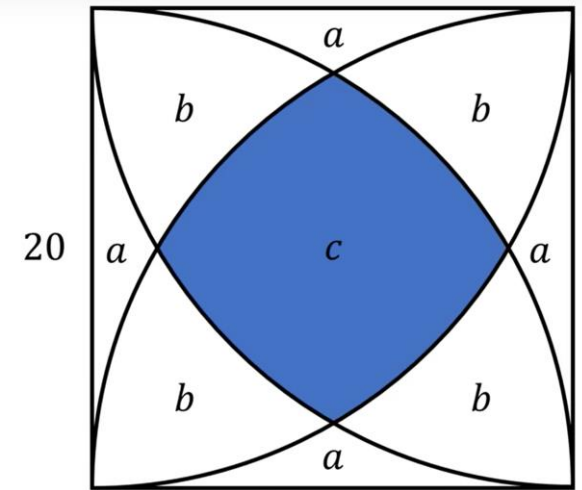
What is the shaded area?

$$\sum_{k=0}^{n} \binom{n}{k} x^k a^{n-k} \text{ ??}$$
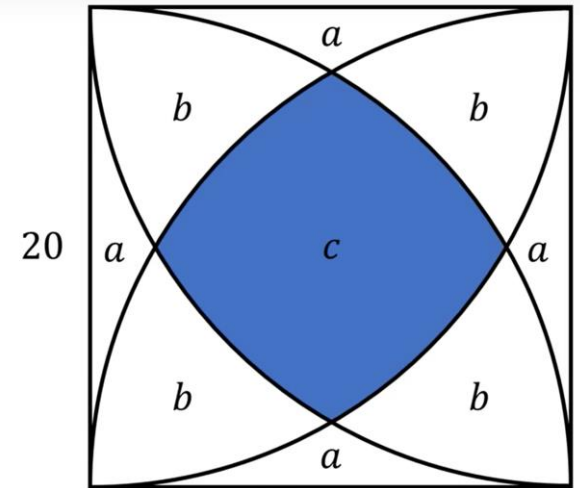
I dont know

I dont know
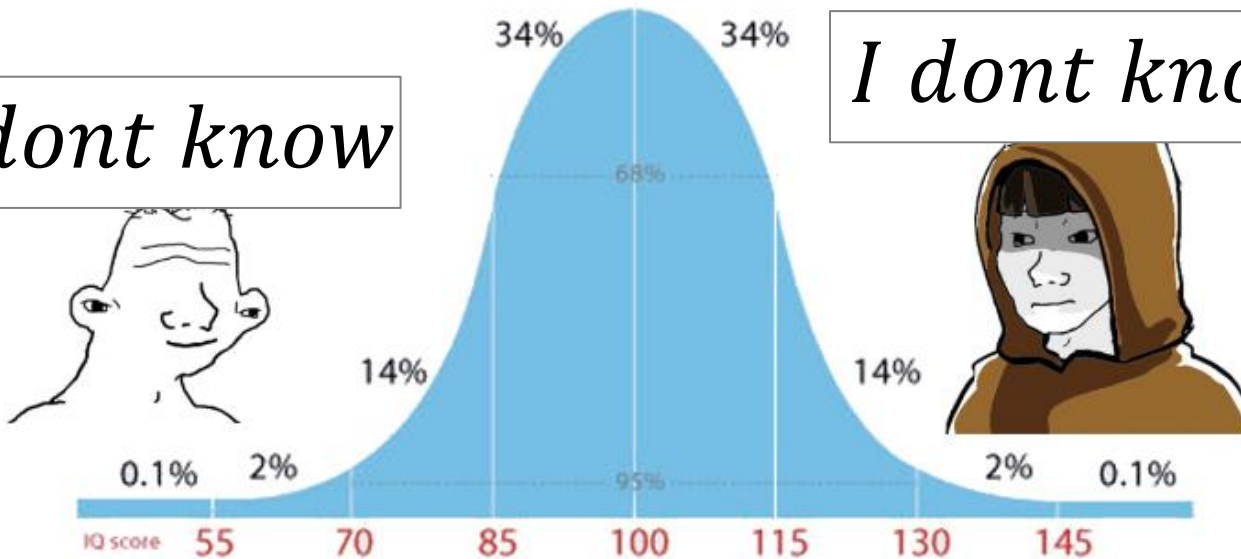
34%   34%

68%

14%   14%

0.1%   2%   95%   2%   0.1%

IQ score   55   70   85   100   115   130   145

What is the shaded area?

126.06

126.06

126.06

126.06

34% 34%

68%

14% 14%

95%

0.1% 2% 2% 0.1%

IQ score 55 70 85 100 115 130 145

What is the shaded area?
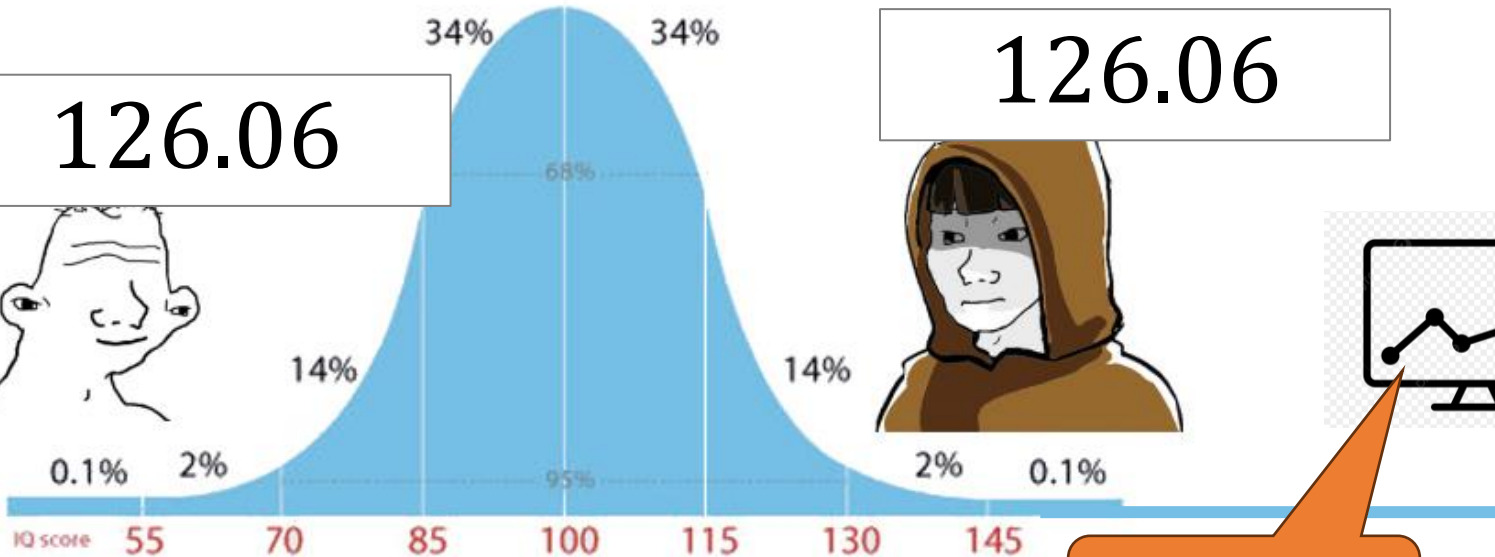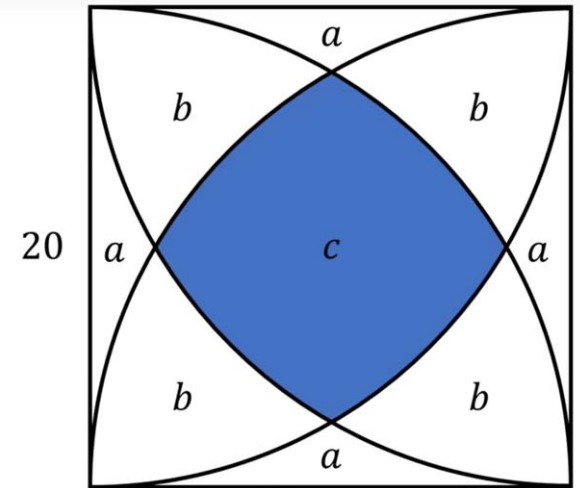
126.06

126.06

126.06
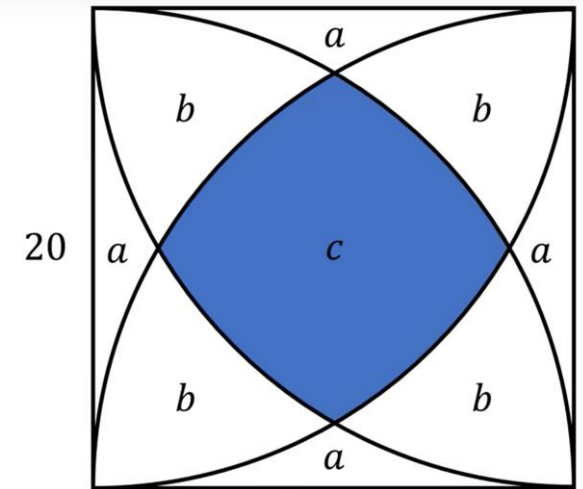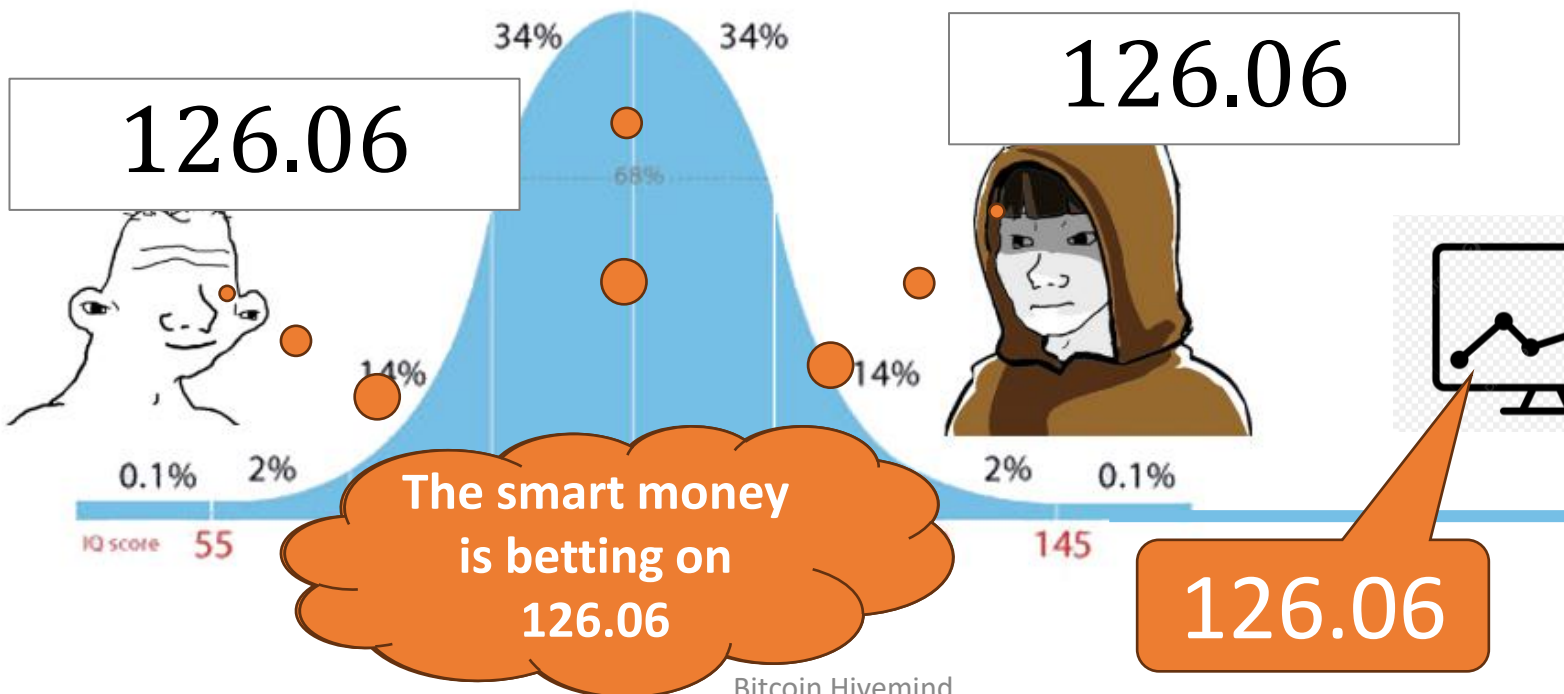
The smart money is betting on 126.06

126.06

Controversial Questions

- Is the earth getting warmer?

- If we fire our CEO next year, would the stock price increase or decrease?

- If David Bailey mints an ordinal next year, what would it be worth?

- Will Trump win the 2024 USA election?

- *Should* Trump win the next USA election?

Event Derivative (InTrade.com) - 2012 global warming

(also called a "prediction market")

Worth $100 if 2012 is the warmest year on record.

Ran from Jan 2011 to End of 2012

Controversial Questions

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- *Should* Trump win the next USA election?

Betting on who will win

The probability of winning the Republican nomination
according to UK gambling site Betfair's betting market

JAN. 13
Trump first becomes the betting favorite

FEB. 2
The day after losing in **Iowa** caucuses, Trump's winning chances plummet

FEB. 10
Following **New Hampshire** success, his probability rises back above Rubio's

FEB. 23
Trump's probability first surpasses 50% after a win in **South Carolina**

MAR. 2
Trump's chances near 80% after **Super Tuesday**

Trump

Rubio

Cruz

Kasich

Bush

Data source: Betfair

Graphic from NationalJournal.com

Betting on w̶ ̶ ̶ ̶
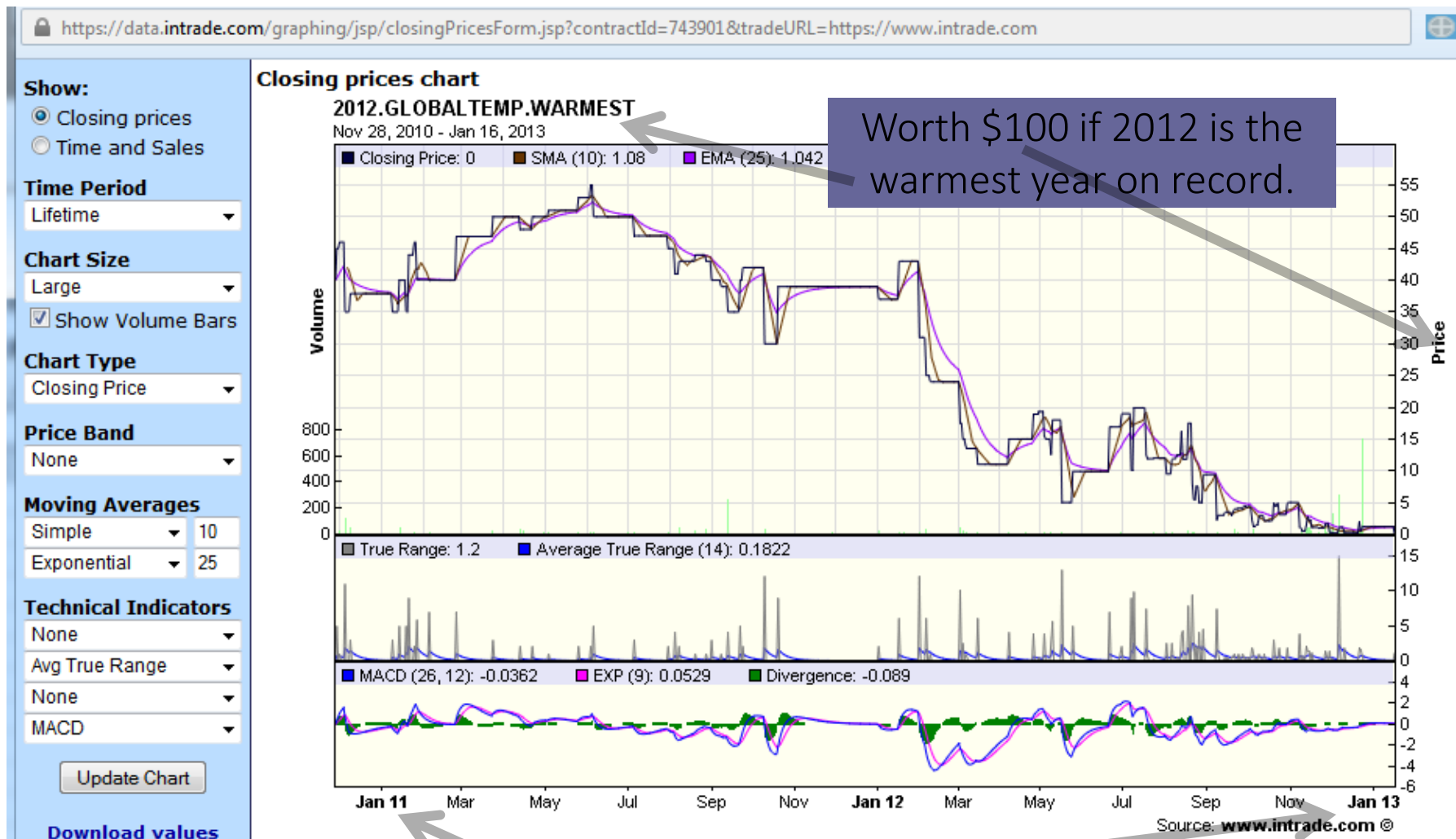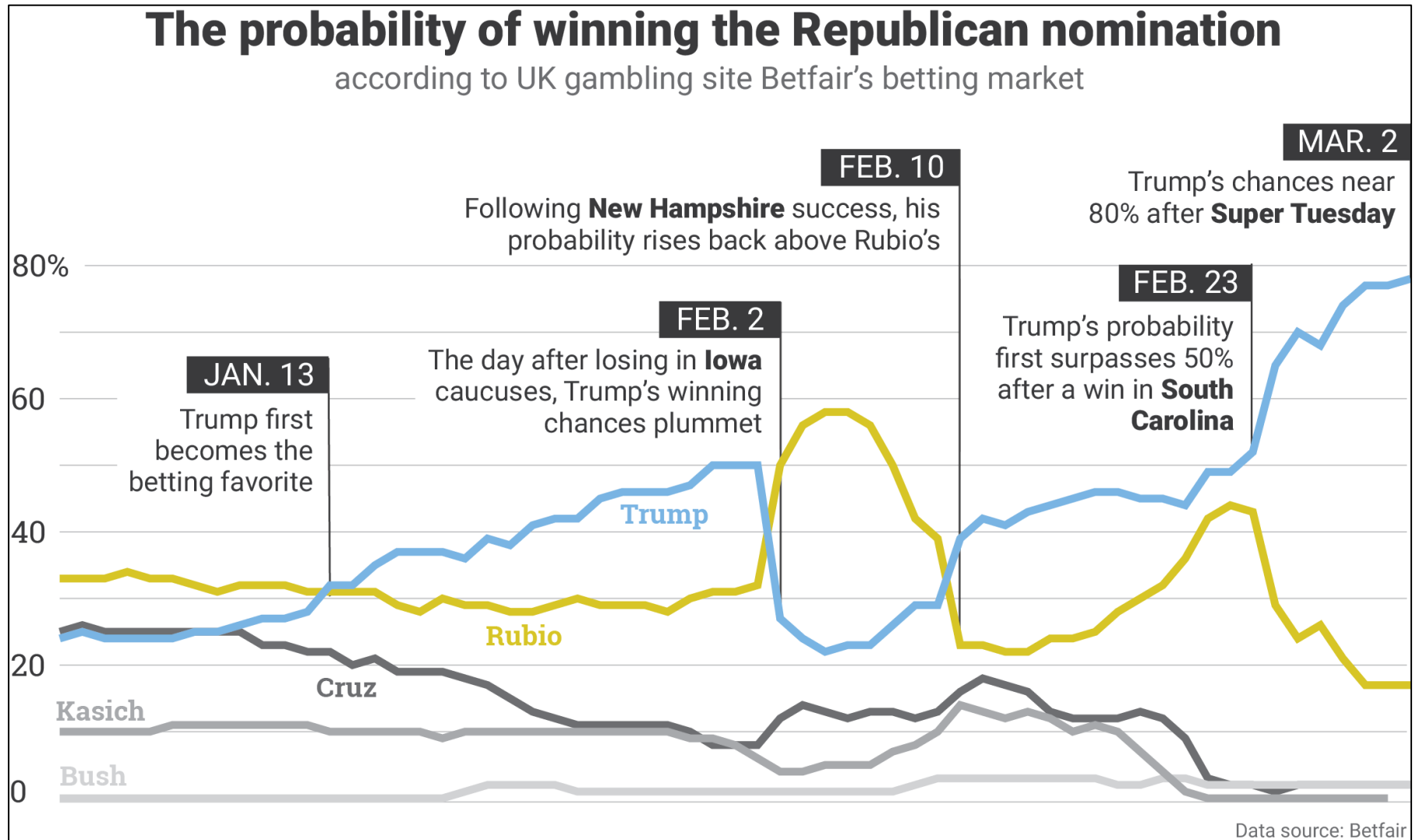
Controversial Questions

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The Voter's Values

- What will _the Unemployment Rate_ be?
- How much will the _government spend_, and _on what_?
- What will the country's _GDP_ be?
- How much will everyone _earn_ ($)?
- What will _CO2 emissions_ be?
- How many people _will die_? Will there be any dangerous _wars_? (If there are, will we win those?)

  - Trump wins 2024 election = 55% likely
  - Unemployment Rate in 2026 = likely to be 15%

Nine Slides on Multivariate Betting

(1/9) Probability -- Review

282	Heads
283	Heads
284	Heads
285	Tails
286	Heads
287	Heads
288	Heads
289	Tails
290	Heads
291	Heads
292	Tails
293	Tails
294	Tails
295	Tails
296	Heads
297	Heads
298	Tails
299	Tails
300	Heads
301	Tails

Some future event (coin flip).

Heads has 50% likelihood.
Tails has 50% likelihood.

Coin Flip #303

| H | .50 |
| T | .50 |

1.00

Total probabilities
add up to 100%.
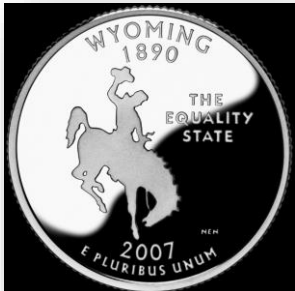
(2/9) Probability -- Review

Some future event (dice roll).

(1)	1/6
(2)	1/6
(3)	1/6
(4)	1/6
(5)	1/6
(6)	1/6

Each outcome has one-sixth likelihood.

Dice Roll #1190

1.00
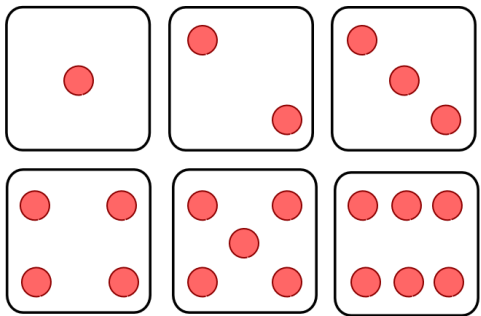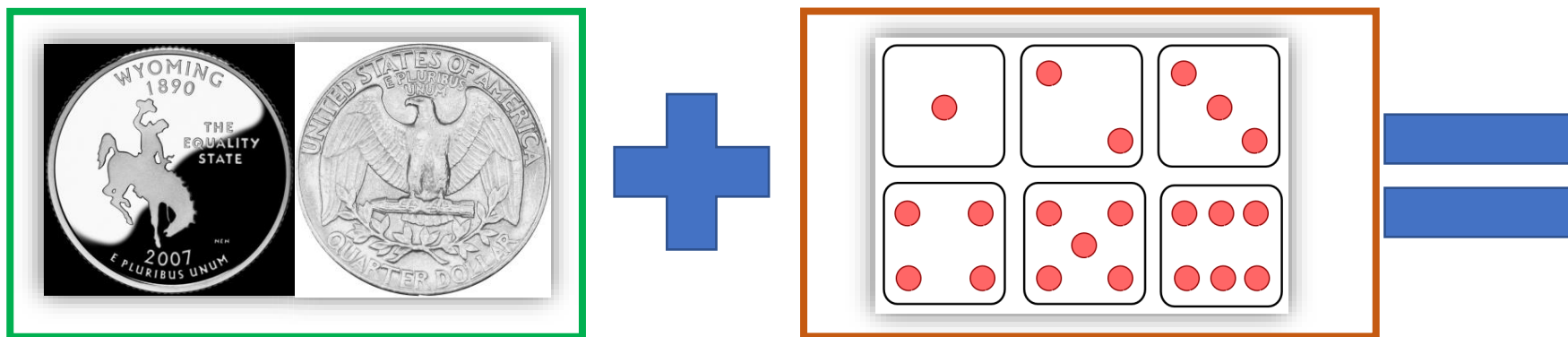
Dice Roll #1190

Coin Flip #303	(1)	(2)	(3)	(4)	(5)	(6)	"margin"
H	1/12	1/12	1/12	1/12	1/12	1/12	.50
T	1/12	1/12	1/12	1/12	1/12	1/12	.50
	1/6	1/6	1/6	1/6	1/6	1/6	1.00

"margin"

Rolling a two AND flipping a tails.

Rolling a two.

Flipping a tails.

24

	282	Heads
	283	Heads
	284	Heads
	285	Tails
	286	Heads
	287	Heads
	288	Heads
	289	Tails
	290	Heads
	291	Heads
	292	Tails
	293	Tails
	294	Tails
	295	Tails
	296	Heads
	297	Heads
	298	Tails
	299	Tails
	300	Heads
	301	Tails
	302	Tails
	304	Tails

Coin Flip #304

Coin Flip #305		H	T
	H	.25	.25
	T	.25	.25

Two coins.

Coin Flip #304

Coin Flip #304		H	T
	H	?	?
	T	?	?

The same event
(#304 x #304)
(not realistic)!

1	2	3	4	5	6
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?

The same dice.

282	Heads
283	Heads
284	Heads
285	Tails
286	Heads
287	Heads
288	Heads
289	Tails
290	Heads
291	Heads
292	Tails
293	Tails
294	Tails
295	Tails
296	Heads
297	Heads
298	Tails
299	Tails
300	Heads
301	Tails

Coin Flip #304

Coin Flip #305	H	T
H	.25	.25
T	.25	.25

Two coins.

Coin Flip #304

Coin Flip #304	H	T
H	.50	0
T	0	.50

The same event (#304 x #304) (not realistic)!

1	2	3	4	5	6
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?
?	?	?	?	?	?

The same dice.

Coin Flip #305	Coin Flip #304		
		H	T
	H	.25	.25
	T	.25	.25

Two coins.

Coin Flip #304	Coin Flip #304		
		H	T
	H	.50	0
	T	0	.50

The same event (#304 x #304) (not realistic)!

Dice Roll #4011	1	2	3	4	5	6
1	?	?	?	?	?	?
2	?	?	?	?	?	?
3	?	?	?	?	?	?
4	?	?	?	?	?	?
5	?	?	?	?	?	?
6	?	?	?	?	?	?

Dice Roll #4011

The same dice roll (again, unrealistic!).

	Coin Flip #304	
	H	**T**
H	.25	.25
T	.25	.25

Coin Flip #305

Two coins.

	Coin Flip #304	
	H	**T**
H	.50	0
T	0	.50

Coin Flip #304

The same event (#304 x #304) (not realistic)!

Dice Roll #4011

	1	**2**	**3**	**4**	**5**	**6**
1	(1/6)	0	0	0	0	0
2	0	(1/6)	0	0	0	0
3	0	0	(1/6)	0	0	0
4	0	0	0	(1/6)	0	0
5	0	0	0	0	(1/6)	0
6	0	0	0	0	0	(1/6)

Dice Roll #4011

The same dice roll (again, unrealistic!).

(8/9) "Clumping" = Related

Coin Flip #304

Coin Flip #304	H	T
H	.50	0
T	0	.50

Will Candidate X be Elected?

Will American Voters Earn Higher Incomes?	Yes	No
Yes	.50	0
No	0	.50

Will Candidate X be Elected?

Will American Voters Earn Higher Incomes?
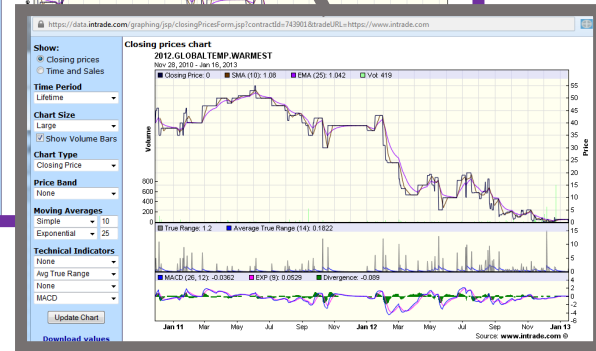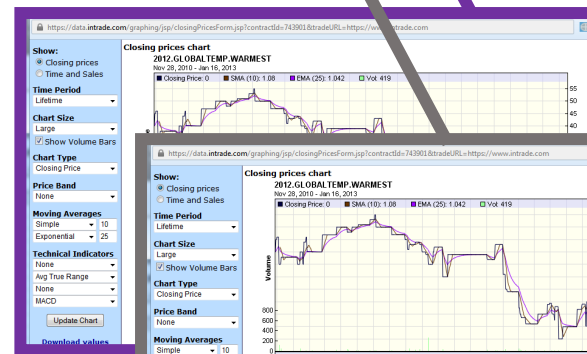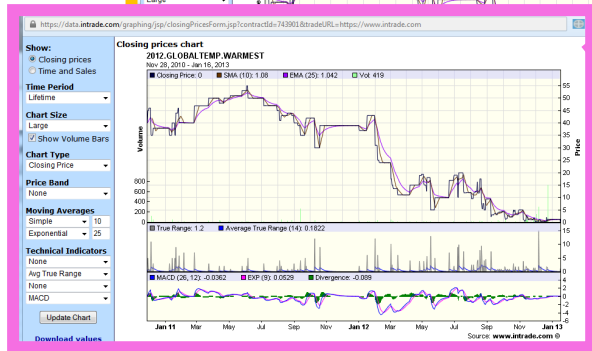
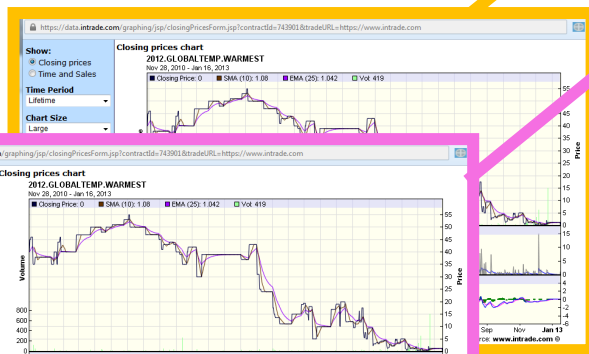|	Yes	No
Yes	.50	0
No	0	.50

Basic Arithmetic

	"Good Economy" in 2024 (<5% Unemployment)?			**"Good Economy" (Conditional Likelihood)**
	No	Yes		
Someone Else	0.0005	0.0005	0.001	50%
Nov 2024 Election Winner — Biden	.42	.19	.61	31%
Trump	.23	.15	.38	39%
Elon Musk	.00	.009	.009	100%
	.6505	.3495		

Voter Sees on Election Morning (For Example):

Average, over years 2024-2028...	Biden	Trump
Total Government Spending ($/person)	$12,568	$10,407 `better`
Total Money Earned by all Citizens ($ billions)	$16,427	$17,009 `Slightly better`
Total Deaths, all causes (thousands of people)	2,917	2,901 `basically the same`

continental breakfast

HILTON HHONORS

Curated especially for
HHonors Diamond & Gold Members.
Please enjoy up to 3 choices
plus any beverage listed.

YOGURT
WITH GRANOLA

STEEL CUT IRISH OATS
CINNAMON APPLE

HOMEMADE WAFFLE

PASTRIES
CROISSANT
PAIN AU CHOCOLATE
BLUEBERRY MUFFINS

illy Coffee • Orange Juice • Grapefruit Juice

Complimentary when presenting valid
Hilton discount card issued at check-in.

It also works for…

- **Which CEO** *would most increase* **our stock price**?
- **Which FED Policy** *would most increase* **nGDP**?
- **Which laws** *would most increase* **local land values**?
- **Which policies** *would most decrease* **violent crime**?
- **Which hardfork to BTC** would most increase **the USD/BTC price**? *(if any)*

- Works better on "the big questions" – more people, more disagreement, more information to unite.

Rot From Above: Who controls what?
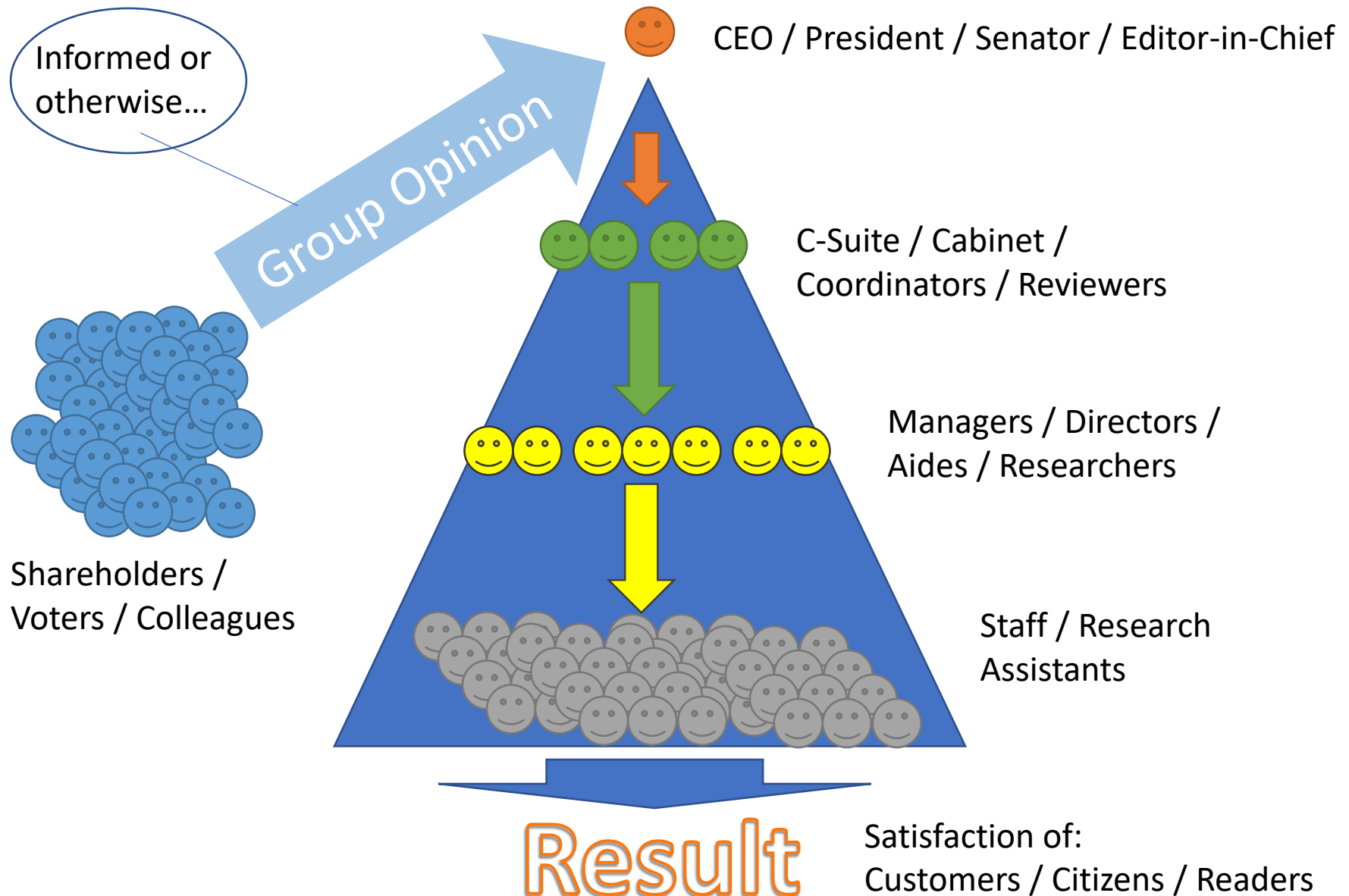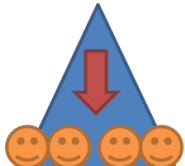
Ownership and Control:
The Weakest Link
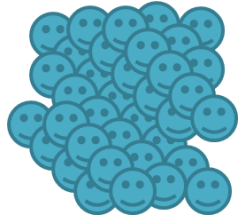
Shareholders / Voters / Colleagues

1. How to we **combine** the many preferences of this group into one request?
2. Do we each have to **monitor** the leader's work? If not, who do we trust (and why)?
3. If I don't like this leader, how do I find out if others agree? How do we **fire the leader**?

Bad

CEO / President / Senator / Editor-in-Chief

C-Suite / Cabinet / Coordinators / Reviewers

Managers / Directors / Aides / Researchers

Staff / Research Assistants

Can easily…
…make requests.
…observe work/results.
…fire insubordinates.

Good

What does this have to do with Bitcoin?

- The whole process can be on a special L2 of Bitcoin
- This includes:
  - The creation of Questions and Markets
  - The P2P Oracle algorithm that allows the blockchain to determine what-actually-happened (ie, whether Trump won or not)
  - Market Scoring rules so that markets never run out of liquidity
  - Trades
- Ambitious project!
- **BitcoinHivemind.com**

File   Settings   Help

⌂ Overview   ↗ Send   ⊟ Receive   ⊟ Transactions   ⚹ Markets   ☰ Decisions   ✎ Author   ▣ Vote

Recent Hivemind Objects:

Type/Icon	
☰	Bitcoin exchange rate as reported by CoinD
☰	Will Jeff Immelt have been replaced, as CEO
☰	Global surface temperature anomaly, cumul
☰	Will Barack Obama win US President in 201
⚹	Unemployment drivers
⚹	Fire Immelt?
⚹	Unemployment drivers

Balances

Available:	400.00000000 BTC
Pending:	0.00000000 BTC
Immature:	50.00000000 BTC
Total:	450.00000000 BTC

Recent transactions

5/17/16 11:41   [+50.00000000 BTC]
(19y1RCwANn71vEZkxMrDoAjXuCzERyJE8A)

5/17/16 11:41   +50.00000000 BTC
(14u1sX6BTJnnTAL2dPDgm7WKKubofpwuEy)

5/17/16 11:41   +50.00000000 BTC
(1D6kbEHq7BXpJsVbuxLivt4CV4fv8poCk7)

5/17/16 11:41   +50.00000000 BTC
(1AAdn8e5v7QM155C6Cc6Z8u82SZWDLH6cd)

5/17/16 11:41   +50.00000000 BTC
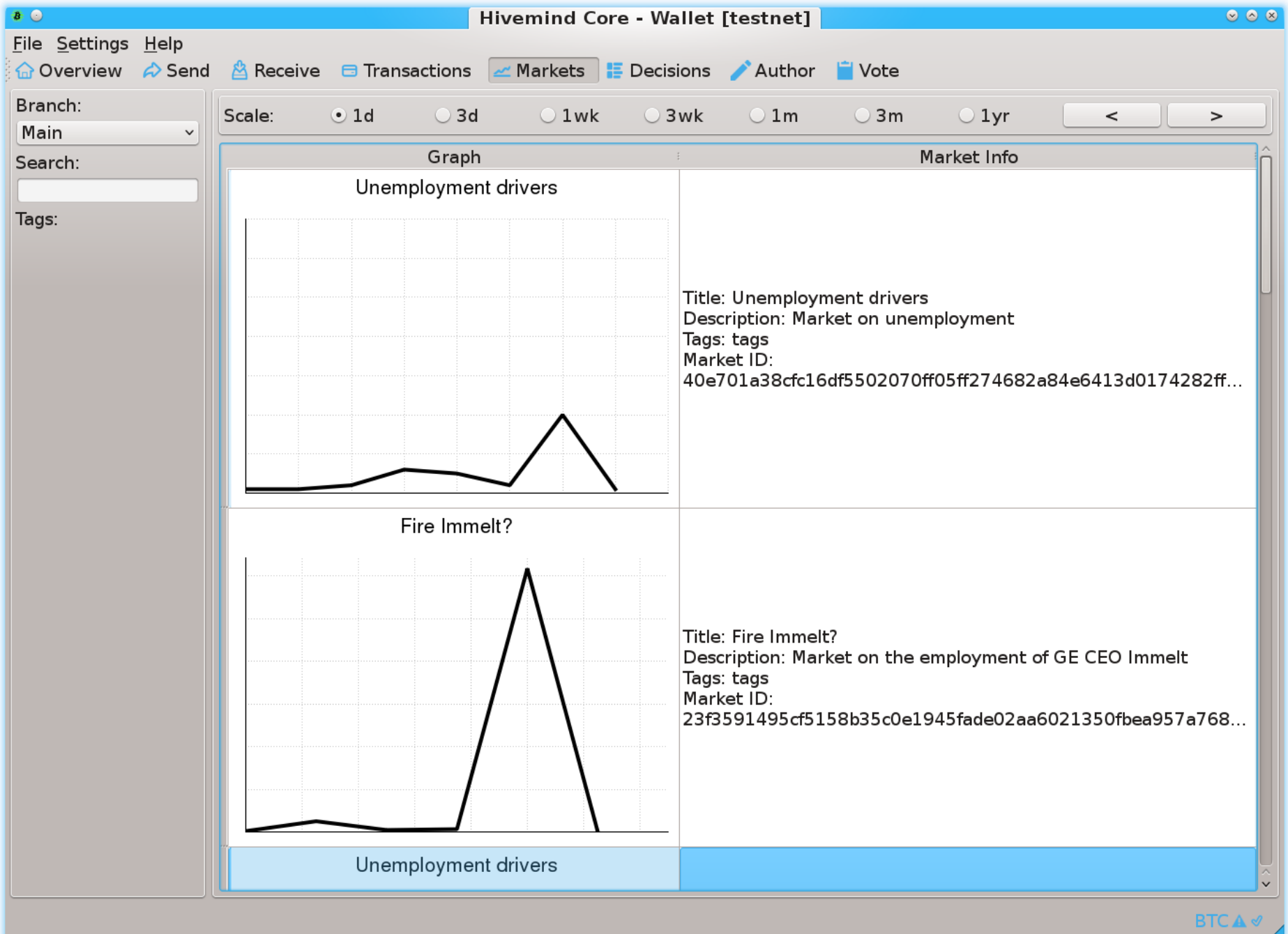(16bfT93g3QY53xsEkK6UwnKYaa7FDBxsoc)

5/17/16 11:40   +50.00000000 BTC
(1NwRMJnpetsFHVCpzjeYo1s89StTi4HHDa)

BTC ▲ ✓

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Branch:

Main

Search:

Tags:

Scale: ⦿ 1d   ○ 3d   ○ 1wk   ○ 3wk   ○ 1m   ○ 3m   ○ 1yr   <   >

Graph	Market Info

Unemployment drivers

Title: Unemployment drivers
Description: Market on unemployment
Tags: tags
Market ID:
40e701a38cfc16df5502070ff05ff274682a84e6413d0174282ff...

Fire Immelt?

Title: Fire Immelt?
Description: Market on the employment of GE CEO Immelt
Tags: tags
Market ID:
23f3591495cf5158b35c0e1945fade02aa6021350fbea957a768...

Unemployment drivers

BTC ▲ ✓

Trade

Market ID: 40e701a38cfc16df5502070ff05ff274682a84e6413d0174282ff54d45d0576c [□ Copy]

| Standard | Two Dimensional | High Dimensional |

Market Graph: ● 1 Month ○ 1 Day ○ 5 Minutes
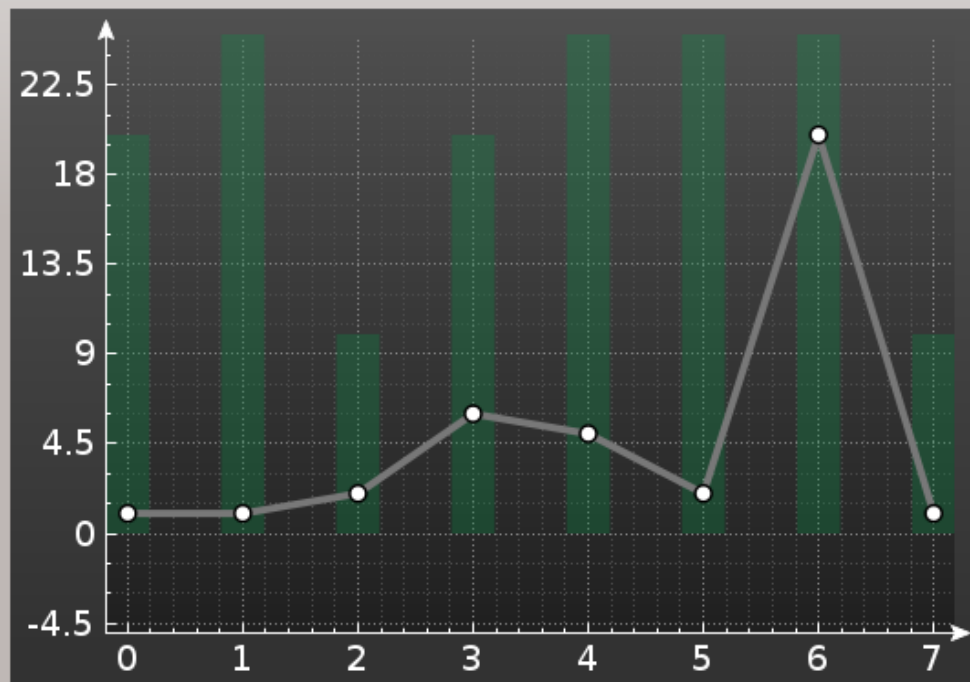
Current Price: 0.00   Shares Owned: 0

Your trades:

● Long (Buy) ○ Short (Sell)

| Make Order | ? Help |

 # Shares:

0

[-10] ———●———————— [+10]

Price:

0.00

Decision State:

0

Payout Address:

Shares to buy: 0
Trade Cost: 0
Balance: 0

✔ Finalize

Final Slide – External Links

- Paul Sztorc, CEO LayerTwo Labs
- @truthcoin on Twitter
- @psztorc on Telegram
- LayerTwoLabs.com
- Drivechain.info
- T.me/DcInsiders – Drivechain Telegram Group
- **BitcoinHivemind.com** – Bitcoin Prediction Markets

Thank You!

ElectionBettingOdds.com tracked some 462 different candidate chances across dozens of races and states in 2016 and 2018.

How accurate has this site been?

When a candidate favored by bettors loses, it's easy to fall into the trap of thinking the bettors were "wrong". But remember that when bettors give someone, for example, a 65% chance to win -- that also means the bettors give the person a 35% chance to *lose*.
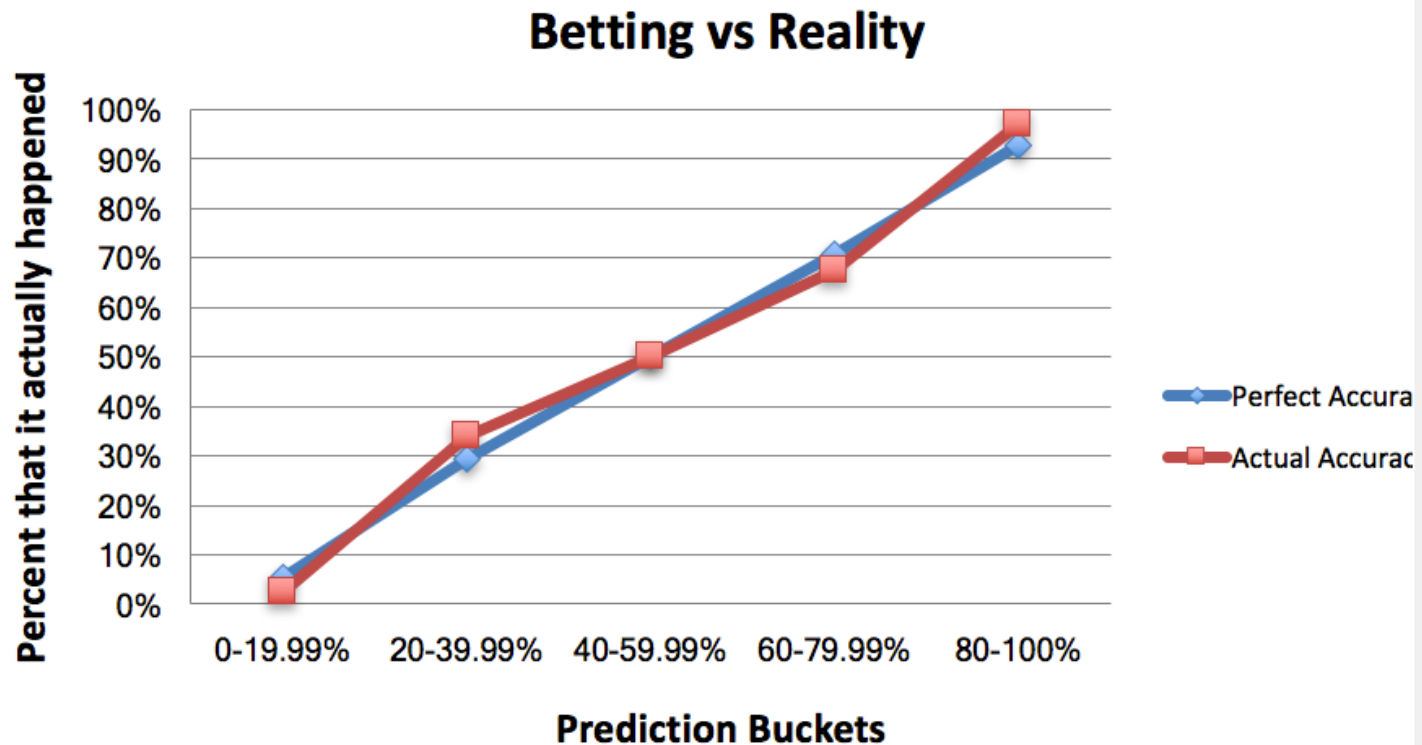
The following graph shows how closely the betting tracked reality.

The blue line shows what predictions would look like if they were perfect. Where the red line differs from the blue line, the predictions were off somewhat:
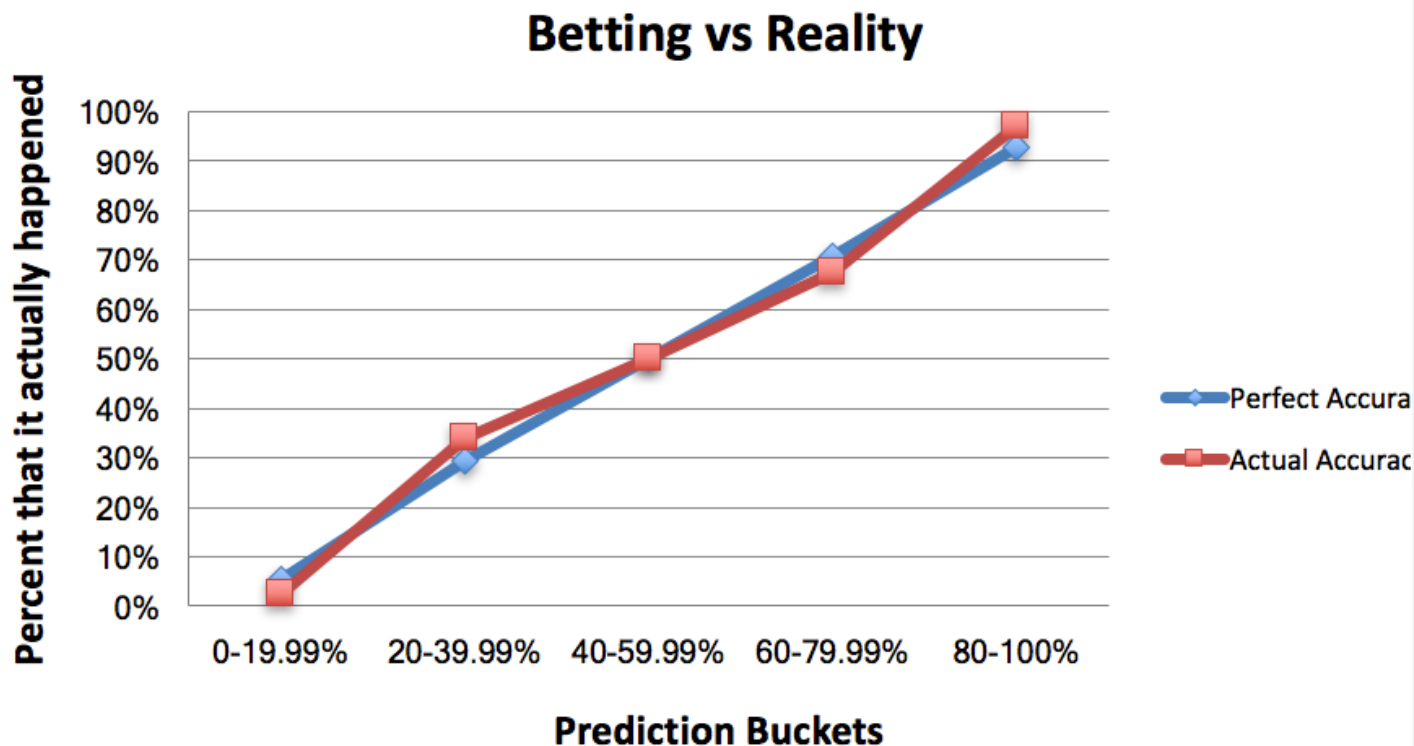
"Ramp it up" Lowbrow → Highbrow

- Sports (SuperBowl, March Madness)
- E-Sports
- Arts (Oscars, Tonys).

Betting vs Reality

Last Slide:
Here, Rhetoric Is Irrelevant

- As this idea becomes influential, politicians will start competing on these metrics.

- But in order for their numbers to go up, they'll need to actually **_hit_** the target in reality.

- For example: Politician could announce that they want everyone to die, and plan to kill everyone, but unless traders believe that the politician can follow through with this plan, the 'deaths' numbers won't budget an inch.

- Layperson already knows that politicians are liars. (Will prefer this.)