Microtick Tech Walkthrough

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Efficient Markets

Efficient Market Hypothesis (EMH) is a theory that states liquid markets reflect all relevant information at any given time. At the very least, it's likely true in general that the more liquid a market is, the better the price discovery.

- **How do we generate price discovery liquidity for assets or indices that do not (or cannot) trade?**
- **And how do we bring that price information on-chain?**

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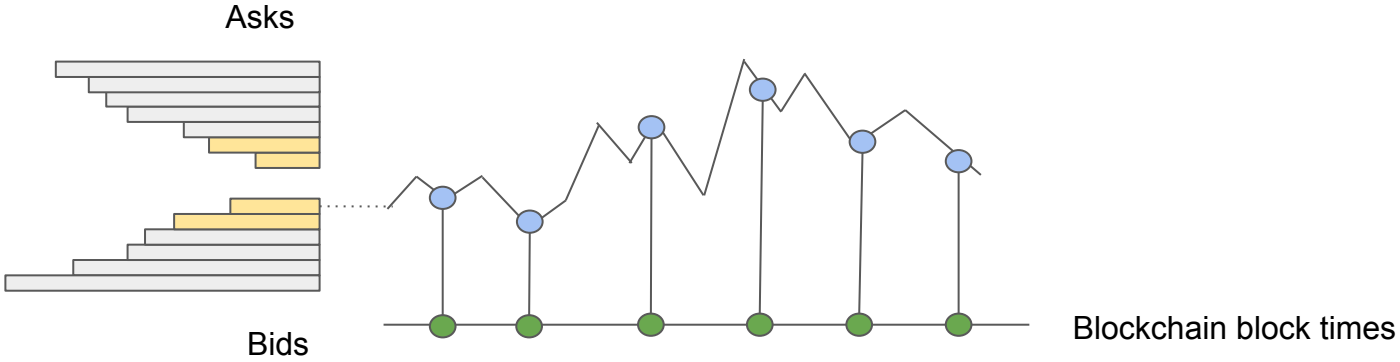
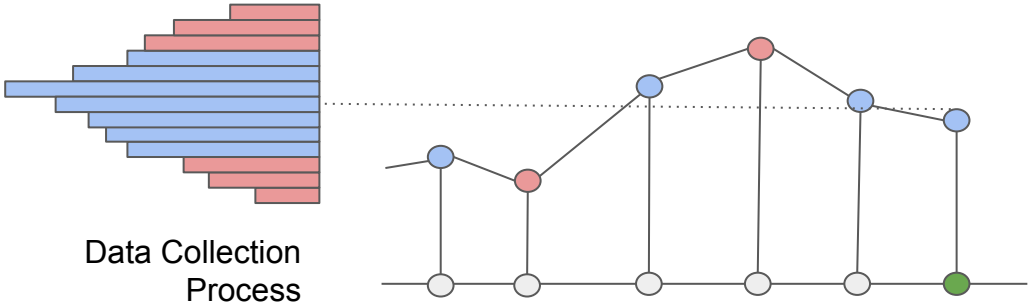
Traditional Price Discovery



- Smallest orders are on the inside spread, and order flow is matched from the inside-outwards; the system tends to be erratic and unstable over short timeframes.
- Matching traditionally occurs at a centralized location; order flow must converge at that point, leading to issues with front-running and high frequency trading.
- Because blocks occur at unpredictable times and different locations, even with a trusted oracle there can be no “exact price” at any given block time.

Decentralized Price Discovery



Data Collection Process

Block times / Epoch time (green)

- Uses an average of prices generated through a time windowed schelling point mechanism. Example: blockchain oracles.
- The goal is to arrive at a price consensus on an asset, with many participants contributing. The actual asset does not trade. Incentives / slashing conditions usually based on statistics and / or reputation mechanisms.
- No way to hedge risk associated with changes in the consensus or average price.

Automated Market Makers

- Smart contract based. Requires tokenization to encapsulate value in an on-chain token.
- Uses pools of token liquidity and bonding curve math to generate prices based on supply and demand. Tokens exist on the same chain as the market maker contract or logic.
- Currently very popular in the DeFi space.
- The market price from the AMM smart contract can double as a price oracle for other Dapps.

Microtick's Price Discovery

- Smart contract based. **Does not require tokenization.**
- Similar to decentralized oracle pools, uses Schelling points and averages of price assertions. **Does not use epochs, slashing or reputation**. Instead, we standardize assertions across fixed time durations to create trading opportunities using option pricing to adjust quotes in realtime (block by block).
- Cosmos SDK based, but could run on many types of chains. **Very easy to combine liquidity cross-chain.**
- **Similar to AMMs**, the market price from the on-chain smart contract can double as a price oracle for other Dapps.

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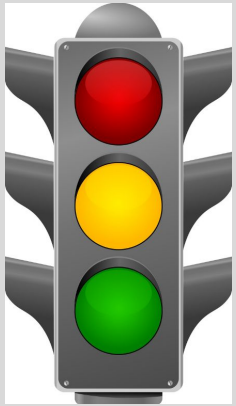
What exactly is a Schelling Point?

- “Cooperation without communication”.
- Based on the science of game theory.
- Participants’ actions are based on what their expectations are for the actions of *other* participants.
- The participants must trust that the rules of the game will be enforced.

Schelling Point example:

Traffic Light



Assumptions

Traffic lights work based on an expectation that other drivers will act based on green signaling “GO” and red signaling “STOP”. The light itself is a “smart contract” that drivers trust will never display green simultaneously in two crossing directions.

Slashing conditions

Financial: you might get an expensive traffic citation.

Physical: you might get into an accident leading to damage, injury, or worse.

Microtick's use of Schelling Points

Rules:

A given market is understood to represent a real world condition, e.g. the value of Bitcoin in $USD.

Participants act based on the expectation that other participants have the same understanding.

Trusted Logic:

The smart contract enforces the consensus spot price for every block is always equal to the weighted average of all the individual contributed spots across all time durations.

$$\text{Weighted mean} = \frac{\sum_{i=1}^{n} \text{weight}_n \times x_n}{\sum_{i=1}^{n} \text{weight}_n}$$

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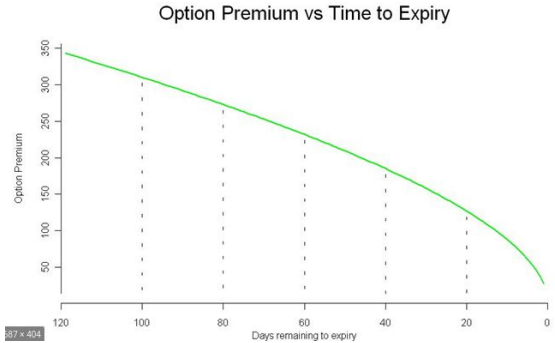
Option Pricing vs. Slashing

- First, it's a natural fit. Blockchain based sampling of real-world prices is inherently inaccurate due to real-world volatility (even if you trust the oracle). So we need to include volatility in any Schelling point solution.
- Second, options are a well known asset class that we can easily tie into existing infrastructure for applications that require a direct coupling. For example, exercise into an actual underlying asset instead of cash settling.
- Microtick standardization based on a time duration instead of fixed strike / expiration, and the marketplace itself computes the strike price on a block-by-block basis.
- Finally, we can trade options. Option synthetic long / short trades will be covered later in this presentation.

Standardized time durations instead of fixed expirations



An option's premium drops off exponentially as time to expiration gets shorter. Short-term options do not exist in today's financial markets because of the way they are traditionally standardized (fixed strikes, fixed expirations). Microtick reframes this standardization requirement by standardizing options based on time duration, and this is the enabling factor that makes competitive pricing for extremely short-term options feasible.

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Price Assertion

- Bi-directional option quote - the maker specifies the:
    - Spot price
    - Premium, specified in spot units, centered around the spot price (+/-)
    - Token backing
- A price assertion is an offer on either a call or put at the current consensus, with the direction (call vs. put) decided by the taker at the time the trade is undertaken.
- Makers price short-term volatility, while trying to be as accurate as possible with the spot.
- Takers watch for divergences of the consensus from the real-world price, and trade the delta (arbitrage).
- **Weight = Backing / Premium**

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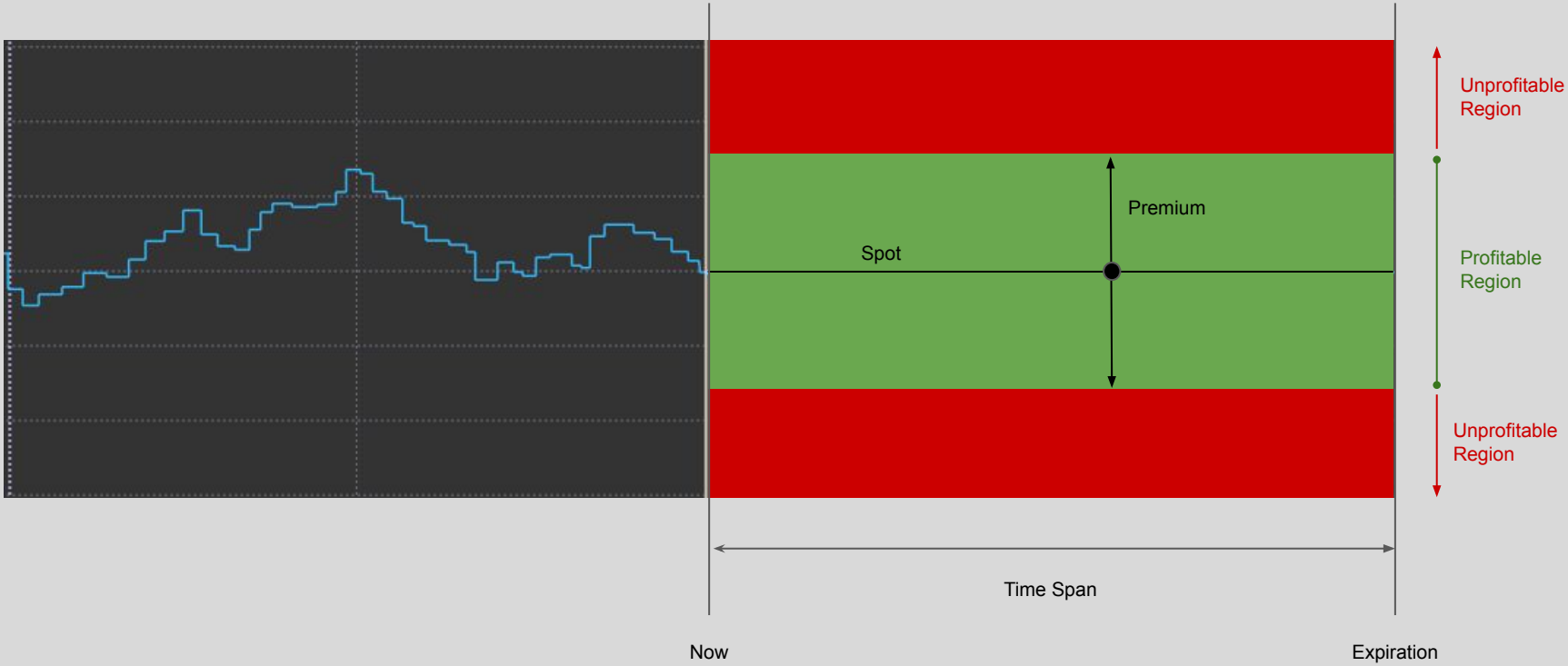
Price Assertion - at the money



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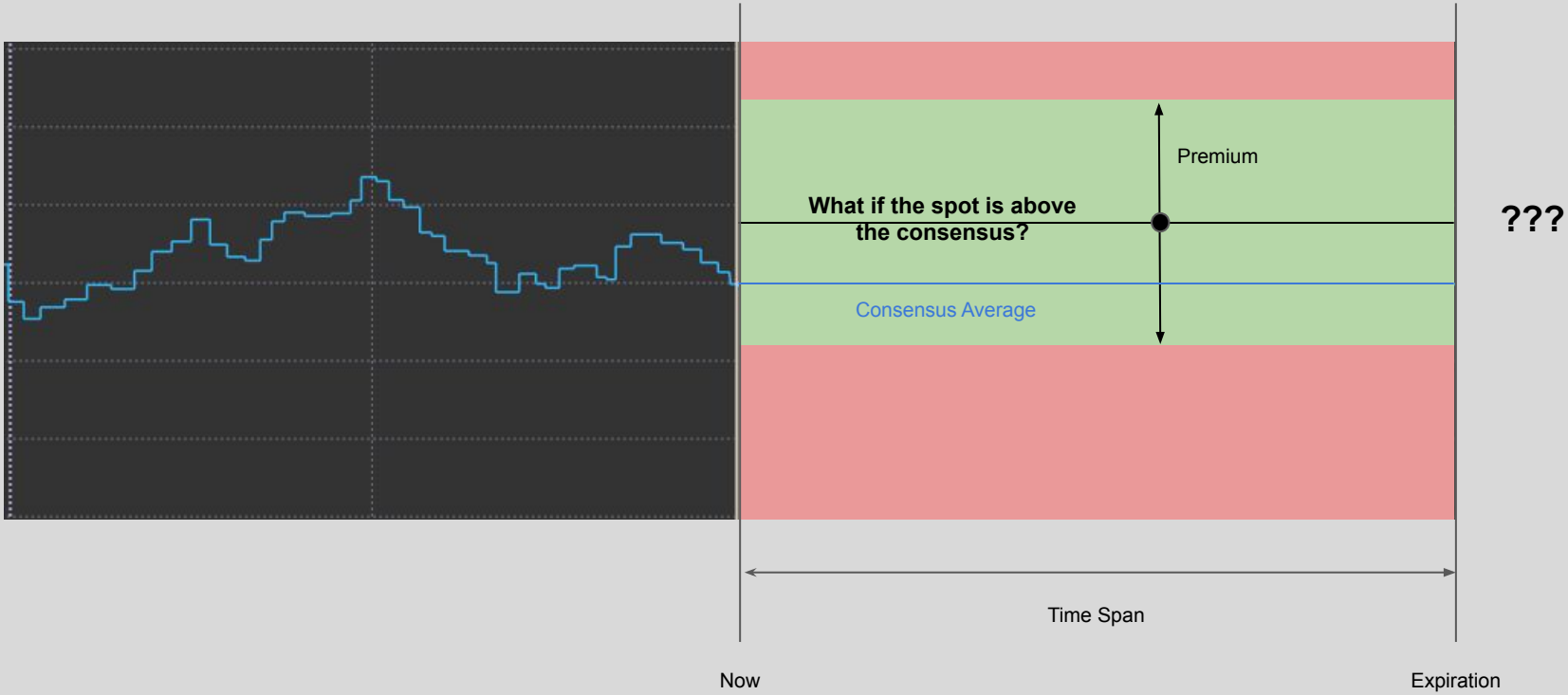
Price Assertion - above consensus



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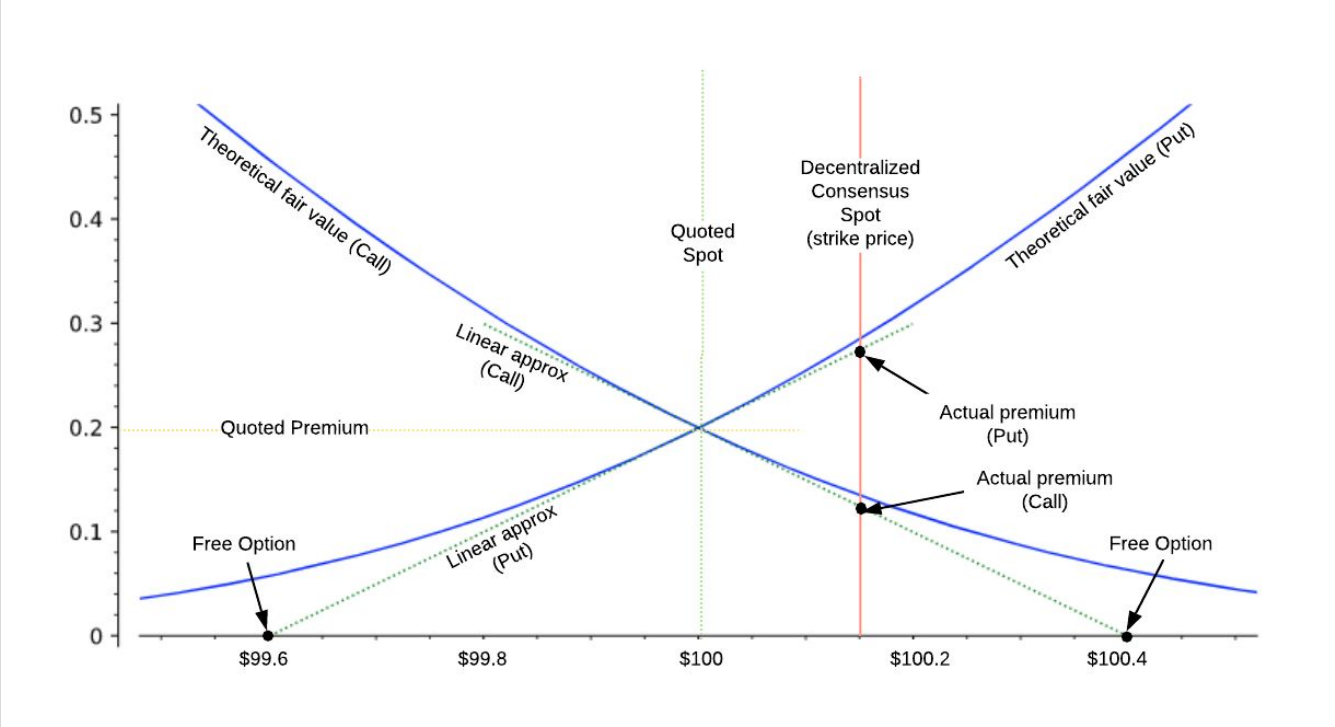
Linear approximation for at-the-money options



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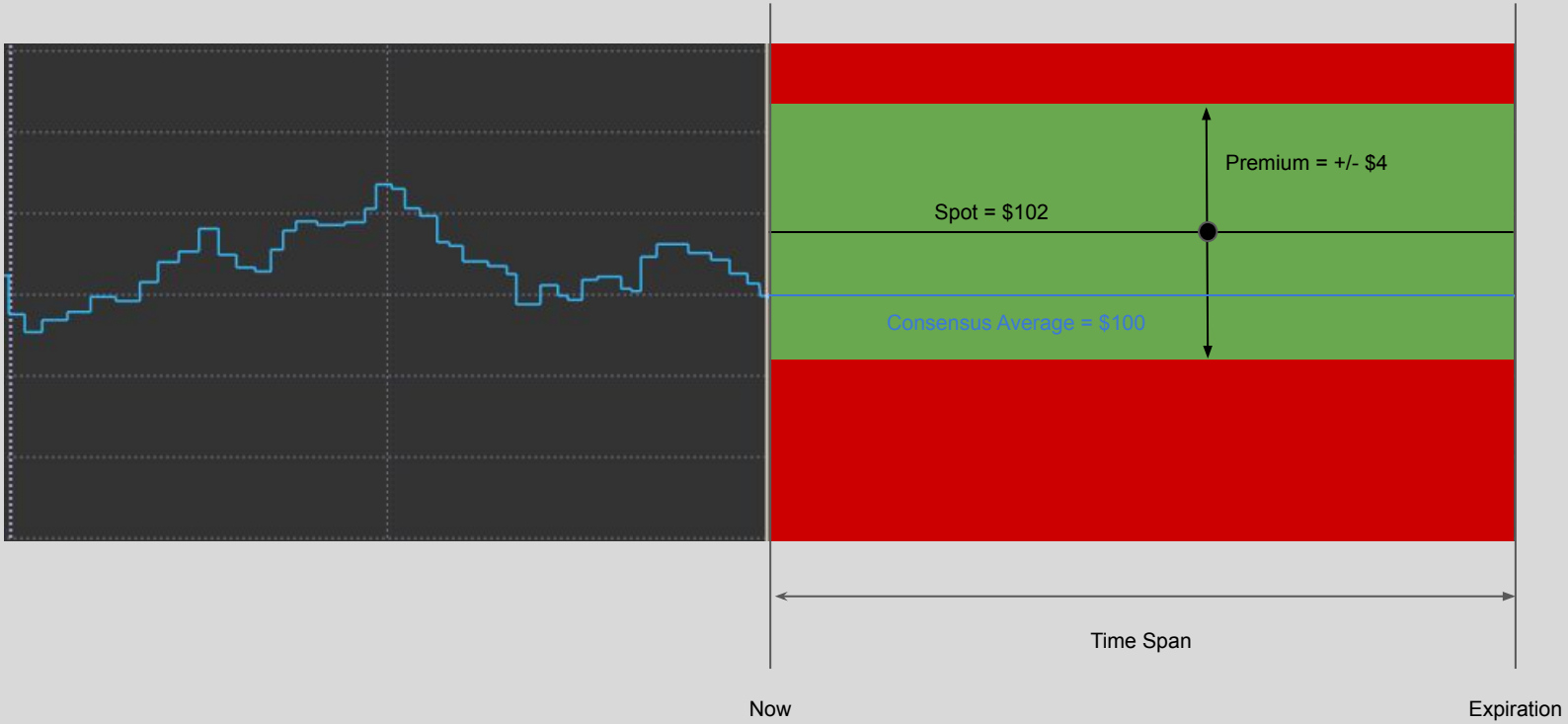
Original Quote



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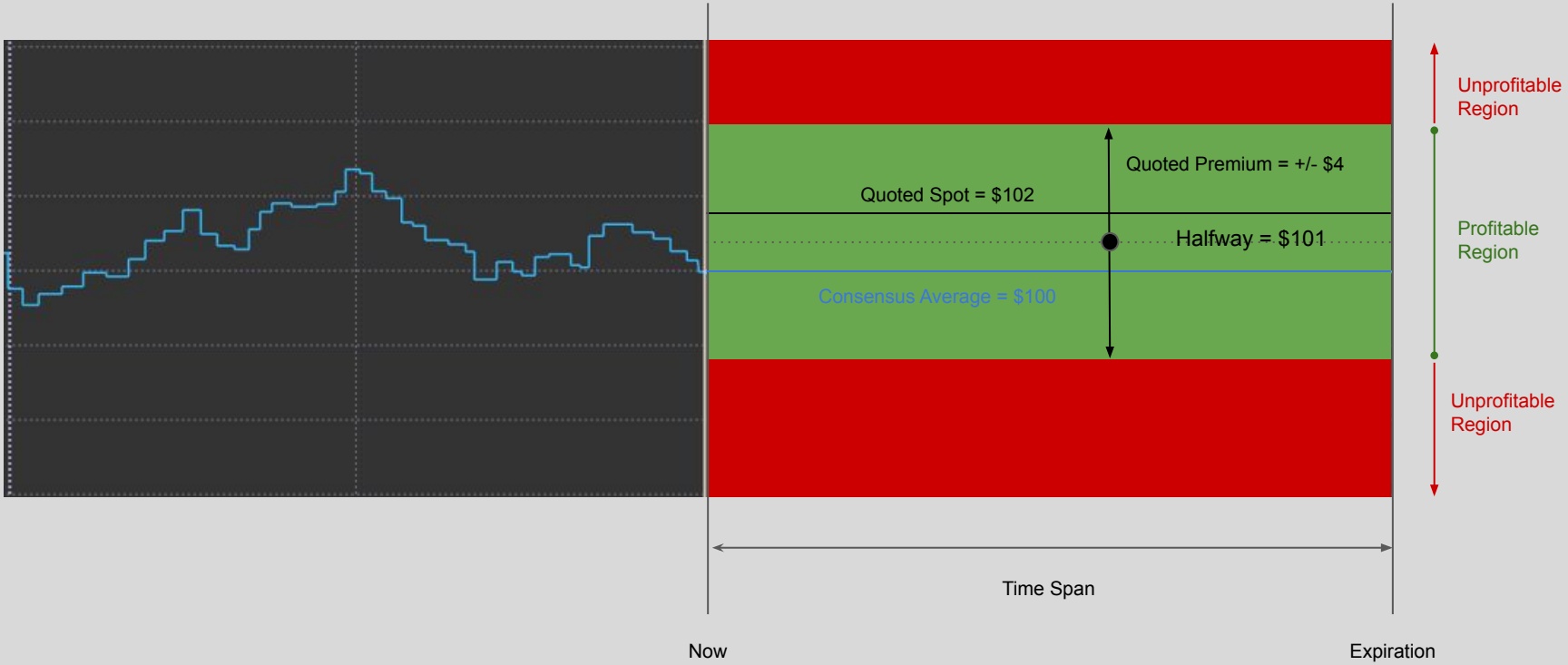
Adjusted Profit Region



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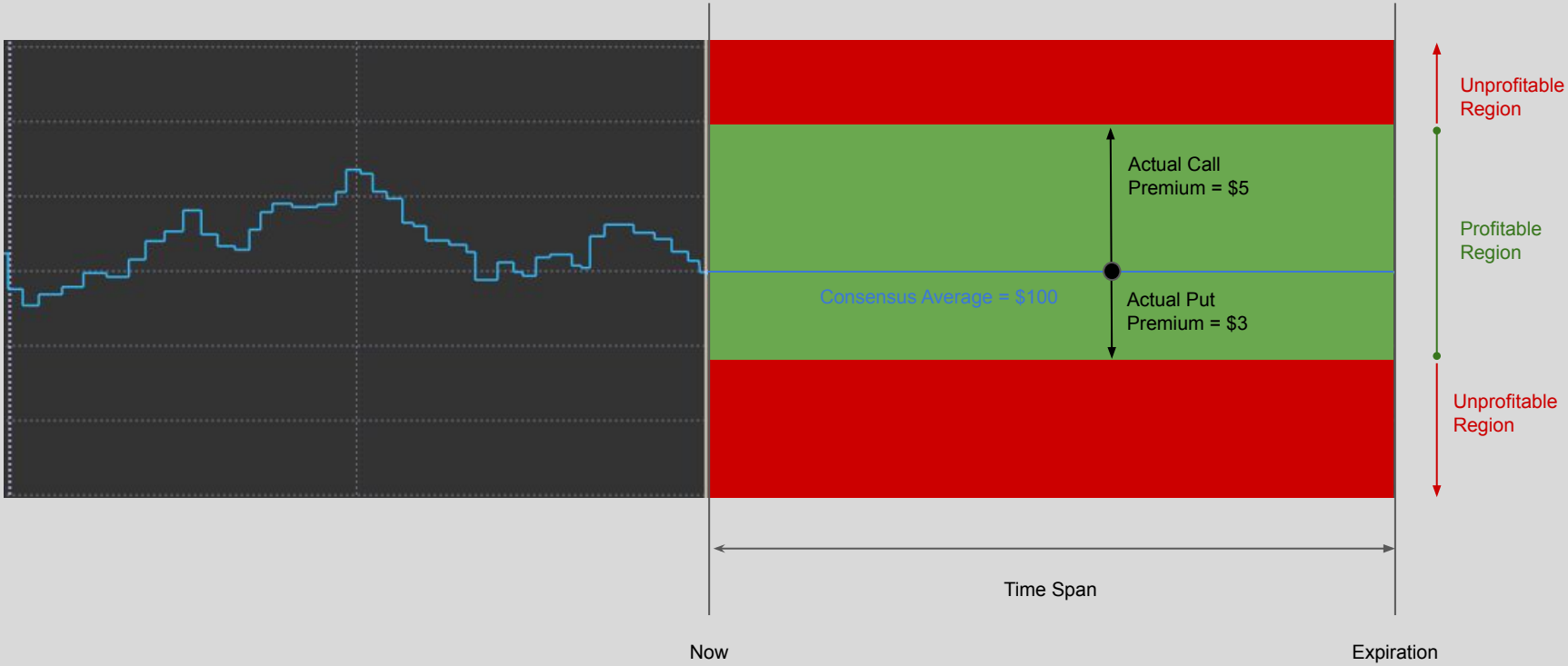
Adjusted Premiums



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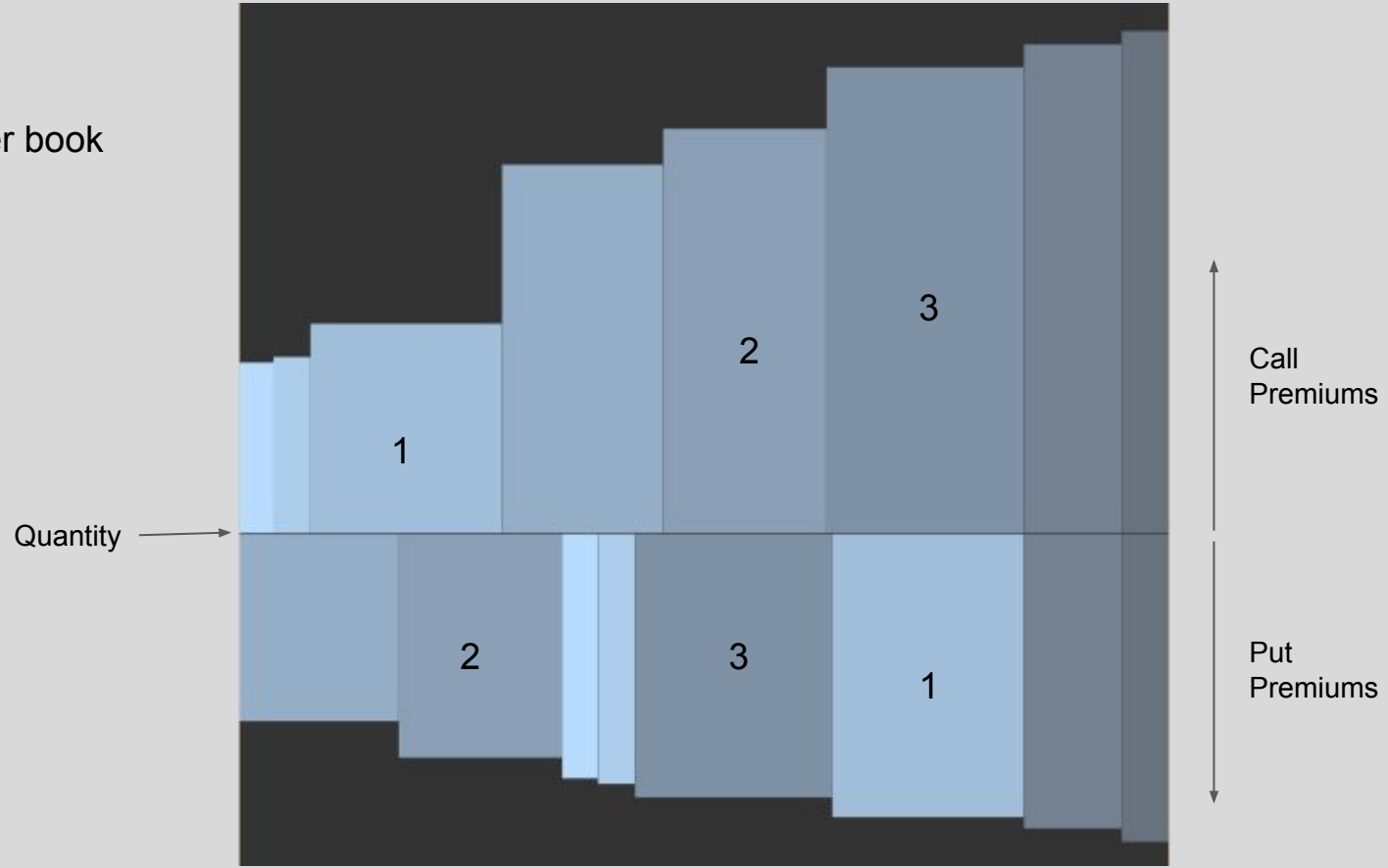
Microtick:
Call / Put order book



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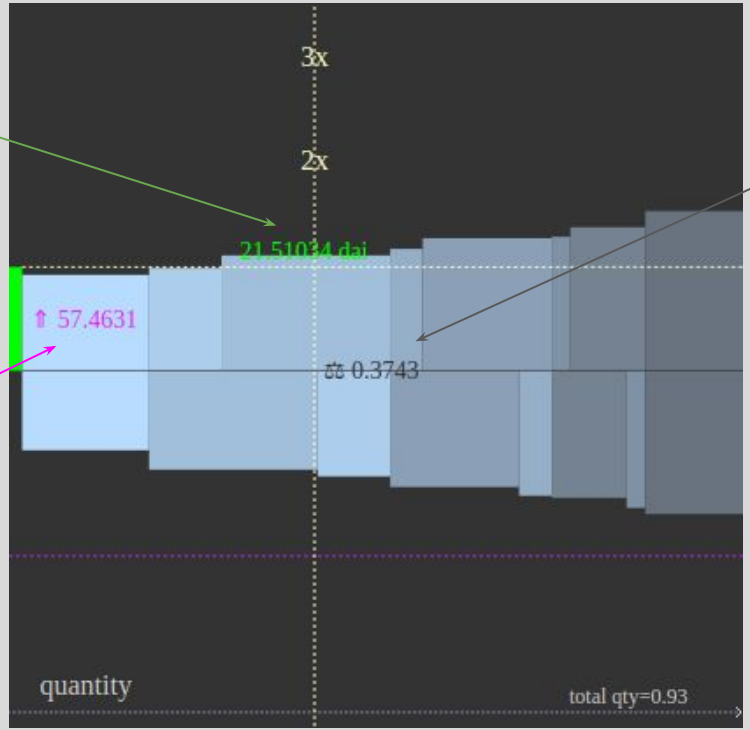
Trading: Select Quantity

Total Cost

Average Premium



Quantity

Moving the mouse left or right selects the quantity.

The height of the green bar shows the average premium based on the quantity being bought.

Total Cost = Average Premium x Quantity

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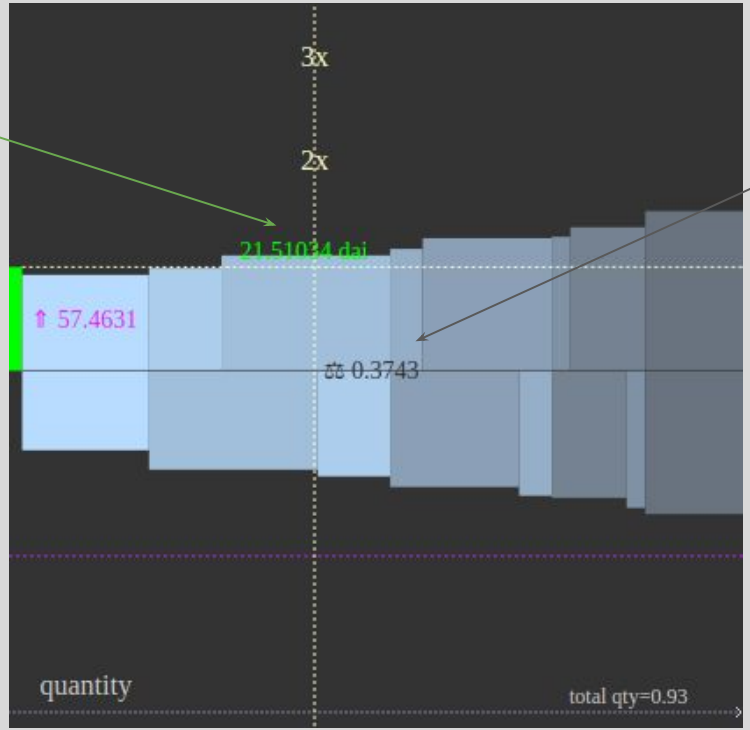
Trade Payout

Total Cost



Quantity

The average premium sets the reference price movement.

For every 1x price movement, the trade pays out the total cost.

If the price moves 3x, this trade would pay out 64.5 DAI.

The trader wants to keep the average premium as low as possible because this translates to more profit.

As quantity increases, quotes become more expensive based on the current order book.

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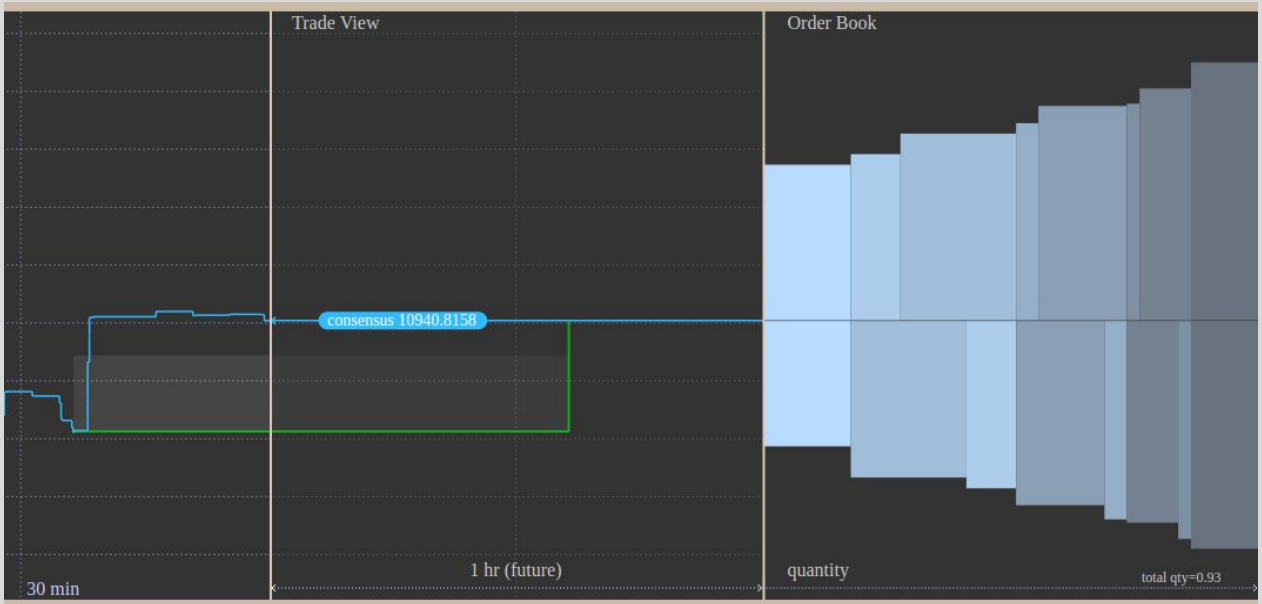
Trade In Progress

Height of the shaded rectangle shows the average premium. This is the amount price needs to move for the trade to be profitable.

Here the price has moved about 1.5 x the average premium.

The profit is therefore 5 DAI (original cost = 10 DAI).



	Remain	Spot	Strike	Qty	Backing	Cost	Value	Profit / Loss
M	00:36:22	@10941.4276	@10902.5258	⚖ 0.4003	106.903448 dai	10.512087 dai	15.570557 dai	5.05847 dai
Total:						**10.512087 dai**	**15.570557 dai**	**5.05847 dai**

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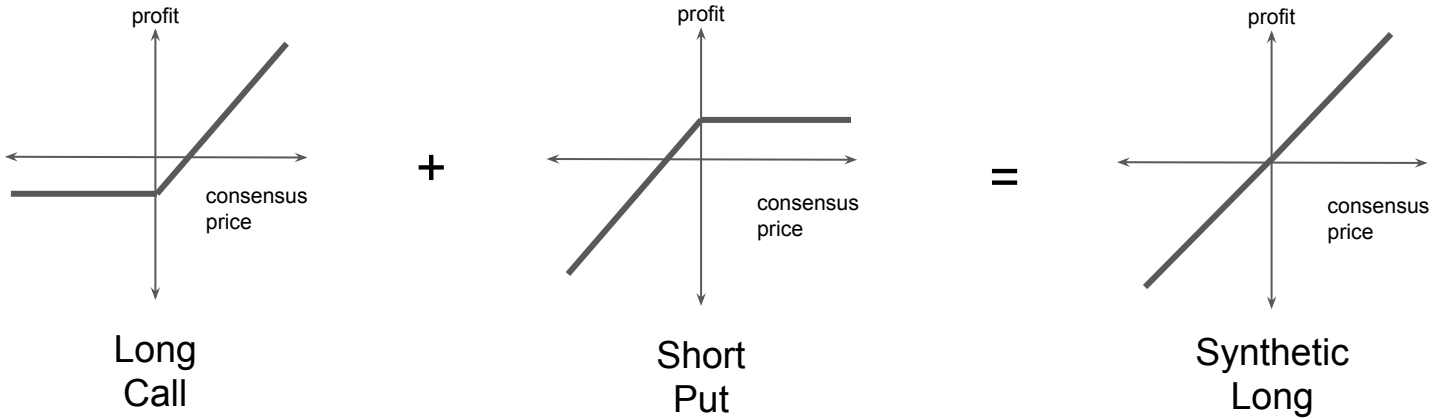
Option-based Synthetic Positions

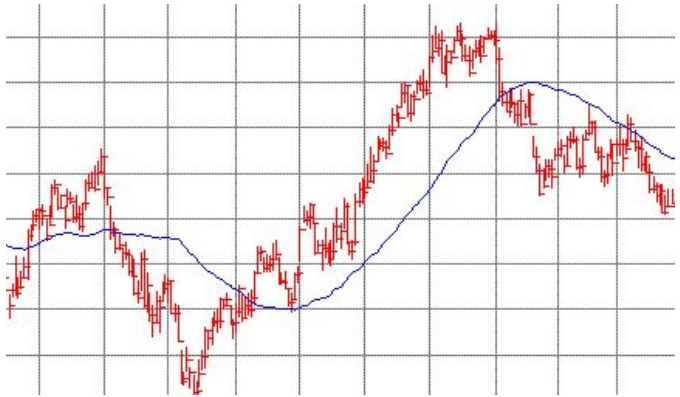
Using synthetic trades, the Microtick consensus can be used to arbitrage price differences against real-world markets, or other tokenized markets.



Long Call + Short Put = Synthetic Long

Use Cases

- Hedging
- Speculation
- Selling premium (on-demand when option bids are enabled - upcoming feature)
- Lagging price - arbitrage (when synthetic positions are enabled)
- Stable price oracle for Dapps



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Feature Comparison

	Works without tokenization	Tradable	Price Oracle	Cross-chain Liquidity	Price “Insurance” **
Order Book		✔	*		
AMM		✔	✔		
Oracle Pool	✔		✔		
Microtick	✔	✔	✔	✔	✔

** Only on-chain order books such as DEX’s*
*** Price insurance used here means a way to hedge short-term price movement with limited downside risk*

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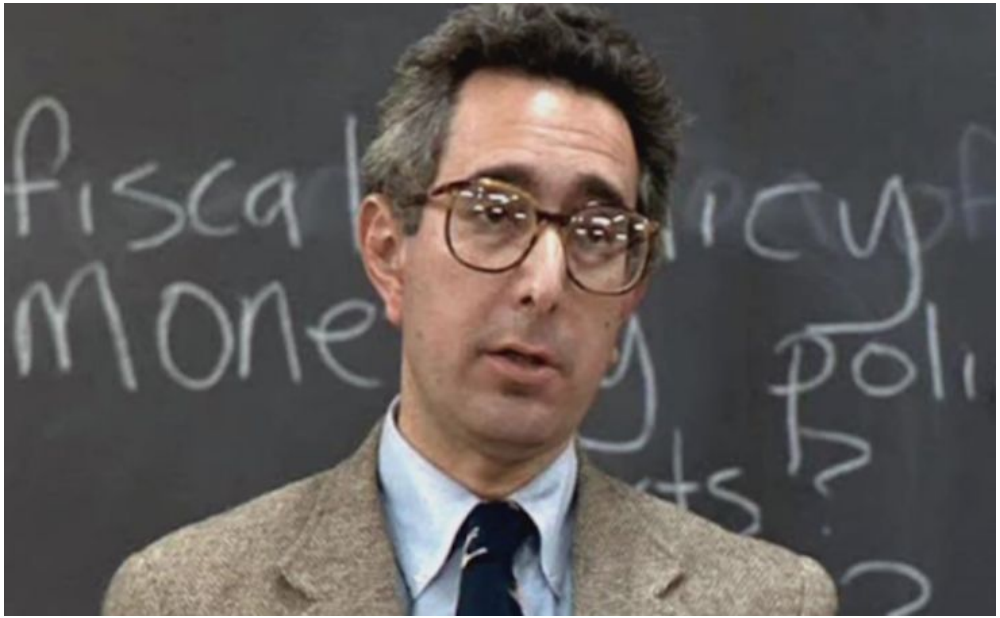
Questions? Anyone?



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