

Project Crowbar

Concept

The broader purpose of this project is to create a framework for solutions relying on the collection and interpretation of statistical data, rendering them particularly vulnerable to issues of ambiguity. In this project, we propose a contest based on a statistical test where data entry and interpretation of the results is facilitated by consensus tools such as blockchain and smart contracts. This means that the formalized outcome of the contest can be supplied via oracle-like plugins to various aggregation tools, such as prediction markets. The unambiguous data interpretation would be ensured by a formalized resolver smart contract, determined and built in consensus and peer-reviewed by a board of academic participants with opposing views. The test then will be performed by incentivized community.

Proposed Test

We propose to test the weak form (WF) of Efficient Market Hypothesis (EMH) which asserts that future prices are random and not influenced by past events.

Advocates of weak form efficiency believe all current information is reflected in stock prices and past information has no bearing on current market prices. Past tests of this theory have shown mixed or ambiguous results, with findings of predictability of historical data deemed unexploitable when transaction/management fees were applied, to reports of inefficiencies in emerging markets. All tests were however conducted on old assets classes. With the invention of cryptocurrencies, relatively high liquidity pools with transaction fees approaching zero became possible, thus making transaction cost argument (one among the most frequent EMH-supporting arguments) for unexploitability of historical data invalid. The now numerous automated trading contests and championships reinforce the idea that the exploitation of market inefficiency.

Mechanics

We propose a test of the WF of MEH using a bet between two groups with opposing views. The first group is a group of skeptics; those betting against an any outcome other than one consistent with randomness. The other is a group of proponents of successful trading, divided into two sub-groups; adepts of manual and automated trading respectively.

The group of skeptics will bet that the statistical data collected during the contest will have a homogeneous distribution across all categories of participants of the opposite camp. This is based on the premise that every trading group has same mean performance regardless of their background and experience, thus proving market efficiency. The other groups will bet on the assumption that their trading strategy improves their chances of success beyond random chance.

All participating accounts can be surveyed to be fit into different categories based on their personal information (such as age, sex, background etc), their trading strategies and preferences. The validity and honesty of the survey can be enforced by processes similar to KYC routines, with the quality of the survey evaluated based on statistical findings from sociological research. The collected data would be *unambiguously* analyzed by an oracle-like smart contract based on rules approved by a review board (made up of academics with different views on the subject).

This trading contest will administered via a segregated human/software interface to a smart contract with 3 parts: I) data collection, II) trading engine integration and III) outcomes resolution. The human interface would consist of a wallet app with integrated simplified terminal for buy/sell operations. The automated part would consist of an API modeled as a simplified version of some major exchange, like Bitfinex, with the differentiation between manual and automated traders determined by sort of a captcha on the manual (human) side and by simple arithmetic operation on large numbers with sub-second timeout on assisted trading (software) side.

The smart contract with trading engine integration could interact with a range of decentralized trading exchanges/smart contracts (of which the number is growing) such as Bancor or Kyber. Liquidity pools are great tools to facilitate the contest as they offer a seamless integration of the new ERC20 tokens. The initial liquidity pool could be created there from ICO funds lock or other income streams discussed further in details in the **3.2 Incentives** section of whitepaper.

The feeding of contest outcomes to prediction markets such Gnosis should in principle generate additional interest in the contest, leading to increased participation and broader statistics, deepening the liquidity pool for contest token trading.

Resolution rules proposal

The outcomes of contest (win/lose with respect to the two participant categories of skeptics and traders) will be decided according to data analysis by the smart contract, based on the rules decided by the board and approved by the community. The funds

accumulated from sources as proposed in the Incentives section will be distributed by the smart contract to the token holder addresses proportionally to the amounts held at the time of the result. Additionally, prediction markets would be resolved and the funds would be distributed as well.

Incentives

Participants of all groups would be incentivized. Skeptics will be the primary Initial Coin Offering (ICO) target group. The Crowbar ERC20 token (CWBR) will be generated based on the amount of funds accumulated during ICO and released immediately at the initiation of the contest. It will constitute the prize for the traders group. However, in order to obtain the funds secured during the ICO, traders will have to purchase tokens from the holders (skeptics), thus driving the price up. Taking as an example a scenario in which only a single token is purchased by a trader, such an event would be deemed (by the smart contract) as anomalous, and thus the skeptics having lost the bet. The smart contract then distributes the funds to the winning trading group, rendering all skeptic tokens useless. This provides incentive for traders to join the contest as the bet is decided by purchasing skeptic tokens. Their interest in the tokens will drive the price up further, incentivizing more holders to sell. Skeptics are also incentivized to not hold the tokens indefinitely as the maximum return would be less or equal than the amount of funds invested at the ICO. With these incentives, it is assumed that the active trading will start quite quickly and the price will reach its equilibrium soon after the contest has started.

Furthermore, the CWBR token does not follow a security definition and thus fits well to be placed on large exchanges driving the speculative interest and price up and therefore producing more statistical data.

Attempts to manipulate the token price by carrying out large transactions on external exchanges outside of the smart contract would be thwarted by the fact that one would have to purchase tokens from participants, thus sharing the benefit with the group, making the required input exceed the benefit. Attempts to manipulate the statistics via the smart contract will be obvious to the community, with immediate action to be taken, ranging from requisition of funds, to a contest restart with full penalty to a cheater. Data collection would be incentivized for traders by requirement to interact strictly via smart contract in order to have obtained tokens be converted to locked funds after contest resolution. Possible attack vectors will be discussed in more details in a section **Attack vectors 3.3** of whitepaper.