

Project Crowbar

1. Introduction

In economics and finance, agents are called to make daily decisions about what goods and services to consume, what assets or portfolio of assets to hold under different types of constraints, mainly wealth constraint. For instance, in the modern portfolio theory, if investors are faced with portfolios with similar returns, they would choose the one that minimizes the risk. This choice under constraint allows the theorist to derive predictions about the behavior of the agent, which can then be tested against real world data using statistical techniques.

The importance of statistics in economics and finance cannot be emphasized enough. There are countless cases in economics and finance where statistics play a key role. One of the key tool of statistics applied in finance is the probability theory. Most the variables used in economics and finance are random, or not not known a priori, such as asset prices, cash-flows, trading volume, and so on. Random variables are characterized by probability distribution that allows the reconstruct figures such as the mean and the standard deviation.

Though many investors use their subjective probability when buying and selling assets, Fama's efficient market hypothesis maintains that an asset price contains all the necessary information investors need to know and this is done through what is called price discovery process to unveil the hidden probabilities that govern price movements. Other applications of statistics include the stochastic processes that model the price as a geometric Brownian motion and the Black-Scholes formula for option pricing.

2. Blockchain and Statistical Analysis

One of the most recent application of statistics is in the blockchain data and cryptocurrency analysis. With invention of cryptocurrencies, relatively high liquidity pools with zero transaction fees became possible. For example Bitfinex exchange offers maker zero fee tier, depending on a monthly volume. With such option, it is possible to execute pair of purchase/sell orders of approximately 10 BTC depth that will result in a same balance as before transaction. Automated

exchange protocols like Bancor that itself allows zero fee trade(ZFT) (but of limited use for high frequency trading (HFT) due to high transaction cost of Ethereum blockchain), if implemented on upcoming zero fee transaction blockchain like EOS, could trivialize HFT with ZFT. Thus making transaction cost argument (one among the most frequent EMH-supporting arguments for unexploitability of historical data invalid.

3. Proposed test

The proposed test will predict the market entry behavior of investors analyzing a betting game between two types of investors: skeptics group (skeptical about the success of cryptocurrency in eliminating transaction costs) and proponents group. The second group would be in turn subdivided into two subgroups: adepts of manual trading and adepts of automated trading. There will be trading contest running with segregated human/software interface to a smart contract with data collection, trading engine integration, and outcomes resolution. Human interface would consist of simple UI with basic buttons for purchase/sell. Automated part would consist of API modeled as simplified version of some major exchange like Bitfinex. The smart contracts will also be run on zero fee crypto platforms, such as Bancor, Bitmex, Cobinhood, Quinone, and GDAX. The segregation would be enforced by captcha on manual (human) side and by simple arithmetic operation on big numbers with sub second timeout on assisted trading (software) side.

Skeptics will be primary ICO target group. Crowbar ERC20 token (CWBR) will be generated based on the amount of funds accumulated during ICO and released immediately to participants. It will form the prize for traders group. But in order to obtain funds locked during ICO - traders will have to purchase the token from holders (skeptics) thus driving the price up. For example, if there is only one trader who purchased one token, this will generate data abnormality and oracle will decide that skeptics lost the bet, rendering all their tokens useless and distributing funds to the winning trading group. This, in turn, will incentivize more and more traders to join as the bet is decided, increasing the demand for tokens and driving the price further up. As the price increases, the supply of tokens will increase, leading even the skeptics to sell their tokens to harvest high return that would not last long. The CWBR token will be placed on big exchanges

driving the speculative interest and price up and therefore producing more statistical data, implying the active trading will start quickly and the price will reach its equilibrium soon after the contest start.

The contest or game is immune to manipulation from internal and external attacks. Hence if one tries to manipulate the price by doing large transactions on external exchanges outside of data collecting smart contract, this will have to be done by purchasing tokens from participants, thus sharing the supposed benefit with one's group, making required input much bigger than supposed benefit. If one tries to manipulate statistics via smart contract, it will be obvious to community, triggering immediate action, ranging from requisition of funds, to contest restart with full penalty to cheaters who will get useless tokens and undecided oracle in return for substantial funds. Data collection would be incentivized for traders by requirement to interact strictly via smart contract in order to have the obtained tokens converted to locked funds after contest resolution.

The participating accounts will be surveyed to fall into different categories based on age, gender, education, work background, trading strategies, and preferences. The validity of the survey will be enforced by a process similar to KYC routines. In addition, quality of the survey can be estimated by empirical data from similar sociological findings. The collected data will be analyzed by oracle-like smart contract based on rules approved by the review board, consisting of academia with different views on the subject. The outcomes will be fed to prediction markets like Gnosis, leading to wider participation and deepening liquidity pool for contest token trading. To put the two categories of traders in real world context, random events could be simulated and traders reaction is superposed to price charts to analyze how traders internalize the two sets of information in their trading strategies.

We expect skeptics to bet that statistical data, collected during the contest, will have homogeneous distribution across all categories of participants of opposite camp. Basically they will bet on premise that every trading group has same (poor) mean performance just like anybody have same chances of guessing the dice being thrown, regardless of their background and experience. Thus ultimately proving market efficiency. Other groups will bet on assumption that their trading strategy and tools are winning.