Fair Price Discovery with Decentrlized Exchange

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Abstract

Ever since bitcoin solved peer to peer digital cash was possible, poeple have been trying to apply similar technoques to solve other hard problems. One such problem, peer to peer exchange, is one of the most difficult of these problems.

An exchange is a financial market, where trading of securities occur. The pupose of an exchange is two fold. 1) for price discovery, 2) for counter party settlement..

Centralized Exchanges (CEX), have been well researched and developed in traditional finaince for well over a century. [exchage cite] They evoled from trading under a tree, the Chicago trading pits, to electroic exchanges with continuous limit order books. Modern exchanges provide 24/7 trading, and offer co-location for the most prolfic traders, High Freaquency Trading (HFT) bots.

Decentralized exchange (DEX), aims to bring tradition centralized exchanges into a peer to peer blockchain protocol. Due to early bitcoin CEX hacks, most DEXs have been focused on the settlement utility of exchange. As price discovery is an emergent property of the real-time trading and difficult to research.

We present a DEX with focus on providing price discovery. Our solution, Fair Price Disovery (FPD)

1 Introduction

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The word "central" is part of the common definitio of an exchange. "A central place where buying and sellers come to finf price and execute trades.

The pupose of exchage is two fold. 1 - for price disoverry [cite] 2 - for counter party settlement

Due to early bitcoin exchange hacks, Decentrlized Exchange or (DEX), has been mostly focused on the non-custodial side for the settlement utility.

We focusing on the real public service of an Exchange, the price disovery utility. We design price discovery within a DEX, with a pupose of "Fair Price Discovery".

With, Fair Price Disovery (FPD), as our goal. We focus on a mechanism designed exchange, for reaching equalibriam which produces price.

Taking inspiratiuon from Rational Protocol Design analysis of Bitcoin, and looking back to the origional Bitcoin white-paper.

examaning the state of teh art in price-disovery, High Freaquernncy Market Making, and electronic exchange matching engines

Since Bitcoin showed us how peer to peer electroic cash was possible, we have researching if and how peer-to-peer exchange was possible.

Exchanges are a critial part of the finanical markets.

Ecological balalnce otherwise the order-driven market can colapse Transparency is an importtant feature

first to win is most important

Price Discovery

Price disovery as a key goal in the design of the market structure. In fact, the goal of the architecure of an exchange meachanism, is to attract as much liquidity needed to for price discovery. [3]

Price discovery is described in microstruture research as a search for an equalibrian price, from new external information. This new information is reflected in the traders orders, and is ultimatly coverted into a market price. [5]

> price discovery is dynamic in nature, and an efficient price discovery process is characterized by the fast adjustment of market prices from the old equilibrium to the new equilibrium with the arrival of new information [6]

From a definitional perspective, any trading facility that has as its primary function the delivery of good price discovery can, de facto at least, be considered an exchange. Unfortunately, however, the price discovery function of an exchange typically receives insufficient attention in market structure discussions. This is largely attributable to the non-observability of equilibrium prices and, therefore, to the difficulty of quantifying the deviations of transaction prices from their equilibrium values [3]

Limit order books and price discovery are tightly related. [5] [4]

Continuous limit order books (CLOB) are the market micro struture that leads to price discovery [1]. There are two order types. Limit orders, where you provide your own price, with the risk of waiting to be matched. And market-orders, where you get filled immediatly in return for a possible worse price.

Directional liquiidy traders

Perfect Alpha and the High Freaquency Trading (HFT) arms race

We define *Perfect Alpha* as recurring risk-less real-time arbitrage with positive EV. Beleive it or not, *Perfect Alpha* is a product of centralized exchanges and continous limit-order books.

1. HFT - "Buy 1 @ 100"

2. Bob - "Buy 1 @ 100"

qty	bid	ask	qty
2	100		

2 Results

[1]

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[1]Other types of markets such as call auctions, and dealer markets, dont provide the robustness of limit orders for price discovery. [2]

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