CardDex v1

A multi-pool DEX on the Cardano Network

Liquidity Pool Launch Date: Early September

Introducing CardDex

This technical paper explains the design and some concepts of CardDex – a DEX (decentralized exchange) and AMM (automated market-maker) on Cardano. We're going to talk about multi-function pools, automated babel fees, and a functional pricing structure to accommodate arbitrage traders as well as liquidity providers in a simple, coherent way. This is an "under the hood" overview that is not by any means necessary to dive into if one wants to reap the profits of the CardDex network. The relevant information for investors will be provided in a quick summary at the conclusion of the paper.

AMM Pricing

Decentralized exchanges traditionally follow two main protocols in order to provide a market price: an order book or an **AMM**. An order book model works best on centralized exchanges such as Coinbase and Binance. These exchanges typically have a small set of tokens listed with high market caps that, by nature, have high volume and little spread. On these exchanges millions of dollars are needed to move the needle in any one direction.

The problem arises when a user wants to trade a lower liquidity pair. Coins listed on centralized exchanges with low MCs have one very important problem that needs to be solved. Put simply: investors do not see a reason to provide liquidity. As a result of the low level of investment, even a few thousand dollars can send prices soaring, or, alternatively, plummeting. For that reason, the second option, **AMMs,** work well on DEXs for the simple reason that the vast majority of tokens listed on the exchange have very low liquidity.

AMMs solve this problem of low liquidity by using a composite constant function which can be simplified as such:

$x * y = k$^**2**

Babel Fees and Automation

IOHK has come out with a concept which would allow users to pay TX fees using the native token. Native assets on Cardano work as such: tokens are created and treated natively in the ledger with ADA. Instead of using the traditional UTXO (unspent transaction output) model presented by, (among many others), Bitcoin, Cardano's ledger has adopted the EUTXO (extended unspent transaction output) model which provides the foundations for Plutus. Utilizing this method we are able to have multiple different tokens (including NFTs) in a single transaction.

An issue with utilizing this protocol is that TX fees would be paid to SPOs (stake pool operators) and if a token is underutilized it will contribute to slow network speeds. A simple fix would be to therefore implement a system in which these tokens in question would quickly swap to ADA before completing the original transaction. This would give SPOs a purpose in helping process these described transactions.

Multi-Asset Pools

An issue with LPs as they exist currently is that if ratios have a habit of changing dynamically regularly, liquidity providers have incentive to provide liquidity to low volume assets for higher rewards, as they get a share directly proportional to the volume they provide to the pool. Unfortunately this is not enough of a reward in most cases as impermanent loss is rampant in lower volume assets. Put simply, it is not worth the risk/reward for liquidity providers. We have a simple, yet elegant solution to this problem: CardDex offers one-sided liquidity pools.

A user may provide liquidity to a CardDex pool with a single token and maintain 100% exposure to the token. In contrast, other AMMs require LPs to take on unnecessary exposure to multiple assets. With single-sided liquidity, LPs can stay invested in a single asset and collect returns, while earning swap fees and mining rewards.

Swap fees auto-compound in the pool and are paid in the tokens staked, while rewards will have the option to auto-compound interest over 250 times a day, or be re-staked to the protocol in a single-sided fashion to compound yield.

Highest Cardano Staking Rewards

Most Stake Pool Operators offer ADA staking rewards between 3-5%. Some other Cardano based Defi platforms offer higher returns for staking ADA, which they pay out in their native token at rates between 50-200% APY. ADA stakers on the CardDex platform will earn over 500% returns in ACE token on their staked ADA, two orders of magnitude higher than what they would earn in staking rewards by using our platform instead of any of the thousands of ADA stake pools being currently used. We plan to follow and implement the PancakeSwap model, as we will offer the highest staking rewards on Cardano, just like PancakeSwap did with the Binance Smart Chain. Like PancakeSwap, our staking/farming rewards rates will adjust based on the amount of liquidity provided.

Anonymity Policy

Unlike many centralized exchanges, with a DEX, anybody can trade from the hundreds of digital assets with millions in liquidity.

Fees and Pricing Models

Every modern AMM uses a swap fee to earn profits for liquidity contributors. Swap fees vary from exchange to exchange, Pancakeswap, for example, charges .2% per swap, Uniswap charges .3%, and Balancer's fee structure can be set depending on the pool. Liquidity providers, as stated earlier, are compensated by the fee structure. During periods of high volatility, liquidity providers lose significant profit by arbitrage traders and scalping algorithms which pounce on these opportunities when they happen.

AMMs, however, are able to maximize profit in two different ways: catering towards liquidity providers by increasing trading fees or doing the opposite and catering towards arbitrage traders. One example of the former is Mooniswap, which charges a 0.3% fee.

However we cannot forget the high TX fees of AMMs like Mooniswap which are based on the Ethereum network. But there is a middle ground, however, as arbitrage traders, while they profit from mispriced pools, still need liquidity to be filled. Without users making trades,

liquidity providers are not able to make a profit. High fees mean that there will not be trading on the platform, low fees and there will not be any liquidity providers.

Fee Solution

To solve this we will go with a fee structure of 0.2%. This is low enough for both traders and liquidity providers to use the same platform reliably. We should also 4 take into account TX fees, which are significantly lower on Cardano than, as an example, Ethereum, which is notorious at the moment for the high fee structure. Of this 0.2%, we will give back 75% to the LP and the rest will go to the CardDex Bank which will be used to fund marketing campaigns, development, and partnerships.

Price Oracles

Price oracles act as on-chain APIs, meaning while a traditional API is variable, hackable, and has the potential to become outdated, oracles can remain more consistent and more secure as a pricing mechanism. In more simple terms, when you are looking at stock quotes online, checking the price of Gold, or bidding on eBay, you are using your phone as a price oracle in all these situations. They use information provided and, in a sense, power the smart contract to trigger specific predefined actions. They are not always completely necessary, however, they are helpful. An example of a DEX without an external price oracle would be Balancer, where the price of an asset only changes when a person makes a trade on their platform.

Fundraising

We will begin our fundraising efforts prior to the deployment of the Goguen Mainnet for one simple reason: we want to ensure the development of the most robust and secure Cardano based DeFi platform. While our project is being coded in Haskell, and tested on the Alonzo Testnet, our fundraising will begin with a liquidity pool on Uniswap in early September 2021. We want those who believe in our project to be rewarded for their support.

Future Outlook

The Cardano blockchain offers dramatic and exciting improvements in terms of throughput, fees, and energy efficiency. We expect a huge surge in economic activity and utility in the coming months and years. As more and more native tokens are created, there will be an increasing need for markets to trade and acquire these tokens. Naturally, we are finalizing the details for further development of our project, which will be discussed in future whitepapers.

Roadmap

- Create a functional demo & Confirm CardDex Functionality on Alonzo Testnet
- Launch/ICO (Initial Card Offering)
- Launch on Cardano Guguen Mainnet with the Plutus Smart Contracts Deployment
- Solidify niche in ADA ecosystem

Protocol Research

- The role of the ACE token
- Hayek, the CardDex governance model is defined by our community, showing true democracy with its defining principle of decentralization