Crypto Index White Paper

Decentralized Indexes For Cryptocurrency

Version 1.1

index labs

Abstract

Traditional financial markets have long enjoyed the use of indexes. It is time to bring this tool to the cryptocurrency space, but in a manner that allows a community to create and manage its own decentralized indexes. For indexes to be properly integrated into the cryptocurrency market, two kinds of indexes are necessary, both of which are adaptive in order to include new projects of the ever-evolving cryptocurrency world. The first is a market index designed to measure the growth of a market as a whole. The second is a sector index intended for the active management of a specific allotment of related cryptocurrencies. Decentralized, active management of sector indexes will occur by means of a platform-specific governance token. Cryptocurrency indexes will be tokenized to allow for individual token ownership and trading of the indexes.

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Introduction

The performance of traditional markets around the world is measured by indexes. Indexes such as the Dow Jones Industrial Average, S&P 500, and the NASDAQ Composite have become the common measure of stock exchanges around the world.

Among the benefits of indexes are the abilities to have a simplified overview of the market or to isolate a particular sector for deeper inspection. An index pulls together a group of subsets to be presented as a singular unit. Beyond being used for measuring an aspect of a market, indexes often become closely actualized in the form of assets for the purpose of trading and investing. The trading of an index allows investors to gain a broad exposure to the market or to hone in on a favored sector of the market. Indexes work to reduce risk by spreading the risk over the factors of the index. Indexes have allowed millions of people to enjoy long-term portfolio growth by riding the overall uptrend of traditional markets. Between the rapid expansion of the cryptocurrency market and the diverse uses of cryptocurrency technology across many industries, it is time to introduce index-based assets to the world of cryptocurrency for a better understanding of the performance of the overall market and specific market sectors utilizing cryptocurrency to revolutionize the world.

The cryptocurrency market has already seen immense growth in its young life. However, cryptocurrency, like any new and innovative technology, has its inherent obstacles to mainstream adoption. One of these obstacles is how unique cryptocurrency is from anything that traditional finance has to offer. The average person operating in the

world of traditional finance generally has little inherent knowledge of the complexities exclusive to cryptocurrency.

The goal of mainstream adoption will be achieved, in part, by bridging this gap between cryptocurrency and traditional finance. We have already witnessed efforts aimed at bridging this gap such as user-friendly methods of buying and storing cryptocurrency that eliminate the necessity for a deeper understanding of the technology inherent and unique to cryptocurrency.

Following the same idea of making the world of cryptocurrency more welcoming to newcomers, cryptocurrency will find greater long-term adoption by making the market appear more familiar and easy to understand. The introduction of index-based assets will contribute to this goal.

The power of blockchain technology can be utilized to bring index-based assets to the cryptocurrency market in a decentralized manner. The Decentralized Finance movement has already made great strides in bringing authoritative power back to the people, away from central authorities. We hope to continue this trend by introducing a way to bring indexes to the cryptocurrency market where the people can have full control over these indexes.

Crypto Indexes

In order to best integrate indexes into the cryptocurrency market, it is crucial to have the right kind of index for the desired subset of cryptocurrencies. Building from the basics of the Fixed Index, a different kind of index referred to as an Adaptive Index can

be utilized. There are two kinds of Adaptive Indexes, Adaptive Market and Adaptive Sector, which address two types of use cases for indexes in the cryptocurrency market.

Fixed Index

In order to begin exploring how indexes may be applied to the world of cryptocurrency, we will explore a basic form of an index. The Fixed Index is the type of index where its composition will not change once it is created. The Fixed Index works to track the performance of a fixed group of assets. Because the makeup of the index never changes, a change in the value of the index comes from a change in the market capitalization value of the underlying assets.

Exhibit A

Asset Name	Market Cap
Asset A	100
Asset B	200
Asset C	300
Total	600

The above chart illustrates a sample market. The Fixed Index can be used to track the performance of the market containing Asset A, Asset B, and Asset C. One unit of an index-based asset derived from the Fixed Index for these three assets can be set at a value of 1/100 of the total market cap, making the value of one unit of the index equal to 6. At the current market cap values, Asset A makes up 1/6 of the value of the index. Asset B makes up 1/3 of the value of the index. Asset C makes up 1/2 of the

value of the index. The following changes in the value of the assets will illustrate how the value of the index is impacted.

Exhibit B

Asset Name	Market Cap
Asset A	200
Asset B	350
Asset C	250
Total	800

The changes to the individual market capitalizations of the underlying assets caused the total market cap to increase from 600 to 800. Thus, the value of one unit of the index increased from 6 to 8. While a Fixed Index is a good example of how an index works and has found great success in traditional finance, the world of cryptocurrency needs a different kind of index to keep up with its ever-changing nature.

Adaptive Crypto Indexes

The main shortcoming of a Fixed Index when attempting to apply it to the world of cryptocurrency is its inability to factor in new cryptocurrencies. With the ever-evolving nature of the cryptocurrency space, an index that does not factor in new cryptocurrencies has little place in the market. In order to solve this shortcoming, an index intended for continual addition of assets is necessary. This type of index is an Adaptive Index. Contrary to the immutable nature of a Fixed Index, an Adaptive Index allows for the continual introduction of new cryptocurrencies. In order to best introduce

indexes into the world of cryptocurrency, we present two kinds of Adaptive Indexes: Adaptive Market Indexes and Adaptive Sector Indexes. While the following examples are simplified for the purpose of presentation, the principles exhibited can be applied to the cryptocurrency market on a larger scale to create indexes for the market or desired sector.

Adaptive Market Index

The Adaptive Market Index serves as the foundational index for the cryptocurrency market. The Adaptive Market Index is ideal for an index that is created to cover a large, overarching market where the introduction of new assets to the market is a common occurrence. For example, if the Adaptive Market Index were to be applied to an overall stock market, the index would factor in currently existing stocks and automatically include new stocks in the index once they are introduced to the market. This results in an index that tracks the growth and performance of the market as a whole, including the future projects of the market.

Exhibit C

Cryptocurrency	Market Cap
Coin A	200
Token B	350
Coin C	250
Total	800

Exhibit C presents a base cryptocurrency market that an Adaptive Market Index is created for. So far, it functions the same as a Fixed Index. An index derived from the total market capitalization of this market will only be impacted by the performance of the assets in the index. Additionally, the index value will experience percent changes that are identical to that of the total market capitalization. We can now investigate what separates the Adaptive Market Index from a Fixed Index: the addition of new assets.

Exhibit D

Cryptocurrency	Market Cap
Coin A	200
Token B	350
Coin C	250
Token D	80
Total	880

Once the addition of Token D occurs, the function of the index returns to that of the Fixed Index, until another asset is to be added. The value of the index, being tied to the market capitalization of the index, experiences the same 10% growth that the market experiences. Additionally, any further changes in the total value of the underlying assets of the index, either positive or negative, will have the same percentage impact on the value of the index. For example, if the market capitalization of Coin C, under the market state presented in Exhibit D, decreases by 88, then the index will experience the same 10% reduction that the total market capitalization of the underlying assets experiences.

Adaptive Sector Index

While the Adaptive Market Index is useful for passively tracking the performance of a large market, it does not allow for the active management of a specific allotment of assets or a specific sector of the market. A new kind of index is necessary to fill the need for decision-based management of the index. This kind of index is an Adaptive Sector Index.

An Adaptive Sector Index for the cryptocurrency market has two major stages: initial creation and regular management. The initial creation stage decides which cryptocurrencies are to be included in the sector index. The management stage is where new cryptocurrencies are added and where existing cryptocurrencies are removed from the sector index. Whereas the index unit value previously mirrored the total market cap of the indexed assets, the ability to change the underlying assets of the Adaptive Sector Index no longer makes this true. The Indexed Market Cap is a new measurement of the index that maintains a stable value during changes to the composition of the index. The index unit value is based off of the Indexed Market Cap rather than the Total Market Cap.

The creating stage of the Adaptive Sector Index is similar to the previously discussed indexes. Exhibit E represents a sample Adaptive Sector Index.

Exhibit E

Cryptocurrency	Market Cap
Coin A	500
Token B	650
Coin C	850
Total	2000
Indexed Cap	2000

At the creation of an Adaptive Sector Index, the Indexed Market Cap is equal to the Total Market Cap of the underlying assets. These two will remain equal until a change is made to the makeup of the index. One unit of the index can be placed, for the purpose of presentation, at a value of 1/100 of the Indexed Market Cap, giving a single unit of the index a value of 20. Similar to the previous types of indexes discussed, the index unit changes in value according to the change in value of the Indexed Market Cap.

The workings of the Adaptive Sector Index diverges from that of the previously discussed indexes when moving onto the management stage. The Adaptive Sector Index has the ability to change which assets make up the index. One of these potential changes is the addition of a new cryptocurrency to the index. This process re-weights the contents of the index by means of a divisor calculated from the new and previous market cap of the indexed assets. This process adds in the new cryptocurrency without changing the index unit value, which is derived from the maintained total market cap of all underlying cryptocurrencies known as the Indexed Market Cap. When a change to the makeup of the index is set to occur, the Indexed Market Cap retains its value from

immediately before the change, essentially becoming frozen during the change to the index. Once a change is made to the index that creates a difference in value between the market cap of the underlying assets and the Indexed Market Cap, the value of the index unit solely relies on the Indexed Market Cap. This is shown in action below where Token D is being added to the Adaptive Sector Index.

Exhibit F

Cryptocurrency	Market Cap
Coin A	500
Token B	650
Coin C	850
Token D	100
Total	2100
Indexed Cap	2000
Market-Index Quotient	2100/2000 = 1.05

The market cap of the index before the addition of a new asset was 2000, with an index unit price of 20. The addition of Token D increases the total market value of the underlying cryptocurrencies to 2100. The quotient between the total market value of the underlying assets and Indexed Market Cap becomes a divisor, in this example equal to 1.05, that is applied to all of the underlying assets in order to maintain the Indexed Market Cap of 2000, which also keeps the index unit price at 20. Once the addition of the first cryptocurrency is complete, the value of the Indexed Market Cap until the next change to the underlying cryptocurrencies can be calculated by the summation of the

Indexed Market Cap value at the time of the most recent underlying asset alteration and the change in the total market value of all underlying assets since the alteration.

While the addition of the new asset to the Adaptive Sector Index does not change the value of the index unit, a subsequent change in value of the added asset will have an impact on the value of the index unit. Additionally, a change to the makeup of the index will change the relative impact of the underlying assets on the value of the index unit. This is demonstrated below.

Exhibit G

Cryptocurrency	Market Cap
Coin A	500
Token B	650
Coin C	850
Token D	200
Total	2200
Indexed Cap	2100
Market-Index Quotient	2200/2100 = 1.0476

The market cap of Token D increased to 200, which increased the Total Market Cap of the underlying assets to 2200. The Indexed Market Cap is equal to the summation of the Indexed Market Cap at the time of the most recent change to the makeup of the index (2000) and the change in the Total Market Cap of the underlying assets since the most recent change to the index makeup (2200-2100). Thus, the Indexed Market Cap increased from 2000 to 2100 and the index unit value increased

from 20 to 21 since the addition of Token D. We observe that the Market-Index Quotient decreases as the Total Market Cap of the underlying assets and Indexed Market Cap increase by the same amount.

We can now observe the impact of the addition of a new cryptocurrency to the index when the Indexed Market Cap is different from the Total Market Cap.

Exhibit H

Cryptocurrency	Market Cap
Coin A	500
Token B	650
Coin C	850
Token D	200
Coin E	300
Total	2500
Indexed Cap	2100
Market-Index Quotient	2500/2100 = 1.1905

The addition of Coin E increased the Total Market Cap of the underlying assets to 2500. However, just as it previously occurred in Exhibit F, the Indexed Market Cap retains its value from before the addition of the new asset. The retained value of the Indexed Market Cap causes no change in the index unit value of 21 as a result of the addition.

Finally, we can observe an example where an asset of the index, Token D, is removed. Just as it was with the addition of an asset to the index, the Indexed Market Cap is maintained through the change to the index.

Exhibit I

Cryptocurrency	Market Cap
Coin A	500
Token B	650
Coin C	850
Coin E	300
Total	2300
Indexed Cap	2100
Market-Index Quotient	2300/2100 = 1.0952

The Total Market Cap of the underlying cryptocurrencies decreased with the removal of Token D. The Indexed Market Cap retains its value of 2100 and the index unit retains its value of 21. The removal of Token D does not directly impact the value of the index unit, but it changes the relative impact of each cryptocurrency on the value of the index unit as well as removing the impact of Token D on the future value of the index unit.

Changes to the underlying cryptocurrencies of an Adaptive Sector Index carry a significant impact on the future performance of the index. With the help of blockchain and other contemporary technology, the authority over the creation and management of these indexes does not have to lie in the hands of a central authority. It can be

decentralized so that all users can share in the creation and management of their indexes.

Decentralization

Owners of index-based assets are traditionally subjected to the authority of the index creator and thus often have little power in the management and oversight of the index. It is time to utilize blockchain technology to decentralize a major component of financial markets. Blockchain technology enables an index to be easily created, managed, and controlled by all of its holders rather than a single authority. In order to decentralize these indexes, all of the important decisions will be made by a vote of the people.

Governance

Members of the cryptocurrency community will be able to exercise full control over the creation and management of Adaptive Sector Crypto Indexes through the ownership of the platform governance token. The governance token's voting properties will be utilized for all necessary decisions regarding Adaptive Sector Crypto Indexes. Each governance token will have equal voting power that can be exercised by the owner on the decentralized crypto index platform.

Voting

Owners of the governance token will first decide which sector of the market the new sector index will cover. One week after the market sector is chosen, the holders of the governance token will decide upon the initial set of cryptocurrencies for the Adaptive Sector Crypto Index. Future voting regarding the maintenance (adding or removal of cryptocurrencies) of the Adaptive Sector Crypto Index will occur similarly.

Voting will occur biannually, with the possibility of at most one Adaptive Sector Crypto Index being created every six months. The number of votes a holder of the governance token possesses is the amount of governance tokens the person owns at any given time, rounded down to the nearest tenth of a token. For example, a person that owns 11.36 governance tokens will have 11.3 votes as long as they continue to hold that amount of governance tokens. If the amount of governance tokens held by a person changes, the voting power of that person becomes the updated balance of their governance token(s). Voting does not expend governance tokens. At least 1 governance token is necessary to vote in Adaptive Sector Crypto Index decisions.

The vote to decide the market sector and the vote to decide the initial assets of the Adaptive Sector Crypto Index will be treated as separate votes where governance token holders can use all of their voting power for each separate vote. Using the previous example of a person owning 11.36 governance tokens at the time of the first vote to decide the market sector, the person will be able to cast 11.3 votes in favor of their preferred market sector. The voter can split their votes across multiple preferred market sectors if desired. Moving onto the initial asset (coin/token) selection vote that

closely follows the market sector selection, the person will be able to cast their full voting power at the time of the initial asset selection vote. If the person acquired one additional governance token to now have a balance of 12.36 governance tokens, they now will be able to cast 12.3 votes. At this stage, the voter picks their ideal initial asset grouping for the index and applies their 12.3 votes in favor of each chosen asset to represent the index. A coin/token must have a minimum total market cap of $10 million to be available for sector index selection. In order for an Adaptive Sector Crypto Index to be created, the index will need to have at least 5 initial assets or 20% of available assets for selection to initially represent the index, whichever is greater. This minimum asset number is retained for the lifetime of the index. Maintenance voting for existing Adaptive Sector Crypto Indexes will occur similarly. The voter will be able to cast their full voting power in favor of adding an asset or assets to the index and/or in favor of removing an asset or assets from the index. The resulting index must maintain at least the minimum number of assets set when the index was initially created for the change to the index's underlying assets to occur.

In order for a coin/token to be included in the initial set of cryptocurrencies for an Adaptive Sector Crypto Index or for a coin/token to be added to an existing Adaptive Sector Crypto Index, the coin/token will need a majority of the votes cast (>50%). In order for a coin/token to be removed from an Adaptive Sector Crypto Index, a greater than two-thirds majority of votes cast will be required. If a coin/token is removed from an index, the coin/token will not be able to rejoin the index for at least one year.

All tokens held by founders, employees, or our company will never utilize their voting properties, thus keeping the power of voting solely to the public.

Rewarding Democracy

The distribution of Adaptive Sector Crypto Index tokens will be distributed evenly amongst the governance tokens. This provides additional incentive for the holders of the governance token to participate in the crypto index ecosystem and to exercise their voting power to create an asset of their desire.

Once a token holder of the newly created Adaptive Sector Crypto Index, the person is incentivized by the future performance of their token(s) to participate in the voting for adding or releasing cryptocurrencies from the index.

Crypto Index Tokens

Crypto Indexes will be actualized in the market through tokenization. The tokens for Crypto Indexes will be built off of Ethereum as ERC20 tokens. Crypto Indexes tokens will allow for the tracking and trading of the market itself as well as specific sectors of the market.

Creation and Distribution of Tokens

Tokenized indexes will join the world of cryptocurrency through the introduction of a total market index token: Total Market Index (TMX). The Total Market Index will be an Adaptive Market Index corresponding to the total cryptocurrency market capitalization. The value of one TMX token will be placed at one ten-billionth of the total market capitalization with an initial supply of 5 million tokens. Similar to the index-based assets present in traditional financial markets, the TMX token circulating supply will further be

decreased or increased, if necessary, based upon large changes in market demand. This function works to maintain the value of the TMX token as a fraction of the total market capitalization, rather than the result of a large market demand surplus or shortage. However, contrary to the centralized supply control of index-based assets in traditional markets, the control over the supply of cryptocurrency indexes can be decentralized. In order to achieve this goal, a smart contract and other complementary technology can be utilized. Once the cryptocurrency index ecosystem is established, governance token holders will vote on the proposed smart contract and other aiding technology where a majority of votes cast will be required to implement the decentralized supply control mechanism. The decentralized supply control mechanism will work to maintain the approximate token price against large market demand shocks in a decentralized manner so that a central authority does not possess sole authority over the supply.

Governance tokens will be initially distributed to the holders of the Total Market Index token at the time of the governance token launch. Adaptive Sector Index tokens will be distributed to addresses holding at least one governance token at the time of sector token distribution. The governance token will have a fixed supply of 10 million tokens with a market-determined price. All Adaptive Sector Index tokens will have an initial supply of 10 million tokens, simplifying the Adaptive Sector Crypto Index token distribution so that governance token balances above one will be matched with the token of the created sector. The subsequent circulating supply of Adaptive Sector Index tokens will function the same as the Total Market Index token.

The price of an Adaptive Sector Index unit, when applied to the cryptocurrency market in a decentralized manner, cannot simply be taken from the Indexed Market Cap. If this were the case, governance token holders would be swayed in their voting to make the Indexed Market Cap of the Adaptive Sector Index as large as possible. In order to prevent this from occurring, the initial market cap of Adaptive Sector Crypto Index tokens will be derived from the total market cap of their specific market sector, independent of the assets selected to represent the index. A logarithmic equation will be applied to the total market cap of the sector in order to partially reduce the large variance between market sector valuations. The Indexed Market Cap for the selected index will then be scaled to match the determined initial token market cap to ensure that the Indexed Market Cap of the selected assets is the force that impacts the price and market cap of the Adaptive Sector Crypto Index token.

Conclusion

Starting from the release of this whitepaper, we will always value and implement community feedback. For this reason, we ask that if you have any feedback or suggestions for us or the platform, please do not hesitate to reach out. Comments and questions can be placed in one of our many social media platforms available on our official website (indexlabs.finance). Additionally, you can find more information about this project and its release on the website.