

June 2020



## **MVIS® CryptoCompare Digital Assets Indices**



**MV Index Solutions GmbH  
A VanEck Company**

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**MV Index Solutions (MVIS®)** offers a focused selection of pure-play and investable indices designed to underlie high quality financial products. They cover several asset classes including hard assets and international equity markets as well as fixed income markets. Clients include leading financial institutions globally.

MVIS is the index business of VanEck, a US-based investment management firm and provider of the VanEck Vectors ETFs. Approximately USD 15.55 billion\* in assets under management are currently invested in financial products based on MVIS Indices. Many of those products are the largest in their investment category. MVIS also develops and maintains customized indices for third parties that aim to track specific investment themes.

## About CryptoCompare

CryptoCompare offers the most complete pricing and transaction data collected from digital asset exchanges. It provides data to a broad range of digital asset natives, wallets, apps, traders and researchers, as well as helps its community of over 330,000 users track their portfolio, stay up to date and discuss the latest news.

## About VanEck

Founded in 1955 by John C. van Eck, Van Eck Associates Corporation was among the first U.S. asset managers helping investors achieve greater diversification through global investing. Today, the firm continues this tradition by offering forward looking, intelligently designed investment solutions in hard assets, emerging markets, precious metals including gold, asset allocation and other specialized, domestic and international asset classes.

VanEck Funds is the actively managed business of VanEck. Our funds are designed for investors seeking innovative choices for portfolio diversification; they are often categorized in asset classes having returns with low correlations to those of more traditional U.S. equity and fixed income investments.

VanEck Vectors® ETFs is the exchange-traded fund (ETF) business of VanEck. Since the listing of VanEck's first ETF in 2006, VanEck Vectors ETFs have become one of the largest ETF brands in the U.S. and one of the most recognized ETF brands worldwide.

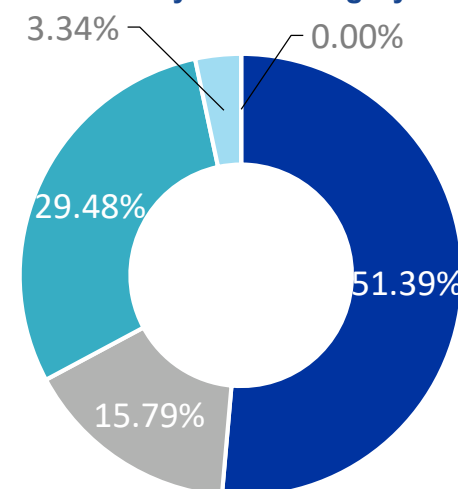
Headquartered in New York City, VanEck has a presence in other cities worldwide, including Shanghai (China), Frankfurt (Germany), Madrid (Spain), Pfaffikon SZ (Switzerland), Sydney (Australia) and Amsterdam (The Netherlands), and manages approximately USD 56.92 billion.\*

\*Data as of 30 June 2020

- Established in 2011 by VanEck
- Objective of capturing important investment opportunities that were being missed by traditional indices
- Introduction of blue chip indices with investability characteristics specifically designed to underlie exchange-traded products (ETPs)
- The indices are built on three key factors
  - pure-play exposure
  - component liquidity
  - index diversification

In combination, these factors ensure an intelligent index design, tailor-made for ETPs
- MVIS manages 87 Indices among several asset classes:
  - 24 Digital Asset Indices
  - 36 Country Indices
  - 10 Hard Asset Indices
  - 6 Bond Indices
  - 10 Sector Indices
  - 1 Speciality Index

**AUM in % by Index Category**



- *Hard Asset Indices*
- *Sector Indices*
- *Digital Assets Indices*
- *Country Indices*
- *Bond Indices*

**AUM in USD by Index Category**

Index Category	AUM (USD bn)
<i>Hard Asset Indices</i>	7.46
<i>Country Indices</i>	2.29
<i>Sector Indices</i>	4.28
<i>Bond Indices</i>	0.48
<i>Digital Assets Indices</i>	0

Data as of 30 June 2020

- **Crypto Currency**

- Cryptocurrencies, like traditional currencies, are meant to be a store of value
- Bitcoin (BTC) is the most widely recognized cryptocurrency, and has become known as a form of “digital gold”
- Not all cryptocurrencies are currently an effective means to transact value

- **Platforms**

- Platforms serve as a base layer that underlie and enable a wide variety of applications
- Ethereum (ETH), for example, is a platform with 30+ “product” applications being developed on it
- One might think about platforms as “fat protocols”

- **Applications**

- Applications are specific use cases that enable the tracking of ownership, allocating resources or meet a specific utility
- For example, IOTA is an application-based digital asset that is used to track internet of things devices and measures communication traffic
- Applications are predominantly ICO-funded

## ▪ Price

- Prices are trading platform dependent (i.e., exchange, no unified quotation system, no consolidated tape)
- Trading platforms are independent of each other and active at various cycles of the day
- Not all digital assets trade against fiat currencies
- Pricing providers are most often not independent of trading platforms
- Solution: liquidity-weighted tape

## ▪ Forks

- Exposure to a single digital asset necessitates exposure to subsequent forks and future evolutions
- Blockchain “corporate actions” require extensive research
- No rules-based fork treatment
- Solution: total return index that includes forks and index that can handle forks

## ▪ Custody

- Counterparty risk of trading platforms (along with potential conflicts of interest, front running, lack of transparency)
- High human/key person risk, dependency on trusting individuals at custody providers
- Solution: exchange traded instruments and best practices around custody (multiple shards, multiple controls, insurance or balance sheet)

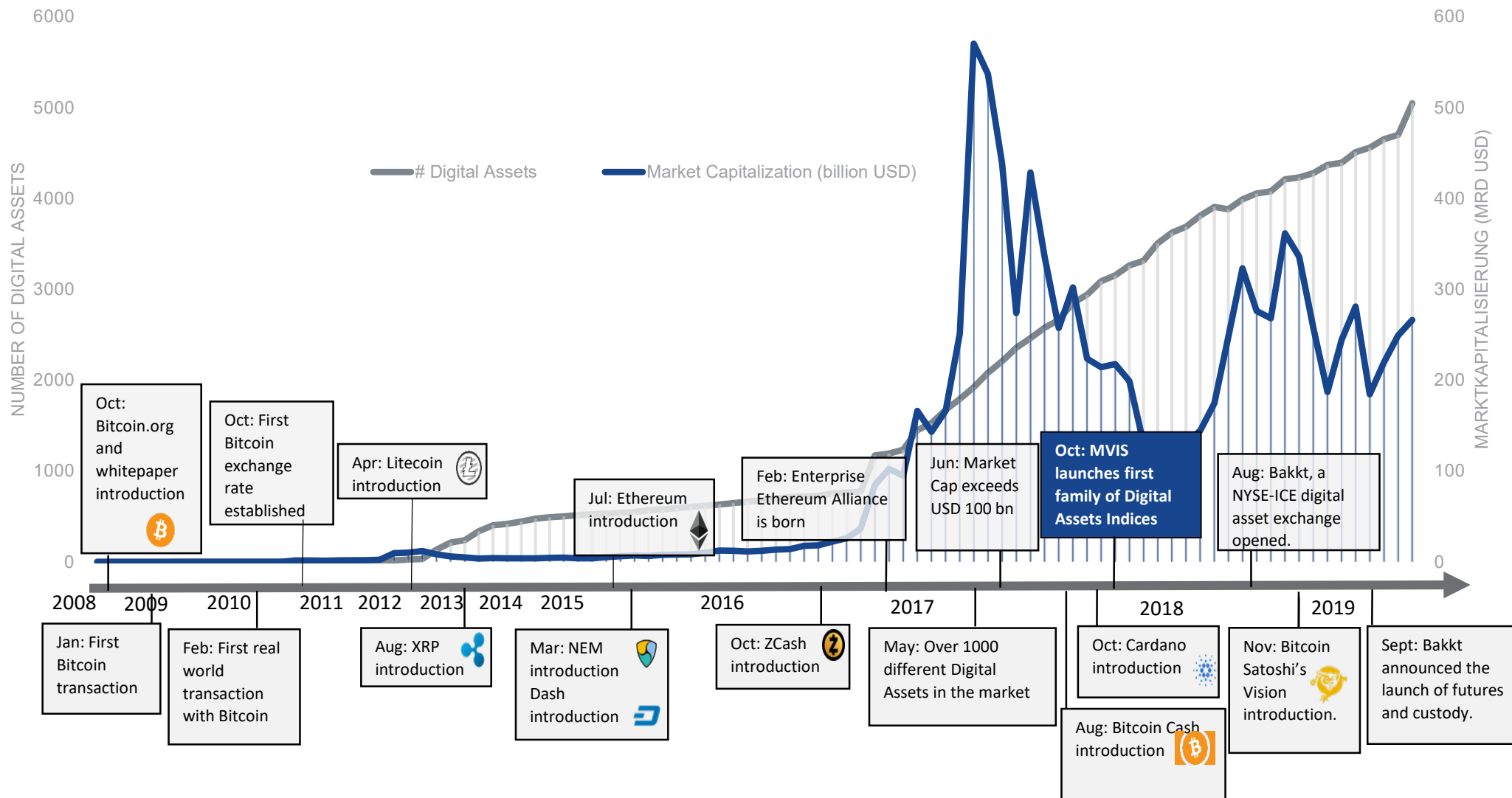


## Digital asset risks include:

- Immaturity/extreme early stage of many applications
- Hacking of trading platforms and participants in the life cycle of a trade (usually social engineering)
- Unintentional coding error
- Governance shortcomings
- Can miners and developers “run” the “core” software? (Linux is a good example for successful execution)
- Ecosystem design
- Will payments continue to sustain processing and verification activities
- Encryption vulnerability; developments in quantum computing (which would increase success of private key hacking; credit cards more vulnerable nevertheless)
- Price volatility



# History of Digital Assets



\*Data as of 30 June 2020



- Digital assets have gained steady recognition over the past several years
- Today, there are over 5,000 digital assets with over \$260 billion in market capitalization\*
- The top 5, 10, 25, and 100 are most widely cited
- Digital assets are traded on various trading platforms against hard currencies and other digital assets
- Digital assets markets are fragmented
  - Trade at different prices across different markets (no Reg. NMS)
  - Increased difficulty of asset valuation
- Digital asset trading platforms face several challenges
  - Varying technological platform sophistication and standards
  - Frequent DDOS attacks and hacks
  - Potential fraud (including ICOs)
- Digital assets have the potential to integrate in the broad economy
  - Structural market improvements
  - Proper price discovery
  - Sound index methodology
  - An investable asset class
- The state of digital asset markets
  - Prices are trading platform dependent, no unified quotation system
  - Popular markets are generally the top trading platforms
  - Trading platforms are independent of each other and active at various cycles of the day (geographic location, clientele)
  - When volume drops on a given trading platform, spreads widen and prices get pushed around
  - Sometimes there is as much as a 12%-15% price difference between trading platforms

\*

\*Data as of 30 June 2020



# Top Ten Digital Assets By Market Capitalization

	Name	Market Cap	Price	Circulating Supply	Symbol	Mon. Avg. Vol. (1 Mon)
1	Bitcoin	\$168,973,000,000	\$9,176.31	18,414,012	BTC	\$3,774,799,566
2	Ethereum	\$25,194,668,386	\$225.98	111,490,700	ETH	\$1,430,733,660
3	Bitcoin Cash	\$4,117,150,709	\$223.22	18,444,363	BCH	\$223,299,242
4	XRP	\$7,776,096,096	\$0.18	44,257,803,618	XRP	\$147,172,679
5	Litecoin	\$2,679,172,173	\$41.29	64,886,708	LTC	\$148,676,004
6	EOS	\$2,211,185,679	\$2.37	933,777,736	EOS	\$192,859,493
7	Bitcoin SV	\$2,920,253,061	\$158.34	18,442,927	BSV	\$104,529,037
8	Binance Coin	\$2,407,708,317	\$15.48	155,536,713	BNB	\$83,581,450
9	Chainlink	\$1,622,250,000	\$4.64	350,000,000	LINK	\$80,480,833
10	Ethereum Classic	\$670,546,169	\$5.77	116,313,299	ETC	\$138,278,246

Source: CryptoCompare  
Data as of 30 June 2020

## Types of Digital Assets

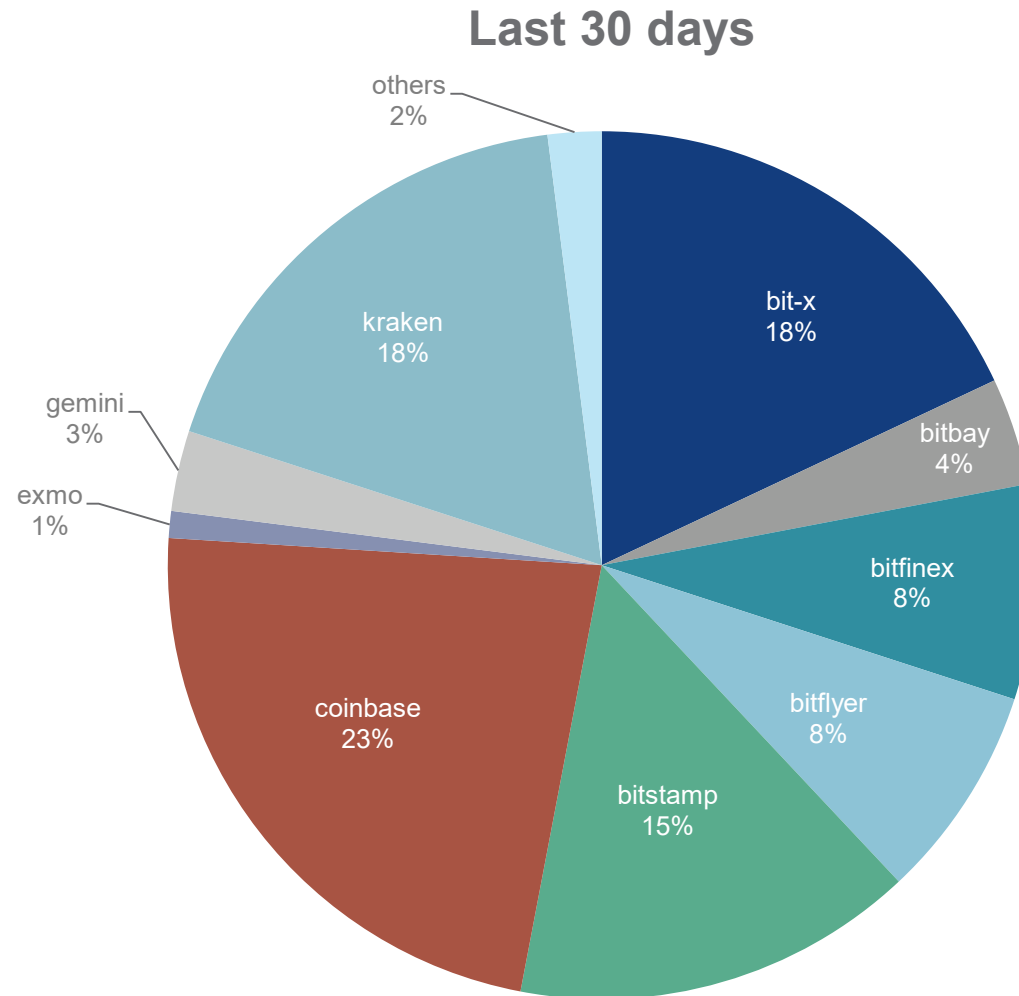
- Cryptocurrency/store of value, platform/protocol, specific function/utility
- Bitcoin may become digital gold but is one of many digital assets and one of many use cases; do not know the winners at this point
- The top 10 and 25 digital assets and their use-cases are investable and worthwhile to monitor
- Investment bucket: aggressive early stage technology, uncorrelated assets

## Example Digital Assets and Classification

- Bitcoin model based (Bitcoin, Litecoin, BitcoinCash) **[cryptocurrency/store of value]**
- Decentralized applications and smart contracts (Ethereum, NEO, EOS) **[platform/protocol]**
- Transactions/payment systems (Ripple, Stellar, OmiseGo) **[cryptocurrency/store of value]**
- Privacy oriented (Zcash, Dash, Monero) **[cryptocurrency/store of value]**
- Internet of things (IOTA) **[specific use case/utility]**
- Decentralized asset issuance platform (Waves) **[platform/protocol]**
- Decentralized digital asset exchange (BitShares) **[specific use case/utility]**
- User merit-based media platform (Steem) **[specific use case/utility]**
- Worldwide supercomputer (Golem) **[specific use case/utility]**
- Blockchain development software (Stratis) **[platform/protocol]**
- Quantum-secure blockchain (Quantum) **[platform/protocol]**
- All-in-one blockchain (ARK) **[platform/protocol]**



# Bitcoin Market Share Across Top Exchanges



Last 30 days volume  
Source: MVIS Research, CryptoCompare  
Data as of 30 June 2020

# Top Digital Asset Exchanges

Website platforms	Digital assets traded in pairs	Fiat currencies	Location
<i>Bitfinex</i>	275	USD, EUR, JPY, GBP	Hong Kong
<i>Bitstamp</i>	29	USD, EUR	Luxembourg
<i>Coinone</i>	80	KRW	South Korea
<i>Poloniex</i>	178	Digital Asset Only	Delaware
<i>Kraken</i>	161	USD, EUR, CAD, GBP, JPY	California
<i>Coinbase Pro</i>	67	USD, EUR, GBP	California
<i>Bittrex</i>	431	USD	USA
<i>HitBTC</i>	834	Digital Asset Only	London
<i>Gemini</i>	27	USD	New York
OTC	Various	Various	DRW, GGT, Circle Financial are big 3 Large block trades between counterparties

Source: MVIS Resarch & CryptoCompare  
Data as of 30 June 2020

**BITFINEX**

**coinone**

**kraken**  
Bitcoin Exchange

**BITTREX**

**GEMINI**

**BITSTAMP**  
SECURE TRADING AND MONEY BACK GUARANTEE

**POLONIEX**  
CRYPTOCURRENCY EXCHANGE

**GDAX**

**HitBTC**

## MVIS's methodology

- Prices compiled from 54 global digital asset trading platforms
- Trading platform weights established based on liquidity
  - Prices are checked real-time on 54 trading platforms, covering >90% of global trading volume (ex OTC)
  - Availability every second, 86,400 times a day
  - More liquid trading platform receives a higher weight
  - Intraday liquidity is taken into account by liquidity penalty factor
- Results of high market coverage and liquidity-weighting:
  - Fairest price of a digital asset
  - Robustness in case of flash crashes, even if larger trading platform(e.g., Coinbase) are affected
  - Global approach (liquidity in certain regions/time zones is taken into account)



**Important notice:** The calculated prices may not be achieved by investors as the calculated price is based on prices from different trading platforms. As not all trading platforms may be used by the investor the actual price may differ and be much less than the calculated price referred to on this slide.

At any time  $t$  the Index price for a currency pair is the weighted average of prices on all exchanges.

$$P_t^* = \sum_i P_t^i W_t^i \quad (1)$$

A weight belonging to an exchange is the ratio of the 24 hour trading volume of a currency pair to the total volume of the pair on all exchanges.

$$W_t^i = \frac{V_t^i 1_{\{x=0\}} \gamma_t^i}{\sum_k V_t^k 1_{\{x=0\}} \gamma_t^k} \quad (2)$$

The 24 hour volume of an exchange at a certain time is defined as the sum of trading volume of the last 24 full hours.

$$V_t^i = \sum_{s=h_t-86400}^{h_t} V_s^i \quad (3)$$

The exchange volume is adjusted with the liquidity penalty factor, that decreases with the increasing time since the last trade.

$$\gamma_t^j = \begin{cases} 1 & \text{if } \tau_t^j \leq 5 \\ 0.8 & \text{if } 5 < \tau_t^j \leq 10 \\ 0.6 & \text{if } 10 < \tau_t^j \leq 15 \\ 0.4 & \text{if } 15 < \tau_t^j \leq 20 \\ 0.2 & \text{if } 20 < \tau_t^j \leq 25 \\ 0.001 & \text{otherwise} \end{cases}$$

There are cases when a currency pair of interest, for example DOGE\_USD is not liquid, however, an alternative set of pairs such as DOGE\_BTC and BTC\_USD enables us to calculate a more liquid conversion.

The liquidity level at which a pair is viewed illiquid is specific to each coin. Based on the available trading pairs, there are different ways for conversion. There are also cases, when a currency pair might not even trade directly.

Let  $x, y, z$  be different cryptos, and  $x\_y$  be the interested pair, but it's not trading directly or is very illiquid. The best conversion can be one of the following cases:

1. Invert

Most liquid pair:  $y\_x$

$$x\_y = \frac{1}{y\_x} \quad (4)$$

2. Multiply

Most liquid pairs:  $x\_z$  and  $z\_y$

$$x\_y = x\_z * z\_y \quad (5)$$

3. Divide

Most liquid pairs:  $x\_z$  and  $y\_z$

$$x\_y = \frac{x\_z}{y\_z} \quad (6)$$

4. Invert divide

Most liquid pairs:  $z\_x$  and  $z\_y$

$$x\_y = \frac{z\_y}{z\_x} \quad (7)$$

5. Invert multiply

Most liquid pairs:  $z\_x$  and  $y\_z$

$$x\_y = \frac{1}{z\_x * y\_z} \quad (8)$$

As a rule of thumb, if a direct or invert conversion is not possible, a 2-step conversion is tested with BTC or ETH, as we assume that most cryptos trade against these 2 currencies. The best conversion is chosen according to 24 hour volume and time since last trade.

**Important notice:** The calculated prices may not be achieved by investors as the calculated price is based on prices from different trading platforms. As not all trading platforms may be used by the investor the actual price may differ and be much less than the calculated price referred to on this slide.

## Setting the stage for investability

- MVIS applies strict and demanding liquidity screening to digital assets:
  - One month average daily trading volumes of at least USD1 million at review date
  - Liquidity criteria applies to the blue chips (5, 10, 25 component indices) - not for the 100 component index (broad benchmark used as a universe).
- MVIS selection criteria and capping method typically result in a more liquid index.

### Average daily trading volume MVIS CryptoCompare Digital Assets 10 Index

Criteria	Required	Bitcoin	Ethereum	Bitcoin Cash	XRP	Litecoin
Average daily trading volume	\$1,000,000	\$3,774,799,566	\$1,430,733,660	\$223,299,242	\$147,172,679	\$148,676,004

Data as of 30 June 2020

**Important notice:** An investment into crypto currencies may become illiquid depending on the trading platform or investment product used for the specific investment. Investors should carefully review the liquidity risk and disclosures of the relevant trading platform or investment product they aim to invest in.



## ▪ Weighting schemes

- MVIS CryptoCompare Digital Assets 5 Index: 35% maximum weight per constituent
- MVIS CryptoCompare Digital Assets 10 Index: 30% maximum weight per constituent
- MVIS CryptoCompare Digital Assets 25 Index: 20%  
(capping factors are staggered from a maximum weight of 20% down to 4.5%)

### Weightings MVIS CryptoCompare Digital Assets 10 Index

#### Top 10 Components

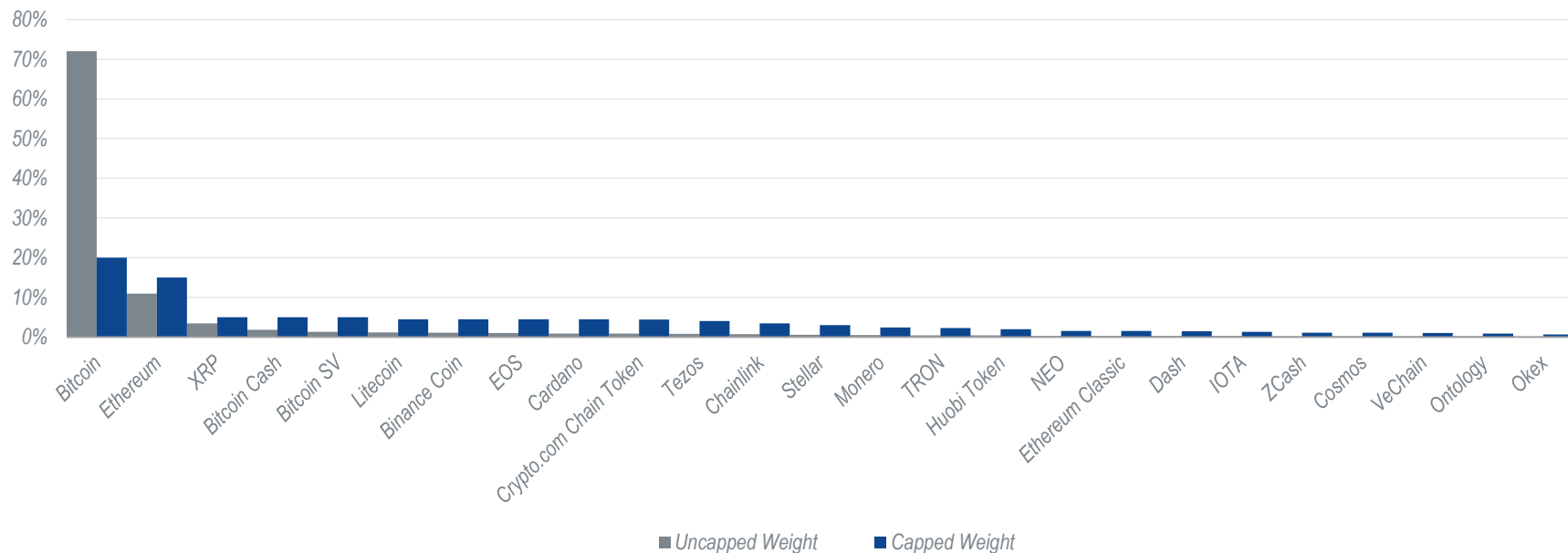
Digital Asset	Uncapped Weight	Weight
<i>Bitcoin</i>	76.85%	30.00%
<i>Ethereum</i>	11.70%	30.00%
<i>XRP</i>	3.64%	12.70%
<i>Bitcoin Cash</i>	1.92%	6.73%
<i>Bitcoin SV</i>	1.43%	5.00%
<i>Litecoin</i>	1.24%	4.33%
<i>Binance Coin</i>	1.12%	3.92%
<i>EOS</i>	1.04%	3.64%
<i>Chainlink</i>	0.73%	2.54%
<i>Ethereum Classic</i>	0.32%	1.13%

Data as of 30 June 2020

# Index Concept – Diversification and Cap Factors

- Capitalization factors promote balanced, diversified index exposure, especially in markets dominated by a few large assets
- MVIS CryptoCompare Digital Assets 25 Index
  - Top four digital assets are capped
  - All other company weights increase
  - The excess weight generated by capping is distributed across smaller companies
  - Underweight large-cap; overweight mid- and small-cap companies

## Digital Assets – Top 25 Component Weightings in the Index



\*Data as of 30 June 2020

## Definition

- A hard fork means a change to the protocol of the underlying digital asset. A hard fork makes previously valid blocks/transactions invalid. As such, a hard fork requires all nodes or users to upgrade to the latest version of the protocol because previous versions will no longer be accepted by the new version. One path follows the new, upgraded blockchain and one path continues along the previous path.

## MVIS's Treatment of Forks

- A forked digital asset of an index constituent can be eligible for the index if it fulfills some rigorous requirements that ensure quality:
  - The fork should trade in at least one of the top tier exchanges.
  - It should ensure accountability: Open source code, public developers engaged in project, premine information as well as an announcement significantly prior to activation are among factors that ensure seriousness of the fork.
- If eligible, a forked digital asset of an index constituent is added to the index as soon as the fork becomes effective. The price of the forked asset is determined as follows:
  - If the main net is available and the fork trades on at least one trading platform(not by futures), the (composite) price is used.
  - Otherwise the price is 0.
- As soon as a price is available, the first available close (5:00 pm GMT) is used.
  - In the multi component indices, the smallest coin by market capitalization will be deleted.
  - In the single component indices, the forked coin will be deleted. Only in exceptional cases (e.g., no acceptance for the old chain), MVIS may decide to keep the new chain and delete the old.
  - In all instances, the market capitalization of the deleted coin is reinvested in the index.
- The new index composition is implemented after the second close after the first price is available.



# Index Concept – Forks, Bitcoin Cash Example

## What is Bitcoin Cash?

- Bitcoin Cash is a digital asset that forked off from the original Bitcoin blockchain. Bitcoin Cash's main protocol change intends to improve bitcoin's scaling capability by introducing variable blocksize limits up to 8MB compared to bitcoin's original 1MB blocksize, adjust block difficulty levels and change core fee code instead of SegWit, thereby enabling faster payments, lower fees and more on-chain transactions
- The Bitcoin Cash scaling solution was sufficiently different from the core bitcoin protocol and gathered enough support, so it "forked" from the original bitcoin blockchain creating a new blockchain and a new digital asset that is bitcoin cash blockchain and bitcoin cash, respectively. For every Bitcoin an investor owned before the fork, the investor is entitled to one Bitcoin Cash

## Timeline of the Bitcoin Fork

- Bitcoin scaling solutions are discussed globally; MVIS and CryptoCompare monitor developments
- Hard Fork occurred on August 1<sup>st</sup> at 12:37 UTC, block number 478,558
- First block (478,559) mined at on the evening on August 1<sup>st</sup>, 18:14 GMT

## MVIS treatment of Bitcoin Fork

Based on its price, Bitcoin Cash assumed respective weights in the indices

- Bitcoin Cash was eligible to be added to MVIS indices which contained Bitcoin on August 1<sup>st</sup>. The parameters were the same as for Bitcoin (keep the index in line with a virtual portfolio). The price was set to 0
- The first price for Bitcoin Cash was available on August 2<sup>nd</sup> at 5:
- Indices were adjusted (e.g., Bitcoin Cash was removed from MVBTC) after close August 3<sup>rd</sup>

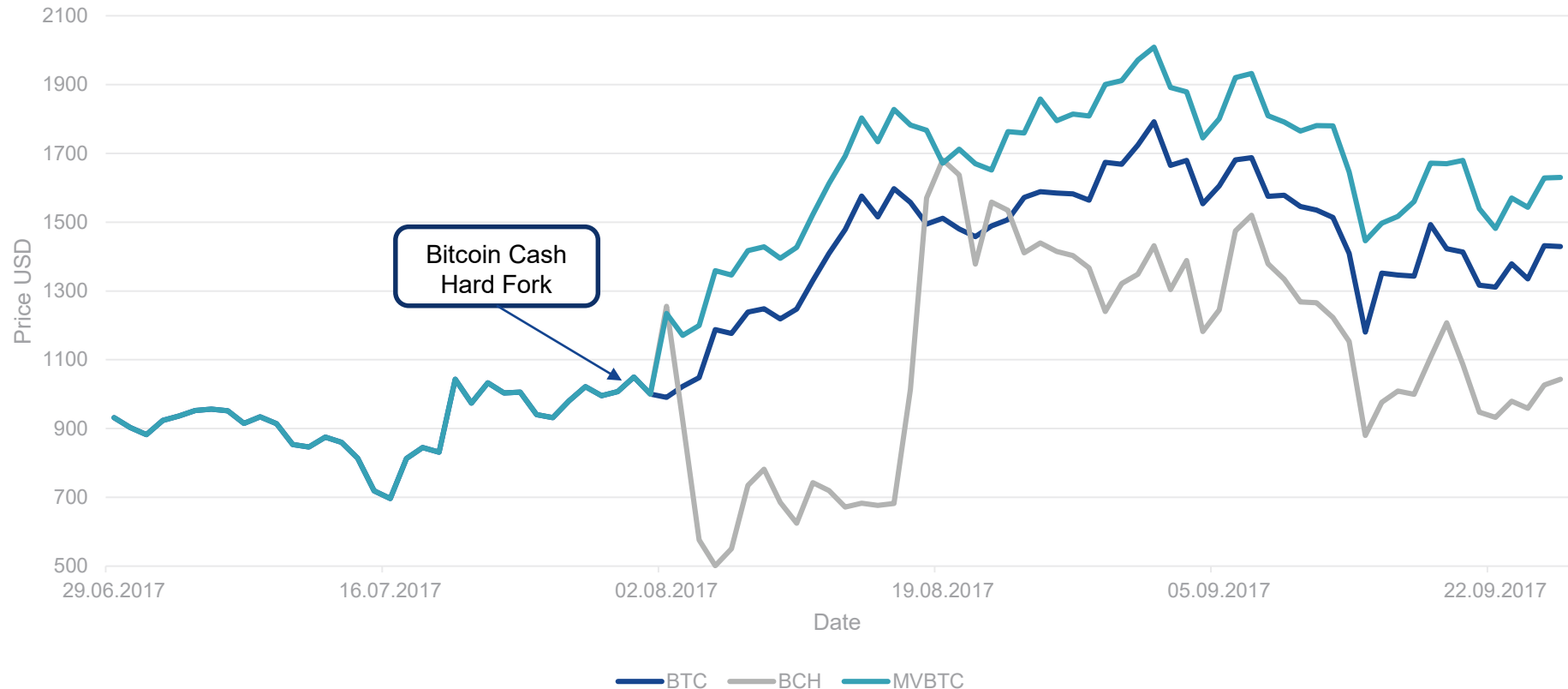


31.07.2017		01.08.2017		02.08.2017		03.08.2017	
Component	Price	Component	Price	Component	Price	Component	Price
BTC	2883.27	BTC	2746.99	BTC	2720.53	BTC	2809.99
-		BCH	439.27	BCH	551.59	BCH	405.92

## After the Bitcoin Fork

- Bitcoin Cash traded like Bitcoin on several trading platforms. Bitcoin Cash price is between approximately 250 and 800 USD per unit
- MVIS and CryptoCompare continued to monitor both Bitcoin and Bitcoin Cash as separate assets, until the Bitcoin Cash fork in November 2018.

### Bitcoin Cash Hard Fork (Price)



## What is Bitcoin Cash ABC and Bitcoin SV?

- Bitcoin Cash ABC (BCHABC) is a hard forked version of Bitcoin Cash, aims to preserve the original functionality and vision of the Bitcoin Cash network and currently preserves the block size of 32MB. However, because the hard fork is technically an upgrade, there are some improvements.
- Bitcoin SV (BSV) is a hard fork protocol initiated by the nChain developers, block size has quadrupled from 32MB to 128MB. Changes to the protocol have been made to ease the transition to smart contracts on the BCHSV network.

## Timeline of the Bitcoin Cash SV Hard Fork

- Two Hard Forks were diverged at block 556767, starting on November 15<sup>th</sup> at 16:40 UTC.

## MVIS treatment of Bitcoin Cash SV Hard Fork

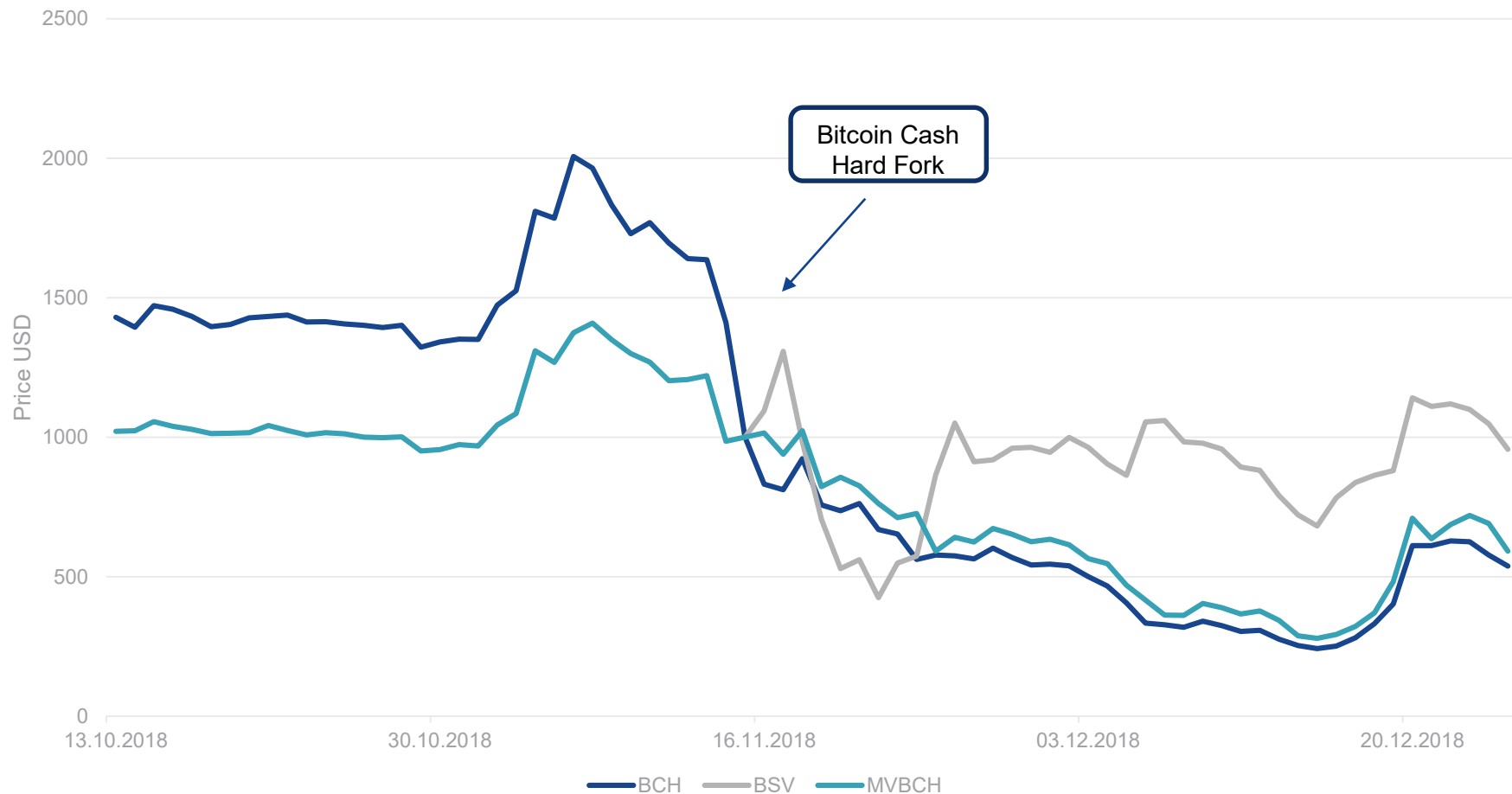
- Bitcoin Cash ABC and Bitcoin Cash SV were both eligible to be added to MVIS indices on November 15<sup>th</sup>.
- Indices were adjusted after completion on November 15<sup>th</sup>
- As Bitcoin ABC not only follows Bitcoin Cash upgrade roadmap published by bitcoincash.org, but also has a bigger market capitalization and liquidity at the close of November 15<sup>th</sup>, than the other forked component, Bitcoin Cash SV, which was removed from the index after close of November 16<sup>th</sup>.

14.11.2018		15.11.2018		16.11.2018		17.11.2018	
Component	Price	Component	Price	Component	Price	Component	Price
BCH	444.16	BCHABC	314.76	BCHABC	261.94	BCHABC	255.60
-		BCHSV	99.55	BCHSV	109.01	BCHSV	130.22

### After the Bitcoin Cash Fork

- Bitcoin Cash traded like Bitcoin on several trading platforms. Bitcoin Cash price is between approximately 250 and 800 USD per unit
- MVIS and CryptoCompare continued to monitor both Bitcoin and Bitcoin Cash as separate assets, until the Bitcoin Cash fork in November 2018.

### Bitcoin Cash SV Hard Fork (Price)



# Index Concept – Initial Coin Offerings (ICOs)

## Definition

ICOs are a means to raise capital for a company's business or project

In an ICO campaign, a percentage of the underlying digital asset (i.e., the initial coin) is sold to investors in exchange for U.S. Dollars or digital assets. Importantly, ICOs do not necessarily provide ownership in the company or the underlying venture or project

## MVIS's Treatment of ICOs

ICOs and non-component digital assets are added to the indices at the next review, provided they trade for at least ten days, and meet index selection and liquidity criteria set forth in the MVIS index rulebook





## Wallets

- Bitcoins are stored in “wallets”
- A wallet is a randomly generated string of numbers and consists of two parts: the public key and private key. Example of a public key: 14GabW85FUMQy62CMWLCToQLo81w7iXL2x
- The second half of the Bitcoin wallet is what is known as the private key. Only the wallet owner has access to the private key
- Type of wallets: online, local, paper

## Current Custody Types

- On trading platform (online wallet)
- Multi-signature (more secure online wallet)
- Cold storage (local secure hardware and process driven wallet)

## Shortcomings of Current System

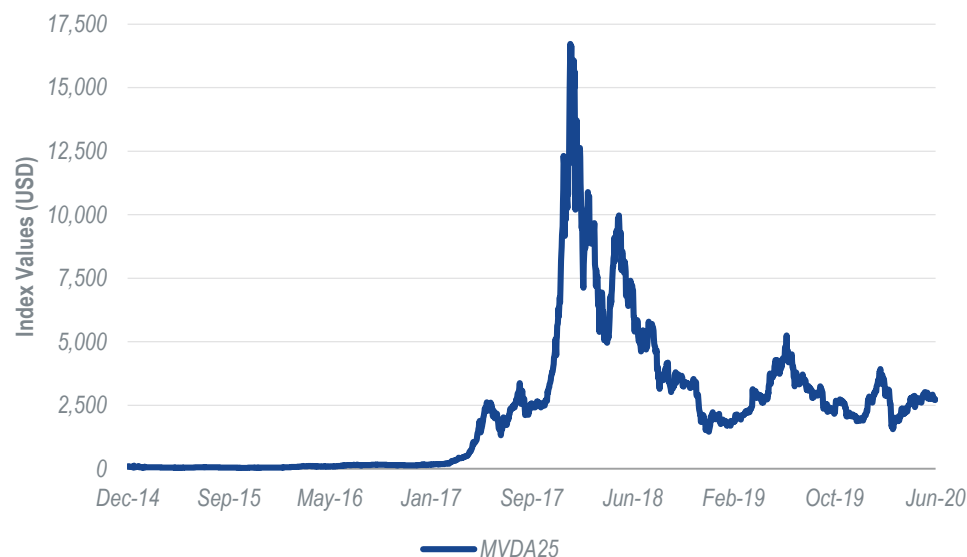
- High counterparty risk of custody service providers
- Potential conflicts of interest, front running, lack of transparency
- Unproven or novel technology
- High risk operational business processes
- High human/key person risk, dependency on trusting individuals at custody providers
- Lack of regulatory status and oversight
- Not well integrated into either mainframe financial or digital asset eco system



# MVIS CryptoCompare Digital Assets 25 Index (MVDA25)

MVIS® INVESTABLE INDICES

- Top 25 components of MVIS® CryptoCompare Digital Assets 100 Index by size and liquidity (excl. stable/pegged coins)
- Investable
- 20% (capping factors are staggered from a maximum weight of 20% down to 4.5%.)
- Liquidity screen: monthly average-daily-trading volume of at least USD 1 million at review
- Total market capitalization – USD 230.76 billion
- Index history back to 31 December 2014



## Components

### Top 5 Components

Bitcoin	20.08%
Ethereum	15.54%
Cardano	5.68%
XRP	4.80%
Bitcoin Cash	4.67%
Other	49.23%

## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	227,259,109
Weighted Average	1 Month June Review	1,048,393,914

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	40.09%	All Time High/Low	16,720 / 39
1-Year Performance	-38.87%	52-Weeks High/Low	4,503 / 1,560
Since Inception	82.42%	Quarter High/Low	3,925 / 1,560
		Month High/Low	3,020 / 2,708

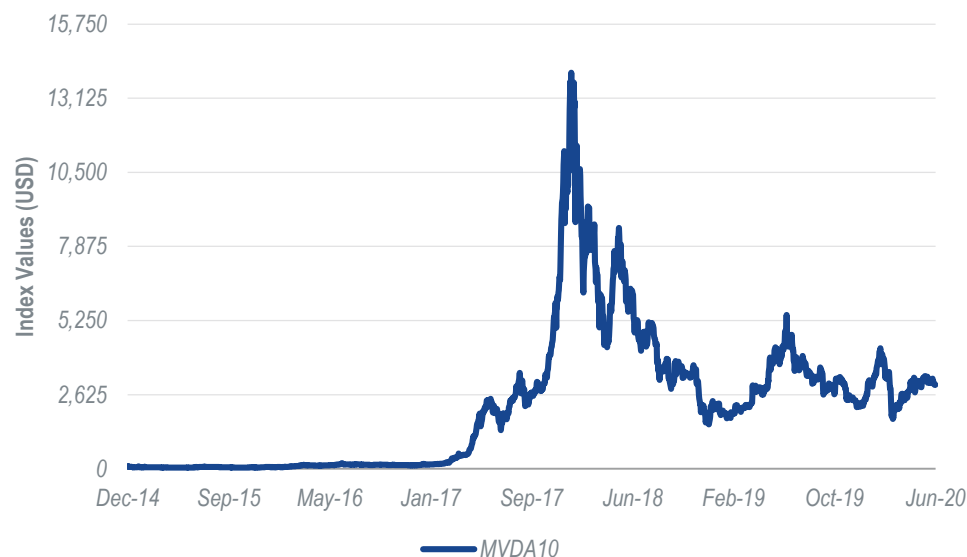
\*Performance since inception is annualized

Data as of 30 June 2020

# MVIS CryptoCompare Digital Assets 10 Index (MVDA10)

MVIS® INVESTABLE INDICES

- Top 10 components of MVIS® CryptoCompare Digital Assets 100 Index by size and liquidity (excl. stable/pegged coins)
- Investable
- 30% maximum weight per constituent
- Liquidity screen: monthly average-daily-trading volume of at least USD 1 million at review
- Total market capitalization – USD 218.18 billion
- Index history back to 31 December 2014



## Components

### Top 5 Components

Ethereum	32.69%
Bitcoin	30.62%
XRP	11.67%
Bitcoin Cash	6.19%
Bitcoin SV	4.39%
Other	14.43%

## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	568,053,418
Weighted Average	1 Month June Review	1,678,074,978

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	30.41%	All Time High/Low	14,033 / 39
1-Year Performance	-35.28%	52-Weeks High/Low	4,751 / 1,761
Since Inception	85.34%	Quarter High/Low	4,276 / 1,761
		Month High/Low	3,279 / 2,963

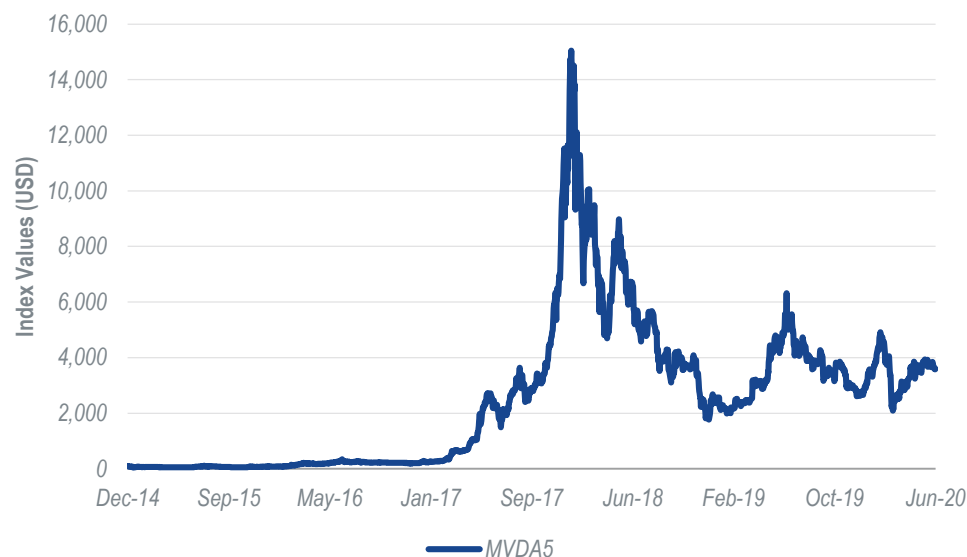
\*Performance since inception is annualized

Data as of 30 June 2020

# MVIS CryptoCompare Digital Assets 5 Index (MVDA5)

MVIS® INVESTABLE INDICES

- Top 5 components of MVIS® CryptoCompare Digital Assets 100 Index by size and liquidity (excl. stable/pegged coins)
- Investable
- 35% maximum weight per constituent
- Liquidity screen: monthly average-daily-trading volume of at least USD 1 million at review
- Total market capitalization – USD 208.35 billion
- Index history back to 31 December 2014



## Components

### Top 5 Components

Ethereum	37.66%
Bitcoin	35.27%
XRP	14.43%
Bitcoin Cash	7.65%
Litecoin	4.98%

## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	1,144,936,230
Weighted Average	1 Month June Review	1,916,070,456

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	32.52%	All Time High/Low	15,041 / 47
1-Year Performance	-32.71%	52-Weeks High/Low	5,560 / 2,095
Since Inception	91.81%	Quarter High/Low	4,912 / 2,095
		Month High/Low	3,938 / 3,582

\*Performance since inception is annualized

Data as of 30 June 2020

# MVIS CryptoCompare Digital Assets 100 Index (MVDA)

MVIS® INVESTABLE INDICES

- A market cap-weighted index
- Tracks the performance of the 100 largest digital assets
- Benchmark/universe for the MVIS CryptoCompare Digital Assets Indices
- Contains three sub-indices (large, mid and small capitalization)
- Total market capitalization - USD 254.11 billion
- Index history back to 31 December 2014
- No liquidity screen



## Components

### Top 5 Components

Bitcoin	66.39%
Ethereum	9.88%
Tether	3.46%
XRP	3.05%
Bitcoin Cash	1.62%
Other	15.60%

## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	104,384,899
Weighted Average	1 Month June Review	2,834,353,942

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	29.15%	All Time High/Low	8,877 / 50
1-Year Performance	-25.54%	52-Weeks High/Low	3,403 / 1,339
Since Inception	77.70%	Quarter High/Low	2,892 / 1,339
		Month High/Low	2,528 / 2,349

\*Performance since inception is annualized

Data as of 30 June 2020

# MVIS CryptoCompare Bitcoin Index (MVBTC)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Bitcoin Index covers the performance of a digital assets portfolio which invests in Bitcoin
- Total market capitalization – USD 168.71 billion
- Index history back to 31 January 2012
- Bitcoin is a peer-to-peer digital asset and technology that operates with no central authority or banks
- Transactions and the issuing of Bitcoin is carried out collectively by the network
- Bitcoin is the first decentralized digital asset and has spawned tremendous evolution in the digital asset space



Data as of 30 June 2020

## Component

Bitcoin	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	3,774,799,566

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	27.16%	All Time High/Low	41,173 / 8
1-Year Performance	-18.21%	52-Weeks High/Low	27,214 / 10,885
Since Inception	146.47%	Quarter High/Low	22,434 / 10,885
		Month High/Low	21,193 / 19,711

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
21,000,000	SHA-256	PoW
Difficulty Adj.	BlockRR.	BlockNo.
2016 blocks	0.5	639093
Start Date	Twitter	Website
03.01.2009	-	-
Network H/s	Current Supply	Block Reward
124,169,033,211.7	18,431,812	6.3

\*Performance since inception is annualized

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# MVIS CryptoCompare Bitcoin Cash Index (MVBCH)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Bitcoin Cash Index covers the performance of a digital assets portfolio which invests in Bitcoin Cash.
- Total market capitalization – USD 4.11 billion
- Index history back to 31 August 2017
- Bitcoin Cash (BCH) is a hard forked version of the original Bitcoin. It is similar to Bitcoin with regards to its protocol:
  - Proof of Work SHA-256 hashing
  - Max 21 million supply
  - Same block times and reward system



Data as of 30 June 2020

## Component

Bitcoin Cash	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	223,299,242

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	7.92%	All Time High/Low	6,761 / 181
1-Year Performance	-45.74%	52-Weeks High/Low	1,165 / 400
Since Inception	-20.21%	Quarter High/Low	1,165 / 400
		Month High/Low	611 / 523

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
21,000,000	SHA-256	PoW
Difficulty Adj.	BlockRR.	BlockNo.
6 blocks	0.5	643747
Start Date	Twitter	Website
01.08.2017	@BITCOINCASH	-
Network H/s	Current Supply	Block Reward
3,392,518,714,518,286,000.0	18,460,908	6.3

\*Performance since inception is annualized

# MVIS CryptoCompare Dash Index (MVDASH)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Dash Index covers the performance of a digital assets portfolio which invests in Dash
- Total market capitalization – USD 0.65 billion
- Index history back to 28 February 2014
- DigitalCash (Dash) uses a new chained hashing algorithm approach, with many new scientific hashing algorithms for the proof-of-work
- Dash aims to be the first privacy-centric cryptographic currency with fully encrypted transactions and anonymous block transactions. (PrivateSend)
- PrivateSend mixes Dash coins with other users who are also using this feature making transactions untraceable
- Users can earn DigitalCash rewards by hosting a master node to help maintain the blockchain. One must have a balance of at least 1000 DASH in order to host a Dash master node. This collateral is required to avoid 51% attacks on the network



Data as of 30 June 2020

## Component

Dash	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	45,068,271

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	62.70%	All Time High/Low	25,358 / 9
1-Year Performance	-56.84%	52-Weeks High/Low	2,961 / 727
Since Inception	114.67%	Quarter High/Low	2,471 / 751
		Month High/Low	1,459 / 1,251

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
22,000,000	X11	PoW/PoS
Difficulty Adj.	BlockRR.	BlockNo.
DGW	0.5	1303625
Start Date	Twitter	Website
18.01.2014	@Dashpay	-
Network H/s	Current Supply	Block Reward
5,751,351,504,313,740.0	9597641	2.9

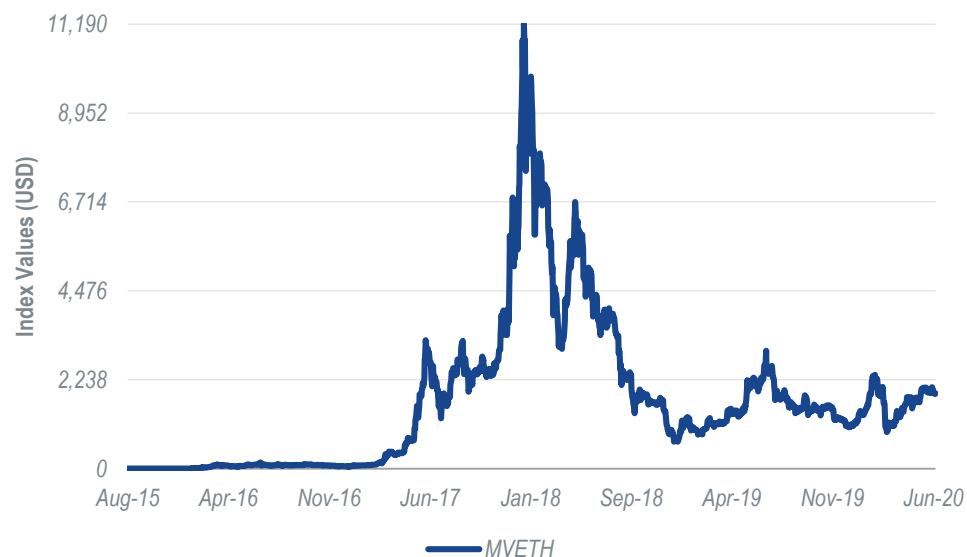
\*Performance since inception is annualized



# MVIS CryptoCompare Ethereum Index (MVETH)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Ethereum Index covers the performance of a digital assets portfolio which invests in Ether.
- Total market capitalization – USD 25.10 billion
- Index history back to 31 August 2015
- Ethereum is a decentralized platform that runs smart contracts: applications that run exactly as programmed without downtime, censorship, fraud or third party interference.
- In the Ethereum protocol and blockchain there is a price for each operation. In order transfer or execute data on the network, you have to consume or burn gas.
- The digital asset underlying the Ethereum network is called Ether and is used to pay for computation time and for transaction fees.



Data as of 30 June 2020

## Component

Ethereum	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	1,430,733,660

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	73.70%	All Time High/Low	11,188 / 3
1-Year Performance	-25.12%	52-Weeks High/Low	2,592 / 924
Since Inception	196.01%	Quarter High/Low	2,367 / 924
		Month High/Low	2,053 / 1,885

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
-	Ethash	PoW
Difficulty Adj.	BlockRR.	BlockNo.
Per 1 Block	-	10451934
Start Date	Twitter	Website
30.07.2015	@ethereum	-
Network H/s	Current Supply	Block Reward
188,805,429,796,042.3	111,741,930	2.0

\*Performance since inception is annualized

# MVIS CryptoCompare IOTA Index (MVIOT)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare IOTA Index covers the performance of a digital assets portfolio which invests in IOTA
- Total market capitalization – USD 0.61 billion
- Index history back to 31 July 2017
- IOTA is an open-source distributed ledger protocol that goes 'beyond blockchain' through its core invention of the blockless 'Tangle'
- The IOTA Tangle is a quantum-proof Directed Acyclic Graph, with no fees on transactions, no fixed limit on how many transactions can be confirmed per second in the network. Throughput grows in conjunction with activity in the network; the more activity, the faster the network.
- Unlike blockchain architecture, IOTA has no separation between users and validators. Validation is an intrinsic property of using the ledger, thus avoiding centralization. IOTA is initially focused on serving as the backbone of the emerging Internet-of-Things (IoT).



Data as of 30 June 2020

## Component

IOTA	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	13,253,191

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	36.97%	All Time High/Low	18,929 / 401
1-Year Performance	-45.48%	52-Weeks High/Low	1,551 / 401
Since Inception	-5.59%	Quarter High/Low	1,343 / 401
		Month High/Low	952 / 804

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
2,779,530,283	-	Tangle
Difficulty Adj.	BlockRR.	BlockNo.
-	-	-
Start Date	Twitter	Website
00.01.1900	-	-
Network H/s	Current Supply	Block Reward
-	2,779,530,283	-

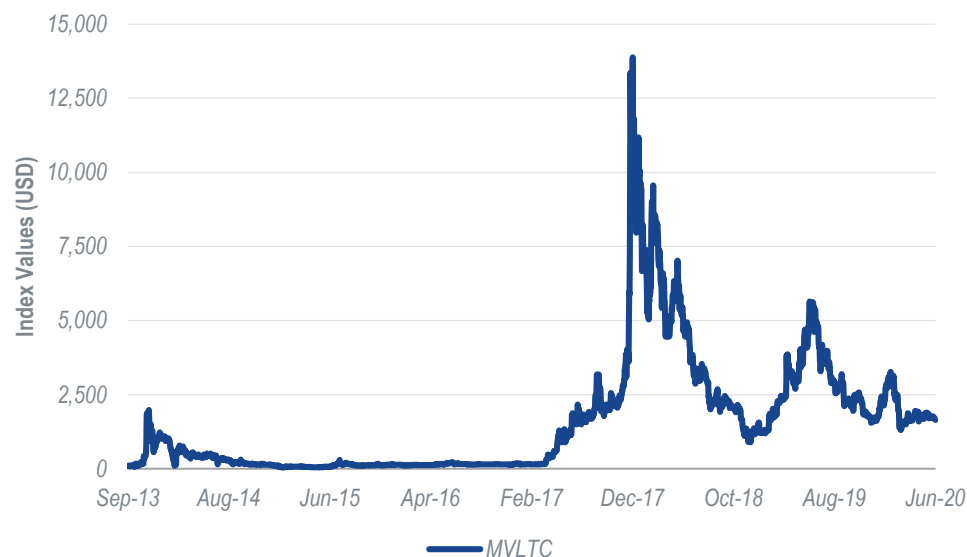
\*Performance since inception is annualized

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# MVIS CryptoCompare Litecoin Index (MVLTC)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Litecoin Index covers the performance of a digital assets portfolio which invests in Litecoin.
- Total market capitalization – USD 2.68 billion
- Index history back to 30 September 2013
- Litecoin LTC - provides faster transaction confirmations (2.5 minutes on average) and uses a memory-hard, script-based mining proof-of-work algorithm to target the regular computers and GPUs most people already have - which are its main differences to Bitcoin.
- The coin was created by a Google employee, Charles Lee. Litecoin is in second spot to Bitcoin and has spawned numerous clones - however it has solid support and dedicated development team.



Data as of 30 June 2020

## Component

LiteCoin	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	148,676,004

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	-0.89%	All Time High/Low	13,876 / 43
1-Year Performance	-68.32%	52-Weeks High/Low	5,210 / 1,314
Since Inception	51.46%	Quarter High/Low	3,269 / 1,314
		Month High/Low	1,902 / 1,650

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
84,000,000	Scrypt	PoW
Difficulty Adj.	BlockRR.	BlockNo.
2016 blocks	0.5	1876303
Start Date	Twitter	Website
13.10.2011	@litecoin	-
Network H/s	Current Supply	Block Reward
264,828,783,301,494.00	65,451,808	12.5

\*Performance since inception is annualized

# MVIS CryptoCompare Monero Index (MVXMR)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Monero Index covers the performance of a digital assets portfolio which invests in Monero
- Total market capitalization – USD 1.13 billion
- Index history back to 31 January 2015
- Monero (XMR) is a cryptonight algorithm-based alternative digital asset. XMR is based on Proof of Work and has a block reward that varies smoothly.
- The difficulty retargets every block with a sixty second block target. Monero uses a Ring Signature system to protect privacy, allowing users to make untraceable transactions.



Data as of 30 June 2020

## Component

Monero	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	21,373,767

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	41.22%	All Time High/Low	14,866 / 8
1-Year Performance	-31.35%	52-Weeks High/Low	3,534 / 1,152
Since Inception	170.97%	Quarter High/Low	3,264 / 1,152
		Month High/Low	2,365 / 2,172

## Digital Asset Specifications

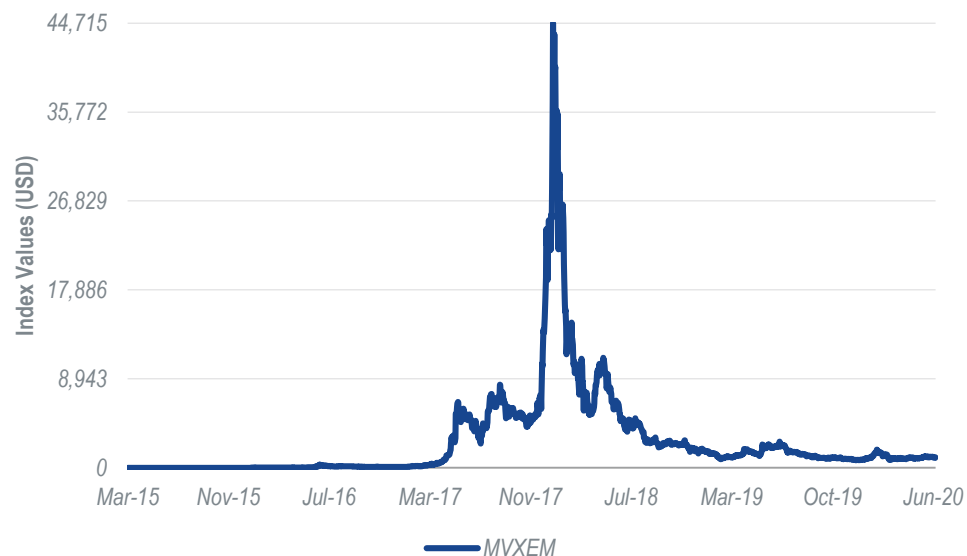
Max Supply	Algorithm	Proof Type
-	CryptoNight-V7	PoW
Difficulty Adj.	BlockRR.	BlockNo.
2 blocks	-	2141395
Start Date	Twitter	Website
02.06.2014	@monero	-
Network H/s	Current Supply	Block Reward
1,469,166,318.7	17,630,010.3	1.6

\*Performance since inception is annualized

# MVIS CryptoCompare NEM Index (MVXEM)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare NEM Index covers the performance of a digital assets portfolio which invests in NEM
- Total market capitalization – USD 0.38 billion
- Index history back to 31 March 2015
- NEM (XEM) is a peer-to-peer crypto platform. It is written in Java and JavaScript with 100% original source code.
- NEM has a stated goal of a wide distribution model and has introduced new features in blockchain technology in its proof-of-importance (POI) algorithm.
- NEM also features an integrated peer-to-peer secure and encrypted messaging system - Multisignature accounts and an Eigentrust++ reputation system.



## Component

NEM	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	4,197,193

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	34.33%	All Time High/Low	44,710 / 2
1-Year Performance	-54.24%	52-Weeks High/Low	2,294 / 779
Since Inception	142.43%	Quarter High/Low	1,843 / 779
		Month High/Low	1,168 / 1,008

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
8,999,999,999	-	PoI
Difficulty Adj.	BlockRR.	BlockNo.
-	-	-
Start Date	Twitter	Website
31.03.2015	@NEMofficial	-
Network H/s	Current Supply	Block Reward
-	8,999,999,999	-

\*Performance since inception is annualized

Data as of 30 June 2020

# MVIS CryptoCompare NEO Index (MVNEO)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare NEO Index covers the performance of a digital assets portfolio which invests in NEO
- Total market capitalization – USD 0.71 billion
- Index history back to 30 September 2016
- NEO is a platform in which users can issue and trade assets. NEO has been rebranded from the original 'Antshares'.
- NEO tokenizes proof of ownership of an asset and not the asset itself, thus taking into account all of the legal complications and obligations that may come with the transfer of shares, equity and assets.
- NEO represent an ownership of the NEO platform and allows users to buy NEO and to vote on protocol changes on the NEO blockchain. NEOs are 100% pre-mined and issued on the NEO's genesis block.



Data as of 30 June 2020

## Component

NEO	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	48,665,436

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	15.11%	All Time High/Low	4,598 / 3
1-Year Performance	-42.26%	52-Weeks High/Low	473 / 141
Since Inception	140.50%	Quarter High/Low	436 / 141
		Month High/Low	330 / 266

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
100,000,000	-	N/A
Difficulty Adj.	BlockRR.	BlockNo.
-	-	-
Start Date	Twitter	Website
01.08.2017	@neo_blockchain	-
Network H/s	Current Supply	Block Reward
-	100,000,000	-

\*Performance since inception is annualized

# MVIS CryptoCompare XRP Index (MVXRP)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare XRP Index covers the performance of a digital assets portfolio which invests in XRP
- Total market capitalization – USD 7.75 billion
- Index history back to 31 January 2015
- Ripple (XRP) is a distributed peer-to-peer network - transactions occur immediately across the network. The network is resilient to systemic risk.
- XRP is not mined - unlike Bitcoin and others. However, each transaction destroys a small amount of XRP which adds a deflationary measure into the system.
- Currently, there are 40 billion XRP



Data as of 30 June 2020

## Component

XRP	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	147,172,679

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	-8.30%	All Time High/Low	22,591 / 29
1-Year Performance	-56.52%	52-Weeks High/Low	2,902 / 1,019
Since Inception	59.69%	Quarter High/Low	2,366 / 1,019
		Month High/Low	1,490 / 1,262

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
100,000,000,000	-	N/A
Difficulty Adj.	BlockRR.	BlockNo.
1 block	-	-
Start Date	Twitter	Website
02.02.2013	@Ripple	-
Network H/s	Current Supply	Block Reward
-	99,991,850,794	-

\*Performance since inception is annualized

# MVIS CryptoCompare Zcash Index (MVZEC)

MVIS® INVESTABLE INDICES

- The MVIS® CryptoCompare Zcash Index covers the performance of a digital assets portfolio which invests in Zcash
- Total market capitalization – USD 0.48 billion
- Index history back to 30 November 2016
- Zcash (ZEC) is a privacy-driven digital asset. It uses the Equihash as an algorithm, which is an asymmetric memory-hard Proof of Work algorithm based on the generalized birthday problem.
- It relies on high RAM requirements to bottleneck the generation of proofs and making ASIC development unfeasible.
- Zcash uses zero-knowledge Succinct Non-interactive Arguments of Knowledge (zk-SNARKs) to ensure that all information (sender, receiver, amount) is encrypted, without the possibility of double-spending.
- The only information that is revealed regarding transactions is the time in which they take place.



Data as of 30 June 2020

## Component

Zcash	100.00%
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## Liquidity

Top 5 Components	Period	Volume (USD)
Average	1 Month June Review	56,600,352

## Fundamental Data

Index Performance	Value	Index Records	Value
Year-to-Date Performance	85.54%	All Time High/Low	11,981 / 348
1-Year Performance	-50.58%	52-Weeks High/Low	1,549 / 348
Since Inception	-7.18%	Quarter High/Low	1,076 / 348
		Month High/Low	855 / 734

## Digital Asset Specifications

Max Supply	Algorithm	Proof Type
21,000,000	Equihash	PoW
Difficulty Adj.	BlockRR.	BlockNo.
-	0.5	899786
Start Date	Twitter	Website
28.10.2016	@zcashco	-
Network H/s	Current Supply	Block Reward
7,038,023,024.00	9,583,663	6.3

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