DIGITAL ASSETS
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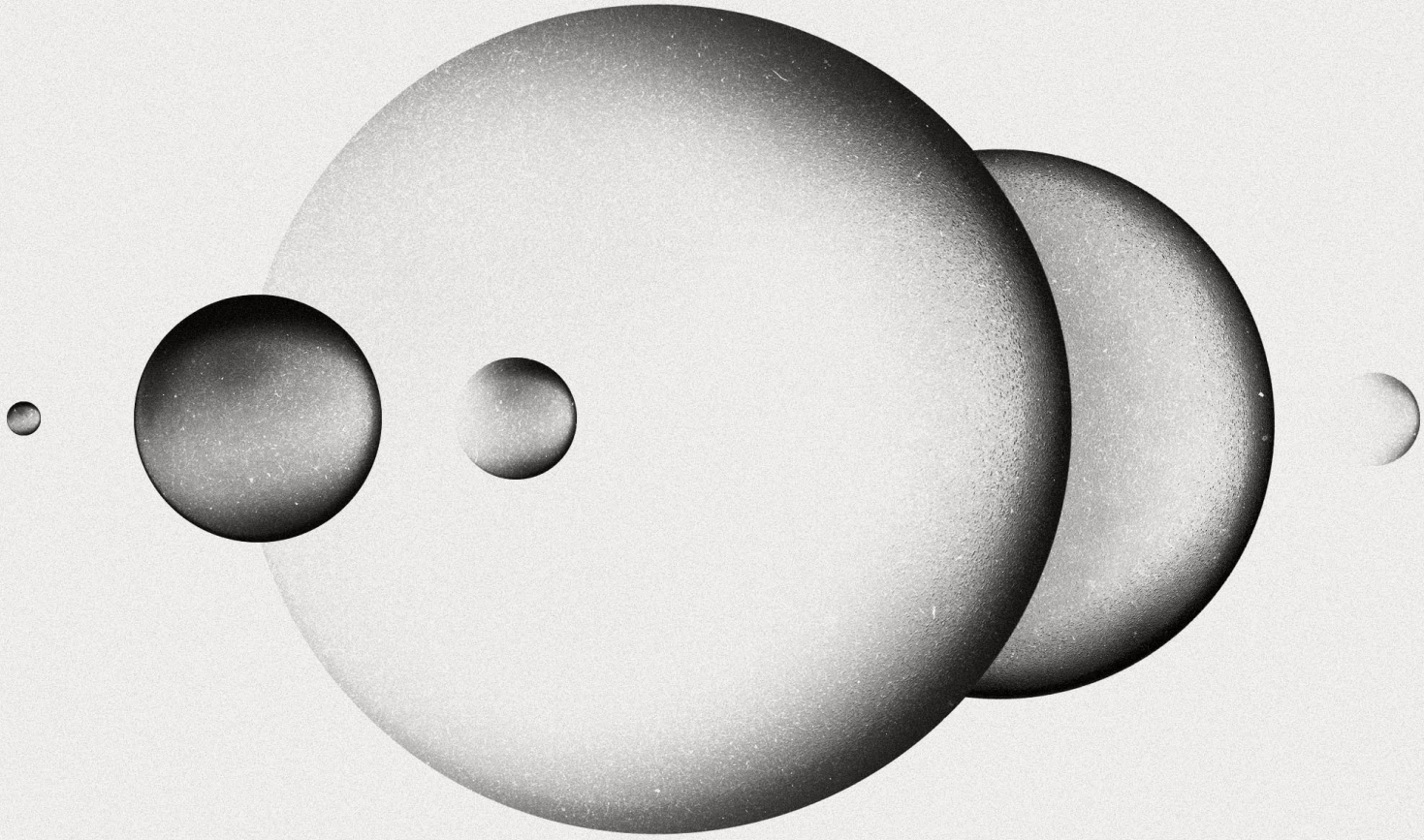
A Classification Framework for Digital Assets

Sorting out the crypto world



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A Classification Framework for Digital Assets

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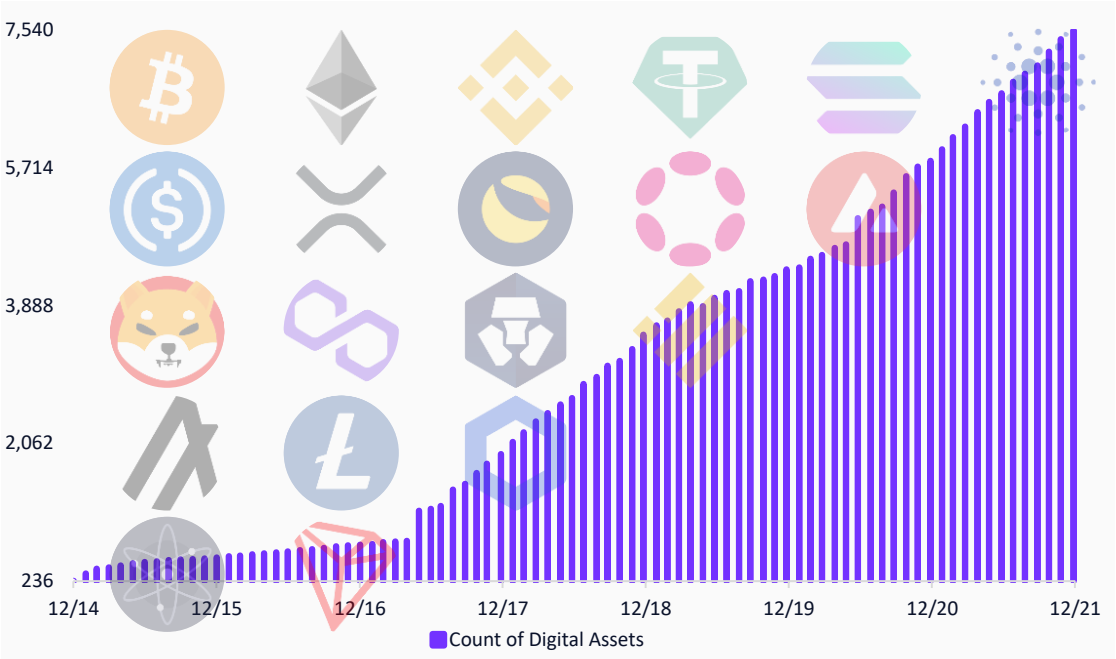
"Classifications can be useful for identifying market cycles and quickly assessing which sectors are outperforming. It enables investors to exploit those narrative plays end enhance the alpha potential of their portfolios."

"MarketVector Indexes™ (´MarketVector´) has developed a classification scheme for digital assets and provides category indexes that allow users to measure, benchmark, and capture the performance and characteristics of targeted categories within the digital assets, making digital assets more digestible to traditional finance investors while giving crypto native funds additional benchmarking capabilities."

Sorting out the Crypto World

According to the data provider CoinMarketCap, there are over 20,000 digital assets, which leads to increasing options as well as confusion for investors. Are there really so many tokens required in order to facilitate payments? How should investors choose amongst the various options? How should investors evaluate and monitor their choices?

Exhibit 1: Growth of Digital Assets

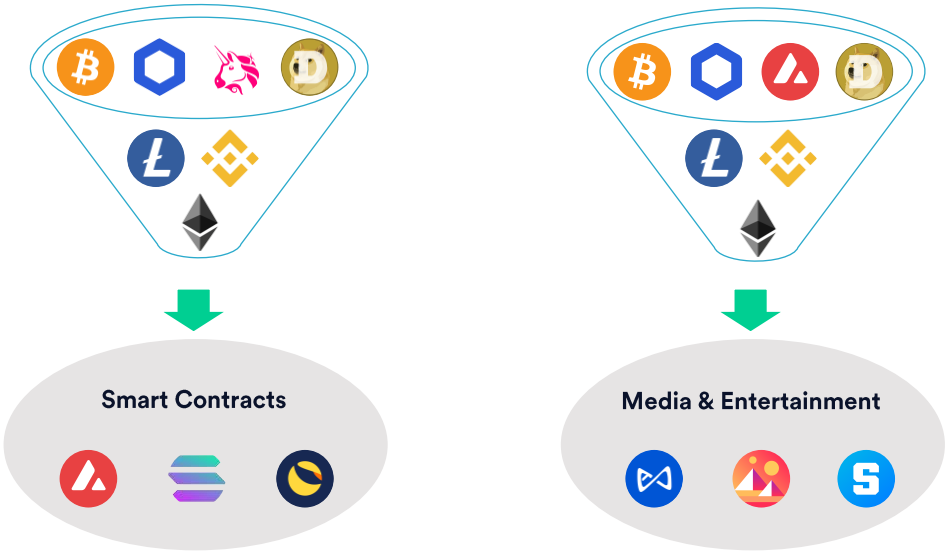


Source: MarketVector Research & CryptoCompare.

The answers are not trivial. As software, these tokens perform different functions and their functions and use cases can change over time. To simplify the answers, investors increasingly look at the actual usage and underlying microeconomics of various networks and trading activity around a token's unique drivers of growth. Grouping and categorizing tokens is an important part to structuring optimal investment decisions.

The world has gone from a singular focus on Bitcoin to a wider adoption of DeFi apps, distributed computing platforms, NFTs etc. As with the equity markets, categorization of sub asset groupings into sectors and more recently themes are important in the institutional adoptions of diverse asset classes. MarketVector digital asset categories use a top down approach to digital assets to reduce the complexity of the highly fragmented crypto space and to allow investors to see the developments on the market beyond short-term speculation on individual token.

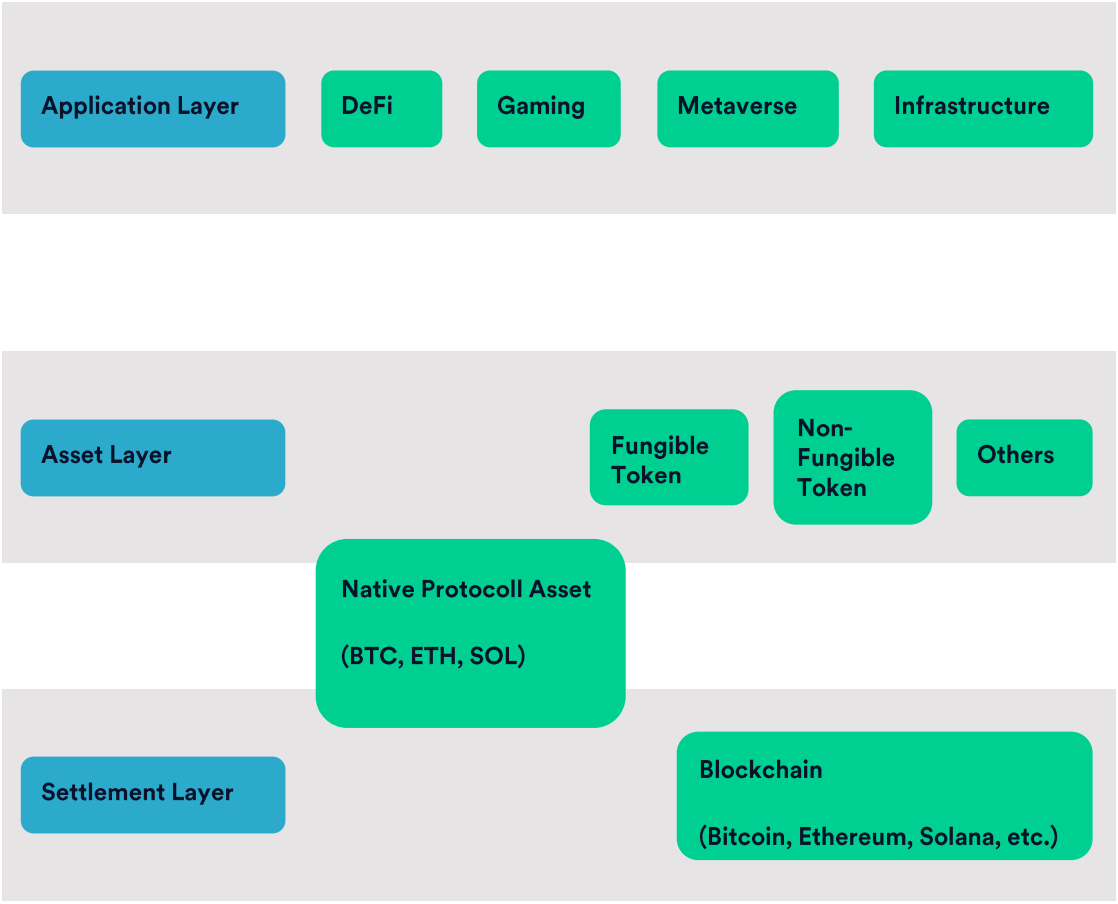
Exhibit 2: Categorizing Digital Assets



Source: MarketVector Research.

As the crypto ecosystem is structured in different layers, the first step is to differentiate across the different layers. Settlement layers are the foundation for all activities in a decentralized ecosystem. They consist of the blockchain, as well as its native asset. They store information and value, as well as ownership securely and ensure that any change of the ownership status follows the network's rules. They provide trustless execution and finally serve as the ultimate dispute resolution and settlement layer for transactions and state transitions. Everything built on top of the settlement layer inherits the security and cannot influence its rules or functionality. The asset layer consists of all assets that are issued on top of the settlement layer. This includes the network's native asset (e.g. ETH, SOL, ADA etc.) which fuel and secure the ecosystem. Besides that, different token types such as fungible, semi-fungible and non-fungible token are issued. They serve numerous functionalities, and thus have unique characteristics and properties. The Protocol Layer provides the core functionality of decentralized applications. Decentralized applications are implemented as a smart contract, or collection of smart contracts that can be interacted with by a user or application.

Exhibit 3: Digital Asset Layers



Source: MarketVector Research.

As the digital asset ecosystem grows and evolves, tracking and defining layers will become more complex.

MarketVector™

The MarketVector Digital Asset Classification Scheme: Built on a history of innovation

In 2017, MarketVector in partnership with CryptoCompare — an established London-based digital assets data provider — became the first regulated index provider to launch a series of digital assets indexes designed to accurately track the performance of the otherwise fragmented global digital assets markets. These indexes were the first to meet applicable benchmarking standards by providing a public rulebook, industry-wide data distribution, proper identifiers and further standard index governance requirements. Today, MarketVector is regulated under the EU Benchmark regulation directive and is the first index provider with such regulatory status to offer transparent and industry standard digital asset indexes.

In 2021, MarketVector introduced a categorization scheme of digital asset coins into distinct, non-overlapping categories that form the building blocks for our new **Digital Asset Classification Scheme**. Categories capture the value and use case related to a coin. We need to appreciate the vast functional differences of crypto assets and yet be able to talk about meaningful high-level crypto asset categories. At the same time, we have to provide both the required level of detail and abstraction.

MarketVector's focus is to create a robust classification standard that accurately reflects the digital asset space. Appropriate definitions for each level of the structure are needed in order to provide transparency. The classification is determined based on the business description of the digital asset which is most often found on the digital asset's public website. As you might know from the Global Industry Classification Standard (GICS), which is widely used by equity investors, MarketVector uses the same starting point for digital tokens. With exclusionary categories, each coin can only fit in one category. Any time a coin is greater than 250mn USD in market cap and has an average daily turnover of at least 10mn USD, we do the deep dive to read the white paper, read various third party research, and look at the community -- including telegram, discord channels -- in order to identify the use case.

MarketVector uses a qualitative approach focused on the economic drivers behind the protocol. The structure of our classification will be reviewed periodically and require modifications as the digital asset landscape continues to evolve. Any material changes will be announced prior to implementation.

Exhibit 4: MarketVector Digital Asset Categories (Top 420 token)

Category	Definition	Examples	# of coins
DeFi	Financial services built on top of distributed networks with no central intermediaries	Uniswap, Aave	84
Exchange	Tokens owned and operated by a centralized cryptocurrency exchange	Binance, FTX	15
Infrastructure Applications	A decentralized computer program designed to perform specific tasks	Polygon, Chainlink	100
Media & Entertainment (Metaverse)	Used to reward users for content, games, gambling or social media	Axie Infinity, Decentraland, Basic Attention Token	56
Payments	Digital, non-stable money for use in distributed network	Bitcoin Cash, Litecoin, Dogecoin	61
Smart Contract Platforms	Blockchain protocol designed to host variety of self-developed and 3rd party applications	Ethereum, Polkadot, Solana	74
Stablecoins	Designed to minimize volatility by pegging to a more stable asset	Tether, USDC	23
Store of Value	Designed to hold or increase purchasing power over time	Bitcoin, wrapped Bitcoin	3

Source: MarketVector Research.

The MarketVector categorization model can be used to

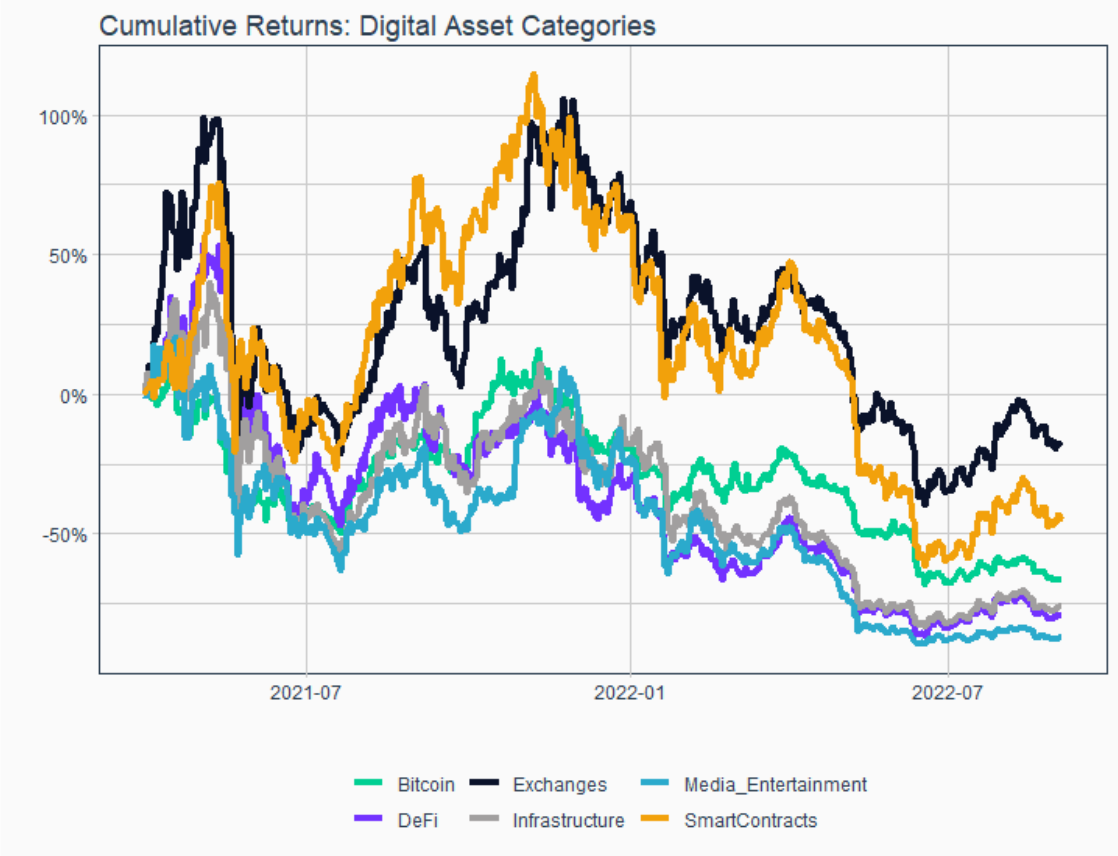
- differentiate crypto asset sectors,
- diversify crypto asset portfolios and
- analyze individual, peer and aggregated performance review.

As the basis for investable indexes, the MarketVector categories can provide the underlying components to build an investment solution aimed at capturing the performance of the tokens within the category or provide guidance on how to allocate across categories.

Category Performance

Our analysis of cumulative returns revealed that the performance of digital asset sectors differ significantly. Phases of high correlation can alternate with phases of high dispersion. Exhibit 5. illustrates the performance differences amongst crypto categories. Between September and December 2021, the Media & Entertainment category (Decentral and, Axie, Flow etc.) returned 83%, while Decentralized Finance (Uniswap, AAve, Maker etc.) underperformed and returned a disappointing -9%.

Exhibit 5: Cumulative returns by Classification



Source: MarketVector Research, CryptoCompare. Data as of September 6, 2022.

The crypto space is largely narrative-driven. Mini cycles change on a constant basis and rotate between sectors. We all remember the DeFi summer of 2020 which was the followed by the DeFi winter in 2021. As media attention turned toward Meta (the company previously incorporated as Facebook), the performance of tokens in the Media & Entertainment Index (Metaverse), have been lifted by 48% within 3 days; but this can change abruptly. Even in a bear market, you recognize certain degree of dispersion.

Exhibit 6: Performance Ratios since April 2021

Category	Annualized Return	Annualized Sharpe (Rf=0%)	Annualized Volatility	Max Drawdown
Bitcoin	-41%	-0.6876	59%	72%
Exchanges	-9%	-0.1195	78%	71%
DeFi	-53%	-0.5423	99%	91%
Infrastructure Applications	-50%	-0.5325	93%	88%
Media & Entertainment	-63%	-0.6945	91%	91%
Smart Contract	-24%	-0.3044	79%	82%

Source: MarketVector Research.

The performance ratios indicate, that centralized exchanges and smart contract platforms showed some relative strength. Since the start of the category indexes in April 2021, both the annualized return and volatility are significantly better than the other categories. These figures therefore provide a good starting point for diving deeper into the individual categories and identifying value drivers.

Integrating Classification Schemes to Deliver Better Investment Solutions

MarketVector has four digital asset categories available:

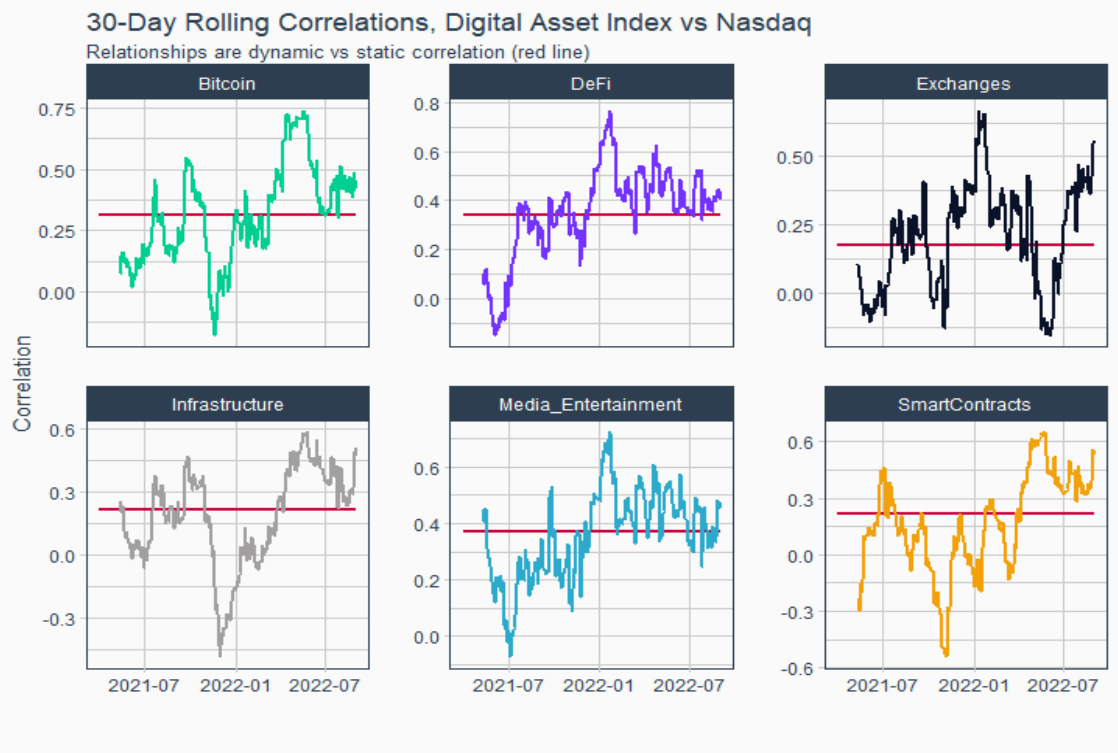
- The MarketVector™ Centralized Exchange Index (ticker: MVCEX),
- The MarketVector™ Decentralized Finance Index (ticker: MVDF),
- The MarketVector™ Infrastructure Application Index (ticker: MVIAP),
- The MarketVector™ Media & Entertainment Index (ticker: MVME),
- The MarketVector™ Smart Contract Index (ticker: MVSC).

These broad category indexes capture the performance of coins with $250m market cap and $10m average daily trading volume (ADTV). In addition to the broad categories, MarketVector provides a Leaders Index for each index category. The Leaders Indexes capture the performance of coins with $1bn market cap and $25m ADTV, and introduces additional screening requiring the coins to be traded on a major US exchange and supported by a reputable crypto custodian. In addition, the investable Leaders indexes include a 20% buffer for existing constituents so as to limit turnover.

- The MarketVector™ Decentralized Finance Leaders Index (ticker: MVDFLE),
- The MarketVector™ Infrastructure Application Leaders Index (ticker: MVIALE),
- The MarketVector™ Media & Entertainment Leaders Index (ticker: MVMELE),
- The MarketVector™ Smart Contract Leaders Index (ticker: MVSCLE).

As you can see from Exhibit 7, the rolling correlations between the broad and the Nasdaq 100 (QQQ ETF) are quite diverse. For example, there's a huge difference in the correlation profile between DeFi and Exchanges indicating that there should be diversification benefits over time.

Exhibit 7: Rolling Correlations



Source: MarketVector, Yahoo Finance (QQQ) based on daily returns. Data as of September 6, 2022.

Of the current MarketVector categories identified, some are not, at present, suitable for building investable indexes:

- **Payments:** this category includes meme coins such as Dogecoin and Shiba Inu, and prominent forks such as Bitcoin Cash and Bitcoin SV. While a "meme coin" category might emerge in future iterations, for now, MarketVector sees less demand among market participants for a category that includes both meme coins and prominent forks. If and as the digital assets market cap grows as we expect, investors should expect further sub-categorization of "Payments" etc.

- **Stablecoins:** these coins aim to peg their value to another asset. While MarketVector believes market participants will find value in an index that tracks the yields on stablecoins, there is currently no use case for a stablecoin price index.

- **Store of Value:** this category includes Bitcoin, wrapped Bitcoin and Bitcoin Gold. Bitcoin itself offers pure enough exposure to this category.

Classifications can be useful for identifying market cycles and quickly assessing which sectors are outperforming. Classifications enable investors to exploit those narrative plays and can enhance the alpha potential of their portfolios. MarketVector digital asset category indexes allow users to measure, benchmark, and capture the performance and characteristics of targeted categories, enabling digital assets to be more comprehensible to traditional finance investors, while providing crypto native funds additional benchmarking capabilities.

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Martin Leinweber is an expert in fundamental and quantitative trading strategies. He sees crypto assets as a fundamental building block for investors to achieve their return targets in a low interest rate environment. He works as a Digital Asset Product Strategist at MarketVector Indexes™ providing thought leadership in an emerging asset class. His role encompasses product development, research and the communication with the client base of MarketVector Indexes™. Prior to joining MarketVector Indexes™, he worked as a portfolio manager for equities, fixed income and alternative investments for almost two decades. He was responsible for the management of active funds for institutional investors such as insurance companies, pension funds and sovereign wealth funds at the leading German quantitative asset manager Quoniam. Previously, he held various positions at one of Germany's largest asset managers, MEAG, the asset manager of Munich Re and ERGO. Among other things, he contributed his expertise and international experience to the establishment of a joint venture with the largest Chinese insurance company PICC in Shanghai and Beijing. Martin Leinweber is co-author of "Asset-Allokation mit Kryptoassets. Das Handbuch" (Wiley Finance, 2021). It's the first handbook about integrating digital assets into traditional portfolios. He has a Master in Economics from the University of Hohenheim and is a CFA Charter holder.

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Joy Yang is Global Head of Index Product Management at MarketVector Indexes™. She is responsible for managing MarketVector Indexes™ products and services to accelerate innovation in financial index design and adoption. Joy brings more than 25 years of investment experience to MarketVector Indexes™, having led teams delivering index and quantitative-active investment solutions at Arabesque Asset Management, Dimensional Fund Advisors, Vanguard, Aberdeen Standard Investments, AXA Rosenberg, and Blackrock. Joy has an MBA from the University Of Chicago Booth School Of Business, and a BS in Electrical Engineering from Cooper Union's Albert Nerken School of Engineering.

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All information shown prior to the index launch date is simulated performance data created from back testing ("Simulated past performance"). Simulated past performance is not actual but hypothetical performance based on the same or fundamentally the same methodology that was in effect when the index was launched. Simulated past performance may materially differ from the actual performance. Actual or simulated past performance is no guarantee for future results.

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