

Digital Assets Quarterly

Chart Pack Q4 2022

A weaker dollar increased risk appetite for traditional assets such as US equities, emerging markets, and gold. Neither tech stocks nor crypto assets participated in this rise. Recently, most Layer-1 smart contract platforms underperformed Bitcoin and Ethereum as investors sold anything they could to fund redemptions amid broader sector deleveraging. The ongoing consequences from the FTX fraud, many Bitcoin miner bankruptcies, and solvency concerns at DCG's lending business Genesis, in particular, provided fundamental and liquidity-based obstacles.

In general, the MVDA Top 10 index, Ethereum, Bitcoin, and centralized exchanges have been the most defensive tokens in recent quarters. Despite the FTX fall and subsequent Huobi news, exchange tokens are still outperforming most other categories on a relative basis. Many investors are also skeptical of Binance, citing a lack of transparency for these unregulated entities. However, we notice no underperformance as compared to the other Top 10 coins.

Large cap crypto assets are outperforming their small cap counterparts in such a volatile market. As a result, Bitcoin and smart contract platforms suffered less than media and entertainment. In recent quarters, this category has consistently ranked bottom. This underperformance was caused by a drop in daily active users and unfavorable tokenomics.

The majority of publicly traded bitcoin mining companies have suffered massive losses in value. CleanSpark, the top performer among the five largest public bitcoin miners evaluated by bitcoin hashrate, lost 79%. Other crypto-related equities are also plunging. Silvergate faces \$8 billion in withdrawals and a 40% reduction in employment. Silvergate has been a critical infrastructure provider for exchanges, and its problems are resonating throughout the sector, including Coinbase.

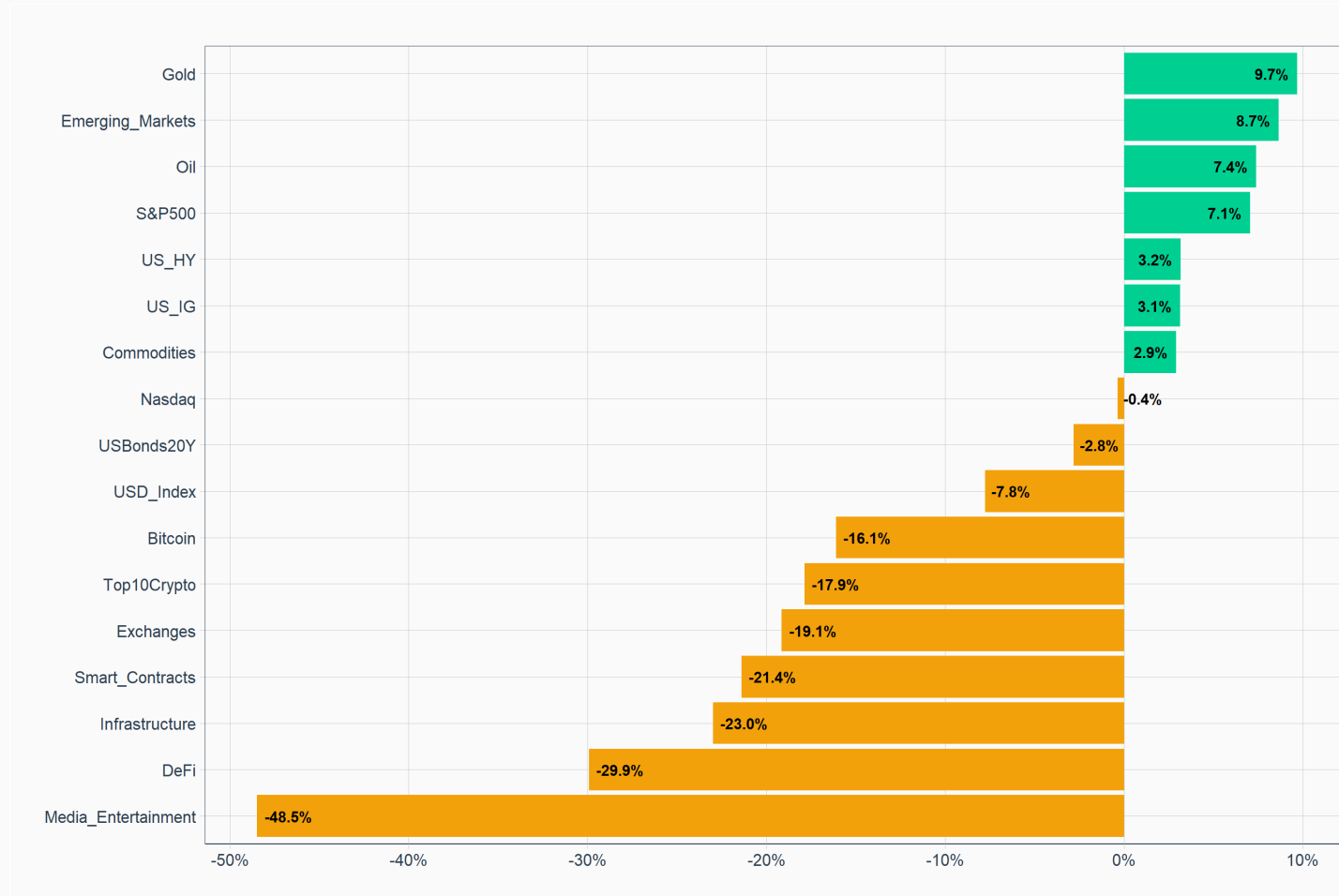
Even in this severe bear market, the dominance of Bitcoin is staying flat at roughly 40%. This is surprising because Bitcoin's dominance should rise during a bear market. We don't yet observe a higher trend that is sustainable even when stablecoins are excluded.

Following the FTX implosion in early November, the crypto market has experienced unusually low volatility. Prices have been virtually unchanged for almost a month, with the exception of a small jump upward in mid-December. This is unique for the cryptocurrency market, which has always been recognized for extreme volatility, which allows for several trading opportunities.

Last quarter, a weaker Dollar supported traditional asset classes, but not crypto

Cross Asset Return

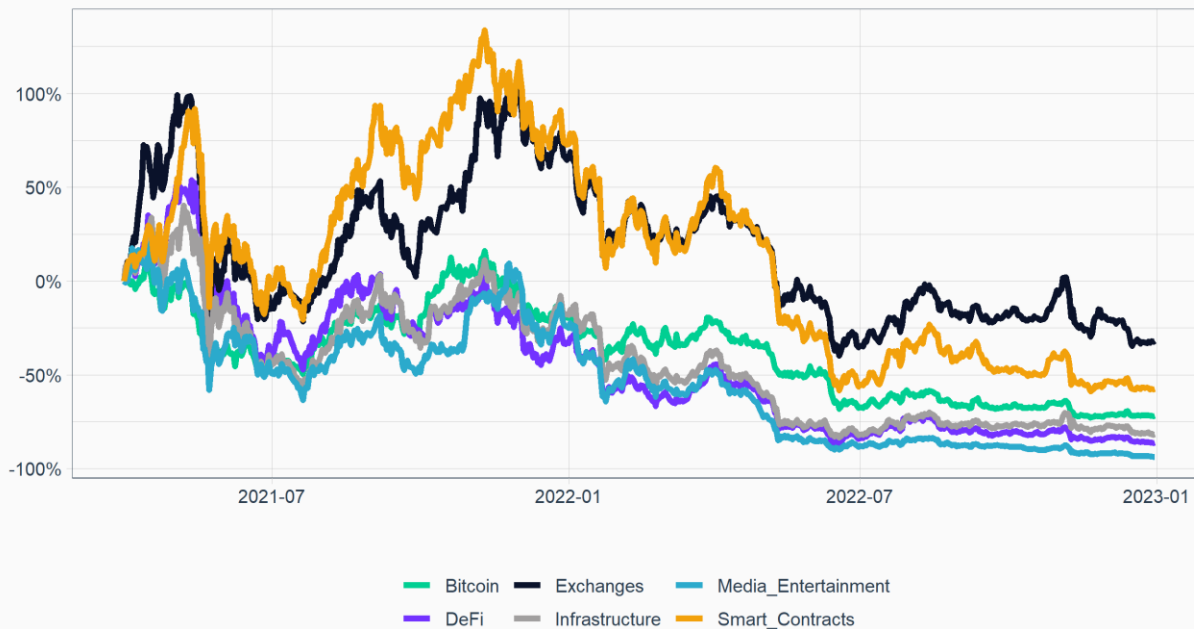
Cumulative Return: 2022-09-30 to 2022-12-30



Source: MarketVector Indexes™ ("MarketVector"), Yahoo Finance. Indexes used MVBTC, MVDA10, MVCEX, MVDF, MVIAP, MVME, MVSC. Traditional returns based on ETF returns from GLD, TLT, GSG, QQQ, SPY, EEM, UUP, USO, LQD, HYG.

The difference between the best and worst performers is quite large

Cumulative Return: 2021-03-31 to 2022-12-31

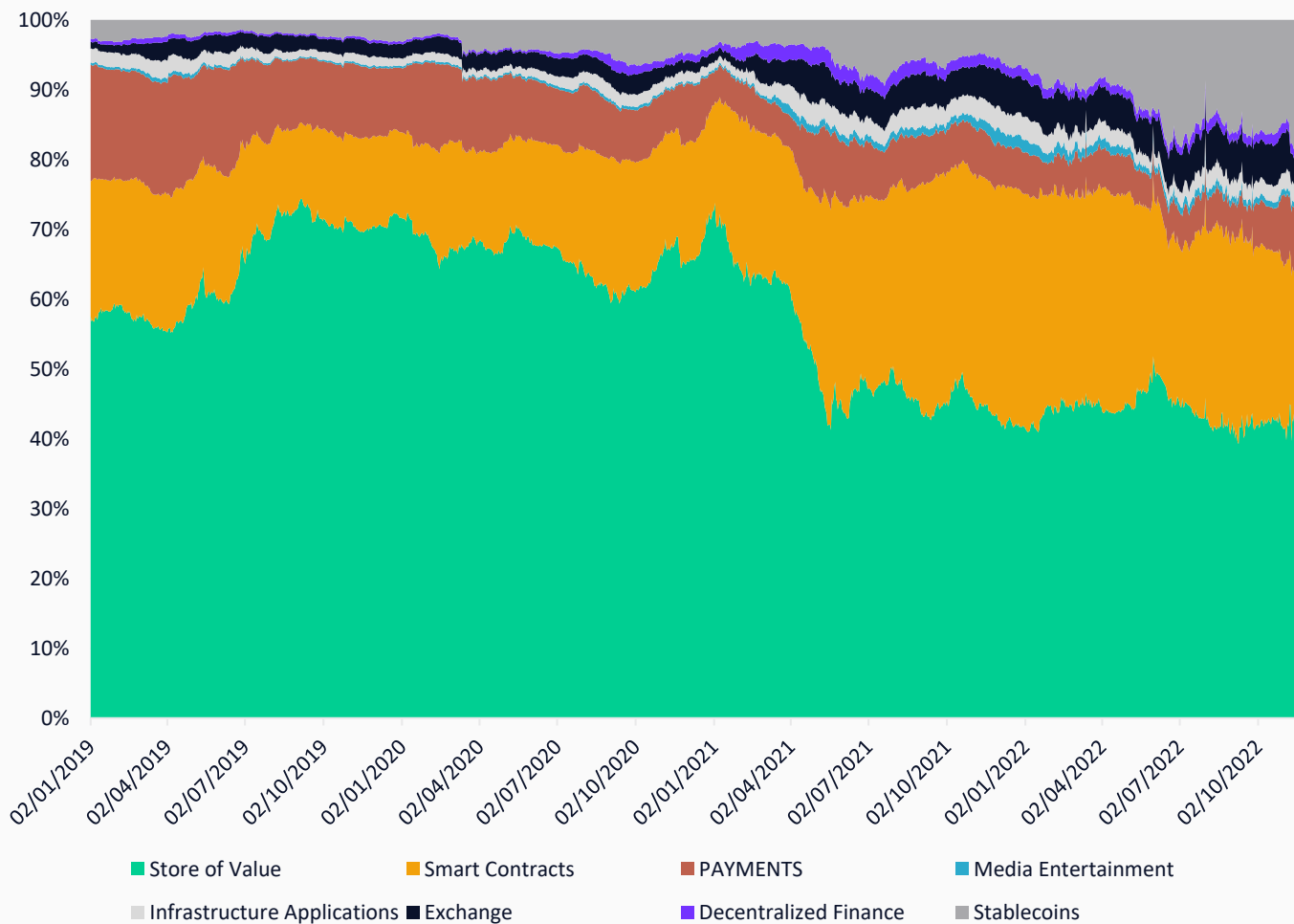


Name	Week	Month	Quarter	Year	All
Bitcoin	-1.32%	-2.0%	-15.8%	-65.1%	-71.9%
DeFi	-1.09%	-15.8%	-29.0%	-79.0%	-86.1%
Exchanges	1.41%	-13.9%	-18.4%	-58.8%	-31.8%
Infrastructure	-2.94%	-20.7%	-22.0%	-77.8%	-81.7%
Media Entertainment	-6.07%	-23.7%	-47.7%	-91.7%	-93.7%
Smart Contracts	-1.21%	-8.9%	-20.7%	-75.5%	-57.5%

Source: MarketVector. Indexes used: MVBTC = Bitcoin, MVCEX = Exchanges, MVDF = DeFi, MVIAP = Infrastructure, MVME = Media_Entertainment, MVSC = Smart_Contracts.

Store-of-Value dominance isn't rising in this bear market

Category Dominance: 01-01-2019 to 12-31-2022



Source: MarketVector. Indexes used: MVBTC = Store-of-Value, MVCEX = Exchanges, MVDF = DeFi, MVIAP = Infrastructure Applications, MVME = Media_Entertainment, MVSC = Smart_Contracts.

Digital Asset Returns: Quarterly Index Ranking



Q1-2020	Q2-2020	Q3-2020	Q4-2020	Q1-2021	Q2-2021	Q3-2021	Q4-2021	Q1-2022	Q2-2022	Q3-2022	Q4-2022
Ethereum 25.6%	Ethereum 70.8%	Ethereum 58.4%	Bitcoin 163.2%	Small-Cap 361.2%	Ethereum 14.2%	Smart Contract Platforms 71.2%	Media & Entertainment 62.0%	Bitcoin -3.7%	Exchanges -53.3%	Infrastructure Applications 34.8%	Ethereum -11.7%
Mid-Cap 14.9%	Small-Cap 62.2%	Smart Contract Platforms 36.2%	Ethereum 103.1%	Infrastructure Applications 347.7%	Smart Contract Platforms -9.0%	Small-Cap 45.3%	Exchanges 43.2%	Top 10 -11.2%	Bitcoin -58.2%	Ethereum 31.6%	Bitcoin -16.1%
Small-Cap 12.9%	Smart Contract Platforms 56.6%	Top 10 34.5%	Top 10 93.1%	Mid-Cap 300.1%	Top 10 -14.8%	Mid-Cap 41.8%	Ethereum 25.6%	Ethereum -12.7%	Top 10 -64.3%	Exchanges 29.0%	Top 10 -17.9%
Top 10 12.4%	Bitcoin 42.5%	Mid-Cap 26.5%	Smart Contract Platforms 73.0%	Smart Contract Platforms 256.6%	Exchanges -14.9%	Ethereum 41.5%	Mid-Cap 14.9%	Smart Contract Platforms -12.9%	Mid-Cap -64.5%	Decentralized Finance 21.1%	Exchanges -19.1%
Bitcoin 10.5%	Top 10 34.8%	Bitcoin 17.6%	Mid-Cap 40.9%	Top 10 174.2%	Mid-Cap -19.4%	Top 10 37.2%	Infrastructure Applications 13.6%	Mid-Cap -15.3%	Decentralized Finance -67.2%	Mid-Cap 19.7%	Infrastructure Applications -23.4%
Smart Contract Platforms 9.9%	Mid-Cap 32.0%	Small-Cap -7.8%	Small-Cap 37.2%	Ethereum 153.8%	Small-Cap -29.3%	Exchanges 35.1%	Small-Cap 12.9%	Exchanges -15.8%	Small-Cap -67.8%	Smart Contract Platforms 18.2%	Smart Contract Platforms -28.8%
				Bitcoin 107.9%	Infrastructure Applications -34.9%	Bitcoin 25.8%	Top 10 12.4%	Small-Cap -20.0%	Ethereum -68.4%	Top 10 15.8%	Decentralized Finance -30.4%
					Decentralized Finance -39.5%	Media & Entertainment 23.2%	Bitcoin 10.5%	Infrastructure Applications -27.4%	Infrastructure Applications -71.0%	Small-Cap 6.1%	Small-Cap -33.5%
					Bitcoin -42.1%	Infrastructure Applications 21.0%	Smart Contract Platforms 9.9%	Decentralized Finance -28.4%	Smart Contract Platforms -71.7%	Media & Entertainment 5.8%	Mid-Cap -39.6%
					Media & Entertainment -51.1%	Decentralized Finance 20.8%	Decentralized Finance -9.0%	Media & Entertainment -32.3%	Media & Entertainment -76.9%	Bitcoin 3.1%	Media & Entertainment -49.5%

Source: MarketVector. Returns are ending 30 December, 2022. Index returns are the equal weighted returns of underlying Thematic indexes listed in Exhibit 2.

Large Caps were the most defensive token

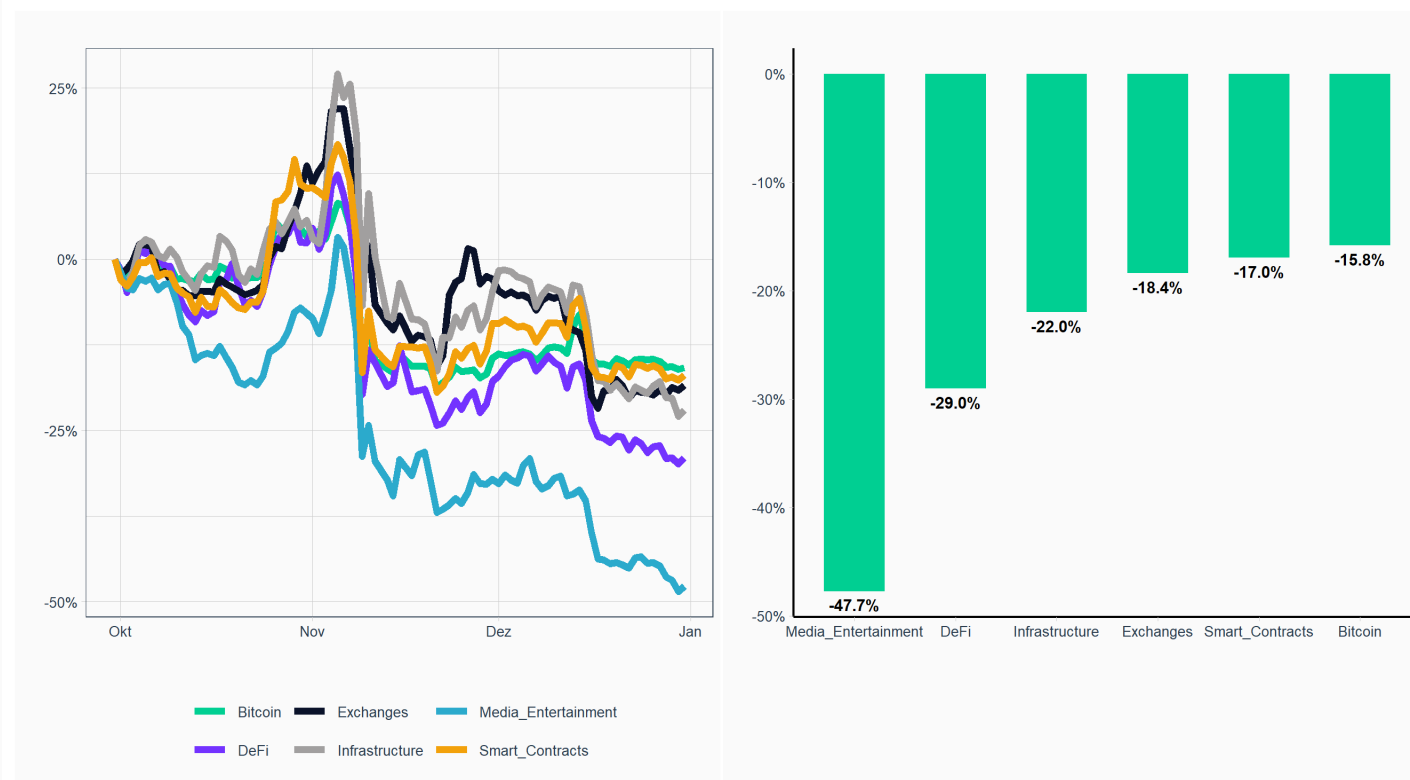
Performance by Size: Cumulative Return:
2022-09-30 to 2022-12-31



Source: MarketVector. Indexes used: MVDALC = Large Cap, MVDAMC = Mid Cap, MVDASC = Small Cap. The MVIS® CryptoCompare Digital Assets 100 Large-Cap Index (MVDALC) is a market cap-weighted index which tracks the performance of the 20 largest digital assets in the MVIS CryptoCompare Digital Assets 100 Index. The MVIS® CryptoCompare Digital Assets 100 Mid-Cap Index (MVDAMC) is a market cap-weighted index which tracks the performance of the 30 mid-size digital assets in the MVIS CryptoCompare Digital Assets 100 Index. The MVIS® CryptoCompare Digital Assets 100 Small-Cap Index (MVDASC) is a market cap-weighted index which tracks the performance of the 50 smallest digital assets in the MVIS CryptoCompare Digital Assets 100 Index.

There's a huge dispersion between different categories

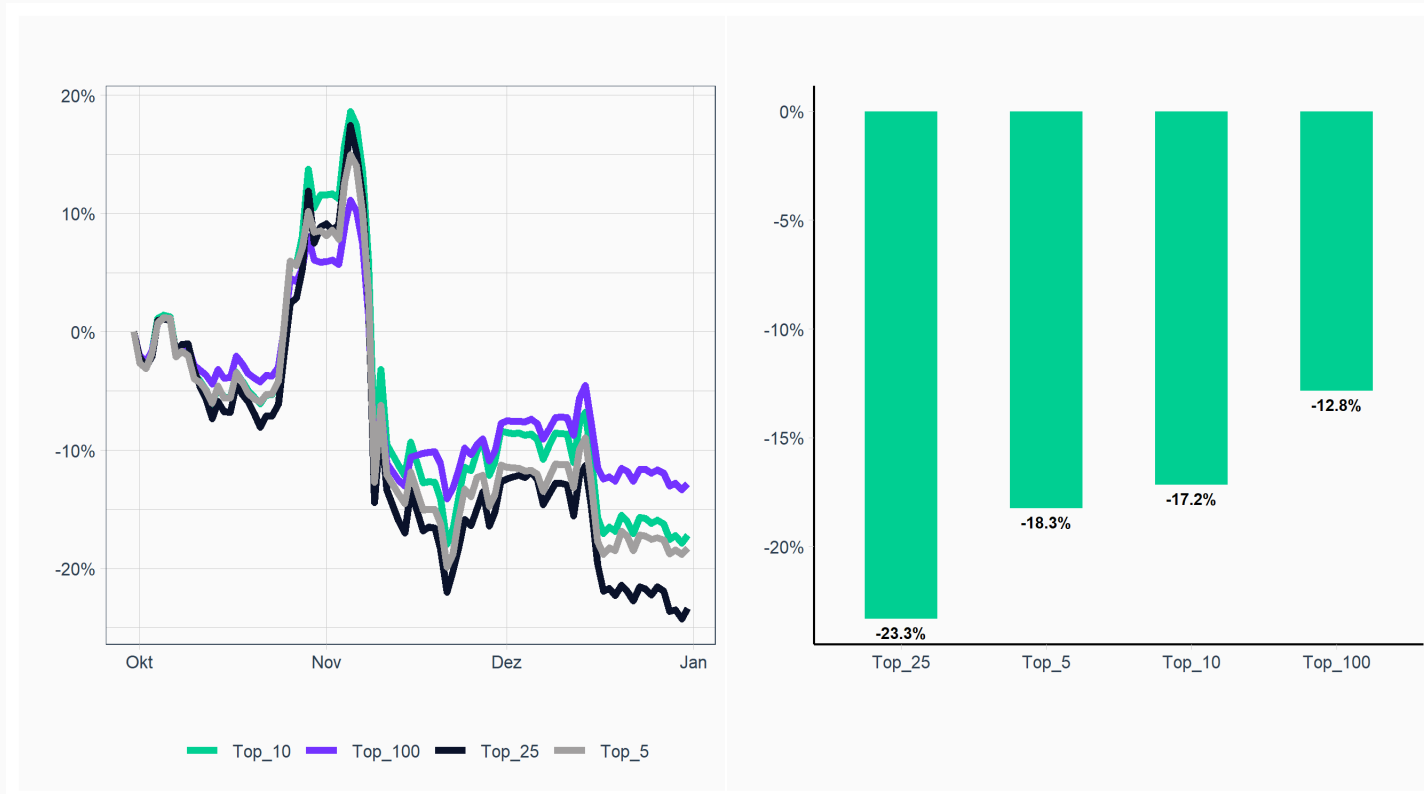
Performance by Categories: Cumulative Return:
2022-09-30 to 2022-12-31



Source: MarketVector. Indexes used: MVBTC = Bitcoin, MVCEX = Exchanges, MVDF = DeFi, MVIAP = Infrastructure, MVME = Media_Entertainment, MVSC = Smart_Contracts.

The Top 100 Index benefited from a greater proportion of BTC and ETH.

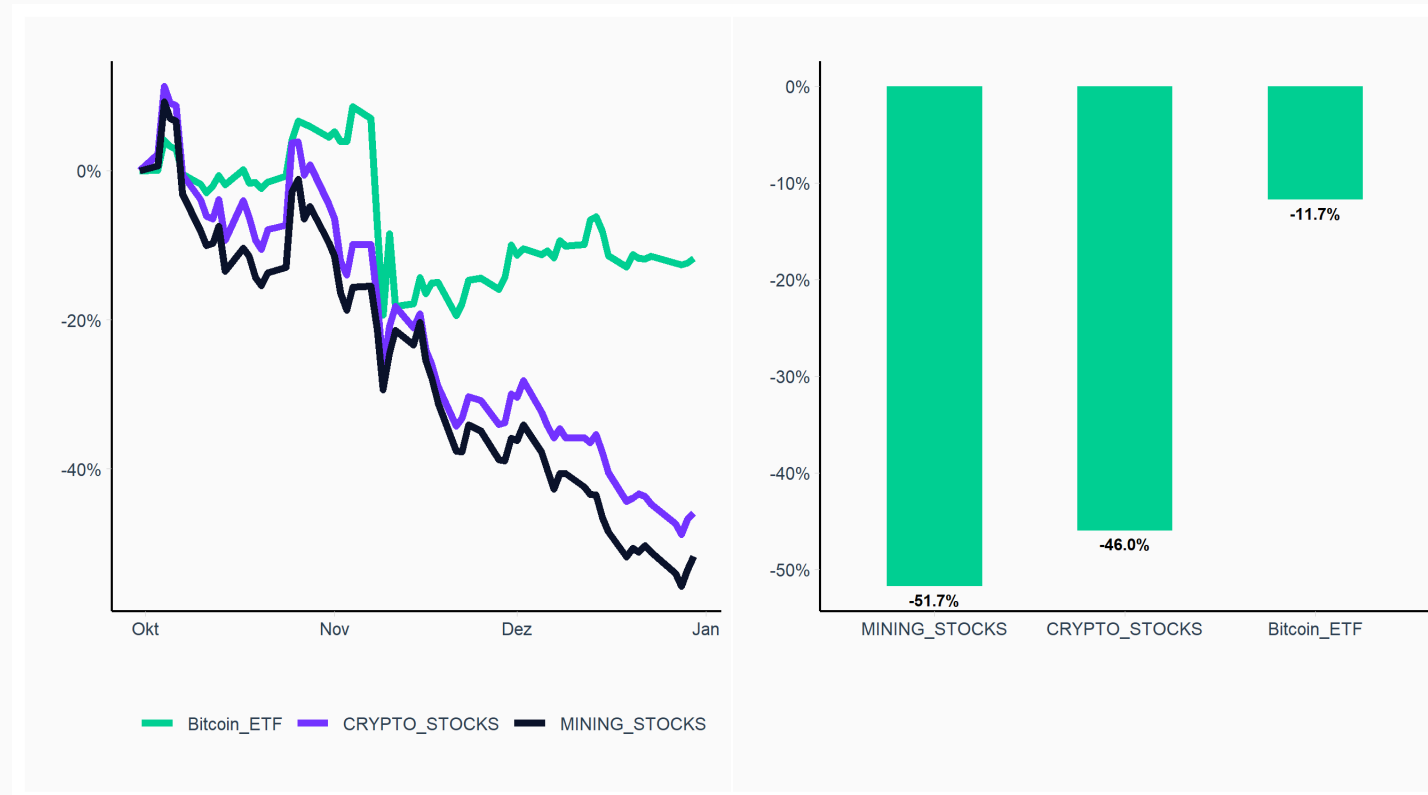
Performance by Top Market Cap: Cumulative Return:
2022-09-30 to 2022-12-31



Source: MarketVector. Indexes used: MVDA5 = Top 5, MVDA10 = Top 10, MVDA25 = Top 25, MVDA = Top 100.

Crypto-related stocks underperformed Bitcoin by a wide margin

Performance of Crypto Stocks vs. Bitcoin:
Cumulative Return: 2022-09-30 to 2022-12-31



Source: MarketVector, Yahoo Finance. ETFs used: XBTF = Bitcoin ETF, DAPP = Crypto Stocks, DAM = Crypto Mining

Correlations between Crypto Categories comparable to equity sector correlations

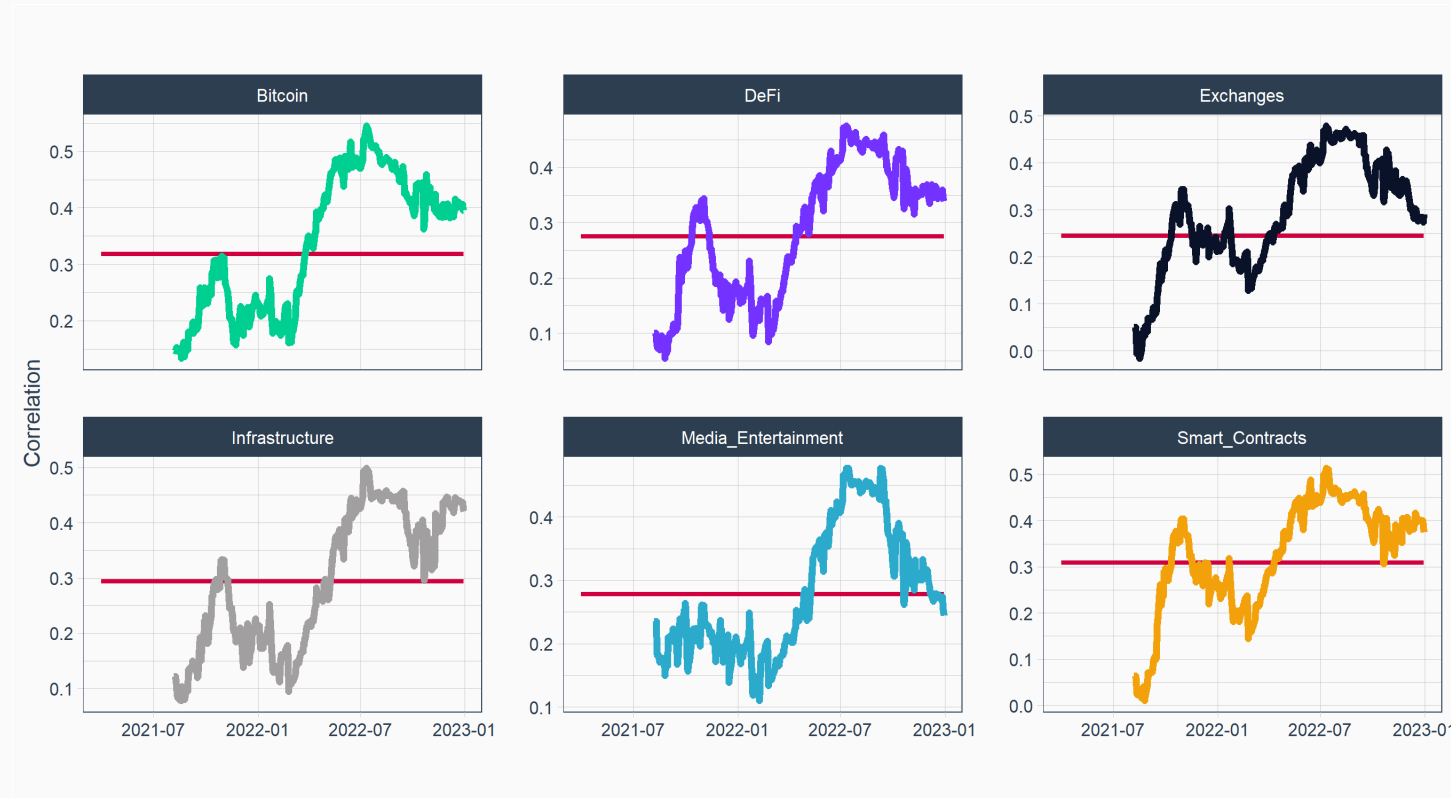
Correlation Matrix

	Bitcoin	Bonds	Commodities	DeFi	Exchanges	Gold	Infrastructure	Media Entertainment	Smart Contracts	QQQ
Bitcoin	1	-0.04	0.10	0.79	0.80	0.04	0.81	0.76	0.88	0.32
Bonds		1.00	-0.11	-0.03	-0.03	0.31	-0.03	-0.03	-0.04	0.07
Commodities			1.00	0.08	0.10	0.39	0.09	0.08	0.11	0.12
DeFi				1.00	0.83	0.07	0.91	0.84	0.90	0.27
Exchanges					1.00	0.07	0.83	0.80	0.86	0.24
Gold						1.00	0.09	0.05	0.08	0.14
Infrastructure							1.00	0.89	0.90	0.29
Media Entertainment								1.00	0.83	0.28
Smart Contracts									1.00	0.31
QQQ										1.00

Source: MarketVector, Yahoo Finance. Indexes used MVBTC, MVCEX, MVDF, MVIAP, MVME, MVSC. Traditional returns based on ETF returns from GLD, GSG and QQQ. Daily returns used since 2021-03-31.

In general, rolling correlations have decreased

90-Day Rolling Correlations, Digital Asset Index vs Nasdaq
Relationships are dynamic vs static correlation (red line)



Source: MarketVector, Yahoo Finance. Indexes used MVBTC, MVCEX, MVDF, MVIAP, MVME, MVSC. Traditional returns based on ETF returns from QQQ. Daily returns used since 2021-03-31.

Bitcoin is approaching the 40% volatility level

Rolling 90-day Annualized Volatility

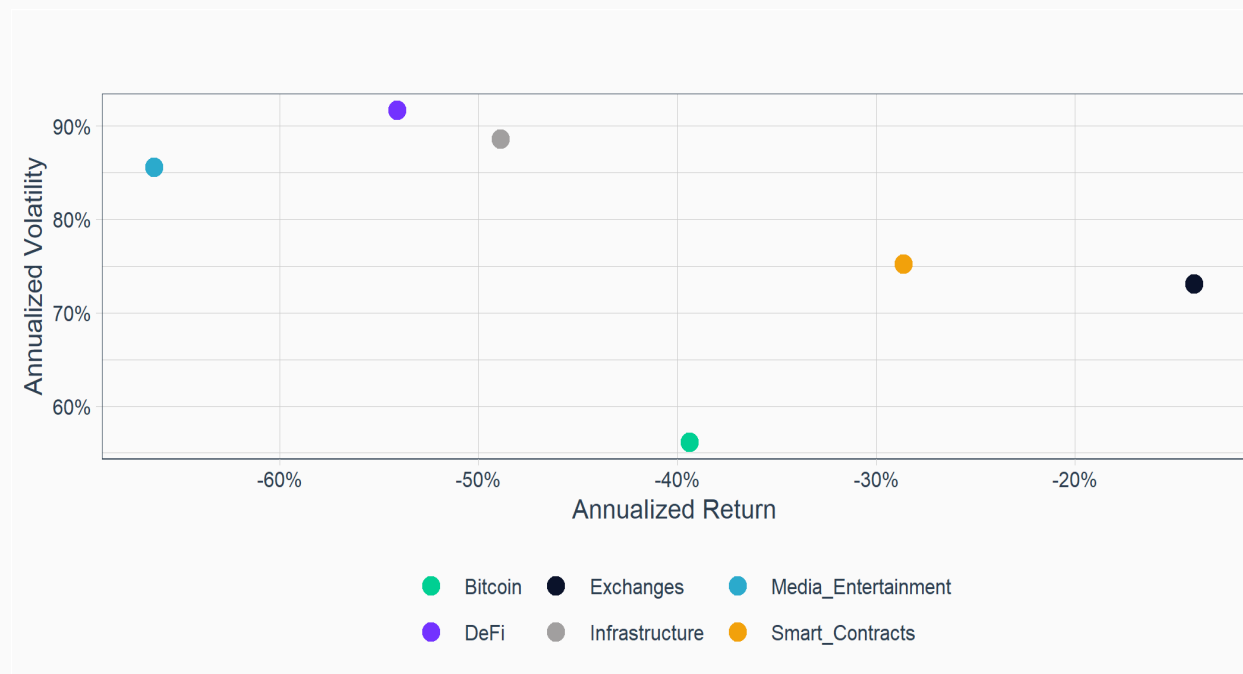


Source: MarketVector. Indexes used MVBTC, MVCEX, MVDF, MVIAP, MVME, MVSC. Daily returns used since 2021-03-31.

The exchanges are acting more defensively thus far, despite the fact that there were numerous headline and idiosyncratic risks



Risk & Return since 2021-03-31

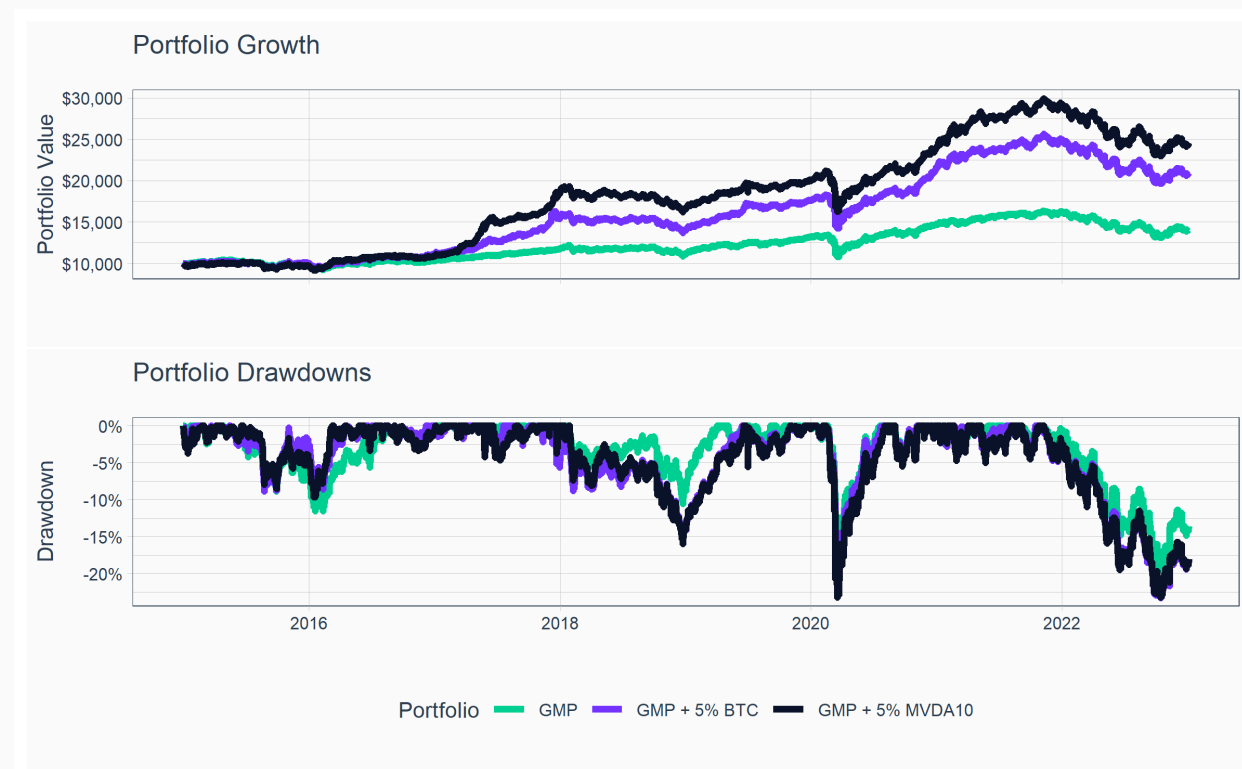


Name	Annualized Return	Sharpe Ratio	Annualized Vola	Max Drawdown
Bitcoin	-39%	-0.74	56%	77%
DeFi	-54%	-0.61	92%	91%
Media Entertainment	-66%	-0.79	86%	95%
Exchanges	-14%	-0.24	73%	71%
Infrastructure	-49%	-0.57	89%	88%
Smart Contracts	-29%	-0.42	75%	82%

Source: MarketVector. Indexes used MVBTC, MVCEX, MVDF, MVIAP, MVME, MVSC. Daily returns used since 2021-03-31.

In this bear market, a 5% crypto allocation has increased the max drawdown by 4%

Impact of BTC and a crypto basket with an initial investment of \$10k and quarterly rebalancing



Portfolio	Annualized Return	Sharpe Ratio	Annualized Vol	Max Drawdown
Global Market Portfolio (GMP)	3.01%	0.37	8.16%	19.47%
GMP + 5% Bitcoin	6.57%	0.68	9.62%	23.24%
GMP + 5% MVDA10	8.03%	0.79	10.12%	23.19%

Source: Source: MarketVector, Yahoo Finance. Indexes used MVBTC, MVDA10. Traditional returns based on ETF from ACWI, BND, GSG. Daily returns used since 2014-12-31. Data as of Dec 30, 2022.

Index Returns (USD, ending 30 December 2022)



Main	Universe	Index Ticker	Index Name	Meta Theme	Launch Date	Base Date	Quarterly Returns (USD)				Last3 Years (USD)		
							Q4-2022	Q3-2022	Q2-2022	Q1-2022	Ann Ret	Ann Stdev	Draw-Down
MVBTC	Single Token	MVBTC	MVIS® CryptoCompare Bitcoin	Bitcoin	10.23.17	01.31.12	-16.1%	3.1%	-58.2%	-3.7%	31.8%	78.7%	-40.5%
MVALGOV	Single Token	MVALGOV	MVIS® CryptoCompare Algorand VWAP Close Index	Algorand	12.22.21	06.30.19	-53.9%	22.2%	-70.5%	-44.5%	-10.1%	119.5%	-55.9%
MVAVAXV	Single Token	MVAVAXV	MVIS® CryptoCompare Avalanche VWAP Close Index	Avalanche	11.18.21	09.30.20	-38.3%	7.3%	-83.7%	-7.7%			
MVLINKV	Single Token	MVLINKV	MVIS® CryptoCompare Chainlink VWAP Close Index	Chainlink			-29.0%	28.6%	-66.2%	-13.0%	45.0%	138.1%	-46.5%
MVETH	Single Token	MVETH	MVIS® CryptoCompare Ethereum Index	Ethereum	10.23.17	08.31.15	-11.7%	31.6%	-68.4%	-12.7%	109.7%	111.2%	-47.7%
MVFTTV	Single Token	MVFTTV	MVIS® CryptoCompare FTX Token VWAP Close Index	FTT	12.22.21	11.30.21	-96.5%	3.1%	-54.1%	27.5%			
MVNEARV	Single Token	MVNEARV	MVIS® CryptoCompare NEAR VWAP Close Index	NEAR			-64.9%	12.6%	-77.5%	-9.8%			
MVMATICV	Single Token	MVMATICV	MVIS® CryptoCompare Polygon VWAP Close Index	Polygon	11.18.21	09.30.20	-2.7%	77.9%	-74.7%	-34.8%			
MVXRP	Single Token	MVXRP	MVIS® CryptoCompare XRP Index	XRP	10.23.17	01.31.15	-28.8%	51.9%	-60.7%	-4.6%	21.0%	175.4%	-66.5%
MVDA	Multi Token	MVDA	MVIS® CryptoCompare Digital Assets 100 Index	Top 100	10.23.17	12.31.14	-15.9%	9.3%	-58.5%	-10.1%	41.3%	76.8%	-35.2%
MVDA5	Multi Token	MVDA5	MVIS® CryptoCompare Digital Assets 5 Index	Top 5	10.23.17	12.31.14	-18.8%	18.6%	-64.6%	-11.7%	48.7%	92.1%	-40.4%
MVDA10	Multi Token	MVDA10	MVIS® CryptoCompare Digital Assets 10	Top 10	10.23.17	12.31.14	-17.9%	15.8%	-64.3%	-11.2%	54.5%	93.6%	-38.6%
MVDA25	Multi Token	MVDA25	MVIS® CryptoCompare Digital Assets 25 Index	Top 25	10.23.17	12.31.14	-24.3%	15.4%	-65.7%	-15.2%	48.2%	99.1%	-35.0%
MVDALC	Multi Token	MVDALC	MVIS® CryptoCompare Digital Assets 100 Large-Cap Index	Large-Cap	10.23.17	12.31.14	-13.7%	8.8%	-57.6%	-9.2%	42.1%	75.7%	-35.4%
MVDAMC	Multi Token	MVDAMC	MVIS® CryptoCompare Digital Assets 100 Mid-Cap	Mid-Cap	10.23.17	12.31.14	-39.6%	19.7%	-64.5%	-15.3%	40.4%	97.8%	-33.7%
MVDASC	Multi Token	MVDASC	MVIS® CryptoCompare Digital Assets 100 Small-Cap	Small-Cap	10.23.17	12.31.14	-33.5%	6.1%	-67.8%	-20.0%	19.4%	104.1%	-38.0%
MVLEADV	Multi Token	MVLEADV	MVIS® Cryptocompare Crypto Leaders VWAP Close Index	Crypto Leaders	12.07.21	12.31.18	-25.1%	8.4%	-66.5%	-10.2%	47.0%	94.6%	-38.4%
MVGCFI	Multi Token	MVGCFI	MVIS® CryptoCompare Optimum Global Cryptoasset Index	Fixed Multi Coins			-24.1%	12.0%	-64.5%	-9.2%			
MVWTAR	Multi Token	MVWTAR	Weiss MVIS Top Tech Adoption Rating Index	Weiss Tech Adoption Rating	12.16.20	12.31.17	-15.5%	12.9%	-62.9%	-10.0%	52.2%	86.8%	-42.0%
MVCEX	Multi Token	MVCEX	MarketVector™ Centralized Exchanges Index	Exchanges	06.01.22	02.28.21	-19.1%	29.0%	-53.3%	-15.8%			
MVDF	Multi Token	MVDF	MVIS® CryptoCompare Decentralized Finance	Decentralized Finance	10.08.21	01.31.21	-29.9%	22.8%	-69.4%	-22.4%			
MVDFLE	Multi Token	MVDFLE	MVIS® CryptoCompare Decentralized Finance Leaders	Decentralized Finance	10.08.21	01.31.21	-30.8%	19.3%	-65.0%	-34.3%			
MVIAP	Multi Token	MVIAP	MVIS® CryptoCompare Infrastructure Application	Infrastructure Applications	10.08.21	12.31.20	-23.0%	30.4%	-70.1%	-27.1%			
MVIALE	Multi Token	MVIALE	MVIS® CryptoCompare Infrastructure Application Leaders	Infrastructure Applications	10.08.21	12.31.20	-23.9%	39.2%	-71.8%	-27.8%			
MVME	Multi Token	MVME	MVIS® CryptoCompare Media & Entertainment	Media & Entertainment	10.08.21	03.31.21	-48.5%	2.8%	-76.5%	-33.7%			
MVMELE	Multi Token	MVMELE	MVIS® CryptoCompare Media & Entertainment Leaders	Media & Entertainment	10.08.21	03.31.21	-50.5%	8.8%	-77.3%	-30.8%			
MVSC	Multi Token	MVSC	MVIS® CryptoCompare Smart Contract	Smart Contract Platforms	10.08.21	12.31.17	-21.4%	22.5%	-70.9%	-12.9%	75.8%	108.8%	-43.5%
MVSCLE	Multi Token	MVSCLE	MVIS® CryptoCompare Smart Contract Leaders	Smart Contract Platforms	10.08.21	12.31.17	-36.2%	13.9%	-72.4%	-12.9%	51.5%	126.7%	-43.9%

Source: MarketVector. Price Return Indexes. Ratios based on monthly returns.

Digital Asset Classification Scheme

There is currently no standard definition of digital assets types, as there are for securities in various jurisdictions. Drawing distinctions between different types of digital assets is important because the regulatory treatment of a particular digital asset depends in large part on whether or not it is a “security”. MarketVector Indexes™ categorizes digital asset coins into distinct, non-overlapping categories that form the building blocks of a new crypto classification scheme. Categories capture the value and use case related to a coin. Using a qualitative process, each coin is categorized into one category.

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

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