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## Executive Summary

Over the past fifteen years, crypto has matured into a full-fledged asset class with hundreds of liquid tokens. However, most crypto allocations are still 100% Bitcoin. We believe proper asset-pricing models can help investors seeking to diversify beyond Bitcoin. Adapting traditional equity “factor investing” to crypto, we build a Four-Factor Model with crypto market, size, momentum and intangible value factors. These factors exhibit historical excess returns and can be implemented in simple long-only crypto portfolios.

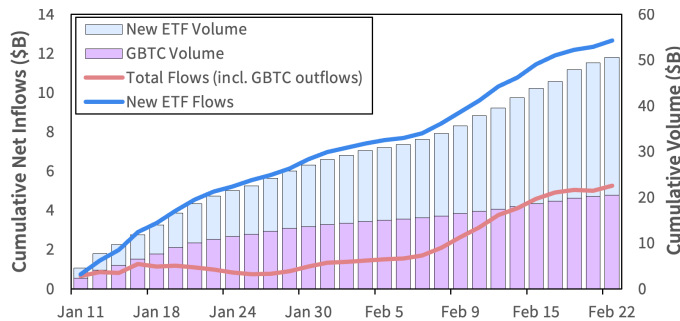
## Factor Investing

### Going Mainstream 🎉

On Jan 10, 2024, crypto achieved a milestone in its journey to becoming a mainstream asset class. On this day, Bitcoin exchange-traded funds (ETFs) were approved for listing on U.S. stock exchanges. In the weeks that followed, \$50 billion in shares were traded, resulting in \$5.2 billion in net inflows.

### Exhibit 1

#### Bitcoin ETF Flows



Source: S&P, Farside, Sparkline. On 1/11, GBTC uplisted to an ETF and 9 ETFs launched (IBIT, FBTC, BITB, ARKB, BTCO, EZBC, BRRR, HODL, BTCW). 1/11/2024 to 2/22/2024.

Bitcoin ETFs broaden access to the asset class, enabling spot crypto ownership in the comfort of a traditional brokerage account. These products are helpful not only for retail investors, but also for highly sophisticated financial advisors with stringent custody and reporting requirements.

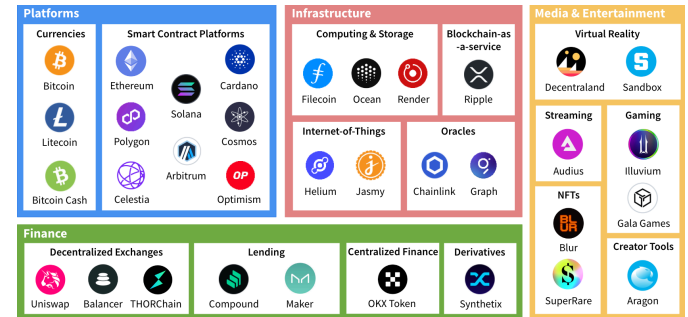
In addition, the Bitcoin ETF marks a symbolic embrace by the financial establishment. Many of the largest and most important players in the traditional financial system, such as Blackrock, Fidelity, JPMorgan, and NYSE, are involved in the issuance of these products. Crypto is now for adults.

### Beyond Bitcoin 🚀

While Bitcoin is the original and largest cryptocurrency, it is not the only one. As shown in the following exhibit, the asset class now contains hundreds of liquid tokens with use cases ranging from decentralized computing to social networking that go far beyond the original ambitions of Bitcoin.

### Exhibit 2

#### Crypto Is More Than Bitcoin



Source: Sparkline. For illustrative purposes only. As of 2/14/2024.

While these so-called “altcoins” don’t yet have their own ETFs, many have ample liquidity on U.S. crypto exchanges like Coinbase. As the asset class matures, we expect altcoins to further increase their share of total crypto market cap and for investors to diversify beyond Bitcoin accordingly.

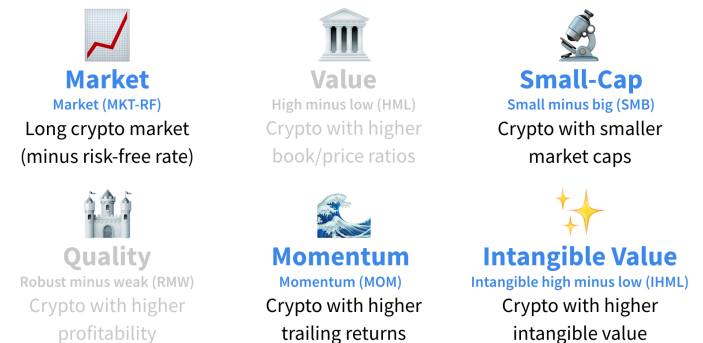
## Factor Investing

The proliferation of hundreds of altcoins has created a need for proper asset-pricing models. Luckily, we can repurpose existing “factor models,” which are widely used in traditional markets and backed by decades of rigorous academic and practitioner research (e.g., Fama-French, BARRA).

We’ll start with the “Six-Factor Model” from [Intangible Value: A Sixth Factor](#) (May 2023). As the next exhibit shows, four of these factors can be cleanly ported from stocks to crypto.

### Exhibit 3

#### Crypto Factor Universe



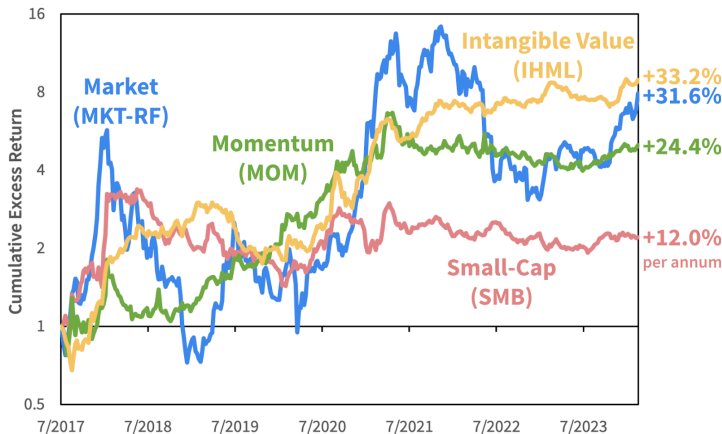
Source: Sparkline. See detailed definitions in appendix.

We define the **market** as a portfolio of all liquid crypto, weighted by market cap. The **small-cap** factor buys small-cap tokens and shorts large-caps, while **momentum** buys assets with high past returns and shorts those with low past returns. **Intangible value**, which we introduced for crypto in [Value Investor's Guide to Web3](#) (Jan 2022), favors tokens that are more undervalued relative to their intangible assets.

We leave out the **traditional value** factor. Cryptocurrencies are highly intangible, deriving their fundamental value from intellectual property, brand equity, human capital, and, perhaps most importantly, network effects. As such, they lack meaningful book value. We also set aside the **quality** factor, as most of these early-stage projects do not yet have well-defined profitability metrics.

The next exhibit shows the (backtested!) returns of the four factors in the resulting crypto "Four-Factor Model."

**Exhibit 4**  
**Crypto Factor Returns**



Source: CoinMarketCap, Sparkline. MKT-RF is the return of a cap-weighted portfolio of liquid crypto minus the 3-month U.S. T-Bill return. SMB, MOM, and IHML is the return of the top minus bottom tercile of liquid crypto, sorted on inverse market cap, 14-day return, and intangible value. Excludes transaction and financing costs. See detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

Although crypto still has a limited track record, we uncover early evidence of a return premium for all four factors. The **market** has compounded at an impressive +31.6% per year but with huge volatility and drawdowns. Interestingly, its 0.37 Sharpe Ratio (i.e., return/volatility) is similar to that realized by stock and bond indexes over the past century.

The other factors have also generated excess returns. Of the three, **intangible value** has performed the best, delivering market-like returns with less than half the volatility. The **momentum** and **small-cap** factors have also outperformed,

although their returns have been more muted recently. Moreover, while the **small-cap** factor has produced positive excess returns, they are not statistically significant.

These results provide an intriguing "out of sample" test of the factor framework. In [Value and Momentum Everywhere](#) (2013), researchers at AQR, a quantitative investment firm, found that these two factors enjoyed consistent returns in eight diverse asset classes (e.g., stocks, bonds, currencies, commodities). We can now add crypto to this list! ✅

## Style Boxes

### Small-Cap Intangible Value 🧠💎

In equities, one widely-used framework is the "style box," which was popularized by the research firm Morningstar. This framework divides the stock market into a 3 x 3 grid based on companies' size and value factor exposures.

We can replicate this framework in crypto, although we use intangible value instead of traditional value. The next exhibit shows the historical returns of the nine style boxes.

**Exhibit 5**  
**Crypto Style Boxes**

		Intangible Value		
		Value	Blend	Growth
Market Capitalization	Large	15.8	8.2	2.9
	Mid	17.4	3.1	-10.7
	Small	28.7	5.9	-25.8

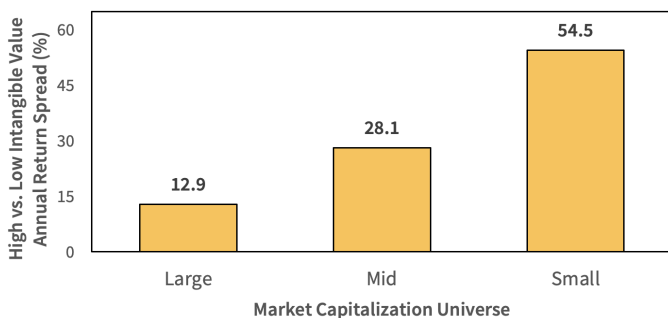
Source: CoinMarketCap, Morningstar, Sparkline. We first sort on size, then intangible value. Large has crypto in the top 10% of market cap, small has crypto in the bottom 70%, and mid has the rest. Value has crypto in the top 33% on intangible value, growth has crypto in the bottom 33%, and blend has the rest. Numbers show average annualized returns. Excludes transaction and financing costs. See detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

High intangible value crypto (left column) produced the bulk of the asset class's return, with blend chipping in modestly

and “growth” (i.e., expensive) crypto detracting greatly from overall market returns. Within intangible value, small-caps delivered the highest returns, followed by mid- and large-caps. On the growth side (right column), the relationship is reversed, with small-cap returns particularly negative.

While intangible value outperformed its growth counterpart in all three market cap bands, the spread was most extreme in the small-cap universe. This interaction is confirmed in the next exhibit, which shows the annualized value-growth return spread in each of the three size bands.

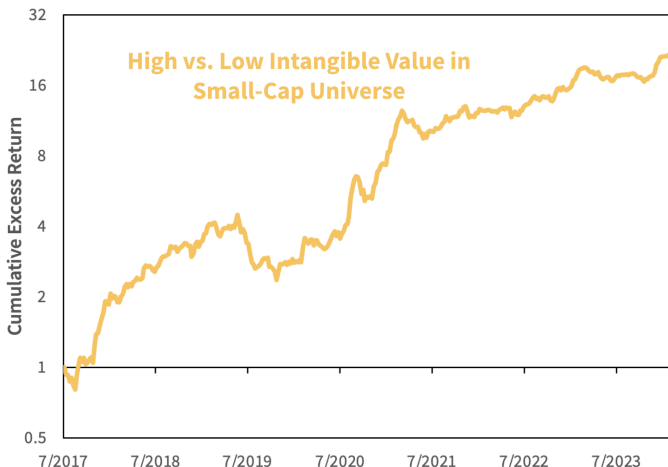
**Exhibit 6**  
**Value Return by Size Band**



Source: CoinMarketCap, Morningstar, Sparkline. Annualized return spread between the top and bottom intangible value terciles for each of the three style box size bands. Excludes transaction and financing costs. See prior exhibit footnote and detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

The intangible value factor not only enjoyed the greatest excess returns in small-caps, but its risk-adjusted returns were also particularly robust in this universe. The next exhibit shows the (backtested!) returns of small-cap value relative to small-cap growth.

**Exhibit 7**  
**Crypto Small-Cap Value vs. Growth**



Source: CoinMarketCap, Morningstar, Sparkline. Return spread between the top and bottom intangible value terciles for the smallest style box size band. Excludes transaction and financing costs. See prior exhibit footnote and detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

One intuitive explanation for the superior performance of intangible value in small-caps is that small-cap tokens are a “frontier asset class” with fewer sophisticated investors and thus more inefficiencies. This is consistent with research in equities showing that both the value and momentum factors tend to work better in small-cap stocks.

**Large-Cap Momentum**

So far, our results have been impressively consistent with the equity factor literature. However, as we now turn to momentum, we’ll see a major departure.

The next exhibit repeats our analysis of the historical return by style box but uses momentum instead of intangible value.

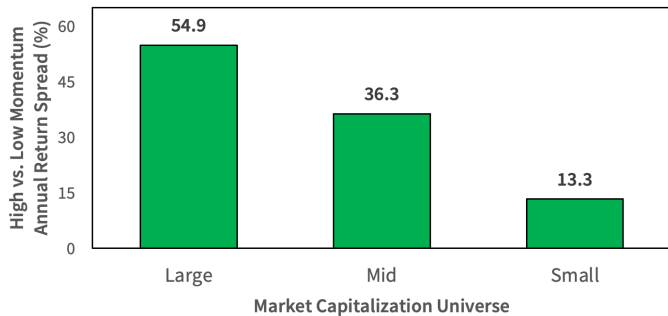
**Exhibit 8**  
**Crypto Momentum Style Boxes**

		Momentum		
		Low	Neutral	High
Market Capitalization	Large	-18.2	14.6	36.7
	Mid	-12.2	6.0	24.1
	Small	-2.4	14.1	10.9

Source: CoinMarketCap, Morningstar, Sparkline. We first sort on size, then momentum. Large has crypto in the top 10% of market cap, small has crypto in the bottom 70%, and mid has the rest. High has crypto in the top 33% on past 14-day returns, low has crypto in the bottom 33%, and neutral has the rest. Numbers show average annualized returns. Excludes transaction and financing costs. See detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

Unlike value, momentum has worked better in large-caps. Both the highest- and lowest-returning style boxes are in the large-cap universe (top row). The next exhibit confirms that the strength of the crypto momentum factor declines monotonically with size.

**Exhibit 9**  
**Momentum Return by Size Band**



Source: CoinMarketCap, Morningstar, Sparkline. Annualized return spread between the top and bottom momentum terciles for each of the three style box size bands. Excludes transaction and financing costs. See prior exhibit footnote and detailed definitions and important backtest disclosure below. From 7/1/2017 to 2/14/2024.

Why might momentum work better in large-caps? First, large-caps dominate media attention, potentially amplifying narrative-led trends. Second, they are more correlated to the macroeconomy, which itself trends. Third, only large-caps support leverage, which can lead to cascading liquidations and short squeezes. Finally, these coins avoid the short-term mean reversion dynamics found in some small-cap markets.

From an implementation perspective, this is good news. The momentum factor is faster-moving in crypto than equities. Researchers usually define cross-sectional stock momentum using returns over the past 1 to 12 months. In contrast, crypto momentum is strongest in the past 1 to 4 weeks.

Our analysis does not attempt to model transaction costs, which in practice will reduce net returns. While this is less of a concern for the slower-moving intangible value factor, momentum requires a lot of trading. Therefore, we are fortunate that momentum happens to work best in large-caps, as they are much more liquid than small-caps.

**Quality Screen** 🏠

Let’s now return to the question of why intangible value has been so effective in small-caps. In addition to small-caps generally being a more inefficient “frontier market,” another possible explanation is that intangible value stands in as a proxy for the “quality factor” in small-caps.

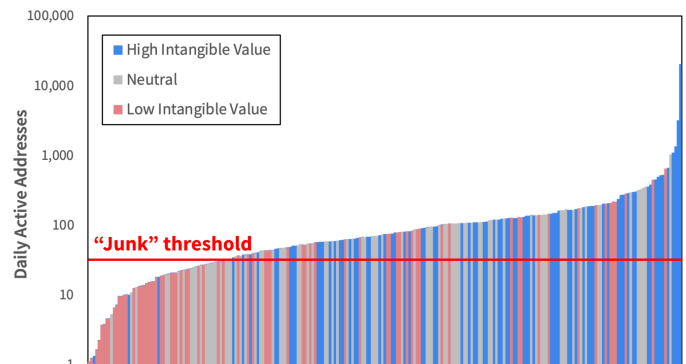
As skeptics are quick to point out, the small-cap space is rife with hype, vaporware, and outright scams. Many tokens achieve reasonable market caps despite having virtually no real usage, often simply “forking” the open-sourced code of an established project and attempting no further changes.

Lacking material fundamental value, these tokens are the equivalent of unprofitable “junk stocks” in equities.

Interestingly, intangible value may indirectly filter out many of these low-quality assets. Intangible value is built from the composite of several valuation ratios, all of which have fundamentals in their denominators (e.g., price / daily active addresses). Projects without a modicum of fundamental activity are likely to be screened out by such metrics.

For illustration, the next exhibit sorts all small-cap tokens by daily active addresses. High intangible value tokens are shaded blue, while low intangible value tokens are shaded red. We (arbitrarily) draw a horizontal line at 30 daily active addresses, below which assets are considered “junk.”

**Exhibit 10**  
**Sh\*tcoin Detector**



Source: CoinMarketCap, Morningstar, Sparkline. Each bar represents a token in the small-cap universe, which consists of liquid tokens in the bottom 70% of market cap. Bar height is based on daily active addresses over the past 30 days. Shading represents membership in the top (blue), middle (gray) or bottom (red) tercile of intangible value. See prior exhibit footnote and detailed definitions below. As of 2/14/2024.

The left tail, which falls below our “junk” threshold, consists of tokens with very limited adoption. As expected, these projects are almost all also considered low intangible value. Conversely, virtually all high intangible value tokens exceed our minimum quality standards.

This finding connects to another AQR paper, [Size Matters, If You Control Your Junk](#) (2015), which addresses a debate in the academic world over if the size factor in stocks actually works. The authors argue that the small-cap factor’s shaky past performance is due to its positive correlation with low-quality stocks. Once controlling for junk, they are able to “revive” the historical small-cap return premium.

As shown by our “style box” analysis (Exhibit 5), the deeply negative returns of the small-cap growth segment detracted

greatly from the overall performance of small-caps. A major contributor to these negative returns is the high prevalence of “junk” in this style box. As with stocks, by strategically avoiding these low-quality assets, we are able to “revive” the performance of small-cap crypto! 🙌

## Crypto Market Evolution

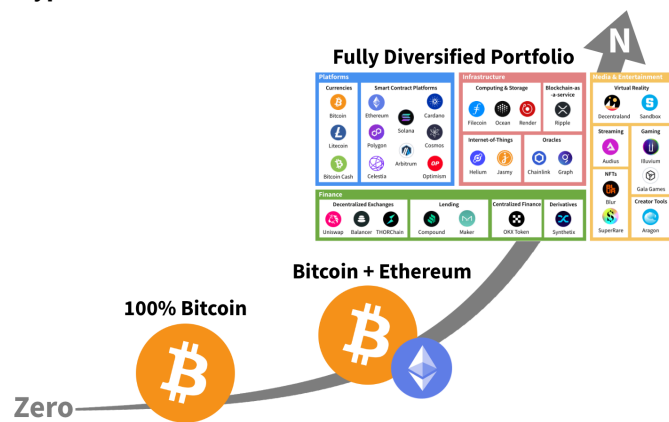
### 1 to N 🚀

Let’s step away from the academic research and get back to the real world. In practice, few mainstream investors have any meaningful exposure to altcoins. To the extent investors hold any crypto at all, in most cases it is exclusively Bitcoin.

That said, we believe crypto investors will naturally migrate over time from 100% Bitcoin to more diversified crypto portfolios. For most investors, this journey starts by adding Ethereum, which is not only the second-largest crypto asset (with ~33% the market cap of Bitcoin) but also the likely recipient of its own ETF later this year.

From here, we expect investors to continue downmarket at varying speeds. For most investors, “getting off zero” is the hard part. From there, it’s much simpler to scale from 1 to N.

**Exhibit 11**  
**Crypto Market Evolution**



Source: Sparkline. For illustrative purposes only. As of 2/14/2024.

We believe this process will unfold without much resistance, since most investors already believe in the principle of diversification. Stock market investing generally does not mean putting all your money in the single largest stock (e.g., MSFT) but rather investing in broad index funds containing hundreds of diverse businesses (e.g., S&P 500).

In fact, spreading your bets is even more critical when investing in technological revolutions. Periods of disruption are characterized by “power law” outcomes, with a few big winners driving the returns of the market. Importantly, the long-term winners are not always the early market leaders (e.g., AOL, Yahoo, BlackBerry, Friendster). By definition, disruption reshuffles the competitive landscape, meaning that winners can come from almost anywhere!

Investors in the crypto revolution cannot afford to back only the top dog and ignore the field. While Bitcoin is the obvious frontrunner today, there are hundreds of altcoins that we believe collectively have at least as great a chance of being the long-term winner(s). Diversification helps ensure that investors are betting on the adoption of blockchain technology more broadly, rather than the idiosyncratic success of a single asset, Bitcoin.

### Liquid Venture 💧

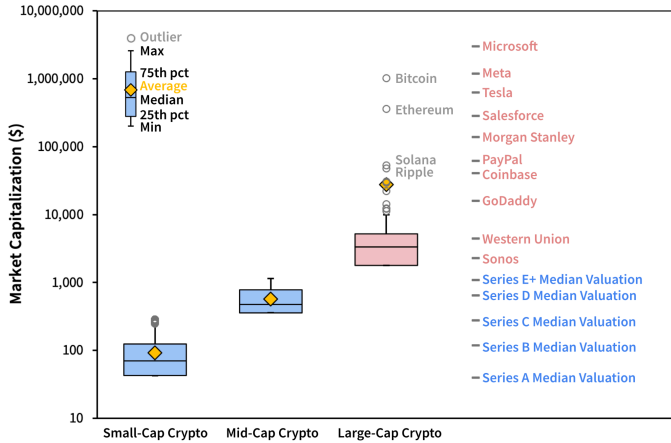
Due to the success of the so-called “endowment model,” investors have been clamoring for private market exposure. Within this, venture capital funds are especially coveted for their “power law” return distribution, offering investors the potential to make multiples of their capital at risk.

Of course, venture funds also come with downsides, such as decade-long lock-ups, adverse selection with the best funds at capacity, and overhang from the 2021 boom-bust cycle. In [Liquid Venture Capital](#) (Sep 2022), we argued that small-cap tokens provide an interesting alternative, at least for those seeking to invest in the blockchain vertical.

Historically, crypto has enjoyed similar right-skewed “power law” return distributions to venture capital. However, unlike venture equities, crypto also offers the benefit of liquidity. Tech trends can shift abruptly, and the best startups today may not be the best tomorrow. Liquidity grants investors the “option” to course-correct in the face of a rapidly evolving landscape. It also enables dynamic trading strategies that take advantage of crypto’s high and often irrational volatility.

However, as the crypto asset class continues to mature, we expect some of the larger coins will gradually start behaving more like large-cap tech platforms than early-stage startups. The next exhibit compares crypto market caps to those of public and venture-backed private equities.

### Exhibit 12 Crypto Maturity Lifecycle



Source: CoinMarketCap, S&P, Carta, Sparkline. Boxplots show distribution of crypto market caps. Max = 75th percentile + 1.5\*IQR, Min = 25th percentile - 1.5\*IQR. IQR = interquartile range (75th - 25th percentile). Size bands defined in prior footnotes. Stock market caps shown for comparison. Venture equity valuations are median pre-money valuations by venture round, averaged over the past five years. As of 2/14/2024.

Bitcoin is by far the largest crypto, with a market cap greater than all others combined. Its \$1 trillion market cap is even higher than that of Tesla of the “Magnificent 7,” while next-highest Ethereum’s \$330 billion market cap exceeds that of Salesforce. With market caps between \$1 and \$45 billion, the other large-caps are similar in size to established public companies ranging from Sonos to PayPal.

On the other hand, mid- and small-cap tokens still have similar market caps to venture-backed private firms. Small-caps are valued similarly to Series A and B startups, while mid-caps correspond to later-stage Series C and D firms. These smaller tokens are more likely to retain the attractive “power law” properties of tech startups.

We believe that small-cap tokens fill a different portfolio role from large-caps. Bitcoin in particular is now often thought of as a currency or commodity (i.e., “digital gold”). In contrast, small-caps are more aptly considered “liquid alternatives” to early-stage venture capital, diversifying not only large-cap crypto but most later-stage assets in general.

### Factor Portfolios 🛒

Finally, let’s consider how a diversified crypto factor portfolio can be implemented in real life.

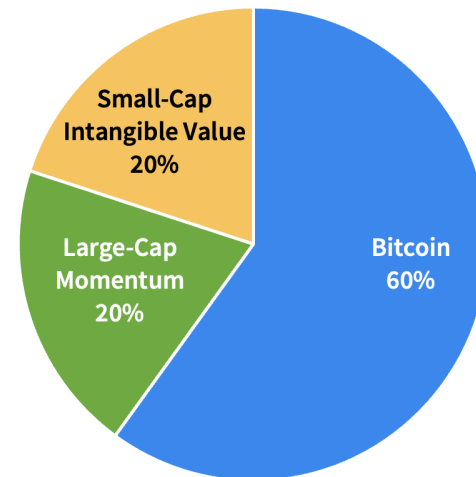
In the tradition of academic factor research, we have so far studied factors in a long-short context. However, in practice, most investors prefer long-only portfolios. This is even more

true in crypto. Not only is shorting operationally challenging, but most crypto investors do want exposure to the outsized returns that may result in the event of successful adoption.

In addition, most investors have greater conviction in crypto market beta than the other three factors. A theoretically optimal portfolio would actually have more momentum and intangible value than market exposure due to their higher historical Sharpe Ratios. However, this would be too far a departure from the current 100% Bitcoin norm.

Therefore, we’ll instead propose a simple long-only “60/40 portfolio” of 60% Bitcoin and 40% altcoins, where the altcoin exposure consists of 20% large-cap momentum and 20% small-cap intangible value. In order to ensure full market coverage, we split the mid-cap universe and assign the top half to large-caps and the bottom half to small-caps.

### Exhibit 13 Crypto 60/40 Model Portfolio



Source: Sparkline. For illustrative purposes only.

The next exhibit shows the model portfolio’s exposure to each of the factors in the Four-Factor Model, computed using regressions on past daily returns. We show exposures for each of the three components as well as the total portfolio.

### Exhibit 14 Four-Factor Exposure

	Portfolio Weight	Four-Factor Model Exposure			
		Market (MKT-RF)	Small-Cap (SMB)	Momentum (MOM)	Intangible Value (IHML)
Bitcoin	60%	94%	-8%	3%	-10%
Large-Cap Momentum	20%	103%	-4%	71%	21%
Small-Cap Intangible Value	20%	102%	80%	1%	87%
<b>Total</b>	<b>100%</b>	<b>97%</b>	<b>10%</b>	<b>16%</b>	<b>16%</b>

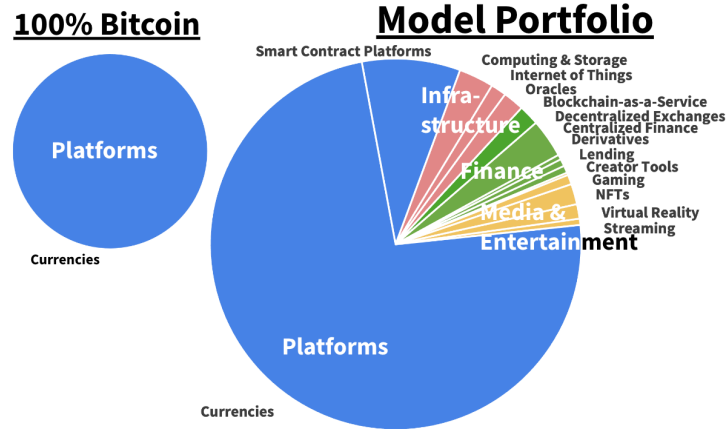
Source: CoinMarketCap, Sparkline. Size cutoff at 80th percentile of market cap. Intangible value and momentum cutoffs at 67th percentile of the respective factor. Factor exposures are the coefficients resulting from an OLS regression of the past daily returns of each of the three portfolios against the Four-Factor Model, as defined in the appendix. From 7/1/2017 to 2/14/2024.

Each piece of the portfolio provides intuitive factor exposures. **Bitcoin** contributes pure market exposure; **large-cap momentum** provides both market and momentum exposure; and **small-cap intangible value** contributes market, intangible value, and small-cap exposure.

In total, the portfolio has 97% market, 10% small-cap, 16% momentum, and 16% intangible value exposure. In other words, it offers essentially the same crypto market exposure as a 100% Bitcoin portfolio, but additionally provides tilts to the other three factors.

The portfolio provides exposure not only to more factors but also more industries. The next exhibit compares the industry allocation of the model portfolio to that of 100% Bitcoin.

**Exhibit 15**  
**Industry Exposure**

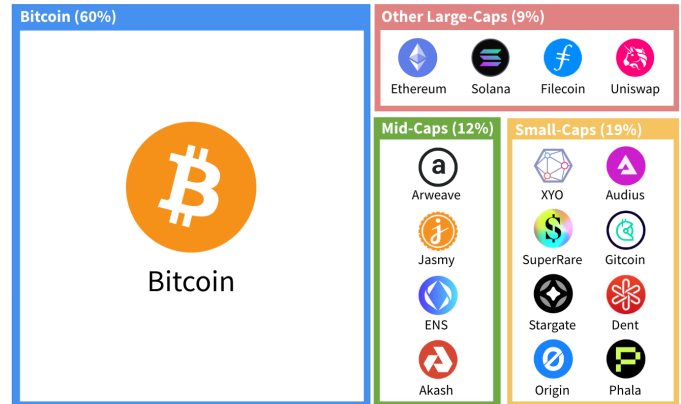


Source: Sparkline. For illustrative purposes only. As of 2/14/2024.

Due to its large Bitcoin allocation, the model portfolio still mainly consists of crypto **platforms**. However, it also has a meaningful 20% spread across the **infrastructure**, **finance**, and **media & entertainment** sectors. At the more granular industry level, its top allocations are to **currencies**, **smart contract platforms**, **decentralized exchanges**, **computing & storage**, **oracles**, **NFTs**, and **blockchain-as-a-service**.

The portfolio also offers investors a wider range of market caps. The next exhibit shows the size distribution of the portfolio, with a few illustrative tokens for each size band.

**Exhibit 16**  
**Size Exposure**



Source: Sparkline. For illustrative purposes only. As of 2/14/2024.

In addition to **Bitcoin**, the portfolio currently has 9% in **other large-caps** with strong positive momentum. This includes both alternate Layer-1s (Ethereum, Solana) and established projects from other sectors, such as Filecoin and Uniswap. It has an even greater 12% in **mid-caps** and 19% in **small-caps** with strong intangible value, such as Jasmy, Ethereum Name Service, XYO, Stargate Finance, and Phala Network.

Of course, this portfolio is merely illustrative. Investors can easily adjust their exposure to small-caps, intangible value, and momentum to align with their investment philosophy (e.g., value-orientation) or express a tactical view (e.g., altcoins currently undervalued relative to Bitcoin).

For most investors, any crypto allocation should be only a small share of their broader portfolio, with the vast majority dominated by traditional stocks, bonds, real estate, and perhaps alternatives (e.g., hedge funds, real assets, venture capital). Investors should tailor the composition of their crypto allocations to best complement these core holdings.

**Conclusion**

Since Bitcoin was first introduced in 2009, cryptocurrencies have grown from a single asset into a vibrant ecosystem with hundreds of liquid tokens.

The launch of the Bitcoin ETF is an important milestone in the maturity of the asset class. However, Bitcoin is only one of hundreds of crypto assets. As we know from historical technological revolutions, the early frontrunners (e.g., AOL) are not always the ultimate winners. For this reason, crypto investors should consider diversifying beyond Bitcoin.

We believe that altcoins, which encompass a rich diversity of use cases, collectively have at least as great a chance as Bitcoin to be the “big winner” if blockchains fulfill their potential. In addition, their “liquid venture” properties make them an intriguing complement to the later-stage assets typically held by traditional portfolios.

That being said, altcoins can be intimidating. There are now hundreds of liquid tokens, with dozens listed and delisted each month. Altcoins invariably have high volatility, short track records, and a high failure rate. Many of these tokens are extremely overhyped, having suspiciously high market caps despite virtually no real activity.

We believe factor investing offers a useful tool for navigating the dynamic altcoin ecosystem. Intangible value can help filter out low-quality tokens, while homing in on those with under-appreciated adoption relative to their market caps. Momentum can help latch onto assets experiencing virtuous adoption cycles and sentiment- or flow-driven price trends.

Importantly, crypto factor portfolios can be implemented in a simple long-only structure without requiring leverage, derivatives or offshore exchanges. Even today, these model portfolios contain a rich cross-section of use cases and projects. As the asset class continues to mature, we expect these portfolios will only become even more diverse, liquid, and fascinating!

**Kai Wu****Founder & CIO, Sparkline Capital LP**

Kai Wu is the founder and Chief Investment Officer of Sparkline Capital, an investment management firm applying state-of-the-art machine learning and computing to uncover alpha in large, unstructured data sets.

Prior to Sparkline, Kai co-founded and co-managed Kaleidoscope Capital, a quantitative hedge fund in Boston. With one other partner, he grew Kaleidoscope to \$350 million in assets from institutional investors. Kai jointly managed all aspects of the company, including technology, investments, operations, trading, investor relations, and recruiting.

Previously, Kai worked at GMO, where he was a member of Jeremy Grantham’s \$40 billion asset allocation team. He also worked closely with the firm’s equity and macro investment teams in Boston, San Francisco, London, and Sydney.

Kai graduated from Harvard College Magna Cum Laude and Phi Beta Kappa.

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### Factor Definitions

MKT is a portfolio of all liquid cryptocurrencies, weighted by (circulating) market capitalization.

SMB, MOM, and IHML are long-short portfolios, where the long (short) side consists of liquid cryptocurrencies in the top (bottom) 33% of inverse (circulating) market capitalization, 14-day trailing return, and intangible value, respectively.

The liquid universe is defined as all cryptocurrencies listed on CoinMarketCap with 90-day moving average (circulating) market capitalization greater than \$25 million. Portfolios are rebalanced on a daily basis over a 7-day rolling period (i.e., 1/7 of the portfolio is rebalanced each day).

### Disclaimer

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The performance shown reflects the simulated model performance an investor may have obtained had it invested in the manner shown but does not represent performance that any investor actually attained. This performance is not representative of any actual investment strategy or product and is provided solely for informational purposes.

Hypothetical performance has many significant limitations and may not reflect the impact of material economic and market factors if funds were actually managed in the manner shown. Actual performance may differ substantially from simulated model performance. Simulated performance may be prepared with the benefit of hindsight and changes in methodology may have a material impact on the simulated returns presented.

Index returns are shown for informational purposes only and/or as a basis of comparison. Indexes are unmanaged and do not reflect management or trading fees. One cannot invest directly in an index.

No representation or warranty is made as to the reasonableness of the methodology used or that all methodologies used in achieving the returns have been stated or fully considered. There can be no assurance that such hypothetical performance is achievable in the future. Past performance is no guarantee of future results.