

Presentation:

Is There a Value Premium in Cryptoasset Markets?*

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Presenting at:

Research Seminar - University of Liechtenstein

May 25, 2021

*I thank Alfredo Terrero, and Lucas Outumuro of IntoTheBlock for their help with data. I also thank Leah Homan of Coinmarketcap helping me with data from their website. Thanks also to Raffael Huber of Bitcoin Suisse for valuable suggestions. Last but not least, I am grateful for the helpful comments of Manuel Ammann, Zeno Adams, Tobias Hemauer, Stephan Heller, Alexander Cocharadt, Mathis Mörke, Simon Straumann, Immanuel Lampe, Alexander Bechtel, Andrea Barbon, Tom Burdorf, Miriam Werner, Aristid Klumbies, Maximilian Schacker, Daniel Tinner, and Nicola Liebi. The author has signed a nondisclosure agreement for the proprietary data used in this study.

Motivation

Bloomberg

Cryptocurrencies

First Bitcoin ETF in North America Hits \$1 Billion in Assets

By [Claire Ballentine](#)
13. April 2021, 19:04 MESZ

Bitcoin's Market Cap Now Bigger Than Visa and MasterCard Combined

 Author: Jordan Lyanchev • Last Updated Apr 12, 2021 @ 09:27

- ▶ As of 2020, 45% (27%) of institutional investors in Europe (U.S.) already have exposure to cryptoassets, either directly or via future contracts.¹

¹Over 91% of all institutional investors surveyed by Fidelity (774 in total) are planning to invest in cryptoassets ([Fidelity Investments \(2020\)](#))

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SUSTAINABLE FUTURE

Why everyone from Elon Musk to Janet Yellen is worried about bitcoin's energy usage

PUBLISHED THU, MAY 13 2021 9:03 AM EDT | UPDATED THU, MAY 13 2021 1:01 PM EDT

Dogecoin's value tumbles after Elon Musk calls the virtual currency a 'hustle'

- ▶ Is everything is just speculation?

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- ii If so, does a value factor have explanatory power for average returns in the cross-section?
- ▶ **Equity market:** Value stocks (high book-to-market ratios) earn higher expected returns than growth stocks (low book-to-market ratios) (See **Fama and French (1992)**, **Lakonishok, Shleifer, and Vishny (1994)**, **Chen, Petkova, and Zhang (2008)**).

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- ▶ **Cryptoasset market (H1):** Value cryptoassets (high active addresses-to-network value ratios) earn higher expected returns than growth cryptoassets (low high active addresses-to-network value ratios).

Spoiler Alert

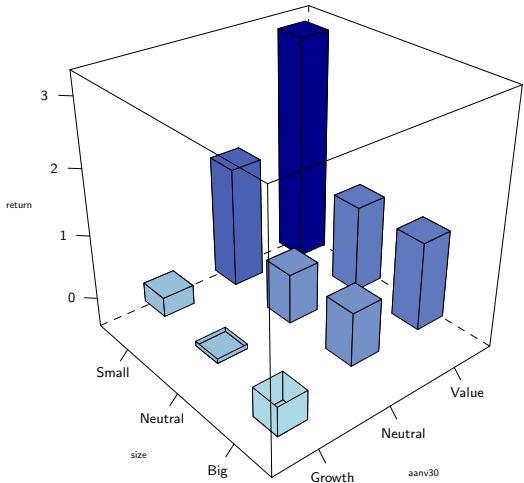


Figure 1: 3x3 independent size-aanv30 sort

Literature

- ▶ **Cheah and Fry (2015)** argue that Bitcoin has a fundamental value of zero and contains a significant speculative component.²
- ▶ **Liu and Tsyvinski (2018)** document that cryptocurrencies have no exposure to the most common stock market and macroeconomic factors.

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- ▶ Various premias have been documented (size: **Li, Zhang, Xiong, and Wang (2020)**, idiosyncratic volatility: **Zhang and Li (2020)**)
- ▶ **Liu, Liang, and Cui (2020)** introduce the three-factor model that is specific to cryptocurrency market (i.e. market β , size, and momentum).

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- ▶ Liu, Liang, and Cui (2020) introduce the three-factor model that is specific to cryptocurrency market (i.e. market β , size, and momentum).
- ▶ Biais, Bisiere, Bouvard, Casamatta, and Menkveld (2018) and Pagnotta and Buraschi (2018) emphasize that the fundamental value of cryptoassets depends on the number of users. Cong, Li, and Wang (2021) document that an increasing number of participants in the network brings about transactional benefits and leads to positive network externalities.

²Empirical studies show that non-fundamental factors affect cryptoasset prices (see Makarov and Schoar (2020), and Griffin and Shams (2020))

My Contribution

- ▶ I create a unique dataset that combines price data with blockchain fundamentals.
- ▶ I propose a value measure that is defined as the ratio between the active addresses to network value (aanv30).

$$\text{aanv30}_{i,t} = \frac{\frac{1}{30} \sum_{s=0}^{29} \text{number of active addresses}_{i,t-s}}{\text{network value}_{i,t}} \quad (1)$$

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- ▶ High aanv30 ratio → Value
- ▶ Low aanv30 ratio → Growth
- ▶ Alternative value measures: tvnv, txnv
- ▶ ⚠ Importantly, my results suggest that cryptoasset prices are related to their blockchain fundamentals.

Data

- ▶ Dataset combines price data with blockchain information
 - ▶ July 4th, 2017 to October 6th, 2020; 170 weeks.
 - ▶ 652 cryptoassets
 - ▶ At the beginning (end) of the period, the sample includes 50 (638) cryptoassets.
 - ▶ List of all assets is in the Online Appendix.

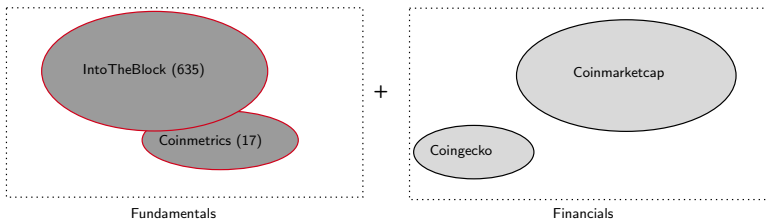


Figure 2: Data Sources

Summary Statistics

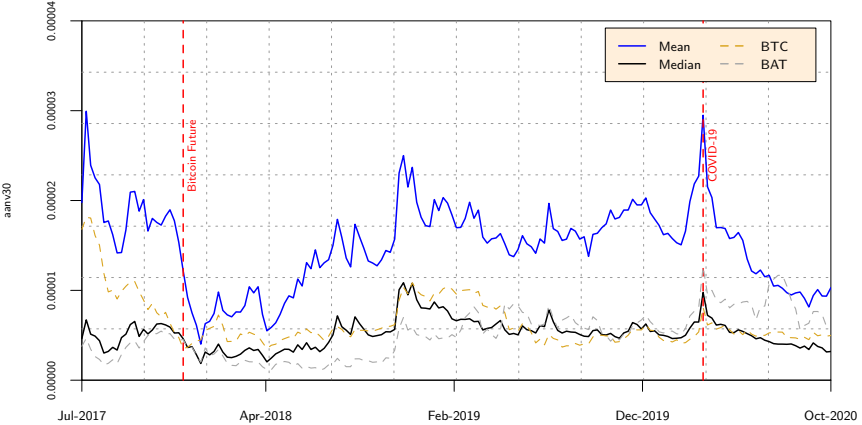


Figure 3: Time-series of summary statistics for aanv30 ratios

Method

- ▶ Is there a value premium in cryptoasset markets?
 - ▶ Univariate portfolio sorts
 - ▶ Bivariate portfolio sorts
 - ▶ Fama and MacBeth (1973) regressions

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- ▶ Is there a value premium in cryptoasset markets?
 - ▶ Univariate portfolio sorts
 - ▶ Bivariate portfolio sorts
 - ▶ Fama and MacBeth (1973) regressions
- ▶ If so, does a value factor have explanatory power for average returns in the cross-section?
 - ▶ 3x3 sorts to construct SMB, WML, and HML factors.
 - ▶ GRS statistic of Gibbons, Ross, and Shanken (1989) to evaluate factor models' performance.
 - ▶ Spanning regressions to determine redundant factors.

Univariate Portfolio Sorts

Table 1: One-dimensional weekly sorts

A: VW	Low	2	3	4	High	HML	α	B: EW	Low	2	3	4	High	HML	α
market	0.65 (0.63)	0.29 (0.32)	1.45 (1.41)	0.24 (0.23)	-0.6 (-0.52)	-1.25 (-1.29)	-1.42 (-1.48)	market	1.41 (1.42)	0.76 (0.74)	1.39 (1.32)	0.96 (0.92)	1.27 (1.19)	-0.14 (-0.30)	-0.28 (-0.61)
size	2.77 (2.55)	0.91 (0.82)	0.62 (0.56)	0.36 (0.33)	1.12 (1.31)	-1.65** (-2.29)	-1.64** (-2.27)	size	3.92 (3.72)	1.01 (0.91)	0.52 (0.48)	0.47 (0.44)	0.16 (0.16)	-3.76*** (-5.96)	-3.78*** (-5.95)
txnv	-0.28 (-0.25)	0.83 (0.87)	1.15 (1.06)	0.6 (0.57)	0.67 (0.62)	0.95 (1.05)	0.76 (0.84)	txnv	1.01 (1.05)	0.42 (0.41)	0.89 (0.82)	1.25 (1.10)	2.13 (1.96)	1.12*** (2.66)	1.09** (2.57)
txnv30	-0.53 (-0.61)	1.26 (1.40)	0.66 (0.57)	0.54 (0.50)	1.14 (1.01)	1.67** (2.28)	1.38** (1.99)	txnv30	-0.37 (-0.41)	0.68 (0.67)	0.79 (0.74)	1.49 (1.35)	3 (2.82)	3.37*** (7.63)	3.29*** (7.49)
aanv	-0.5 (-0.50)	-0.48 (-0.46)	1.02 (0.80)	1.56 (1.63)	0.6 (0.60)	1.1* (1.68)	1.01 (1.54)	aanv	1.1 (1.14)	0.14 (0.14)	0.82 (0.72)	1.24 (1.15)	2.36 (2.18)	1.25*** (2.92)	1.24*** (2.85)
aanv30	-0.48 (-0.47)	0.1 (0.09)	1.31 (1.21)	0.94 (0.87)	1.14 (1.06)	1.62** (2.18)	1.47** (2.00)	aanv30	-0.42 (-0.46)	0.43 (0.41)	1 (0.90)	1.42 (1.32)	3.15 (3.02)	3.58*** (7.72)	3.53*** (7.60)

Note:

*p<0.1; **p<0.05; ***p<0.01

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size	2.77 (2.55)	0.91 (0.82)	0.62 (0.56)	0.36 (0.33)	1.12 (1.31)	-1.65** (-2.29)	-1.64** (-2.27)	size	3.92 (3.72)	1.01 (0.91)	0.52 (0.48)	0.47 (0.44)	0.16 (0.16)	-3.76*** (-5.96)	-3.78*** (-5.95)
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aanv30	-0.48 (-0.47)	0.1 (0.09)	1.31 (1.21)	0.94 (0.87)	1.14 (1.06)	1.62** (2.18)	1.47** (2.00)	aanv30	-0.42 (-0.46)	0.43 (0.41)	1 (0.90)	1.42 (1.32)	3.15 (3.02)	3.58*** (7.72)	3.53*** (7.60)

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- ▶ Value cryptoassets (high aanv30 ratios) earn higher expected returns than growth cryptoassets (low aanv30 ratios).
- ▶ The long-short portfolio, which is long in the highest level of aanv30 and short in the lowest level of aanv30, yields an average return of 1.6% per week.

Bivariate Portfolio Sorts (I/II)

Table 2: Two-dimensional weekly sorts

Panel A: Value-weighted					Panel B: Equal-weighted				
Panel A.1: size-aanv30	Small	Neutral	Big	HML	Panel B.1: size-aanv30	Small	Neutral	Big	HML
Growth	0.29 (0.26)	-0.07 (-0.07)	-0.46 (-0.41)	-0.75 (-0.75)	Growth	0.4 (0.37)	-0.06 (-0.06)	-0.24 (-0.25)	-0.64 (-0.87)
Neutral	1.8 (1.54)	0.75 (0.66)	0.8 (0.90)	-0.99 (-1.08)	Neutral	2.4** (2.05)	0.5 (0.45)	0.35 (0.32)	-2.05*** (-2.89)
Value	3.34** (2.55)	1.31 (1.05)	1.32 (1.28)	-2.02** (-2.13)	Value	4.03*** (3.50)	1.34 (1.10)	0.49 (0.47)	-3.54*** (-4.43)
HML	3.05*** (3.00)	1.38** (2.29)	1.78** (2.21)		HML	3.63*** (4.45)	1.4** (2.42)	0.73 (1.56)	

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- ▶ The value premium is documented within all size terciles...
- ▶ ...but most profound within small size portfolios.

Bivariate Portfolio Sorts (II/II)

Table 3: Two-dimensional weekly sorts

Panel A: Value-weighted					Panel B: Equal-weighted				
Panel A.2: beta-aanv30	Low	Neutral	High	HML	Panel B.2: beta-aanv30	Low	Neutral	High	HML
Growth	-0.93 (-1.01)	0.67 (0.53)	-0.34 (-0.28)	0.6 (0.59)	Growth	-0.95 (-1.04)	0.58 (0.57)	0.12 (0.12)	1.07** (2.09)
Neutral	0.46 (0.43)	1.76 (1.52)	0.61 (0.50)	0.15 (0.16)	Neutral	0.61 (0.57)	1.13 (1.00)	0.9 (0.81)	0.29 (0.50)
Value	0.88 (0.82)	1.46 (1.27)	0.49 (0.43)	-0.39 (-0.35)	Value	3.5*** (3.14)	2.09* (1.90)	2* (1.79)	-1.5** (-2.41)
HML	1.81* (1.91)	0.78 (0.92)	0.83 (0.84)		HML	4.44*** (8.00)	1.51*** (2.68)	1.88*** (3.21)	

Note:

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- ▶ The value premium for cryptoassets is most profound within small, low market β , low momentum, and high idiosyncratic volatility portfolios.

Fama-Macbeth Regression

Table 4: Fama-Macbeth 1-week ahead

Dependent variable:							
	$r_{i,t+1}$						
	(1)	(2)	(4)	(8)	(9)	(10)	(11)
market beta	0.072 (0.248)			0.757** (2.071)	0.571* (1.710)	0.544* (1.674)	0.618** (1.997)
log(size)		-0.532*** (-5.729)		-0.352*** (-3.187)	-0.251** (-2.506)	-0.229** (-2.123)	-0.259** (-2.397)
log(tmrv30)				0.401*** (2.768)			
log(tmrv30)					0.499*** (3.448)		
log(aanv)						0.502*** (4.032)	
momentum				-2.428*** (-6.950)	-2.003*** (-5.924)	-1.720*** (-4.973)	-1.987*** (-5.704)
log(aanv30)			0.765*** (7.155)				0.522*** (4.329)
ivol						-2.991 (-0.532)	-0.150 (-0.027)
Constant	1.089 (1.098)	9.707*** (4.824)	10.529*** (5.932)	7.133*** (2.745)	10.122*** (3.497)	10.333*** (3.220)	10.726*** (3.454)
R ²	0.011	0.013	0.008	0.056	0.054	0.071	0.071
adj. R ²	0.007	0.010	0.004	0.031	0.030	0.040	0.040

Note:


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Recap of Finding i

- i Is there a value premium in cryptoasset markets?

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i Is there a value premium in cryptoasset markets?

- ▶  Value cryptoassets yield higher returns than growth cryptoassets.
- ▶ When sorting on `aanv30`, I find an increasing pattern in average returns. The long-short portfolio, which is long in the highest level of `aanv30` and short in the lowest level of `aanv30`, yields an average return of 1.6% per week.
- ▶ Unconditional bivariate sorts show that the value premium is most profound within small, low market β , low momentum, and high idiosyncratic volatility portfolios.
- ▶ **Fama and MacBeth (1973)** regressions confirm the positive relation between `aanv30` and future returns.

Research Question ii

- ii If so, does a value factor have explanatory power for average returns in the cross-section?

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_i[R_{M,t} - R_{F,t}] + s_iSMB_t + w_iWML_t + v_iHML_t + \epsilon_{i,t} \quad (2)$$

where:

$$SMB = \frac{SMB_{Value} + SMB_{Neutral} + SMB_{Growth}}{3} \quad (3)$$

$$WML = \frac{WML_{Small} + WML_{Neutral} + WML_{Big}}{3} \quad (4)$$

$$HML = \frac{HML_{Small} + HML_{Neutral} + HML_{Big}}{3} \quad (5)$$

Explaining Average Returns of Cryptoassets

Table 5: Summary statistic of weekly factor tests

	GRS	$A(a_i)$	$A(\text{adj.}R^2)$		GRS	$A(a_i)$	$A(\text{adj.}R^2)$
Panel A: 25 Size-aanv30				Panel C: 25 Size-txnv30			
MKT	3.229	0.012	0.538	MKT	3.316	0.012	0.536
MKT SMB	3.136	0.014	0.65	MKT SMB	3.17	0.013	0.648
MKT HML	2.523	0.009	0.55	MKT HML	2.517	0.009	0.547
MKT SMB WML	4.516	0.018	0.677	MKT SMB WML	4.9	0.018	0.675
MKT SMB HML	2.559	0.011	0.662	MKT SMB HML	2.521	0.01	0.659
MKT WML SMB HML	3.51	0.017	0.686	MKT WML SMB HML	3.868	0.016	0.681
Panel B: 25 Size-Beta				Panel D: 25 Size-ivol			
MKT	4.384	0.011	0.549	MKT	4.639	0.012	0.551
MKT SMB	4.347	0.013	0.656	MKT SMB	4.433	0.013	0.661
MKT HML	3.578	0.01	0.555	MKT HML	4.313	0.012	0.558
MKT SMB WML	4.713	0.018	0.683	MKT SMB WML	4.66	0.018	0.692
MKT SMB HML	3.662	0.011	0.664	MKT SMB HML	4.262	0.012	0.668
MKT WML SMB HML	3.8	0.016	0.686	MKT WML SMB HML	4.265	0.016	0.695

HML: The only Factor?

Table 6: Spanning regression

	<i>Dependent variable:</i>			
	MKT	SMB	HML	WML
	(1)	(2)	(3)	(4)
MKT		-0.055 (-0.917)	0.134*** (3.351)	-0.017 (-0.331)
HML	0.474*** (3.351)	0.432*** (4.010)		0.290*** (3.017)
SMB	-0.092 (-0.917)		0.205*** (4.010)	-0.208*** (-3.152)
WML	-0.038 (-0.331)	-0.271*** (-3.152)	0.179*** (3.017)	
Constant	0.0005 (0.053)	-0.001 (-0.148)	0.020*** (4.378)	-0.022*** (-3.762)
Observations	170	170	170	170
R ²	0.064	0.119	0.167	0.085
Adjusted R ²	0.048	0.103	0.152	0.068
Residual Std. Error (df = 166)	0.109	0.084	0.058	0.074
F Statistic (df = 3; 166)	3.810**	7.456***	11.119***	5.118***

Note:

*p<0.1; **p<0.05; ***p<0.01

Average Return of the HML Factor

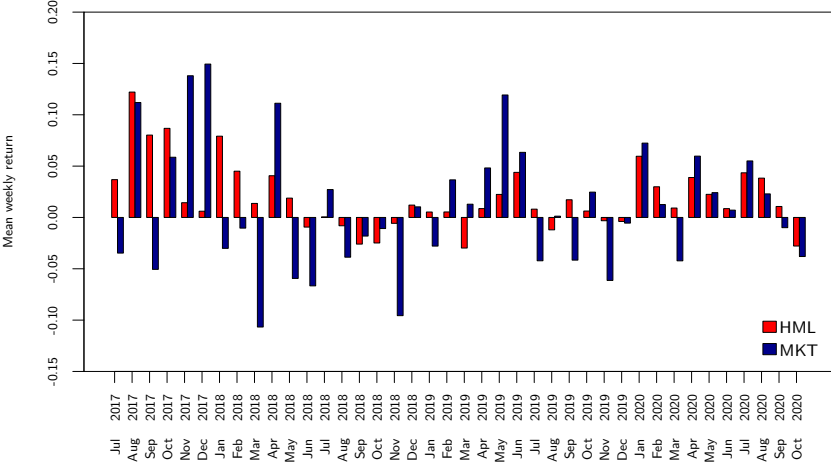


Figure 4: Averages of weekly returns for the high-minus-low (HML) and the excess market return (MKT) factor by month

Recap of Finding ii

- ii If so, does a value factor have explanatory power for average returns in the cross-section?

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 - ▶ Four cryptoasset specific common risk factors are constructed.
 - ▶ GRS statistics indicate that all models are incomplete descriptions of expected returns.
 - ▶ ⚠ Adding the value factor to the three-factor model of **Liu, Liang, and Cui (2020)** significantly improves the model's ability to describe average cryptoasset returns.
 - ▶ The value factor yields an average return of 2.1% per week and exhibits a Sharpe ratio of 0.33
 - ▶ Spanning regressions suggest that the HML factor is not redundant.

Robustness (I/II)

- ▶ **Already presented:**
 - ▶ The value premium is robust to different weighting-schemes...
 - ▶ ... and related value measures (aanv, txnv30, and tvnv30)

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- ▶ **In the paper:**
 - ▶ As a robustness test, all results are examined using daily data, which enlarges the sample size from 170 weeks to 1190 days.
 - ▶ Overall, the results remain unchanged but become statistically more significant and increase in economic magnitude.
 - ▶ The long-short portfolio, which is long in the highest level of aanv30 and short in the lowest level of aanv30, yields an average value-weighted (equal-weighted) return of 0.3% (1.07%) per day.

Robustness (II/II)

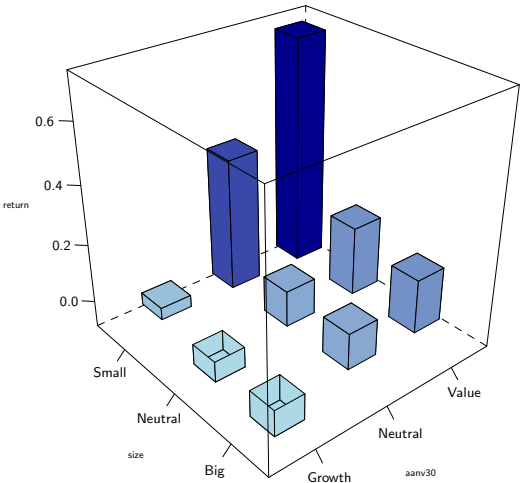


Figure 5: 3x3 independent size-aav30 daily sorts

Conclusion & Implications

- ▶ There is a pattern in average cryptoasset returns related to active addresses to the network value ratio. This pattern in average returns is referred to as value premium in the cryptoasset market.
- ▶ Adding the value factor to the three-factor model of [Liu, Liang, and Cui \(2020\)](#) significantly improves the model's ability to describe average cryptoasset returns.
- ▶ Spanning regressions suggest that the HML factor is not explained by the exposures to other risk factors.
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- ▶ The value factor yields an average return of 2.1% per week and exhibits a Sharpe ratio of 0.33.
- ▶ **Implications**
 - ▶ The results suggest that cryptoasset prices are related to their blockchain fundamentals, which challenges the view of long-run speculations in cryptoasset markets.

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