WAVE Financial

Understanding Bitcoin's Impact on Portfolio Performance.

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Executive Summary

Wave explores Bitcoin as an investment asset class, analyzes it as digital gold, and uses Stock-to-Flow Ratio (a popular gold valuation model) to value Bitcoin. Resulting target price is $55,000 for 2021 and over $400,000 after the next halving in 2024.

2020 is the beginning of institutional adoption, both as a business and as an investment asset class. Corporates are also joining the game and have benefitted from the recent rally.

Portfolio diversification is a traditional concept which takes advantage of correlation differences among assets classes. Bitcoin has performed well while having low correlation to most other traditional asset classes, and therefore is a great tool to increase risk adjusted returns of a portfolio.

Therefore, Wave Financial recommends investors to consider adding an exposure to Bitcoin.

Bitcoin (BTC) as an investment asset class

Bitcoin has been in the news as institutional and corporate adoption has picked up late in 2020, which has the positive effect of driving the price up significantly.

BTC Performance since Oct 2020

Source: Coinmarketcap

Separate from retail interest and general "buzz" around Bitcoin, there is actually a fundamental case to be made for the investment into Bitcoin as an asset class. To begin with, let us take a look at valuation of investment assets in general and see if we can apply a fundamental valuation framework around Bitcoin.

Valuation models change, depending on the type of assets to be considered. For example, in the equity world, early-stage startups are typically valued by the TAM, Total Addressable Market, and the quality of the startup team to be able to capture the TAM with the business model proposed. Late-stage startups are judged by growth and scalability; typical models include and year-on-year revenue growth and PE (Price to Earnings) ratios are used as benchmarks across industry as a valuation tool. Mature companies, such as utilities as an extreme example, are typically valued on the cashflow that it generates now and into the future, rather than growth and the next big idea. Finally, late-stage companies are valued at the assets on the balance sheet, typically using a PBR (Price to Book Ratio) as benchmark.

In the fixed income world, it is typically about the spread over an interest rate benchmark relative to the risk of repayment, which is a more quantitative analysis of cash flows.

Bitcoin represents a completely different asset class, so the traditional models stated above do not work. It is a reward for the global network of computers that powers the blockchain which represents Bitcoin. Initially, as a reward, it is not of significant value, leading to someone buying 2 pizzas for 10,000 BTC. As of this writing with BTC at $40,000 each, those pizzas are worth $400m if the buyer had paid cash and held onto the Bitcoin. Since then, many businesses have tried to adopt BTC as a form of payment, which is certainly functional, but not efficient, as transactions take 10 minutes or more to settle. But this functionality does make Bitcoin have more value. As an extension to the idea, Bitcoin can be considered a store of value as opposed to a payment transfer mechanism.

Last November, [Blackrock's] CIO for fixed income, Rick Rieder, told CNBC that cryptocurrency may be "here to stay," and could even replace gold "to a large extent," noting that it was "much more functional" than the yellow metal.

Rick Rieder, Blackrock CIO

This latest theory would bring Bitcoin into the commodities world for valuations. As a store of value, this becomes a benchmark asset to be used for exchange of other items, similar to gold. In comparison:

- Cost of storage: Bitcoin beats gold in storage as it is digital
- Cost/speed of movement: Bitcoin beats gold in cost to move the asset around globally and the speed to accomplish the transactions
- Supply schedule: The value is certainly dependent on the speed that the assets are being created (mined). Bitcoin has a transparent structure, where some Bitcoins are created every 10 minutes. (Currently at 6.25 BTC per block which takes roughly 10 minutes to create[1]). Whereas gold is produced at a certain rate that changes depending on various circumstances.
- Control: Bitcoin is decentralized, while gold production and sales are regulated differently in each country.
- Volatility: As a new asset class, Bitcoin volatility is high as there are differing opinions on valuation. Gold is more stable as marginal investors drive valuations.

Additionally, the Bitcoin blockchain is designed to produce up to 21 million BTC's, and no more. Also, the pace of production of these Bitcoins are designed to decrease over time. This is similar to the idea of a finite amount of gold that is in existence on this planet and the possibility of not being able to mine any more at some point in the future.

Or theory is Bitcoin can be considered similar to gold (digital gold, as some proponents like to call it), then valuation models used for gold can be applied to Bitcoin.

[1] A block is created roughly every 10 minutes. Difficulty of calculation is adjusted so that amount of time is stable. Currently, 6.5 BTC is created per block. This amount halves roughly every 4 years. (6.5 BTC is half of the amount that was during the 2016-2020 period. And in 2024, it will drop to 3.25 BTC.)

One common model used in the commodities world is the SF (Stock-to-Flow) ratio, which looks at the amount of inventory ever produced versus the 1-year volume of production. For example, gold typically is considered to have a SF ratio of about 62, which means that It takes 62 years of production to reproduce the existing inventory that is in existence.

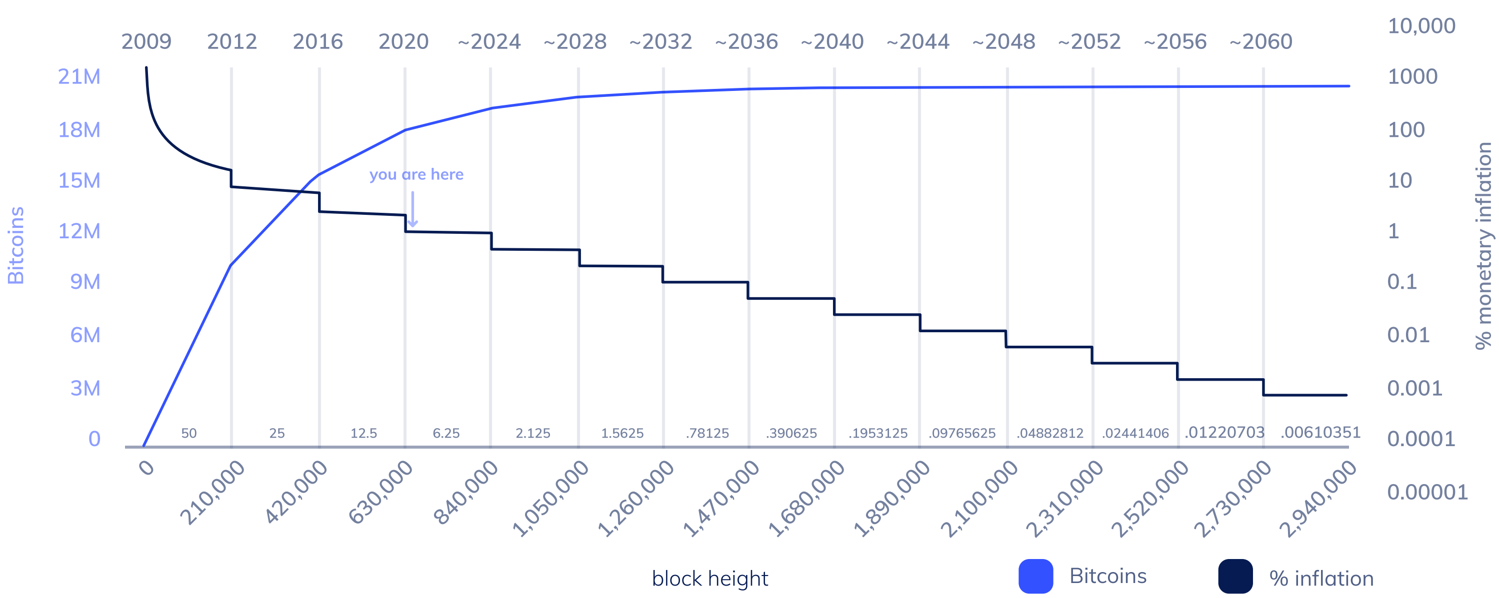
	Stock (tn)	Flow (tn)	SF	Supply growth	Price $/Oz	Market Value
Gold	185,000	3,000	62	1.6%	$ 1300	$ 8,417,500,000,000
Silver	550,000	25,000	22	4.5%	$ 16	$ 308,000,000,000
Palladium	244	215	1.1	88.1%	$ 1400	$ 11,956,000,000
Platinum	86	229	0.4	266.7%	$ 800	$ 2,400,000,000

Source: https://medium.com/@100trillionUSD/modeling-bitcoins-value-with-scarcity-91fa0fc03e25

The higher the SF, the more valuable it is, as further inventory increase does not affect the actual pricing of the existing inventory. (Impact of production becomes insignificant.)

Applying this to Bitcoin, the production schedule should be examined.

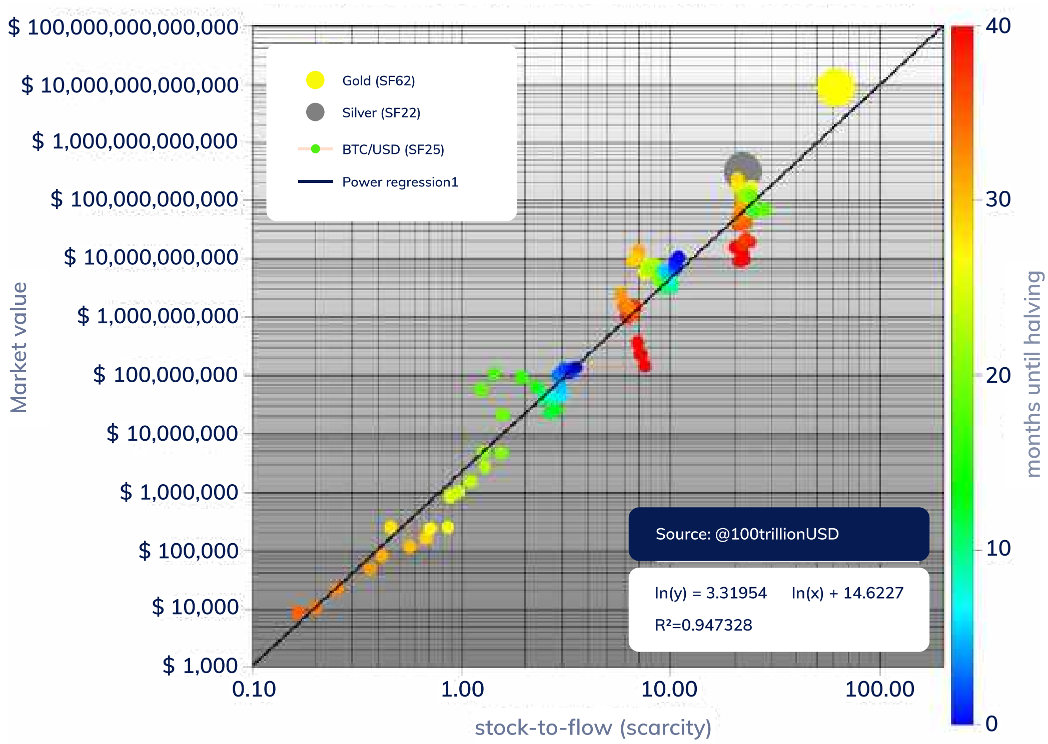
Bitcoin Monetary Inflation



inflation = coinbase x blocksPerYear / existingCoins

Source: https://medium.com/@100trillionUSD/modeling-bitcoins-value-with-scarcity-91fa0fc03e25

So for Bitcoin, due to its "halving" feature, it does not have a constant SF. The ratio is currently at 50, which is not quite at gold (62) but getting close. This creates an interesting opportunity to look at the SF ratio versus price over time. A person by the pseudonym of PlanB has published this analysis on Medium, which came up with the following result.



Source: https://medium.com/@100trillionUSD/modeling-bitcoins-value-with-scarcity-91fa0fc03e25

The linear relationship between price of BTC, as it approaches each halving date, and its SF ratio is very well established (on a logarithmic scale), and is in line with gold and silver, the large yellow and gray dots on the plot. This means that the assumption of using SF ratio for valuation has held up well, and the model can be one way to look at the valuation of Bitcoin.

With the model, what does it say about the future prices of Bitcoin? The current SF is about 50, after May 2020's halving. Points to a market cap of $1trn, and a BTC price of $55,000 a piece to be achieved a year or two after halving. The article was published in March of 2019, when Bitcoin was traded at $4000. A $55,000 prediction seemed relatively outlandish. But at today (Feb 2, 2021), spot price is $35,000 with over 100% volatility over the past quarter, $55,000 seems like a reasonable target for 2021.

Taking one small step further, the next halving will be in 2024. This might step the target price of Bitcoin up to 400k, which once again, seems outlandish today.

Institutional and Corporate Adoption of Bitcoin

Goldman Sachs	TEMASEK HOLDINGS	BlackRock	IDG Capital	Square	NYSE
BCG	USV	SEQUOIA		中国信贷 CREDIT CHINA	coatue
khosla ventures	WELLINGTON MANAGEMENT	TIGERGLOBAL	MITSUBISHI	TD Ameritrade	SKYBRIDGE
BNP PARIBAS	Santander	DTCC	citi	accenture	J.P.Morgan
PNC	Fidelity	BRIDGEWATER	GUGGENHEIM	MassMutual	PayPal
Jefferies	ONERIVER ASSET MANAGEMENT	STONE RIDGE	MicroStrategy	BCJ	Standard Chartered
ruffer	NAVER	VOYAGER	WisdomTree	DBS	ADDISON CAPITAL
ARK INVEST	Rothschild	BOSTON PRIVATE	CORRIENTE ADVISORS LLC	FIRST NEW YORK	Formidable
IP	heritage	Northern Virginia	Kinetics Mutual Funds, Inc.	RENN	SlateStone WEALTH
Sterling Investment Advisors, Ltd.	VERUS CAPITAL PARTNERS, LLC	WELLS FARGO	Deutsche Bank	Google	Microsoft
NORTHERN TRUST	SBI	NOMURA	EUREKAHEDGE	BARCLAYS	lightspeed

Source: Forbes, Coindesk, Cointelegraph

In the second half of 2020, there seems to be an increase in the discussion of adoption of Bitcoin as an asset class. Before highlighting those, there are institutional players that have been participating but on a more limited basis.

Fidelity Digital Assets is a subsidiary of the Fidelity powerhouse in asset and wealth management. They have been in the space for more than 5 years, first starting in the philanthropy division (taking in donations in crypto and managing the position), then in mining (as a major contractor for mining capacity in the US), finally launching FDA as a qualified custodian of digital assets, starting with Bitcoin. We have been a client since 2019, and have been comfortable knowing that Fidelity is holding our Bitcoin safely.

Other players are joining the custody party as it is the first stop in institutional adoption. Nomura announced a joint venture with Ledger in 2019, and has launched a custodian last year out of Jersey Islands to service their institutional clients. Standard Chartered has also announced in 2020 a joint venture custodian with Northern Trust in 2021. DBS, the biggest local bank in Singapore, has announced support for Bitcoin and a few other top crypto currencies on their foreign exchange platform late 2020, bringing crypto mainstream for their existing institutional clients.

Billionaire U.S. investor Stanley Druckenmiller: "I own many, many more times gold than I own bitcoin, but frankly if the gold bet works, the bitcoin bet will probably work better because it's thinner and more illiquid and has a lot more beta to it."

Stanley Druckenmiller

On the corporate side, the biggest highlight would be MicroStrategy, led by Michael Saylor, who has gotten the nickname “Bitcoin CEO” for converting his corporate treasury of over $400m to Bitcoin. ($250m at around $11,635 each in Aug, then $175m at around $10,419, for 38,250 BTC, current value about $1.3bn). Others like Paypal have joined also, but have not spent nearly as large of a percentage of treasury as MicroStrategy has. He was speaking at Wave Financial’s latest conference, and his video presentation on his views of Bitcoin is available on the [Wave Financial website](#).

We really felt we were on a $500M melting ice cube," says MicroStrategy (NASDAQ:MSTR) CEO Michael Saylor. "Once the real yield on our treasury got to more than negative 10%, we realized that everything we are doing on P&L is irrelevant.

Michael Saylor

This adoption is one of the many reasons for the massive increase in value of Bitcoin over the past quarter.

Publicly Traded

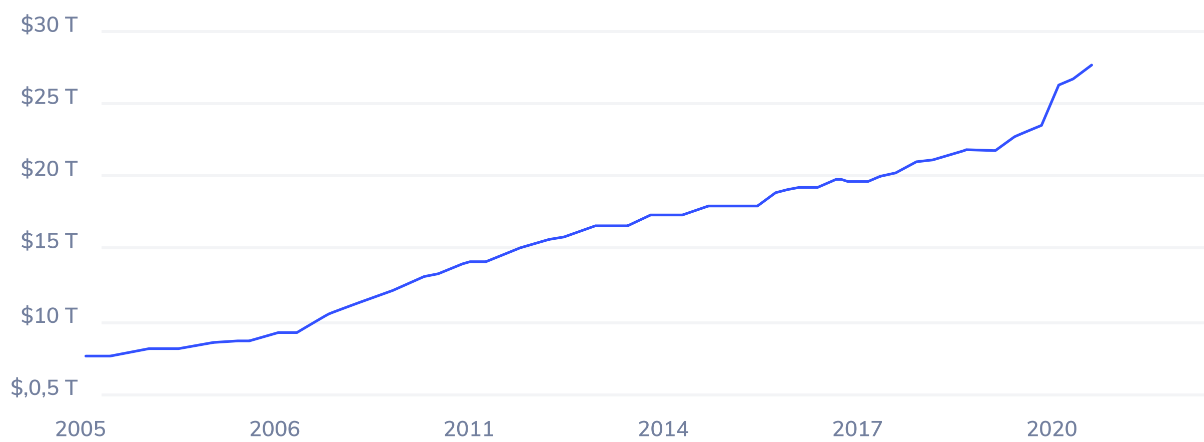
Company name	Symbol	Market Cap	%BTC	Purchases / Fillings	Basis Price USD	Today's value	BTC	%
MicroStrategy inc.	NADQ:MSTR	$9,002,959,872	34.35%	250M Aug,175M Sep 2020	✓ $1,145,000,000	$3,092,683,939	71,079	.338%
Galaxy Digital Holdings	TSX:GLXY	$1,140,802,432	62.56%	$134M on Jun-30-2020	✓ $134,000,000	$713,659,477	16,402	.079%
Square Inc.	NADQ:SQ	$115,191,857,152	0.18%	50M,Bitcoin Investment Whitepaper	✓ $50,000,000	$204,891,018	4,709	.022%
Hut 8 Mining Corp	TSX:Hut-8	$707,061,632	18.18%	Q2 2020	✓ $36,788,573	$128,530,063	2,954	.014%
Voyager Digital LTD	CSE:VYGR	$283,990,752	18.98%	March 31 2020	✓ $7,927,182	$53,909,529	1,239	.006%
Riot Blockchain Inc.	NADQ:RIOT	$1,915,823,488	2.67%	$7.2M on Jun-30-2020	✓ $7,200,000	$51,124,856	1,175	.006%
Coin Citadel Inc	OTCMKTS:CCTL	$5,121	435,869.84%	December 2015 report	✓ $184,390	$22,320,895	513.0	.002%
Bit Digital, Inc.	NASDAQ:BTBT	$984,902,656	4.19%	Sept 2020	✓ $10,080,000	$41,313,235	949.5	.005%
Advanced Bitcoin Technologies AG	ABT:GR	$19,575,206	56.41%	Q1 2018	✓ $2,117,978	$11,042,969	253.8	.001%
DigitalX	ASX:DCC	$42,725,420	21.90%	215 BTC 2019	✓ $874,835	$9,354,761	215.0	.001%
Hive Blockchain	CVE:HIVE	$1,057,753,280	0.87%	Report	? $6,820,520	$9,198,123	211.4	.001%
Cypherpunk Holdings Inc.	TSX:HODL	$32,085,120	37.50%	$1.63M on Jun-30-2020 +60BTC	✓ $1,630,000	$12,030,658	276.5	.001%
BIGG Digital Assets Inc.	CNSX:BIGG	$115,002,544	7.17%	SEDAR Reports	✓ $1,909,259	$8,245,243	189.5	.001%
Argo Blockchain	LSE:ARB	$403,154,976	1.92%	September 2020	✓ $1,340,000	$7,744,872	178.0	.001%
FRMO Corp.	OTCMKTS:FRMO	$225,522,176	1.21%	March 21, 2020	? $2,025,962	$2,732,460	62.8	.000%
Marathon Patent Group	NASDAQ:MARA	$2,728,050,688	7.68%	Jan25th Ann	✓ $150,000,000	$209,416,112	4,813	.023%
Fortress Blockchain	TSXV:FORT	–	–	Q3 2020	? $5,261,568	$7,100,916	163.2	.001%
Neptune Digital Assets Corp.	TSXV: DASH	–	–	Q3 2020	? $2,418,000	$3,263,289	75.0	.000%
Tesla, Inc.	TSLA	$826,053,099,520	0.02%	Report	$1,500,000,000	$1,680,288,523	37,500	.020%

	Company name	Symbol	Market Cap	%BTC	Purchases / Fillings	Basis Price USD	Today's value	BTC	%
Private	MTGOX K.K.	private	private	–	Report	✓ $68,576,024	$6,164,830,914	141,686	.675%
Private	Block.one	private	private	–	Profile	? $4,513,600,000	$6,091,472,185	140,000	.667%
Private	The Tezos Foundation	private	private	–	Sep 2020	? $799,809,920	$1,079,408,871	24,808	.118%
Private	Stone Ridge Holdings Group	private	private	-	Oct 2020 Ann. BTC @ NYDIG	✓ $115,000,000	$473,786,004	10,889	.052%
ETF Like	Grayscale Bitcoin Trust	OTCQX:GBTC	$7,592,400,384	353.34%	Info on AUM and Reports OCT 9th	$19,877,829,920	$26,826,756,482	616,558	2.940%
ETF Like	CoinShares / XBT Provider	COINXBT:SS	–	–	Info on NAV and Reports OCT 9th	$770,170,932	$3,033,988,253	69,730	.332%
ETF Like	Ruffer Investment Company	RICA.L	$498,794,080	392.54%	11/1/2020 £550M	$744,260,000	$1,957,973,202	45,000	.214%
ETF Like	3iQ The Bitcoin Fund	TSX:QBTC.U	–	–	Info on NAV and Reports OCT 9th	$728,295,474	$982,902,548	22,590	.108%
ETF Like	Grayscale Digital Large Cap	GDLC	$370,082,624	82.72%	Info on AUM	$162,820,780	$306,139,988	7,036	.034%
ETF Like	Bitwise 10 Crypto Index Fun	BITW	–	–	Info on AUM and Reports	$45,370,629	$286,734,298	6,590	.023%
ETF Like	WisdomTree Bitcoin	BTCW.SW	–	–	Info on ETP	$131,900,534	$248,009,939	5,700	.027%
ETF Like	ETC Group Bitcoin ETP	BTCE:GR	–	–	Info on NAV and Reports SEP 4th	$413,961,600	$558,675,020	12,840	.025%
ETF Like	21Shares AG	multiple	–	–	ABBA.SW, ABTC.SW, HODL.SW, KEYS.SW, MOON.SW	$192,467,545	$259,757,778	5,970	.023%
ETF Like	CI Galaxy Bitcoin Fund	TSX:BTCG.U	–	–	Info on ETF	$507,780,000	$685,290,621	15,750	.075%
ETF Like	Bitcoin Group SE	ADE:GR	–	–	Info on this AUM	$122,250,000	$164,991,875	3,792	.025%
ETF Like	Leonteq Bitcoin Tracker USD	UBTCTQ	–	–	ABBA.SW, ABTC.SW, HODL.SW, KEYS.SW, MOON.SW	$70,076,864	$94,591,861	2,174	.025%
	02/08/21	Source: bitcointreasuryreserve.com				**$32,329,748,489**	**$53,951,895,026**	**1,239,974**	**5.89%**

Taking a more macro view, the fundamental reason for such a focus on Bitcoin is actually centered around the financial environment of 2020. Due to the pandemic, governments around the world are printing money to stabilize and boost the economy. As an example, in the US:

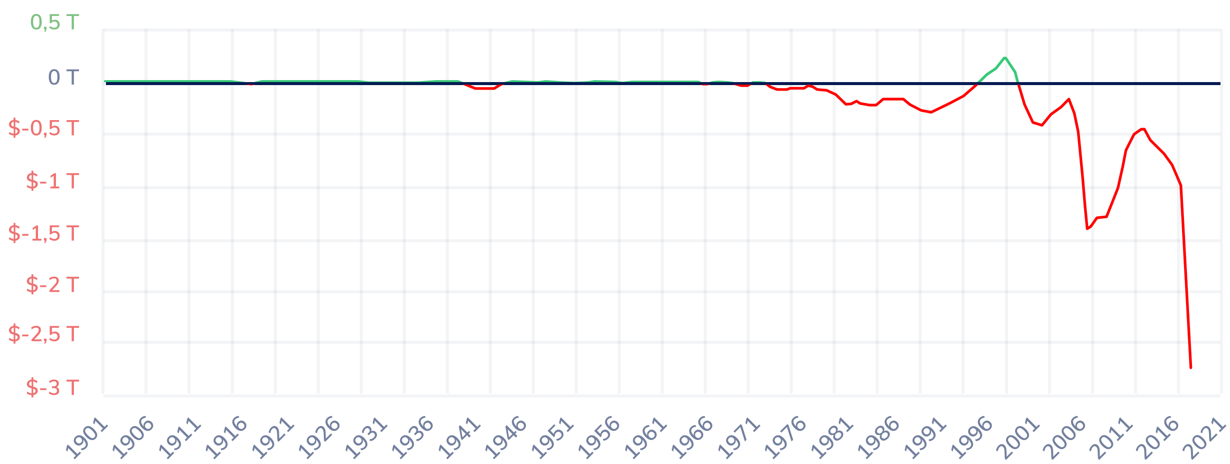
Public debt will cross the $30 Trillion milestone in 2021

US Treasury Total Public Debt Outstanding - $US Billion



Source: Bloomberg - Global Macro Investor

US Treasury Federal Budget Yearly Summary Deficit Or Surplus



Source: Bloomberg - Global Macro Investor

Amount of US debt increases to record levels, while US budget deficit triples.

As a hedge, an investor would switch to hard assets to hedge versus inflation, such as real estate and gold. As discussed in the previous section, a new alternative has appeared and the more innovative investors have started to shift to using Bitcoin.

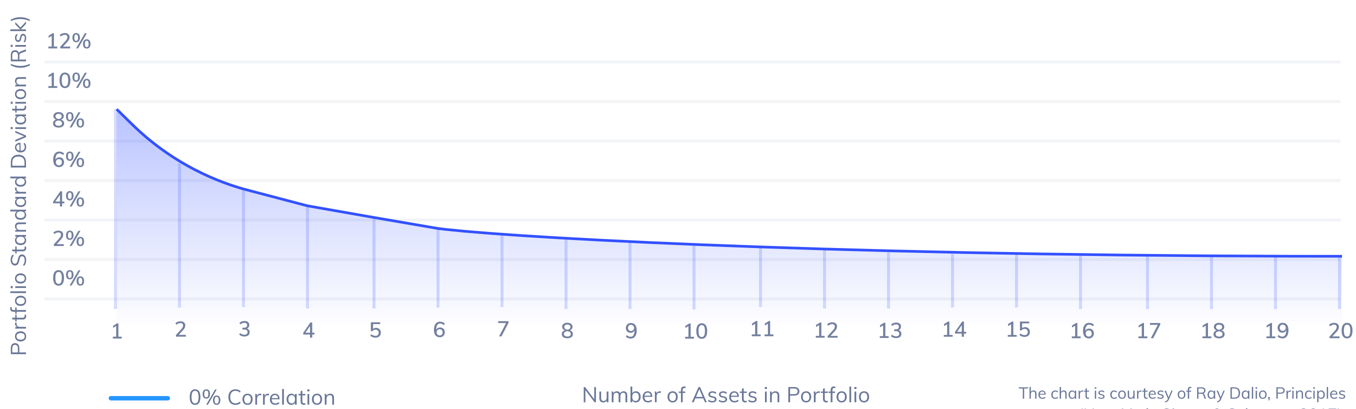
Priming the Pump: Correlation as a Tool

Before jumping into a discussion of using Bitcoin as an investment, the basics of diversification should be addressed. In modern portfolio management theory, the analysis is around not only maximizing return, but also looking at that return from a risk perspective. Maximizing risk adjusted return within a target risk tolerance is actually the goal of institutional portfolio managers. (The target risk tolerance is dependent on the portfolio owner and the purpose of the investment portfolio, whether that is wealth preservation, cash flow generation, total asset growth, or some other financial goal.)

With that in mind, adding lower correlation assets improve the risk adjusted return profile, as large drops in certain assets are buffered by the lower correlation asset (not dropping), even if the lower correlation asset has higher volatility. Finally, the volatility of the total portfolio can be adjusted by either holding some benchmark cash which lowers leverage and therefore volatility (as benchmark cash is by definition zero volatility), or by taking on leverage to increase exposure and volatility.

> *Low correlation means that as one asset swings into a downturn, the other has no reason to follow it down, and so returns are smoothed out.*

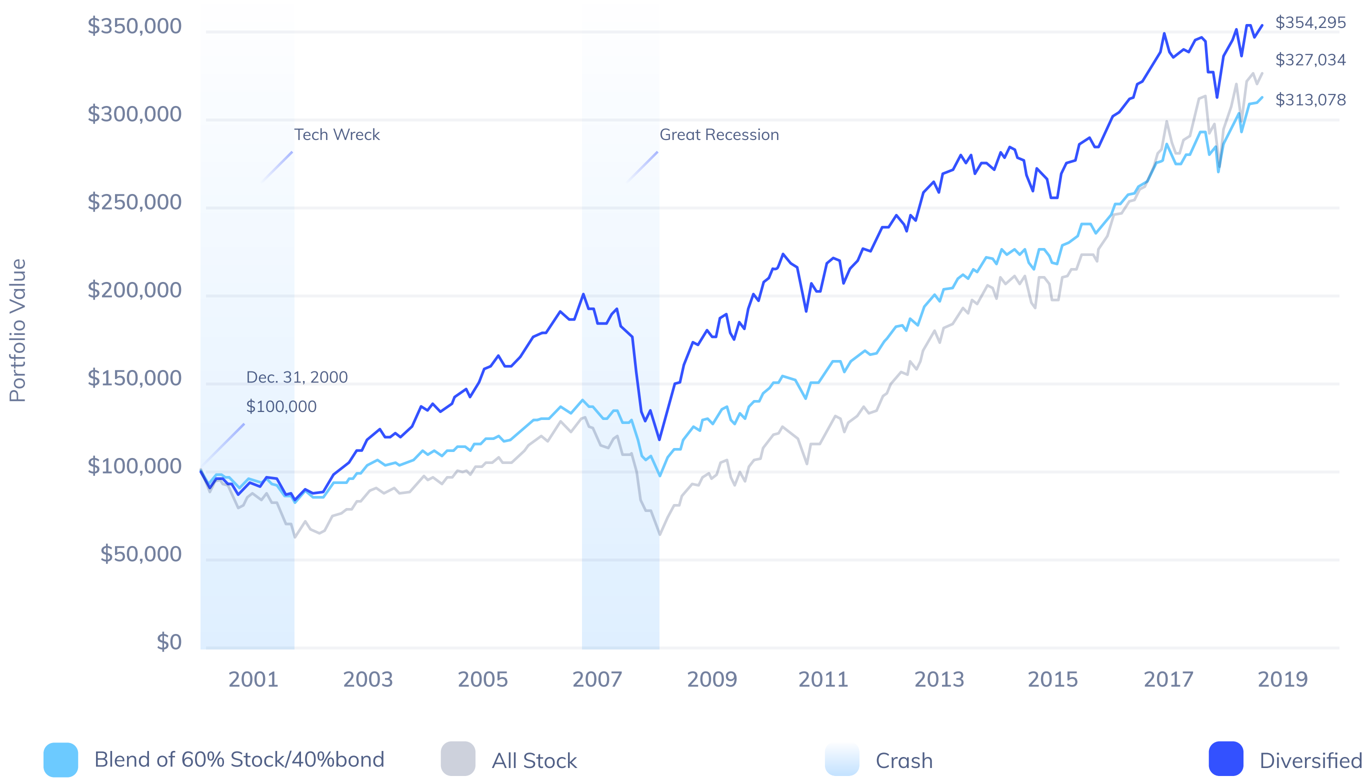
Portfolio expected volatility decreases as 0% correlation assets are added.



The chart is courtesy of Ray Dalio, Principles (New York: Simon & Schuster, 2017).

Based on this logic, institutional investors typically hold a diversified portfolio, as opposed to a single bet or a few concentrated positions.

Cumulative returns of concentrated and diversified portfolios, 2000-2019



Source: Schwab Center for Financial Research, with data provided by Morningstar, Inc.

The above chart helps give a sense of how diversification has performed through time, albeit with the caveat that 2000-2019 is an extreme and short time scale over which to observe the benefits of diversification versus an equity-heavy portfolio.

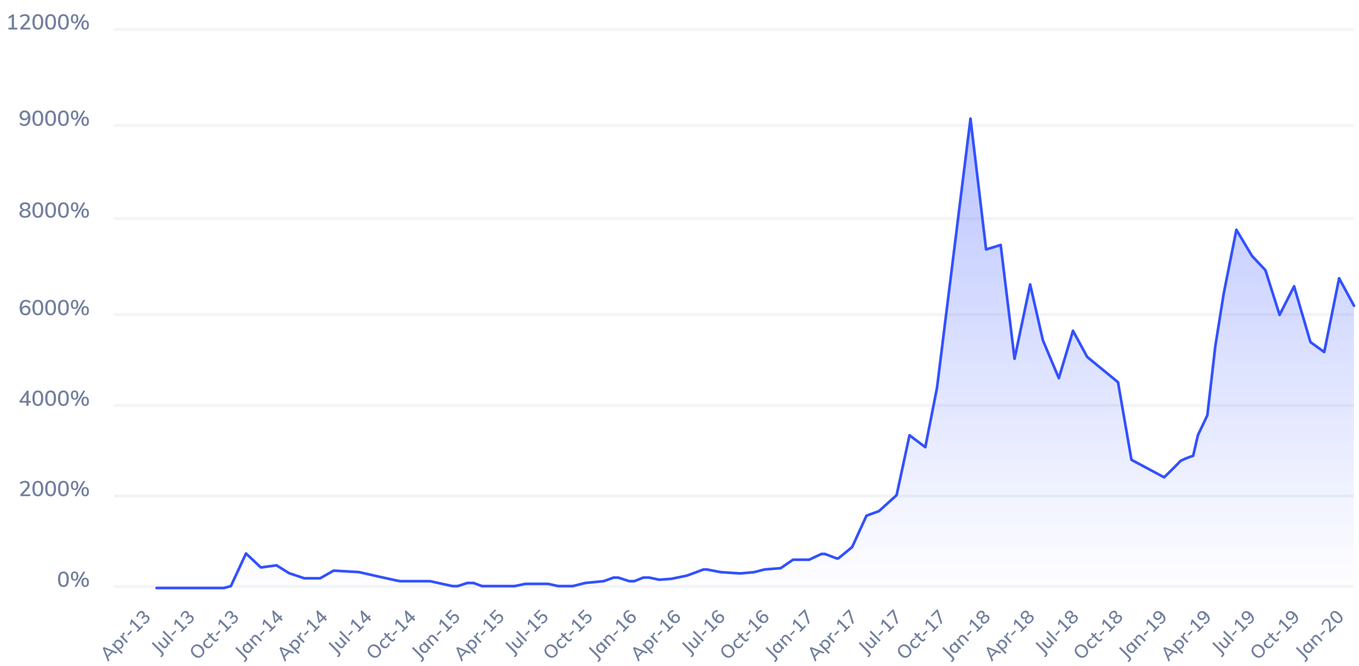
Wall Street legend and billionaire Paul Tudor Jones, who made headlines when he revealed he was buying bitcoin to hedge against inflation earlier this year, has said buying bitcoin is like investing with Steve Jobs and Apple or investing in Google early.

Paul Tudor Jones

Bitcoin’s Starring Role

Bitcoin's performance as an asset class in the past decade is like nothing before seen in financial markets.

Cumulative Return of Bitcoin



Source: Yahoo Finance and Coinmarketcap, data as of Feb 7, 2021.

This performance gives it an annualized return of 113% and an annualized volatility of 85% since 2016. Traditional assets achieve performances of that magnitude usually only on the downside, when businesses go into bankruptcies.

The table below elaborates on the headline finding that Bitcoin since 2016 has had low correlations to other assets. Moreover, this pattern has persisted in a random, unsystematic fashion.

Correlation of total returns of selected assets since 2016

Asset Class	Bitcoin	Gold	S&P 500	NASDAQ	MSCI EM	US 10Y	Crude Oil	DXY
Bitcoin	100%	17%	2%	3%	-5%	14%	-1%	-4%
Gold	17%		-10%	-6%	24%	61%	-13%	-47%
S&P	2%	-10%		88%	66%	-34%	49%	-21%
NASDAQ	3%	-6%	88%		61%	-18%	34%	-20%
MSCI EM	-5%	24%	66%	61%		-9%	31%	-64%
US 10Y	14%	61%	-34%	-18%	-9%		-40%	-14%
Crude Oil	-1%	-13%	49%	34%	31%	-40%		-17%
DXY	-4%	-47%	-21%	-20%	-64%	-14%	-17%	
AVG	4%	4%	20%	20%	15%	-6%	6%	-27%

Source: CoinMarketCap, Yahoo Finance, MSCI, Standard & Poor's, Bloomberg, and others

Looking at the chart above, Bitcoin is similar to gold as a low correlation asset class. To be exact, the optimal number is zero, where positive 1 (100%) and negative 1 (-100%) are both considered high correlation. This is especially useful, as Bitcoin has low correlation to equities (S&P 2% and MSCI -5%) and Crude Oil (-1%).

This means that adding Bitcoin to any of the assets would improve the performance of the portfolio on a risk adjusted basis.

SPX Portfolio with BTC

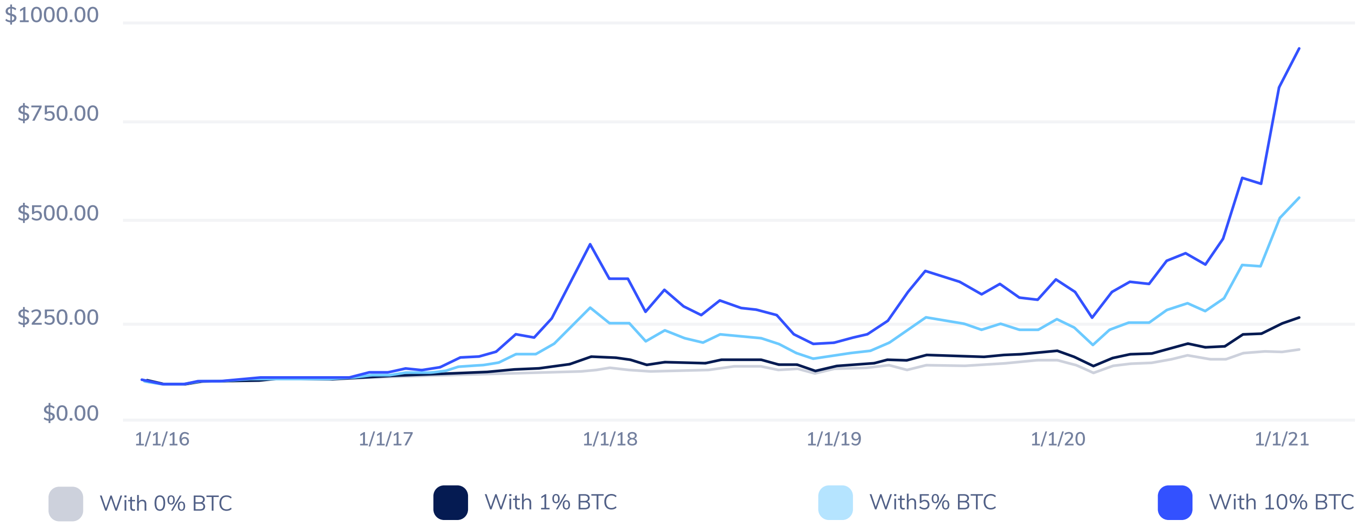


Chart 1

As it is obvious on the chart, adding BTC improves performance of the portfolio. At the same time, there is more risk from adding the more volatile asset, so it is more important to examine the Sharpe and Sortino ratios.

2016 to 2020	Portfolio value ($100 start)	Total Return	Annualized Return	Volatility	Sharpe Ratio	Sortino Ratio
With 0% BTC	$181.98	81.98%	12.72%	15.27%	0.71	2.42
With 1% BTC	$258.05	158.05%	20.88%	18.39%	0.99	3.76
With 5% BTC	$562.33	462.33%	41.25%	34.95%	1.08	4.80
With 10% BTC	$942.69	842.69%	56.63%	46.95%	1.12	5.42

Chart 2

Adding BTC does meaningfully increase the Sharpe and Sortino ratio, hence an improvement in the risk adjusted performance of the portfolio. One last thing to point out, if the volatility is too high on an absolute basis, an investor can consider holding a portfolio of half of this suggested portfolio and half in cash (at zero volatility), which historically would have brought down the returns, but also the volatility.

Chart 1, Chart 2: Backtesting is based on hypothetical monthly performance, and Portfolio utilizes S&P 500 Index ("SPX") total returns (excluding dividends and interest). Each incremental 1% allocation to BTC reduces the allocation to SPX by 1%. Data from January 2016 through February 2021 Source: Yahoo Finance. Provided for illustrative purposes only. Past performance is not an assurance of future returns. All returns are preliminary, unaudited, and were calculated by Wave's internal Portfolio team.

Extending the discussion further, similar conclusions can be drawn to a 60/40 portfolio containing 60% US stocks and 40% US bonds, and a diversified portfolio. For example, here is an example with 5% BTC added.

60/40 Portfolio with BTC

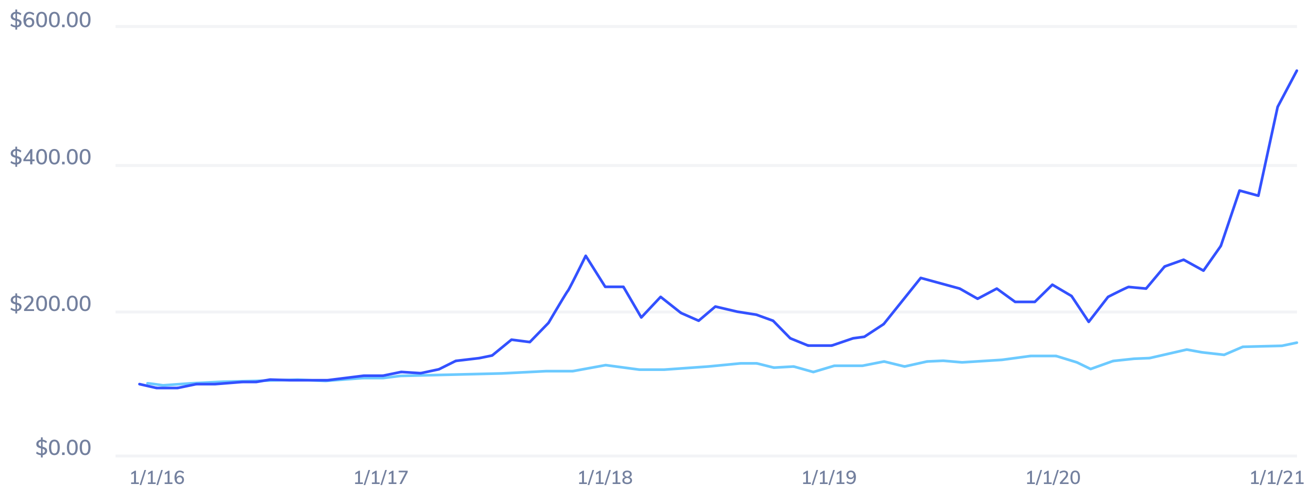


Chart 3

With 0% BTC   With 5% BTC

2016 to 2020	Portfolio value ($100 start)	Total Return	Annualized Return	Volatility	Sharpe Ratio	Sortino Ratio
With 0% BTC	$153.54	53.54%	8.95%	9.92%	0.69	2.36
With 5% BTC	$535.32	435.32%	39.87%	35.03%	1.05	4.97

Chart 4

Chart 3, Chart 4: Backtesting is based on hypothetical monthly performance. Each incremental 5% allocation to BTC reduces the allocation to SPX by 3% and USTR10 by 2%. Data from January 2016 through February 2021 Source: Yahoo Finance. Provided for illustrative purposes only. Past performance is not an assurance of future returns. All returns are preliminary, unaudited, and were calculated by Wave's internal Portfolio team.

And here is an example of adding 5% BTC exposure to a diversified portfolio.

Diversified Portfolio with BTC

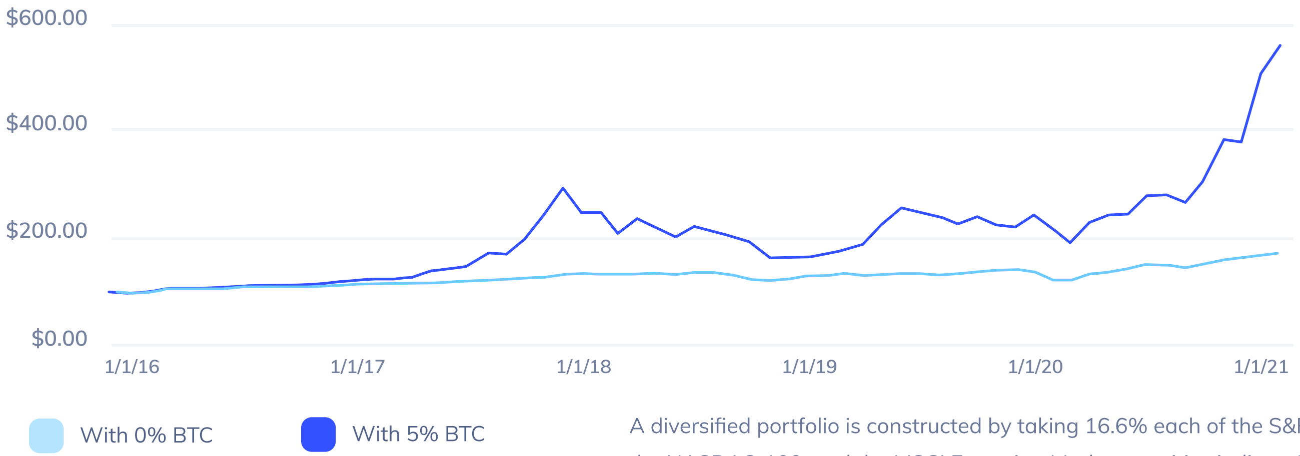


Chart 5

A diversified portfolio is constructed by taking 16.6% each of the S&P 500, the NASDAQ 100, and the MSCI Emerging Markets equities indices, 30% US 10Yr Treasuries, 10% crude oil, and 10% gold.

2016 to 2020	Portfolio value ($100 start)	Total Return	Annualized Return	Volatility	Sharpe Ratio	Sortino Ratio
With 0% BTC	$172.24	72.27%	11.49%	10.34%	0.88	2.94
With 5% BTC	$558.73	458.78%	41.07%	33.93%	1.09	5.36

Chart 6

In both cases, the total return improves significantly, along with an increase in the volatility. With the higher volatility, did the performance of the portfolio actually increase? Looking at the Sharpe Ratio, which is a risk adjusted parameter to compare portfolios, it does show an improvement in performance. More importantly, the Sortino Ratio, which is a ratio that looks at risk adjusted returns by considering only the downside volatility, improved significantly, which is not surprising as the movement of BTC is actually more towards the upside rather than the downside.

To wrap up, adding Bitcoin improves not only the performance of various standard portfolios, it also improves the risk adjusted performance.

Chart5, Chart 6: Backtesting is based on hypothetical monthly performance. Each incremental 5% allocation to BTC reduces the allocation to SPX by 0.83%, NASDAQ by 0.83%, MSCI by 0.83%, USTR10 by 1.5%, Oil by 0.5% and Gold by 0.5%. Data from January 2016 through February 2021 Source: Yahoo Finance. Provided for illustrative purposes only. Past performance is not an assurance of future returns. All returns are preliminary, unaudited, and were calculated by Wave's internal Portfolio team.

Conclusion

As a novel source of risk and return, Bitcoin deserves attention from managers seeking a diversifying alternative for inclusion into their portfolio. After a decade on the scene, sufficient data have been generated to validate its benefits. Despite high inherent volatility, prudent risk weighting within a portfolio can maximize gains from Bitcoin inclusion while limiting exposure to the truly dramatic swings. In a highly variable world where the diversification benefits of traditional assets may be weakening, Bitcoin differentiates itself as an asset class.

Research Note Authors

Benjamin Tsai

President & Managing Partner

ben@wavegp.com

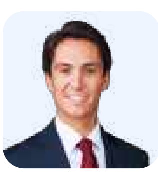
Ben's 20 years of trading & structured finance experience led him to senior leadership roles at AllianceBernstein and Merrill Lynch where he led business strategy and managed profitable distribution teams in Tokyo, Hong Kong, Singapore, Seoul, and Taipei. Ben looks after product development and trading. He holds numerous security licenses globally, such as Series 65 and 3.

Constantin Kogan

Managing Director at Wave Financial

constantin@wavegp.com

Constantin has been a cryptocurrency investor since 2012. He has over 10 years of experience in corporate leadership, technology and finance. He contributes to the digital asset space as well as the sharing and value economies.

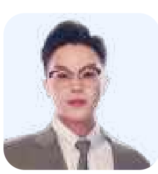


Henry Elder

Henry Elder, Head of Treasury & Wealth Management

constantin@wavegp.com

Prior to joining Wave in 2018, Henry co-founded Digital Asset Advisors (DAA). Previously he was at commercial real estate tokenization startup Slice, where he tokenized one of the first commercial properties in the US. Henry is also the President of the International Blockchain Real Estate Association (IBREA). Henry holds Series 7, 63, and 66 securities licenses.



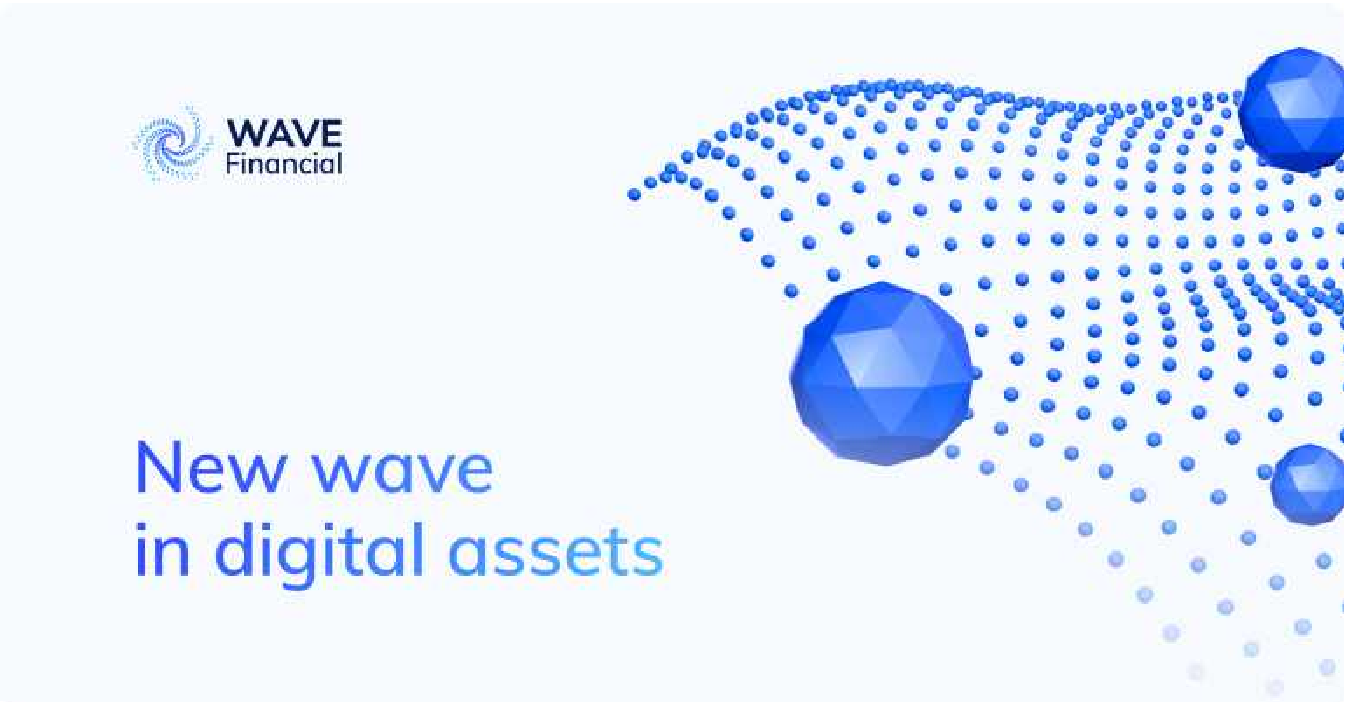
Jack Lu

Client Service Analyst

jack@wavegp.com

Registered Investment Advisor, Mutual of Omaha. BA, Financial Math and Statistics, UC Santa Barbara. Licensed Investment Advisory Representative

About Wave Financial



Wave Financial LLC (Wave) is a Los Angeles and London based investment management company that provides institutional digital asset fund products. Led by a team of highly experienced financial services professionals, Wave provides investable funds via their diverse investment strategies applied to digital assets and tokenized real assets. Wave also offers managed accounts for HNWIs and family offices seeking tailored digital asset exposure, bespoke treasury management services, and early-stage venture capital and strategic consultation to the digital asset ecosystem. Wave is regulated as a California Registered Investment Advisor (CRD#: 305726).

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www.wavegp.com

info@wavegp.com

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