

GETTING OFF ZERO — SERIES ARTICLE II

Getting off zero: from passive to managed exposure

What is the impact of an actively managed bitcoin strategy on the performance of traditional institutional portfolios?

Contents

- 1 Introduction

- 2 Aegis: exposure by rule

- 3 Asset panel and standalone metrics

- 4 Return against volatility

- 5 Correlation and diversification

- 6 Performance by period

- 7 Adding Aegis to four base allocations

- 8 Optimum allocation

- 9 Portfolio growth

- 10 Conclusion

1. Introduction

This article continues the series of fundamental research publications that demonstrate bitcoin's relevance to institutional allocators. In the "Getting off zero" series, we examine a set of portfolios and reference holdings that serve allocators with different mandates. This second article examines how an actively managed bitcoin strategy affects traditional institutional portfolios.

Mandates are written around risk budgets, drawdown limits and reporting obligations. Bitcoin moves in larger swings than the holdings those mandates were designed for. The return history of bitcoin is well documented. The question for many allocators is therefore not whether bitcoin has performed. It is whether the path of that performance fits inside the framework those allocators work within.

Our first article in this series, "Getting Off Zero: The Power of Bitcoin Allocation", showed that a modest bitcoin allocation increased both returns and risk-adjusted returns in a traditional 60/40 portfolio. That analysis assumed a passive bitcoin holding with periodic rebalancing.

A passive holding transfers the full volatility of bitcoin into the portfolio. Managing that volatility requires continuous monitoring, defined rules, execution discipline and custody arrangements. Building all four takes dedicated staff and systems. Aegis incorporates those capabilities within the strategy, so an allocator holds one position without having to build them in-house.

This article examines the actively managed bitcoin strategy: Aegis. The strategy manages bitcoin by following a defined set of rules. Those rules determine how the bitcoin exposure is adjusted as market conditions change. This paper addresses the question: What is the impact of an actively managed bitcoin strategy on the performance of traditional institutional portfolios?

The paper proceeds as follows. Section 2 explains Aegis in more depth. Sections 3 to 6 compare Aegis with a direct bitcoin holding and the wider panel, on standalone metrics, correlation and performance by period. Sections 7 and 8 add Aegis to four base allocations. They locate where the marginal benefit fades and where Sharpe and Sortino peak. Section 9 translates the results into portfolio value. Section 10 sets out the conclusions.

2. Aegis: exposure by rule

Aegis is an actively managed bitcoin strategy that is based on Blockrise's bitcoin cost price model. The strategy increases and decreases the bitcoin weight month by month. Depending on market conditions, bitcoin allocation can range from 0% to 100%. The model is a mathematical derivation that approximates the cost of producing one bitcoin. The model adjusts for the capital expenditure of mining companies and for changes in network activity.

The model continuously approximates the over- or undervaluation of the bitcoin market price relative to that cost price. Each month, the strategy rebalances to the weight that this valuation indicates. The strategy increases the bitcoin position under an undervaluation, where the market price is below the cost price. It decreases the bitcoin position under an overvaluation, where the market price is above the cost price. The cash position funds an increase in bitcoin exposure during a downward price movement as well, simultaneously reducing portfolio volatility and moving contrarian to the market.

The strategy's safety trigger continuously monitors whether the overvaluation of bitcoin has become too large. When the valuation passes a certain threshold, the safety trigger decreases the bitcoin position to 0% and holds the portfolio in cash.

3. Asset panel and standalone metrics

Table 1 sets out every asset and portfolio in this study over the full period: compound annual return, volatility, Sharpe, Sortino and maximum drawdown.

ASSET OR PORTFOLIO	COMPOUND ANNUAL RETURN %	ANN. VOL %	SHARPE	SORTINO	MAX DRAWDOWN %
Aegis	62.64	55.43	1.11	1.70	-70.9
Bitcoin	53.23	67.37	0.94	1.41	-83.1
US equity (IVV)	15.36	18.41	0.74	1.03	-33.9
US bonds (AGG)	1.90	5.50	-0.07	-0.10	-18.4
European equity (IEUR)	10.02	18.49	0.48	0.66	-37.0
Gold (IAU)	13.75	16.17	0.73	1.02	-26.2
US real estate (VNQ)	5.66	20.95	0.25	0.34	-42.4
US 60/40	10.06	11.39	0.68	0.95	-21.6

Table 1: compound annual return, annualised volatility, Sharpe, Sortino and maximum drawdown per asset and portfolio, full period, 2017 to mid-2026.

The study period runs from 1 January 2017 to 30 June 2026. The first trading day in the period is 3 January 2017. Because all calculations use daily returns, the first return falls on 4 January 2017. The period contains 2,384 trading days. Every figure uses US trading days and US dollars. Every return is a daily simple return. The risk-free rate is the three-month US Treasury bill yield, converted to a daily rate by dividing the annual yield by 252. That yield averaged 2.45% a year across the period.

Six of the eight rows in Table 1 are conventional holdings, meaning listed asset classes that institutional portfolios already hold. Five of those are single holdings: US equity (IVV), US bonds (AGG), European equity (IEUR), gold (IAU) and US real estate (VNQ). The sixth is the US 60/40 base allocation, built from 60% US equity and 40% US bonds. Each is represented by a listed total-return index proxy. A proxy is a listed instrument used to stand in for an asset class, so its return already reflects that instrument's own costs and its tracking of the index. Total return means income is treated as reinvested rather than taken out. Bitcoin is a US dollar closing price series. Aegis returns are net of a 1.82% annual management fee, accrued daily, and 0.30% of traded notional at each rebalance. The proxy returns above are net of each instrument's own costs, so all assets and portfolios are on a comparable basis.

Aegis and bitcoin are priced on a seven-day calendar, while the asset panel prices on a five-day trading calendar. To make sure Aegis and bitcoin can be compared with the other assets, the trading calendars need to be aligned. This is done in three steps. First, Aegis and bitcoin are aligned onto the trading calendar. Then their last value is carried forward. Lastly, the non-trading day returns are

compounded into the next trading day, so no return is dropped. This convention affects every Aegis and bitcoin figure in the paper.

Compound annual return is the constant yearly growth rate that turns the starting value into the ending value over the period. It accounts for compounding. It therefore describes the outcome of a position held for the full period, which the arithmetic average of the annual returns does not.

Annualised volatility measures how widely a holding's returns disperse around their own mean, expressed as a yearly figure. Volatility is indifferent to direction; a large gain and a large loss contribute equally. It also weights big moves more heavily than small ones, so a handful of extreme days can dominate the figure.

The Sharpe ratio answers one question: how much excess return above the risk-free rate did each unit of movement produce? A higher number means the holding returned more per unit of movement. The daily risk-free rate is subtracted from each daily return, which gives a daily excess return. The arithmetic mean of that series is divided by its standard deviation. That figure is multiplied by the square root of 252, the number of trading days in a year.

The Sortino ratio asks the same question but counts only the downward moves. Upward swings are not a problem for an allocator, yet the Sharpe ratio treats them as risk all the same. Sortino favours a holding whose large moves point mostly upward. The Sortino ratio is calculated using the same excess return series as Sharpe. The arithmetic mean is divided by the downside deviation, which is the square root of the mean squared value of the excess returns below zero. That figure is multiplied by the square root of 252.

Maximum drawdown is the largest fall from any peak to its subsequent low, as a percentage of that peak. It answers the question the ratios cannot: how bad did it get?

Table 1 divides into two groups. The six conventional holdings form the first. They return between 1.90% and 15.36% a year. For this group the volatility ranges between 5.50% and 20.95%. Their Sharpe ratios run from -0.07 for US bonds to 0.74 for US equity, and their Sortino ratios from -0.10 for US bonds to 1.03 for US equity.

Aegis and bitcoin form the second group. Aegis returns 62.64% a year and bitcoin 53.23% a year, which is 4.1 times and 3.5 times the 15.36% of US equity, the highest-returning conventional holding. They also carry the highest volatility in the table, at 55.43% and 67.37%. Aegis's maximum drawdown is -70.9% and bitcoin's -83.1%. Aegis has a Sharpe ratio of 1.11 and bitcoin 0.94. Aegis has a Sortino ratio of 1.70 and bitcoin 1.41.

Aegis outperforms bitcoin on every column of Table 1. The strategy returns 9.4 percentage points more a year than bitcoin, while also carrying 11.9 percentage points less volatility than bitcoin. Aegis's deepest fall is 12.2 percentage points shallower than bitcoin's, though it remains the second deepest in the panel on drawdown. Aegis also has a higher Sharpe and a higher Sortino than bitcoin.

4. Return against volatility

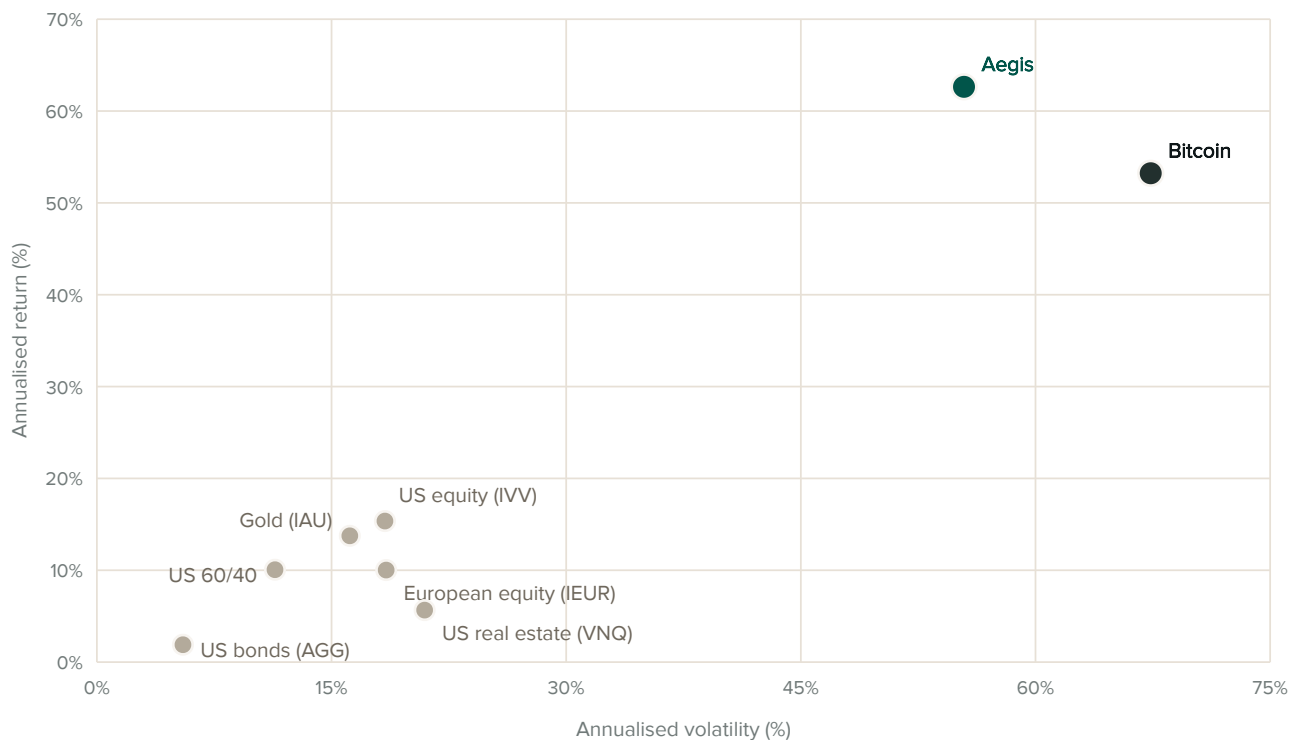


Figure 1: annualised return against annualised volatility, full period, 2017 to mid-2026.

Figure 1 further illustrates the differences between Aegis, bitcoin and the other assets. Both, bitcoin and Aegis, are located apart from the rest of the panel, in the top right corner. No other asset in this paper approaches their annualised returns or their volatility. Aegis carries lower volatility than bitcoin, while also having the highest return of all analysed holdings.

Every other holding clusters below. All are under 20% annualised return and under 25% volatility. US equity (IVV) is above the rest of that cluster on return, at 15.36%. Gold (IAU) is just below, at 13.75%. Gold also carries lower volatility than US equity, 16.17% against 18.41%.

The US 60/40 portfolio is at the left edge of the cluster. It returns 10.06%, less than both US equity and gold. Its volatility of 11.39% is the lowest in the cluster apart from US bonds at 5.50%. European equity (IEUR) matches the US 60/40 portfolio on return, 10.02% against 10.06%. European equity carries higher volatility than the US 60/40 portfolio, 18.49% against 11.39%.

US real estate (VNQ) carries the highest volatility of the cluster, at 20.95%, and returns 5.66%. US bonds (AGG) are lowest in the cluster on both return and volatility, at 1.90% and 5.50%.

5. Correlation and diversification

5.1 Full-period correlation matrix

Figure 2 shows the correlation of daily returns between every pair in the panel. This paper examines the Aegis row, because Aegis is the holding being added to the four base allocations. Correlation measures how closely two return series move together on a scale from -1 to +1. The lower the correlation between two assets, the less their returns have moved together over the sample period. This paper treats readings below 0.30 as weak, 0.30 to 0.70 as moderate, and above 0.70 as strong correlation.

Weakly correlated assets can be combined to lower portfolio risk. The return does not necessarily fall with portfolio risk, as risk and return do not combine in the same way. Portfolio return is the weighted average of the returns of its holdings. Portfolio risk is not. When two assets move apart, their movements partly offset each other. The combined volatility falls below the weighted average of the individual volatilities. The return remains the full weighted average.

	Aegis	US equity	US bonds	EU equity	Gold	US real estate
Aegis	1.00	0.24	0.10	0.24	0.12	0.18
US equity	0.24	1.00	0.13	0.82	0.11	0.73
US bonds	0.10	0.13	1.00	0.21	0.32	0.29
EU equity	0.24	0.82	0.21	1.00	0.23	0.67
Gold	0.12	0.11	0.32	0.23	1.00	0.14
US real estate	0.18	0.73	0.29	0.67	0.14	1.00

Figure 2: correlation of daily returns, full period, 2017 to mid-2026.

Every Aegis reading falls in the weak band, below 0.30. European equity, US equity and US real estate correlate 0.67 to 0.82 with one another and fall in the moderate to strong band. Aegis's correlations with the other five assets range from 0.10 to 0.24. The lowest readings of Aegis's correlations are against US bonds at 0.10 and gold at 0.12. Aegis's highest correlations are with European equity and US equity, both at 0.24. Those two indices correlate 0.82 with each other. The correlation with US real estate is 0.18.

5.2 Stress-event returns

Stress events are short periods in which broad markets fall together, usually after a macroeconomic, geopolitical or systemic shock. This section asks what Aegis returned while those events were happening.

Figure 3 shows cumulative return for Aegis and the two equity indices from the onset of each of the eight stress events. Two periods are shown: the first 10 trading days, which isolate the shock, and the first 60, which show how far the fall went and whether the holding recovered.

STRESS EVENT	ONSET	FIRST 10 DAYS			FIRST 60 DAYS		
		Aegis	US eq	EU eq	Aegis	US eq	EU eq
COVID-19 crash	20 Feb 2020	-9.2%	-7.4%	-6.6%	+1.3%	-15.3%	-23.6%
Russia invades Ukraine	24 Feb 2022	+8.6%	+1.4%	-5.5%	-9.1%	-7.3%	-9.4%
FTX collapse	8 Nov 2022	-21.7%	+3.9%	+6.2%	+14.5%	+9.1%	+19.2%
SVB / banking stress	9 Mar 2023	+25.2%	-1.3%	-1.3%	+24.4%	+7.7%	+3.4%
Israel-Hamas war	7 Oct 2023	+6.1%	-1.9%	-3.1%	+49.1%	+9.6%	+10.0%
Iran-Israel strikes	13 Apr 2024	-2.2%	-0.5%	+2.1%	-4.9%	+10.3%	+6.3%
Yen carry trade unwind	5 Aug 2024	-2.3%	+4.0%	+3.4%	+10.9%	+9.4%	+3.5%
US tariff shock	2 Apr 2025	+0.3%	-6.9%	-1.8%	+3.8%	+9.8%	+11.6%

■ below 0%
 ■ 0% to 5%
 ■ 5% and above

Figure 3: cumulative return after onset by event and period, eight stress events. Colour marks three bands: red below 0%, yellow from 0% to 5%, and green at 5% and above.

Over the 10-day period Aegis's return is positive in four of the eight events, against three for each equity index. Over the 60-day period Aegis is positive in six of eight, the same count as US equity and European equity. Three events show Aegis positive over 10 days while both equity indices fall. At the SVB banking stress Aegis returns +25.2% while both equity indices fall 1.3%. At the Israel-Hamas war Aegis returns +6.1% against -1.9% for US equity and -3.1% for European equity. At the US tariff shock Aegis returns +0.3% against -6.9% for US equity and -1.8% for European equity. Over the 60-day period Aegis's reading at the Israel-Hamas war is above both equity indices, at +49.1% against +9.6% and +10.0%. Aegis's 60-day range is wider than US equity's: -9.1% to +49.1%, against -15.3% to +10.3%.

Against that, the FTX collapse is the deepest 10-day reading in the table, at -21.7%, while both equity indices increase. Even so, Aegis returns +14.5% over the 60-day period.

Two conclusions follow. Aegis is positive in four of the eight events over the 10-day period, against

three for each index. During those positive events Aegis also returns more than both indices, the highest being 25.2% against -1.3% for each of them in the same event. Over the 60-day period Aegis is positive in six of the eight events. Again, it returns significantly more than both indices do. Its average gain across those events is 17.3%, against an average loss of 7.0% in the two negative events. Both equity indices show the reverse: their losses tend to be larger than their gains. US equity gains 9.3% on average and loses 11.3%, while European equity gains 9.0% and loses 16.5%. Aegis carries roughly three times the volatility of US equity, but that volatility is skewed to the upside. While the two indices seem to move together, Aegis follows its own path. Together with the directional asymmetry, these properties distinguish Aegis from both indices and make it a favourable asset to allocate towards in moments of crisis.

5.3 Stressed-months correlation matrix

Correlation is not fixed. It increases when markets fall, which is exactly when a diversifier is most needed. A full-period average cannot show that increase, because ordinary days outnumber the days that do the damage. The full period average therefore says little about how an asset behaved in a sell-off. Isolating stressed periods removes that problem. The following section measures correlation within those periods alone.

The stressed sample holds all 60 trading days on and after each stress-event onset date, the same windows used in section 5.2. Those windows do not overlap, so the sample is 480 trading days of the 2,384 in the period, or 20.1%.

	Aegis	US equity	US bonds	EU equity	Gold	US real estate
Aegis	1.00	0.45	0.27	0.46	0.18	0.40
US equity	0.45	1.00	0.15	0.88	0.09	0.86
US bonds	0.27	0.15	1.00	0.23	0.33	0.25
EU equity	0.46	0.88	0.23	1.00	0.19	0.80
Gold	0.18	0.09	0.33	0.19	1.00	0.14
US real estate	0.40	0.86	0.25	0.80	0.14	1.00

Figure 4: correlation of daily returns, stressed months only.

Figure 4 shows the correlation over the stressed months only. The main question is whether Aegis's low full-period reading holds when the whole panel is under stress. Correlations increase across most of the matrix. The average correlation between pairs of assets is 0.30 over the full period and 0.38 over stressed months. The increase appears across most of the matrix rather than in the Aegis row alone, which is consistent with a market-wide effect rather than an effect specific to Aegis. The

absolute level of each reading in Figure 4 carries less information than its change from Figure 2. Figure 5 extracts the Aegis row from both correlation matrices and sets them side by side. It shows how the correlation between Aegis and each asset shifts between stressed and non-stressed months.

5.4 Aegis against each asset

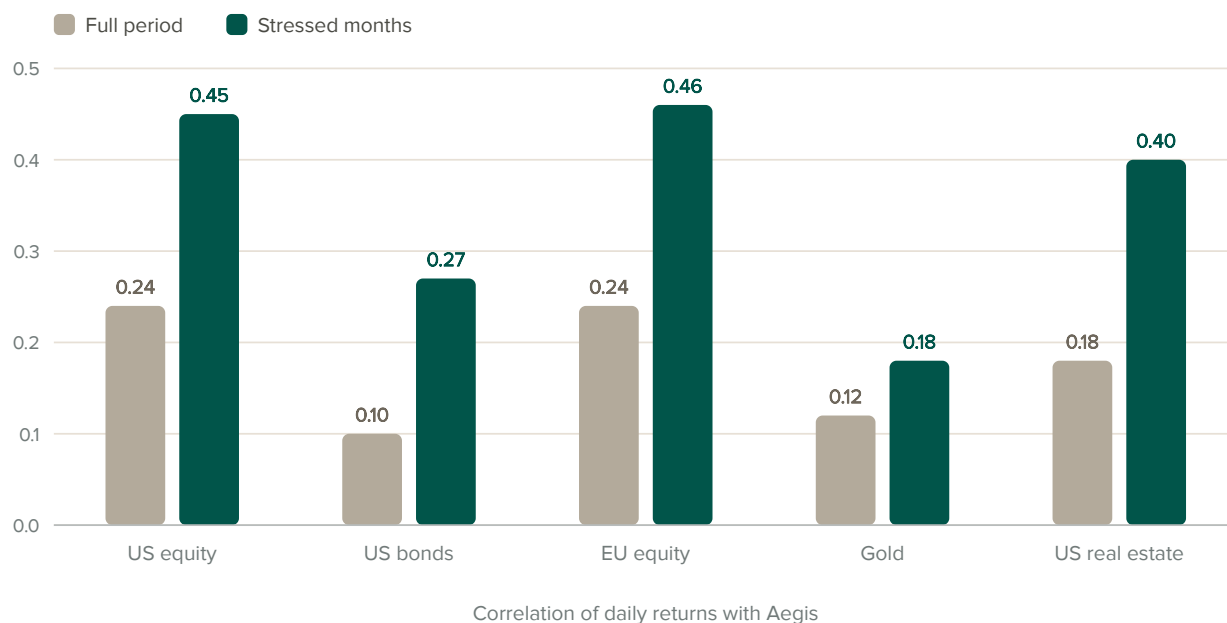


Figure 5: Aegis correlation to each asset, full period against stressed months.

Figure 5 places Aegis's full-period correlation next to its stressed-months correlation for each asset. The full-period bar includes the stressed months, so the comparison is against the whole sample rather than against the calm months alone. Over the full period Aegis's correlation to every asset stays below 0.30. Under stress every reading increases. European equity increases from 0.24 to 0.46, US equity from 0.24 to 0.45, and US real estate from 0.18 to 0.40, an increase of roughly 0.22 in each case. US bonds increase from 0.10 to 0.27, an increase of 0.16. Gold increases least, from 0.12 to 0.18, an increase of 0.06.

The difference between the two bars shows how much of Aegis's independence remains in the months a portfolio needs it most. Aegis gives up part of that independence under stress. Its highest reading increases from 0.24 to 0.46. At a maximum of 0.46, Aegis under stress is below the 0.80 to 0.88 range that US equity, European equity and US real estate show against each other in the same months.

6. Performance by period

Bitcoin moved through several market regimes over the study period, and the prevailing regime can influence how any asset performs. A full-period figure blends those regimes into one number and describes none of them individually. It is therefore informative to examine performance in individual periods. This section divides the study period into fixed calendar periods. Four periods run exactly two years: 2017-18, 2019-20, 2021-22 and 2023-24. The fifth, most recent period, runs 18 months, from January 2025 to 30 June 2026, because the data stops mid-year. The figures cover Aegis, bitcoin, US equity (IVV) and European equity (IEUR). They illustrate drawdown and risk-adjusted return in each period, alongside the full study period.

6.1 Drawdown by period

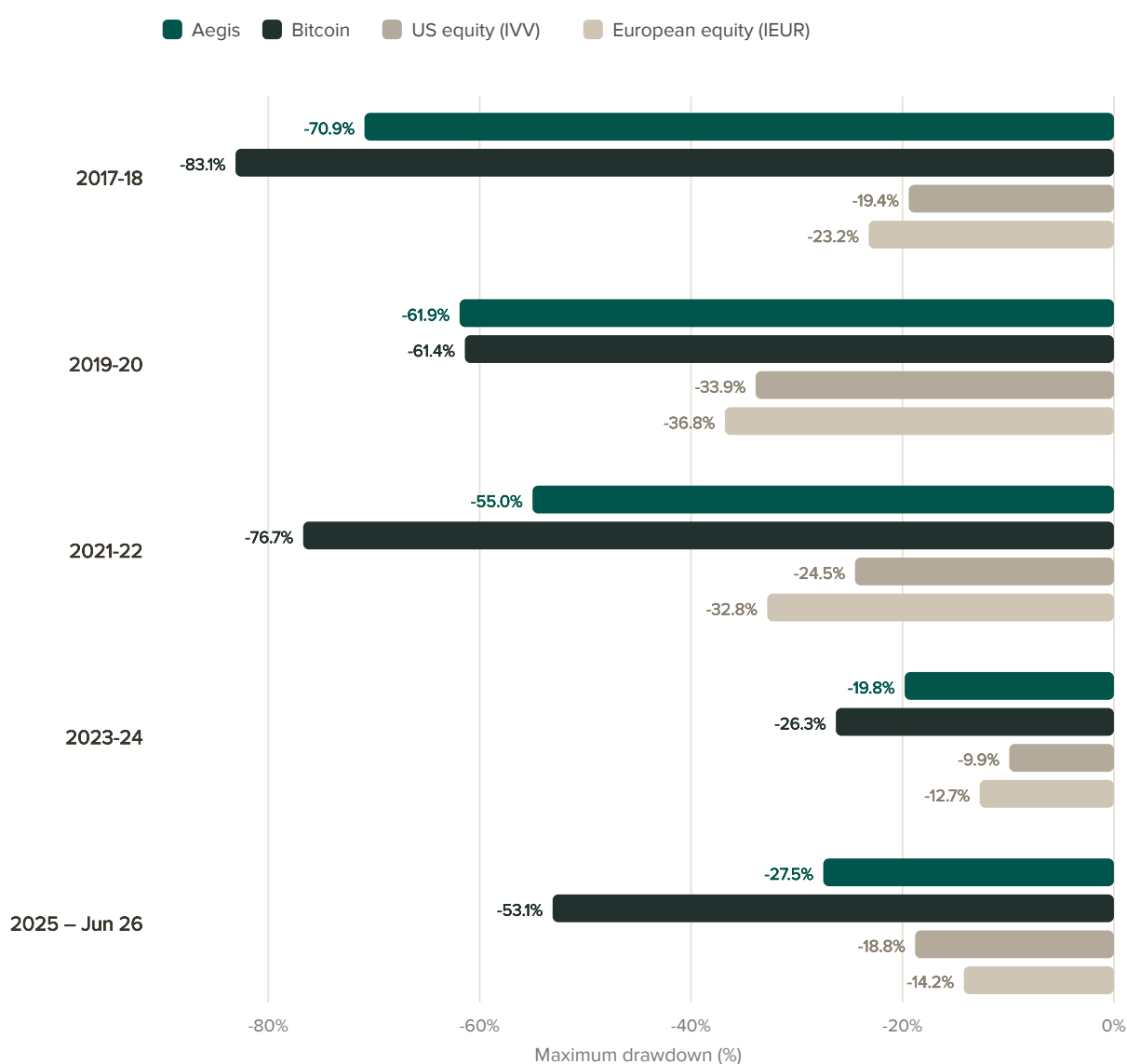


Figure 6: maximum drawdown by period, for Aegis, bitcoin, US equity (IVV) and European equity (IEUR).

Aegis's drawdown is shallower than bitcoin's in four of the five periods shown in the figure. The exception is 2019-20, at -61.9% for Aegis against -61.4% for bitcoin. In 2021-22, the long bitcoin

drawdown, Aegis had a drawdown of -55.0% against -76.7% for bitcoin, a difference of 21.7 percentage points. The gap is widest in the most recent period, January 2025 to June 2026, where Aegis draws down 25.6 percentage points less than bitcoin, at -27.5% against -53.1%. Aegis and bitcoin both still fall further than either equity index in every period. In the most recent period, for example, US equity drew down -18.8% and European equity -14.2%, against -27.5% for Aegis. Aegis's shallowest drawdown comes in 2023-24, at -19.8%. Even there it is twice the drawdown of US equity, which is -9.9%.

6.2 Risk-adjusted return by period

The Sharpe ratio measures the return an asset earns above the risk-free rate, per unit of volatility. Discussing the Sharpe ratio by period gives valuable insight on how the risk-adjusted performance of each holding changes across the study period.

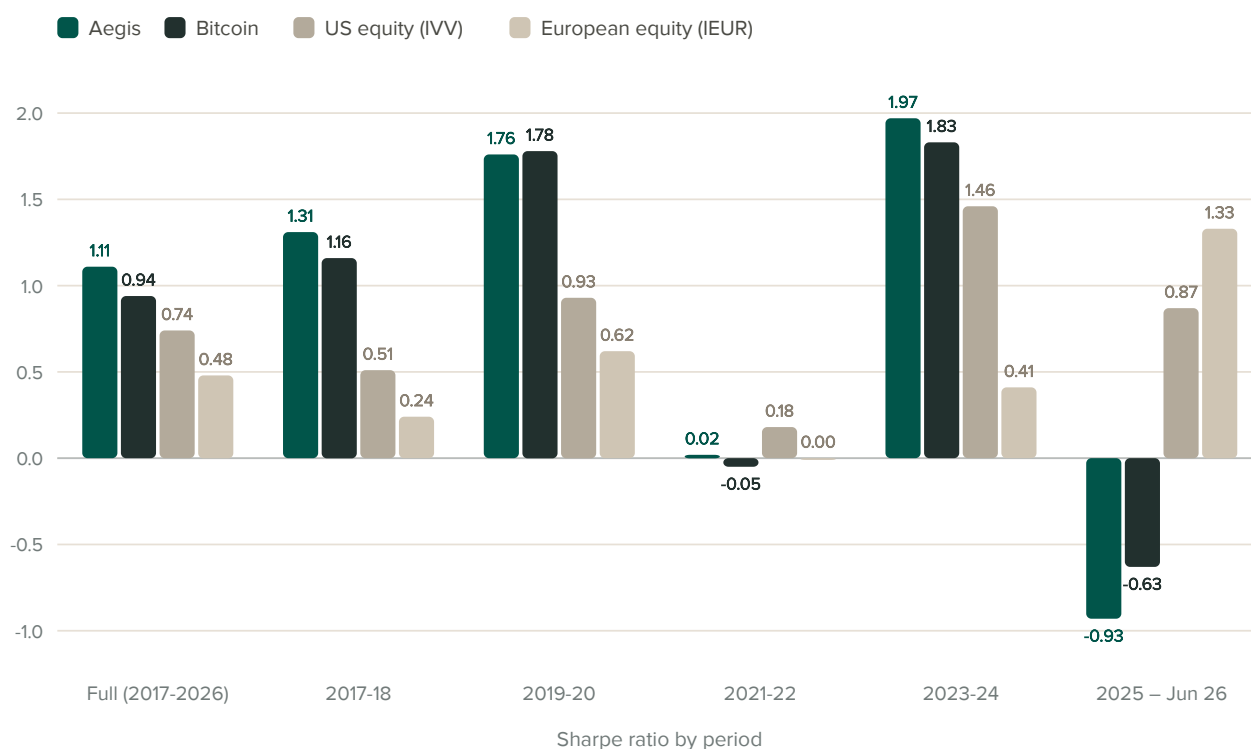


Figure 7: Sharpe ratio by period, for Aegis, bitcoin, US equity (IVV) and European equity (IEUR).

Aegis's Sharpe of 1.11 over the full period is the highest of the four in the figure, even though its reading in the most recent period is negative. Aegis's Sharpe is also higher than bitcoin's in four of the six periods. European equity is the lowest of the four over the full period, at 0.48.

Aegis has the highest reading of the four in 2017-18, at 1.31, and in 2023-24, at 1.97, the highest reading of any period. However, in 2019-20 bitcoin's Sharpe is 0.02 higher than Aegis's, at 1.78 against 1.76. European equity has the lowest Sharpe of the four in both 2017-18 and 2019-20, at 0.24 and 0.62. It is lowest again in 2023-24, at 0.41, against 1.46 for US equity.

Across 2021-22, every holding's Sharpe ratio clusters near zero. Aegis is marginally positive at 0.02,

bitcoin is negative at -0.05 and European equity is flat at 0.00. US equity is the highest of the four at 0.18.

Aegis and bitcoin both returned less than the risk-free rate over the 2025-26 period. The Sharpe ratio divides excess return by volatility, which means that where excess return is negative, the ratio increases as volatility increases. The ranking in this period therefore favours the more volatile line rather than the better-performing one. Bitcoin's -0.63 is higher than Aegis's -0.93 because bitcoin moved more, not because it lost less.

Over the same period Aegis returned -22.9% against bitcoin's -37.3% on a cumulative basis, with a maximum drawdown of -27.5% against -53.1%. The return and drawdown figures remain valid in precisely the conditions that invalidate the ratio. Therefore this period should be judged on return and drawdown rather than on Sharpe. Judged that way, Aegis fell less than bitcoin on both measures, by 14.4 percentage points on cumulative return and 25.6 percentage points on maximum drawdown.

In the 2025-26 period, European equity has a Sharpe of 1.33, the highest reading of the four, and US equity 0.87. These are the only positive readings in the period, and this is the only period in which both equity indices have a higher Sharpe than Aegis.

By period, Aegis's drawdown was shallower than bitcoin's in five of the six periods, and its Sharpe was higher in four. Aegis's Sharpe was also higher than both equity indices in four of the six periods, and the highest of the four assets in three periods. In four periods Aegis had a shallower drawdown and a higher Sharpe than bitcoin at the same time. Only 2019-20 goes the other way, and there the gaps are 0.5 percentage points of drawdown and 0.02 of Sharpe. The advantage over bitcoin therefore does not come from one strong period. It appears across regimes, in the depth of loss and in the return earned per unit of movement.

7. Adding Aegis to four base allocations

The sections above establish how Aegis and the other assets behave on their own and in different market circumstances. The next question is how Aegis performs when it is combined with an existing allocation. Our previous article in this series, *Getting Off Zero: The Power of Bitcoin Allocation*, showed that a modest bitcoin allocation can be a valuable addition to a traditional portfolio. This section examines how four base allocations behave as an increasing amount of Aegis is added to the portfolio instead.

The four base allocations are: US 60/40, European equity (IEUR), gold (IAU) and US real estate (VNQ). Aegis is funded out of the base allocation at every step, so the base allocation is held at 100% minus the Aegis weight and the two always sum to 100%.

Figure 8 shows annualised return and the Sharpe ratio at eight Aegis allocation weights. The horizontal axis spaces those weights evenly, although the steps between them are not equal.

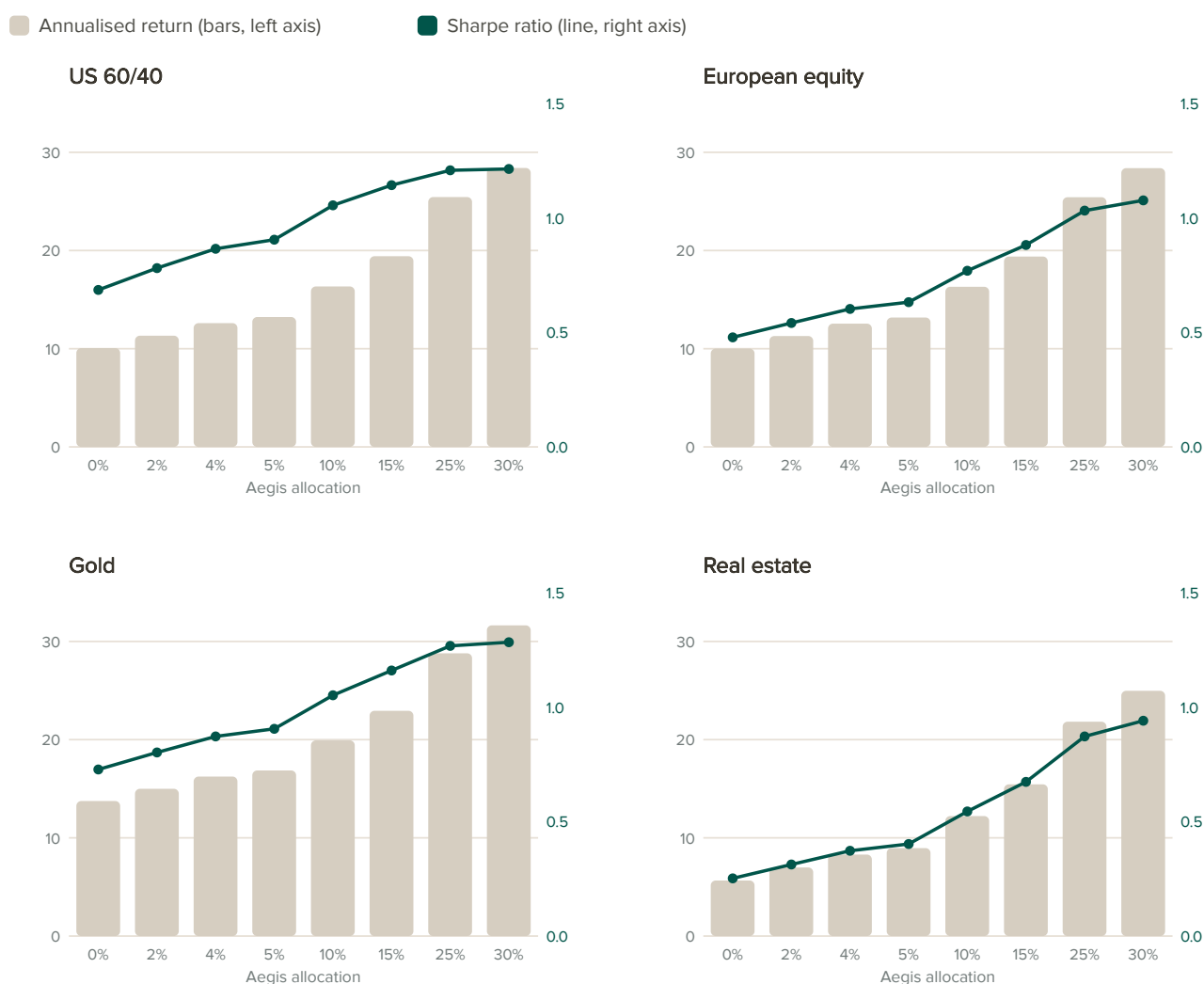


Figure 8: return and Sharpe as the Aegis weight increases, by base allocation.

The relationship is positive throughout. For every base allocation the annualised return and the Sharpe ratio increase at every step. Aegis returned more than every base allocation over the period,

at 62.64% a year against 13.75% for the highest of the four. Each further percentage point of Aegis adds a near-constant amount of return: for US 60/40 the return increases from 10.06% at a 0% weight to 28.3% at a 30% weight. This is close to 0.61 percentage points a year for each percentage point Aegis added. Volatility increased less than proportionally across the same range of weights, which drove the Sharpe increase.

Gold starts from the highest-Sharpe base allocation of the four, with a Sharpe ratio of 0.73 and an annualised return of 13.75%. Adding Aegis increased that Sharpe to 1.27 and the return to 28.79% at a 25% weight. Gold combined with Aegis holds the highest return of any combined allocation at every weight tested. It also holds the highest Sharpe at every weight tested, except at a 10% weight, where it is level with US 60/40 combined with Aegis at 1.05. At a 15% weight gold combined with Aegis and US 60/40 combined with Aegis both have a higher Sharpe than Aegis held alone, at 1.16 and 1.14 against 1.11.

The other three base allocations increase in a similar way, but from different starting points. US 60/40 starts at a Sharpe of 0.68 with a return of 10.06%. It ends at 1.21 with a 28.3% return at a 30% weight. European equity starts at 0.48 and 10.02% and ends at 1.07 and 28.3%. The two return paths are almost identical at every weight tested. What separates them is volatility, not return. Real estate starts lowest of the four, at 0.25 and 5.66%, and ends at 0.93 and 25.0%.

The pace of the increase also differs. The Sharpe ratios of gold and US 60/40 stop increasing almost entirely between a 25% and a 30% weight. European equity and real estate still increase at the final step. Return increases for all four base allocations throughout, so the slowdown is in risk-adjusted return, not in return itself.

The ranking of the four base allocations at a 30% weight matches their ranking at 0%, so Aegis increases both measures for every base allocation without changing their order. Over the 0% to 30% range the largest Sharpe increase goes to the base allocation with the lowest starting Sharpe, real estate at 0.25, at 0.68 against 0.55 for gold. The weights tested end at 30%, so Figure 8 cannot show whether the increase continues past that point. Two of the four Sharpe ratios are already flat at the final step, which indicates that an optimum exists. Section 8 determines whether an optimal allocation weight exists, and if so, where it is located.

8. Optimum allocation

The relationship between the Aegis weight and the Sharpe ratio is positive across every weight tested in section 7, from 0% to 30%. Whether that relationship has an optimum, and where that optimum lies, is the next question. The first approach measures the marginal benefit of Aegis: what each further percentage point adds to a base allocation's Sharpe ratio. Extending the test to the full 0% to 100% range locates a knee in the Sharpe curve for every base allocation. The knee is the weight at which the marginal benefit first falls below 0.01 Sharpe per further percentage point. The peak is the weight at which the Sharpe ratio is highest. At that weight the marginal benefit has fallen to zero, because a further percentage point no longer increases the ratio.

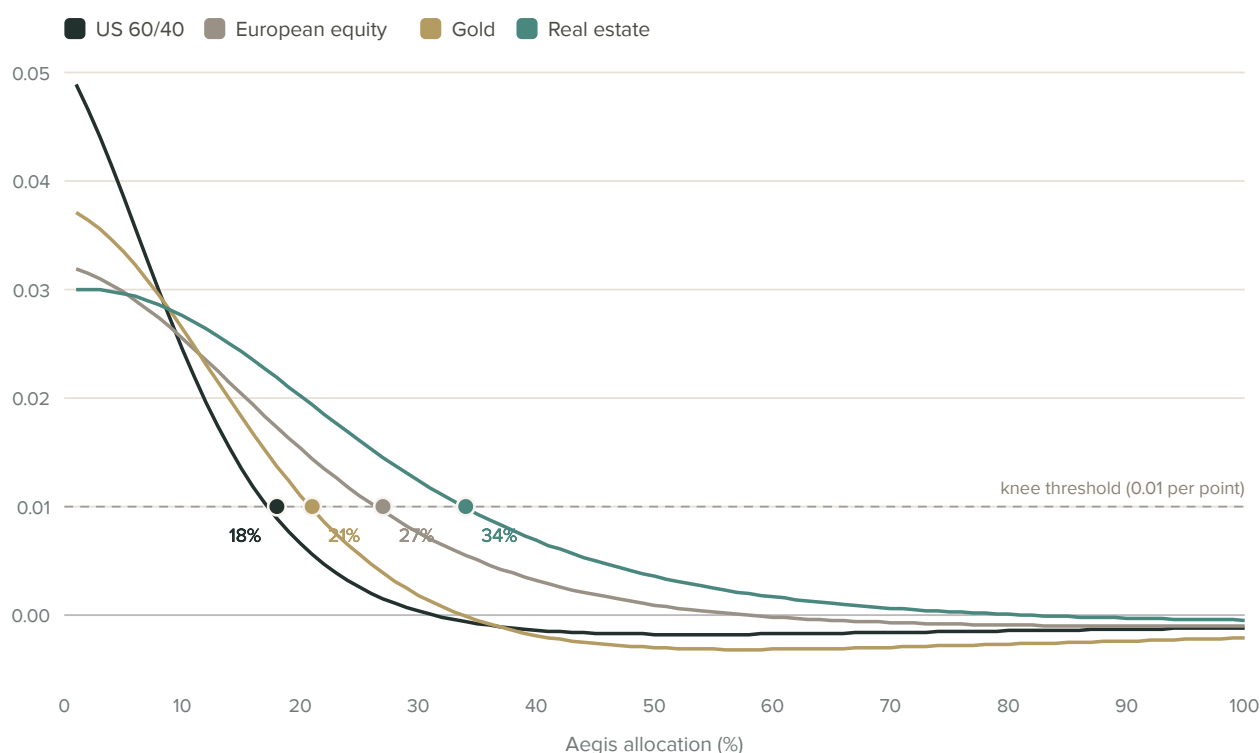


Figure 9: marginal benefit of Aegis, change in Sharpe per percentage point of allocation, all four base allocations, knee threshold marked.

At a 1% weight, US 60/40 gains most from each additional percentage point of Aegis, at 0.049 Sharpe per percentage point. Gold follows at 0.037, European equity at 0.032 and real estate at 0.030. The four curves then decline at different speeds. US 60/40 declines fastest and real estate slowest. From a 12% weight the ranking is reversed: real estate gains most from each additional percentage point, and US 60/40 least. The spread widens from there. At a 20% weight real estate has the largest marginal benefit at 0.020 and US 60/40 the smallest at 0.007. The knees follow from those decline rates. US 60/40 reaches its knee first, at 18%, and gold at 21%. European equity does not reach its knee until 27%, and real estate not until 34%.

8.1 Sharpe and drawdown across the full allocation

Figure 10 sets two criteria against each other: the highest Sharpe ratio and the shallowest drawdown. It plots both across the full 0% to 100% range, one panel per base allocation. Each panel runs between two ends. At 0% the base allocation is held alone. At 100% Aegis is held alone. Sharpe is on the left axis and maximum drawdown on the right. The dotted markers show each panel's Sharpe peak and its shallowest drawdown.

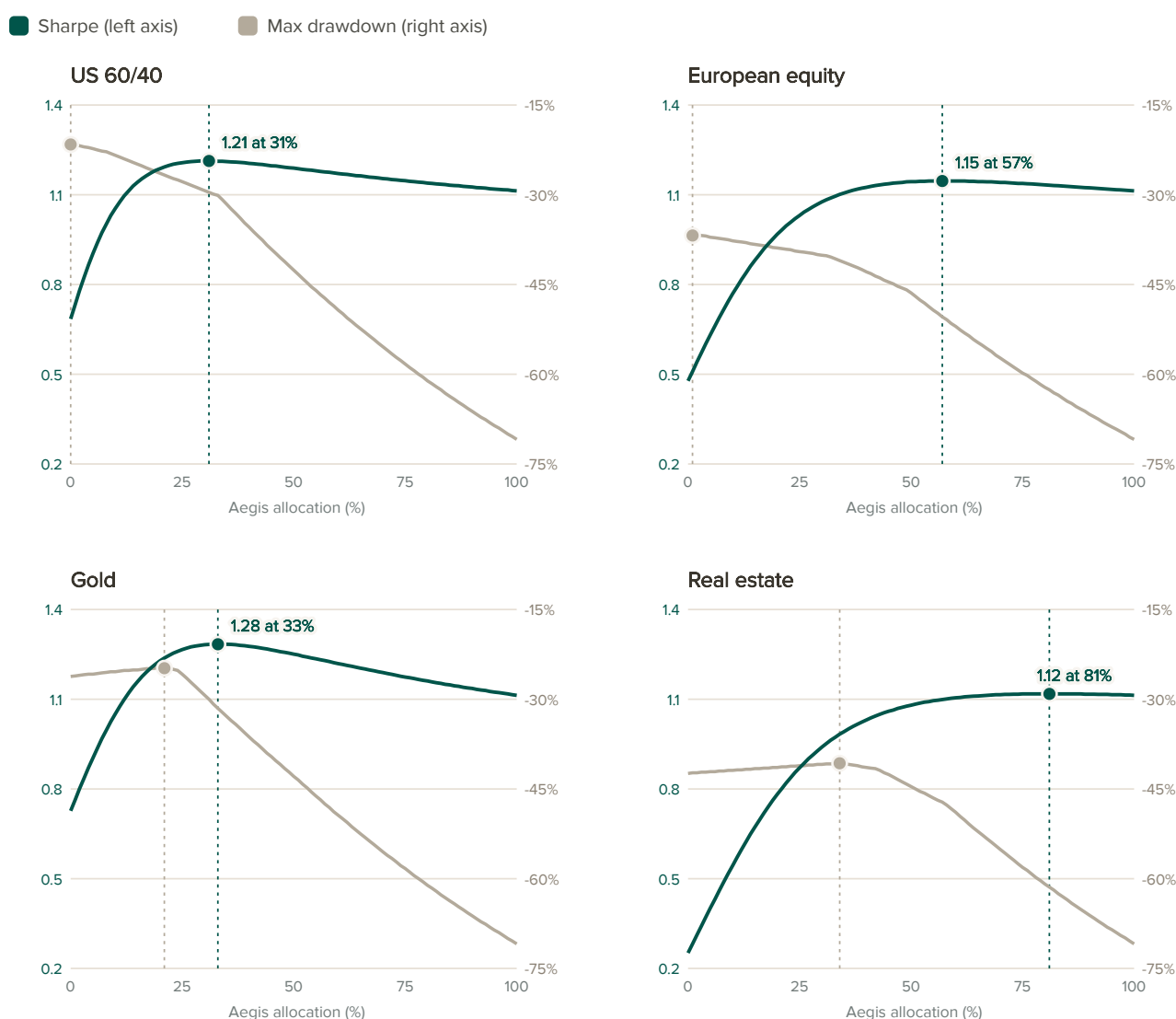


Figure 10: Sharpe and drawdown across the full Aegis allocation, one panel per base allocation.

Every base allocation reaches its highest Sharpe in combination with Aegis rather than on its own. US 60/40 peaks at 1.21 at a 31% weight, up from 0.68. Gold peaks at 1.28 at 33%, up from 0.73. European equity peaks at 1.15 at 57%, up from 0.48. Real estate peaks at 1.12 at 81%, up from 0.25.

All four peaks are above both endpoints though two are meaningfully above them: the base allocation on its own and Aegis on its own. The peak Sharpe for US 60/40, 1.21, is above both 0.68 for the base allocation alone and 1.11 for Aegis alone. The peak for gold, 1.28, is above 0.73 for gold alone and the same 1.11 for Aegis. Both peaks carry a deeper maximum drawdown than the base allocation

alone: -29.6% against -21.6% for US 60/40, and -31.5% against -26.2% for gold. Both are inside the -70.9% maximum drawdown of Aegis on its own. The combination therefore increases the Sharpe ratio at a maximum drawdown less than half that of Aegis held alone.

No base allocation reaches its highest Sharpe and its shallowest drawdown at the same weight, so the two criteria cannot both be met. US 60/40 is shallowest at 0% and European equity at 1%. For both, the drawdown deepens at every weight above that point. Gold and real estate behave differently. Adding Aegis makes their drawdown shallower at first. Gold reaches its shallowest point at a 21% weight and real estate at 34%. Beyond those weights, drawdown deepens. Gold's two optima are 12 percentage points apart. For the other three the gap runs from 31 to 56 percentage points.

8.2 Sortino across the full allocation

The Sortino ratio, like Sharpe, measures return above the risk-free rate against the risk taken. Unlike Sharpe, it counts only downside volatility as risk. Sharpe charges an asset for every swing, upward as well as downward. Sortino divides the same excess return by downside volatility alone, so gains are not held against the asset. Aegis's volatility includes large upward moves. Figure 11 therefore repeats the allocation range on a Sortino basis, so the Sortino peak of each base allocation can be set against its Sharpe peak.

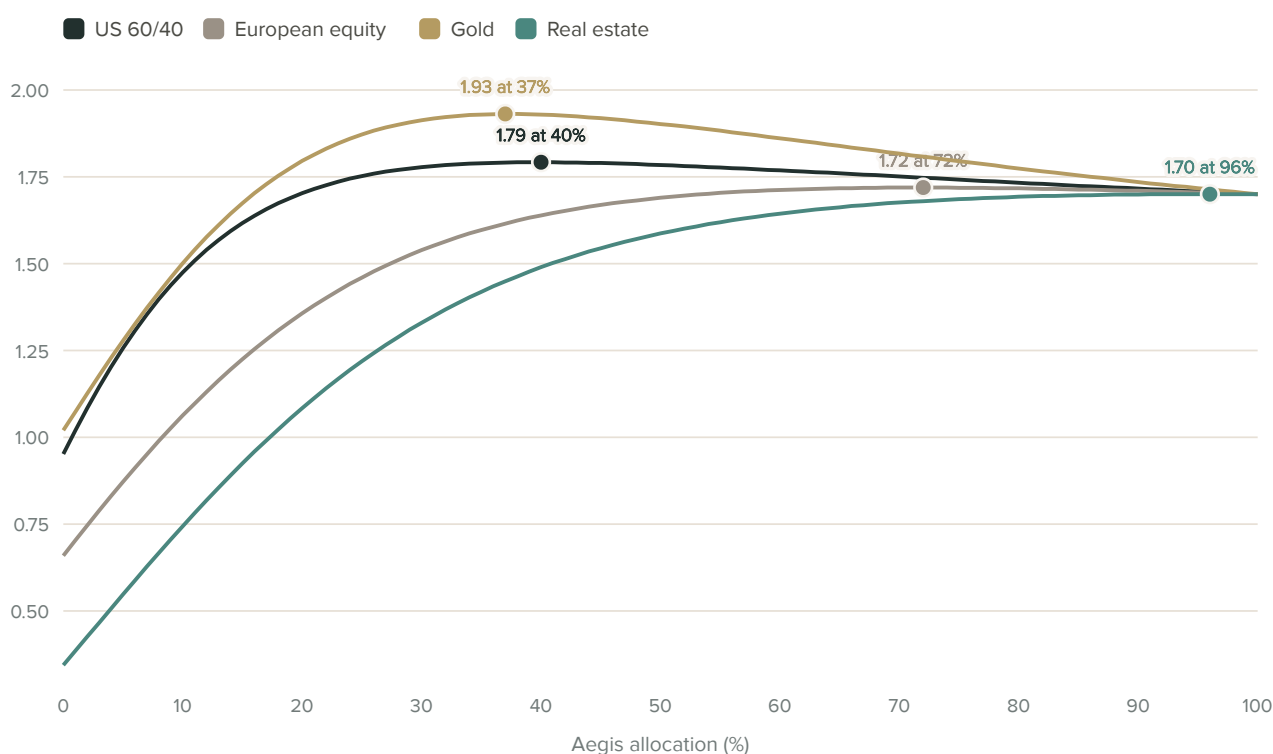


Figure 11: Sortino ratio across the full Aegis allocation, all four base allocations, peaks marked.

Figure 11 shows Sortino across the full range of Aegis weights. Gold peaks highest and earliest, at a Sortino of 1.93 at a 37% weight. US 60/40 peaks at 1.79 at 40%. European equity peaks at 1.72 at 72%, and real estate at 1.70 at 96%. As with Sharpe, all four curves converge at a 100% weight on Aegis's own Sortino of 1.70.

How far each peak is above Aegis held alone is as relevant as where that peak is located. The peak for gold combined with Aegis, 1.93, is 0.23 above Aegis's own Sortino of 1.70. The peak for US 60/40 combined with Aegis, 1.79, is 0.09 above it. The peak for European equity combined with Aegis, 1.72, is 0.02 above it. The peak for real estate combined with Aegis, 1.70 at a 96% weight, matches Aegis's own 1.70 exactly, so Sortino locates no optimum between the two ends for that base allocation.

Three of the four combined allocations peak above both their base allocation and Aegis's own Sortino. Real estate is the exception, matching Aegis's 1.70 rather than being above it. The difference between the highest and lowest peak is 0.16 on Sharpe and 0.23 on Sortino.

8.3 Comparison across base allocations

This section compares the four combined allocations on their peak Sharpe and Sortino, on how far those peaks are above the ratios for Aegis held on its own, and on maximum drawdown.

Gold combined with Aegis has the highest peak on both ratios, at 1.28 on Sharpe and 1.93 on Sortino. US 60/40 combined with Aegis has the second highest, at 1.21 on Sharpe and 1.79 on Sortino. European equity combined with Aegis has the third highest, at 1.15 on Sharpe and 1.72 on Sortino. Real estate combined with Aegis has the lowest, at 1.12 on Sharpe and 1.70 on Sortino. The same order holds for distance from Aegis held alone. Gold combined with Aegis is 0.17 above on Sharpe and 0.23 above on Sortino, US 60/40 combined with Aegis 0.10 and 0.09, European equity combined with Aegis 0.04 and 0.02, and real estate combined with Aegis 0.01 on Sharpe and level on Sortino.

The order reverses on the size of the increase from each base allocation to its Sharpe peak. Real estate gains most, at 0.87 on Sharpe, and European equity next, at 0.67, against 0.55 for gold and 0.53 for US 60/40. The two base allocations with the lowest starting Sharpe, real estate at 0.25 and European equity at 0.48, gain most and finish closest to Aegis held alone. The two with the highest, gold at 0.73 and US 60/40 at 0.68, gain least and finish furthest above it.

The peaks arrive at different Aegis weights: 31% for US 60/40, 33% for gold, 57% for European equity and 81% for real estate. Two of the four have a shallower drawdown with Aegis added. Gold combined with Aegis has its shallowest drawdown at a 21% weight, at -24.8% against -26.2% for gold held alone. Real estate combined with Aegis has its shallowest drawdown at a 34% weight, at -40.7% against -42.4% for real estate held alone. The drawdown of US 60/40 deepens at every weight, and that of European equity at every weight above 1%.

Section 9 sets out these combined allocations as the value of an illustrative portfolio.

9. Portfolio growth

Figure 12 translates the findings above into US dollars. It shows the value of an illustrative \$1,000 portfolio built on each of the four base allocations across the period. Each base allocation takes the same Aegis weights under the same rebalancing rule, so the panels differ only in their base allocation.

■ 0% Aegis ■ 5% Aegis ■ 10% Aegis ■ 15% Aegis

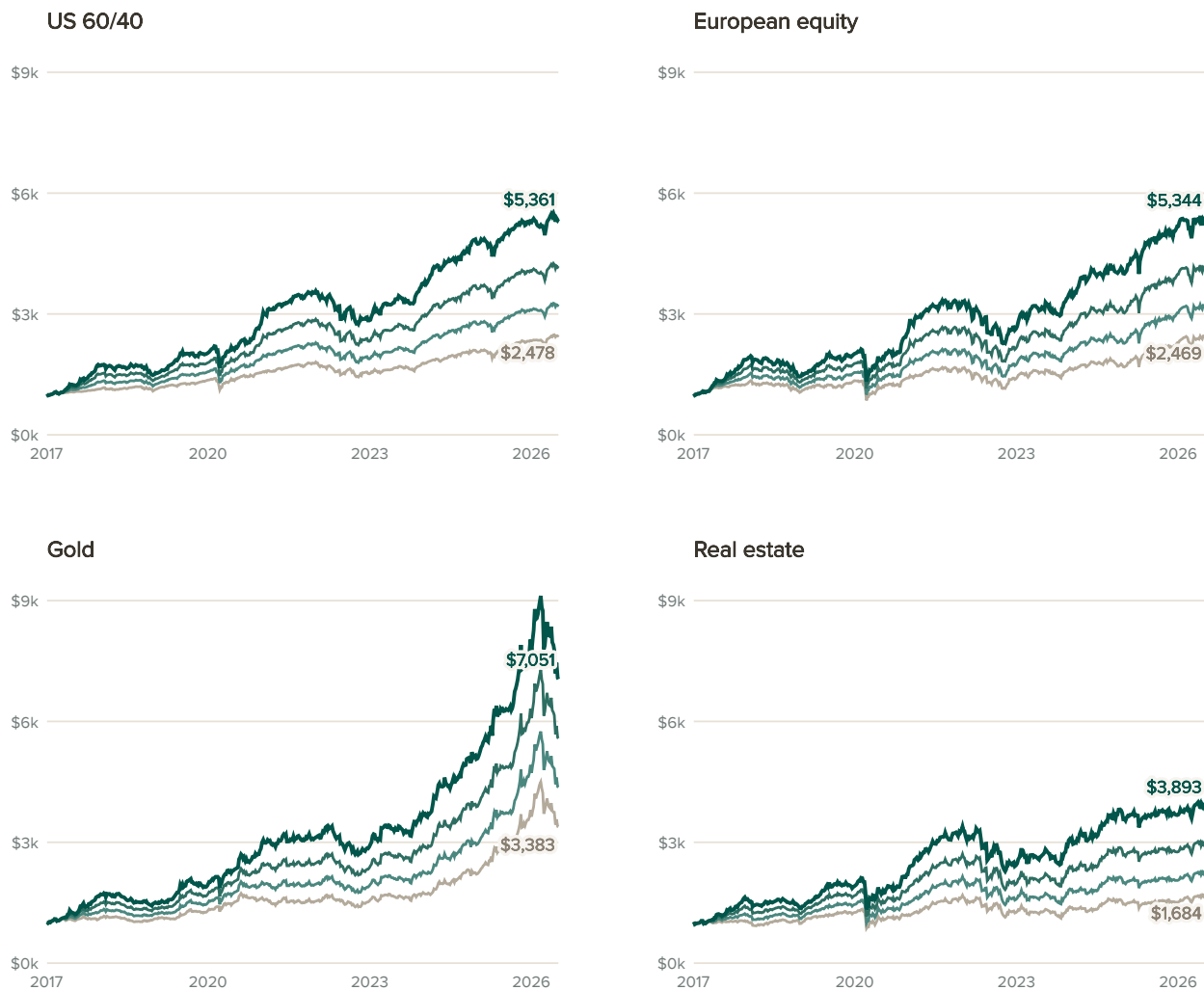


Figure 12: illustrative growth with Aegis allocations, all four base allocations.

Every portfolio starts at \$1,000 on 3 January 2017. Every base allocation ends higher with Aegis added than without it, at each of the four weights plotted. US 60/40 held alone ends at \$2,478 and reaches \$5,361 at a 15% weight. European equity held alone ends at \$2,469 and reaches \$5,344. US 60/40 and European equity track each other closely and stay within \$20 of one another at all four weights. Gold held alone ends highest of the four base allocations at \$3,383. Gold combined with Aegis stays highest at every weight, ending at \$7,051 at a 15% weight, seven times its starting value. Real estate starts lowest and stays lowest throughout, from \$1,684 held alone to \$3,893 at a 15% weight.

10. Conclusion

This paper set out to answer one question: what is the impact of an actively managed bitcoin strategy on the performance of traditional institutional portfolios? Adding Aegis increased annualised return, the Sharpe ratio and the Sortino ratio for all four base allocations, at every weight tested from 0% to 30%. The direction did not vary by base allocation or by weight. The size of the effect did. Each further percentage point of Aegis added a near-constant amount of annualised return, while adding a decreasing amount of Sharpe. Beyond a weight of between 18% and 34%, depending on the base allocation, each further percentage point of Aegis added less than 0.01 to the Sharpe ratio. Maximum drawdown deepened for two of the four base allocations across the whole range, so no single weight was optimal on both risk-adjusted return and depth of loss.

On a standalone basis Aegis outperformed a direct bitcoin holding on every measure. It returned 62.64% a year against 53.23%, at a volatility of 55.43% against 67.37%. Its deepest drawdown was -70.9% against -83.1% for bitcoin. Its Sharpe was 1.11 against 0.94 and its Sortino 1.70 against 1.41. The six conventional holdings in this study returned between 1.90% and 15.36% a year, at volatility between 5.50% and 20.95%. Their deepest falls ranged from -18.4% for US bonds to -42.4% for US real estate. Aegis's -70.9% drawdown remains the second deepest in the panel, behind bitcoin.

Aegis's correlation to every other holding was between 0.10 and 0.24 over the full period. During stressed periods every correlation increased. The highest correlation of Aegis was 0.46 against European equity. US equity, European equity and US real estate correlated 0.80 to 0.88 with each other over the stressed periods.

Across the eight stress events, Aegis was positive more often than the equity indices over 10 days, and although it matched their hit rate over 60 days, its average gain was close to twice theirs while its average loss was smaller. The strategy also tended to follow a different path from US equity and European equity during stress events. This, combined with the positive directional asymmetry, makes Aegis a favourable asset to allocate to in moments of crisis.

Aegis's maximum drawdown was shallower than bitcoin's in four of the five periods plotted, the exception being 2019-20, at -61.9% against -61.4%. Aegis and bitcoin both fell further than either equity index in every period. Nevertheless, Aegis held the highest Sharpe ratio of the four holdings plotted over the full period. It also had the highest Sharpe ratio of all holdings in 2017-18 and in 2023-24. Aegis and bitcoin both recorded negative Sharpe ratios from January 2025 to June 2026, at -0.93 and -0.63. The Sharpe ratio does not rank holdings meaningfully when excess return is negative; therefore, the performance in that period had to be judged on return and drawdown. Aegis fell less than bitcoin on both measures over that period, returning -22.9% against -37.3% at a maximum drawdown of -27.5% against -53.1%. Concluding from these two measures, Aegis performed better than bitcoin in the period January 2025 to June 2026.

Added to the four base allocations at weights from 0% to 30%, Aegis increased both the annualised return and Sharpe ratio at every step. At a 30% weight US 60/40 increased from a Sharpe of 0.68 to 1.21, European equity from 0.48 to 1.07 and real estate from 0.25 to 0.93. Gold increased from 0.73 to 1.27 by a 25% weight. At a 15% weight gold reached 1.16 and US 60/40 reached 1.14, both above Aegis's own 1.11.

Extended to the full 0% to 100% range, the marginal Sharpe gain decreased below 0.01 per percentage point at an 18% weight for US 60/40, 21% for gold, 27% for European equity and 34% for real estate. Every Sharpe peak was located above a 30% weight. The Sharpe ratios of gold and US 60/40 stopped increasing between a 25% and a 30% weight, while European equity and real estate were still increasing at 30%.

Sharpe and Sortino ranked the four combined allocations identically. On Sharpe, gold with Aegis was highest at 1.28, then US 60/40 with Aegis at 1.21, European equity with Aegis at 1.15 and real estate with Aegis lowest at 1.12. The Sortino readings followed the same order, at 1.93, 1.79, 1.72 and 1.70. Ranked on the size of the increase rather than the peak, the order was close to reversed: real estate increased most at 0.87 on Sharpe, then European equity at 0.67, gold at 0.55 and US 60/40 at 0.53.

An illustrative \$1,000 portfolio, held in each base allocation from 3 January 2017, ended higher with Aegis added than without it at every Aegis allocation plotted. Gold ended highest, at \$3,383 without Aegis and \$7,051 at a 15% weight. US 60/40 and European equity tracked each other closely. They ended at \$2,478 and \$2,469 without Aegis, and at \$5,361 and \$5,344 at a 15% weight. Real estate ended lowest of the four, at \$1,684 and \$3,893.

Disclaimer

Blockrise™ is a trademark of Blockrise Capital B.V. in the Netherlands and other countries. Blockrise Capital B.V. is a private limited liability company registered in the Netherlands, under Chamber of Commerce number 74879782. Blockrise Capital B.V. holds a MiCAR licence with number 41000029, issued by the Dutch Authority for the Financial Markets (AFM). Blockrise Lending B.V. is a group company of Blockrise Capital B.V. and does not hold a MiCAR-license. Bitcoin-backed loans are not a MiCAR regulated product.

Trading in bitcoin involves significant risks. Bitcoin is highly volatile and you may lose part or all of your investment. You should only invest if you fully understand bitcoin and can afford to lose the money you invest. No advice is provided by Blockrise Capital B.V. or any of its group companies, and the information provided should not be construed as advice. For more information, please refer to our bitcoin disclosures.