DAILY RETURN DISTRIBUTION STATISTICAL ANALYSIS - BTC
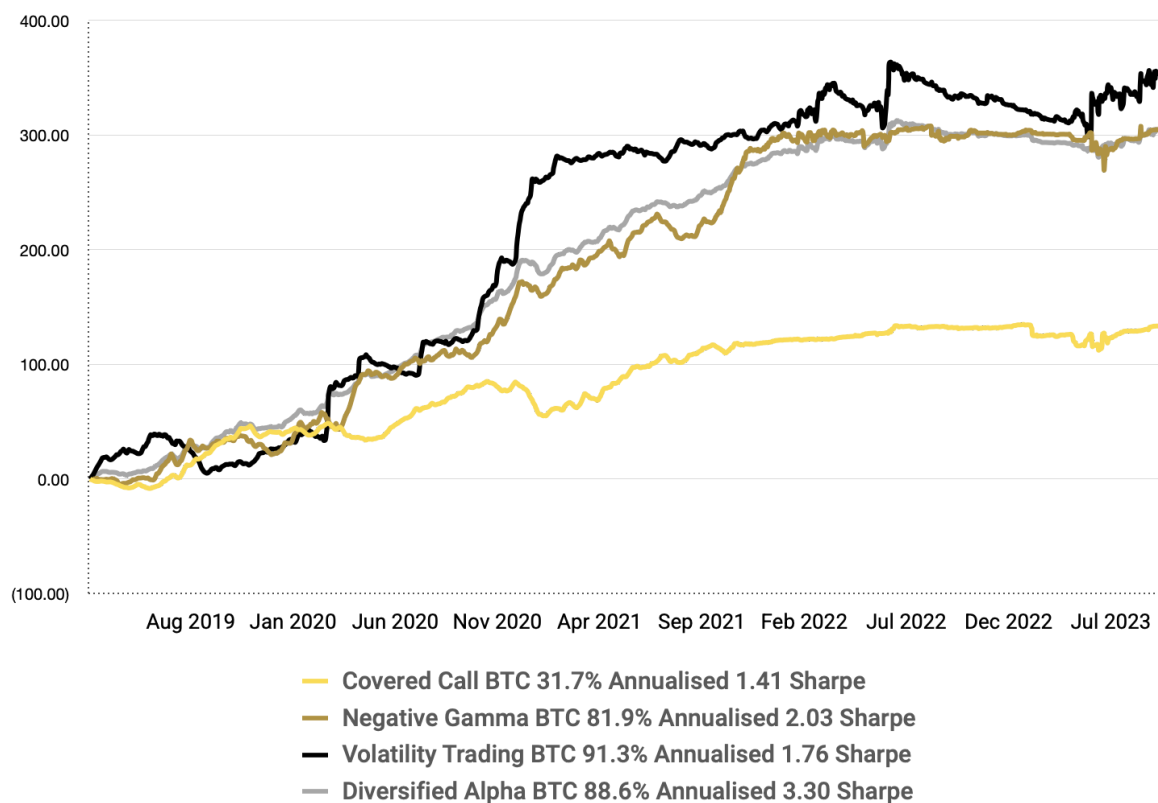
August 2023

LibertyRoad

CAPITAL

Founded in 2019, LibertyRoad Capital is a world class digital asset manager, specialising in yield enhancement strategies for digital currencies, especially Bitcoin. The team has decades of experience in asset management, investment banking and digital and blockchain business. LibertyRoad Capital offers four BTC strategies:

1. **Covered Call BTC** - uses zero leverage where the USD principal is 100% protected, and the BTC balance is 95% protected.

2. **Negative Gamma BTC** - utilises up to 3x leverage, trading the bitcoin volatility surface with a directional bias depending on fundamental blockchain analysis.

3. **Volatility Trading BTC** - buys and sells bitcoin calls and puts, arbitrages the volatility surface and arbitrages across products and across exchanges.

4. **Diversified Alpha BTC** - is a blend of the 3 other BTC strategies and offers the best risk adjusted returns.
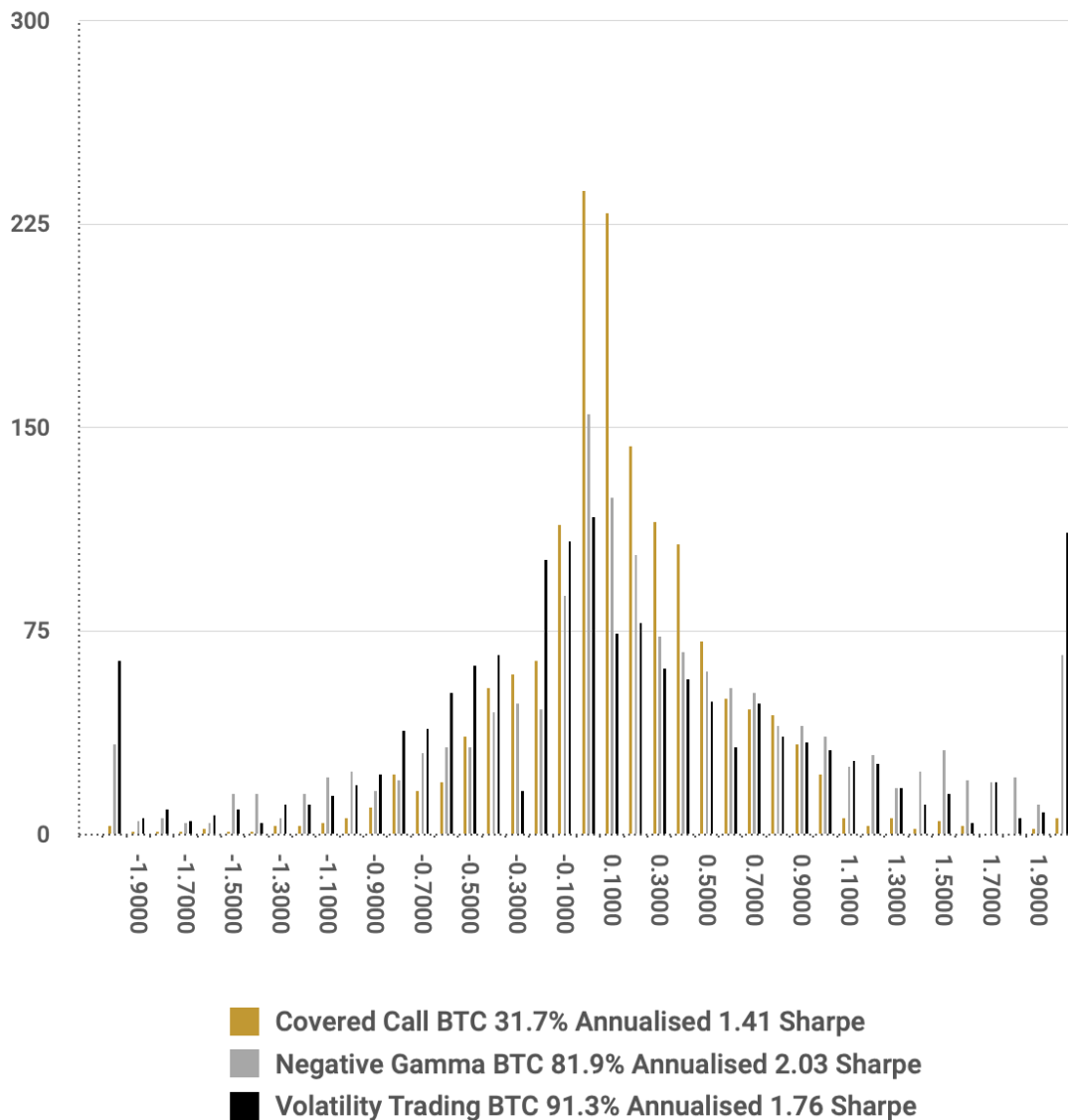
Cumulative Daily Returns - LibertyRoad BTC Programmes

— Covered Call BTC 31.7% Annualised 1.41 Sharpe
— Negative Gamma BTC 81.9% Annualised 2.03 Sharpe
— Volatility Trading BTC 91.3% Annualised 1.76 Sharpe
— Diversified Alpha BTC 88.6% Annualised 3.30 Sharpe

The chart above shows cumulative daily returns since April 2019. Returns are generated using a targeted level of Extreme Value at Risk (EVaR) which is a sophisticated methodology that models the tail risk and incorporates an estimate of tail risk into the portfolio modelling.

A given level of EVaR is targeted over the year, with actual EVaR being calculated and modelled in real time. Therefore, where market conditions are positive from a Risk Adjusted Return perspective, targeted EVaR will be higher, and when conditions are detrimental targeted EVaR will be lower.

Overlaid Daily Return Distributions

Covered Call BTC 31.7% Annualised 1.41 Sharpe
Negative Gamma BTC 81.9% Annualised 2.03 Sharpe
Volatility Trading BTC 91.3% Annualised 1.76 Sharpe

Above are the historical distribution of returns for each strategy.

The Covered Call Strategy employs zero leverage and has returns highly condensed around the mean. It averages 8.5 bp of daily returns with a daily standard deviation of 0.65.

The Negative Gamma Strategy generates on average 19.5 basis points of returns each day, with a daily standard deviation of 1.27. The Volatility Trading Strategy generates on average 21.8 basis points of return each day with a Standard Deviation of 2.00.

The Volatility Trading Strategy is significantly skewed to the upside in its distribution of returns. This is because while it sells both puts and calls, it also buys options, which on highly volatile days limits downside and skews the upside significantly higher.

Covered Call BTC- Daily Distribution of Returns
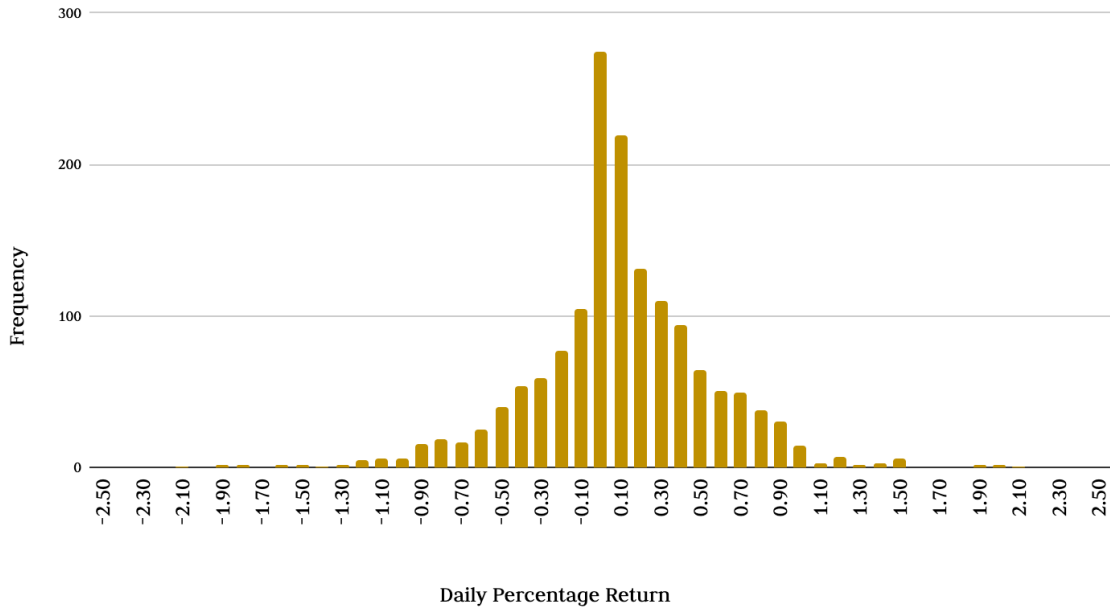
Mean	0.0855
Standard Error	0.01650076922
Median	0.0725
Standard Deviation	0.6563075948
Sample Variance	0.430739659
Kurtosis	-1037.250668
Skewness	-1.791968121
Range	20.69
Minimum	-10.78
Maximum	9.91
Sum	135.2316
Count	1582
Confidence Level (95.0%)	0.03236569124

The Covered Call Strategy is capped at 1x leverage. Therefore, it cannot sell more calls than are invested. It targets 10 bp of return a day and is constantly short gamma and long theta, receiving premium every day. It has the closest distribution to a normal distribution and has returned 31.7% annualised return with a Sharpe Ratio of 1.41.

The largest drawdown occurred on the 11/12th of April 2023 with a 10.78% drawdown when Bitcoin moved from 27.6k to around 30.2k.

Negative Gamma BTC- Daily Distribution of Returns
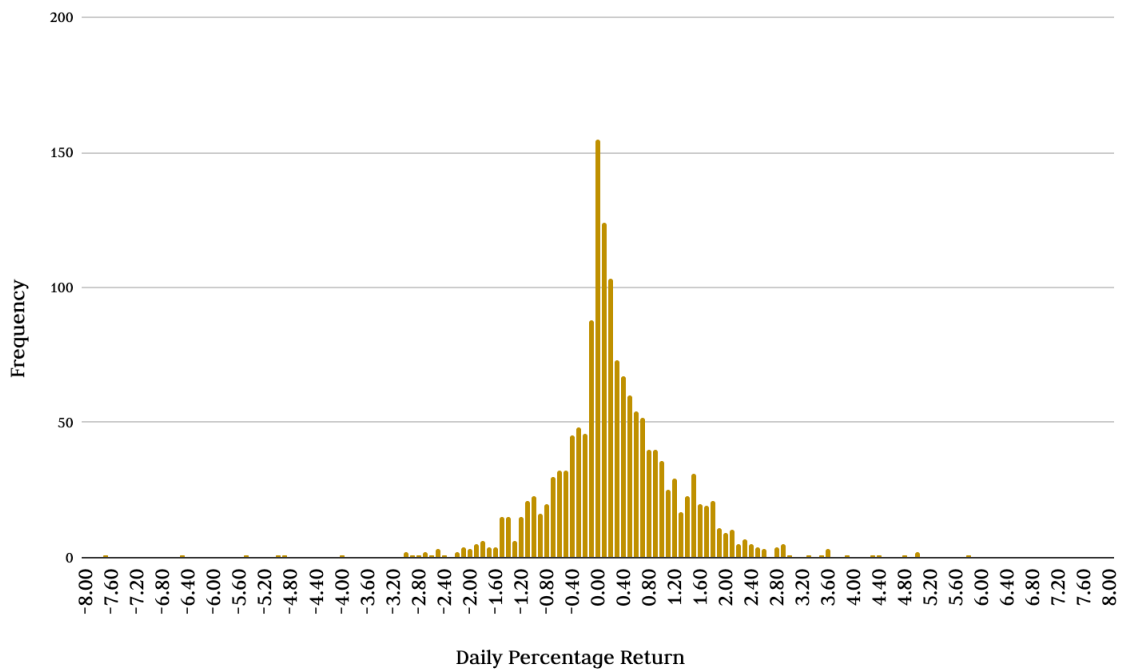
Mean	0.1952
Standard Error	0.03207470668
Median	0.1226
Standard Deviation	1.274137192
Sample Variance	1.623425584
Kurtosis	-475.4775544
Skewness	-1.784425526
Range	28.61187298
Minimum	-15.81
Maximum	12.79
Sum	307.9915
Count	1578
Confidence Level (95.0%)	0.06291355611

The Negative Gamma Strategy is capped at 3x leverage. However it targets 24 bp of return a day which is roughly equivalent to 2x leverage. It is constantly short gamma and long theta, receiving premium every day. It sells both puts and calls, and is directional based on fundamental and technical analysis in our AI Machine Learning algorithm. It has returned 81.9% annualised return with a Sharpe Ratio of 2.03.

The largest drawdown occurred on the 11/12th of April 2023 with a 15.81% drawdown when Bitcoin moved from 27.6k to around 30.2k.

Volatility Trading BTC- Daily Distribution of Returns
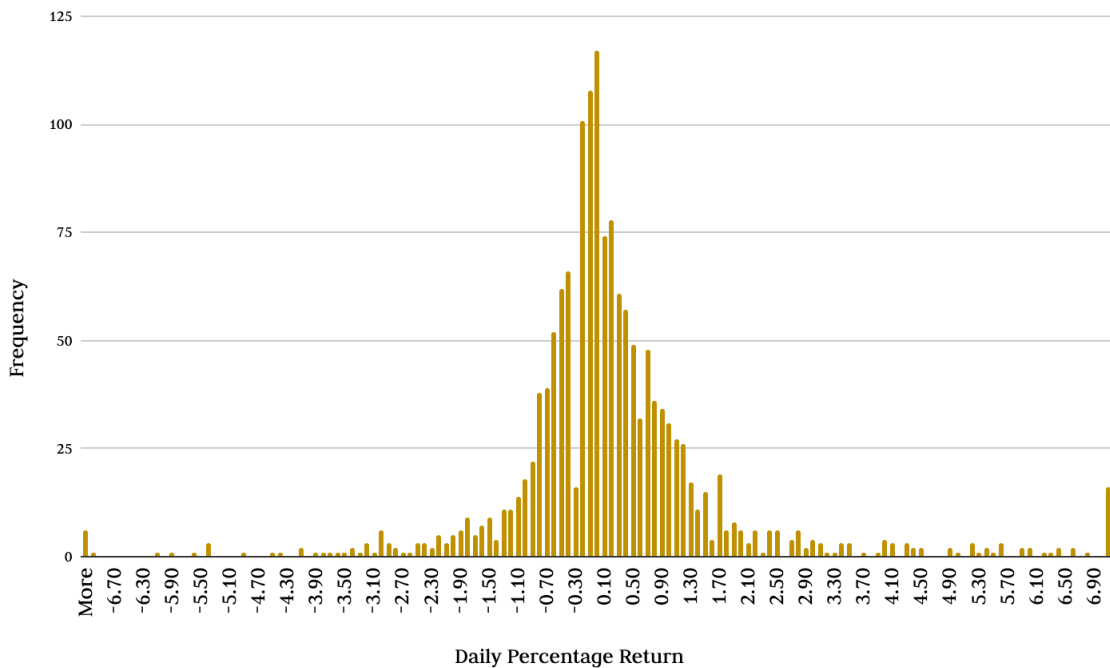
Mean	0.2180
Standard Error	0.05029001524
Median	-0.0268
Standard Deviation	2.000885443
Sample Variance	4.003542557
Kurtosis	-692.7136838
Skewness	4.643230196
Range	41.92
Minimum	-9.61
Maximum	32.30
Sum	345.0465
Count	1583
Confidence Level (95.0%)	0.09864208726

The Negative Gamma Strategy is capped at 3x leverage. However, it targets 24 bp of return a day which is roughly equivalent to 2x leverage. It is constantly short gamma and long theta, receiving a premium every day. It sells both puts and calls, and is directional based on fundamental and technical analysis in our AI Machine Learning algorithm. It has returned 91.3% annualised return with a Sharpe Ratio of 1.76.

The largest daily drawdown occurred on the 23rd May 2023 with a -9.61% drawdown.