Hedged Cryptocurrency Strategies

Objective: Hedge Long-only Crypto Investment

- Algorithm design objectives:
  - Generate returns comparable to underlying (BTC)
  - With reduced risk/volatility
  - Lower drawdown / tail risk
 - Provide significant capacity ($Bns)

Algo Design

- Long BTC or cryptocurrency portfolio
- Dynamic hedging using a hedge portfolio of selected futures contracts
  - VIX, ES, etc
- Optimize weights & rebalance regularly

Hedging / Rebalancing

- Dynamic hedging principles
  - see e.g. Dynamic Hedging, Taleb
  - Adjust hedge as correlations, $-value of portfolio change

- Machine learning algorithms
  - See e.g. Hull, etc "Deep Hedging of Derivatives Using Reinforcement Learning"

- Leverage
  - Adjust leverage of the hedge basket to achieve desired risk/return profile

Example:

	BTC	BTC Portfolio
Leverage	1.0	2.2
Total Return	630%	687%
CAGR	70.2%	73.7%
Ann. Vol	70.5%	37.2%
SR	0.99	1.98
Max DD	-73.1%	-40.1%
Total Return/Max DD	8.6	17.1

BTC vs BTC Portfolio
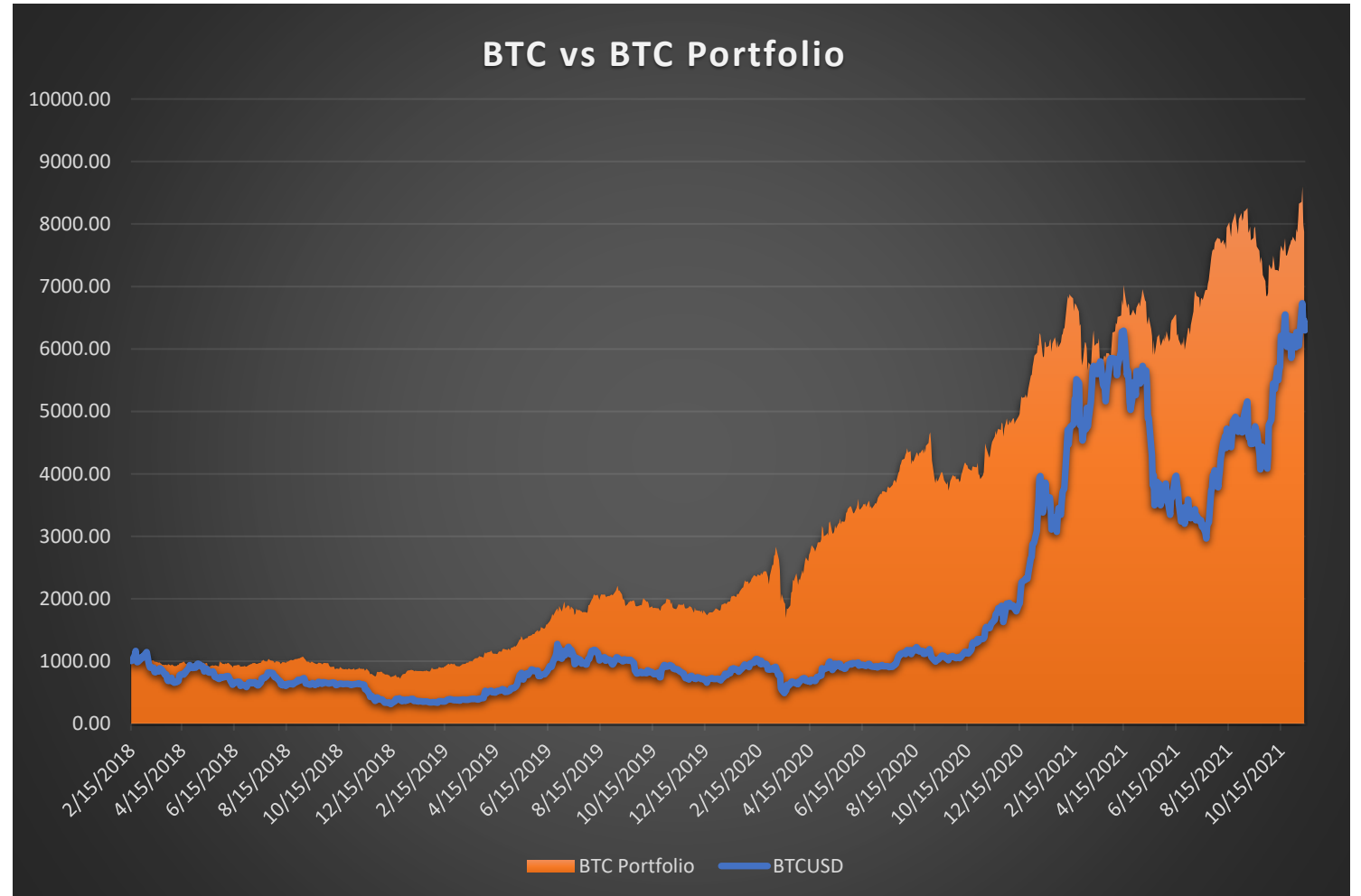
Evaluation of Hedged Portfolio Performance

- The hedged portfolio dominates the long-only BTC strategy continuously from inception

- Returns are comparable

- Volatility of the portfolio is around half that of BTC

- Sharpe is around 2 for the portfolio vs 1 for BTC

- The max drawdown of the portfolio is just over half that of BTC

- Hedge is maintained using highly liquid futures contracts, dynamically adjusted

- Capacity is not an issue

Applications

- Hedge Overlay
  - Typically for institutional crypto investors
  - Investor maintains custody of crypto assets
  - Posts hedge collateral with hedge manager (e.g. 10%)
  - Manager dynamically adjusts hedge portfolio using rebalancing algorithm
  - Additional tail risk hedge could also be implemented with deep OTM options
  - Low cost (e.g. < 50bp)
- Hedge Fund Product
  - Combine hedge and crypto assets with varying leverage rates
  - Achieves different risk/return profiles to match objectives of different investor classes
  - Offered as separate fund tranches
  - Typical hedge fund cost (1%/20%)

Example 1: Low Leverage

- Leverage 1:1

	BTC	BTC Portfolio
Leverage	1.0	1.0
Total Return	630%	173%
CAGR	70.2%	30.9%
Ann. Vol	70.5%	16.9%
SR	0.99	1.83
Max DD	-73.1%	-20.0%
Total Return/Max DD	8.6	8.7

BTC vs BTC Portfolio
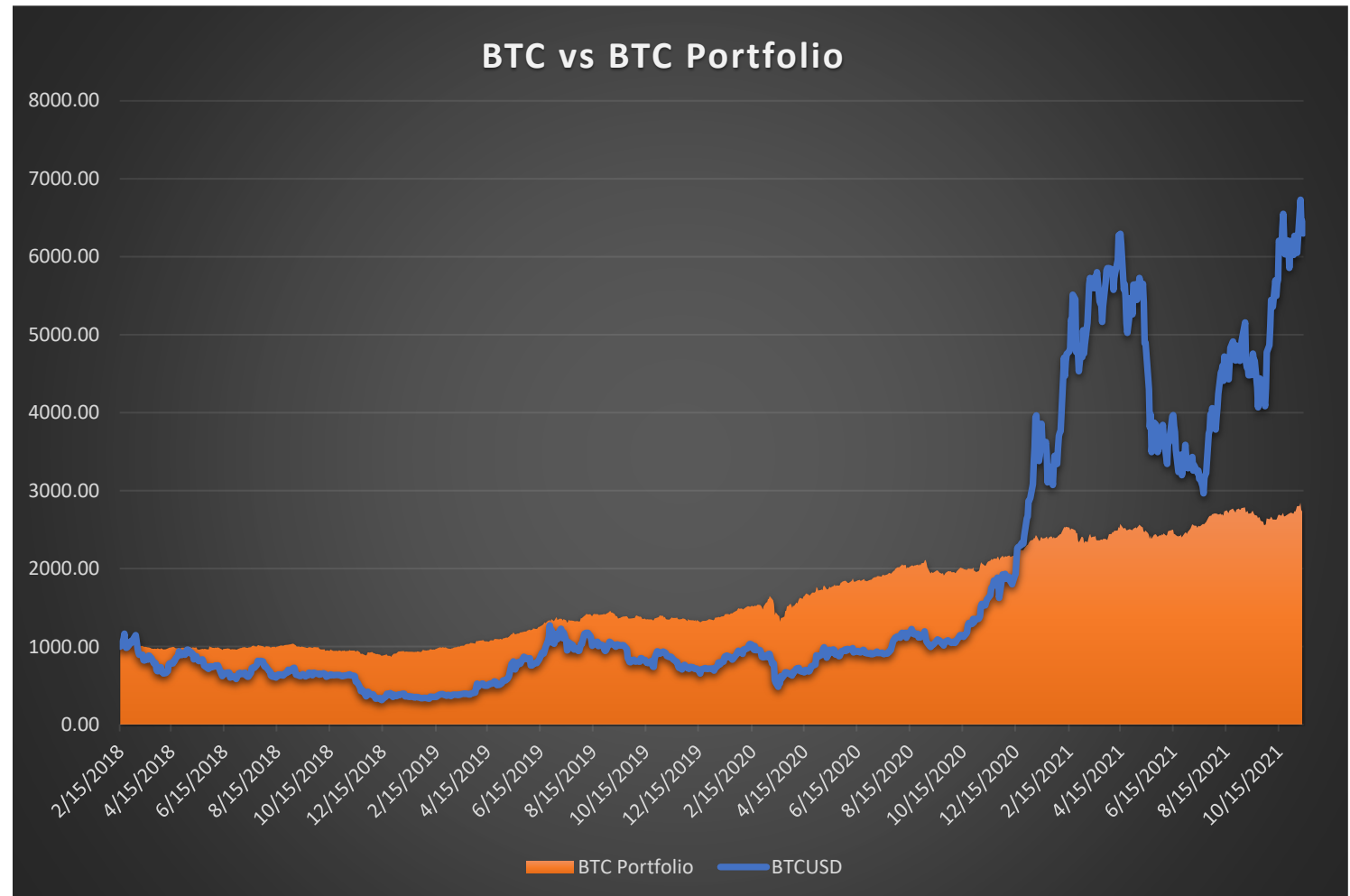
Example 2: Medium Leverage

- Leverage 2:1

	BTC	BTC Portfolio
Leverage	1.0	2.0
Total Return	630%	568%
CAGR	70.2%	66.2%
Ann. Vol	70.5%	33.8%
SR	0.99	1.96
Max DD	-73.1%	-37.1%
Total Return/Max DD	8.6	15.3

BTC vs BTC Portfolio
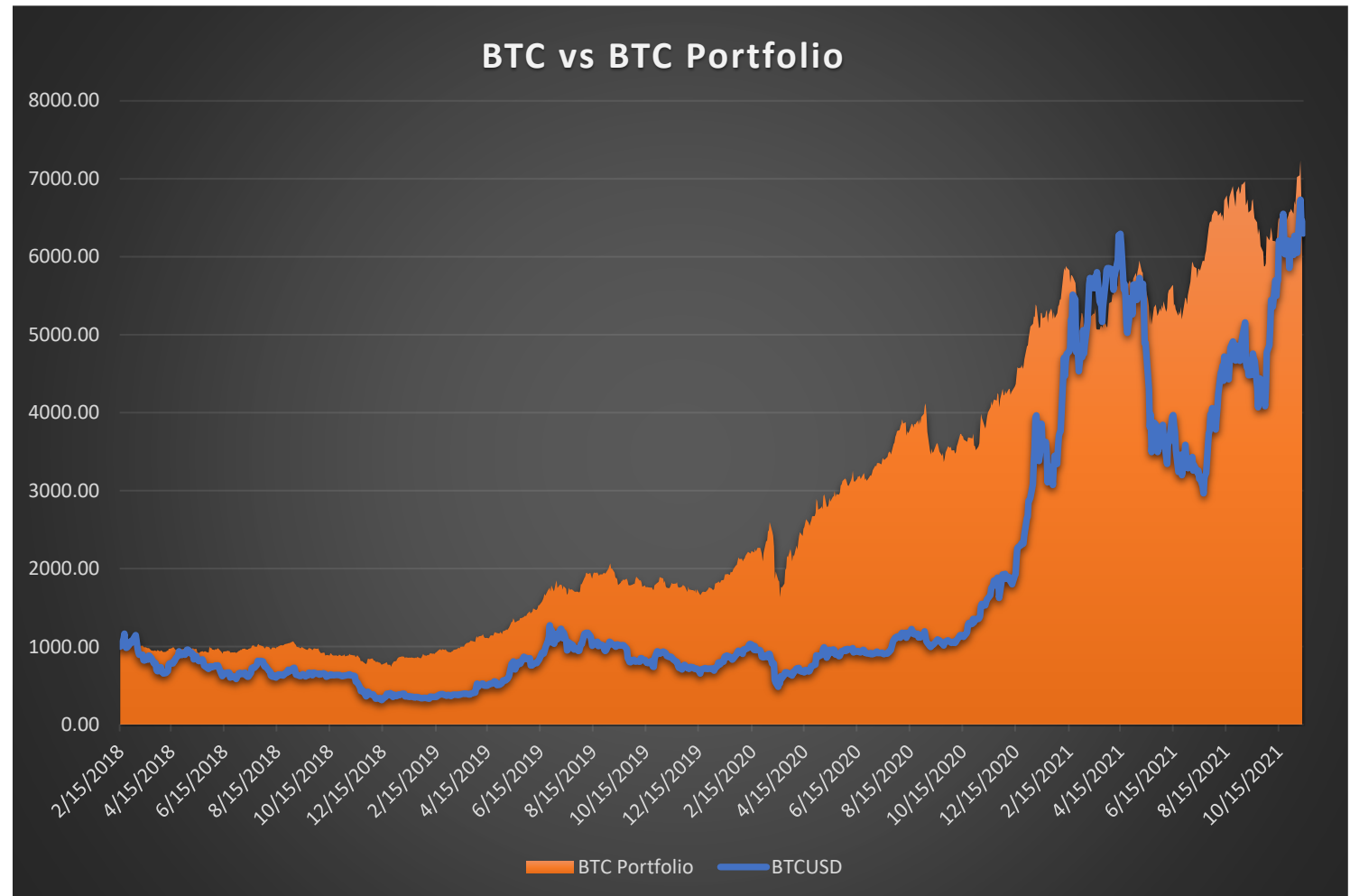
Example 3: High Leverage

- Leverage 3:1

	BTC	BTC Portfolio
Leverage	1.0	3.0
Total Return	630%	1353%
CAGR	70.2%	104.6%
Ann. Vol	70.5%	50.7%
SR	0.99	2.06
Max DD	-73.1%	-51.5%
Total Return/Max DD	8.6	26.3