A Hedged, Liquidation-Free, Leveraged Trading System Generating Perpetual Compound Interest in Bitcoin

Original Draft: January 1st, 2021
Last Updated: June 11th, 2022

Carlos Augusto, Founder: plu.sx
Co-author: William Harmony

Dedicated to Adrian Castro — May his genius, legacy, and spirit live on herein.

Abstract. A quote often attributed to Albert Einstein reads, *"Compound interest is the eighth wonder of the world. He who understands it, earns it; he who doesn't, pays it."*

A cryptocurrency hedge fund which manages leveraged perpetual futures trades, free of liquidation risk, can leverage volatility over time to extract continuous compound interest, allowing its starting balance to grow a thousandfold in five to seven years.

Expert trading skills are part of the solution. Good trading decisions executed within our framework increase the efficiency and accelerate the compounding rate.

Our solution unlocks reliable and perpetual compound interest over long time spans, generating alpha in the hundreds-of-thousands of percent under extremely favorable negligible risk conditions.

Thesis

A cryptocurrency hedge fund running specially-configured liquidation-free leveraged perpetual futures positions can reliably earn ongoing compound interest at a conservative weekly average rate of ~2.7%, growing its wealth a thousandfold in approximately five to seven years.

As the trades are hedged, there is always a losing position for each winning position. Any losing position can have size added multiple times without incurring liquidation risk until either breaking even or flipping into a winning position. Thus, over time, all positions win. This is what translates into continuous compound interest.

Introduction

In 2016, BitMEX launched the first 100x leveraged Bitcoin perpetual futures market. This quickly became recognized as a breeding ground for degenerate gamblers to use this massive leverage on what was already the most volatile, nascent asset in the world: Bitcoin.

Over the following years, the world's top crypto exchanges began opening their own leveraged perpetual futures markets, and they became a standard product offering in the space. Initially these markets were solely Bitcoin margined but soon after various other altcoins became available to trade as well.
In 2020 however, the exchanges began launching dollar (USD) margined markets. By early 2021 these USD markets had sufficient volume and liquidity to become viable for larger players to begin utilizing them.

These USD margined markets are the key component of this paper.

With both Bitcoin and USD margined markets being utilized simultaneously, a novel type of hedge fund and liquidation-free trading system becomes possible.

A Liquidation-Free Trading Environment

The crux of generating continuous compound interest is the liquidation-free leveraged trading system.

The wildest and fastest profits and losses possible to be made in the crypto markets come from leveraged trading, which, when misused, is like driving a Lamborghini at top speed with no brakes.

At 100x leverage, if the price of Bitcoin moves by only 1% you gain 100% (doubling your money) because a $100 trade leveraged at 100x accesses the power of $10,000, which gains the $100 from the 1% move.

Of course, the same 1% move *against* you would liquidate your entire trade.

This reality has, in effect, created an enormous casino out of these highly leveraged trading platforms, and is also why these platforms remain illegal in regulated jurisdictions like the US.

The mechanism that every exchange employs to manage the risk of these leveraged trades is the liquidation engine. This engine constantly monitors trade positions; available account margin; and leverage rate to apply a liquidation price to each trade. If the price of Bitcoin reaches the liquidation price the position is closed and the losing trader is left with nothing. The liquidation engine may also auto-deleverage a winning trader's position if there is not enough liquidity available to meet expected profits.

But what if you could leverage trade without the risk of liquidation? Well, you can. Since 2016, upon the advent of the world's first leveraged perpetual Bitcoin futures on BitMEX, it has been possible to short Bitcoin at 1x leverage, essentially risk-free.

> **Note:** We will use the term "negligible risk" instead of "risk-free" to avoid confusion and maintain accuracy. Although these are virtually risk-free trades, as all risk factors are mitigated as explained herein, reducing the probability of losing funds to near zero, we will stick with the term "negligible risk".

The First Half of the Mechanism

In 2018, Flood, a well known crypto futures trader, disclosed his method[1] of shorting his entire account balance at 1x leverage when going on vacation or otherwise unable to trade in order to eliminate his Bitcoin exposure risk. This was more convenient than withdrawing all his Bitcoin from BitMEX in order to sell it back to USD in the spot market on another exchange before hitting the beach.

He proposed the term "Synthetic USD" to define his 1x leveraged short position margined in Bitcoin, meaning his account balance was in Bitcoin, and his 1x leveraged short trade was a Bitcoin trade, but the value of this trade, whether winning or losing in Bitcoin, would always be worth the original spot price value in USD from the time he opened the trade.

[1] https://twitter.com/thinkingusd/status/962053190983155715

That is: if a 1 BTC 1x short trade was opened with Bitcoin at $8,000, and later Bitcoin doubled in value to $16,000, he would be losing 50% (-0.5 BTC) in his Bitcoin balance, but the *purchasing power* of the remaining Bitcoin (0.5 BTC) would still equal the original trade size of $8,000 USD.

Therefore, "Synthetic USD" means a perpetual futures short trade in which the trade size plus the profits or losses constantly retains the USD purchasing power of the original trade size.

But most importantly, in this trade configuration there is no liquidation price.

With no liquidation price, and if you count your wealth in dollars — as most people did back in 2018, and, unfortunately, as most people still do today — this is a negligible risk trade because you can never lose this trade, nor can this trade expire at an unfavorable time.

So — what was then just an interesting hack that Flood proposed to save himself time from converting his Bitcoin back into dollars when he went on vacation, is now one half of a novel, liquidation-free trading system that enables us to generate continuous compound interest and grow our wealth a thousandfold in a few years.

The Second Half of the Mechanism

After the first USD margined markets appeared in 2020, it finally became possible to open a liquidation-free 1x *long* position against Bitcoin using the dollar, the inverse operation to the above 1x short using Bitcoin. By the same reasoning that a 1x short position against Bitcoin, margined in Bitcoin, is of negligible risk because it cannot be liquidated, we can see that a 1x long position against Bitcoin, margined in USD, is of negligible risk as well, because it also cannot be liquidated.

On January 19th, 2022, about a year after beginning the first draft of this whitepaper, Carlos Augusto, the founder of the +× Fund, tweeted the inverse[2] message to Flood's seminal tweet:

And thus, nearly four years later, defined Synthetic Bitcoin.

By concurrently running a 1x leveraged Bitcoin short position (synthetic USD) and a 1x leveraged USD long position (synthetic Bitcoin), we have effectively configured a fundamentally negligible risk trading environment, giving us access to the potential profits associated with leveraged trading with virtually no risk over time of bearing the losses.

This is the key to unlocking continuous compound interest.

> **Note:** A more inclusive term than Synthetic Bitcoin would be Synthetic Crypto, which would include 1x leveraged perpetual futures positions in major cryptocurrencies such as Ethereum, Cardano, and other top qualifying digital assets. However, for simplicity and focus herein, we will refer only to Synthetic Bitcoin.

"Risk-Free" Trades, Negligible Risk Operation

We recognize that there are inherent risks intrinsic to every trade or investment. The trading system defined in this whitepaper completely eliminates market risks, which are what trigger liquidations. In leveraged trading the vast majority of losses are due to liquidations, not medical emergencies, exchanges going out of business, getting hacked, or other catastrophes.

Therefore, we have listed all of the external risks we bear in Appendix A, since they are not directly addressed by this whitepaper. We have gone to great lengths to mitigate these risks and reduce them to negligibility.

[2] https://twitter.com/solrac149/status/1483956627732639744?s=20

Note: Any use of the term “risk-free” or “negligible risk” refers solely to our specific definition and configuration of liquidation-free 1x leveraged perpetual futures trades.

Anatomy of the Trades

Legend:

xUSD = Synthetic USD **xBTC** = Synthetic Bitcoin **$** = Trade size (in USD) ฿ = Trade size (in BTC) **D** = Direction (long / short) **Δ** = Leverage rate **λ** = $\Delta\frac{S}{V}$ leverage gearing	**HAP** = Hedged Aggregate Position **HAP_{vpnl}** = HAP vpnl **HAP_{MP}** = HAP Margin Position **M_{BTC}** = BTC Margin **M_{USD}** = USD Margin **pnl** = Unrealized profit and loss	**S** = Opening spot price **V** = Value, or current price **S_2** = Inverted current price **V_2** = Inverted spot Price

Let us define the formulas which power our hedged trading system, comprising of a Synthetic USD trade and a Synthetic Bitcoin trade which together form a Hedged Aggregate Position (HAP), all of which function equivalently on any major crypto perpetual futures trading platform.

Let us first define λ (lambda) as the standard leverage gearing formula in traditional options trading[3]. It applies the same way in perpetual crypto futures trading. Note that in both Synthetic USD and BTC, Δ (leverage) is always 1, so we may ignore it.

$$\lambda = \Delta\frac{S}{V}$$

Synthetic USD

We define Synthetic USD (xUSD) as being a 1x leveraged short position in Bitcoin where the current price of Bitcoin “V” multiplied by your total margin in Bitcoin “M_{BTC}” plus your unrealized profit and loss “pnl” is rate-locked to the USD value of the Bitcoin at the time the trade was opened. That is, the original USD purchasing power of the Bitcoin position is always maintained.

Here we define pnl as your Bitcoin trade position minus its leveraging calculation.

$$pnl = ฿ - ฿\lambda$$

[3] https://en.wikipedia.org/wiki/Greeks_(finance)#Lambda

And the full formula is:

$$xUSD = V \times (M_{BTC} + pnl)$$

Broken out completely, it is written as:

$$xUSD = V \times (M_{BTC} + (฿ - ฿\lambda))$$

Please note: The total margin "M_{BTC}" is added to "pnl" because Synthetic USD must be a short position. The short position (direction) is "1" so it is represented as simply the plus sign.

You may verify this calculation works as expected at Wolfram Alpha[4]. Change V, the current Bitcoin price, to any other value, and xUSD (shown as "x") will always be equal to S, the opening / entry price of the trade. Note that this will break in "Math Input" mode due to a bug in Wolfram Alpha. Please use "Natural Language" input mode.

> **Please note:** If this trade is modified to be a long position instead of a short, or the leverage is not 1x, it is no longer Synthetic USD, but just a normal perpetual futures trade.
>
> *Synthetic USD only pops into existence when running a 1x leveraged perpetual futures short position in Bitcoin.*

Solving for xUSD

Let us solve the equations for Synthetic USD with a trade size of 1 BTC at $40,000. At the instant the trade is opened (zero profit or loss), this would result in:

$$xUSD = V \times 1 = \$40k$$

Which means our 1 BTC trade is valid Synthetic USD, rate locked to the original purchasing power of $40,000.

If the price of Bitcoin doubled to $80,000, the Bitcoin value within the parentheses would become 0.5, which is a loss of 50% in Bitcoin, giving us:

$$xUSD = V \times 0.5 = \$40k$$

→ Running 50% loss in BTC

[4] https://is.gd/syntheticUSD (shortlink to Wolfram Alpha for print copies)

So although we are losing 50% in Bitcoin, we are rate locked to the original purchasing power of $40,000, proving that this is valid Synthetic USD. Later we will see that, since this is a liquidation-free trade, we can remain completely free of emotion while suffering this 50% unrealized loss in Bitcoin, and simply wait as long as necessary for the price to move back in our favor so that this side of the HAP will not suffer any losses.

Conversely, if the Bitcoin price crashed to $20,000, the Bitcoin value within the parentheses would become 2 (a gain of 100% in Bitcoin), giving us:

$$xUSD = V \times 2 = \$40k$$

→ Enjoying 100% profit in BTC

This rate locks us to the original purchasing power of $40,000, proving that this is valid Synthetic USD. But notice that in this case, we have doubled our Bitcoin: a fantastic trade! This would be an excellent time to take Bitcoin profits.

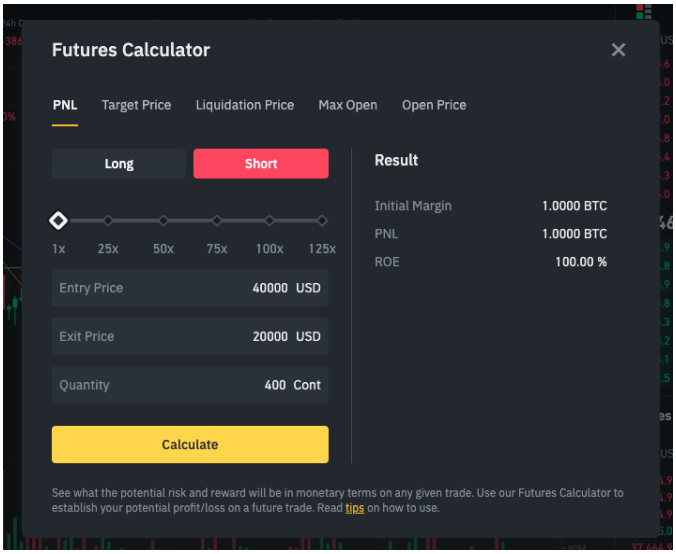
The Synthetic USD scenarios can be validated with the Binance COIN-M Perpetual Futures calculator[5] or any other major crypto perpetual futures trading platforms' calculator.

Input the following values:

- Click "Short" as Synthetic USD must be a short position.
- Leverage: 1x as Synthetic USD must always be 1x (slide the bar to the left).
- Entry price: $40,000 (this represents S in the equation above)
- Exit price: $20,000 (this represents V in the equation above)
- Quantity: 400 contracts. (Each contract is valued at $100 on Binance, so 400 contracts would represent a 1 BTC trade as per the equation above.)

Click calculate. The results display as:

[5] https://www.binance.com/en/delivery/btcusd_perpetual/calculator



Here, we've doubled our Bitcoin while the price crashed from $40k to $20k. On the right, note your initial margin of 1 BTC, and your profit of 1 BTC = 2 BTC total, and 2 BTC × $20k current price = $40k, maintaining this as valid Synthetic USD. Remember that we've doubled our Bitcoin with virtually no risk in a liquidation-free trade.

Synthetic Bitcoin

We define Synthetic Bitcoin (xBTC) as being a 1x leveraged long position in USD where the total margin in USD "M_{USD}" minus your unrealized profit and loss "pnl", and divided by "V", the current Bitcoin price, is always equal, and therefore rate-locked, to the purchasing power in BTC of the USD value at the time the trade was opened. That is, the original Bitcoin purchasing power of the USD position is always maintained.

Here we define pnl as your USD trade position minus itself divided by the leveraging calculation in order to maintain it as a USD figure.

$$pnl = \$ - \frac{\$}{\lambda}$$

And the full formula is:

$$xBTC = (M_{USD} - pnl) \div V$$

Broken out completely, it is written as:

$$xBTC = (M_{USD} - (\$ - \frac{\$}{\lambda})) \div V$$

Please note: The total margin "M_{USD}" is subtracted from "pnl" because Synthetic Bitcoin must be a long position. The long position (direction) is "-1" so it is represented as simply the minus sign.

You may verify this calculation works as expected at Wolfram Alpha[6]. Change V, the current Bitcoin price, to any other value, and xBTC (shown as "x") will always be equal to S, the opening / entry price of the trade.

Please note: If this trade is modified to be a short position instead of a long, or the leverage is not 1x, it is no longer Synthetic Bitcoin, but just a normal perpetual futures trade.

Synthetic Bitcoin only pops into existence when running a 1x leveraged perpetual futures long position in USD.

Solving for xBTC

Let us solve the equations for Synthetic Bitcoin with a trade size of $40,000 when Bitcoin is also at $40,000. At the instant the trade is opened (zero profit or loss), this would result in:

$$xBTC = \$40k \div V = 1$$

Which means our $40,000 trade is valid Synthetic Bitcoin, rate locked to the original purchasing power of 1 BTC.

If the price of Bitcoin doubled to $80,000, the USD value within the parentheses would become $80,000, which is a gain of 100% in USD, giving us:

$$xBTC = \$80k \div V = 1$$

→ Enjoying 100% profit in USD

This rate locks us to the original purchasing power of 1 BTC, proving that this is valid Synthetic Bitcoin. But notice that in this case, we have doubled our USD: a fantastic trade! This would be an excellent time to take USD profits.

[6] https://is.gd/syntheticBTC (shortlink to Wolfram Alpha for print copies)

Conversely, if the Bitcoin price crashed to $20,000, the USD value within the parentheses would become $20,000 (a loss of 50% in USD), giving us:

$$xBTC = \$20k \div V = 1$$

→ Running 50% loss in USD

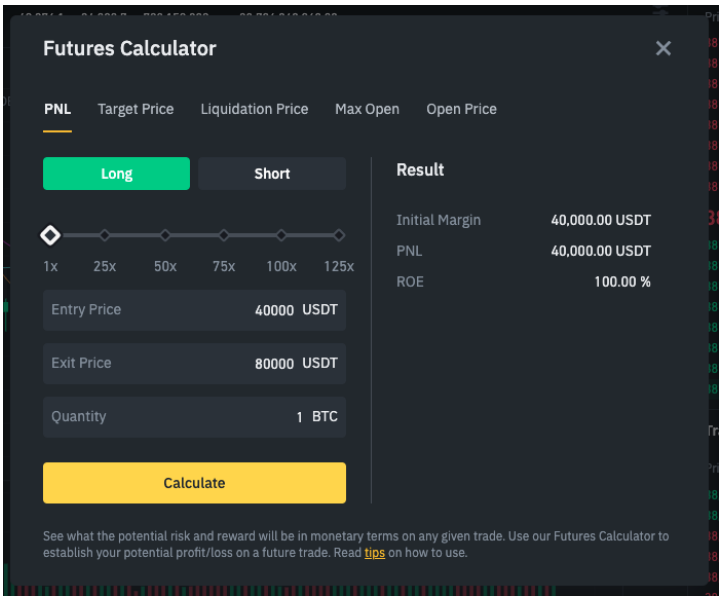
So although we are losing 50% in USD, we are rate locked to the original purchasing power of 1 BTC, proving that this is valid Synthetic Bitcoin. Later we will see that, since this is a liquidation-free trade, we can remain completely free of emotion while suffering this 50% unrealized loss in USD, and simply wait as long as necessary for the price to move back in our favor so that this side of the HAP will not suffer any losses.

The Synthetic Bitcoin scenarios can be validated with the Binance USDⓈ-M Perpetual Futures calculator[7] or any other major crypto perpetual futures trading platforms' calculator.

Input the following values:

- Click "Long" as Synthetic Bitcoin must be a long position.
- Leverage: 1x as Synthetic Bitcoin must always be 1x (slide the bar to the left).
- Entry price: $40,000 (this represents S in the equation above)
- Exit price: $80,000 (this represents V in the equation above)
- Quantity: 1 BTC. (This represents a $40,000 trade as 1 BTC = $40,000 as per the equation above.)

Click calculate. The results display as:



[7] https://www.binance.com/en/futures/BTCUSDT/calculator

Here, we've doubled our USDT as the price rose from $40k to $80k. On the right, note your initial margin of $40,000 USDT, and your profit of $40,000 USDT = $80,000 USDT total, and $80k ÷ $80k (current Bitcoin price) still equals 1 BTC, maintaining this as valid Synthetic Bitcoin. Remember that we've doubled our USDT with virtually no risk in a liquidation-free trade.

Hedged Aggregated Position

As you have probably noticed, both the Synthetic USD and the Synthetic Bitcoin trades are mirror reflections of each other, and both are rate locked to their respective values — or purchasing power — against each other. However, both positions can gain Bitcoin or USD, and one of those trades will always have profits available to take, while the other trade will always be running in loss. But as negligible risk trades because they bear no liquidation risk, the losing trades simply leverage the power of volatility and time in the market to eventually return back to break-even, or even flip into winning trades themselves. This is what unlocks the capability of generating ongoing, continuous, reliable compound interest.

Both of these trades running simultaneously form what we define as our Hedged Aggregate Position (HAP).

HAP Breakdown

We define the HAP equation as the combination of both the Synthetic USD and Synthetic Bitcoin equations above:

$$HAP(Mp) = \left(\frac{V \times (M_{BTC} + (฿ - ฿\lambda))}{V}\right) + \left(\frac{(M_{USD} - (\$ - \frac{\$}{\lambda}))}{V}\right)$$

As the key component of the liquidation-free trading system, the HAP equation proves that a fund manager can maintain two trades that are hedged against one another, demonstrating that the losses of one side are equal to the profits of the other side, creating a perfectly balanced hedge.

Solving for HAP(Mp)

Let us solve the synthetic USD and synthetic Bitcoin equations of the HAP with a total initial margin size of $108,000 when Bitcoin is at $27,000. At the instant the trade is opened (zero profit or loss), this would result in a $54,000 synthetic USD trade size and a 2 BTC synthetic Bitcoin trade size, equivalent to $54,000 USD as well. Let's say that the market dips to $23,000, the synthetic USD short moves into profit, and the synthetic Bitcoin long moves into a loss.

Solving for our xUSD short position, we have a 17.39% gain, giving us a margin position of 2.34783 BTC, equivalent to an increase of $8,000 if denominated in USD.

Solving for our xBTC long position, we have a 14.81% loss, or -$8,000, giving us a margin position of $46,000 which has the purchasing power equivalent value of 2 BTC.

Combining the current margin position of both sides of the HAP shows us that we still have our original 4.0 BTC worth of margin positions between both the long position and the short position, if denominated in BTC. The aggregated margin position is unchanged, as the losses from one side have now moved onto the winning side.

Solving for HAP(vPnl)

Knowing our HAP(Mp) equation, we're able to then deduce the profit and loss of any HAP. Using the HAP(Mp) as a component, subtracted from the initial margins of both the synthetic USD and the synthetic BTC positions, gives us the virtual profit and loss:

$$HAP(vPnl) = HAP(Mp) - \frac{(M_{BTC} * S) + M_{USD}}{S}$$

Continuing with the above example, inputting our HAP(Mp) value of 4 BTC, and solving for the HAP(vPnl), we see that we have a 0 BTC profit and loss, demonstrating that the losses of one side become the gains of the other side.

Liquidation Risk

Normally, leveraged perpetual futures products carry a significant liquidation risk. However, there are two reasons why our hedged trading system carries no such risk: first is the fact that we only open long positions using USD margined markets. As the price of Bitcoin falls, it becomes cheaper to buy it with USD. This mechanism automatically protects against liquidation.

Backtest / Sensitivity Test

Paramount to any such system or strategy is an in depth backtest that outputs performance over time. As these are negligible risk perpetual trades we can easily show how this system performs in the best and worst possible scenarios.

The backtest will run from the end of the top of the bull run in December 2017 to the end of the next bullrun of April 2021 which made a new top. The backtest will run about three years, essentially the length of the bear market after every yearlong Bitcoin bull run.

This period saw a high of $19,000 at the December 2017 market cycle top, down to $6,000, the strongest support level in 8 years at the time, in summer of 2018, which broke for the first time in winter 2018, down to $3,000. From there, by summer of 2019 Bitcoin rose back to a $14,000 high, and fell back to range between $7-10,000 until March 2020 when the Coronavirus dump dropped the price back to $3,600 lows. Finally, the next bull run which began in October 2020, saw a price movement from $10,000 to $65,000, over 6x!

Therefore the most severe move was from the 2018 high of $19,000 down to $3,000 10-11 months later. The worst possible scenario then would be opening a long position at $19,000 as well as a corresponding short position. We'll call this configuration; Trader A[8]. The second worst possible scenario would have been to open a short position and a corresponding long position at the bottom of the bear market in December of 2018. We'll call this configuration; Trader C[9]. Finally, as a more human-like balance between Trader A and Trader C, we'll open a long position and corresponding short position half-way through the bearmarket that follows the bull run which created a high of $19,000. We'll call this configuration; Trader B[10], who enters in February 2018 at $8,500.

All three traders and their long and short positions have been plotted on the TradingView BTCUSD chart, their positions have been dollar-cost averaged into over their lifespans, profits have been taken and merged into corresponding positions, and the heavily weighted and leveraged winning positions have been carried through to the top of the next bull run, demonstrating remarkable multifold returns.

Additionally, the raw data that composes the backtest has been transcribed into a spreadsheet for more detailed review and analysis. (See; Spreadsheet[11]).

Exploring the System

Inversely, we only open short positions using Bitcoin margined markets. As the price of Bitcoin rises, that Bitcoin is automatically worth more USD, and that mechanism

[8] https://bit.ly/TraderA
[9] https://bit.ly/TraderB
[10] https://bit.ly/TraderC
[11] https://bit.ly/xbacktest

automatically protects against liquidation as well. These are the inherent benefits of utilizing USD margined markets and Bitcoin margined markets in this way.

Secondly, we are using valid Synthetic USD and Synthetic Bitcoin, both of which necessitate 1x leverage, which is always liquidation-free anyway. These extremely favorable conditions are what allow us to categorize these specially configured positions as negligible risk when they are used together simultaneously as a hedged aggregate position.

At historical maximum price volatility levels we are able to introduce leverage at the most opportune times in price history, and since the positions were already valid synthetic assets which are inherently resistant to liquidation, the liquidation risks at those points in time remain extremely low while allowing the trades to gain exposure to even much greater rewards than before.

We imagine the liquidation-free trading system as a mechanism of transferring profits captured from market movements into opposing perpetual futures, locking the gains and principle into another round of compounded growth. By transferring the margin of the winner into the margin of the loser and reducing the cost basis to just above or below the spot price of the losing position, the volatility requirement is now very low to win, at the historical maximum. At this point, the required volatility to win becomes negligible and highly probable.

Trading Conditions & Rules

In an effort to balance the performance of all three traders against one another as well as to define a basic standard set of rules which are designed to ensure a minimum level of liquidation-free trading system performance, we've opted to build a standard basic rule set which all three traders will adhere to, providing a consistent growth and performance curve across all three traders, as well as having rules which anyone can follow that proves that the liquidation-free trading system of this whitepaper will earn profits in any market scenario that BTC exists in.

- **Rule 1: Uniform Rule Adherence**
    - 1.1: These rules are designed to be strictly systematic and serve to provide a guideline that guarantees a minimum level of performance. Any scenario trader must abide by these rules as commandments.

- **Rule 2: Margin Requirements**
    - 2.1: The whitepaper positions (long and short) are to be opened using 25% of the entire USD margin balance, with 75% of the USD margin balance being reserved for DCA action. Specifically, ⅛ of the USD

margin balance is to be used to open the long position and another 1/8th is to be used to open the short position.

- **Rule 3: Dollar-Cost Average Protocol**
    - 3.1: Only positions taking losses are DCAd into.
    - 3.2: For your losing short position, meaning the price is going up, you simply measure 20.5% above the original short trade entry price (or the previous spot price where you last DCA'd into this short). That is where you DCA.
    - 3.3: For your losing long position, meaning the price is going down, you simply measure 17.01% below the original long trade entry price (or the previous spot price where you last DCA'd into the long), which will always happen to be 20.5% above the lower price. That is where you DCA.
    - 3.4: Only a total of 7 DCAs are to be made, shared between both the short and long position, meaning that if the short position gains two DCAs, the long position would only be allowed five DCAs. Whether all the DCA's go into one or the other, or divided into both, that's the maximum amount.
    - 3.5: DCA Weights: The seven DCAs are to be progressively weighted as each DCA is made until seven DCAs are reached, which will have utilized the remaining 75% of the initial USD account margin.
    - 3.6: In order to calculate your weighted average DCA grid, you must split your reserve into seven DCA entries, weighted lightest (least money) in the beginning, to heaviest (most money) in the end. In order to do this, we take the reserve amount and divide it by two, giving us the amount of the 7th and final DCA, then divide the remainder by 2, giving us the 6th DCA, and so on. (See; figure below)
    - 3.7: Leverage isn't utilized until the end of the weighted DCA grid and then we only have to prove the liquidation price once or twice on the calculator at the end on the bottom, see specific liquidation price rules below.

Progressively Weighted DCA Action Grid Structure

DCA Reserves 75% of USD Account Balance (Ex. **$75,000.00**)		
DCA Action	Amount to DCA	DCA Weight Calculation
DCA 1	$585.94	$1,171.88 / 2
DCA 2	$1,171.88	$2,343.75 / 2

DCA 3	$2,343.75	$4,687.50 / 2
DCA 4	$4,687.50	$9,375.00 / 2
DCA 5	$9,375.00	$18,750.00 / 2
DCA 6	$18,750.00	$37,500.00 / 2
DCA 7	$37,500.00	**$75,000.00** / 2

- Weighted DCA Grid Logic & Reasoning
    - This DCA grid guarantees that as large market movements happen, the market volatility can be taken advantage of through the application of progressive weight, meaning that the USD reserve margin can be DCAd into the BTC macrotrend where it's biased to the macrotrend movement (up or down).
    - As this weighted DCA buy grid doesn't discriminate or preferentiate between the long or short position (as there's only seven DCAs in total, aggregated between either position), this is a reliable way to ensure that the DCA buys are biased in the direction of the macrotrend, favoring the big-picture market direction.
    - As every DCA is performed at a predetermined distance from the previous DCA, by the time of the 7th DCA, the average trader will have made the final DCA (the heaviest of the all) close to the 80% milestone of the bigger picture macrotrend market direction. Specifically, in the case of Trader A, 80% of the macro volatility was captured, while in the case of Trader C, 87% was captured.
    - Increasing the DCA weight as the position falls in value, ensures that the 'moving liquidation price' (the liquidation price of the position that is being adjusted as the value of BTC falls and as the DCAs are performed) is regularly pushed beyond the range of market volatility, meaning that the positions are substantially less likely to be liquidated. The weighted DCA grid buys keep the traders in a regime that will not violate safety thresholds, maintaining all positions within a "safe" zone.

- **Rule 4: Taking Profits and Profit Transfer Rules**
    - 4.1: At the time of the 7th DCA into the losing position, automatically close the winning position.
    - 4.2: Transfer the principle and profits of the now closed winning position into the corresponding losing position.
    - 4.3: If the market is falling into a bear market from the top of a bull run, having completed a market cycle, and the short position that has been opened at the top of this market peak is winning, by the time of the

seventh DCA into the losing long position, the short position will have absorbed approximately 73% of the bearish macro downtrend which historically completes at an approximate maximum of an 80% fall from the previous peak. (See; Trader A)
    - Meaning, any trader that has followed the standard rules, will have captured at least 80% of the downtrend market move with their short position.
  - 4.4: If the short position has been opened at the bottom of a bear market and has been DCAd into towards the top of a preliminary pump, mark the top of the preliminary pump and set an objective to close the short position 50% down from the preliminary pump peak. (See; Trader C)
    - If closing the short position 50% down from the preliminary pump peak, this is a reliable way to lock in consistent performance over various cycles when handling the worst case possible short positions of this nature.
  - 4.5: When closing a short position in profit, immediately flip the profits and principle into a newly opened long position in anticipation of the inevitable bull run. (See; Trader C)

- **Rule 5: Leverage & Liquidation Requirements**
  - 5.1: Regardless of market conditions or trader selection (A, B, or C), when applying leverage and performing DCAs, the liquidation price must be under 50% marked from below the absolute bottom (approximately 80%) of the bear market dump that follows any prior bull run peak. (See; Crash Minimum marking on any backtest chart)
  - 5.2: Leverage should only be applied at the time of the seventh DCA into either a long or short position, and generally, at a maximum, 50% of the final weighted DCA margin amount as well as the entirety of the profits and principle from the winning position that becomes merged into the losing position, will be eligible for 2x or 3x leverage.
    - If the liquidation price allows the addition of more BTC, the trader may add more BTC to be leveraged, so long as the safety threshold is maintained.
  - 5.3: Maximum achievable leverage that falls within the safety guidelines of the whitepaper system is generally either 2x or 3x leverage.
    - Since leverage is only permitted to be applied at the time of the 7th DCA, it's more probable that the maximum market uptrend or downtrend price has already happened, or is very close, meaning that the liquidation price will fall below the crash minimum 50% safety guideline, making these leveraged positions "safe".

Backtest Trading Analysis; Trader A

Trader A opened both their long and short positions at the top of the previous bull run cycle, the worst time to open a long position, at the absolute peak of a bull run, where the price falls from. As the price of BTC falls in price, the short position moves into profit, while the long position is DCAd into. By the time of the seventh DCA into the long position, the short position made 268.92% profit.

Following the strictly systematic rules, Trader A closes the short position at the time of the seventh DCA into the long position and transfers its principle and profit into the long position. Performing this transfer action results in growing the long position an additional 24.29% in size.

Following the leverage and liquidation rules, Trader A was able to leverage 18 BTC at 2x leverage, bringing the cost-basis at the bottom from 26.348345 BTC to 44.483054 BTC, a 51.2% increase in the BTC margin position. Holding this position into the bull run netted Trader A a phenomenal 1,060.80% return.

- Having begun with only 2 BTC, Trader A finished having collected another 42.483054 BTC for a total of 44.483054.
- By the end of Trader A's trades at the top of the following bull run, Trader A enjoys a 22x growth in BTC margin as well as a 16x growth in USD margin.
- The initial USD margin was $158,000.00, while the final USD margin is $2,638,187.62.
- Total trade length is 1,214 days, or ~3 years and 4 months.

Backtest Trading Analysis; Trader B

Trader B has been designed to be the most human-like trader between all three and has opened both their long and short positions in the middle of the previous bull run drawdown. As the price of BTC rises and falls in price, DCAs are performed on both the long position and the short position, but as the system's rules ensure that only the position that benefits the most in the macrotrend is DCAd into, the long was heavily weighted. By the time of the seventh DCA into the long position, the short position made 170.32% profit.

Following the strictly systematic rules, Trader B closes the short position at the time of the seventh DCA into the long position and transfers its principle and profit into the long position. Performing this transfer action results in growing the long position an additional 30.08% in size, in comparison to the initial USD margin.

Following the leverage and liquidation rules, Trader A was able to leverage 12.46 BTC at 3x leverage, bringing the cost-basis at the bottom from 20.331739 BTC to 45.267632

BTC, a 76.02% increase in the BTC margin position. Holding this position into the bull run netted Trader A a remarkable 1,771.22% return, proving that the human-like actions of Trader B, perform above the other two traders.

- Having begun with only 2 BTC, Trader A finished having collected another 43.267632 BTC for a total of 45.267632.
- By the end of Trader B's trades at the top of the following bull run, Trader B enjoys a 22x growth in BTC margin as well as a 40x growth in USD margin.
- The initial USD margin was $85,000.00, while the final USD margin is $2,780,804.67.
- Total trade length is 1,167 days, or ~3 years and 2 months.

Backtest Trading Analysis; Trader C

Trader C opened both their long and short positions at the bottom of the post-bull run bear market, the worst time to open a short position, at the absolute bottom of a bear market, a decision that a real human trader would not have made. As the price of BTC rises, the long position moves into profit, while the short position is DCAd into seven times, according to the system's rules. By the time of the seventh DCA into the short position, the long position had made 267.39% profit.

Following the strictly systematic rules, Trader C closes the long position at the time of the seventh DCA into the failing short position and transfers its principle and profit into the short position, according to the rules. Performing this transfer action results in growing the short position an additional 38.45% in size and locking in a cost-basis close to the peak of the preliminary pump. As the preliminary pump begins to fail, the heavily weighted short position moves into profit and is closed out 50% from the top of the preliminary pump, netting Trader C a solid 65.14% profit, about 6.7955 BTC which will then be flipped into a new long position, with some leverage.

Following the leverage and liquidation rules, Trader C was able to leverage 2.933333 BTC at 3x leverage, bringing the cost-basis at the bottom from 6.7955 BTC to 12.662167 BTC, a 60.3% increase in the BTC margin position. Holding this long position into the bull run netted Trader C an acceptable 835.77 return. Remembering our rules, Trader C has a rule exception: As BTC always goes up and there's always a bull run on the horizon, it's imperative that short positions are closed as soon as possible and that longs are weighted into and held onto as soon as possible to ensure that each bull run cycle is caught.

- Having begun with only 2 BTC, Trader A finished having collected another 10.622167 BTC for a total of 12.622167.

- By the end of Trader C's trades at the top of the following bull run, Trader C enjoyed a 6x growth in BTC margin as well as a 28x growth in USD margin.
- The initial USD margin was $25,450.00, while the final USD margin is $733,940.48.
- Total trade length is 1,077 days, or ~3 years.

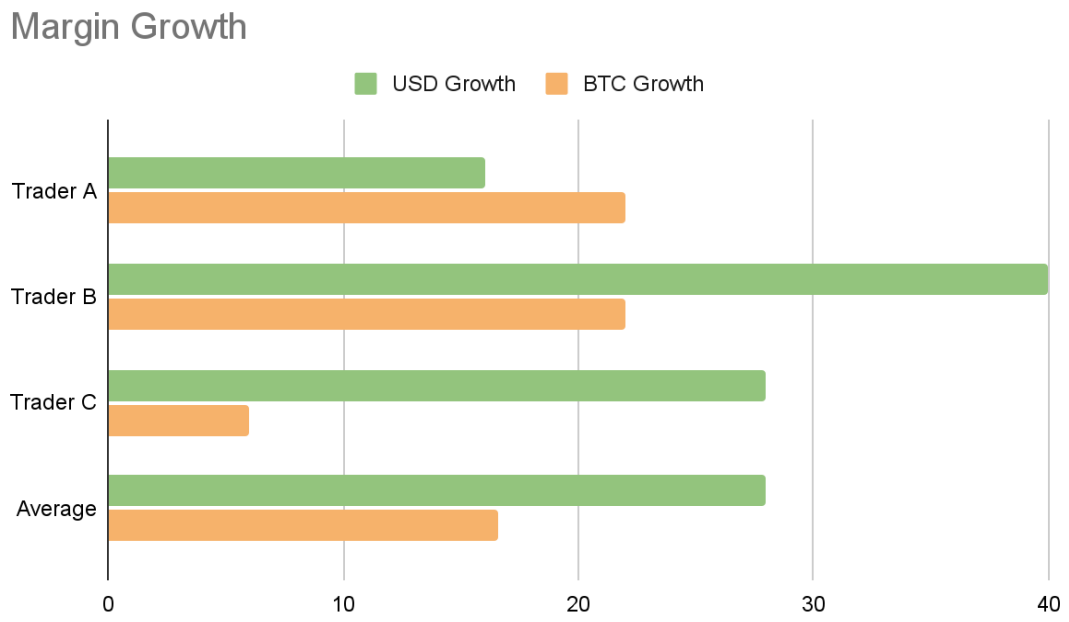
Multi Cycle Volatility Concerns

After having finally reached the peak of the bull run and having enjoyed an average 16x gain in the growth of BTC margin, the whitepaper trading system must be restarted, by closing the winning position and by following the take profit and profit transfer rules to open a new short position which will be maintained.

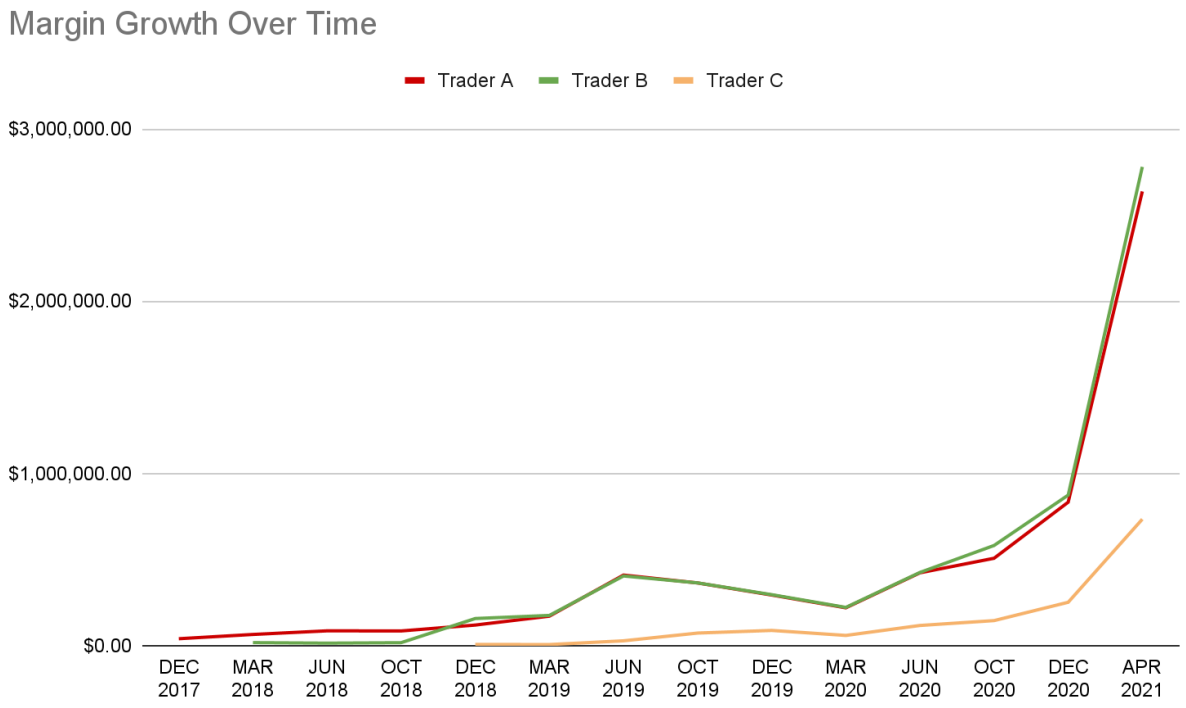
As it is generally accepted as common knowledge that over the next 10+ years Bitcoin will become less volatile over time, we are also running the liquidation-free trading system on top-10 altcoins as well, such as ETH, ADA, BCH, etc. Over time, altcoins will provide the volatility and performance that Bitcoin provided over the past 10 years. For the purposes of this whitepaper everything has been measured against Bitcoin, but internally we are running all of this on a variety of the top 10 altcoins as well, such as Ethereum, Cardano, Bitcoin Cash, Avalanche, etc., where volatility is higher but not too much so as to introduce adverse risk too far beyond what Bitcoin offers.

Statistical Trading Summary

- Average BTC margin growth per cycle is 16.6x
- Average USD margin growth per cycle is 28x
- Time of Trading Cycle per cycle: 1,077 days, or ~3 years



Visualized here is the margin growth multipliers for both BTC and USD for each individual trader.



Visualized here is the margin growth of each individual trader over the lifespan of the trading cycle, a graphical representation of each trader's backtest that has been plotted on TradingView.

Trader Incapacitation Risks

In the hypothetical situation that all three traders were to become incapacitated, such as fall into a three-year coma, and be unable to manage their positions, as the next bull run cycle happens, their short positions would all become worthless, but the multifold profits their long positions would gain will more than cover the losses of the short positions. So, even in a worst case scenario, simply holding these perpetual positions into the next bull run cycle becomes a reasonably viable strategy, but the performance is subpar and underperforms the liquidation-free trading strategy.

Summary Conclusions

We conclude that with an average BTC margin growth of 16.6x per cycle (~3 years), that after two cycles (~6 years), average BTC margin growth performance will be 275x, conservatively. However, if we disregard the sub-optimal performance of Trader C (as Trader C was required by our standard rules to open a sub-optimal short position which drastically reduced this trader's performance), then we conclude that the average BTC margin growth performance will be **484x** over the course of two cycles.

Finally, Trader B is the highest performing trader. Despite having the same 22x BTC margin growth as Trader A, Trader B grows their USD margin by almost three times more than Trader A. For a more complete picture of trader performance, we include USD margin growth in this metric. While knowing the USD margin growth curve is outside the scope of a system denominated in BTC, we felt that it's worthwhile to mention that the trading system generates a **784x** compounded return on USD margin every six years.

The Path to 1,000x Bitcoin

The goal of the fund is to grow its starting balance of 1 BTC (ca. November 2020), to 1,000 BTC by 2025-2027, which happens to be the 1,000x target given herein. A compound interest calculator reveals that an average weekly gain of 3% will compound to 1,000 BTC in 4.5 years.

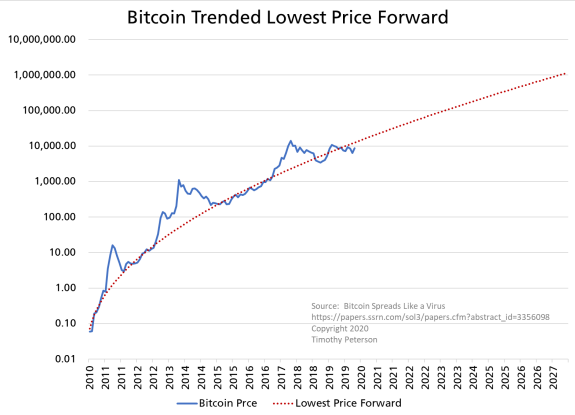
Compounding Over Volatility

As described in the beginning of this document, and proven to be viable in the backtest in the previous section, our negligible risk hedged trading system will compound gains continuously over long time spans.

It is worth noting that as the next 10 years progresses, the current four-year “boom and bust” halving cycle which leads to a bull-run after each halving may become less clearly defined as more and more liquidity pours into Bitcoin, with less volatility, which will further necessitate trading top altcoins, such as Ethereum, Cardano, etc. which follow standard network growth adoption rates as proven by Metcalfe’s Law.

Metcalfe’s Law and the Bitcoin Network

Metcalfe's law[12] states that the value of a network is proportional to the square of the number of connected users of the system (n^2). In essence, the more nodes that are connected to a network, the more valuable it becomes. Metcalfe’s law was first formulated in this form in 1993 and in regard to the internet. As Bitcoin functions in a blockchain node-based network, Metcalfe’s law applies, and in 2017, Timothy Peterson, an asset manager, published a paper[13] whereby he modeled the expansion of Bitcoin using Metcalfe’s law.



Peterson has been quoted suggesting that using his model, Bitcoin will likely reach $1M a coin by 2027[14]. His later paper titled “Bitcoin spreads like a virus[15]” concludes that an increasing number of users does have a positive effect on Bitcoin price which could hit $1 million 7 years from now. This can be seen from the “Trended Lowest Price Forward” which has been growing continuously as shown below.

Top altcoins that have been shown to follow Metcalfe’s law in growth / adoption rate include Ethereum, Cardano, and others. As the +× Fund is managed by professional traders, we are already trading these coins within the negligible risk system

[12] https://en.wikipedia.org/wiki/Metcalfe%27s_law
[13] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3078248
[14] https://zycrypto.com/asset-manager-timothy-peterson-reveals-why-bitcoin-is-likely-to-hit-1-million-by-2027/
[15] https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3356098

described herein, even though this document only references Bitcoin. Trading these other top altcoins also captures far more volume, liquidity, and profits across all the exchanges as compared to just trading Bitcoin alone.

As Raoul Pal[16], popular macro investor and former hedge fund manager, in various of his videos, notes that Ethereum is currently behaving like Bitcoin did in the previous 2013-2017 cycle. This is because it, like Bitcoin, is behaving according to Metcalfe's law. This is how we will choose which altcoins to use in our trading system.

Liquidation-Free Trading Examples

Initial testing of the trading system took place in January 2021 in a ByBit account funded with $22,742. This would equate our average weekly 2.7% goal to $614.

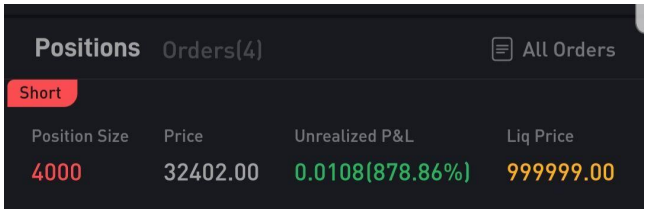


Figure 1: Shorting $4,000 worth of Bitcoin in a liquidation-free trade (shown in this old ByBit UI as a $999,999 liquidation price). The price of Bitcoin is down 8.78% to $32,402, earning 0.0108 BTC worth $350. Note: although this was using cross margin at 100x leverage, the trade size was 100x less than the margin, making the effective leverage 1x. This is why the 8.78% move in the market is shown as 878% in the UI.

As $350 is a 1.5% gain on the entire margin of $22,742, which took place within one day, this foreshadows the ease of being able to gain 2.7% within a week (the fund's ideal average weekly goal to generate 1000x returns over 5-7 years).

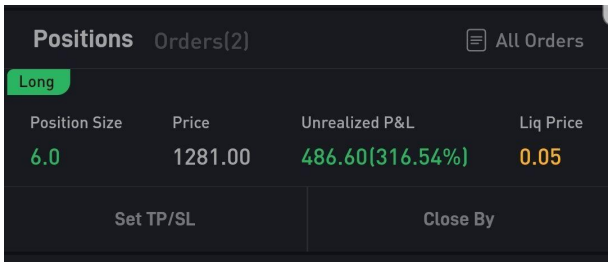


Figure 2: A long position of 6 ETH (USDT margin), in a liquidation-free trade (shown in this old ByBit UI as a liquidation price of 5 cents). The unrealized profit and loss is

[16] https://twitter.com/RaoulGMI

$486, or 2.13% of the entire margin. This was also achieved within a day, again foreshadowing the ease of reaching the 2.7% ideal average weekly goal.

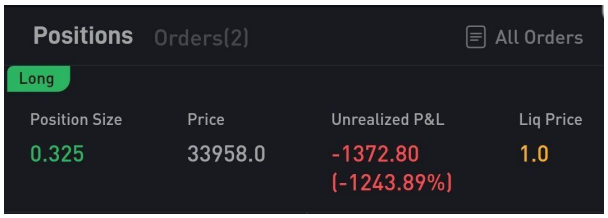


Figure 3: A long position of 0.325 BTC (USDT margin), in a liquidation-free trade (shown in the ByBit UI at that time as a value of one dollar). It was down $1,372 or 6%, but clearly this was later converted into a huge gain when the bitcoin price continued to skyrocket up. The above short position (figure 1) was in profit, and later this long position also flipped into profit. As long as the trades remain within the liquidation-free parameters, the system allows us to win on both sides, no matter how long they may take to play out.

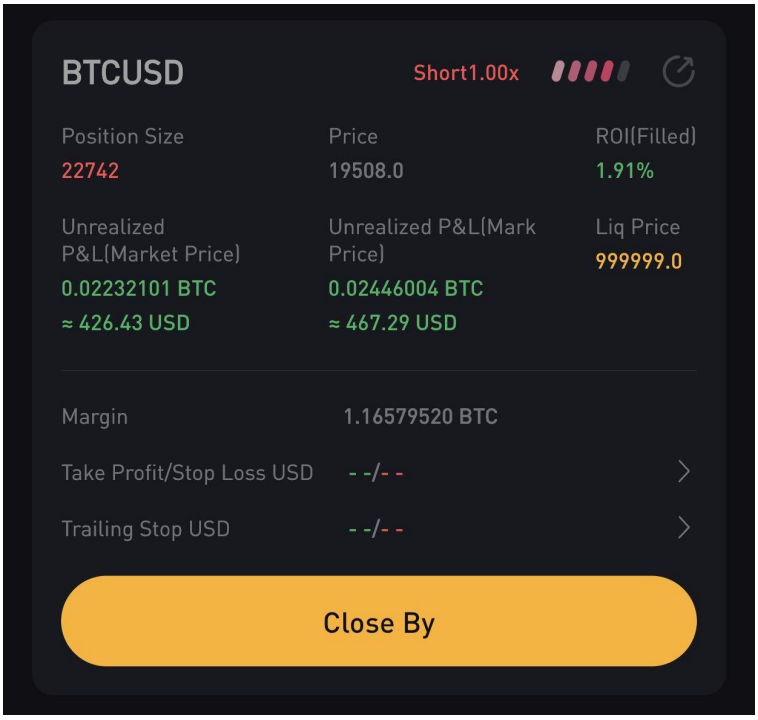


Figure 4: a position size of $22,742, over five times larger than the $4,000 position in figure 1, and the trade still remains liquidation-free (again, shown here as a $1 million value). Note that this is a pure 1x short as shown at the top of the image. That means that the effective leverage of the $4,000 position in figure 1 was only 0.176x. Such a small amount of leverage still resulted in 1.5% gain in one day, half the ideal weekly goal of the fund! This reveals that there is enough play within the system to allow us

to grow our position size by at least 5 times on a losing trade in order to massage it into an eventual break-even trade, and ultimately a winning trade.

The Necessity of Expert Trading Skills

How much leverage is the losing trade given in order to successfully flip to a winner? The answer to this question reveals the necessity of expert trading skills in order to fully realize the gains of this negligible risk trading system. As shown above, an effective leverage of only 0.15x is enough to gain 3% within a week of trading, liquidation-free. Even a traditional 1x leveraged position is still liquidation-free. A 2x leveraged position becomes low-risk.

Therefore, an expert trader, undeterred by emotions, and staying within the mathematical parameters required to remain liquidation-free over the long term, will operate within historical extremes to guarantee the transformation of the loser into a winner. Historical maximum declines for Bitcoin are at around 80%. A 0.15x leverage scaled up to 2x gives us about six different points in which to increase size with weighted amounts, at about every 13% the market moves against the losing position.

Instead of robotically acting at predetermined price movements, an expert trader can watch and wait for ideal conditions, use tools such as fibonacci retracements, key support and resistance levels, and identify large chart patterns on the daily and weekly charts, and maximize the performance of the fund by adding to the losing position at the most likely price points to result in reaching the break even point more quickly.

Why Trade Hedged?

What are the benefits of having a USDT margin balance and always running a losing trade along with a winning trade this way?

Why not trade the traditional way, where you trade naked (one direction only), and protect yourself with a stop loss?

There are two primary answers to this, and one is purely statistical, the other emotional. But both are of paramount importance in trading.

The Emotional Component

The mind matters in making money. In the psychological mechanics of trading, traders must understand fear, overcome greed, set rules, and remain flexible in moments of adversity.

Of all the skills involved in trading, emotional awareness and discipline reign supreme above all else. Regulating emotions, lateral thinking, and being disciplined are all components of what is trading psychology. In the face of snap decisions, the successful investor controls his greed and fear, giving him the discipline and objectivity to make the right decision that consistently generates positive results in his portfolio.

When a trader is perceiving bad news or a pullback, they naturally will experience fear. They may feel compelled to liquidate their position, or chase a pump, which could result in losses. Realizing that fear is only a natural reaction to a perceived threat, quantifying the fear helps traders to practice mindful actions in response. By stepping back, thinking ahead, and sticking to the plan, traders can move past the emotional response without suffering losses due to this emotional component.

There's an adage on Wall Street, that "pigs get slaughtered", as sometimes greedy traders hold onto winning positions for too long and experience the pullback, not having taken profits. Greed, as in instinct to gain, to perform better, to win, may lead traders to ruin. By having a solid plan and following their trading rules, traders can overcome greed by having clearly defined exit strategies. By conducting research and reviews and other background work such as macroeconomic analysis, this knowledge allows an expert trader to construct rigorous systems and rules that help ensure the holy grail of consistent gains in trading environments.

When you trade in one direction only you must be very disciplined with your stop losses. You may have a losing streak as well.

A more sinister reason are liquidity hunts, aka "scamwicks", in which the price will have a severe movement in one direction, sometimes for just a few moments, which will stop out thousands of traders (and liquidate many idiots as well), which requires you to set up a system of laddered stops to protect yourself while still avoiding the scam.

The two way hedged mode requires no stop losses. You essentially never lose. Whatever the price may do in one direction, you will be winning, while your other trade is losing. You could take profit on a scamwick and use the money to support your other losing trade. You become a long term winner.

With negligible risk trades that never liquidate, there is no stress. You can simply monitor the trades every day, and take profits or add more to the position at leisure. You can take three days off (not recommended) and still be sure your trades will be open and running when you return.

Given enough time, both sides will always become winning trades. This is a huge emotional boost, stress reliever, and a way to avoid ever being hunted for liquidity.

The Statistical Component

In Bitcoin, there are periodic huge moves. Even more so in altcoins. Given enough time, there will always be a giant move in price, and just holding a leveraged position for enough time will eventually win. Statistical is just sitting like a fisherman with a line just waiting for the fish to bite eventually which will happen.

Statistically there is no way to catch all of these moves nor anyway to predict them, if you're trading in one direction only. There is always an element of luck.

But with this system, you will catch every single huge move, because your trades stay open perpetually. And no matter how big the move is against your losing trade, you will never lose. If Bitcoin pumped from $8,000 to $80,000, you would be up thousands of percent on your long trade and be able to easily take partial profits on the way up.

Your losing short position would be negative thousands of percent as well, but it doesn't liquidate until a million dollars. It is irrelevant. What goes up must come down. An experienced trader working within this negligible risk system could continually keep adding to the losing position at key levels, until the price finally corrects. The time will come. It may take 3 months but the time will come. And the longer it takes, the bigger and bigger that losing short position would become until it eventually becomes a winning trade that earns much or more than the winning trades did on the shorter time frame.

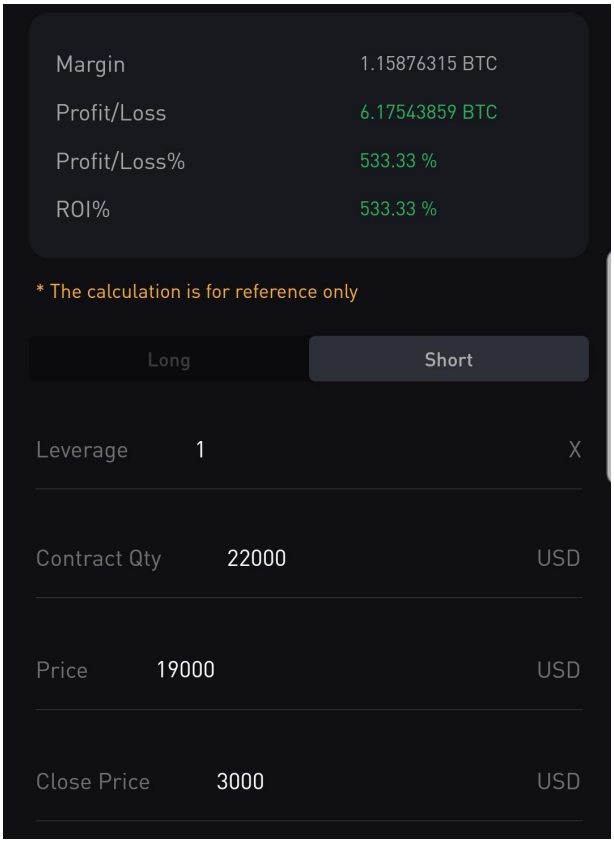
Therefore, over time, this system allows you to grab every single one of Bitcoin's unpredictable huge moves, as well as medium and small moves, in both directions.

You can only gain money and lose (spend) time.

And this, therefore, results in a system that generates a guaranteed consistent compound interest. The most powerful idea in wealth creation. The eighth wonder of the world.

The long position, with USDT margin (which didn't exist in 2018 but for testing we ignore this), would negative thousands and thousands of dollars, but the trade would remain open with a liquidation price of $1.

The short position would gain around 3 BTC. The screenshot below shows 6.175 BTC but this assumes the maximum risk allowed to remain negligible risk from the start of the trade, which is not realistic.



So we have a long position underwater by thousands of dollars, and a short position that gained about 3 BTC, or $9,000, at the lowest price of $3,000.

This represents an 84% drop from the top over 10 months which is historically in the range of the biggest swing possible in the market so any good trader would take total profits by this point and just go long on Bitcoin.

The profits from the short would allow more long positions to be bought, and as the price continued to move to key levels, more long positions could be bought, bringing the entry price ever closer to the current price.

The long position, which would liquidate only at $1, would never die.

At some point, around a $6,000 or so Bitcoin, the long position would have broken even, at which point it would have been sensible to convert most of the USDT margin into Bitcoin, as the price was still nearly 70% down from the top.

From there the long position would have won big going to $14,000, while the short position would continue losing more and more while staying negligible risk. By the time Bitcoin started falling from $14,000 full profit taking on the long position and conversion to majority USDT would be taking place. At which point the short position would end up being a huge winner for the next year while the long position would be used to take smaller profits during the worst of the bear market, during spikes in price.

Pooled Fund Management

The fund, its investors, investor deposits and withdrawals, growth, and all related data is managed within a shared Google spreadsheet. Newer investors can join the investment pool at any stage without their deposits being affected by historical fund performance. The percentage of ownership per each investor is calculated automatically.

The spreadsheet is actually quite sophisticated, and is able to calculate profit and loss for each individual investor even though all the money is pooled into one fund. This was accomplished by literally creating a plaintext blockchain of investor deposits embedded within the framework of the way the spreadsheet was constructed.

There are also other features such as a compound interest calculator, current running trades in the fund, total allocation of crypto assets across exchanges, and various other miscellaneous supporting information.

Trading Fees and Funding Fees

Short positions win free money in the bull run
ByBit Funding Fee History

Note that trading fees and funding fees are negligible when compared to the amount of profits that can be earned over long periods of time. Trading fees are extremely cheap and only significant to high frequency traders employing automated algorithms. Funding fees are paid directly to counterparties and are applied every 8 hours (more or less depending on the exchange). Since our trading system trades both long and short, we are effectively our own counterparty. If one trade is bleeding money every 8 hours, the other trade will be gaining the same. Over long stretches of time, the profits that can be earned over larger price movements also greatly eclipse the funding fees. Usually funding fees will have been paid by the winning trade and its profits would automatically be reduced by those fees, while the

losing trade on the other side will be gaining the funding fees (or at least paying close to 0% fees) during the time it has to wait for the market to reverse into its favor.

Therefore, the same way this trading system leverages time in order to extract profits, and effectively trades time for profits, it also leverages time to make funding fees and trading fees completely negligible, and in fact, the longer term losing trades in the system will earn funding fees which become realized in the future when the position reaches break-even — which actually becomes a secondary source of income for the fund!. — ByBit Funding Fee History

Tax Implications and Liabilities

- All deposits in & out are in crypto. No countries tax crypto movement.
- All gains are in crypto. You don't pay tax until you sell.
- Investor withdrawals are paid in crypto. Individual investors deal with their own taxes

Appendix A — Negligible Risk Types

This whitepaper deals with the elimination of the single greatest risk in leveraged trading: liquidations, which are caused by market risk.

Market risk

Market risk, or the risk of asset prices moving against you, is the factor that directly triggers liquidations, responsible for the vast majority of losses that market participants experience in the leveraged trading space. This risk is completely eliminated by the trading system outlined and proven in this whitepaper.

There are at least nine[17] other common types of risk which we categorize as negligible risk factors, because they would only cause significant losses in a black swan catastrophe, and otherwise have no meaningful day to day impact.

However, we have taken efforts to mitigate these risk factors to the maximum extent possible and we will detail these efforts here:

17 https://www.getsmarteraboutmoney.ca/invest/investing-basics/understanding-risk/types-of-investment-risk/

Key Negligible Risk Types

Concentration Risk / Counterparty Risk

This is by far our greatest risk factor outside of the primary market and liquidation risks. The fund utilizes an internal capital allocation strategy to ensure that the concentration risk is negligible.

We distribute our trading capital over the top five exchanges: Binance, FTX, ByBit, Huobi, and KuCoin, none of which have ever come close to going out of business or have ever lost any customer funds due to hacking. KuCoin did suffer a hack[18] in 2020 but recovered all customer funds in an amazing show of effort and support. If one of these exchanges were to lose our funds, we would suffer about a 20% loss to the entire fund, a small enough figure that would be recoverable over a few months of continued fund performance. In fact, a 20% loss is recovered with unrealized gains in 2 months at 3% interest per week, and later realized within any 6-12 month period based on historical volatility (See; backtest section).

More recently, we've also added decentralized insurance by Nexus Mutual[19] which covers exchanges being hacked or withdrawals becoming frozen, even further reducing this risk to negligibility.

If an exchange were to modify the rules of the perpetual futures contracts being traded, or even abruptly closed the positions, we wouldn't lose any value as the core value of the contract is tied to the original exchange rate of the contract quantity at the time of open, immutably rate-locked, resulting in us receiving the original market value at the time of the contract closure.

We do, however, recognize that exchanges could institute unforeseen or even unfair rule changes which could affect the mechanics of the liquidation engine, or otherwise negatively affect our positions. This risk is also mitigated by spreading our positions over multiple exchanges, each housed in separate environments and jurisdictions, and can be seen as equivalent to the risk of an exchange being hacked.

Capital Loss Risk / Emergency Life Risk

Although the fund manager maintains a full, high end business health policy under Sul America and life insurance policies by Mongeral and Icatu, we are mindful to categorize this as an applicable negligible risk factor while the fund is still small

---

18 https://cryptopotato.com/kucoin-ceo-reassures-they-recovered-all-285-million-stolen-in-last-years-hack/

19 https://nexusmutual.io

enough for this to matter. What happens if a severe medical trauma affects the fund manager that requires a large capital outlay to deal with? If hospital fees of $50,000 were required to get through a rough spot, that would represent about 16.6% of the fund as of January 2022. As the fund continues to grow, this risk factor will continue to shrink until it becomes inapplicable and can be moved to the section below. During the fund's earliest years, please consider this an existing risk factor if you are considering investing into the fund, however we are confident this risk is also small enough now to be negligible. Most likely any severe emergency event will be covered by the health and life insurance policies mentioned above.

Death of the Fund Manager

The fund has constructed an asset recovery program to reimburse all its investors in the event of the fund manager's death. Please consult the provided documentation for understanding this extreme case. For brevity here, the quick explanation is the use of a bank safety deposit box accessible by the fund's lawyer with a death certificate. This box contains an encrypted file that reveals a secondary lawyer's contact information. Both lawyers are able to combine passwords in order to decrypt the archive containing all authentication codes to access the crypto on the various exchanges. At that point, each investor can be reimbursed based on their reported holdings in the fund spreadsheet, after subtracting legal and administrative fees.

Legal Risk for Trading / Owning Crypto

There is an actual, yet negligible, risk associated with the legality of using leveraged perpetual trading products. These products are banned in the USA, for example. Carlos Augusto, the fund manager, has Brazilian citizenship, the right to Colombian citizenship, and avenues to gain Portuguese citizenship. Furthermore, there are various avenues available to gain citizenship in other countries, such as island nations, either for providing investment capital (which can be expensive) or through other means. Considering the fund manager's citizenship rights, the risk of losing the ability to legally trade the products outlined herein are negligible.

Inapplicable Risk Types

Liquidity Risk

Not applicable as crypto is pure liquidity. Crypto is analogous to cash, and since the fund is growing from a small pool of money over many years, we are floating in an ocean of liquidity. After 5 years, if the fund is successful, and is managing billions of dollars worth of crypto, there will be other risks associated with liquidity that will demand further analysis to implement a capital allocation strategy for each centralized exchange and decentralized liquidity pool we use. Quite a nice problem to find a solution for.

Credit Risk, Reinvestment Risk

Not applicable as we are not dealing with financial instruments that are affected by these risks.

Inflation Risk

Not applicable. Since the Coronavirus pandemic, and the subsequent execution of QE Infinity,[20] the increasing inflation of the US Dollar has become the primary narrative driving the success of crypto. We are investing into, and trading against, the best form of money humanity has ever seen, which solves the age old problems of fiat currency. It is safe to say that we are completely unexposed to inflation risk.

Horizon Risk

The fund has grown enough for Horizon risk to become negligible. Fund expenses, especially living costs for the fund manager, are about 0.6% per month of the total fund size as of January 2022.

Longevity Risk

Not applicable since we are assuming that the basic premises of the whitepaper will hold true and ongoing compound interest will be achieved. Longevity risk is only a factor if the fund is a total failure.

Business Risk

There are a variety of factors that can determine whether the fund succeeds as a business regardless of the performance of the trading system. These risks are represented as assumptions outlined below in Appendix B.

Appendix B — Assumptions

The following assumptions are accepted as givens by the fund investors, or at least accepted as having an extremely high probability of being true. These assumptions must all prove to be true for the premises given herein to result in the fund growing a thousandfold via compound interest in the coming years.

The assumptions are listed below in order of most to least important:

20 https://www.afr.com/markets/equity-markets/why-the-fed-went-nuclear-with-qe-infinity-20200324-p54d8x

Exchanges will not cease to exist or offer leveraged trading products

This assumption is the most important. The success of the fund relies on leveraged perpetual trading products to generate continuous compound interest. Both dollar margined and Bitcoin (crypto) margined markets must coexist in order for the trading system to function. Since 2016, when BitMEX launched the first leveraged perpetual Bitcoin futures, this space has only grown wildly. There is no indication that this trend will reverse. In fact decentralized exchanges, such as dYdX, are now being launched. Leveraged trading is a massive money maker for exchanges, and provides an ocean of liquidity and higher volatility to the crypto markets.

Today, these leveraged trading platforms remain one of the key factors driving the extreme volatility of the crypto markets, and they present an ocean of liquidity that will only widen and deepen. Open interest (OI) had already reached $16 billion in November 2021[21] mostly from the biggest unregulated centralized exchanges (CEX's) like Binance, ByBit, KuCoin, Huobi, and FTX, without any market participation from regulated jurisdictions such as the USA.

As of early 2022 the CFTC still prohibits leveraged trading in the US[22]. However, FTX, one of the world's top crypto exchanges, which has received an $8 billion valuation, is in the process of bringing regulated crypto-based derivatives to the US market[23].

Once these markets start to become accessible for US based traders and the rest of the prohibited world, OI will explode. The leveraged trading trend is continuing in our favor. These platforms will continue to be available for us to execute the trading system outlined herein and generate continuous compound interest over the next decade and beyond.

The fund manager will not violate the system

Investors must put their faith in the fund manager. The fund is open to failure if the manager gets greedy and, for example, puts too much risk on a single trade for whatever reason. The manager must remain disciplined over the coming years and only execute trades that fit within the mathematical parameters that allow the positions to remain liquidation-free with enough play to allow adding sufficient size to the losing positions even through moves as large as historical maximums.

Additionally, investors must assume that the manager would not embezzle the funds and disappear into a life of crime as a wanted fugitive. Any such scenario would forfeit the enormous rewards of continuous compound interest made

[21] https://cryptoquant.com/asset/btc/chart/derivatives/open-interest
[22] legalscoops.com/is-cryptocurrency-margin-trading-legal-according-to-commodity-futures-trading-commission-cftc
[23] https://cryptoslate.com/ftx-us-receives-8-billion-valuation-as-it-looks-to-bring-derivatives-to-the-u-s

possible by the trading system described herein, thus only an idiot would violate the system or steal from it. This alone should serve as self-evidence that this assumption will come true. The fund is additionally doing everything possible to be transparent and open, establishing a strong legal and contractual foundation for investors to feel confident in trusting the fund with their hard earned money.

Volatility will remain constant

So far in the history of Bitcoin and more so in major altcoin markets, there has always been constant volatility. The charts have never printed a flatline, giving extremely low volatility over long stretches of time. Conversely, there has never been price action disproportionately moving to only one side for long periods of time, except during bull runs which so far have only begun several months after each four-year Bitcoin halving event and return to normal volatility within several months. For the fund to succeed with the trading system defined herein, volatility must remain constant. This is the easiest assumption for us to believe is true, on par with assuming the sun will rise again tomorrow.

Bitcoin will not go to zero

By now, the narratives of Bitcoin being a “greater fool”, intrinsically worthless asset or ponzi scheme have all been thoroughly debunked and the world has begun to agree that Bitcoin is the greatest form of money ever invented in human history. Entire countries are beginning to declare Bitcoin as legal tender. The biggest institutional investors and banks are buying Bitcoin. More people are beginning to understand that the blockchain and distributed ledger technology secured by math and cryptography are an intrinsically valuable asset to humanity.

However, investors must still assume that some catastrophe like a quantum computer being able to hack the blockchain decades before anyone thought possible, an electromagnetic pulse that fries all electronics worldwide, or a mass extinction event could occur. Most catastrophic scenarios that would destroy Bitcoin would also destroy human civilization as we know it. However, this assumption is still worth listing here to keep ourselves thinking critically.

Crypto will grow to $100T market cap over the next 10 years

This assumption is the least important because it is required only to enable the double compounding opportunity. Even if double compounding could never be achieved, i.e. the price of Bitcoin ranged between $40k to $50k for the rest of time, the fund could still grow a thousandfold via regular compound interest over many years.

The assumption is that the world continues to recognize Bitcoin as factually the best form of money ever known and share the common expectation that Bitcoin will become the world's reserve currency and inflation hedge, and therefore grow to a $100 trillion market cap by 2030. This equates to an expected price of $500,000 per Bitcoin by 2024-25 and $1 million by 2027-28.

1,000 Bitcoin at $1M will be worth $1 billion. As a pooled fund, an investor who owns 1% of the fund at that point would own 10 BTC, worth $10 million.

As the fund pays returns only in BTC, and gladly loses value against USD short term while increasing its Bitcoin count during market crashes, we welcome investors who only care about gains in the BTC balance regardless of its falling USD value in the short term, especially during large market crashes.

Appendix C — Denominating Wealth in Bitcoin

The +× Fund is one of the first entities in the world to denominate all its wealth and its balance sheet in the terms of Bitcoin and not USD.

Forward thinking: USD is inflating at 7% per year. The world's reserve currency will be Bitcoin. The dollar is dead. Fiat currency is dead. These are tenets that we believe in.

We already envision a not-so-distant future where almost everyone denominates all their wealth in Bitcoin. We are proud pioneers in this movement.

Appendix D — Comparisons, Analogies, etc.

On Perpetual Motion

Because the open leveraged futures trades run perpetually, this trading system has been previously compared to a perpetual motion machine in that the continuous compounding of profits can be likened to a violation of the second law of thermodynamics; that profits generated this way must always be less than the sum of the total initial capital invested into it, not to mention the associated trading fees and funding fees on the exchange.

This analogy is false. Although the analogy is easy to conceptualize, we can apply a more appropriate analogy for this system. The markets are like the sun, and the ongoing profits we extract are like solar energy, which is made possible by our trading system, which can be likened to solar panels. Solar energy is not limitless, but for all intents and purposes, just as the sun will shine for billions of years, the markets,

over the passing of time, provide more than enough volume and liquidity from which more profits can be extracted than the initial capital put in.

We can also employ expert technical analysis and trading skills to reach profitability on both sides of the trades more efficiently, which can be likened to improving the technology of the solar panels. With more efficient solar panels, more energy can be extracted from sunlight in less time.

Appendix E — Inverse Perpetual Futures Contracts

Crypto-based Inverse Perpetual Futures

Inverse perpetual futures contracts use cryptocurrency (BTC, ETH, etc) as the base currency. Traders must confirm the traded quantity in terms of the quoted currency (USD) and then use their base currency (BTC, ETH, etc) to calculate the margin, profit, and loss.

Since the base currency is the cryptocurrency, the value of the inverse perpetual contract is rate-locked (at 1x leverage) to the original spot price against the quoted USD trade amount at the time of open. With a traditional futures contract, there's an expiration date and a certain exchange of assets determined at the expiry of the contract. Inversely, with the cryptocurrency based inverse perpetual futures contracts, the contracts remain open indefinitely and the value of the exchange of assets is determined by the exchange value at the opening of the contract, meaning that the contracts can increase or decrease the base asset quantity over time.

Furthermore, in the case of inverse perpetual futures contracts, the base asset is the margin, which the trader must have actually deposited into their account, which is why the positions opened against the margin can be perpetual without technically being considered a loan.

Example 1;
Using a BTCUSD contract as an example, if a trader decides to buy 10,000 contracts of this BTCUSD contract when BTC is at $8,000 spot price, what the trader is actually doing is that he is selling $10,000 USD and is then purchasing an equivalent value of BTC at that time ($10,000/$8,000), which is 1.25 BTC.

Supposing the trader then decides to close all the contracts when BTC is at a spot price of $12,500, what actually happens is that the trading is buying back the 10,000 USD worth of contracts by selling the equivalent value of BTC ($10,000/$12,500), which is 0.8 BTC.

Example 2;
Let's say that a trader decides to open a perpetual short against BTC using his USD balance. The trade commences on January 24th with a BTC spot price of $35,000:

Open Perpetual Short Against BTC	Exchange Account Balance
T+0, Jan 24 is BTC @ 35k **(BTC 1.43)**	Account balance of USD of $50,000
T+1, Jan 25 is BTC @ 30k **(1.66 BTC)**	Account balance of USD of $50,000
T+3, Jan 26 is BTC @ 20k **(2.5 BTC)**	Account balance of USD of $50,000

On day three, the trader decides to close his short, earning BTC as profit while maintaining his original USD account balance. The value of his account margin remains the same, but the base currency asset (BTC in this case) has increased in quantity. This is the fundamental mechanic behind inverse perpetual futures contracts.

Liquidation Engine

The mechanics that operate under the hood and drive inverse perpetual futures contracts are universally equivalent and largely indistinguishable between the various exchanges such as ByBit, FTX, Huobi, etc. The formulas and algorithms that make up the liquidation engines are interoperable across all exchanges.

Liquidation Mechanics

There are two primary modes of leverage; isolated margin mode and cross margin mode[24]. Under isolated margin, a specific amount of margin, i.e. initial margin, is applied to a position, and position margin[25] can be adjusted manually. In the event of a liquidation, a trader may lose the initial margin and extra margin added to the position. Under cross margin, all available balance of the corresponding margin account will be deployed to meet maintenance margin requirements and prevent liquidation. All corresponding available balance can be lost in the event of a liquidation.

For the purposes of this paper and the liquidation-free trading system, we'll only address cross-margin mode which essentially automates repeated isolated margin entries.

Initial Margin[26]

[24] https://help.bybit.com/hc/en-us/articles/360039749733-What-is-Isolated-Margin-Cross-Margin-
[25] https://help.bybit.com/hc/en-us/articles/4409547735705-What-is-Position-Margin-
[26] https://help.bybit.com/hc/en-us/articles/360039261174-Initial-Margin-Inverse-Contract-

Simply put, initial margin is the amount of collateral required to open a position for leveraged trading. In regards to dynamic margin, we must know our initial margin rate, which we may find in the exchange's "risk limit table"[27], which will outline the initial margin rates and the maximum leverage which may be used. This rate depends on the leverage used to open the position.

$$InitialMargin = \frac{Quantity of Contracts}{Order Price \; x \; Leverage}$$

Example: A trader opens a position of 9,000 BTCUSD contracts at the order price of $32,500 with 50x leverage.

$$InitialMargin = \frac{9000}{32500 \; x \; 50}$$

$$InitialMargin = 0.00553846 \; BTC$$

Maintenance Margin[28]

Maintenance margin is the minimum margin required to hold a position open. The amount will increase or decrease according to the trader's chosen risk limit level. Liquidation occurs when the margin for the position is less than its maintenance margin level. The maintenance margin rate will typically vary between exchanges. However, 0.5% to 1.0% are typical maintenance margin rates that will be used. It should be noted that in practice, whether using isolated margin or cross margin, the maintenance margin calculations are the same.

$$OrderValue = Quantity of Contracts \; x \; EntryPrice$$

$$MaintenanceMargin = MaintenanceMarginRate \; x \; OrderValue$$

The Maintenance Margin Rate (MMR) required for a position is based on the selected margin level requirements determined by its position value.

Example: A trader places a long position of 1 BTC at USDT $10,000 with 25x leverage. First we must calculate the initial margin, and then the maintenance margin.

$$InitialMargin = 1 \; x \; 10000 \; x \; \frac{1}{25} = 400 \; USDT$$

$$MaintenanceMargin = 1 \; x \; 10000 \; x \; 0.005 (0.5\%) = 50 \; USDT$$

---

27 https://help.bybit.com/hc/en-us/articles/360039749753-What-is-Risk-Limit-What-effect-does-the-Risk-Limit-have-on-Margin-Inverse-Contract-

28 https://help.bybit.com/hc/en-us/articles/900000182646-Maintenance-Margin-USDT-Contract-

This means the position could take an unrealized loss of up to 350 USDT ($400\ USDT\ -\ 50\ USDT\ =\ 350\ USDT$) before liquidation takes place.

Bankruptcy Price[29]

Bankruptcy price is the price level that indicates when a trader has lost all of their initial margin. The bankruptcy price is also used to calculate the fee to close a position, reflected in the order cost of the trade. Upon a liquidation action, the position will be closed at the bankruptcy price, meaning that all initial margin has been lost. If the position has its final liquidation price better than the bankruptcy price, the excess margin will be contributed to the exchange's insurance fund[30]. Vice versa, if the liquidated position has its final liquidation price worse than the bankruptcy price, the insurance fund will cover the loss gap.

Calculating Bankruptcy Price Under Cross Margin Leverage Mode

Long Position

$$BankruptcyPrice\ =\ \frac{1.00075\ x\ Quantity}{OrderValue\ +\ (AccountBalance\ -\ OrderMargin\ -\ OpeningFee^{*})}$$

$$Where;\ OrderValue\ =\ \frac{QuantityofContracts}{SpotPriceatEntry}$$

Short Position

$$BankruptcyPrice\ =\ \frac{0.99925\ x\ Quantity}{OrderValue\ -\ (AccountBalance\ -\ OrderMargin\ -\ OpeningFee^{*})}$$

$$Where;\ OrderValue\ =\ \frac{QuantityofContracts}{SpotPriceatEntry}$$

**Note: The OpeningFee is only applicable if opening a new order where the fee to open hasn't been realized.*
***Note: For a long position, the bankruptcy price will be rounded to the nearest 0.5 decimal place or integer while for a short position the bankruptcy price will be rounded down to the nearest 0.5 decimal place or integer.*

Calculating Perpetual Positions Under Cross Margin Leverage Mode[31]

Long Position

$$Quantity\ x\ (\frac{1}{AverageEntryPrice}\ -\ \frac{1}{LiquidationPrice})\ =-\ (AccountBalance\ -\ OrderMargin^{*}\ \ -\ \ldots$$

$$\ldots\ \frac{Quantity}{AverageEntryPrice}\ x\ MaintenanceMargin\ -\ \frac{Quantity\ x\ 0.00075}{BankruptcyPrice})$$

[29] https://help.bybit.com/hc/en-us/articles/360039749813-What-is-Bankruptcy-Price-Inverse-Contract-
[30] https://help.bybit.com/hc/en-us/articles/900000037786-What-is-insurance-fund-
[31] https://help.bybit.com/hc/en-us/articles/360039261334-How-to-calculate-Liquidation-Price-Inverse-Contract-

Short Position

$$Quantity\ x\ (\frac{1}{LiquidationPrice} - \frac{1}{AverageEntryPrice}) =- (AccountBalance - OrderMargin^* - \ldots$$
$$\ldots \frac{Quantity}{AverageEntryPrice}\ x\ MaintenanceMargin - \frac{Quantity\ x\ 0.00075}{BankruptcyPrice})$$

**Note: OrderMargin consists of the sum of all margins for active orders that are pending for execution.*

Example: A trader has an account balance of 3 BTC and buys a long of 10,000 contracts at the spot price of $25,000 using cross margin leverage, assuming the trader has no other active orders. As a result of not having any other active orders, OrderMargin is 0. (First, we must calculate and know the BankruptcyPrice and then we must know the MaintenanceMargin[32], which is 0.5% in this case, which is common of BTC positions)

$$BankruptcyPrice = \frac{1.00075\ x\ 10000}{\frac{10000}{25000} + (3.0 - 0)}$$

**Note: "0" being the OpeningFee*

$$BankruptcyPrice = 2943.38$$

$$10000\ x\ (\frac{1}{25000} - \frac{1}{LiquidationPrice}) =- (3.0 - 0 - \frac{10000}{25000}\ x\ 0.005 - \frac{10000\ x\ 0.00075}{2943.38})$$

**Note: We must solve for LiquidationPrice*

$$LiquidationPrice = 2945.11^*$$

**Note: For a long position, the bankruptcy price will be rounded to the nearest 0.5 decimal place or integer while for a short position the bankruptcy price will be rounded down to the nearest 0.5 decimal place or integer.*

Appendix F — Synthetic Assets Anatomy: Diving Deeper

Synthetic USD

Synthetic USD is an inverted perpetual futures short contract that has been opened against the USD using BTC as the margin, meaning that if the value of BTC is rising, the BTC margin balance is decreasing, yet the USD equivalent value (which may be defined as BTC's purchasing power of USD) remains the same, as the USD is the currency used to quote the contract. A trade opened with a USD value of $40,000 will maintain a USD value of $40,000.

Here are two examples, each giving us an expected output that allows us to take a look at what's going on underneath the hood and know what's required for us to build our formula by identifying each component.

32

https://help.bybit.com/hc/en-us/articles/360039749753-What-is-Risk-Limit-What-effect-does-the-Risk-Limit-have-on-Margin-Inverse-Contract-

Expected Output of a Synthetic USD Formula

Example 1

```
BTC margin starting balance is 1 BTC
A BTC short is opened, using the entire 1 BTC margin, at 1x leverage
BTC moved from $40k — up 20% to $48k, margin value multiplier of 0.83333
Trade pnl = -0.16667 BTC
Current trade value = 0.83333 BTC @ 48k = $40k USD balance
```

Example 2

```
BTC margin starting balance is 2.5 BTC
A BTC short is opened, using the entire 2.5 BTC margin, at 1x leverage
BTC moved from $34k — up 88.24% to $64k, margin value multiplier of 0.53125
Trade pnl = -1.171875 BTC
Current trade value = 1.328125 BTC @ 64k = $85k USD balance
```

In both examples above, each short position was opened with a BTC margin that was quoted at a specific USD value at the time of opening the position. As the value of BTC continues to climb, the BTC margin value reduces in each example, yet the USD value of each trade continues to remain rate-locked to the USD value at the time of opening the trade.

Unpacking the Formula of Synthetic USD

After analyzing the expected outputs, we have identified two individual components that together form our complete Synthetic USD formula. (Note: To avoid redundancy, we are not unpacking Synthetic Bitcoin in this section.)

The first component is a profit and loss (pnl) calculation, that allows us to know exactly our profit and loss at the moment of calculation, whether realized or unrealized, and the second component allows us to take our pnl output and generate the margin position value of the trade denominated in USD which is the same as Synthetic USD as Synthetic USD is equal to the margin position of the trade. Our formula is significant in that we're able to begin with a margin in BTC and know our position value in USD, which is what Synthetic USD is; an inverted margin position valuation, inverted from BTC into USD.

Where:

xUSD = Synthetic USD ₿ = Trade size in Bitcoin **Δ** = Leverage multiplier (1x is default) **λ** = Standard leverage / gearing formula	**S** = Opening spot price **V** = Value, or current spot price $\mathbf{M_{BTC}}$ = Margin position in BTC **D** = Direction: long = -1; short = 1

Component 1 — Calculating for pnl

Step 1.1
Take the standard leverage / gearing formula in options trading[33] which is:

$$\lambda = \Delta \frac{S}{V}$$

And calculate the leveraged position value at the time of open. This is ₿, the Bitcoin trade size, multiplied by **λ** (lambda). This results in the initial margin.

$$Initial\ margin = ₿\lambda$$

Step 1.2
Subtract the $Current\ BTC\ margin\ value$ from the original BTC margin trade size, properly accounting for the trade leverage, resulting in the difference in margin from opening to close/current, which is the difference of initial margin and position margin (margin at the time of measurement).

The pnl (profit and loss) is the difference of initial margin and position margin:

$$pnl = ₿\Delta - ₿\lambda$$

Step 1.3
Define whether the trade is a long or a short by applying the direction modifier D to the margin difference, resulting in the position profit and loss. However, since Synthetic USD *must be* a short position, then D = 1 and can be removed.

Component 2 — Calculating for Synthetic USD; margin position

Step 2.1
Adding the pnl (profit and loss) of the position to ₿, the Bitcoin trade, outputs the margin position denominated in BTC.

$$M_{BTC} = ₿ + pnl$$

Step 2.2
Finally, multiplying M_{BTC} by V outputs the margin position denominated in USD, which is Synthetic USD (xUSD).

[33] https://en.wikipedia.org/wiki/Greeks_(finance)#Lambda

$$xUSD = V \times M_{BTC}$$

Which is:

$$xUSD = V(฿ + pnl)$$

Which is:

$$xUSD = V(฿ + (฿\Delta - ฿\lambda))$$

Combining the Components

Combining the pnl component and the $xUSD$ component together into a single formulation;

$$xUSD = V(฿ + (฿\Delta - ฿\lambda))$$

**Note: Depending on where this formula is utilized (formula context), the result of this formula may be denoted as Synthetic USD or as margin position.*

***Note: The broken down equation is* $xUSD = Sp(T + (D((\Delta T) - (\Delta T)\frac{Op}{Sp})))$

In Conclusion

Now that we understand how each component of the Synthetic USD formula functions, we now have one side figured out that will be used in calculating the final hedged aggregate position margin value (HAP[Mp]) and hedged aggregate position virtual profit and loss (HAP[vPnl]).

Running the Examples; Using the Synthetic USD components

Component 1: $pnl = D((\Delta T) - (\Delta T)\frac{Op}{Sp}))$

Example 1 *Solve for pnl*	**Example 2** *Solve for pnl*
Linearized formula: $D((\Delta * T) - (\Delta * T)(Op/Sp))$	*Linearized formula:* $D((\Delta * T) - (\Delta * T)(Op/Sp))$
(-1)((1 * 1) - (1 * 1)(40000/48000)) (-1)((1 * 1) - ((1 * 1) * 0.83333)) (-1)((1 * 1) - (1 * 0.83333)) (-1)((1 * 1) - 0.83333) (-1)(1 - 0.83333) (-1)(0.16667) **-0.16667 = pnl**	(-1)((1 * 2.5) - (1 * 2.5)(34000/64000)) (-1)((1 * 2.5) - ((1 * 2.5) * 0.53125)) (-1)((1 * 2.5) - (2.5 * 0.53125)) (-1)((1 * 2.5) - 1.328125) (-1)(2.5 - 1.328125) (-1)(1.171875) **-1.171875 = pnl**

**Note: As a syntheticUSD trade is always a short, we will substitute (-1) for D, direction of trade, in the final step.* syntheticUSD(pnl) formula: Wolfram Link	**Note: As a syntheticUSD trade is always a short, we will substitute (-1) for D, direction of trade, in the final step.* syntheticUSD(pnl) formula: Wolfram Link

Component 2: $synthUSD = Sp((\Delta T) + (pnl))$

Example 1	**Example 2**
Solve for synthUSD *Linearized formula:* $Sp((\Delta * T) + (pnl))$ (48000 * ((1 * 1) + (-0.16667))) (48000 * (1 + (-0.16667))) (48000 * 0.83333) **40000 = synthUSD**	*Solve for synthUSD* *Linearized formula:* $Sp((\Delta * T) + (pnl))$ (64000 * ((1 * 2.5) + (-1.171875))) (64000 * (2.5 + (-1.171875))) (64000 * 1.328125) **85000 = synthUSD**

These examples demonstrate that the final solution, whether the price of BTC has risen or not, the margin (account balance) has remained the same when denominated in USD. This means that no matter how high Bitcoin has moved, we still maintain the same USD purchasing power against BTC (the value of our original margin starting balance).

Synthetic BTC (WIP)

To prove our Synthetic Bitcoin concept, we've created a formula that demonstrates the existence of Synthetic Bitcoin. In essence, Synthetic Bitcoin is a perpetual futures long position that has been opened against BTC using USD as the margin, meaning that if the value of BTC is falling, the USD margin balance will decrease, yet the purchasing power of BTC will remain the same.

Here are two examples, each giving us an expected output that allows us to take a look at what's going on underneath the hood and know what's required for us to build our formula by identifying each component.

Expected Output of a Synthetic Bitcoin Formula

Example 1

```
USD margin starting balance is $40k USD
A USD long is opened, using the $40k margin, at 1x leverage (purchasing
power of 1 BTC)
BTC moved from $48k — down -16.66% to $40k, margin multiplier of 1.2
```

```
Trade pnl = -$8,000 USD or -0.83333 BTC
Current trade value = $40,000 USD, equivalent to purchasing power of 1 BTC

Example 2
USD margin starting balance is $160k USD
A USD long is opened, using the $160k margin, at 1x leverage (purchasing
power of 2.5 BTC)
BTC moved from $64k — down 46.875% to $34k, margin multiplier of 1.88235
Trade pnl = -$75,000 USD or -1.17187 BTC
Current trade value = $85,000 USD, equivalent to purchasing power of 2.5 BTC
```

In both examples above, each long position was opened with a USD margin that held a specific BTC value at the time of opening the position. As the value of BTC continues to fall, the USD margin value reduces in each example, yet the BTC purchasing power value of each trade continues to remain the same as the purchasing power value of BTC at the time of opening the trade.

Understanding the Components of Synthetic Bitcoin

After analyzing the expected outputs, we have identified two individual components that together form our complete Synthetic Bitcoin formula. The first component is a profit and loss (pnl) calculation, that allows us to know exactly our profit and loss at the moment of calculation, whether realized or unrealized, and the second component allows us to take our pnl output and generate the margin position value of the trade denominated in Synthetic Bitcoin which is equal to the margin position of the trade.

With a traditional Synthetic Bitcoin formula (also known as an uninverted Synthetic Bitcoin formula), the opening price and the spot price of the position is readily known in USD denomination. These readily known values are the foundational Op and Sp subcomponents from our Synthetic USD formulation, which of course are denominated in USD.

Appendix G — Additional Resources

Comparing Perpetual Futures Markets[34] — dYdX Exchange
A wealth of supporting data about the origin of perpetual futures, transaction volume in exchanges, and more.

Drift Protocol on Twitter[35]

[34] https://integral.dydx.exchange/comparing-perpetual-markets
[35] https://twitter.com/DriftProtocol/status/1405229839703961601

Further data on the discrepancies between percentage gains between linear and inverse perpetuals

List of decentralized perpetual futures platforms[36]
Foreshadowing the future as the volume within perpetual futures trading will only grow immensely greater over time.

[36] https://docs.google.com/document/d/1wVUo4Roe7HqeYUNXt7bpTiXBRMwzEKiDMovPczRakOY