

Research Report

Is There a Best Time and Day to DCA Bitcoin?



Introduction

Recurring orders, often referred to as dollar-cost averaging, are a way to spread out an investment amount over time. This decreases exposure to price volatility and reduces time spent trying to time the market. It's a way to passively invest in bitcoin in the long term.

River recently started offering [zero-fee hourly recurring orders](#), in addition to the zero-fee daily, weekly, and monthly options we have had for a while.

This feature has led to two categories of questions:

1. How can we offer a zero-fee product? Is there a hidden cost in the price spread? You can read the [explanation on our blog](#), but TL;DR, there are no hidden fees.
2. Is there a best time of the day or best day of the week to DCA bitcoin? Which frequency is the best?

Based on our research, we found that:

1. Historically, the daily high price happened within a 4-hour window 38.5% of the time, and the daily low price happened within that same 4-hour window 39.4% of the time. This pattern has shifted over time and the window has shrunk.
2. From **12-1 PM Eastern time**, there is a one-hour window with over 3 times as many price bottoms than peaks in the past twelve months. This hour has a 4.37% theoretical advantage for **daily recurring orders** relative to any day's average.
3. **Mondays** have historically had the highest odds of having the weekly low price relative to the weekly high price falling on this day. This day has a 14.36% theoretical advantage for **weekly recurring orders** relative to any week's average.
4. **The first and second days of each month** have historically had the highest odds of having the lowest price relative to the monthly high price happening on those days. A **monthly recurring order** on these days gives a 6.83% and 3.73% theoretical advantage relative to any month's average, while on the last three days of the month, you have a 3.11%, 6.83%, and 6.21% higher chance to buy a monthly high than a monthly low.

You would think these findings are common knowledge among Bitcoin traders and investors, right?

We asked around, and apparently, many of them don't know.

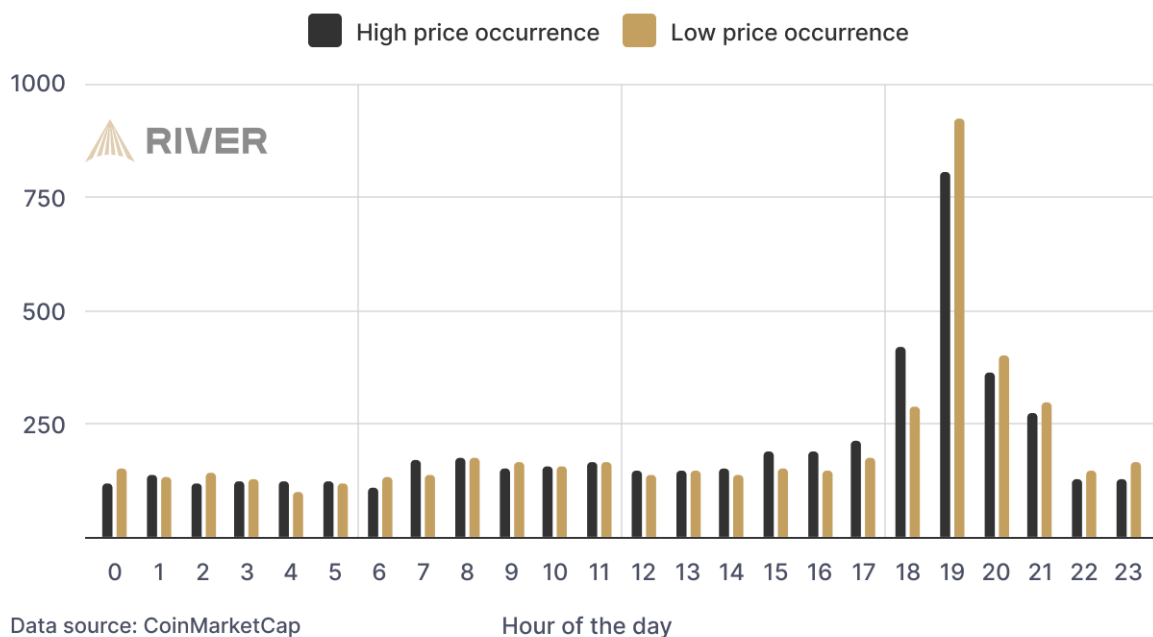
In this report, we will dive into each of these findings.

1. Daily Highs and Lows in Bitcoin Price

We looked at bitcoin's price since it first got one back in 2010. Each day, it has a highest and lowest point, the values and timing of which were recorded by CoinMarketCap and publicly made available in [their dataset](#). The timing is only visible upon downloading.

We mapped out daily highs and lows by hour for 4860 days, and came across a clear pattern: the daily high price happened within a 4-hour window 38.5% of the time, and the daily low price happened within that same 4-hour window 39.4% of the time.

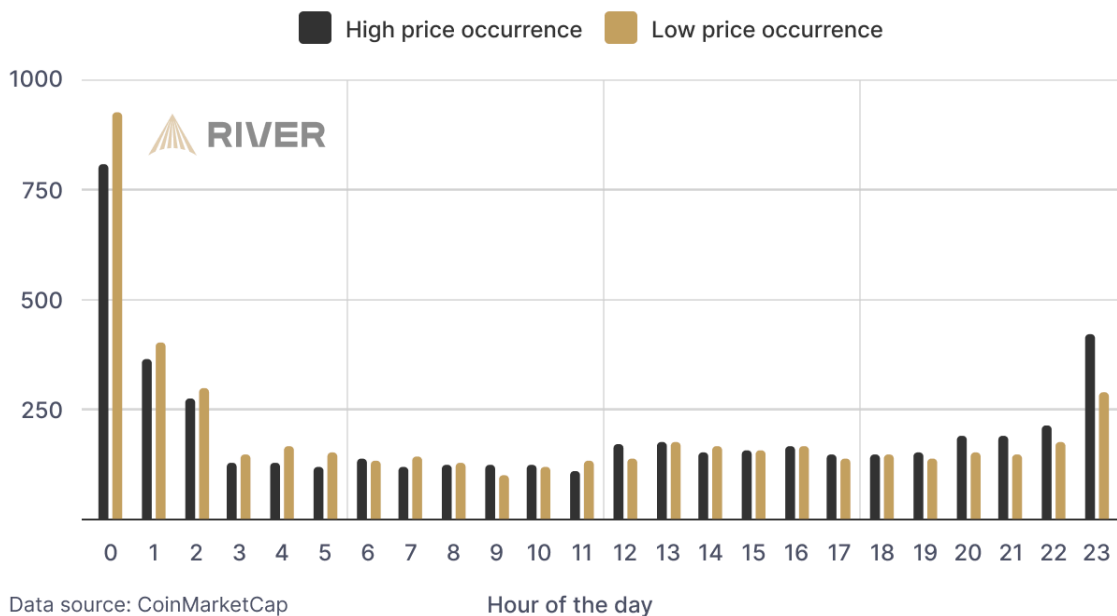
High & Low Bitcoin Price Occurrences by Hour Since 2010 (UTC-5)



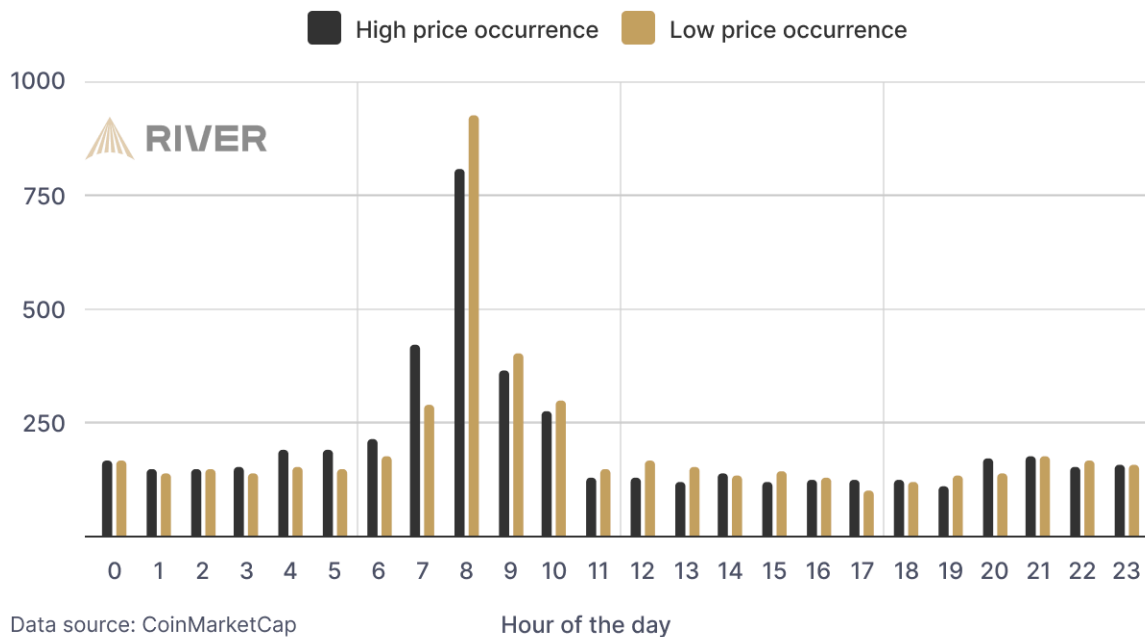
The first question that comes to mind is: why these specific hours?

Part of the answer is revealed when converting the timezone on the graph above to European and Asian timezones: This is when the highest number of traders can be awake.

High & Low Bitcoin Price Occurrences by Hour Since 2010 (UTC)



High & Low Bitcoin Price Occurrences by Hour Since 2010 (UTC+8)

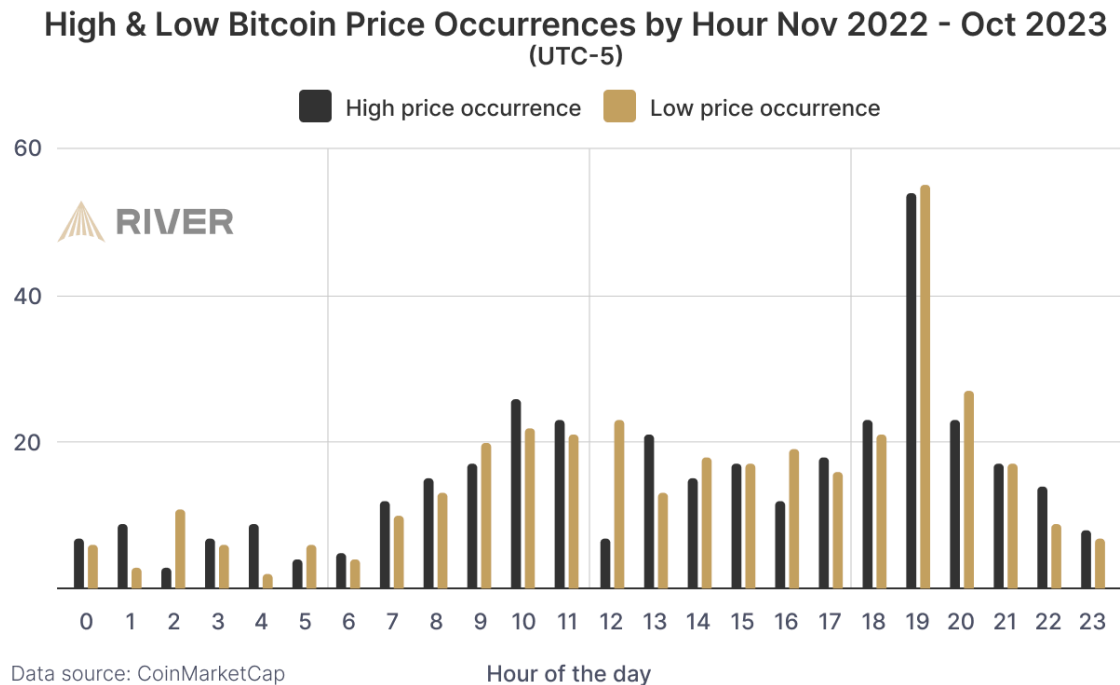


For the US, the highest odds of the daily high and low price are in the early evening. For the EU around midnight, and for a large part of Asia, in the early morning.

Besides this 4-hour window, the distribution of daily highs and lows is remarkably flat.

2. The Best Time to Daily DCA Bitcoin

The analysis above was done over the past 13 years, but do these findings still hold up in recent history? We had a look at the past 12 months, from November 2022 to October 2023, and found three changes in the pattern.



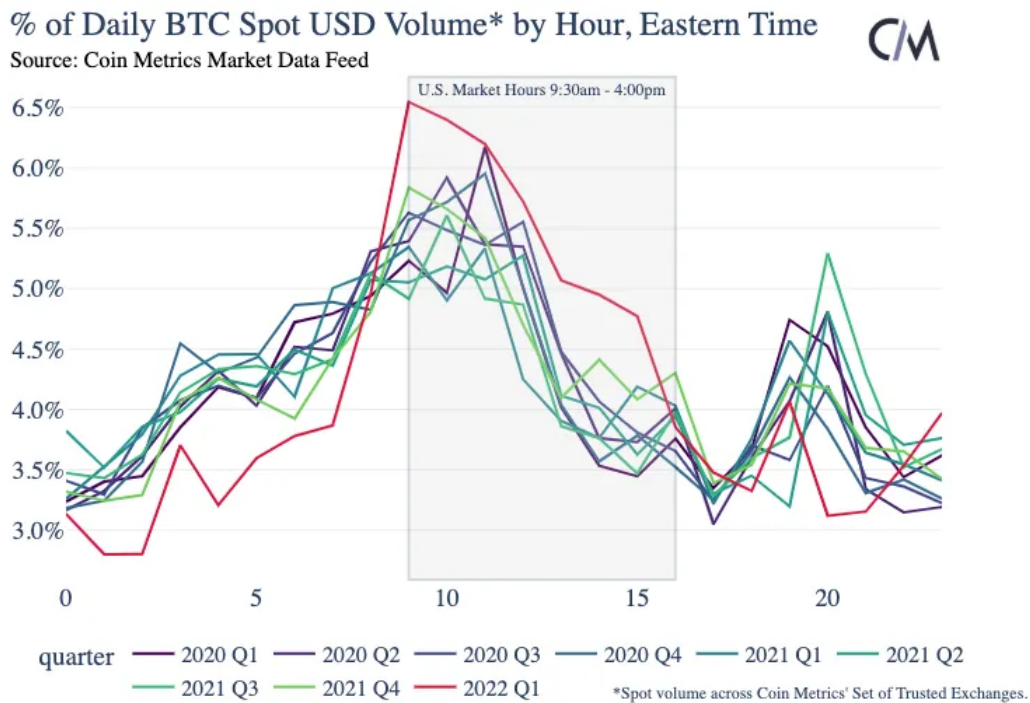
1. There is now an 8-hour window with significantly fewer high- and low price points.
2. Instead of a 4-hour window of clear outliers, there is now only one hour that stands out, which accounts for 14.75% of high price points and 15.03% of low price points. This is still statistically significant for traders and investors.
3. **12-1 PM Eastern time** is a clear outlier with significantly more low price points than high price points. This translates to 5 PM London time, and 1 AM Hong Kong time.

This makes it an appealing time for **daily recurring orders** to be executed, as there is a 6.28% chance of buying the daily low price, versus a 1.91% chance of buying the daily high price, the biggest gap on average across the year. This pattern may not hold up in the long term and should be tested from time to time, but it could help to stack a few more sats over time. Note that on River, daily recurring orders execute at the time they were first set up.

The question remains: why is the 4-hour window pattern changing? We found some context when looking at price volatility by hour.

2.1 Bitcoin Volume by Hour of the Day

In 2022, Coin Metrics published data on the share of volume traded per hour throughout the day. This provides an overview of when most money is being traded, which is not always the same as when the most price fluctuation is happening or the most profit can be made.



Source: [Coin Metrics](#)

There is a clear trend of US mornings having the most volume on average. [The dataset Coin Metrics used](#) is international, so it was not skewed based on data from specific exchanges.

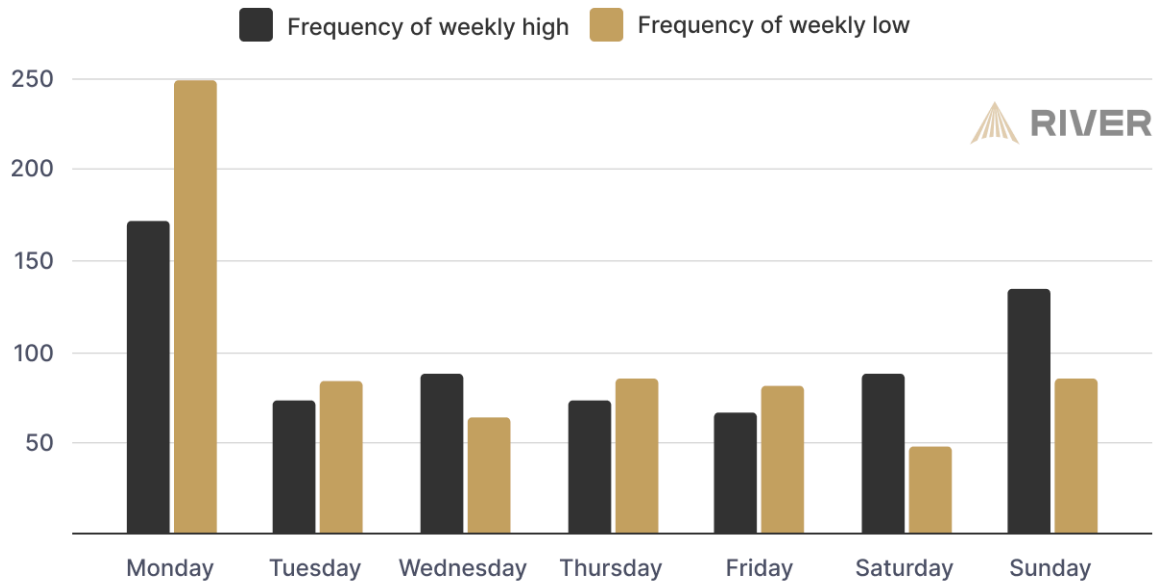
Mornings did not only have the most volume, but they did so at an increasing rate every quarter, while the volume in the evening dropped rather significantly.

The evening hours historically represented the 4-hour window we raised earlier. It could be that volumes were reduced because the peaks were occurring less often, or that volumes shifting to US daytime lead to fewer peaks in the evening.

3. The Best Day to Weekly DCA Bitcoin

Similar to the best time of the day for DCA, we also found a weekly pattern.

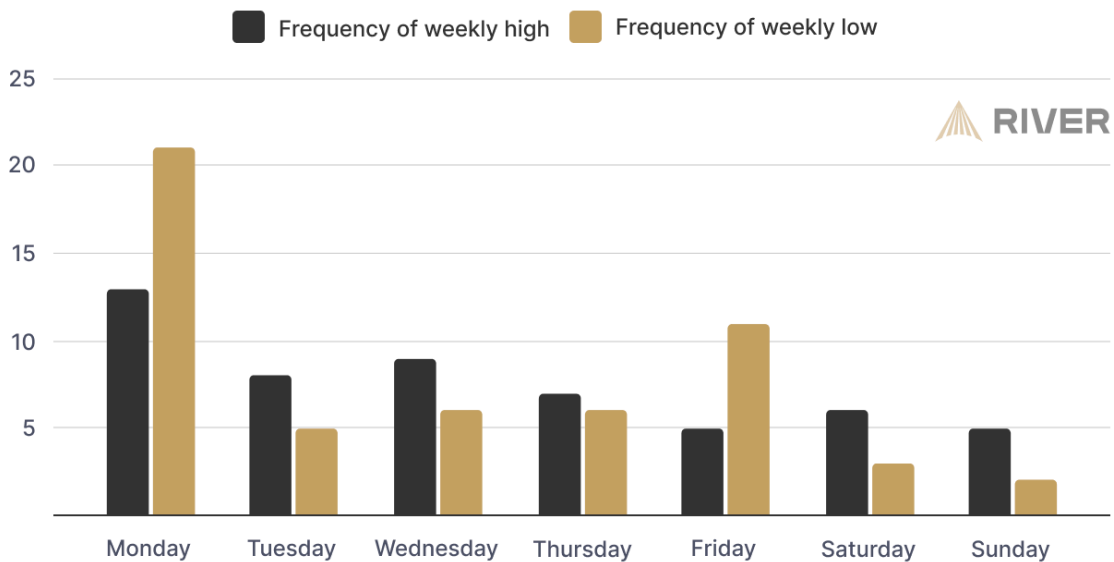
High & Low Bitcoin Price Occurrences by Day Since 2010



Data source: CoinMarketCap

Since 2010, **Mondays** have had the highest odds of having the weekly low price relative to the weekly high price falling on this day. This pattern holds up over the last 12 months.

High & Low Bitcoin Price Occurrences by Day Nov 2022 - Oct 2023



Data source: CoinMarketCap

Monday had a 14.36% theoretical advantage over the past year for **weekly recurring orders** relative to the average per week. Friday was also an outlier over the past year with a 10.94% theoretical advantage, but historically this advantage was only 2.15%.

It is important to clarify that this statistical advantage does not equate to 14.36% higher profits, hence why we are referring to it as theoretical. Just because you statistically have a higher chance of buying at a below-average price, this does not mean it happens often enough. The timing during the day has an impact on whether you get close to the daily low price or not.

To visualize this with an example:

If you had bought \$10 worth of Bitcoin each week at 12PM Eastern time over the past five years, you would have invested \$2,610, and made an estimated profit of:

Each Monday	\$4,628.20
Each Thursday	\$4,572.55

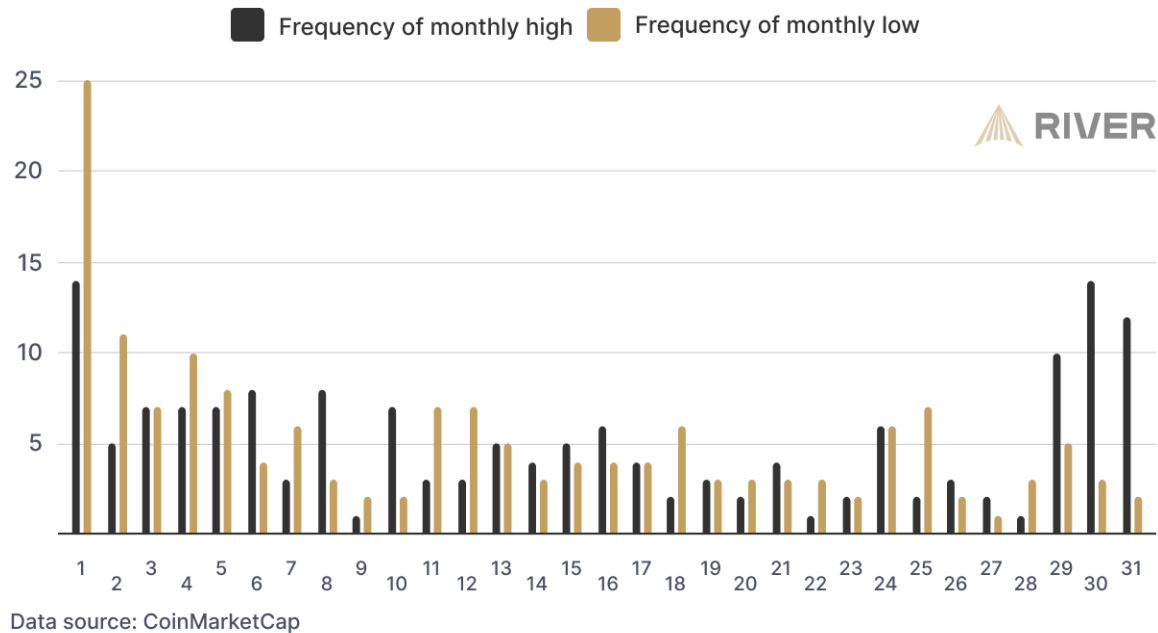
That is only a \$55.65 advantage, which is 1.2%, and thus drastically lower than the 14.36% statistical advantage. The reason is that while Monday may have a higher ratio of low price points to high price points, the low price points only affect recurring orders when they happen close to execution time. Over a long enough period, there should be a more noticeable difference if the pattern holds up, but for now, there is significant variance still.

1.2% more profit over five years will not be meaningful enough for many investors to act on, especially when it is not a given. At the same time, it is also reassuring for investors to know that the exact time at which they set up their recurring order won't massively affect how much Bitcoin they accumulate.

4. The Best Day to Monthly DCA Bitcoin

For a monthly recurring order, there is a pattern as well when we look at the data since 2010, but it is not statistically significant enough to result in a meaningful impact.

High & Low Bitcoin Price Occurrences by Day of the Month Since 2010



An investor would have to DCA for many years to benefit from the 6.83% and 3.73% theoretical advantages on the first two days of the month, and it would take many years to validate whether the pattern still holds up. Out of the daily, weekly, and monthly patterns, this one seems the least impactful to act on. This makes it not worth pursuing the pattern.

On the other hand, the last three days of the month certainly seem worth avoiding. There is little drawback to setting up a recurring order on some of the earlier days in the month, to at least not have potentially higher odds of buying a monthly price peak.

We did not include a graph for the past twelve months here, as the sample size only consists of 12 high prices and 12 low prices, compared to 161 of each in the graph above.

5. Which DCA Frequency Is the Best?

Various factors influence the decision, and there are many ways to analyze this question.

1. Market conditions

Dollar-cost averaging performs differently in a bull market (continuously rising price over time), a bear market (continuously dropping price over time), and a relatively stable market.

2. Time period taken

With these analyses, it can be tempting to cherry-pick a timeframe in which the results match your personal preference. However, past performance is not indicative of future results. Depending on during which period you start and how volatile markets are, outcomes may differ.

3. User goal

If it is your goal to accumulate as much bitcoin as possible, then a lower frequency for a recurring order has historically been a bit better.

If it is your goal to accumulate bitcoin, but always be able to convert it back to as close to the number of dollars you invested in the short term, then a higher frequency for a recurring order has historically been a bit better.

Conclusion

There are a few interesting patterns in the bitcoin price that can lead to small advantages for recurring orders if a user wants to accumulate as much bitcoin as possible.

However, it's important to remember that past performance is not indicative of future results. The effectiveness of these strategies varies depending on market conditions and the time frame that is being considered. In general, the exact timing of a recurring order will not have a material impact on many investors.

The recurring order frequency can have an impact: A higher frequency keeps the investor closer to the dollar amount they invested in case they need to exchange their investment back at any time. A lower frequency can accumulate a bit more bitcoin in the long run.

The principles of recurring orders remain regardless of the frequency or timing used:

- Lower your exposure to price volatility.
- Reduce your time invested to try to time the market.
- Turn investing in bitcoin into a long-term, passive activity.

About River

Founded in 2019, River is a Bitcoin technology and financial services company. River offers Bitcoin brokerage and custody services in one easy-to-use mobile app and on [River.com](https://river.com).

One of our flagship products is the [zero-fee recurring order](#), which we offer in hourly, daily, weekly, and monthly options. This is a great way for passive investors to build up their bitcoin position over time, without paying any (hidden) fees. Try it out on the River platform or mobile app.

Credits

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