A Novel Method to Gain Profits using Reverse Splits

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1 Abstract

This paper investigates a new arbitrage strategy focused on reverse stock splits, a corporate action where companies reduce their number of outstanding shares while proportionally increasing the share price. Reverse stock splits are often used to meet stock exchange listing requirements or to enhance a company's appeal to investors. The research outlines how small investors can capitalize on the rounding up of fractional shares that occurs when companies adjust shareholder positions during reverse splits. By executing carefully timed trades, investors can secure guaranteed profits based on predictable corporate behaviors. Empirical data, historical case studies, and statistical models demonstrate the potential profitability of reverse stock split arbitrage. The analysis reveals that, although this strategy offers low risk and consistent returns, investors must navigate significant challenges such as market volatility, liquidity issues, and transaction costs. The findings highlight how this arbitrage technique can provide a reliable revenue stream for investors, especially those with smaller accounts seeking safe, consistent growth.

2 Introduction

Reverse stock split arbitrage is a unique trading strategy that captures profits from the stock market by capitalizing on the predictability of corporate actions associated with reverse stock splits. To understand what reverse stock split arbitrage is, it is important to first understand what a stock split is. A stock split is a corporate action in which a company increases the number of its outstanding shares by issuing more shares to existing shareholders, which in turn reduces the stock price proportionally. This action occurs without directly changing the company's overall market capitalization. For example, in a 2-for-1 stock split, a shareholder holding 100 shares at $50 each would end up with 200 shares at $25 each, maintaining the same total value of their holdings. Companies usually perform stock splits to make their shares more affordable and attractive to a broader range of investors, thus boosting the stock's liquidity.[1]

In contrast, a reverse stock split happens when a company reduces the number of its outstanding shares while proportionally increasing the price. For instance, in a 1-for-10 reverse split, a shareholder holding 100 shares at $1 each would end up with 10 shares worth $10 each. This action would leave the value of the investor's equity unchanged, but the stock value and number of shares would adjust proportionally [1]. Companies often perform reverse stock splits to meet the exchange listing requirements, particularly the NASDAQ, which mandates that companies maintain a minimum closing bid price of $1 per share to avoid delisting. Specifically, NASDAQ's Listing Rule 5550(a)(2) requires listed companies to maintain a minimum bid price of $1 for 30 consecutive business days, and if a company fails to meet this requirement, it risks being delisted from the exchange, which can severely impact the company's valuation, stock liquidity, and shareholder confidence.

One main reason that companies choose to round up fractional shares after a reverse split is to simplify their share structure and maintain positive investor relations. When a reverse stock split results in fractional shares, companies can round these fractional shares up to the nearest whole share or pay cash in lieu (CIL) of the fractional shares. This can also help drive more volume to the stock and keep shareholders more inclined to retain the shares they have, as they will keep equity in the company instead of just receiving CIL in return for their equity. This rounding can create minor arbitrage opportunities as investors may receive slightly more value in whole shares than they had prior to the reverse stock split.

3 Motivation

Reverse Stock Split Arbitrage can be utilized by investors with all sizes of brokerage accounts, but it is most beneficial to small investors. Arbitrage in general is finding opportunities to gain guaranteed profit, and for smaller accounts, the biggest goal is to increase capital to let compound interest take over. Using Reverse Stock Split Arbitrage, small account investors can use the predictable patterns that are present during reverse splits and rounding, allowing them to gain guaranteed profit. For smaller investors, they might also be motivated to optimize and maximize the profit from this strategy, leading to them creating multiple brokerage accounts and researching the brokerages that charge the least for splits so they can use this in lieu of daytrading. Larger accounts can still be motivated to follow reverse stock split arbitrage, but they might be less motivated. Already having huge capital, the almost $100 per month is not a significant impact on their account. The motivation for larger accounts stems from the guaranteed nature of this profit, as if the market is down or up, the profit from this trading strategy

is guaranteed and can be used to supplement losses in times of bad markets.

4 History

Reverse stock splits happen regularly in the market, and oftentimes, there are more of these in the market than traditional stock splits. This means that there is an increasing window for more people to participate in reverse stock split arbitrage in the future. Historically, reverse stock splits were relatively rare and often solely used by companies in bad financial situations to help prop up their declining stock prices. However, now the trend has shifted, and reverse stock splits have become much more commonplace across various sectors.

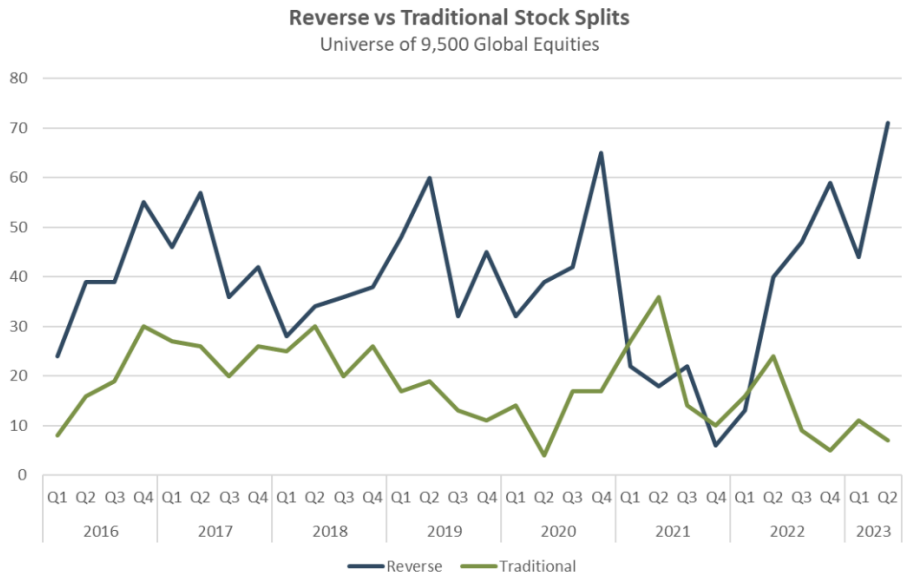

Figure 1: Reverse vs Traditional Stock Splits from 2016 - 2023

Several factors contribute to the growth of these reverse stock splits. By executing these stock splits, companies can quickly raise their share prices above the minimum required levels. By doing this,

companies can make their stocks look more attractive to retail investors, which can inadvertently cause increased demand and better market performance.

One successful example of a reverse stock split is AT&T Inc.'s 1–5 in 2002. AT&T performed this split in conjunction with plans to spin off its own cable TV network and merge it with Comcast Corp. ($CMSA). This corporate action was planned to protect AT&T from a significant decline in its share price, which was the reasoning behind this reverse split.[1]

Other instances of these stock splits include small, revenueless companies interested in research and development (R&D), which lack profits or marketable products or services. In these cases, these stocks simply undergo this corporate action to maintain their listing on stock exchanges [1] Many investors view reverse stock splits as a tactic companies use to artificially increase their share prices when they are "lacking organic strategies to boost share prices."[2]

5 Empirical Evidence

The rounding up of the stock in reverse stock split arbitrage is when the number of shares goes down, in turn increasing the value of each stock, all without changing the companies' market cap. The post-split price movements are what most reverse arbitrage investors make their profits on. Since the stock consolidates, and the market cap stays the same, each stock is worth much more and "rounds up". Over time, each stock that rounds up and consolidates is worth much more, and in the end, can result in profits larger than $400 a year. Since lots of investors take a reverse stock split as a sign that the company will start to decline numbers-wise, they sell their shares and exit before the stock does its reverse split. However, selling the shares right after the reverse split would be more beneficial for the

investor as they are still making a profitable exit instead of making a marginal profit or breaking even. Here is a basic run-through of how the "rounding up" works in a real-life example.

Citigroup is an investment bank and financial services company based in New York City. In 2011, they executed a 10:1 reverse stock split due to their desire to get their stock price back into the double digits. This resulted in the amount of Citigroup shares and price going from 29 billion and $4.50 to 2.9 billion and $45, respectively. For one who would have had one share of Citigroup, their share would be worth $45 instead of just $4.50, resulting in them making a profit of $40.50. If the reverse stock split were a 20:1 split, every twenty shares of the company would be consolidated into one, making the value of the shares 20x. The company's market cap would stay the same, but each shareholder would have an increased value in their ownership.

Another example was General Electric's reverse stock split in 2021. GE's stock price had rapidly dropped throughout the year due to over-diversification, underperforming divisions, and high debt levels. These issues led the companies' stock price to reduce all the way down to $13. GE then implemented a 1:8 reverse stock split, meaning that every 8 shares would consolidate into one. This resulted in the stock price jumping from $13 to $104 and getting GE into the triple digits. The reason GE did this was because they wanted to seem more appealing to investors, who don't invest in lower-priced stocks. Examples like these show that reverse stock split arbitrage is a very profitable financial technique if conducted with caution and thorough research on the stock.

DryShips Inc. was a company that between the years 2016 and 2017, executed several reverse splits. In 2016, they did a 1:15 split, where every 15 shares were consolidated into 1, making the stock price go up 15x. In 2017, they did multiple, two of which were 1:4

and 1:7. The reason that they participated in so many reverse splits was to stay in the NASDAQ. NASDAQ has a rule that the share price of a company must be above $1. To stay in compliance with these rules, DryShips participated in many reverse splits to stay above that $1 threshold. Despite the reverse splits, the stock still remained volatile, showing that it was an unstable company. Long-term shareholders lost lots of money due to the actual financial health of the company. Soon enough, despite all efforts, DryShips was eventually delisted from the NASDAQ. This example shows that reverse stock splits can also be a sign of weakness in the company's financial health, and the reverse splits can result in "stock inflation". However, a day trading investor can profit heavily from companies like this, before they go under.

Chesapeake Energy Corporation is an exploration and production company that is big in natural gas and oil production. In April 2020, the companies stock fell under $1, which made it ineligible to stay in the NYSE if this continued for 30 more days. They therefore consolidated every 200 shares in 1, performing a 1:200 reverse split. Another reason to perform the reverse stock split is to not be seen as a penny stock company in the eyes of an investor. Being a penny-stock company makes it seem as though it is risky to invest in that company. A higher stock price can attract many more investors, which in turn, is more beneficial for the company.

6 Blockages

Although Reverse Stock Splits seem like safe investments, there are many downsides and possible blockages in this technique. This action by companies can sometimes be a sign that the company is in financial distress, making investors sell and exit. This greater volatility makes it more risky to perform a reverse stock split ar-

bitrage strategy. Since the new stock prices issued can mess with the liquidity of the stock, selling the stock would be more negatively impactful than it would have been before the reverse split. This negative impact would come in the form of a decrease in stock price, which over the long run, could possibly result in more reverse stock splits, driving the company down gradually. In many stock brokerages, short selling is not allowed. For instance, in Robinhood, you must wait two days before you can sell the stock, this would negatively impact many investors, as the greatest profit margins are mostly right when the stock performs its reverse split. This diminishment of profits over time can lead to big differences at quarterly or yearly stock account reports. Transaction fees can also quickly diminish large amounts of an individual's profits as reverse split arbitrage requires making many trades a week. If one makes about 10-15 trades a week they can lose almost 10% of their weekly profits in just fees and commissions. Timing is also a big issue when it comes to performing reverse stock split arbitrage, being available at the right times to buy and sell the specific share is not an easy task. For someone who is drowned with work and personal life, they may forget from time-to-time that they need to buy or sell their shares to make the highest profit margin possible. Missed trades can add up quickly and take a hefty fraction of the yearly or quarterly profits. One can only reach the step of buying the reverse split share if proper research is conducted. Sometimes, bigger corporations can influence and manipulate the market, creating false signals that can mess with reverse split traders. For instance, in 2018, Elon Musk posted a tweet saying "Funding Secured", after considering taking Tesla private after reaching $420 a share. This tweet caused a surge in Tesla stock price. However, it was later revealed that Elon Musk did not have any funding secured, and this resulted in Tesla stock price dropping from $387 when the tweet was posted to $305 after

the scandal was over and Musk was charged. Scandals like this can happen in any aspect of the stock market and it is important to conduct thorough research about the stock before one buys it. This thorough research must be conducted daily and can take anywhere from 15 minutes to an hour if a specific stock requires more checking, which lots of people don't have the time and/or energy for.

7 Statistics

Figure 2 represents the market capitalization equation, where the market capitalization is proportional to the number of shares multiplied by the price of shares. In a traditional stock split, the quantity of shares increases, while the price of each share decreases, keeping the market capitalization the same. In a reverse stock split, the opposite occurs as the price of the share increases while the quantity decreases. However, a dilemma occurs when an investor holds a number of shares that are not split evenly.

When a reverse stock split occurs, companies need to give shareholders a proportion of what they own in the company. Some companies issue fractional shares, where the market capitalization stays the same because of Figure 2. However, some companies do not have the money to give out fractional shares so they do 1 of 2 things; pay cash in lieu or round up shares.

When a company pays cash in lieu for an investor's stocks, the market capital stays the same, as the company pays the shareholder for the fractional shares that they own. This keeps the market value the same but comes at a cost to the company as fewer investors are engaged, thus decreasing the stock's market value.

When a stock does a round-up reverse split, the company rounds up 1 old value share to 1 new value share. The company increases their market capitalization by doing this. This is highlighted in

Figure 2

Market Capitalization:

$$Mc = pq \quad (1)$$

Figure 3

New Share Price After Reverse Split:

$$p_{new} = pN \quad (2)$$

Figure 4

New Quantity of Shares After Reverse Split:

$$q_{new} = \frac{q}{N} \quad (3)$$

Figure 5

Fractional Shares Resulting from Reverse Split:

$$F = q_{new} - \lfloor q_{new} \rfloor \quad (4)$$

Figure 6

Rounded-Up Share Count:

$$R = \lceil q_{new} \rceil \quad (5)$$

Figure 7

Additional shares issued due to rounding up:

$$\Delta q = R - q_{new} \quad (6)$$

Figure 8

New Market Capitalization After Reverse Split:

$$Mc_{new} = pN \times \frac{q}{N} \quad (7)$$

Figure 9

New Market Capitalization After Rounding Up:

$$Mc_{new,\,rounded} = p_{new} \times (q_{new} + \Delta q) \quad (8)$$

Figure 10

Additional Value Given to Shareholders:

$$\epsilon = Mc_{new,\,rounded} - Mc \quad (9)$$

$$\epsilon = p \times N \times \Delta q \quad (10)$$

Figure 11

Companies losses after a rounded reverse split:

$$Loss = \Delta q \times p_{new} \quad (10)$$

Where:

Mc = Market capitalization

p = Original price per share

q = Original quantity of outstanding shares

N = Reverse split factor

p_{new} = New price per share after reverse split

q_{new} = New quantity of shares after reverse split

F = Fractional shares resulting from the reverse split

R = Rounded-up share count

Δq = Additional shares issued due to rounding up

Mc_{new} = New market capitalization after reverse split

$Mc_{new,rounded}$ = New market capitalization after rounding up

figure 8, where new shares change the market capitalization of the stock.

The epsilon represents the total profit an individual investor gains for every reverse share. The higher the reverse split factor is, the higher the Epsilon is. Additionally, the original price per share plays a big part in calculating the amount of profit an investor can make. The profit that the individual investor makes is a loss to the company, where the company absorbs the cost, usually marking it down as reorganizing fees. By rounding up and giving a full share back to investors, it also adds value to market capitalization.

In a traditional stock split, the price per share decreases while the number of outstanding shares increases proportionally. Inversely, in a reverse stock split that pays cash in lieu of the fractional share, the price per share increases while the number of outstanding shares decreases proportionally, which keeps the market capitalization the same, post- and pre-split.

Figure 10 highlights the losses a company takes on when they issue a rounded-up reverse split. Let's say a company performs a 1 for 10 reverse split. A shareholder originally holding 105 shares at \$1 per share owns 10.5 shares. After the company rounds, they now own 11 shares. The new price per share is \$10. So the company's loss rounding up is illustrated by figure 10, where Loss = 0.5 * 10 = \$5. These 5 dollars would be the profit to the investor.

These splits can come in all shapes and sizes. For a single investor, there is a small and on-margin profit to have had, but collectively, this roundup could cause a huge drain in cash and lead to the erosion of a company's market capitalization. As seen in figure 2, there is a large percentage of profit gained in investing a company when there is a reverse split occurring. BIVI split on August 6th 2024, and we were able to collect data. When an investor buys the least they can of a stock, the more profit they are able to gain. For

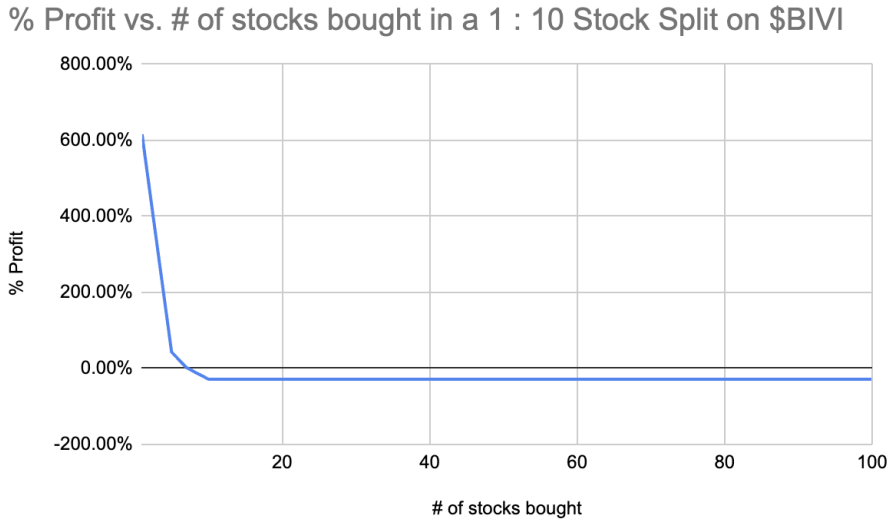

Figure 2: Profits earned from different amounts of shares owned during a reverse rounding split

example, when a investor buys 1 share, they were able to gain a profit of 615%. While if an investor bought 7 shares, their gained profit would only be 2%. This logarithmic function goes into the negatives as well, when an investor buys 100 shares, they often lose money because the stocks go down after most reverse split, while ideally, they should stay at the same price.

A similar occurrence happens when a company goes through a 1:20 reverse rounding split. Profits for the individual is much higher because the individual themselves has rounded up more shares. Thus, when an individual buys more than 1 share, they lose the amount of additional profits they could have been receiving. When $SBFM rounded on August 8th 2024, investors who bought only one share were given 19 more shares to round up, effectively increasing their profits by 1366.67%. When investors invest more, they cannibalize their own profits, reducing the percentage they make.

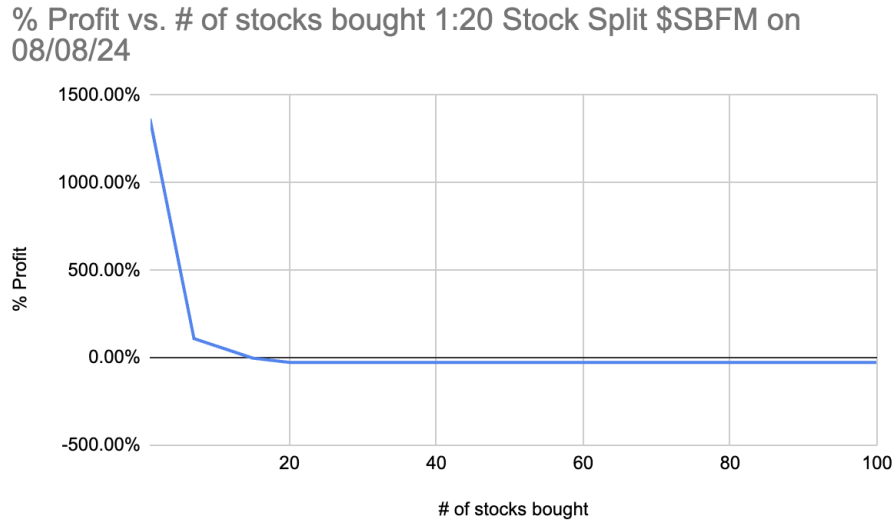

Figure 3: Profits earned from different amounts of shares owned during a reverse rounding split

8 Conclusion

Reverse stock split arbitrage presents a compelling strategy for investors seeking low-risk, consistent returns through corporate actions. This method leverages the predictable nature of reverse stock splits, particularly the rounding up of fractional shares, to generate profits that can be especially beneficial for smaller investors. While the empirical evidence demonstrates potential profitability, it is important to note that reverse stock split arbitrage is not without its risks. Market volatility, liquidity constraints, transaction costs, and the potential financial instability of companies engaging in reverse stock splits all pose challenges that investors must navigate carefully. Additionally, the strategy requires vigilant monitoring of market conditions, detailed research, and precise timing to fully capitalize on opportunities. Despite these hurdles, reverse stock split arbitrage remains a viable and profitable option for those willing

to engage in the meticulous work necessary to exploit this market inefficiency. With the continued prevalence of reverse stock splits, the strategy has the potential to remain a valuable tool for investors looking to supplement income or achieve steady portfolio growth.

9 Acknowledgments

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