Applicability of Fibonacci Series on Low Beta Stocks of Nifty-50

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ABSTRACT: This study explores the relationship between stock volatility, measured by beta & price movement patterns using the Fibonacci series in the context of low beta stocks. Low beta stocks, typically more stable than high beta ones, were analyzed using Fibonacci retracement & extension levels to identify key support & resistance points. Historical price data from Nifty 50 low beta were examined under various market conditions including bullish, bearish & stable. The findings from our research indicate that the low beta stocks adhere to Fibonacci levels, hence it offers reliable long-term guidance. The study highlights that while Fibonacci retracement levels are useful, their effectiveness depends on stock volatility & market conditions, which helps investors in optimizing their trading strategies.

KEYWORDS: Stocks, Low beta, volatility, Fibonacci retracement levels, support & resistance.

INTRODUCTION

The Fibonacci series is a mathematical sequence renowned for its natural order & harmonic proportions. Each number in the series is the sum of 2 numbers that precedes it (e.g., 0,1,1,2,3,5,8,13 and so on). The arrangement of leaves, the spiral of shells & the growth of plants are examples of this pattern as commonly seen in nature. Because of its aesthetic balance & proportionality, this pattern has also been used in humanmade structures such as art & architecture. Fibonacci series' extensive applicability across numerous domains like biology, art & others highlights its versatility. In financial analysis, the Fibonacci sequence is often used as a tool for predicting stock movements, particularly in technical analysis (Lahutta, n.d.). Fibonacci retracements & extension levels are often used by traders as well as analysts to predict zones where stock prices are likely to reverse. The applicability of the Fibonacci sequence to low beta securities in the Nifty 50 index is researched in this study. Risk averse investors find low beta stocks attractive, especially during times of market turmoil & instability because of their relatively greater resistance to general market volatility. Despite the greater stability, these stocks are nevertheless susceptible to general market tendencies & investor sentiments of-course. This research aims to assess whether Fibonacci retracement levels can accurately forecast price support & resistance points, trend reversals & future price movements in the selected stocks. These levels are derived from key Fibonacci ratios such as 23.6%, 38.2%, 50%, 61.8% and so on which are believed to reflect areas where market sentiment may shift, either stopping or boosting the price momentum. By focusing on low beta stocks, the research takes a distinctive approach, exploring the effectiveness of this mathematical tool in a market segment that generally experiences more subdued price fluctuations. This raises the question of whether the Fibonacci series, traditionally applied to more volatile securities, can offer meaningful insights into the price behavior of relatively stable stocks. The study first reviews existing literature on the use of the Fibonacci series in the stock market analysis, emphasizing its role in technical analysis & its historical success in predicting price behavior. Following this, it applies Fibonacci retracement & extension principles to a set of low beta stocks selected from the Nifty 50 index. By doing so, the research aims to provide investors & market participants with valuable insights to optimize portfolio strategies & enhance decision making processes, particularly in uncertain market conditions which may enable investors to enhance returns while minimizing exposure to volatility. The results will reveal whether mathematical constructs such as the Fibonacci series can offer practical guidance in analyzing & trading low beta stocks. Ultimately, the study aims to bridge the gap between mathematical theory & practical investment strategies, showing how tools like the Fibonacci series can be leveraged, not just for high risk, volatile stocks but also for the more conservative, low risk securities of the market.

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LITERATURE REVIEW

In finance, Fibonacci tools are essential for analyzing market movements and identifying key price levels. Fibonacci retracement levels, which are based on ratios such as 23.6%, 38.2%, 50%, 61.8%, and 76.4%, assist traders in locating potential support and resistance zones within a price trend (Dikici & Özkan, 2003). These levels are calculated by applying these percentages to the vertical distance between a significant high and low on a chart, helping to predict where price corrections might occur. Fibonacci extensions, on the other hand, are used to estimate price targets beyond the initial high or low by extending the same ratios. Common extension levels include 161.8%, 261.8%, and 423.6%, providing insights into where the price might head following a retracement. Fibonacci arcs and fans offer more dynamic visualizations, with arcs creating curved lines based on Fibonacci ratios to highlight potential support and resistance, and fans using diagonal lines extending from a key price point to project these zones. Additionally, Fibonacci time zones apply Fibonacci ratios to time intervals rather than price levels, helping traders forecast potential turning points and significant price changes based on the timing of past market movements (Sinha, 2017). These tools, used individually or in combination, enable traders to make informed decisions about market entry, exit points, and risk management. High Beta Stocks: These stocks have a beta greater than 1, indicating higher volatility compared to the broader market; they tend to experience larger price swings and are more sensitive to market movements. Investors often use high beta stocks for potential higher returns, albeit with increased risk. Low Beta Stocks, these stocks have a beta less than 1, reflecting lower volatility and smaller price swings relative to the market; they are generally more stable and less sensitive to market fluctuations. Investors typically choose low beta stocks for stability and reduced risk. In the case of low beta or risk, if the volatility of the stock is lower, it could be possible that the support and resistance frequencies will be lower.

Our research gap lies in the application of Fibonacci retracement levels specifically to low beta stocks. While Fibonacci retracements have been studied in the context of high beta stocks, their effectiveness and predictive power for low beta stocks underexplored. By analyzing how Fibonacci retracement levels impact and correlate with the price movements of low beta stocks, our research aims to unravel interesting findings into the relative efficacy of these tools across different volatility profiles and provide a more comprehensive understanding of their utility in diverse market conditions.

RESEARCH METHODOLOGY

In this study, we aim to compare the performance and low beta stocks using the Fibonacci series as a tool for technical analysis. The data utilized in this research is composed of two main components: stock market data (low beta stocks) and the Fibonacci sequence applied in financial analysis. Historical stock market data for low beta stocks is collected from reputable financial databases such as Investing.com & the Economic Times. It comprises data of Nifty-50 as well as of a few companies forming a part of the aforementioned index. This data spans over a period of 10 years (e.g., from October 2014 to September 2024) to capture multiple market cycles and ensure the robustness of the results. Fibonacci retracement levels are calculated and used to assess price movements in stocks. These levels are generated from the Fibonacci sequence (e.g., 23.6%, 38.2%, 50%, 61.8%, and 100%) and applied to identify support and resistance levels in stock prices. Fibonacci Retracement Levels: Calculated for each stock based on the highest and lowest prices observed during the study period. Fibonacci Ratios: Percentage levels derived from the Fibonacci sequence used to analyze price trends. The Golden Ratio, often denoted by the Greek letter φ (phi), is an irrational number approximately equal to 1.6180339887. It has a deep connection with patterns in nature, geometry, and is frequently seen in art, architecture, and financial markets. The Golden Ratio occurs when a line segment is divided into two parts such that: The ratio of the entire length to the longer part is the same as the ratio of the longer part to the shorter part. In mathematical terms, if a segment is divided into a longer part "a" and a shorter part "b," then the Golden Ratio is defined as

Figure 1: Golden Ratio of Fibonacci

This relationship can be simplified to the quadratic equation:

$$\phi^2 - \phi - 1 = 0 \ldots \ldots \ldots \ldots (1)$$

Solving this equation gives the value of φ:

$$\overline{\phi} = (1 + \sqrt{5})/2 \approx 1.6180339887$$

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In this study, a regression test is used to investigate the relationship between high-beta and low-beta stocks, incorporating the Fibonacci series as a tool to compare their performance over time. Beta, a measure of a stock's volatility in relation to the market, categorizes stocks into high-beta (more volatile) and low-beta (less volatile) groups. The Fibonacci sequence is used to forecast potential support and resistance levels for both categories.

Independent Variable: In this research paper, the independent variable is Fibonacci retracement, which is used to identify potential reversal levels in stock price movements. When applied to the stock market, the employment of the Fibonacci sequence is tied to coefficients. These coefficients are utilized to define proper formations associated with the golden ratio (Majumdar, 2023b).

Dependent Variable: The dependent variable is stock price, which will be analyzed in low-beta stocks to observe how they behave in relation to Fibonacci retracement levels.

Table 1: Exponents of Fibonacci coefficients

Exponent	Fibonacci coefficient
-3	0.236 (23.6%)
-2	0.382 (38.2%)
-1.44	0.5 (50%)
-1	0.618 (61.8%)
-0.5	0.786 (78.6%)
1	1.618 (161.8%)
2	2.618 (261.8%)
3	4.236 (423.6%)

	Coefficient		Standard Error		T-stat	p-value
	b	a	b	a		
Nifty-50	7.79E-0.5	-2.77412	1.17E-05	0.466708	6.67247	0.000549
TCS	0.000479	-2.79251	7.17E-05	0.468952	6.672457	0.000549
Wipro	0.004235	-3.05182	0.000642	0.506618	6.597546	0.000583
HCL Tech	0.00095	-2.4954	0.000142	0.433433	6.672461	0.000549
Infosys	0.000933	-2.58173	0.00014	0.443585	6.672467	0.000549
Dr. Reddy's Labs	0.000356	-3.17399	5.34E-05	0.516607	6.672469	0.000549

Figure 7: Regression results

REGRESSION ANALYSIS

As we can observe in figure 7, all p-values are exceptionally small indicating that the results are highly significant. Therefore, the relationship between Fibonacci retracement levels & stock returns are statistically robust. In our reference research paper, we saw that most of the high beta stocks has 'b' coefficient as negative. However, this is not the case here. 'b' coefficient values are positive which shows that low beta stocks experience less dramatic reactions to retracement levels as they are less volatile & respond differently to market signals. Despite being from different sectors like IT & Pharma, the results are remarkably consistent across the board. All stocks show a positive "b" coefficient & highly significant p values suggesting that Fibonacci Retracement levels are effective in predicting return patterns for stable, low beta stocks.

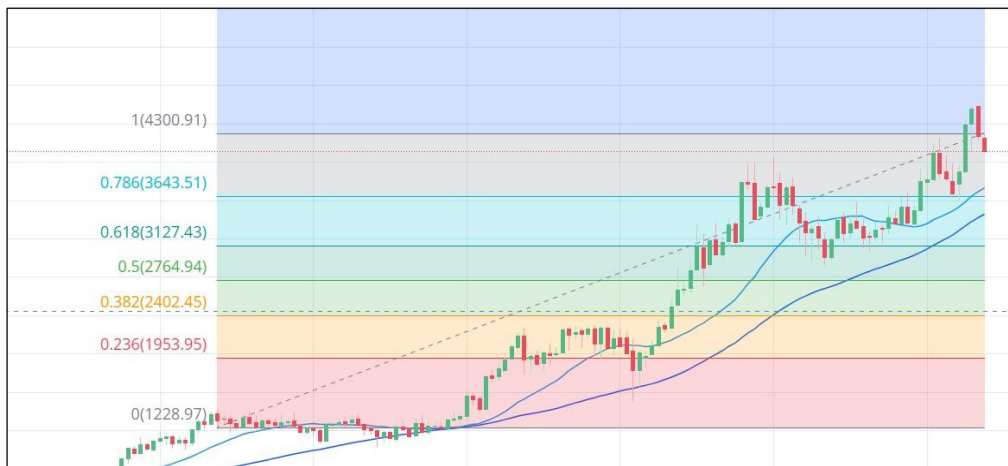**Applicability of Fibonacci Series on Low Beta Stocks of Nifty-50**

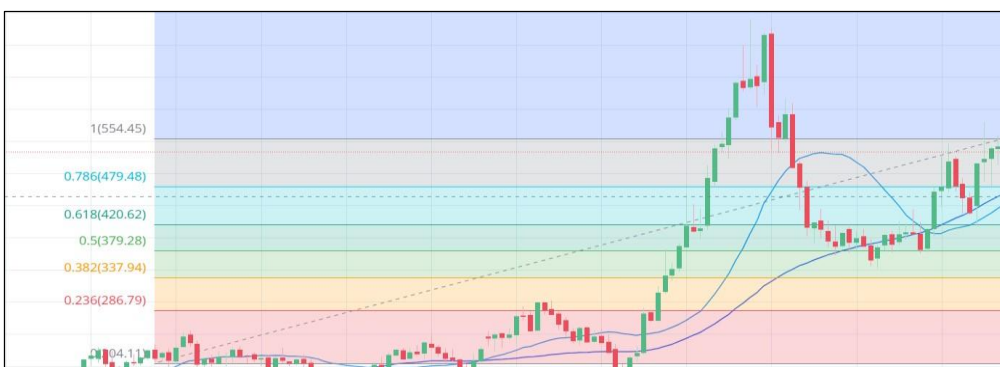Figure 2: Fibonacci retracement levels of TCS

Figure 3: Fibonacci retracement levels of Wipro

Figure 4: Fibonacci retracement levels of Dr. Reddy's

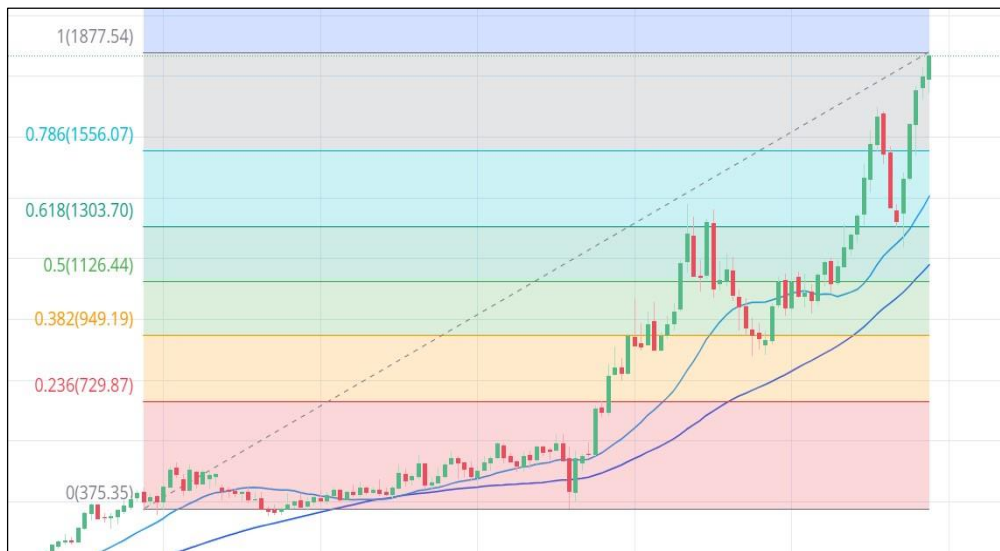**Applicability of Fibonacci Series on Low Beta Stocks of Nifty-50**

Figure 5: Fibonacci retracement levels of HCL Tech

Figure 6: Fibonacci retracement levels of Infosys

RESULT & DISCUSSION

Fibonacci retracements in technical analysis are usually supposed to act as a level of support or resistance for the ongoing trends. These levels of retracements act as gives an indication of trend reversals, potential turning points where the price might reverse after a correction, these retracement levels are used to plan entry and exit points. In figure 2, As we can see in this chart at 23.6% level or at price 1953.95, it is acting as support during those levels, after the couple of months fluctuating around this level it took support from here and shot up. But when it came to 38.2% level or at 2402.45 it didn't act as a resistance and broke right through it, without any pullbacks. When it reached at the level of 61.8% or at 3127.43 this level acted as a bit of resistance for the price for the couple of months as it was bouncing right back from it (acting as a resistance). After crossing the level of 61.8% the trend again went downwards in a couple of months and here the same level acted as a support for the stock to go back up breaking the resistance at 78.6% levels. In figure 3, As it is noticed again the 28.6% level which is at 286.79 the prices initially acted as a resistance, as the stock prices where bouncing right back from it. After a couple of months once the price crossed that level the price of the stock went on an upward trajectory. Here during the upward moves the levels of 38.2% wasn't that significant because it didn't act as either a resistance or a support. In the 61.8% level or at 420.62, it did act as a bit of a minor resistance but broke right through it for further upward trend, breaking the 78.6% level easily. After the couple of months, the stock price did fall and took support back from the 61.8% level which acted a support for the stock price. As seen in figure 4, In this case the 23.6% initially

didn't act as resistance or a support, but after a couple of months this level acted as support in the latter stages. At 38.2% level or at 4447.86 this initially acted as resistance but broke right after that and signifying an up move. This level also acted a very strong support after it was crossed. The stock price went back and forth from this level as it was sometimes acting as a support and sometimes as a resistance before finally breaking from it. At 61.8% the price took a bit of support and moved onwards and upwards before breaking the weak resistance at 78.6%. In figure 5, At 38.2% level or at 949.19 the stock price acted as a resistance and then as a support, then it continued its upward move until 61.8%. at this level 1303.70 acted a very strong resistance for the price. Despite a couple of attempts to breakthrough this level it didn't break out and the stock fall and took support at 38.2% level again, before shooting up and finally crossing the levels of 61.8% and 78.6% in a single strong up move, before falling and taking support at 61.8%. As seen in figure 6, Here at 23.6% or at 814.19 as we can observe that this level has acted as a very strong resistance for the price. But once this level was broken it very easily went on to break the 31.8% level indicating that this wasn't a strong resistance, as it went on to cross the 61.8% and 78.6% level as well. After reaching its all-time high as it is seen the stock price fell from and took a really good support at 61.8% level again and then it shoots up.

CONCLUSION

The analysis of low beta stocks using the Fibonacci series reveals distinct risk-return profiles. High beta stocks, being more volatile, exhibit larger price fluctuations and are more sensitive to market movements (Majumdar, 2023a). High beta stocks, as mentioned above, are more volatile & hence they form multiple support & resistance levels when mapped to Fibonacci retracement levels. In contrast, low beta stocks demonstrate more stability and are less likely to breach Fibonacci levels frequently. This suggests that Fibonacci series can be a useful tool for identifying potential reversal points, especially in high beta stocks, offering insights for risk management. Even though the research includes data points spanning over a period of 10 years, it is important to acknowledge that those were monthly data points hence the graphs shown above may suffer from smoothening bias & hence show a better result as to how the stock prices coincide with the Fibonacci retracement levels. The future scope of research includes identifying if Fibonacci retracements work consistently across industries, across market capitalizations & across indexes.

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