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### **Efficacy of Technical Analysis to Assess Fair Value Gap: Evidence from Nepalese Commercial Bank**

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#### **Abstract**

This paper examines the efficacy of the selected technical indicators to identify fair value gaps meant for stock investment and trade optimization based on the technical signals of the Banking sector stocks listed in the Nepal Stock Exchange (NEPSE). The analysis focuses on Simple Moving Averages (SMA), Moving Average Convergence Divergence (MACD), Bollinger Bands (BB), Relative Strength Index (RSI), and Fibonacci Retracement as key indicators. Findings reveal that the selected technical indicators provide reliable ground to explore fair value gap and better market entry and exit signals for optimizing investment, aligning with standard technical analysis principles. Therefore, the study underscores the significance of using multiple indicators for robust decision-making for stock market investment, particularly in emerging markets like Nepal, where market inefficiencies and volatility is common phenomena. Moreover, the results have practical implications for all market participants including traders, investors, and analysts. Future research should may choose other indicators to support this strategy to develop more comprehensive trading models.

**Keywords:** technical analysis, fair value gap, moving averages, MACD, RSI, bollinger bands, fibonacci retracement,

**JEL Classification:** G10, G11, G12, G14

### **Introduction**

Stock markets play a crucial role in financial ecosystems by acting as an intermediary between providers and users of financial resources (Trapanese & Lanotte, 2023). They serve as a financial marketplace where investors buy and sell financial instruments of publicly listed companies in general, and shares or equity in particular (Subrahmanyam & Titman, 1999; Romano, 1998). Hence, stock market framework is popular intermediary to link institutional relation between savers and users of financial resources. Therefore, it serves as a popular platform for public companies to raise substantial capital and for investors to trade and acquire ownership in businesses enterprises (Eisenmann, 2008). In this context, investors and financial analysts are interested to explore reliable parameters to optimize their investment decisions. Moreover, they rely on various valuation techniques to assess whether a particular stock is overvalued or undervalued in particular point of investment. Generally, stock market participants and investors rely on financial reports or company accounting information to gauge the fair value of financial instruments (Georgiou, 2018). But, the financial or accounting information of listed companies are valued with high degree market price differentials creating serious dilemma amongst naïve market participants. Essentially, naïve investors and traders confront with the challenge in stock market analysis due to the persistent deviation of stock prices from their fair value or intrinsic, commonly referred to as the Fair Value Gap (FVP). In fact, this gap arises due to several factors, including macroeconomic fluctuations, speculative trading, investor sentiment, international events and natural calamities (Granville, 2018; Shiller, 2017). In this regard, having better understanding and identifying fair value gaps of stock price is critical for traders and market participants to make informed optimal investment decisions and improve market efficiency.

The tools and techniques developed for the assessment far value gap can be broadly classified as fundamental analysis and technical analysis. But, technical analysis is a widely used approach for predicting stock price movements based on historical price patterns and market trends of stock price (Rouf et al., 2021; Picasso et al., 2019; Edwards et al., 2018). In other words, unlike fundamental analysis, which focuses on financial statements and economic indicators, technical analysis relies on price moving average indicators and technical chart patterns to identify potential price movements (Wu et al., 2022; Murphy, 1999). Among the numerous technical indicators available, author is interested to take the reference of five key indicators viz; Relative Strength Index (RSI), Moving Averages (MA), Moving Average Convergence Divergence (MACD),

Bollinger Bands (BB), and Fibonacci Retracement indicators. These are popularly used to analyze stock trends and identify mispricing (Lo et al., 2000). Therefore, this study aims to assess the effectiveness of these technical indicators to identify fair value gaps in stock markets based on the price reference of Nepal Stock Exchange (NEPSE). In other words, by applying these technical indicators to the historical stock price data of stock index, sub-index or script price, the research seeks to determine whether technical analysis can systematically detect FVG or overvalued and undervalued stock price of the companies listed in NEPSE. The findings are expected to contribute to the existing body of knowledge on stock price forecasting based on technical analysis parameters and market efficiency. Eventually, this will offer valuable and practical insights to the investors and financial analysts in the national as well as global context. In these context, the pertinent research questions are: How effectively can these technical indicators identify fair value gaps in stock prices? Can technical indicators serve as reliable tools for predicting price corrections? Therefore, this study is guided by the following research objectives:

- To examine the role of Simple Moving Averages, RSI, MACD, Bollinger Bands (BB), and Fibonacci retracement Indicators in identifying fair value gaps in stock prices.
- To evaluate the efficacy of predictive power of technical indicators in detecting potential price reversals.

## **Literature Review**

### **Theoretical Perspectives**

The main principle underlying on technical analysis is that the market price is the result of all available information of particular stock. As a result, we no need to look at economic fundamentals, since they all are already priced into a given security of the financial market (Fama, 1970). In this regard, technical analysts generally believe that price of security move in trends and history tends to repeat itself given the market's overall psychology. In this regard, the technical analysis of various types stocks and their trends has been used for hundreds of years (Edwards, 2018). Charles Dow is regarded as the forerunner of technical analysis as it became Dow Theory, an analysis of maximum and minimum market fluctuations (Nazário et al, 2017). Elliott Wave Theory is a technical analysis approach to financial market forecasting that was developed by Ralph Nelson Elliott in the 1930s (Subedi, 2024).

### **Fair Value Gap and Market Efficiency**

The concept of fair value in stock markets is rooted in the Efficient Market Hypothesis

(EMH), which postulates that equity prices reflect all available information at any given time (Fama, 1970). According to EMH, equity prices should trade at their fair value, leaving no room for persistent price deviations. However, empirical studies have shown that market inefficiencies exist, leading to price bubbles and corrections (Shiller, 2017). These types of inefficiencies create opportunities for investors to speculate fair value gap analysis. In this regard, behavioral finance theories suggest that investor psychology plays a significant role in stock price deviations from fair value.

### **Thematic Review of Selected Technical Indicators of Stock Market Analysis**

Technical analysis has been widely used as a forecasting tool for financial markets because it also implicitly covers the fundamental aspects of stock price revealed by the price action. Murphy (1999) describes technical indicators as mathematical calculations based on historical price and volume data to predict future stock movements. Among the vast array of indicators, this paper examines selected five technical indicators viz; Relative Strength Index (RSI), Moving Averages (MA), Moving Average Convergence Divergence (MACD), Bollinger Bands (BB), and Fibonacci Retracement indicators. five have been widely recognized for their effectiveness in identifying price trends and potential mispricing:

#### **Moving Averages (MA)**

MA is a price trend-following indicator that smooths price data over a given period of time that helps investors to identify long-term price trends (Murphy, 1999). The several studies have emphasized the 200-day and 50-day moving average as a strong signal for undervaluation and overvaluation of stock price (Brock et al., 1992).

#### **Relative Strength Index (RSI)**

RSI is a momentum oscillator and measures the magnitude and direction of price movements, helping to have better insight for identifying overbought and oversold zones and conditions (Wilder, 1978). Several empirical studies indicated that stocks with RSI value greater than tend to experience price corrections, while those value below 30 are frequently undervalued (Levy, 1967).

#### **Moving Average Convergence Divergence (MACD)**

MACD measures the relationship between two moving averages and helps in identifying trend reversals. In other words, MACD was pioneered by Gerald Appel (1979) to calculate using the difference between two Exponential Moving Averages (EMAs), a faster or short-term and a

slower or long-term EMA (Appel, 2005). Several empirical studies have shown that MACD crossovers serve as strong signals for price corrections of the stock (Achelis, 2001).

### **Bollinger Bands (BB)**

The BB indicator consists of a moving average and two standard deviation bands based on the 20 period moving average (Bollinger, 2001). Several empirical studies suggested that stocks trading near the upper band are overvalued and potential go down towards fair value. Conversely, those near the lower band are undervalued and potential to go up towards fair value (Niszl, 2020).

### **Empirical Literature**

Several past studies have indicated that cognitive biases based the phenomena of neuroeconomics, such as herd behavior and overreaction, frequently drive stock prices away from their intrinsic value (Subedi, 2025). In other words, equity price goes deep down and sharp rise due to such intertemporal phenomena. Better understanding of these deviations and volatility through technical indicators may help identify opportunities for strategic trading (Barberis, 2003; Kahneman & Tversky, 2013; Subedi, 2022).

Bhattacharya and Kumar (2006) study reviewed popular technical analysis methodologies based on Fibonacci sequences and provide a theoretical rationale for their application in equity price movement support and resistance zone. The study found effectiveness of Fibonacci Sequences. Lento et al. (2007) examined the effectiveness of Bollinger Band trading strategies across different markets, including the Forex and Dow Jones and found positive returns in various markets. Chong and Ng (2008) study underscored that the technical indicators MACD is found highly effective to locate fair value gap of equity price.

Mahajan (2015) study focused on optimizing the MACD and RSI indicators for optimizing investment decisions in the Indian equity market. This study that optimized MACD and RSI are more profitable bearing robustness as fair value gap locating tool. Bansal (2016) examined the effectiveness of the RSI in the NIFTY 50 index using historical data from 2000 to 2021. In the study RSI outperformed buy and hold in average return, potential gains, and stability.

Muis and Prajawati (2021) evaluated the effectiveness of Bollinger Bands, Stochastic Oscillator indicators and Parabolic SAR in guiding buy and sell decisions in the stock market and found robustness of the indicator leading to optimal returns. Joshi (2022) examined efficacy of MACD to predict security prices and assist investors in making informed decisions and the study found that MACD is a significant tool for equity trading, providing a basis for decision-making. Porselvi

and Meenakshi (2024) analyzed the effectiveness of MACD indicator to forecast equity price of Information Technology sector of the Bombay Stock Exchange of India. Their study compared different MACD strategies and concluded that the strategy is as profitable. In conclusion, these literatures also provide valuable insights into efficacy of these technical indicators to explore fair value gap of stock price based on their intertemporal movements and are widely used by traders to anticipate market shifts. However, their effectiveness in identifying fair value gaps has not been extensively studied, in Nepalese capital market context presenting a gap in the literature that this research aims to address.

Despite the popular use of technical analysis and research of it global body of literature in financial markets, its analysis in the body of literature in identifying fair value gaps of equity price remains underexplored, particularly in the context of Nepalese capital markets. Essentially, most existing studies on Moving Averages, MACD, Bollinger Bands, RSI, and Fibonacci Retracements belonged to neighboring countries and others. In other words, existing body of literature predominantly analyzes large-cap markets such as the SENSEX Indian stock market, NYSE United States stock market, and NASDAQ the largest stock exchanges in the world, leaving a significant regional gap in understanding how technical analysis can function in comparatively smaller and less efficient capital markets like NEPSE. Thus, this research seeks to fill the gap by evaluating the efficacy of key five technical analysis indicators and tools in locating fair value gaps within Banking Sub-index of NEPSE contributing to a deeper understanding of market efficiency in Nepal's equity market.

### **Methods and Materials**

This is a descriptive and analytical in nature as it analyzes the fair value gap in stock prices using selected five technical indicators of stock market. For this Banking Sub-index of Banking sector of the Nepal Stock Exchange (NEPSE) is selected. The dataset consists of daily timeframe price movements of the Banking Sub-index since 2023. In other words, amongst 13 sectors of capital market of Nepal, Banking Sector is selected as sample for analysis. The chart of NEPSE developed by Sharesansar is adopted for analysis. In fact, the is based on the daily stock price data for the Banking Sub-index is obtained from NEPSE's official records. This analysis utilizes widely recognized and used five technical indicators (Sermpinis et al., 2018).

The first selected technical indicator is Simple Moving Average (SMA) particularly 50 day SMA to represent short-term price trends and 200-day SMA to represents long-term price

movements. Generally, the interaction between these moving averages indicates golden cross (bullish trends) and death cross (bearish trend) indicating to assess potential trend reversals. In others words, if 50-day SMA cross over 200-day SMA from below indicate bullish signal. Conversely, if 50-day SMA cross down the 200-day SMA indicate death cross (Lo et al., 2000; Brock et al., 1992). It also can be observed in different time frame based on the risk appetite of market participants. Formula for SMA is given as:

$$SMA = \frac{P_1 + P_2 + \dots + P_n}{n} \quad \dots (1)$$

In the above equation,  $P_n$  denotes the closing price of the asset for each period and the number of periods are 50-day and 200-day.

The second selected technical indicator is Moving Average Convergence Divergence (MACD). The MACD is a trend-following momentum indicator that shows the relationship between two moving averages of stock price. It consists of the MACD line, signal line, and histogram to identify trend strength and reversals (Chio, 2022). The formula of calculation of MACD is given below:

$$MACD = EMA_{12} - EMA_{26} \quad \dots (2)$$

$$\text{Signal Line} = EMA_9 (MACD) \quad \dots (3)$$

$$\text{Histogram} = MACD - \text{Signal Line} \quad \dots (4)$$

In the equations,  $EMA_{12}$ ,  $EMA_{26}$  and  $EMA_9$  exponential moving average for 12-days, 26-days 9-days respectively.

The third selected technical indicator is Relative Strength Index (RSI) which is a momentum oscillator (range between 0-100) used to identify overbought (when  $RSI > 70$ ) and oversold (when  $RSI < 30$ ) conditions, helping market participants to anticipate potential reversals (Rosillo et al., 2013). The formula for calculation of RSI is given as:

$$RSI = 100 - \left[ \frac{100}{1 + RS} \right] \quad \dots (5)$$

$$RS = \frac{\text{Average Gain over } n \text{ periods}}{\text{Average Loss over } n \text{ periods}} \quad \dots (6)$$

In the above case RS stands for relative strength and  $n$  denotes 14 periods of selected time frame. Likewise, Average Gain is calculated dividing sum of gains over the past  $n$  periods by  $n$  periods and Average Loss is calculated dividing sum of losses over the past  $n$  periods by  $n$  periods. The fourth selected technical indicator is Bollinger Bands (BB) which is a volatility-based technical indicator consisting of a middle band and two outer bands representing standard



deviations( $\sigma$ ) from the SMA (Lento et al., 2007). It was developed by John Bollinger (1986) to measure price volatility and identify overbought and oversold conditions of a stock. It consists of a middle band (SMA 20-period) and two outer bands set at a specified number of standard deviations ( $\sigma$ ) usually  $\pm 2$ . When the prices of a stock touch the upper band, the stock may be overbought, whereas touching the lower band suggests an oversold condition of the stock. The formula for calculation of BB is given as:

$$\text{Middle Band} = \text{SMA}(n) \quad \dots(7)$$

$$\text{Upper Band} = \text{SMA}(n) + (k \times \sigma) \quad \dots(8)$$

$$\text{Lower Band} = \text{SMA}(n) - (k \times \sigma) \quad \dots(9)$$

In the above equations, SMA (n) implies the Simple Moving Average over 20 periods. Likewise,  $\sigma$  is Standard deviation of SMA (n) price and k is multiplier (typically 2).

The fifth selected technical indicator is Fibonacci Retracement Levels. It is derived from the Fibonacci sequence and commonly uses retracement levels 23.6 percent, 38.2 percent, 50 percent, 61.8 percent, and 78.6 percent. It is used to identify potential support and resistance levels at 23.6 percent, 38.2 percent, 50 percent, 61.8 percent, and 100 percent retracements (Shaker et al., 2018).

$$\text{Retracement Level} = \text{High Price} - (\text{High Price} - \text{Low Price}) \times F \quad \dots (10)$$

In the above, equation, F is the Fibonacci ratio such as 0.236, 0.382, 0.50, 0.618, 0.786).

Therefore, in the methodological perspectives, the fair value gap is measured by comparing actual daily price action of the Banking Sub-index with their expected values based on technical indicators. In this regard, SMA crossovers, MACD signals, and RSI thresholds validate upward or downward trends. Likewise, BB assess price volatility and breakout probabilities. Finally, Fibonacci retracement levels is expected to identify critical turning points in price movements in the sub-index.

## **Results and Discussion**

### **Simple Moving Averages (SMA)**

The figure 1 below is a technical chart of banking sub-index that depicts 50-day and 200-day SMA. In the figure below, the thicker line is for 50-day SMA and thinner line is 200-day SMA. It is clearly visible that as soon as golden crossover is observed, that banking sector is increased by 489 points (38.82%) within about 20 trading days' time periods. This is a valuable signal trading and investment optimization.



**Figure 1****SMA of 50-Day and 200-Day**

Note: This Figure is adopted by author as generated by Sharesansar Technical Chart based on the data of Nepal stock Exchange (NEPSE).

**RSI and MACD**

RSI measures the speed and change of price movements, helping to identify overbought and oversold conditions as a momentum oscillator (Wilder, 1978). Similarly, MACD measures the relationship between two moving averages of stock and helps to identify potential trend reversals (Appel, 2005). In this regard, empirical studies have revealed that MACD crossovers serve as strong signals for price corrections of the stock (Achelis, 2001). It is better to use MACD and RSI signals for best result. Hence Figure 2 below is presented both the indicators simultaneously. It is clearly visible that both of the indicators have given buy signals for banking sector script during the month of 2024 July and within three weeks, there is observed substantial upward trend rising from nearby 1100 and reached near 1750. It is about 650-point gains (Figure 2).

**Figure 2: Relative Strength Index and Moving Average Convergence Divergence**

Note: This Figure is adopted by author as generated by Sharesansar Technical Chart based on the data of Nepal stock Exchange (NEPSE).

### Bollinger Bands

The Bollinger Bands (BB) is a volatility-based technical indicator consisting of a middle band and two outer bands representing standard deviations( $\sigma$ ) from the SMA (Lento et al., 2007). Essentially, when price touches the upper band, it may indicate overbought and when it touches the lower band, it may indicate oversold. It is clearly visible in Figure that as soon as the price of banking sub-index touches the lower band it bounces back upward and touching upper gives reaction to downward pressure in general. Therefore, this pattern is aligning with established standard of BB.

**Figure 3: Bollinger Bands**

Note: This Figure is adopted by author as generated by Sharesansar Technical Chart based on the data of Nepal stock Exchange (NEPSE).

### Fibonacci Retracement

Fibonacci Retracement is a technical analysis tool used to identify potential support and resistance levels based on key Fibonacci ratios. It is clearly visible that at each of the Fibonacci retracement level such as 23.6 percent, 38.2 percent, 50 percent, 61.8 percent, and 78.6 there is reaction in the composite price movement of Banking sub-index of NEPSE as a support and resistance.

**Figure 4: Fibonacci Retracement**



Note: This Figure is adopted by author as generated by Sharesansar Technical Chart based on the data of Nepal stock Exchange (NEPSE).

### Conclusions and Implications

This study highlights the effectiveness of selected five technical indicators viz., Simple Moving Averages (SMA), Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), Bollinger Bands (BB), and Fibonacci Retracement to identify potential trading opportunities and fair value gaps in the listed shares of Nepal Stock Exchange (NEPSE). The observed golden crossover based on the 50-day and 200-day SMA led to a significant 38.82 percent price increase within 20 trading days, indicating its predictive value and fair value gap location both. Likewise, the simultaneous confirmation from RSI and MACD during the same period generated strong buy signals, resulting in a 650-point gain in just short span of time three weeks. Moreover, Bollinger Bands reliably and effectively signaled overbought and oversold conditions of the banking stocks, confirming standard price movement patterns. Finally, Fibonacci Retracement levels also served as reliable support and resistance zones that provided further validation of price reactions of the banking stocks. Therefore, the findings have critical implications for all market participants such as investors, traders, and market analysts. Hence, it can be inferred that by integrating multiple

technical indicators, market participants can improve risk management, optimize investment choosing correct entry and exit points, thereby enhance portfolio returns. Essentially, this study suggests that technical analysis can be a valuable tool in less efficient markets like NEPSE 98 too, where fundamental analysis alone cannot fully capture market dynamics. Furthermore, future research is expected to focus on quantitative back testing and integrating fundamental factors for a more holistic and reliable trading strategy.

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