Acknowledgement

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Abstract

This research introduces "Bitcoin Range Theory," a trading strategy developed by Aryan Patel to systematically capture intraday movements in the price of Bitcoin. The strategy constructs mathematical levels based on the daily opening price using the formula:

$$\text{Level}_i = (\sqrt{x} + i)^2 \quad \text{for } i = ..., -2, -1, 0, 1, 2, ...$$

where x is the opening price recorded at 5:30 AM IST. Levels are calculated both above and below the open, and trades are initiated when 15-minute candles break one level, targeting the next. ICT (Inner Circle Trader) confirmation techniques and volume filters improve trade validity. The strategy has been applied in real-time live markets and backtested using an Excel-based environment, showing 65–70% accuracy under normal conditions. This paper also compares the proposed model with existing ORB strategies and discusses future enhancements including automation and machine learning integration. Although the strategy is illustrated using Bitcoin, the model is applicable across various indices and assets with minor adjustments to opening times.

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Chapter 1: Introduction

1.1 Introduction to Topic

Intraday trading, especially during the volatile opening sessions, has long attracted professional and retail traders alike. One well-known method is the Opening Range Breakout (ORB), which identifies directional momentum early in the day. Bitcoin, with its 24/7 trading cycle and pronounced volatility, presents a unique opportunity for applying structured intraday strategies. This paper presents a strategy that uses mathematically derived levels from the opening price of Bitcoin, forming the core of what is named the "Bitcoin Range Theory."

1.2 Motivation

This strategy was motivated by the need for a repeatable, mechanical trading approach grounded in price behavior and mathematical logic. The author sought to merge traditional intraday concepts with modern scripting tools in Excel, creating a repeatable range system that performs well across varying conditions. This model is a result of continued market observation and personal learning.

1.3 Problem Statement

Despite the abundance of intraday strategies, few provide dynamic, adaptable, and formula-based levels grounded in market structure. There exists a need for a Bitcoin-specific method that is simple yet powerful in capturing price movements with a high degree of accuracy.

1.4 Objectives

- To develop a level-based intraday strategy for Bitcoin
- To use mathematical formulas for price level generation
- To test the model both in live market and through backtesting
- To compare its effectiveness against conventional ORB techniques
- To identify its limitations and potential improvements
- To generalize the model for high-value assets and global indices

Chapter 2: Literature Review

ORB strategies have been applied widely in stocks, futures, and Forex markets. Studies have shown that assets often exhibit momentum after breaking their opening range. Research such as Holmberg et al. (2013) and Zarattini & Aziz (2023) show that systematic trading using levels derived from the first few minutes or price anchors such as open or previous close provide statistically significant returns. Bitcoin-specific studies show high intraday volatility, volume clustering around specific hours, and the presence of liquidity zones, supporting the utility of level-based systems.

Chapter 3: Proposed Model/Architecture

The Bitcoin Range Theory constructs symmetric levels using the formula:

$$\text{Level}_i = (\sqrt{x} + i)^2$$

Where: - x : Opening price of the asset - i : Natural numbers and their negatives (e.g., -3, -2, -1, 1, 2, 3...)

These levels are plotted both above and below the opening price, enabling a bidirectional trade framework. A trade is initiated when a 15-minute candle breaks a level decisively (confirmed by body close). The direction of the trade is always towards the next level.

This model is not limited to Bitcoin. It can be applied to: - **Bank Nifty (India)** using 9:15 AM IST as opening time - **US30 / US100 (Dow Jones / Nasdaq)** using 3:30 AM IST (U.S. equity market open) - **Other spot charts or high-value instruments**, as long as opening time and volatility conditions are understood and respected.

3.1 Topic 1: Entry Criteria

- 15-minute candle must break and close beyond a level
- Confirmed with ICT methods: liquidity sweep, market structure shift, or order block
- Volume spike during breakout supports entry
- Confirmation from higher time frame bias strengthens signal

3.2 Topic 2: Exit and Risk

- Target: Next calculated level
- Stop Loss: Just below/above the breakout level
- R-Multiple aimed: 1.5 to 2.0
- Risk per trade: 0.5% of total capital, reduced to 0.25% after 2 losses in a row

Chapter 4: Implementation Environment

The strategy was implemented using an Excel spreadsheet designed by the author. It calculates levels dynamically using the formula, logs backtest entries and exits, and tracks P&L. The sheet includes:

- Input: Manual entry of opening price (e.g., 5:30 AM IST for Bitcoin, 9:15 AM for Bank Nifty)
- Level Calculation: Sqrt(x) calculated, then i added or subtracted, then squared
- Trade Logger: Entry time, bias, result, R-multiple, confirmation method, and notes
- Summary Table: Win rate, total trades, average return, and performance filters
- No macros used, only formula-driven logic

Historical 15-minute OHLC Bitcoin data (Jan–Apr 2025) was used. ICT confirmations were manually logged based on chart reviews.

Chapter 5: Experimental Results

- Total Trades (Jan–Apr): 120 (Live tracked)
- Win Rate: 68%
- Avg R-Multiple: 0.5
- Max Drawdown: 5%
- Net Equity Gain: 12%
- Risk Management: 0.5% standard risk; 0.25% after 2 consecutive losses
- Best performance on weekdays; weekends excluded

Case Study: 23-May - Bias: Sell - Reason: Price broke and sustained below level 7 - Confirmation: ICT Order Block on 15-min chart, matching daily bias - Result: Win (R-multiple 6.5) - Time: 16:45

Chapter 6: Limitations and Future Enhancements

Limitations: - Underperforms in sideways/range-bound markets - Does not adapt automatically to volatility spikes - Requires manual chart review for ICT confirmations

Future Enhancements: - Automate strategy via Python + Binance API - Integrate ATR to dynamically adjust level spacing - Apply ML models (e.g., LSTM) to forecast successful breakout conditions - Build a dashboard for real-time level tracking and alerts - Develop Telegram alert bot for trade notifications

Conclusion

Bitcoin Range Theory is a novel, mathematically grounded intraday strategy that provides consistent results when applied with discipline and confirmation techniques. It has been live-tested successfully by Aryan Patel. With further automation, improved filters, and dynamic level adjustment, it has the potential to evolve into a robust algorithmic trading tool. Its flexibility also allows it to be adapted to other indices and assets with high value and structured market opens.

References

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