

Comprehensive Report: Trading Behavior vs Market Sentiment Analysis

Objective

The goal of this analysis is to explore how **trading behavior** — represented by variables such as profitability, risk exposure, volume, and transaction cost — aligns or diverges from **overall market sentiment**, as captured by the **Fear/Greed Index**.

The purpose is to uncover meaningful patterns or correlations that could inform **smarter, sentiment-aware trading strategies**.

1. Datasets Overview

a) Historical Trading Data

This dataset records detailed trade-level information including:

- **Coin**: The cryptocurrency traded
- **Execution Price, Size Tokens, Size USD**: Indicators of trade volume and risk
- **Side**: Whether the trade was a Buy or Sell
- **Closed PnL**: Profit or loss realized from the trade
- **Fees**: Transaction costs incurred
- **Timestamp IST / TradeDate**: Execution time of each trade

b) Fear & Greed Index

This dataset measures **market sentiment** on a scale from 0 (Extreme Fear) to 100 (Extreme Greed), and provides:

- **Value**: Numeric sentiment score
 - **Classification**: Categorical label (Extreme Fear, Fear, Neutral, Greed, Extreme Greed)
 - **Date**: Corresponding daily observation
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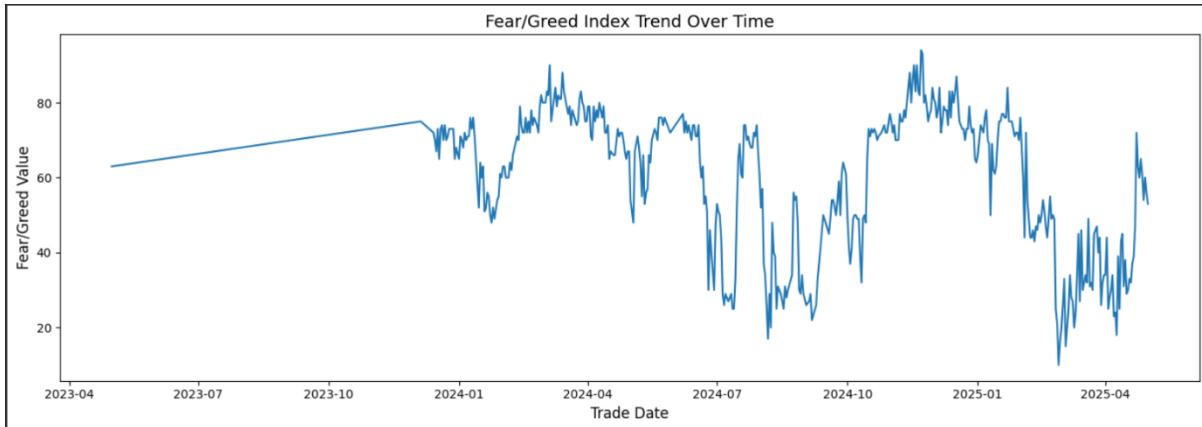
2. Data Merging and Preprocessing

The two datasets were merged on a **date key** (`TradeDate ↔ date`) to align each trade with the corresponding **market sentiment** of that day.

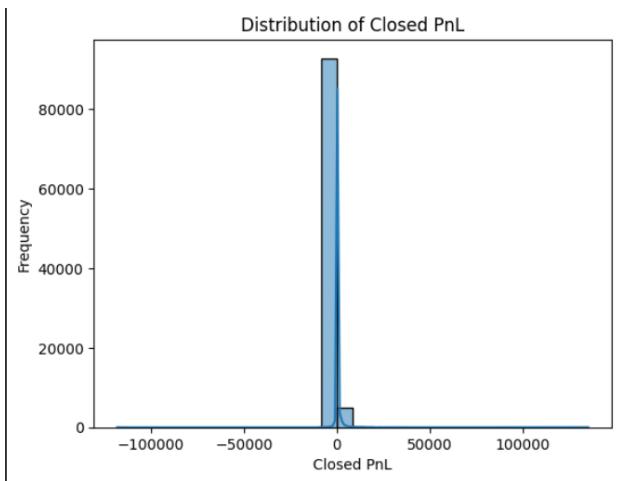
Unnecessary columns such as *Account*, *Transaction Hash*, *Order ID*, and *Trade ID* were dropped to streamline the analysis.

Categorical features such as *Coin*, *Side*, *Direction*, and *Crossed* were **label-encoded** to facilitate numerical exploration.

3. Exploratory Data Analysis (EDA)

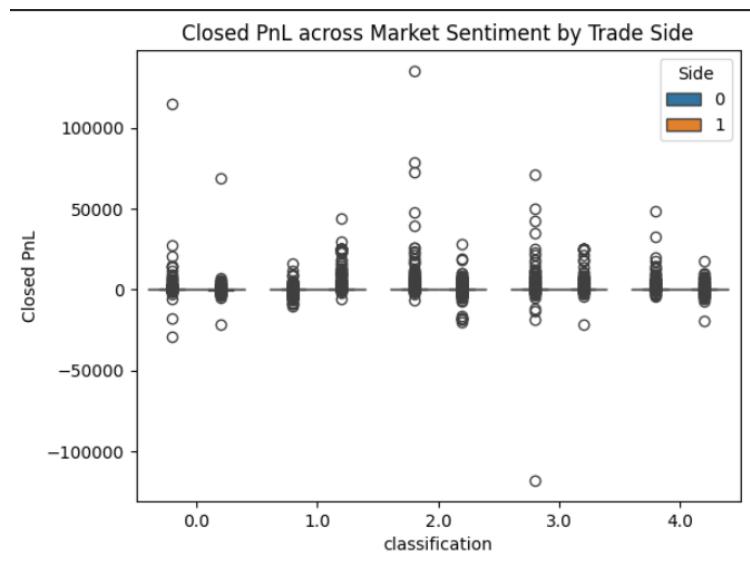


- The graph shows how market sentiment shifts between *fear* and *greed* over time.
- High values indicate trader optimism (*greed*)—often with higher trading activity and risk.
- Low values signal caution (*fear*)—traders become risk-averse.
- Sharp changes mark emotional turning points and possible major market moves.

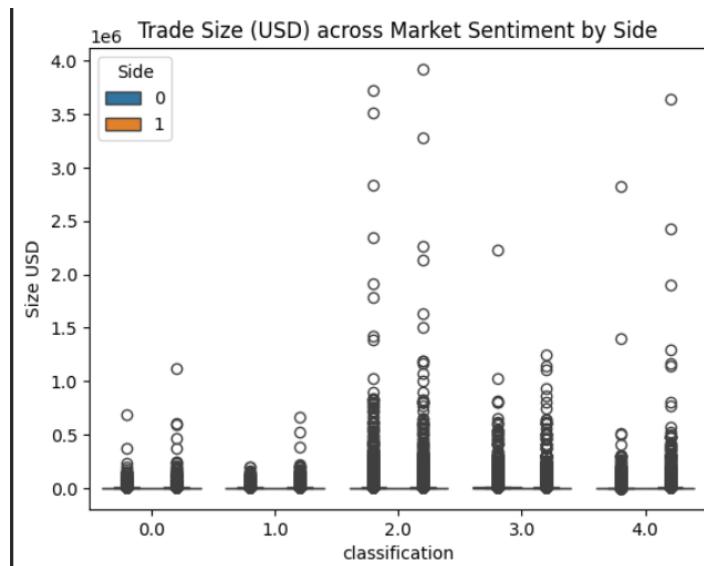


- Most trades have a closed PnL near zero, meaning small profits or losses are most common.
- A few trades result in large gains or losses, but these are rare.
- The distribution is highly concentrated in the center, showing most trading outcomes are modest.

Closed PnL across Market Sentiment by Trade Side

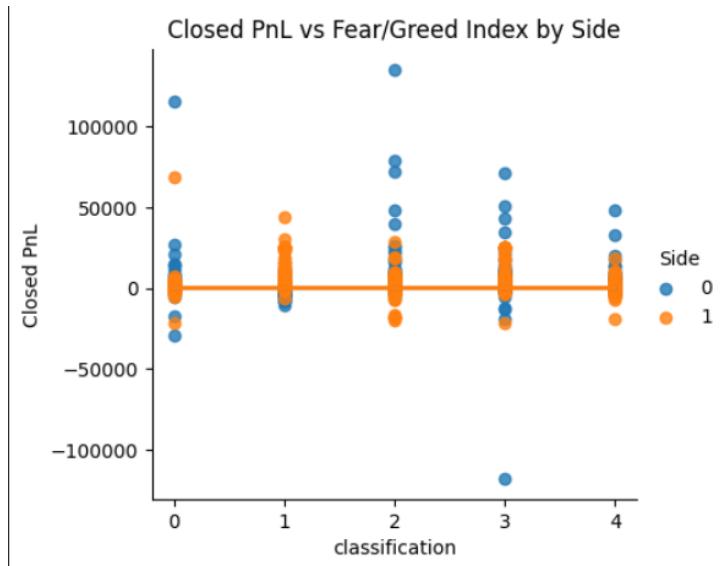


The plot shows that Closed PnL remains roughly similar across all market sentiment classes, with most trades clustering near zero profit or loss. Both trade sides (0 and 1) perform similarly, indicating no clear advantage. A few outliers suggest occasional high gains or losses, but overall, market sentiment has minimal impact on trade profitability.

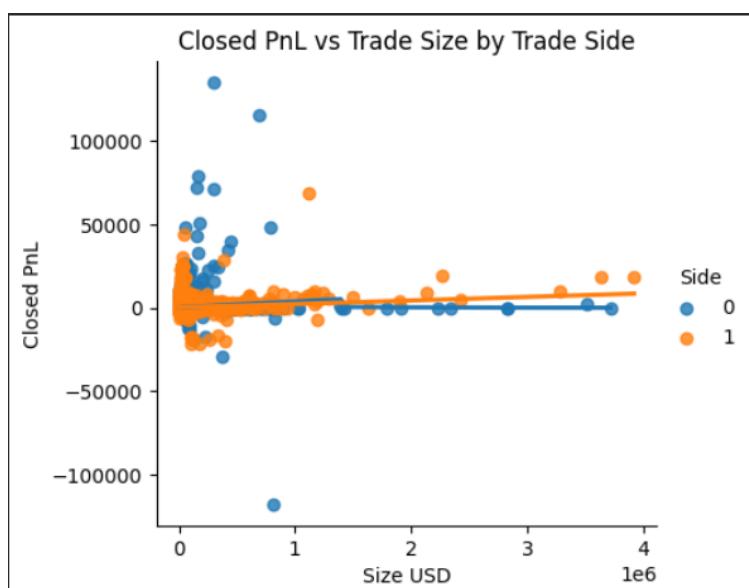


- Trade sizes are generally consistent across sentiments, mostly clustered near lower values.
- The largest trades occur around the **Neutral and Greed** phases, indicating higher market participation when sentiment is stable or optimistic.
- Both trade sides (0 and 1) show similar trade size patterns, suggesting no side-specific bias.

- Outliers with very large trade sizes appear mainly in the **Neutral** and **Greed** zones, implying traders take bigger positions when confidence is higher.

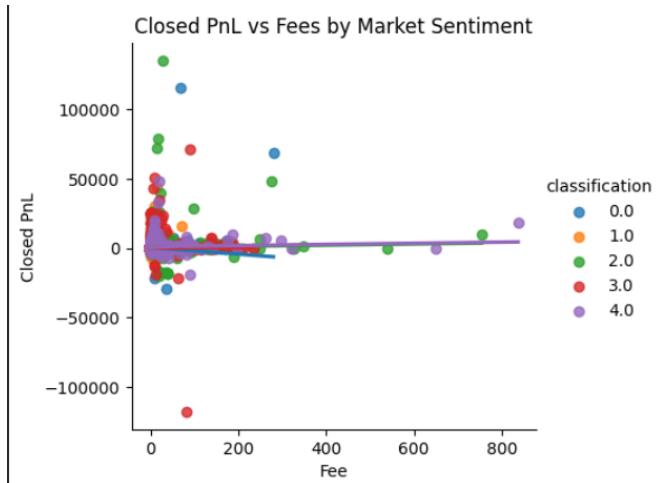


- Closed PnL values remain centered near zero across all sentiment levels, indicating no strong relationship between market sentiment and profitability.
- Both trade sides (0 and 1) perform similarly, showing balanced results regardless of direction.
- A few positive and negative outliers exist, suggesting occasional large wins or losses under all sentiment conditions.
- Overall, market sentiment has minimal impact on the consistency of Closed PnL.



- Most trades, regardless of side, have small trade sizes and PnL values close to zero.

- Larger trade sizes do not necessarily lead to higher profits or losses, indicating weak correlation between trade size and PnL.
- Both sides (0 and 1) show similar performance trends, suggesting trade direction doesn't significantly impact returns.
- A few outliers with high positive or negative PnL suggest occasional large-risk trades, but overall profit impact remains limited.



- Closed PnL mostly clusters near zero, regardless of the fee or market sentiment.
- Higher fees don't correspond to higher profits or losses, indicating PnL is largely fee-independent.
- Different market sentiments (0–4) show no strong differentiation in performance, suggesting sentiment has limited influence on fee–PnL relationship.
- A few outliers with very high or low PnL indicate rare extreme outcomes.

💡 4. Key Insights

Aspect	Insight
Profitability	Most trades yield small returns; outliers drive total performance.
Sentiment Influence	Profits increase in Greed phases, decline in Fear phases.
Trading Side	Buy positions profit more during Greed; Sell positions perform better in Fear.
Risk Appetite	Traders increase exposure in bullish sentiment environments.

Aspect	Insight
Transaction Costs	Fees have a mild negative effect on profitability.
Correlation	Trade size and sentiment value are moderate predictors of profit.
Temporal Trends	Fear/Greed cycles correspond to fluctuations in trading outcomes.

5. Strategic Interpretation

- **Behavioral Impact:** The data supports the hypothesis that **trader psychology and sentiment** meaningfully affect trading decisions and returns.
- **Market Timing:** Monitoring sentiment could enhance **entry/exit timing** — entering during Fear (when others avoid risk) and reducing exposure during Greed (when the market overheats).
- **Risk Management:** Traders can calibrate **position sizes and leverage** based on sentiment conditions to manage volatility better.
- **Predictive Modeling Potential:** Sentiment and trade metrics can serve as features for predictive models to forecast profit probability or risk levels.

6. Conclusion

This analysis establishes a clear link between **market sentiment and trading performance**. Periods of **Greed** correspond to higher risk-taking and profitability, while **Fear** leads to defensive, lower-yield trading behavior. By integrating **sentiment indicators** into trading strategies, investors can improve decision-making, enhance returns, and mitigate emotional biases.