

Analyzing the Impact of Fear & Greed on Crypto Trading Outcomes

Summary

This project explores how cryptocurrency trader behavior is influenced by market sentiment, measured using the Bitcoin Fear & Greed Index. By analyzing trading metrics such as profitability, risk, volume, and leverage under various sentiment conditions, we identify how emotional regimes impact trader outcomes. The findings reveal that while extreme greed results in the highest profits, periods of fear also offer valuable opportunities for strategic traders. This analysis provides actionable insights to build sentiment-aware trading strategies.

Introduction

The cryptocurrency market is known for its volatility and emotional influence. The *Fear and Greed Index* offers a way to quantify market sentiment on a daily basis. This study aims to investigate how such sentiments affect real-world trading performance. Using historical trading data and sentiment labels, we analyze patterns in profitability, risk, and trader behavior to uncover smarter ways to trade in volatile environments.

Dataset Overview

a. Fear & Greed Index (fear_greed_index.csv)

- Columns: timestamp, value, classification, date
- Sentiment Classes: Extreme Fear, Fear, Neutral, Greed, Extreme Greed

b. Historical Trader Data (historical_data.csv)

- **Columns:** Account, Coin, Execution Price, Size, Closed PnL, Fee, Timestamp IST, etc. size 200,000+
- Includes trade performance, direction, leverage, and transaction metadata

Exploratory Data Analysis

a. *Sentiment Distribution*

- Observation:
The market is most often in Fear or Greed, meaning traders frequently operate under emotionally driven conditions.

- Interpretation:
This suggests that market participants are often swayed by volatility and social narratives. The extreme sentiments (Greed/Fear) are less frequent, but highly impactful when they occur. Trading strategies should prioritize preparation for these phases, despite their rarity.

b. Average PnL by Sentiment

Sentiment	Avg PnL
Extreme Greed	67.89
Fear	54.29
Greed	42.74
Neutral	34.30
Extreme Fear	34.53

Observation:

- The highest profits occur during Extreme Greed, as traders likely ride upward trends.
- Surprisingly, Fear ranks second, indicating successful contrarian trading.
- Neutral sentiment yields lower average PnL.

Interpretation:

Extreme Greed offers a momentum-based opportunity, while Fear allows smart traders to buy dips. Neutral markets are less favorable for profit, likely due to indecision and sideways movement.

c. Win Rate (Profitability Rate)

Sentiment	Win Rate
Extreme Greed	46.49%
Fear	42.08%
Greed	38.48%
Neutral	39.69%
Extreme Fear	37.06%

Observation:
Win rates are highest in Extreme Greed and Fear, while Extreme Fear sees the lowest success rate.

Interpretation:
In high-confidence bull markets, trades succeed more often. Fear phases show relatively strong performance, again highlighting that dip-buying behavior is effective. However, in Extreme Fear, panic and irrationality may lead to poor decision-making, causing low success rates.

d. PnL Distribution (Box Plot Insight)

Observation:
All sentiments show high variance in PnL, with outliers both positive and negative. These outliers are most pronounced in Fear and Greed.

Interpretation:
These results point to higher risk and volatility during emotionally charged markets. While these conditions present lucrative opportunities, risk of major losses is also high. This reinforces the need for proper risk management (e.g., stop-loss, position sizing).

e. Correlation Heatmap Insight

Key Correlation Findings:

- Size USD ⇄ Fee: Very strong positive correlation (~0.75)
- Leverage does not show strong correlation with sentiment or outcome variables

Interpretation:

- Larger trades incur higher fees, which may erode net profitability if not managed.
- Leverage alone isn't a predictor of success, implying that the way leverage is used matters more than just its magnitude.

f. Top Trader Performance by Sentiment

Account	Sentiment	Avg PnL	Win Rate	Score
Ox430f...	Extreme Greed	8285.66	100%	1.00
Ox3f9a...	Extreme Fear	5.82	100%	0.71
Oxa520...	Greed	408.98	95.37%	0.69
Ox75f7...	Mixed	29–81	77–91%	0.55–0.65

Observation:

Top accounts show consistent profitability and high win rates across multiple sentiment classes.

Interpretation:

These traders likely use adaptive strategies that:

- Adjust risk levels according to market sentiment
- Exploit both momentum (during Greed) and reversal opportunities (during Fear)
- Maintain discipline, avoiding emotional decisions during Extreme Fear

Key Insights

- Extreme Greed is the most profitable regime for traders
- Fear offers contrarian opportunities with surprisingly good results
- Extreme Fear has the lowest win rate and highest risk
- Traders tend to be more active (higher volume) during Fear and Greed
- Smart traders show adaptability across all sentiments, not just bull runs
- Correlations reveal that high volume = high fees, important for strategy optimization

Conclusion

This study demonstrates that trading performance is heavily influenced by market sentiment. While *Extreme Greed* conditions offer the highest average returns, *Fear* also provides

profitable opportunities for contrarian traders. Risk is notably higher during sentiment extremes, with a large spread in outcomes. Top-performing traders show consistent performance across all emotional market states, indicating that success lies in adaptability and discipline. These insights can guide the development of sentiment-aware algorithms and smarter human trading decisions.