

Multi-Asset Market Insights: Extreme Positioning in Commitments of Traders (COT) Data

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Executive Summary

This report presents a quantitative analysis of Commitments of Traders (COT) data to evaluate the predictive power of extreme positioning in three major futures markets: Euro FX (6E), Crude Oil (CL), and E-mini S&P 500 (ES).

Extremes are defined as z-scores exceeding ± 2 standard deviations for both commercial (hedgers) and non-commercial (speculators) net positions. Average forward returns are calculated at 1-week and 2-week horizons following these events.

Key findings:

- Crude Oil exhibits the strongest signals, with average 1-week returns of +2.21% after commercial oversold positions and +2.34% after non-commercial overbought positions.
- Euro FX shows clear contrarian tendencies, particularly a delayed reversal (-0.13% at 2 weeks) after non-commercial oversold positions
 - E-mini S&P 500 produces milder and less consistent results.
- Rolling correlation analysis (52-week window) reveals near-perfect opposition between commercial and non-commercial positions in Euro FX (-0.991) and Crude Oil (-0.984), but only moderate opposition in ES (-0.593).

These asset-specific patterns highlight the value of COT extremes as a tool for short-term positioning strategies.

1. Introduction

The Commitments of Traders (COT) report is a weekly release from the CFTC that shows how different types of traders are positioned in U.S. futures markets. It breaks participants into commercials (mostly hedgers), non-commercials (speculators), and smaller players, along with total open interest.

Many traders watch COT data because it gives a glimpse into what the "smart money" (hedgers) and big speculators are doing. The idea is that when positioning gets extreme, it can signal potential short-term price moves — either reversals or continuation.

In this project, I put that idea to the test. I looked at three major futures contracts — Euro FX (6E), Crude Oil (CL), and E-mini S&P 500 (ES) — focusing on extreme positioning (z-scores beyond ± 2 standard deviations). I compared commercials and non-commercials, and checked average price returns 1 week and 2 weeks after those extremes.

2. Methodology

Research Design: This study uses a quantitative approach to examine how extreme positioning in Commitments of Traders (COT) data relates to subsequent price movements across multiple asset classes. The focus is on historical positioning and market prices to identify patterns and predictive signals.

Data Sources

- COT data was obtained from the Commodity Futures Trading Commission (CFTC) website.
- Price data was retrieved from Yahoo Finance using their Python module (yfinance).

Asset Selection : Three assets were chosen from different markets for diversification:

- Commodities: Crude Oil (CL)
- Currency (FX): Euro FX (6E)
- Equity Indices: E-mini S&P 500 (ES)

This selection allowed evaluation of COT's predictive consistency across varied market types.

Timeline: The analysis covers January 1, 2010, to October 7, 2025. This period ensures consistency across different market regimes and provides sufficient data for robust z-score calculations.

Positioning Measures and Extremes: Only two trader categories were analysed: Commercials (hedgers — producers, merchants, processors, etc.) and Non-Commercials (speculators — hedge funds, CTAs, etc.). Non-reportables were excluded due to their limited impact on market movements.

For each category and asset:

- **Net positions** were calculated (long contracts minus short contracts).
- **Z-scores** were derived to standardize positions across assets and time: $Z\text{-score} = (\text{current net position} - \text{historical mean}) / \text{historical standard deviation}$

Extreme positioning was defined as z-scores exceeding **± 2 standard deviations** ($|Z| > 2.0$). These extremes were seen as potential inflection points for price reversals or continuations.

Data Preparation: COT reports were aligned with Tuesday closing prices for consistency. Forward returns were calculated on the underlying futures prices at 1-week and 2-week intervals. Returns were measured starting from the Tuesday close (COT report date) to the respective horizons.

Analysis Approach: Conditional average returns were computed for each extreme event to measure subsequent price performance.

As a supplementary check, correlation analysis was conducted to examine the relationship between trader positioning (z-scores) and subsequent price movements (lagged returns). This helped assess whether extreme positioning preceded market reversals or trend continuation. Full-sample correlations were generally weak, reinforcing the focus on tail events ($\pm 2\sigma$ extremes).

3. RESULTS

The section presents the main findings from the analysis of extreme positioning in the three selected futures contracts.

3.1 Conditional Average Returns After Extreme Positioning: The tables below show the number of extremes found within the timeline(01-01-2010 to 07-10-2025) and the average forward returns for 1 and 2 weeks.

Table 1: Commercial Positioning Extremes

Asset	Signal	Count	1w Avg Return (%)	2w Avg Return (%)
Euro	Overbought	58	-0.0187	-0.0655
Euro	Oversold	53	0.2606	0.2379
Crude oil	Overbought	33	0.2719	0.6593
Crude oil	Oversold	54	2.2110	1.6280
E-mini S&P	Overbought	38	0.2965	0.4775
E-mini S&P	Oversold	41	-1.1020	0.0252

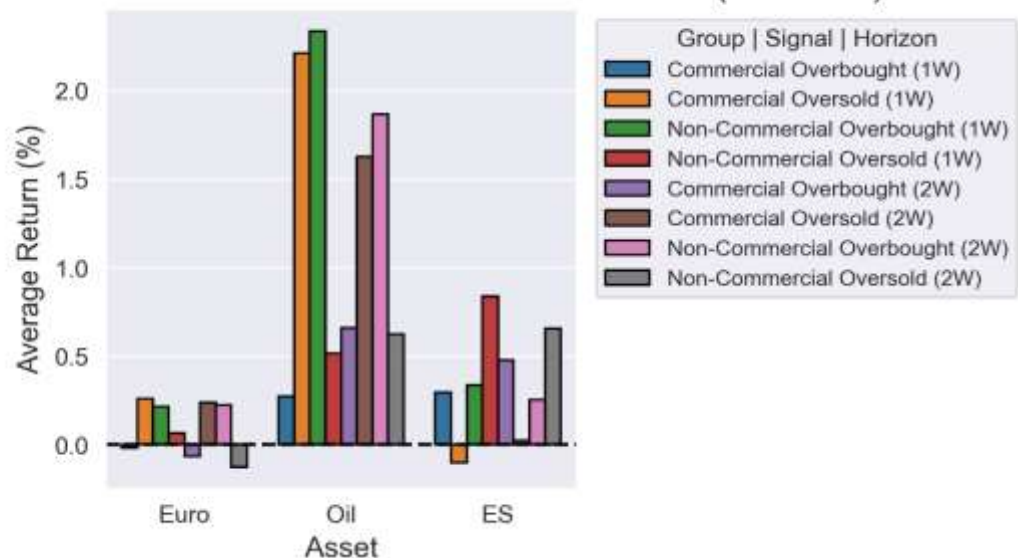
Table 2: Non commercials Positioning Extremes

Assets	Signal	Count	1w Avg Return (%)	1w Avg Return(%)
Euro	Overbought	48	0.2145	0.2264
Euro	Oversold	61	0.0636	-0.1253
Crude oil	Overbought	50	2.3363	1.8669
Crude oil	Oversold	37	0.5152	0.6235
E-mini S&P	Overbought	41	0.3379	0.2541
E-mini S&P	Oversold	46	0.8392	0.6557

3.2 Visual Summary

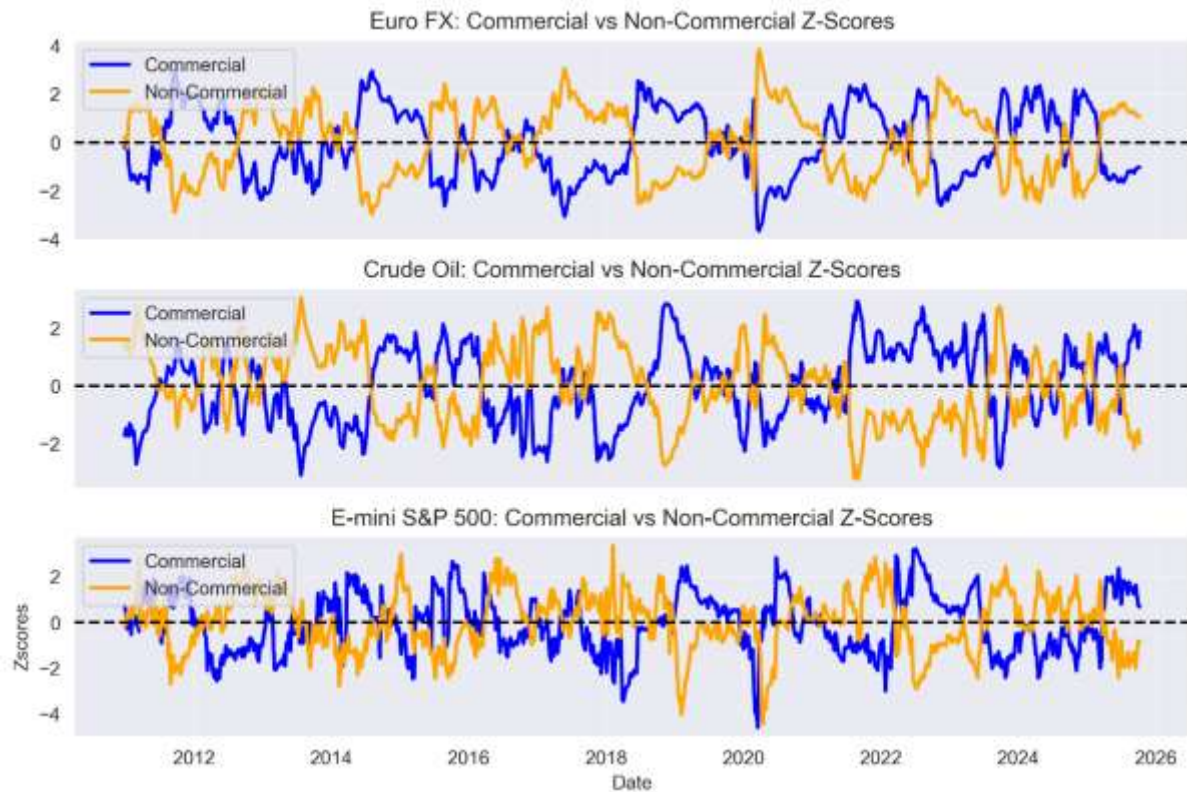
Figure 1: Average Forward Returns by Signal and Group

Extreme Positioning Signals ($\pm 2\sigma$ Z-Score)
Average Forward Returns: Commercial vs Non-Commercial (1W & 2W)



Average 1-week and 2-week returns following extreme positioning ($\pm 2\sigma$). Commercial signals shown in blue tones, non-commercial in orange tones. Crude Oil extremes consistently produce the largest positive returns.

Figure 2: Commercial vs Non-Commercial Z-Score Time Series



Time series of z-scores illustrating the degree of opposition between commercial and non-commercial positioning. Euro FX shows near-perfect mirroring, while E-mini S&P 500 exhibits weaker and more variable opposition.

3.3 Rolling Correlations Between Trader Groups

The average 52-week rolling correlation between commercial and non-commercial z-scores across the sample period is shown below:

ASSETS	Average Rolling Correlation
Euro FX	-0.991
Crude Oil	-0.984
E-mini S&P	-0.593

The near perfect negative correlations in Euro and Crude oil shows that Commercials and Non-commercials strongly mirror each other but the weaker correlations in E-mini S&P reflects more variable positioning dynamics.

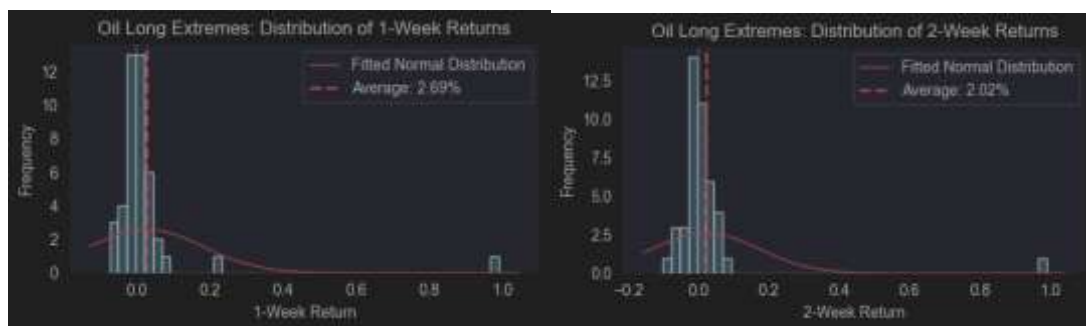
4.Key Insights & Trade Ideas

The analysis of extreme COT positioning ($\pm 2\sigma$ z-scores) reveals clear, **asset-specific** predictive patterns.

Crude Oil – Highest-Conviction Long Signal When **commercial oversold** ($< -2\sigma$) and **non-commercial overbought** ($> +2\sigma$) align simultaneously (44 events, enabled by the -0.984 rolling correlation):

- Average 1-week return: **+2.69%**
- Average 2-week return: **+2.02%**
- Win rate: ~50% (1-week)

The high average return despite a moderate win rate is driven by **strong positive skew** in the return distribution a few large winners significantly outweigh modest losses.



Trade idea: Go long Crude Oil on dual-extreme confirmation — combines speculative momentum with hedging pressure fade. This is the standout opportunity in the sample.

Euro FX – High-Conviction Contrarian Short Signal When **non-commercial oversold** ($< -2\sigma$) and **commercial overbought** ($> +2\sigma$) align (49 events, driven by the -0.991 rolling correlation):

- Average 1-week return: **+0.045%** (near flat)
- Average 2-week return: **-0.145%**
- Win rate: ~49% (1-week), ~45% (2-week)

This produces a reliable **delayed mean-reversion** pattern — initial flat performance followed by downside as speculative shorts unwind. **Trade idea:** Short Euro FX on dual-extreme short confirmation, targeting the 2-week horizon.

E-mini S&P 500 – Milder Signals Returns are generally positive but smaller in magnitude, with no dominant reversal or continuation pattern. The weaker rolling correlation (-0.593)

results in less consistent positioning dynamics. **Trade idea:** Limited standalone edge — best used as a supporting filter in broader equity strategies.

Overall COT extremes are most valuable in **Crude Oil** (high-reward longs) and **Euro FX** (contrarian shorts). The near-perfect negative correlations in these markets create pure, high-conviction dual-extreme setups, while ES remains noisier.

5. Limitations

While the analysis identifies promising signals from COT extremes, several limitations should be noted:

- **Sample Size and Event Frequency:** Extreme events ($\pm 2\sigma$) are rare. For example, the strongest Oil dual-long setup occurred only 44 times over 15 years (approx. 3 events per year), limiting statistical robustness and making out-of-sample testing challenging.
- **Data Frequency:** COT reports are weekly (Tuesday snapshot), which may miss intra-week positioning changes or rapid market moves. This reduces precision for very short-term trading.
- **Survivorship and Regime Dependence:** The sample period (2010–2025) includes diverse regimes (e.g., 2020 oil crash/recovery), but results may vary in future environments (e.g., structural shifts in commercial hedging behaviour).
- **No Risk Adjustment in Main Results:** While win rates and distribution skew were examined for key signals, formal risk metrics (e.g., Sharpe ratio, maximum drawdown) were not fully developed due to the event-based nature of the strategy.
- **Correlation vs Causation:** Strong conditional returns and correlations suggest predictive relationships, but do not prove causation — other factors (e.g., fundamentals) may drive both positioning and returns.

6. Conclusion

This report demonstrates that extreme positioning in Commitments of Traders (COT) data offers valuable short-term predictive signals, with clear asset-specific patterns.

Crude Oil provides the strongest edge through dual-extreme long setups (commercial oversold + non-commercial overbought), delivering +2.69% average 1-week return across 44 events, driven by positive skew from large winners.

Euro FX yields a reliable contrarian short signal via dual-extreme short alignment (non-commercial oversold + commercial overbought), producing a delayed reversal to -0.145% average 2-week return over 49 events.

In contrast, E-mini S&P 500 extremes generate milder and less consistent results, reflecting weaker group opposition.

The near-perfect negative correlations in Crude Oil (-0.984) and Euro FX (-0.991) create high-conviction dual-extreme opportunities, while the looser relationship in ES (-0.593) limits signal strength.

Overall, COT extremes serve as an effective complementary tool for short-term futures strategies, particularly long Crude Oil and short Euro FX setups.

Challenges and Technical hurdles: Obtaining, sorting, and cleaning the COT data for analysis was a very tedious part of this project which took a large part of my time, then a robust data selection script was developed by me to automate the task.

The inconsistencies in the name and figures of the COT data severely restricted and disturbed me which led me to reduce the timeline that I would be working with.

Note: All data processing, analysis, and visualization code used in this study is available in the accompanying GitHub repository: <https://github.com/praise-west/COT-multi-asset-analysis.git> .