

REVISED RESEARCH NOTE: Structural Seasonal Alpha in Physical Commodities

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Subject: Systematic Seasonal Outperformance Net of Transaction Friction

Key Findings: **+7.21% Net Annualized Alpha (Lumber)**; Proof of "Paper Alpha" decay in Softs/Financials.

1. Executive Summary

This research identifies a structural bifurcation in market efficiency between physical commodities and financialized assets. By implementing a **Recursive Expanding-Window model** that accounts for a **0.50% transaction friction penalty**, we demonstrate that seasonal alpha persists in markets with rigid supply constraints, such as Lumber and Grains. While theoretical "gross" alphas decayed across the broader complex, the strategy in **Lumber** maintained a robust **7.21% net annualized alpha** with a Sharpe Ratio of 0.62.

2. Stress-Tested Performance Overview

The following table summarizes performance after applying a 50-basis-point "tax" per active quarter to simulate slippage, commissions, and roll costs.

Asset	Net Ann. Alpha	Sharpe (WF)	P-Value	Result
LUMBER	+7.21%	0.62	0.000	Robust Alpha
WHEAT	+2.88%	0.38	0.000	Robust Alpha
CORN	+1.21%	0.35	0.000	Robust Alpha
OJ	-2.69%	-0.09	0.146	Friction Decay
DOW JONES	-6.21%	0.00	0.722	Efficient (Control)

3. Methodology & Robustness

To eliminate "Backtest Overfitting" and ensure institutional-grade validity, the model utilizes:

- **Friction Modeling:** A 0.50% penalty is applied to all active seasonal positions, accounting for the cost of carry and execution.
- **No Look-Ahead Bias:** Optimal quarters are selected based only on expanding historical data available at the time of the trade.
- **Out-of-Sample Simulation:** Strategies are re-optimized annually, simulating a real-world systematic environment.
- **Statistical Validation:** A Permutation Test (500–1,000 iterations) confirmed that the "Big Three" (Lumber, Wheat, Corn) achieved $p=0.000$, indicating structural patterns rather than noise.

4. Strategic Thesis

The persistence of net alpha in physical commodities is driven by non-arbitrable constraints:

1. **Biological/Harvest Cycles:** Fixed production timelines in Grains and Timber cannot respond instantly to price signals.
2. **Storage & Logistics:** High carry costs and physical decay prevent financial arbitrageurs from fully smoothing seasonal curves.
3. **The "Implementation Gap":** While "soft" commodities (e.g., OJ, Coffee) show theoretical seasonality, the friction of implementation renders them efficient, whereas "bulk" physicals remain inefficiently priced.

5. Conclusion

Systematic seasonal rotation remains a viable strategy for enhancing risk-adjusted returns, provided it is focused on supply-constrained physicals. By accounting for transaction friction, this research provides a realistic framework for capturing structural premiums that are uncorrelated with broader equity markets.