



# Retail Holiday Arbitrage

Traders@SMU

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# Agenda

- ❖ Industry Overview
- ❖ Pairs overview
- ❖ Performance Metrics
- ❖ Overview of the Model
- ❖ Results of the Model
- ❖ Past and Future Analysis



# The Consumer Retail Industry

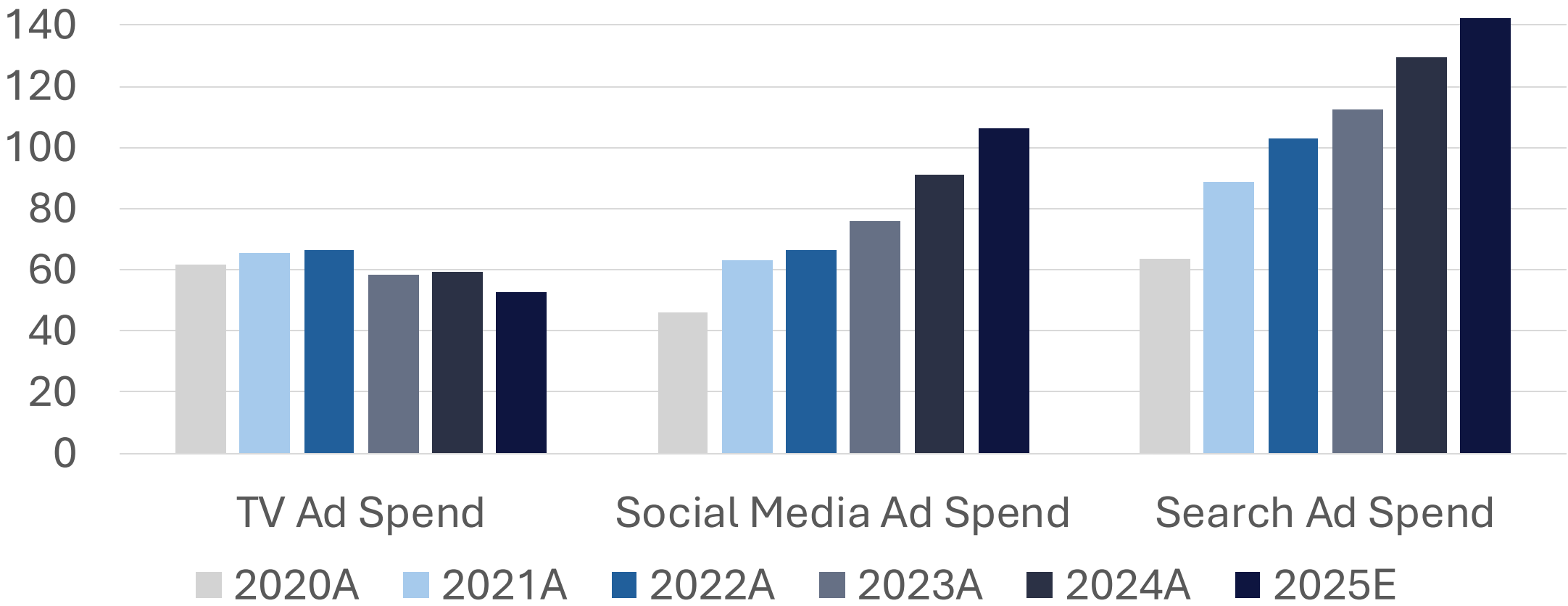
## Industry Trends

Since 2020, shifts in media awareness and usage have led changes in how retail is advertised and discovered. Trends are highly influenced through programs like affiliated marketing that promote product sentiment inflation.

### Common Flow of Retail Discovery



### Retail Ad Spend (in Billions \$)



## Macroeconomic Shifts

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### Inflation: Eroding Real Wages

Consumers have less discretionary income, leading to a pull-back on non-essential, big-ticket items. As a proxy higher levels of credit is used driving sales to retailers.

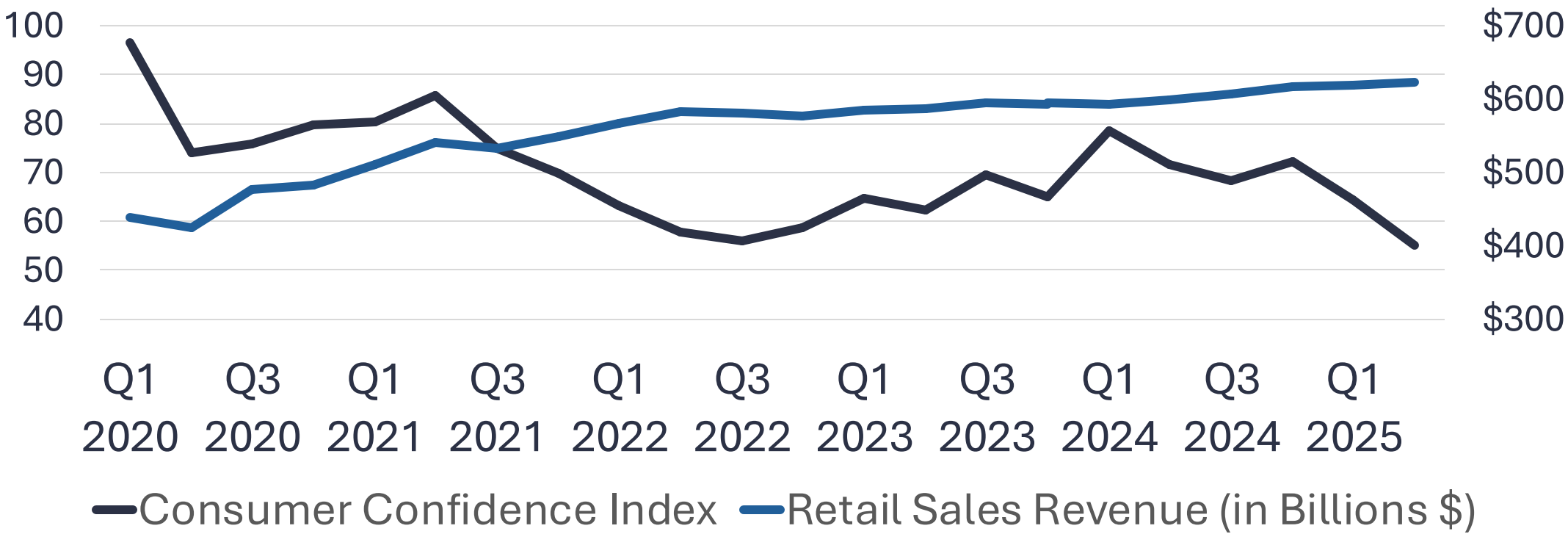
Driving consumers to prioritize value and brand loyalty simultaneously, increasing demand for private-label products and discount retailers.
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### Tariffs: A Double-Sided Impact

Retailers strategically pass costs to consumers, aiming to preserve competitive pricing. Purchase of inventory before full effects lead to inventory volatility and high carrying costs.

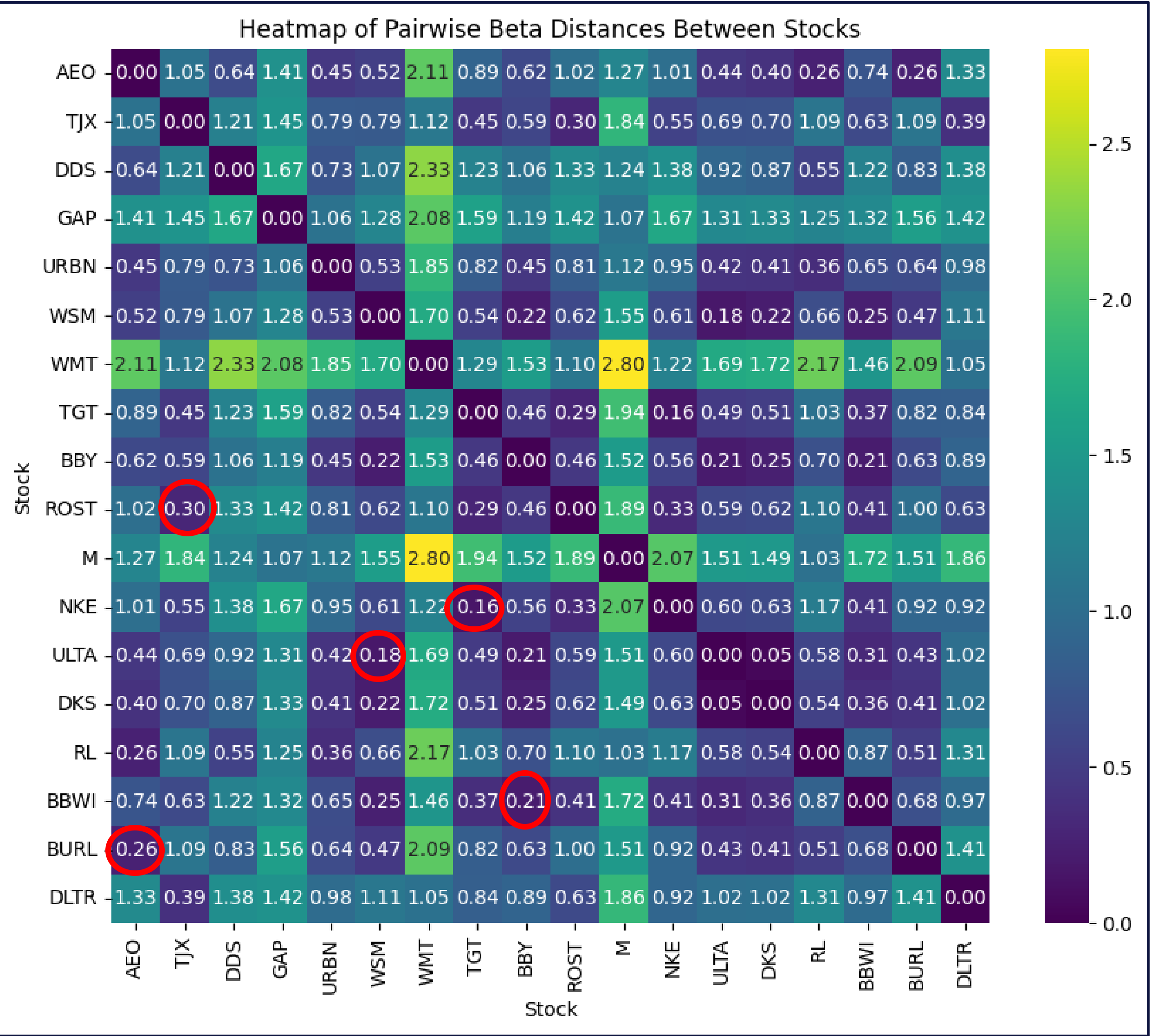
Consumers become discount, trust seeking as costs rise on imported raw materials/finished goods. UGC content provides retailers perceived authenticity that fuels cyclical trend adoptions.

### Consumer Sentiment vs Retail Revenue



Source: FactSet, FRED

# Pairs Overview



Original Pairs Selection & Distance
TGT & NIKE (0.16)
WSM & ULTA (0.18)
BBWI & BBY (0.21)
WSM & DKS (0.22)
WSM & BBY (0.22)

Finalized Pairs Selection & Distance
TGT & NIKE (0.16)
WSM & ULTA (0.18)
BBWI & BBY (0.21)
AEO & BURL (0.26)
ROST & TJX (0.30)

Wash Trading: Occurred with WSM, artificially manipulate the trading volume for WSM



# Performance Drivers

## Operational KPIs

### Sales: Units Per Transaction

The average number of items a customer purchases in a single transaction. Tracks the success of merchandising and product scarcity.

### Customer Loyalty: Retention Rate

The percentage of customers who return to make more purchases over a defined period. Retaining existing customers is significantly cheaper than acquiring new ones.

### Physical Measures: Foot Traffic

The total number of people who enter the store or visit the website. Evaluates the effectiveness of location and marketing efforts.

## Trading KPIs

### Implied Volatility

IV serves as a gauge for market sentiment on price movement; quantifies the risk associated with anticipated news such as sales reports.

### Earnings Per Share

EPS is the ultimate measure of a retailer's ability to convert peak holiday revenue into net profit after all expenses. The biggest stock price movements are triggered by the **Earnings Surprise**: the difference between reported EPS and analyst consensus

### Historical Pairs Spread

Deviation from the mean spread signals the movement is significant enough to warrant a trade entry. The mean-reverting movement signals the optimal time to close the position, as the expected profit is realized from L/S entry.

BURL US EquityExport

InflectionKPI CorrelationTrend Analysis

Alternative Data Metrics Summary - Burlington Stores Inc

Data up to 2023-07-05About the Data

Alt Data Metrics	Trailing YoY Growth %			Trailing PoP Growth %		
	91 Day	28 Day	7 Day	91 Day	28 Day	7 Day
Bloomberg Second Measure						
Observed Sales	2.57	5.34	7.64	7.27	-8.20	0.06
Observed Transactions	5.88	9.14	10.92	6.22	-5.71	-0.34
Observed Customers	3.22	7.08	10.33	4.11	-5.29	0.67
Average Transaction Value	-3.12	-3.49	-2.96	0.99	-2.64	0.39
Transactions per Customer	2.50	1.60	0.92	2.50	-0.78	-0.90
Sales per Customer	-0.63	-1.63	-2.44	3.04	-3.08	-0.61
Placer.ai						
Estimated Visits	6.61	12.21	15.28	10.70	-4.68	-1.99

Bloomberg Second Measure: ?

U.S. consumer transaction data

Panel: Millions of consumers

Geo: Mid-west > coasts

Card Type: Debit > credit

Placer.ai: ?

U.S. consumer foot-traffic data

Panel: 25 million mobile devices

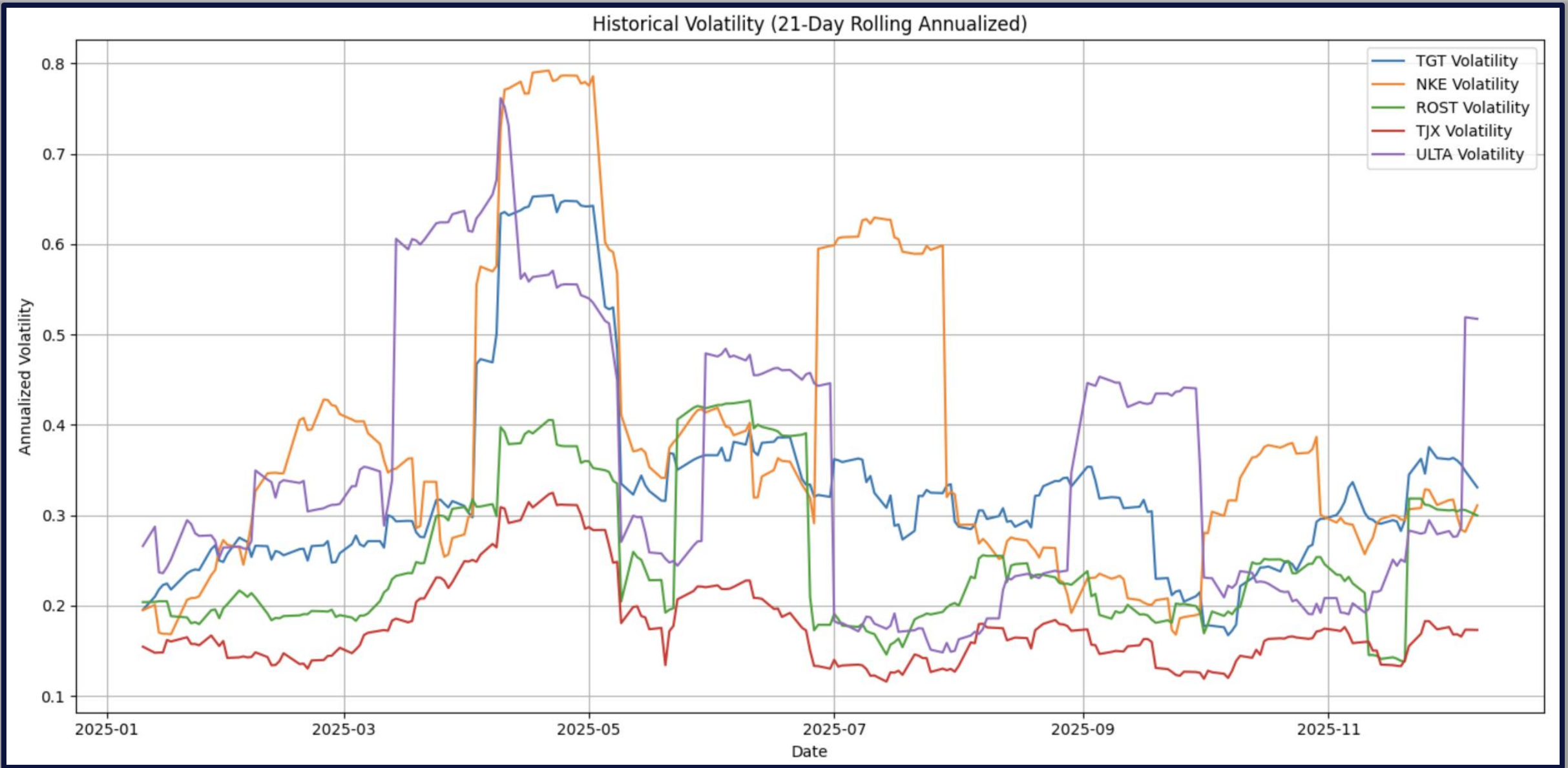
Stores: Outdoor > indoor

Operating Systems: iOS > Android

Observed Sales YoY Growth %

Comp Source Analyst Curated (BI)Growth Year-over-YearPeriod Weekly3M6M1Y2Y3Y5YMax

	2023											
Week Ending	16-Apr	23-Apr	30-Apr	07-May	14-May	21-May	28-May	04-Jun	11-Jun	18-Jun	25-Jun	02-Jul
Analyst Curated (BI) - Median	5.16	-0.85	-5.41	-6.85	13.49	2.40	0.65	0.15	5.47	2.28	4.40	7.13
Burlington Stores Inc	3.49	-5.40	-8.22	-0.85	19.17	6.96	7.22	0.86	10.93	2.90	1.84	7.15
TJX Cos Inc/The	11.05	1.05	-0.79	-5.89	17.31	4.65	4.71	7.25	6.55	4.99	9.10	9.35
Ross Stores Inc	6.83	1.53	-2.60	-7.82	9.66	0.15	-3.40	-0.57	4.40	1.66	6.96	7.11
Citi Trends Inc	-23.45	-2.76	-13.30	-23.68	-14.27	-26.09	-8.81	-11.11	0.82	-15.47	-6.27	-15.99





# Overview of the Model

## Pairs Model

We wanted to see how well the Fama French Factors could calculate pairs based on risk-matching in the retail sector and how well those pairs performed in times of high volatility (seasonality and earnings releases)

## Earnings Release of the Pairs

- WSM — most recent earnings report: November 18, 2025
- TJX — most recent earnings report: November 19, 2025
- TGT — most recent earnings report: November 19, 2025
- BBWI — most recent earnings report: November 20, 2025
- BBY — most recent earnings report: November 25, 2025
- BURL — most recent earnings report: November 25, 2025
- ROST — most recent earnings report: November 25, 2025
- AEO — most recent earnings report: December 2, 2025
- ULTA — most recent earnings report: December 4, 2025
- NIKE — most recent earnings report: December 18, 2025

## Some of the Biggest Players...



```
# -----  
# 2.4 DETERMINE TRADE DIRECTION  
# -----  
if z > 0:  
    long_stock = stock_B  
    short_stock = stock_A  
else:  
    long_stock = stock_A  
    short_stock = stock_B
```

```
# -----  
# 2.3 COMPUTE SPREAD  
# -----  
spread = prices[stock_A] - beta * prices[stock_B]  
  
# Use only PREVIOUS data for mean/stddev  
hist = spread.iloc[:-1]  
spread_mean = hist.mean()  
spread_std = hist.std()  
  
# Today's spread  
spread_today = spread.iloc[-1]  
z = (spread_today - spread_mean) / spread_std
```



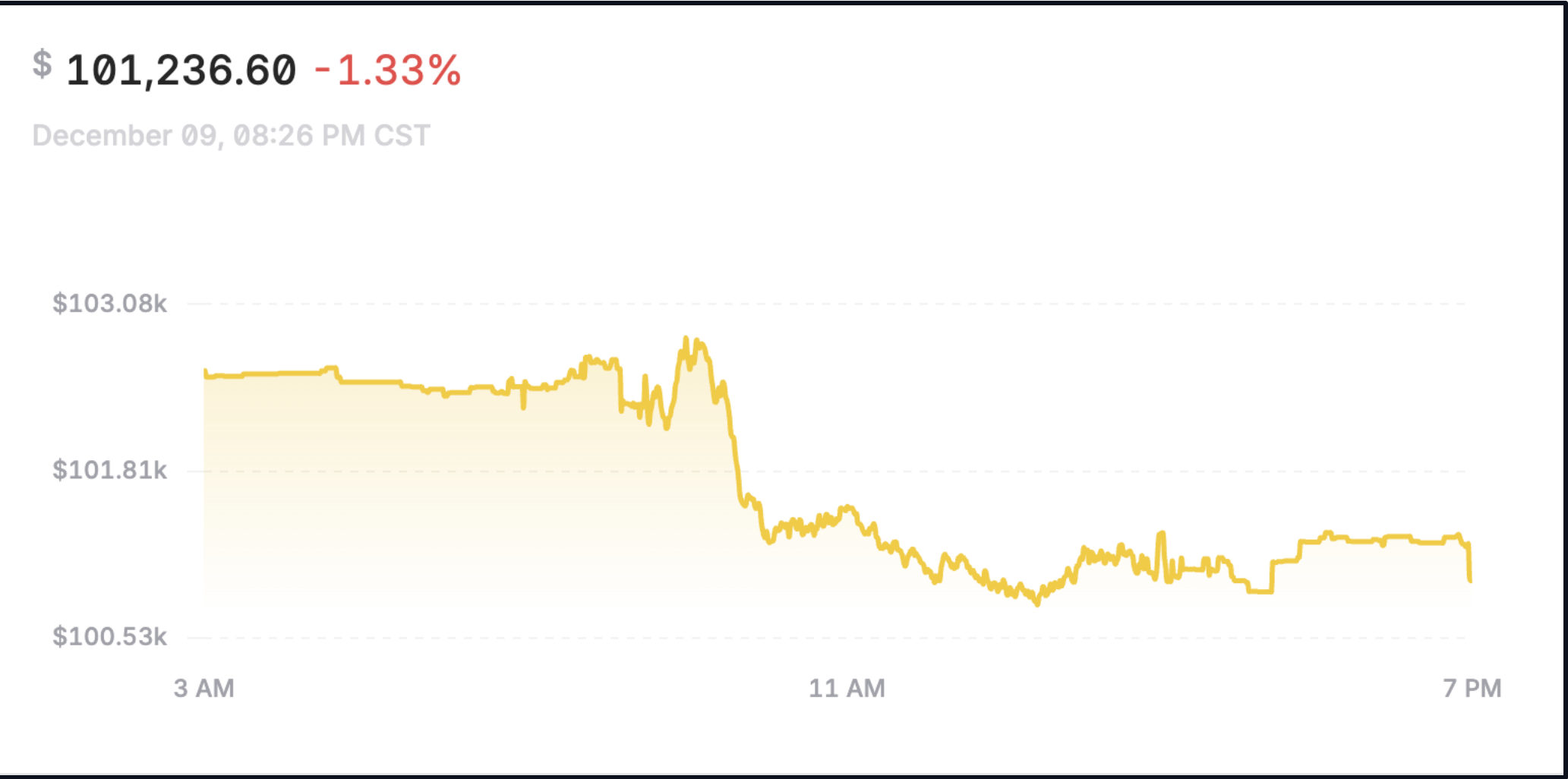
# Results of the Model

Annualized Return

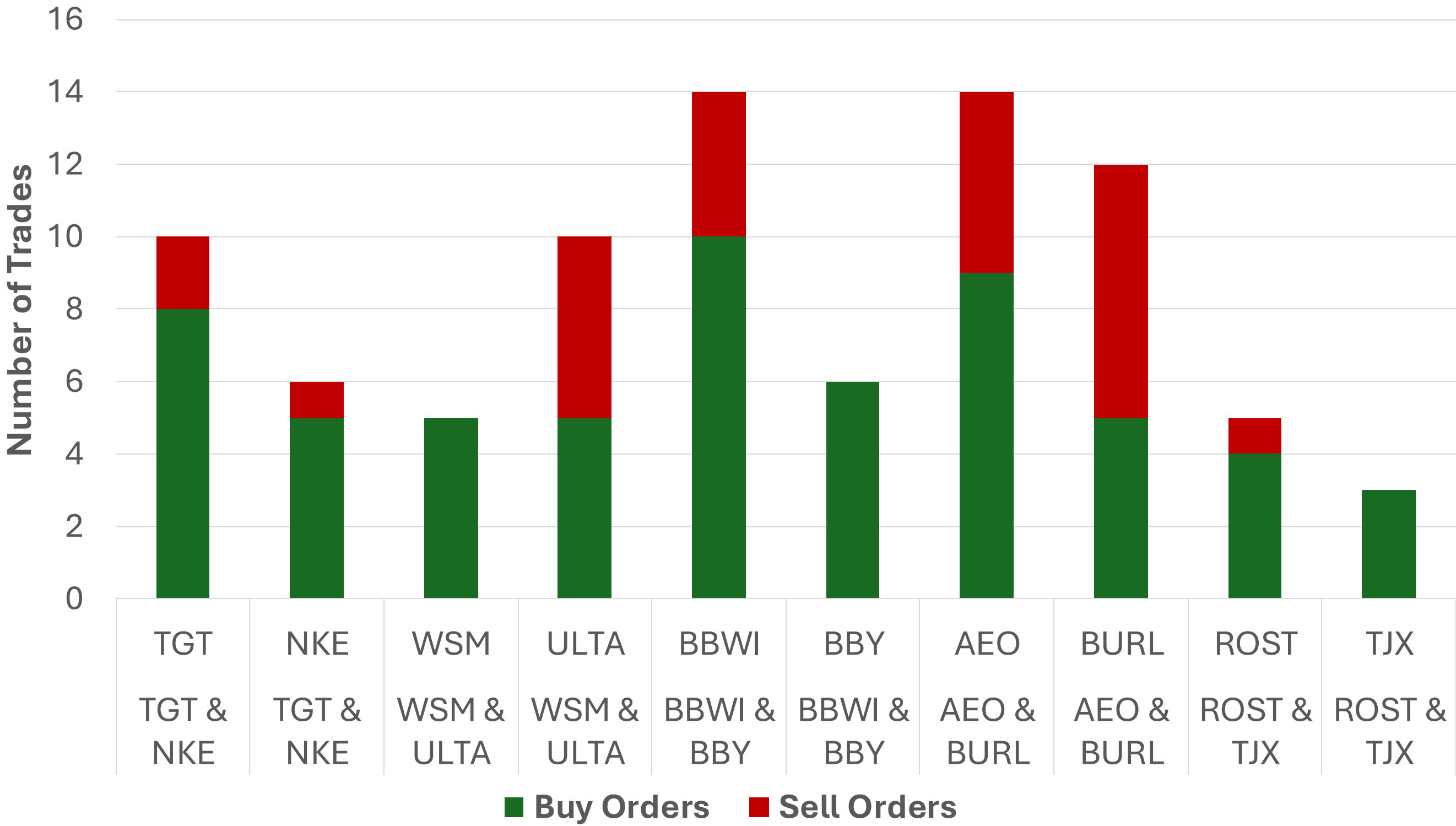
129.53%

Sharpe Score

6.05



Algorithm Buy/Sell Distribution



# Looking Back...

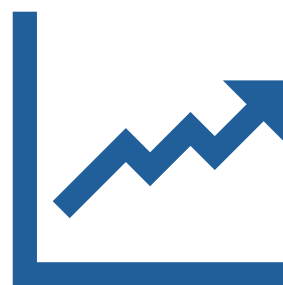
## Servers

Continuous execution required dedicated server infrastructure to avoid manual intervention and ensure reliable trade execution



## Back-testing vs LIVE Trading

Historical testing framework needed to validate strategy performance before deploying capital in live markets



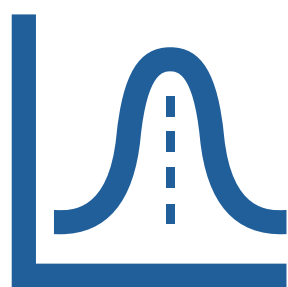
## Alpaca Optimizations

Broker-specific code refinements would have streamlined order execution and reduced implementation friction



## Parameter Tweaking

Threshold adjustments needed to capture daily price movements rather than relying on 2 standard deviation triggers



## Cointegration/Stationarity

Statistical validation of pair relationships would have confirmed long-term trading viability and mean-reversion properties





## What We Are Bullish On:

We believe the strategy is a smooth way to arbitrage the opportunity that arises during Holiday seasons within retail. When it comes to trend adoption amongst consumers, the retail industry fits perfectly. Moving ahead, this strategy would need to be set up **at least** a quarter before major holidays’, ensuring enough time for mean reverting deviations to occur and price volatility.

## Enhancements to Make:

### Margin/Short-Selling

- Margin allows a model to control a larger portion of capital allocation. Shorting will allow spread neutrality.

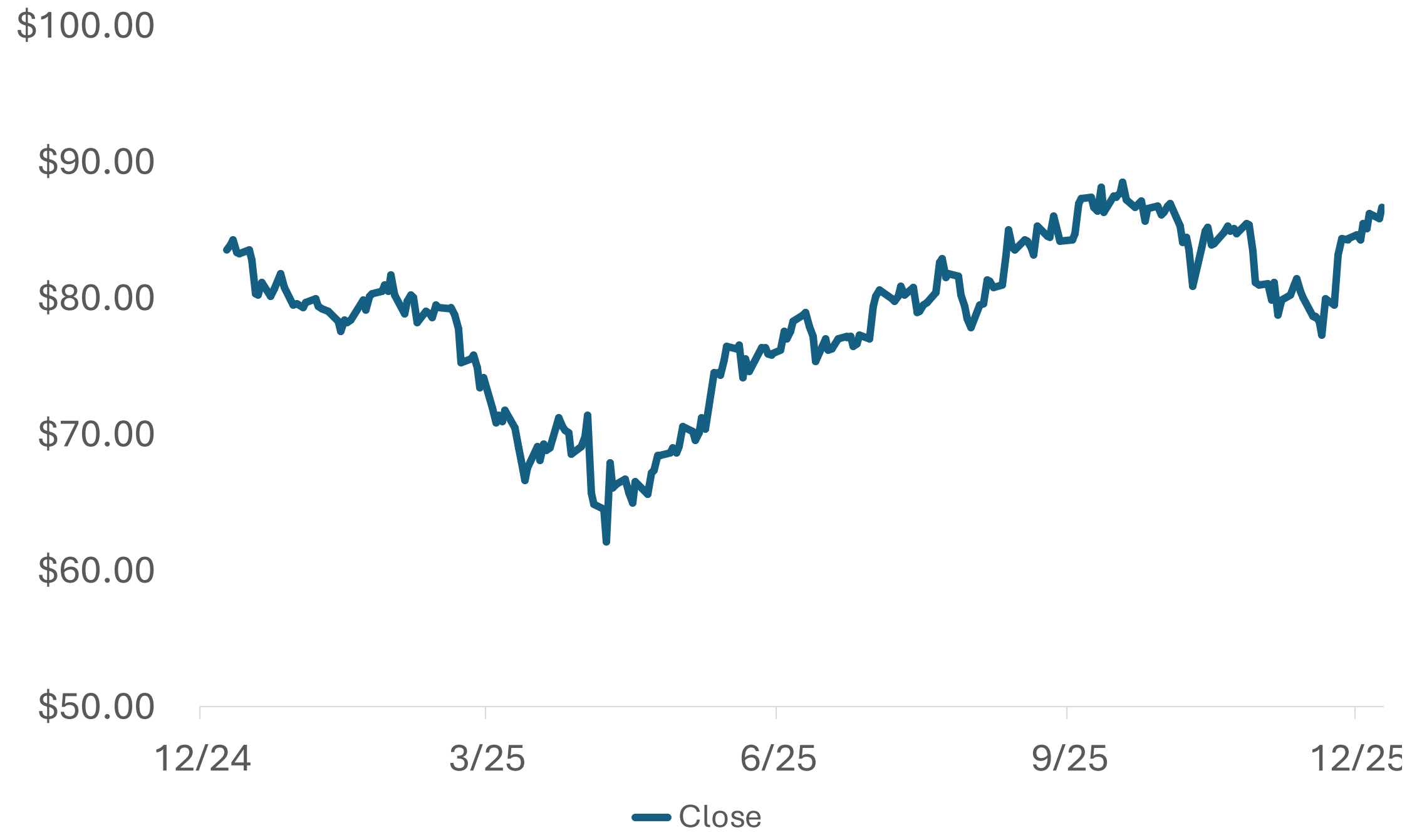
### Sophisticated Signal Generation

- Directly incorporating KPI projections/performance into signaling allows customized metrics, rather than just historical averages.

### Broader Time Horizon

- A long-time frame is crucial in establishing significant relationships and measuring model success.

Closing Prices for S&P Retail ETF XRT







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