Beat The Market

An Effective Intraday Momentum Strategy for S&P500 ETF (SPY)

AUGUST 21, 2024 – 12:50 PM ET

PRESENTED BY

Carlo Zarattini & Andrew Aziz

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- Co-Founder of **R-Candles.com** (*The first backtester for discretionary technical traders)*
- Former Quantitative Research in **BlackRock**

- BSc in Mathematics, Padova, Italy
- MSc Investments & Wealth Management, Imperial College
- MSc Quantitative Finance, USI, Switzerland


CONCRETUM RESEARCH s:fi PEAK CAPITAL TRADING

A Profitable Day Trading Strategy For The U.S. Equity Market

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February 16, 2024

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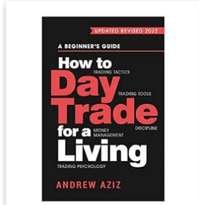

How to Day Trade for a Living: A Beginner's Guide…

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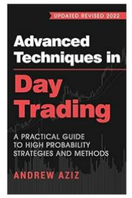

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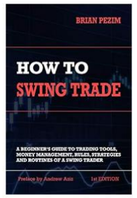

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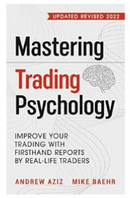

Mastering Trading Psychology

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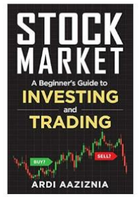

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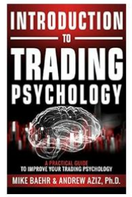

Introduction to Trading Psychology: A Pr…

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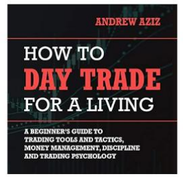

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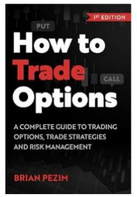

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A Productive Research Partnership (I)

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Can Day Trading Really Be Profitable?

18 Pages • Posted: 24 Apr 2023 • Last revised: 21 Feb 2024

Carlo Zarattini
Concretum Research

Andrew Aziz
Peak Capital Trading; Bear Bull Traders

Date Written: April 10, 2023

Abstract

The validity of day trading as a long-term consistent and uncorrelated source of income is a matter of debate. In this paper, we investigate the profitability of the well-known Opening Range Breakout (ORB) strategy during the period of 2016 to 2023. This period encompasses two bear markets and a few events with abnormal volatility. Our results suggest that with the proper use of leverage or leveraged products (such as 3x leveraged ETFs), day trading can empirically produce significant returns when compared to a standard buy and hold strategy on benchmark indexes in the US public equity markets (Nasdaq or NYSE). Without any loss of generality, we studied the results of an ORB strategy implemented in QQQ. By comparing the results of the active day trading approach with a passive exposure in QQQ, we prove that it is possible for the ORB portfolio to significantly outperform the passive investment. In fact, the day trading portfolio produced an annualized alpha of 33% (net of commissions). Nevertheless, due to leverage constraints enforced by brokers, an active trader would have capped the full upside potential given by the ORB strategy. To overcome this issue, we introduced the use of TQQQ, a leveraged ETF of QQQ, which allows day traders to fully exploit the benefit of the active strategy while adhering to leverage constraints. The resulting portfolio would have earned an outstanding return of 1,484% during the same period of 2016 to 2023, while an investment in the QQQ ETF would have earned only 169%.

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Volume Weighted Average Price (VWAP) The Holy Grail for Day Trading Systems

26 Pages • Posted: 4 Dec 2023 • Last revised: 26 Dec 2023

Carlo Zarattini
Concretum Research

Andrew Aziz
Peak Capital Trading; Bear Bull Traders

Date Written: November 13, 2023

Abstract

This paper explores the application of the Volume Weighted Average Price (VWAP) in detecting market imbalances and enhancing trading decisions across diverse market conditions. We introduce a straightforward VWAP-based day trading strategy, which initiates long positions when price is above the VWAP and short positions when it falls below the VWAP. Our analysis employs QQQ and TQQQ as primary trading instruments, covering the period from January 2, 2018, to September 28, 2023. This timeframe includes two bear markets and multiple high-volatility events, providing a comprehensive test of market variations. Our findings reveal that an initial investment of $25,000 in the VWAP Trend Trading strategy with QQQ would have grown to $192,656, net of commissions, yielding a 671% return. This performance is marked by a maximum drawdown of just 9.4% and a Sharpe Ratio of 2.1. In contrast, a passive buy-and-hold strategy in QQQ during the same period would have returned 126%, with a significantly higher maximum drawdown of 37% and a lower Sharpe Ratio of 0.7. Further enhancing our strategy with TQQQ (3x leveraged ETFs of QQQ), we observed extraordinary outcomes: a $25,000 investment surged to $2,085,417, net of commissions. This equates to an 8,242% total return, or an average annual return of

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A Profitable Day Trading Strategy For The U.S. Equity Market

25 Pages • Posted: 15 Mar 2024

Carlo Zarattini
Concretum Research

Andrea Barbon
University of St. Gallen; University of St.Gallen

Andrew Aziz
Peak Capital Trading; Bear Bull Traders

Date Written: February 16, 2024

Abstract

The validity of day trading as a long-term consistent and uncorrelated source of income for traders and investors is a matter of debate. In this paper, we endeavored to answer this question by conducting a thorough analysis of the profitability of Opening Range Breakout (ORB) strategies, with a particular focus on the 5-minute ORB. Using a large dataset that covered more than 7,000 US stocks traded from 2016 to 2023, the research aimed to assess how effective this strategy was in producing consistent and uncorrelated returns. A new aspect of our study was the focus on Stocks in Play, which are stocks that show higher than normal trading activity on a specific day, mostly because of fundamental news about the company. Our results showed a significant benefit in limiting day trading only to those Stocks in Play (even after considering transaction costs). A portfolio that consisted of the top 20 Stocks in Play achieved a total net performance of over 1,600%, with a Sharpe ratio of 2.81, and an annualized alpha of 36%. Passive exposure in the S&P 500 would have achieved a total return of 198% during the same period. Furthermore, this paper expanded the analysis to compare the

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The Art of Financial Illusion: How to Use Martingale Betting Systems to Fool People

18 Pages • Posted: 18 Jan 2024

Carlo Zarattini
Concretum Research

Andrew Aziz
Peak Capital Trading; Bear Bull Traders

Date Written: December 28, 2023

Abstract

In this paper, we undertake a comprehensive exploration of the financial scam landscape, focusing particularly on the use of Martingale betting systems and their role in artificially inflating the perceived short-term profitability of trading strategies. We trace the evolution of financial deception from the primitive practices of coin clipping to the sophisticated schemes of modern Ponzi operations, shedding light on the enduring patterns of exploitation and deceit that characterize financial fraud. Central to our analysis is the Martingale system, a method of progressively increasing investments after losses, devised in 18th-century in France. We critically examine its application in contemporary trading and how it creates an illusion of early success to mislead investors. A significant contribution of this paper is the demonstration, through statistical analysis and historical simulations, of how a trading system can seemingly generate a 20% annual return with nearly 80% probability, despite its reliance on randomly generated trading signals. Our research provides an in-depth analysis of the anatomy of financial scams, delving into their psychological and sociological foundations. We aim to equip readers with a comprehensive understanding of these deceptive practices, offering valuable insights for their detection and prevention. This

Paper statistics

DOWNLOADS	2,284
ABSTRACT VIEWS	4,108
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Beat the Market

An Effective Intraday Momentum Strategy for S&P500 ETF (SPY)

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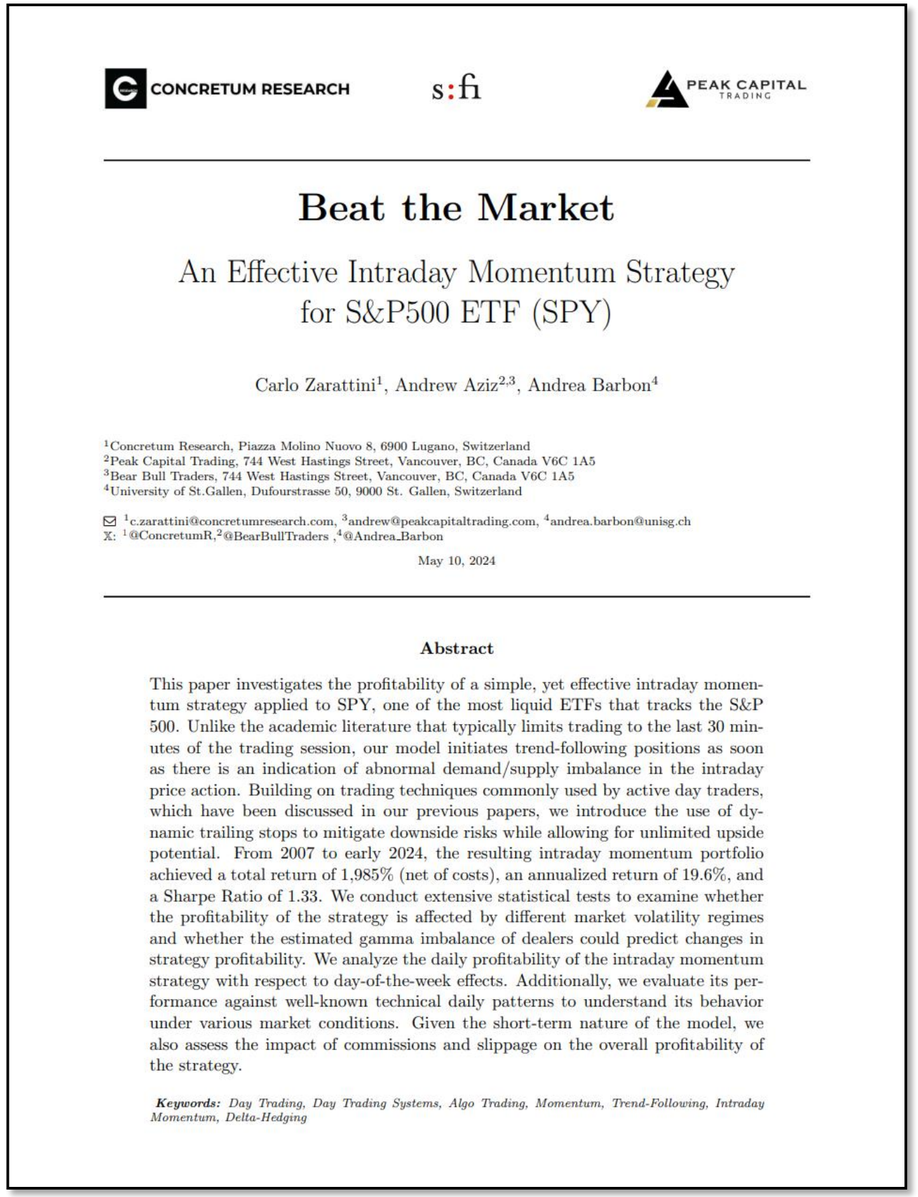

CONCRETUM RESEARCH s:fi PEAK CAPITAL TRADING

Beat the Market

An Effective Intraday Momentum Strategy for S&P500 ETF (SPY)

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May 10, 2024

Abstract

This paper investigates the profitability of a simple, yet effective intraday momentum strategy applied to SPY, one of the most liquid ETFs that tracks the S&P 500. Unlike the academic literature that typically limits trading to the last 30 minutes of the trading session, our model initiates trend-following positions as soon as there is an indication of abnormal demand/supply imbalance in the intraday price action. Building on trading techniques commonly used by active day traders, which have been discussed in our previous papers, we introduce the use of dynamic trailing stops to mitigate downside risks while allowing for unlimited upside potential. From 2007 to early 2024, the resulting intraday momentum portfolio achieved a total return of 1,985% (net of costs), an annualized return of 19.6%, and a Sharpe Ratio of 1.33. We conduct extensive statistical tests to examine whether the profitability of the strategy is affected by different market volatility regimes and whether the estimated gamma imbalance of dealers could predict changes in strategy profitability. We analyze the daily profitability of the intraday momentum strategy with respect to day-of-the-week effects. Additionally, we evaluate its performance against well-known technical daily patterns to understand its behavior under various market conditions. Given the short-term nature of the model, we also assess the impact of commissions and slippage on the overall profitability of the strategy.

Keywords: *Day Trading, Day Trading Systems, Algo Trading, Momentum, Trend-Following, Intraday Momentum, Delta-Hedging*

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A century of trend trading evidence

… at least at low frequencies …

From Academia...

THE JOURNAL OF FINANCE • VOL. XLVIII, NO. 1 • MARCH 1993

Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency

NARASIMHAN JEGADEESH and SHERIDAN TITMAN*

ABSTRACT

This paper documents that strategies which buy stocks that have performed well in the past and sell stocks that have performed poorly in the past generate significant positive returns over 3- to 12-month holding periods. We find that the profitability of these strategies are not due to their systematic risk or to delayed stock price reactions to common factors. However, part of the abnormal returns generated in the first year after portfolio formation dissipates in the following two years. A similar pattern of returns around the earnings announcements of past winners and losers is also documented.

The Journal of FINANCE
The Journal of THE AMERICAN FINANCE ASSOCIATION

THE JOURNAL OF FINANCE • VOL. LXVIII, NO. 3 • JUNE 2013

Value and Momentum Everywhere

CLIFFORD S. ASNESS, TOBIAS J. MOSKOWITZ, and LASSE HEJE PEDERSEN*

ABSTRACT

We find consistent value and momentum return premia across eight diverse markets and asset classes, and a strong common factor structure among their returns. Value and momentum returns correlate more strongly across asset classes than passive exposures to the asset classes, but value and momentum are negatively correlated with each other, both within and across asset classes. Our results indicate the presence of common global risks that we characterize with a three-factor model. Global funding liquidity risk is a partial source of these patterns, which are identifiable only when examining value and momentum jointly across markets. Our findings present a challenge to existing behavioral, institutional, and rational asset pricing theories that largely focus on U.S. equities.

A Century of Evidence on Trend-Following Investing

BRIAN HURST, YAO HUA OOI, AND LASSE HEJE PEDERSEN

As an investment style, trend following has existed for a very long time. Some 200 years ago, the classical economist David Ricardo's imperative to "cut short your losses" and "let your profits run on" suggests an attention to trends. A century later, the legendary trader Jesse Livermore stated explicitly that the "big money was not in the individual fluctuations but in…sizing up the entire market and its trend."[1]

The most basic trend-following strategy is time-series momentum—going long markets with recent positive returns and shorting those with recent negative returns. The literature shows that since 1985, time-series momentum has been profitable, on average, for nearly all equity index futures, fixed-income futures, commodity futures, and currency forwards.[2] The strategy explains the strong performance of managed futures funds from the late 1980s, when fund returns and index data first become available,[3] and captures most forms of trend-following investing.[4]

In this article, we seek to establish whether the strong performance of trend following is a statistical fluke of the last few decades or a more robust phenomenon that exists over a wide range of economic conditions. We construct a time-series momentum strategy all the way back to 1880 using historical data from a number of sources, including novel data on commodity futures prices that we hand collect and transcribe from annual reports of the Chicago Board of Trade.[5]

We find that time-series momentum has been consistently profitable throughout the past 137 years. We examine the strategy's decade-by-decade performance, its correlation to major asset classes, and its performance in historical equity bull and bear markets. This wealth of data also provides context for evaluating how the strategy performs across various macroeconomic environments—such as recessions versus booms, war versus peacetime, high- versus low-interest-rate regimes, high- versus low-volatility periods, high- versus low-inflation periods, and high- versus low-correlation periods. Although the strategy has historically performed well across most of these economic environments, the characteristic that appears to have affected the performance the most is correlation—the strategy has performed the best during low-correlation environments. We also estimate the effects of fees and transaction costs and evaluate the benefits of allocating to a trend-following strategy from a traditional stock/bond portfolio.

DATA

In our analysis, we use monthly returns for 67 markets across four major asset classes: 29 commodities, 11 equity indices, 15 bond

CONCRETUM RESEARCH

Optimal Momentum

A Century of Profitable Industry Trends

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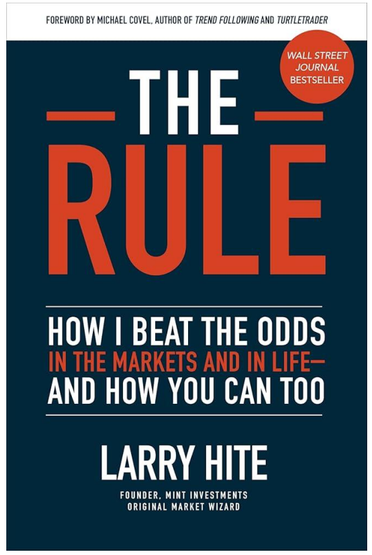
June 17, 2024

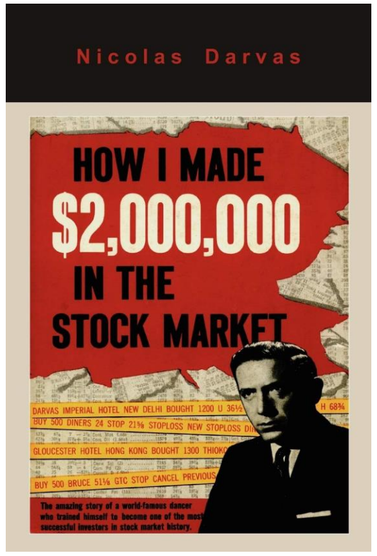
Abstract

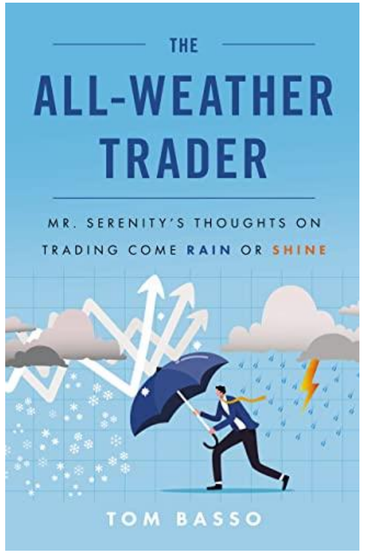
This paper evaluates the profitability of an industry-based long-only trend-following portfolio. Utilizing 48 industry portfolios from 1926 to 2024, our analysis explores the model's profitability over a century, highlighting its adaptability and effectiveness across diverse market epochs. We assess the overall profitability of the model and examine the distribution of long-term returns and associated risks. Our analysis includes the impact of individual industry contributions on overall portfolio performance, focusing on the frequency and average profitability of trades at both the portfolio and industry levels. The Timing Industry strategy achieves an average annual return of 18.2% with an annual volatility of 12.6%, resulting in a Sharpe Ratio of 1.39, compared to the US equity market's 9.7% return, 17.1% volatility, and 0.63 Sharpe Ratio. The model's outperformance is underscored by an annualized alpha of 10.9%, with the timing strategy reducing drawdown by almost 60% compared to a passive long exposure. Further investigations reveal the active strategy's ability to fully participate during market upswings while significantly limiting exposure during downturns. In the final section, we introduce 31 sector ETFs provided by State Street Global Advisors and backtest the same trading methodology over the last 20 years. The ETFs successfully replicate the model's exposure and returns. We also assess the impact of commissions and slippage, demonstrating that the active timing strategy remains largely profitable even with high trading costs.

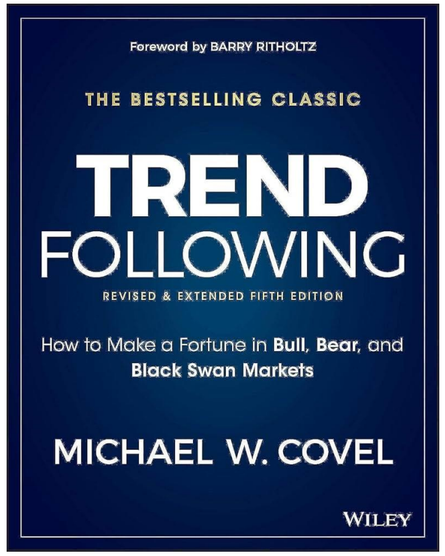
Keywords: *Momentum, Trend-Following, Dual Momentum, Industry Rotation, Algo Trading*

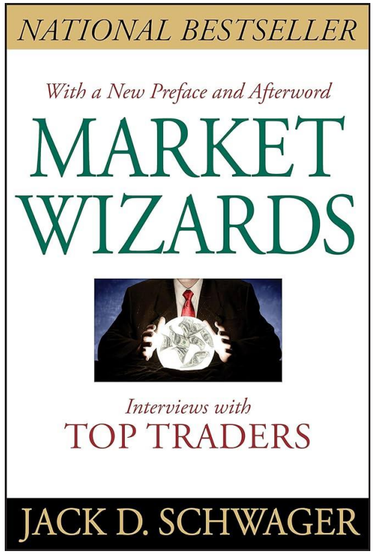
And From Market Legends...

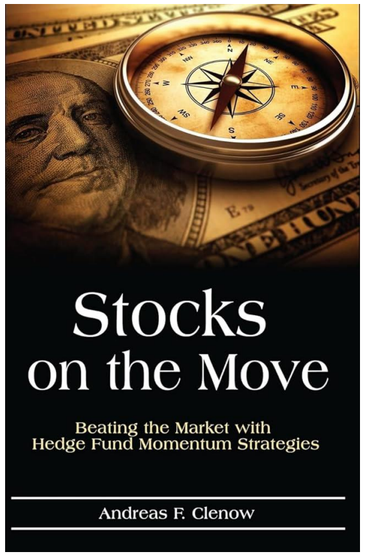


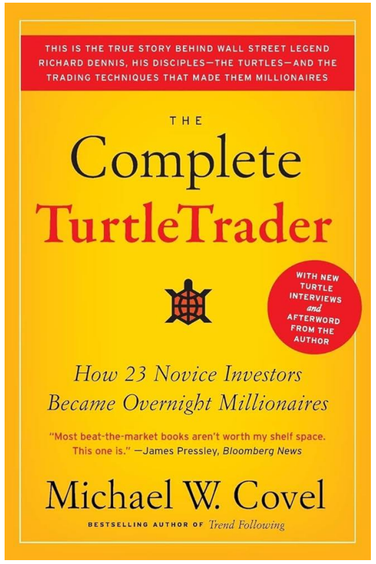


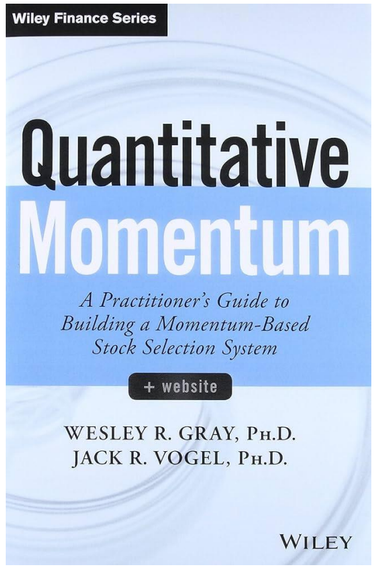


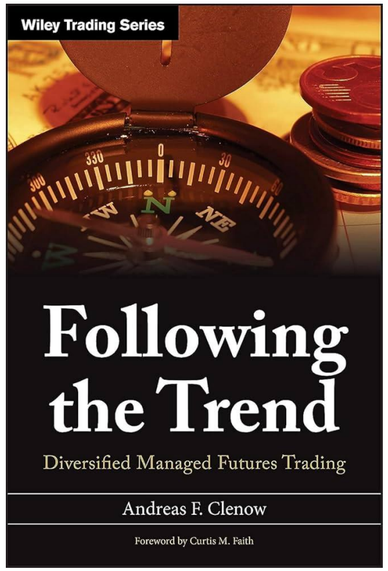


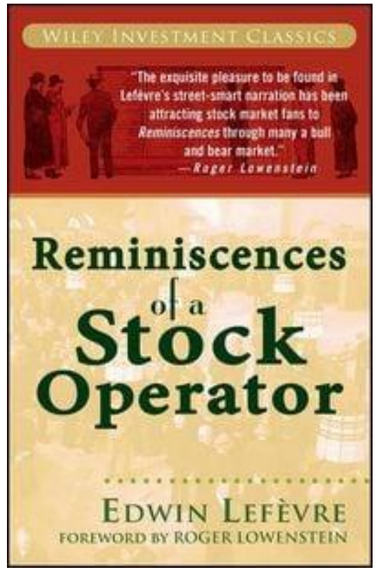


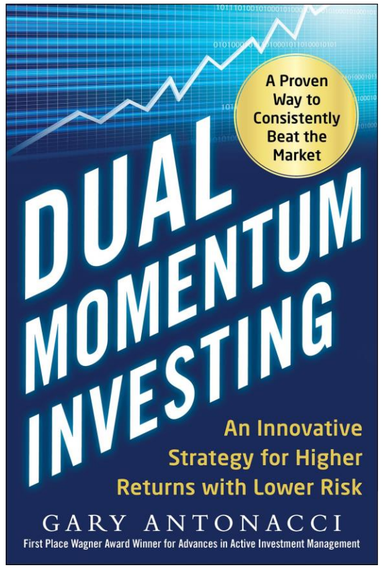












But can we exploit trends also at intraday frequencies?

1 How to identify an intraday trend?

Detecting Trends, Avoiding Noise

- What is the average move of the market between 9:30 (market open) and HH:MM?
- We define a Noise Area using average intraday moves over the previous 14-days
- Whenever price fluctuates within this area, NO significant moves are taking place but…

if SPY > Noise Area → Potential Trend-Up Day

if SPY < Noise Area → Potential Trend-Down Day

- A move outside the Noise Area signals significant imbalance between demand and supply that may persist throughout the trading session

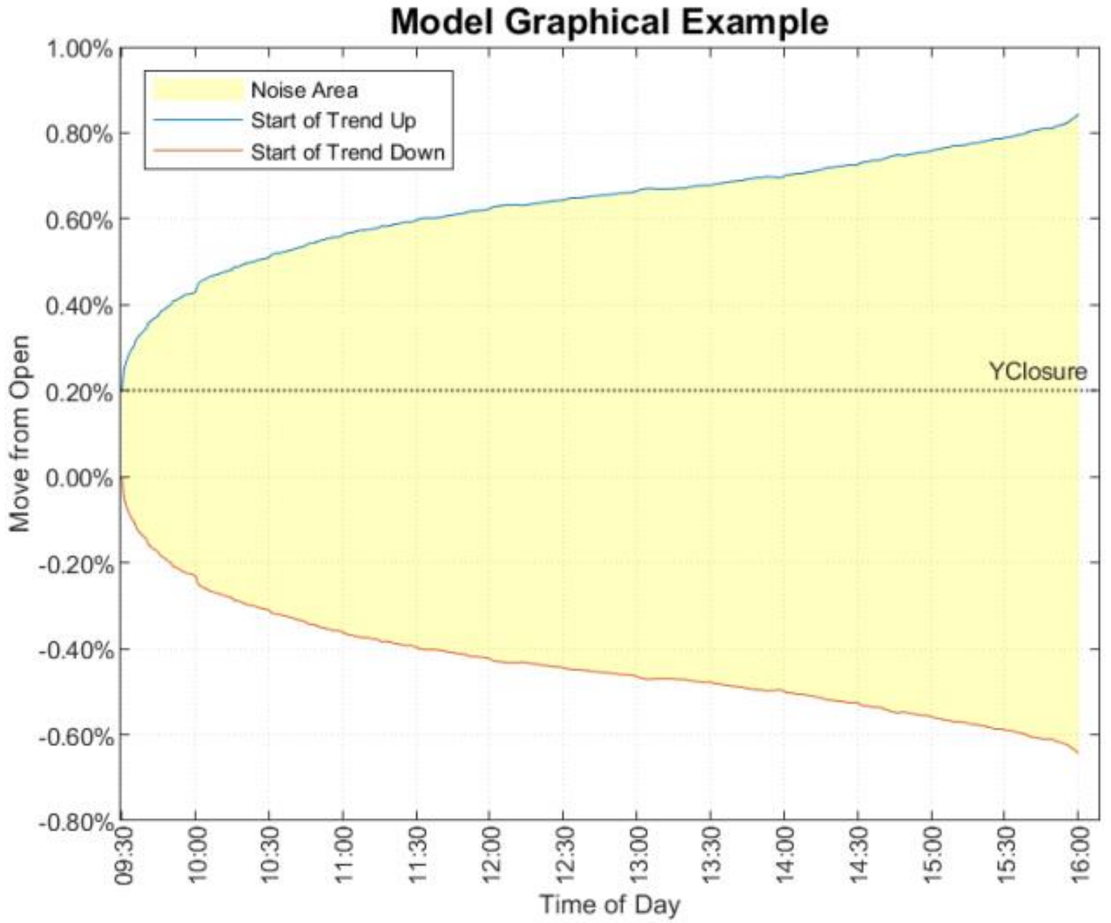
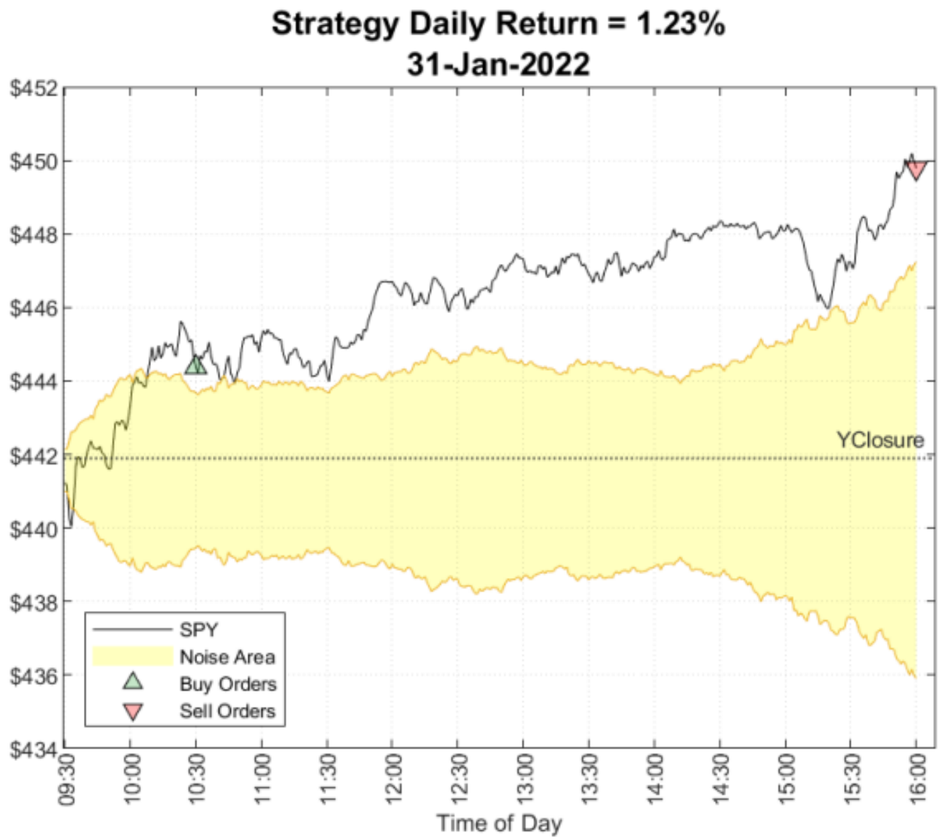


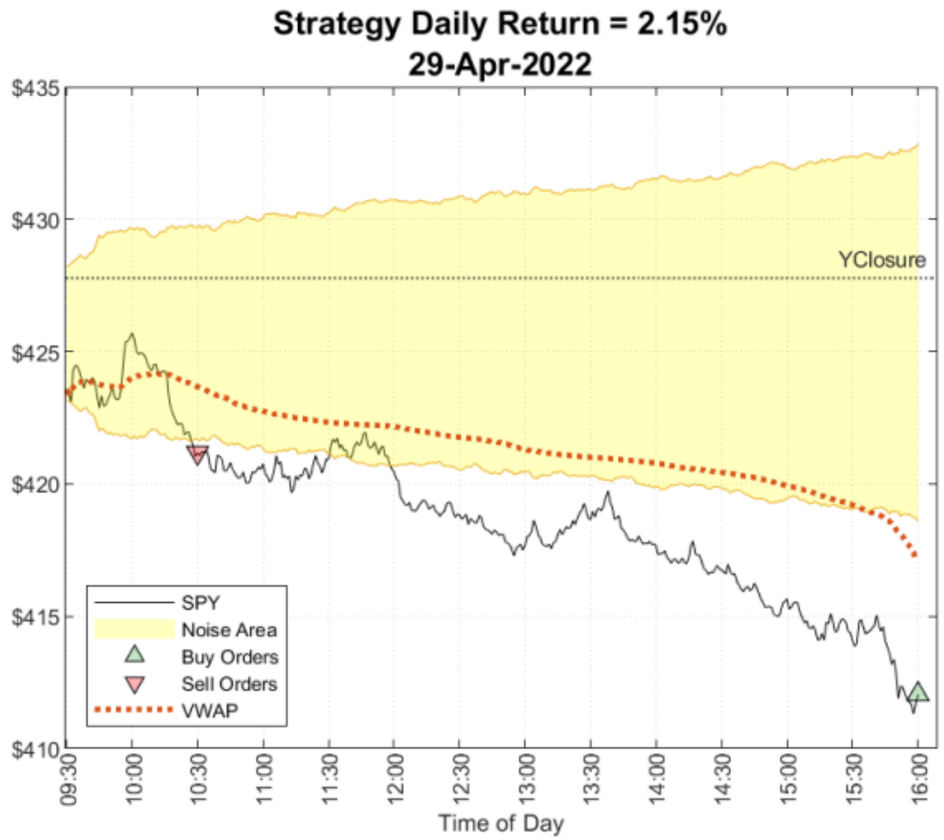
Figure 1. The time-varying boundary area for identifying the start of a new upward or downward trend in price. The shaded area represents noise or choppy price action.

2 When to enter?

Check Signals Every 30 Minutes (HH:00 or HH:30)



(a) Long



(b) Short

Figure 2: The time-varying boundary areas on SPY for 31 January 2022 (a) and 29 April 2022 (b) and the resulting trades based on our base-model. Please note that all positions are closed at the market Close (16:00).

3 When to exit?

When Trend Vanishes… But Don’t Wait Too Long!

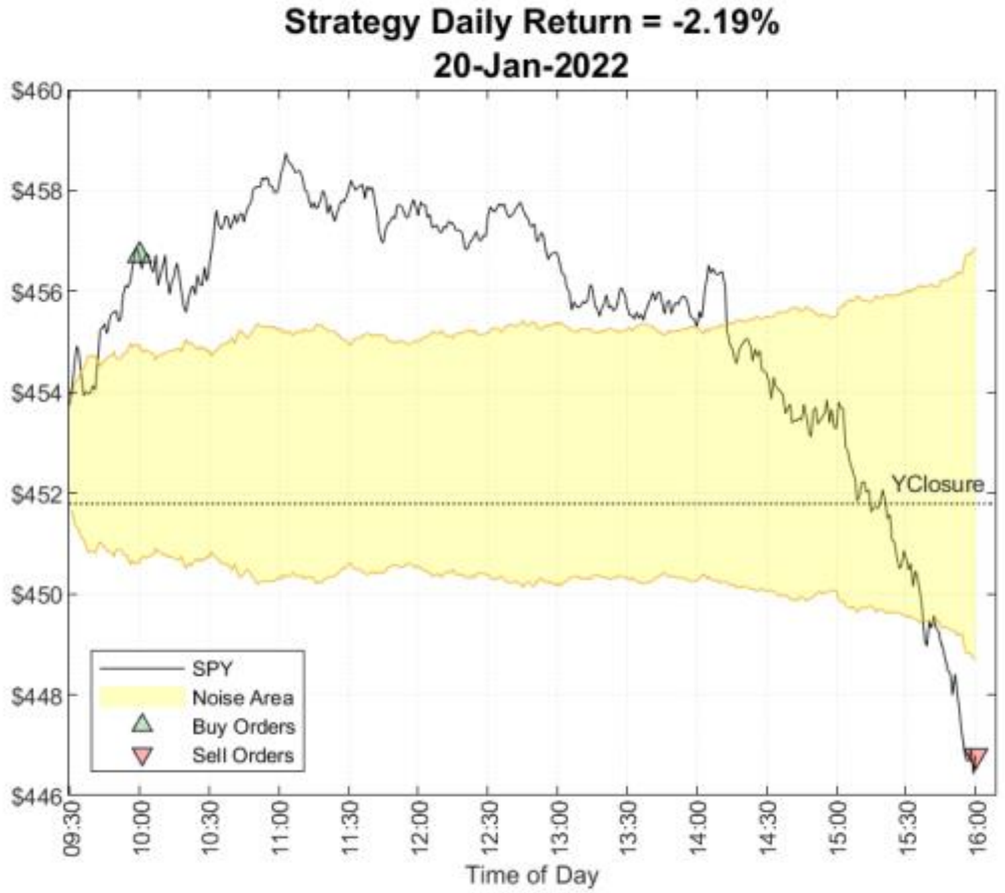
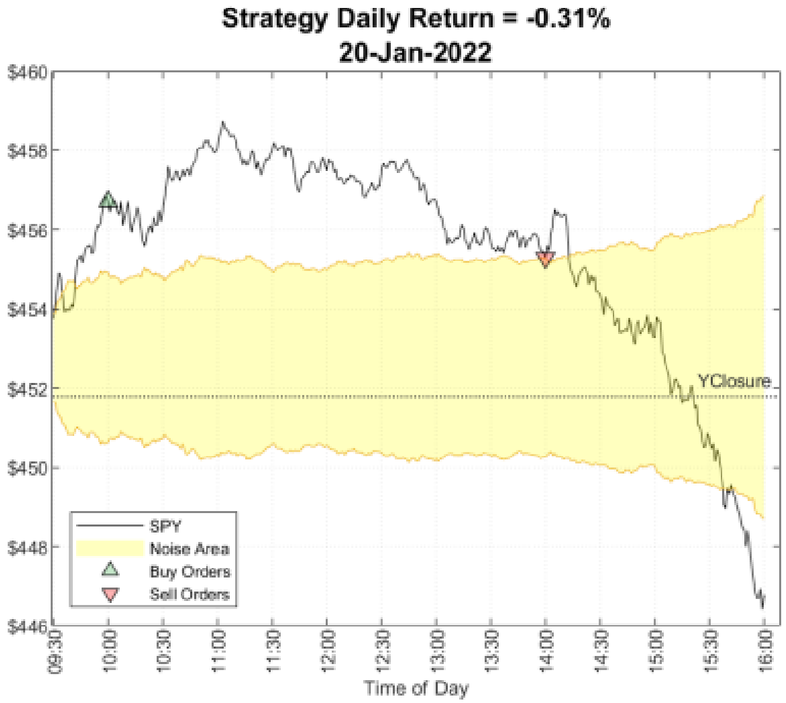
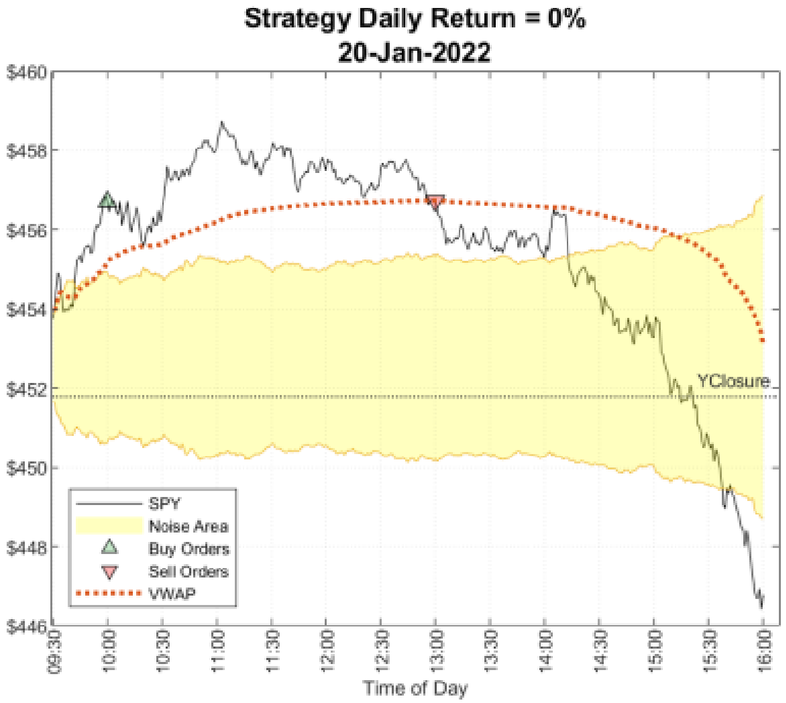


Figure 4: SPY price action on 20 January 2022 illustrates our model strategy’s entry and exits. The base strategy uses the opposite band as a trailing stop. Following a sharp reversal in SPY in the last 2 hours of trading, the base model realizes a loss of more than 2%.

Trailing Stops using Noise Boundaries + VWAP



(a) Stop = UpperBand

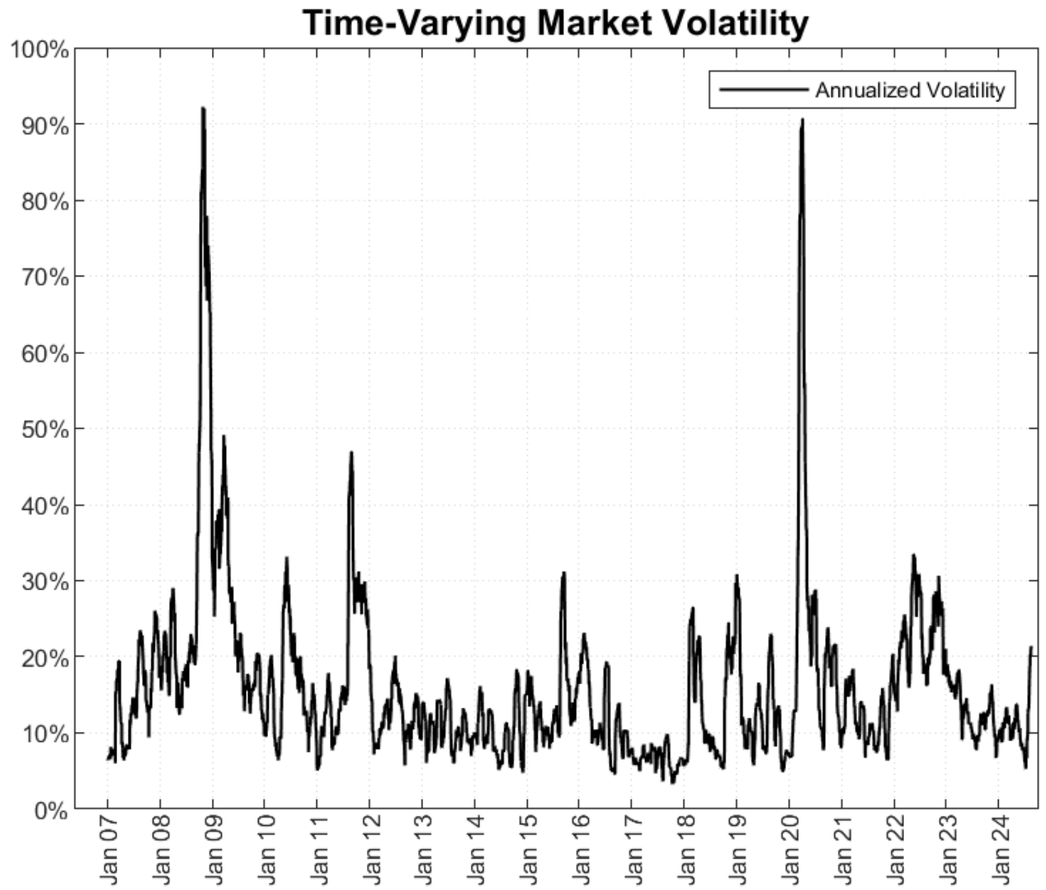


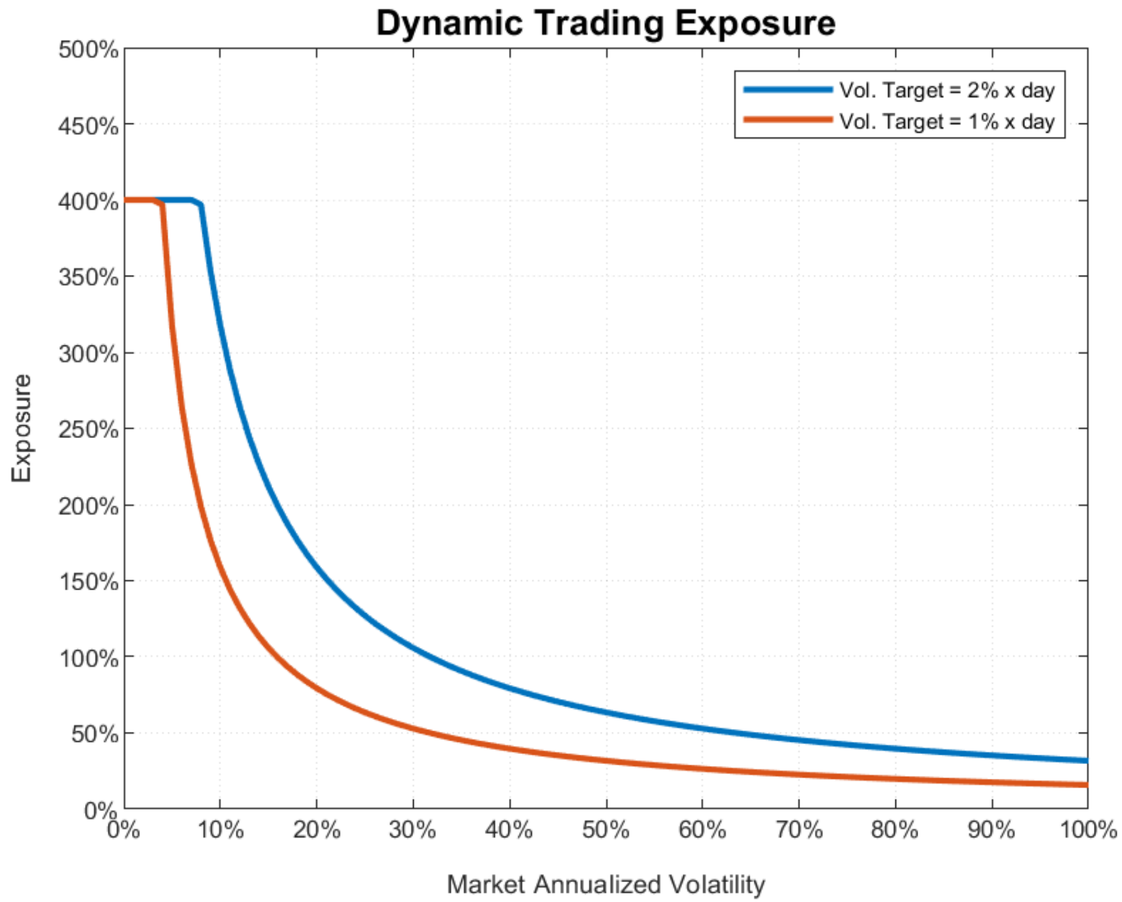
(b) Stop = max(VWAP,UpperBand)

Figure 5: Improvement in our strategy's exit by incorporating tighter trailing stop losses. In Figure (a), the trailing stop is based on the upper band of the *Noise Area*, while in Figure (b), it is based on the maximum between the VWAP and the upper band.

4 How to size trades?

Adjust Exposure Based on Current Market Volatility





Is this profitable?

Performance Statistics

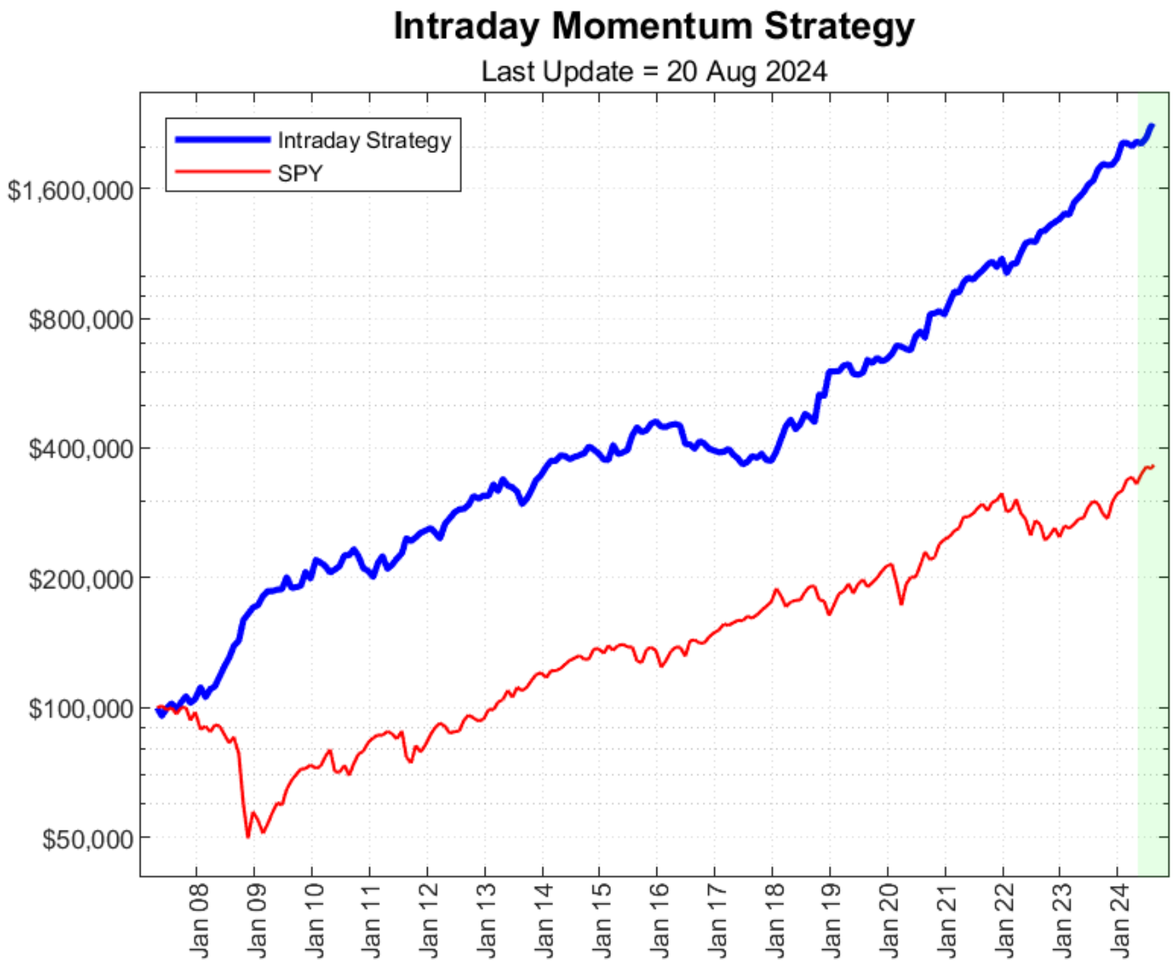


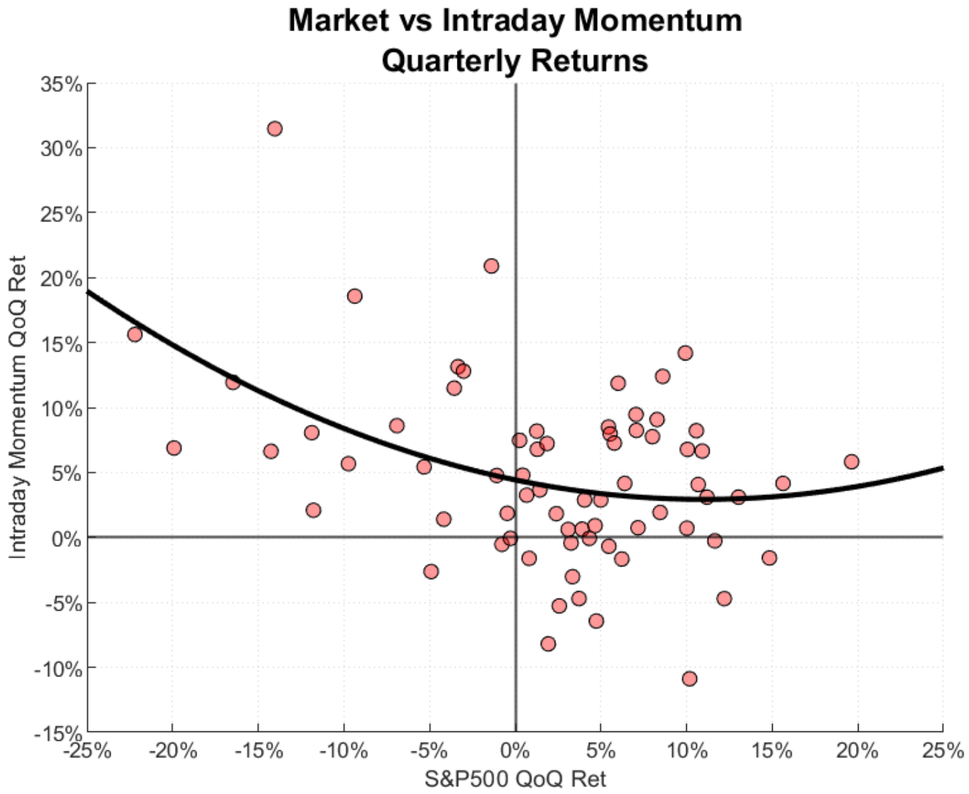
Table 3: Summary statistics of intraday momentum strategy with a) stop loss at opposite band, b) current band with VWAP, c) as in (b) with the additional dynamically adjusted share size based on daily market volatility, and d) SPY Buy&Hold Commission set at $0.0035 as per Interactive Brokers' entry-level rate. We highlight in bold coefficients that are statistically significant at 5% level or below.

Strategy	Stop	Size	Total Return	IRR	Vol	Sharpe Ratio	Hit Ratio	MDD	Alpha	Beta
Momentum	Opp.Band	100%	178%	6.2%	10.9%	0.61	54%	21%	**7.1%**	**-0.05**
Momentum	Curr.Band + VWAP	100%	380%	9.7%	7.7%	1.24	43%	12%	**9.9%**	**-0.03**
Momentum	Curr.Band + VWAP	Dyn.	1,985%	19.6%	14.3%	1.33	43%	25%	**19.6%**	**-0.07**
SPY (Buy&Hold)		100%	227%	7.2%	20.2%	0.45	54%	56%		

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Year
2007					-3.4	2.9	1.9	1	0.7	-0.6	1.9	0.1	4.5
2008	5.1	-1.6	2.2	-1.3	8.6	5.3	7.3	4.7	5.5	8.3	3.6	3	63.4
2009	0.9	4.4	2.6	1.4	0.4	2.3	3.8	-5.4	0.2	9.9	-1.8	0.1	19.6
2010	7.3	-1	-3.1	2.5	-3.3	3	5.1	1.3	1.6	-4.8	-5.6	-0.8	1.3
2011	0.8	2.5	4.9	-5.5	-0.4	8.2	0.7	6.7	-0.8	3	1.8	1.7	25.7
2012	0.5	-4.6	-0.6	7.5	0.3	4.9	3.6	-0.6	4.2	2.9	-1.4	3.3	21.1
2013	-1.4	8.4	-5.8	6.4	-6.9	2.9	-5.8	-2.5	1.8	4.9	6.2	2.5	9.6
2014	4.6	2.2	1.2	3	-0.5	-1.6	4.9	-3.7	2.2	3.1	-1.1	-2.1	12.6
2015	-2.2	-1.3	8.5	-5.6	1.2	4.6	5.5	3.4	-0.4	-0.7	3.2	1.7	18.4
2016	-1	-1.9	1.3	-1.4	0.4	-7.3	-3.1	-5.2	8.4	-5	1.4	0.7	-12.8
2017	-3.3	0.9	1.7	-3.3	-2.4	0.4	-1.8	3.6	-1.1	2.9	-2.2	-2.3	-6.9
2018	3.5	8.9	7.2	3.5	-4.7	2	6.2	-1.7	-3.5	13.4	3	12.5	61.1
2019	0.9	-0.7	2.9	0.9	-5.1	-0.5	1.4	6.8	-1.4	2.6	-1.7	1	6.9
2020	5.3	1.9	-0.5	-1.8	-0.2	8	0.1	-1.8	14.3	2.8	-1.1	-1.9	26.8
2021	7.8	3.1	0.7	6.1	2.6	-1	2.8	1.7	2.8	3.3	-3.2	4.1	34.8
2022	-5.5	2.8	0.2	9	2.1	0.5	0.2	6.3	-1	5.8	1.6	0.7	24.4
2023	2.9	-1.3	7.8	1.8	2.9	4.1	2.2	6	2.9	-1.1	0.5	3.8	37.2
2024	8.8	-1.5	-0.4	5.8	-4.3	1.6	8.2	-0.9					17.8

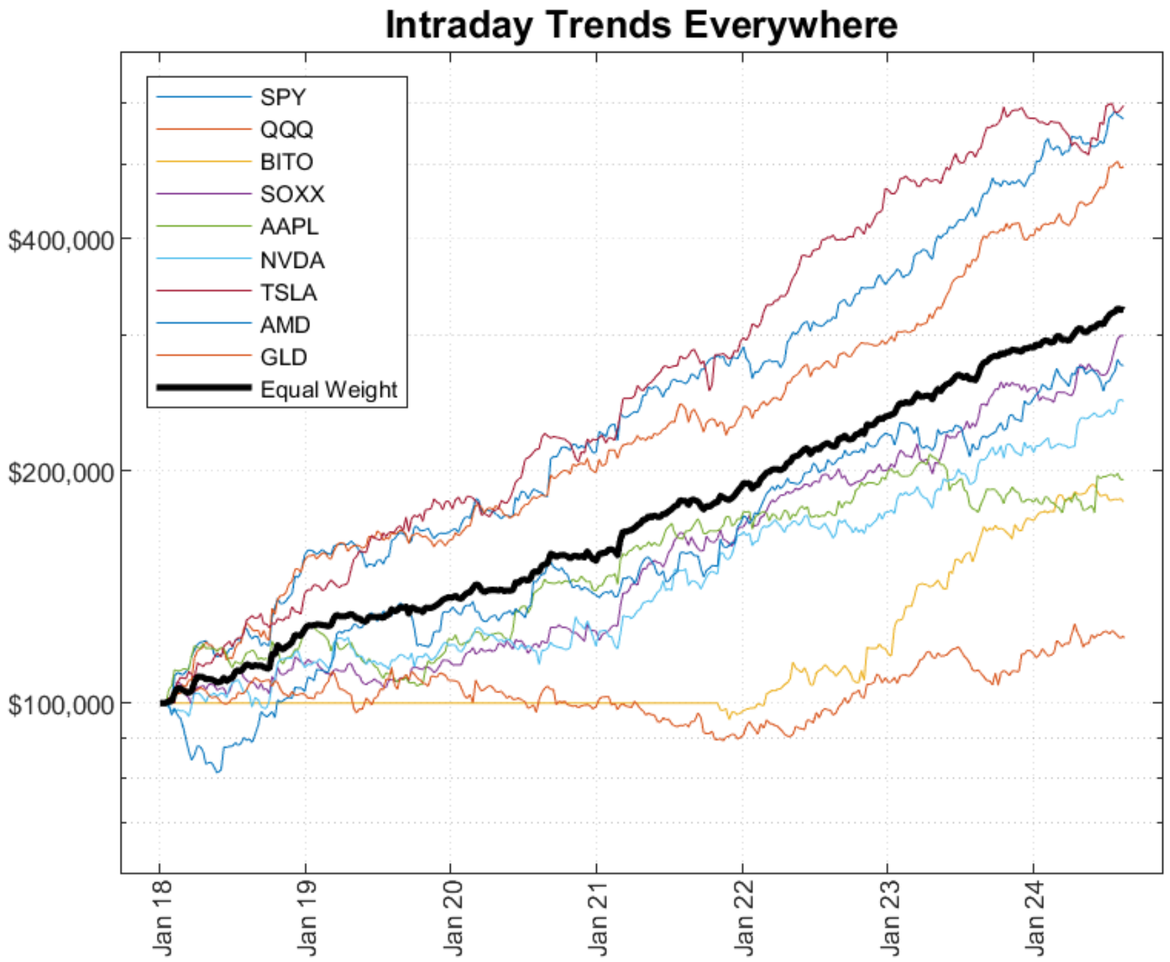
Crisis Alpha: Exploiting Chaos and Behavioral Biases

The 10 Worst Quarters for S&P500			
Quarter	**Event**	**S&P500**	**Strategy**
Q4 2008	Financial Crisis	-22%	16%
Q1 2020	COVID-19	-19%	7%
Q2 2022	Inflation and Rates	-16%	12%
Q3 2011	Debt Ceiling Crisis	-14%	7%
Q4 2018	Trade War Escalation	-14%	31%
Q2 2010	European Debt Crisis	-11%	2%
Q1 2009	Financial Crisis Bottom	-11%	8%
Q1 2008	Financial Crisis Onset	-9%	6%
Q3 2008	Lehman Collapse	-9%	19%
Q3 2015	China Market Crash	-6%	9%



Does it also work on other ETFs or stocks?

Same Trading Rules, Similar Results!

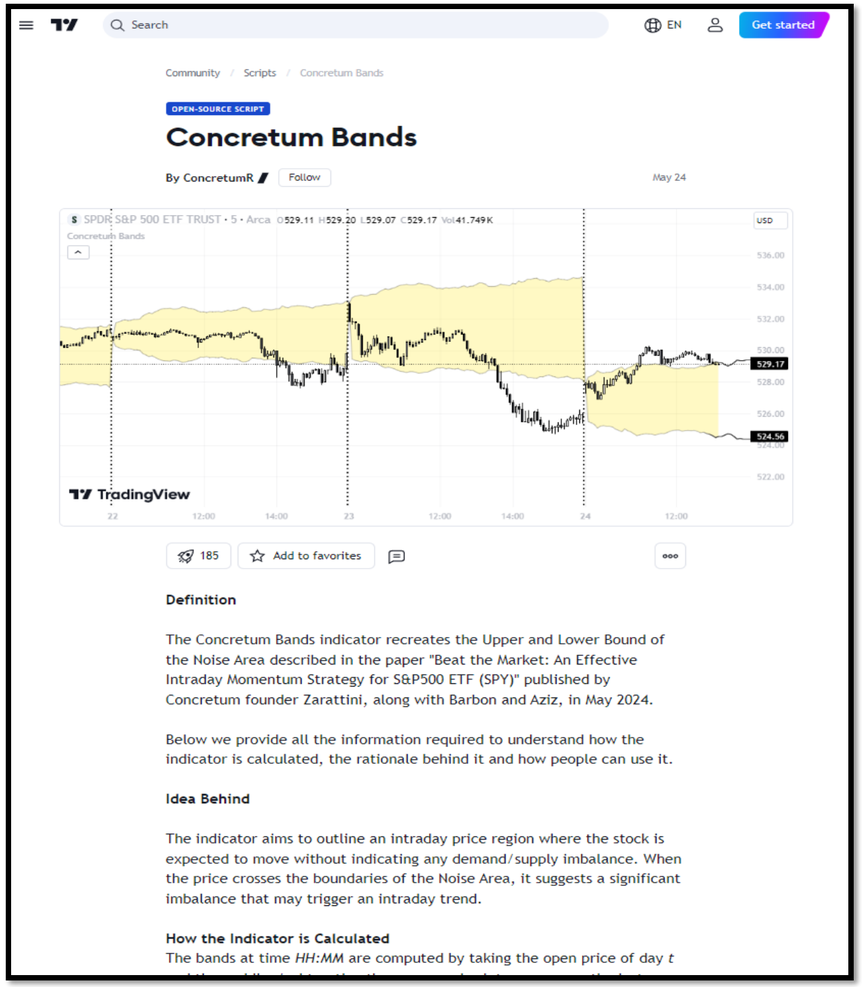


PERFORMANCE STATISTICS

Ticker	IRR	VOL	SR	MDD
SPY	30%	14%	2.11	9%
QQQ	28%	14%	2.03	9%
BITO	24%	14%	1.72	7%
SOXX	18%	12%	1.48	9%
AAPL	11%	14%	0.77	17%
NVDA	15%	14%	1.09	11%
TSLA	31%	14%	2.19	14%
AMD	17%	15%	1.11	19%
GLD	3%	11%	0.28	20%
Equal Weight	19%	7%	2.62	3%

How to track the Noise Area?

In TradingView, It is FREE, It is Open-Source



Download it for FREE → https://bit.ly/CBands

Backtest your Intraday Momentum Strategy

Backtesting Code is Available: Matlab & Python

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2 YEARS FREE DATA

Backtesting 2 Years of FREE Data Using Python: Enhancing SPY Momentum Strategies with Polygon, from 'Beat the Market'

Dive into our latest exploration of Python-based backtesting with two years of free SPY ETF data from Polygon. This post expands on the momentum strategies from 'Beat the Market', providing detailed Python code and analysis to assess their profitability and effectiveness.

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Step 3: Backtesting

Overview

In this part, we conduct the actual backtest. This section involves defining the trading environment, including assets under management (AUM), commission costs, maximum leverage, volatility multiplier, and many others. To improve the readability of the code, we used a for loop where each iteration represents a historical trading day.

Step 3 Code:

– Click to see the Python Code for Step 3

Python

```python
import math

# Constants and settings
AUM_0 = 100000.0
commission = 0.0035
min_comm_per_order = 0.35
band_mult = 1
band_simplified = 0
trade_freq = 30
sizing_type = "vol_target"
target_vol = 0.02
max_leverage = 4


# Group data by day for faster access
daily_groups = df.groupby('day')

# Initialize strategy DataFrame using unique days
```

Matlab Backtest → https://bit.ly/BeatMarketCode

Python Backtest → https://bit.ly/BTestPyt

Useful Links and Contacts

For any questions, feel free to reach out!

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