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Books, Education, and Media Sector ETF: Analysis and Performance Evaluation

General Investment Philosophy

My project's ETF was created under the premise that market inefficiencies exist within specialized sector portfolios, particularly in the education and media industries. This investment philosophy rejects the efficient market hypothesis in favor of an adaptive markets framework (Downey). This recognizes that investor behavior is often characterized by biases and incomplete information processing (Downey). The fund's approach is grounded in behavioral finance principles. This acknowledges that market participants frequently exhibit predictable patterns of overreaction and underreaction to new information (Hayes).

The investment philosophy embraces a data-driven approach to portfolio management. This uses technical analysis and statistical methods to identify and capitalize on market anomalies. Rather than relying on fundamental analysis or macroeconomic forecasting, the strategy focuses on price action and market microstructure patterns that can be identified and monetized (Nguyen). This approach assumes that while markets may be efficient over extended periods, short to medium-term inefficiencies provide opportunities for alpha generation.

Investment Methods and Trading Rules

The fund uses a dual-signal approach combining mean reversion and momentum strategies to generate trading decisions. The primary methodology centers on statistical mean reversion, utilizing a 20-day rolling window to calculate moving averages and standard deviations for each security in the portfolio (Chen). Mean reversion generates Z-scores by measuring the deviation of current prices from their 20-day moving average, standardized by the 20-day rolling standard deviation (Chen). Buy signals are triggered when the Z-score falls below -2, indicating the security is trading more than two standard deviations below its recent average (Chen).

The momentum overlay provides another filter using one-year price changes to identify trending behavior. This longer-term momentum component generates additional buy signals when annual returns exceed 20%. This indicates strong positive momentum that may continue. Sell signals are generated when Z-scores exceed +2 (indicating overbought conditions) or when annual momentum falls below -10%, suggesting deteriorating price trends. The integration of these two methodologies in my code aims to capture both short-term price reversals and longer-term directional movements, providing a more robust signal generation framework than either approach would yield independently (Dhir).

Securities Selection and Portfolio Composition

The fund focuses on publicly traded equities within the education, publishing, and media sectors. The portfolio consists of ten securities with varying allocations for diversification within this portfolio. Amazon (AMZN) receives the largest allocation at 15%, reflecting its dominant position in both retail and digital media distribution, while also providing some diversification beyond pure-play education stocks. Target (TGT) is at 13% and Costco (COST) is at 12% providing exposure to consumer spending patterns that often correlate with educational expenditure cycles. The education segment includes Barnes & Noble Education (BNED) at 8%, Scholastic Corporation (SCHL) at 9%, and Pearson PLC (PSO) at 8%. These companies span from textbook retail to educational content creation and standardized testing. The media section is News Corporation (NWSA) at 10%, The New York Times Company (NYT) at 10%, RELX Group (RELX) at 8%, and Thomson Reuters Corporation (TRI) at 7%. These holdings provide exposure to traditional and digital media, academic publishing, legal and regulatory information services, and financial data provision. This portfolio reflects an assumption that these sectors

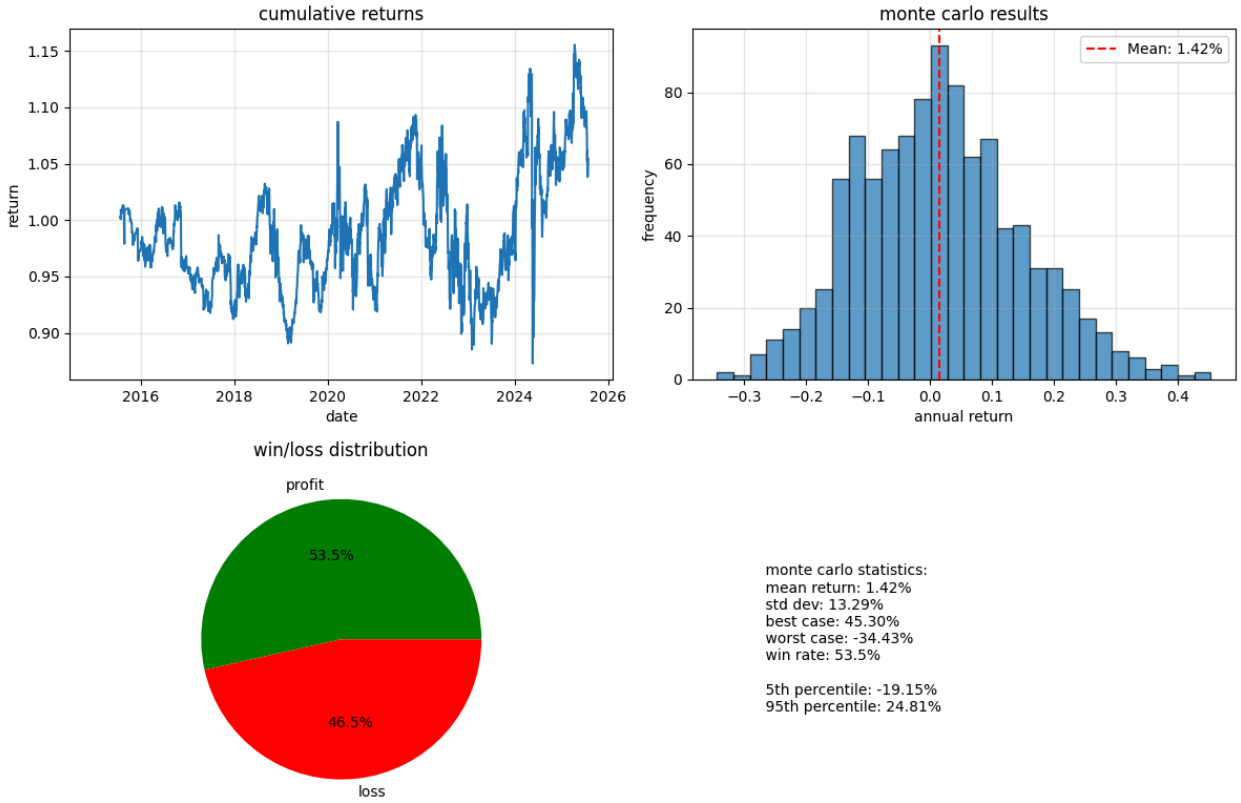
exhibit similar cyclical patterns and respond to comparable economic drivers. These include education spending, technology adoption, and demographic trends.

Performance Evaluation and Risk Assessment

The backtesting analysis covering the period from 2015 to 2025 reveals mixed performance characteristics that would need careful consideration. The strategy generated an annualized return of 1.42%. The Sharpe ratio of -0.04 indicates that the strategy failed to provide adequate compensation for the risk undertaken, with returns insufficient to justify the volatility (Fernando).

Risk metrics highlight significant concerns about the strategy's downside protection capabilities. The win rate of 48.2% indicates that losing trades slightly outnumber winning trades, suggesting that the strategy's positive returns depend on the magnitude rather than frequency of successful positions.

Monte Carlo simulation results provide additional insight into the strategy's expected performance. Based on 1,000 simulations using historical return and volatility parameters, the mean expected annual return remains at 1.42%, consistent with the backtesting results. The probability of generating positive returns in any given year stands at 53.5%. The 90% confidence interval spans from -19.15% to 24.81%. This indicates uncertainty around expected outcomes and shows the strategy's significant volatility.



The distribution of Monte Carlo results reveals concerning tail risk characteristics, with the 5th percentile outcome showing potential annual losses of nearly 20% (Hayes). While the 95th percentile suggests possible gains approaching 25%, the asymmetric risk-reward profile and high volatility raise questions about the strategy's suitability for risk-averse investors (Hayes).

Management Recommendation and Business Viability Assessment

Based on the performance analysis and risk evaluation, launching this fund presents significant challenges that likely outweigh the potential benefits. So, I would not recommend launching this fund. The strategy's 1.42% annual return falls well short of the performance threshold necessary to justify typical fee structures. Even without performance fees, the gross returns would not be enough to provide meaningful net returns to investors after covering management costs.

The negative Sharpe ratio indicates that investors would be better served by risk-free investments, while the 23% maximum drawdown suggests downside risk for the returns generated (Paljug). These characteristics would make the fund difficult to market to institutional investors.

From an operational perspective, the strategy's complexity and sector concentration can create additional challenges. The reliance on technical indicators and frequent trading would generate large transaction costs. Also, the concentrated exposure to education and media sectors increases the fund's vulnerability to sector-specific shocks or regulatory changes.

Alternative applications for the research and methodology developed might prove more valuable than launching a standalone fund. The framework could serve as a component within a larger multi-strategy fund, where its performance could be averaged with other approaches. Additionally, the framework might be better applied to fundamental analysis or private investment opportunities within the education technology space, where the sector knowledge could provide greater competitive advantages.

My recommendation is to not pursue this fund launch as currently structured. Instead, efforts should focus on improving risk-adjusted returns, potentially through enhanced signal generation, better risk management techniques, or expanded diversification beyond the current sector.

Conclusions

This analysis demonstrates the challenges in generating consistent alpha through technical analysis approaches. Despite employing signal generation techniques combining mean reversion and momentum indicators, the strategy did not deliver performance metrics that would

justify commercial fund launch. The Monte Carlo simulation results further emphasize the strategy's limitations, with only a marginal 53.5% probability of generating positive returns.

However, findings contribute valuable insights to the ongoing debate regarding market efficiency and the viability of systematic trading strategies. While the analysis rejects the strict efficient market hypothesis in favor of an adaptive markets framework, the poor risk-adjusted performance results suggest that inefficiencies may be more difficult to capture. The backtesting and Monte Carlo analysis methodology used provides a template for future strategy evaluation, demonstrating the importance of a comprehensive risk assessment. Future research should focus on enhanced risk management frameworks, dynamic position sizing mechanisms, and investigation into alternative signal generation techniques that address the limitations and potentially achieve the performance necessary for commercial viability.

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