Angelica Hussar
MSDS 451
Term Project Project Checkpoint C
Book and Reading ETF: Performance Evaluation and Business Viability Analysis

Introduction

This assignment focuses on developing an ETF that uses data science techniques to systematically buy and sell stocks in the books and reading sector. The main research question asks if systematic trading strategies can generate returns above market benchmarks while also providing investors with exposure to the growing literacy and education market. Several groups would benefit from this research. Investment management firms are looking for new ways to diversify their portfolios and gain exposure to underserved market sectors. Individual investors also want investments that align with their values. Additionally, institutions managing endowments could benefit from exposure to an industry that directly supports their mission. The research will produce an automated portfolio management system, risk assessment tools for sector-specific investments, and performance models that can separate strategy effectiveness from general market conditions.

Literature Review

Previous studies provide the theoretical foundation but have not addressed the unique characteristics of book retail and publishing stocks. For example, recent analysis named “Momentum Investment Strategies across Time and Trends: A Review and Preview "by Karki and Khadka examined momentum strategies across 1993-2024, highlighting the role of behavioral biases in trading decisions. Their comprehensive study demonstrates that momentum investing research has seen remarkable growth with strategies continuing to generate positive returns across multiple asset classes. Mean reversion strategies have received academic validation with recent technological developments. Additionally, "Efficacy of a Mean Reversion Trading Strategy Using True Strength Index." by Daniel Requejo presented a comprehensive analysis of mean reversion strategies applied to SPY and QQQ ETFs demonstrating strategy

usefulness across various market conditions through rigorous backtesting. When comparing momentum and mean-reversion, mean reversion performs better in range-bound markets while momentum excels in trending conditions (Chen).

I have found no studies that have developed systematic trading strategies designed specifically for book industry stocks. The closest existing investment product is the Invesco Next Gen Media and Gaming ETF, which allocates only about 12% to publishing companies while focusing mainly on technology and gaming. Additionally, academic research has not examined the unique patterns in book retail, including seasonal education spending, social media influence on reading trends, or unique opportunities created by the industry's digital transformation.

Methods

This research combines several approaches to create a comprehensive framework for evaluating the performance potential of a book industry ETF. The approach addresses the main challenge of limited historical data by using Monte Carlo simulation to test the strategy across thousands of possible market scenarios. This dataset includes daily stock prices, trading volumes, and company financial information from the past 15 years.

The ETF portfolio uses a four-level structure designed to balance growth potential with risk management. Large retailers including Amazon, Target, and Costco make up 40% of the fund because they provide stability through diversified revenue streams while still offering significant book sales exposure. Dedicated book retailers including Barnes & Noble Education, Scholastic, and John Wiley & Sons comprise 25% of the portfolio, giving direct exposure to book industry trends. Publishing companies like News Corp and New York Times Company represent 20% of the fund, capturing content creation and digital transformation trends.

Educational content companies including RELX and Thomson Reuters make up the remaining 15%, providing exposure to academic and professional publishing markets.

The trading strategy would combine three different approaches that work together to reduce risk and improve returns. Mean reversion strategy would identify when book stocks are trading unusually high or low compared to their normal price ranges. This approach assumes that book industry stocks often overreact to short-term news and seasonal changes before returning to more reasonable price levels. The momentum strategy would buy stocks that are both outperforming the overall market and showing positive returns over the past year (Gratton). The pairs trading approach would find pairs of related book industry stocks that usually move together, buying the temporarily cheaper stock and selling the more expensive one when their prices diverge (Chen). The Monte Carlo evaluation framework would address the challenge of limited historical data by creating possible market scenarios. The 15 years of historical data would be used to calculate important statistics including how volatile each stock tends to be, how different stocks relate to each other, and how market conditions change. The analysis would also incorporate position limits to prevent any single stock from dominating the portfolio and stop-loss rules to limit losses from individual positions.

Results

The Monte Carlo analysis across 10,000 simulated scenarios shows strong performance potential that supports the viability of the book industry ETF strategy. From the previous checkpoint, the strategy produces return characteristics with a mean annual return of 16.88% and a median return of 14.21%. The annual volatility of 23.59% places the fund in the moderate risk category, which seems to be appropriate for a sector-focused ETF. Most importantly, the strategy

generates positive returns in 75.5% of all simulated scenarios, giving investors high confidence in profitable outcomes.

Each component of the trading strategy contributes value to the overall performance. The mean reversion strategy would provide consistent returns across different market conditions and performs well during volatile periods when book stocks experience temporary drops. The momentum strategy would deliver strong performance during trending markets, especially during periods of sustained education sector growth (Gratton). The pairs trading would significantly reduce portfolio volatility by maintaining low correlation with the directional strategies (Chen).

The integration of alternative data sources would also add additional value beyond traditional financial analysis. Google Trends and social media sentiment analysis could improve risk-adjusted returns by identifying early signals of changing book retail demand. Additionally, seasonal pattern recognition would provide reliable performance metrics during the back-to-school and holiday season that would give consistency across simulation scenarios. Risk analysis indicates that the diversified approach balances exposure and stability. Large retailer positions reduce volatility while specialized book companies offer direct exposure to industry growth trends.

Conclusions

This assignment shows that using data science methods to invest in book industry stocks can be profitable and offers something different from existing investment options. The book industry's unique characteristics including seasonal demand patterns, social media influence, and ongoing transformation create competitive advantages that systematic trading strategies can use. The diversified portfolio structure successfully addresses different investor needs, with large

retailer allocations providing stability. Despite implementation challenges including liquidity constraints, regulatory requirements, and technology infrastructure needs, the research strongly supports proceeding with full strategy development. The quantitative evidence demonstrates clear market opportunity with sustainable competitive advantages that justify the operational complexity. The book industry ETF represents an opportunity to create a differentiated investment product serving underserved market segments while generating attractive returns for both investors and fund management. The combination of strong performance potential, clear market differentiation, and growing investor interest in education-focused investments creates a compelling business case for moving forward with this specialized quantitative fund.

References

Chen, James. "Pairs Trade." Investopedia, https://www.investopedia.com/terms/p/pairstrade.asp.

Chen, James. "Mean Reversion." *Investopedia*, https://www.investopedia.com/terms/m/meanreversion.asp.

Gratton, Peter. "An Introduction to Momentum Trading." Investopedia, https://www.investopedia.com/trading/introduction-to-momentum-trading/.

Karki, Dipendra, and Prajjwol Bikram Khadka. "Momentum Investment Strategies across Time and Trends: A Review and Preview." Nepal Journal of Multidisciplinary Research, vol. 7, no. 1, 2024, pp. 62-83. SSRN, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4837507.

Requejo, Daniel. "Efficacy of a Mean Reversion Trading Strategy Using True Strength Index." SSRN, 27 Jan. 2024, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4708400.

Ti, Yen-Wu, et al. "Improving Cointegration-Based Pairs Trading Strategy with Asymptotic Analyses and Convergence Rate Filters." Computational Economics, 19 Jan. 2024, https://link.springer.com/article/10.1007/s10614-023-10539-4.