

Article

Do High P/E and EV/EBITDA Stocks Outperform Low-Multiple Stocks? Evidence from Technology, Consumer Staples, and Healthcare Portfolios in the U.S. Market (2018–2022)

Abed Aftabi ^{1,*}  and SeyedSoroosh Azizi ²¹ Amsterdam Business School, University of Amsterdam, 1105 Amsterdam, The Netherlands² Department of Finance and Accounting, Heller College of Business, Roosevelt University, Chicago, IL 60605, USA; sazizi@roosevelt.edu

* Correspondence: abed.aftabi1@gmail.com

Abstract

This study examines the relationship between valuation multiples and investment performance in the U.S. stock market. Specifically, it tests whether portfolios constructed with high-multiple stocks consistently outperform portfolios with low-multiple stocks. The analysis spans the Technology, Consumer Staples, and Healthcare sectors from 2018 to 2022. A sector-based portfolio construction framework was employed using quarterly portfolio-return data. Quantitative financial modelling, including regression analysis and descriptive statistics, was applied to assess the correlation between portfolio returns and valuation multiples (P/E and EV/EBITDA), while interpreting results within the broader context of market volatility and the COVID-19 period. The results show no statistically significant relationship between valuation multiples and portfolio performance. Low-multiple portfolios demonstrated marginally higher average returns over the period, offering weak support for value-based investment strategies. Results further suggest limited standalone predictive power in high-multiple valuations. Drawing on the Efficient Market Hypothesis, Value Investing, Growth Investing, and the Fama-French Three-Factor Model, this paper empirically tests the impact of valuation multiples within a sector-based portfolio framework. Accordingly, the study adds to the asset pricing literature by offering a structured null-result framework, demonstrating that valuation multiples, when applied in isolation, may not provide sufficiently reliable standalone signals for portfolio performance. The COVID-19 period is interpreted as an economically meaningful contextual regime characterized by elevated volatility, liquidity intervention, and sectoral divergence, rather than as a formally estimated event-study framework.



Academic Editor: Thanasis Stengos

Received: 2 May 2026

Revised: 19 June 2026

Accepted: 23 June 2026

Published: 30 June 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

Keywords: stock valuation; valuation multiples; asset pricing; portfolio management; value investing; growth investing

1. Introduction

Valuation multiples—specifically the Price-to-Earnings (P/E) ratio and the Enterprise Value to EBITDA (EV/EBITDA) ratio—are among the most commonly used tools in equity valuation and investment decision-making. These metrics provide benchmarks for comparing firms' market values relative to their earnings or operational profitability. High-multiple stocks are typically interpreted as high-growth opportunities, priced to reflect

strong future expectations, whereas stocks with low multiples tend to be viewed as more mature or undervalued firms offering stable, income-oriented cash flows. However, despite the widespread use of multiples in valuation practice, the question of how well these multiples predict future investment performance remains open and subject to continued empirical investigation. The use of valuation multiples as practical benchmarking tools is consistent with established valuation frameworks, where relative valuation is commonly applied to compare firms against peers and sector benchmarks (Damodaran, 1995, 2012). At the same time, valuation ratios have also been examined as indicators of long-run market expectations, although their predictive usefulness may vary across horizons and market conditions (Campbell & Shiller, 1998; Siegel, 2016).

The academic literature on valuation multiples and return predictability remains rich but presents mixed findings. The debate surrounding “value” versus “growth” investment styles has long-standing roots and has been formalized in multi-factor asset-pricing models (such as Fama & French, 1992, 1993). One key contribution in this domain is Value and Momentum Everywhere by Asness et al. (2013), which suggests that value and momentum strategies generate significant premia across eight diverse markets and asset classes, and identifies a common factor structure across these strategies.

More recently, the role of investor sentiment and macroeconomic shocks in linking asset markets to the real economy has attracted growing academic attention. X. Liu et al. (2024) develop a dynamic stochastic general equilibrium (DSGE) model in Asset-Market Sentiments and Business-Cycle Fluctuations, illustrating how sentiment-driven shocks in financial markets can amplify boom–bust cycles in the broader economy (X. Liu et al., 2024). Their findings suggest that valuation metrics are shaped not only by firm-specific fundamentals, but also by systemic factors such as market sentiment, liquidity conditions, and macroeconomic uncertainty.

Between 2018 and 2022, global equity markets experienced major structural shifts including rapid digitalization, ultra-low interest rates, the onset of the COVID-19 pandemic, and increased macroeconomic uncertainty. These developments challenge traditional valuation paradigms and raise questions about whether valuation multiples retain their predictive power under volatile and non-normal market conditions.

Accordingly, this study examines whether portfolios constructed from stocks with high valuation multiples (i.e., P/E or EV/EBITDA above the sector median) outperform portfolios constructed from stocks with low valuation multiples (i.e., below the sector median) within the U.S. market during the 2018–2022 period. The analysis focuses on three sectors—Technology, Consumer Staples, and Healthcare—selected for their contrasting growth profiles, risk characteristics, and macroeconomic sensitivity. Equally weighted portfolios are constructed for high- and low-multiple stocks in each sector and compared over multiple time horizons to evaluate differential performance.

This study extends prior research in three respects. First, it applies a sector-specific analysis of valuation multiples during a recent period of market stress and transition, extending the broad findings of Asness et al. (2013) into a more granular context. Second, it examines valuation-based selection strategies under structural market changes, including the COVID-19 period, thereby addressing concerns about the stability of multiples in non-normal environments. Third, it links valuation theory to portfolio construction by evaluating whether simple multiple-based screening retains empirical usefulness under recent market conditions.

Research Question

This study examines whether valuation-multiple classifications provide meaningful information regarding subsequent portfolio performance across the Technology, Consumer

Staples, and Healthcare sectors. Particular attention is devoted to differences between high- and low-multiple portfolios, the strength of the valuation–return relationship across investment horizons, and the extent to which the COVID-19 period may have influenced valuation-based investment outcomes.

This analysis adds to the literature on value-versus-growth performance and the empirical usefulness of multiple-based investing. The findings are relevant to both asset-pricing research and portfolio interpretation by reassessing the explanatory power of valuation metrics in recent market conditions. The remainder of the paper is structured as follows:

Section 2 outlines the literature review and theoretical framework, highlighting key valuation theories and prior empirical studies. Section 3 explains the data sources, portfolio construction methodology, and statistical models used. Section 4 presents the results from portfolio return analysis, regression findings, and correlation assessments. Section 5 discusses the implications of these findings in the context of existing literature. Section 6 concludes the paper and provides recommendations for investors and suggestions for future research.

2. Literature Review and Theoretical Framework

Valuation-based investment strategies, which are anchored in ratios such as Price-to-Earnings (P/E) and Enterprise Value-to-EBITDA (EV/EBITDA), have long occupied a central place in asset-pricing research. Yet, empirical findings remain inconsistent across markets, time periods, and sectors. Classic studies (Fama & French, 1992, 1993; Chan et al., 1991) established the dichotomy between value and growth stocks, identifying systematic differences in expected returns. Subsequent research, however, has produced mixed results regarding the persistence and robustness of these valuation premia.

Theoretical foundations: The debate surrounding the valuation–performance relationship originates from several foundational asset-pricing theories. The Efficient Market Hypothesis (EMH) formulated by Fama (1970) posits that security prices fully incorporate available information, implying that valuation ratios should not systematically predict excess returns. In contrast, the value-investing framework advanced by Fama and French (1992, 1993) contends that mispricing or risk premia can result in persistent return differentials, with low-multiple (“value”) stocks outperforming high-multiple (“growth”) stocks over time. Theoretical explanations of the value premium further suggest that investment frictions and firm-level fundamentals may contribute to return differences between value and growth stocks, reinforcing the interpretation that valuation-based return patterns may reflect compensation for underlying economic risks rather than simple mispricing (L. Zhang, 2005). The Fama–French Three-Factor Model formalized this relationship by incorporating size and book-to-market factors as determinants of expected returns, and their subsequent five-factor model (Fama & French, 2015) expanded this to include profitability and investment patterns. These models build on earlier asset-pricing foundations, including the Capital Asset Pricing Model, which links expected returns to systematic risk (Sharpe, 1964). Subsequent extensions also highlight that return variation may reflect additional systematic factors beyond value and size, such as momentum (Carhart, 1997), while empirical comparisons of return models show that different specifications can produce varying explanations of stock-return behavior (Kon, 1984). Evidence from alternative applications of the Fama–French five-factor model further suggests that factor relevance may differ across markets and model specifications (Foye, 2018).

More recently, Hou et al. (2021) extended the q-factor framework by incorporating an expected-growth factor and demonstrated that profitability, investment behavior, and growth expectations explain a substantial portion of cross-sectional return variation. Their

findings suggest that valuation multiples alone may omit economically important information embedded in firms' future growth opportunities and investment decisions. This perspective complements the Fama–French framework and reinforces the view that valuation indicators should be interpreted within a broader multifactor asset-pricing context. This interpretation is also consistent with [Novy-Marx \(2013\)](#), who shows that gross profitability contains strong explanatory power for expected returns, suggesting that profitability-based signals may complement or outperform simple valuation multiples.

The robustness of market efficiency during periods of crisis has also been questioned in the recent literature. [Vasileiou \(2021\)](#) reports evidence of fear-driven market behavior during the COVID-19 outbreak, suggesting that deviations from fundamental valuation may emerge when uncertainty is exceptionally high. Such findings are particularly relevant to the present study because the sample period encompasses one of the most disruptive episodes in modern financial-market history.

Recent evidence further suggests that the declining effectiveness of traditional valuation measures may be linked to structural changes in corporate valuation. [Gonçalves and Leonard \(2023\)](#) show that the apparent decline of the value premium is largely attributable to the increasing divergence between book-based measures and firms' underlying economic fundamentals, particularly in environments characterized by greater intangible-asset intensity and persistently lower discount rates.

The role of investor sentiment has likewise received increasing attention. [Birru and Young \(2022\)](#) demonstrate that sentiment exerts its strongest influence on stock returns during periods of elevated uncertainty, when valuation signals become more difficult to interpret. This finding is particularly relevant to the COVID-19 period.

Recent advances in portfolio-management research further emphasize the importance of market-regime awareness when evaluating investment strategies. [Y. Zhang et al. \(2025\)](#) develop a regime-aware portfolio optimization framework and demonstrate that portfolio performance varies significantly across changing market environments. Their findings suggest that static valuation measures may be insufficient when used in isolation and should be interpreted alongside broader market and sectoral conditions. This perspective is consistent with the present study's conclusion that valuation multiples alone provide limited explanatory power for portfolio returns. Empirical evidence and recent developments: Empirical findings on the relationship between valuation multiples and stock performance have evolved considerably. Early studies such as [Fama and French \(1998\)](#) reported that low-multiple portfolios consistently outperformed across global markets, reinforcing value-premium hypotheses. International evidence also shows that size and value effects can vary across market structures, as demonstrated by [J. Liu et al. \(2018\)](#) in the Chinese equity market.

[Kosowski et al. \(2006\)](#) later found that high-minus-low P/E strategies generated abnormal returns during specific historical periods, suggesting that valuation effects may be time-variant.

Recent cross-sectional studies further challenge traditional multiple-based valuation frameworks. For example, [Akhtar \(2021\)](#) suggests that market multiples may retain some predictive relevance across emerging and developed markets, although the strength of these relationships appears to vary across settings. Similarly, [Kim and Nikolaev \(2023\)](#) show that context-adjusted profitability has superior ability to explain expected returns relative to conventional profitability measures, suggesting that standard valuation multiples alone may omit relevant information about profitability quality. These developments underscore the need to augment classic valuation models with newer insights on profitability, investment behavior, and structural market shifts. Thus, while early foundational work established valuation and profitability factors as key drivers of cross-sectional stock returns,

more recent literature emphasizes that the explanatory validity of valuation multiples is conditioned by firm-specific profitability, investment discipline, and macroeconomic state. This study links these two strands of research by applying multiple-based classification within sector-specific contexts and over a volatile recent cycle.

Identified research gap: Despite extensive prior work, several gaps remain. First, most studies evaluate valuation premium at the market-wide level, overlooking sectoral heterogeneity in growth expectations, cyclicity, and exposure to economic shocks. Second, while many authors recognize macroeconomic disruptions—particularly the COVID-19 crisis—as influential, few explicitly model or test how such shocks reshape valuation–performance relationships at the sector level. Third, the recent period between 2018 and 2022 constitutes a unique environment characterized by record-low interest rates, accelerated digitalization, unprecedented fiscal and monetary expansion, and pandemic-induced volatility, conditions under which macroeconomic uncertainty may materially affect expected stock returns (Bali et al., 2020).

Research Hypotheses:

H1. *Low-multiple portfolios generate higher average returns than high-multiple portfolios during periods of elevated macroeconomic uncertainty.*

H2. *The relationship between valuation multiples and portfolio returns differs across Technology, Consumer Staples, and Healthcare sectors due to sector-specific growth and defensive characteristics.*

H3. *Valuation multiples, when used in isolation, exhibit limited standalone explanatory power for portfolio returns during volatile market conditions.*

Study contribution: This study addresses these gaps by conducting a sector-specific examination of valuation multiples across Technology, Consumer Staples, and Healthcare from 2018 to 2022. By applying an equally weighted portfolio approach, it evaluates whether high-multiple (“growth”) or low-multiple (“value”) portfolios yield systematically different outcomes under evolving macroeconomic regimes. The study contributes by: (i) integrating relative-valuation multiples (P/E, EV/EBITDA) with contemporary profitability and investment-factor insights; (ii) applying this framework across three distinct sectors and differing economic regimes; and (iii) empirically testing whether valuation-multiple strategies remain informative during periods of heightened structural and macroeconomic disruption.

3. Data and Methodology

This study utilizes data from Wharton Research Data Services (WRDS), Yahoo Finance, and publicly available U.S. stock market databases. These sources provide comprehensive financial metrics, including Price-to-Earnings (P/E) ratios, Enterprise Value (EV) to EBITDA multiples, and sector performance indicators. Additional data validation was performed using industry reports and academic research databases to ensure accuracy and consistency across data sources.

3.1. Data Collection & Portfolio Construction

- **Period Covered:** January 2018–January 2022. The sample period was selected to cover distinct macro-financial conditions, including pre-pandemic stability, pandemic-induced disruption, and post-recovery revaluation. This period includes substantial market volatility and sectoral revaluation, allowing the analysis to assess performance across different market conditions. The inclusion of multiple phases within this window helps capture changes in investor behavior and sectoral rebalancing.

- Data Extraction: Financial ratios were obtained via WRDS-CRSP database and cross-verified with Yahoo Finance to ensure completeness and reliability.
- Validation: Industry and sector medians were calculated annually, and stock-level ratios were validated against these benchmarks. Discrepancies were resolved using random-cell validation and systematic data-filtering procedures.

Two equally weighted portfolios were constructed to compare the performance of high-multiple and low-multiple stocks across the Technology, Consumer Staples, and Healthcare sectors.

- High-Multiple Portfolio: Stocks with above-median P/E and EV/EBITDA multiples.
- Low-Multiple Portfolio: Stocks with below-median P/E and EV/EBITDA multiples.
- Investment Size: Each portfolio had an initial investment of \$1 million, equally allocated across approximately 40–45 stocks in total, corresponding to 10–15 stocks per sector depending on the number of qualifying firms.
- Selection Criteria: Stocks were chosen based on GICS classification, ensuring industry diversification.
- Stock Returns: Measured quarterly, with annual averages reported only for descriptive comparison, accounting for both capital gains and dividends.
- Portfolio Returns: Calculated as the weighted average of individual stock returns, rebalanced every six months.
- Performance Metrics:
 - Treynor Ratio: Assesses risk-adjusted returns.
 - Regression Analysis: Evaluates the relationship between valuation multiples and portfolio performance.

The sample was constructed from a comprehensive list of more than 700 publicly listed companies across the targeted sectors. For each sector, the median values of the Price-to-Earnings (P/E) and EV/EBITDA ratios were calculated to establish a benchmark for relative valuation. Stocks were then classified into high-multiple or low-multiple categories depending on whether their P/E and EV/EBITDA ratios were above or below the sector-specific medians.

No universal threshold exists for what constitutes “high” or “low” multiples, as these are relative measures that depend on the period under analysis and the valuation dynamics of each sector. Accordingly, this study follows an empirical, sector-based approach consistent with common valuation practice. Within each sector, the portfolio construction process targeted 10–15 qualifying stocks per portfolio, subject to the number of firms satisfying the dual median classification criteria. This classification rule is transparent and replicable. The final sample comprised approximately 85 firms in total, with 45 allocated to the high-multiple portfolios and 40 to the low-multiple portfolios. This slight asymmetry reflects the fact that the number of firms meeting the dual classification criteria varied across sectors and periods. The final sample of 85 firms across the Technology, Consumer Staples, and Healthcare sectors provides a balanced cross-section of industries with diverse growth and risk profiles. The sample horizon provides data continuity and cross-period comparability, and the sample is large enough to reflect cross-industry variation while maintaining sectoral focus.

Equal-Weighting Approach: Equally weighted portfolios were employed to minimize the dominance of large-cap firms and to ensure that performance outcomes reflected relative valuation effects rather than size bias. This approach follows [Fama and French \(1993\)](#) and [Asness et al. \(2013\)](#), who use equal weighting to reduce market-capitalization distortion and improve cross-sector comparability.

Selection Bias: To reduce selection bias, several validation steps were implemented: (1) verifying sector-median consistency across years, (2) excluding outliers with extreme valuation ratios, and (3) performing random-cell validation and multi-iteration testing to confirm portfolio stability. Alternative portfolio-classification approaches may be explored in future research to assess the sensitivity of valuation-based results to portfolio construction choices. The authors acknowledge that the binary division into high- and low-multiple groups is a simplified classification. However, it was adopted to reflect common valuation practice in corporate finance and M&A, where high/low-multiple peer-group comparisons are routinely used for benchmarking and pricing decisions. This improves the practical interpretability of the research design.

3.2. Statistical Model and Analysis

This study employed a linear regression model in which valuation multiples served as the independent variables and portfolio returns functioned as the dependent variable. The broader asset-pricing framework recognizes the potential influence of sectoral and macroeconomic factors. However, the empirical specification focuses on the standalone relationship between valuation multiples and portfolio returns. The baseline regression specification is expressed as: $R_{p,t} = \alpha + \beta_1 PE_{p,t} + \beta_2 EVEBITDA_{p,t} + \gamma HighPortfolio_p + \varepsilon_{p,t}$. The pooled specification includes a binary portfolio-type indicator equal to 1 for High-Multiple Portfolio observations and 0 for Low-Multiple Portfolio observations. This allows the baseline return level to differ across portfolio groups and avoids imposing a common intercept on the two portfolios.

Sectoral characteristics, firm-size effects, and changing market regimes are discussed as contextual factors that may influence portfolio performance and help interpret the empirical findings. However, these variables were not included as separate explanatory variables within the baseline regression specification. Similarly, the COVID-19 pandemic is treated as an economically meaningful contextual regime rather than a formally estimated event-study framework. Consequently, references to sectoral, size, market-regime, or COVID-19 effects should be interpreted as explanatory context rather than causal econometric estimates.

3.3. Limitations and Future Considerations

- The study relies on observational data, limiting causal inference.
- The regression analysis was supplemented with Newey–West heteroskedasticity- and autocorrelation-consistent (HAC) standard errors to improve the robustness of statistical inference. Future research may incorporate additional valuation metrics (e.g., Price-to-Sales or PEG ratios) and macroeconomic variables (e.g., inflation or interest-rate shocks) to extend predictive robustness.
- Testing alternative weighting schemes (value-weighted or volatility-weighted) could further validate the persistence of valuation effects across market conditions.

4. Results

This section reports the empirical results, focusing on portfolio performance comparisons, regression analysis, and correlation assessments. The analysis examines whether high-multiple portfolios outperform low-multiple portfolios across the selected sectors over the 2018–2022 period. It reports quarterly and annual averages for descriptive comparison (Figures 1 and 2), comparison with relevant sector averages (Figures 3 and 4) statistical relationships between valuation multiples and portfolio returns (Figure 5), and the role of broader macroeconomic context, particularly the COVID-19 period (Figure 6).

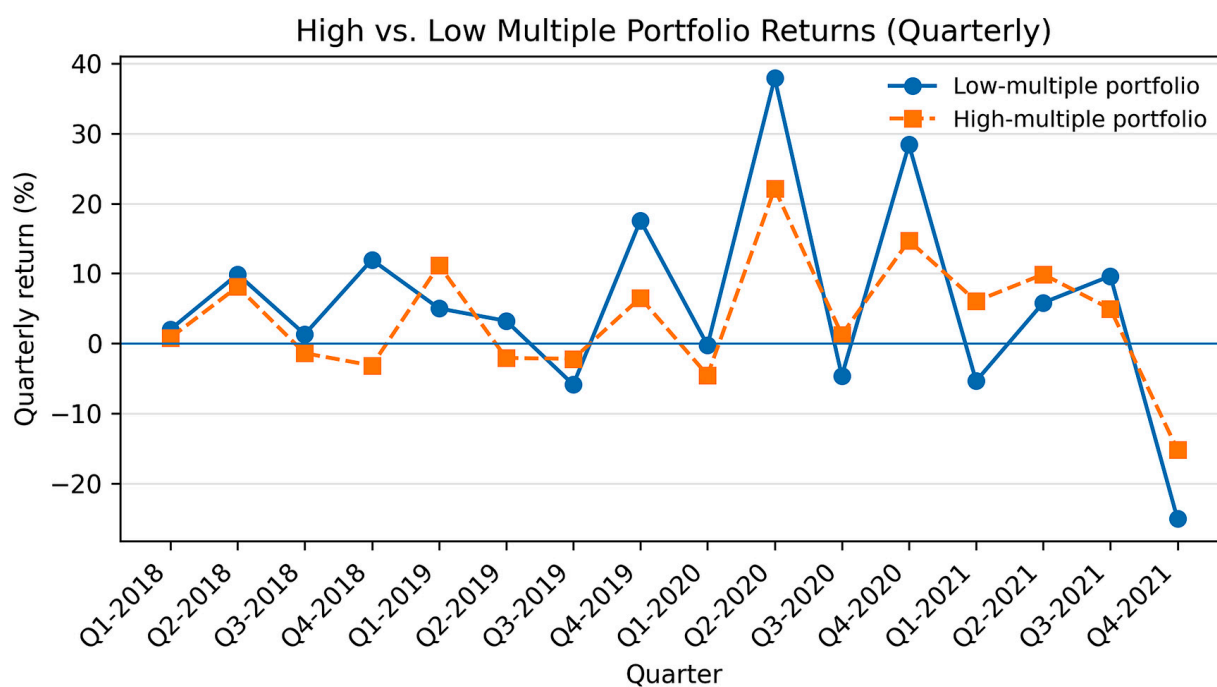


Figure 1. High vs. Low Multiple Portfolio Returns (Quarterly).

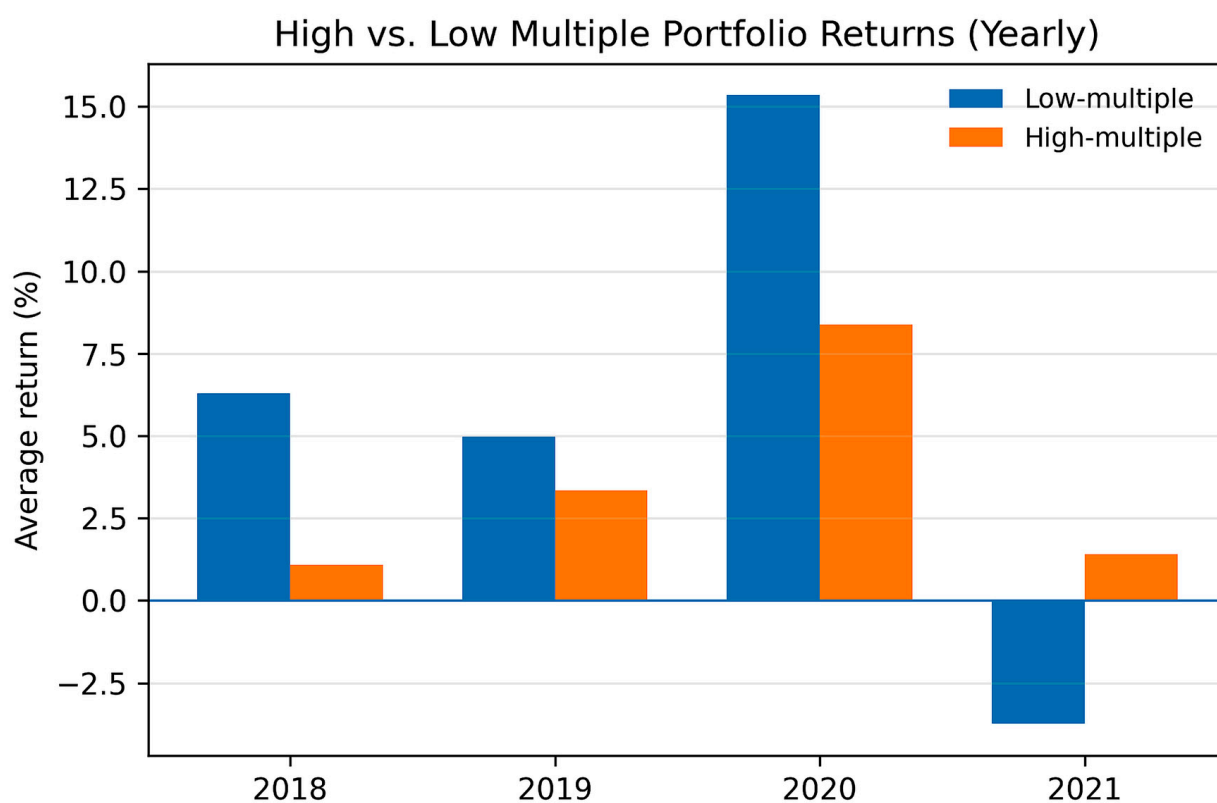


Figure 2. High vs. Low Multiple Portfolio Returns (Yearly).

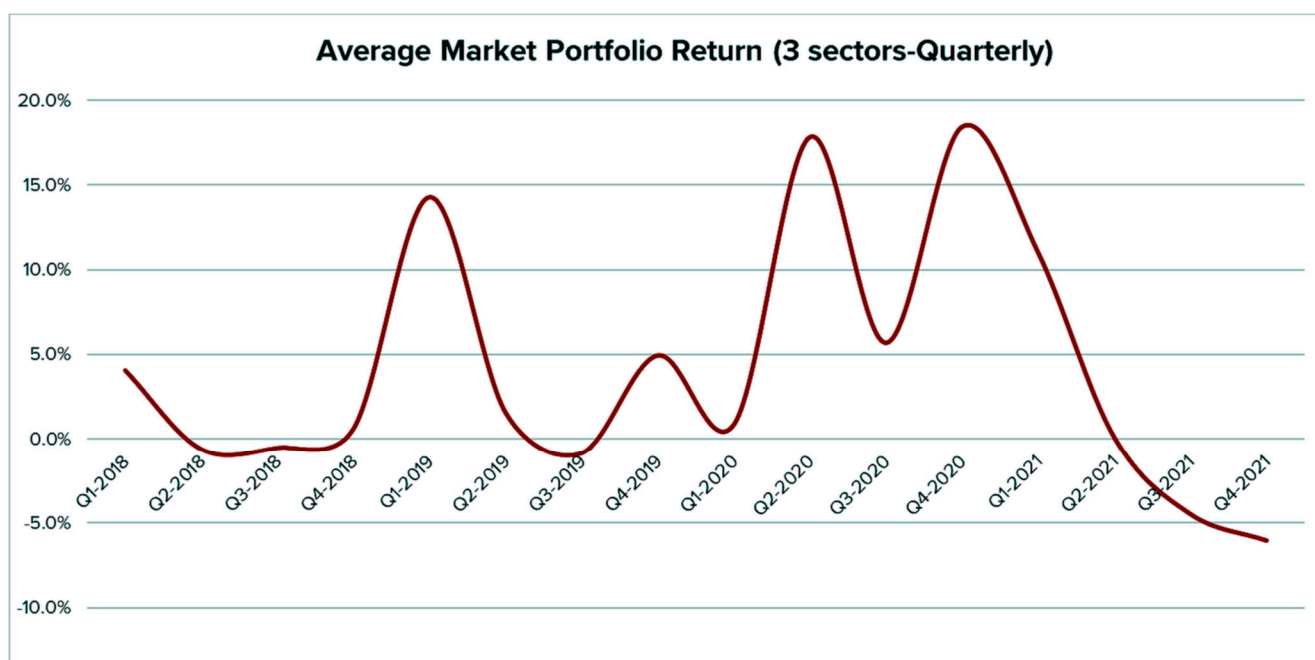


Figure 3. Average Return of Three Sectors (Quarterly).

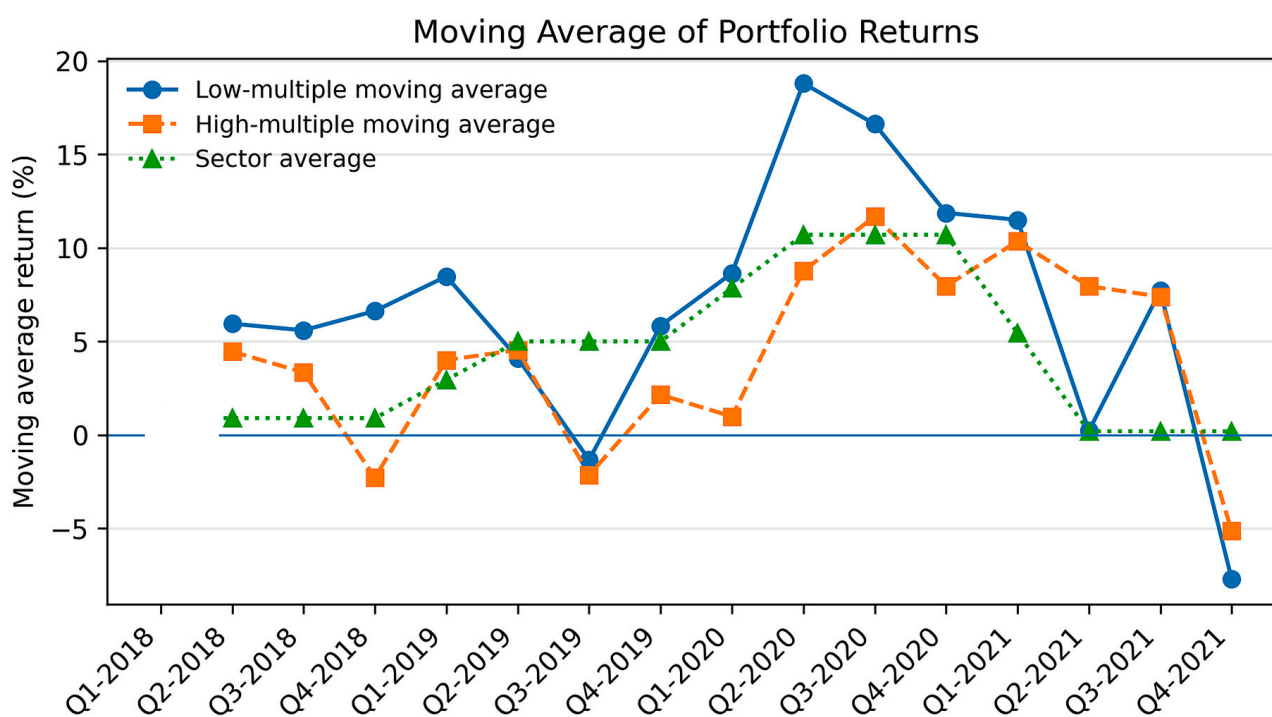


Figure 4. Moving Average of Portfolio Returns (High/Low-Multiple, and Sector Portfolio).

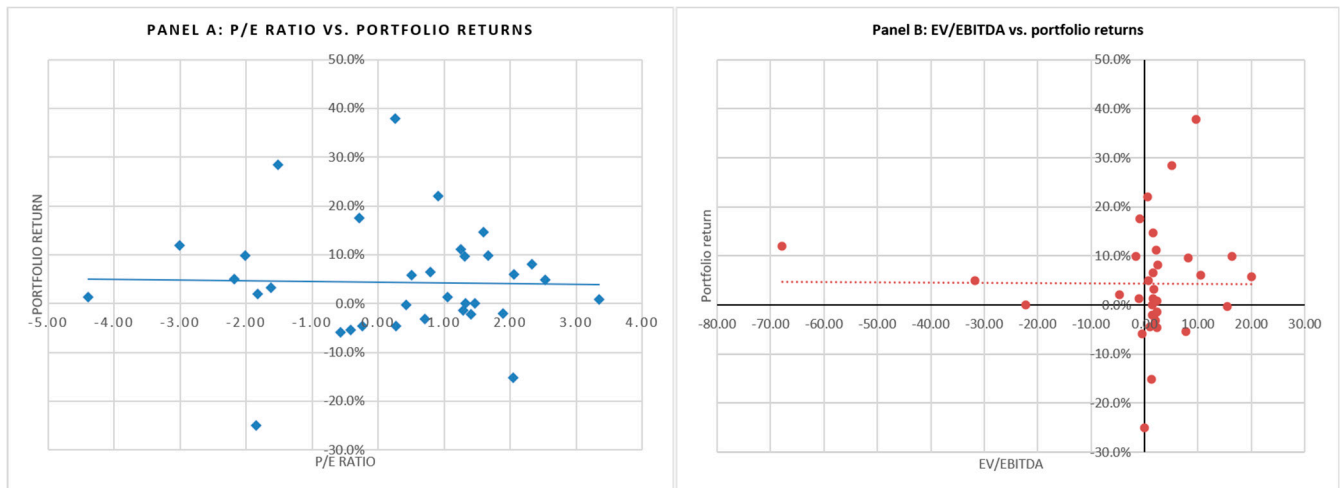


Figure 5. Linear association between valuation multiples and portfolio returns.

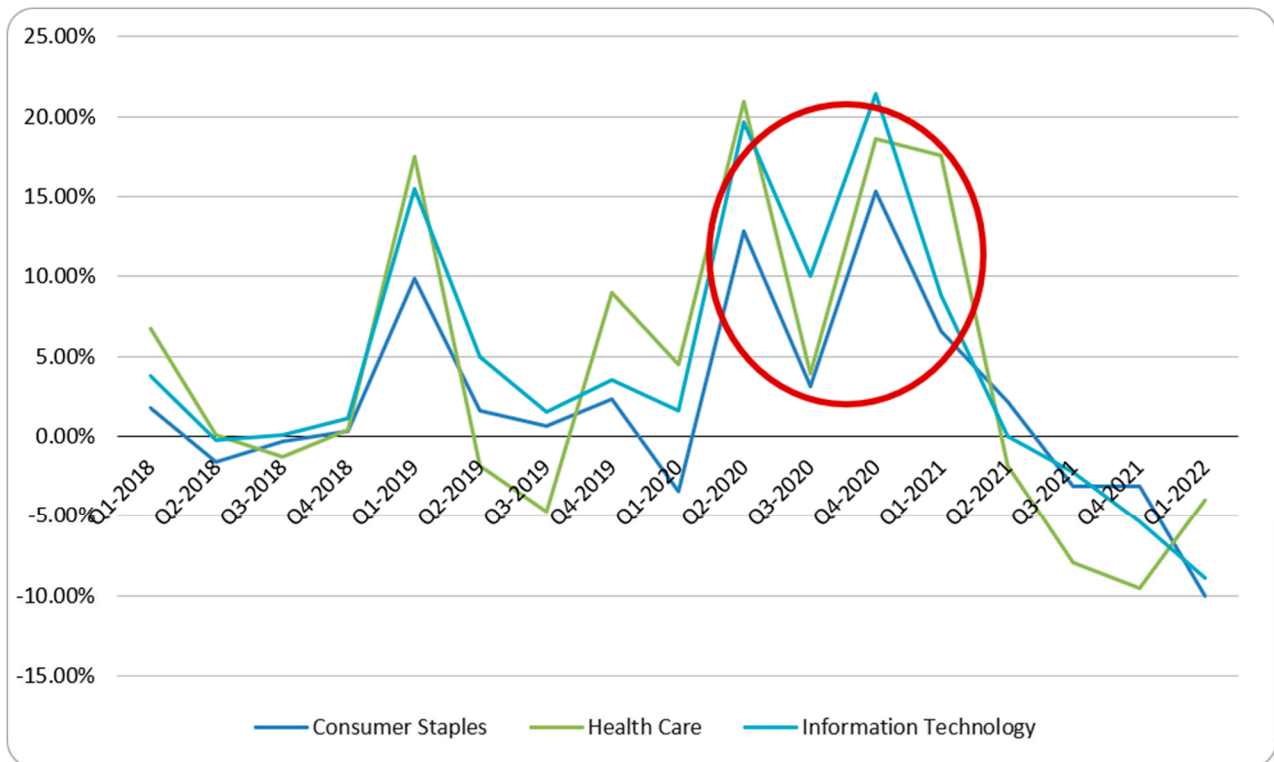


Figure 6. Sector Quarterly Performance including the COVID period (in the Circle).

The performance of both high-multiple and low-multiple portfolios fluctuates over time. As illustrated in Figure 1, portfolio returns ranged from -5% to 40% per quarter, with a sharp decline observed in Q4 2021. The low-multiple portfolio outperformed the high-multiple portfolio in a majority of observed quarters, and this pattern is also visible in the yearly average returns shown in Figure 2.

Additionally, Figure 3 presents the sector-weighted portfolio returns, offering an aggregated view of performance across Technology, Consumer Staples, and Healthcare. Comparing sector average returns with the constructed portfolios (Figure 4) reveals that low-multiple portfolios exhibit higher returns relative to both the high-multiple portfolio and the sector average.

4.1. Descriptive Results

- Low-multiple portfolios outperformed high-multiple portfolios in 63% of periods (10 out of 17 quarters).
- The low-multiple portfolio exhibited a higher cumulative return area (0.9) compared to the high-multiple portfolio (0.6).
- Sector performance remained between the two portfolios, indicating a diversified approach mitigates extreme fluctuations.
- Table 1 presents descriptive statistics for the principal variables used in the empirical analysis, including valuation multiples and portfolio returns. The statistics provide an overview of the distributional characteristics of the sample and support the interpretation of the subsequent regression results.

Table 1. Descriptive Statistics of Key Variables.

Variable	Mean	Median	Std. Dev	Min	Max
Returns (Quarterly)	0.0148	0.0047	0.1497	−0.6599	0.9973
P/E Ratio	3.72	21.10	2368.88	−73,792.74	35,417.41
EV/EBITDA	0.56	7.28	142.23	−650.92	508.54

Descriptive statistics are reported for the full sample and indicate substantial dispersion in valuation multiples, especially for P/E and EV/EBITDA. Such dispersion is expected in equity datasets because ratio-based measures can become extreme when denominators are small, negative, or close to zero. Accordingly, negative P/E observations were retained when earnings were negative, and firms with negative EBITDA were not automatically excluded from the descriptive sample, so as to avoid imposing ad hoc filters that could distort the sector composition. The resulting divergence between means and medians suggests that the distributions are highly skewed and materially affected by outliers. Consequently, the median is more informative than the mean as a summary measure of central tendency for these variables. Although trimming or winsorization could reduce the influence of extreme observations, the baseline specification reports the raw distributions for transparency and preserves the original information content of the data. These descriptive statistics should therefore be interpreted as reflecting genuine cross-sectional heterogeneity in firm valuation rather than measurement inconsistency.

4.2. Regression Analysis

To examine the relationship between valuation multiples and portfolio returns, a linear regression analysis was conducted. The model tested the correlation between P/E ratios, EV/EBITDA multiples, and portfolio returns using quarterly data from 2018 to 2022.

- Methodology and Variables:
- Dependent Variable: Quarterly portfolio return.
- Independent Variables: P/E Ratio, EV/EBITDA, and a binary High-Multiple Portfolio Dummy variable.
- High-Multiple Portfolio Dummy: Equal to 1 for High-Multiple Portfolio observations and 0 for Low-Multiple Portfolio observations. The dummy variable allows baseline return levels to differ across portfolio groups within the pooled specification.
- Regression coefficients indicate whether valuation multiples are associated with portfolio returns. The analysis calculates weighted-average multiple indexes for each portfolio (Table 2) as proxies for high- and low-valuation portfolios.
- Descriptive statistics for the principal variables are reported in Table 1.

Table 2. EV and P/E Index for Low/High-Multiple Portfolios (2018–2022; Quarterly).

	Low Portfolio EV Index	Low Portfolio PE Index	High Portfolio EV Index	High Portfolio PE Index
2018 Q1	4.7	1.8	2.3	3.3
2018 Q2	1.6	2	2.4	2.3
2018 Q3	1.6	4.4	2.3	1.3
2018 Q4	−67.8	3	2.1	0.7
2019 Q1	−31.7	2.2	2.2	1.3
2019 Q2	1.8	1.6	1.4	1.9
2019 Q3	−0.4	0.6	1.7	1.4
2019 Q4	−0.9	0.3	1.6	0.8
2020 Q1	15.4	0.4	1	0.3
2020 Q2	9.7	0.3	0.5	0.9
2020 Q3	2.4	−0.2	−1	1.1
2020 Q4	5.1	1.5	1.6	1.6
2021 Q1	7.7	0.4	10.5	2.1
2021 Q2	20	0.5	16.3	1.7
2021 Q3	8.1	1.3	0.7	2.5
2021 Q4	−0.1	1.8	1.3	2
2022 Q1	−22.2	1.3	1.5	1.5

Source: own calculations based on data described in Section 3.

4.3. Regression Findings

Table 3 reports pooled OLS regression results using quarterly observations from both the Low-Multiple and High-Multiple portfolios, yielding 34 portfolio-level observations. Following reviewer feedback, the revised specification includes a binary High-Multiple Portfolio indicator to allow the baseline return level to differ across portfolio groups. This adjustment avoids imposing a common intercept on portfolios that generated different average returns during the sample period. The coefficient on the High-Multiple Portfolio Dummy is negative ($\beta = -0.0552$) but statistically insignificant ($p = 0.2914$), indicating a negative estimated difference in baseline returns between High-Multiple and Low-Multiple portfolios during the sample period after controlling for valuation measures. However, the absence of statistical significance indicates that this difference should be interpreted cautiously.

Table 3. Pooled OLS Regression Results with Newey–West (HAC) Standard Errors.

Variable	Coefficient	Newey–West Std. Error	t-Statistic	p-Value
Intercept	0.0668	0.0278	2.404	0.0226
P/E Ratio	0.0143	0.0199	0.718	0.4781
EV/EBITDA	−0.0002	0.0006	−0.318	0.7530
High-Multiple Portfolio Dummy	−0.0552	0.0514	−1.074	0.2914
Statistic	Value			
R-squared	0.0254			
Adjusted R-squared	−0.0721			
N observations	34			
F-statistic	0.2606			
Degrees of freedom (regression)	3			
Degrees of freedom (residual)	30			

Notes: Newey–West heteroskedasticity- and autocorrelation-consistent standard errors are computed with one quarterly lag. The High-Multiple Portfolio Dummy equals 1 for High-Multiple Portfolio observations and 0 for Low-Multiple Portfolio observations.

Importantly, the estimated coefficients on P/E Ratio ($\beta = 0.0143$, $p = 0.4781$) and EV/EBITDA ($\beta = -0.0002$, $p = 0.7530$) remain economically small and statistically insignificant. The model's explanatory power remains limited ($R^2 = 0.0254$), indicating that valuation multiples explain only a small proportion of variation in portfolio returns. These findings reinforce the study's central conclusion that valuation multiples exhibit limited standalone explanatory power for portfolio returns during the sample period. The inclusion of the portfolio-type indicator directly addresses potential differences in baseline returns between portfolio groups while leaving the substantive conclusions unchanged.

Key regression statistics:

- R-squared values were extremely low, indicating negligible explanatory power.
- The F-statistic remained low (0.261), indicating limited overall explanatory power of the model.
- In the pooled regression with a High-Multiple Portfolio Dummy and Newey–West robust standard errors, neither P/E Ratio nor EV/EBITDA exhibited statistical significance, confirming the limited standalone explanatory power of valuation multiples.
- Newey–West robust standard errors produced qualitatively identical conclusions, indicating that valuation multiples exhibit limited standalone explanatory power for portfolio returns.
- T-statistics and p -values indicate that neither the P/E ratio nor EV/EBITDA exhibits statistically significant explanatory power for portfolio returns.

The extremely low explanatory power of the regression models should be interpreted as a substantive empirical result rather than only a statistical limitation. The results indicate that valuation multiples, when used as standalone predictors, have limited explanatory capacity for portfolio returns during the examined period. This outcome is consistent with the view that traditional valuation signals may become less informative in market environments characterized by high liquidity, behavioral distortions, and macroeconomic intervention.

Table 3 reports results using a pooled sample that combines quarterly observations from both the Low-Multiple and High-Multiple portfolios, yielding a total of 34 portfolio-level observations (17 quarters $\times$ 2 portfolios). This pooled specification was adopted to improve consistency between the regression framework and the observation structure reported elsewhere in the analysis, where Tables 4 and 5 summarize observations from both portfolios. By pooling observations from both portfolio groups, the revised specification provides a broader empirical basis for evaluating the relationship between valuation multiples and portfolio returns.

To assess the sensitivity of statistical inference to potential heteroskedasticity and autocorrelation—common concerns in time-series portfolio return data—we re-estimated the model using Newey–West heteroscedasticity- and autocorrelation-consistent (HAC) standard errors with one lag. The estimated coefficients for P/E Ratio ($\beta = 0.0143$, $p = 0.4781$) and EV/EBITDA ($\beta = -0.0002$, $p = 0.7530$) are economically small and statistically insignificant. The coefficient on the High-Multiple Portfolio Dummy ($\beta = -0.0552$, $p = 0.2914$) is negative but not statistically significant, indicating no reliable difference in baseline returns between the two portfolio groups after controlling valuation measures. The model's explanatory power remains low ($R^2 = 0.0254$), suggesting that valuation multiples and portfolio type collectively explain only a limited proportion of return variation. These findings reinforce the conclusion that valuation multiples possess limited standalone predictive relevance for portfolio returns during the sample period.

These findings reinforce the study's central conclusion: valuation multiples, when used as standalone predictors, exhibit limited explanatory power for portfolio returns during the sample period. The pooled regression results, combined with the robustness of the Newey–West adjustment, provide additional support for the interpretation that traditional

valuation signals may weaken in market environments characterized by elevated liquidity, monetary intervention, and behavioral distortions. The consistency of the results across the pooled specification and Newey–West inference increases confidence in the stability of the reported findings, notwithstanding the relatively small sample size inherent in portfolio-level quarterly analysis.

Table 4. Baseline P/E Regression Summary Statistics.

Statistic	Value
Multiple R	0.0206
R Square	0.0004
Adjusted R Square	−0.0308
Standard Error	0.1171
Observations	34

Table 5. Baseline EV/EBITDA Regression Summary Statistics.

Statistic	Value
Multiple R	0.0055
R Square	0.0000
Adjusted R Square	−0.0312
Standard Error	0.1172
Observations	34

Note: Tables 4 and 5 are based on the combined portfolio-level observations from both Low-Multiple and High-Multiple portfolios, comprising 17 quarterly observations per portfolio and 34 observations in total. Results are presented for descriptive comparison with the pooled multivariate specification reported in Table 3.

4.4. Correlation Analysis: Portfolio Return vs. Valuation Multiples

A correlation test was performed to assess the relationship between portfolio returns and valuation multiples. The results (Tables 6 and 7) indicate:

- Weak correlations in both high- and low-multiple portfolios.
- EV/EBITDA multiples showed minimal correlation with total returns (0.201 for high-multiple portfolios, −0.008 for low-multiple portfolio).
- P/E ratios exhibited near-zero correlation with total returns (−0.052 for high-multiple portfolios, 0.100 for low-multiple portfolio).

Table 6. High-Multiple Portfolio Return Coefficients.

	Total Return of Portfolio	EV Portfolio	PE Portfolio
Total return of portfolio	1.0000	0.2015	−0.0529
EV Portfolio	0.2015	1.0000	0.1697
PE Portfolio	−0.0529	0.1697	1.0000

Table 7. Low-Multiple Portfolio Return Coefficients.

	Total Return of Portfolio	EV Portfolio	PE Portfolio
Total Return of Portfolio	1.0000	−0.0086	0.1009
EV Portfolio	−0.0086	1.0000	0.4118
PE Portfolio	0.1009	0.4118	1.0000

4.5. COVID-19 Impact on Portfolio Performance

The COVID-19 period coincided with substantial stock-market volatility. The U.S. stock market experienced a sharp decline in Q1 2020, followed by a strong recovery in Q3 2020 alongside stimulus measures and Federal Reserve interventions.

- Figure 6 illustrates the quarterly performance of the 3 sectors, highlighting a sharp surge in Healthcare and Technology in 2020, corresponding to pandemic-related demand.
- Figure 7 presents the S&P 500 performance from 2018 to 2022, confirming market-wide disruptions and subsequent rebounds.
- During 2020–2021, low-multiple portfolios continued to outperform despite increased volatility. However, in Q2 2021–Q1 2022, high-multiple portfolios briefly outperformed amid economic reopening and speculative growth stock investments.

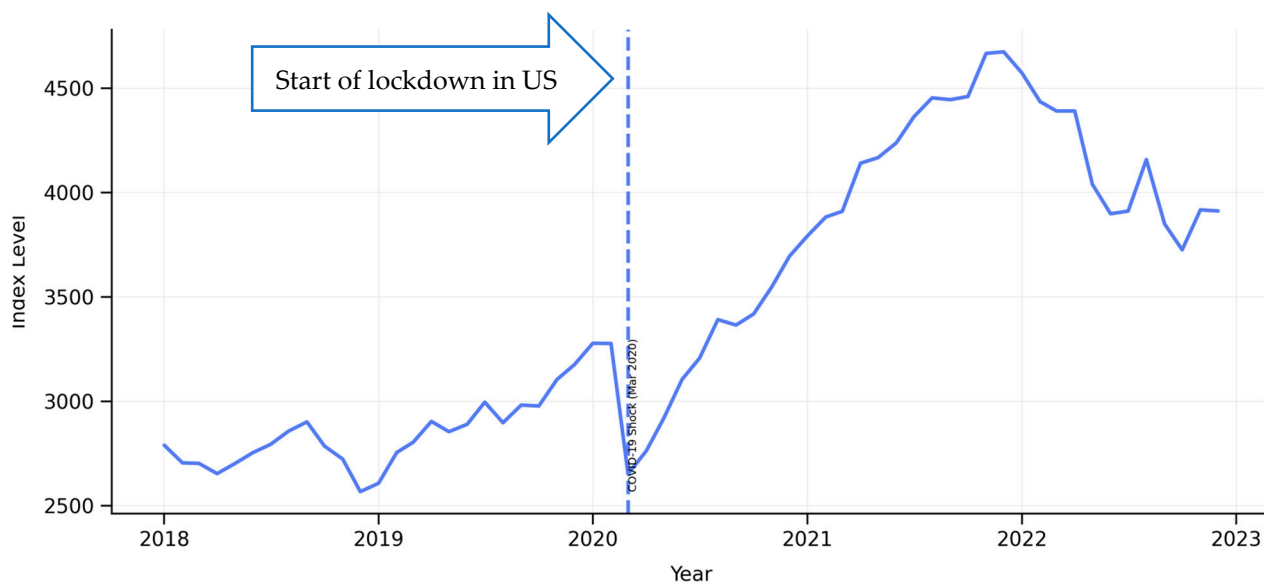


Figure 7. US Stock Market Index (2018–2022)–dotted line indicates start of COVID in U.S.

These sector-specific dynamics are consistent with Choi (2021), who documents heightened volatility spillovers across U.S. equity sectors during the COVID-19 crisis relative to previous stress episodes.

4.6. Key Findings

The hypothesis-testing results provide partial support for the study’s central argument that valuation multiples possess limited standalone predictive power during periods of elevated uncertainty and structural market change. While H1 receives directional support through observed portfolio performance patterns, the absence of statistical significance suggests that the return advantage of low-multiple portfolios should be interpreted cautiously. H2 receives descriptive support through observed sector-specific performance differences but is not formally tested within the regression framework. H3 receives the strongest empirical support based on the pooled regression results, Newey–West robust inference, and weak correlation coefficients observed across both portfolio groups.

The analysis of portfolio performance between 2018 and 2022 provides valuable insights into the relationship between valuation multiples and stock returns. Key findings are as follows:

- The Low-Multiple Portfolio outperformed the High-Multiple Portfolio in approximately 63% of observed periods (10 out of 17 quarters).
- The Low-Multiple Portfolio exceeded the sector average performance in 56% of periods, indicating a moderate advantage in returns.
- The High-Multiple Portfolio underperformed the sector average in 55% of periods, showing inconsistent returns relative to market benchmarks.
- No statistically significant relationship was found between valuation multiples (P/E, EV/EBITDA) and portfolio performance.
- R-squared values were low, indicating an extremely weak explanatory power of valuation multiples in predicting returns.
- Together, the pooled regression and Newey–West robustness results reinforce H3 by showing that valuation multiples provide only weak standalone explanatory value for portfolio returns during the sample period.
- The COVID-19 pandemic caused extreme market fluctuations, with a sharp market decline in Q1 2020 followed by a strong recovery by Q3 2020 due to fiscal stimulus and Federal Reserve interventions.
- Sectoral performance varied significantly, with Technology and Healthcare sectors experiencing strong gains, influencing both portfolio returns.
- A unique shift occurred from Q2 2021 to Q1 2022, where the High-Multiple Portfolio temporarily outperformed the Low-Multiple Portfolio, possibly due to economic reopening, speculative trading, and shifting investor sentiment.

The overall implications of these findings for the study hypotheses are summarized in Table 8. The analysis indicates that low-multiple stocks exhibited marginally superior returns throughout the observed period; however, the differences were not statistically significant. As illustrated in Figure 8 and Table 9, while the Low-Multiple Portfolio outperformed both the High-Multiple Portfolio and the sector average in a majority of observed quarters, the overall return advantage was minimal. These findings suggest that macroeconomic conditions, sector-specific trends, and investor sentiment played a more significant role in shaping portfolio performance than valuation multiples alone. Furthermore, the results challenge the conventional assumption that high-multiple stocks consistently outperform and indicate that valuation multiples should not be used in isolation for investment decision-making. Instead, a comprehensive portfolio management approach that integrates macroeconomic analysis, sector-specific trends, and risk management strategies is necessary to improve investment outcomes.

Table 8. Summary of Hypothesis Testing Results.

Hypothesis	Description	Outcome
H1	Low-multiple portfolios generate higher average returns than high-multiple portfolios during periods of elevated macroeconomic uncertainty.	Supported directionally (weakly)
H2	The relationship between valuation multiples and portfolio returns differs across Technology, Consumer Staples, and Healthcare sectors.	Partially supported (descriptive evidence)
H3	Valuation multiples exhibit limited standalone explanatory power for portfolio returns during volatile market conditions.	Supported

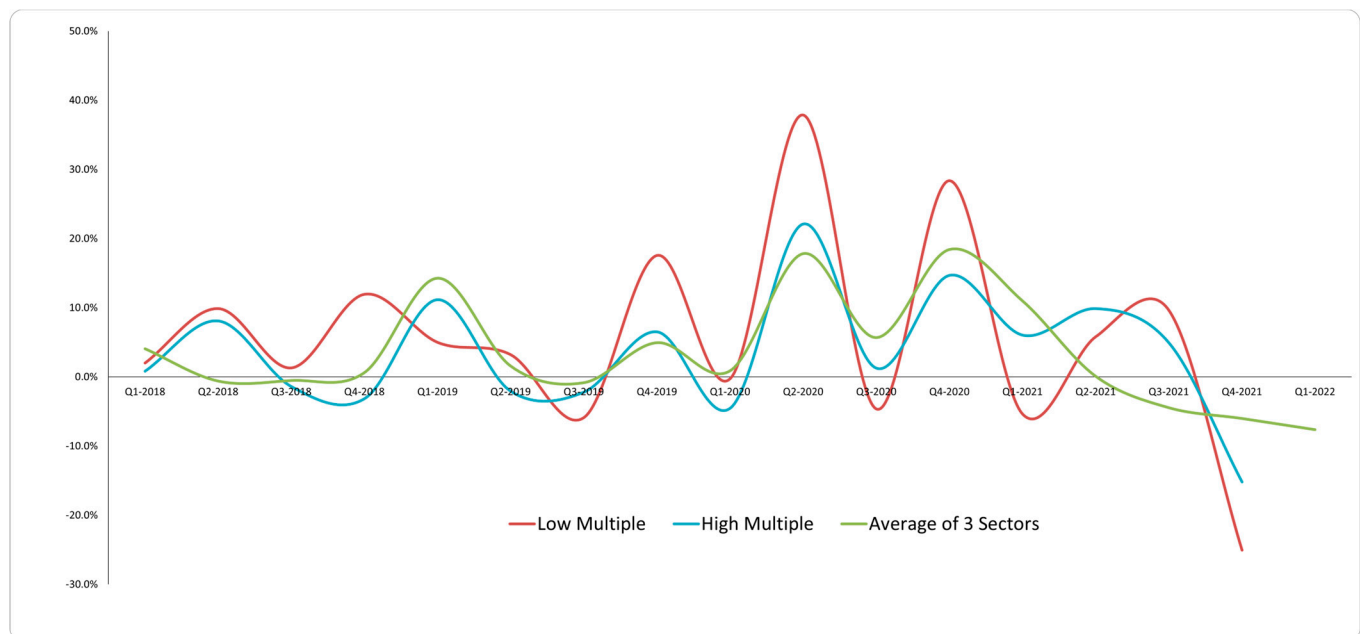


Figure 8. Return Comparison of Two Portfolios and Sector Performance (Quarterly).

Table 9. Average Return of Three Portfolios (Yearly).

	Low Multiple	High Multiple	Aver. of 3 Sectors
Average 2018	6.3%	1.1%	0.9%
Average 2019	5.0%	3.4%	5.0%
Average 2020	15.3%	8.4%	10.7%
Average 2021	−3.7%	1.4%	0.2%
Total	5.7%	3.6%	4.2%

5. Discussion in Relation to Existing Literature

The findings relate to the broader debate regarding the relationship between valuation multiples and investment performance. By analyzing high-multiple and low-multiple portfolios across three key sectors from 2018 to 2022, the study provides evidence on the effectiveness of multiple-based stock selection strategies. The results indicate that low-multiple portfolios outperformed high-multiple portfolios in 63% of observed periods, yet the differences are not statistically significant. This finding aligns with Fama and French's (1992) value-investing framework, which suggests that undervalued stocks with lower multiples tend to generate higher long-term returns. However, the weak correlation between valuation multiples (P/E, EV/EBITDA) and portfolio returns differs from studies that report stronger predictive content for valuation multiples.

The Efficient Market Hypothesis (EMH) posits that stock prices incorporate all available information, making it difficult to systematically outperform the market using valuation multiples alone. Our results support this view, as regression analysis revealed no significant relationship between valuation multiples and portfolio performance. Similarly, behavioral finance theories suggest that investor sentiment and psychological biases can lead to overvaluation of growth stocks, potentially explaining why high-multiple stocks did not consistently deliver superior returns (Shiller, 2000). This interpretation is consistent with Birru and Young (2022), who document that sentiment effects become particularly pronounced when uncertainty is elevated. Consequently, valuation multiples may become

less informative during periods of substantial macroeconomic disruption, as investor expectations and behavioral responses increasingly dominate traditional fundamental signals.

The COVID-19 period introduced an additional layer of complexity, as seen in Figure 6. Market disruptions coincided with substantial short-term fluctuations, with the Technology and Healthcare sectors exhibiting strong gains during 2020, while performance patterns shifted in 2021. The temporary outperformance of high-multiple portfolios between Q2 2021 and Q1 2022 may reflect reopening effects and changing market sentiment. Such valuation dispersion may also reflect investor categorization and return co-movement, whereby stocks grouped into similar sectors or investment styles move together beyond what firm-level fundamentals alone would imply (Barberis et al., 2005). From a descriptive perspective, these results suggest that valuation-based screening may retain conditional relevance when interpreted through sectoral and macroeconomic context. High-multiple portfolios tended to perform more favorably in liquidity-expansion or early-growth phases, whereas low-multiple portfolios exhibited greater resilience during contractionary or mature-cycle environments. This pattern suggests that valuation indicators should be applied dynamically and contextually rather than as static predictors of performance. These sectoral differences are consistent with macroeconomic and behavioral interpretations of market behavior. The resilience of the Technology and Healthcare sectors during the pandemic is consistent with defensive market behavior and policy-driven liquidity support, while the subsequent reversal in 2021–2022 suggests sentiment-driven valuation dispersion. These patterns suggest that macroeconomic factors and sectoral trends were more closely associated with portfolio performance than valuation multiples alone. The findings also align with Gonçalves and Leonard (2023), who argue that structural changes in corporate valuation have reduced the effectiveness of traditional value signals. In particular, the growing importance of intangible assets and expected future profitability may weaken the relationship between conventional valuation multiples and subsequent returns. This perspective provides a potential explanation for the limited explanatory power observed in the present study. The revised pooled regression specification further supports this interpretation. By introducing a High-Multiple Portfolio Dummy variable, the model allows baseline return levels to differ across portfolio groups while testing the explanatory relevance of valuation multiples. The continued insignificance of both P/E Ratio and EV/EBITDA after this adjustment indicates that the weak relationship between valuation measures and portfolio returns is not an artifact of the pooling structure but rather reflects the limited standalone predictive capacity of valuation multiples during the sample period.

The extremely low explanatory power observed in the regression models should be interpreted as a substantive empirical result rather than merely a statistical limitation. The results suggest that traditional valuation multiples exhibit limited standalone predictive relevance in financial markets characterized by heightened macroeconomic intervention, liquidity cycles, and behavioral market dynamics.

5.1. Descriptive Sensitivity Analysis

This supplementary sensitivity analysis evaluates whether the directional findings remain broadly consistent under an alternative portfolio-selection rule based solely on EV/EBITDA. The exercise is descriptive in nature and is not intended to constitute a formal econometric robustness test. The results indicate a similar pattern of outperformance by low-multiple portfolios, although the margin of superiority decreased slightly (57% vs. 63% in the baseline scenario).

Both high-multiple and low-multiple portfolios exhibited higher average returns in the robustness-check scenario, with average portfolio returns increasing relative to the

baseline specification. The low-multiple portfolio exhibited an approximate 18% increase and the high-multiple portfolio an approximate 50% increase. These findings suggest that portfolio composition and the choice of valuation multiples can affect portfolio-classification outcomes, yet the core conclusion remains unchanged: valuation multiples alone are not strong predictors of stock performance.

5.2. Limitations of the Study

Several limitations should be acknowledged when interpreting the findings. First, the study relies on data obtained from WRDS, and potential gaps in dividend availability for certain securities may affect return calculations. In addition, the definition of high-multiple portfolios, which incorporates both P/E and EV/EBITDA criteria, may introduce selection effects that favor particular firm characteristics. The analysis also assumes a linear sector-average return rather than a weighted sector-average return, which may slightly influence performance comparisons.

Second, the study focuses on only three sectors—Technology, Consumer Staples, and Healthcare—which limits the generalizability of the findings to other industries and market environments. Furthermore, the regression framework assumes a linear relationship between valuation multiples and portfolio returns and therefore may not fully capture the complexity of financial-market behavior. Future research could explore non-linear specifications and incorporate additional valuation measures such as Price-to-Sales or EV-to-Sales ratios.

Third, although the regression analysis was re-estimated using Newey–West heteroskedasticity- and autocorrelation-consistent (HAC) standard errors, the study does not implement additional econometric diagnostics such as stationarity tests, structural-break tests, regime-switching models, variance inflation factor assessments, or alternative multifactor asset-pricing specifications. Consequently, while the robustness of statistical inference has been improved, the findings should still be interpreted within the context of an exploratory portfolio-level framework. Future research using larger samples and longer time horizons may benefit from incorporating these additional procedures to evaluate the stability of valuation–performance relationships across changing market conditions. This analysis should be interpreted as a baseline sector-based evaluation of the standalone predictive capacity of valuation multiples rather than a fully specified multifactor asset-pricing framework. Additional econometric extensions, including structural-break tests and expanded multivariate specifications, may further strengthen robustness assessment in future research. Accordingly, the study should be interpreted as a sector-based exploratory assessment of the standalone predictive capacity of valuation multiples rather than a comprehensive multifactor asset-pricing model.

6. Conclusions

This study examined whether high-multiple stocks outperform low-multiple stocks by analyzing portfolio performance across three key sectors—Technology, Consumer Staples, and Healthcare—over the period 2018–2022. The results reinforce the conclusion that valuation multiples alone do not provide a sufficiently robust framework for predicting stock performance. While low-multiple portfolios exhibited marginally superior returns, these differences were not statistically significant. Instead, external factors such as macroeconomic conditions, investor sentiment, and sectoral trends appear to have been more closely associated with portfolio outcomes.

The findings have implications for the interpretation of valuation-based portfolio strategies. The evidence suggests that valuation indicators such as P/E and EV/EBITDA appear insufficient as standalone signals for stock selection and should instead be inter-

puted alongside sector-specific conditions, macroeconomic developments, and broader market dynamics. While valuation metrics remain informative, their usefulness appears to be context dependent.

Overall, the results indicate that low-multiple portfolios generated marginally higher returns during the sample period; however, the differences were not statistically significant. The evidence therefore supports the view that valuation multiples alone provide limited explanatory power for portfolio performance in periods characterized by substantial market disruption and changing investor sentiment. This conclusion remained unchanged after re-estimating the pooled regression with a portfolio-type indicator and Newey–West heteroskedasticity- and autocorrelation-consistent standard errors, which were introduced to address methodological concerns raised during the review process.

Several limitations should be acknowledged. The analysis focuses on three sectors and a single market over a five-year period and does not incorporate more advanced econometric techniques such as structural-break testing or expanded multifactor specifications. Future research may extend the analysis to additional sectors and international markets, investigate nonlinear relationships between valuation measures and returns, and examine the interaction between valuation strategies, macroeconomic conditions, and investor sentiment.

In conclusion, this study adds to the asset-pricing literature by showing that valuation multiples, when applied in isolation, have limited standalone predictive capacity. The findings highlight the importance of combining valuation measures with broader economic and sectoral analysis when interpreting portfolio strategies.

Author Contributions: Conceptualization, A.A. and S.A.; methodology, A.A. and S.A.; formal analysis, A.A.; data curation, A.A.; writing—original draft preparation, A.A.; writing—review and editing, A.A. and S.A.; supervision, S.A.; visualization, A.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data used in this study are derived from WRDS, Yahoo Finance, and publicly available U.S. stock market databases. Further details are available from the corresponding author upon reasonable request.

Conflicts of Interest: The authors declare no conflicts of interest.

References

- Akhtar, T. (2021). Market multiples and stock returns among emerging and developed financial markets. *Borsa Istanbul Review*, 21(1), 44–56. [\[CrossRef\]](#)
- Asness, C. S., Moskowitz, T. J., & Pedersen, L. H. (2013). Value and momentum everywhere. *Journal of Finance*, 68, 929–985. [\[CrossRef\]](#)
- Bali, T. G., Brown, S., & Tang, Y. (2020). Macroeconomic uncertainty and expected stock returns. *Review of Asset Pricing Studies*, 10, 1–34.
- Barberis, N., Shleifer, A., & Wurgler, J. (2005). Comovement. *Journal of Financial Economics*, 75, 283–317. [\[CrossRef\]](#)
- Birru, J., & Young, T. (2022). Sentiment and uncertainty. *Journal of Financial Economics*, 146, 1148–1169. [\[CrossRef\]](#)
- Campbell, J. Y., & Shiller, R. J. (1998). Valuation ratios and the long-run stock market outlook. *Journal of Portfolio Management*, 24, 11–26. [\[CrossRef\]](#)
- Carhart, M. M. (1997). On persistence in mutual fund performance. *Journal of Finance*, 52, 57–82. [\[CrossRef\]](#)
- Chan, L. K. C., Hamao, Y., & Lakonishok, J. (1991). Fundamentals and stock returns in Japan. *Journal of Finance*, 46, 1739–1789. [\[CrossRef\]](#)
- Choi, S. Y. (2021). Analysis of stock market efficiency during crisis periods in the US stock market: Differences between the global financial crisis and COVID-19 pandemic. *Physica A: Statistical Mechanics and Its Applications*, 578, 126109. [\[CrossRef\]](#)
- Damodaran, A. (1995). *Investment valuation: Tools and techniques for determining the value of any asset*. John Wiley & Sons.

- Damodaran, A. (2012). *Damodaran on valuation: Security analysis for investment and corporate finance* (2nd ed.). John Wiley & Sons. [\[CrossRef\]](#)
- Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25, 383–417. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *Journal of Finance*, 47, 427–465. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 33, 3–56. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (1998). Value versus growth: The international evidence. *Journal of Finance*, 53, 1975–1999. [\[CrossRef\]](#)
- Fama, E. F., & French, K. R. (2015). A five-factor asset pricing model. *Journal of Financial Economics*, 116, 1–22. [\[CrossRef\]](#)
- Foye, J. (2018). Testing alternative versions of the Fama–French five-factor model in the UK. *Risk Management*, 20, 167–183. [\[CrossRef\]](#)
- Gonçalves, A. S., & Leonard, G. (2023). The fundamental-to-market ratio and the value premium decline. *Journal of Financial Economics*, 147, 382–405. [\[CrossRef\]](#)
- Hou, K., Mo, H., Xue, C., & Zhang, L. (2021). An augmented q-factor model with expected growth. *Review of Finance*, 25, 1–41. [\[CrossRef\]](#)
- Kim, A. G., & Nikolaev, V. V. (2023). *Profitability context and the cross-section of stock returns* (BFI working paper, No. 2023-76). Becker Friedman Institute.
- Kon, S. J. (1984). Models of stock returns: A comparison. *Journal of Finance*, 39, 147–165. [\[CrossRef\]](#)
- Kosowski, R., Timmermann, A., Wermers, R., & White, H. (2006). Can mutual fund “stars” really pick stocks? New evidence from a bootstrap analysis. *Journal of Finance*, 61, 2551–2595. [\[CrossRef\]](#)
- Liu, J., Stambaugh, R. F., & Yuan, Y. (2018). Size and value in China. *Journal of Financial Economics*, 134, 48–69.
- Liu, X., Wang, P., & Xu, S. (2024). Asset-market sentiments and business-cycle fluctuations. *International Economic Review*, 65, 1795–1819. [\[CrossRef\]](#)
- Novy-Marx, R. (2013). The other side of value: The gross profitability premium. *Journal of Financial Economics*, 108, 1–28. [\[CrossRef\]](#)
- Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, 19, 425–442. [\[CrossRef\]](#)
- Shiller, R. J. (2000). *Irrational exuberance*. Princeton University Press.
- Siegel, J. J. (2016). The Shiller CAPE ratio: A new look. *Financial Analysts Journal*, 72, 41–50. [\[CrossRef\]](#)
- Vasileiou, E. (2021). Behavioral finance and market efficiency in the time of the COVID-19 pandemic: Does fear drive the market? *International Review of Applied Economics*, 35, 224–241. [\[CrossRef\]](#)
- Zhang, L. (2005). The value premium. *Journal of Finance*, 60, 67–103. [\[CrossRef\]](#)
- Zhang, Y., Goel, D., Ahmad, H., & Szabo, C. (2025). RegimeFolio: A regime-aware machine-learning system for sectoral portfolio optimization in dynamic markets. *IEEE Access*, 13, 85646–85666. [\[CrossRef\]](#)

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.