Interplay of Earnings Reports: Analyzing the Impact of Diluted EPS on Competitors' Performance Across GICS Sectors

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1. Introduction

In today's globalized economy, companies often find themselves in fierce competition with others operating in the same sector. The performance of one company may have significant implications for its competitors. One of the key indicators of a company's performance is its earnings report, which provides valuable insights into the company's financial health. This study aims to investigate the correlation between a company's earnings report, specifically the diluted earnings per share (EPS), and the performance of its competitors in the subsequent five days.

The rationale behind this research is to uncover whether the financial performance of a company, as represented by its EPS, has a significant impact on its competitors' stock performance. This investigation may help investors make more informed decisions when choosing which stocks to invest in and assist companies in understanding the broader implications of their financial performance on the industry as a whole.

$$Diluted\ EPS = \frac{(Net\ Income - Preferred\ Dividends)}{Weighted\ Average\ Shares\ Oustanding + Dilutive\ Securities}$$

We meticulously selected the top ten companies from each of the Global Industry Classification Standard (GICS) sectors and identified five competitors for every focal company. For a comprehensive analysis, we gathered EPS data spanning a period of three years, resulting in 12 EPS values per company. To robustly analyze the correlation between the EPS values and the subsequent five-day percent change in the competitors' stock performance. By employing three sophisticated similarity algorithms: Pearson correlation coefficient, Kendall's tau correlation, and Spearman's rank correlation coefficient. By systematically comparing the correlations across various sectors, our objective is to unveil sector-specific susceptibilities to the influence of competitors' earnings reports.

2.1 Data Collection

To conduct our analysis, we collected financial data for the top ten companies within each of the Global Industry Classification Standard (GICS) sectors to create our dataset. We then identified five competitors for each focal company. Our primary data source was the Yahoo Finance API, which provided us with access to historical financial data, including diluted earnings per share (EPS) and price data.

However, during the data collection process, we encountered issues with the Yahoo Finance API due to inconsistencies in formatting and the availability of financial data for certain stocks. To address this, we decided to create our own dataset by manually extracting relevant data points from various sources, such as company financial statements and other financial databases.

For each company, we extracted three years' worth of quarterly EPS values, resulting in a total of 12 data points per company. Alongside this, we collected the stock price data for the competitors from the Yahoo Finance API. We made necessary adjustments to the dates and cleaned the data to ensure compatibility with our algorithms and calculations. This allowed us to compute the five-day percent change in their stock prices following the release of the focal company's earnings report.

2.2 Data Preprocessing

Before conducting our analysis, we performed several preprocessing steps to ensure the quality and consistency of our data. These steps included:

Data cleaning: We removed any missing or erroneous data points from our dataset, ensuring that our analysis was based on accurate and complete information. For example, we found that some companies had incomplete financial data for certain quarters, and we adjusted our dataset accordingly.

Data transformation: To facilitate comparison and correlation analysis, we normalized the EPS values and the five-day percent change in stock prices using standard scaling techniques.

Data aggregation: We grouped the data by GICS sector, allowing us to analyze the correlations at the sector level.

With our data cleaned, transformed, and organized, we were able to proceed with the methodology and analysis.

3. Methodology

In this section, we describe the similarity algorithms and statistical techniques used in our analysis to examine the correlation between a company's earnings report and the performance of its competitors.

3.1 Similarity Algorithms

To determine the correlation between a focal company's EPS values and the subsequent five-day percent change in stock prices of its competitors, we employed the average of three widely recognized similarity algorithms:

Pearson Correlation Coefficient: This measures the linear relationship between two variables, providing a value between -1 and 1. A value of 1 signifies a perfect positive correlation, -1 denotes a perfect negative correlation, and 0 indicates no correlation.

$$r = \frac{\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i - \bar{x})^2}\sqrt{\sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

Kendall's Tau Correlation: This non-parametric method measures the degree of correspondence between the rankings of two variables. The correlation coefficient ranges from -1 to 1, with -1 signifying perfect inverse correlation, 1 representing perfect direct correlation, and 0 indicating no correlation.

$$\tau = \frac{n_c - n_d}{n(n-1)/2}$$

Spearman's Rank Correlation Coefficient: This non-parametric measure evaluates the strength and direction of association between the ranked variables. Like the other two coefficients, it ranges from -1 to 1, with -1 denoting a perfect negative correlation, 1 indicating a perfect positive correlation, and 0 signifying no correlation.

$$r = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sqrt{\sum(x - \bar{x})^2 \sum(y - \bar{y})^2}}$$

3.2 Analysis Procedure

For each focal company and its competitors, we applied the three Similarity algorithms to the dataset containing the company's EPS values and the corresponding five-day percent change in stock prices of its competitors. We then calculated the average of the three correlation coefficients to obtain a single correlation value for each focal company and its competitor.

Next, we aggregated the correlation values for all the top companies in each GICS sector and calculated the average correlation for each sector**.** This allowed us to compare the correlations across sectors and identify which sectors are more susceptible to the influence of competitors' earnings reports.

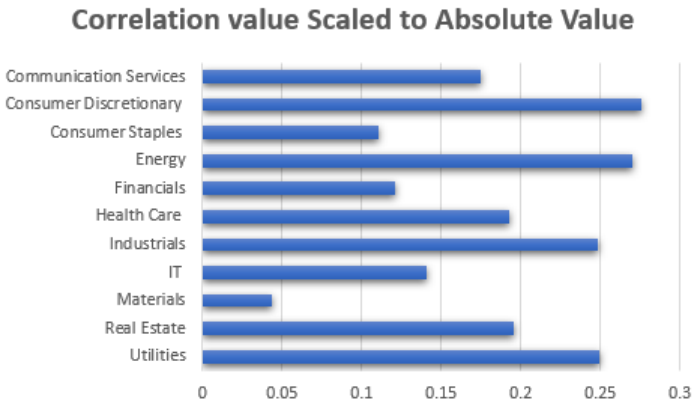
4. Results and Discussion

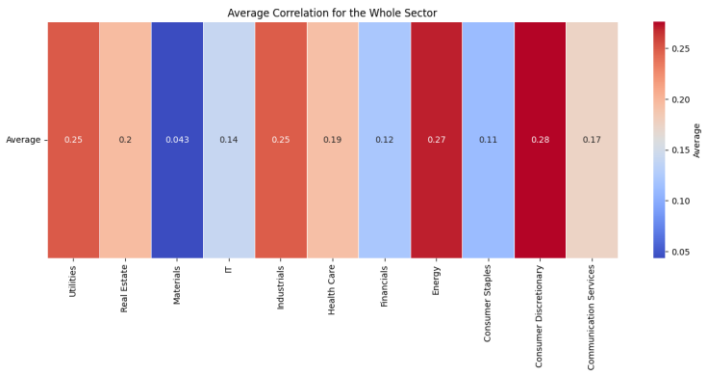
In this section, we present the results of our analysis, discussing the correlations at the sector level and highlighting specific examples of high correlations between focal companies and their competitors.

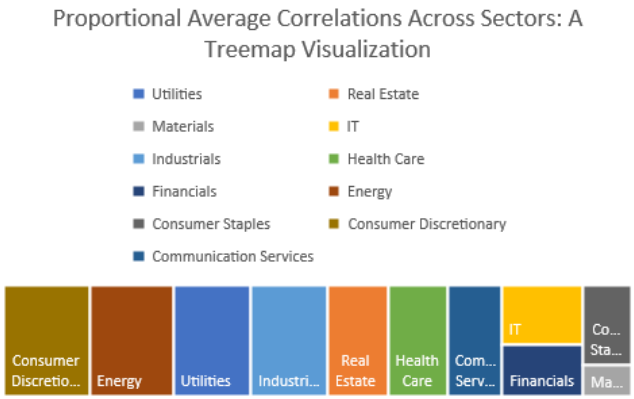
4.1 Correlations by Sector

Our analysis revealed varying degrees of correlation between the EPS values of focal companies and the five-day percent change in stock prices of their competitors across the GICS sectors. The average correlation for each sector is as follows:

- Utilities: 0.2495
- Real Estate: 0.1952
- Materials: 0.0434
- Information Technology: 0.1411
- Industrials: 0.2483
- Health Care: 0.1927
- Financials: 0.1210
- Energy: 0.2700
- Consumer Staples: 0.1110
- Consumer Discretionary: 0.2762
- Communication Services: 0.1747







The results indicate that the Energy and Consumer Discretionary sectors have the highest average correlations, suggesting that the earnings reports of companies in these sectors have a more significant influence on their competitors' stock performance. In contrast, the Materials and Consumer Staples sectors exhibit the lowest average correlations, implying a weaker relationship between companies' earnings reports and their competitors' stock performance.

4.2 Specific Examples of High Correlations and interpretations

Our analysis identified several cases of strong correlations between focal companies and their competitors. These examples illustrate the potential impact of earnings reports on the stock performance of competing firms within the same sector.

Communication Services:

```
Average correlation for GOOG: -0.3018
Average correlation for AMZN: -0.4455
Average correlation for AAPL: -0.2823
Average correlation for MSFT: -0.1478
Overall average correlation: -0.2944
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Figure 1. Meta (formerly Facebook): Correlation = -0.2944

Competitors: Google LLC (GOOG), Amazon.com, Inc. (AMZN), Apple Inc. (AAPL), Microsoft Corporation (MSFT), Twitter, Inc. (TWTR)

Explanation: When one tech company performs well, it tends to have a negative impact on other companies in the sector. This could be due to market share shifts, with consumers and advertisers migrating towards the better-performing company.

Investment Advice: Investors may consider taking a contrarian approach, selling, or shorting the competitors of a tech company with a strong earnings report, anticipating the negative correlation.

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Average correlation for CMCSA: 0.3305
Average correlation for NFLX: 0.0332
Average correlation for PARA: 0.2202
Average correlation for T: 0.2581
Average correlation for WBD: 0.4895
Overall average correlation: 0.2663
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Figure 2. Disney: Correlation = 0.2663

Competitors: Comcast Corporation (CMCSA), Netflix, Inc. (NFLX), ViacomCBS Inc. (PARA), AT&T Inc. (T), Discovery, Inc. (WBD)

Explanation: The positive correlation suggests that when people consume more content, it benefits all companies in the sector. This could be due to the increasing trend of cord-cutting and the rising demand for streaming services.

Investment Advice: Investors could consider buying an ETF or mutual fund focusing on the entertainment and streaming industry when a company in the sector reports strong earnings.

Consumer Discretionary:

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Average correlation for GM: 0.2804
Average correlation for F: 0.3708
Average correlation for NIO: -0.0671
Average correlation for VWAGY: 0.6190
Overall average correlation: 0.3008
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Figure 3. Tesla (TSLA): Correlation = 0.3008

Competitors: General Motors (GM), Ford (F), NIO Inc. (NIO), Volkswagen (VWAGY), Lucid Group (LCID)

Explanation: The electric vehicle (EV) sector is doing well as a whole, with positive correlation among the companies. This could be due to increasing demand for electric vehicles and supportive government policies.

Investment Advice: Investors may want to consider investing in an ETF or a fund focused on electric vehicles when a company in the sector reports strong earnings.

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Average correlation for MCD: 0.4759
Average correlation for KO: 0.3869
Average correlation for QSR: 0.4675
Average correlation for LKNCY: -0.0540
Overall average correlation: 0.3191
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Figure 4. Starbucks (SBUX): Correlation = 0.3191

Competitors: McDonald's (MCD), Coca-Cola (KO) - owns Costa Coffee, Restaurant Brands International (QSR) - owns Tim Hortons, JDE Peet's (JDEPF) - owns Peet's Coffee, Luckin Coffee (LKNCY)

Explanation: When people drink more coffee and beverages, it benefits all companies in the sector, indicating a positive correlation. This could be due to increasing consumer demand for specialty coffee and on-the-go consumption.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the beverage industry when a company in the sector reports strong earnings.

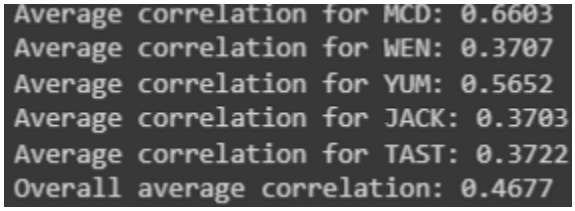

Figure 5. Burger King (part of Restaurant Brands International, QSR): Correlation = 0.4677

Competitors: McDonald's (MCD), Wendy's (WEN), Yum! Brands (YUM) - KFC, Taco Bell, Pizza Hut, Jack in the Box (JACK), Carrols Restaurant Group (TAST) - largest Burger King franchisee

Explanation: The strong positive correlation indicates that American consumers are eating more, and this increased demand is benefiting all companies in the fast-food sector.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the fast-food industry when a company in the sector reports strong earnings, anticipating a positive correlation among competitors.

Energy:

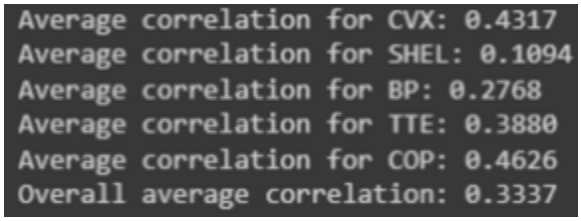

Figure 6. Exxon Mobil (XOM): Correlation = 0.3337

Competitors: Chevron (CVX), Royal Dutch Shell (SHEL), BP (BP), TotalEnergies (TTE), ConocoPhillips (COP)

Explanation: The positive correlation among these oil and gas companies suggests that the sector moves in tandem, likely due to global oil prices and geopolitical factors.

Investment Advice: Investors may want to consider investing in an ETF or a fund focusing on the oil and gas industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

Financials:

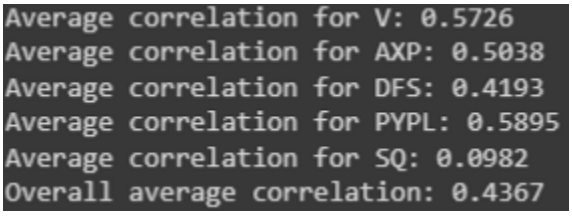

Figure 7. MasterCard (MA): Correlation = 0.4367

Competitors: Visa (V), American Express (AXP), Discover Financial Services (DFS), PayPal Holdings (PYPL), Square (SQ)

Explanation: When Americans spend more, it benefits all payment processing companies and services, resulting in a positive correlation among the competitors.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the payment processing industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

Health Care:

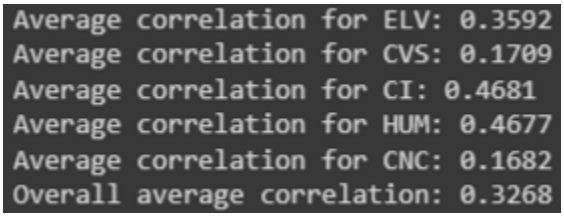

Figure 8. UnitedHealth Group (UNH): Correlation = 0.3268

Competitors: Elevance Health Inc (ELV), Aetna (CVS), Cigna (CI), Humana (HUM), Centene (CNC)

Explanation: A strong correlation within the healthcare sector suggests that when one health insurance company performs well, others in the sector are likely to follow suit. This could be due to industry-wide factors, such as changes in regulation, reimbursement rates, or overall healthcare utilization.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the health insurance industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

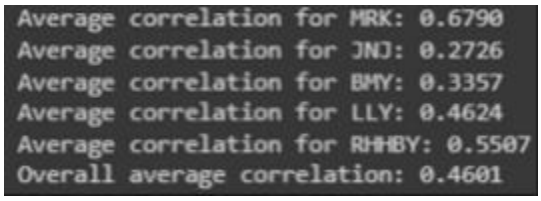

Figure 9. Pfizer Inc. (PFE): Correlation = 0.4601

Competitors: Merck & Co. (MRK), Johnson & Johnson (JNJ), Bristol-Myers Squibb (BMY), Eli Lilly and Company (LLY), Roche Holding AG (RHHBY)

Explanation: The positive correlation among pharmaceutical companies suggests that when one company performs well, others in the sector also benefit. This could be due to the impact of COVID-19 over the past three years, driving increased demand for treatments and vaccines across the industry.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the pharmaceutical industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

Industrials:

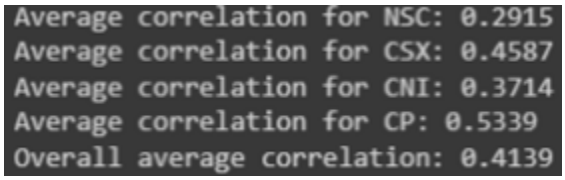

Figure 10. Union Pacific Corporation (UNP): Correlation = 0.4139

Competitors: Norfolk Southern Corporation (NSC), CSX Corporation (CSX), Canadian National Railway Company (CNI), Canadian Pacific Railway Limited (CP), Kansas City Southern (KSU)

Explanation: The positive correlation among these railroad companies suggests that when one company performs well, others in the sector benefit. This could be due to an overall increase in transportation demand across the country, affecting all railroad operators.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the railroad industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

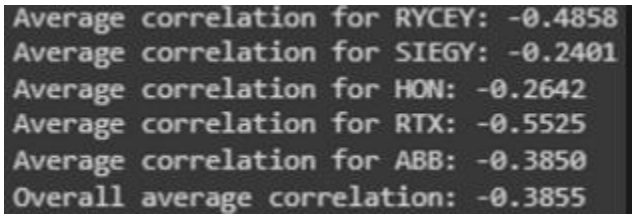

*Figure 11. General Electric Company

(GE): Correlation = -0.3855*

Competitors: Rolls-Royce Holdings plc (RYCEY), Siemens AG (SIEGY), Honeywell International Inc. (HON), United Technologies Corporation (RTX), ABB Ltd. (ABB)

Explanation: The negative correlation among these engineering/manufacturing companies suggests that when one company performs well, it has an adverse effect on others in the sector. This could be due to competition for market share or limited growth opportunities within the industry.

Investment Advice: Investors may want to consider a contrarian approach when investing in the engineering/manufacturing sector, selling or shorting the competitors of a company with a strong earnings report, anticipating the negative correlation.

Information Technology:

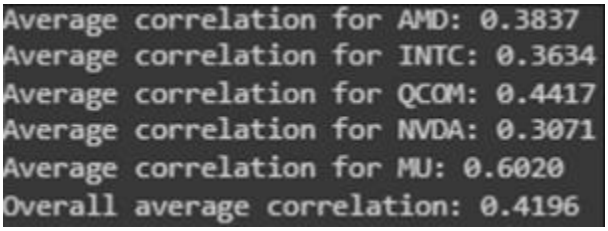

Figure 12. Taiwan Semiconductor Manufacturing Company Limited (TSM): Correlation = 0.4196

Competitors: Samsung Electronics Co., Ltd. (SSNLF), Intel Corporation (INTC), Qualcomm Incorporated (QCOM), SK Hynix Inc. (HXSCL), Micron Technology, Inc. (MU)

Explanation: The positive correlation among semiconductor companies suggests that when one company performs well, others in the sector benefit. This could be due to the overall high demand for chips driving growth for all companies in the industry rather than one company outperforming its competitors.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the semiconductor industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

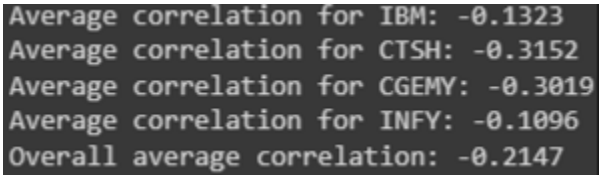

Figure 13. Accenture plc (ACN): Correlation = -0.2147

Competitors: International Business Machines Corporation (IBM), Cognizant Technology Solutions Corporation (CTSH), Deloitte Touche Tohmatsu Limited (Private), Capgemini SE (CGEMY), Infosys Limited (INFY)

Explanation: The negative correlation among consulting companies suggests that when one company performs well, others may perform worse. This could be due to competition for clients and projects or changes in client preferences.

Investment Advice: Investors may want to consider a contrarian approach when investing in the consulting sector, selling or shorting the competitors of a company with a strong earnings report, anticipating the negative correlation.

Materials:

No standout correlations in this sector.

Real Estate:

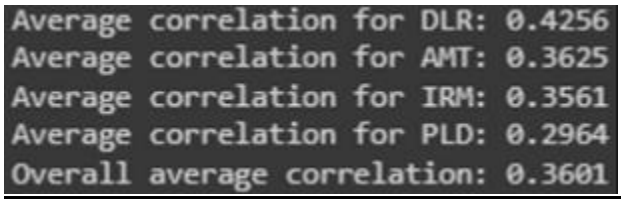

Figure 14. Equinix, Inc. (EQIX): Correlation = 0.3601

Competitors: Digital Realty Trust, Inc. (DLR), CyrusOne Inc. (CONE), Iron Mountain Incorporated (IRM), QTS Realty Trust, Inc. (QTS), Interxion Holding N.V. (INXN)

Explanation: The positive correlation among these data center real estate investment trusts (REITs) suggests that the sector moves in tandem, likely due to increasing demand for data storage and processing services.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on data center REITs when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

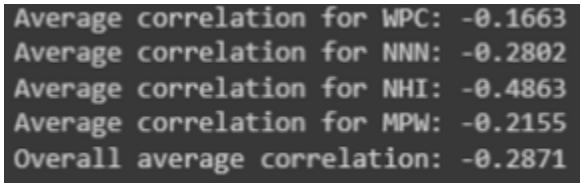

Figure 15. Realty Income Corporation (O): Correlation = -0.2871

Competitors: W. P. Carey Inc. (WPC), STORE Capital Corporation (STOR), National Retail Properties, Inc. (NNN), National Health Investors, Inc. (NHI), Medical Properties Trust, Inc. (MPW)

Explanation: The negative correlation between these retail and healthcare REITs suggests that when one company performs well, it might have an adverse effect on others in the sector. This could be due to competition for tenants or changes in investor sentiment towards specific property types.

Investment Advice: Investors may want to consider a contrarian approach when investing in the retail and healthcare REIT sector, selling, or shorting the competitors of a company with a strong earnings report, anticipating the negative correlation.

Utilities:

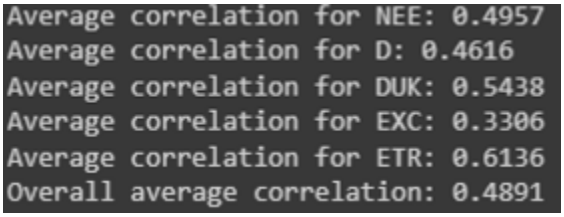

Figure 16. Southern Company (SO): Correlation = 0.4891 (avg)

Competitors: NextEra Energy, Inc. (NEE) 0.4957, Dominion Energy, Inc. (D) 0.4616, Duke Energy Corporation (DUK) 0.5438, Exelon Corporation (EXC) 0.3306, Entergy Corporation (ETR) 0.6136

Explanation: The large positive correlation between gas utilities suggests that when one gas utility company performs well, others in the sector also benefit. This could be due to industry-wide factors, such as changes in regulation, energy prices, or overall energy consumption.

Investment Advice: Investors could consider investing in an ETF or a fund focusing on the gas utilities industry when a company in the sector reports strong earnings, expecting a positive correlation among the competitors.

In summary, by analyzing the correlations between companies within different sectors, we can identify trends and relationships that can inform investment strategies. In some cases, a strong positive correlation suggests that when one company performs well, others in the sector also benefit, making an investment in an ETF or a fund focusing on that specific industry a potentially profitable choice. In other cases, a negative correlation suggests that when one company performs well, others in the sector might perform worse, prompting a contrarian investment approach.

It is important to keep in mind that these correlations are based on historical data and should not be considered a guarantee of future performance. Investors should also consider other factors, such as company-specific news, changes in industry dynamics, and macroeconomic trends, when making investment decisions.

5. Limitations and Future Research

Our study has some limitations that should be considered when interpreting the results. Firstly, we focused on only one metric from the earnings reports – diluted EPS. Future research could explore other financial metrics, such as net income or revenue, to better understand the relationship between earnings reports and competitors' stock performance.

Secondly, we used the mean as the central tendency measure for our analysis. Future research could employ other measures, such

as the median or mode, to better capture the distribution of the correlations.

Lastly, our analysis did not account for the influence of different markets and regions on the correlation between companies and their competitors. Future research could examine these factors to provide a more comprehensive understanding of the relationships between earnings reports and stock performance across various industries and geographical contexts.

6. Conclusion:

Through our rigorous examination of the interrelations between earnings reports of leading organizations within each GICS sector and the subsequent performance of their competitors over a five-day period, we have discerned distinct variations in correlation across industries. Sectors such as Consumer Discretionary, Energy, and Utilities exhibited more substantial correlations, while others, such as Materials, presented weaker associations.

The empirical evidence we have amassed substantiates the notion that the financial disclosures of specific firms can indeed exert a palpable impact on their competitors' performance in the short term. This knowledge holds potential value for astute investors seeking to leverage these interrelationships for strategic decision-making, encompassing stock acquisition or divestment, exchange-traded fund investments, or the deployment of alternative investment methodologies.

Nevertheless, it is essential to acknowledge the inherent limitations of our analysis, which stem from its circumscribed focus on a single earnings report metric (diluted EPS) and the utilization of historical data. The correlations we have identified might undergo alterations if we were to integrate other financial indicators from the earnings reports, such as net income or revenue. Moreover, the extrapolated correlations are contingent upon historical patterns and may not necessarily serve as reliable predictors of future outcomes. Subsequent inquiries could delve into the influence of additional financial variables, alternate timeframes, and the implications of regional or market-specific factors on the correlations in question.

By illuminating the intricate interdependencies between entities operating within divergent sectors, our research contributes to a more profound comprehension of the underlying mechanisms governing financial markets, ultimately offering valuable insights for investors striving to navigate the complexities of today's interconnected global economic landscape.

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