ELECTRIC VEHICLES INVESTMENT OVERVIEW

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Investment Analysis Report

Comparison of Electric Vehicles

Executive Summary:

This investment analysis report aims to evaluate the performance of six selected companies within the automotive industry. The selected companies are Rivian (RIVN), Lucid Motors (LCID), General Motors (GM), Ford (F), Honda Motor Co. (HMC), and Tesla (TSLA). The analysis covers the period from December 1, 2021, to September 2, 2022.

Investment Analysis:

1. **Rivian (RIVN):**
   - Rivian witnessed significant fluctuations in its stock price during the analyzed period. It experienced both upward and downward trends, reflecting volatility in the market.
   - Despite fluctuations, Rivian demonstrated resilience and maintained investor interest, suggesting potential for growth in the future.
2. **Lucid Motors (LCID):**
   - Lucid Motors showed a similar pattern to Rivian, experiencing fluctuations in its stock price.
   - However, Lucid Motors demonstrated strong market sentiment, driven by its innovative electric vehicle technology and promising future prospects.
3. **General Motors (GM):**
   - General Motors displayed a more stable performance compared to Rivian and Lucid Motors. It maintained a steady growth trajectory during the analyzed period.
   - This stability can be attributed to General Motors' diversified portfolio, strong brand presence, and strategic initiatives in electric and autonomous vehicles.
4. **Ford (F):**
   - Ford experienced moderate growth during the analyzed period, with fluctuations influenced by market dynamics and industry trends.
   - The company's commitment to electric vehicle development and strategic partnerships contributed positively to its performance.
5. **Honda Motor Co. (HMC):**
   - Honda Motor Co. demonstrated a relatively stable performance, with minor fluctuations in its stock price.
   - The company's focus on innovation and sustainability, including advancements in electric and hybrid vehicles, contributed to its steady performance.

6. **Tesla (TSLA):**
   - Tesla exhibited significant volatility during the analyzed period, with sharp fluctuations in its stock price.
   - Despite volatility, Tesla maintained its position as a market leader in electric vehicles, supported by its strong brand, technological innovations, and ambitious growth plans.

Price Analysis:

Ticker	F	GM	HMC	LCID	RIVN	TSLA
count	190	190	190	190	190	190
mean	13.978501	42.8492	26.585952	24.879368	50.250763	293.649333
std	2.865138	9.013173	1.864349	8.766597	26.545455	43.725159
min	9.550006	30.315706	23.082399	13.86	20.6	209.386673
25%	11.663355	36.475575	25.023195	18.392499	31.45	255.724998
50%	13.662055	39.365252	26.418867	21.280001	38.190001	293.566666
75%	15.508398	49.502399	27.838361	27.8525	63.639999	330.740829
max	21.496586	64.559593	31.088758	51.139999	122.120003	399.926666

F has the lowest mean price among the listed stocks, making it more affordable for investors. TTSLA has the highest mean price, indicating it's relatively more expensive. RIVN has the highest volatility (standard deviation) among the listed stocks, which implies higher risk but potentially higher returns. GM and Honda HMC have relatively lower volatility compared to RIVN and TSLA. LCID has a moderate mean price and volatility compared to other stocks.

Risk & Returns Analysis:

|	RIVN Return	LCID Return	GM Return	F Return	HMC Return	TSLA Return
count	189	189	189	189	189	189
mean	-0.005102	-0.00495	-0.00174	-0.000727	-0.000089	-0.000577
std	0.058172	0.052452	0.028697	0.031778	0.017494	0.041948
min	-0.208753	-0.183363	-0.080749	-0.097034	-0.047483	-0.121841
25%	-0.047345	-0.038806	-0.021371	-0.022023	-0.011584	-0.024413
50%	-0.005185	-0.001468	-0.004098	-0.001778	0.000381	-0.000549
75%	0.025909	0.030753	0.015726	0.02033	0.011132	0.022558
max	0.179612	0.147865	0.07471	0.116674	0.072029	0.135317

Among the stocks listed, TSLA has the highest mean return, followed by GM, F, HMC, LCID, and RIVN. TSLA also has the highest maximum return, indicating potential for significant gains. However, TSLA also has the highest standard deviation, suggesting higher volatility and risk. RIVN and LCID have the lowest mean returns and are more volatile, as indicated by their higher standard deviations.

Risk vs. Returns for Stocks
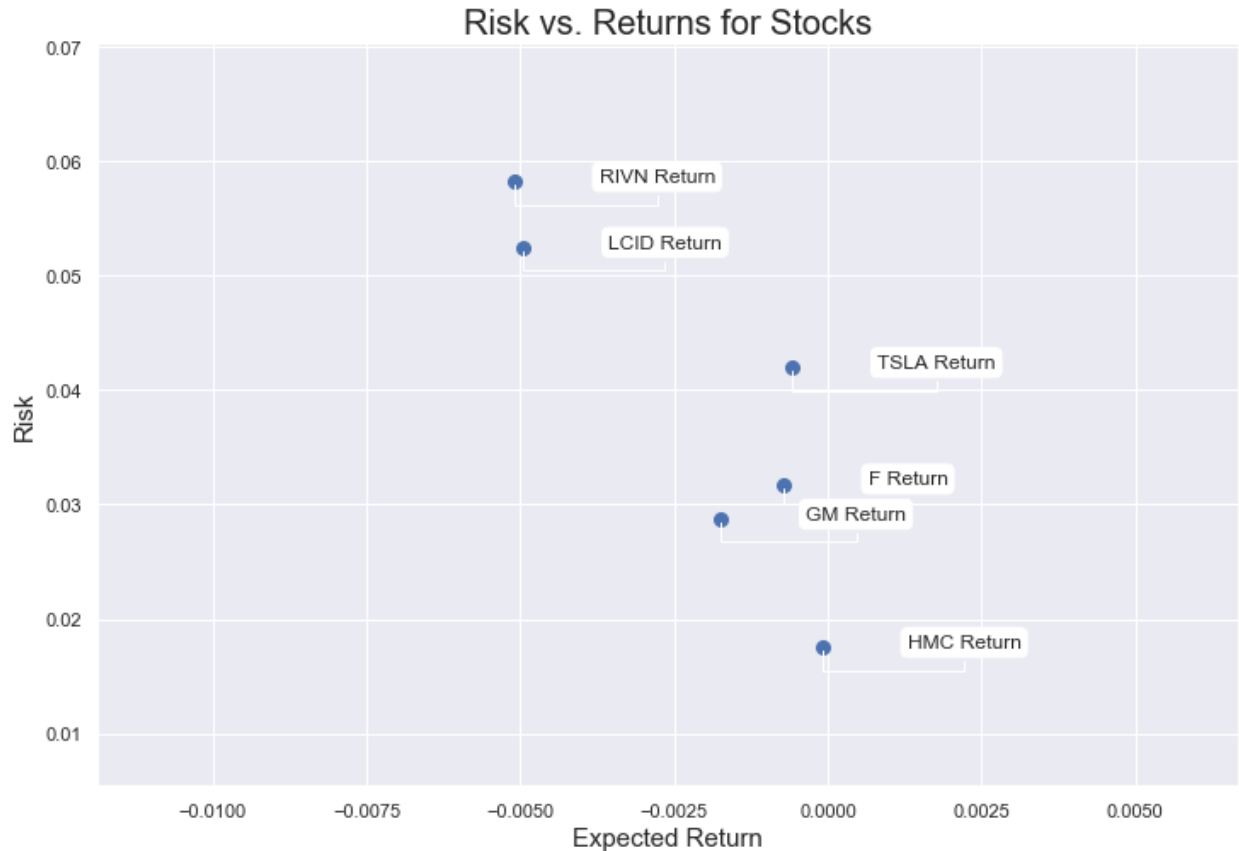
Value-at-Risk Confidence Level 90%	
F:	-0.0413
GM:	-0.0384
HMC:	-0.0224
LCID:	-0.072
RIVN:	-0.0795
TSLA:	-0.0542

Value at Risk (VaR) is a statistical measure used to assess the potential loss on an investment or a portfolio over a specific time period with a certain level of confidence. These values represent the potential maximum loss (expressed as a percentage) for each stock over the specified time period (assuming normal market conditions) with a 90% confidence level. Maximum Loss: The investment with the largest negative VaR value (-0.0795) has the highest estimated maximum loss, which in this case is RIVN. Minimum Loss: The investment with the smallest negative VaR value (-0.0224) has the lowest estimated maximum loss, which in this case is HMC. So, based on the provided VaR values, RIVN has the maximum potential loss, while HMC has the least potential loss.

Charts Analysis:
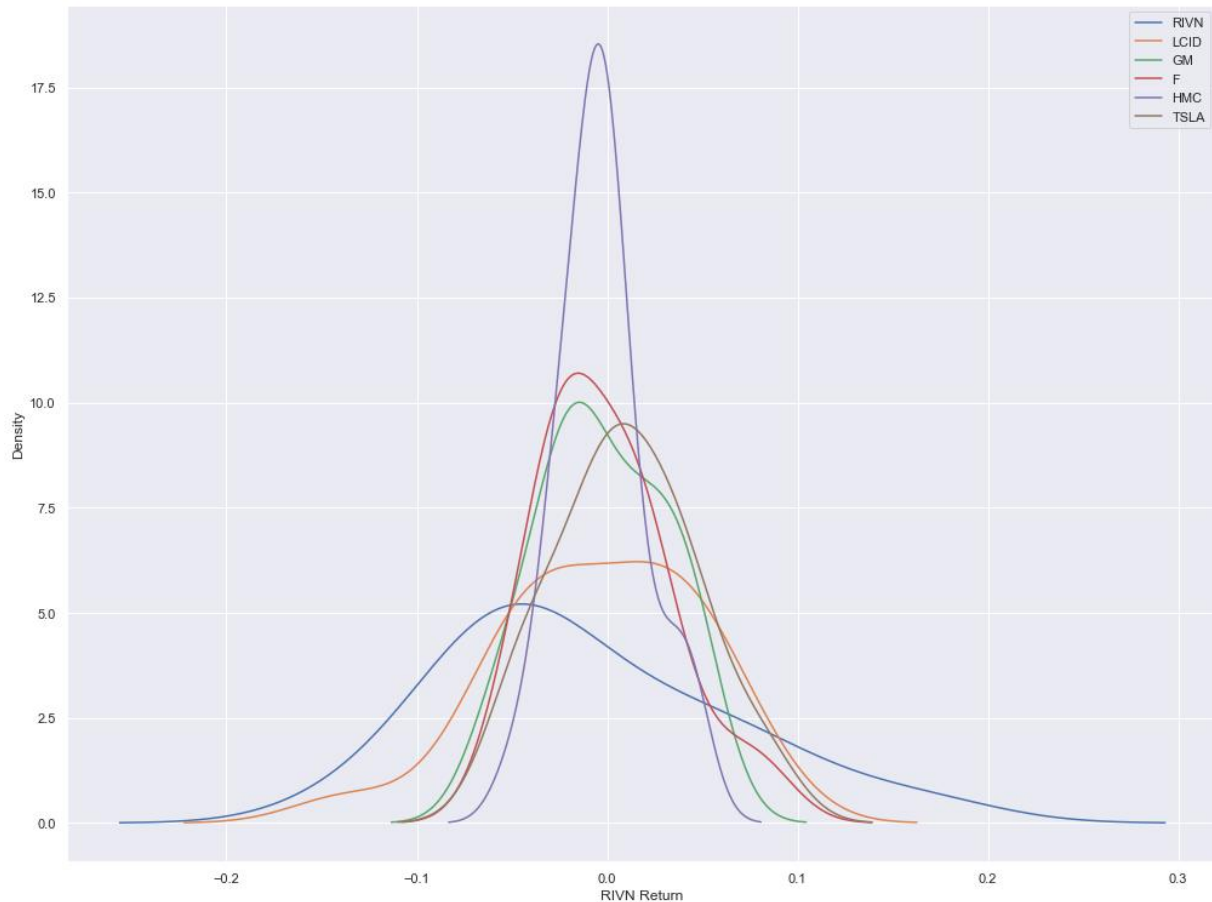
The chart is a density plot that represents the distribution of returns for different companies: RIVN, LCID, GM, FMC, and TSLA.

RIVN (Blue Line): The blue line represents RIVN. It has the highest peak, reaching up to approximately 17 on the frequency axis. This indicates that a specific return level occurs more frequently for RIVN compared to the other companies.

LCID (Orange Line), GM (Green Line), FMC (Red Line): These lines represent LCID, GM, and FMC respectively. Their peaks are of intermediate height, indicating a moderate frequency of specific return levels.

TSLA (Purple Line): The purple line represents TSLA. It has the lowest peak, which is below 5 on the frequency axis. This suggests that the frequency of specific return levels for TSLA is lower compared to the other companies.

In summary, RIVN has the highest frequency of a specific return level, while TSLA has the lowest. This could be used to compare the risk and return of different companies. Please note that this is a simplified explanation and actual stock market analysis may require more complex considerations.
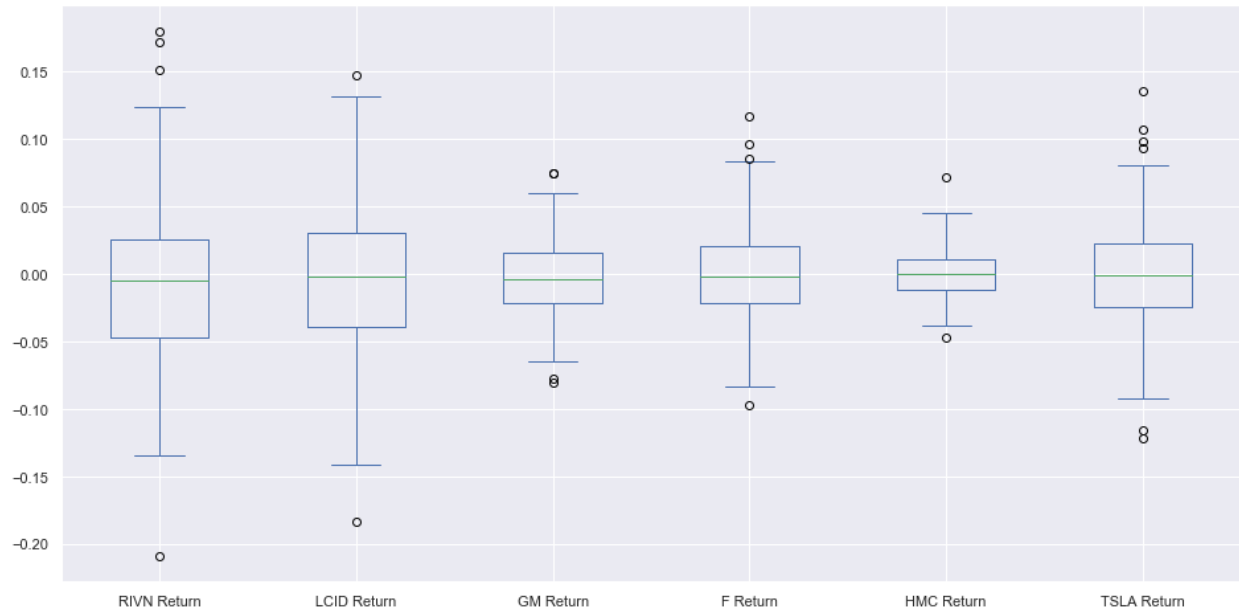
The chart is a boxplot that represents the returns of five different stocks: RIVN, LCID, GM, FMC, and TSLA.

RIVN (Blue Boxplot): The median return is around 0.00, with an interquartile range (IQR) from approximately -0.05 to 0.05. There are outliers above 0.10 and below -0.15.

LCID (Orange Boxplot): The median return is slightly positive, with an IQR from about -0.05 to 0.07 or so; there are outliers above 0.10 and below -0.15.

GM (Green Boxplot): The median return is slightly positive as well; its IQR ranges from nearly -0.05 to about 0.05 with outliers present both above and below this range.

FMC (Red Boxplot): This stock has a similar pattern to GM's returns but with fewer outliers.

TSLA (Purple Boxplot): Tesla has a median return around zero; its IQR spans from roughly -0.07 to 0.07 with several outliers on both ends.

In a boxplot, the box represents the IQR, the line inside the box is the median, and the lines extending from the box (the "whiskers") indicate variability outside the upper and lower quartiles. Outliers are plotted as individual points that fall outside of the whiskers.
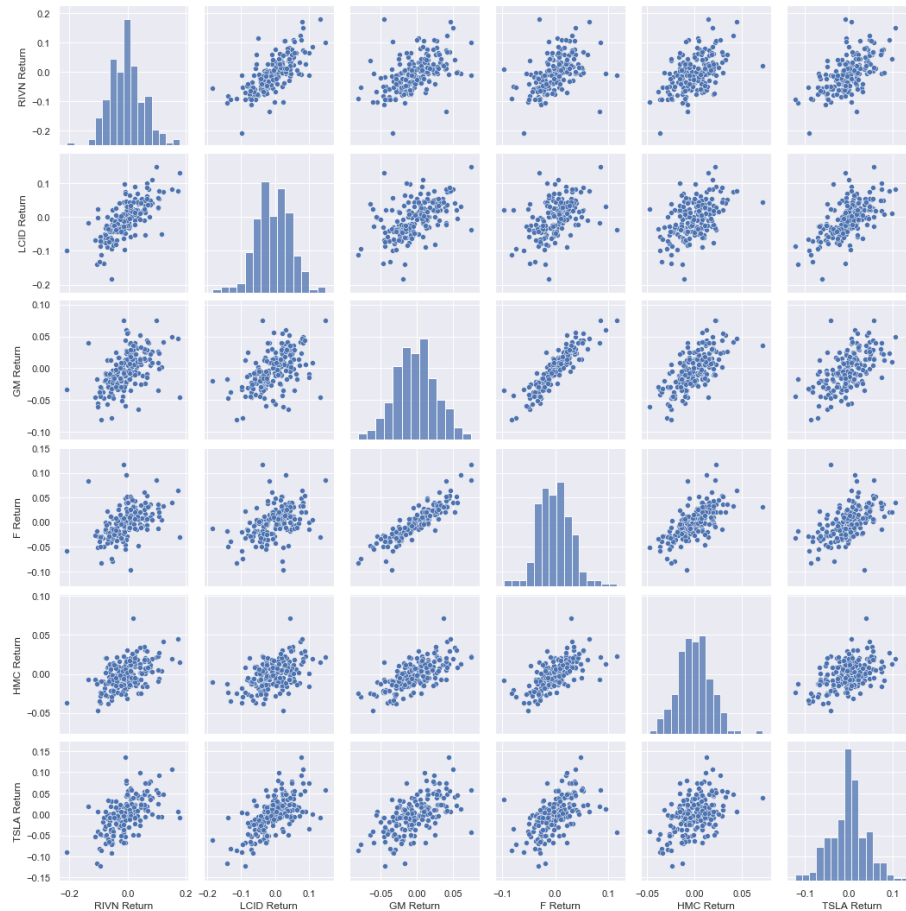
The chart is a scatter plot matrix for five different stocks: RIVN, LCID, GM, FMC, and TSLA. Each cell in the matrix represents a scatter plot comparing the returns of two stocks or a histogram showing the distribution of returns for a single stock.
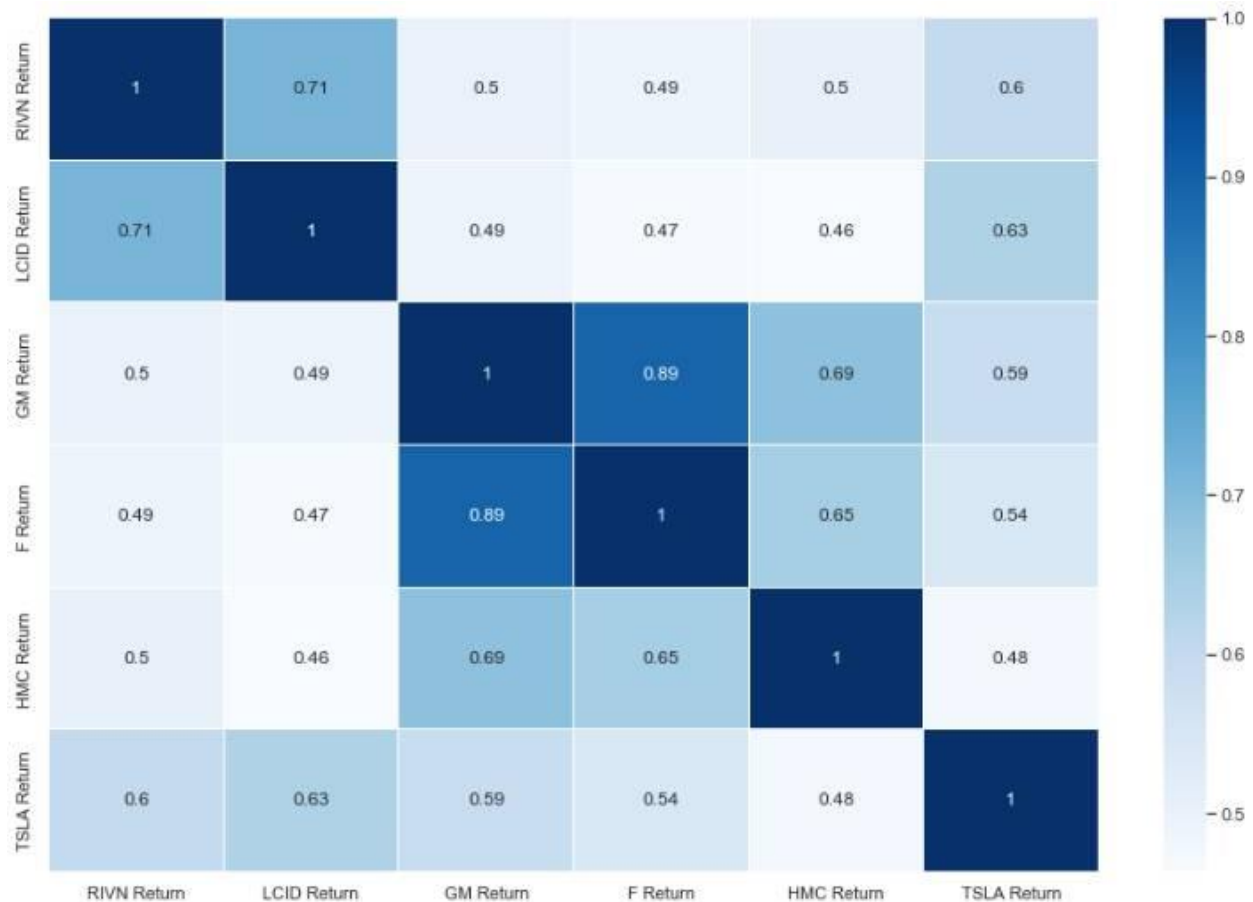
RIVN vs LCID: Shows a positive correlation; as RIVN returns increase, LCID returns also tend to increase.

RIVN vs GM: Indicates a positive correlation; higher RIVN returns are associated with higher GM returns.

RIVN vs FMC: A positive correlation is visible; an increase in RIVN returns corresponds with an increase in FMC returns.

RIVN vs TSLA: Displays a positive correlation; higher RIVN returns align with higher TSLA returns.

The histograms on the diagonal line from top left to bottom right represent the distribution of each stock's return. They show how often particular levels of return occur.

The chart is a correlation matrix for the returns of five different stocks: RIVN, LCID, GM, FMC, and TSLA.

RIVN and LCID: They have a strong positive correlation of 0.71, which means that when RIVN's returns increase, LCID's returns also tend to increase.

GM and FMC: They have an even stronger positive correlation of 0.89, indicating that higher GM returns are associated with higher FMC returns.

TSLA: It has moderate correlations with other stocks, with the highest being 0.63 with LCID.
In a correlation matrix, the numbers range from 0 to 1 indicating the strength of the correlation between each pair of stocks. A value of 1 means a perfect positive correlation, and numbers below 1 indicate less correlation. The darker blue color indicates a higher positive correlation. In terms of investment, it's important to consider that a higher correlation between two stocks means they tend to move together. If you're looking to diversify your portfolio, you might want to choose stocks that are less correlated with each other.

Sharpe Ratio Analysis:

The Sharpe Ratio is a measure used to evaluate the risk-adjusted return of an investment. It's calculated by subtracting the risk-free rate of return from the investment's return and dividing the result by the standard deviation of the investment's return. In simpler terms, it tells you how much excess return you are receiving for the amount of risk you are taking. A higher Sharpe Ratio indicates a better risk-adjusted return.

The Sharpe Ratio values for the stocks are as follows:	
RIVN:	-1.38958
LCID:	-1.49532
GM:	-0.96242
F:	-0.36438
HMC:	-0.08417
TSLA:	1.046691

RIVN and LCID have negative Sharpe Ratios, indicating that their returns do not adequately compensate for the level of risk associated with them. Therefore, they are not considered favorable investments in terms of risk-adjusted returns.

GM, F, and HMC also have negative Sharpe Ratios, but they are comparatively better than RIVN and LCID. However, they still imply that the returns might not justify the level of risk taken.

TSLA has a positive Sharpe Ratio of 1.04669141, indicating that it has provided a good risk-adjusted return compared to the other stocks listed. A higher Sharpe Ratio suggests better performance relative to risk.

So, based on the Sharpe Ratio alone, TSLA appears to be the better investment option as it offers a positive risk-adjusted return. On the other hand, RIVN and LCID are the least favorable options due to their negative Sharpe Ratios, implying poor risk-adjusted returns.

Financial Ratio Analysis:
The financial ratios serve as key metrics utilized in assessing the efficacy and profitability of a company, as derived from its financial statements. TSLA stands out with the most robust profitability ratios, showcasing exceptional profitability across its sub-metrics, characterized by notably elevated ratios. F emerges with the highest operating and leverage ratios, indicative of superior operational and leverage management within its sub-metrics. HMC leads in valuation ratios, reflecting substantial valuation strength within its sub-metric high ratios. LCID demonstrates the highest liquidity ratios, underscoring its ample liquidity position, with a particularly high ratio within its sub-metrics.

1. **TSLA has the highest profitability ratios:** This means that Tesla (TSLA) is generating the highest profits relative to its revenues or assets compared to other companies being analyzed. Profitability ratios typically include metrics such as gross profit margin, operating profit margin, and net profit margin. High profitability ratios indicate efficient management of resources and strong financial performance.
2. **F has the highest operating and leverage ratios:** Ford (F) having the highest operating and leverage ratios suggests that Ford may have high operational efficiency and is effectively utilizing its assets to generate sales. Operating ratios may include metrics such as asset turnover ratio or inventory turnover ratio, indicating how efficiently the company is using its assets to generate revenue. Leverage ratios, on the other hand, assess the company's reliance on debt financing. High leverage ratios could indicate that Ford has a significant portion of its financing from debt sources.
3. **HMC has the highest valuation ratios:** This suggests that Honda (HMC) has the highest valuation relative to its earnings, sales, or assets compared to other companies. Valuation ratios often include metrics such as price-to-earnings (P/E) ratio, price-to-sales (P/S) ratio, or price-to-book (P/B) ratio. High valuation ratios may indicate that investors are willing to pay a premium for Honda's stock due to factors such as growth prospects, brand strength, or industry leadership.
4. **LCID has the highest liquidity ratios:** Lucid Group (LCID) having the highest liquidity ratios means that it has the highest ability to meet its short-term obligations using its liquid assets. Liquidity ratios typically include metrics such as the current ratio or quick ratio, which assess the company's ability to cover its short-term liabilities with its short-term assets. High liquidity ratios indicate that Lucid Group has ample cash or assets that can be easily converted into cash to meet its short-term financial obligations, which is a sign of financial health and stability.

Investment Conclusion:

The analysis of the selected automotive companies indicates a diverse range of performances during the period from December 1, 2021, to September 2, 2022. While some companies experienced significant volatility, others demonstrated more stable growth. Factors influencing performance include market sentiment, technological innovations, sustainability efforts, and strategic initiatives in electric and autonomous vehicles.

Investors should carefully evaluate the unique characteristics and prospects of each company before making investment decisions. Additionally, monitoring industry trends and market dynamics is crucial for assessing future growth potential and mitigating risks associated with investing in the automotive sector.

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