



Financial Analysis of Tesla, Inc.

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PROJECT SCOPE

The objective of this project is to conduct a thorough financial analysis of Tesla, Inc., integrating theoretical concepts with practical insights gained from the course. The analysis encompasses business operations, financial ratios, CAPM, and stock price forecasting using Monte Carlo simulation, FB Prophet, and other technical analysis tools. By applying these methodologies, the report aims to provide valuable insights into Tesla's financial performance, market positioning, and future stock price trends.

BUSINESS ANALYSIS

Tesla, Inc. is a highly influential company in the electric vehicle (EV) and clean energy industry, known for its innovative approaches and significant impact on the automotive and energy sectors. The Automotive segment deals with electric vehicles, including sales of regulatory credits and various after-sales services. They also offer direct and used vehicle sales, a network of Tesla Superchargers, in-app upgrades, and various vehicle service options. The Energy Generation and Storage segment focuses on solar energy and energy storage products, catering to a range of customers. This segment also provides related services, including installation and repairs. Tesla, originally named Tesla Motors, Inc., rebranded in 2017 and is headquartered in Austin, Texas.

History

- **Founding:** Tesla was founded in 2003 by a group of engineers, including Martin Eberhard and Marc Tarpenning. Elon Musk, who contributed a significant portion of initial funding, joined the board of directors as chairman.
- **Early Developments:** Tesla's first vehicle, the Roadster, debuted in 2008, showcasing the potential for high-performance electric vehicles.
- **Expansion:** The company expanded its lineup with the Model S, Model X, Model 3, and Model Y, gaining widespread attention and market share.
- **Innovation:** Tesla has been at the forefront of automotive technology, developing advanced battery technology, software, and self-driving capabilities.

Current Operations

- **Products:** Tesla's current product lineup includes electric vehicles like the Model S, Model 3, Model X, Model Y, and the upcoming Cybertruck and Roadster. They also manufacture solar products and energy storage solutions like the Powerwall, Powerpack, and Solar Roof.
- **Services:** Tesla provides charging solutions through its Supercharger network, software updates, and autonomous driving features.

Macroeconomic Environment

- **Growth Strategy:** Tesla's growth has been largely organic, focusing on scaling up production, entering new markets, and developing new products. They have also acquired several companies to enhance their technology and production capabilities.
- **Market Influence:** As a market leader in EVs, Tesla's strategies and performance significantly influence the overall market dynamics in the EV industry.

Industrial Competitors

- Tesla faces competition from traditional automakers like General Motors, Volkswagen, Ford, Nissan, Nio, and Honda, which are increasing their EV offerings.
- Other EV-specific companies like Rivian, Lucid Motors also present competition.
- In the energy sector, companies like SunPower and LG Chem compete in solar and battery storage.

Market Share

- Tesla holds a substantial share of the electric vehicle market, particularly in regions like the United States and Europe.
- Its competitors' market share varies by region and specific market segments (e.g., luxury EVs, mass-market EVs).
- The exact market shares fluctuate and depend on various factors including production capacity, market demand, and introduction of new models.

Tesla's influence extends beyond its market share, as its approach to technology, marketing, and production has set new standards in the automotive and energy industries. The company's continued innovation and expansion strategies are pivotal in shaping the future of sustainable transportation and energy.

RATIO AND VALUATION ANALYSIS

Ratio Analysis

This report presents a comprehensive analysis of Tesla's financial performance compared to industry averages based on key financial ratios. The analysis encompasses liquidity, leverage, efficiency, profitability, and market ratios, providing valuable insights into Tesla's relative strengths and areas for improvement within the automotive industry.

Financial Ratio Analysis: Tesla vs. Industry Averages

Financial Ratio	Industrial	Tesla
Current Ratio	1.95	1.73
Quick Ratio	1.03	1.25
Cash Ratio	0.82	0.57
Debt-to-Equity Ratio	1.21	0.69
Inventory Turnover Ratio	7	5.81
Gross Profit Margin	9.10%	18.25%
Operating Profit Margin	10%	15.50%
Return on Sales Ratio	2.10%	9.19%
Return on Total Assets	6.00%	14.07%
Return on Equity Ratio	21.00%	23.95%
Return on Investment Ratio	10%	14.07%
Earnings per share	\$8.50	\$3.41
Price/Earnings Ratio	10.30	50.10
Dividend Payout Ratio		NA
Sustainable Growth Rate		31.49%

Tesla demonstrates strong financial performance compared to industry averages across various key financial ratios. It exhibits slightly lower liquidity, with a current ratio of 1.73 compared to the industry average of 1.95, but outperforms in quick ratio, indicating efficient coverage of short-term liabilities with highly liquid assets.

The company shows lower reliance on debt financing, as reflected in its debt-to-equity ratio of 0.69 against the industry average of 1.21. While its inventory turnover ratio is slightly lower than the industry average, Tesla boasts significantly higher gross profit margin (18.25% vs. 9.10%) and operating profit margin (15.50% vs. 10%), indicative of superior profitability.

Tesla's return on sales, return on total assets, and return on equity also surpass industry averages, highlighting its effectiveness in generating profits from sales revenue and utilizing assets. However, the company's price/earnings ratio stands notably higher than the industry average, suggesting that investors are willing to pay a premium for Tesla's stock, possibly due to high growth expectations or other factors.

Capital Asset Pricing Model (CAPM)

CAPM stands for Capital Asset Pricing Model. It's a financial model used to determine the expected return on an investment based on the systematic risk it carries. The model provides a framework for calculating the expected return of an asset by considering its risk relative to the overall market and the risk-free rate of return.

$$\text{Cost of Equity (} k_e \text{)} = r_f + \beta (r_m - r_f)$$

- $r_f \rightarrow$ Risk-Free Rate
- $\beta \rightarrow$ Beta
- $r_m \rightarrow$ Market Return
- $(r_m - r_f) \rightarrow$ Equity Risk Premium (ERP)

Importance of CAPM in business valuation

CAPM helps determine the cost of equity, a critical component of a business's overall cost of capital, guiding decisions on investments and financing. It aids in evaluating investment opportunities by comparing expected returns to risk, allowing businesses to make informed choices. CAPM is integrated into various valuation models, like discounted cash flow analysis, to estimate the fair value of assets or companies. Understanding the cost of equity from CAPM informs strategic plans by aligning them with investor expectations and market conditions, setting realistic financial goals.

CAPM Components	Values
Beta	1.87
Geomean	0.87%
Effect (R_m)	10.90%
Ycharts (R_f)	4.36%
R_a	$R_f + b(R_m - R_f)$
Expected Return (R_a)	16.56%

From the above table, we can see that the beta is greater than 1, it implies that the asset is more volatile than the market. This means that for every 1% change in the market, the asset's price is expected to change by approximately 1.87%.

This information is useful for investors and analysts in understanding the risk associated with the asset compared to the overall market. A beta greater than 1 indicates higher risk but potentially higher returns, while a beta less than 1 suggests lower risk but potentially lower returns relative to the market.

An expected return of approximately 16.56% indicates the anticipated average rate of return on the asset, as derived from the Capital Asset Pricing Model (CAPM). With an expected return (R_a)

of approximately 16.56% exceeding the targeted return of 14.07%, the investment offers the potential for higher returns relative to the required or expected level. While the higher expected return may be attractive, investors should carefully assess the associated risk, ensure alignment with investment objectives and risk tolerance, and consider diversification strategies to manage overall portfolio risk effectively.

Analysis of Free Cash Flows (FCF)

Free Cash Flows for Telsa.Inc				
Cash Flow Year	2023-12-31	2022-12-31	2021-12-31	2020-12-31
Operating Cash flow	\$13,256,000	\$14,724,000	\$11,497,000	\$5,943,000
Capital Expenditure	\$8,899,000	\$7,172,000	\$8,014,000	\$3,242,000
Free Cash Flow	\$4,357,000	\$7,552,000	\$3,483,000	\$2,701,000

Over the past four years, Tesla, Inc. has demonstrated a positive trend in operating cash flow, which has steadily increased from \$5,943,000 in 2020 to \$13,256,000 in 2023. This growth indicates the company's improving ability to generate cash from its core operations. Simultaneously, capital expenditure has also risen, reflecting Tesla's significant investments in expanding and upgrading its infrastructure.

Despite fluctuations, free cash flow remained positive throughout the period, indicating that Tesla has generated more cash from its operations than it has invested in capital assets. This suggests effective cash flow management and the financial capacity to fund growth initiatives internally. However, the slight decrease in free cash flow in 2023 warrants further analysis to understand its implications and ensure the sustainability of Tesla's cash generation capabilities.

Analysis of stock price w.r.t. market price

Using WACC (Weighted Average Cost of Capital) and common stock, we calculated intrinsic Stock Value and compare it with the current market price. (FCFE is taken from NASDAQ)

Free cash flow to equity (FCFE) forecast for Telsa.Inc						
Year	2023-12-31	2022-12-31	2021-12-31	2020-12-31	2019-12-31	TV (5)
FCF or TV	\$7,550	\$8,985	\$10,860	\$13,329	\$16,607	\$1,353,247
PV Value	\$6,493	\$6,645	\$6,907	\$7,290	\$7,811	\$636,490
Common Stock Intrinsic Value	\$671,636					
Number of Common Stock	3,000			WACC 16.28%		
Intrinsic Stock Value	\$223.88					
Market Price	\$172.98			US\$ in millions, except per share data		

The intrinsic value of the stock is calculated at \$223.88, while the market price stands at \$172.98. The stock's intrinsic value differs from its market price due to several factors. First, intrinsic

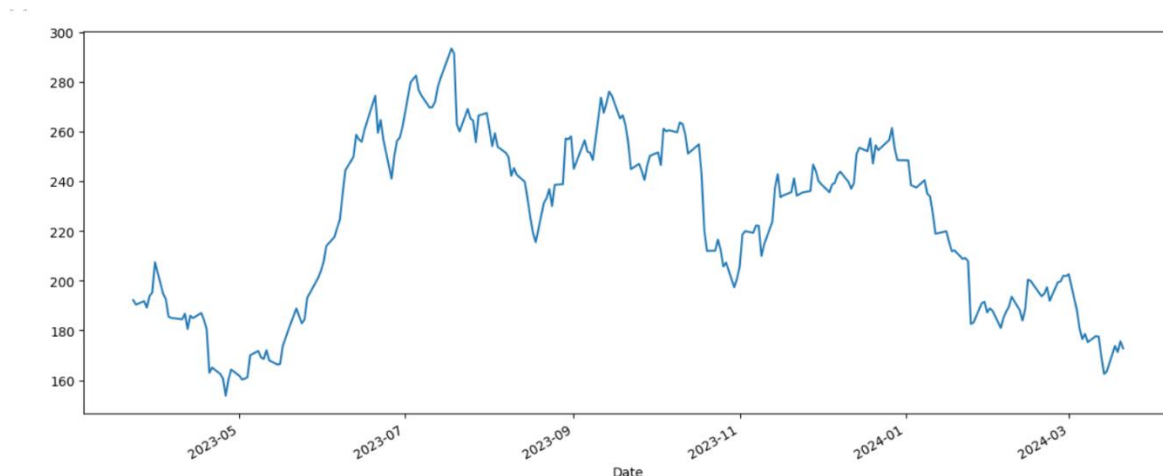
calculations are based on estimated future cash flows and chosen discount rates, which are inherently speculative and may not align with market perceptions. Second, the market price is influenced by investor sentiment, macroeconomic factors, and market liquidity, which can cause deviations from fundamental valuations. Lastly, the market may have information, or a perspective not fully captured in the intrinsic value model, leading to a difference in valuation.

TECHNICAL ANALYSIS

Graphical Representation of Last One-Year Stock Prices

Our analysis began with a graphical representation of TSLA's stock prices over the last. The one-year stock price trend graph for TSLA shows a significant fluctuation in stock prices. Starting from the initial part of the graph, there was a steady increase in stock price, indicating a bullish market sentiment. However, this upward trend encountered resistance, and prices started to exhibit volatility, characterized by peaks and troughs. This could suggest a period of market indecision or reaction to external factors such as company news, market events, or economic changes.

The decline towards the latter part of the graph indicates a bearish phase, where selling pressure has driven the stock prices down. For investors, understanding where the stock price is in relation to historical highs and lows could provide potential buy or sell signals, particularly if the price approaches known support or resistance levels.



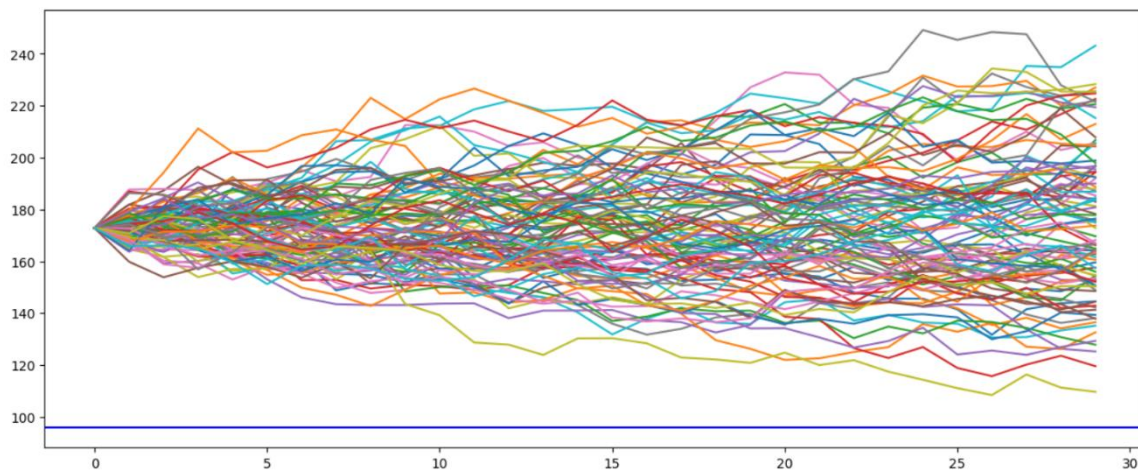
One-year trend of TSLA's stock prices

The overall trajectory of the stock prices suggests that TSLA experienced significant fluctuations, reflective of various market forces and company-specific news that may have influenced investor sentiment.

Monte Carlo Simulation Analysis

Following the initial price trend analysis, a Monte Carlo simulation was conducted to understand the potential future paths that TSLA's stock prices could take. This simulation considers the stock's

historical volatility and returns, projecting 100 potential price paths over the next 30 days. The resulting graph depicts a wide range of possible outcomes, signifying the inherent uncertainty and risk in stock market investments.

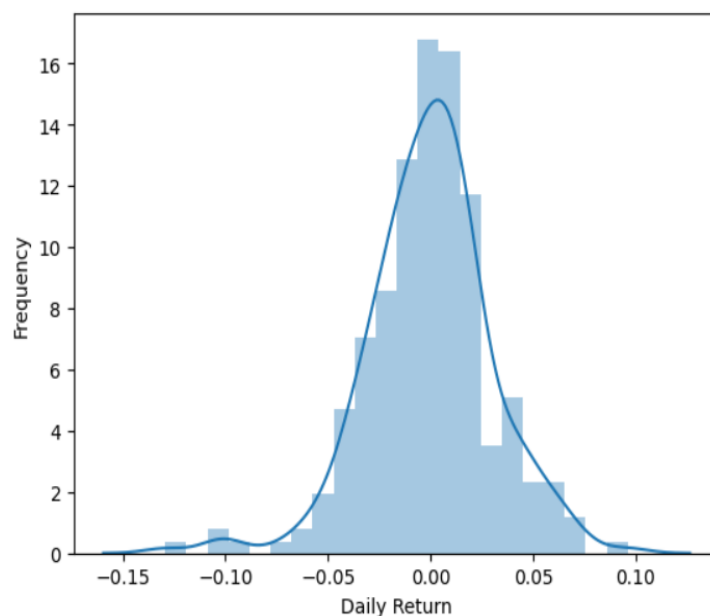


Monte Carlo Simulation showing 100 potential price paths for the next 30 days

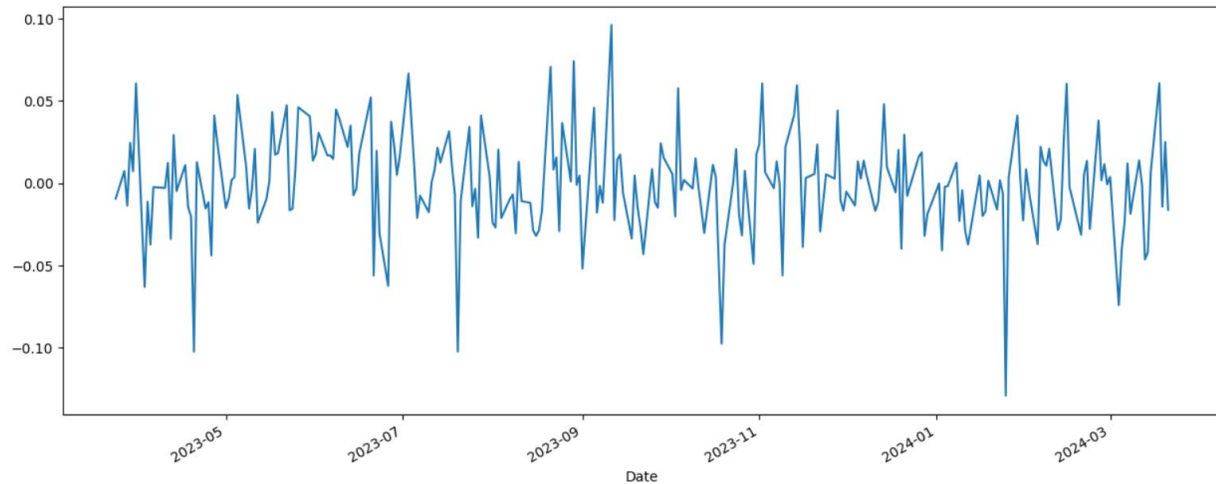
The Monte Carlo simulation forecasted TSLA's stock price for the upcoming 30 days with 100 iterations, which revealed a broad distribution of possible future stock prices. The forecast underscores the stock's volatility, with the simulation paths fanning out over time, indicating increasing uncertainty as the forecast period extends. The wider the spread of the simulation paths, the higher the expected volatility, and thus, the higher the risk associated with the investment.

Daily Returns Analysis

The daily returns of TSLA's stock were analyzed to provide insights into the stock's day-to-day fluctuations. The histogram of daily returns is a key tool for analyzing the distribution of TSLA's stock price changes. The bell-shaped curve suggests a normal distribution of returns, centered around the mean. This is a common assumption in finance, implying that most of the time, returns will be near the average, with extreme returns (either high or low) being less common.



Histogram of TSLA's daily returns



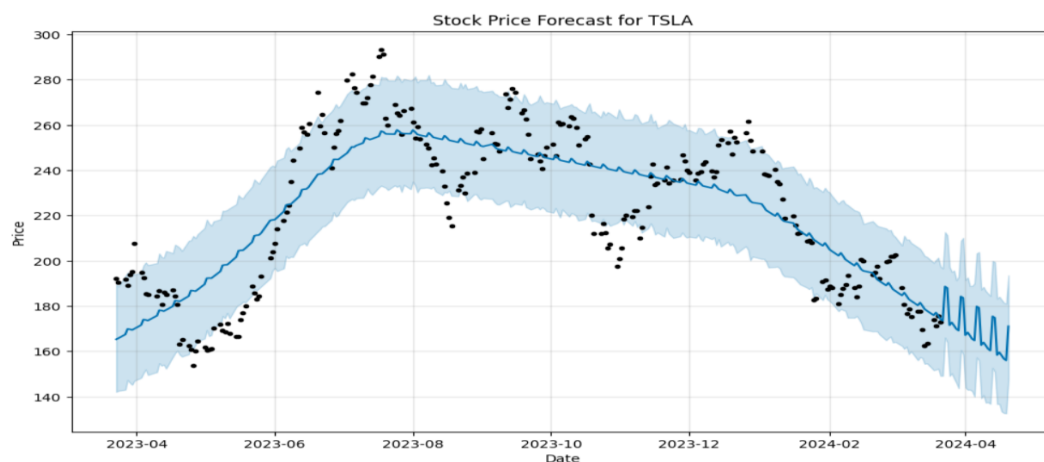
Timeseries plot of TSLA's daily returns

The timeseries plot of daily returns shows the volatility over time, with no apparent trend, which indicates that returns are seemingly random and follow a "random walk". This suggests that past price movements are no reliable indicator of future price directions, emphasizing the unpredictable nature of the stock market.

FB Prophet Forecast Analysis

An FB Prophet model has been also employed to analyze TSLA's stock price data. Typically, the model will provide forecasts along with decomposed components such as trends, weekly and yearly seasonality, and holiday effects if applicable. These components are crucial for understanding the underlying factors driving stock price movements.

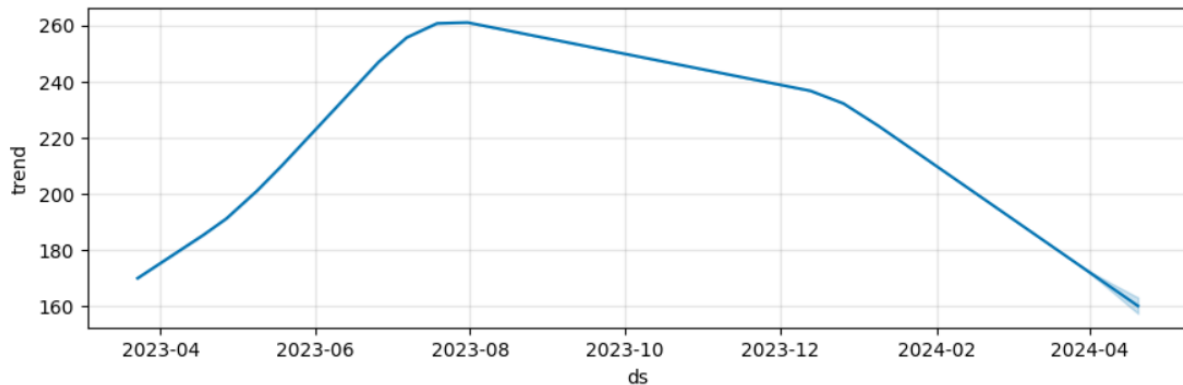
The forecast graph shows the historical adjusted close prices alongside the model's prediction for future prices. The shaded area represents the uncertainty intervals of the predictions, illustrating the possible range in which future stock prices are expected to lie.



Forecasting model output with historical data and projected stock prices for TSLA

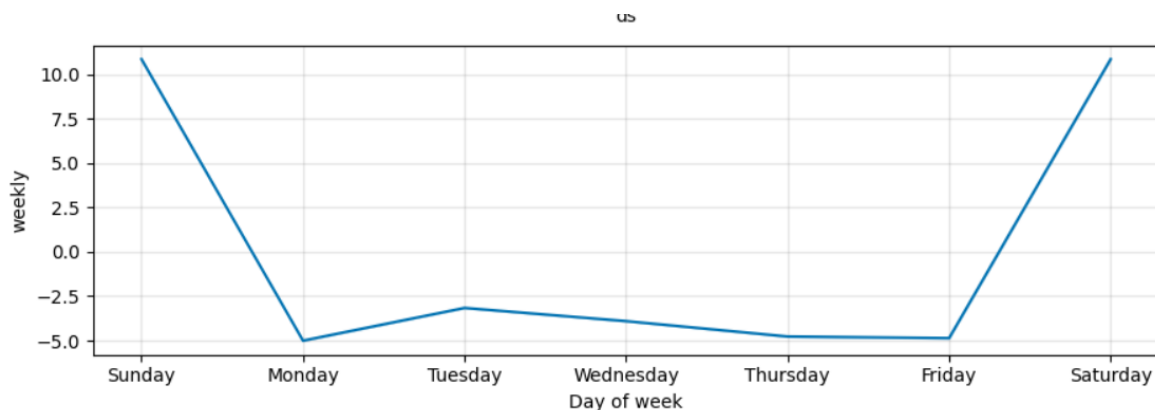
Additionally, the component graphs of the FB Prophet model reveal the underlying patterns in the data:

- The trend component (refer to FB Trend Graph) exhibits the general direction of TSLA's stock price over time, indicating a strong uptrend until 2023-08, after which a downtrend is predicted.



FB Trend Graph: Trend component of the FB Prophet forecast

- The weekly seasonality component (refer to FB Weekly Seasonality Graph) indicates a pattern within the week. This component is useful to discern any systematic weekly effects that might influence the stock's behavior. In this case, it suggests variability in the stock's performance depending on the day of the week.



FB Weekly Seasonality Graph

These components help us understand the factors that might be driving the forecasts, such as long-term trends and repetitive weekly patterns. However, it's important to remember that while FB Prophet provides a robust statistical framework for forecasting, the model's predictions should not be interpreted as certainties but as informed estimates that inherently come with uncertainty.

CONCLUSION

The comprehensive financial analysis of Tesla, Inc. reveals a company that is not only a key player in the electric vehicle and clean energy industry but also a significant influencer of market trends and investor sentiments.

From a ratio and valuation perspective, Tesla outperforms industry averages in key financial ratios, showcasing robust operational efficiency, profitability, and market positioning. Despite slightly lower liquidity ratios, Tesla's prudent debt management and impressive profit margins highlight its ability to generate substantial returns from its operations. The higher price/earnings ratio suggests investors' willingness to pay a premium for Tesla's stock, driven by growth expectations and market perceptions.

The Capital Asset Pricing Model (CAPM) underscores Tesla's attractiveness as an investment opportunity, with an expected return exceeding the targeted rate, despite its higher risk profile. Additionally, the evaluation of stock value versus market price suggests a potential undervaluation, further enhancing Tesla's investment appeal. However, technical analysis highlights the volatility in Tesla's stock prices, emphasizing the importance of prudent risk management strategies.

In sum up, Tesla's financial analysis highlights its prominent role in the electric vehicle and clean energy sector, supported by strong operational efficiency and profitability. Despite stock price volatility, the company's favorable valuation and growth potential underscore its attractiveness as an investment opportunity, contingent upon prudent risk management strategies.

RECOMMENDATIONS

As a financial advisor, based on the comprehensive analysis conducted, I would recommend Tesla, Inc. as a strong investment opportunity with promising growth prospects. The company's robust financial performance, demonstrated by strong liquidity, profitability, and efficiency ratios, suggests its ability to weather market fluctuations and capitalize on emerging opportunities in the electric vehicle and clean energy sectors. Furthermore, the Capital Asset Pricing Model (CAPM) indicates an attractive expected return relative to its risk profile, reinforcing its investment appeal.

Considering the undervaluation implied by the stock's intrinsic value compared to its market price, along with Tesla's track record of innovation and market leadership, I would advise potential investors to consider buying the stock. Tesla's continuous technological advancements, expanding product portfolio, and global market presence position it favorably for future growth and market dominance.

In summary, I recommend investors to **BUY** Tesla stock, as its strong fundamentals, innovative prowess, and market leadership make it a compelling investment choice with the potential for significant long-term gains.

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