Tesla Financials Data Analysis

Introduction

Tesla, the leading electric vehicle (EV) pioneer, has disrupted the automotive industry and captured the imagination of investors and consumers alike. Its journey has been marked by bold innovation, rapid growth, and significant financial transformation. However, questions remain about its long-term sustainability and investment potential. This comprehensive financial analysis aims to shed light on Tesla's past and present financial health, evaluate its current position, and uncover its future prospects.

Project Background

* Founded in 2003, Tesla initially focused on high-end electric sports cars before expanding into more affordable models and energy storage solutions.
* The company has experienced periods of explosive growth, fueled by innovative technology, celebrity endorsements, and government incentives.
* However, Tesla has also faced challenges, including production delays, quality issues, and intense competition from established automakers.

Analysis Goals and Objectives

* **Assess Tesla's growth potential:** Analyzing revenue trends and identifying key drivers to understand its future growth trajectory.
* **Evaluate profitability and efficiency:** Examining profitability metrics, cost management strategies, and operational efficiency to gauge financial health.
* **Analyze liquidity and solvency:** Assessing debt levels, cash flow generation, and short-term debt coverage to measure financial stability.
* **Investigate investment potential:** Evaluating free cash flow generation, valuation metrics, and intrinsic value to assess investment risks and opportunities.
* **Provide actionable recommendations:** Based on the analysis, suggest strategies for Tesla to improve its financial performance and enhance shareholder value.

Data Source and Collection

This financial analysis utilizes data primarily from two sources:

**Primary Source:**

* **URL:** <https://www.macrotrends.net/stocks/charts/TSLA/tesla/income-statement?freq=A>
* **Description:** This website provides access to various financial data for publicly traded companies, including Tesla. For this analysis, the following data sets were extracted:
  + **Financial Statements:** Annual and quarterly income statements, balance sheets, and cash flow statements from 2009 to 2023.
  + **Key Financial Ratios:** A wide range of pre-calculated financial ratios covering areas like profitability, liquidity, solvency, efficiency, and valuation.

**Secondary Source:**

* **URL:** <https://ir.tesla.com/#quarterly-disclosure>
* **Description:** This is the official Investor Relations website of Tesla. While not the primary source, it was used for:
  + **Cross-checking data:** To ensure the accuracy and consistency of the data obtained from Macrotrends.net.
  + **Accessing additional information:** To supplement the analysis with specific details from Tesla's official financial reports, such as Form 10-K annual reports and Form 10-Q quarterly reports.

Financial Health and Trends Analysis:

Goals: Assess Tesla's growth potential, profitability, liquidity, and efficiency.

1) Revenue and Growth:

Is Tesla experiencing sustainable and healthy revenue growth?

*Understanding growth component:*

Revenue: amount of money received from the sale of goods or services before any expenses are deducted.

**Analyze year-over-year and quarter-over-quarter growth in revenue.**

1. Calculate Y-o-Y & Q-o-Q Growth:

**Annual Sheet:**

1. Add a "Y-o-Y Growth" column next to "Revenue".
2. In the first cell (B2), enter formula: =((D2/D3)-1)\*100% (calculates growth between 2022 and 2021).
3. Growth Formula: ‘= ((Revenue in Current Year / Revenue in Previous Year) – 1) \* 100’
4. Copy formula down to all cells in the "Y-o-Y Growth" column.
5. Create "Year" column with formula: =YEAR(A2).

**Quarter Sheet:**

1. Add a "Q-o-Q Growth" column next to "Revenue" and apply the same Growth formula.
2. Add a "Financial Quarters" column with formula: "Q"&INT((MONTH(A2)-1)/3)+1&" "&YEAR(A2).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Revenue** | **Y-o-Y Growth** |  | **Dates** | **Financial Quarters** | **Revenue** | **Q-o-Q Growth** |
| 2009 | 111.943 |  |  | **6/30/2009** | **Q2 2009** | 26.945 |  |
| 2010 | 116.744 | 4% |  | **9/30/2009** | **Q3 2009** | 45.527 | 69% |
| 2011 | 204.242 | 75% |  | **12/31/2009** | **Q4 2009** |  | -100% |
| 2012 | 413.256 | 102% |  | **3/31/2010** | **Q1 2010** | 20.812 |  |
| … | … | … |  | **6/30/2010** | **Q2 2010** | 28.405 | 36% |
|  |  |  |  | **…** | **…** | … | … |
|  |  |  |  | **12/30/2023** | **Q4 2023** | 25,167 | 8% |

1. Graph Plotting:
2. *Observation & Interpretation*:

Year-over-Year Growth:

* Overall Trend: Tesla has experienced significant year-over-year revenue growth throughout its history, with an average annual growth rate of 76% from 2010 to 2023.
* Early Years (2009-2013): Very volatile growth, with periods of explosive increases followed by sharp declines. This reflects Tesla's early stage of development and its focus on launching new models.
* Maturation (2014-2020): More consistent growth, averaging around 50% annually. This suggests Tesla was establishing itself in the market and scaling up production.
* Recent Years (2021-2023): Growth has slowed down but remains positive, averaging around 47% annually. This could be due to increased competition, saturation in some markets, or pandemic-related challenges.

Quarter-over-Quarter Growth:

* High Volatility: Tesla's quarterly growth has been much more volatile than its annual growth, with frequent quarters of negative or low growth even during periods of overall expansion.
* Seasonality: Tesla's sales tend to be seasonally stronger in the second half of the year, particularly Q4, which often coincides with new product launches or holiday shopping.
* Recent Fluctuations: Since 2021, Tesla has experienced several quarters of negative or low quarter-over-quarter growth, indicating potential production or delivery bottlenecks, changes in demand, or other challenges.

Key Takeaways:

* Tesla has grown rapidly over the past decade, but its growth has slowed down in recent years.
* The company's quarterly growth is highly volatile, with seasonality and potential external factors playing a significant role.
* While Tesla remains a major player in the electric vehicle market, it faces increasing competition and needs to navigate various challenges to sustain its growth trajectory.

**Shorter Version**:

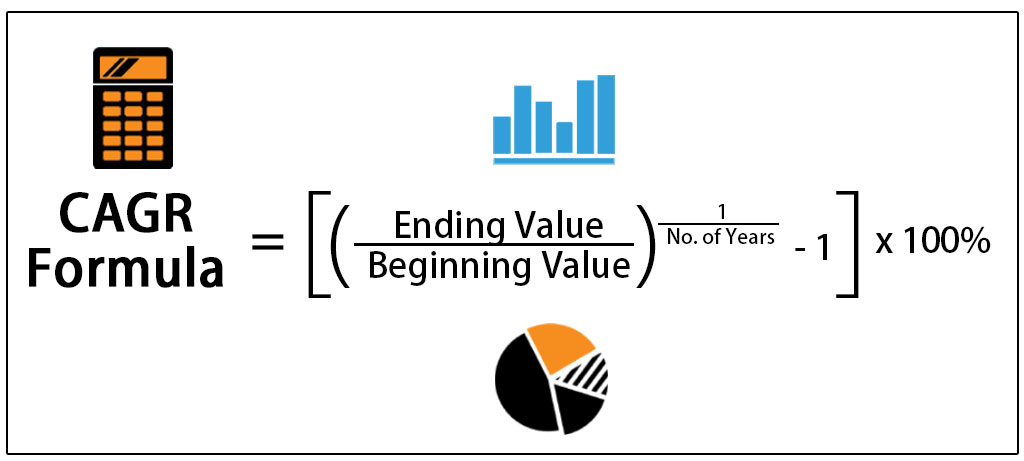
Tesla Revenue Growth Summary:

* Strong overall growth: Average annual increase of 54% from 2010-2023.
* Early volatility: Rapid ups and downs in early years.
* Maturation phase: Consistent growth around 50% annually (2014-2020).
* Recent slowdown: Growth averaging 47% (2021-2023), potentially due to competition and market saturation.
* High quarterly volatility: Frequent negative or low growth quarters, even during periods of overall expansion.
* Seasonality: Stronger sales in the second half, particularly Q4 (product launches, holiday shopping).
* Key takeaway: While rapid growth, Tesla faces challenges to sustain its trajectory in a competitive market.

**Calculate CAGR for revenue over different time periods.**

*CAGR (compound annual growth rate):* how fast a company’s revenue is growing on average each year. It's a handy way to see if the company's sales are steadily rising, staying the same, or maybe even going down.

CAGR = ((Ending Value / Starting Value)^(1/Number of Years) - 1) \* 100%



For 5-year CAGR (2019-2023):

* Starting Value = Revenue in 2019 = 24,578 million
* Ending Value = Revenue in 2023 = 96,773 million
* Number of Years (n) = 5

CAGR = [(FV / PV)^(1/n)] - 1

=(((96773/24578)^(1/5))-1)\*100

= 31.5%

For 3-year CAGR (2021-2023):

* Starting Value (SV) = 53823 (Revenue in 2021)
* Ending Value (EV) = 96773 (Revenue in 2023)
* Number of Years (N) = 3

CAGR =(((96773/53823)^(1/3))-1)\*100

= 21.6%

For 10-year CAGR (2014-2023):

* Starting Value (SV) = 3198.356 (Revenue in 2014)
* Ending Value (EV) = 96773 (Revenue in 2023)
* Number of Years (N) = 10

CAGR =(((96773/3198.356)^(1/10))-1)\*100

= 40.6%

*Interpretation:*

* Tesla has experienced significant revenue growth over the past decade, with an average annual growth rate of 40.6%.
* Recent growth has slowed down slightly, with a 3-year CAGR of 21.6%.
* However, the 5-year CAGR of 31.5% suggests that growth momentum remains strong.

2. Profitability:

How effectively is Tesla converting revenue into profit?

Problem: Assessing the company's ability to generate financial returns for investors.

Understanding Key components:

* + - *Cost of Goods Sold*: Direct costs to produce goods/services (materials, labor).
    - *Gross Margin*: profit you make from selling a product after subtracting the cost of producing it.
    - *Operating Expenses*: Indirect costs to run the business (marketing, admin).
    - *Operating Margin*: Profit after deducting operating expenses.
    - *EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization)*:

Earnings before taxes and loan interest are deducted.

Formula: Revenue − (COGS & Operating Expenses).

But excludes interest on loans, taxes, or the depreciation of assets.

* + - *EBITDA Margin*: EBITDA as % of revenue.
    - *Net Income*: Profit after deducting all expenses from revenue.
    - *Net Profit Margin*: Net Income as % of revenue.

**Analyze trends in gross margin, operating margin, EBITDA margin, and net profit margin.**

Create new columns next to each relevant metric and use formulas to calculate the following ratios:

* + Gross Margin: (Revenue - Cost of Goods Sold) / Revenue
  + Operating Margin: (Revenue - Operating Expenses) / Revenue
  + EBITDA Margin: EBITDA / Revenue
  + Net Profit Margin: Net Income / Revenue
  + Result:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year** | **Gross Margin %** | **Operating Margin %** | **EBITDA Margin %** | **Net Profit Margin %** |
| 2009 | 8.5% | 45.1% | -46.4% | -49.8% |
| 2010 | 26.3% | -52.1% | -125.8% | -132.2% |
| 2011 | 30.2% | -53.3% | -123.1% | -124.6% |
| … | … | … | … | … |
| 2022 | 25.6% | 91.2% | 16.8% | 15.4% |

Visualization:

*Trend Summary*:

Good:

* Gross margin: Upward trend, reaching 26% in 2022.
* Operating margin: Strong & rising, peaking at 91% in 2022/2023.
* EBITDA margin: Positive since 2018, indicating cash flow generation.
* Net profit margin: Positive since 2020, showing overall profitability.

Slight Concerns:

* 2023 dip in gross margin (18%) and EBITDA margin (9%).
* Net profit margin remained stable, suggesting good cost management elsewhere.

Overall:

* Significant profitability improvement over the past decade.
* Strong operational efficiency and cash flow generation.
* Recent fluctuations require monitoring, but overall trajectory remains positive.

3. Liquidity and Solvency:

Does Tesla have enough cash and resources to meet its obligations?

Problem: Identifying potential financial risks and ensuring long-term stability.

Understanding key terms

*Liquidity*: Ability to cover short-term obligations with assets. It measures how readily a company can convert assets to cash to cover its debts.

*Solvency*: Ability to cover long-term obligations with assets. Strong solvency suggests a lower risk of defaulting on debt.

*Current Assets*: Assets expected to be converted to cash or used up within a year. Typically including Cash and Cash Equivalents, Marketable Securities, Accounts Receivable, Inventory, Prepaid Expenses

*Inventory*: value of goods or materials held for sale.

*Current Liabilities*: debts or obligations that are due within one year, typically including Accounts Payable, Accrued Expenses, Short-term Debt.

*Current Ratio*: company's short-term liquidity, indicating its ability to meet its current liabilities with its current assets. A higher ratio generally indicates better short-term solvency.

Current Ratio = Current Assets / Current Liabilities

*Quick Ratio*: Measures immediate liquidity, excluding inventory from current assets, as inventory may be difficult to sell quickly. A higher ratio indicates a stronger ability to meet short-term obligations without relying on inventory sales.

Quick Ratio = (Current Assets - Inventory) / Current Liabilities

*Debt-to-Equity Ratio*: how much debt company uses to finance its assets compared to its shareholders' equity. It is calculated as Total Debt / Total Equity. A lower ratio indicates less reliance on debt financing, potentially suggesting lower financial risk.

**3.1 Trends of current ratio, quick ratio, and debt-to-equity ratio.**

In our dataset we already have a current ratio and debt-to-equity ratio. We are going to calculate a quick ratio using the formula below.

**Quick Ratio = (Current Assets - Inventory) / Current Liabilities**

= (AL2 - AI2) / AS2

Data of current ratio, quick ratio, and debt-to-equity ratio :

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Current Ratio** | **Quick Ratio** | **Debt/Equity Ratio** |
| 2009 | 1.75 | 1.35 | 0.00 |
| 2010 | 2.76 | 2.23 | 0.35 |
| 2011 | 1.95 | 1.69 | 1.25 |
| … | … | … | … |
| 2022 | 1.53 | 1.05 | 0.07 |

*Observation and Interpretation***:**

Good:

* Current & Quick ratios mostly above 1, showing improved short-term debt coverage.
* Debt-to-Equity ratio significantly reduced, indicating lower financial leverage.

Slight Concerns:

* Small increase in Debt-to-Equity Ratio (0.08 in 2023) needs monitoring.

Overall:

* Tesla's liquidity & solvency have strengthened significantly in recent years.
* Continued monitoring is important to ensure sustained improvement.

**3.2 Analyze trends in working capital and cash flow.**

Understanding key terms:

*Working Capital*: Difference between current assets and liabilities. It reflects the company's ability to manage its short-term financial needs and fund its day-to-day operations.

*Cash Flow*: Movement of cash in/out of a business. It's crucial for understanding a company's liquidity and ability to generate cash from its operations.

*Cash Flow from Operating Activities*: Cash from core business operations, such as cash received from customers and cash paid to suppliers, employees, and for operating expenses.

Cash Flow from Investing Activities: Cash from buying/selling assets, such as buying or selling property, plant, and equipment, or investing in securities.

*Cash Flow from Financial Activities*: Cash from financing actions, such as issuing or repaying debt, or issuing or repurchasing equity.

*Net Cash Flow*: Overall change in cash position. Sum of cash flows from all three activities.

3.2.1 Working Capital Analysis:

Working Capital = Total Current Assets − Total Current Liabilities

|  |  |
| --- | --- |
| **Year** | **Working Capital** |
| 2009 | 43.07 |
| 2010 | 150.321 |
| 2011 | 181.499 |
| … | … |
| 2022 | 14208 |

*Observations*:

Highly volatile: Swings between large positive and negative values throughout history.

Recent growth: Significant increase in recent years, reaching a peak of 20,868 in 2023.

Possible reasons for growth: Increased sales, higher inventory, customer advances.

3.2.2 Cash Flow Analysis:

Organize the Cash Flow components.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | **Cash Flow from Operating Activities** | **Cash Flow from Investing Activities** | **Cash Flow from Financial Activities** | **Net Cash Flow** |
| 2009 | -80.825 | -14.244 | 155.419 | 60.35 |
| 2010 | -127.817 | -180.297 | 338.045 | 29.931 |
| 2011 | -128.034 | -162.258 | 446 | 155.708 |
| … | … | … | … | … |
| 2022 | 14724 | -11973 | -3527 | -1220 |

Graph Plotting:

*Observation and Interpretation:*

Positive:

* Operating Activities: Positive cash flow since 2013, showing operational efficiency and profitability.
* Net Cash Flow: Positive since 2018, indicating self-sufficiency in funding operations and growth.
* Financing Activities: Less reliant on external financing, suggesting improved financial health.

Areas of Focus:

* Investing Activities: Large outflows for expansion and development, requiring careful management.

Overall:

Tesla's cash flow generation has improved significantly, enabling self-funded growth. Continued monitoring of investments and cash allocation remains important.

4. Efficiency:

How efficiently is Tesla managing its assets and generating returns?

Problem: Optimizing resource allocation and maximizing performance.

Understanding key terms:

*Inventory turnover ratio:* how often a company sells its entire inventory and replaces it with new stock in each time frame. For e.g., in 2009 Tesla sold and replaced its inventory 4.4 times during that year. So, for every item in inventory, it was sold and restocked approximately 4.4 times throughout the year.

Formula: Cost of Goods Sold / Average Inventory

*Receivables turnover ratio:* Shows how efficiently a company collects payments from customers. For e.g., Tesla's 2009 Ratio was 32.1. This means Tesla, on average, collected money owed from customers 32.1 times that year. In simpler terms, it took them around 11.5 days (365 days / 32.1) to collect each dollar owed.

Formula: Net Credit Sales / Average Accounts Receivable

*Asset turnover ratio:* It measures how much revenue a company is making for every dollar it invests in assets like equipment, inventory, and property. For e.g., in 2009 for every dollar invested in assets, Tesla generates 90 cents in revenue.

Formula: Net Sales / Average Total Assets

4.1 Analyze Trends**:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **Asset Turnover** | **Inventory Turnover Ratio** | **Receiveable Turnover** |
| 2009 | 0.9 | 4.4 | 32.1 |
| 2010 | 0.3 | 1.9 | 17.4 |
| 2011 | 0.3 | 2.8 | 21.4 |
| … | … | … | … |
| 2023 | 0.9 | 5.8 | 27.6 |

*Observation & Interpretation:*

* Asset Turnover: Upward trend, reaching 1.0 in 2022, indicating better asset utilization for revenue generation.
* Inventory Turnover: Gradual increase to 7.0 in 2021, suggesting improved inventory management and quicker sales.
* Receivables Turnover: Mostly stable, with recent rise in 2021-2022 (needs further analysis).

Overall:

Tesla's efficiency has significantly improved, particularly in asset and inventory management. Continued monitoring of receivables turnover trends is advised.

4.2 Analyze Correlations:

**CORREL** function to calculate the correlation coefficient between pairs of ratios.

=CORREL(Table2[Asset Turnover],Table2[Inventory Turnover Ratio])

=CORREL(Table2[Asset Turnover],Table2[Receivable Turnover])

=CORREL(Table2[Inventory Turnover Ratio],Table2[Receivable Turnover])

Result table :

|  |  |  |
| --- | --- | --- |
| Turnover Correlation | | |
| **Asset & Inventory** | **Asset & Receivable** | **Inventory & Receivable** |
| 0.722569 | 0.67128 | 0.400937 |

Visualization :

*Observation and Interpretation:*

Strong:

* Asset & Inventory: Companies with higher asset turnover often have faster inventory turnover, suggesting efficient resource and inventory management.
* Asset & Receivable: Higher asset turnover might be linked to faster receivables collection, indicating good credit policies or customer base.

Weaker:

* Inventory & Receivable: The connection between these two is less clear, requiring further analysis based on specific contexts.

Overall Analysis:

Efficient asset utilization is closely tied to effective inventory management and receivables collection, with potential areas for improvement identified in operational processes.

Investment and Valuation:

**Goals:** Understand Tesla's cash flow generation and intrinsic value.

1. Free Cash Flow and Valuation:

Is Tesla generating sufficient cash flow to justify its current market valuation?

Problem: Making informed investment decisions based on underlying cash flow generation.

Understanding key terms:

*Valuation:*

Assessing the worth of an asset or company. It considers various factors like its financial performance, growth prospects, and market conditions. Valuation methods often use future free cash flow projections as a key input.

*Capital Expenditures (CapEx):*

Investments in assets. Funds used by a company to acquire, upgrade, or maintain physical assets such as property, plant, equipment, or technology.

*Free Cash Flow (FCF):*

It's essentially the "extra" cash the company has available. Cash generated after deducting all operating expenses and capital expenditures (investments in assets). It reflects the cash available for paying dividends, debt repayment, or further investment and share buybacks.

FCF = Operating Cash Flow - Capital Expenditures

*Outstanding Shares*:

Total number of shares of a company's stock that are held by investors and are available for trading on the open market.

*Free Cash Flow Per Share*: It reflects the cash available to each shareholder.

FCF per share = FCF / Number of Outstanding Shares

For e.g., in 2009 FCF/share was ‘-0.8802’, which means Tesla lost or ‘burned’ 88.02 cents for every $1 invested in the company through its stock in 2009. Tesla wasn't generating enough cash from its operations to cover its expenses and investments. Instead, it had to use its cash reserves or borrow money to meet its financial obligations.

In 2023 FCF/share was ‘1.1961’ indicates Tesla's business operations were able to produce excess cash of $1.1961 per share.

*Price-to-Free Cash Flow (P/FCF) Ratio*:

Stock Price vs. Future cash flow. Compares stock market price per share to FCF per share, indicating stock valuation. P/FCF ratio uses FCF/Share to assess a company's valuation based on its cash generation potential.

P/FCF = Market Price Per Share / FCF Per Share

For e.g., in 2009 P/FCF was 0 which means the company did not have any positive free cash flow in that year.

In 2022 P/FCF was 92.74 indicates investors are willing to pay $92.74 for every $1 of free cash flow that Tesla is expected to generate per share in the future. Investors are optimistic about Tesla's future growth. However, it also means that Tesla's stock is relatively expensive compared to its current free cash flow generation.

In 2023 P/FCF was ‘-207.74’ indicates that the company is currently unprofitable and does not generate positive free cash flow to justify its current market valuation. Tesla's stock price is significantly higher than its free cash flow generation. Despite the negative ratio, investors might be willing to pay a premium for Tesla's future potential and believe its cash flow will turn positive in the long run.

Analyze trends in FCF/share and P/FCF to assess the company's ability to generate sustainable cash flow.

To calculate P/FCF we need FCF/Share (available in dataset) and Historical stock price.

We have pulled Stock price from 2010 to 2022 of December and calculated P/FCF using below formula.

P/FCF = Market Price Per Share / Free Cash Flow Per Share

=[@[Historical Stock Price (Dec/year)]] / [@[Free Cash Flow Per Share]]

Result :

|  |  |  |
| --- | --- | --- |
| Year | Free Cash Flow Per Share | Price-to-free cash flow ratio |
| 2009 | -0.8802 | 0 |
| 2010 | 0.6593 | 2.6998332 |
| … | … | … |
| 2022 | 1.3282 | 92.742057 |
| 2023 | 1.1961 | -207.74183 |

Trend Visualization:

*Observation and Interpretation*:

Positive:

* Free Cash Flow per Share has been generally positive since 2013, showing improved cash generation.
* Valuation: Price-to-Free Cash Flow ratio decreased in past years, indicating valuation improvement.

Recent Concerns:

* Free Cash Flow dip in 2023 suggests potential challenges or increased investments.
* P/FCF 2023's negative ratio indicates a potential disconnect between stock price and cash flow fundamentals.

Overall:

Tesla's cash flow generation and valuation have improved, but recent fluctuations require monitoring and further analysis to understand the underlying factors and potential risks.

2. Discounted Cash Flow (DCF) Analysis:

What is the intrinsic value of Tesla based on its future cash flow potential?

Problem: Assessing the long-term value proposition for potential investors.

* + Estimate future cash flows and discount them back to present value to obtain an intrinsic value for the company.
  + Compare the DCF-based valuation to the current market price to assess potential over/undervaluation.

Understanding Key terms:

*Return On Equity*: ROE shows how effectively a company uses its shareholders' equity (money invested by owners) to generate profit. Higher ROE indicates efficient use of equity for profit generation.

Formula: Net Income / Shareholders' Equity (expressed as a %)

*Debt/Equity Ratio*: Indicates proportion of debt financing relative to equity. Lower ratio implies less reliance on debt, reducing financial risk.

Formula: Total Liabilities / Shareholders' Equity

To do a DCF calculation, we need two main things:

An estimate of how much money the company will make in the future,

and a "discount rate" to adjust these future earnings back to today's value.

Finally, we need to compare the intrinsic value to today’s market price.

**2.1 *Estimating Future Cash Flows:***

**Revenue Forecast :**

Calculate Growth Rates : = (Revenue in Current Year / Revenue in Previous Year) – 1

Project Future Years : = Revenue in Last Year \* (1 + Median Growth Rate)

**Net Income Forecast :**

Growth Rate = ((Current Year Net Income - Previous Year NI) / Previous Year NI) \* 100

Forecasted Net Income = Previous Year's Net Income \* (1 + Median Growth Rate)

**Cost of Goods Sold Forecast:**

Growth Rate: **=**((Current COGS - Previous COGS) / Previous COGS) \* 100

Forecasted COGS = Previous Year's COGS \* (1 + Growth Rate)

**Operating Expenses Forecast:**

=FORECAST.ETS(F69,J55:J68,F55:F68)

**Free Cash Flow Per Share Forecast:**

=FORECAST.LINEAR(F69,K55:K68,F55:F68)

**Net Cash Flow Forecast:**

Growth Rate = ((NCF of current year - NCF of previous year) / NCF of previous) \* 100

Forecasted NCF = Previous Year's NCF \* (1 + Median Growth Rate)

**Return on Equity Forecast:**

=FORECAST.ETS(F69,M55:M68,F55:F68)

**Debt/Equity Ratio Forecast:**

=FORECAST.LINEAR(F69,N55:N68,F55:F68)

Forecasted Values:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Forecasted Value | | | | | | | | |
| Year | Revenue $ | Net Income | Cost Of Goods Sold | Operating Expenses | Free Cash Flow Per Share | Net Cash Flow | ROE - Return on Equity | Debt/Equity Ratio |
| **2024** | **161610.91** | **24748.35** | **124440.401** | **9724.0** | **0.90** | **132.5** | **62.79** | **0.46** |
| **2025** | **269890.2197** | **40834.7775** | **207815.469** | **10142.7** | **1.13** | **66.25** | **104.77** | **0.02** |
| **2026** | **450716.6669** | **67377.3829** | **347051.834** | **10817.9** | **1.30** | **33.125** | **115.19** | **-0.40** |
| **2027** | **752696.8337** | **111172.682** | **579576.562** | **11736.7** | **1.45** | **16.5625** | **138.14** | **-0.47** |
| **2028** | **1257003.712** | **183434.925** | **967892.858** | **12659.3** | **1.68** | **8.28125** | **165.10** | **-0.91** |

**2.2 *Calculate the Discount Rate:***

Determining the appropriate discount rate **using** the Weighted Average Cost of Capital (**WACC**) **method**.

WACC is the average rate a company pays its investors to finance assets, considering both debt and equity costs.

**WACC % = E / (E + D) \* Cost of Equity + D / (E + D) \* Cost of Debt \* (1 - Tax Rate)**

A diagram of a company's cost

Description automatically generated

**Calculate Cost of Equity:**

Estimate the cost of equity using the Capital Asset Pricing Model (CAPM).

**Cost of Equity = Risk-free Rate of return + Beta \* (Expected Market Return - Risk-free Rate of return)**

Risk-Free Rate = 4.009 it is Treasury Constant Maturity Rate.

Beta = 1.83 It measures how a stock's returns move in relation to the overall market's returns.

(Expected Market Return - Risk-Free Rate) is also called market premium. We require market premium to be 6%.

**Cost of Equity =** 4.062% + 1.83 \* 6% = **15.042%**

Return investors expect to earn about 15% by investing in Tesla’s stock. It's like the "price" the Tesla pays to use funds provided by shareholders.

**Calculate Cost of Debt:**

Cost of debt = Latest TTM Interest ÷ Avg. Debt (1-year, quarterly)

Trailing twelve months (TTM) Interest Expense as of Dec 2023 was $156 Million.

Total Debt : $6978.6 Million.

**Cost of Debt =** 156 / 6978.6 **= 2.2354%**

Tesla pays on its debt about 2% interest rate to borrow money from lenders.

**Calculate Weight of Equity and Debt:**

We calculate the weight of equity and debt to see how a company's assets are funded.

Market value of equity(E) or "Market Cap" for Tesla is $608072.034 Million as of today.

Total Debt : $6238.8 Million

a) weight of equity = **E / (E + D) = 608072.034 / (608072.034 + 6238.8) = 0.9898**

b) weight of debt = **D / (E + D) = 6238.8 / (608072.034 + 6238.8) = 0.0102**

Equity represents about 99% of the company's funding, while debt makes up only about 1%.

**Tax shield benefits:**

Tax Rate = Income Tax Expense ÷ Pre-Tax Income

= recent TTM (Trailing Twelve Months) Tax Expense ÷ recent TTM Pre-Tax Income

= TTM Tax Expense $-5,001 Million ÷ Pre-Tax Income $9,973 Million

**=** -5001 / 9973

= -50.15%

which is less than 0%. Therefore, **Tax Rate set to 0%.** Tesla does not pay taxes on its earnings.

**Tesla's WACC is calculated as:**

**WACC = E / (E + D) \* Cost of Equity + D / (E + D) \* Cost of Debt \* (1 - Tax Rate)**

= 0.9887 \* 15.054% + 0.0113 \* 2.2354% \* (1 - 0%)

= 14.91%

**Tesla's WACC of 14.91%** represents the overall return Tesla needs to provide to its investors, considering the money it borrows and the money invested by shareholders.

Reference Link :

https://www.gurufocus.com/term/wacc/TSLA/WACC-Percentage/Tesla#:~:text=The%20formula%20is%3A%20Cost%20of%20Equity%20%3D%20Risk-Free,of%20the%20Market%20-%20Risk-Free%20Rate%20of%20Return%29

**2.3 *Calculate Present Value Factor***

Apply the discount to each year’s cash flow. The discount factor for each year is calculated as follows:

Present Value Factor = 1 ÷ (1 + discount rate) raised to the power of the number of discount years.

= 1 / (1 + discount rate)^discount years

= 1 / (1 + r) ^ n

For the years 2023 to 2027 using a WACC of 14.91% ( 0.1491 in decimal form)

For 2024: PVF\_2024 = 1 / (1 + 0.1491)^1 = 0.871632286

For 2025: PVF\_2025 = 1 / (1 + 0.1491)^2 = 0.758785356

For 2026: PVF\_2026 = 1 / (1 + 0.1491)^3 = 0.660090766

For 2027: PVF\_2027 = 1 / (1 + 0.1491)^4 = 0.573909848

For 2028: PVF\_2028 = 1 / (1 + 0.1491)^5 = 0.498888418

*Interpretation:*

* PVF\_2024 = 0.87: This means that $1 received in the year 2024 is equivalent to approximately $0.87 today, considering a 14.91% discount rate. So, to find the present value of $1 received in 2024, we will multiply it by 0.87.
* Similarly, $1 received in the year 2025 is worth approximately $0.76 today.
* $1 in 2026 ≈ $0.66 today, in 2027 ≈ $0.57 today and in 2028 ≈ $0.50 today.

**2.4 *Discount Future Cash Flows:***

Discounted Cash Flow = Future Cash Flow \* Present Value Factor

= Forecasted Revenue \* PVF

= Forecasted Net Income \* PVF

= All Forecasted element \* PVF

Result:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | **Present Value** | | | | | | | |
| Revenue | Net Income | COGS | Operating Expenses | FCF/ Share | Net Cash Flow | ROE | Debt/Equity Ratio |
| **2024** | 140865.2869 | 21571.4609 | 108466.271 | 8475.75 | 0.79 | 115.49 | 54.73 | 0.40 |
| **2025** | 204788.7464 | 30984.8312 | 157687.335 | 7696.17 | 0.86 | 50.27 | 79.50 | 0.01 |
| **2026** | 297513.9099 | 44475.1883 | 229085.711 | 7140.78 | 0.85 | 21.87 | 76.03 | -0.27 |
| **2027** | 431980.1254 | 63803.0969 | 332624.697 | 6735.78 | 0.83 | 9.51 | 79.28 | -0.27 |
| **2028** | 627104.5935 | 91513.5595 | 482870.537 | 6315.58 | 0.84 | 4.13 | 82.37 | -0.45 |

**2.5 *Calculate Intrinsic Value:***

Sum up the present values for each year to find intrinsic value.

Ensuring unit consistency before summing by following method.

**Weighting Factors**: We'll weigh each element based on its importance before adding them up.

First, we'll assign weighting factors to each element, totaling 100%

* Revenue: 25%
* Net Income: 20%
* Cost of Goods Sold (COGS): 15%
* Operating Expenses: 10%
* Free Cash Flow per Share (FCF/share): 5%
* Net Cash Flow: 10%
* Return on Equity (ROE): 10%
* Debt/Equity Ratio: 5%

Next, we'll assign weights to each yearly value.

Weighted Value = Present Value \* Weighting Factor

= PV Revenue value \* 25%, PV Net Income \* 20% etc.

Below is the weighted value of each forecasted year:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | Revenue | Net Income | COGS | Operating Expenses | FCF/share | Net Cash Flow | ROE | Debt/Equity Ratio |
| **2024** | 35216.32 | 4314.29 | 16269.94 | 847.57 | 0.04 | 11.55 | 5.47 | 0.02 |
| **2025** | 51197.19 | 6196.97 | 23653.10 | 769.62 | 0.04 | 5.03 | 7.95 | 0.00 |
| **2026** | 74378.48 | 8895.04 | 34362.86 | 714.08 | 0.04 | 2.19 | 7.60 | -0.01 |
| **2027** | 107995.03 | 12760.62 | 49893.70 | 673.58 | 0.04 | 0.95 | 7.93 | -0.01 |
| **2028** | 156776.15 | 18302.71 | 72430.58 | 631.56 | 0.04 | 0.41 | 8.24 | -0.02 |

**Calculate the DCF for each year:**

For example, to calculate the DCF for 2023:

* DCF\_2023 = Present Value of Revenue\_2023 + Present Value of Net Income\_2023 + ... + Present Value of Debt/Equity Ratio\_2023

Result:

|  |  |
| --- | --- |
| **Year** | **Total Weighted Value** |
| 2024 | 56665.21 |
| 2025 | 81829.89 |
| 2026 | 118360.27 |
| 2027 | 171331.84 |
| 2028 | 248149.67 |

This represents the intrinsic value of Tesla based on its future cash flow potential.

**2.6 *Intrinsic value per share:***

Divide the total weighted value for that year by the total number of shares outstanding.

Intrinsic Value per Share = Total Weighted Value for 2023 / Shares Outstanding

We need a ‘Shares Outstanding’ of future years. For that I forecasted it using below formula.

=FORECAST.ETS(N118,$O$103:O117,$N$103:N117)

Result :

|  |  |
| --- | --- |
| **Forecasted Value** | |
| **Year** | **Shares Outstanding** |
| 2024 | 3723.30322 |
| 2025 | 3934.65901 |
| 2026 | 4141.7167 |
| 2027 | 4348.40881 |
| 2028 | 4553.09972 |

Now apply the forecasted Shares Outstanding to calculate the Intrinsic value per share.

‘= Total Weighted Value / Shares Outstanding’

Result:

|  |  |
| --- | --- |
| **Year** | **Intrinsic Value/Share** |
| **2024** | $ 15.219 |
| **2025** | $ 20.797 |
| **2026** | $ 28.578 |
| **2027** | $ 39.401 |
| **2028** | $ 54.501 |

**2.*7 Compare Intrinsic Value to Market Price:***

Compare the calculated intrinsic value with the current market price of Tesla to assess whether the stock is undervalued or overvalued.

Comparison Calculation: subtract the market price from the intrinsic value per share for each year.

Market Price: Given as $185 (as of February 2, 2024).

Difference = Intrinsic Value per Share - Market Price

Result :

|  |  |  |
| --- | --- | --- |
| **Year** | **Intrinsic Value/Share** | **IV v/s MP** |
| **2024** | 15.2191 | -169.7809 |
| **2025** | 20.7972 | -164.2028 |
| **2026** | 28.5776 | -156.4224 |
| **2027** | 39.4010 | -145.5990 |
| **2028** | 54.5013 | -130.4987 |

**2.8 *Interpretation****:* Tesla's stock appears overvalued compared to its intrinsic value, suggesting potential risks for investors.

Cost Analysis:

Can Tesla identify and control key cost elements to improve profitability?

Problem: Optimizing spending and ensuring cost-effectiveness in operations.

**1. Analyze trends in Cost components** - COGS,  R&D, and SG&A expenses.

Gather cost Data:

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **COGS** | **R&D Expenses** | **SG&A Expenses** |
| 2009 | 102.408 | 19.282 | 42.15 |
| 2010 | 86.013 | 92.996 | 84.573 |
| 2011 | 142.647 | 208.981 | 104.102 |
| … | … | … | … |
| 2022 | 60609 | 3075 | 3946 |

Understand Cost Components:

* *COGS* includes direct costs associated with production, such as materials and labor.
* *R&D (research & development) expenses* represent investments in innovation and product development.
* *SG&A expenses (Sales & Marketing, General & Administrative)* encompass overhead costs related to sales, marketing, and administrative functions.

Analyze Trends in Cost Elements :

Calculate the percentage of revenue represented by COGS, R&D expenses, and SG&A expenses over time. Formula:

COGS % = (COGS / Revenue) \* 100

R&D Expenses % = (R&D Expenses / Revenue) \* 100

SG&A Expenses % = (SG&A Expenses / Revenue) \* 100

Result :

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | **COGS% of Revenue** | **R&D Expenses % of Revenue** | **SG&A Expense % of Revenue** |
| 2009 | 91% | 17% | 38% |
| 2010 | 74% | 80% | 72% |
| 2011 | 70% | 102% | 51% |
| … | … | … | … |
| 2022 | 74% | 4% | 5% |

*Observation & Interpretation*:

Improvements:

* COGS: Steady decline since 2013, suggesting improved production efficiency.
* R&D: Significant reduction since 2018, potentially reflecting completed projects or shifted focus.
* SG&A: Drastically lowered from 2010, indicating better operational efficiency or economies of scale.

Areas for Monitoring:

* COGS: Recent slight increase requires observation for continuity.
* R&D: Significant fluctuations warrant understanding underlying drivers.

Overall:

Tesla has achieved substantial cost management, particularly in R&D and SG&A. But further optimization, particularly in COGS, is crucial for long-term profitability.

**2. Correlation Analysis between Cost components and Profitability metrics:**

*Identify Relevant Variables*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | Cost Components | | | Profitability Metrics | |
| COGS | R&D Expenses | SG&A Expenses | Gross Margin | Net Profit Margin |
| 2009 | 102.408 | 19.282 | 42.15 | 8.5177 | -49.7932 |
| 2010 | 86.013 | 92.996 | 84.573 | 26.3234 | -132.1935 |
| 2011 | 142.647 | 208.981 | 104.102 | 30.1579 | -124.5635 |
| … | … | … | … | … | … |
| 2023 | 79113 | 3969 | 4800 | 18.2489 | 15.4992 |

*Calculate Correlation Coefficients:*

Formula ‘=CORREL(B2:B14, D2:D14)’

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| COGS and Gross Margin | COGS and Net Profit Margin | R&D and Gross Margin | R&D and Net Profit Margin | SG&A and Gross Margin | SG&A and Net Profit Margin |
| 0.0705624 | 0.5748243 | 0.0925498 | 0.6466108 | 0.0855348 | 0.7117408 |

*Preprocessing for Graph:*

When dealing with variables that have significantly different scales, you can normalize the data before plotting to make the correlations more visible. Normalization involves transforming the data so that it falls within a similar scale. A common method is Min-Max Scaling, which scales the values between 0 and 1.

Normalize the Data :

Calculate the normalized values for each variable using the **Min-Max Scaling formula**:

Normalized Value = (Original Value−Min Value) / (Max– Min)

​ Min Value: =MIN(B2:B15)

Max Value: =MAX(B2:B15)

Normalized Value: =(B2 - $B$3) / ($B$16 - $B$3)

Normalized Data between 0 and 1:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | Normalized COGS | Normalized R&D Expenses | Normalized SG&A Expenses | Normalized Gross Margin | Normalized Net Profit Margin |
| 2009 | 0.0002709 | 0 | 0 | 0.0542821 | 0.5581164 |
| 2010 | 0 | 0.0241233 | 0.0094803 | 0.8324251 | 0 |
| 2011 | 0.0009357 | 0.06208 | 0.0138445 | 1 | 0.0516798 |
| … | … | … | … | … | … |
| 2023 | 1 | 1 | 1 | 0.4795541 | 1 |

*Visualization:*

0.07

*Observation and Interpretation:*

Net Profit Margin:

* Strong positive correlations with COGS (0.57) and R&D (0.65) and SG&A (0.71) expenses.
* Higher costs generally lead to lower net profit margins.

Gross Margin:

* Weaker correlations with all cost components (0.07-0.09).
* Other factors likely play a bigger role in gross margin fluctuations.

Limitations and Assumptions

1. **Historical Trend Projection:** Relies on past trends to predict future performance.
2. **Market Stability:** Assumes stable market conditions for analysis validity.
3. **Metric Interpretation:** Simplifies complex financial data for analysis.
4. **Correlation Implication:** Assumes causation in correlated metrics.
5. **Industry Factors:** Generalizes findings without considering industry-specific nuances.
6. **Financial Disclosure:** Relies on Tesla's accurate financial reporting.
7. **Economic Conditions:** Assumes consistent economic environment for analysis.

Conclusion :

**Strong Points:**

* Impressive growth (76% average annually)
* Improved profitability (positive net margin since 2020)
* Enhanced liquidity and solvency (reduced debt, improved ratios)
* Increased efficiency (better asset & inventory utilization)

**Areas for Improvement:**

* Recent fluctuations in revenue, profitability, and valuation.
* Cost management, particularly in COGS.
* Volatility in cash flow and large investment outflows.

**Overall:**

* Significant progress, but challenges remain. Careful monitoring and strategic optimization are crucial for sustained success.

Recommendations

**Recommendations:**

1. **Diversify Revenue Streams:** Explore new products and markets to mitigate revenue growth slowdown.
2. **Manage Seasonal Fluctuations:** Stabilize financial performance by addressing quarterly seasonality.
3. **Optimize Cost Management:** particularly in COGS, to maximize profitability.
4. **Invest in R&D:** Maintain strategic investments in research and development for innovation.
5. **Expand Market Reach:** Focus on expanding the customer base and market presence.
6. **Monitor Working Capital:** Assess and manage working capital fluctuations for efficiency.
7. **Risk Management in Cash Flow:** Evaluate capital expenditure decisions for sustainable growth.
8. **Enhance Investor Communication:** Provide transparent updates to foster investor confidence.
9. **Optimize Customer Payments:** Efficiently manage customer advances and preorders for cash flow.
10. **Scenario Planning for Valuation:** Engage in scenario planning to understand valuation dynamics.

Github Repository

Find the detailed financial analysis files on GitHub

In conclusion, Tesla's financial analysis reveals robust growth, profitability, and efficiency. Despite challenges, its innovative approach and operational strengths position it well for the future. Ongoing monitoring and strategic adjustments will be crucial for sustained success.