Introduction:

In this project, I aim to simulate the analysis performed by equity research analysts in real-time, by using advanced data analysis techniques. By utilizing SQL for data manipulation and Power BI for visualization, I will conduct a comprehensive analysis of a dataset comprising various financial metrics of companies across different sectors and industries. This analysis will provide me with valuable insights into market trends, company performance, and sectoral comparisons, ultimately aiding in investment decision-making.

Objective:

The primary objective of this equity research analysis project is to perform an in-depth examination of the financial data of companies to draw actionable insights. Specifically, the project aims to:

1. **Data Exploration:** Understand the structure and key statistics of the dataset, ensuring data quality and completeness.

2. **Financial Metric Analysis:** Use SQL to answer targeted insightful questions that cover various aspects of financial performance, such as profitability, valuation, efficiency, and growth.

3. **Visualization:** Create informative and visually appealing representations of the data using Power BI, making complex data more accessible and understandable.

4. **Insight Generation:** Identify trends, outliers, and patterns within the data to provide strategic insights that can guide investment decisions.

5. **Reporting:** Compile the analysis results, visualizations, and key insights into a comprehensive report, facilitating easy dissemination of findings to stakeholders.

Dataset Overview:

For this analysis project, I'll be using a dataset sourced from the Kaggle website, a popular platform for data science and machine learning. The dataset consists of comprehensive stock information for a diverse range of companies. Key attributes included in the dataset are:

- Company Name

- Stock Symbol

- Sector

- Industry

- Market Value

- Enterprise Value

- P/E Ratio

- Diluted EPS

- Performance Metrics (1 Week, 3 Months, YTD, 1 Year)

- Revenue and Revenue Growth

- Operating Expenses and Income

- Gross Profit and Margin

- Inventory

- Account Receivables Turnover

- Cash Flow from Operations and Investing Activities

- Capital Expenditures

- Free Cash Flow and related ratios

- Price to Book Value

- Price to Sales Ratio

- EV/EBITDA

- Operating, Gross, and Profit Margins

- Basic EPS and EPS Growth

- Return on Assets (ROA)

- Return on Capital

- Institutional Ownership %

This rich dataset provides a solid foundation for performing an in-depth equity research analysis, enabling us to explore various financial aspects of the companies included.

SQL Analysis:

SQL Query Details:

To Create Table:

```sql
CREATE TABLE stock_data (
    company_name TEXT,
    stock_symbol TEXT,
    sector TEXT,
    industry TEXT,
    market_value DECIMAL,
    enterprise_value DECIMAL,
    pe_ratio DECIMAL,
    diluted_eps DECIMAL,
    week_performance DECIMAL,
    three_months_performance DECIMAL,
    ytd_performance DECIMAL,
    year_performance DECIMAL,
    revenue DECIMAL,
    operating_expenses DECIMAL,
    operating_income DECIMAL,
    revenue_growth_yoy DECIMAL,
    gross_profit DECIMAL,
    inventory DECIMAL,
    account_receivables_turnover DECIMAL,
    cash_flow_from_operations DECIMAL,
    capital_expenditures DECIMAL,
    cash_from_investing_activities DECIMAL,
    free_cash_flow DECIMAL,
    price_to_free_cash_flow DECIMAL,
    price_to_book_value DECIMAL,
    price_to_sales_ratio DECIMAL,
    ev_ebitda DECIMAL,
    operating_margin DECIMAL,
    gross_margin DECIMAL,
    profit_margin DECIMAL,
    basic_eps DECIMAL,
    eps_1yr_growth DECIMAL,
    return_on_assets DECIMAL,
    return_on_capital DECIMAL,
    institutional_ownership DECIMAL
);
```

Once the above query creates the table, I upload the entire CSV dataset file into the table in my SQL database to conduct further data analysis and get insights.

SQL Analysis Questions:

1. **What is the average P/E ratio across all companies?**

Reason: The P/E ratio provides insight into how much investors are willing to pay for a dollar of earnings.

Query:

SELECT AVG(pe_ratio) FROM stock_data;

Answer: 27.4

I feel the P/E ratio value is on the higher side here, so the market must be little overvalued due to the few fast-growing companies where investors usually invest a lot in the initial stages of companies.

Use: This value now will help us understand whether the market is overvalued or undervalued on average.

2. **Which companies have the highest and lowest market value?**

Reason: Identifying companies with extreme market values can highlight market leaders and potential undervalued stocks.

Query:

SELECT company_name, market_value FROM stock_data ORDER BY market_value DESC LIMIT 1;

SELECT company_name, market_value FROM stock_data ORDER BY market_value ASC LIMIT 1;

Answer: Company 146 has the highest market value of 999.28 Billion dollars; whereas Company 332 has the lowest market value of 2.024 Billion dollars.

Use: Useful for benchmarking and investment decisions.

3. What is the average revenue for companies in each sector?

Reason: Sectors vary in revenue-generating capacity.

Query:

SELECT sector,

AVG(revenue) as avgrevenue

FROM stock_data

GROUP BY sector

ORDER BY avgrevenue DESC;

Answer: The average revenue for each sector is:
- Technology: 52.827 billion dollars
- Finance: 50.855 billion dollars
- Consumer goods: 49.848 billion dollars
- Healthcare: 48.856 billion dollars
- Utilities: 48.848 billion dollars

Use: Provides insight into which sectors are generating more revenue on average. This will help us to focus on more revenue-generating sectors as there might be more profits there.

4. Which industry has the highest average gross margin?

Reason: Gross margin indicates profitability at the core business level.

Query:

SELECT industry,

AVG(gross_margin) as avggrossmargin

FROM stock_data

GROUP BY industry

ORDER BY avggrossmargin DESC LIMIT 1;

Answer: 0.55694257059223300971

A gross margin of 55.69% is generally considered strong, especially in industries like software, where the cost of goods sold is relatively low compared to revenue. It indicates that the software companies are efficient in converting revenue into profit before accounting for other expenses such as operating costs, taxes, and interest.

Use: This will help us identify which industries are more efficient and profitable.

5. What is the average return on assets (ROA) for companies with a market value above $1 billion?

Reason: ROA measures how efficiently a company uses its assets to generate profit.

Query:

SELECT AVG(return_on_assets)

FROM stock_data

WHERE market_value > 1000000000;

Answer: 0.01998289295700000000

The ROA of 1.998% indicates that, on average, companies with a market value above $1 billion are generating a net income of approximately 1.998 cents for every dollar of assets they have. This low ROA suggests that these companies are not generating high profits relative to their asset base. This can indicate to us that either their asset base is large relative to their profit or their profitability is relatively low.

Use: The ROA value will help us Identify how well large companies utilize their assets.

6. How do the top 10 companies by market value perform in terms of P/E ratio?

Reason: Evaluating top companies' P/E ratios can indicate if they are over or undervalued.

Query:

SELECT company_name, market_value, pe_ratio

FROM stock_data

ORDER BY market_value DESC LIMIT 10;

Answer: The following is the list of those 10 companies:

S.no.	Company Name	Market value	P/E ratio
1	Company 146	$ 999,280,000,000.00	34.4
2	Company 320	$ 999,185,000,000.00	33.1
3	Company 915	$ 999,172,000,000.00	35.6
4	Company 851	$ 994,084,000,000.00	38.8
5	Company 926	$ 992,727,000,000.00	5.5
6	Company 139	$ 992,382,000,000.00	7.7
7	Company 90	$ 992,090,000,000.00	40.2
8	Company 718	$ 989,310,000,000.00	38.8
9	Company 480	$ 986,244,000,000.00	38.2
10	Company 456	$ 984,249,000,000.00	41.4

Use: This will help investors understand the valuation of top market leaders.

7. **What is the distribution of institutional ownership percentage across different sectors?**

Reason: Institutional ownership can signal confidence in a sector.

Query:

SELECT sector,

AVG(institutional_ownership)

FROM stock_data GROUP BY sector;

Answer: The following is the distribution:

S.no.	Sector	Avg ownership %
1	Finance	60%
2	Utilities	61%
3	Technology	62%
4	Healthcare	60%
5	Consumer Goods	59%

Use: Helps assess the credibility and stability of sectors.

8. **Which companies have experienced the highest revenue growth year-over-year (YoY)?**

Reason: High revenue growth often indicates strong business expansion.

Query:

SELECT company_name, revenue_growth_yoy

FROM stock_data ORDER BY revenue_growth_yoy DESC LIMIT 10;

Answer: The following is the list of top 10 companies with the highest revenue growth YOY:

S.no.	Company name	Revenue Growth YOY
1	Company 654	49.998%
2	Company 612	49.941%
3	Company 714	49.931%
4	Company 282	49.785%
5	Company 60	49.727%
6	Company 99	49.640%
7	Company 796	49.639%
8	Company 788	49.555%
9	Company 425	49.502%
10	Company 717	49.272%

All the companies listed have experienced significant revenue growth, close to 50% YoY, indicating strong performance over the past year.

Use: Identifies high-growth companies for potential investment.

9. What is the average gross profit margin for companies in the technology sector?

Reason: Gross profit margin indicates how well a company manages its production costs.

Query:

 SELECT AVG(gross_margin)

FROM stock_data WHERE sector = 'Technology';

Answer: 0.556291822 (or 55.63%)

A gross margin of 55.63% indicates that, on average, companies in the technology sector are operating with high efficiency in terms of production costs relative to their revenue.

Use: Helps evaluate the profitability of tech companies.

10. Which companies have the highest price-to-book value ratio?

Reason: Price-to-book ratio indicates how much investors are willing to pay for each dollar of book value.

Query:

SELECT company_name, price_to_book_value

FROM stock_data ORDER BY price_to_book_value DESC LIMIT 10;

Answer: The following is the list of top 10 companies by 'price to book value'.

S.no.	Company name	Price to Book value
1	Company 212	4.96
2	Company 633	4.96
3	Company 470	4.96
4	Company 162	4.95
5	Company 55	4.95
6	Company 394	4.95
7	Company 256	4.95
8	Company 364	4.94
9	Company 682	4.94
10	Company 350	4.94

The above top 10 companies by P/B ratios ranging from **4.94** to **4.96**, are seen as highly valued by investors. They might be companies with strong growth potential, valuable intangible assets, or efficient use of capital.

Use: The P/B ratio indicates how much investors are willing to pay for each dollar of book value. A higher P/B ratio suggests that investors expect the company to generate more value in the future, while a lower ratio might indicate that the company is undervalued or struggling.

11. What is the average free cash flow for companies in each industry?

Reason: Free cash flow indicates the amount of cash generated after capital expenditures.

Query:

SELECT industry,

AVG(free_cash_flow)

FROM stock_data GROUP BY industry;

Answer: The following is the list of Industries with their avg free cash flow values:

S.no.	Industry	Avg. Free Cash flow
1	Software	$13,755,806,165.32
2	Biotechnology	$13,341,189,783.68
3	Retail	$15,007,223,110.97
4	Energy	$14,854,091,065.75
5	Banking	$15,494,917,268.73

- The **Banking Industry** leads with an average FCF of **$15.49 billion**, reflecting efficient cash management and lower CapEx.
- The **Retail Industry** follows with **$15.01 billion**, generating substantial cash despite high CapEx for physical infrastructure.
- The **Energy Industry** averages **$14.85 billion**, with strong cash flows but typically high CapEx.
- The **Software** and **Biotechnology Industries** show strong cash flows at **$13.76 billion** and **$13.34 billion** respectively, with software benefiting from lower CapEx.

Use: Helps assess the financial health and potential for growth in industries.

12. Which companies have the highest operating margin?

Reason: A higher operating margin indicates that a company is more efficient at converting sales into profits.

Query:

SELECT company_name, operating_margin

FROM stock_data

ORDER BY operating_margin DESC LIMIT 10;

Answer:

S.no.	Company name	Operating Margin
1	Company 123	49.97%
2	Company 303	49.96%
3	Company 159	49.92%
4	Company 921	49.89%
5	Company 989	49.88%
6	Company 731	49.86%
7	Company 985	49.73%
8	Company 383	49.62%
9	Company 871	49.57%
10	Company 969	49.47%

The above companies have the highest operating margins, meaning they are particularly efficient at managing their costs relative to their revenues. This efficiency allows them to retain a larger percentage of their revenue as profit from operations, which is a strong indicator of financial health and operational success.

Use: Helps us identify highly efficient and profitable companies.

13. How does the average P/E ratio vary by industry?

Reason: Different industries have different typical P/E ratios due to varying growth expectations.

Query:

SELECT industry, AVG(pe_ratio)

FROM stock_data GROUP BY industry;

Answer:

S.no.	Industry	Avg P/E ratio
1	Software	26.18
2	Biotechnology	27.80
3	Retail	29.28
4	Energy	26.97
5	Banking	27.00

High P/E ratios in sectors like Retail and Biotechnology indicate that investors are optimistic about future earnings growth, while the relatively lower P/E ratio in Software may reflect mature companies with steady, predictable earnings.

Use: Understanding the P/E ratios by industry helps investors make more informed decisions when evaluating stock valuations and comparing companies within and across different sectors.

14. What is the average EPS 1-year growth for companies with positive revenue growth?

Reason: EPS growth indicates improving profitability and shareholder value.

Query:

SELECT AVG(eps_1yr_growth)

FROM stock_data WHERE revenue_growth_yoy > 0;

Answer: 0.15249409051 (approximately 15.25%)

An average EPS 1-year growth of **15.25%** indicates that, on average, these companies have increased their earnings per share by 15.25% over the past year.

Use: Helps identify companies with strong earnings growth potential.

15. Which companies have the highest and lowest EV/EBITDA ratios?

Reason: EV/EBITDA is a valuation multiple used to compare the value of a company to its earnings.

Query:

SELECT company_name, ev_ebitda FROM stock_data ORDER BY ev_ebitda DESC LIMIT 1;

SELECT company_name, ev_ebitda FROM stock_data ORDER BY ev_ebitda ASC LIMIT 1;

Answer: Company 14 has the highest EV/EBITDA ratio of '1582.43' whereas Company 162 has the lowest EV/EBITDA ratio of '0.1533'.

- **Company 14's** very high EV/EBITDA ratio of **1582.43** could indicate high growth expectations or potential overvaluation, making it a top choice for further analysis by investors.
- **Company 162's** low EV/EBITDA ratio of **0.1533** might suggest undervaluation, signaling either a potential investment opportunity or the need to analyse the reasons behind the low market valuation relative to earnings.

Use: Helps identify potentially overvalued or undervalued companies.

16. What is the average cash flow from operations for companies in the healthcare sector?

Reason: Operating cash flow indicates the cash generated from regular business operations.

Query:

SELECT AVG(cash_flow_from_operations)

FROM stock_data WHERE sector = 'Healthcare';

Answer: $14,608,942,857

The average cash flow from operations of **$14.61 billion** for healthcare companies reflects strong financial performance and operational efficiency within the sector.

Use: Assesses the financial health of healthcare companies.

17. How does the average price-to-sales ratio compare across sectors?

Reason: Price-to-sales ratio indicates how much investors are willing to pay per dollar of sales.

Query:

SELECT sector,

AVG(price_to_sales_ratio)

FROM stock_data GROUP BY sector;

Answer:

S.no.	Sector	Avg Price to Sales ratio
1	Finance	2.74
2	Utilities	2.62
3	Technology	2.63
4	Healthcare	2.94
5	Consumer Goods	2.78

- **Healthcare** and **Consumer Goods** have higher ratios, indicating higher expectations of growth or profitability.
- **Finance** and **Technology** have moderate P/S ratios, balancing growth potential with current revenue generation.
- **Utilities** have the lowest P/S ratio, reflecting the sector's stable but slower growth prospects.

Use: This comparison helps investors understand how much the market values each sector's sales and can guide decisions based on growth expectations and risk tolerance.

18. What is the average capital expenditures for companies with positive free cash flow?

Reason: Capital expenditures indicate investments in long-term assets.

Query:

SELECT AVG(capital_expenditures)

FROM stock_data WHERE free_cash_flow > 0;

Answer: $497,694,744.13 (approximately $497.69 million)

The average capital expenditure of **$497.69 million** for companies with positive free cash flow indicates that these companies are effectively managing their finances. They are investing significantly in their assets while still maintaining a positive cash flow, which is a strong indicator of financial stability and growth potential.

Use: Helps identify companies reinvesting in their growth.

19. Which companies have the highest return on capital?

Reason: Return on capital measures how well a company generates returns from its capital.

Query:

SELECT company_name, return_on_capital

FROM stock_data

ORDER BY return_on_capital DESC LIMIT 10;

Answer:

S.no.	Company Name	Return on Capital
1	Company 449	84%
2	Company 121	20%
3	Company 344	19%
4	Company 439	17%
5	Company 950	15%
6	Company 609	14%
7	Company 513	14%
8	Company 796	13%
9	Company 892	12%
10	Company 357	11%

Company 449 leads with a return on capital (ROC) of 84%, showcasing exceptional efficiency and profitability. Company 121 follows with a strong 20% ROC, while Company 344 has a solid 19%. Companies 439 and 950 have ROCs of 17% and 15%, respectively, indicating effective capital use. The remaining companies, with ROCs ranging from 14% to 11%, demonstrate reasonable efficiency in generating profits from their capital.

Use: Helps identify highly efficient companies.

20. What is the average profit margin for companies in the finance sector?

Reason: Profit margin indicates how much of each dollar of revenue is retained as profit.

Query:

SELECT AVG(profit_margin)

FROM stock_data WHERE sector = 'Finance';

Answer: 0.253312945 (or approximately 25.33%).

The average profit margin of **25.33%** for companies in the finance sector reflects strong profitability and efficient cost management. This indicates that finance companies are effectively converting a significant portion of their revenue into profit

Use: Assesses profitability in the finance sector.

21. Which companies have the highest diluted EPS?

Reason: Diluted EPS indicates the profitability available to shareholders.

Query:

SELECT company_name, diluted_eps

FROM stock_data

ORDER BY diluted_eps DESC LIMIT 10;

Answer:

S.no.	Company Name	Diluted EPS
1	Company 867	19.99
2	Company 241	19.97
3	Company 294	19.96
4	Company 52	19.94
5	Company 503	19.93
6	Company 904	19.89
7	Company 521	19.89
8	Company 1	19.89
9	Company 588	19.87
10	Company 412	19.85

Company 867 leads with the highest diluted EPS at $19.99, showcasing strong profitability per share even after accounting for potential dilution. Companies 241, 294, 52, and 503 follow closely with slightly lower but still high diluted EPS, indicating similar strong earnings performance. Companies 904, 521, and 1 each have a diluted EPS of $19.89, reflecting comparable profitability. Finally, Companies 588 and 412 round out the top 10 with diluted EPS values of $19.87 and $19.85, respectively, maintaining the trend of high per-share earnings.

Use: Helps identify companies with high earnings per share even after potential dilution of shares.

22. How does the average account receivables turnover compare across industries?

Reason: Receivables turnover measures how efficiently a company collects its receivables.

Query:

SELECT industry, AVG(account_receivables_turnover)

FROM stock_data

GROUP BY industry;

Answer:

S.no.	Industry	Accounts Receivables Turnover
1	Software	10.11
2	Biotechnology	10.22
3	Retail	10.75
4	Energy	11.12
5	Banking	10.39

- The **Energy** and **Retail** industries have the highest turnover ratios, indicating superior efficiency in collecting payments.
- The **Banking**, **Biotechnology**, and **Software** industries follow closely, with turnover ratios just above 10, showing good but slightly less efficiency in managing receivables.

Use: Assesses the credit and collection efficiency across industries.

23. What is the average cash from investing activities for companies in each sector?

Reason: It reflects how much a company is spending on or earning from investments, which can be a key indicator of its growth strategy and financial health.

Query:

SELECT sector, AVG(cash_from_investing_activities)

FROM stock_data

GROUP BY sector;

Answer:

S.no.	Sector	Avg. Cash from Investing Activities
1	Finance	$13,760,378,872.13
2	Utilities	$14,721,113,989.43
3	Technology	$15,785,695,890.67
4	Healthcare	$14,102,360,722.09
5	Consumer Goods	$14,681,715,212.59

The Technology sector leads with the highest average cash from investing activities at $15.79 billion, reflecting significant investments in R&D, innovation, and expansion. Utilities and Consumer Goods sectors also show substantial investment, driven by infrastructure development and growth initiatives. The Healthcare sector invests heavily in R&D and new technologies, crucial for maintaining competitiveness. The Finance sector, with the lowest average at $13.76 billion, focuses more on financial instruments rather than physical assets or infrastructure.

Use: Helps assess how sectors are investing for future growth.

24. Which companies have the highest YTD performance?

Reason: Year-to-date performance indicates how well a company has performed in the current year.

Query:

SELECT company_name, ytd_performance

FROM stock_data

ORDER BY ytd_performance DESC LIMIT 10;

Answer: The following is the list of top 10 companies by their YTD performance:

S.no.	Company Name	YTD Performance
1	Company 614	49.95%
2	Company 807	49.50%
3	Company 443	49.48%
4	Company 536	49.41%
5	Company 812	48.88%
6	Company 325	48.85%
7	Company 265	48.79%
8	Company 107	48.77%
9	Company 478	48.65%
10	Company 868	48.52%

All these companies have shown exceptional performance so far this year, with YTD growth rates (gains) close to or above 48%. This strong performance indicates that these companies have been successful in driving shareholder value through strong financial performance, strategic initiatives, or favorable market conditions, making them attractive to investors looking for growth opportunities.

Use: Identifies top-performing companies for potential investment.

25. What is the correlation between market value and enterprise value?

Reason: Correlation analysis helps understand the relationship between market value and enterprise value.

Query:

SELECT CORR(market_value, enterprise_value)

FROM stock_data;

Answer: Correlation Coefficient: 0.9932497945524373

The correlation coefficient of **0.993** indicates a **very strong positive correlation** between market value and enterprise value. This means that as the market value of a company increases, the enterprise value also tends to increase, and vice versa.

Use: Understanding this correlation will help us see that the enterprise value, which gives a more comprehensive view of a company's total value, is largely driven by its market value. Therefore, changes in stock prices (which affect market value) will strongly influence enterprise value.

Summary

In this analysis project, I conducted a thorough examination of financial data using SQL for querying and Power BI for visualization. The analysis addressed around 25 critical questions, providing insights into various financial metrics such as P/E ratios, market values, revenue growth, profitability, and efficiency across different sectors and industries.

Key findings from the analysis include:

- Valuation Metrics: The average P/E ratio across all companies and comparisons of P/E ratios among top market value companies.

- Performance Metrics: Identification of companies with the highest and lowest market values, revenue growth, and return on assets.

- Sectoral Insights: Sector-wise comparisons of average revenue, gross margins, and institutional ownership percentages.

- Profitability Analysis: Examination of operating margins, profit margins, and free cash flow across different companies and industries.

- Efficiency Metrics: Analysis of account receivables turnover and return on capital to assess operational efficiency.

- Growth Indicators: Year-over-year growth in revenue and EPS, highlighting high-growth companies.

Also, I've created a Power BI dashboard that will provide a clear and intuitive presentation of the data, making it easier to identify trends and outliers.

Overall, my project successfully demonstrated the application of SQL and Power BI in performing comprehensive equity research analysis. The findings offer valuable insights for investors, helping them make well-informed decisions. This report consolidates the insights, providing a detailed overview of the financial health and performance of companies across various sectors and industries.