

Financial Report across various Industries Using Data Analysis

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Independent Data Analysis Project

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Abstract

In this project, titled *Financial Report across Various Industries Using Data Analysis*, we focus on evaluating the financial performance of companies in different industries by analyzing key financial ratios. Specifically, we calculate the leverage ratio and profitability ratio to assess how companies manage debt and generate profits. We further investigate industry trends and relationships between leverage and profitability, with particular emphasis on the real estate sector. By leveraging datasets provided by DataCamp, we examine companies from the tech, FMCG, and real estate industries to provide insights for hedge fund investment strategies. Our findings aim to assist in more informed decision-making regarding capital allocation, risk management, and financial performance trends.

Keywords: Financial analysis, Leverage ratio, Profitability ratio, Industry analysis, Data analysis, Real estate, Tech industry, FMCG industry, Investment decisions, Risk management.

Introduction

Financial analysis plays a critical role in understanding a company's ability to sustain and grow in the marketplace. In this project, we aim to analyze the financial performance of various companies using data-driven techniques. The central focus is to compute key financial ratios, including leverage and profitability ratios, which are essential metrics for assessing a company's financial health and performance. This analysis is particularly relevant for industries like technology, FMCG, and real estate, where the use of debt and the ability to generate profits from operations can differ significantly. For investors, understanding these metrics can guide better decision-making in capital allocation, especially within high-leverage industries like real estate.

In addition to calculating financial ratios, this project seeks to explore trends in these ratios over time, providing valuable insights into the financial behavior of companies over several years. By investigating relationships such as the link between leverage and profitability, particularly in the real estate sector, we aim to understand whether companies with higher leverage tend to show higher profitability or face greater financial risk.

Using datasets like the *Balance_Sheet.xlsx* and *Income_Statement.xlsx* files provided by DataCamp, we will conduct a thorough financial analysis, focusing on key areas such as:

- Leverage ratio (e.g., debt-to-equity ratio)
- Profitability ratio (e.g., gross margin ratio or operating margin ratio)
- Industry-specific analysis across technology, FMCG, and real estate sectors

Ultimately, this report will offer strategic insights for both investors and company managers regarding financial trends and optimal capital structures.

Data

For this project, we utilize two primary datasets: *Balance_Sheet.xlsx* and *Income_Statement.xlsx*, both containing financial information for companies across various industries. The datasets are structured to

include common columns that allow for a unified analysis across financial statements. These common columns are:

- **Company:** The ticker name representing each company.
- **comp_type:** The type of industry the company operates in, categorized as “tech” for technology, “fmcg” for fast-moving consumer goods, and “real_est” for real estate.
- **Year:** The specific year the financial data was collected.

Each dataset focuses on different aspects of a company’s financial standing. The *Balance_Sheet.xlsx* dataset contains variables like "Total Liab" (Total Liabilities), which represent the overall debt of a company. On the other hand, the *Income_Statement.xlsx* dataset contains columns such as "Revenue" and "Operating Income," which provide insights into how much a company is earning and how efficiently it is operating.

These datasets form the foundation for calculating key financial ratios:

- **Leverage Ratio:** Calculated using either the debt-to-equity ratio or the equity multiplier ratio from the *Balance_Sheet.xlsx* data.
- **Profitability Ratio:** Based on metrics such as gross margin or operating margin, derived from the *Income_Statement.xlsx* data.

By analyzing the financial ratios over time and across industries, we aim to derive insights into profitability and leverage trends, compare industry performance, and assess risk and return factors that may influence investment decisions.

Methodology

The methodology for this project is structured into several key steps, focusing on data preparation, ratio calculations, visualization, and analysis. Below is a detailed breakdown of the approach used:

1. Data Loading and Merging

We began by loading two financial datasets, *Balance_Sheet.xlsx* and *Income_Statement.xlsx*, into dataframes using the pandas library. These datasets contain financial data for companies across different industries:

- Technology (Tech)
- Fast-Moving Consumer Goods (FMCG)
- Real Estate (Real_Est)

To conduct analysis across both balance sheets and income statements, we merged the two datasets on common columns: Year, Company, and comp_type (which indicates the industry type).

2. Calculation of Financial Ratios

Once the data was merged, two key financial ratios were calculated to assess company performance:

- **Leverage Ratio:** This was computed by dividing the total assets by the total stockholder equity to determine the extent of leverage (debt vs equity) used by each company.
- **Profitability Ratio:** This was calculated by dividing the operating income by the total revenue to assess how efficiently each company was generating profit from its revenues.

3. Visualization

We utilized the seaborn and matplotlib libraries to create visual representations of the financial ratios. The visualizations were essential for providing insights and identifying trends:

- **Profitability and Leverage Across Industries:** Bar plots were created to compare profitability and leverage ratios across different industries (tech, FMCG, real estate). This helped in identifying which industries had the lowest profitability and highest leverage.
- **Leverage vs Profitability in Real Estate:** A regression plot was used to examine the relationship between leverage and profitability in real estate companies. This visual helped assess whether higher leverage was associated with higher profitability within the real estate sector.

4. Trend Analysis (2018-2021)

To analyze trends over time, we filtered the data for the years 2018 to 2021 since the dataset contains only data from these years for real estate company types, and for both fast-moving consumer goods (FMCG) and technology, there were only one or two records for 2022. We then plotted:

- **Leverage Ratio Trends:** Line plots were created to track changes in leverage ratios across industries over the years.
- **Profitability Ratio Trends:** Similarly, line plots were used to visualize profitability ratio trends across industries from 2018 to 2021.

5. Comparative Analysis

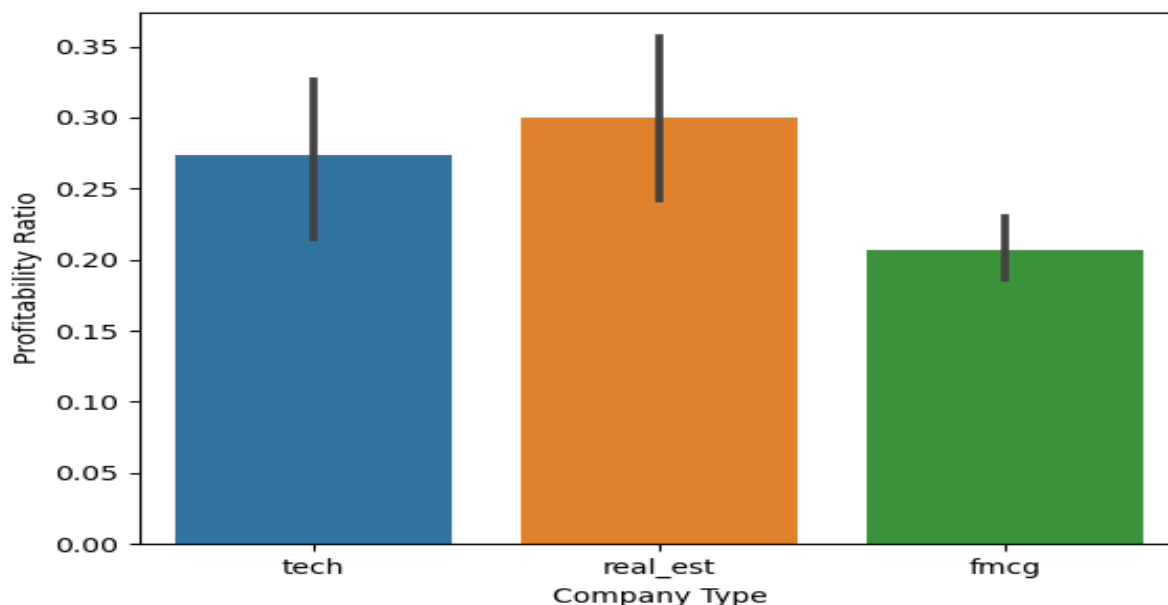
A comparative analysis was conducted by calculating the average leverage and profitability ratios for each industry between 2018 and 2021. Bar plots were generated to provide a clearer picture of how the industries performed on average in terms of leverage and profitability during the selected years.

6. Result Visualization and Insights

All findings were saved as PNG images to facilitate easy sharing and presentation. The use of visual aids greatly enhanced the interpretability of the results, offering clear insights into financial performance across industries and over time.

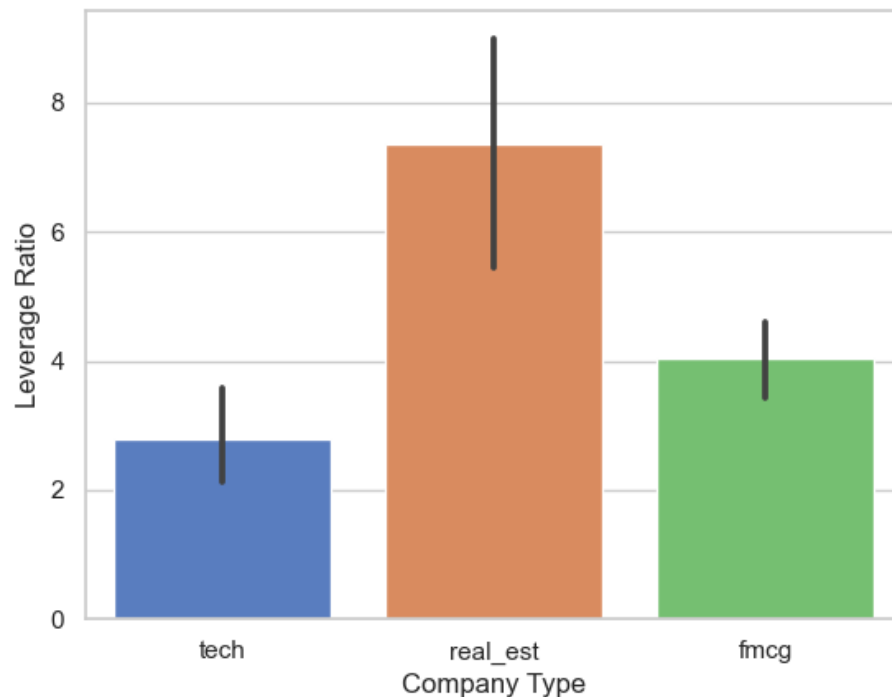
Results

i. Lowest Profitability Ratio



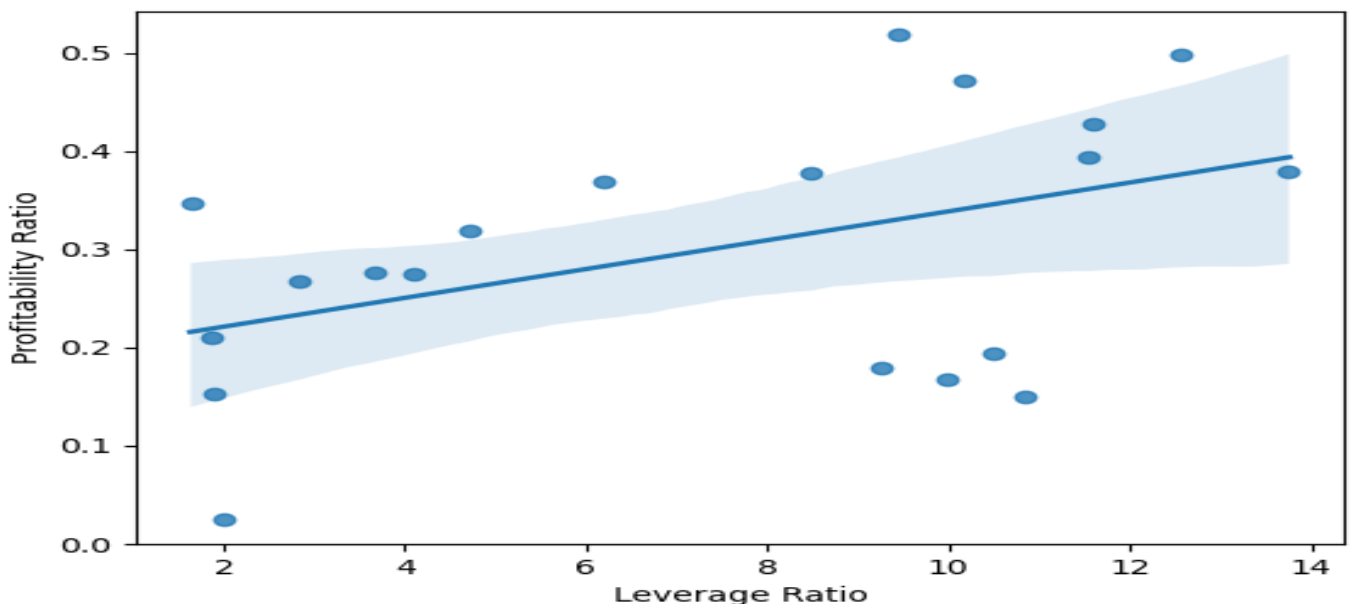
The bar plot for the profitability ratio indicates that the **FMCG sector** had the lowest profitability ratio, likely due to factors like intense competition, thin margins, and high distribution costs. This trend may have been exacerbated by economic challenges such as the COVID-19 pandemic. On the other hand, **Real Estate** showed the highest profitability, likely due to stable rental income and high dividend yields. A study on Italian real estate companies found an increase in profitability ratios after the 2008 financial crisis, reflecting improved financial structures.

ii. Highest Leverage Ratio



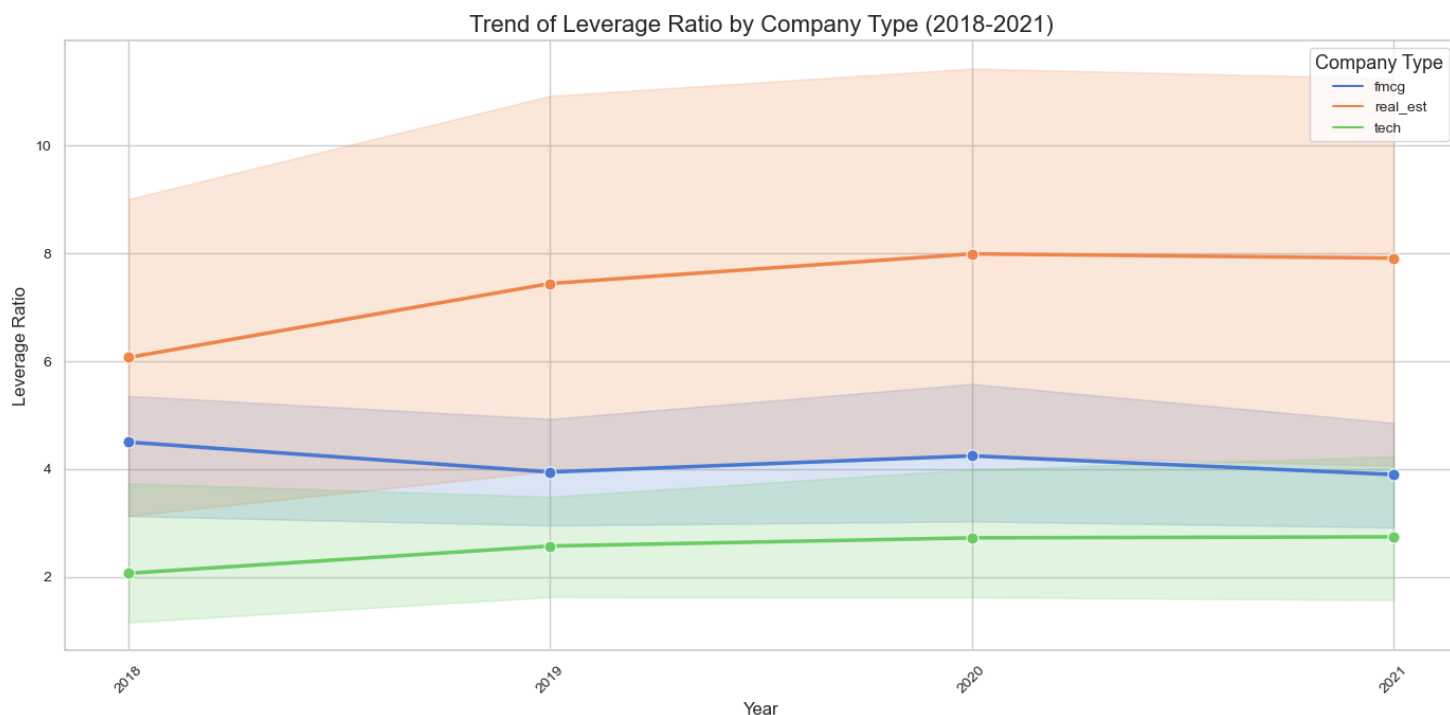
The leverage ratio bar plot shows that **Real Estate** companies had the highest leverage. This is expected since the sector often requires significant debt for property acquisitions and development. The stable cash flows from rental income support higher leverage levels. Additionally, low interest rates during the 2019-2021 period made borrowing more attractive for these companies. **FMCG** came second, while the **Tech sector** had the lowest leverage, as tech companies tend to rely more on equity financing due to the high volatility in the industry.

iii. Relationship between Leverage and Profitability in Real Estate



The regression plot demonstrated a **positive correlation between leverage and profitability** for real estate companies. Leveraging allows these firms to acquire larger properties and magnify returns when property values appreciate. The stable and predictable cash flows from rental income also help in servicing debt, enhancing profitability. Real Estate Investment Trusts (REITs) benefit from tax deductions on interest payments, further improving profitability. This relationship aligns with studies showing that leveraging assets in the real estate sector can drive value creation and growth.

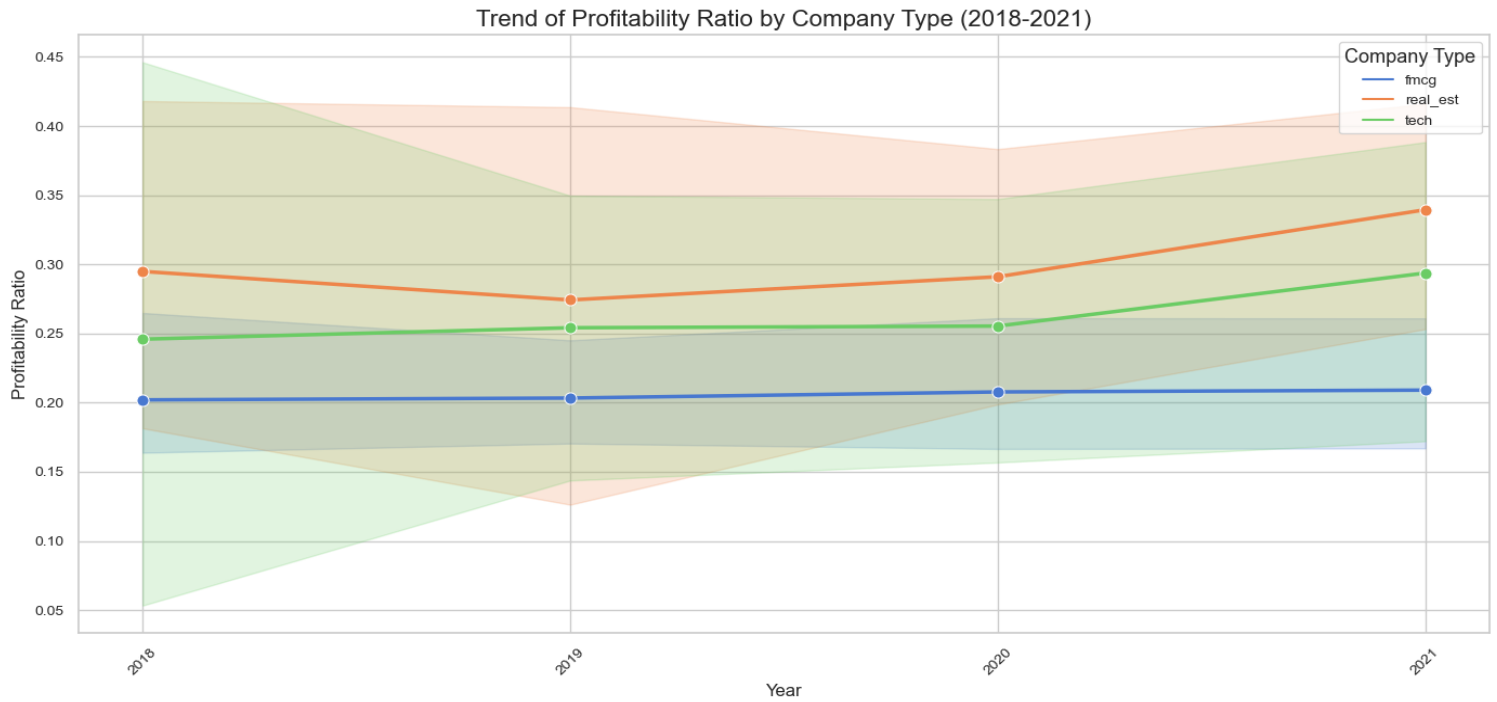
iv. Trend of Leverage Ratio by Company Type (2018-2021)



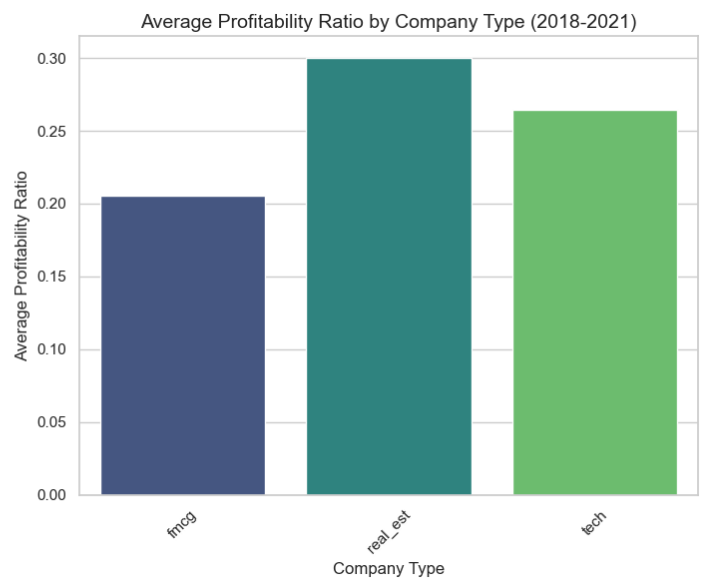
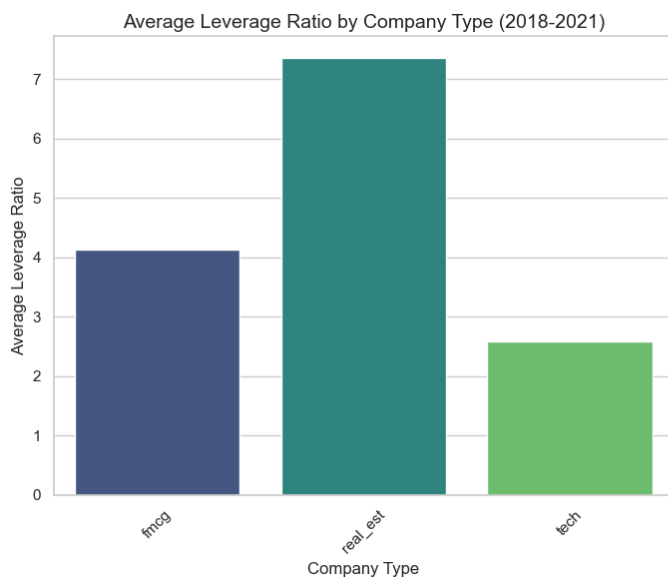
- **Real Estate** displayed a consistent upward trend in leverage from 2018 to 2021, likely due to favourable borrowing conditions and stable cash flows.
- **FMCG** saw a downward trend from 2018 to 2019, followed by a slight increase in 2020, and then another decline in 2021, reflecting conservative financial management amidst market uncertainty.
- **Tech** experienced an increase in leverage from 2018 to 2019, followed by stabilization, reflecting a shift towards risk management and reliance on equity rather than debt.

v. Trend of Profitability Ratio by Company Type (2018-2021)

- **Real Estate** showed a downward trend from 2018 to 2019, followed by a recovery from 2019 to 2021. This reflects the sector's ability to adapt and capitalize on market recovery after initial declines.
- **FMCG** maintained a fairly consistent profitability ratio with a slight upward trend, highlighting the sector's resilience and stable demand for essential goods.
- **Tech** exhibited an upward trend in profitability, except for a slight dip between 2019 and 2020, possibly due to increased investments in innovation and R&D. The sector quickly recovered, driven by strong growth potential and demand for technology during the period.



vi. Comparative Analysis



- **Average Leverage Ratio by Company Type (2018-2021):** Real Estate had the highest average leverage ratio due to substantial capital needs for property acquisitions, leading to increased reliance on debt. In contrast, FMCG and Tech sectors used less leverage, focusing on risk management and operational structures.
- **Average Profitability Ratio by Company Type (2018-2021):** Real Estate also led in profitability, driven by stable rental income and effective debt use. Tech followed, benefiting from growth but facing market fluctuations. FMCG had the lowest profitability, reflecting tighter margins and increased competition.

Conclusion

This analysis provided valuable insights into the financial performance of three key sectors: Real Estate, FMCG, and Tech. Key findings from the study include:

- The Real Estate sector exhibited the highest profitability and leverage ratios, driven by stable cash flows, favorable borrowing conditions, and the ability to magnify returns through debt. This sector's strong financial performance aligns with its capital-intensive nature and reliance on debt to finance property investments.
- The FMCG sector, despite having the lowest profitability, maintained a conservative approach to leverage. Intense competition and thin margins likely contributed to the sector's lower profitability, but its steady demand and resilience helped it manage risks effectively.
- The Tech sector demonstrated strong profitability growth, although it favored equity over debt financing, resulting in the lowest leverage ratios. This reflects the sector's preference for mitigating volatility and risk while capitalizing on innovation and growth opportunities.

The analysis highlights that each sector's financial strategy—whether through leverage or profitability—depends heavily on the unique challenges and opportunities they face. Real Estate benefits from leveraging debt to enhance profitability, FMCG prioritizes stability and risk management, and Tech focuses on growth with cautious leverage strategies.

References

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