

Financial Data and Stock Price Correlation

Jacob Kulik, David Pogrebitskiy

OUR GROUP



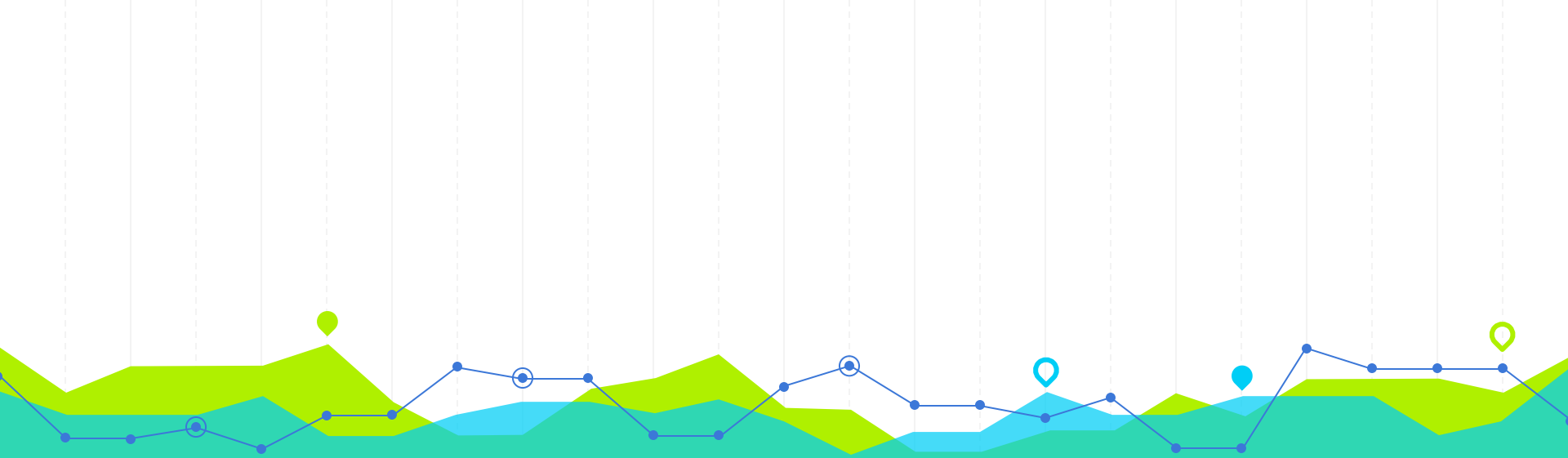
Jacob Kulik

Data Science & Business
Administration
Class of '25



David Pogrebitskiy

Data Science, Mathematics
Minor
Class of '25



Statistical Question

Project Motivation

1



How do various quantitative pieces of financial data affect and correlate with their company's current share price?





Company Introduction

Who We Analyzed and Why

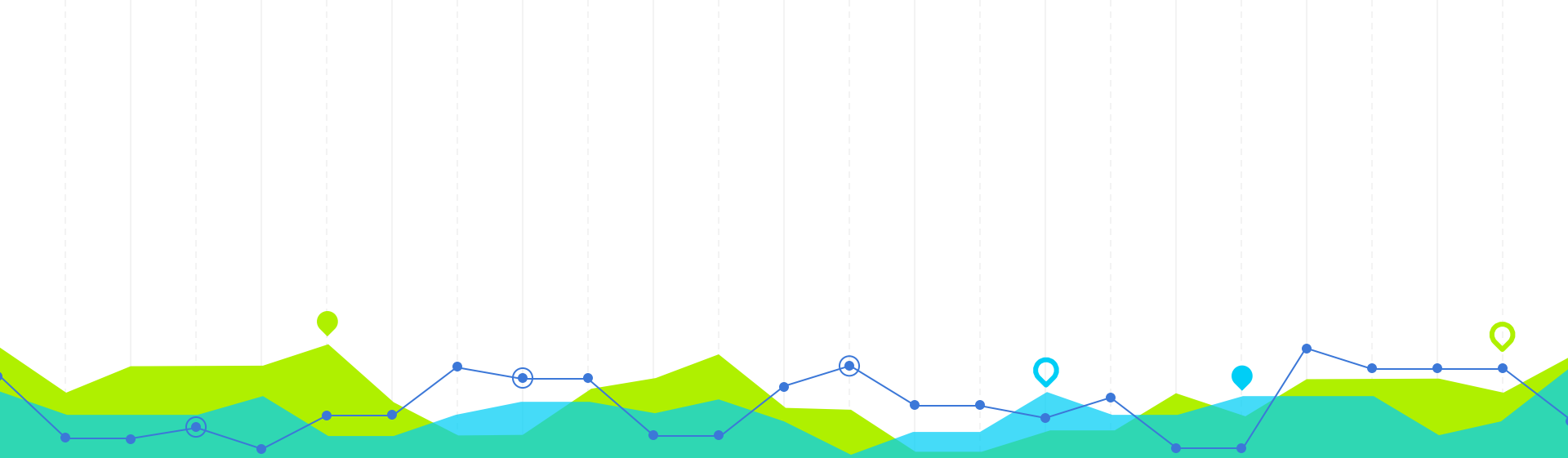
2



APPLE AND GOOGLE



- We are analyzing the big tech industry because it is one that continues to grow and innovate whilst also carrying a fair amount of uncertainty.
- Apple and Google are big players in the sector and actively compete in various products.



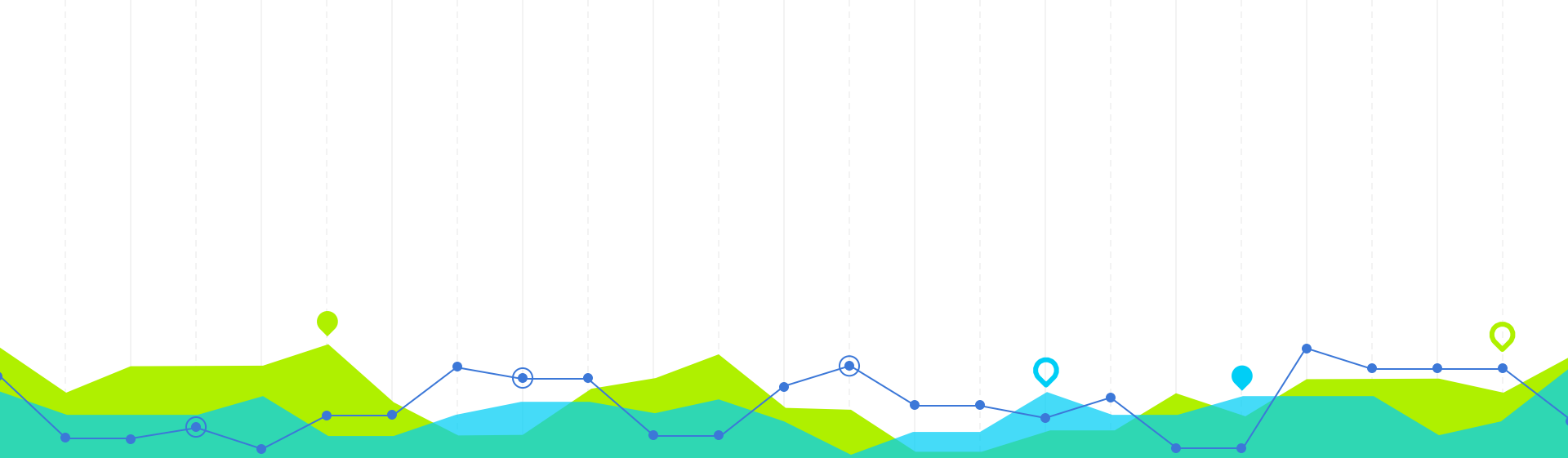
Sourcing Data

Data Collection Process

3

WHARTON RESEARCH DATA SERVICES

- Using CompuStat from Wharton Research Data Services, we were able to access quarterly company filings for over 600 quantitative measures.
- WRDS is a service that gives academic researchers access to accurate, reviewed data.
- We exported this data from CompuStat in CSV format and converted into data frames.



Ratio Introduction

What We Analyzed

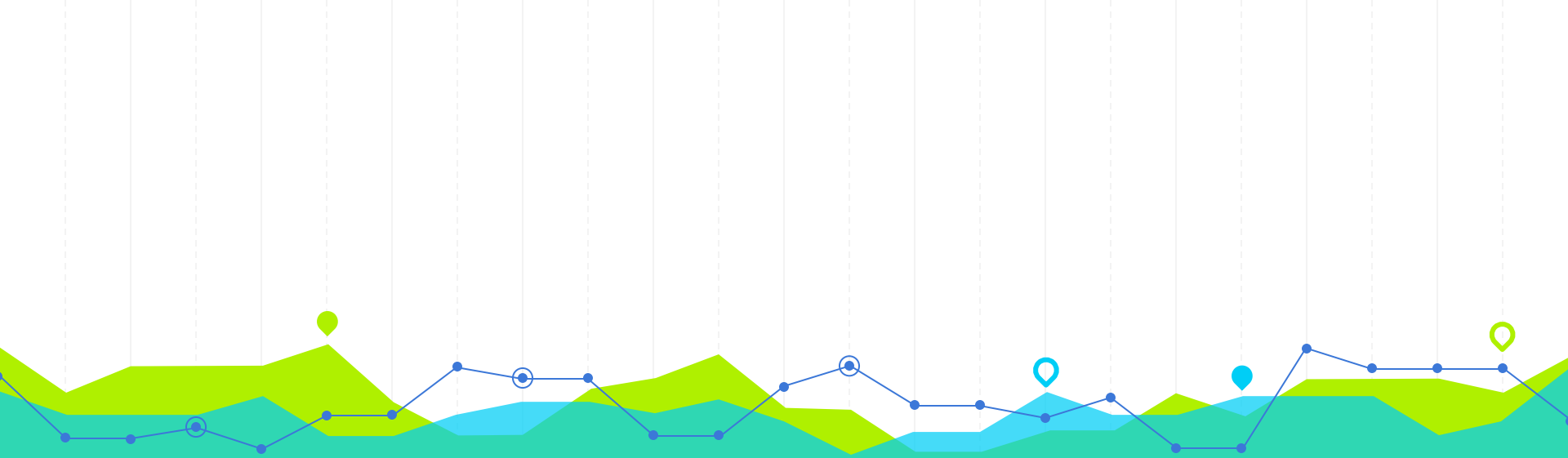
4



CORRELATION TO SHARE PRICE



- Although a stock price simply represents the cost to purchase a singular share of a company, the price changes of that share price reflect the public's opinion of the future success of the company.



Graph Overview

How Displayed Results

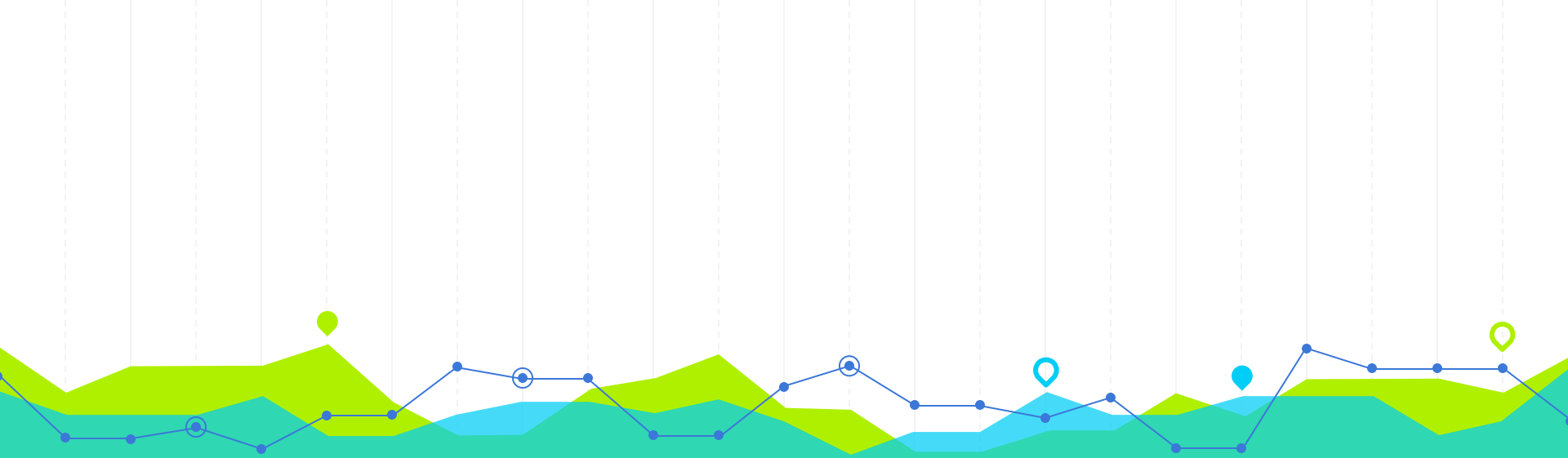
5



GRAPHING



- Typical graphs contain the independent and dependent variables on the x and y-axes, respectively.
- In our analyses, our dependent variable of stock price, however, will be on the x-axis as it is more correlated with time and creates a better visualization of the information.



Current Ratio Analysis

Ability to Pay Off Short-term Debt

6

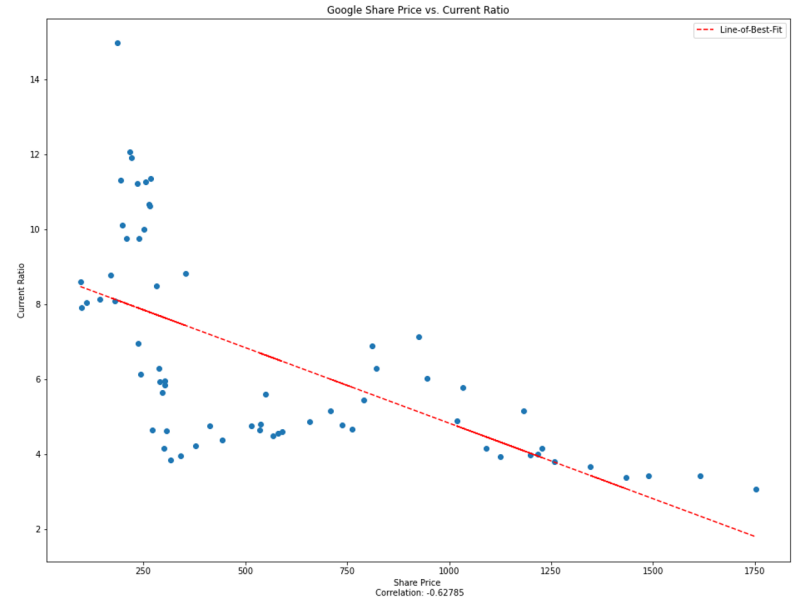
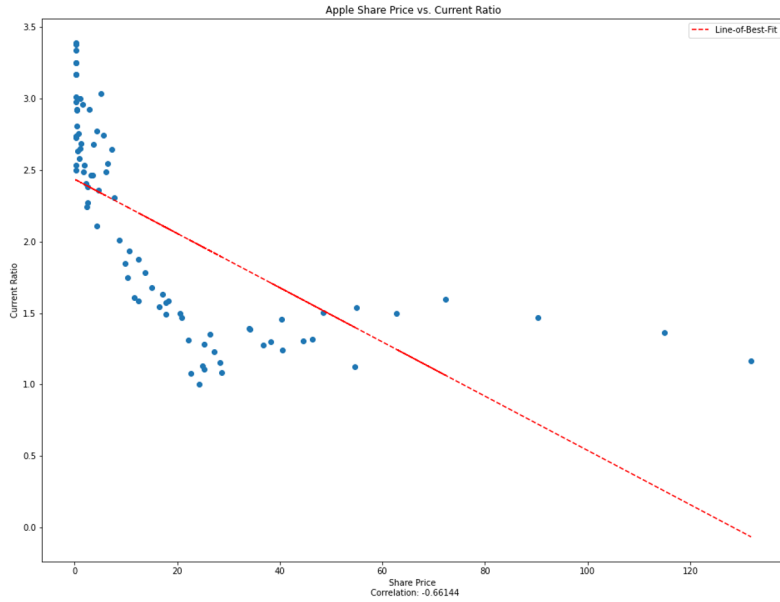
CURRENT RATIO

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

- The current ratio quantifies a company's ability to pay for short-term debt using their current assets.
- This typically reflects a company's strategy with excess cash.

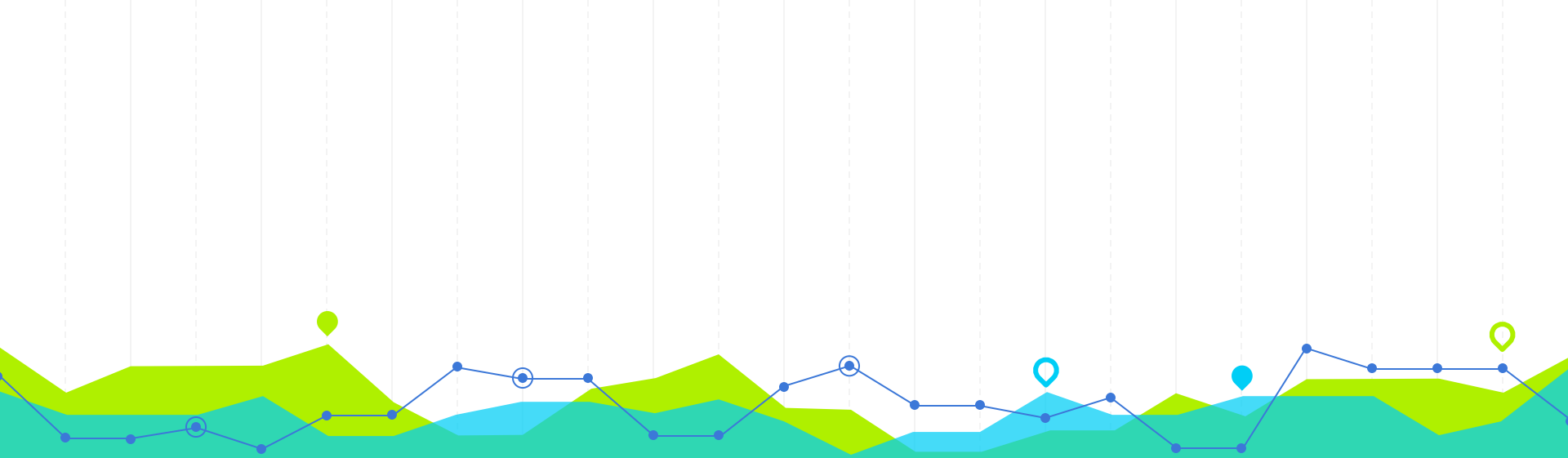


CURRENT RATIO GRAPHS



Correlation: -0.66144

Correlation: -0.62785



Return on Assets Analysis

Return on a Company's Internal Investments

7

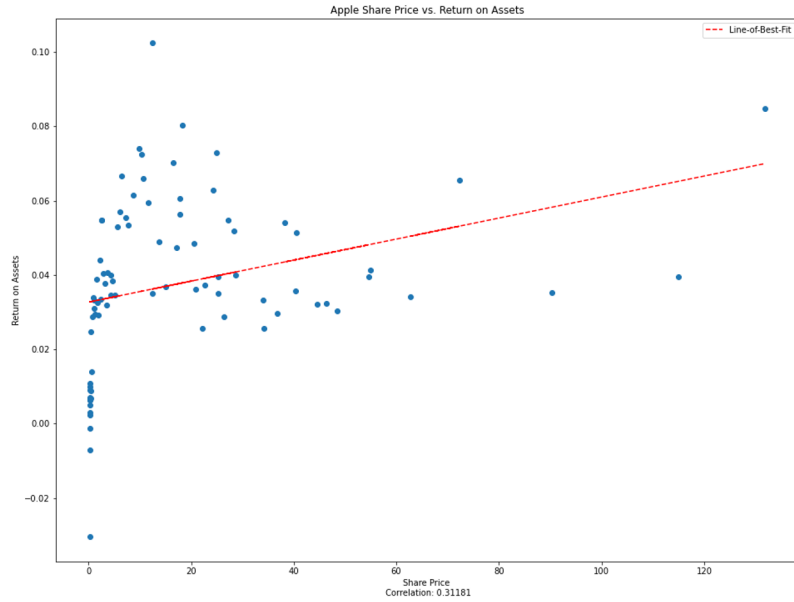
RETURN ON ASSETS

$$\text{ROA} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

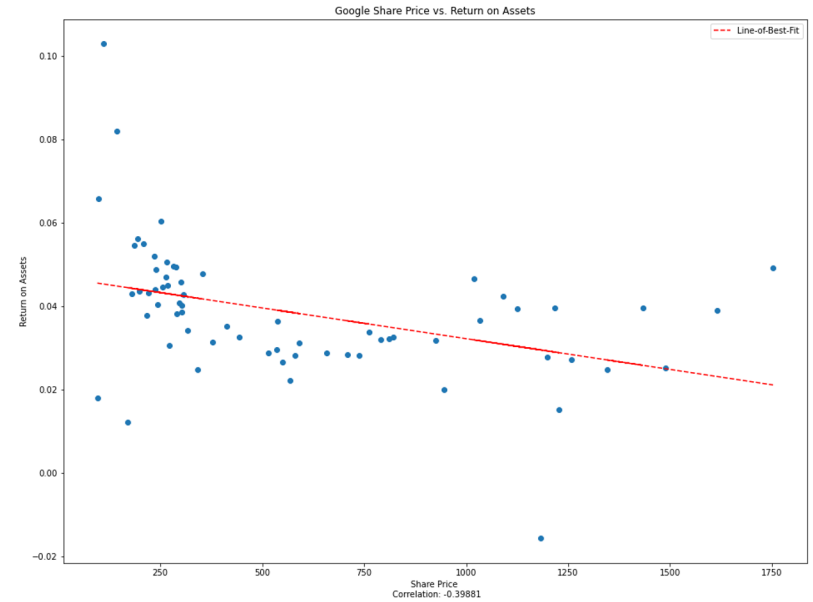
- The return on assets ratio highlights how effectively management was able to invest in assets to help produce a profit.
- Makes companies of various sizes easily comparable.



ROA GRAPHS

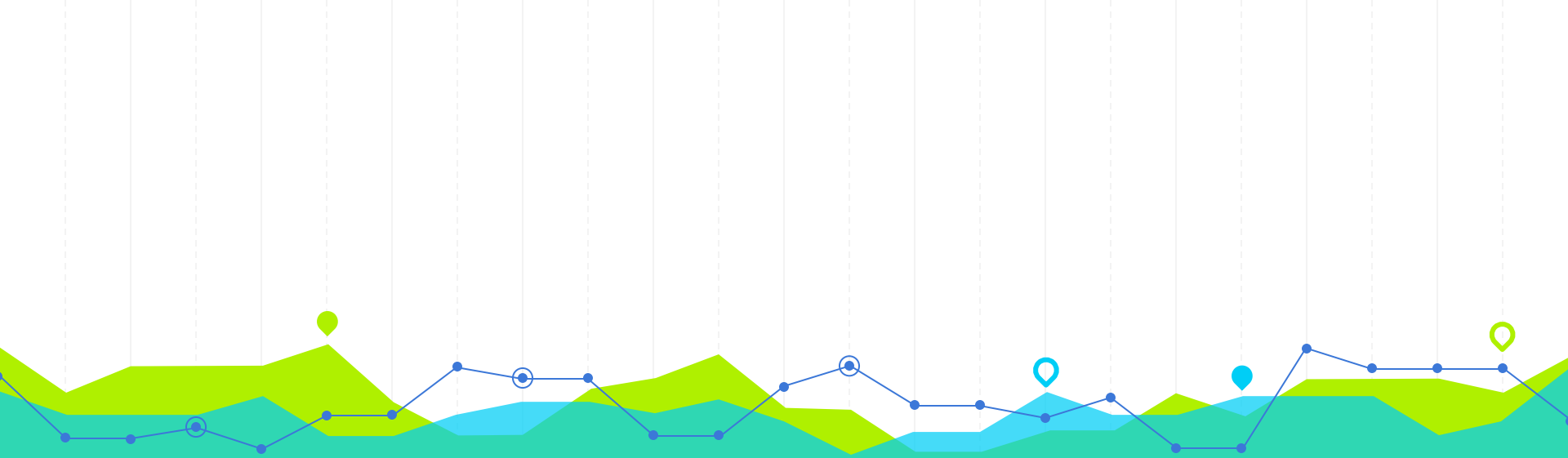


Correlation: 0.31181



Correlation: -0.39881





Return on Equity Analysis

Return on a Company's External Investments

8

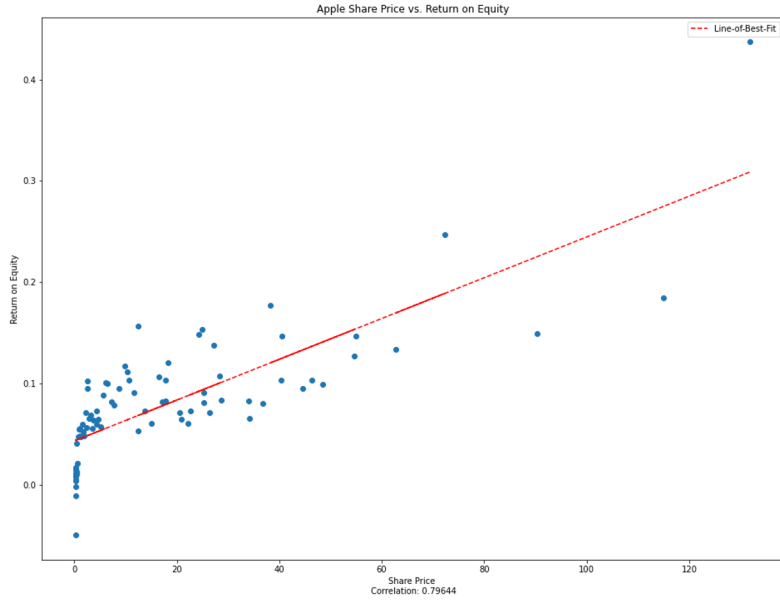
RETURN ON EQUITY

$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Total Equity}}$$

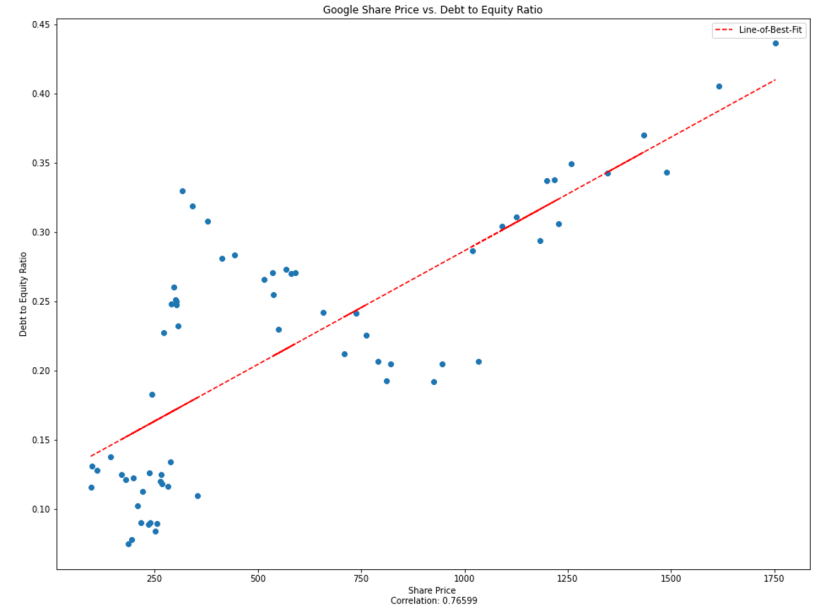
- The return on equity ratio conveys how a company generates profit from shareholders investments.



ROE GRAPHS

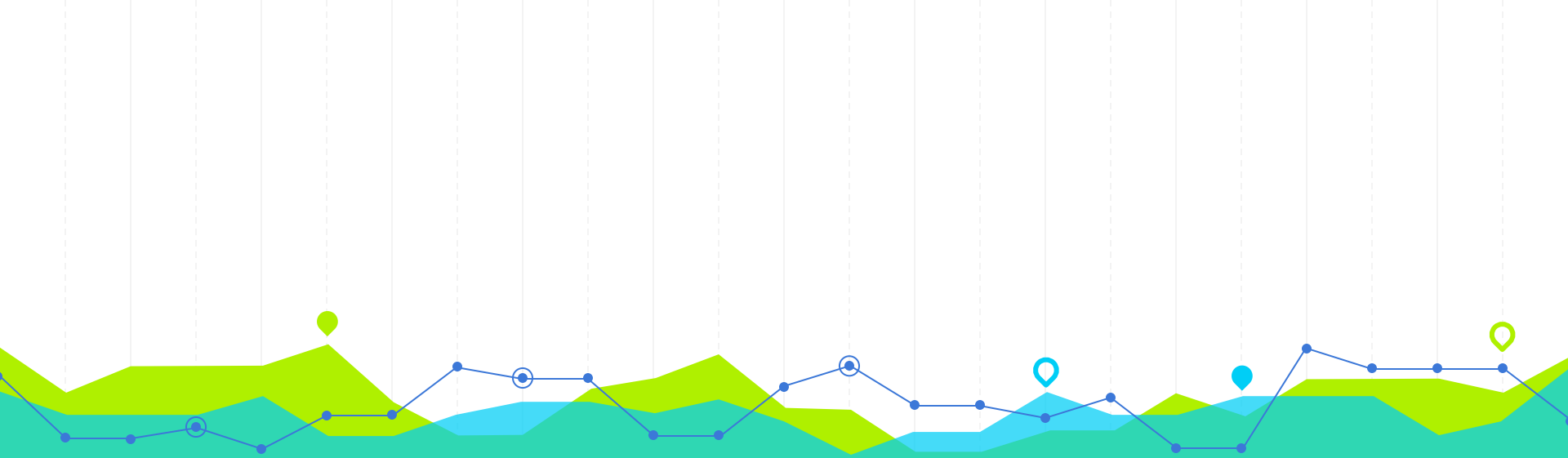


Correlation: 0.79644



Correlation: 0.76599





Net Profit Margin Analysis

Ability to Generate Profit Compared to Net Sales

9

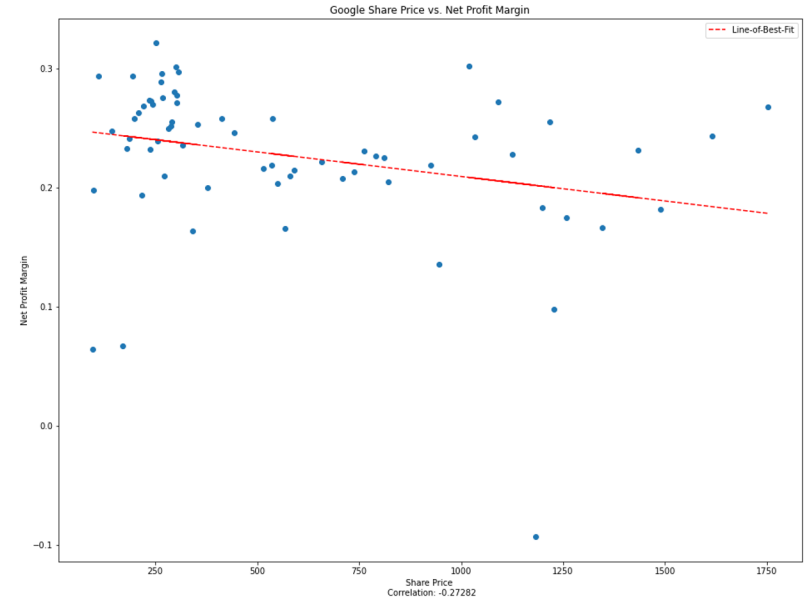
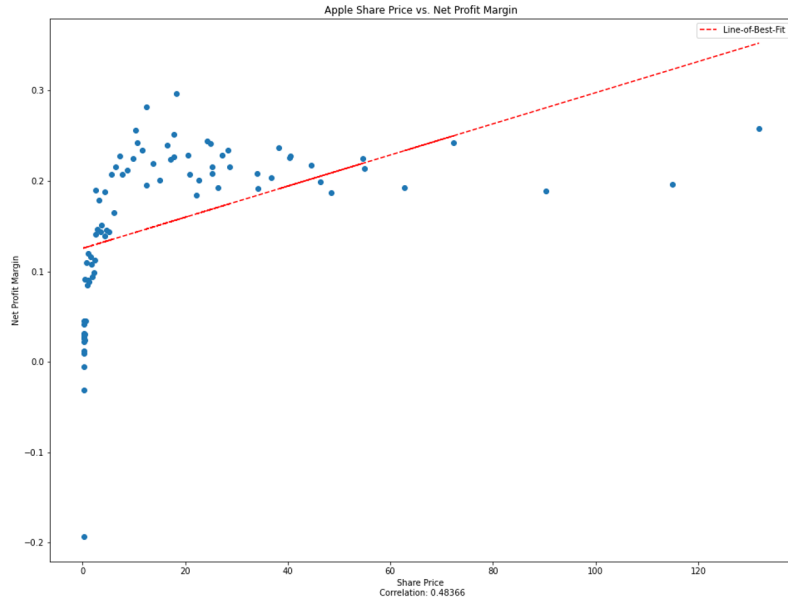
NET PROFIT MARGIN

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Net Sales}}$$

- The net profit margin represents the company's ability to produce profit for every dollar of revenue.
- Typically represented as a percentage, a higher net profit margin reflects better performance from the company.

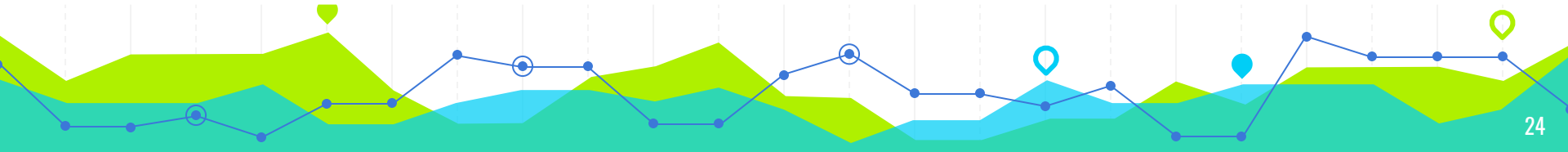


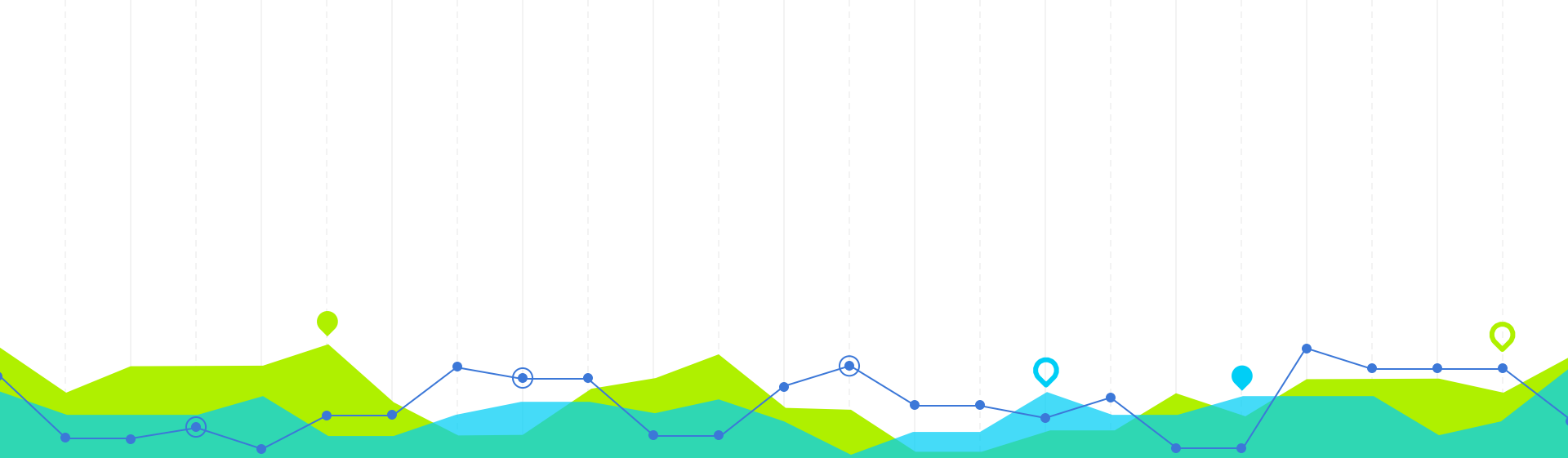
NPM GRAPHS



Correlation: 0.48366

Correlation: -0.27282





Debt to Equity Analysis

Extent of Reliance on External Creditors

10

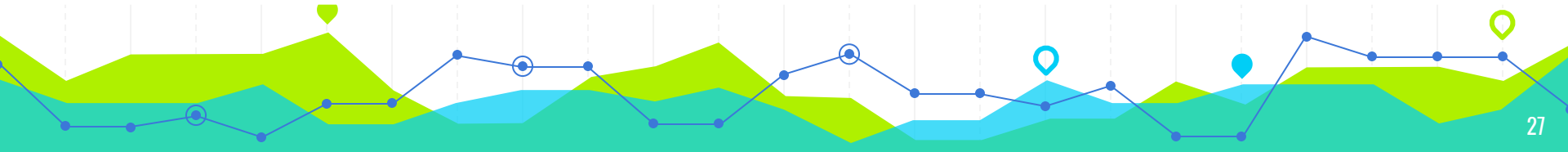
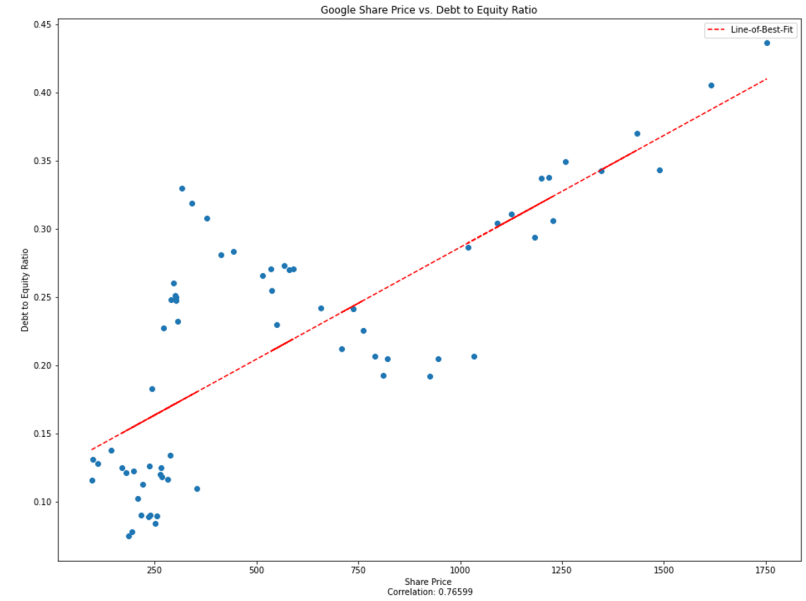
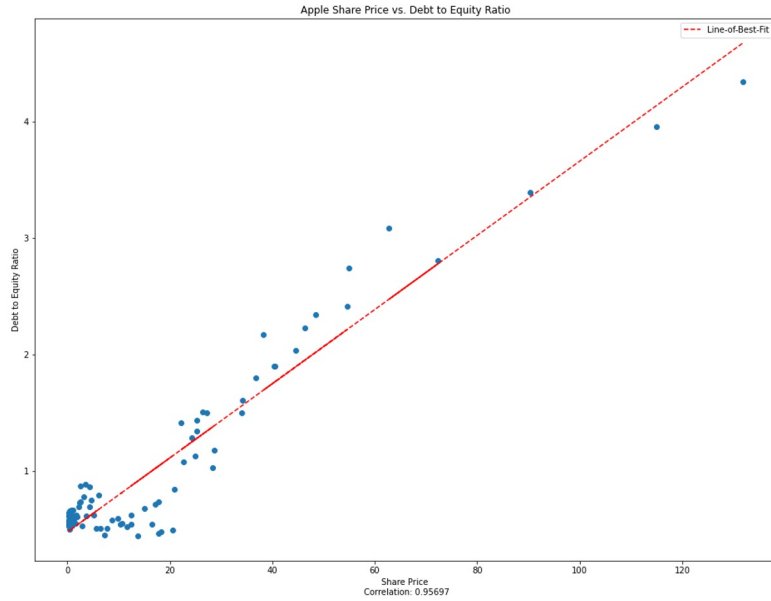
DEBT TO EQUITY

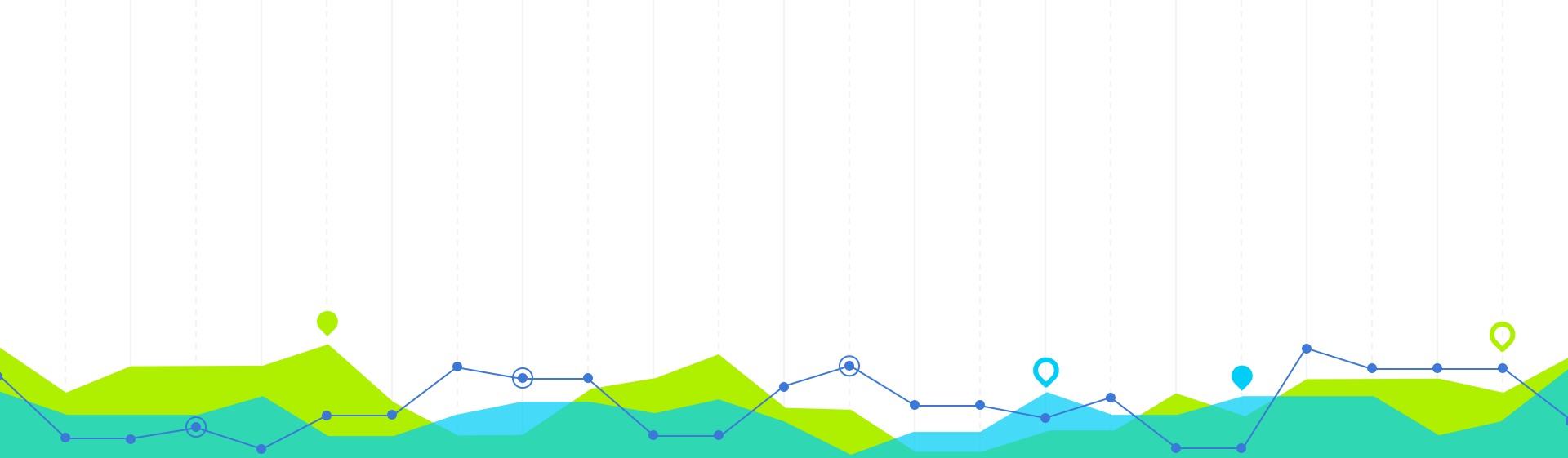
$$\text{Debt to Equity} = \frac{\text{Total Liabilities}}{\text{Shareholder Equity}}$$

- Represents how much a company relies on debt to operate the company.
- A higher ratio can represent a higher risk to investors because the company is borrowing money that has to be repaid with interest.
- A ratio between 0 and 1 means that the company is utilizing more financing from investors than from creditors.



D2E GRAPHS





Cash Flow to Capital Expenditures Analysis

Ability to Purchase Long-term Assets Using Excess Cash
Flow

11

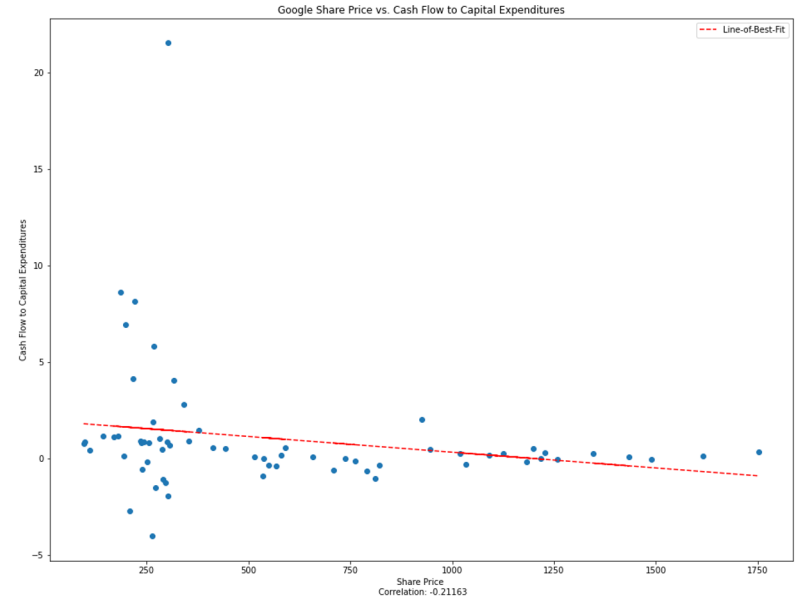
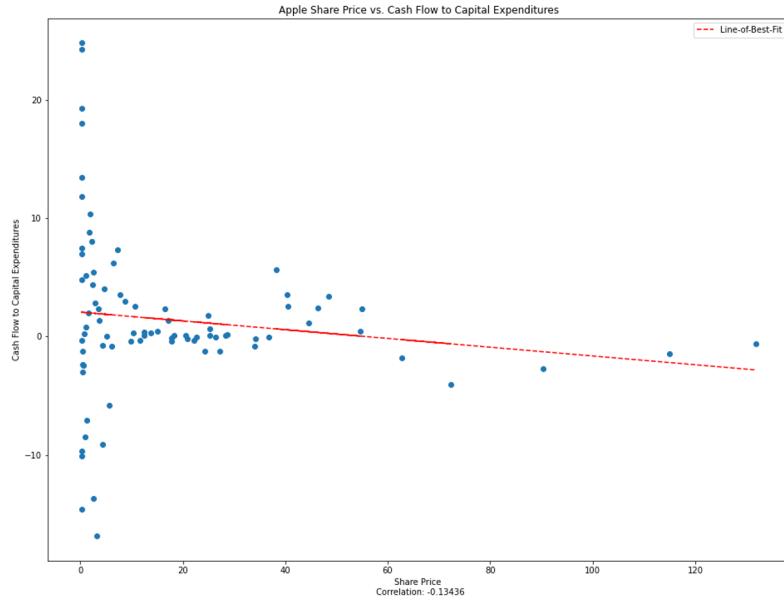
CASH FLOW TO CAPITAL EXPENDITURES

$$\text{Cash Flow to CapEx} = \frac{\text{Cash Flow}}{\text{Capital Expenditures}}$$

- CF to CapEx represents how easily a company can purchase long-term assets using excess cash flow.
- A higher ratio generally shows a company is generating enough cash flow to begin investing in assets that will help long-term growth.



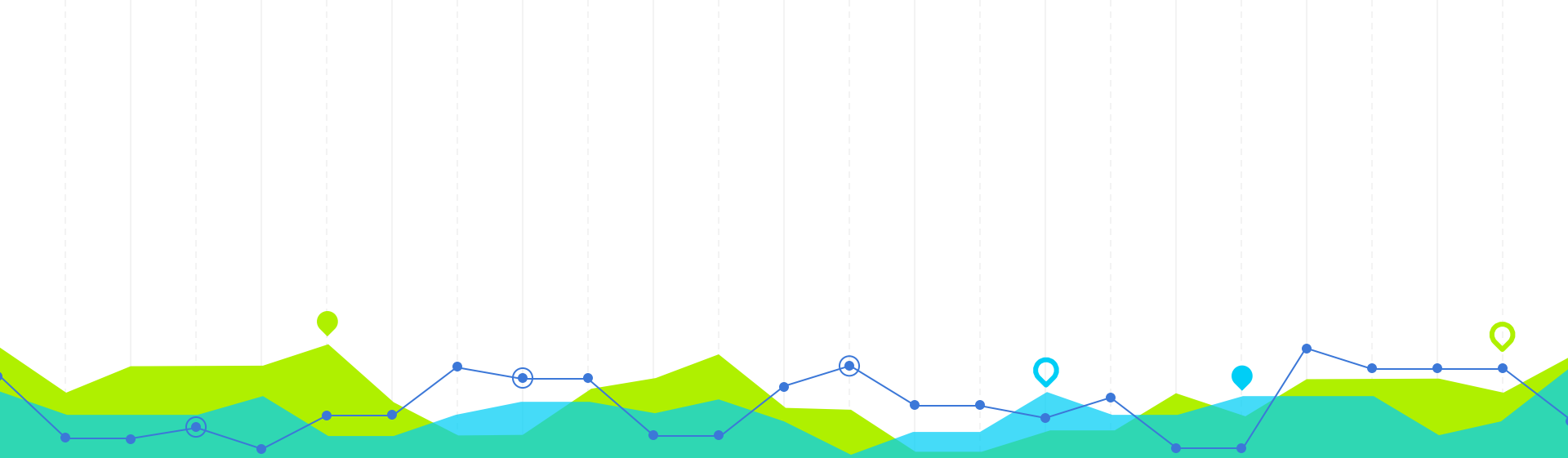
CF2CAPEX GRAPHS



Correlation: -0.13436

Correlation: -0.21163





Research and Development Analysis

Investments in Innovation

12

RESEARCH AND DEVELOPMENT EXPENSE

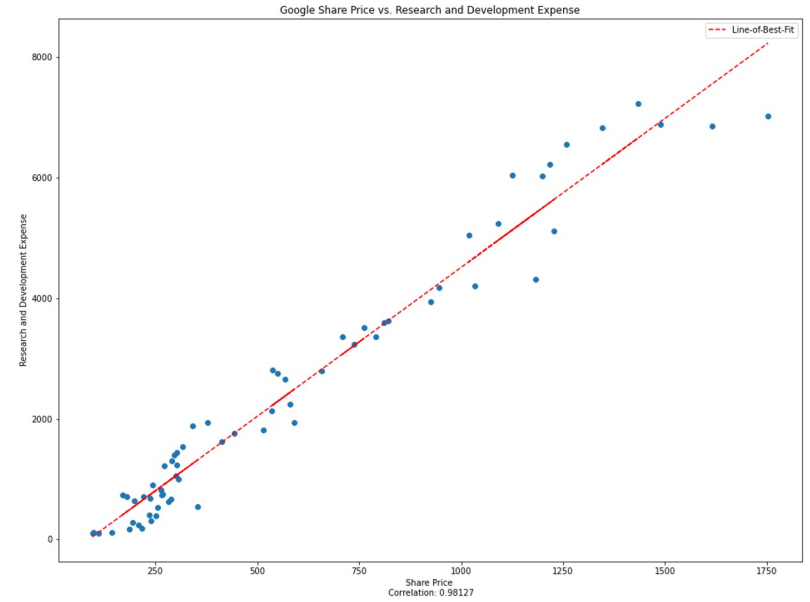
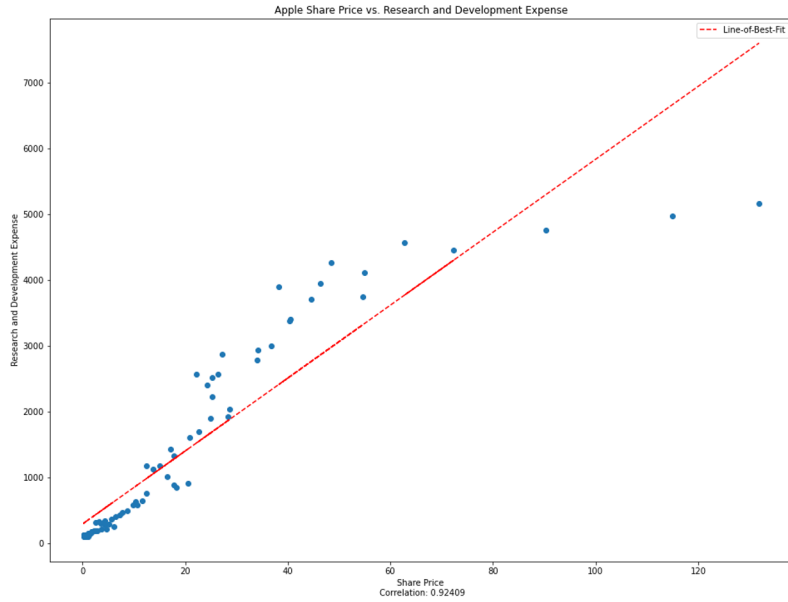
R&D =

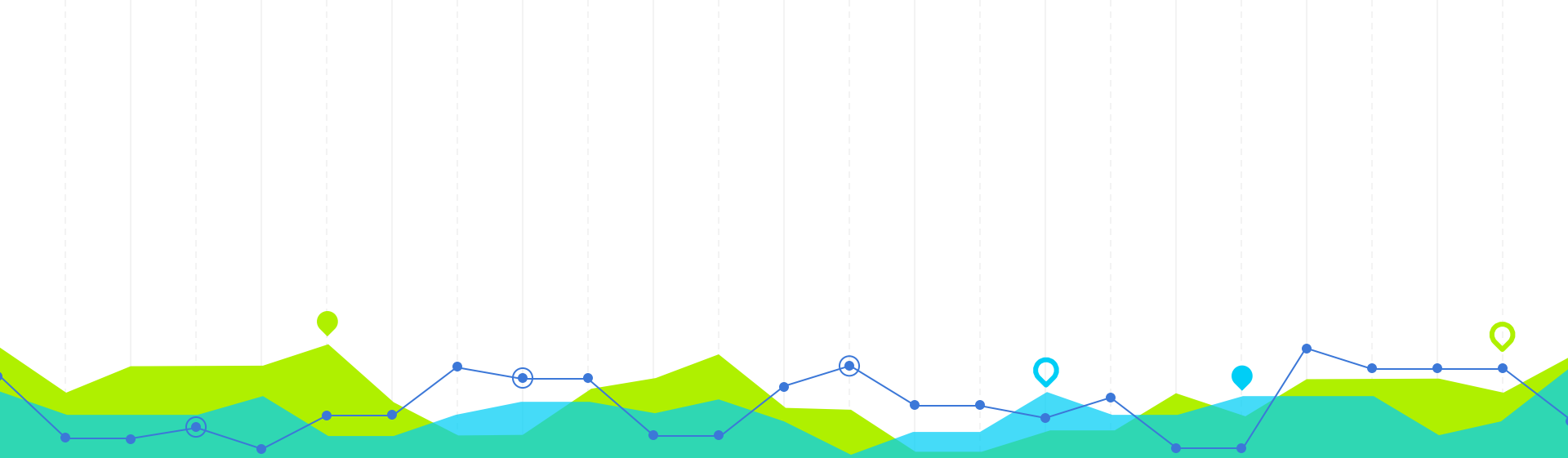
Sum of expenses
of innovative
activities

- R&D is directly related to the company's innovativity and future growth.
- Although the effect of a company's research isn't directly material, it builds on its ownership of intellectual property.



R&D GRAPHS





Summary of Findings

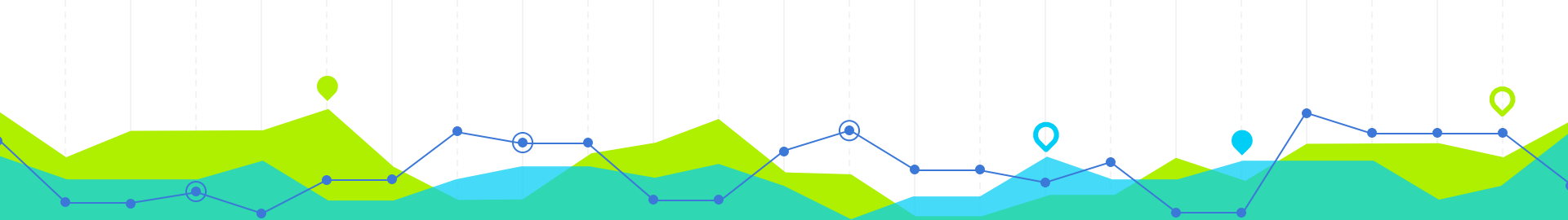
13



SUMMARY OF FINDINGS



- ROE, D2E, and R&D had strong, positive correlations
- Current Ratio had an asymptotic negative correlations
- ROA, NPM, and CF2CapEX had weak correlations



Thank you!