



# Financial Data and Stock Price Correlation

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## OUR GROUP



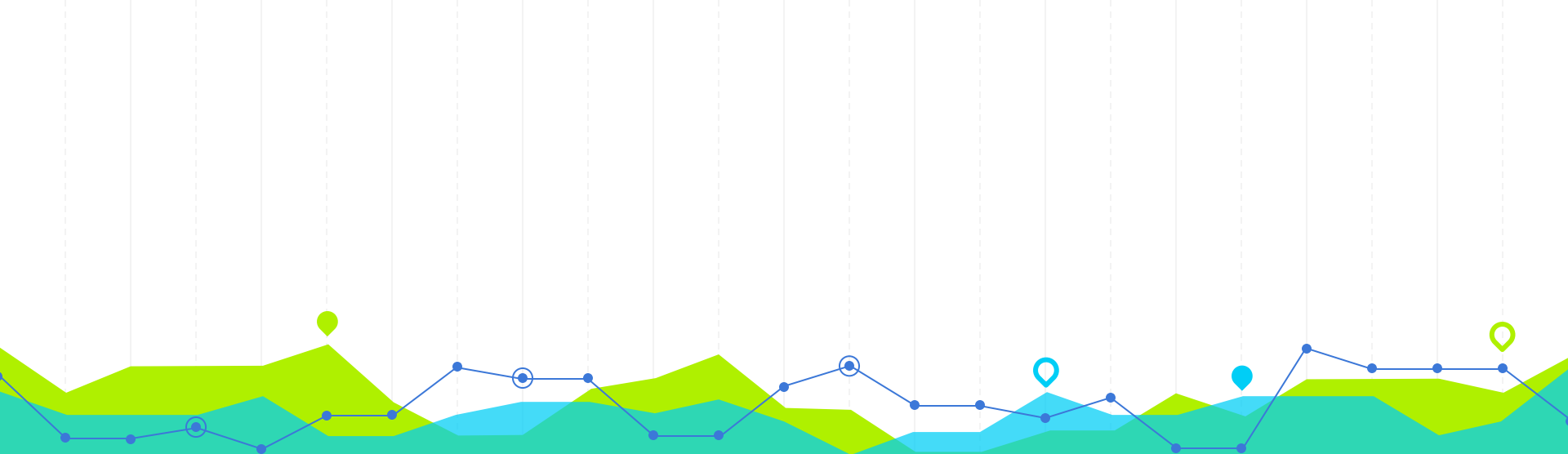
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Data Science & Business  
Administration  
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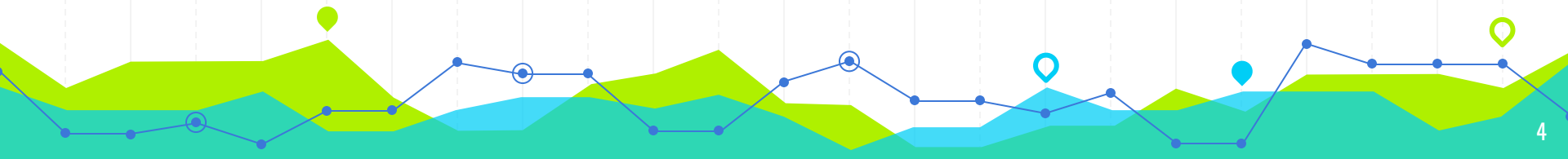
# Statistical Question

Project Motivation

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*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

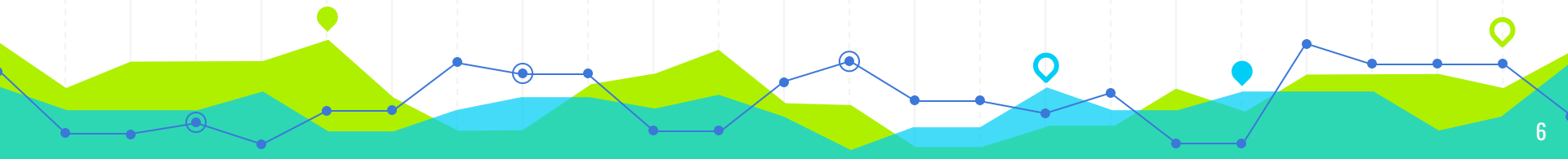
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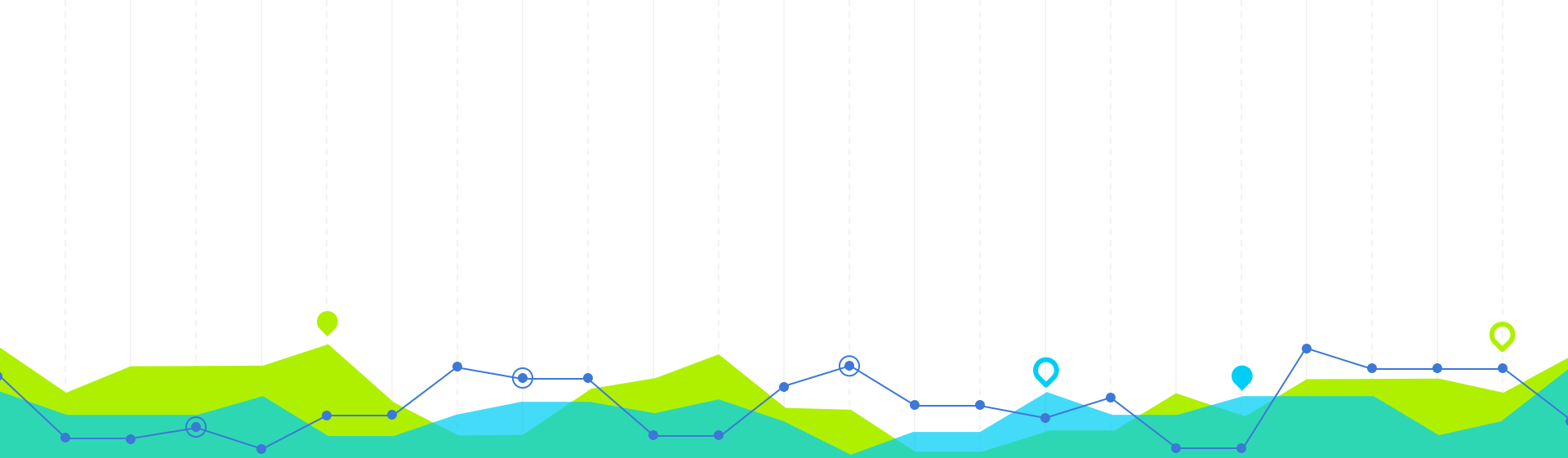


## APPLE AND GOOGLE



- 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

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## 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

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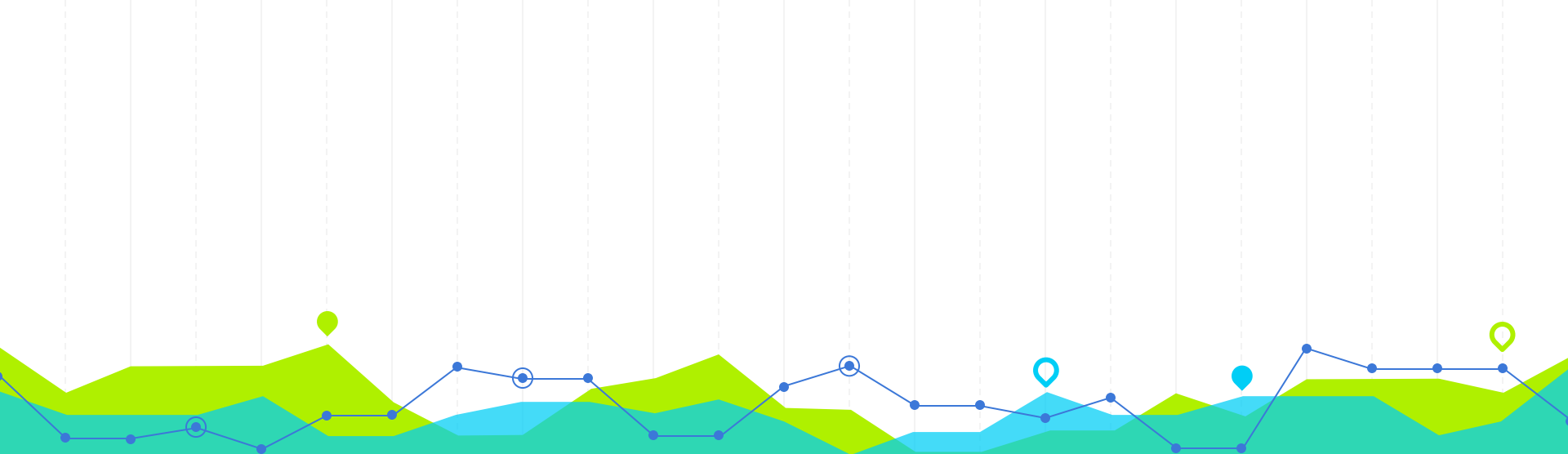


## CORRELATION TO SHARE PRICE



- 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

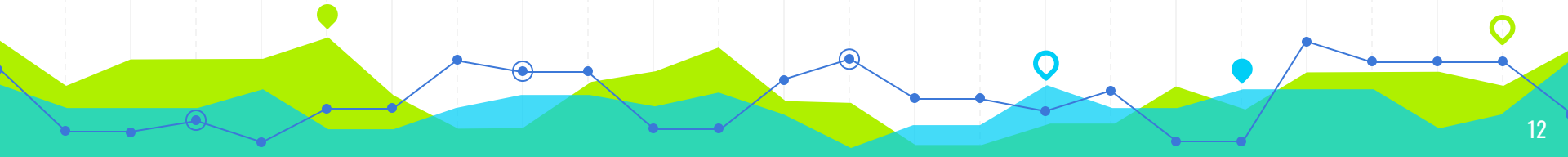
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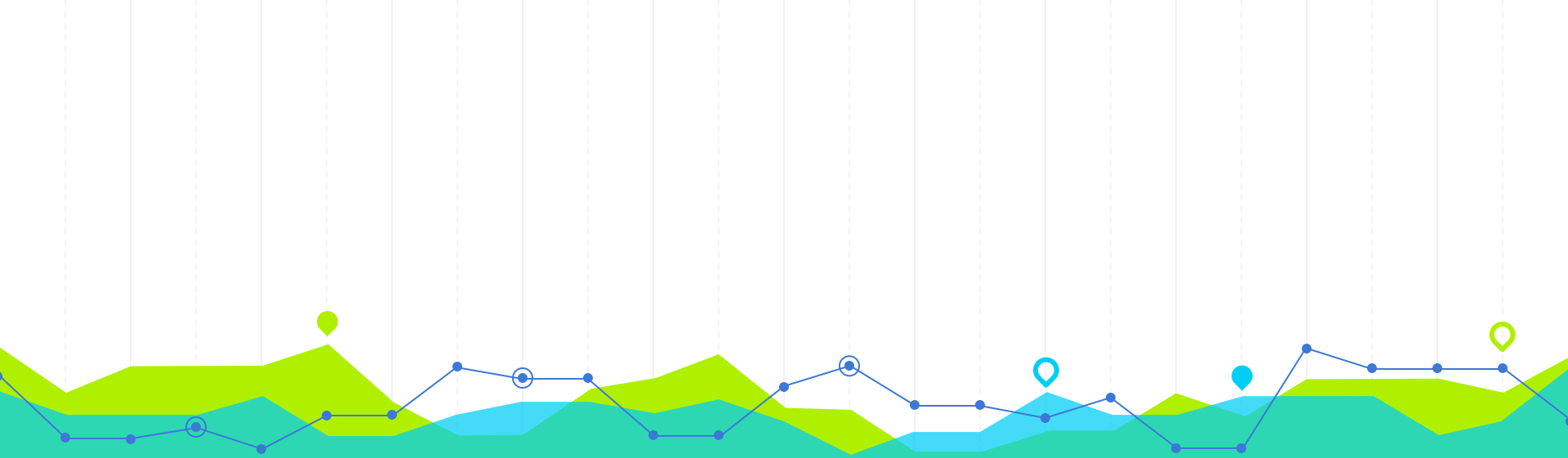


## GRAPHING



- 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

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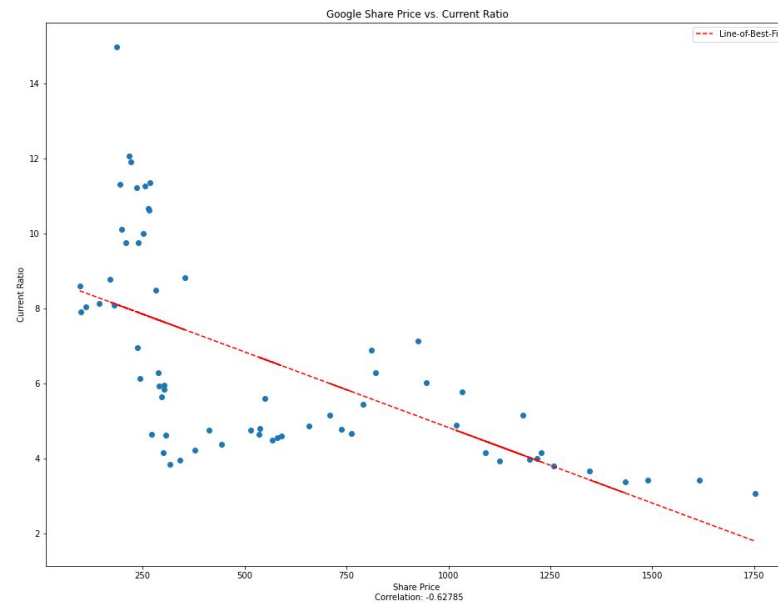
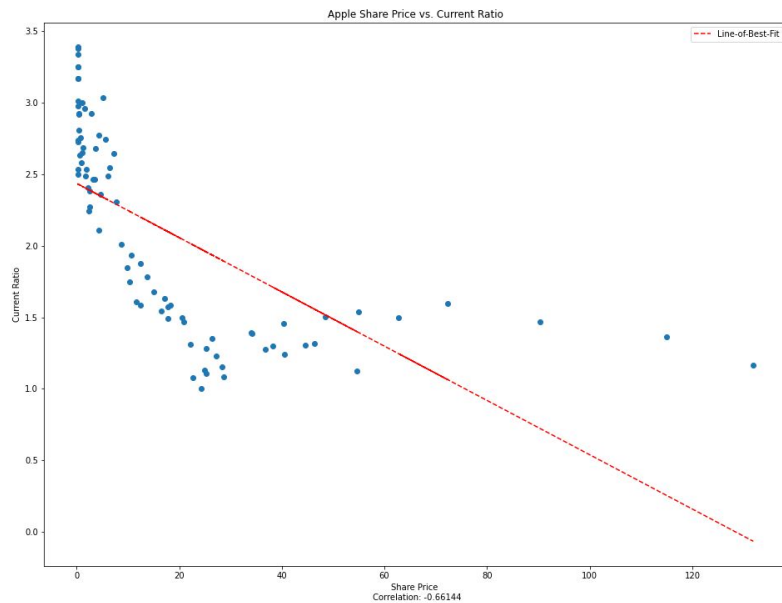
## CURRENT RATIO

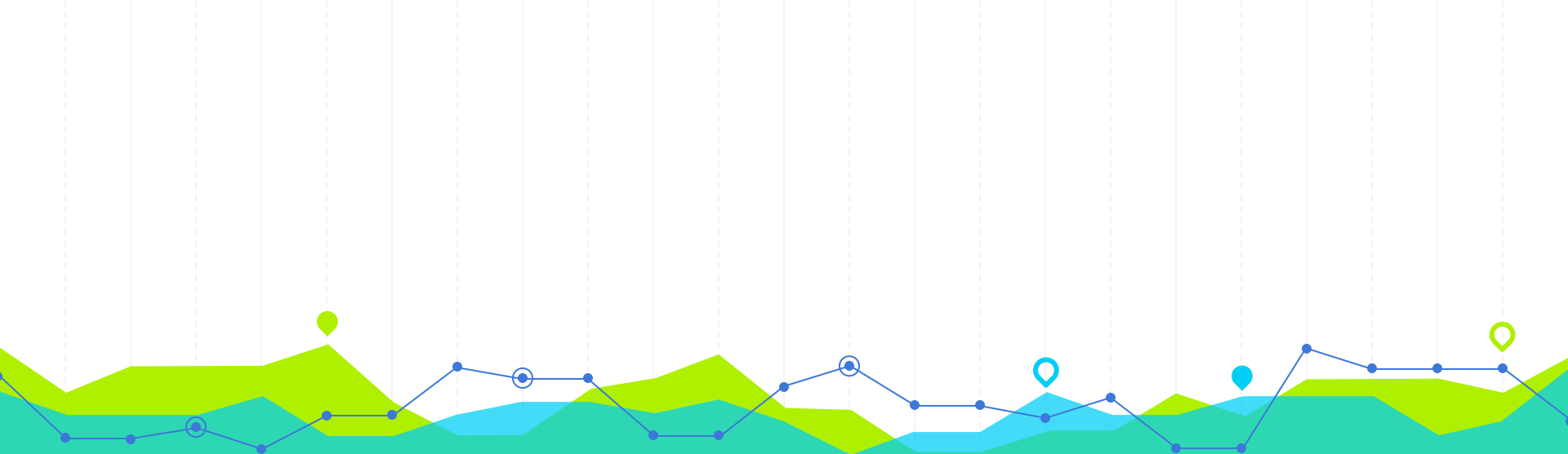
$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

- 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





# Return on Assets Analysis

Return on a Company's Internal Investments

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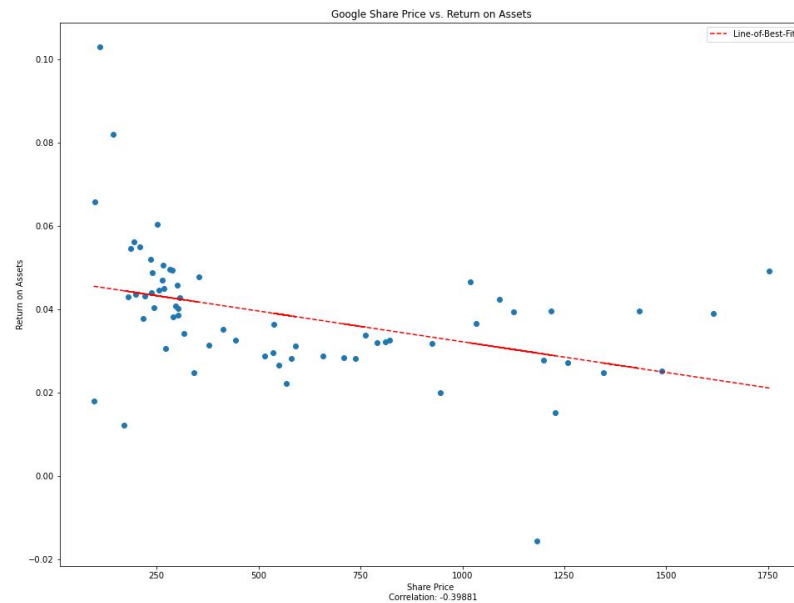
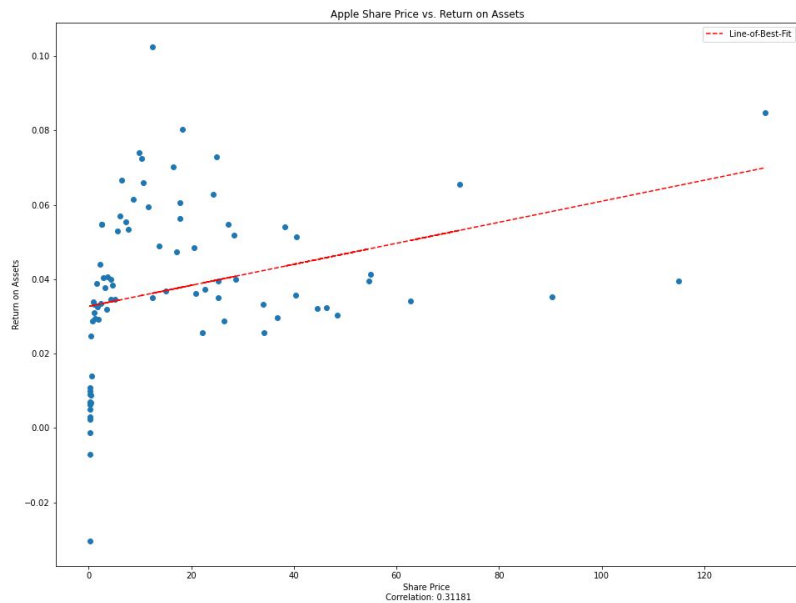
## RETURN ON ASSETS

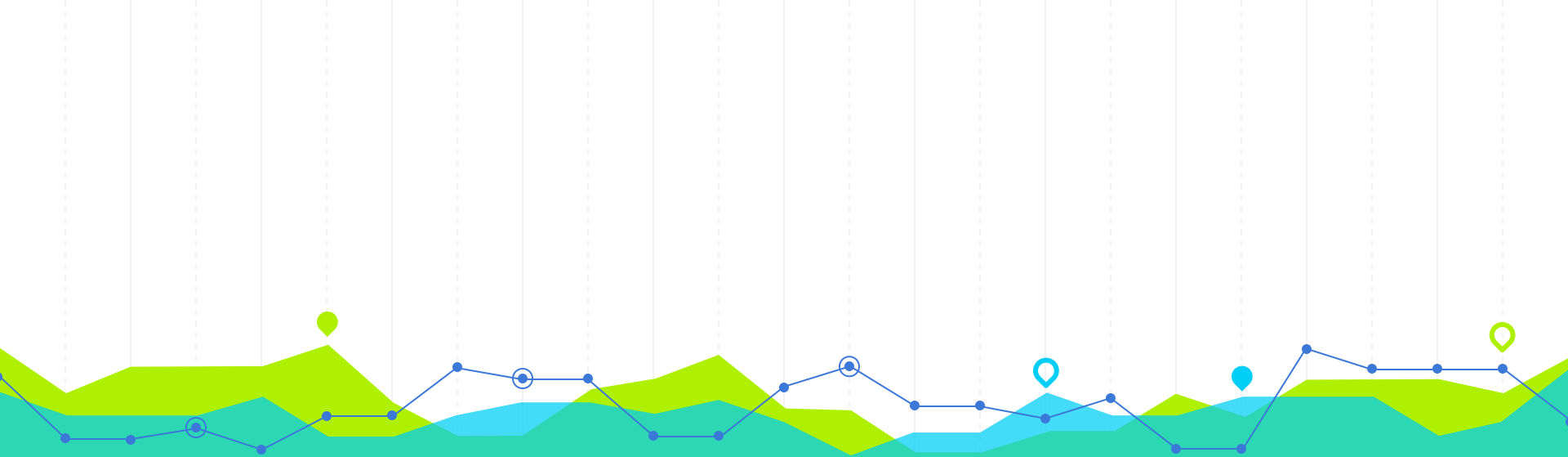
$$\text{ROA} = \frac{\text{Net Income}}{\text{Average Total Assets}}$$

- 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





# Return on Equity Analysis

Return on a Company's External Investments

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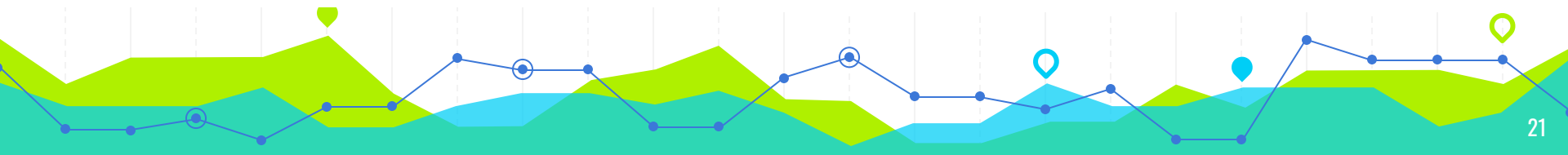
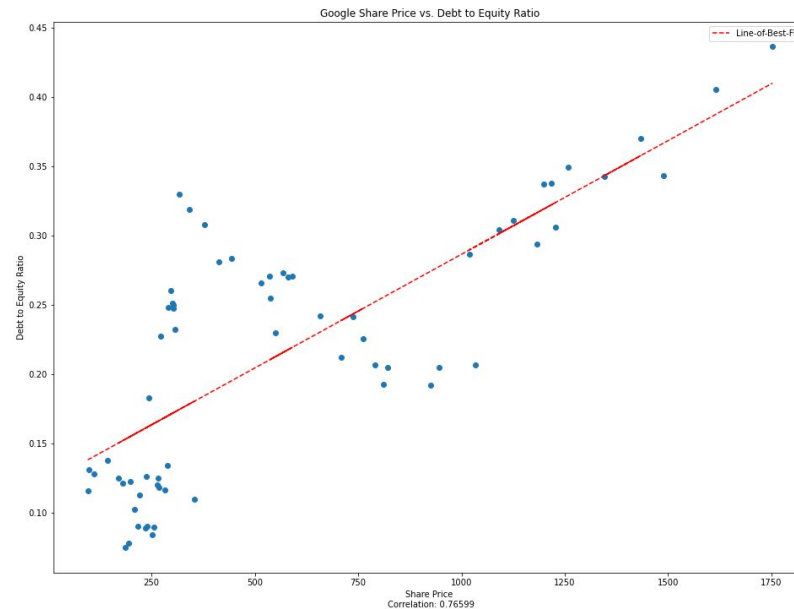
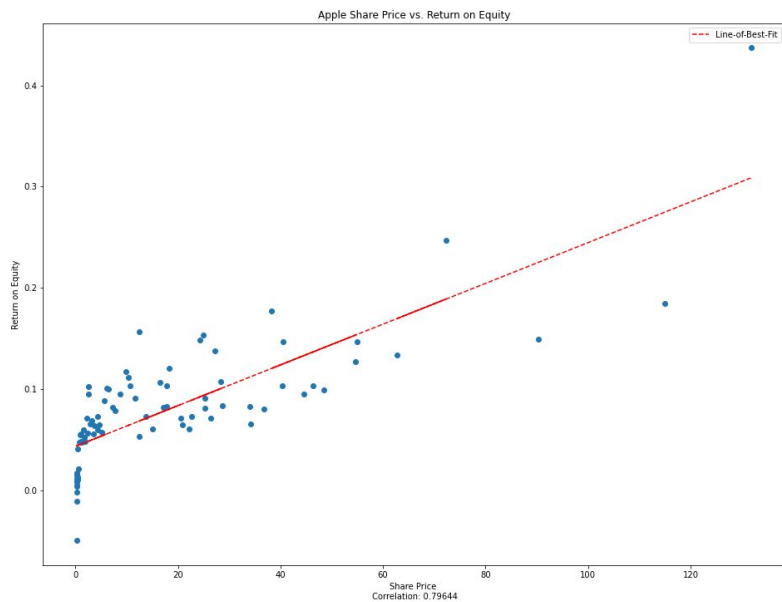
## RETURN ON EQUITY

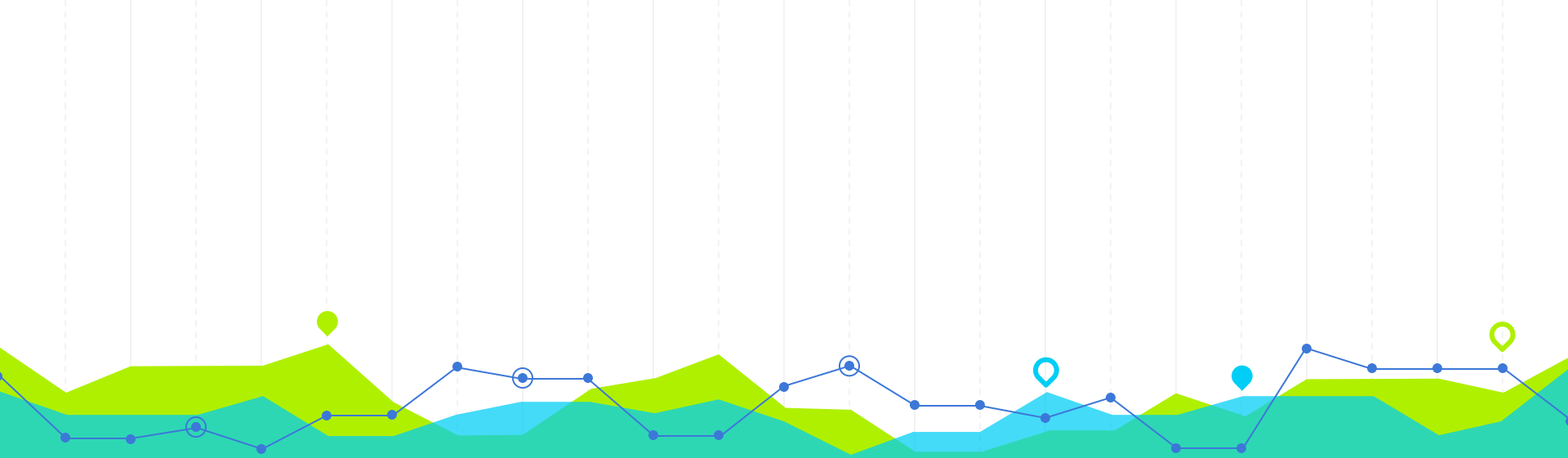
$$\text{ROE} = \frac{\text{Net Income}}{\text{Average Total Equity}}$$

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



# ROE GRAPHS





# Net Profit Margin Analysis

Ability to Generate Profit Compared to Net Sales

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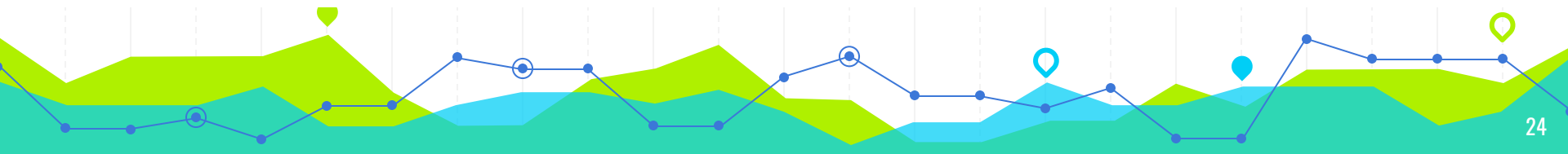
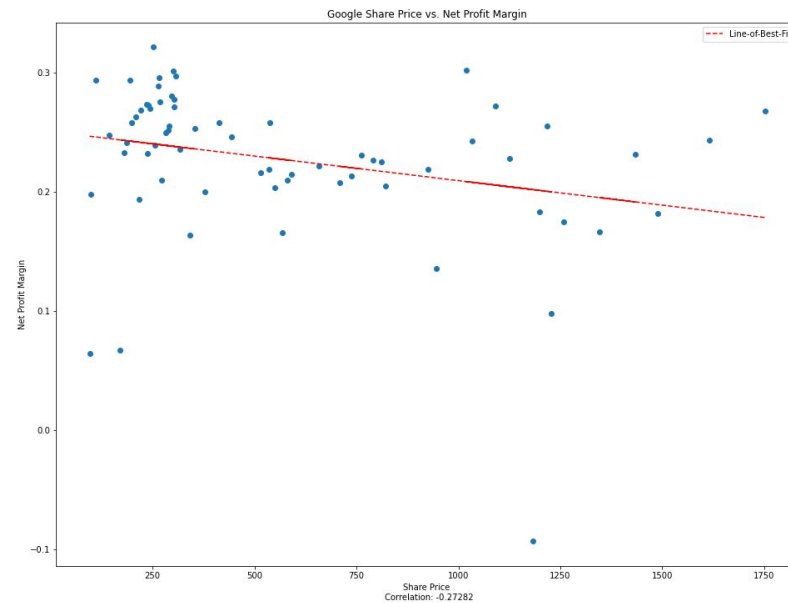
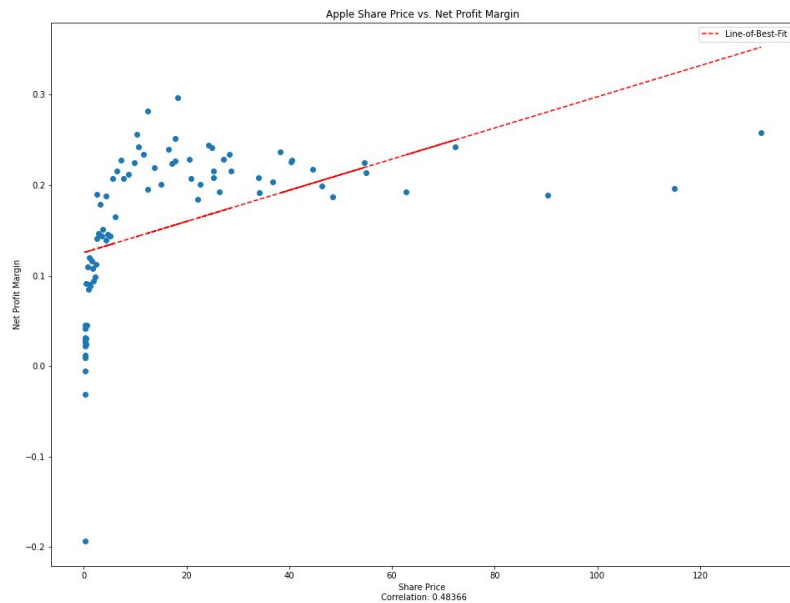
## NET PROFIT MARGIN

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

- 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







# Debt to Equity Analysis

Extent of Reliance on External Creditors

# 10

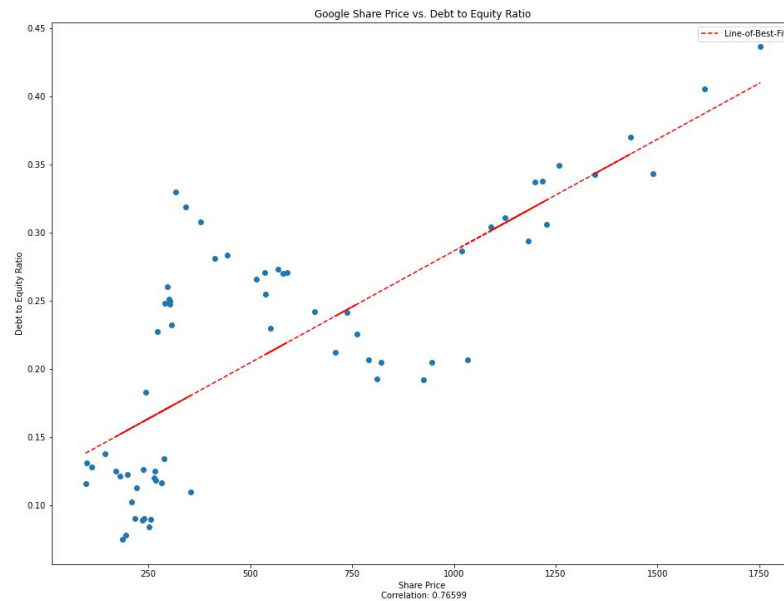
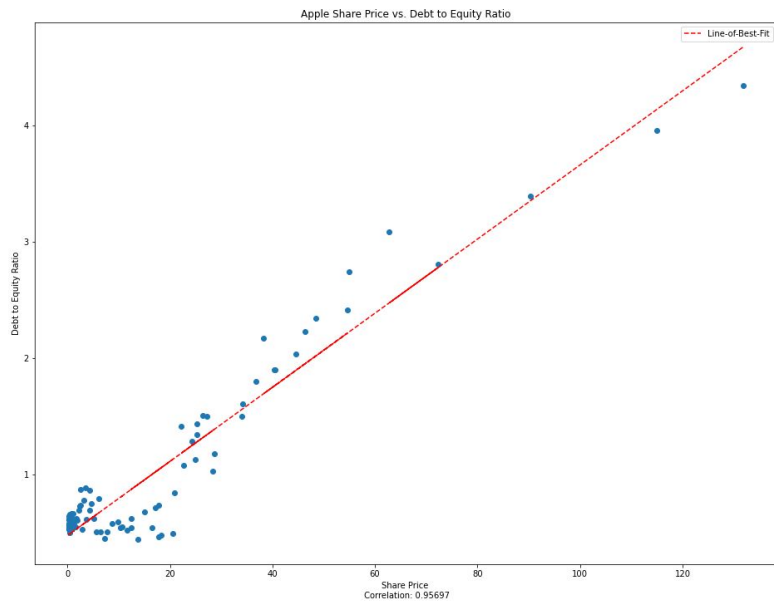
## DEBT TO EQUITY

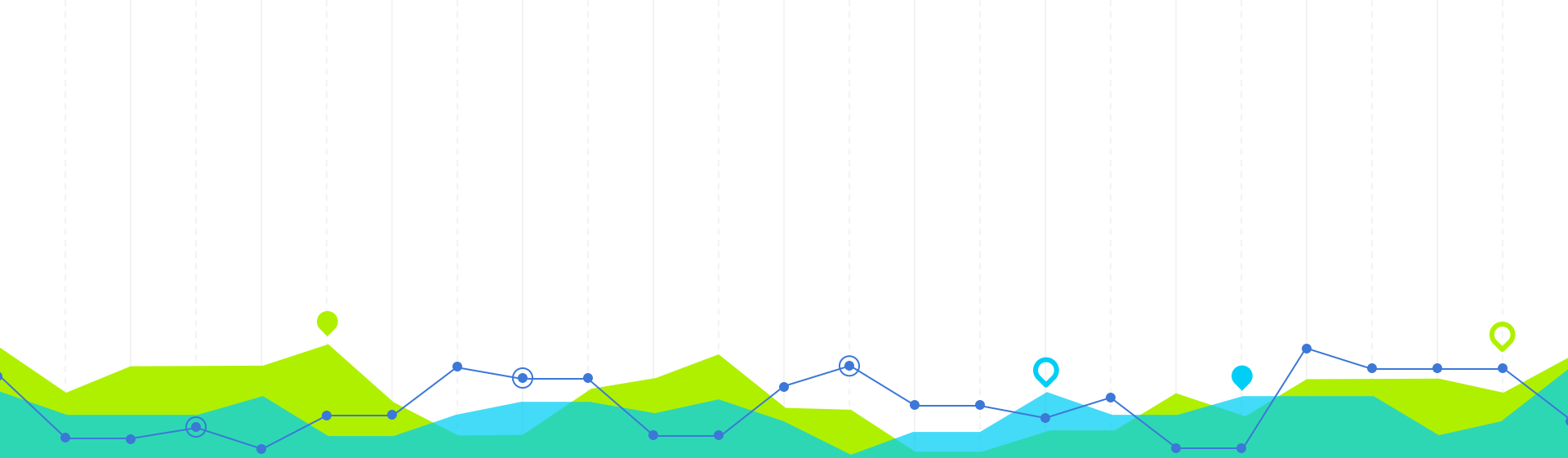
$$\text{Debt to Equity} = \frac{\text{Total Liabilities}}{\text{Shareholder Equity}}$$

- 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

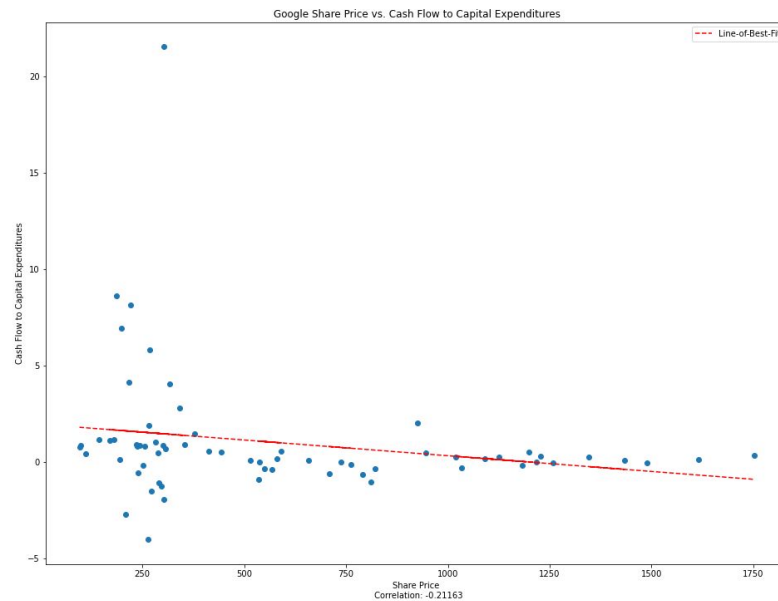
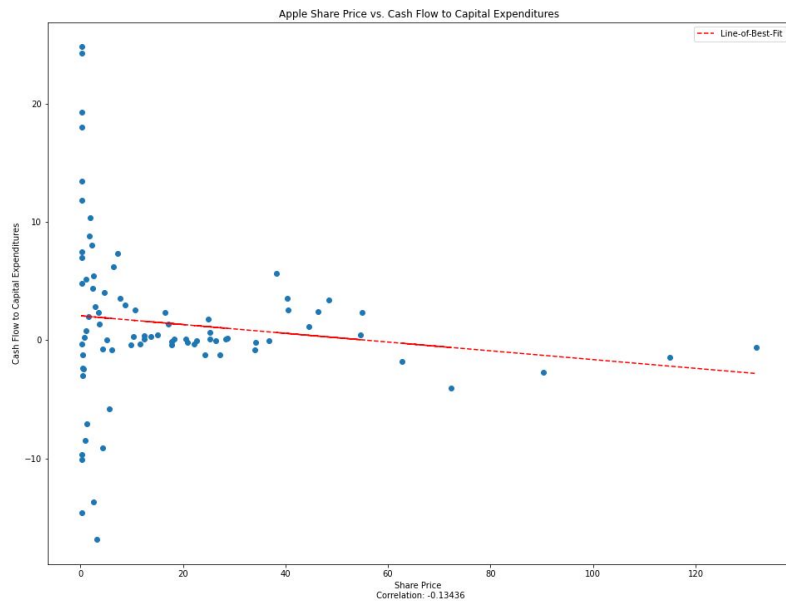
## CASH FLOW TO CAPITAL EXPENDITURES

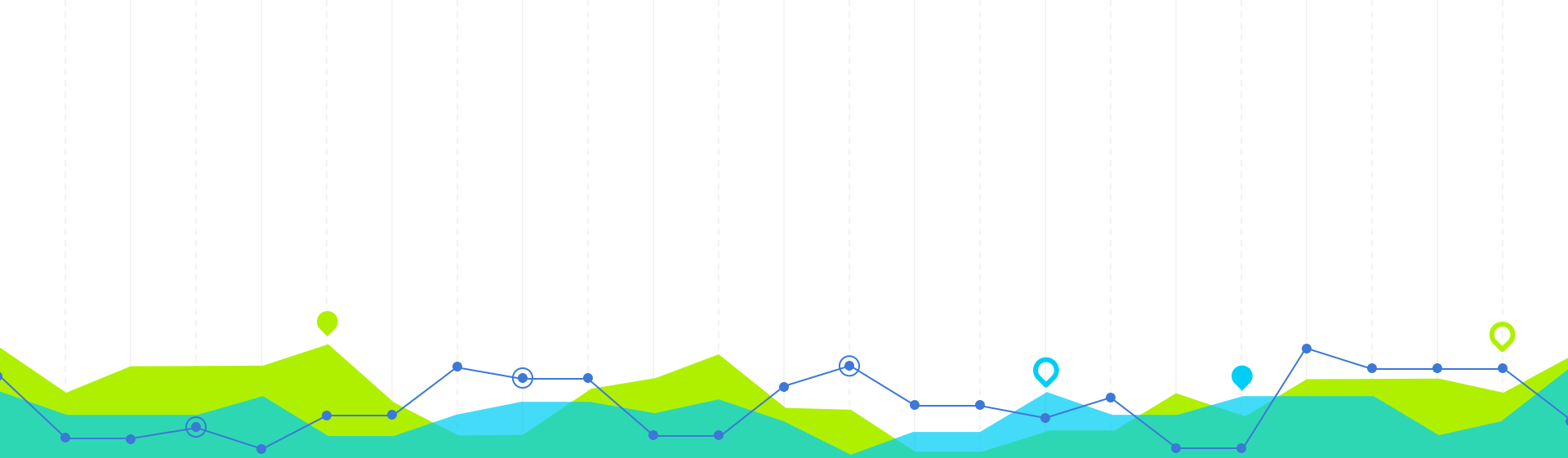
$$\text{Cash Flow to CapEx} = \frac{\text{Cash Flow}}{\text{Capital Expenditures}}$$

- 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





# Research and Development Analysis

Investments in Innovation

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# RESEARCH AND DEVELOPMENT EXPENSE

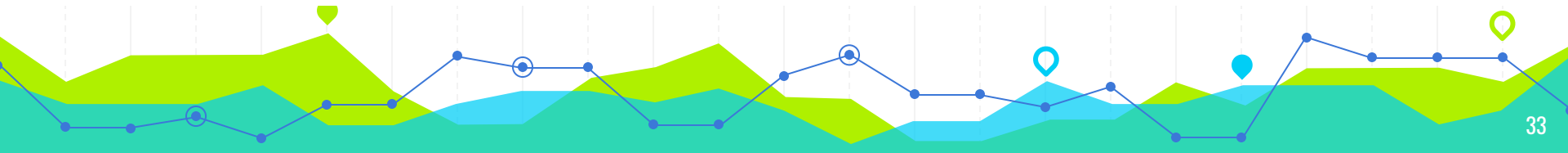
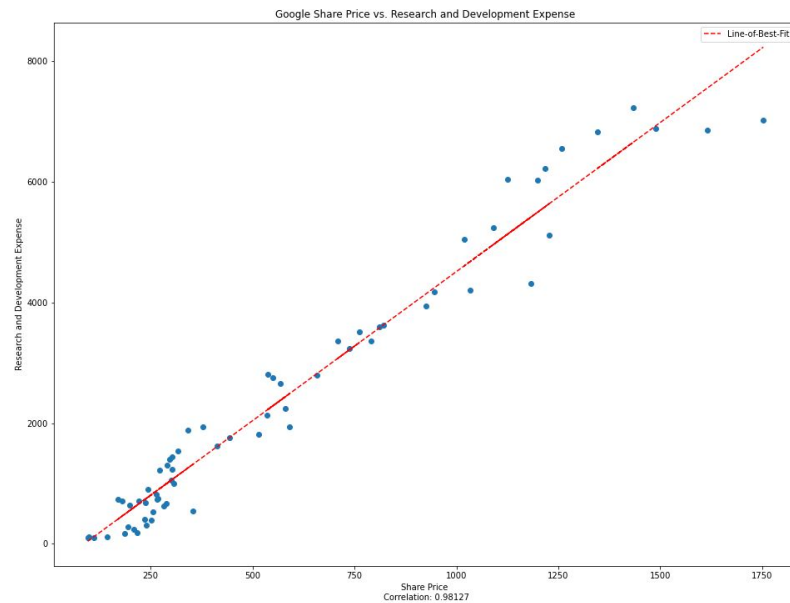
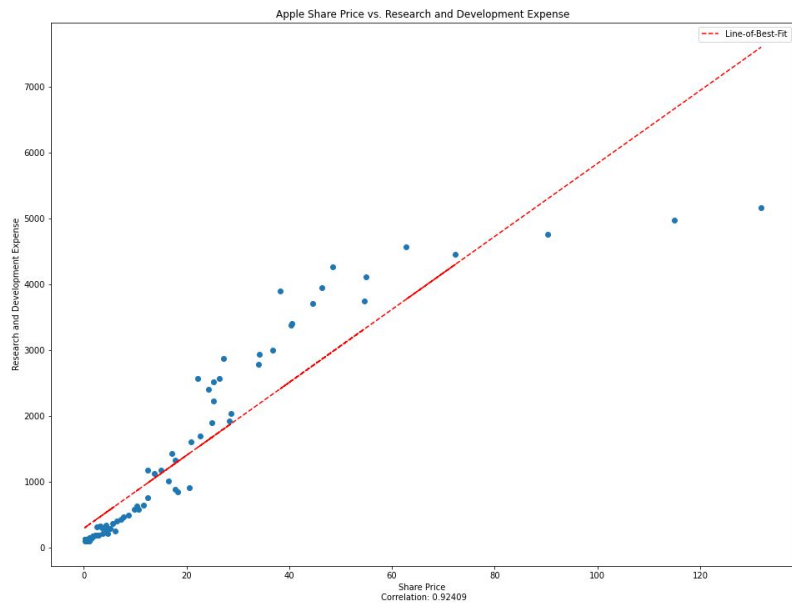
R&D = Sum of expenses  
of innovative  
activities

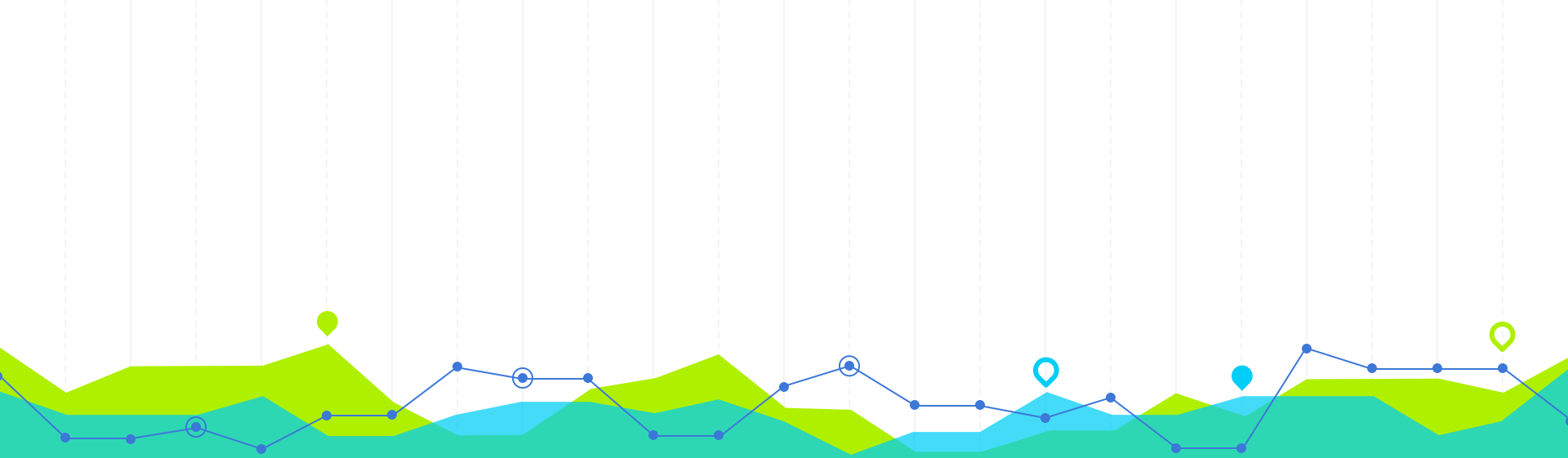
- R&D is directly related to the company's innovativity and future growth.
- Although the effect of a company's research isn't directly material, it builds on its ownership of intellectual property.





# 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!**