

# Analyze and evaluate Apple's investment potential in the current financial market

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## Abstract:

This research is centered on Apple, Inc., a prominent American-based multinational corporation renowned for its preeminent role in the design, manufacture, and distribution of advanced electronic devices alongside a diverse array of internet services. Established in 1976 by Steve Jobs and Steve Wozniak (Alex, 2015), Apple has risen to become the world's largest company, boasting a market capitalization of \$3 trillion and a listing on NASDAQ while occupying a significant position within the S&P 500 index (Bob, 2023). Apple's influence on computing and mobile technology is unparalleled, exemplified by the widespread adoption of its macOS and iOS operating systems in personal computers and mobile devices, contributing to the global popularity of Apple products. Apple is a frontrunner in the computer sector, known for its advanced systems and hardware. MacOS is one of the three major computer operating systems, alongside Microsoft and Linux.

**Keywords:** S&P 500, Apple, macOS, iOS

## Introduction

This research is centered on Apple, Inc., a prominent American-based multinational corporation renowned for its preeminent role in designing, manufacturing, and distributing advanced electronic devices alongside a diverse array of internet services. Established in 1976 by Steve Jobs and Steve Wozniak (Alex, 2015), Apple has risen to become the world's largest company, boasting a market capitalization of \$3 trillion and a listing on NASDAQ while occupying a significant position within the S&P 500 index (Bob, 2023). Apple's influence on computing and mobile technology is unparalleled, exemplified by the widespread adoption of its macOS and iOS operating systems in personal computers and mobile devices, contributing to the global popularity of Apple products. Apple is a frontrunner in the computer sector, known for its advanced systems and hardware. MacOS is one of the three major computer operating systems, alongside Microsoft and Linux. In 2022, Apple's Mac computers captured 8.6% of the market share, ranking fifth globally (Rohan, 2023). Pioneering the smartphone era, the iPhone series secured approximately 30% of the global market share, solidifying Apple's position as the largest player in the smartphone industry, even when in competition with Android phones (Maleah, 2023). In both the computer and smartphone sectors, Apple, Inc. is synonymous with innovation and excellence, exerting significant influence within these domains.

## Organizational Structure

Apple, Inc. adheres to a conventional corporate organizational framework as a publicly traded entity within the financial market. Under CEO Tim Cook's leadership, succeeding Steve Jobs, the company's hierarchical structure is characterized by direct oversight provided by four subgroup leaders, including senior vice presidents, the chief design officer, the chief operating officer, and vice presidents. Senior vice presidents, in turn, oversee nine distinct departments encompassing Retail, Internet Software and Services, Software Engineering, Chief Financial Officer, Hardware Engineering, Worldwide Marketing, General Counsel, Hardware Technologies, and AI and machine learning. Additionally, vice presidents are responsible for guiding seven departments: User Inference Design, Communication, Industrial Design, Environment, Policy and Social Initiatives, Marketing Communications, Dean-Apple University, and Worldwide Human Resources (Joel and Morten, 2020). Apple, Inc.'s organizational structure is underpinned by a hierarchical framework structured around product groups, facilitating close and intensive interdepartmental collaboration to develop diverse product portfolios, including but not limited to iPhone, Mac, and iPad, as visually depicted in Figure 1. As large as Apple in the capital market and global electronic market, it affects many interest groups worldwide. The main stakeholders of Apple, Inc. include customers around the globe, its employees in many different countries with more than 16,000 in total, investors of Apple, Inc., Governments in different

countries, especially the United States and China, and Suppliers of Apple products matrices, many of them are the Chinese manufacturers, like Foxconn. Apple affects the local communities of the United States that it can bring many jobs and investments to where it locates (Andrew, 2023). Apple, Inc.'s major individual shareholders are three of Apple, Inc.'s executive officers, including CEO Tim Cook, Chief Operating Officer Jeff Williams, and former Apple, Inc. Chairman Arthur Levinson. Major

institutional shareholders include Vanguard Group Incorporated, BlackRock Incorporated, and Berkshire Hathaway Incorporated. Apple, Inc. recently issued as much as 5.25 billion bonds, one of the largest bonds issued by major companies in the United States; some are for green technology, some are for buying back its shares (Jeff, 2023), some of the major holders of these bonds are including the Federal Reserve and large pension funds.

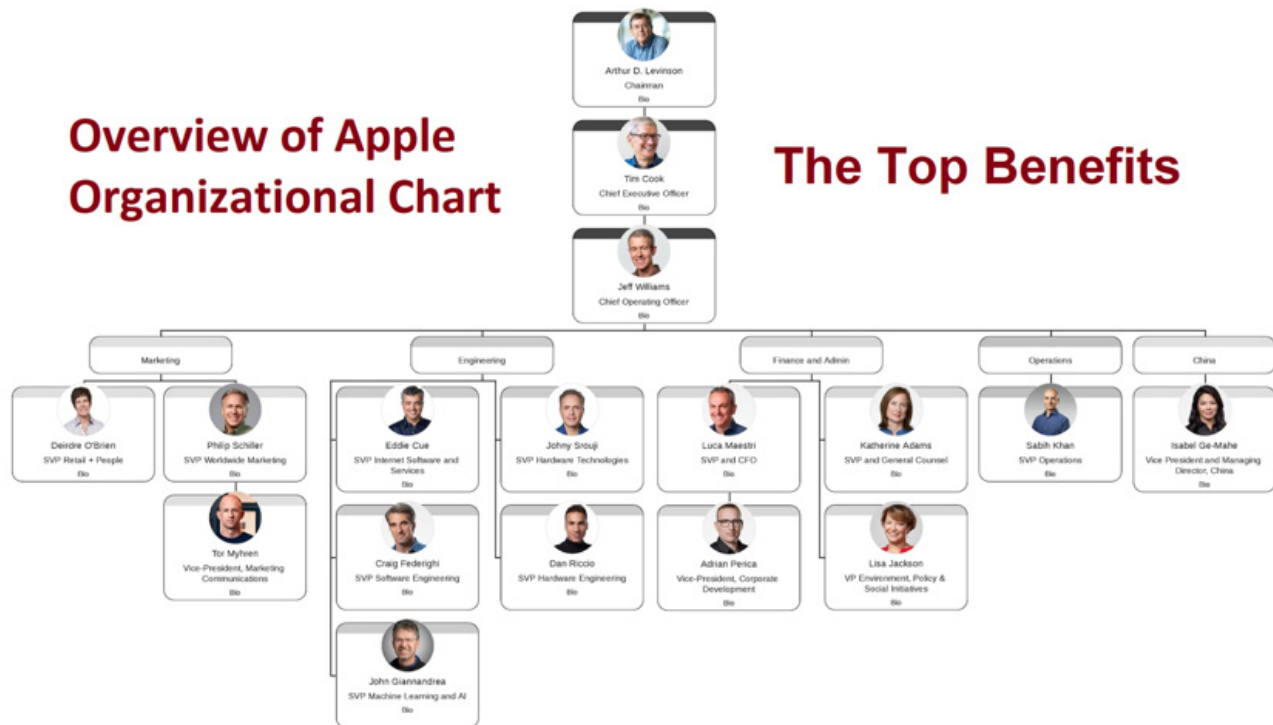


Figure 1 Apple Organizational Structure

## Managerial Responsibilities & Agency Conflicts

The Board of directors and executive management in Apple, Inc. is based on product groups with a Hierarchical organizational structure. The current board of directors and executive management includes Tim Cook as CEO, Katherine Adams as Senior Vice President and General Counsel, Eddy Cue as Senior Vice President of Service, Craig Federighi as Senior Vice President in Software Engineering, John Giannandrea as Senior Vice President in Machine Learning and AI Strategy, Greg Joswiak as Senior Vice President in Worldwide Marketing, Sabih Khan as Senior Vice President in Operations, Luca Maestri as Senior Vice President and Chief Financial Officer, Deirdre O'Brien as Senior Vice President in Retail, Johny Srouji as Senior Vice President in Hardware Technologies, John Ternus as Senior Vice President in Hardware

Engineering, Jeff Williams as Chief Operating Officer, Mike Fenger as Vice President in Worldwide Sales, Lisa Jackson as Vice President in Environment, Policy and Social initiatives, Isabel Ge Mahe as Vice President and Managing Director of Greater China, Tor Myhren as Vice President in Marketing. Communications, Adrian Perica is vice president of corporation development, Kristin Huguet Quayle is vice president of worldwide communications, Phil Schiller is an Apple Fellow, and Carol Surface is chief people officer (Apple, 2023). The primary responsibilities of the board of directors and executives management of Apple, Inc. are to ensure that serve the long-term interests of shareholders, maintain a reasonable and stable increasing stock price, and give continuous earnings dividend, making the company in a steady and healthy growth in the market to assure the long run business profits and keeping the leading position of Apple, Inc in the global electronic device industries and

internet service (SEC, 2023). In the last decade, Apple, Inc. has spent 576 billion dollars in buying back its shares to keep the stock price steadily growing and making major shareholders benefit from the growing stock price by holding shares (Fortune, 2023).

A recent shareholder-management conflict occurred in 2012. The shareholders of Apple fought against the management over the issue of profit sharing. They demanded that the company distribute some of its cash profits to the shareholders through dividends or share buybacks. In this case, the shareholders demanded a share of those profits as shareholders themselves because they believed that Apple was far too profitable compared to its current cash dividends and stock price. Apple's management has rejected this request because it's better to use the cash for business expansion and growth in the future.

## Portfolio Theory & CAPM

The principle of portfolio theory states that a portfolio should consider the individual expected return, variance, and internal correlations of each stock, share, or bond, and the weighted share of each in the portfolio. In the following cases, we take the simplest 2-asset portfolio as a special case to illustrate the principle of portfolio theory. Usually, an individual asset has a risk-return relationship with the return, i.e., higher risk comes with higher return. The formula for the return of a portfolio with two assets is as follows:

$$E(R_p) = w_1E(X_1) + w_2E(X_2)$$

Where  $w_i$ , for  $i \in 1, 2$ , is the weight of an individual asset within a portfolio, the sum of the weights of all individual assets in a single portfolio should be 1; and the  $E(R_p)$  is the expected return of a portfolio,  $E(X_i)$ ,  $i \in 1, 2$  is the expected return of the two individual assets. This formula indicates that if we enlarge the weight of an asset's higher expected return, the portfolio's total expected return should be higher. In contrast, the same as individual assets, the portfolio also follows the same relationships in risk and return, thus higher weight in higher return assets, usually indicates a higher risk. The variance formula of a 2-asset portfolio is as follows:

$$\sigma_p^2 = w_1^2\sigma_1^2 + w_2^2\sigma_2^2 + 2w_1w_2\sigma_1\sigma_2\rho_{12}$$

Where  $\sigma_p^2$  is the variance of a portfolio,  $\sigma_i^2$ ,  $i \in 1, 2$  is the variance of each asset, and  $\rho_{12}$  is the correlation between two assets.

From the variance formula, we can see that keeping all other factors constant, the variance of a portfolio would be higher with an increasing weight of a higher-risk asset.

Apple, Inc. is a high-return and high-risk asset (Mohamad & Nur, 2018). Thus, if an investor decides to add Apple stock to a portfolio, one only expects a high return but a higher risk, which means sometimes a possible big loss. If an investor adds Apple stock to his or her portfolio, the expected return of the Apple stock can simply use the CAPM model to calculate, where the CAPM formula is as follows:

$$E(R_i) = R_f + \beta_i(E(R_M) - R_f)$$

Where  $E(R_i)$  is the expected return of the Apple stock,  $R_f$  is the risk-free rate, in this case, American 5-10 years long-term treasury bills rate can be seen as the risk-free rate.  $R_M$  is the market expected return, in this case, NASDAQ index can be seen as the market expected return,  $\beta_i$  indicates the systematic risk of a particular asset, usually a positive volume.

The risk-free return would ensure the basic earnings, while a higher risk-free rate would also make a lower risk

premium than  $E(R_M) - R_f$  would be lower if  $\beta_i$  increases; thus, when the beta of a stock is high, the expected return of a stock would generally lower, and vice versa. And if the market's expected return is higher, the expected return of Apple stock would be higher, keeping all other factors constant. And if the beta, systematic risk is higher, keeping all other factors constant, the expected stock return would also increase, and vice versa. According to Yahoo Finance (2023), Apple stock has a 1.57 beta rate, the current American 10-year treasury bill is 4.59%, and the NASDAQ index return rate is 10.6%.

## Valuation using NPV

According to the DDM model and NPV principles, the value of a stock can be easily calculated from its future cash flow or dividends. Given a market interest rate for that stock and the expected dividend growth, the formula can be expressed simply as follows:

$$P = \frac{D}{r - g}$$

Where  $P$  is the stock's fair price according to the DDM model or NPV principles, and  $r$  is the stock's equity cost,  $D$  is the dividend's growth rate. Hence, there are three major factors when an investor evaluates a stock price, also according to NPV principles, the discount time is very important. To support green technology, Apple recently issued very large green bonds. Bonds have a face value, a coupon rate (or can be calculated directly as a coupon payment), a payment period, and a maturity date. These are used to evaluate the bond price. The present value of an asset is its total future value or future cash flows discounted at a fair discount rate, according to NPV principles. For simplicity, let us assume that the Apple

bond pays a constant coupon, that is, a constant coupon rate each year, and matures in time T, because in each year, the investor in the Apple bond would receive a constant coupon payment C, and in the final year plus face value F, so we can have the following NPV formula for the Apple stock:

$$P = C * \frac{1 - \frac{1}{(1+r)^T}}{r} + \frac{F}{(1+r)^T}$$

We can determine a fair bond price by adding all future coupon payments and face value discounts to the present value.

## Conclusion

As one of the largest companies and leading suppliers of electronic devices, Apple has unprecedented influence in both the smartphone and computer industries, with its professional board of directors and management and advanced organizational structure, which makes it one of the top companies worldwide in recent years and the foreseeable future. Although Apple has issued very large bonds, its cash reserve is still very good, and it has given out cash payments in the past ten years; the latest annual report still shows that it has very strong domain power in the consumer electronics market and Apple's stock has increased 217% large in the past five years and soared almost 900% in the past decade. (Dani, 20/23). The bottom line is that Apple stock should be a good buy now.

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