# Krause Fund Research

# Fall 2022

November 18, 2022

Stock Rating: **BUY**

| | |
|---|---|
| **Current Price:** | **$149.70** |
| **Target Price:** | **$161-$177** |

# Apple Inc. (NASDAQ: AAPL)

## Technology – Tech Hardware, Storage, and Peripherals


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## Investment Thesis

We recommend a BUY rating **as Apple will experience strong growth in subscription-based services and continue its historical dominance as a leader in consumer electronics and technological innovation**. While Apple has faced short term challenges due to higher interest rates, heightened inflation, and supply chain issues, we still believe in the company's distinguished track record of generating consistently strong cash flows and shareholder returns over the long term. **This investment will yield an 8-18% upside for investors**.

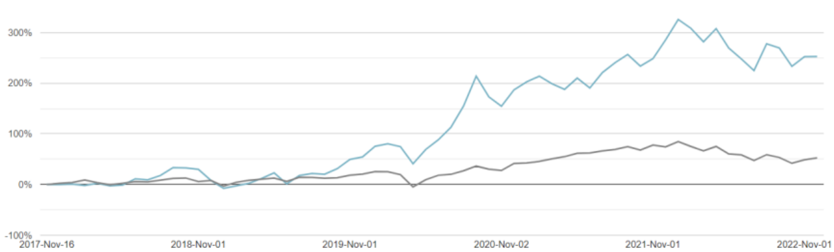
**Drivers of Thesis**

- Apple is the most dominant player in the technology hardware, storage & peripherals space and has continued to grow significantly, led by its innovative development of existing product offerings and its industry-leading brand recognition worldwide.
- Growth of subscription-based business models presents a great opportunity for Apple to introduce subscription plans for both current and new products and services. This is reflected under their rapidly expanding Services segment, its second largest source of revenue.
- Apple is trading at lower multiples relative to its strongest competitors. We forecast Apple to trade at 22x and 1.7x on a one-year forward P/E and PEG multiples basis respectively, which falls below the average of comparable peers in the information technology and communications sectors. This could mean that Apple is undervalued compared to its peers.

**Risks of Thesis**

- Current volatile market conditions with threats of a recession, increasing interest rates, and slower economic growth into 2023 and 2024 could significantly decrease consumer spending and Apple's sales growth, as well as increase its Weighted Average Cost of Capital (WACC).
- The technology sector having a growing number of new entrants, as well as current, established competitors which have continued to innovate, could pose a threat to Apple's dominance in its business segments.
- Chip shortages, rapid production cuts, and other supply chain crises lasting longer than expected all pose significant short-term risks to Apple's manufacturing operations and business growth.

## Stock Performance vs. S&P 500




## Company Description

Apple (NASDAQ: AAPL) is a company engaged in application hardware and software development. The company has two main operating segments: products and services. Apple designs, manufactures, and markets smartphones, electronic accessories, computers, and other devices. Apple also offers a diverse array of related services including digital content and advertising. The company was founded by Steve Jobs in 1976. 46 years later, Apple has transformed into a world leader in technology and media products. Apple is headquartered in Cupertino, California.

## At a Glance

| | |
|---|---|
| **DCF:** | **$161** |
| **DDM:** | **$161** |
| **Relative Valuation:** | **$174-$177** |

**Price Data**

| | |
|---|---|
| Current Price: | $150.72 |
| 52-Week Range: | $129.04-$182.94 |
| Analyst Mean Target Price: | $175 |

**Key Metrics**

| | |
|---|---|
| Market Capitalization: | $2.4T |
| Shares Outstanding: | 15.9B |
| Beta: | 1.22 |
| 1Y Forward P/E: | 22.0x |

**Financial Profile**

| | |
|---|---|
| 2022 ROE: | 158.19% |
| 2022 ROA: | 28.29% |
| 2022 Revenue: | $394.3B |
| 2023E Revenue: | $419.9B |
| 2022 Gross Margin: | 43.31% |
| 2023E Gross Margin: | 43.07% |
| 2022 Total Payout Ratio: | 92.01% |

**Earnings Estimates**

| Year | 2022A | 2023E | 2024E |
|---|---|---|---|
| EPS | $6.15 | $6.81 | $7.87 |
| Growth | 7.8% | 10.7% | 15.6% |

## Executive Summary

Apple, Inc. (NASDAQ: AAPL), based in Cupertino, CA, is a world leader in the technology hardware, storage, and peripherals industry. Apple is a premier player in the industry, operating as a consumer-facing enterprise with a portfolio of innovative product and service offerings to satisfy the needs of any potential or existing customer. Under its product lines, Apple is a leading designer and manufacturer of smartphones, computers, tablets, as well as other electronics under their Wearables, Home, and Accessories products. In addition to its products, Apple has a wide range of service offerings, including advertising, digital content, and Apple Card payment services.

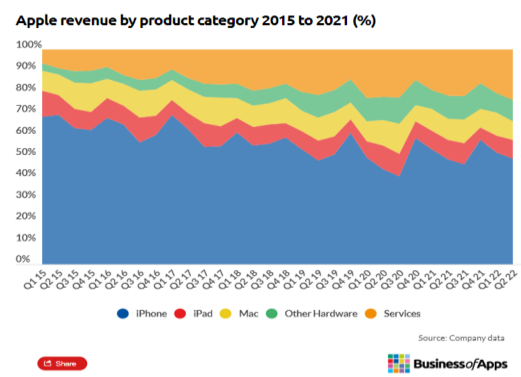
We believe in Apple's dominance as a top player in the consumer electronics and technology hardware space, driven by its ability to deliver in terms of quality, reliability, constant innovation, and price-to-performance value that is supported by a strong software accessories ecosystem and backed by comprehensive end-market and after-market capabilities. Even with a looming recession and a highly competitive market, Apple continues to maintain a competitive advantage as the most valuable brand globally, valued at $947 billion U.S. dollars.

Leveraging their strong brand, consistent free cash flow generation, and continuing their track record of developing the latest in-demand technologies across segments, Apple is in a prime position to lead not only their industry, but the information technology sector as a whole over the foreseeable future.

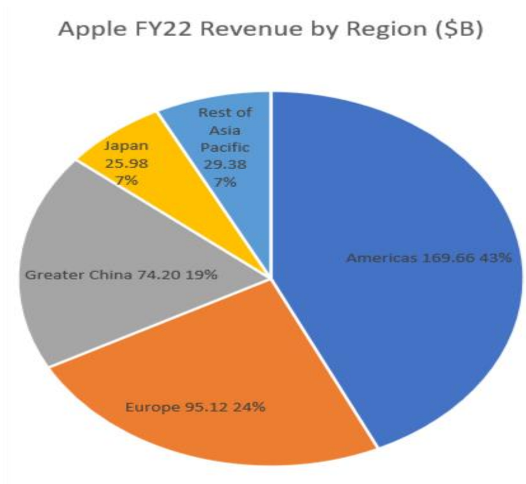
## Company Analysis

Apple, Inc. (NASDAQ: AAPL), headquartered in Cupertino, CA, operates as a global, consumer-facing business, segmenting its operations by geography: Americas, Europe, Greater China, Japan, and Rest of Asia Pacific. As a company within the technology hardware, storage, and peripherals industry, Apple generates the largest components of its revenues from iPhone sales and its other electronic devices. Apple's fastest growing segments are the sales of its variety of services as well as its wearables and accessories products.

Apple's vision is to deliver the best offerings and service experience to end consumers by delivering innovative hardware, software, and related technologies to the marketplace. Apple aims to maintain customer loyalty by providing consistent solutions through the expansion of its market opportunities in consumer electronics. Apple's reported product lines include its iPhone, Mac, iPad, and Wearables, Home, and Accessories (WH&A) products. The company's reported service lines are Advertising, AppleCare, Cloud Services, Digital Content, and Payment Services. Apple has transformed into one of the most accomplished companies driven by revenue, profit, size, and brand name.[1] Apple's fiscal 2022 revenue breakdown across business lines and geographic segments can be highlighted below.[2]




*Source: BusinessofApps*[6]




*Source: Apple 10-K*[2]

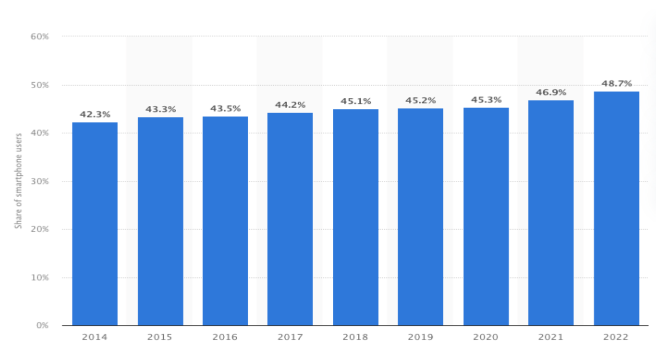
## iPhone

The iPhone is Apple's line of smartphones based on its iOS operating system. The current iPhone line includes iPhone 14 Pro, iPhone 14, iPhone 13, iPhone SE, iPhone 12 and iPhone 11. In the past 5 years, iPhone sales have increased at a 4.5% CAGR. iPhone net sales increased by 7.0% during FY22 due to higher sales from the company's release of new iPhone models in the beginning of Q4 2021.[1]

With Apple cutting production in 2022-2023, tied to a slowdown in sales from consumer pessimism and supply chain issues[4], we forecast iPhone revenue to grow at a mere 1.9% in 2023E, in line with analyst estimates. Towards the high end of estimates, we expect iPhone revenue growth to rebound at 13.0% growth in 2024E when market conditions start improving and consumers become more comfortable with discretionary spending on new iPhones once again.

While iPhones are becoming an increasingly mature product, we still expect high growth to continue driven by Apple's release of a new Phone each fiscal year, marketed towards both new phone buyers as well as existing customers looking to upgrade their iPhones. As of 2022, there were more than 1.2 billion iPhone users in the world as well as 2.2 billion iPhone units sold. In the U.S. alone, 48.7% of smartphone users have an Apple phone, seeing a 6.4% increase since 2014. As the population of smartphone users and iPhone market share grows, we expect iPhones to continue stable growth rates over most of our 10 year forecast period.[2]

**Share of smartphone users that use an Apple iPhone in the United States from 2014 to 2022**




*Source: Statista – Apple Smartphone Users in the U.S*[8]

## Mac

The Mac is Apple's line of personal computers based on its macOS operating system. The Mac line includes laptops MacBook Air and MacBook Pro, as well as desktops iMac, Mac mini, Mac Studio and Mac Pro. Over the last 5 years, Mac net sales have grown at a 9.8% CAGR. Mac net sales grew by 14.0% in fiscal year 2022 tied to a greater demand during the COVID-19 pandemic. Despite declining growth in the PC market, Mac was the sole winner in the industry during Q3 of 2022 on a Y/Y basis, growing 40.0% compared to the overall market which declined 15.0% in the same period.[1]

Given the current state of the economy, we forecast Mac sales to grow just 6.0% in 2023 led by a slowdown and an overall saturated market for PCs. We expect growth to steadily decline as highlighted by a decrease in demand for PCs throughout the industry.[2]

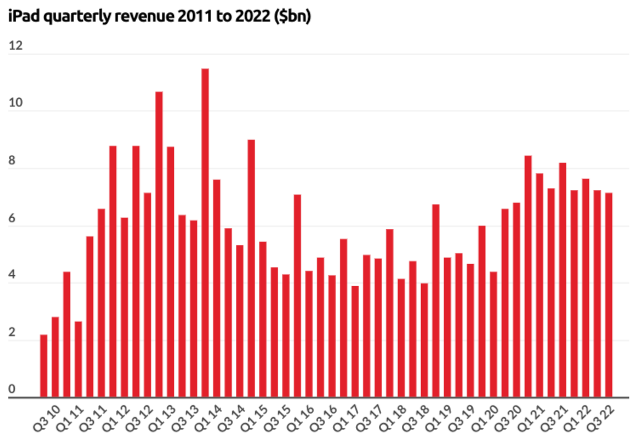
| Company | 3Q22 Shipments | 3Q22 Market Share | 3Q21 Shipments | 3Q21 Market Share | 3Q22/3Q21 Growth |
|---|---|---|---|---|---|
| 1. Lenovo | 16,880 | 22.7% | 20,129 | 23.1% | -16.1% |
| 2. HP Inc. | 12,706 | 17.1% | 17,603 | 20.2% | -27.8% |
| 3. Dell Technologies | 11,963 | 16.1% | 15,184 | 17.4% | -21.2% |
| 4. Apple | 10,060 | 13.5% | 7,174 | 8.2% | 40.2% |
| 5. ASUS | 5,540 | 7.5% | 6,011 | 6.9% | -7.8% |
| Others | 17,103 | 23.0% | 21,218 | 24.3% | -19.4% |
| **Total** | **74,252** | 100.0% | **87,319** | 100.0% | **-15.0%** |

Source: IDC Quarterly Personal Computing Device Tracker, October 10, 2022

*Source: 9 To 5 Mac – PC Market*[4]

## iPad

The iPad is Apple's line of tablet devices based on its iPadOS operating system. The iPad line includes iPad Pro, iPad Air, iPad and iPad mini. iPad net sales have increased at a 9.8% CAGR over the last 5 years. iPad net sales decreased 8.1% Y/Y, driven by a stagnation in iPad innovation by the company. While Apple released a new chip update to the iPad Air product, no other products in the iPad business line saw any new releases due to supply constraints. This year's sales were a runoff of the products that Apple released in the prior fiscal year, which explains a decline in sales.[1] Apple expects to release new updates to its iPad products in 2023, so we reflected this in our 2023E by forecasting 8.0% growth. Since the iPad is a relatively mature segment, and because current and new customers are opting out of upgrades given the product's durability and longer life cycle, we expect a steady and slow decline in growth over our forecast period.[2]



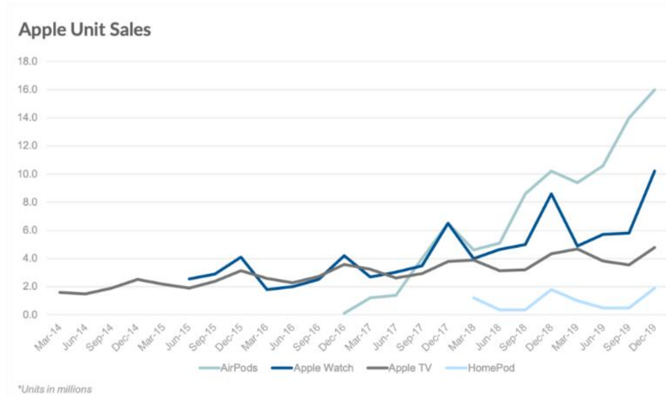

*Source: BusinessofApps*[6]

## Wearables, Home, and Accessories

Apple's Wearables, Home and Accessories segment includes 4 product lines. **AirPods** are Apple's wireless headphones, including AirPods, AirPods Pro and AirPods Max. **Apple TV** is Apple's media streaming and gaming device based on its tvOS operating system, including Apple TV 4K and Apple TV HD. **Apple Watch** is Apple's line of smartwatches based on its watchOS operating system, including Apple Watch Ultra, Apple Watch Series 8 and Apple Watch SE. The company also sells **audio products** with Beats, Apple's line of wireless headphones and earbuds; the HomePod mini, a wireless speaker; and related audio accessories.[2]

Wearables, Home, and Accessories has seen the fastest growth of all business segments with an 18.9% CAGR over the past 5 years. In FY22, the segment's revenue saw a sharp decline in growth to 7.5%, driven by global shipment declines due to the supply chain crisis and an overall economic decline.[1] With a resolution of the supply chain crisis and the newer, heavy-hitting products such as AirPods and the Apple Watch being in the growth stage of the product life cycle, we forecasted revenue to regain its strong growth in 2023E with a 19.0% growth rate Y/Y. Since these products have still yet to hit maturity in the life cycle, we expect continued high growth for the majority of our forecast period.

**Unit Sales of Apple's Most Popular Wearables (2014 – 2019)**




*Source: LoupFunds*[32]

## Services

Services includes 5 product lines. Apple's **advertising services** include various third-party licensing arrangements and its own advertising platforms. **AppleCare** offers fee-based service and support, providing priority access to Apple technical support, access to global Apple-authorized repair and replacement services, and additional warranty/loss coverage. **Cloud Services** store keeps customers' content up-to-date and available across multiple Apple devices and Windows personal computers. **Digital Content** operates various platforms, including the App Store, that allows customers to discover and download applications and digital content. Apple also offers digital content through subscription-based services, including Apple Arcade, Apple Fitness+, Apple Music, Apple News+, and Apple TV+. Apple also offers **payment services**, including Apple Card®, a co-branded credit card, and Apple Pay®, a cashless payment service.[2]

Apple's Services business segment has grown at a 14.5% CAGR over the last 5 years. In FY22, the segment grew at 14.2%, showing significant growth but also the lowest growth in 5 years.[2] The Services segment is largely in its growth stage and is competing in new markets with other competitors (such as advertising and other "Big Tech" companies), which we believe provides lucrative opportunities for Apple. We expect growth to slowly trend downwards over our forecast period as the segment matures, but we still believe this will be a high growth segment and the second biggest revenue contributor over our forecast period.

## SWOT Analysis

### Strengths

Apple's biggest strength is its brand value. Apple controls more than 50% of the smartphone market in 2022[8]. This is made possible through years of successful product launches that have given Apple a loyal and supportive customer base. When Apple's customers purchase Apple products, they know they are going to get a well-crafted, well-functioning device that will meet the needs of the buyer. Apple also creates brand value through their effective marketing. Apple's advertisements are both quality and simple, which leaves a positive impression on consumers. In addition, the timing of Apple's product release announcements is consistent and predictable. This puts the Apple brand at the top of the consumer's mind during the months they release new products and services, commonly September. An effective combination of smart marketing and quality devices enable Apple to command pricing power in the market.

Another important reason why Apple maintains a competitive edge is due to the many patents and intellectual property licenses it controls. A company as big as Apple, that provides a diverse range of products and services, cannot remain competitive if rivals can replicate its products. Apple's patents and licensing rights prevent this from occurring and allows Apple to continue its reputation as a leader in innovation.[2]

Apple is quickly expanding its service offerings and the Services segment is expected to be the fastest growing segment for Apple. Services such as Apple Music or iCloud are already household names, and newer services such as Apple Fitness+ are gaining traction. The focus on services by Apple enables the company to incorporate a more subscription-based business model, which leads to more predictable revenue streams and is generally more sticky than other revenue streams. The strengths listed all go to push the Apple ecosystem, which is the interaction of a consumer with various interconnected Apple products and services, finding all their solutions under the Apple brand.[5]

### Weaknesses

Apple's operating system, which drives its strong ecosystem, is also a source of weakness for the company. Apple keeps its operating system in-house and that means there is a lack of functionality with third party ecosystems when using Apple's OS. The lack of portability of external operating systems is a source of inconvenience for consumers, so this could act as a push away from buying Apple products.

The popularity of Apple's products subjects them to significant amounts of imitation. This is especially prevalent in foreign markets, where supply of Apple products may not be as plentiful. While the amount is difficult to estimate, Apple likely loses out on lots of revenue due to counterfeit Apple devices. Another reason why counterfeit Apple products have been so prevalent could be attributed to the expensive cost of its products. Apple commands premium prices for a premium-looking phone, but the price tag may make it economically unfeasible for some geographic markets to purchase Apple products like the iPhone.[17]

### Opportunities

The growth of the subscription-based business model in the tech sector presents Apple with a great opportunity to capitalize off the trend. Apple has been investing heavily in its services segment and the segment has become one of Apple's fastest growing segments as the smartphone, PC, and tablet markets mature. Another trend Apple can capitalize on is the trend towards healthier lifestyles. With the Fitness+ service, Apple can market themselves to an entire market of health-conscious people. The Apple Watch is a great complement to Fitness+ and the synergies that could be realized between the two offer a lot of potential for Apple.[2]

Apple's recent moves to provide customer financing has presented potential since Apple first ventured into financial services with Apple Pay. Apple is expected to release a "buy now, pay later" option for U.S. users soon. The popularity of Apple's products and services make this an attractive move. The move can potentially make Apple a player in the financial services space. Other opportunities for Apple involve cars, alternative reality, and artificial intelligence. Apple has been rumored to be developing augmented reality glasses, and this is a lucrative opportunity given the excitement about the metaverse and alternative realities.[7]

**Threats**

The tech sector has grown rapidly in recent years and there are many companies and startups that try to compete with Apple. Since Apple has such a diverse business, they face a lot of competition. And this competition means Apple's products have very short life cycles. Apple as an industry leader faces pressure to keep its products at the edge of innovation. Consumers expect a lot from Apple, and competitors and upstarts are always aiming to take some of Apple's market share. We believe that current, established competitors pose more of a threat to Apple than newer, smaller competition. Established players in the tech space have more access to capital to help finance growth in their business. Established firms also have the experience and customer base to immediately challenge Apple.[17]

Apple sources many of its chip components from overseas suppliers. Apple's sole supplier of chips is TSMC. In fact, Apple makes up roughly a quarter of TSMC's overall revenues.[26] This relationship, however, subjects Apple to a lot of dependency on TSMC. As U.S.-China relations continue to deteriorate, Apple will need to reevaluate their dependency with TSMC. Along with geopolitical risk, country risk is also another consideration companies are paying attention to now. Since Apple maintains customer and supplier relationships throughout the world, Apple must evaluate the threat of potential country policies that may negatively affect its business. The COVID lockdowns that took place in China over the summer are a prime example of country risk. Many of Apple's suppliers are based in China and the lockdowns led to constraints in Apple's supply chain during the lockdown period.

Relating to supply chains, the trend of nearshoring its business closer to the U.S. may pose short-term risks for Apple if they cannot find or build good relationships with closer suppliers. In addition, Apple will likely pay more to source raw components from closer suppliers. This could affect customers if Apple raises prices in response to higher costs of raw components. From the regulatory side, the EU has announced Apple must adopt USB-C in its devices. This announcement is bad for Apple because they still only support compatibility for the lightning cable in their most popular product, the iPhone.[33]

In 2022, Apple's foreign market presence has become a threat to the company itself. Apple has a large foreign presence, generating more than half its sales outside the U.S. However, this comes at a cost when the USD is strong. Apple faces significant foreign currency translation losses as a result. In fiscal year 2022, Apple had foreign currency translation losses of roughly $1.5 billion.[22]

## Industry Analysis

### Overview

The Information Technology sector includes manufacturers and service providers of tech software and hardware. The major industries in Information Technology are tech software and services, tech hardware and equipment, and semiconductors and semiconductor equipment. On the software side of the sector, companies develop software applications, internet tools, databases, data processing, and entertainment, among other services. On the hardware side of the sector, companies develop and manufacture smartphones, computers, wearables (headphones/earphones, smart speakers, etc.), communications equipment, semiconductors, and semiconductor equipment. Apple competes in many different industries in the sector, though it resides within the Technology Hardware, Storage, and Equipment sub-industry. The Technology Hardware, Storage & Peripherals sub-industry includes manufacturers of cellular phones, personal computers, servers, electronic computer components and peripherals (including data storage components, motherboards, audio and video cards, monitors, keyboards, printers and other peripherals).[20]

**Comparison to Industry and Competition**

Apple's top 3 competitors in the Technology Hardware, Storage & Peripherals industry are HP, Dell, and Motorola Solutions. Apple is, by far, the leader in the industry across various financial metrics. Apple generates 2x more revenue than the latter three combined at $394,328 million in 2022. Motorola is the smallest at $8,171 million as of its latest fiscal year, and we think that it is the most similar company to Apple in the industry.[1, 17]

Apple leads with a 28.3% free cash flow margin according to FactSet, compared to HP and Dell which fall below 10% margins and Motorola which has a 19.5% margin. It has a current assets to current liabilities ratio of 0.9x, greater than HP and Dell's 0.8x and less than Motorola's 1.3x, showing relatively strong liquidity. Lastly, Apple is trading at 24.49x earnings compared to HP and Dell's 5-6x, and Motorola's 36.67x, suggesting Apple could be undervalued compared to Motorola. Because Apple generates the highest free cash flow margin, at a scale much larger than its other 3 industry competitors, we believe that Apple is the industry's clear leader. Further, the companies that make up tech hardware, storage, and peripherals industry are particularly small compared to Apple. These companies may operate under different capital structures, have different abilities to access debt markets, have different target customers, and other financial characteristics that make comparing them to Apple difficult.[1]

As a result of this, we think that Apple's competition is better defined by the top players in each of its unique business segments. Apple competes with different companies at the highest level in each segment, namely large-cap tech companies. Microsoft (MSFT) offers the Windows operating system to compete against Apple's Mac operating system. Amazon (AMZN) and Netflix (NFLX) offer competing stream services with Apple TV+. Alphabet (GOOG) and Motorola Solutions (MSI) both sell smartphones that compete against the iPhone. Cisco Systems (CSCO) shares a similar market to Apple in providing communications services to businesses. Because these are all large-cap tech companies with similar financial profiles, they reflect the best comparable companies for Apple compared to other slower growth industry-specific comparables, and their P/E ratios will be a more accurate guide for Apple's relative valuation.

## Porter's Five Forces

**Threat of Substitute Products**

The threat of substitute products in the industry is low. There are no substitute products that pose an immediate threat to the most popular products in the industry currently. For the foreseeable future, devices such as smartphones, earphones, smart speakers, laptops, etc. are expected to be an integral part of our lives. There is not a new innovative product so far that threatens the market share of these products. However, the breadth of products in the industry is expansive and substitutes may develop over time for certain products.

**Bargaining Power of Suppliers**

The bargaining power of suppliers in the industry is low, with potential for being moderate. The industry is heavily concentrated at the top. Top firms control the majority of the industry's market share and subsequently command a lot of bargaining power. The suppliers for the industry are not as concentrated and top firms are able to procure supplies from a number of different suppliers.

We potentially see bargaining power shifting towards suppliers because of supply chain trends that have developed in the past year. These trends include the practice of "near-shoring", where manufacturers select suppliers that are of closer geographic proximity to the company. The growing popularity of near-shoring can be attributed to the need for more flexible supply chains in response to COVID-19 and the concern of geopolitical risk arising from the Russia-Ukraine conflict. Near-shoring may shift some bargaining power to suppliers as manufacturers become more selective with their suppliers. However, these effects are likely to be inconsequential because the top firms in the industry already possess significant bargaining power over suppliers.[17]

**Bargaining Power of Buyers**

The bargaining power of buyers in the industry is moderate. Consumers have many options among the products in the industry. The top firms offer similar products, and this gives power to the buyer to choose which one suits them the best. Buyers that are unhappy with one brand can easily switch to another brand that offers a similar alternative. Companies must continually innovate their existing line of products to stay relevant with the consumer. In addition, public relations matter a lot for companies and their bargaining power.

Companies that take PR hits may see consumer sentiment for their products fall, which can decrease market share. With that said, buyers are often loyal to a particular brand. The top firms in the industry understand the importance of building solid customer relationships and have built up a base of loyal buyers. This allows top companies in the industry to command their own bargaining power from buyers, such as through price increases in existing products.[17]

**Threat of New Entrants**

The threat of new entrants in the industry is low. The top firms in the industry are well-established and control most of the market share. The established firms have the resources and capital to continually innovate existing products and introduce new prototypes. Newer firms in the industry are at a disadvantage competing with established firms that have solidified customer relationships and have brand presence. To compete, newer firms must introduce products that can be differentiated from the major players. However, funding R&D and other research-related expenses when developing new products can be very capital intensive. Consumers will likely remain with brands they currently associate with because of brand loyalty.[17]

Existing companies that plan on entering the technology hardware, storage, and peripherals industry are likely to pose a greater threat to top firms than newer firms in the industry. Existing companies have the capital and brand recognition that can directly compete with the top firms. Yet, existing new entrants have generally found little success in capturing market share from the top firms in the industry.

**Rivalry Among Existing Players**

The rivalry among existing players in the industry is moderate. The top firms in the industry often compete in the same product category, such as smartphones, wearables, or personal computers. This naturally gives way to competition among these firms. With that said, the industry is also very broad, and many types of tech products are grouped into the tech hardware space.

Even though the top firms compete among the popular products in the space, they also have core competencies that their rivals do not. HP, Inc. for example, is an industry leader in developing printers and printer ink cartridges. This is a competency that HP's competitors do not possess. Each of the top firms in the industry possess their own unique competencies that allows for these firms to compete yet coexist with each other.

Rivalry will likely intensify if firms cannot continually offer products that satisfy their customer's expectations. Innovation is key to growing market share and retaining customers in the industry. If firms fall behind on the innovation cycle, other firms will try to capture market share. However, brand loyalty is very strong in the industry, and this diminishes the magnitude of competitive rivalry among the top firms.[1]

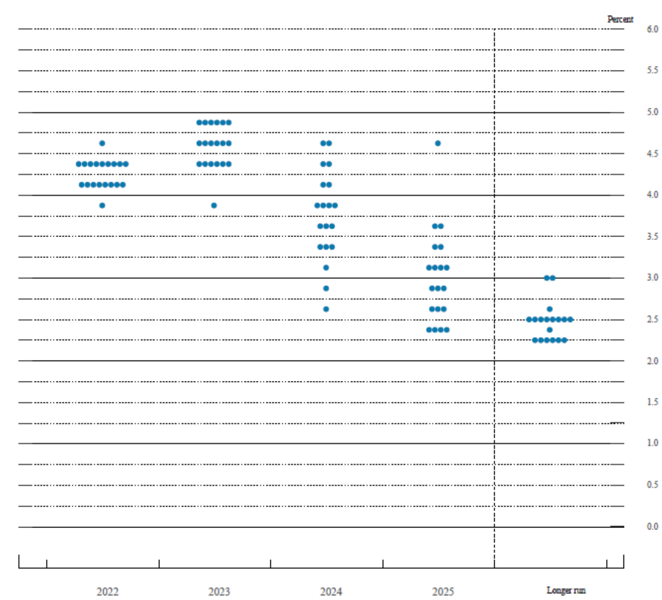
## Economic Analysis

**Interest Rates**

Interest rates are a particularly important economic gauge for the technology sector. Interest rates are guided by the federal funds rate, which is set by the U.S. Federal Reserve. The federal funds rate sets the interest rate that banks borrow from each other at in the overnight lending market, and it trickles down to influence the borrowing, saving, and treasury bond rates. In response to inflation, the Fed raised the federal funds rate to a range of 3.75% to 4.00% as of the latest FOMC meeting held in November.[23] Interest rates affect the sector because it impacts consumer demand and firm investment in growth. When looking at interest rate levels, we look specifically at the relationship that interest rates have on the 10-year treasury bond yield. We look at this relationship because the 10-year yield is the rate at which companies typically base their borrowing costs at. As interest rates increase, the 10-year yield will follow suit, decreasing a company's intrinsic value.[23]

We highlight the impact of interest rates because increases to the federal funds rate do two things that hinder growth in the tech sector. First, rising interest rates decrease consumer demand for discretionary products and services. As interest rates rise, the cost of financing for households increases. From mortgages to credit cards, people will face higher interest payments. The tech sector is adversely affected because it is overwhelmingly discretionary based. Consumers are going to dedicate more of their spending to ensuring they have consumer staples products, and as a result, the overall tech sector will be negatively impacted.

Second, rising interest rates increase the discount rate used in valuation models. Higher discount rates equate to a lower present value of cash flows. The tech sector is growth-oriented and achieves growth primarily through investment in future cash flow generating projects. As a result, tech companies tend to invest a lot of capital up front in projects and realize value in the form of higher present values of future cash flows once new products make it to the market. Therefore, we are seeing that a rise in rates results in a higher opportunity cost and expense to firms for investing in projects and thus less firm growth and profitability on its long-term cash flows to investors across the technology sector.




*Source: Financial Express*[25]

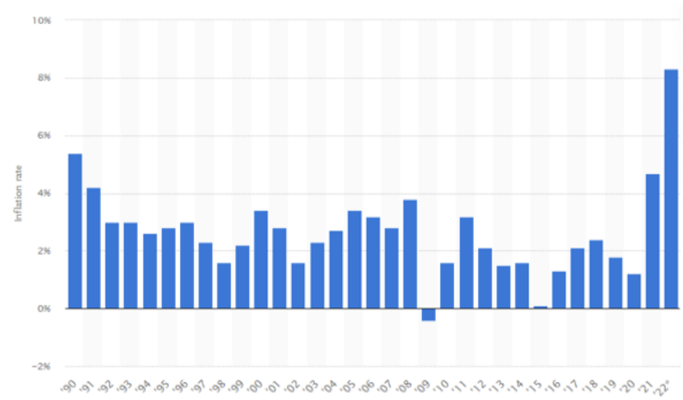
The chart above shows notes from the Fed's FOMC policy meeting in September 2022. The blue dots show each members' estimates for where rates will be in the coming years, and we looked to the median to create our forecasts. Following these insider estimates, we expect rates in the next 12 months to peg at roughly 4.75%, driven by the continued fight against inflation and aggressive contractionary policy. In the longer term (3+ years), we expect rates to loosen up and peg at

2.50% after inflation is relatively calmer, either because of a short recession or because the Fed's tightening policy worked as intended. Our forecast shows that in the short-term, the technology sector will hurt by a gloomy economic outlook resulting in risk-off behaviors. In the longer term, the technology sector will be comparable to the 2018-2019 period: higher growth levels and lower interest rates. In our model, we forecasted lower revenue growth in 2023E due to lower demand. In the rest of our forecast period, as important interest rates for consumers and businesses return to normal rates, we expect relatively high and stable growth across the firm. We discounted our projected free cash flows by a 9.16% Weighted Average Cost of Capital, which represents Apple's opportunity cost of financing today.

## Inflation

The rate at which inflation has increased in 2022 has made it a very crucial economic indicator in every industry, but especially technology. The latest CPI report showcases 7.7% Y/Y inflation, and the June CPI reached 9.1%, which is the highest CPI print since the early 1980s. The level of inflation impacts the tech sector by decreasing consumer purchasing power and confidence. Consumer confidence and spending are critical to the technology sector because consumer demand drives total profit. Many tech companies rely on economies of scale - they need profits to keep the company running while they reinvest into expansion and maintain high profit margins. Historically, the technology sector outperforms after input prices sharply decline (periods of low inflation).

The tech sector is highly dependent on consumer confidence because it is the consumer's confidence that dictates how much they are willing to consume. A less confident consumer will want to consume less. Two popular measures of consumer confidence are The Conference Board's Consumer Confidence Index and University of Michigan's Consumer Sentiment Survey. Both indices are down M/M as of their latest reports[19, 24]. Inflation is a big driver of consumer sentiment. When inflation is high, consumers have less purchasing power for their everyday expenses. This creates uncertainty and forces consumers to cut down on spending and allocate more of it to essentials. The impact is negative for the sector as sales growth slows when consumers slow down on spending.




*Source: Statista[26]*

The chart above shows the overall inflation rate (CPI) from 1990 to 2022. Since 1990, annual inflation rates have been low relative to 2022, providing an ideal environment for the growth of the technology sector. Since the beginning of 2022, inflation has been reaching historical levels with September 2022's numbers reading 7.7% year-over-year – the NASDAQ 100 Technology Sector Index is correspondingly down 36.0%.

We believe inflation rates in the future will be a function of the Fed's monetary policy against inflation. With Fed estimates in 2023 showing even higher interest rates, we expect inflation to stay this high in the short-term at 7.7% annualized going into early 2023. In the longer term, Fed estimates indicate lower rates, meaning they expect inflation to be calmer in 3+ years; we expect annual inflation to be 4.0% in 2026. For the tech sector, this means consumer spending and confidence will be down in 2023, but by 2026, we expect normal consumer behaviors to return. In our Apple model, we forecasted revenue growth across all segments to be dramatically lower in 2023E, but for the rest of our forecast period we expect a return to higher, stable growth rates as consumer confidence returns to higher levels over time.

## Real GDP

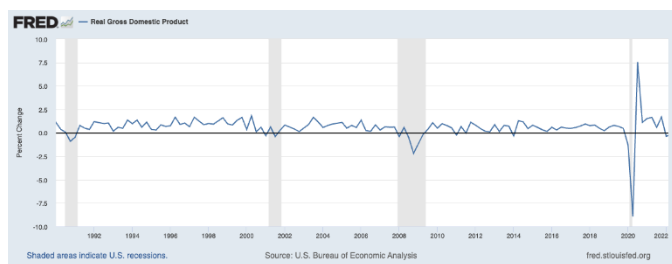
Real GDP is a measure of economic output adjusted for inflation. Economic output increases when the productivity of an economy increases. The tech sector historically outperforms during periods of increasing economic output and vice versa. In 2022, real GDP decreased in the first two quarters and increased by 2.6% in Q3. The tech-heavy NASDAQ during the same time is down nearly 30%, maintaining the historically positive correlation between Real GDP and tech sector performance. In addition, real GDP is used as a key warning sign for a recession when there are two consecutive quarters of falling real GDP. The U.S. would therefore be in a technical recession. Real GDP impacts the tech sector by affecting consumer demand and firm investment in growth.

When Real GDP decreases, economic output decreases. Decreases in economic output indicate stagnant job growth, stagnant wages, less spending, less investment, and a worse environment overall for companies. It is important to note that GDP actually grew in 2022 without adjusting for inflation, which means economic output did grow. However, the effects of inflation are what contribute to falling real GDP. Even as inflation begins to gradually subside, we believe real GDP growth will remain depressed in the near-term primarily due to interest rate hikes. The tech sector's growth is driven by consumer demand. When real GDP falls, consumers are less likely to consume as much. The problem is further exacerbated during periods of recessions. Consumers will adopt a "save first" strategy, which is detrimental to the sector because firms rely on continued consumer spending to drive growth.

Tech firms have fewer opportunities to invest in growth during periods of falling Real GDP. First, tech firms will have less profits to reinvest as a result of decreased consumer spending. Second, the investment opportunities available when the economy contracts are significantly less. This means tech firms will be less focused on growing and will instead look at reducing costs instead. The current layoffs being observed in big tech currently is an example of this.

We forecast Real GDP growth to be stagnant in the short term. The U.S. is currently in the late stages of the business cycle, which is characterized by slowing or negative real GDP growth. We believe the U.S. is or will be in a recession by the end of 2022, but we do not expect the recession to last long. Our short-term real GDP growth estimates are at 0.2%. We are much more optimistic about real GDP growth in the long run. Historically, recessions have not lasted more than a couple years and we believe the current period will reflect just that. The business cycle will enter its expansion period again and we expect annual real GDP growth to return to historic averages of around 2% by 2024. These estimates are in line with the IMF's estimates of global GDP growth.

The tech sector will struggle in 2023 as the economy slowly recovers from a recession. After 2023, the tech sector will return to growth as real GDP growth should increase again. To adjust for this in our forecast period, we projected slower revenue growth in 2023E driven by minimal GDP growth. We projected stronger revenue growth in 2024E and beyond as real GDP will start growing towards normal levels again.




*Source: FRED Economic Data*[30]

The chart above shows the U.S.'s Real GDP levels from 1990 – 2022. Notice how during periods of falling real GDP, such as in 2001, 2008, 2012, that tech stocks (NASDAQ as a proxy) underperformed.

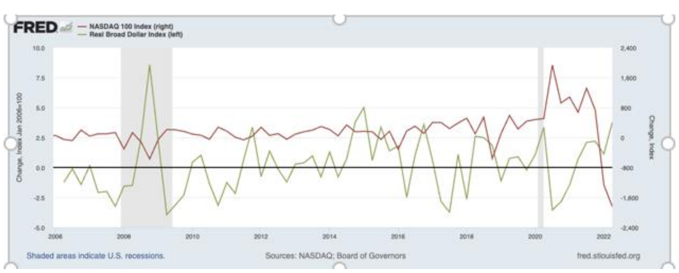
## Foreign Exchange Rates

Foreign exchange rates are a very important measure for the technology sector in 2022 due to the strong rise of the USD. The U.S. Dollar Index (DXY) reached a 52-week high of 114.78 in September. This is the highest level of the DXY since 2002. Foreign exchange rates impact the tech sector by affecting the global demand for U.S. exports, affecting how tech firms view their foreign operations, and ultimately affecting the profit realized from foreign sales[22].

Tech firms are disproportionately impacted by foreign exchange rates because a majority of the tech sector's sales are outside the U.S. It is estimated that around 59% of tech revenues are non-U.S. based. These foreign revenues will eventually be translated into USD. When the dollar's strength relative to other currencies is high, foreign currency translation effects become increasingly detrimental to tech firms.

A stronger USD will hurt overall demand in the tech sector. A stronger USD means it becomes relatively more expensive for other countries to import U.S. products and services. As a result, foreign consumers may consider non-U.S. based alternatives or decrease their consumption of U.S. exports. The tech sector realizes more profit from foreign consumers than any other sector.

Foreign exchange rates also impact how tech firms operate. During periods of a stronger USD, tech firms will more likely consider outsourcing labor and capital investment into foreign countries. This, however, may lead to more domestic unemployment within the tech sector.




*Source: FRED Economic Data[31]*

This chart shows the USD Real Broad Dollar Index (measuring dollar strength against foreign currencies) against the NASDAQ 100 Market Index (with significant tech exposure) from 2006 to 2022. This trend has continued since the 2008 recession, with the strong dollar coinciding with weak tech-heavy market performance.

We can confirm that this strong correlation exists not only by historical data, but by looking at today: the technology sector has been sharply underperforming, while the U.S. dollar has been greatly appreciating against other currencies, notably overtaking the Euro for the first time in two decades. In the short term, we expect this trend of a stronger USD to continue with the Real Broad Dollar Index reaching 127 in 2023 (from 121 today). In the long term, the technology sector will return from its economic downturn as forecasted with other macroeconomic variables, so we expect a Real Broad Dollar Index of 110 and a weaker USD by 2026.

This means that in the short term, the technology sector will continue its downwards trend, but in the long term the technology sector's growth and the value of the USD will return to pre-pandemic levels. Because Apple has significant international exposure, we forecasted lower revenue growth for all geographic segments, with international regions' growth rates being hurt the most in 2023E. We expect the dollar to weaken in 2024 and the rest of our forecast period, so we forecasted a similar growth across all regions beyond 2023E.

## The Supply Chain

In 2022, Apple CEO Tim Cook cited a $6 billion loss in Q4 2021 due to "supply constraints" that affected the iPhone, iPad, and Mac.[34] One factor resulting in the supply constraints is the ongoing chip shortage, resulting from pent-up pandemic and rapid digitalization demand growing faster than production capacity can increase. Another factor playing into this has been COVID-19-related disruptions in Southeast Asia, which have temporarily but significantly reduced production capacity at production facilities.

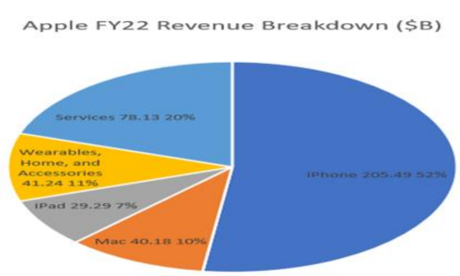
This has particularly affected Apple as their manufacturing operations are outsourced and lightly diversified geographically. Its three biggest suppliers are Foxconn, Wistron, and Pegatron, all based in the China-Taiwan region, and over 25% of their production facilities are located in China. This creates the risk of Apple's production falling victim to Chinese economic and political forces, such as COVID-19 restrictions placed on an iPhone assembly facility in Zhengzhou, China, significantly reducing the factory's production.[35]

Another supply constraint has been Apple's lack of diversification in suppliers. Its sole chip provider is Taiwan Semiconductor Manufacturing Company (TSMC), and recently Apple and TSMC have agreed to a price hike on chips for future products such as an iPhone 15.[36] In our model, we see these supply chain issues, and specifically the chip shortage, resolving soon in early 2023 as production capacity continues to increase and we move further away from the pandemic. Because of this, we forecasted product sales to still grow in 2023E and see them growing significantly faster in 2024 and beyond as Apple's supply will finally be able to meet the demand for its products.

## Valuation Analysis

**Revenue Decomposition**

Below is Apple's revenue breakdown in fiscal year 2022.




*Source: Apple 10-K[2]*

Overall, while forecasting our revenue, we found that Apple's business is going to be significantly hurt in 2023E and have lower growth across the board, in line with analyst estimates.

With company-specific factors, we believe that the iPhone, iPad, and Mac will see growth well below historical averages as these are Apple's oldest and most mature products. We do believe that the Wearables, Home, and Accessories and Services business segments will still see the strongest growth in 2023E as these are newer, growth-stage products, although still significantly below historical averages of growth.

With industry-specific factors, we found that Apple faces competition from and operates similarly to the biggest players because it is a market leader in each of its different business segments. We expect Apple to lead both its industry and competitors in resilience in revenue growth, shown in 2023E, and have consistent revenue growth for the rest of our forecast period.

Considering macroeconomic factors, we think that supply chain issues, higher inflation and interest rates, and slower RGDP growth will all slow Apple's growth in the short-term, in 2023E. However, we expect these macroeconomic issues to be eased in 2024E and the downward pressure on sales to be relieved throughout the rest of our forecast period.

Our final revenue decomposition showed 6.5% total revenue growth in 2023E, driven by high growth in the Wearables, Home, & Accessories (19.0%) and Services (11.6%) segments. Relatively low growth was seen in the iPhone (1.9%), Mac (6.0%), and iPad (8.0%) segments. In 2024E, we saw iPhone revenues stand out by rapidly growing at 13.0% and saw overall revenue growth at 11.9%, with each segment slowly decreasing in growth for the rest of the forecast period.

**Cost of Sales**

Management has provided minimal guidance regarding the breakdown of cost of sales, but they did note that new product and service introductions can impact their cost of sales. Cost of sales, which was broken down by operating segments Product and Services, was forecasted as a percentage of sales. Because Apple's products are rapidly changing, we believe a more recent 2-year historical average of cost of sales as a percentage of sales would be the most accurate estimate going forward. Our cost of products was straight-lined at 64%

of sales and our cost of services was straight-lined at 29% of sales for our entire forecast period.

**Operating Expenses**

Similarly, to cost of sales, management also lacks guidance regarding other operating expenses, such as research & development and selling, general, and administrative expenses. We found that within the past 5 years, operating expenses have stayed relatively stable as a percentage of sales. We used a 5-year historical average percentage of sales for both research & development and selling, general, and administrative expenses, straight-lining them at 6% and 7% of sales respectively for our entire forecast period.

**Capital Expenditures**

As technology companies have changed since the pandemic, we saw that Apple's capital expenditures changed as well. We saw that in FY21 and FY22, Apple had lower capital expenditures than what they historically have spent. We used a 2-year average of $10.90 billion to capture this change and then grew it by 20% to meet Apple's capital expenditures needs for their PP&E in 2023E. We continued this 20% growth until 2025 as we expect Apple to grow quickly over the next few years, and then grew capital expenditures at 8% for the rest of our forecast period.

**WACC**

To calculate Apple's Weighted Average Cost of Capital (WACC), we took the weighted average of our calculated cost of equity and after-tax cost of debt.

To calculate the cost of equity, we used the Capital Asset Pricing Model (CAPM). For our assumptions, we used the 10-year U.S. treasury bond as our risk-free rate at 3.81%; Damodaran's trailing 12-month implied equity risk premium, which was 4.59% as of November 2022; and Apple's 5-year daily beta of 1.22. We multiplied the equity risk premium by the beta and then added the risk-free rate to find a CAPM cost of equity of 9.41%.

For our pre-tax cost of debt, we took the Yield-to-Maturity of Apple's 10-year corporate bond which was 4.47%. In the 10-K, we found Apple's marginal tax rate of 28.87%. We then multiplied our pre-tax cost of debt by (1 – the marginal tax rate) to find a final after-tax cost of debt of 3.18%. We weighed the cost of equity and the cost of debt by the market value of each form of financing, and then added them together to find Apple's WACC of 9.14%.

**Cost of Equity**

We calculated the 9.41% cost of equity by using the Capital Asset Pricing Model. In the CAPM we used the risk-free rate of the 10-year treasury, Apple's 5-year daily beta, and the market's equity risk premium to identify the company's cost of equity. We chose the 10-year treasury risk-free rate of 3.81%, which matched our model's forecast horizon into fiscal year 2032. Identifying Apple's beta, we took the company's 5-year daily beta of 1.22 over other similar betas (5Y monthly: 1.25) as we believe it best represents Apple's volatility and risk compared to the rest of the current market. Our equity risk premium of 4.59% was taken from Damodaran's trailing 12-month implied equity risk premium as of November 2022. By utilizing these metrics, we multiplied Apple's beta by the Damodaran implied equity risk premium and added the 10-year risk-free rate to arrive at our cost of equity at 9.41%.

**Cost of Debt**

To arrive at the pre-tax cost of debt of 4.47%, we assumed a 10-year maturity on an Apple corporate bond which matched our forecast horizon. We subtracted the risk-free rate on the 10-year of 3.81% from the company's pre-tax cost of debt to get our implied default premium of 0.65%. Finally, multiplying Apple's estimated pre-tax cost of debt by (1 - the marginal tax rate of 28.87%) from Apple's 10-K resulted in an after-tax cost of debt of 3.18%.

## Valuation Models

**Discounted Cash Flow & Economic Profit ("DCF"/"EP")**

For Apple's discounted cash flow model, we forecasted the company's free cash flow to the firm out 10 years into the future and arrived at a continued value using a steady-state NOPLAT growth rate of 3.56%. Adding these future cash flows together, we discounted all of Apple's cash flows to present value using Apple's WACC of 9.14%, resulting in our value of operating assets. After adjusting for non-operating adjustments and dividing by shares outstanding, we arrived at an intrinsic equity value price of $161 per share after making year-end adjustments. For the economic profit (EP) model, we followed the same process except we used Apple's present value of economic profits and added our last fiscal year's invested capital. After adjustments and dividing by shares outstanding, we found the same intrinsic share price of $161.

We remain confident that the DCF and EP models translate to the true intrinsic value of Apple's equity because its historically strong cash flow generation is what has driven the company to be a world leader in technology. We acknowledge that the current economic conditions and supply chain challenges poses to the company's operations as indicated by our cost of equity using a trailing 12-month implied equity risk premium, which represents the challenges that the market has been facing in 2022.

**Dividend Discount Model ("DDM")**

For Apple's Dividend Discount Model, we projected Apple's earnings per share (EPS) into 2032E. To calculate Apple's earnings per share, we divided our forecasted net income by Apple's 2-year weighted average shares outstanding. An assumption we made is that Apple would continue its aggressive share repurchase program, growing the annual value of share repurchases by 10% a year for the next 10 years and resulting in a similar amount of shares being repurchased each year. This will be Apple's biggest driver of EPS growth.

Another assumption we made is that Apple will continue its $0.05 increase in dividends per share throughout our projection period. Discounting by the cost of equity, we found the present values of annual dividends per share into 2031E. Using a 134.80% ROE and 4.00% CV growth of EPS, we found the continuing value and discounted that by cost of equity as well. Adding the present value of these cash flows together and making year-end adjustments, we found an intrinsic price of $160.67 per Apple share. We believe that the Dividend Discount Model is an accurate representation of the intrinsic value of Apple's equity because Apple has a strong track record of delivering both dividends and continued EPS growth to shareholders.

**Relative Price-to-Earnings ("P/E")**

For our relative price-to-earnings models, we took Apple's biggest competitors in its biggest business segments as detailed in our industry analysis, and we felt that they represented appropriate comparable companies given their similar business, financial, and growth profiles. When comparing multiples, we excluded companies that felt like outliers to the rest of the comparable companies set and found the average multiple of the remaining companies. We applied these multiples to Apple's financial metrics to find a relative valuation. Our comparable companies were priced as of 11/11/2022 and their implied earnings estimates for the next two years were taken from FactSet consensus analyst estimates. The average P/E multiples of Apple's comparable companies were 26.01x and 23.61x for 2022E and 2023E respectively. Apple's lower P/E at 22.00x and 19.00x on a 1-year forward and 2-year forward basis respectively can indicate that the company is currently undervalued relative to its peers. The lower multiple can be explained by ongoing supply chain challenges and a 14% year-over-year drop in production to now 52 million units of iPhones, driven by declining sales from consumer pessimism given the current economic outlook.

The 5-year estimated earnings-per-share (EPS) growth was also taken from FactSet, and we divided the comparable P/E multiples by their estimated growth rates, standardizing the multiple. This resulted in an average PEG multiple of 2.03 and 1.99 for 2022E and 2023E respectively. Apple's PEG ratios are lower at 1.7 and 1.5 on a 1-year forward and 2-year forward basis, which further demonstrates that the company is trading at cheaper levels than its competitors even when considering growth.

When deciding which valuation metric to use for our relative valuation, we chose a P/E multiple which substantially increased Apple's intrinsic share price to $177-186 at peer multiples. This metric plays to Apple's greatest strength of providing returns to shareholders. For equity investors, Apple's best measure of value would be comparing equity returns. We think that Apple's relative P/E share price is the most accurate valuation in our report.

## Sensitivity Analysis

To test the impact of our assumptions, we created six sensitivity tables based off our DCF or DDM valuations (noted in the top left of each table). Numbers typed in green represent values that are above Apple's current share price; numbers typed in black represent anything below that price. Relatively higher intrinsic share values will have darker green shading of cells.

### Cost of Equity vs. Pre-Tax Cost of Debt

The cost of equity and pre-tax cost of debt are the two major factors in determining Apple's cash flow discount rate, which has a huge impact on our final valuation in the DCF and Dividend Discount Model. We sensitivity tested these two variables against our discounted cash flow valuation to see how much our price moves if we were to assume a higher or lower discount rate. As we move the cost of equity down to 8.81%, we see Apple's intrinsic share price go from the $161 range to the $180 range; when cost of equity increases to 10.01%, assuming a riskier market, we see it move down towards the $146 range. As we move the pre-tax cost of debt upwards and downwards, resembling Apple's corporate bond, we see that this barely affects Apple's intrinsic share price, with differences being in the cents.

| | | Cost of Equity | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *DCF* | $ 161.26 | 10.01% | 9.81% | 9.61% | **9.41%** | 9.21% | 9.01% | 8.81% |
| Pre-Tax Cost of Debt | 4.17% | 146.38 | 151.10 | 156.14 | 161.50 | 167.29 | 173.49 | 180.17 |
| | 4.27% | 146.31 | 151.03 | 156.06 | 161.42 | 167.20 | 173.40 | 180.07 |
| | 4.37% | 146.24 | 150.96 | 155.98 | 161.33 | 167.11 | 173.30 | 179.96 |
| | **4.47%** | 146.18 | 150.89 | 155.91 | 161.26 | 167.03 | 173.21 | 179.86 |
| | 4.57% | 146.11 | 150.81 | 155.83 | 161.17 | 166.94 | 173.11 | 179.75 |
| | 4.67% | 146.04 | 150.74 | 155.75 | 161.09 | 166.85 | 173.01 | 179.65 |
| | 4.77% | 145.97 | 150.67 | 155.67 | 161.00 | 166.76 | 172.92 | 179.55 |

### WACC vs. CV Growth of NOPLAT

Apple's CV growth of NOPLAT and its Weighted Average Cost of Capital are the two main drivers of the discounted cash flow valuation. Apple's continuing value makes up 70% of its total intrinsic valuation, which is common for discounted cash flow models. Apple's projection period free cash flows and this continuing value are discounted by the WACC, meaning the valuation should be very sensitive to our discount rate.

As we increase the CV growth of NOPLAT towards 4.16%, we see Apple's intrinsic share price increase to the range of $173; when we decrease the CV growth towards 2.96%, we see the share price drop to the range of $152. As we decrease our WACC towards 8.54%, we see an upside in the range of $181. Towards the higher rate of 9.74%, we see a downside near $145. The final valuation of Apple's share price has very high sensitivity to both our CV growth and WACC assumptions.

| | | CV Growth of NOPLAT | | | | | | |
|---|---|---|---|---|---|---|---|---|
| *DCF* | $ 161.26 | 2.96% | 3.16% | 3.36% | **3.56%** | 3.76% | 3.96% | 4.16% |
| WACC | 8.54% | 168.44 | 172.25 | 176.35 | 180.79 | 185.59 | 190.81 | 196.51 |
| | 8.74% | 162.48 | 165.96 | 169.70 | 173.73 | 178.08 | 182.79 | 187.92 |
| | 8.94% | 156.92 | 160.11 | 163.53 | 167.20 | 171.15 | 175.42 | 180.05 |
| | **9.14%** | 151.83 | 154.76 | 157.90 | 161.26 | 164.86 | 168.75 | 172.95 |
| | 9.34% | 146.86 | 149.55 | 152.43 | 155.50 | 158.79 | 162.33 | 166.14 |
| | 9.54% | 142.30 | 144.78 | 147.42 | 150.24 | 153.26 | 156.49 | 159.96 |
| | 9.74% | 138.00 | 140.29 | 142.73 | 145.33 | 148.09 | 151.05 | 154.23 |

### Beta vs. Equity Risk Premium

Apple's beta and the equity risk premium are crucial metrics for calculating WACC in the discounted cash flow analysis model and dividend discount model. We sensitivity tested variables against our discounted cash flow valuation to gain insight into the volatility of Apple's intrinsic share price when reacting to these cost of equity assumptions. As we decrease the Beta to 1.07, Apple's intrinsic value rises to around $183 given less risk relative to the overall market; when we increase it to 1.37, we see a downside near $144. As we decrease the equity risk premium to 4.29%, this implies less risk to Apple's cash flows and investors are more willing to hold equities in their portfolio, and we see Apple's intrinsic share value increase to the range of $172. When this increases to 4.89%, Apple's price decreases to nearly $152. The discounted cash flow model is very sensitive to both the beta and equity risk premium assumptions.

| | | Beta | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **DCF** | $ 161.26 | 1.37 | 1.32 | 1.27 | **1.22** | 1.17 | 1.12 | 1.07 |
| Equity Risk Premium | 4.29% | 153.90 | 159.53 | 165.57 | 172.10 | 179.17 | 186.83 | 195.19 |
| | 4.39% | 150.52 | 156.02 | 161.94 | 168.33 | 175.24 | 182.75 | 190.93 |
| | 4.49% | 147.28 | 152.66 | 158.46 | 164.72 | 171.49 | 178.84 | 186.85 |
| | **4.59%** | 144.17 | 149.45 | 155.13 | 161.26 | 167.89 | 175.09 | 182.95 |
| | 4.69% | 141.20 | 146.37 | 151.93 | 157.94 | 164.44 | 171.50 | 179.20 |
| | 4.79% | 138.34 | 143.41 | 148.87 | 154.76 | 161.13 | 168.06 | 175.60 |
| | 4.89% | 135.60 | 140.57 | 145.92 | 151.70 | 157.95 | 164.74 | 172.15 |

## iPhone Annual % Decrease vs. Services Decrease

To test the growth of Apple's two biggest business segments and analyze the impact these assumptions on its intrinsic share price, we created a sensitivity analysis testing the iPhone segment's revenue growth over time against the Services segment's revenue growth over time. As we decrease the annual revenue taper of the iPhone segment, we see that intrinsic share price increases up to $5 in the range of $166; when this increases, it sees an intrinsic downside of around $157. As we decrease the annual revenue taper of the Services segment, we see a similar story, with share price increasing up to near $167; when this increases, it falls towards $156. Based off this, we see that these small growth changes of 0.1% have a moderate effect on our final valuation and that the iPhone and Services segments both play a big role in determining Apple's intrinsic share value.

| | | iPhone Annual % Decrease | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **DCF** | $ 161.26 | -1.55% | -1.45% | -1.35% | **-1.25%** | -1.15% | -1.05% | -0.95% |
| Services Decrease | -0.60% | 162.93 | 164.36 | 165.83 | 167.33 | 168.88 | 170.47 | 172.10 |
| | -0.70% | 160.84 | 162.27 | 163.73 | 165.24 | 166.79 | 168.37 | 170.00 |
| | -0.80% | 158.81 | 160.24 | 161.71 | 163.21 | 164.76 | 166.35 | 167.98 |
| | **-0.90%** | 156.86 | 158.28 | 159.75 | 161.26 | 162.80 | 164.39 | 166.02 |
| | -1.00% | 154.96 | 156.39 | 157.85 | 159.36 | 160.91 | 162.49 | 164.12 |
| | -1.10% | 153.13 | 154.56 | 156.02 | 157.53 | 159.07 | 160.66 | 162.29 |
| | -1.20% | 151.36 | 152.78 | 154.25 | 155.76 | 157.30 | 158.89 | 160.52 |

## Cost of Sales (Products) vs. Cost of Sales (Services)

Cost of products and cost of services are crucial performance metrics for determining the gross margins of products and services. We sensitivity tested both variables against our discounted cash flow valuation model to determine how differing cost structures related to the sales of products and services can affect Apple's intrinsic share price. As we decrease cost of products to 61.68%, Apple's intrinsic price rises to $172 given less risk to its cost structure; however, with an increase in cost of products to 65.68%, we see the intrinsic price's downside approaching $155 given greater risk to the company's operations.

Additionally, when we decrease the cost of services, we see upside with Apple's intrinsic share price trading at $163; meanwhile, as we increase cost of services, it results in an intrinsic downside of $160. Given this data, we see greater deviations in Apple's intrinsic share price as we increase cost of products, but smaller deviation when we increase cost of services.

| | | Cost of Sales (Products) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **DCF** | $ 161.26 | -65.68% | -65.18% | -64.68% | **-64.18%** | -63.68% | -63.18% | -61.68% |
| Cost of Sales (Services) | -27.77% | 156.40 | 158.56 | 160.72 | 162.87 | 165.04 | 167.21 | 173.69 |
| | -28.27% | 155.86 | 158.02 | 160.18 | 162.33 | 164.51 | 166.67 | 173.15 |
| | -28.77% | 155.32 | 157.48 | 159.64 | 161.79 | 163.97 | 166.13 | 172.61 |
| | **-29.27%** | 154.79 | 156.95 | 159.11 | 161.26 | 163.43 | 165.59 | 172.08 |
| | -29.77% | 154.24 | 156.41 | 158.57 | 160.71 | 162.89 | 165.05 | 171.53 |
| | -30.27% | 153.71 | 155.87 | 158.03 | 160.17 | 162.35 | 164.51 | 170.99 |
| | -30.77% | 153.17 | 155.33 | 157.49 | 159.64 | 161.81 | 163.97 | 170.46 |

## CV Growth of EPS vs. Cost of Equity (DDM)

For our Dividend Discount Model, we decided to sensitivity test our two biggest assumptions, CV growth of EPS and cost of equity, to see how this affected our final intrinsic share price. The CV growth of EPS affects our continuing value, which is about 95% of Apple's intrinsic cash flows in the DDM. As the CV growth of EPS increases towards 4.75%, the intrinsic share value reaches the $184 range. As it decreases towards 3.25%, the price reaches the $143 range. The cost of equity discounts the dividends and continuing value, so it should have a large impact on our final valuation. As the cost of equity decreases towards 8.81%, we see a large upside at $191 intrinsic share price; as it increases towards 10.01%, we see a downside at $137. We believe that the upside is likely in our sensitivity table since we capped the CV growth of EPS at the economic growth rate, even though Apple's EPS growth will be higher than that for a longer time than our forecast period.

| | | CV Growth of EPS | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **DDM** | $ 160.67 | 3.25% | 3.50% | 3.75% | **4.00%** | 4.25% | 4.50% | 4.75% |
| Cost of Equity | 8.81% | 167.45 | 174.71 | 182.68 | 191.48 | 201.24 | 212.14 | 224.38 |
| | 9.01% | 158.54 | 165.14 | 172.36 | 180.31 | 189.08 | 198.84 | 209.73 |
| | 9.21% | 150.31 | 156.33 | 162.89 | 170.09 | 178.01 | 186.77 | 196.51 |
| | **9.41%** | 142.67 | 148.16 | 154.14 | 160.67 | 167.84 | 175.73 | 184.47 |
| | 9.61% | 135.63 | 140.66 | 146.13 | 152.08 | 158.59 | 165.73 | 173.61 |
| | 9.81% | 129.06 | 133.68 | 138.68 | 144.12 | 150.04 | 156.52 | 163.64 |
| | 10.01% | 122.94 | 127.19 | 131.78 | 136.76 | 142.16 | 148.06 | 154.52 |

## Important Disclaimer

This report was created by students enrolled in the Applied Equity Valuation class at the University of Iowa. The report was originally created to offer an internal investment recommendation for the University of Iowa Krause Fund and its advisory board. The report also provides potential employers and other interested parties an example of the students' skills, knowledge and abilities. Members of the Krause Fund are not registered investment advisors, brokers or officially licensed financial professionals. The investment advice contained in this report does not represent an offer or solicitation to buy or sell any of the securities mentioned. Unless otherwise noted, facts and figures included in this report are from publicly available sources. This report is not a complete compilation of data, and its accuracy is not guaranteed. From time to time, the University of Iowa, its faculty, staff, students, or the Krause Fund may hold a financial interest in the companies mentioned in this report.

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**Apple Inc.**

*Revenue Decomposition*

All figures in billions of USD

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Revenue Breakdown | | | | | | | | | | | | | | | |
| **iPhone** | 164.89 | 142.38 | 137.78 | 191.97 | 205.49 | 209.39 | 236.61 | 264.42 | 292.18 | 319.21 | 344.74 | 368.01 | 388.25 | 404.76 | 419.93 |
| % of total revenue | 62.1% | 54.7% | 50.2% | 52.5% | 52.1% | 49.9% | 50.4% | 50.8% | 51.1% | 51.3% | 51.4% | 51.5% | 51.5% | 51.5% | 51.5% |
| Segment Growth (YOY) | 18.3% | -13.6% | -3.2% | 39.3% | 7.0% | **1.9%** | **13.0%** | 11.8% | 10.5% | 9.3% | 8.0% | 6.8% | 5.5% | 4.3% | 3.8% |
| **Mac** | 25.20 | 25.74 | 28.62 | 35.19 | 40.18 | 42.59 | 45.04 | 47.51 | 50.01 | 52.51 | 55.00 | 57.48 | 59.92 | 62.32 | 64.50 |
| % of total revenue | 9.5% | 9.9% | 10.4% | 9.6% | 10.2% | 10.1% | 9.6% | 9.1% | 8.7% | 8.4% | 8.2% | 8.0% | 8.0% | 7.9% | 7.9% |
| Segment Growth (YOY) | -1.5% | 2.2% | 11.2% | 22.9% | 14.2% | **6.0%** | 5.8% | 5.5% | 5.3% | 5.0% | 4.8% | 4.5% | 4.3% | 4.0% | 3.5% |
| **iPad** | 18.38 | 21.28 | 23.72 | 31.86 | 29.29 | 31.64 | 34.01 | 36.39 | 38.75 | 41.08 | 43.34 | 45.51 | 47.55 | 49.46 | 51.04 |
| % of total revenue | 6.9% | 8.2% | 8.6% | 8.7% | 7.4% | 7.5% | 7.2% | 7.0% | 6.8% | 6.6% | 6.5% | 6.4% | 6.3% | 6.3% | 6.3% |
| Segment Growth (YOY) | -2.2% | 15.8% | 11.5% | 34.3% | -8.1% | **8.0%** | 7.5% | 7.0% | 6.5% | 6.0% | 5.5% | 5.0% | 4.5% | 4.0% | 3.2% |
| **Wearables, Home, and Accessories** | 17.38 | 24.48 | 30.62 | 38.37 | 41.24 | 49.08 | 57.54 | 66.46 | 75.60 | 84.67 | 93.35 | 101.29 | 108.12 | 113.53 | 117.50 |
| % of total revenue | 6.5% | 9.4% | 11.2% | 10.5% | 10.5% | 11.7% | 12.2% | 12.8% | 13.2% | 13.6% | 13.9% | 14.2% | 14.3% | 14.4% | 14.4% |
| Segment Growth (YOY) | 35.5% | 40.9% | 25.1% | 25.3% | 7.5% | **19.0%** | 17.3% | 15.5% | 13.8% | 12.0% | 10.3% | 8.5% | 6.7% | 5.0% | 3.5% |
| **Services** | 39.75 | 46.29 | 53.77 | 68.43 | 78.13 | 87.22 | 96.58 | 106.08 | 115.56 | 124.85 | 133.75 | 142.09 | 149.68 | 156.31 | 161.68 |
| % of total revenue | 15.0% | 17.8% | 19.6% | 18.7% | 19.8% | 20.8% | 20.6% | 20.4% | 20.2% | 20.1% | 20.0% | 19.9% | 19.9% | 19.9% | 19.8% |
| Segment Growth (YOY) | 21.6% | 16.5% | 16.2% | 27.3% | 14.2% | **11.6%** | 10.7% | 9.8% | 8.9% | 8.0% | 7.1% | 6.2% | 5.3% | 4.4% | 3.4% |
| **Total Revenue** | 265.60 | 260.17 | 274.52 | 365.82 | 394.33 | 419.91 | 469.78 | 520.86 | 572.10 | 622.31 | 670.19 | 714.38 | 753.53 | 786.37 | 814.66 |
| Total Revenue Growth (YOY) | 15.9% | -2.0% | 5.5% | 33.3% | 7.8% | 6.5% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| Geographic Revenue Breakdown | | | | | | | | | | | | | | | |
| **Americas** | 112.09 | 116.91 | 124.56 | 153.31 | 169.66 | 184.76 | 206.71 | 229.18 | 251.73 | 273.82 | 294.88 | 314.33 | 331.55 | 346.00 | 358.45 |
| % of total revenue | 42.2% | 44.9% | 45.4% | 41.9% | 43.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% | 44.0% |
| Segment Growth (YOY) | 16.0% | 4.3% | 6.5% | 23.1% | 10.7% | 8.9% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| **Europe** | 62.42 | 60.29 | 68.64 | 89.31 | 95.12 | 96.58 | 108.05 | 119.80 | 131.58 | 143.13 | 154.14 | 164.31 | 173.31 | 180.87 | 187.37 |
| % of total revenue | 23.5% | 23.2% | 25.0% | 24.4% | 24.1% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% | 23.0% |
| Segment Growth (YOY) | 13.6% | -3.4% | 13.9% | 30.1% | 6.5% | 1.5% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| **Greater China** | 51.94 | 43.68 | 40.31 | 68.37 | 74.20 | 79.78 | 89.26 | 98.96 | 108.70 | 118.24 | 127.34 | 135.73 | 143.17 | 149.41 | 154.78 |
| % of total revenue | 19.6% | 16.8% | 14.7% | 18.7% | 18.8% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% | 19.0% |
| Segment Growth (YOY) | 16.0% | -15.9% | -7.7% | 69.6% | 8.5% | 7.5% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| **Japan** | 21.73 | 21.51 | 21.42 | 28.48 | 25.98 | 29.39 | 32.88 | 36.46 | 40.05 | 43.56 | 46.91 | 50.01 | 52.75 | 55.05 | 57.03 |
| % of total revenue | 8.2% | 8.3% | 7.8% | 7.8% | 6.6% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% |
| Segment Growth (YOY) | 22.6% | -1.0% | -0.4% | 33.0% | -8.8% | 13.2% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| **Rest of Asia Pacific** | 17.41 | 17.79 | 19.59 | 26.36 | 29.38 | 29.39 | 32.88 | 36.46 | 40.05 | 43.56 | 46.91 | 50.01 | 52.75 | 55.05 | 57.03 |
| % of total revenue | 6.6% | 6.8% | 7.1% | 7.2% | 7.4% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% |
| Segment Growth (YOY) | 14.5% | 2.2% | 10.1% | 34.5% | 11.5% | 0.1% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |
| **Total Revenue** | 265.60 | 260.17 | 274.52 | 365.82 | 394.33 | 419.91 | 469.78 | 520.86 | 572.10 | 622.31 | 670.19 | 714.38 | 753.53 | 786.37 | 814.66 |
| Total Revenue Growth (YOY) | 15.9% | -2.0% | 5.5% | 33.3% | 7.8% | 6.5% | 11.9% | 10.9% | 9.8% | 8.8% | 7.7% | 6.6% | 5.5% | 4.4% | 3.6% |

**Apple Inc.**

*Income Statement*

All figures in billions of USD except p/share or labeled

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Net sales** | 265.60 | 260.17 | 274.52 | 365.82 | 394.33 | **419.91** | **469.78** | **520.86** | **572.10** | **622.31** | **670.19** | **714.38** | **753.53** | **786.37** | **814.66** |
| Products | 225.85 | 213.88 | 220.75 | 297.39 | 316.20 | 332.69 | 373.20 | 414.78 | 456.54 | 497.47 | 536.44 | 572.28 | 603.85 | 630.06 | 652.97 |
| Services | 39.75 | 46.29 | 53.77 | 68.43 | 78.13 | 87.22 | 96.58 | 106.08 | 115.56 | 124.85 | 133.75 | 142.09 | 149.68 | 156.31 | 161.68 |
| **Cost of sales (Excluding D&A)** | (152.85) | (149.24) | (158.50) | (201.70) | (212.45) | **(226.33)** | **(254.97)** | **(283.57)** | **(311.60)** | **(339.05)** | **(365.10)** | **(388.93)** | **(409.70)** | **(426.65)** | **(441.00)** |
| **Less Depreciation and Amortization** | (10.90) | (12.55) | (11.06) | (11.28) | (11.10) | **(12.73)** | **(12.83)** | **(13.70)** | **(15.25)** | **(16.78)** | **(18.35)** | **(19.97)** | **(21.68)** | **(23.49)** | **(25.42)** |
| Products | (148.16) | (145.00) | (151.29) | (192.27) | (201.47) | (213.53) | (239.53) | (266.22) | (293.02) | (319.29) | (344.30) | (367.31) | (387.57) | (404.39) | (419.10) |
| Services | (15.59) | (16.79) | (18.27) | (20.72) | (22.08) | (25.53) | (28.27) | (31.05) | (33.82) | (36.54) | (39.15) | (41.59) | (43.81) | (45.75) | (47.32) |
| | | | | | | | | | | | | | | | |
| **Gross margin** | 101.84 | 98.39 | 104.96 | 152.84 | 170.78 | **180.85** | **201.98** | **223.59** | **245.26** | **266.48** | **286.74** | **305.48** | **322.15** | **336.23** | **348.24** |
| | | | | | | | | | | | | | | | |
| **Total operating expenses** | (30.94) | (34.46) | (38.67) | (43.89) | (51.35) | **(53.75)** | **(60.13)** | **(66.67)** | **(73.23)** | **(79.65)** | **(85.78)** | **(91.44)** | **(96.45)** | **(100.65)** | **(104.27)** |
| Research and development | (14.24) | (16.22) | (18.75) | (21.91) | (26.25) | (26.09) | (29.19) | (32.37) | (35.55) | (38.67) | (41.65) | (44.39) | (46.83) | (48.87) | (50.63) |
| Selling, general and administrative | (16.71) | (18.25) | (19.92) | (21.97) | (25.09) | (27.65) | (30.94) | (34.30) | (37.67) | (40.98) | (44.13) | (47.04) | (49.62) | (51.78) | (53.65) |
| | | | | | | | | | | | | | | | |
| **Operating income** | 70.90 | 63.93 | 66.29 | 108.95 | 119.44 | **127.11** | **141.85** | **156.93** | **172.03** | **186.83** | **200.96** | **214.04** | **225.70** | **235.58** | **243.96** |
| | | | | | | | | | | | | | | | |
| Other income / expense, net | 2.01 | 1.81 | 0.80 | 0.26 | (0.33) | 0.14 | 0.15 | 0.17 | 0.19 | 0.22 | 0.25 | 0.27 | 0.29 | 0.31 | 0.31 |
| Income before provision for income taxes | 72.90 | 65.74 | 67.09 | 109.21 | 119.10 | **127.25** | **142.00** | **157.10** | **172.22** | **187.05** | **201.20** | **214.31** | **225.99** | **235.88** | **244.27** |
| Provision for income taxes | (13.37) | (10.48) | (9.68) | (14.53) | (19.30) | (20.61) | (23.00) | (25.45) | (27.90) | (30.30) | (32.60) | (34.72) | (36.61) | (38.21) | (39.57) |
| Net income | 59.53 | 55.26 | 57.41 | 94.68 | 99.80 | **106.63** | **119.00** | **131.65** | **144.32** | **156.75** | **168.61** | **179.59** | **189.38** | **197.67** | **204.70** |
| | | | | | | | | | | | | | | | |
| **Other Equity Information** | | | | | | | | | | | | | | | |
| Basic Earnings Per Share | 3.00 | 2.99 | 3.31 | 5.67 | 6.15 | 6.81 | 7.87 | 9.02 | 10.27 | 11.60 | 13.01 | 14.47 | 15.98 | 17.52 | 19.11 |
| Annual Dividends Per Share ($) | 0.68 | 0.75 | 0.80 | 0.85 | 0.90 | **0.95** | **1.00** | **1.05** | **1.10** | **1.15** | **1.20** | **1.25** | **1.30** | **1.35** | **1.40** |
| Basic Total Shares Outstanding (M) | 19,020 | 17,773 | 16,977 | 16,427 | 15,943 | 15,386 | 14,858 | 14,323 | 13,784 | 13,238 | 12,687 | 12,129 | 11,566 | 10,997 | 10,422 |
| Basic Weighted Average Shares Outstanding (M) | 19,822 | 18,471 | 17,352 | 16,701 | 16,216 | **15,665** | **15,122** | **14,591** | **14,054** | **13,511** | **12,962** | **12,408** | **11,848** | **11,281** | **10,709** |

**Apple Inc.**
*Balance Sheet*
All figures in billions of USD except p/share or labeled

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total assets** | 365.73 | 338.52 | 323.89 | 351.00 | 352.76 | **374.57** | **417.53** | **466.96** | **518.54** | **569.99** | **619.35** | **663.71** | **699.67** | **723.49** | **733.46** |
| **Total current assets** | 131.34 | 162.82 | 143.71 | 134.84 | 135.41 | **146.44** | **164.49** | **186.21** | **210.04** | **234.11** | **256.94** | **276.11** | **288.78** | **291.68** | **282.30** |
| Cash and cash equivalents | 25.91 | 48.84 | 38.02 | 34.94 | 23.65 | 27.49 | 36.71 | 49.37 | 64.09 | 79.20 | 93.46 | 104.67 | 110.23 | 107.10 | 92.48 |
| Short-term marketable securities | 40.39 | 51.71 | 52.93 | 27.70 | 24.66 | 24.80 | 24.95 | 25.12 | 25.31 | 25.53 | 25.78 | 26.05 | 26.34 | 26.64 | 26.95 |
| Accounts receivable, less allowances | 23.19 | 22.93 | 16.12 | 26.28 | 28.18 | 31.70 | 35.46 | 39.32 | 43.19 | 46.98 | 50.59 | 53.93 | 56.88 | 59.36 | 61.50 |
| Inventories | 3.96 | 4.11 | 4.06 | 6.58 | 4.95 | 6.38 | 7.14 | 7.92 | 8.70 | 9.46 | 10.19 | 10.86 | 11.45 | 11.95 | 12.38 |
| Vendor non-trade receivables | 25.81 | 22.88 | 21.33 | 25.23 | 32.75 | 34.84 | 38.97 | 43.21 | 47.46 | 51.63 | 55.60 | 59.26 | 62.51 | 65.24 | 67.58 |
| Other current assets | 12.09 | 12.35 | 11.26 | 14.11 | 21.22 | 21.24 | 21.26 | 21.28 | 21.29 | 21.31 | 21.33 | 21.35 | 21.36 | 21.38 | 21.40 |
| **Total non-current assets** | 234.39 | 175.70 | 180.18 | 216.17 | 217.35 | **228.13** | **253.03** | **280.75** | **308.50** | **335.87** | **362.41** | **387.59** | **410.89** | **431.81** | **451.16** |
| Long-term marketable securities | 170.80 | 105.34 | 100.89 | 127.88 | 120.81 | 128.64 | 143.92 | 159.57 | 175.27 | 190.65 | 205.32 | 218.85 | 230.85 | 240.91 | 249.57 |
| Property, plant and equipment, net | 41.30 | 37.38 | 36.77 | 39.44 | 42.12 | 42.47 | 45.33 | 50.46 | 55.55 | 60.73 | 66.10 | 71.74 | 77.73 | 84.12 | 90.98 |
| **Other non-current assets** | 22.28 | 32.98 | 42.52 | 48.85 | 54.43 | **57.02** | **63.79** | **70.72** | **77.68** | **84.50** | **91.00** | **97.00** | **102.31** | **106.77** | **110.61** |
| **Total liabilities and shareholders' equity** | 365.73 | 338.52 | 323.89 | 351.00 | 352.76 | **374.57** | **417.53** | **466.96** | **518.54** | **569.99** | **619.35** | **663.71** | **699.67** | **723.49** | **733.46** |
| **Total liabilities** | 258.58 | 248.03 | 258.55 | 287.91 | 302.08 | **317.10** | **349.66** | **385.61** | **421.45** | **456.14** | **489.37** | **520.27** | **547.96** | **571.63** | **592.44** |
| **Total current liabilities** | 115.93 | 105.72 | 105.39 | 125.48 | 153.98 | **155.97** | **171.64** | **189.62** | **207.45** | **224.44** | **240.64** | **255.59** | **268.85** | **279.98** | **289.57** |
| Accounts payable | 55.89 | 46.24 | 42.30 | 54.76 | 64.12 | 65.57 | 73.36 | 81.33 | 89.33 | 97.17 | 104.65 | 111.55 | 117.66 | 122.79 | 127.21 |
| Accrued expenses | 39.29 | 43.24 | 49.33 | 55.11 | 68.76 | **68.24** | **76.34** | **84.64** | **92.97** | **101.13** | **108.91** | **116.09** | **122.45** | **127.78** | **132.38** |
| Accrued expenses excluding deferred revenue | 33.33 | 37.72 | 42.68 | 47.49 | 60.85 | 59.65 | 66.74 | 74.00 | 81.27 | 88.41 | 95.21 | 101.49 | 107.05 | 111.71 | 115.73 |
| Deferred revenue | 5.97 | 5.52 | 6.64 | 7.61 | 7.91 | 8.58 | 9.60 | 10.64 | 11.69 | 12.72 | 13.70 | 14.60 | 15.40 | 16.07 | 16.65 |
| Commercial paper and repurchase agreement | 11.96 | 5.98 | 5.00 | 6.00 | 9.98 | 10.77 | 11.74 | 12.74 | 13.74 | 14.73 | 15.67 | 16.55 | 17.33 | 17.99 | 18.57 |
| Current portion of long-term debt | 8.78 | 10.26 | 8.77 | 9.61 | 11.13 | 11.39 | 10.20 | 10.91 | 11.41 | 11.41 | 11.41 | 11.41 | 11.41 | 11.41 | 11.41 |
| **Non-current liabilities** | 142.65 | 142.31 | 153.16 | 162.43 | 148.10 | **161.13** | **178.02** | **195.98** | **213.99** | **231.71** | **248.74** | **264.68** | **279.11** | **291.65** | **302.87** |
| Long-term debt | 93.74 | 91.81 | 98.67 | 109.11 | 98.96 | 104.36 | 114.51 | 125.57 | 136.65 | 147.57 | 158.13 | 168.10 | 177.24 | 185.34 | 192.74 |
| Deferred revenue, non-current | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other non-current liabilities | 48.91 | 50.50 | 54.49 | 53.33 | 49.14 | 56.77 | 63.51 | 70.42 | 77.35 | 84.13 | 90.61 | 96.58 | 101.87 | 106.31 | 110.14 |
| **Total shareholders' equity** | 107.15 | 90.49 | 65.34 | 63.09 | 50.67 | **57.47** | **67.87** | **81.36** | **97.09** | **113.84** | **129.98** | **143.44** | **151.71** | **151.86** | **141.02** |
| Common stock and additional paid-in capital | 40.20 | 45.17 | 50.78 | 57.37 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 | 64.85 |
| Retained earnings | 70.40 | 45.90 | 14.97 | 5.56 | (3.07) | 3.73 | 14.13 | 27.62 | 43.35 | 60.10 | 76.24 | 89.70 | 97.97 | 98.12 | 87.28 |
| Accumulated other comprehensive income / loss | (3.45) | (0.58) | (0.41) | 0.16 | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) | (11.11) |

**Apple Inc.**
*Historical Cash Flow Statement*
All figures in billions of USD except p/share or labeled

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|
| **Adjustments to reconcile net income to cash generated by operating activities** | 17.90 | 14.14 | 23.26 | 9.36 | 22.35 |
| Depreciation and amortization | 10.90 | 12.55 | 11.06 | 11.28 | 11.10 |
| Share-based compensation expense | 5.34 | 6.07 | 6.83 | 7.91 | 9.04 |
| Deferred income tax expense / benefit | (32.59) | (0.34) | (0.22) | (4.77) | 0.90 |
| Excess tax benefits from stock options | | | | | |
| Gain on sale of PowerSchool net assets | | | | | |
| Other | (0.44) | (0.65) | (0.10) | (0.15) | 0.11 |
| **Changes in operating assets and liabilities** | 34.69 | (3.49) | 5.69 | (4.91) | 1.20 |
| Accounts receivable, net | (5.32) | 0.25 | 6.92 | (10.13) | (1.82) |
| Inventories | 0.83 | (0.29) | (0.13) | (2.64) | 1.48 |
| Vendor non-trade receivables | (8.01) | 2.93 | 1.55 | (3.90) | 7.52 |
| **Other current and non-current assets** | (0.42) | 0.87 | (9.59) | (8.04) | (6.50) |
| Loss on disposition of property, plant and equipment | | | | | |
| Other current assets | | | | | |
| Other assets | | | | | |
| Accounts payable | 9.18 | (1.92) | (4.06) | 12.33 | 9.45 |
| **Other liabilities** | 38.45 | (5.33) | 11.00 | 7.48 | 6.11 |
| Deferred revenue | (0.00) | (0.63) | 2.08 | 1.68 | 0.48 |
| Other current and non-current liabilities | 38.45 | (4.70) | 8.92 | 5.80 | 5.63 |
| **Cash used in / generated by investing activities** | 16.07 | 45.90 | (4.29) | (14.55) | (22.35) |
| Purchases of marketable securities | (71.36) | (39.63) | (114.94) | (109.56) | (76.92) |
| Proceeds from maturities of marketable securities | 55.88 | 40.10 | 69.92 | 59.02 | 29.92 |
| Proceeds from sale of PowerSchool net assets | | | | | 0.00 |
| Proceeds from sales of marketable securities | 47.84 | 56.99 | 50.47 | 47.46 | 37.45 |
| Payments for acquisition of property, plant and equipment | (13.31) | (10.50) | (7.31) | (11.09) | (10.71) |
| **Other** | (2.98) | (1.07) | (2.43) | (0.39) | (2.09) |
| Payments made in connection with business acquisitions, net | (0.72) | (0.62) | (1.52) | (0.03) | (0.31) |
| **Other excluding payments made in connection with business acquisitions, net** | (2.26) | (0.45) | (0.91) | (0.35) | (1.78) |
| **Payments for strategic investments** | (1.52) | 0.63 | (0.12) | 0.26 | 0.00 |
| Purchases of non-marketable securities | (1.87) | (1.00) | (0.21) | (0.13) | 0.00 |
| Proceeds from non-marketable securities | 0.35 | 1.63 | 0.09 | 0.39 | 0.00 |
| **Other excluding payments for strategic investments** | (0.75) | (1.08) | (0.79) | (0.61) | 0.00 |
| Payments for acquisition of intangible assets | | | | | |
| **Other excluding payments for acquisition of intangible assets** | | | | | |
| Purchases of other long-term investments | | | | | |
| Other excluding purchases of other long-term investments | | | | | |
| **Cash used in / generated by financing activities** | (87.88) | (90.98) | (86.82) | (93.35) | (110.75) |
| Excess tax benefits from equity awards | | | | | |
| Payments for taxes related to net share settlement of equity awards | (2.53) | (2.82) | (3.63) | (6.56) | (6.22) |
| Payments for dividends and dividend equivalents | (13.71) | (14.12) | (14.08) | (14.47) | (14.84) |
| Repurchase of common stock | (72.74) | (66.90) | (72.36) | (85.97) | (89.40) |
| Proceeds from issuance of term debt, net | 6.97 | 6.96 | 16.09 | 20.39 | 5.47 |
| Repayments of term debt | (6.50) | (8.81) | (12.63) | (8.75) | (9.54) |
| Change in commercial paper, net | (0.04) | (5.98) | (0.96) | 1.02 | 3.96 |
| **Other** | 0.67 | 0.68 | 0.75 | 0.98 | (0.16) |
| Proceeds from issuance of common stock | 0.67 | 0.78 | 0.88 | 1.11 | 0.00 |
| Other excluding proceeds from issuance of common stock | 0.00 | (0.11) | (0.13) | (0.13) | 0.00 |
| Proceeds from repurchase agreement | | | | | |
| Increase / decrease in cash and cash equivalents | 5.62 | 24.31 | (10.44) | (3.86) | (10.95) |
| Cash, cash equivalents and restricted cash, beginning balances | 20.29 | 25.91 | 50.22 | 39.79 | 35.93 |
| Cash, cash equivalents and restricted cash, ending balances | 25.91 | 50.22 | 39.79 | 35.93 | 24.98 |

**Apple Inc.**

*Forecasted Cash Flow Statement*

All figures in billions of USD except p/share or labeled

| *Fiscal Years Ending Sep. 25* | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|
| **Cash, cash equivalents, and restricted cash (beginning balances)** | **23.65** | **27.49** | **36.71** | **49.37** | **64.09** | **79.20** | **93.46** | **104.67** | **110.23** | **107.10** |
| | | | | | | | | | | |
| Net income (loss) | 106.63 | 119.00 | 131.65 | 144.32 | 156.75 | 168.61 | 179.59 | 189.38 | 197.67 | 204.70 |
| *Adjustments to reconcile net income to cash generated by operating activities:* | | | | | | | | | | |
| Depreciation & amortization | 12.73 | 12.83 | 13.70 | 15.25 | 16.78 | 18.35 | 19.97 | 21.68 | 23.49 | 25.42 |
| *Changes in operating assets and liabilities:* | | | | | | | | | | |
| Changes in accounts receivable | (3.51) | (3.76) | (3.86) | (3.87) | (3.79) | (3.61) | (3.34) | (2.96) | (2.48) | (2.14) |
| Changes in inventories | (1.44) | (0.76) | (0.78) | (0.78) | (0.76) | (0.73) | (0.67) | (0.60) | (0.50) | (0.43) |
| Changes in vendor non-trade receivables | (2.09) | (4.14) | (4.24) | (4.25) | (4.17) | (3.97) | (3.67) | (3.25) | (2.72) | (2.35) |
| Changes in other current assets | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) | (0.02) |
| Changes in other non-current assets | (2.59) | (6.77) | (6.94) | (6.96) | (6.82) | (6.50) | (6.00) | (5.32) | (4.46) | (3.84) |
| Changes in accounts payable | 1.45 | 7.79 | 7.98 | 8.00 | 7.84 | 7.48 | 6.90 | 6.11 | 5.13 | 4.42 |
| Changes in deferred revenue | 0.67 | 1.02 | 1.04 | 1.05 | 1.03 | 0.98 | 0.90 | 0.80 | 0.67 | 0.58 |
| Changes in accrued expenses (excl. deferred revenue) | (1.19) | 7.08 | 7.26 | 7.28 | 7.13 | 6.80 | 6.28 | 5.56 | 4.67 | 4.02 |
| Changes in other non-current liabilities | 7.63 | 6.74 | 6.91 | 6.93 | 6.79 | 6.47 | 5.97 | 5.29 | 4.44 | 3.82 |
| **Net cash flows from operating activities** | **118.27** | **139.01** | **152.70** | **166.95** | **180.76** | **193.85** | **205.93** | **216.69** | **225.88** | **234.19** |
| | | | | | | | | | | |
| Changes in marketable securities | (7.98) | (15.43) | (15.82) | (15.89) | (15.60) | (14.91) | (13.81) | (12.28) | (10.37) | (8.98) |
| Capital expenditures | (13.08) | (15.69) | (18.83) | (20.34) | (21.96) | (23.72) | (25.62) | (27.67) | (29.88) | (32.27) |
| **Net cash flows from investing activities** | **(21.05)** | **(31.12)** | **(34.65)** | **(36.23)** | **(37.56)** | **(38.63)** | **(39.42)** | **(39.95)** | **(40.25)** | **(41.25)** |
| | | | | | | | | | | |
| Changes in commercial paper | 0.79 | 0.97 | 1.00 | 1.00 | 0.99 | 0.94 | 0.88 | 0.78 | 0.66 | 0.58 |
| Changes in long-term debt | 5.40 | 10.14 | 11.06 | 11.08 | 10.93 | 10.56 | 9.97 | 9.14 | 8.10 | 7.40 |
| Changes in current portion of long-term debt | 0.26 | (1.19) | 0.71 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Repurchases of common stock | (85.22) | (93.74) | (103.12) | (113.43) | (124.77) | (137.25) | (150.97) | (166.07) | (182.68) | (200.95) |
| Dividends paid | (14.62) | (14.86) | (15.04) | (15.16) | (15.22) | (15.22) | (15.16) | (15.04) | (14.85) | (14.59) |
| **Net cash flows from financing activities** | **(93.38)** | **(98.67)** | **(105.39)** | **(116.01)** | **(128.08)** | **(140.97)** | **(155.29)** | **(171.18)** | **(188.76)** | **(207.56)** |
| | | | | | | | | | | |
| **Net increase (decrease) in cash, cash equivalents, and restricted cash** | **3.84** | **9.22** | **12.66** | **14.72** | **15.12** | **14.25** | **11.21** | **5.56** | **(3.12)** | **(14.62)** |
| **Cash, cash equivalents, and restricted cash (ending balances)** | **27.49** | **36.71** | **49.37** | **64.09** | **79.20** | **93.46** | **104.67** | **110.23** | **107.10** | **92.48** |

**Apple Inc.**

*Common Size Balance Sheet*

(% of sales)

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total assets** | 137.70% | 130.11% | 117.99% | 95.95% | 89.46% | 89.20% | 88.88% | 89.65% | 90.64% | 91.59% | 92.41% | 92.91% | 92.85% | 92.00% | 90.03% |
| **Total current assets** | 49.45% | 62.58% | 52.35% | 36.86% | 34.34% | 34.87% | 35.01% | 35.75% | 36.71% | 37.62% | 38.34% | 38.65% | 38.32% | 37.09% | 34.65% |
| Cash and cash equivalents | 9.76% | 18.77% | 13.85% | 9.55% | 6.00% | 6.55% | 7.81% | 9.48% | 11.20% | 12.73% | 13.94% | 14.65% | 14.63% | 13.62% | 11.35% |
| Short-term marketable securities | 15.21% | 19.88% | 19.28% | 7.57% | 6.25% | 5.91% | 5.31% | 4.82% | 4.42% | 4.10% | 3.85% | 3.65% | 3.50% | 3.39% | 3.31% |
| Accounts receivable, less allowances | 8.73% | 8.81% | 5.87% | 7.18% | 7.15% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% | 7.55% |
| Inventories | 1.49% | 1.58% | 1.48% | 1.80% | 1.25% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% | 1.52% |
| Vendor non-trade receivables | 9.72% | 8.79% | 7.77% | 6.90% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% | 8.30% |
| Other current assets | 4.55% | 4.75% | 4.10% | 3.86% | 5.38% | 5.06% | 4.53% | 4.08% | 3.72% | 3.42% | 3.18% | 2.99% | 2.84% | 2.72% | 2.63% |
| **Total non-current assets** | 88.25% | 67.53% | 65.63% | 59.09% | 55.12% | 54.33% | 53.86% | 53.90% | 53.92% | 53.97% | 54.08% | 54.26% | 54.53% | 54.91% | 55.38% |
| Long-term marketable securities | 64.31% | 40.49% | 36.75% | 34.96% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% | 30.64% |
| Property, plant and equipment, net | 15.55% | 14.37% | 13.39% | 10.78% | 10.68% | 10.11% | 9.65% | 9.69% | 9.71% | 9.76% | 9.86% | 10.04% | 10.32% | 10.70% | 11.17% |
| **Other non-current assets** | 8.39% | 12.68% | 15.49% | 13.35% | 13.80% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% | 13.58% |
| **Total liabilities and shareholders' equity** | 137.70% | 130.11% | 117.99% | 95.95% | 89.46% | 89.20% | 88.88% | 89.65% | 90.64% | 91.59% | 92.41% | 92.91% | 92.85% | 92.00% | 90.03% |
| **Total liabilities** | 97.36% | 95.33% | 94.18% | 78.70% | 76.61% | 75.52% | 74.43% | 74.03% | 73.67% | 73.30% | 73.02% | 72.83% | 72.72% | 72.69% | 72.72% |
| **Total current liabilities** | 43.65% | 40.63% | 38.39% | 34.30% | 39.05% | 37.14% | 36.54% | 36.41% | 36.26% | 36.07% | 35.91% | 35.78% | 35.68% | 35.60% | 35.54% |
| Accounts payable | 21.04% | 17.77% | 15.41% | 14.97% | 16.26% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% | 15.61% |
| **Accrued expenses** | 14.79% | 16.62% | 17.97% | 15.06% | 17.44% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% | 16.25% |
| Accrued expenses excluding deferred revenue | 12.55% | 14.50% | 15.55% | 12.98% | 15.43% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% | 14.21% |
| Deferred revenue | 2.25% | 2.12% | 2.42% | 2.08% | 2.01% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% | 2.04% |
| Commercial paper and repurchase agreement | 4.50% | 2.30% | 1.82% | 1.64% | 2.53% | 2.57% | 2.50% | 2.45% | 2.40% | 2.37% | 2.34% | 2.32% | 2.30% | 2.29% | 2.28% |
| Current portion of long-term debt | 3.31% | 3.94% | 3.20% | 2.63% | 2.82% | 2.71% | 2.17% | 2.09% | 1.99% | 1.83% | 1.70% | 1.60% | 1.51% | 1.45% | 1.40% |
| **Non-current liabilities** | 53.71% | 54.70% | 55.79% | 44.40% | 37.56% | 38.37% | 37.89% | 37.63% | 37.40% | 37.23% | 37.11% | 37.05% | 37.04% | 37.09% | 37.18% |
| Long-term debt | 35.29% | 35.29% | 35.94% | 29.83% | 25.10% | 24.85% | 24.37% | 24.11% | 23.89% | 23.71% | 23.59% | 23.53% | 23.52% | 23.57% | 23.66% |
| Deferred revenue, non-current | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Other non-current liabilities | 18.42% | 19.41% | 19.85% | 14.58% | 12.46% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% | 13.52% |
| **Total shareholders' equity** | 40.34% | 34.78% | 23.80% | 17.25% | 12.85% | 13.69% | 14.45% | 15.62% | 16.97% | 18.29% | 19.39% | 20.08% | 20.13% | 19.31% | 17.31% |
| Common stock and additional paid-in capital | 15.14% | 17.36% | 18.50% | 15.68% | 16.45% | 15.44% | 13.80% | 12.45% | 11.34% | 10.42% | 9.68% | 9.08% | 8.61% | 8.25% | 7.96% |
| Retained earnings | 26.51% | 17.64% | 5.45% | 1.52% | -0.78% | 0.89% | 3.01% | 5.30% | 7.58% | 9.66% | 11.38% | 12.56% | 13.00% | 12.48% | 10.71% |
| Accumulated other comprehensive income / loss | -1.30% | -0.22% | -0.15% | 0.04% | -2.82% | -2.65% | -2.36% | -2.13% | -1.94% | -1.79% | -1.66% | -1.56% | -1.47% | -1.41% | -1.36% |

**Apple Inc.**

*Common Size Income Statement*

(% of sales)

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Net sales** | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% | 100.00% |
| Products | 85.03% | 82.21% | 80.41% | 81.30% | 80.19% | 79.23% | 79.44% | 79.63% | 79.80% | 79.94% | 80.04% | 80.11% | 80.14% | 80.12% | 80.15% |
| Services | 14.97% | 17.79% | 19.59% | 18.70% | 19.81% | 20.77% | 20.56% | 20.37% | 20.20% | 20.06% | 19.96% | 19.89% | 19.86% | 19.88% | 19.85% |
| **Cost of sales (Excluding D&A)** | -57.55% | -57.36% | -57.74% | -55.14% | -53.88% | -53.90% | -54.27% | -54.44% | -54.47% | -54.48% | -54.48% | -54.44% | -54.37% | -54.26% | -54.13% |
| **Less Depreciation and Amortizatic** | -4.11% | -4.82% | -4.03% | -3.08% | -2.82% | -3.03% | -2.73% | -2.63% | -2.67% | -2.70% | -2.74% | -2.80% | -2.88% | -2.99% | -3.12% |
| Products | -55.79% | -55.73% | -55.11% | -52.56% | -51.09% | -50.85% | -50.99% | -51.11% | -51.22% | -51.31% | -51.37% | -51.42% | -51.43% | -51.43% | -51.44% |
| Services | -5.87% | -6.45% | -6.66% | -5.66% | -5.60% | -6.08% | -6.02% | -5.96% | -5.91% | -5.87% | -5.84% | -5.82% | -5.81% | -5.82% | -5.81% |
| **Gross margin** | 38.34% | 37.82% | 38.23% | 41.78% | 43.31% | 43.07% | 43.00% | 42.93% | 42.87% | 42.82% | 42.79% | 42.76% | 42.75% | 42.76% | 42.75% |
| **Total operating expenses** | -11.65% | -13.25% | -14.09% | -12.00% | -13.02% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% | -12.80% |
| Research and development | -5.36% | -6.23% | -6.83% | -5.99% | -6.66% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% | -6.21% |
| Selling, general and administrativ | -6.29% | -7.01% | -7.25% | -6.01% | -6.36% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% | -6.59% |
| **Operating income** | 26.69% | 24.57% | 24.15% | 29.78% | 30.29% | 30.27% | 30.20% | 30.13% | 30.07% | 30.02% | 29.99% | 29.96% | 29.95% | 29.96% | 29.95% |
| Other income / expense, net | 0.75% | 0.69% | 0.29% | 0.07% | -0.08% | 0.03% | 0.03% | 0.03% | 0.03% | 0.04% | 0.04% | 0.04% | 0.04% | 0.04% | 0.04% |
| Income before provision for income t | 27.45% | 25.27% | 24.44% | 29.85% | 30.20% | 30.30% | 30.23% | 30.16% | 30.10% | 30.06% | 30.02% | 30.00% | 29.99% | 30.00% | 29.98% |
| Provision for income taxes | -5.03% | -4.03% | -3.53% | -3.97% | -4.89% | -4.91% | -4.90% | -4.89% | -4.88% | -4.87% | -4.86% | -4.86% | -4.86% | -4.86% | -4.86% |
| Net income | 22.41% | 21.24% | 20.91% | 25.88% | 25.31% | 25.39% | 25.33% | 25.27% | 25.23% | 25.19% | 25.16% | 25.14% | 25.13% | 25.14% | 25.13% |

**Apple Inc.**
*Key Management Ratios*

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Liquidity Ratios:*** | | | | | | | | | | | | | | | |
| Current Ratio (Cur. Assets/Cur. Liabilities) | 1.13 | 1.54 | 1.36 | 1.07 | 0.88 | 0.94 | 0.96 | 0.98 | 1.01 | 1.04 | 1.07 | 1.08 | 1.07 | 1.04 | 0.97 |
| Quick Ratio (Liquid Assets/Cur. Liabilities) | 0.57 | 0.95 | 0.86 | 0.50 | 0.31 | 0.34 | 0.36 | 0.39 | 0.43 | 0.47 | 0.50 | 0.51 | 0.51 | 0.48 | 0.41 |
| Cash Ratio (Cash & Cash Equivs/Cur. Liabilities) | 0.22 | 0.46 | 0.36 | 0.28 | 0.15 | 0.18 | 0.21 | 0.26 | 0.31 | 0.35 | 0.39 | 0.41 | 0.41 | 0.38 | 0.32 |
| ***Asset-Management Ratios:*** | | | | | | | | | | | | | | | |
| Receivables Turnover (Sales/Avg Accounts Receivable) | 12.94 | 11.28 | 14.06 | 17.26 | 14.48 | 14.02 | 13.99 | 13.93 | 13.87 | 13.80 | 13.74 | 13.67 | 13.60 | 13.53 | 13.48 |
| Days in Receivables (365/Receivables Turnover) | 28.21 | 32.35 | 25.96 | 21.15 | 25.21 | 26.03 | 26.09 | 26.20 | 26.32 | 26.44 | 26.57 | 26.70 | 26.84 | 26.98 | 27.08 |
| Total Asset Turnover (Total Revenue/Avg Total Assets) | 0.73 | 0.77 | 0.85 | 1.04 | 1.12 | 1.12 | 1.13 | 1.12 | 1.10 | 1.09 | 1.08 | 1.08 | 1.08 | 1.09 | 1.11 |
| ***Financial Leverage Ratios:*** | | | | | | | | | | | | | | | |
| Debt-to-Equity (Total Debt/Total Equity) | 0.96 | 1.13 | 1.64 | 1.88 | 2.17 | 2.01 | 1.84 | 1.68 | 1.52 | 1.40 | 1.30 | 1.25 | 1.24 | 1.30 | 1.45 |
| Debt-to-Assets (Total Debt/Total Assets) | 0.28 | 0.30 | 0.33 | 0.34 | 0.31 | 0.31 | 0.30 | 0.29 | 0.29 | 0.28 | 0.27 | 0.27 | 0.27 | 0.27 | 0.28 |
| ***Profitability Ratios:*** | | | | | | | | | | | | | | | |
| Return on Equity (Net Income/Beg Equity) | 44.41% | 51.57% | 63.45% | 144.91% | 158.19% | 210.44% | 207.08% | 193.98% | 177.40% | 161.44% | 148.11% | 138.17% | 132.03% | 130.29% | 134.80% |
| Return on Assets (Net Income/Total Assets) | 16.28% | 16.32% | 17.73% | 26.97% | 28.29% | 28.47% | 28.50% | 28.19% | 27.83% | 27.50% | 27.22% | 27.06% | 27.07% | 27.32% | 27.91% |
| Gross Profit Margin ((Rev-COGS)/Rev)*100 | 38.34% | 37.82% | 38.23% | 41.78% | 43.31% | 43.07% | 43.00% | 42.93% | 42.87% | 42.82% | 42.79% | 42.76% | 42.75% | 42.76% | 42.75% |
| ***Payout Policy Ratios:*** | | | | | | | | | | | | | | | |
| Total Payout Ratio ((Divs + Repur)/Net Income) | 145.22% | 146.62% | 150.56% | 106.08% | 92.01% | 93.63% | 91.26% | 89.75% | 89.10% | 89.31% | 90.43% | 92.51% | 95.63% | 99.93% | 105.29% |
| Dividend Payout Ratio (DPS/EPS) | 22.67% | 25.08% | 24.17% | 14.99% | 14.63% | 13.96% | 12.71% | 11.64% | 10.71% | 9.91% | 9.23% | 8.64% | 8.13% | 7.70% | 7.32% |

**Apple Inc.**
*Weighted Average Cost of Capital (WACC) Estimation*

| | | |
|---|---|---|
| **Cost of Equity:** | | *ASSUMPTIONS:* |
| Risk-Free Rate | 3.81% | *10-yr treasury bond (Yahoo), matches forecast horizon* |
| Beta | 1.22 | *5-yr daily raw beta (Factset)* |
| Equity Risk Premium | 4.59% | *Damodaran Implied ERP, trailing 12-month adj payout, 11/22* |
| **Cost of Equity** | **9.41%** | |
| | | |
| **Cost of Debt:** | | |
| Risk-Free Rate | 3.81% | *10-yr treasury bond (Yahoo), matches forecast horizon* |
| Implied Default Premium | 0.65% | |
| Pre-Tax Cost of Debt | 4.47% | *YTM on Apple's 10-year corporate bond (FINRA)* |
| Marginal Tax Rate | 28.87% | |
| **After-Tax Cost of Debt** | **3.18%** | |

| | | |
|---|---|---|
| **Market Value of Common Equity:** | | **MV Weights** |
| Total Shares Outstanding | 15.94 | |
| Current Stock Price | $149.70 | |
| **MV of Equity** | **2,386.73** | 95.59% |
| | | |
| **Market Value of Debt:** | | |
| Short-Term Debt | 0.00 | |
| Current Portion of LTD | 0.52 | |
| Long-Term Debt | 98.96 | |
| PV of Operating Leases | 10.61 | |
| **MV of Total Debt** | **110.09** | 4.41% |
| | | |
| **Market Value of the Firm** | **2,496.82** | 100.00% |

| | |
|---|---|
| **Estimated WACC** | **9.14%** |

**Apple Inc.**

*Discounted Cash Flow (DCF) and Economic Profit (EP) Valuation Models*

| Key Inputs: | |
|---|---|
| CV Growth of NOPLAT | 3.56% |
| CV Year ROIC | 106.56% |
| WACC | 9.14% |
| Cost of Equity | 9.41% |

| ***Fiscal Years Ending Sep. 25*** | **2023E** | **2024E** | **2025E** | **2026E** | **2027E** | **2028E** | **2029E** | **2030E** | **2031E** | **2032E** |
|---|---|---|---|---|---|---|---|---|---|---|
| **DCF Model:** | | | | | | | | | | |
| Free Cash Flow (FCF) | 104.0 | 112.0 | 122.3 | 135.0 | 147.4 | 159.2 | 170.2 | 180.0 | 188.4 | 195.3 |
| Continuing Value (CV) | | | | | | | | | | 3551.7 |
| PV of FCF | 95.3 | 94.1 | 94.1 | 95.2 | 95.2 | 94.2 | 92.3 | 89.4 | 85.8 | 1617.1 |
| **Value of Operating Assets:** | 2452.6 | | | | | | | | | |
| **Non-Operating Adjustments** | | | | | | | | | | |
| Excess cash | 0.0 | | | | | | | | | |
| Marketable Securities | 145.5 | | | | | | | | | |
| Other non-current assets | 54.4 | | | | | | | | | |
| Value of Debt | -99.5 | | | | | | | | | |
| PV of operating leases | -10.6 | | | | | | | | | |
| Other Liabilities | 0.0 | | | | | | | | | |
| **Value of Equity** | 2542.3 | | | | | | | | | |
| **Shares Outstanding** | 15.9 | | | | | | | | | |
| Intrinsic Value of Last FYE | $ 159.46 | | | | | | | | | |
| **Implied Price as of Today** | $ 161.26 | | | | | | | | | |
| **EP Model:** | | | | | | | | | | |
| Economic Profit (EP) | 96.3 | 108.4 | 120.4 | 132.2 | 143.8 | 154.7 | 164.8 | 173.7 | 181.1 | 187.3 |
| Continuing Value (CV) | | | | | | | | | | 3359.4 |
| PV of EP | 88.3 | 91.0 | 92.6 | 93.2 | 92.9 | 91.6 | 89.4 | 86.3 | 82.5 | 1529.5 |
| Total PV of EP | 2337.3 | | | | | | | | | |
| Invested Capital (last FYE) | 115.3 | | | | | | | | | |
| **Value of Operating Assets:** | 2452.6 | | | | | | | | | |
| **Non-Operating Adjustments** | | | | | | | | | | |
| Excess cash | 0.0 | | | | | | | | | |
| Marketable securities | 145.5 | | | | | | | | | |
| Other non-current assets | 54.4 | | | | | | | | | |
| Value of debt | -99.5 | | | | | | | | | |
| PV of operating leases | -10.6 | | | | | | | | | |
| Other Liabilities | 0.0 | | | | | | | | | |
| **Value of Equity** | 2542.3 | | | | | | | | | |
| **Shares Outstanding** | 15.9 | | | | | | | | | |
| Intrinsic Value of Last FYE | $ 159.46 | | | | | | | | | |
| **Implied Price as of Today** | $ 161.26 | | | | | | | | | |

**Apple Inc.**

*Dividend Discount Model (DDM) or Fundamental P/E Valuation Model*

| *Fiscal Years Ending Sep. 25* | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|
| EPS | $ 6.81 | $ 7.87 | $ 9.02 | $ 10.27 | $ 11.60 | $ 13.01 | $ 14.47 | $ 15.98 | $ 17.52 | $ 19.11 |
| ***Key Assumptions*** | | | | | | | | | | |
| CV growth of EPS | 4.00% | | | | | | | | | |
| CV Year ROE | 134.80% | | | | | | | | | |
| Cost of Equity | 9.41% | | | | | | | | | |
| ***Future Cash Flows*** | | | | | | | | | | |
| P/E Multiple (CV Year) | | | | | | | | | | 17.93 |
| EPS (CV Year) | | | | | | | | | | $ 19.11 |
| Future Stock Price | | | | | | | | | | $ 342.78 |
| Dividends Per Share | 0.90 | 0.95 | 1.00 | 1.05 | 1.10 | 1.15 | 1.20 | 1.25 | 1.30 | |
| Discounted Cash Flows | $ 0.82 | $ 0.79 | $ 0.76 | $ 0.73 | $ 0.70 | $ 0.67 | $ 0.64 | $ 0.61 | $ 0.58 | $ 152.57 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 9 |
| Intrinsic Value as of Last FYE | $ 158.88 | | | | | | | | | |
| **Implied Price as of Today** | $ 160.67 | | | | | | | | | |

**Apple Inc.**

*Relative Valuation Models*

| Ticker | Company | Price | EPS 2023E | EPS 2024E | 1Y Fwd P/E 22 | 2Y Fwd P/E 23 | Est. 5yr EPS gr. | PEG 22 | PEG 23 |
|---|---|---|---|---|---|---|---|---|---|
| MSI | Motorola Solutions, Inc. | $250.12 | $8.16 | $8.93 | 30.65 | 28.01 | 10.3 | 2.98 | 2.73 |
| MSFT | Microsoft Corporation | $235.87 | $9.69 | $11.36 | 24.34 | 20.76 | 12.2 | 2.00 | 1.70 |
| GOOGL | Alphabet Inc. | $96.29 | $4.77 | $5.49 | 20.19 | 17.54 | 11.1 | 1.82 | 1.58 |
| AMZN | Amazon.com, Inc. | $103.41 | ($0.07) | $1.92 | ~~(1,477.29)~~ | ~~53.86~~ | 19.2 | ~~(76.94)~~ | 2.81 |
| NFLX | Netflix, Inc. | $295.72 | $10.25 | $10.52 | 28.85 | 28.11 | 20.8 | 1.39 | 1.35 |
| CSCO | Cisco Systems, Inc. | $44.82 | $3.05 | $3.33 | ~~14.70~~ | ~~13.46~~ | 7.5 | 1.96 | 1.79 |
| | | | | Average | **26.01** | **23.61** | | **2.03** | **1.99** |
| AAPL | Apple Inc. | $149.70 | $6.81 | $7.87 | 22.0 | 19.0 | 12.6 | 1.7 | 1.5 |

**Implied Relative Value:**

| | | |
|---|---|---|
| **P/E (EPS22)** | **$** | **177.04** |
| **P/E (EPS23)** | **$** | **185.76** |
| **PEG (EPS22)** | **$** | **174.22** |
| **PEG (EPS23)** | **$** | **197.88** |

**Apple Inc.**
*Value Driver Estimation*
All figures in billions of USD except p/share or labeled

| *Fiscal Years Ending Sep. 25* | 2018 | 2019 | 2020 | 2021 | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NOPLAT:** | | | | | | | | | | | | | | | |
| Sales | 265.60 | 260.17 | 274.52 | 365.82 | 394.33 | 419.91 | 469.78 | 520.86 | 572.10 | 622.31 | 670.19 | 714.38 | 753.53 | 786.37 | 814.66 |
| Cost of Sales (excl. D&A) | (152.85) | (149.24) | (158.50) | (201.70) | (212.45) | (226.33) | (254.97) | (283.57) | (311.60) | (339.05) | (365.10) | (388.93) | (409.70) | (426.65) | (441.00) |
| Depreciation and Amortization | (10.90) | (12.55) | (11.06) | (11.28) | (11.10) | (12.73) | (12.83) | (13.70) | (15.25) | (16.78) | (18.35) | (19.97) | (21.68) | (23.49) | (25.42) |
| Selling, General and Administrative | (16.71) | (18.25) | (19.92) | (21.97) | (25.09) | (27.65) | (30.94) | (34.30) | (37.67) | (40.98) | (44.13) | (47.04) | (49.62) | (51.78) | (53.65) |
| Research and Development | (14.24) | (16.22) | (18.75) | (21.91) | (26.25) | (26.09) | (29.19) | (32.37) | (35.55) | (38.67) | (41.65) | (44.39) | (46.83) | (48.87) | (50.63) |
| Plus Interest on Operating Leases | 0.28 | 0.34 | 0.35 | 0.38 | 0.37 | 0.47 | 0.48 | 0.49 | 0.50 | 0.51 | 0.52 | 0.53 | 0.54 | 0.55 | 0.57 |
| **EBITA** | **71.18** | **64.27** | **66.64** | **109.33** | **119.81** | **127.58** | **142.34** | **157.42** | **172.53** | **187.34** | **201.48** | **214.58** | **226.24** | **236.13** | **244.53** |
| Provision for Income Tax | 13.37 | 10.48 | 9.68 | 14.53 | 19.30 | 20.61 | 23.00 | 25.45 | 27.90 | 30.30 | 32.60 | 34.72 | 36.61 | 38.21 | 39.57 |
| Plus Tax Shield on Lease Interest | 0.10 | 0.10 | 0.11 | 0.11 | 0.13 | 0.14 | 0.14 | 0.14 | 0.15 | 0.15 | 0.15 | 0.15 | 0.16 | 0.16 | 0.16 |
| Less Tax on Other, Net | (0.58) | (0.52) | (0.23) | (0.07) | 0.10 | (0.04) | (0.04) | (0.05) | (0.06) | (0.06) | (0.07) | (0.08) | (0.08) | (0.09) | (0.09) |
| **Adjusted Taxes** | **12.89** | **10.06** | **9.56** | **14.56** | **19.52** | **20.71** | **23.10** | **25.54** | **27.99** | **30.39** | **32.68** | **34.79** | **36.68** | **38.29** | **39.65** |
| **Change in Deferred Taxes** | **(32.59)** | **(0.34)** | **(0.22)** | **(4.77)** | **0.90** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |
| **NOPLAT** | **25.69** | **53.87** | **56.86** | **90.00** | **101.19** | **106.87** | **119.24** | **131.88** | **144.54** | **156.96** | **168.81** | **179.78** | **189.56** | **197.85** | **204.88** |
| **Invested Capital:** | | | | | | | | | | | | | | | |
| *Net Operating Working Capital* | | | | | | | | | | | | | | | |
| Operating Current Assets | | | | | | | | | | | | | | | |
| Normal Cash (6% of sales) | 15.94 | 15.61 | 16.47 | 21.95 | 23.66 | 25.19 | 28.19 | 31.25 | 34.33 | 37.34 | 40.21 | 42.86 | 45.21 | 47.18 | 48.88 |
| Accounts Receivable, net | 23.19 | 22.93 | 16.12 | 26.28 | 28.18 | 31.70 | 35.46 | 39.32 | 43.19 | 46.98 | 50.59 | 53.93 | 56.88 | 59.36 | 61.50 |
| Inventories | 3.96 | 4.11 | 4.06 | 6.58 | 4.95 | 6.38 | 7.14 | 7.92 | 8.70 | 9.46 | 10.19 | 10.86 | 11.45 | 11.95 | 12.38 |
| Other Current Operating Assets | 37.90 | 35.23 | 32.59 | 39.34 | 53.97 | 56.08 | 60.23 | 64.49 | 68.76 | 72.94 | 76.93 | 80.61 | 83.88 | 86.62 | 88.98 |
| **Total Operating Current Assets** | **80.97** | **77.87** | **69.24** | **94.15** | **110.76** | **119.35** | **131.02** | **142.97** | **154.96** | **166.71** | **177.92** | **188.26** | **197.43** | **205.12** | **211.74** |
| Operating Current Liabilities | | | | | | | | | | | | | | | |
| Accounts Payable | 55.89 | 46.24 | 42.30 | 54.76 | 64.12 | 65.57 | 73.36 | 81.33 | 89.33 | 97.17 | 104.65 | 111.55 | 117.66 | 122.79 | 127.21 |
| Other Operating Current Liabilities | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total Operating Current Liabilities** | **55.89** | **46.24** | **42.30** | **54.76** | **64.12** | **65.57** | **73.36** | **81.33** | **89.33** | **97.17** | **104.65** | **111.55** | **117.66** | **122.79** | **127.21** |
| **Total Net Operating Working Capital** | **25.09** | **31.64** | **26.94** | **39.38** | **46.65** | **53.78** | **57.67** | **61.64** | **65.63** | **69.54** | **73.27** | **76.71** | **79.76** | **82.33** | **84.54** |
| **Property, Plant, and Equipment, net** | 41.30 | 37.38 | 36.77 | 39.44 | 42.12 | 42.47 | 45.33 | 50.46 | 55.55 | 60.73 | 66.10 | 71.74 | 77.73 | 84.12 | 90.98 |
| Long-term Operating Assets | | | | | | | | | | | | | | | |
| Net Intangible Assets | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PV Operating Leases | 7.83 | 8.54 | 8.37 | 9.88 | 10.61 | 10.82 | 11.03 | 11.26 | 11.48 | 11.71 | 11.94 | 12.18 | 12.43 | 12.68 | 12.93 |
| Other Long-term Operating Assets | 22.28 | 32.98 | 42.52 | 48.85 | 54.43 | 57.02 | 63.79 | 70.72 | 77.68 | 84.50 | 91.00 | 97.00 | 102.31 | 106.77 | 110.61 |
| **Total Long-term Operating Assets** | **30.11** | **41.51** | **50.89** | **58.73** | **65.03** | **67.83** | **74.82** | **81.98** | **89.16** | **96.21** | **102.94** | **109.18** | **114.74** | **119.45** | **123.54** |
| Less Long-term Operating Liabilities | | | | | | | | | | | | | | | |
| Deferred Revenues, non-current | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Other Long-term Operating Liabilities | 41.09 | 41.97 | 46.12 | 43.44 | 38.54 | 45.95 | 52.48 | 59.16 | 65.87 | 72.42 | 78.66 | 84.40 | 89.45 | 93.64 | 97.21 |
| **Total Long-term Operating Liabilities** | **41.09** | **41.97** | **46.12** | **43.44** | **38.54** | **45.95** | **52.48** | **59.16** | **65.87** | **72.42** | **78.66** | **84.40** | **89.45** | **93.64** | **97.21** |
| **Invested Capital** | **55.41** | **68.56** | **68.48** | **94.11** | **115.26** | **118.13** | **125.34** | **134.92** | **144.48** | **154.05** | **163.65** | **173.24** | **182.79** | **192.26** | **201.85** |
| **Free Cash Flow (FCF):** | | | | | | | | | | | | | | | |
| NOPLAT | 25.69 | 53.87 | 56.86 | 90.00 | 101.19 | 106.87 | 119.24 | 131.88 | 144.54 | 156.96 | 168.81 | 179.78 | 189.56 | 197.85 | 204.88 |
| Change in IC | 7.28 | 13.15 | (0.08) | 25.63 | 21.15 | 2.87 | 7.20 | 9.58 | 9.56 | 9.58 | 9.60 | 9.59 | 9.55 | 9.47 | 9.58 |
| **FCF** | **18.41** | **40.72** | **56.95** | **64.37** | **80.04** | **104.00** | **112.03** | **122.30** | **134.99** | **147.38** | **159.21** | **170.19** | **180.01** | **188.38** | **195.30** |
| **Return on Invested Capital (ROIC):** | | | | | | | | | | | | | | | |
| NOPLAT | 25.69 | 53.87 | 56.86 | 90.00 | 101.19 | 106.87 | 119.24 | 131.88 | 144.54 | 156.96 | 168.81 | 179.78 | 189.56 | 197.85 | 204.88 |
| Beginning IC | 48.13 | 55.41 | 68.56 | 68.48 | 94.11 | 115.26 | 118.13 | 125.34 | 134.92 | 144.48 | 154.05 | 163.65 | 173.24 | 182.79 | 192.26 |
| **ROIC** | **53.38%** | **97.23%** | **82.94%** | **131.42%** | **107.52%** | **92.72%** | **100.93%** | **105.22%** | **107.13%** | **108.64%** | **109.58%** | **109.86%** | **109.42%** | **108.24%** | **106.56%** |
| **Economic Profit (EP):** | | | | | | | | | | | | | | | |
| Beginning IC | 48.13 | 55.41 | 68.56 | 68.48 | 94.11 | 115.26 | 118.13 | 125.34 | 134.92 | 144.48 | 154.05 | 163.65 | 173.24 | 182.79 | 192.26 |
| x (ROIC - WACC) | 44.25% | 88.09% | 73.80% | 122.28% | 98.38% | 83.58% | 91.80% | 96.08% | 98.00% | 99.50% | 100.44% | 100.72% | 100.29% | 99.10% | 97.43% |
| **EP** | **21.30** | **48.81** | **50.60** | **83.74** | **92.59** | **96.34** | **108.44** | **120.43** | **132.22** | **143.76** | **154.73** | **164.83** | **173.73** | **181.15** | **187.32** |

**Apple Inc.**

*Sensitivity Tables*

Cost of Equity

Pre-Tax Cost of Debt

| ***DCF*** | $ 161.26 | 10.01% | 9.81% | 9.61% | **9.41%** | 9.21% | 9.01% | 8.81% |
|---|---|---|---|---|---|---|---|---|
| | 4.17% | 146.38 | 151.10 | 156.14 | 161.50 | 167.29 | 173.49 | 180.17 |
| | 4.27% | 146.31 | 151.03 | 156.06 | 161.42 | 167.20 | 173.40 | 180.07 |
| | 4.37% | 146.24 | 150.96 | 155.98 | 161.33 | 167.11 | 173.30 | 179.96 |
| | **4.47%** | 146.18 | 150.89 | 155.91 | 161.26 | 167.03 | 173.21 | 179.86 |
| | 4.57% | 146.11 | 150.81 | 155.83 | 161.17 | 166.94 | 173.11 | 179.75 |
| | 4.67% | 146.04 | 150.74 | 155.75 | 161.09 | 166.85 | 173.01 | 179.65 |
| | 4.77% | 145.97 | 150.67 | 155.67 | 161.00 | 166.76 | 172.92 | 179.55 |

Beta

Equity Risk Premium

| ***DCF*** | $ 161.26 | 1.37 | 1.32 | 1.27 | **1.22** | 1.17 | 1.12 | 1.07 |
|---|---|---|---|---|---|---|---|---|
| | 4.29% | 153.90 | 159.53 | 165.57 | 172.10 | 179.17 | 186.83 | 195.19 |
| | 4.39% | 150.52 | 156.02 | 161.94 | 168.33 | 175.24 | 182.75 | 190.93 |
| | 4.49% | 147.28 | 152.66 | 158.46 | 164.72 | 171.49 | 178.84 | 186.85 |
| | **4.59%** | 144.17 | 149.45 | 155.13 | 161.26 | 167.89 | 175.09 | 182.95 |
| | 4.69% | 141.20 | 146.37 | 151.93 | 157.94 | 164.44 | 171.50 | 179.20 |
| | 4.79% | 138.34 | 143.41 | 148.87 | 154.76 | 161.13 | 168.06 | 175.60 |
| | 4.89% | 135.60 | 140.57 | 145.92 | 151.70 | 157.95 | 164.74 | 172.15 |

CV Growth of NOPLAT

WACC

| ***DCF*** | $ 161.26 | 2.96% | 3.16% | 3.36% | **3.56%** | 3.76% | 3.96% | 4.16% |
|---|---|---|---|---|---|---|---|---|
| | 8.54% | 168.44 | 172.25 | 176.35 | 180.79 | 185.59 | 190.81 | 196.51 |
| | 8.74% | 162.48 | 165.96 | 169.70 | 173.73 | 178.08 | 182.79 | 187.92 |
| | 8.94% | 156.92 | 160.11 | 163.53 | 167.20 | 171.15 | 175.42 | 180.05 |
| | **9.14%** | 151.83 | 154.76 | 157.90 | 161.26 | 164.86 | 168.75 | 172.95 |
| | 9.34% | 146.86 | 149.55 | 152.43 | 155.50 | 158.79 | 162.33 | 166.14 |
| | 9.54% | 142.30 | 144.78 | 147.42 | 150.24 | 153.26 | 156.49 | 159.96 |
| | 9.74% | 138.00 | 140.29 | 142.73 | 145.33 | 148.09 | 151.05 | 154.23 |

iPhone Annual % Decrease

Services Decrease

| ***DCF*** | $ 161.26 | -1.55% | -1.45% | -1.35% | **-1.25%** | -1.15% | -1.05% | -0.95% |
|---|---|---|---|---|---|---|---|---|
| | -0.60% | 162.93 | 164.36 | 165.83 | 167.33 | 168.88 | 170.47 | 172.10 |
| | -0.70% | 160.84 | 162.27 | 163.73 | 165.24 | 166.79 | 168.37 | 170.00 |
| | -0.80% | 158.81 | 160.24 | 161.71 | 163.21 | 164.76 | 166.35 | 167.98 |
| | **-0.90%** | 156.86 | 158.28 | 159.75 | 161.26 | 162.80 | 164.39 | 166.02 |
| | -1.00% | 154.96 | 156.39 | 157.85 | 159.36 | 160.91 | 162.49 | 164.12 |
| | -1.10% | 153.13 | 154.56 | 156.02 | 157.53 | 159.07 | 160.66 | 162.29 |
| | -1.20% | 151.36 | 152.78 | 154.25 | 155.76 | 157.30 | 158.89 | 160.52 |

CV Growth of EPS

Cost of Equity

| ***DDM*** | $ 160.67 | 3.25% | 3.50% | 3.75% | **4.00%** | 4.25% | 4.50% | 4.75% |
|---|---|---|---|---|---|---|---|---|
| | 8.81% | 167.45 | 174.71 | 182.68 | 191.48 | 201.24 | 212.14 | 224.38 |
| | 9.01% | 158.54 | 165.14 | 172.36 | 180.31 | 189.08 | 198.84 | 209.73 |
| | 9.21% | 150.31 | 156.33 | 162.89 | 170.09 | 178.01 | 186.77 | 196.51 |
| | **9.41%** | 142.67 | 148.16 | 154.14 | 160.67 | 167.84 | 175.73 | 184.47 |
| | 9.61% | 135.63 | 140.66 | 146.13 | 152.08 | 158.59 | 165.73 | 173.61 |
| | 9.81% | 129.06 | 133.68 | 138.68 | 144.12 | 150.04 | 156.52 | 163.64 |
| | 10.01% | 122.94 | 127.19 | 131.78 | 136.76 | 142.16 | 148.06 | 154.52 |

Cost of Sales (Products)

Cost of Sales (Service

| ***DCF*** | $ 161.26 | -65.68% | -65.18% | -64.68% | **-64.18%** | -63.68% | -63.18% | -61.68% |
|---|---|---|---|---|---|---|---|---|
| | -27.77% | 156.40 | 158.56 | 160.72 | 162.87 | 165.04 | 167.21 | 173.69 |
| | -28.27% | 155.86 | 158.02 | 160.18 | 162.33 | 164.51 | 166.67 | 173.15 |
| | -28.77% | 155.32 | 157.48 | 159.64 | 161.79 | 163.97 | 166.13 | 172.61 |
| | **-29.27%** | 154.79 | 156.95 | 159.11 | 161.26 | 163.43 | 165.59 | 172.08 |
| | -29.77% | 154.24 | 156.41 | 158.57 | 160.71 | 162.89 | 165.05 | 171.53 |
| | -30.27% | 153.71 | 155.87 | 158.03 | 160.17 | 162.35 | 164.51 | 170.99 |
| | -30.77% | 153.17 | 155.33 | 157.49 | 159.64 | 161.81 | 163.97 | 170.46 |

**Apple Inc.**

*Effects of ESOP Exercise and Share Repurchases on Common Stock Account and Number of Shares Outstanding*

| | |
|---|---|
| Number of Options Outstanding (shares): | 0 |
| Average Time to Maturity (years): | 0.00 |
| Expected Annual Number of Options Exercised: | 0 |
| | |
| Current Average Strike Price: | $ - |
| Cost of Equity: | 9.41% |
| Current Stock Price: | $149.70 |

| *Fiscal Years Ending Sep. 25* | 2022 | 2023E | 2024E | 2025E | 2026E | 2027E | 2028E | 2029E | 2030E | 2031E | 2032E | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Increase in Shares Outstanding: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Average Strike Price: | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | |
| **Increase in Common Stock Account:** | - | - | - | - | - | - | - | - | - | - | - | |
| | | | | | | | | | | | | |
| Share Repurchases ($M) | 77,473 | 85,221 | 93,743 | 103,117 | 113,429 | 124,771 | 137,248 | 150,973 | 166,071 | 182,678 | 200,946 | **10% Repur Growth** |
| Expected Price of Repurchased Shares: | $ 149.70 | $ 162.94 | $ 177.35 | $ 193.03 | $ 210.10 | $ 228.68 | $ 248.90 | $ 270.91 | $ 294.87 | $ 320.94 | $ 349.32 | |
| **Number of Shares Repurchased:** | **518** | **523** | **529** | **534** | **540** | **546** | **551** | **557** | **563** | **569** | **575** | |
| | | | | | | | | | | | | |
| Shares Outstanding (beginning of the year) | 16,427 | 15,909 | 15,386 | 14,858 | 14,323 | 13,784 | 13,238 | 12,687 | 12,129 | 11,566 | 10,997 | |
| Plus: Shares Issued Through ESOP | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Less: Shares Repurchased in Treasury | 518 | 523 | 529 | 534 | 540 | 546 | 551 | 557 | 563 | 569 | 575 | |
| **Shares Outstanding (end of the year) (M)** | **15,909** | **15,386** | **14,858** | **14,323** | **13,784** | **13,238** | **12,687** | **12,129** | **11,566** | **10,997** | **10,422** | |

**Apple Inc.**

*Present Value of Operating Lease Obligations*

(billions of USD)

| **Fiscal Years Ending Sep. 25** | **2018** | **2019** | **2020** | **2021** | **2022** |
|---|---|---|---|---|---|
| Year 1 | 1.3 | 1.3 | 1.5 | 1.6 | 1.8 |
| Year 2 | 1.3 | 1.3 | 1.5 | 1.6 | 1.7 |
| Year 3 | 1.2 | 1.1 | 1.3 | 1.5 | 1.7 |
| Year 4 | 1.0 | 0.9 | 1.1 | 1.3 | 1.4 |
| Year 5 | 0.8 | 0.8 | 1.0 | 1.1 | 1.1 |
| Thereafter | 4.0 | 5.4 | 3.9 | 5.2 | 5.1 |
| Total Minimum Payments | 9.6 | 10.8 | 10.2 | 12.2 | 12.8 |
| Less: Cumulative Interest | 1.8 | 2.3 | 1.8 | 2.3 | 2.2 |
| **PV of Minimum Payments** | **7.8** | **8.5** | **8.4** | **9.9** | **10.6** |
| | | | | | |
| **Implied Interest in Year 1 Payment** | **0.3** | **0.3** | **0.4** | **0.4** | **0.4** |
| | | | | | |
| Pre-Tax Cost of Debt | 4.47% | 4.47% | 4.47% | 4.47% | 4.47% |
| Years Implied by Year 6 Payment | 5.0 | 6.5 | 4.0 | 4.9 | 4.4 |
| Expected Obligation in Year 6 & Beyond | 0.8 | 0.83 | 0.96 | 1.06 | 1.143 |
| | | | | | |
| Present Value of Lease Payments | | | | | |
| PV of Year 1 | 1.2 | 1.3 | 1.4 | 1.6 | 1.7 |
| PV of Year 2 | 1.2 | 1.2 | 1.3 | 1.4 | 1.7 |
| PV of Year 3 | 1.1 | 1.0 | 1.2 | 1.3 | 1.5 |
| PV of Year 4 | 0.9 | 0.8 | 0.9 | 1.0 | 1.2 |
| PV of Year 5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.9 |
| PV of 6 & beyond | 2.8 | 3.7 | 2.8 | 3.7 | 3.6 |
| Capitalized PV of Payments | 7.8 | 8.5 | 8.4 | 9.9 | 10.6 |

**Apple Inc.**

*Valuation of Options Granted under ESOP*

| | |
|---|---|
| Current Stock Price | $149.70 |
| Risk Free Rate | 3.81% |
| Current Dividend Yield | 0.57% |
| Annualized St. Dev. of Stock Returns | 40.00% |

| Range of Outstanding Options | Number of Shares | Average Exercise Price | Average Remaining Life (yrs) | B-S Option Price | Value of Options Granted |
|---|---|---|---|---|---|
| Range 1 | 0 | 0 | 0 | #DIV/0! | #DIV/0! |
| Range 2 | 0 | 0 | 0 | #DIV/0! | #DIV/0! |
| Range 3 | 0 | 0 | 0 | #DIV/0! | #DIV/0! |
| Range 4 | 0 | 0 | 0 | #DIV/0! | #DIV/0! |
| Range 5 | 0 | 0 | 0 | #DIV/0! | #DIV/0! |
| Range 6 | | | | | $ - |
| Range 7 | | | | | $ - |
| Range 8 | | | | | $ - |
| Range 9 | | | | | $ - |
| Total | 0 | #DIV/0! | #DIV/0! | #DIV/0! | **#DIV/0!** |