A Work Project, presented as part of the requirements for the Award of
a Master Degree in Finance from the NOVA – School of Business and Economics.

Does Apple still come to fruition or is the harvest time over? *The tech giant seeks to find growth in new markets*

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A Project carried out on the Master in Finance Program, under the supervision of:

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16-12-2022

Abstract

This is the Equity Research Report on the AAPL stock, analyzing Apple's business units, financial history, markets and outlook in order to be able to award a Buy, Hold or Sell recommendation. It should not be interpreted as professional financial advisory as it is drawn up for academic purposes. It will however provide an insight into both the company and the related stock and its prospectuses. There is an accompanied Excel document that is highly relevant for interpretation and justification of the assumptions made. With all information taken into account, the writers end up with a "Buy" recommendation as a result of the analysis of the market and trends, (forecasts of) its business units, the strategy and vision.

Apple
Equity Research
Growth
Value

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

This report is part of Equity Research report called “The Tech giant that keeps on accumulating. *Apple’s outperforming growth does not seem to slow down.”* It is developed by Floris Würzner (48911) and Samuel Bahrt (51211) and should be read has an integral part of it.

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Introduction

This report is the outcome of a joint research on Apple and its related stock from a financial perspective in order to analyse whether it is a profitable investment.

The success of the company has originated from the computer business from the start in the garage of the Jobs family in 1977. Since the Mac computers established the business success during the lifetime of the company, its analysis has to be included in this report.

In the past years the business model of Apple has changed considerably. The focus (and profit) shifted from computers to apps and – next – services. New devices like the Apple Watch have been developed, which combine a broad functionality with professional health capabilities. This fits perfectly with the strategic Digital Health focus that Apple offers both to consumers and the professional health institutions. The value that will be generated by this strategic move is of prime importance to the determination of a Buy, Hold or Sell advice.

Technological innovation forms the basis for the unique positioning of the company. In order to keep the momentum, Apple has to both acquire new technologies and successful engineers. Both targets are achieved by the secretive M&A approach the company developed. For this reason it is contained in the report.

It is evident that the iPhone and iPad in combination with related consumer oriented services play an important part in the business success from the start of the first iPhone in 2007. For this reason my research partner focused his report on these topics.

The structure of this report consists of the introduction and investors overview. Next the Mac is analysed, including risks and manufacturing topics. The wearables and services follow, with special attention to Watch, Health, iCloud and Care. The M&A process is described in a separate paragraph as it represents a less well-known factor to the continuing success of the company.

At the end a section is dedicated to Potential Future Endeavors, as considerable information leaks about the next moves of the company affecting the stock price which can not be left unmentioned in an Equity Research Report.

Having taken all of this information into account, the last part is dedicated to explaining the valuation as performed in the accompanied Excel document. All of the here forementioned analyses, research and writing in this report have been performed by Floris Würzner, except for the accompanied Excel which has been done by the pair. We conclude with a firm Buy recommendation for the Apple Inc stock.

1. History and Company Overview

Today, Apple is the world's most valuable Company with a Market Cap of $2,3 trillion dollars. It produces hardware and software targeted at the consumer market and to an increasing extent also to the professional market. For years CEO and co-founder Steve Jobs was famous for leading the company and introducing revolutionary sector-changing products. It became famous with its Macintosh computers, but its revenues, innovation power and brand awareness boomed after its introduction of its still best current asset: the iPhone, responsible for over $205 billion sales revenue in FY 2022, a 52% of its annual revenue. With the smartphone market reaching closer to saturation in the Western markets, Apple has shifted its focus to offer value for clients by subscription models for its services, and an ever tighter integration of its products and services with its unique ecosystem. Looking forward, the company is seriously considering stepping into entire new business markets like the automotive segment and Augmented Reality, Virtual Reality and Artificial Intelligence.

1.1. Institutional Investors[1]

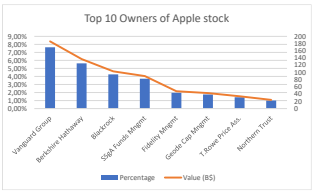

Figure 1 – Top 10 Owners of Apple stock

Institutional Investors hold a major part of Apple's outstanding shares: 59.92%. The top three investors are the Vanguard Group with a 7.63% stake or $186 billion dollars worth of shares, Berkshire Hathaway with a 5.63% stake or $137 billion worth of shares and Blackrock with a 4.26% stake or $103 billion worth of shares. Other institutional investors together with the three listed above hold 30.76%, and because mutual funds also own 29.16%, a mere 0.35% of shares is left for individual shareholders. During the past 24 months 4.629 institutional investors and hedge funds held stocks in Apple. As institutional investors tend to keep the stocks for a long period of time, the stock value fluctuations are smaller compared to stocks that are mainly held by active individual shareholders, which is beneficial to Apple.

2. Mac

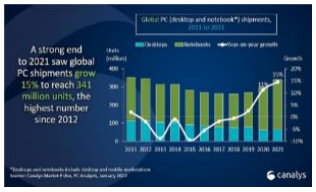

Figure 2 - *Source:* Canalys Newsroom - Global PC shipments pass 340 million in 2021 and 2022 is set to be even stronger

The laptop series MacBook grew exponentially. Global computer shipments in 2021 exceeded 341 million units, while Macs contributed to 29 million units: its annual market share growth of 8,5% exceeded the competitors by far. The geographical spread is large: currently in the US Apple covers some 15%, while the rest of the world lags behind. Both work-from-home due to COVID and the introduction of the proprietary M1-chips boosted sales.

The computer market is expected to grow at a 8,3% CAGR until 2026[2], which is a reasonably conservative estimate to take for Apple itself given that the Mac business unit had YoY growth rates of 11%, 23% and 14% for the last three years. We estimate this is therefore a valid assumption to make, and are for the years after assuming a growth rate equal to the weighted average of the geographical markets Apple operates in. Apple stopped reporting unit sales in fiscal year 2019. Mac sales increased by 40,2% yoy in the 3rd quarter of 2022 while the sales of the other leading computer industry were reduced drastically due to supply chain issues for

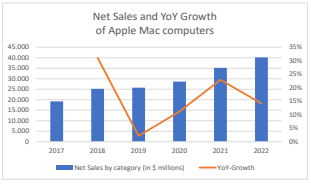

Figure 3 - Source: Apple Statistics (2022) - Business of Apps

[1] (CNN Money, 2021) https://money.cnn.com/quote/shareholders/shareholders.html?symb=AAPL&subView=institutional
[2](The Business Research Company, 2021) https://www.thebusinessresearchcompany.com/report/computers-global-market-report

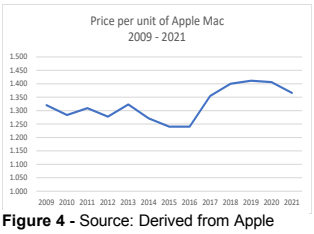

Figure 4 - Source: Derived from Apple Statistics (2022) - Business of Apps

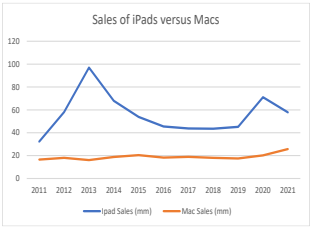

Figure 5 - Source: Derived from Apple Statistics (2022) - Business of Apps

key components[3]. This led to an increase of market share from 8,2% to 13,5% yoy in the 3rd quarter. The market as a whole declined by 15% in the quarter.

Shortages have driven the product mix towards the premium end, where Apple tends to have a strong presence. After a period of relatively stable sales from 2011 to 2019, sales have increased 15,4% (2020) and 27,2% (2021) in the last years. This must be strongly related to the emergence of COVID-19 and the related need for equipment for home-offices. It is remarkable that the price per unit has been kept at a very stable level.

The 2021 price is only 3,4% above the level of 2009 while functionality has increased drastically: step changes in processing power, screen brightness, color accuracy and dots-per-inch had been offered at the same price level. As a consequence, margin improvement has to be realized by increases of operational cost levels and economies-of-scale. Cost depends on supplier efficiencies in line with Moore's law: the number of transistors on a chip doubles every two years whereas its cost level halves in that period, see graph.

2.1. User categories: competitive advantage

Figure 6 - Source: Derived from Apple Statistics (2022) - Business of Apps

Apple differentiates its product offerings between consumers and professional users.

Apple is neither merely a hardware nor purely a software company: Apple's business model is user experience[4]. Consumers value the full integration of the Apple ecosystem[5]. The different product groups iPhone, Apple Watch, Airpod, iPad and MacBook together with the software applications have melted together into a fully integrated and seamless ecosystem.

2.2. Manufacturing

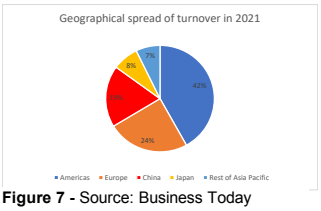

Figure 7 - Source: Business Today

Manufacturing (or better: assembly of purchased components) has been centered at China. This country represents 19% of Apple revenue, while India represents the largest growth rate: 68% in total revenue in 2021 and over 200% growth in the Mac business unit[6], whilst continuing strong growth in 2022. Sales of Macs have doubled in 2022 and represents some 5% of the local computer market in India.

Transferring manufacturing of Macs from China to India seems more than likely as iPhone 14 is currently being produced in that country and first signs indicate that iPad production is being prepared[7]. As a next step, production of Macs seems logical as the growth rate of businesses and the spending power of consumers exceed the rate at developed countries.

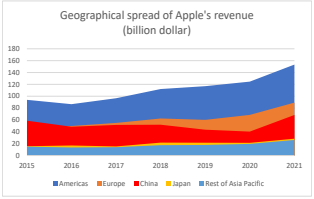

Figure 8 - Source: Business Today

While Net Sales have shown a steady increase over the past years, year-over-year growth varies significantly during the period. This is related to the introduction of new generations of products. Apple has introduced an in-house competitor for the Mac-series: the successful iPad. This device is not only used by consumers but also in increasing numbers by businesses. The processors and screen quality, especially of the Pro-series, equal those of the MacBook Air.

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[3] All numbers of alinea: (Mac Daily News, 2022), https://macdailynews.com/2022/10/10/idc-apples-mac-sales-surge-40-worldwide-to-grab-significant-market-share-as-pc-shipments-swoon/

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[4] (iMore, 2022) Apple and the user experience business model | iMore

[5] (A little bit Human, 2022) [5] The Apple Ecosystem: Love It or Hate It, Here's Why It's So Valuable (alittlebithuman.com)

[6] (Business Today, 2022) Apple India may cross Rs 30,000 crore revenue in FY2022 - BusinessToday .

[7] (MacRumors, 2022) Apple Could Start Manufacturing Some iPads in India - MacRumors)

Consumers value the full integration of the Apple ecosystem. The different product groups iPhone, Apple Watch, Airpod, iPad and MacBook together with the software applications have melted together into a fully integrated and seamless ecosystem. From fundamentally different operating systems and applications, the various platforms have innovated and integrated towards a common architecture and user interface experience.

Apple has minority market shares in personal computer, smartphone and tablet markets. Contrary to leading suppliers with lower cost offerings and larger installed bases, Apple focuses on the higher market segments. The company has a global presence, and faces highly competitive markets.

2.3. Business risk

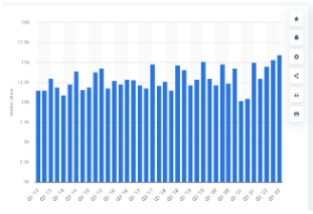

Figure 9 - Apple Mac's market share per quarter in US (source: Apple's PC market share in the U.S. 2013-2022 | Statista Apple's PC market share in the U.S. 2013-2022 | Statista)

A business risk is the dependence on international supply chains and manufacturing by outsourcing partners. International tensions and geopolitical developments especially in Asia have significant impact on the supply chain: for this reason manufacturing is shifted from China to India. Success is determined by the right balance between low operational costs by outsourcing and keeping sufficient control over all elements of the business. The company invests both in manufacturing equipment and in prepayments to suppliers in order to ramp up quickly. The number of suppliers and partners is kept low to single or limited sources, especially in the case of custom or core components. This enables control, but may introduce supply and pricing risks. During ramp-up of production of new products suppliers may fail to deliver sufficient quality, which may lead to acute stops of supply agreements like in the case of one of two suppliers of Airpods Pro 2 . In addition global shortages like in the semiconductor industry impact the organisation.

This is combined with the fact that Apple has stopped its 15 year long collaboration with chipmaker Intel in 2020[8], and is therefore no longer dependent on external suppliers but produces everything in-house. This stop has also enabled Apple to develop a whole new M1 and M2 chip.

This step symbolizes CEO Cook's vision to own core technologies, as according to Cook the company has a "long-term strategy of owning and controlling the primary technologies behind the products we make".This strategy raises initial investment and R&D costs of in-house developing chips and technologies that can at least compete with competitors since Apple virtually always charges its clients a mark-up for its premium segment products. However, in the long run it creates less dependency on external suppliers (proven to be the right choice in 2022 with globally deficient chips for anything), in addition to an even more enhanced symbiosis between hardware and software, which is already one of the leading strategic competitive advantages Apple distinguishes itself with from competitors.

As the world's most valuable company with 38 billion dollar cash in 2020[9], these short-term extra investments will experience higher revenues for the future which already has been the case with 23% YoY growth in 2021 and 14% YoY growth in 2022 and for the future yet to come. The computer market is expected to grow at a 8,3% CAGR until 2026, which is a reasonably conservative estimate to take for Apple itself given that the Mac business unit had

[8] (CNBC, 2020) https://www.cnbc.com/2020/11/10/why-apple-is-breaking-a-15-year-partnership-with-intel-on-its-macs-.html
[9] Consolidated Balance Sheet

YoY growth rates of 11%, 23% and 14% for the last three years.

We expect CAGR in revenues in Mac to come down to 7% in initial years, below the computer market CAGR of 8,3%. We think producing the new M1 and M2 chips in house is attracting customers who require the additional computational and graphical features, but considering the fact Apple's pricing strategies aim for a smaller, more premium and less quickly growing part of the computer segment market. Due to the longer life cycles of computers versus iPads, iPhones and Airpods, customers will wait longer with buying a new computer which also reduces CAGR.

3. Wearables, Home and Accessories

This segment covers Apple's range of Airpods, the Apple TV+ device, Apple Watch products and all products sold under the Beats umbrella, Apple's biggest acquisition yet that cost it 3 billion dollars[10]. Besides, this segment covers all accessories like protective cases and accessories that are sold under Apple's brand, however this can be seen as a very small portion of the business units' revenues.

3.1. Apple Watch

Watch has developed into a device that stimulates and monitors a healthy lifestyle. Professional-grade sensors and analytical software generates reliable information and warnings. New Ultra series shifts the boundaries to heavy duty applications. From the initial reliance on iPhone capabilities, Apple Watch has grown into an independent device with extensive functionalities.

iPhone extends communications to satellite networks for emergency situations.

Apple is forced to improve repairability and supply of tools and replacement components.

3.1.1. Financial Outlook of Wearables

The wearables segment has seen a YoY growth in the last respective five years of -42%, +41%, +25%, +25% and +7% and therefore we expect it to maintain a high growth rate for the first few years of +23%. This is largely driven by the enormous adoption of Airpods, Airpods Pro and Airpods Max and Apple Watch since their releases as AirPods is estimated to be responsible for $20 bln of revenue[11], and Watch for almost $10 billion with the entire business units' revenue equalling $40 billion. The market share for Airpods is 34,4% in its class[12] which we estimate Apple to retain because of its ease of use for consumers already within the Apple ecosystem, especially for the huge population of current and future iPhone users.

The expected CAGR for this total segment is 36.10% until 2028 which seems very high, but we believe Apple to at least hold up with the market growth since it is the market leader and its range of Airpods offers easiness to use, sound quality and noise cancellation other producers

[10](Forex, n.d.) , https://www.forex.com/en/market-analysis/latest-research/apple-acquisition-history/
[11] (Statista, 2022) https://www.statista.com/chart/26791/most-popular-headphone-brands-in-the-us/
[12] (Statista, 2022) https://www.statista.com/chart/26791/most-popular-headphone-brands-in-the-us/

cannot equal (which therefore also makes it the market leader).

For Apple Watch, the same rationale holds true as its ease of use and range of functions is only fully exploitable once users also own an iPhone, and because of the enormous population currently owning one, a target group who often also can afford side gadgets like Apple Watch and iPhone, its estimated market share of 30,1% won't surprise . The CAGR for the market of the Watch segment is 8.2% which we estimate to be at least equal to Apple's Watch, given the fact that Apple is the market leader and the iPhone userbase, its biggest target group.

The remaining category of $12 billion of revenue in this category is coming from Beats, Apple TV and other accessories. Because of the diversity of markets and range of products, combined with such a small revenue part when compared to the total revenues of Apple, a precise estimation is hard and will not be accurate. Therefore, we applied the historic average of 11% from the entire business unit.

Combining the 36.10% CAGR of the nearly 50% revenue wise counting Airpods, 8.2% of the substantial Watch and 11% of the rest category we estimate an aggregate 23% CAGR for the entire business unit for the years up until 2026, with afterwards having YoY growth rates equalling the GDP growth assumptions according to Apple's geographic GDP estimations of 3%. This business unit is estimated to be quite dependent on Apple's main business units like iPhone and iPad, as choosing the more expensive Apple option within the competitive landscape benefits users most when combined with other Apple products because of the merits of being nested into Apple's ecosystem integration.

3.2. Strategic goals privacy and healthcare

Strategic focus – and therefore positioning – is on privacy and health. Where competitors use consumer data as a source of income, Apple chooses not to offer free services in order to collect consumer data. Instead, income is generated by low fees paid by users. As a growing population is aware that they pay for free services by providing personal data and usage data in an untransparent way, the population that consciously chooses providers with high privacy ethics is increasing YOY. Tim Cooke calls the fight to protect privacy one of the most essential battles of our time[13].

3.2.1. Strategic positioning on Health

"Apple's greatest contribution to mankind should be about health," was a statement by CEO Tim Cook during a Jim Cramer interview. One of Apple's main strategic focus points is indeed Digital Health. According to Emergen Research, the global healthcare analytics market is expected to reach USD 90.84 billion in 2027 at a CAGR of 27.9%[14]. Microsoft Corporation is one of the direct competitors to Apple, offering Microsoft Cloud for healthcare: a cloud-based platform aimed at healthcare organizations to manage patient data, enhance patient engagement, secure personal patient information, and financial management.

[13] (Cnet, 2022) , https://www.cnet.com/news/privacy/tim-cook-says-the-fight-to-protect-privacy-is-a-crucial-one/
[14] (Emergen Research, 2022) https://www.emergenresearch.com/blog/top-10-leading-companies-in-the-healthcare-analytics-market

In July 2022 Apple issued the report “Empowering people to live a healthier day - Innovation using Apple technology to support personal health, research, and care”.[15] In the introduction COO Jeff Williams explains the twofold approach: personal health and fitness features on Apple Watch and iPhone, and partnership with the medical community to support research and care.

Apple didn’t limit their ambition by the fact that it is a consumer electronics company. Instead, they obtained a FDA approval for the ECG in the Apple Watch. For other applications official approval would present less additional value, so the lengthy process is avoided and the solution is presented as a consumer health product.

From a strategic point of view Apple has earned a very high credibility to obtain a leading position in the medical world thanks to their reputation in securing users privacy, to their proven ability to build user interfaces, and to their integrated approach towards hardware, software and platforms.

The company understands that more value is created if the proprietary developments and products are enhanced with third party medical applications. Ecosystems and platforms have been built like health kit, care kit and research kit. The thousands of medical apps – many of which have FDA approval – are heavily scrutinised and checked before they are permitted to the platforms. In Q2 2022 some 52.406 medical apps were available [16].

By its ability to master supply chains, advanced components, devices, software, APIs and platforms, the company has achieved the best competitive position to lead Digital Health.[17]

The Apple Watch has captured around 40% of the smartwatch market (The Apple Watch Is A Promising Venture In Healthcare Technology[18], and for most buyers the health- and fitness related features lead to the buying decision. The Watch revenue amounted to $9 billion in 2021.

3.3. iCloud Services

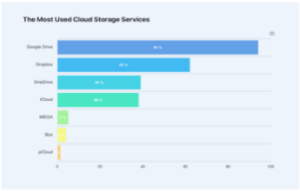

Figure 10 - Source: Cloudwards.net

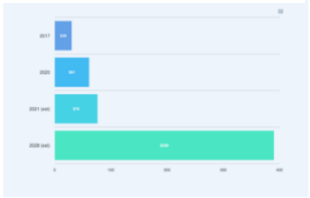

Figure 11 - Source: Cloudwards.net

Revenues of individual Services are not publicly available. iCloud storage is a huge growth market: by 2025 the world will store 200 zettabytes of data (200.000.000.000.000.000.000.000 bytes), and 50% of that amount will be stored in the cloud .

An estimate of revenues may be calculated by multiplying the iPhone users (1,5 billion in 2022) by the adoption rate of iCloud (some 15%) and the average global monthly rate of $2,5. This generates a turnover estimate of$ 6,75 billion in 2022. As gross margins of total services equal 63%, margin contribution of iCloud may be estimated at $4,25 billion.

Security levels of iCloud were unsatisfactory as stated by the company itself[19]: in 2021 data breaches had increased to an alarming global exposure of 1,1 billion personal records. For this reason an Advanced Data Protection plan has been introduced in December 2022, based on end-to-end encryption.

[15] (Health Report Apple, 2022) https://www.apple.com/newsroom/pdfs/Health-Report-July-2022.pdf
[16] (Statista, 2022) https://www.statista.com/statistics/779910/health-apps-available-ios-worldwide/
[17] (Linkedin, 2022) https://www.linkedin.com/pulse/summary-apples-healthcare-strategy-valentin-christian-splett
[18] (Forbes, 2022) https://www.forbes.com/sites/saibala/2022/04/29/the-apple-watch-is-a-promising-venture-in-healthcare-technology/?sh=5e9c684e543c
[19] (Indiatimes, 2022) Apple ICloud: Apple beefs up iCloud data defense against snooping, ET BrandEquity (indiatimes.com)

3.4. Apple Care

Gross margins of hardware equal around 32%: a number that is considerably lower than that of Services. The margin may be increased by elevating the sales price (which will result in lower sales quantities), by reducing total cost (which will have a marginal effect given the world class manufacturing and supply chain), or by adding additional services like Apple Care. As Services have a margin of 63% this is a very effective way to increase profitability of products. As a side-effect customer loyalty will be increased and customer service experience will be strengthened.

4. M&A strategy

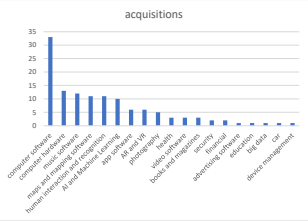

Figure 12 - Source: derived from acquisition data on Wikipedia.com

Apple has a rich history in M&A activities, and ramped up M&A activity to over a 100 in the last six years[20]. Few were focused at regional expansion, most at technological innovation and strengthening of services. The list of 125 acquisitions from 1988 to 2022 proves the following facts[21]:

1. 36,8% consisted of computer hardware and software.
2. 16% referred to photography, video and music.
3. 12,8% consisted of AI, Machine learning, AR and VR.
4. 8,8% was aimed at maps and local mapping.
5. 8,8% focused on human interaction and recognition.
6. 16,8% was spread over various categories.

In the period from 1988 to 2001 M&A was solely focused on computer hardware and software. This was the start-up period in which Apple had to fight to conquer a place in the computer industry. Next came music, mapping and Human Interface technology. In this period the company switched to consumer focused innovation. In the last years AI, machine learning, AR/VR and financial technology were acquired. The scale Apple had achieved allowed the company to focus on and apply breakthrough technologies.

The current user base of Apple has passed 1 billion active users. As a result acquisition of innovative technology is leveraged at a considerable scale. Especially when software is considered the cost per additional user is very low, whereas the value for each individual user is high: each dollar of consumer value nearly equals 1 billion dollar of value to the company.

Apple spends over 26 billion dollar annually on R&D, but thanks to this leverage acquisitions play a very important and attractive role in the growth and value creation strategy of the company. Especially since Apple's acquisitions almost never buy big competitors just to buy growth and not buy value (although its biggest acquisition in history of Beats was an exception to this), but acquires majority stakes in mostly small, technological innovation often still without considerable revenues but with great potential.

[20] (CNBC, 2021) https://www.cnbc.com/2021/05/01/how-apple-does-ma-small-and-quiet-with-no-bankers.html
[21](Wikipedia, 2022) (List of mergers and acquisitions by Apple - Wikipedia

Since 2020, acquisition activity has been focused on AI, AR/VR, Fintech and (classical) music platform technology. The mere scale of acquired technology puts the company at the forefront in the markets of AR/VR-glasses and financial and banking platforms, and it adds a large part of global classical music listeners to the current user base of 88 million Apple Music users. Al of these new products and services have been surfaced by industry watchers. Value creation potential is considerable.

4.1. Acquisition strategy

Apple chooses a different strategy for M&A activities compared to other tech companies: where Google, Facebook, Intel and Amazon frequently perform multi-billion deals, the acquisition of Beats has been a one-off exception for Apple. Most of the acquisitions were aimed at purchasing small companies, mainly in order to hire the talented technical staff: 'acquihire'. The value of the company is determined by the number of engineers working at the company: around 3 million $ per engineer[22]. (How Apple does M&A: Small and quiet, with no bankers (cnbc.com)).

This way overpaying or spending substantial amounts on goodwill or brand value is prevented.

Apple applies this approach in fields where it needs technical talent or it sees a specific technology that could set it apart from its competitors. The company's approach is to identify where the company has technical challenges and then to buy companies that address these, like mentioned before most recently in AR, AI VR and automobility.

In many cases acquisitions are performed under the radar without any publicity. Apple often does not continue the line of business as that is immaterial to the giant. The technical staff is quickly integrated in existing teams.

As [23]the company owns $135 billion in current assets amongst which high excess cash, a quick Cash Conversion Cycle of around 130 days in average and $99 billion in annual free cash flow, most acquisitions can be realised without involvement of banks and thus Apple frequently does so.

5. Potential Future Endeavors

Being the most valuable company with the fear of investors that its biggest business units have reached high saturation, Apple has had rumors around it for years to open up business branches in completely different segments. Since this information is partly affecting the stock price and information is incorporated into it, we thought this equity research paper will not be complete without at least addressing the biggest rumors, its perspectives and grow opportunities.

After Tesla's recent stock surge in the last years[24], the general consensus is clear that the automotive industry will leap towards electric vehicles (EV's) with increased autonomous driving capabilities. This is in line with the recent developments in the automotive world where

[22] (CNBC, 2022) How Apple does M&A: Small and quiet, with no bankers (cnbc.com)
[23] Our calculations from Excel document
[24] (Macrumors, 2022) https://www.macrumors.com/roundup/apple-car/

innovations deviate from the classic mechanical individual cars to integrated traffic networks, Artificial Intelligence algorithms, sensor technology and user interfaces leading towards fully automated and safe traffic.

There are a number of facts pointing out Apple is seriously considering stepping into this trend. First, hundreds of workers have been employed by Apple with previous working experience solely at car manufacturers or previously working in other Apple departments . Additionally, around the area of Cupertino where Apple's headquarters lie, after Apple has requested a formal permit for its self-driving software from the Californian state. In June of 2017, Cook has publicly spoken about autonomous driving software: "We're focusing on autonomous systems. It's a core technology that we view as very important. We sort of see it as the mother of all AI projects. It's probably one of the most difficult AI projects actually to work on. "

5.1. Potential Market and Financial Outlook

With an expected annual 3.9 trillion global Car and Automobile sales revenue in 2021 , Tesla's stand alone market capitalization was in January still 1.239 trillion because of the technologies and knowhow that comes from battery production and AI knowledge, much seen as the most promising future trends.

6. Valuation Methodology

The main valuation methods we used to establish the value of the company was the Discounted Cash Flows (DCF) and Adjusted Present Value (APV) models, as we believed this to be the most accurate way to capture what value the firm will offer its shareholders for the following reasons. First of all, the DCF and APV allow for an exhaustive range of assumptions, a feature we have used in our predictions for breaking down the forecast of revenues by business units and regions, in order to come to an accurate prediction of total future cash flows (and thereby value). Also, discounting future cash flows is a more reliable and company-oriented approach to express the value of the company, as opposed to market or competitor based analyses like multiples, although we did also make a multiple analysis.

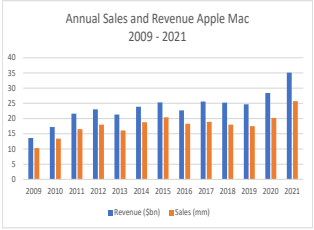

Figure 13 - Source: Apple Statistics (2022) - Business of Apps

We based our approach on Apple's annual 10-K report, and a wide range of online financial and academic literature, and have adjusted our assumptions based on this and our own interpretation and future expectations.

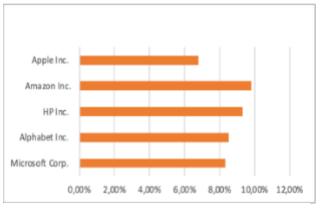

Figure 14 - Source: included in excel-sheet provided

As Apple is a mature, stable company we have chosen to estimate cashflows up until 2033, so only 10 years. The iPhone, iMac and iPad business units only would have allowed for an even smaller explicit period as we predict the growth in the coming years to be relatively small with and stable, respectively 4%, 7% and 0,32%. This is due to a severity of reasons we have elaborated on before more extensively, but heavy competition, saturation of demand in Western markets and low affordability in Apple's pricing range and therefore low growth in non-Western markets being the leading reasons.

For Wearables and Services we estimate the growth rates to be higher and more prone to volatility, which required us to extend the explicit period up to 2033. Not only historical growth rates have been high, also market share is currently very high in Wearables and growing in

Services, and most markets that fall under these two business units are growing at high CAGRs with high volatility.

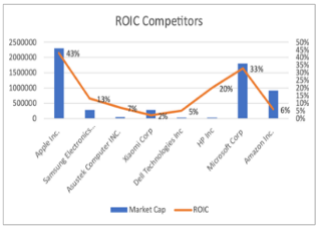

Figure 14 - Source: included in excel-sheet provided

We expect all growth rates to gradually (linearly) come down to the growth rate of a selected range of macroeconomic real GDP countries for perpetuity, as elaborated on later on.

A cost breakdown for individual business units has been proven to be impossible due to lack of information from Apple itself and lack of reliability of third party sources, but costs have been broken down too for the extent to which this was possible as much as possible. For years after which a Compounded Annual Growth Rate was no longer reliably retrievable and perpetuity estimations, a global Macro Analysis has been performed retrieved all from Bloomberg's terminal for long term expectations.

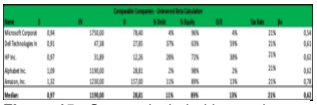

Figure 15 - Source: included in excel-sheet provided

6.1. Ratios

Apple repurchased $90.2 billion dollars of its own shares in FY2022, and $85.5 billion dollars in 2021, which is a continuation of its repurchase strategy Apple has been doing for years. One reason Apple does so is to increase ratios which already are outstanding and higher than competitors, as is clear from the Graph "Roic Competitors". The cause of this outperformance lies for a substantial part in the fact that Apple is turning more and more into a services company, in which initial investment costs are substantial but once up and running marginal costs per customer are close to zero, and due to its very big base of customers who will buy the Apple variant of products anyway, these initially big investment costs are very quickly earned back.

Figure 16 - Source: included in excel-sheet provided

Besides improving the ratios, Apple also does so to up the share price artificially, as then profits are left for a decreasing number of shares and therefore will go up per share. Normally companies do this when they feel like their shares are under-priced, but for Apple this rationale does not really hold as it has consistently been doing so also in COVID times, when the war with Russia has just started and in times of economic prosperity and a bull market right after COVID, so it can be concluded that this consistency in repurchasing shares is not related to the actual current share price. We considered share buybacks not to be considered as a form of dividend, as the market will already automatically price it into the share price due to the lower number of shares outstanding.

6.2. WACC Analysis

In the WACC sheet, we have compared Apple to its biggest comparables in order to get the unlevered beta of 0.62. This is retrieved after having established the rolling beta of 1,134, which we retrieved by computing a regression analysis of Apple's stock returns against the Nasdaq index, in which we have included all monthly data periods from 1985 onwards.

Since for most companies the 2022 fiscal year hasn't ended, most data is retrieved with their 2021 numbers and all data of the comparable companies is retrieved from Yahoo Finance, except for Apple for which both Yahoo Finance and its own 10-K is used.

The Riskfree Rate is the 10 years T-Bill for an American Bond, the MRP is the average between 4,5% and 5,5% as explained in McKinsey's Valuation Report. The AAA probability of default is retrieved from Moody's and the loss given default is the Defaulted Corporate Bond Recoveries

of 2017 for a Moody's AAA rating. We estimated the eventual WACC at 6,76%, which is significantly lower than competitors' (see graph), driving up the valuation. This is partly due to a lower (market value) D/E ratio of 5% compared to 11% in the benchmark group, and to a large cash reserve resulting in high solvability, and both factors bring down the cost of debt.

For the DCF we conducted a sensitivity analysis for adjacent values of G and WACC and it can be concluded that differences of g and WACC can change our recommendation into Hold as well, as values range from 139,3 to 233 dollar. However, only the worst 6 (out of 25) scenarios would change our recommendation into "Hold", meaning we estimate the stock to be a safe "Buy" recommendation.

Besides, we are quite confident about the WACC, the best comparable companies used for unlevering are of course always bound to interpretation but we think we have chosen the most correct competitors, also with regards to future trends. For other parameters we are sure WACC is correct as they are based on given parameters in the market (Rf, MRP since it's from McKinsey's report) and otherwise the entire market would be wrong.

We initially based the growth rates on articles we ought to be most reliable and best reflecting Apple's individual business units, after which we adjusted it to our expectations. We have included CAGR's with all corresponding years, and afterwards have equalled the growth rate gradually to the perpetual macroeconomic real GDP for the reported.

6.3. APV

We conducted two sensitivity analyses for the value of Apple in APV, the terminal growth rate against Ru and against Rd. A changing Rd is an unimportant parameter as no scenario gets below the current share price +10%. In other terms: even if we estimated a not too significantly wrong Rd, our recommendation will always remain "Buy" and therefore a changing Rd is not a parameter investors have to keep in mind when considering buying an Apple stock.

For a changing Ru, the investing advice changes as for 8 out of 25 scenarios our recommendation would change into "Hold". This is due to the fact that since Ru= Rf *(β u*MRP), Apple's historical Beta is 1,13 (as calculated in "Historical Data" against the Nasdaq) but for WACC valuation purposes we "forced" Apple's βu to be 0,62 because of the comparable companies chosen that we thought were best in terms of competitive landscape.

However, it can be argued that Apple's βu should actually be higher when analysed historically, which would result in a higher Ru, and in turn would result in an even higher stock price according to APV and more resilient sensitivity analysis against Ru. In other words, we do not worry too much about changing values of Ru, especially since 17 out of 25 scenarios would still result in a "Buy" recommendation.

With the current macro economic situation and outlook, Rf will likely only go up (resulting in a higher Ru), the βu picked for Apple can be interpreted as artificially low, and if the economy would become worse also MRP will only go up as investors then want a higher compensation for the risk they undertake in a "bear market" or challenging times.

6.4. Multiple Valuation

For the multiple valuation methodology, we have established Apple's biggest competitors for each of its business unit as only then a proper comparison can be made. For instance, for the iPhone category, we retracted the financial data of the biggest smartphone producers (all data in this sheet is from Yahoo Finance).

The EV of each business unit have eventually been summed up in order to get to Apple's total EV number, which is 2,2T with EV/Ebitda so slightly under the market cap and well below our estimations as performed with cash flows. In total only Xiaomi, Amazon and Spotify had higher ones while all remaining competitors had significantly lower multiple ratios.

According to us, this reason for the multiple ratio to be lower than cash flow valuations is due to the fact that Apple is not just the sum of its individual business units, as the value of the ecosystem is then not fully incorporated, the knowhow and skills of acquisitions is not included which also might result in totally new business segments or potential future endeavours, and these are also not included.

In addition, Apple is a conglomerate operating in entirely different markets and besides the fact that information about the hundreds of individual business units is not disclosed, also the list of comparables required to fully capture all of Apple's business units would become too long. We therefore assume our cash flow based valuations to be more accurate.

6.5. Perpetual growth rate

For the perpetual growth rate, we have established an extensive approach of macroeconomic factors through the Bloomberg terminal and taken into account all geographies Apple operates in. It is hard to find data about specific locations since Apple only reports five major geographies, and within such a geography the macroeconomic perspectives can differ hugely.

Take Europe for instance, which consists of all European countries, India, the Middle East and Africa. Because of that, we built our growth rate based on the key revenue drivers in these specific regions. For the Americas region we looked how the most important product, the iPhone, is performing in various countries as a proxy. Despite the US region and Canada, Apple struggled to gain a market share of more than 20% in Latin America and were mostly below 10% . Therefore we identified these two countries as the key revenue drivers and built a weighted average based on their market share and the overall phone market size as a proxy.

For the European Region, we went with the same procedure and found a decline when comparing Western to Eastern Europe. Despite Spain, the whole western European segment is characterized by Apple having a market share of at least 30%, which is exceptionally high compared countries in Eastern Europe. The other countries included in this region (Africa, the Middle East and India) are characterized by lower purchasing power and less disposable income and because we estimate to be only a fraction of total revenues in the "Europe" segment (Apple does not disclose this information), and a not fair proxy for the perpetual growth (substantially too high).

For that reason, we used Western Europe as a proxy for this region. For Greater China, Japan as well as the Rest of Asia Pacific, we considered the whole region due to the similarities the various countries have regarding (the outlook of) their respective markets and Apple's market

share in these markets. After doing that, we took the share of revenue from these regions to create the weights and the perpetuity growth rate of around 1,52% for 2033 onwards. We have based our growth rates not only on Bloomberg terminal, but also on reports and market research we ought to be most reliable and best reflecting Apple's individual business unit and adjusted them to our own perspective.

We have included CAGR's with all corresponding years, and afterwards assumed a linear decline until the year 2033, in which we assume Apple Inc to grow by the perpetuity growth rate as elaborated on earlier. We estimate Apple will experience substantial growth in the next couple of years, after which it will eventually equal these long-term macroeconomic forecasts because competitors will step in on cost and competitive advantages and Apple's growth will be aligned with the market.

A Work Project, presented as part of the requirements for the Award of
a Master Degree in Finance from the NOVA – School of Business and Economics.

Does Apple still come to fruition or is the harvest time over? *The tech giant seeks to find growth in new markets*

Livius Floris Constantijn Bernard Maximiliaan Würzner
48911

A Project carried out on the Master in Finance Program, under the supervision of:

(Rosário André)

16-12-2022

Abstract

This is the Equity Research Report on the AAPL stock, analyzing Apple's business units, financial history, markets and outlook in order to be able to award a Buy, Hold or Sell recommendation. It should not be interpreted as professional financial advisory as it is drawn up for academic purposes. It will however provide an insight into both the company and the related stock and its prospectuses. There is an accompanied Excel document that is highly relevant for interpretation and justification of the assumptions made. With all information taken into account, the writers end up with a "Buy" recommendation as a result of the analysis of the market and trends, (forecasts of) its business units, the strategy and vision.

Apple
Equity Research
Growth
Value

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

This report is part of Equity Research report called “The Tech giant that keeps on accumulating. *Apple’s outperforming growth does not seem to slow down.”* It is developed by Floris Würzner (48911) and Samuel Bahrt (51211) and should be read has an integral part of it.

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Introduction

This report is the outcome of a joint research on Apple and its related stock from a financial perspective in order to analyse whether it is a profitable investment.

The success of the company has originated from the computer business from the start in the garage of the Jobs family in 1977. Since the Mac computers established the business success during the lifetime of the company, its analysis has to be included in this report.

In the past years the business model of Apple has changed considerably. The focus (and profit) shifted from computers to apps and – next – services. New devices like the Apple Watch have been developed, which combine a broad functionality with professional health capabilities. This fits perfectly with the strategic Digital Health focus that Apple offers both to consumers and the professional health institutions. The value that will be generated by this strategic move is of prime importance to the determination of a Buy, Hold or Sell advice.

Technological innovation forms the basis for the unique positioning of the company. In order to keep the momentum, Apple has to both acquire new technologies and successful engineers. Both targets are achieved by the secretive M&A approach the company developed. For this reason it is contained in the report.

It is evident that the iPhone and iPad in combination with related consumer oriented services play an important part in the business success from the start of the first iPhone in 2007. For this reason my research partner focused his report on these topics.

The structure of this report consists of the introduction and investors overview. Next the Mac is analysed, including risks and manufacturing topics. The wearables and services follow, with special attention to Watch, Health, iCloud and Care. The M&A process is described in a separate paragraph as it represents a less well-known factor to the continuing success of the company.

At the end a section is dedicated to Potential Future Endeavors, as considerable information leaks about the next moves of the company affecting the stock price which can not be left unmentioned in an Equity Research Report.

Having taken all of this information into account, the last part is dedicated to explaining the valuation as performed in the accompanied Excel document. All of the here forementioned analyses, research and writing in this report have been performed by Floris Würzner, except for the accompanied Excel which has been done by the pair. We conclude with a firm Buy recommendation for the Apple Inc stock.

1. History and Company Overview

Today, Apple is the world's most valuable Company with a Market Cap of $2,3 trillion dollars. It produces hardware and software targeted at the consumer market and to an increasing extent also to the professional market. For years CEO and co-founder Steve Jobs was famous for leading the company and introducing revolutionary sector-changing products. It became famous with its Macintosh computers, but its revenues, innovation power and brand awareness boomed after its introduction of its still best current asset: the iPhone, responsible for over $205 billion sales revenue in FY 2022, a 52% of its annual revenue. With the smartphone market reaching closer to saturation in the Western markets, Apple has shifted its focus to offer value for clients by subscription models for its services, and an ever tighter integration of its products and services with its unique ecosystem. Looking forward, the company is seriously considering stepping into entire new business markets like the automotive segment and Augmented Reality, Virtual Reality and Artificial Intelligence.

1.1. Institutional Investors[1]

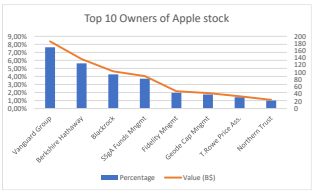

Figure 1 – Top 10 Owners of Apple stock

Institutional Investors hold a major part of Apple's outstanding shares: 59.92%. The top three investors are the Vanguard Group with a 7.63% stake or $186 billion dollars worth of shares, Berkshire Hathaway with a 5.63% stake or $137 billion worth of shares and Blackrock with a 4.26% stake or $103 billion worth of shares. Other institutional investors together with the three listed above hold 30.76%, and because mutual funds also own 29.16%, a mere 0.35% of shares is left for individual shareholders. During the past 24 months 4.629 institutional investors and hedge funds held stocks in Apple. As institutional investors tend to keep the stocks for a long period of time, the stock value fluctuations are smaller compared to stocks that are mainly held by active individual shareholders, which is beneficial to Apple.

2. Mac

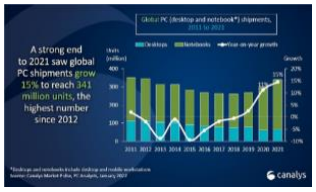

Figure 2 - *Source:* Canalys Newsroom - Global PC shipments pass 340 million in 2021 and 2022 is set to be even stronger

The laptop series MacBook grew exponentially. Global computer shipments in 2021 exceeded 341 million units, while Macs contributed to 29 million units: its annual market share growth of 8,5% exceeded the competitors by far. The geographical spread is large: currently in the US Apple covers some 15%, while the rest of the world lags behind. Both work-from-home due to COVID and the introduction of the proprietary M1-chips boosted sales.

The computer market is expected to grow at a 8,3% CAGR until 2026[2], which is a reasonably conservative estimate to take for Apple itself given that the Mac business unit had YoY growth rates of 11%, 23% and 14% for the last three years. We estimate this is therefore a valid assumption to make, and are for the years after assuming a growth rate equal to the weighted average of the geographical markets Apple operates in. Apple stopped reporting unit sales in fiscal year 2019. Mac sales increased by 40,2% yoy in the 3rd quarter of 2022 while the sales of the other leading computer industry were reduced drastically due to supply chain issues for

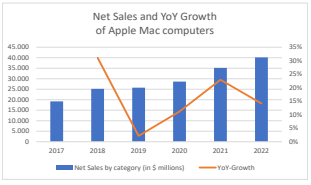

Figure 3 - Source: Apple Statistics (2022) - Business of Apps

[1] (CNN Money, 2021) https://money.cnn.com/quote/shareholders/shareholders.html?symb=AAPL&subView=institutional
[2](The Business Research Company, 2021) https://www.thebusinessresearchcompany.com/report/computers-global-market-report

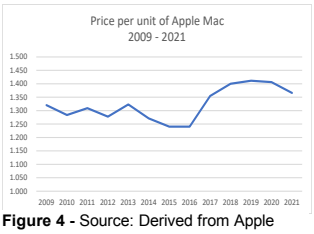

Figure 4 - Source: Derived from Apple Statistics (2022) - Business of Apps

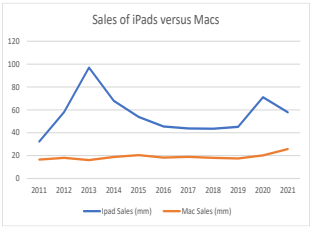

Figure 5 - Source: Derived from Apple Statistics (2022) - Business of Apps

key components[3]. This led to an increase of market share from 8,2% to 13,5% yoy in the 3rd quarter. The market as a whole declined by 15% in the quarter.

Shortages have driven the product mix towards the premium end, where Apple tends to have a strong presence. After a period of relatively stable sales from 2011 to 2019, sales have increased 15,4% (2020) and 27,2% (2021) in the last years. This must be strongly related to the emergence of COVID-19 and the related need for equipment for home-offices. It is remarkable that the price per unit has been kept at a very stable level.

The 2021 price is only 3,4% above the level of 2009 while functionality has increased drastically: step changes in processing power, screen brightness, color accuracy and dots-per-inch had been offered at the same price level. As a consequence, margin improvement has to be realized by increases of operational cost levels and economies-of-scale. Cost depends on supplier efficiencies in line with Moore's law: the number of transistors on a chip doubles every two years whereas its cost level halves in that period, see graph.

2.1. User categories: competitive advantage

Figure 6 - Source: Derived from Apple Statistics (2022) - Business of Apps

Apple differentiates its product offerings between consumers and professional users.

Apple is neither merely a hardware nor purely a software company: Apple's business model is user experience[4]. Consumers value the full integration of the Apple ecosystem[5]. The different product groups iPhone, Apple Watch, Airpod, iPad and MacBook together with the software applications have melted together into a fully integrated and seamless ecosystem.

2.2. Manufacturing

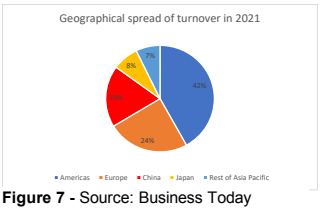

Figure 7 - Source: Business Today

Manufacturing (or better: assembly of purchased components) has been centered at China. This country represents 19% of Apple revenue, while India represents the largest growth rate: 68% in total revenue in 2021 and over 200% growth in the Mac business unit[6], whilst continuing strong growth in 2022. Sales of Macs have doubled in 2022 and represents some 5% of the local computer market in India.

Transferring manufacturing of Macs from China to India seems more than likely as iPhone 14 is currently being produced in that country and first signs indicate that iPad production is being prepared[7]. As a next step, production of Macs seems logical as the growth rate of businesses and the spending power of consumers exceed the rate at developed countries.

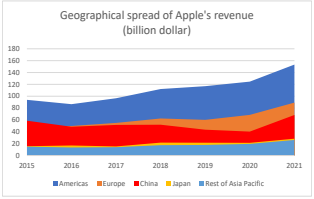

Figure 8 - Source: Business Today

While Net Sales have shown a steady increase over the past years, year-over-year growth varies significantly during the period. This is related to the introduction of new generations of products. Apple has introduced an in-house competitor for the Mac-series: the successful iPad. This device is not only used by consumers but also in increasing numbers by businesses. The processors and screen quality, especially of the Pro-series, equal those of the MacBook Air.

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[3] All numbers of alinea: (Mac Daily News, 2022), https://macdailynews.com/2022/10/10/idc-apples-mac-sales-surge-40-worldwide-to-grab-significant-market-share-as-pc-shipments-swoon/

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[4] (iMore, 2022) Apple and the user experience business model | iMore

[5] (A little bit Human, 2022) [5] The Apple Ecosystem: Love It or Hate It, Here's Why It's So Valuable (alittlebithuman.com)

[6] (Business Today, 2022) Apple India may cross Rs 30,000 crore revenue in FY2022 - BusinessToday .

[7] (MacRumors, 2022) Apple Could Start Manufacturing Some iPads in India - MacRumors)

Consumers value the full integration of the Apple ecosystem. The different product groups iPhone, Apple Watch, Airpod, iPad and MacBook together with the software applications have melted together into a fully integrated and seamless ecosystem. From fundamentally different operating systems and applications, the various platforms have innovated and integrated towards a common architecture and user interface experience.

Apple has minority market shares in personal computer, smartphone and tablet markets. Contrary to leading suppliers with lower cost offerings and larger installed bases, Apple focuses on the higher market segments. The company has a global presence, and faces highly competitive markets.

2.3. Business risk

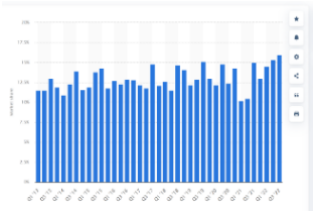

Figure 9 - Apple Mac's market share per quarter in US (source: Apple's PC market share in the U.S. 2013-2022 | Statista Apple's PC market share in the U.S. 2013-2022 | Statista)

A business risk is the dependence on international supply chains and manufacturing by outsourcing partners. International tensions and geopolitical developments especially in Asia have significant impact on the supply chain: for this reason manufacturing is shifted from China to India. Success is determined by the right balance between low operational costs by outsourcing and keeping sufficient control over all elements of the business. The company invests both in manufacturing equipment and in prepayments to suppliers in order to ramp up quickly. The number of suppliers and partners is kept low to single or limited sources, especially in the case of custom or core components. This enables control, but may introduce supply and pricing risks. During ramp-up of production of new products suppliers may fail to deliver sufficient quality, which may lead to acute stops of supply agreements like in the case of one of two suppliers of Airpods Pro 2 . In addition global shortages like in the semiconductor industry impact the organisation.

This is combined with the fact that Apple has stopped its 15 year long collaboration with chipmaker Intel in 2020[8], and is therefore no longer dependent on external suppliers but produces everything in-house. This stop has also enabled Apple to develop a whole new M1 and M2 chip.

This step symbolizes CEO Cook's vision to own core technologies, as according to Cook the company has a "long-term strategy of owning and controlling the primary technologies behind the products we make".This strategy raises initial investment and R&D costs of in-house developing chips and technologies that can at least compete with competitors since Apple virtually always charges its clients a mark-up for its premium segment products. However, in the long run it creates less dependency on external suppliers (proven to be the right choice in 2022 with globally deficient chips for anything), in addition to an even more enhanced symbiosis between hardware and software, which is already one of the leading strategic competitive advantages Apple distinguishes itself with from competitors.

As the world's most valuable company with 38 billion dollar cash in 2020[9], these short-term extra investments will experience higher revenues for the future which already has been the case with 23% YoY growth in 2021 and 14% YoY growth in 2022 and for the future yet to come. The computer market is expected to grow at a 8,3% CAGR until 2026, which is a reasonably conservative estimate to take for Apple itself given that the Mac business unit had

[8] (CNBC, 2020) https://www.cnbc.com/2020/11/10/why-apple-is-breaking-a-15-year-partnership-with-intel-on-its-macs-.html
[9] Consolidated Balance Sheet

YoY growth rates of 11%, 23% and 14% for the last three years.

We expect CAGR in revenues in Mac to come down to 7% in initial years, below the computer market CAGR of 8,3%. We think producing the new M1 and M2 chips in house is attracting customers who require the additional computational and graphical features, but considering the fact Apple's pricing strategies aim for a smaller, more premium and less quickly growing part of the computer segment market. Due to the longer life cycles of computers versus iPads, iPhones and Airpods, customers will wait longer with buying a new computer which also reduces CAGR.

3. Wearables, Home and Accessories

This segment covers Apple's range of Airpods, the Apple TV+ device, Apple Watch products and all products sold under the Beats umbrella, Apple's biggest acquisition yet that cost it 3 billion dollars[10]. Besides, this segment covers all accessories like protective cases and accessories that are sold under Apple's brand, however this can be seen as a very small portion of the business units' revenues.

3.1. Apple Watch

Watch has developed into a device that stimulates and monitors a healthy lifestyle. Professional-grade sensors and analytical software generates reliable information and warnings. New Ultra series shifts the boundaries to heavy duty applications. From the initial reliance on iPhone capabilities, Apple Watch has grown into an independent device with extensive functionalities.

iPhone extends communications to satellite networks for emergency situations.

Apple is forced to improve repairability and supply of tools and replacement components.

3.1.1. Financial Outlook of Wearables

The wearables segment has seen a YoY growth in the last respective five years of -42%, +41%, +25%, +25% and +7% and therefore we expect it to maintain a high growth rate for the first few years of +23%. This is largely driven by the enormous adoption of Airpods, Airpods Pro and Airpods Max and Apple Watch since their releases as AirPods is estimated to be responsible for $20 bln of revenue[11], and Watch for almost $10 billion with the entire business units' revenue equalling $40 billion. The market share for Airpods is 34,4% in its class[12] which we estimate Apple to retain because of its ease of use for consumers already within the Apple ecosystem, especially for the huge population of current and future iPhone users.

The expected CAGR for this total segment is 36.10% until 2028 which seems very high, but we believe Apple to at least hold up with the market growth since it is the market leader and its range of Airpods offers easiness to use, sound quality and noise cancellation other producers

[10](Forex, n.d.) , https://www.forex.com/en/market-analysis/latest-research/apple-acquisition-history/
[11] (Statista, 2022) https://www.statista.com/chart/26791/most-popular-headphone-brands-in-the-us/
[12] (Statista, 2022) https://www.statista.com/chart/26791/most-popular-headphone-brands-in-the-us/

cannot equal (which therefore also makes it the market leader).

For Apple Watch, the same rationale holds true as its ease of use and range of functions is only fully exploitable once users also own an iPhone, and because of the enormous population currently owning one, a target group who often also can afford side gadgets like Apple Watch and iPhone, its estimated market share of 30,1% won't surprise . The CAGR for the market of the Watch segment is 8.2% which we estimate to be at least equal to Apple's Watch, given the fact that Apple is the market leader and the iPhone userbase, its biggest target group.

The remaining category of $12 billion of revenue in this category is coming from Beats, Apple TV and other accessories. Because of the diversity of markets and range of products, combined with such a small revenue part when compared to the total revenues of Apple, a precise estimation is hard and will not be accurate. Therefore, we applied the historic average of 11% from the entire business unit.

Combining the 36.10% CAGR of the nearly 50% revenue wise counting Airpods, 8.2% of the substantial Watch and 11% of the rest category we estimate an aggregate 23% CAGR for the entire business unit for the years up until 2026, with afterwards having YoY growth rates equalling the GDP growth assumptions according to Apple's geographic GDP estimations of 3%. This business unit is estimated to be quite dependent on Apple's main business units like iPhone and iPad, as choosing the more expensive Apple option within the competitive landscape benefits users most when combined with other Apple products because of the merits of being nested into Apple's ecosystem integration.

3.2. Strategic goals privacy and healthcare

Strategic focus – and therefore positioning – is on privacy and health. Where competitors use consumer data as a source of income, Apple chooses not to offer free services in order to collect consumer data. Instead, income is generated by low fees paid by users. As a growing population is aware that they pay for free services by providing personal data and usage data in an untransparent way, the population that consciously chooses providers with high privacy ethics is increasing YOY. Tim Cooke calls the fight to protect privacy one of the most essential battles of our time[13].

3.2.1. Strategic positioning on Health

"Apple's greatest contribution to mankind should be about health," was a statement by CEO Tim Cook during a Jim Cramer interview. One of Apple's main strategic focus points is indeed Digital Health. According to Emergen Research, the global healthcare analytics market is expected to reach USD 90.84 billion in 2027 at a CAGR of 27.9%[14]. Microsoft Corporation is one of the direct competitors to Apple, offering Microsoft Cloud for healthcare: a cloud-based platform aimed at healthcare organizations to manage patient data, enhance patient engagement, secure personal patient information, and financial management.

[13] (Cnet, 2022) , https://www.cnet.com/news/privacy/tim-cook-says-the-fight-to-protect-privacy-is-a-crucial-one/
[14] (Emergen Research, 2022) https://www.emergenresearch.com/blog/top-10-leading-companies-in-the-healthcare-analytics-market

In July 2022 Apple issued the report “Empowering people to live a healthier day - Innovation using Apple technology to support personal health, research, and care”.[15] In the introduction COO Jeff Williams explains the twofold approach: personal health and fitness features on Apple Watch and iPhone, and partnership with the medical community to support research and care.

Apple didn’t limit their ambition by the fact that it is a consumer electronics company. Instead, they obtained a FDA approval for the ECG in the Apple Watch. For other applications official approval would present less additional value, so the lengthy process is avoided and the solution is presented as a consumer health product.

From a strategic point of view Apple has earned a very high credibility to obtain a leading position in the medical world thanks to their reputation in securing users privacy, to their proven ability to build user interfaces, and to their integrated approach towards hardware, software and platforms.

The company understands that more value is created if the proprietary developments and products are enhanced with third party medical applications. Ecosystems and platforms have been built like health kit, care kit and research kit. The thousands of medical apps – many of which have FDA approval – are heavily scrutinised and checked before they are permitted to the platforms. In Q2 2022 some 52.406 medical apps were available [16].

By its ability to master supply chains, advanced components, devices, software, APIs and platforms, the company has achieved the best competitive position to lead Digital Health.[17]

The Apple Watch has captured around 40% of the smartwatch market (The Apple Watch Is A Promising Venture In Healthcare Technology[18], and for most buyers the health- and fitness related features lead to the buying decision. The Watch revenue amounted to $9 billion in 2021.

3.3. iCloud Services

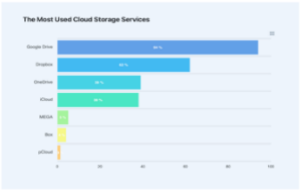

Figure 10 - Source: Cloudwards.net

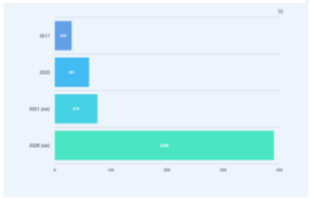

Figure 11 - Source: Cloudwards.net

Revenues of individual Services are not publicly available. iCloud storage is a huge growth market: by 2025 the world will store 200 zettabytes of data (200.000.000.000.000.000.000.000 bytes), and 50% of that amount will be stored in the cloud .

An estimate of revenues may be calculated by multiplying the iPhone users (1,5 billion in 2022) by the adoption rate of iCloud (some 15%) and the average global monthly rate of $2,5. This generates a turnover estimate of$ 6,75 billion in 2022. As gross margins of total services equal 63%, margin contribution of iCloud may be estimated at $4,25 billion.

Security levels of iCloud were unsatisfactory as stated by the company itself[19]: in 2021 data breaches had increased to an alarming global exposure of 1,1 billion personal records. For this reason an Advanced Data Protection plan has been introduced in December 2022, based on end-to-end encryption.

[15] (Health Report Apple, 2022) https://www.apple.com/newsroom/pdfs/Health-Report-July-2022.pdf
[16] (Statista, 2022) https://www.statista.com/statistics/779910/health-apps-available-ios-worldwide/
[17] (Linkedin, 2022) https://www.linkedin.com/pulse/summary-apples-healthcare-strategy-valentin-christian-splett
[18] (Forbes, 2022) https://www.forbes.com/sites/saibala/2022/04/29/the-apple-watch-is-a-promising-venture-in-healthcare-technology/?sh=5e9c684e543c
[19] (Indiatimes, 2022) Apple ICloud: Apple beefs up iCloud data defense against snooping, ET BrandEquity (indiatimes.com)

3.4. Apple Care

Gross margins of hardware equal around 32%: a number that is considerably lower than that of Services. The margin may be increased by elevating the sales price (which will result in lower sales quantities), by reducing total cost (which will have a marginal effect given the world class manufacturing and supply chain), or by adding additional services like Apple Care. As Services have a margin of 63% this is a very effective way to increase profitability of products. As a side-effect customer loyalty will be increased and customer service experience will be strengthened.

4. M&A strategy

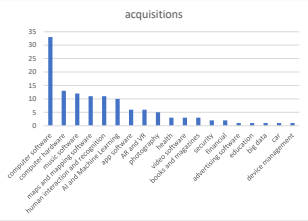

Figure 12 - Source: derived from acquisition data on Wikipedia.com

Apple has a rich history in M&A activities, and ramped up M&A activity to over a 100 in the last six years[20]. Few were focused at regional expansion, most at technological innovation and strengthening of services. The list of 125 acquisitions from 1988 to 2022 proves the following facts[21]:

1. 36,8% consisted of computer hardware and software.
2. 16% referred to photography, video and music.
3. 12,8% consisted of AI, Machine learning, AR and VR.
4. 8,8% was aimed at maps and local mapping.
5. 8,8% focused on human interaction and recognition.
6. 16,8% was spread over various categories.

In the period from 1988 to 2001 M&A was solely focused on computer hardware and software. This was the start-up period in which Apple had to fight to conquer a place in the computer industry. Next came music, mapping and Human Interface technology. In this period the company switched to consumer focused innovation. In the last years AI, machine learning, AR/VR and financial technology were acquired. The scale Apple had achieved allowed the company to focus on and apply breakthrough technologies.

The current user base of Apple has passed 1 billion active users. As a result acquisition of innovative technology is leveraged at a considerable scale. Especially when software is considered the cost per additional user is very low, whereas the value for each individual user is high: each dollar of consumer value nearly equals 1 billion dollar of value to the company.

Apple spends over 26 billion dollar annually on R&D, but thanks to this leverage acquisitions play a very important and attractive role in the growth and value creation strategy of the company. Especially since Apple's acquisitions almost never buy big competitors just to buy growth and not buy value (although its biggest acquisition in history of Beats was an exception to this), but acquires majority stakes in mostly small, technological innovation often still without considerable revenues but with great potential.

[20] (CNBC, 2021) https://www.cnbc.com/2021/05/01/how-apple-does-ma-small-and-quiet-with-no-bankers.html
[21](Wikipedia, 2022) (List of mergers and acquisitions by Apple - Wikipedia

Since 2020, acquisition activity has been focused on AI, AR/VR, Fintech and (classical) music platform technology. The mere scale of acquired technology puts the company at the forefront in the markets of AR/VR-glasses and financial and banking platforms, and it adds a large part of global classical music listeners to the current user base of 88 million Apple Music users. Al of these new products and services have been surfaced by industry watchers. Value creation potential is considerable.

4.1. Acquisition strategy

Apple chooses a different strategy for M&A activities compared to other tech companies: where Google, Facebook, Intel and Amazon frequently perform multi-billion deals, the acquisition of Beats has been a one-off exception for Apple. Most of the acquisitions were aimed at purchasing small companies, mainly in order to hire the talented technical staff: 'acquihire'. The value of the company is determined by the number of engineers working at the company: around 3 million $ per engineer[22]. (How Apple does M&A: Small and quiet, with no bankers (cnbc.com)).

This way overpaying or spending substantial amounts on goodwill or brand value is prevented.

Apple applies this approach in fields where it needs technical talent or it sees a specific technology that could set it apart from its competitors. The company's approach is to identify where the company has technical challenges and then to buy companies that address these, like mentioned before most recently in AR, AI VR and automobility.

In many cases acquisitions are performed under the radar without any publicity. Apple often does not continue the line of business as that is immaterial to the giant. The technical staff is quickly integrated in existing teams.

As [23]the company owns $135 billion in current assets amongst which high excess cash, a quick Cash Conversion Cycle of around 130 days in average and $99 billion in annual free cash flow, most acquisitions can be realised without involvement of banks and thus Apple frequently does so.

5. Potential Future Endeavors

Being the most valuable company with the fear of investors that its biggest business units have reached high saturation, Apple has had rumors around it for years to open up business branches in completely different segments. Since this information is partly affecting the stock price and information is incorporated into it, we thought this equity research paper will not be complete without at least addressing the biggest rumors, its perspectives and grow opportunities.

After Tesla's recent stock surge in the last years[24], the general consensus is clear that the automotive industry will leap towards electric vehicles (EV's) with increased autonomous driving capabilities. This is in line with the recent developments in the automotive world where

[22] (CNBC, 2022) How Apple does M&A: Small and quiet, with no bankers (cnbc.com)
[23] Our calculations from Excel document
[24] (Macrumors, 2022) https://www.macrumors.com/roundup/apple-car/

innovations deviate from the classic mechanical individual cars to integrated traffic networks, Artificial Intelligence algorithms, sensor technology and user interfaces leading towards fully automated and safe traffic.

There are a number of facts pointing out Apple is seriously considering stepping into this trend. First, hundreds of workers have been employed by Apple with previous working experience solely at car manufacturers or previously working in other Apple departments . Additionally, around the area of Cupertino where Apple's headquarters lie, after Apple has requested a formal permit for its self-driving software from the Californian state. In June of 2017, Cook has publicly spoken about autonomous driving software: "We're focusing on autonomous systems. It's a core technology that we view as very important. We sort of see it as the mother of all AI projects. It's probably one of the most difficult AI projects actually to work on. "

5.1. Potential Market and Financial Outlook

With an expected annual 3.9 trillion global Car and Automobile sales revenue in 2021 , Tesla's stand alone market capitalization was in January still 1.239 trillion because of the technologies and knowhow that comes from battery production and AI knowledge, much seen as the most promising future trends.

6. Valuation Methodology

The main valuation methods we used to establish the value of the company was the Discounted Cash Flows (DCF) and Adjusted Present Value (APV) models, as we believed this to be the most accurate way to capture what value the firm will offer its shareholders for the following reasons. First of all, the DCF and APV allow for an exhaustive range of assumptions, a feature we have used in our predictions for breaking down the forecast of revenues by business units and regions, in order to come to an accurate prediction of total future cash flows (and thereby value). Also, discounting future cash flows is a more reliable and company-oriented approach to express the value of the company, as opposed to market or competitor based analyses like multiples, although we did also make a multiple analysis.

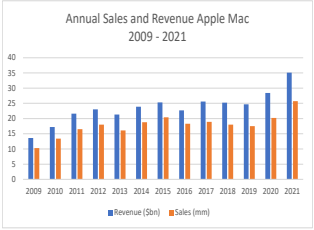

Figure 13 - Source: Apple Statistics (2022) - Business of Apps

We based our approach on Apple's annual 10-K report, and a wide range of online financial and academic literature, and have adjusted our assumptions based on this and our own interpretation and future expectations.

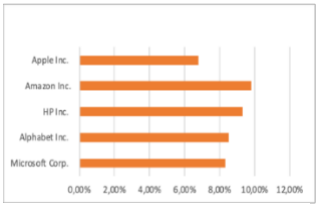

Figure 14 - Source: included in excel-sheet provided

As Apple is a mature, stable company we have chosen to estimate cashflows up until 2033, so only 10 years. The iPhone, iMac and iPad business units only would have allowed for an even smaller explicit period as we predict the growth in the coming years to be relatively small with and stable, respectively 4%, 7% and 0,32%. This is due to a severity of reasons we have elaborated on before more extensively, but heavy competition, saturation of demand in Western markets and low affordability in Apple's pricing range and therefore low growth in non-Western markets being the leading reasons.

For Wearables and Services we estimate the growth rates to be higher and more prone to volatility, which required us to extend the explicit period up to 2033. Not only historical growth rates have been high, also market share is currently very high in Wearables and growing in

Services, and most markets that fall under these two business units are growing at high CAGRs with high volatility.

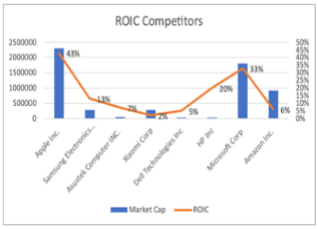

Figure 14 - Source: included in excel-sheet provided

We expect all growth rates to gradually (linearly) come down to the growth rate of a selected range of macroeconomic real GDP countries for perpetuity, as elaborated on later on.

A cost breakdown for individual business units has been proven to be impossible due to lack of information from Apple itself and lack of reliability of third party sources, but costs have been broken down too for the extent to which this was possible as much as possible. For years after which a Compounded Annual Growth Rate was no longer reliably retrievable and perpetuity estimations, a global Macro Analysis has been performed retrieved all from Bloomberg's terminal for long term expectations.

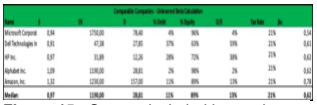

Figure 15 - Source: included in excel-sheet provided

6.1. Ratios

Apple repurchased $90.2 billion dollars of its own shares in FY2022, and $85.5 billion dollars in 2021, which is a continuation of its repurchase strategy Apple has been doing for years. One reason Apple does so is to increase ratios which already are outstanding and higher than competitors, as is clear from the Graph "Roic Competitors". The cause of this outperformance lies for a substantial part in the fact that Apple is turning more and more into a services company, in which initial investment costs are substantial but once up and running marginal costs per customer are close to zero, and due to its very big base of customers who will buy the Apple variant of products anyway, these initially big investment costs are very quickly earned back.

Figure 16 - Source: included in excel-sheet provided

Besides improving the ratios, Apple also does so to up the share price artificially, as then profits are left for a decreasing number of shares and therefore will go up per share. Normally companies do this when they feel like their shares are under-priced, but for Apple this rationale does not really hold as it has consistently been doing so also in COVID times, when the war with Russia has just started and in times of economic prosperity and a bull market right after COVID, so it can be concluded that this consistency in repurchasing shares is not related to the actual current share price. We considered share buybacks not to be considered as a form of dividend, as the market will already automatically price it into the share price due to the lower number of shares outstanding.

6.2. WACC Analysis

In the WACC sheet, we have compared Apple to its biggest comparables in order to get the unlevered beta of 0.62. This is retrieved after having established the rolling beta of 1,134, which we retrieved by computing a regression analysis of Apple's stock returns against the Nasdaq index, in which we have included all monthly data periods from 1985 onwards.

Since for most companies the 2022 fiscal year hasn't ended, most data is retrieved with their 2021 numbers and all data of the comparable companies is retrieved from Yahoo Finance, except for Apple for which both Yahoo Finance and its own 10-K is used.

The Riskfree Rate is the 10 years T-Bill for an American Bond, the MRP is the average between 4,5% and 5,5% as explained in McKinsey's Valuation Report. The AAA probability of default is retrieved from Moody's and the loss given default is the Defaulted Corporate Bond Recoveries

of 2017 for a Moody's AAA rating. We estimated the eventual WACC at 6,76%, which is significantly lower than competitors' (see graph), driving up the valuation. This is partly due to a lower (market value) D/E ratio of 5% compared to 11% in the benchmark group, and to a large cash reserve resulting in high solvability, and both factors bring down the cost of debt.

For the DCF we conducted a sensitivity analysis for adjacent values of G and WACC and it can be concluded that differences of g and WACC can change our recommendation into Hold as well, as values range from 139,3 to 233 dollar. However, only the worst 6 (out of 25) scenarios would change our recommendation into "Hold", meaning we estimate the stock to be a safe "Buy" recommendation.

Besides, we are quite confident about the WACC, the best comparable companies used for unlevering are of course always bound to interpretation but we think we have chosen the most correct competitors, also with regards to future trends. For other parameters we are sure WACC is correct as they are based on given parameters in the market (Rf, MRP since it's from McKinsey's report) and otherwise the entire market would be wrong.

We initially based the growth rates on articles we ought to be most reliable and best reflecting Apple's individual business units, after which we adjusted it to our expectations. We have included CAGR's with all corresponding years, and afterwards have equalled the growth rate gradually to the perpetual macroeconomic real GDP for the reported.

6.3. APV

We conducted two sensitivity analyses for the value of Apple in APV, the terminal growth rate against Ru and against Rd. A changing Rd is an unimportant parameter as no scenario gets below the current share price +10%. In other terms: even if we estimated a not too significantly wrong Rd, our recommendation will always remain "Buy" and therefore a changing Rd is not a parameter investors have to keep in mind when considering buying an Apple stock.

For a changing Ru, the investing advice changes as for 8 out of 25 scenarios our recommendation would change into "Hold". This is due to the fact that since Ru= Rf *(β u*MRP), Apple's historical Beta is 1,13 (as calculated in "Historical Data" against the Nasdaq) but for WACC valuation purposes we "forced" Apple's βu to be 0,62 because of the comparable companies chosen that we thought were best in terms of competitive landscape.

However, it can be argued that Apple's βu should actually be higher when analysed historically, which would result in a higher Ru, and in turn would result in an even higher stock price according to APV and more resilient sensitivity analysis against Ru. In other words, we do not worry too much about changing values of Ru, especially since 17 out of 25 scenarios would still result in a "Buy" recommendation.

With the current macro economic situation and outlook, Rf will likely only go up (resulting in a higher Ru), the βu picked for Apple can be interpreted as artificially low, and if the economy would become worse also MRP will only go up as investors then want a higher compensation for the risk they undertake in a "bear market" or challenging times.

6.4. Multiple Valuation

For the multiple valuation methodology, we have established Apple's biggest competitors for each of its business unit as only then a proper comparison can be made. For instance, for the iPhone category, we retracted the financial data of the biggest smartphone producers (all data in this sheet is from Yahoo Finance).

The EV of each business unit have eventually been summed up in order to get to Apple's total EV number, which is 2,2T with EV/Ebitda so slightly under the market cap and well below our estimations as performed with cash flows. In total only Xiaomi, Amazon and Spotify had higher ones while all remaining competitors had significantly lower multiple ratios.

According to us, this reason for the multiple ratio to be lower than cash flow valuations is due to the fact that Apple is not just the sum of its individual business units, as the value of the ecosystem is then not fully incorporated, the knowhow and skills of acquisitions is not included which also might result in totally new business segments or potential future endeavours, and these are also not included.

In addition, Apple is a conglomerate operating in entirely different markets and besides the fact that information about the hundreds of individual business units is not disclosed, also the list of comparables required to fully capture all of Apple's business units would become too long. We therefore assume our cash flow based valuations to be more accurate.

6.5. Perpetual growth rate

For the perpetual growth rate, we have established an extensive approach of macroeconomic factors through the Bloomberg terminal and taken into account all geographies Apple operates in. It is hard to find data about specific locations since Apple only reports five major geographies, and within such a geography the macroeconomic perspectives can differ hugely.

Take Europe for instance, which consists of all European countries, India, the Middle East and Africa. Because of that, we built our growth rate based on the key revenue drivers in these specific regions. For the Americas region we looked how the most important product, the iPhone, is performing in various countries as a proxy. Despite the US region and Canada, Apple struggled to gain a market share of more than 20% in Latin America and were mostly below 10% . Therefore we identified these two countries as the key revenue drivers and built a weighted average based on their market share and the overall phone market size as a proxy.

For the European Region, we went with the same procedure and found a decline when comparing Western to Eastern Europe. Despite Spain, the whole western European segment is characterized by Apple having a market share of at least 30%, which is exceptionally high compared countries in Eastern Europe. The other countries included in this region (Africa, the Middle East and India) are characterized by lower purchasing power and less disposable income and because we estimate to be only a fraction of total revenues in the "Europe" segment (Apple does not disclose this information), and a not fair proxy for the perpetual growth (substantially too high).

For that reason, we used Western Europe as a proxy for this region. For Greater China, Japan as well as the Rest of Asia Pacific, we considered the whole region due to the similarities the various countries have regarding (the outlook of) their respective markets and Apple's market

share in these markets. After doing that, we took the share of revenue from these regions to create the weights and the perpetuity growth rate of around 1,52% for 2033 onwards. We have based our growth rates not only on Bloomberg terminal, but also on reports and market research we ought to be most reliable and best reflecting Apple's individual business unit and adjusted them to our own perspective.

We have included CAGR's with all corresponding years, and afterwards assumed a linear decline until the year 2033, in which we assume Apple Inc to grow by the perpetuity growth rate as elaborated on earlier. We estimate Apple will experience substantial growth in the next couple of years, after which it will eventually equal these long-term macroeconomic forecasts because competitors will step in on cost and competitive advantages and Apple's growth will be aligned with the market.