



# Microsoft Equity Valuation

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## **I – Abstract**

This equity report, titled ‘Microsoft Equity Research’, delves into a thorough examination of Microsoft Corporation, the second largest organisation in the world ranked by market capitalisation. This analysis is composed of an introduction to the Information Technology sector, the Software industry, and of the firm; a literature review; an analysis of the company’s competitors; the assumptions that I, Vincent Spinetta, the author of the research, made; a comparison to renown investment banking reports; and lastly a conclusion. This report employs a robust methodology, including a detailed financial model utilising discounted cash flow (DCF) to establish an intrinsic value per share as well as scenario analysis gauging the impact of key assumptions on the valuation. The key findings contained in this analysis go against mainstream thought, giving it a feeling of objectivity and independence. It is important to stress that those opinions are my own, and can still be subject to biases like any research ever conducted. The analysis and opinions presented in this report are subject to change, and no one should invest based on the findings found in this analysis alone. Rather, investment decisions should be made after careful consideration of multiple sources, especially conflicting ones.

Este relatório de avaliação da Microsoft, intitulado 'Microsoft Equity Research', investiga minuciosamente a Microsoft Corporation, a segunda maior organização em termos de capitalização de mercado. Esta análise é composta por uma introdução ao setor de Tecnologia da Informação, à indústria de Software e uma introdução à empresa; uma revisão da literatura; uma análise dos concorrentes da empresa; os pressupostos que eu, Vincent Spinetta, o autor desta tese considerei; uma comparação com vários relatórios de bancos de investimento de renome; e, por último, uma conclusão. Este relatório emprega uma metodologia sólida, incluindo um modelo financeiro detalhado que utiliza fluxos de caixa descontados (DCF) para estimar o valor intrínseco por ação, bem como uma análise de cenários que avalia o impacto dos principais pressupostos da avaliação. As principais conclusões contidas desta análise vão contra o pensamento dominante, demonstrando objetividade e independência. É importante ressaltar que as opiniões contidas neste relatório são minhas, sendo assim podem ainda estar sujeitas a vieses como as demais pesquisas. As análises e opiniões apresentadas neste relatório estão sujeitas a alterações, e ninguém deve investir apenas com base nos conclusões e opiniões desta análise. Preferencialmente, as decisões de investimento devem ser tomadas após uma cuidadosa investigação de várias fontes, especialmente as conflitantes.

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### **III – Microsoft Corporation**

This introductory chapter is divided into three sections. The first section, itself being divided into three sub-sections, will touch upon the Sector within which Microsoft operates, its Industry, and then the Company itself. The second and third sections will touch upon the firm's operating segments growth rates, as well as the firm's Gross and EBIT Margins drivers, respectively.

#### III.I. – The Sector : Information Technology

Microsoft Company operates within the Information Technology (IT) sector, which revolves around the use of computers, software, and telecommunication. The IT sector has grown a lot since its inception back in the 1940s with ENIAC. They were the first company to ever create an electronic digital computer – the type of computers we're most familiar with today. Since then, the IT sector has significantly evolved and today, it plays a crucial role in our modern world and affects almost every part of our day-to-day lives.

Today's consensus is that every company, of every industry, of every sector will at some point need to imbue technology into their daily operations, so that they can do more with less. And ultimately, this is what will be the difference between the companies that survive – and can thrive – and those who will fail. This economy of scale makes technology a deflationary force in an inflationary economy.

Today, IT contributes to 5% of overall global GDP, and is predicted to reach 10% in the coming years (experts disagree as to when exactly), as more companies will infuse their operations with even more technology. What will be even more important, however, is IT's influence on the other 90% of the world's economy. Technology will power the entire global economy as every company becomes a software company in its own right.

#### III.II. – The Industry : Software

Microsoft Corporation operates in the Software industry, and within the Application Software sub-industry to be exactly precise. This is a highly competitive industry with lots of innovations, which results in frequent changes in both business models and technologies. Each industry shift is an opportunity for companies to imagine, design and conceive new products and technologies that can further transform themselves and the industry within which they operate. This is why user needs are constantly being met with technological advancements such as new software versions, updates, and entirely new applications – as good user experience (UX), both in design and user-friendliness, can determine the success of a software or application.

### III.III. – The Company : Microsoft Corporation

*Sector:* Information Technology

*Industry Group:* Software & Services

*Industry:* Software

*Sub-Industry:* Application Software

*Exchange:* Nasdaq

*Ticker Symbol:* \$MSFT

*Current Price (06/12/2023) :* \$368.80

Founded on April 4<sup>th</sup>, 1975, by Bill Gates and Paul Allen in Albuquerque, New Mexico, US, Microsoft Corporation (Microsoft) is an American multinational technology corporation headquartered in Redmond, Washington, US. Today, Microsoft has north of 220.000 employees worldwide and focuses on developing software support, software services, software solutions, and devices. As such, they strive to build a computing fabric, across both the edge and the cloud, to help other organisations run and manage their operations. As Artificial Intelligence (AI) capabilities are quickly improving, the latter will be the next phase of innovation.

#### III.III.I. – Operating Segments

##### III.III.I.I. – Productivity and Business Processes

(For sub-segments encompassing a wide range of products and services, such as Office Commercial, for the sake of understanding, I have tried to divide them into three distinct parts: “description, comprising, and competitors”. For those including solely one product or service, such as LinkedIn, I have instead simply described the latter).

This segment refers to products and services marketed for productivity, information services, and communication purposes. It is composed of:

##### *Office Commercial*

Description: designed to increase productivity, whether personal, at a team or organisation level

Comprising: Office, Exchange, SharePoint, Office 365 Security and Compliance, Microsoft Teams, and Microsoft Viva.

Competitors: Apple (\$AAPL), Cisco Systems (\$CSCO), Meta (\$META), Google (\$GOOG), IBM (\$IBM), Okta (\$Okta), Zoom (\$ZM).

### *Office Consumer*

Description: designed to increase personal productivity.

Comprising: Microsoft 365 Consumer subscriptions and Office licensed on-premises.

Competitors: Apple (\$AAPL), Cisco Systems (\$CSCO), Meta (\$META), Google (\$GOOG), IBM (\$IBM), Okta (\$Okta), Zoom (\$ZM).

### *LinkedIn*

With north of 850 million members, LinkedIn connects the world's professionals. On top of its free services, it also offers monetised solutions with Talent Solutions, Marketing Solutions, Sales Solutions, and Premium Subscriptions. Microsoft doesn't face any real competition in this sub-segment.

### *Dynamics Business Solutions*

The Dynamics Business Solutions (Dynamics) sub-segment is focused on cloud-based and on-premises business solutions. Microsoft's competition for this sub-segment comes from companies such as Oracle (\$ORCL), Salesforce (\$CRM), and SAP (\$SAP).

### III.III.I.II. – Intelligent Cloud

This segment includes server products and cloud services that help power businesses and developers. It is composed of:

#### *Server Products and Cloud Services*

Description: Server products refer to software or hardware solutions that are installed and run on physical servers; whereas cloud services involve accessing computing resources over the internet from a cloud service provider's data centres. Its perks are freeing firms from the burden of software and hardware maintenance.

Cloud Services, which represent the main part of this sub-segment, is primarily composed of Microsoft Azure, and to a lesser extent by Nuance and GitHub. Azure provides cloud services offering customers a way to build and manage applications on any platform or device. Nuance and GitHub both offer cloud and on-premises offerings. Nuance provides healthcare and enterprise AI solutions. GitHub provides a collaboration platform and code hosting service for developers. Microsoft's main competitors in the cloud space include companies such as Amazon (\$AMZN), Google (\$GOOG), IBM (\$IBM), Oracle (\$ORCL), and VMware (\$VMW).

Server products include mainly SQL Server and Windows Server. Microsoft's main competitors in the server products space include companies such as Oracle (\$ORCL), Hewlett-Packard (\$HPE), and IBM (\$IBM).

#### *Enterprise Services*

Description: it assists customers in developing and managing Microsoft desktop solutions, Microsoft server solutions, and Nuance conversational AI and ambient intelligent solutions. It also provides training and certification to IT professionals on various Microsoft products.

Competitors: IBM (\$IBM), Oracle (\$ORCL), SAP (\$SAP), Snowflake (\$SNOW), Hewlett-Packard (\$HPE), and VMware (\$VMW).

### III.III.I.III. – More Personal Computing

This segment includes everything that is not included in the two aforementioned segments. It is composed of:

#### *Windows*

Windows is an operating system that manages computer hardware and provides essential functions for other software to run. Microsoft's competition for this sub-segment comes from companies such as Apple (\$AAPL) and Google (\$GOOG).

*Devices* (Surface and PC accessories).

#### *Gaming*

This sub-segment is primarily composed of the Xbox package (hardware, content, services, game pass and other subscription) and advertising. Microsoft's competition for this sub-segment are the same as for the Device sub-segment and comes from companies such as Meta (\$META), Amazon (\$AMZN), Apple (\$AAPL), Tencent (\$700-HK), and Google (\$GOOG).

#### *Search and News advertising*

The Search and News advertising sub-segment is designed to deliver relevant search and display advertising to a global audience. Microsoft's competition for this sub-segment comes from companies such as Google (\$GOOG) and Meta (\$META).

### III.III.II – Segments Growth Rates

It is extremely convenient that besides giving us the reported numbers for their segments, Microsoft also provide investors with a different classification of their segments. They are nine in total and include Service Products and Cloud Services; Office Products and Cloud Services; Windows; LinkedIn; Search and News Advertising; Enterprise Services; Dynamics; Gaming; and Devices. I think it is more convenient to use those sub-classifications than the three previous operating segments (Productivity and Business Processes, Intelligent Cloud, and More Personal Computing) as we can build three very telling ‘new’ segments: Cloud, Software, and Gaming.

Cloud includes:

- Service Products and Cloud Services
- Office Products and Cloud Services

Software includes:

- Windows
- LinkedIn
- Search and News Advertising
- Enterprise Services
- Dynamics

Gaming includes:

- Devices
- Gaming

Table 1 - Microsoft Segments Revenue 2017-2023							
	2017	2018	2019	2020	2021	2022	2023
Cloud	47,222	54,445	64,391	76,695	92,461	112,183	128,745
Software	35,236	40,428	43,971	48,288	53,466	62,866	62,136
Gaming	14,113	15,487	17,481	18,032	22,161	23,221	21,034
Total	96,571	110,360	125,843	143,015	168,088	198,270	211,915
	2017	2018	2019	2020	2021	2022	2023
Cloud	48.90%	49.33%	51.17%	53.63%	55.01%	56.58%	60.75%
Software	36.49%	36.63%	34.94%	33.76%	31.81%	31.71%	29.32%
Gaming	14.61%	14.03%	13.89%	12.61%	13.18%	11.71%	9.93%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	2018	2019	2020	2021	2022	2023	Average
Cloud	15.30%	18.27%	19.11%	20.56%	21.33%	14.76%	18.22%
Software	14.73%	8.76%	9.82%	10.72%	17.58%	-1.16%	10.08%
Gaming	9.74%	12.88%	3.15%	22.90%	4.78%	-9.42%	7.34%
Total	14.28%	14.03%	13.65%	17.53%	17.96%	6.88%	14.05%

As we can see from Table 1, most of the growth has come from Cloud services. As a percentage of sales it rose from 48.90% to 60.75%. Both Software and Gaming have decreased as a percentage of sales. Cloud services is the segment with the highest growth (18.22% – compared to 10.08% for Software and 7.34% for Gaming). It is also important to note that in 2023, both Software and Gaming sales have decreased, which is not the case for Cloud services.

### III.III.III. – Gross & EBIT Margin Drivers

Table 2 - Microsoft Gross and Operating Margins							
	2017	2018	2019	2020	2021	2022	2023
Gross Margin	64.52%	65.25%	65.90%	67.78%	68.93%	68.40%	68.92%
EBIT Margin	30.06%	31.77%	34.14%	37.03%	41.59%	42.06%	41.77%

Table 2 shows Microsoft’s gross and operating margins from 2017 to 2023. As we can see, Microsoft’s gross margin has gradually increased over the period, gaining 4.40 percentage points, passing from 64.52% to 68.92%. On the other hand, Microsoft’s operating margin, or EBIT margin, has soared, passing from 30.06% in 2017 to 41.77% in 2023. This represents a 39% increase over a seven-year period.

As shown in the latter table, EBIT margin decreased last year (passing from 42.06% in 2022 to 41.77% this year). This is not due to a decrease in efficiency but rather both gross and EBIT margin included an unfavourable foreign currency impact of 2%. As such, I expect EBIT margin to keep on increasing as I will explain in greater detail later.

Table 3 - EBIT Margins per Segments							
	2017	2018	2019	2020	2021	2022	2023
Productivity and Business Process	29,870	35,865	41,160	46,398	53,915	63,364	69,274
EBIT	11,389	12,924	16,219	18,724	24,351	29,687	34,189
EBIT Margin	38.13%	36.04%	39.40%	40.36%	45.17%	46.85%	49.35%
Intelligent Cloud	27,407	32,219	38,985	48,366	60,080	75,251	87,907
EBIT	9,127	11,524	13,920	18,324	26,126	32,721	37,884
EBIT Margin	33.30%	35.77%	35.71%	37.89%	43.49%	43.48%	43.10%
More Personal Computing	39,294	42,276	45,698	48,251	54,093	59,655	54,734
EBIT	8,815	10,610	12,820	15,911	19,439	20,975	16,450
EBIT Margin	22.43%	25.10%	28.05%	32.98%	35.94%	35.16%	30.05%

Table 3 shows Microsoft EBIT margins per segments from 2017 to 2023. Microsoft do not provide us with gross margins, nor with the margins (both gross and operating) of the sub-classifications (cloud, software, and gaming). The ‘More Personal Computing’ segment has the lowest EBIT margin as it includes both gaming and devices – hardware products usually have lower margins than software products. Still, it is the segment which has most improved its

efficiency, passing from 22.43% in 2017 to 30.05% in 2023. This represents a 33.97% increase over a seven-year period. Intelligent Cloud for instance, went from 33.3% in 2017 to 43.1% in 2023. This represents a 29.41% increase over a seven-year period. Lastly, Productivity and Business Processes passed from 38.13% in 2017 to 49.35% in 2023. This represents also a 29.41% increase over a seven-year period.

## **IV – Literature Overview**

For valuation purposes, I have chosen to rely entirely on the value I got from the DCF analysis, and not take into account models such as Multiples Analysis, the APV approach, nor Dividend Discount Models (DDMs) models. But why?

In this chapter, I will go through each valuation method one by one, describe it, and give pros and cons regarding the latter. The pros and cons parts are accompanied by black squares for distinctive purposes.

### IV.I. – Why Multiples Analysis is Suboptimal

This first valuation theory is based on the principle that similar assets sell at similar prices. Multiples analysis seeks to value similar firms using the same financial metrics. Those latter financial metrics are ratios generally calculated using the comparable firms' financial statements. Some of the most relevant ratios include price-to-earnings (P/E), price-to-free cash flows (P/FCF), enterprise value to earnings before interests, taxes, depreciation and amortisation (EV/EBITDA)...

- Even if your company looks 'cheap' compared to its peers based on multiple analysis alone, it may be overvalued based on a DCF analysis, which bears more importance as I will explain in detail why later. This also means that the multiple analysis doesn't tell us anything about the actual value of a company; only whether it is more or less effective or more or less cheap than its competitors.
- Metrics like P/E and other income statement ratios, bear only little relevance as the income statement is more prone to management manipulation than for example the cash flow statement.
- Multiple analysis show mostly past performance and not future performance. Hence, a firm having a terrible track records that will turn into a more efficient and profitable firm in the future, will look as it is a bad investment to make purely based on multiple analysis.

#### IV.II. – Why DDMs are suboptimal

DDMs can be used for a stock that pays a current dividend or a stock that is expected to pay a dividend. The Gordon Growth Model is the most used DDM and is preferably used in cases where a company is paying out dividends with a stable dividend growth rate. The value of a stock is computed as follows:

$$V_0 = [ (D_0 * (1 + g)) / r - g ]$$

$$V_0 = D_1 / (r - g)$$

Where

$V_0$  = the value of any company today

$D_0$  = dividend the company is currently paying

$D_1$  = dividend the company is expected to pay in t+1

r = the required rate of return (or RRR)

g = the dividend growth rate

The Gordon model follows the following assumptions:

- (r) = the cost of equity
- (g) = [retention rate (b) x return on equity (ROE)]
- (r) > (g); and both are perpetual and constant over time
- the pay-out ratio (1 – b) and ROE are negatively correlated
- the ROE estimate should reflect the long-term expected ROE
- (g) has to be less than or equal to the growth rate of the economy

However, the models' assumptions might be too simplistic to reflect the characteristics of the companies being evaluated. Indeed, it assumes that:

■ Dividends are the correct metric to use for valuation purposes.

This is false as the value of any company is equal to the discounted present value of all its expected future cash flows. On top of that, applying a DDM is difficult if the company being analysed is not currently paying a dividend. A company may not be paying a dividend if (1) the investment opportunities the company has are all so attractive that the retention and reinvestment of funds is preferable, from a return perspective to the distribution of a dividend to shareholders or (2) the company is in such a weak financial condition that it cannot afford to pay a dividend.

- The dividend growth rate is forever: It is perpetual and never changes.

This poses another problem. Let's take the example of a company that has spent a larger amount of dividend in the recent years: it cannot do so perpetually. Unless they expect to have very strong results in the years to come, this strategy is unsustainable, and their dividend policy will have to change. Also, note that they may also be able to pay dividends by taking on debt, which is a possibility, but is not financially literate.

- The dividend is more of a 'political' move rather than an economically driven decision.

Indeed, the thought process here is the following: Companies usually keep pay-outs at the same level. They do not want to have big changes in the value of the dividends. They prefer a smooth evolution. This is because market reacts to dividend variations, not to the absolute level. Finally, cutting or cancelling dividends is generally done as a last resort as doing so signals worry to investors.

As such, for those three reasons, I don't think DDM models are relevant in valuation.

#### IV.III. – Why the APV Method is Suboptimal

According to the APV model, the value of any company is equal to  $V_L$  if it has debt and to  $V_U$  if it has solely equity. The model is mostly used by practitioners when valuing companies where the level of leverage is changing a lot.

$$V_L = V_U + PV(\text{Interest Tax Shield}) - PV(\text{Financial Distress Costs})$$

Where

$V_L$  = Value of the levered firm

$V_U$  = Value of the unlevered firm =  $\{FCFF (1 + g) / (r - g)\}$

$PV(\text{Interest Tax Shield}) = (\text{Corporate Tax Rate} * \text{Interest Payments})$

$PV(\text{Financial Distress Costs}) = (\text{Probability of Bankruptcy} * \text{Costs of Bankruptcy})$

The Probability of Bankruptcy depends on the probability of financial distress (which increases with the amount of liabilities and with the volatility of cash flows) and the magnitude of the costs after a firm is in distress (which varies by industry). Finally, the Costs of Bankruptcy are generally equal to 25% to 30% of  $V_U$ .

According to the theory, firms have an optimal level of debt. The value of the firm increases as it uses more debt only up to a certain point. Beyond that point, the value-enhancing effects of

financial leverage (the present value of the Interest Tax Shield) are offset by the value-reducing effects (the present value of the Financial Distress Costs).

■ It is not used that much in equity research and equity reports that much today. Indeed, it is more of an academic calculation rather than a practical one. As such, the rationale is the following: if a model isn't widely used by financial market participants, then it bears only little relevance as most investors won't even look at it and thus not include it in their valuation. To a lesser extent, this also applies to the DDMs.

■ There is great difficulty in estimating certain of the assumptions. Indeed, both the Probability of Bankruptcy and Costs of Bankruptcy are not easy to obtain. Getting those assumptions wrong, which is highly probable, would of course invalidate our valuation.

#### IV.IV. – Why the DCF Method is Best

The value of any company is equal to the discounted present value of all its expected future cash flows. And this is specifically what the DCF methodology solves to do.

The first step of the DCF methodology is to obtain a firm's Free Cash Flow to the Firm (FCFF) which are basically the cash flows left for debt and equity holders, and calculate it for each year in the forecast period.

$$FCFF = EBIT - \text{Taxes} + D\&A - CAPEX - \Delta OWC$$

Where

EBIT = Earnings Before Interests and Taxes

D&A = Depreciation and Amortisation

CAPEX = Capital Expenditures

$\Delta OWC$  = Changes in Working Capital

The second step is to get a discount rate reflecting the risk associated with the investment. Typically, financial market participants used the Weighted Average Cost of Capital (WACC). This latter discount rate is equal to:

$$WACC = w_d r_d (1 - t) + w_p r_p + w_e r_e$$

Where

$w_d$  = the target proportion of debt in the capital structure

$r_d$  = the before-tax marginal cost of debt

$t$  = the company's marginal tax rate

$w_p$  = the target proportion of preferred stock in the capital structure

$r_p$  = the marginal cost of preferred stock

$w_e$  = the target proportion of common stock in the capital structure

$r_e$  = the marginal cost of common stock

The third step is to calculate the Present Value by discounting each year's FCFF to their present value using the WACC. The following formula is thus used:

$$PV = FCF / (1 + WACC)^n$$

The fourth step is to calculate the Terminal Value, which represents the value of the firm beyond the forecasted period. The following formula is thus used:

$$\text{Terminal Value} = [ \text{Final Year FCFF} * (1 + g) / (WACC - g) ]$$

The fifth step is to sum both the Present Value and the Terminal Value, giving us the total intrinsic value of the firm (or the Enterprise Value or EV). The final computations are then needed to arrive at the final stock price of the company.

Enterprise Value

(+) Cash

(-) Debt

= Equity Value

(:) Number of Shares Outstanding

= Stock Price

The DCF methodology is the most widely used by practitioners, making it on that basis alone extremely relevant. Indeed, you will get an approximately close value to that shown on Investment Banking equity reports if your assumptions are in line with the markets'.

Not only that, but as the value of any firm is equal to the discounted present value of all its expected future cash flows, the DCF is thus the only method that arrive at what can be deemed the 'true value'. Indeed, as Aswath Damodaran puts it in his book *'The little book of valuation: how to value a company pick a stock and profit'*: 'The intrinsic value of an assets is determined by the cash flows you expect that asset to generate over its life and how uncertain you feel about these cash flows.'

‘The cash flows you expect that asset to generate over its life’ include growth assumptions, the terminal growth rate (TGR), the company’s margins... and ‘how uncertain you feel about these cash flows’ include the weighted average cost of capital (WACC), and to a lesser extent, scenario analysis for both the company’s growth and margins. The DCF is the superior model as it encompasses all of it.

Hence my valuation will only take into account the value I get from the DCF. The multiples analysis will only be used as a way for the investor to see how cheap/ expensive Microsoft is, or how efficient it may be in comparison with their peers. And I will not take any DDM, nor the APV method into consideration at all as they are more academic calculations rather than practical ones.

#### IV.V. – Miscellaneous

The cost of equity is calculated using the Capital Asset Pricing Model (CAPM), the cost of debt is computed using the Yield-to-Maturity (YTM) approach, and the cost of preferred shares is calculated using the method taught by the CFA program.

The time frame needed to compute the Beta should be long enough for the data to be representative of the company situation. As such, I chose as the starting date the time when Microsoft Azure was first launched, or October 27<sup>th</sup>, 2008.

### **V – Valuation and Competitors Analysis**

I divided this chapter, which goal is to compare \$MSFT to its peers, into three parts. The first part, titled ‘Microsoft Competition’ explains my rationale for why I ascribed certain companies as Microsoft peer group. The second part, titled ‘Multiples Analysis’, shows a table with Microsoft Multiples Analysis compared to its peer group and also contains my rationale as to why I have chosen some ratios. The third and final part, titled ‘Market Share for the Competitors’, shows market share of the selected peer group and the inherent trend of that market, starting from 2017 up until 2022 (as not all \$MSFT competitors have yet published their 2023 earnings).

#### V.I. – Microsoft Competition

According to Aswath Damodaran, a comparable firm is ‘one with cash flows, growth potential, and risk similar to the firm being valued. Nowhere in this definition is there a component that relates to the industry or sector to which a firm belongs’. Therefore, a hardware company can

be compared to a telecommunications firm, if the two are identical in terms of cash flows, growth, and risk. I therefore chose as their competitors firms with similar growth rates over the 2017 to 2022 period. I also decided to add a profitability component to my analysis – as a peer group composed of firms with both similar growth rates and profit margins is a better peer group than one composed solely of firms with similar growth rates.

The results were the following: I could construct a peer group composed of three companies (including Microsoft). The two other companies are two US Big Caps Tech stocks, namely: Apple Inc. (\$AAPL) and Adobe Inc. (\$ADBE) – and that even though their business model may be different.

Over the selected period, Microsoft averaged a 15.49% growth rate, Apple averaged a 15.61% growth rate (excluding an outlier year: 2019), and Adobe averaged a 19.36% growth rate – refer to Table 7. Profitability wise Microsoft averaged a 29.45% net income margin, Adobe averaged a 29.46% net income margin, and finally Apple averaged a 22.81% net income margin – refer to Table 9. Even though Apple’s net income margin is a bit on the lower end compared to Microsoft and Adobe, it is important to note that it has increased above 25% during the last two fiscal years (2021 and 2022). Shall this trend continue, Apple’s net income margin will be closer to its selected peer group.

V.II. – Multiples Analysis

		<b>Table 4 - Microsoft's Multiples Analysis</b>				
		P/E (TTM)	P/B	P/CFO	P/FCF	EV/EBITDA
\$MSFT	Microsoft	38.21	16.69	31.21	42.66	27.77
		P/E (TTM)	P/B	P/CFO	P/FCF	EV/EBITDA
AAPL	Apple	32.21	50.78	26.23	28.75	25.58
ADBE	Accenture	49.44	19.56	35.06	37.16	39.18
Average Peers		33.76	47.97	27.02	29.50	26.80
MSFT Implied Share Price		\$327.60	\$1,065.79	\$320.97	\$256.43	\$357.88
Δ to current price		-11.17%	188.99%	-12.97%	-30.47%	-2.96%

The upper part of the table shows Microsoft’s current selected ratios. Beneath are shown the ratios for Microsoft’s peer group. The ‘Average Peers’ line shows an average for each selected ratio, of the peer group. The line ‘MSFT Implied Share Price’ shows the price Microsoft obtained in the Multiples Analysis, and is calculated thanks to the ‘Average Peers’ line. The last line at the very bottom of the table, titled ‘Δ to current price’ shows the difference between Microsoft current share price and the price obtained from the line ‘MSFT Implied Share Price’.

As we can notice from Table 4, Microsoft's implied share price would be lower based on a P/E (TTM) analysis – by 11.17%; based on a P/CFO analysis – by 12.97%; based on a P/FCF analysis – by 30.47%; and based on a EV/EBITDA analysis – by 2.96%. Microsoft's implied share price would be a lot higher based on a P/B analysis – by 188.99%. The latter can be explained easily by the fact that Apple's P/B value is immense compared to the other two firms.

Also, the fact that Microsoft's P/FCF is so low compared to its peers is a bit of a bummer because (as I will explain shortly after), P/FCF is for me the most important ratio. I thus conclude that Microsoft is a bit on the expensive side, but nothing much to worry about really. And even though, as I explained earlier in the chapter 'Literature review', I believe the Multiples Analysis to be a suboptimal valuation method, it is always good to know that information.

The average I have chosen for the 'Peers Average' is the following: on 23 Oct 2023, Apple's market cap was 2.689T, whereas Adobe's was 245B. Apple's market cap was roughly 11 times greater than Adobe's. I thus used different weights to account for the difference in size between the two firms. Apple's weight was of 91% (=10/11) and Adobe's weight was of 9% (=1/11).

#### V.II.I. – Choice for the Ratios

##### *Price-to-earnings (P/E), Price-to-Book-Value (P/BV) and EV/EBITDA*

There are three of the most looked at ratios. Many sophisticated and unsophisticated investors give great importance to these ratios. On that basis alone, I thus decided to include them as people expect these ratios to be present into an equity report.

##### *Price-to-Cash-Flows (P/CFO)*

P/CFO isn't one of the most looked at ratios, but I believe it bears great importance for a specific reason that is not inherent to the latter ratios. Indeed, with many choices available, and the inherent flexibility of estimates in the accounting process, management have many tools for managing and meeting analysts' expectations through financial reporting. Choices exist both in how information is presented (financial reporting quality) and in how financial results are calculated (earnings quality). Investors believe that amounts shown in the cash flow statement, such as cash generated by operations (CFO) are more insulated from managerial manipulation than lines in the income statement, such as Net Income for example. CFOs can still be manipulated to a certain extent, however. On that basis, I thus decided to include it.

### Price-to-Free-Cash-Flows (P/FCF)

P/FCF is also one of the most looked at ratios, and similarly to P/E, P/BV and EV/EBITDA, as people expect these ratios to be present in any equity report, I thus decided to include it. Also, as FCF is linked to CFO, and for the same reason, it is less prone to manipulation than income statement based ratios. But not only that however. FCF is a crucial metric to look at as it represents the actual cash a firm generates after accounting for its necessary capital expenditures to maintain and expand its operations. FCF is important for gauging the long-term sustainability of a firm as it indicates whether the latter is generating enough cash to support its operations and growth over an extended period. It is for me the most important ratio.

### V.III. – Competitors’ Market Share

Table 5 – Peer Group Sales 2017-2022						
Sales	2017	2018	2019	2020	2021	2022
\$AAPL	\$ 229,230,000	\$ 265,595,000	\$ 260,174,000	\$ 274,515,000	\$ 365,817,000	\$ 394,328,000
\$MSFT	\$ 96,570,000	\$ 110,360,000	\$ 125,840,000	\$ 143,015,000	\$ 168,088,000	\$ 198,270,000
\$ADBE	\$ 7,301,000	\$ 9,030,000	\$ 11,171,297	\$ 12,868,000	\$ 15,785,000	\$ 17,606,000

Table 6 – Peer Group Market Share 2017-2022						
Market Share	2017	2018	2019	2020	2021	2022
\$AAPL	68.82%	68.99%	65.50%	63.78%	66.55%	64.62%
\$MSFT	28.99%	28.67%	31.68%	33.23%	30.58%	32.49%
\$ADBE	2.19%	2.35%	2.81%	2.99%	2.87%	2.89%

Table 7 – YOY Change Peer Group Sales, or their Growth Rate						
YOY Δ	2018	2019	2020	2021	2022	Average
\$AAPL	15.86%	-2.04%	5.51%	33.26%	7.79%	15.61%
\$MSFT	14.28%	14.03%	13.65%	17.53%	17.96%	15.49%
\$ADBE	23.68%	23.71%	15.19%	22.67%	11.54%	19.36%

Table 8 – Peer Group Net Income 2017-2022						
Net Income	2017	2018	2019	2020	2021	2022
\$AAPL	\$ 48,351,000	\$ 59,531,000	\$ 55,256,000	\$ 57,411,000	\$ 94,680,000	\$ 99,903,000
\$MSFT	\$ 25,489,000	\$ 16,571,000	\$ 39,240,000	\$ 44,281,000	\$ 61,271,000	\$ 72,738,000
\$ADBE	\$ 1,694,000	\$ 2,591,000	\$ 2,951,000	\$ 5,260,000	\$ 4,822,000	\$ 4,756,000

Table 9 – Peer Group Net Income Margin 2017-2022							
Margin	2017	2018	2019	2020	2021	2022	Average
\$AAPL	21.09%	22.41%	21.24%	20.91%	25.88%	25.34%	22.81%
\$MSFT	26.39%	15.02%	31.18%	30.96%	36.45%	36.69%	29.45%
\$ADBE	23.20%	28.69%	26.42%	40.88%	30.55%	27.01%	29.46%

For the average growth rates of the peer group in Table 7 and 9, I went for a simple arithmetic average ( $X_i / n$ ) – where  $X_i$  is equal to the values of the observations and  $n$  to the number of observations.



As we can see both Microsoft and Adobe have gained market share in the 2017-2022 period, passing respectively from 28.99% to 32.49% and 2.19% to 2.89%, whilst Apple has lost market share, passing from 68.82% to 64.62%.

## VI – Assumptions

In this chapter, I will discuss every assumption I have made in the equity report. I have chosen to divide this chapter into three parts. In the first part, entitled ‘Economic Assumptions’, I will go on to explain what is most likely to happen at a macroeconomic level. In the second part, entitled ‘Microsoft Assumptions’, I will go on to explain what is most likely to happen to the company at a micro economic level. This sub-chapter is itself divided into two parts: ‘WACC Assumptions’ and ‘Growth Assumptions’ which will touch upon the assumptions made in WACC and those regarding the company’s growth as their name suggests. The third part will include the Sensitivity Analysis. All parts are subjective as they are based on my assumptions.

### VI.I. – Economic Assumptions

In order for the reader to get a greater understanding of what is currently happening at a macro level, and where we might head towards in the future, I included in this sub-chapter the three most important factors investors are currently looking at: and that is (1) the inflation/interest rates relationship, (2) the threat of a global conflict, or World War III (WWIII), and (3) a potential recession.

### VI.I.I. – Inflation Will Be Sticky

As a gauge for inflation, I have chosen the US Core CPI and not the headline number. Indeed, headline inflation refers to the inflation rate calculated based on the price index that includes all goods and services in an economy (i.e., the cost of living) whilst core inflation excludes food and energy. Because the prices of food and energy are often internationally determined and not necessarily reflective of the domestic business cycle, the core inflation rate may be a better signal of the trend in domestically driven inflation.

The US Core CPI has risen sharply since March 2021 because of massive money printing by the Federal Reserve (or Fed) in order to combat the Covid 19 pandemic – passing from 1.70% in March 2021 to 6.60% in December 2022. It has gone down to 5% in September 2023 (refer to Table 10). Just by looking at that table, we can clearly see that the curve was much steeper on the way up than it is on the way down. And that brings me up to the following assumption: inflation is going to be much stickier than what financial market participants are currently estimating (most think we're almost over with inflation).

In response to this elevated inflation, the Feds have risen their federal funds rate to combat it. Interest rates, as did inflation, have soared from the period between March 2021 to September 2023, passing from a low of 0.25% to 5.5%. As a result, interest rates on the United States 10-year Treasuries (US10Y, or the risk-free rate) have also soared, passing from a low of 0.52% in March 2021 to a high of nearly 5% in October 2023 – refer to Table 11.

Mathematically, this is very bad for the valuation of a stock. Indeed, as the risk-free rate ( $r_f$ ) increases, the discount rate increases as well, lowering the stock price. This is even more relevant as I base 100% of the value of the stock on a DCF analysis.

But this is not all: as a confirmation of my initial theory (inflation is going to be much stickier), Jerome Powell (the Head of the Federal Reserve) signalled a potential future hike on the table during his last meeting (October 19<sup>th</sup>), thus getting their federal funds rate to 5.75%. Fed Chair Powell has also stated at multiple occasions that there may be the need for keeping their federal funds rate elevated for a much longer period than what financial market participants are currently estimating.

In conclusion, a higher cost of living and higher rates will both draw down consumption at some point. You can't just print trillions of dollars and expect any negative outcome. It also entails a lower stock price based on a DCF Model.

Table 10 – US Core CPI from March 2021 to September 2023

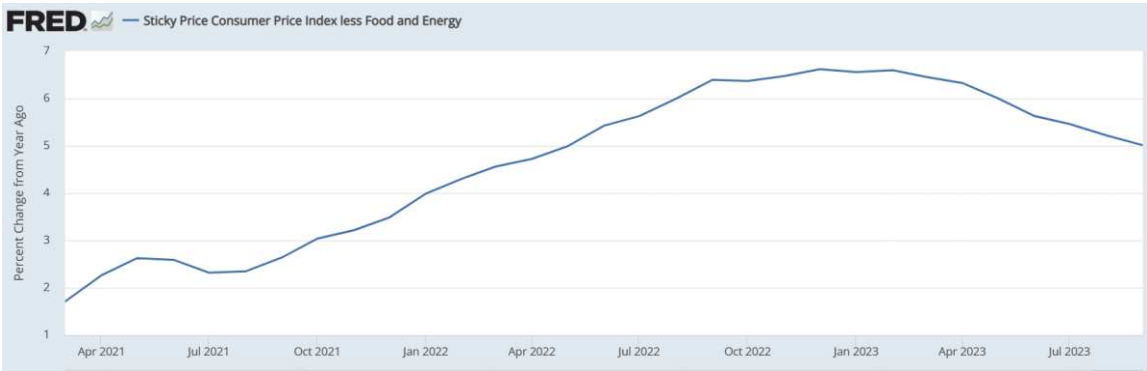
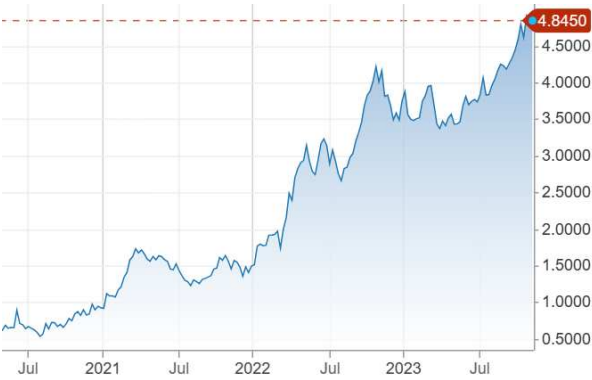


Table 11 – US10Y interest rate



VI.I.II. – Threat of WWIII

The recent events between Israel and Palestine have sparked tensions globally. The West (composed of countries such as: the US, the UK, Canada, Australia, and the EU) have all come out in support of Israel. On the other hand, countries mainly composed the West adversaries (such as Russia, China, South Africa, the Muslim world) have, in turn, all come out in support of Palestine: the shaping of a global major conflict is currently happening. And even though this conflict hasn't started yet, it remains a real possibility and thus a real threat.

VI.I.III. – No Recession

Recession fears have grown in the past year or so because of the inverted yield-curve. The yield-curve has consistently been a reliable recession indicator – hence why financial market participants started to worry. However, and even though these are (and rightfully so) considered the most dangerous words in investing: I believe this time is different. Indeed, economic indicators are still relatively robust : US unemployment at a quasi-all-time low and since the yield curve inversion there has been no terrible earning seasons (most were mixed or rather good). As such, I believe there will be no recession in the short-term.

#### VI.IV. – Conclusion

My take on macroeconomic growth is mixed. I don't think there's going to be a recession in the short-term as economic indicators remain robust. But even though I adhere to the narrative that technology, contributing to 5% of global GDP, is predicted to reach 10% in the coming years; I also think that the inherent macroeconomic uncertainties in the short to medium term (such as inflation or the threat of WWIII) will significantly affect growth in the future, and we will feel the effects even decades from now. As a result, in the short-term, I predict a higher growth than most whereas in the long-term, I predict a slower growth than most.

#### VI.II – Microsoft Assumptions

In this sub-chapter, I will touch upon every assumption in my DCF Model. I will begin with the assumptions I made for the Weighted Average Cost of Capital (WACC, or discount rate) and every part of which it is composed of (i.e., the Beta, the Cost of Equity, the Cost of Debt, the Cost of Preferred Shares). I will then go on to explain my assumptions for the company's growth, margins, Terminal Growth Rate (TGR) – as well as every aspect included in the DCF model: such as NCAPEX, ΔOWC, D&A...

#### VI.II.I. – WACC Assumptions

In order to compute the WACC, I used the following approach:

$$\text{WACC} = w_d r_d (1 - t) + w_p r_p + w_e r_e$$

$$8.96\% = (2.13\% * 4.67\%)(79\%) + (0.04\% * 5.31\%) + (97.83\% * 9.08\%)$$

Where

$w_d$  = the target proportion of debt in the capital structure

$r_d$  = the before-tax marginal cost of debt

$t$  = the company's marginal tax rate

$w_p$  = the target proportion of preferred stock in the capital structure

$r_p$  = the marginal cost of preferred stock

$w_e$  = the target proportion of common stock in the capital structure

$r_e$  = the marginal cost of common stock

Below is a table showing how I got the different weights.

Table 12 - Weight of Preferred Shares, Debt, and Equity			
Preferred Shares	\$1,188	0.04%	Weight of PS
Total Debt	\$59,965	2.13%	Weight of Debt
Market Cap	\$2,760,456	97.83%	Weight of Equity
Firm Value	\$2,821,608	100.00%	Weight of Firm

#### VI.II.I.I. – Beta

In order to compute the Beta, I first calculate the levered Beta of the firm. I then adjust it.

$$\beta_l = \beta_u(1 + (D/E * (1 - t)))$$

$$0.98 = 0.80(1 + (0.29 * (1 - 0.2049)))$$

Where

$\beta_u$  = unlevered Beta of the firm

D/E = Debt-to-Equity ratio

t = tax rate

$\beta_u$  is calculated as follows: it is the daily correlation between Microsoft (\$MSFT) and the Nasdaq 100 (\$IXIC) since October 27<sup>th</sup>, 2008, to November 20<sup>th</sup>, 2023, and is of 0.80.

0.2049 (or 20.49%) is the Microsoft's average tax rate from 2017 to 2023. Note that this rate is pretty close to the 21% US federal tax rate.

Academics have observed that beta tends to regress toward 1.0. In other words, the value of a stock's beta in a future period is likely to be closer to the mean value of 1.0, the beta of the market, than to the value of the calculated raw beta. Because valuation is forward looking, it is logical to adjust the raw beta so that it more accurately predicts a future beta. The most commonly used adjustment was introduced by Blume (1971):

$$\text{Adjusted beta} = (2/3)(\text{Unadjusted beta}) + (1/3)(\text{Market Beta})$$

$$0.99 = (2/3)(0.98) + (1/3)(1.0)$$

The Beta I used for Microsoft is thus of 0.99.

#### VI.II.I.II. – Cost of Equity

In order to compute the cost of equity, I used the following approach:

$$\text{CAPM} = rF + \beta(\text{ERP})$$

$$9.08\% = 4.75\% + 0.99(4.37\%)$$

Where

rF = Risk-free rate (US10Y)

β = Beta of the firm

ERP = Equity Risk Premium

The risk-free rate I used was the US 10-year rate and 4.37% the US ERP for November, according to Damodaran’s website.

### VI.II.I.III. – Cost of Debt

I calculated the cost of debt using the Yield-to-Maturity (YTM) method. Table 13 shows the formula I used. Table 14 is a shows all issued bonds, with their respective ISIN, their maturity (in years), the amount issued, the remaining years they have until maturity, their actual price (on November 20<sup>th</sup>, 2023), their coupon, the cost for each bond, their weight, and what I called ‘Cost Weight’ which corresponds to the sum of the two previous columns (Cost per Bond and Weight) – which allowed me to compute the Total Cost of Debt – of 4.67%.

Table 13 – YTM Formula

$$\text{Yield to Maturity} = \frac{\text{Annual Interest} + \frac{\text{Par Value} - \text{Market Price}}{\text{Number of Years to Maturity}}}{\frac{\text{Par Value} + \text{Market Price}}{2}}$$

Table 14 - Microsoft Bond List and Cost of Debt using YTM Method								
ISIN	Maturity	Issue	Years to Maturity	Price	Coupon	Cost per Bond	Weight	Cost Weight
US594918BX11	7	\$2,250,000,000	1	99.4	2.875	3.49%	8.60%	0.30%
US594918BB90	10	\$2,250,000,000	2	97.08	2.7	4.22%	8.60%	0.36%
US594918BY93	10	\$4,000,000,000	5	95.6	3.3	4.27%	15.30%	0.65%
US594918BC73	20	\$1,500,000,000	16	87.7	3.5	4.55%	5.74%	0.26%
US594918AD65	30	\$750,000,000	16	102.45	5.2	4.99%	2.87%	0.14%
US594918AJ36	30	\$1,000,000,000	17	94.4	4.5	4.97%	3.82%	0.19%
US594918AM64	30	\$1,000,000,000	18	104.41	5.3	4.95%	3.82%	0.19%
US594918AR51	30	\$900,000,000	19	78.33	3.5	5.20%	3.44%	0.18%
US594918AX20	30	\$500,000,000	20	96	4.875	5.18%	1.91%	0.10%
US594918AU80	30	\$500,000,000	20	82.25	3.75	5.09%	1.91%	0.10%
US594918BD56	30	\$1,750,000,000	22	81.48	3.75	5.06%	6.69%	0.34%
US594918BL72	30	\$3,000,000,000	22	89.6	4.45	5.19%	11.47%	0.60%
US594918CA09	30	\$3,000,000,000	24	87.7	4.25	5.07%	11.47%	0.58%
US594918CD48	50	\$3,750,000,000	37	59.95	2.68	4.70%	14.34%	0.67%
Total Cost of Debt								4.67%

#### VI.II.I.IV. – Cost of Preferred Shares

In order to compute the cost of preferred shares, I used the following approach:

$$r_p = D_p / P_p$$

$$5.31\% = \$2.43 / \$45.68$$

Where

$r_p$  = cost of preferred stock

$D_p$  = preferred stock DPS

$P_p$  = current preferred stock price per share

This way of computing the cost of preferred shares is the method taught by the CFA Institute.

#### VI.II.II. – Growth Assumptions

In my DCF model, I divided the explicit period into two parts with one shorter-term period (2024-2026) for which forecasts may be estimated more accurately; and another longer-term period (2027-2033) by which at the end (2033), I predict the company to enter its final stage of growth. I also assume 2027 to be the year when the effects of both higher for longer rates and of WWIII to start materializing – higher costs entailing a worldwide drop in consumption.

As such, I forecast the (2024-2033) period to be a period with a higher growth rate than 2033 onwards, (with two separate growth rates within that time span, the highest during 2024-2026 and the lowest during 2027-2033), as the firm will hit its maturity stage. I also think that by then, Microsoft's cloud services segment will have reach maturity as technology, which is contributing to 5% of global GDP, will reach 10% at that date.

I also want to point out that I didn't try to predict both operating and geographic segments growth in my valuation, only the operating segments. This is because over the recent years, Microsoft's US and International segments were more or less 50/50 (refer to Table 15).

The upper part of the table shows Microsoft Sales divided between the US segment and the international segment. Beneath, are the weights of these Sales as well as their respective growth rates, in that order.

Table 15 – Microsoft's Geographical Segments							
	2017	2018	2019	2020	2021	2022	2023
US	51,078	55,926	64,199	73,160	83,953	100,218	106,744
International	45,493	54,434	61,644	69,855	84,135	98,052	105,171
Total Revenue	96,571	110,360	125,843	143,015	168,088	198,270	211,915
US	52.89%	50.68%	51.02%	51.16%	49.95%	50.55%	50.37%
International	47.11%	49.32%	48.98%	48.84%	50.05%	49.45%	49.63%
Growth	2017	2018	2019	2020	2021	2022	2023
US	x	9.49%	14.79%	13.96%	14.75%	19.37%	6.51%
International	x	19.65%	13.25%	13.32%	20.44%	16.54%	7.26%

### VI.II.II.I. – 2017-2023 Numbers Recap

As I explained in the chapter ‘Industry and Company Overview’, I thought it was more convenient to use the sub-classifications Microsoft provided us in their annual report, as I could create three very telling ‘new’ segments: Cloud, Software, and Gaming.

Table 16 - Microsoft Segments Revenue 2017-2023							
	2017	2018	2019	2020	2021	2022	2023
Cloud	47,222	54,445	64,391	76,695	92,461	112,183	128,745
Software	35,236	40,428	43,971	48,288	53,466	62,866	62,136
Gaming	14,113	15,487	17,481	18,032	22,161	23,221	21,034
Total	96,571	110,360	125,843	143,015	168,088	198,270	211,915
	2017	2018	2019	2020	2021	2022	2023
Cloud	48.90%	49.33%	51.17%	53.63%	55.01%	56.58%	60.75%
Software	36.49%	36.63%	34.94%	33.76%	31.81%	31.71%	29.32%
Gaming	14.61%	14.03%	13.89%	12.61%	13.18%	11.71%	9.93%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
	2018	2019	2020	2021	2022	2023	Average
Cloud	15.30%	18.27%	19.11%	20.56%	21.33%	14.76%	18.22%
Software	14.73%	8.76%	9.82%	10.72%	17.58%	-1.16%	10.08%
Gaming	9.74%	12.88%	3.15%	22.90%	4.78%	-9.42%	7.34%
Total	14.28%	14.03%	13.65%	17.53%	17.96%	6.88%	14.05%

As we can see from Table 16, most of the growth has come from Cloud services as Microsoft averaged a 14.05% growth rate, mostly carried out by that particular operating segment. As a percentage of sales, it rose from 48.90% to 60.75%. Both Software and Gaming have decreased as a percentage of sales. Cloud services is the segment with the highest growth (18.22% – compared to 10.08% for Software and 7.34% for Gaming). It is also important to note that in 2023, both Software and Gaming sales have decreased, which is not the case for Cloud services.

### VI.II.II.II. – Cloud Forecast

I expect the trend in Table 16 (Cloud services sales as a percentage of total sales increasing) to continue in the future – at least until 2033 (when Microsoft’s cloud services segment will have reach maturity).

I predict Cloud services sales as a percentage of total sales to increase by an additional 3% (a bit similar to what happened from 2017 to 2023) each year from 2024 to 2026, passing from 60.75% in 2023 to 64% in 2024, 67% in 2025, and 70% in 2026. After that, I expect it to grow ‘only’ by half a percent onwards – reaching a staggering 73.5% in 2033. Demand for Cloud is real, and a lot of investors place a lot (can’t stress that word enough) of importance to the results of the cloud segment of public companies: this is the case for Google, Amazon, and Microsoft.

#### VI.II.II.III. – A Word on Both Software and Gaming

Evidently, I predict both these segments’ sales to decrease as a percentage of total sales. Even though Microsoft’s three segments all have a potential catalyst for growing much (for Cloud services and Software, it is the evolving way of working for companies – passing to an ever more digital format, as well as the potential explosion of AI use; and for Gaming, it is the metaverse and AI); I believe only Cloud’s explosion to be certain as cloud demand has soared in the recent years and is thus already tangible.

Microsoft’s software has already entered into its maturity phase and its catalyst for growth (AI) is much less certain to materialise. This is also the case for the Gaming operating segment’s catalyst: AI and the metaverse. We don’t know yet how technology (and life for that matter) are going to look like when AI will be an everyday feature we all use – such as the internet today. As such, it is extremely difficult to estimate its growth, or impact.

Regarding the metaverse, almost two years after Facebook’s CEO, Mark Zuckerberg, rebranded his firm to Meta, the hype has diminished and companies like Disney (\$DIS) have closed down their metaverse divisions and deemphasised using the word. It looks like Gaming’s catalysts is far from being certain and as such, it would be unrealistic to expect the segment to rise as a percentage of sales.

#### VI.II.II.IV. – Microsoft’s Big Bets In Those Segments

Back in January 2022, Microsoft announced plans to purchase game company Activision Blizzard (\$ATVI). In October 2022, this deal materialised for \$69B. This purchase dwarfs Microsoft’s \$26B deal with LinkedIn seven years back (in 2016), and becomes the company’s biggest acquisition ever. It also marks Microsoft’s shift to focus more on gaming content

delivery on top of platform building, and the company’s ambition to venture into the incoming metaverse industry. But as mentioned earlier, this bet is risky as the metaverse isn’t certain to materialise in the future.

Regarding AI, Microsoft’s acquired Nuance in 2021 for almost \$20B. On top of that, the latest partnership with OpenAI shows Microsoft’s ambition to advance its AI capabilities with some models already deployed on Azure in products like GitHub Copilot, DALL·E 2, and ChatGPT.

VI.II.II.V. – Growth Forecast

I derived from Statista the forecasted compounded annual growth rate (CAGR) for Microsoft’s three segments from 2024 to 2026. They were as follows: 16.30% for Cloud, 5.42% for Software, and 8.74% for Gaming. As I predict no recession in the short term, I went with those assumptions.

I predict those CAGR to be a bit lower in the next forecast phase (2027-2033) as I expect both the effects of higher rates for longer and of WWII to start hitting. My forecast are thus as such: 14% for Cloud, 4% for Software, and 7% for Gaming. Combining those growth rates and the forecast for the segments, I arrived at the following forecasted sales for the company (refer to Table 17).

Table 17 – Microsoft Sales Forecast (2024-2033)											
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cloud	\$128,745	\$149,730	\$174,136	\$202,521	\$230,873	\$263,196	\$300,043	\$342,049	\$389,936	\$444,527	\$506,761
Software	\$62,136	\$65,504	\$69,054	\$72,797	\$75,709	\$78,737	\$81,887	\$85,162	\$88,569	\$92,112	\$95,796
Gaming	\$21,034	\$22,872	\$24,871	\$27,045	\$28,938	\$30,964	\$33,131	\$35,451	\$37,932	\$40,587	\$43,428
<b>Total</b>	<b>\$211,915</b>	<b>\$238,107</b>	<b>\$268,062</b>	<b>\$302,363</b>	<b>\$338,107</b>	<b>\$362,626</b>	<b>\$429,264</b>	<b>\$480,719</b>	<b>\$537,370</b>	<b>\$599,609</b>	<b>\$667,845</b>
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Cloud	60.75%	64.00%	67.00%	70.00%	70.50%	71.00%	71.50%	72.00%	72.50%	73.00%	73.50%
Software	29.32%	27.00%	25.00%	23.00%	22.75%	22.50%	22.25%	22.00%	21.75%	21.50%	21.25%
Gaming	9.93%	9.00%	8.00%	7.00%	6.75%	6.50%	6.25%	6.00%	5.75%	5.50%	5.25%
<b>Total</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
	2017-2023	2024-2026	2027-2033								
Cloud	18.22%	16.30%	14.00%								
Software	10.08%	5.42%	4.00%								
Gaming	7.34%	8.74%	7.00%								
<b>Average</b>	<b>14.05%</b>	<b>12.58%</b>	<b>14.05%</b>								

Table 17 is a comprehensive table in that it includes most forecast data previously discussed in the ‘Growth Assumptions’ sub-chapter. The upper part of the table shows all three segments forecasted numbers, each according to their respective growth rate. They are divided into three parts: the current year’s numbers (2023), the period from 2024 to 2026, and the period from 2027 to 2033. Beneath is showed these segments’ weight as a percentage of sales – again divided in three time periods. Lastly, Microsoft’s growth rates are shown. The numbers in the first columns refer to an average from 2017 to 2023, the second column refer to the CAGR for

each segment for 2024-2026, and the third column refer to the CAGR for each segment for 2027-2033. The last row shows the average CAGR during each period.

VI.II.II.VI. – EBIT Margin Forecast

Regarding Microsoft’s EBIT margin, it has grown from 30.06% in 2017 to 41.77% in 2023 – this is a 39% increase in a span of 6 years. The increase has already been substantial, but I think there is still the possibility for Microsoft to grow its EBIT margin to a certain extent. Indeed, I see it grow from 41.77% currently to 44% by the end of the first forecasted period in 2026, gaining 1% per year. After that, I predict Microsoft EBIT margin to gain roughly 0.86% onwards, from 2027 to 2033, reaching a high of 55% at that date (refer to Table 18). This is my base case. My bear case is that it will reach 50% and 60% for my bull case (± 5%).

Table 18 - Microsoft's EBIT Margin Forecast (2023-2033)											
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Sales	\$211,915	\$238,107	\$268,062	\$302,363	\$340,441	\$382,626	\$429,264	\$480,719	\$537,370	\$599,609	\$667,845
EBIT	\$88,523	\$100,005	\$115,267	\$133,040	\$155,144	\$180,381	\$209,113	\$241,733	\$278,665	\$320,363	\$367,315
EBIT Margin	41.77%	42.00%	43.00%	44.00%	45.57%	47.14%	48.71%	50.29%	51.86%	53.43%	55.00%

The reasoning for technology decreasing costs in the long term is grounded in several key factors that often accompany technological advancements; such as automation and efficiency, economies of scale, innovation and process optimisation... Technology is a deflationary force in an inflationary environment, and this is the reason why Microsoft’s margins will continue to improve over the years.

VI.II.II.VII. – Terminal Growth Rate

The Terminal Growth Rate I went for is (as you will see in my chapter ‘Comparison with IB’) lower than the street estimates. It is of 2%. I already made very clear the reasons for why I think the TGR shouldn’t be high, and as you can expect, it is one reason for why I got a lower value for my Microsoft valuation.

VI.II.II.VIII. – Other DCF Assumptions

As there is less certainty in estimating accurately those parts compared to earnings, margins, the WACC and the TGR, I didn’t try to divide the explicit period into two parts with one shorter-term (2024-2026) period that may be more precisely estimated and a longer-term period (2027-2033) for which it is more difficult to forecast anything accurately. My assumptions account for the entire 2024-2033 period.



*Taxes* – Microsoft’s average tax rate from 2017 to 2023 was 20.49%. As that this rate is pretty close to the 21% US federal tax rate, I decided to keep this figure. To forecast EBT, I used the following approach. I took my EBIT forecast from Table 18 and I added 0.58% to those figures. In the firm’s financial reports, from 2017 to 2023, the ‘other income, net’ line in the income statement averaged 0.58% of sales, or said in another way: EBT was on average 0.58% higher than EBIT. As such, I decided to keep that additional 0.58% in my 2024-2033 forecast.

Table 20 - Microsoft's EBT and Taxes Forecast											
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
EBIT	\$88,523	\$100,005	\$115,267	\$133,040	\$155,144	\$180,381	\$209,113	\$241,733	\$278,665	\$320,363	\$367,315
EBT	\$89,755	\$101,389	\$116,825	\$134,797	\$157,123	\$182,605	\$211,608	\$244,527	\$281,788	\$323,848	\$371,196
EBIT Margin	41.77%	42.00%	43.00%	44.00%	45.57%	47.14%	48.71%	50.29%	51.86%	53.43%	55.00%
EBT Margin	42.35%	42.58%	43.58%	44.58%	46.15%	47.72%	49.30%	50.87%	52.44%	54.01%	55.58%
Taxes	\$18,393	\$20,777	\$23,940	\$27,623	\$32,198	\$37,419	\$43,363	\$50,109	\$57,744	\$66,363	\$76,066

### VI.II.IX. – Price per Share

To summarise all the assumptions I have made so far, below is shown a table including the historical and forecasted FCFF (Table 21). I also added another table, showing how, thanks to the latter table, I could arrive at the price per share (Table 22).

Table 21 - Forecasted FCFF 2024-2033											
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
EBIT	\$100,005	\$115,267	\$133,040	\$155,144	\$180,381	\$209,113	\$241,733	\$278,665	\$320,363	\$367,315	
Taxes	\$20,777	\$23,940	\$27,623	\$32,198	\$37,419	\$43,363	\$50,109	\$57,744	\$66,363	\$76,066	
EBIAT	\$79,228	\$91,327	\$105,417	\$122,946	\$142,961	\$165,750	\$191,625	\$220,921	\$254,000	\$291,249	
D&A	\$27,001	\$30,398	\$34,288	\$38,606	\$43,390	\$48,679	\$54,514	\$60,938	\$67,996	\$75,734	
CapEx	\$64,289	\$72,377	\$81,638	\$91,919	\$103,309	\$115,901	\$129,794	\$145,090	\$161,895	\$180,318	
ΔOWC	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
FCFF	\$41,941	\$49,348	\$58,067	\$69,633	\$83,042	\$98,528	\$116,344	\$136,769	\$160,101	\$186,665	

Table 22 - Arriving to the Price per Share											
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	
Unlevered Free Cash Flow	\$41,941	\$49,348	\$58,067	\$69,633	\$83,042	\$98,528	\$116,344	\$136,769	\$160,101	\$186,665	
Present Value of FCF	\$38,492	\$41,567	\$44,889	\$49,404	\$54,073	\$58,880	\$63,811	\$68,845	\$73,963	\$79,144	
Terminal Value										\$2,735,860	
Present Value of Terminal Value										\$1,159,976	
Enterprise Value										\$1,733,042	
Cash										\$111,262	
Debt										\$59,965	
Equity Value										\$1,784,339	
Shares Outstanding										7,446	
Share Price										\$240.70	

### VI.IV. – Sensitivity Analysis

My DCF model is built as such: I have incorporated what I call ‘switches’ which allow me to play around with the assumptions. On top of my base case, I have also forecasted a bear and a bull case for four lines in my DCF model – revenue growth, EBIT margin, WACC, and TGR. By switching the four numbers in the top left-hand corner (1 being the bear case, 2 the base case, and 3 the bull case), my model contains a formula that automatically switches cases (bear,

base, bull) – and I thus get different values for the share price. This part of my DCF is shown below in Table 23.

Table 23 - Switches									
Revenue Growth	2			<b>Bear Case</b>			<b>Base Case</b>		<b>Bull Case</b>
EBIT Margin	2			Revenue 2024 - 2026	-2.00%		Revenue 2024 - 2026	2.00%	
				Revenue 2033	9.38%		Revenue 2033	11.38%	13.38%
WACC	2								
TGR	2			EBIT 2024 - 2026	-5.00%		EBIT 2024 - 2026	5.00%	
				EBIT 2033	50.00%		EBIT 2033	55.00%	60.00%
<b>Valuation assumptions</b>									
WACC	8.96%			WACC	9.96%		WACC	8.96%	7.96%
TGR	2.00%			TGR	1.50%		TGR	2.00%	2.50%

I thus decided to use these switches for my sensitivity analysis. I will now walk you through an example in order to understand Table 24 – Sensitivity Analysis. The upper part of the table is based off my bear estimates. The second row (or the first row containing numbers) has all its switches with the number 1 (or the bear case).

As such, we obtain in all four cases the same price and the lowest possible price of \$144.82. I then enter the number 2 in the ‘Revenue Growth’ switch: giving me a price of \$167.61. I then change the number 2 in the ‘Revenue Growth’ switch to the number 3: giving me a price of \$194.05. I then reset it to the number 1, and change the number in the ‘EBIT Margin’ switch to the number 2: giving me a price of \$170.20; and so on.

I then do the same thing by setting all the switches with the number 2 (or the base estimates). My base case is \$240.70 – shown in the second part of the table. And I then do the same thing a last time by setting all the switches with the number 3 (or the bull estimates). My bull case is \$413.58 – shown in the third part of the table. Note that the price I got for my bull case is in line with the Investment Banks (IBs) reports, as we will see in the next chapter.

Table 24 - Sensitivity Analysis								
<b>Bear</b>	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	144.82	50.00%	144.82	9.96%	144.82	1.50%	144.82
Base Case	11.38%	167.61	55.00%	170.20	8.96%	168.23	2.00%	150.52
Bull Case	13.38%	194.05	60.00%	195.58	7.96%	199.31	2.50%	156.99
<b>Base</b>	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	206.93	50.00%	205.09	9.96%	204.89	1.50%	229.50
Base Case	11.38%	240.70	55.00%	240.70	8.96%	240.70	2.00%	240.70
Bull Case	13.38%	279.94	60.00%	276.31	7.96%	289.15	2.50%	253.64
<b>Bull</b>	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	302.60	50.00%	307.81	9.96%	284.95	1.50%	364.76
Base Case	11.38%	353.89	55.00%	360.70	8.96%	338.91	2.00%	387.12
Bull Case	13.38%	413.58	60.00%	413.58	7.96%	413.58	2.50%	413.58

As we can see in Table 24, most of the change in price comes from changes in WACC, followed by changes in Revenue Growth and in EBIT Margins, lastly, followed by changes in the TGR.

Table 25 - Sensitivity Analysis, $\Delta$ to Current Price								
Bear	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	-60.73%	50.00%	-60.73%	9.96%	-60.73%	1.50%	-60.73%
Base Case	11.38%	-54.55%	55.00%	-53.85%	8.96%	-54.38%	2.00%	-59.19%
Bull Case	13.38%	-47.38%	60.00%	-46.97%	7.96%	-45.96%	2.50%	-57.43%
Base	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	-43.89%	50.00%	-44.39%	9.96%	-44.44%	1.50%	-37.77%
Base Case	11.38%	-34.73%	55.00%	-34.73%	8.96%	-34.73%	2.00%	-34.73%
Bull Case	13.38%	-24.09%	60.00%	-25.08%	7.96%	-21.60%	2.50%	-31.23%
Bull	Revenue Growth	Share Price	EBIT Margin	Share Price	WACC	Share Price	TGR	Share Price
Bear Case	9.38%	-17.95%	50.00%	-16.54%	9.96%	-22.74%	1.50%	-1.10%
Base Case	11.38%	-4.04%	55.00%	-2.20%	8.96%	-8.10%	2.00%	4.97%
Bull Case	13.38%	12.14%	60.00%	12.14%	7.96%	12.14%	2.50%	12.14%

Table 25 shows the delta of the estimates given by Table 24 to the current share price of \$368.80.

Below is a summary of the assumptions I made with their respective cases, in a table:

Table 26 - Assumptions Summary						
	Share Price	$\Delta$ to Current Price	Revenue Growth	EBIT Margin	WACC	TGR
Bear Case	\$144.82	-60.73%	9.38%	50.00%	9.96%	1.50%
Base Case	\$240.70	-34.73%	11.38%	55.00%	8.96%	2.00%
Bull Case	\$413.58	12.14%	13.38%	60.00%	7.96%	2.50%
Current Price	06/12/2023	\$368.80				

## VII – Comparison With Investment Banks

In this chapter, I compared the value I got for Microsoft from my DCF analysis to other equity reports done by renowned investment banks (IBs) on the same company. I compared my results to three reports: the first by UBS, the second by Goldman Sachs, and the third by Citi.

I have divided this chapter into two parts. In the first part, titled ‘IBs Reports’ I summarised the main key points gathered into the latter. In the second part, titled ‘Discrepancies’, I went to explain the reasons for why I got a different value in my analysis compared to the IBs reports.

### VII.I. – IBs Reports

#### VII.I.I. – UBS Estimates

12 months rating – BUY

12 months price target – \$400

Price (25 Aug 2023) – \$322.98

Potential upside – 23.8%

They back their bullish price target on the fact that AI will play a much greater role in the near future than today, and Microsoft will benefit from it because of strategic acquisitions. Indeed:

‘The key public technology companies – Microsoft, Amazon, NVIDIA, and the broader AI hardware ecosystem – are reporting and communicating to investors about GPU supply and the need to invest in new technology stack. The spike in demand for NVIDIA GPUs and the related hardware infrastructure is driving a hardware supply shortage and a new, steep and likely multi-year CapEx cycle as the cloud infrastructure providers such as Microsoft need to stand up new AI stacks.’ As a result, Microsoft has signed deals with smaller GPU providers, such as Lambda Labs and CoreWeave, “worth billions” over a multi-year period.

**Table 27 - UBS Forecasted Numbers 2024-2028**

	2023	2024	2025	2026	2027	2028
Sales	211,915	237,389	267,733	294,971	318,184	339,754
Sales growth	x	12.02%	12.78%	10.17%	7.87%	6.78%
EBIT	89,694	101,910	113,933	125,212	136,388	146,163
EBIT Margin	42.33%	42.93%	42.55%	42.45%	42.86%	43.02%
Earnings	73,307	82,714	92,199	101,326	110,373	118,283
Earnings Margin	34.59%	34.84%	34.44%	34.35%	34.69%	34.81%
EPS	9.81	11.12	12.48	13.83	15.19	16.41
EPS growth	x	13.35%	12.23%	10.82%	9.83%	8.03%

#### VII.I.II. – Goldman Sachs Estimates

12 months rating – BUY

12 months price target – \$400

Price (13 Sep 2023) – \$332.88

Potential upside – 20.2%

They derived their \$400 price target from an equal weighting of (1) a DCF – with a 3% TGR; (2) a 35x Q5-Q8 EV/FCF; and (3) a 35x Q5-Q8 P/E. They are very bullish and hold a long-term focus on cloud optimisation ‘as tech as a percentage of global GDP moves from 5% to 10% driven by digitization, [they] view this long-term target as being a reasonable one.’

**Table 28 - GS forecasted numbers 2024-2026**

	2023	2024	2025	2026
Sales	211,915	233,799	264,062	294,436
Sales growth	x	10.33%	12.94%	11.50%
EBITDA	102,384	114,148	132,180	152,163
EBITDA Margin	48.31%	48.82%	50.06%	51.68%
EBIT	88,523	98,847	114,896	132,891
EBIT Margin	41.77%	42.28%	43.51%	45.13%
Earnings	72,361	81,034	93,998	108,558
Earnings Margin	34.15%	34.66%	35.60%	36.87%
EPS	9.81	10.93	13.12	15.89
EPS growth	x	11.42%	20.04%	21.11%

VII.I.III. – Citi Estimates

12 months rating – BUY

12 months price target – \$420

Price (25 Aug 2023) – \$336.06

Potential upside – 25.0%

Their \$420 target price is based on a 34x 12-months forward EV/FCFF multiple. They derive the future valuation multiple by applying a 35% premium to the multiple implied by their valuation regression framework, which they believe is justified given the durability of growth at Microsoft and the generative AI opportunity. This is applied to FY2026 E FCFF to arrive at a future EV of \$3.7 billion. They calculate future equity value per share using their future estimated cash, debt and share count assumptions, and discount to one year from today using 10% cost of equity.

VII.II. – DiscrepanciesVII.II.I. – Model differences

The reason why I got such a different forecasted share price (of \$240.70) is because of the fact that I used a totally different approach. Indeed, as mentioned earlier, my approach is based 100% on a DCF model. But this is not the case for the IBs in questions.

In fact, Citi’s \$420 1-year target price is based on a 34x 12-months forward EV/FCFF multiple. And they use a 10% cost of equity. Also, note that the cost of equity I used in my DCF analysis is of 9.08%.

For Goldman Sachs for instance, their \$400 1-year price target is ‘derived from an equal weighting of (1) a DCF – with a 3% TGR; (2) a 35x Q5-Q8 EV/FCF; and (3) a 35x Q5-Q8 P/E’. Note that the TGR I have in my DCF is only of 2%. This is because they are more bullish than me as they give more importance to the fact that ‘tech as a percentage of global GDP [will move] from 5% to 10%’. And I am not denying that, but I already made very clear in the chapter ‘Assumptions’ the reasons that I believe will be harmful to growth in the medium/long-term.

Different models will entail different results. The discrepancies come mostly from differences in approaches as their valuation is based, in part, on Multiples Analysis (66.6% for Goldman Sachs and 100% for Citi).

VII.II.II. – Forecasted Sales Growth Differences

It is also important to note that my growth rates slightly differ from that of UBS and Goldman Sachs. To my surprise (as their 1-year target price is higher than mine), my sales growth rates for Microsoft are actually a bit higher than theirs (see Table 29). But again, as they applied more weight on Multiples Analysis in their models, this explains why I can have in the short-term a higher CAGR but still get a lower stock price for the firm.

Table 29 shows UBS and Goldman Sachs sales growth rates compared to mine for the 2024-2026 period. The last column shows the cumulative sales growth rates for the period. As we can see, my 37.74% growth rate is slightly higher than both of theirs (34.98% and 34.77% for UBS and Goldman Sachs respectively), but similar, nonetheless.

**Table 29 - Sales Growth Rates Comparison 2024-2026**

	2024	2025	2026	Cumulative
UBS	12.02%	12.78%	10.17%	34.98%
GS	10.33%	12.94%	11.50%	34.77%
Me	12.36%	12.58%	12.80%	37.74%

VII.II.III. – Forecasted EBIT Growth Differences

**Table 30 - Numbers Comparison with IBs**

My estimates					UBS's estimates					Goldman Sachs estimates				
	2023	2024	2025	2026		2023	2024	2025	2026		2023	2024	2025	2026
Sales	\$211,915	\$238,107	\$268,062	\$302,363	Sales	\$211,915	\$237,389	\$267,733	\$294,971	Sales	\$211,915	\$233,799	\$264,062	\$294,436
EBIT	\$88,523	\$100,005	\$116,825	\$134,797	EBIT	\$88,523	\$101,910	\$113,933	\$125,212	EBIT	\$88,523	\$98,847	\$114,896	\$132,891
YOY Δ	2024	2025	2026		YOY Δ	2024	2025	2026		YOY Δ	2024	2025	2026	
Sales	12.36%	12.58%	12.80%		Sales	12.02%	12.78%	10.17%		Sales	10.33%	12.94%	11.50%	
EBIT	12.97%	16.82%	15.38%		EBIT	15.12%	11.80%	9.90%		EBIT	11.66%	16.24%	15.66%	
Margins	2024	2025	2026		Margins	2024	2025	2026		Margins	2024	2025	2026	
EBIT	42.00%	43.00%	44.00%		EBIT	42.93%	42.55%	42.45%		EBIT	42.28%	43.51%	45.13%	

Table 30 shows differences in forecasted EBIT growth and margins between UBS, GS, and me. It is actually Goldman Sachs who's got the highest forecasted margins, followed by me and then UBS.

## VII – Conclusion

My bull case yields a share price of \$413.58, which is higher than its current price and in line with most investment banks reports. As I explained it, my take on macroeconomic growth is mixed. I don't think there's going to be a recession in the short-term as economic indicators remain robust. But even though I adhere to the narrative that technology, actually contributing to 5% of global GDP, is predicted to reach 10% in the coming years; I also think that the inherent macroeconomic uncertainties in the short to medium term (such as inflation or the threat of WWII) will significantly affect growth in the future, and we will feel the effects even decades from now. As a result, in the short-term, I predict a higher growth than most whereas in the long-term, I predict a slower growth than most. Thus, I may not be as optimistic as the other financial market participants. This is why my base case is lower than Microsoft's current market price of \$240.70, and why it is not in line with most investment banks reports as well.

It is also important to stress that mathematically, higher rates are very bad for my valuation of Microsoft. As the  $r_f$  increases, the WACC increases as well, lowering the stock price. This is even more relevant as I base 100% of the value of the stock on a DCF analysis – and this is not the case for the investment banks' reports I've compared my work to.

There is another more structural reason too in my opinion. Investment banks' moves in the market, or the 'smart money', are carefully analysed by each as they bear great importance for every investor. For this reason, they influence markets a lot. When the 'smart money' says "buy", people tend to buy. For a multitude of reasons, such as possible conflict of interests the bank has with the company for which it is issuing the report, those tend to be positively biased. People will thus buy the stock and the price will go up. As such, investment banking reports tend not to say "sell". And especially for such a massive company as Microsoft, because if they are in trouble, just imagine how the rest of the market would be doing.

The last reason in my opinion, is that US equities have performed really well YTD. Especially technology companies, and more specifically big caps AI affiliated firms such as Microsoft. Other examples of firms that grew their market cap by a lot YTD include: Meta, Apple, Nvidia, AMD, Tesla, Google, and Amazon. Those firms are responsible for why the Nasdaq soared. Coming back to my previous point, if any bank were to issue an unfavourable report on Microsoft – or on any of the aforementioned companies – it could have catastrophic consequences on the market as a whole, as one major reason for why US equities have performed so well would be no more.

It would also imply that investment bank to go against what most think, and this is highly unlikely. In fact, there is a tendency for investment banks and analysts to converge on the same opinion within the financial industry, and this phenomenon is often known as 'groupthink' or 'herd behaviour'. This behaviour may provide a sense of safety in consensus, but it also carries its own set of risks – for example if every investment bank were to say "sell", a phenomenon of herd selling would follow.

As an individual, not tied any group or organisation, who tries to be the less biased possible, and who doesn't care about going against what most believe in, my honest opinion is that Microsoft as a stock is overvalued. "Sell" is thus my recommendation.

## **IX – Bibliography**

This section includes all works cited within this report. I have used three investment banking equity reports on Microsoft in my 'Comparison with Investment Banking' chapter. They are as follows:

A UBS report entitled 'Microsoft Corp. : How GPU-Constrained is Microsoft', issued on August 28<sup>th</sup>, 2023.

A Goldman Sachs report entitled ‘Robust Gen-AI backlog continues to build as Copilot offerings show promise: Microsoft Envision Takeaways’, issued on September 13<sup>th</sup>, 2023.

A Citi report entitled ‘Microsoft Corp. Envisioning a Co-pilot future’, issued on September 14<sup>th</sup>, 2023.

Having successfully passed the CFA Exam Level I in August 2022, I have access to the entire curriculum for that level. Some elements in my thesis come directly from the latter, such as:

- The reasons why DDMs are suboptimal
- The way of calculating the cost of preferred shares
- My choice for the ratios
- Blume’s (1971) adjustment for the Beta

To obtain financial data, such as Microsoft’s numbers, I have used their financial statements available on the internet. I have also used websites such as CNBC and Yahoo Finance to get additional financial data, such as getting stock prices, looking for competitors, or calculating Microsoft’s Beta.

To understand the current state of the economy, I have used websites such as St-Louis Fed (FRED), Macrotrend and Statista. My segments growth forecast come from Statista.

Finally, I have been influenced by Aswath Damodaran’s teachings; hence why I chose the ERP according to his website, or why I chose the DCF Model as my sole valuation method, or lastly the choice of competitors.

## IX – Appendices

Table 1 - Microsoft Income Statement 2017-2023							
	2017	2018	2019	2020	2021	2022	2023
Productivity and Business Process	29,870	35,865	41,160	46,398	53,915	63,364	69,274
Intelligent Cloud	27,407	32,219	38,985	48,366	60,080	75,251	87,907
More Personal Computing	39,294	42,276	45,698	48,251	54,093	59,655	54,734
<b>Total Revenue</b>	<b>96,571</b>	<b>110,360</b>	<b>125,843</b>	<b>143,015</b>	<b>168,088</b>	<b>198,270</b>	<b>211,915</b>
Total Cost of Revenue	34,261	38,353	42,910	46,078	52,232	62,650	65,863
<b>Gross Margin</b>	<b>62,310</b>	<b>72,007</b>	<b>82,933</b>	<b>96,937</b>	<b>115,856</b>	<b>135,620</b>	<b>146,052</b>
R&D	13,037	14,726	16,876	19,269	20,716	24,512	27,195
Sales & Marketing	15,461	17,469	18,213	19,598	20,117	21,825	22,759
G&A	4,481	4,754	4,885	5,111	5,107	5,900	7,575
Restructuring	306	0	0	0	0	0	0
<b>EBIT</b>	<b>29,025</b>	<b>35,058</b>	<b>42,959</b>	<b>52,959</b>	<b>69,916</b>	<b>83,383</b>	<b>88,523</b>
Other income, net	876	1,416	729	77	1,186	333	788
<b>EBT</b>	<b>29,901</b>	<b>36,474</b>	<b>43,688</b>	<b>53,036</b>	<b>71,102</b>	<b>83,716</b>	<b>89,311</b>
Taxes	4,412	19,903	4,448	8,755	9,831	10,978	16,950
<b>Net Income</b>	<b>25,489</b>	<b>16,571</b>	<b>39,240</b>	<b>44,281</b>	<b>61,271</b>	<b>72,738</b>	<b>72,361</b>
Basic Shares	7,746	7,700	7,673	7,610	7,547	7,496	7,446
Diluted Shares	7,832	7,794	7,753	7,683	7,608	7,540	7,472
<b>EPS</b>	<b>3.29</b>	<b>2.15</b>	<b>5.11</b>	<b>5.82</b>	<b>8.12</b>	<b>9.70</b>	<b>9.72</b>
<b>Diluted EPS</b>	<b>3.25</b>	<b>2.13</b>	<b>5.06</b>	<b>5.76</b>	<b>8.05</b>	<b>9.65</b>	<b>9.68</b>
Tax Rate	14.76%	54.57%	10.18%	16.51%	13.83%	13.11%	18.98%

**Table 2 - Microsoft Income Statement YOY Change 2017-2023**

YOY change	2018	2019	2020	2021	2022	2023
Productivity and Business Process	20.07%	14.76%	12.73%	16.20%	17.53%	9.33%
Intelligent Cloud	17.56%	21.00%	24.06%	24.22%	25.25%	16.82%
More Personal Computing	7.59%	8.09%	5.59%	12.11%	10.28%	-8.25%
<b>Total Revenue</b>	<b>14.28%</b>	<b>14.03%</b>	<b>13.65%</b>	<b>17.53%</b>	<b>17.96%</b>	<b>6.88%</b>
Total Cost of Revenue	11.94%	11.88%	7.38%	13.36%	19.95%	5.13%
<b>Gross Margin</b>	<b>15.56%</b>	<b>15.17%</b>	<b>16.89%</b>	<b>19.52%</b>	<b>17.06%</b>	<b>7.69%</b>
R&D	12.96%	14.60%	14.18%	7.51%	18.32%	10.95%
Sales & Marketing	12.99%	4.26%	7.60%	2.65%	8.49%	4.28%
G&A	6.09%	2.76%	4.63%	-0.08%	15.53%	28.39%
Restructuring	x	x	x	x	x	x
<b>EBIT</b>	<b>20.79%</b>	<b>22.54%</b>	<b>23.28%</b>	<b>32.02%</b>	<b>19.26%</b>	<b>6.16%</b>
Other income, net	61.64%	-48.52%	-89.44%	1440.26%	-71.92%	136.64%
<b>EBT</b>	<b>21.98%</b>	<b>19.78%</b>	<b>21.40%</b>	<b>34.06%</b>	<b>17.74%</b>	<b>6.68%</b>
Taxes	351.11%	-77.65%	96.83%	12.29%	11.67%	54.40%
<b>Net Income</b>	<b>-34.99%</b>	<b>136.80%</b>	<b>12.85%</b>	<b>38.37%</b>	<b>18.72%</b>	<b>-0.52%</b>
Basic Shares	-0.59%	-0.35%	-0.82%	-0.83%	-0.68%	-0.67%
Diluted Shares	-0.49%	-0.53%	-0.90%	-0.98%	-0.89%	-0.90%
<b>EPS</b>	<b>-34.60%</b>	<b>137.63%</b>	<b>13.78%</b>	<b>39.52%</b>	<b>19.52%</b>	<b>0.15%</b>
Diluted EPS	-34.67%	138.05%	13.87%	39.73%	19.79%	0.39%

**Table 3 - Lines as a % of Sales 2017-2023**

Margins	2017	2018	2019	2020	2021	2022	2023
Productivity and Business Process	30.93%	32.50%	32.71%	32.44%	32.08%	31.96%	32.69%
Intelligent Cloud	28.38%	29.19%	30.98%	33.82%	35.74%	37.95%	41.48%
More Personal Computing	40.69%	38.31%	36.31%	33.74%	32.18%	30.09%	25.83%
<b>Total Revenue</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>
Total Cost of Revenue	35.48%	34.75%	34.10%	32.22%	31.07%	31.60%	31.08%
<b>Gross Margin</b>	<b>64.52%</b>	<b>65.25%</b>	<b>65.90%</b>	<b>67.78%</b>	<b>68.93%</b>	<b>68.40%</b>	<b>68.92%</b>
R&D	13.50%	13.34%	13.41%	13.47%	12.32%	12.36%	12.83%
Sales & Marketing	16.01%	15.83%	14.47%	13.70%	11.97%	11.01%	10.74%
G&A	4.64%	4.31%	3.88%	3.57%	3.04%	2.98%	3.57%
Restructuring	0.32%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<b>EBIT</b>	<b>30.06%</b>	<b>31.77%</b>	<b>34.14%</b>	<b>37.03%</b>	<b>41.59%</b>	<b>42.06%</b>	<b>41.77%</b>
Other income, net	0.91%	1.28%	0.58%	0.05%	0.71%	0.17%	0.37%
<b>EBT</b>	<b>30.96%</b>	<b>33.05%</b>	<b>34.72%</b>	<b>37.08%</b>	<b>42.30%</b>	<b>42.22%</b>	<b>42.14%</b>
Taxes	4.57%	18.03%	3.53%	6.12%	5.85%	5.54%	8.00%
<b>Net Income</b>	<b>26.39%</b>	<b>15.02%</b>	<b>31.18%</b>	<b>30.96%</b>	<b>36.45%</b>	<b>36.69%</b>	<b>34.15%</b>
Gross Margin	64.52%	65.25%	65.90%	67.78%	68.93%	68.40%	68.92%
EBITDA Margin	39.15%	41.06%	43.42%	45.98%	48.55%	49.35%	41.77%
EBIT Margin	30.06%	31.77%	34.14%	37.03%	41.59%	42.06%	41.77%
EBT Margin	30.96%	33.05%	34.72%	37.08%	42.30%	42.22%	42.14%
Net Income Margin	26.39%	15.02%	31.18%	30.96%	36.45%	36.69%	34.15%



<b>Table 8 - Microsoft Balance Sheet 2017-2023</b>							
	2017	2018	2019	2020	2021	2022	2023
<b>Assets</b>							
Cash and Equivalents	7,663	11,946	11,356	13,576	14,224	13,931	34,704
Short-term Investments	125,318	121,822	122,463	122,951	116,110	90,826	76,558
Accounts Receivable	19,792	26,481	29,524	32,011	38,043	44,261	48,688
Inventories	2,181	2,662	2,063	1,895	2,636	3,742	2,500
Other	4,897	6,751	10,146	11,482	13,393	16,924	21,807
<b>Total Current Assets</b>	<b>159,851</b>	<b>169,662</b>	<b>175,552</b>	<b>181,915</b>	<b>184,406</b>	<b>169,684</b>	<b>184,257</b>
PPE	23,734	29,460	36,477	44,151	59,715	74,398	95,641
Operating Leases ROU Assets	0	6,686	7,379	8,753	11,088	13,148	14,346
Equity Investments	6,023	1,862	2,649	2,965	5,984	6,891	9,879
Goodwill	35,122	35,683	42,026	43,351	49,711	67,524	67,886
Intangibles	10,106	8,053	7,750	7,038	7,800	11,298	9,366
Other Long-Term Assets	6,250	7,442	14,723	13,138	15,075	21,897	30,601
<b>Total Long-Term Assets</b>	<b>81,235</b>	<b>89,186</b>	<b>111,004</b>	<b>119,396</b>	<b>149,373</b>	<b>195,156</b>	<b>227,719</b>
<b>Total Assets</b>	<b>241,086</b>	<b>258,848</b>	<b>286,556</b>	<b>301,311</b>	<b>333,779</b>	<b>364,840</b>	<b>411,976</b>
<b>Liabilities</b>							
Accounts Payable	7,390	8,617	9,382	12,530	15,163	19,000	18,095
Short-term Debt	9,072	0	0	0	0	0	0
Current Portion of Long-Term Debt	1,049	3,998	5,516	3,749	8,072	2,749	5,247
Accrued Compensation	5,819	6,103	6,830	7,874	10,057	10,661	11,009
Short-Term Income Taxes	718	2,121	5,665	2,130	2,174	4,067	4,152
Short-Term Unearned Revenue	34,102	28,905	32,676	36,000	41,525	45,538	50,901
Securities Lending Payable	97	0	0	0	0	0	0
Other	6,280	8,744	9,351	10,027	11,666	13,067	14,745
<b>Total Current Liabilities</b>	<b>64,527</b>	<b>58,488</b>	<b>69,420</b>	<b>72,310</b>	<b>88,657</b>	<b>95,082</b>	<b>104,149</b>
Long-Term Debt	76,073	72,242	66,662	59,578	50,074	47,032	41,990
Long-Term Income Taxes	0	30,265	29,612	29,432	27,190	26,069	25,560
Long-Term Unearned Revenue	10,377	3,815	4,530	3,180	2,616	2,870	2,912
Deferred Income Taxes	531	541	233	204	198	230	433
Operating Lease Liabilities	0	5,568	6,188	7,671	9,629	11,489	12,728
Other Long-Term Liabilities	17,184	5,211	7,581	10,632	13,427	15,526	17,981
<b>Total Non-Current Liabilities</b>	<b>104,165</b>	<b>117,642</b>	<b>114,806</b>	<b>110,697</b>	<b>103,134</b>	<b>103,216</b>	<b>101,604</b>
<b>Total Liabilities</b>	<b>168,692</b>	<b>176,130</b>	<b>184,226</b>	<b>183,007</b>	<b>191,791</b>	<b>198,298</b>	<b>205,753</b>
<b>Shareholders' Equity</b>							
Common Stock and Paid-in Capital	69,315	71,223	78,520	80,552	83,111	86,939	93,718
Retained Earnings	2,648	13,682	24,150	34,566	57,055	84,281	118,848
Accumulated OCI	431	-2,187	-340	3,186	1822	-4678	-6,343
<b>Total Shareholders' Equity</b>	<b>72,394</b>	<b>82,718</b>	<b>102,330</b>	<b>118,304</b>	<b>141,988</b>	<b>166,542</b>	<b>206,223</b>
<b>Total Liabilities &amp; Shareholders' Equity</b>	<b>241,086</b>	<b>258,848</b>	<b>286,556</b>	<b>301,311</b>	<b>333,779</b>	<b>364,840</b>	<b>411,976</b>

<b>Table 9 - Balance Sheet Ratios 2017-2023</b>							
	2017	2018	2019	2020	2021	2022	2023
Current Ratio	2.48	2.90	2.53	2.52	2.08	1.78	1.77
Equity %	30.03%	31.96%	35.71%	39.26%	42.54%	45.65%	50.06%
Cash	132,981	133,768	133,819	136,527	130,334	104,757	111,262
Debt	86,194	81,808	78,366	70,998	67,775	61,270	59,965
Cash / Debt	154.28%	163.51%	170.76%	192.30%	192.30%	170.98%	185.54%
Book Value/ Share	9.35	10.74	13.34	15.55	18.81	22.22	27.70

<b>Table 10 - Condensed Cash Flow Statement 2017-2023</b>							
	2017	2018	2019	2020	2021	2022	2023
CFFOs	39,507	43,884	52,185	60,675	76,740	89,035	87,582
D&A	8,778	10,261	11,682	12,796	11,686	14,460	13,861
CFFFs	8,408	-33,590	-36,887	-46,031	-48,486	-58,876	-43,935
Common Stock Repurchased	11,788	10,721	19,543	22,968	27,385	32,696	22,245
Common Stock Issued	772	1,002	1,142	1,343	1,693	1,841	1,866
Net Stock Repurchase	11,016	9,719	18,401	21,625	25,692	30,855	20,379
Common Stock Cash Dividends Paid	11,845	12,699	13,811	15,137	16,521	18,135	19,800
CFFIs	-46,781	-6,061	-15,773	-12,223	-27,577	-30,311	-22,680
PPE	8,129	11,632	13,925	15,441	20,622	23,886	28,107
Acquisition of Companies, Intangible and other Assets	25,944	888	2,388	2,521	8,909	22,038	1,670
NCAPEX	34,073	12,520	16,313	17,962	29,531	45,924	29,777
Effect of Foreign Exchange Rates	19	50	-115	-201	-29	-141	-194
Δ in Cash and Cash Equivalents	1,153	4,283	-590	2,220	648	-293	20,773
Cash and Cash Equivalents, Beginning of Period	6,510	7,663	11,946	11,356	13,576	14,224	13,931
Cash and Cash Equivalents, End of Period	7,663	11,946	11,356	13,576	14,224	13,931	34,704

<b>Table 11 - Cash Flow Statement Ratios 2017-2023</b>							
	2017	2018	2019	2020	2021	2022	2023
DPS	1.53	1.65	1.80	1.99	2.19	2.42	2.66
		7.85%	9.14%	10.51%	10.05%	10.52%	9.91%
FCF	31,378	32,252	38,260	45,234	56,118	65,149	59,475
FCF per Share	4.05	4.19	4.99	5.94	7.44	8.69	7.99
		3.40%	19.05%	19.21%	25.10%	16.88%	-8.10%
CFO per Share	5.10	5.70	6.80	7.97	10.17	11.88	11.76
		11.74%	19.33%	17.23%	27.53%	16.81%	-0.97%

<b>Table 12 - Important Lines of Cash Flow Statement YOY Change 2017-2023</b>							
	2018	2019	2020	2021	2022	2023	Average Growth
Growth							
CFFOs	11.08%	18.92%	16.27%	26.48%	16.02%	-1.63%	14.52%
D&A	16.89%	13.85%	9.54%	-8.67%	23.74%	-4.14%	8.53%
PPE	43.09%	19.71%	10.89%	33.55%	15.83%	17.67%	23.46%
Cash	55.89%	-4.94%	19.55%	4.77%	-2.06%	149.11%	37.05%

Table 12's averages are arithmetic means.