

Microsoft

Investment Analysis &
Recommendation

Intro & Overview

Company Overview



- Founded in 1975, Microsoft is one of the world's biggest leaders in technology and software development
- Microsoft enables people and businesses throughout the world to realize their full potential utilizing their innovative products
- The company is one of only 4 in the world with over \$2 Trillion in market capitalization

- Revenue is generated by developing, licensing, and supporting a wide range of software products and services
- In addition to individual units, Microsoft's product suites and services are key to their lucrative and reliable business model



Principal Products and Services: Windows operating system; Microsoft Azure Cloud, Xbox, Bing, Office 365; Surface RT and Pro devices; and PC accessories.

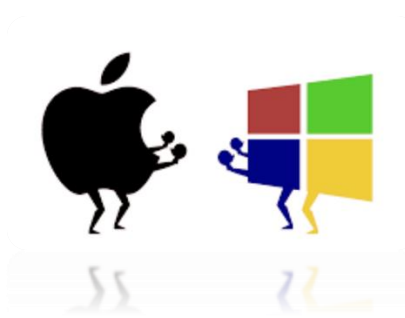
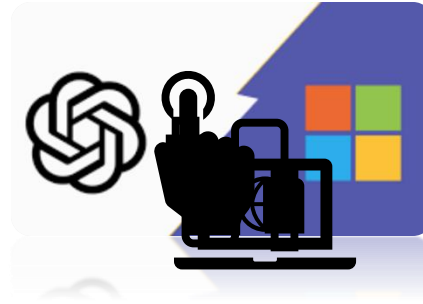
Investment Thesis and Competition

Investment Thesis:

Given Microsoft's consistent year over year performance and innovative involvement in the AI sector, Microsoft is a considerably lower-risk investment with a high upside

Competition:

- Microsoft has incentive to change their lopsided position against Google in the search engine world with over \$10 billion invested into ChatGPT
- This investment is a strong first strike against Google with plans to integrate their Open AI investments with Bing and other Microsoft products.
- By taking just a small amount of search market from Google, Microsoft can make a meaningful addition to its \$83 billion in annual operating profits.



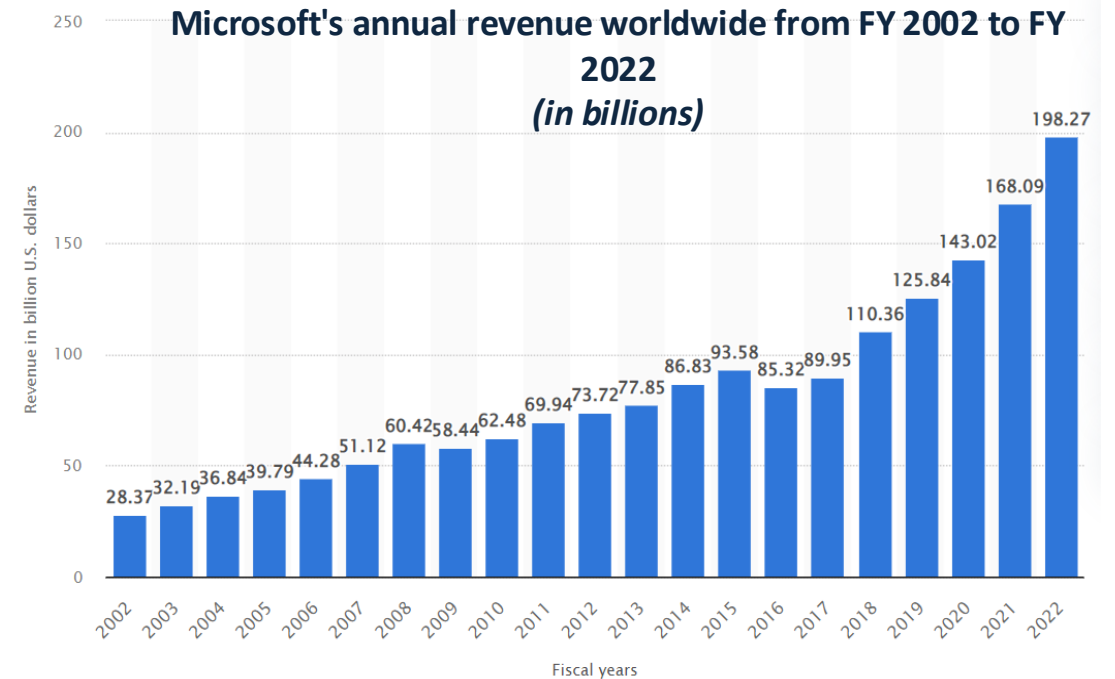
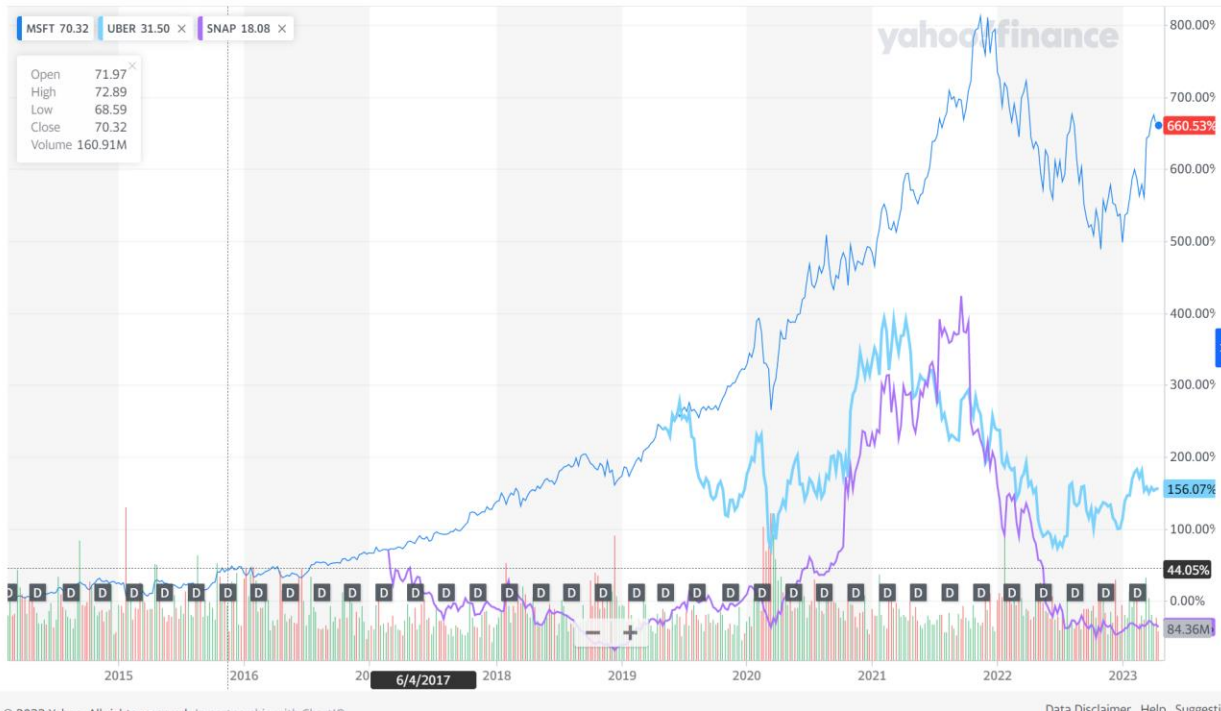
Upside to Downside Risk:

- Accounting for both the positive direction of Open AI and reasonable uncertainty within the economy, Microsoft remains a strong investment choice
- On the upside, our estimations predict a potential for over a 53% increase in share price \$290.00^(from 4/7/23) to \$446.40
- On the downside, our worst-case estimations show the potential for a 17% decrease from the current stock price
- Considerably strong return margin of +53% to (17%)

A New Technological Landscape for Microsoft

The technology industry has changed over time, significantly deviating the growth of Microsoft / Apple / Amazon (mega cap companies) from riskier growth tech stocks (Snap, Uber) below.

Microsoft's consistent YOY increase since 2002 has led it into a new environment as a true industrial stock rather than a growth stock, therefore should not be perceived as highly risky or speculative.



Existing Market

Microsoft 365 Consumer Subscriptions

- New product: Microsoft 365 Copilot (AI Assistant)
- Currently, nearly 345 million Microsoft 365 consumer subscriptions

Gaming

- Planned to acquire Activision Blizzard to expand the current Xbox game access

LinkedIn

- Expanding customer base as more young people entering workforce, currently more than \$1B in annual revenue

Expanding Market

Advertisement

- Acquired premium advertising platform Xandr in June of 2022
- Became Netflix's exclusive technology and sales partner in July of 2022

Azure Infrastructure (AI API)

- Expected CAGR for Cloud computing is 13.1% from 2023 to 2030
- Partnerships: Meta, AMD, Hugging Face, and OpenAI

Business Applications in Cloud and AI

- Microsoft invested \$2B in Self-driving car startup Cruise in January of 2021
- Acquired Nuance Communications, a healthcare leader in conversational AI, in March of 2022
- Other products: GitHub Copilot, DALL·E 2, and ChatGPT

Management Analysis

Management and Risk Involved



- Satya Nadella has been the CEO since 2014 and the chairman since 2021
- During the time of him being a CEO, Microsoft has grown nine times to a valuation of \$2.5 trillion

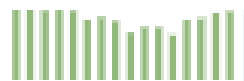
- Amy Hood has been the CFO since 2013
- She has helped orchestrate over 57 deals, including the \$7.5 billion acquisition of GitHub in 2018

- There have been no large incidents related to management in the past several
- Every CEO has held the position for over a decade (there have only been two after Bill Gates)



Strong Leadership and ROIC

ROIC



Since Satya Nadella became CEO of Microsoft there has been a significant increase in ROIC overtime as seen below:

2014	2015	2016	2017	2018	2019	2020	2021	2022
17.8%	10.1%	13.3%	13.2%	8.9%	19.2%	20.3%	25.8%	27.6%



Microsoft's stock price from 2/04/2014 to Present Day



There has also been over a 908.1% increase in stock price since his take over on February 4th, 2014

Operational & Price History

10 Year Stock History

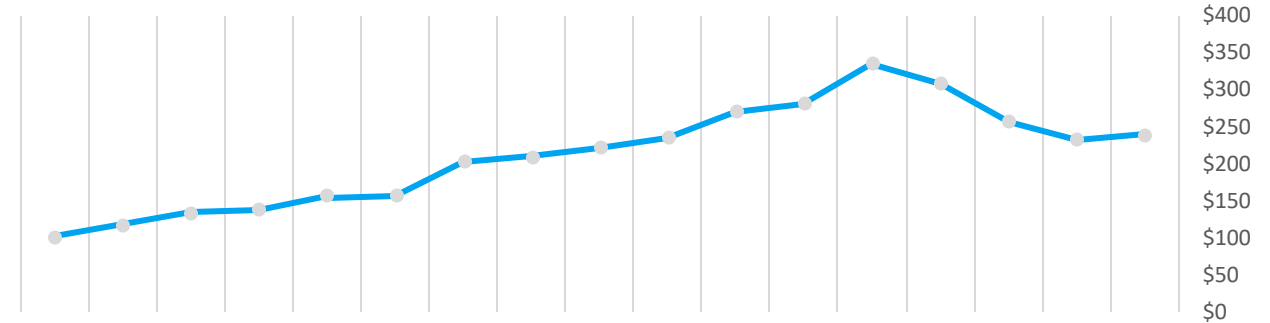


5-Year Price Breakout

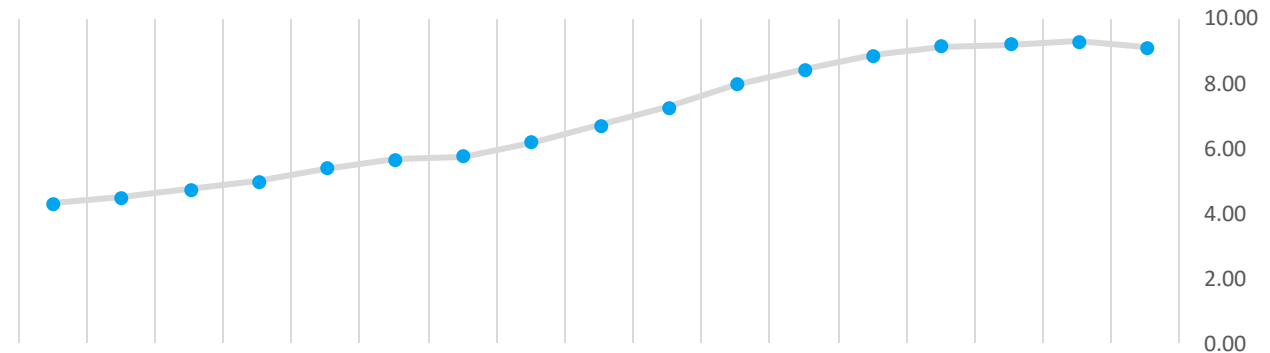
1. Relatively stable price-to-earnings ratios mean that EPS has historically been a good predictor of stock price.
2. Therefore, Microsoft is a strong candidate for fundamental analysis. An accurate prediction of future EPS may give us an accurate assessment of what stock price will be in the future.
3. Finally, price-to-earnings have been compressed to a 5-year low, making now an opportune time to buy.

Note: EPS numbers are based on fully diluted, non-GAAP disclosures on quarterly press releases, P/E data is derived from Price / EPS.

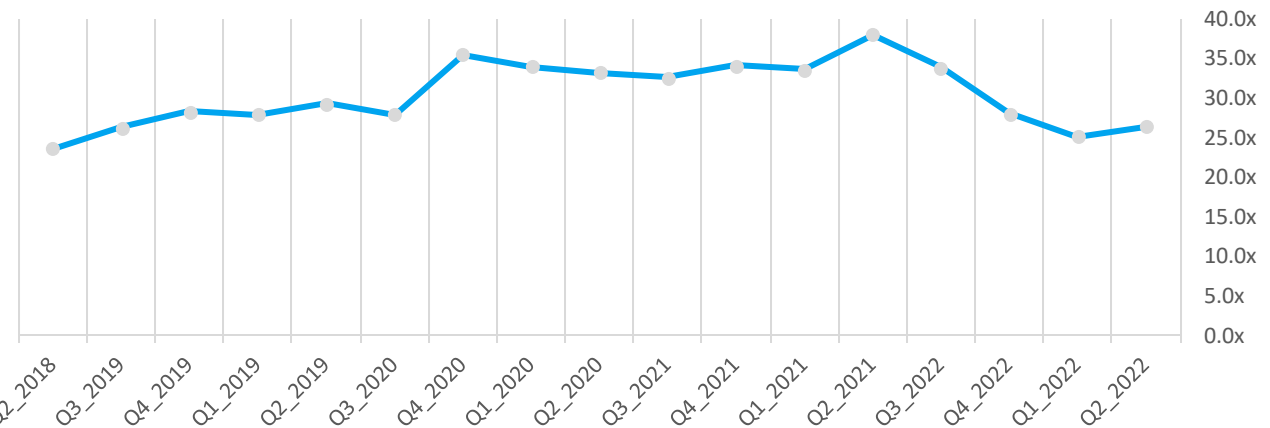
Price



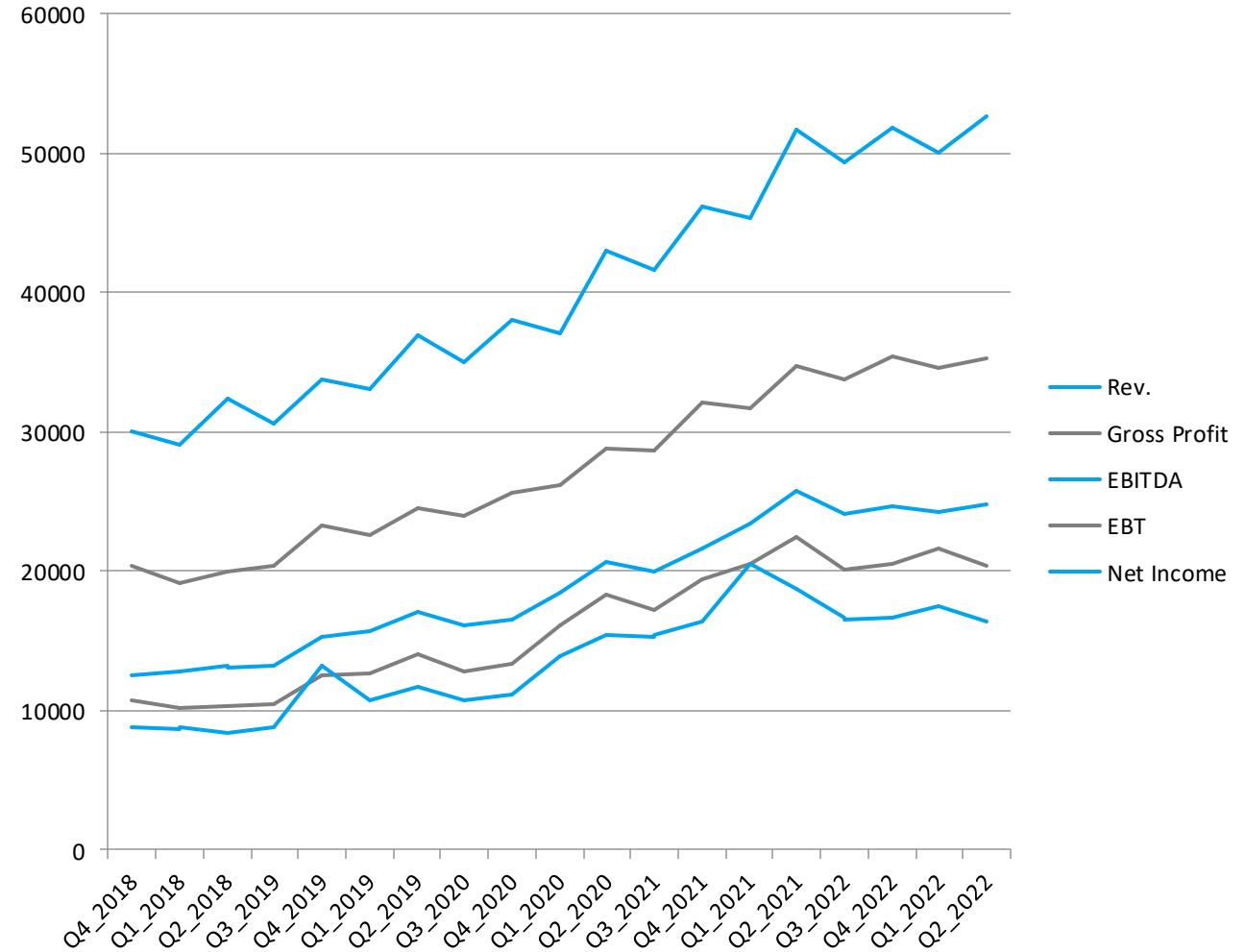
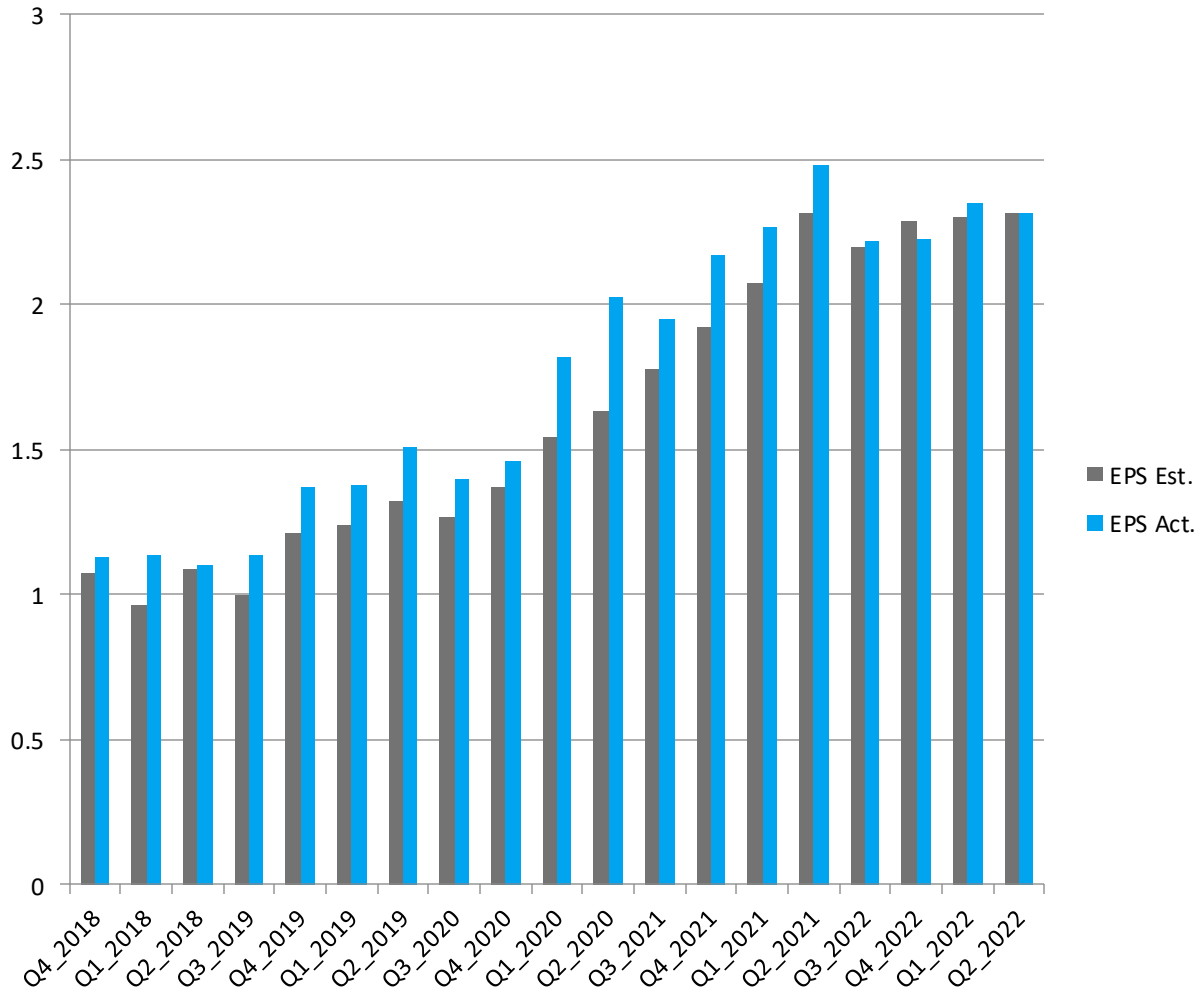
**EPS
(TTM)**



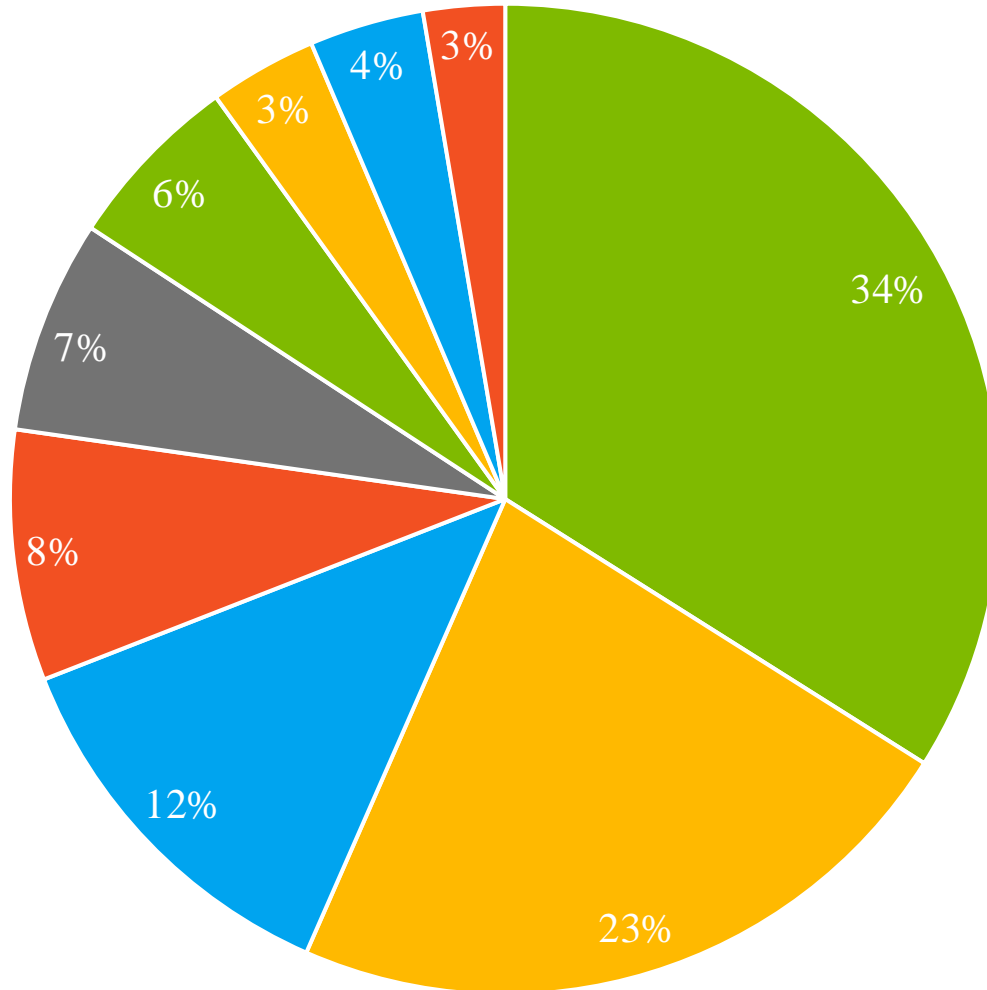
P / E



Operational History



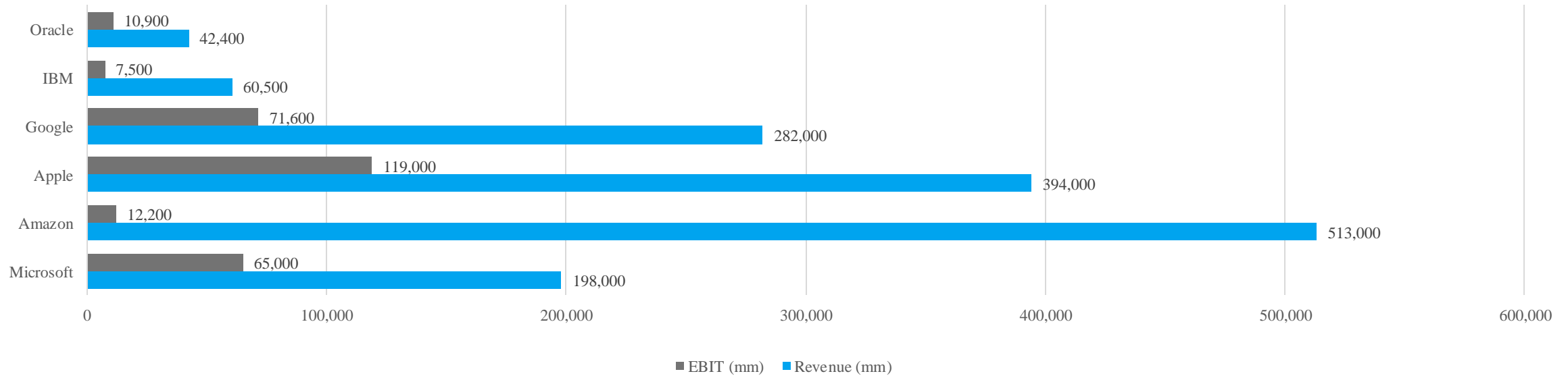
Microsoft Divisional Breakout



- Server products and cloud services
- Office products and cloud services
- Windows
- Gaming
- LinkedIn
- Search advertising
- Devices
- Enterprise Services
- Other

Valuation

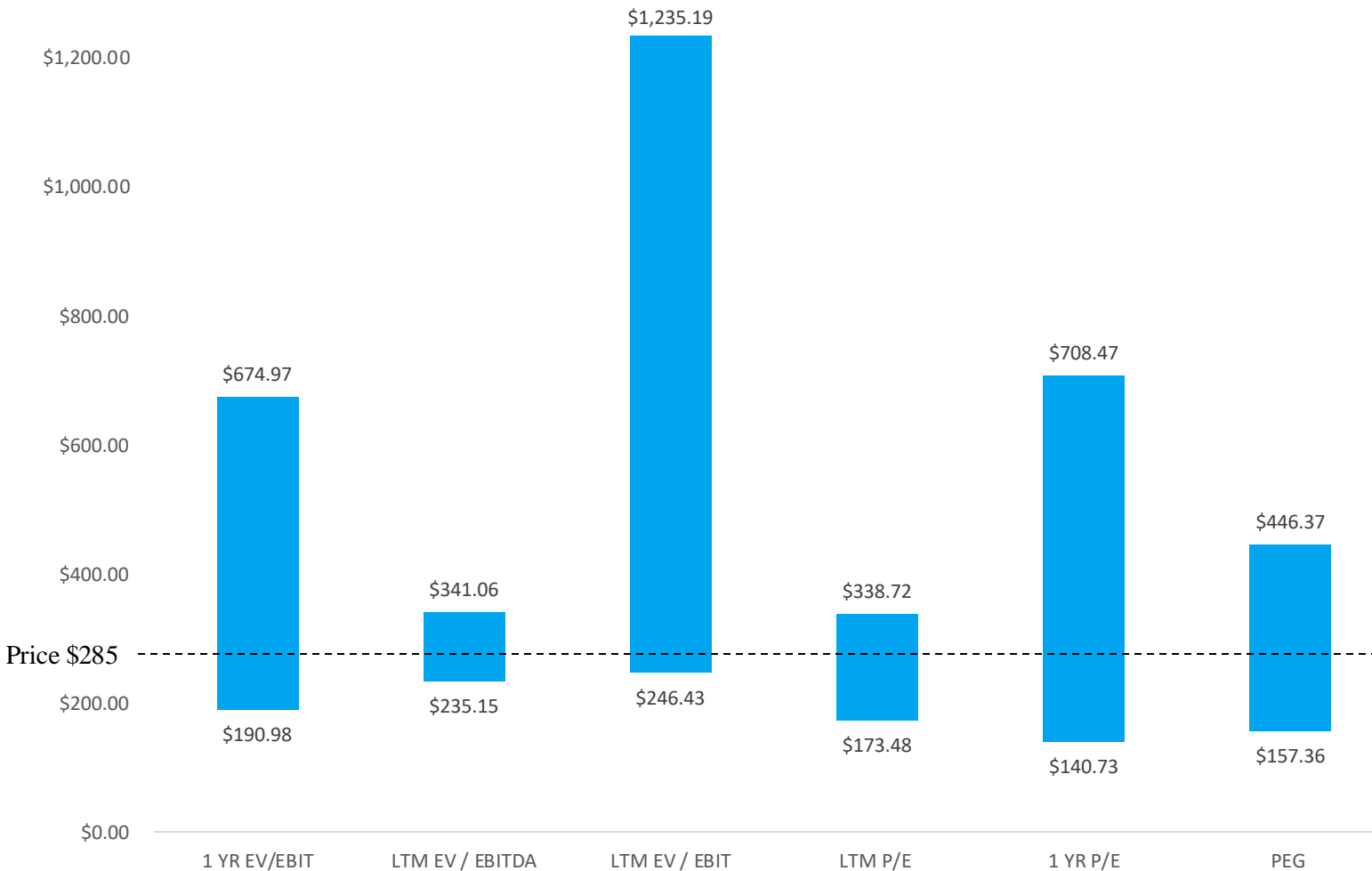
Comparable Companies Breakout



	Cloud Services	Productivity	OS	Gaming	Search	Devices
Microsoft	Azure	Office 365	Windows	Xbox	Bing	✓
Amazon	AWS		Amazon Linux 2 *	Luna		
Apple		iCloud	iOS, macOS	App Store		✓
Google	Google Cloud	Workspace	Android, Chrome OS	Play	Google	✓
IBM	IBM Cloud		AIX, IBM I, Linux Power*			✓
Oracle	Oracle Cloud	UPK				

* Amazon Linux and Linux on Power are used to power AWS and IBM server offerings respectively; however, Linux is a free, open-source platform, and neither OS is sold for profit

Comparative Companies Analysis



Accompanying Notes:

1. Amazon LTM EBIT was negligible, resulting in a heavy upward skew to LTM EBIT multiples that we do not believe is representative of Microsoft's true fundamental value.
2. Similarly, due to their recent unprofitability, Amazon was left out of the P/E and PEG comps.
3. 1 YR multiples are derived by projecting future financial results and holding Enterprise Value / Equity Value constant. Due to projected growth across the board, all future multiples will be lower than their current counterparts.
4. All company's financials have been normalized and calendarized for standardization. These figures represent multiples derived from financials set to fiscal years ending on 12/31/2023 & 12/31/2024 respectively.
5. All per share pricing data is generated using fully diluted shares outstanding, including the effects of options, warrants, convertible debt, and convertible preferred.

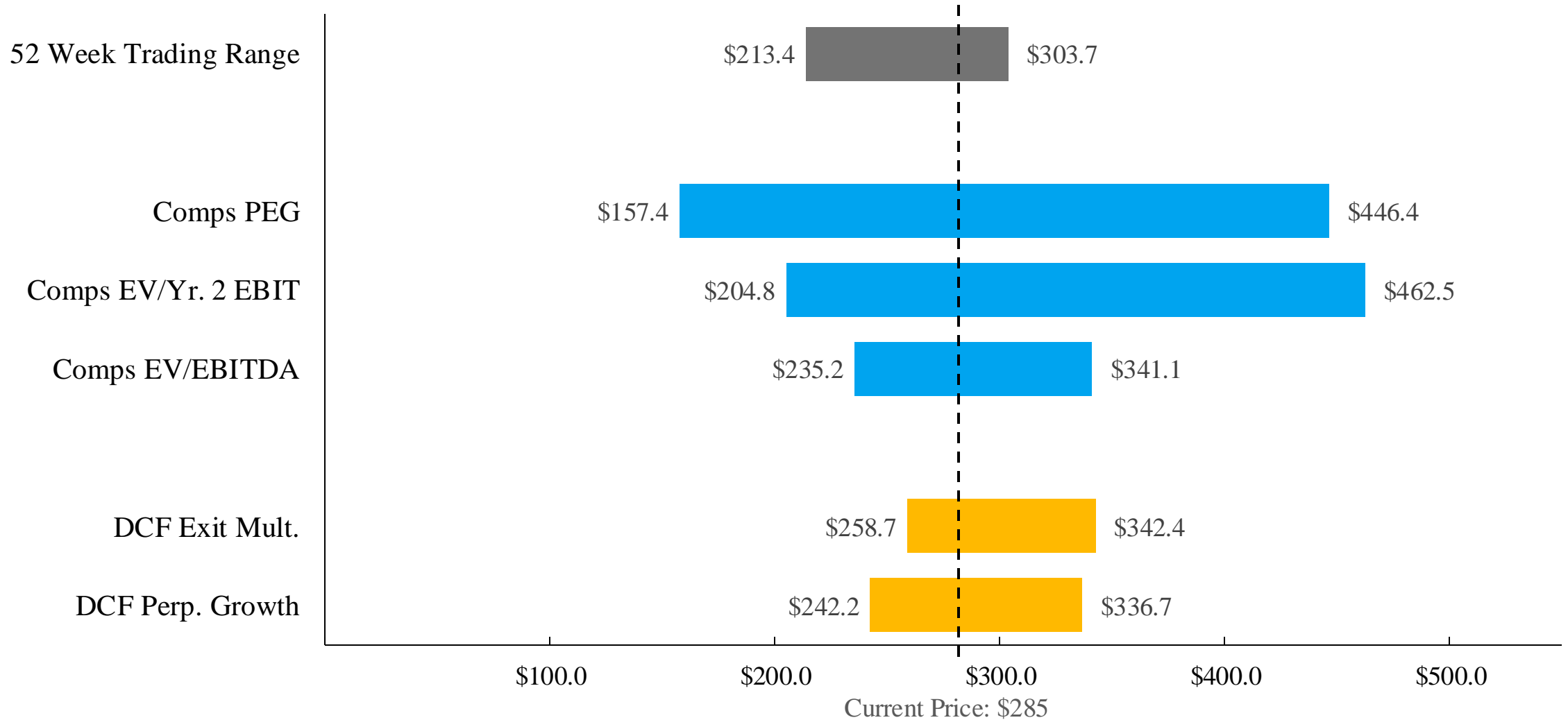
DCF - Revenue Growth Assumptions

<i>Revenue Growth As Of,</i>	2021A	2022A	2023E	2024E	2025E	2026E	2027E	5-Year CAGR
Street base case	17.5%	18.0%	5.4%	11.6%	12.6%	13.2%	6.7%	9.86%
Street best case			6.9%	16.3%	14.3%	14.6%	4.0%	11.12%
Street weak case			4.0%	7.2%	10.5%	12.2%	6.8%	8.09%
Market growth from GDP regression*			9.84%	12.17%	12.66%	11.32%	10.19%	11.23%
Market growth from industry research			13.54%	13.41%	13.18%	12.84%	12.42%	13.08%
Min. prev. 2 - year divisional growth			16.31%	17.10%	17.87%	18.64%	19.38%	17.85%
*P-Values from Divisional Regression for:	Cloud	Office	Gaming	Search				
- X1 (GDP)	0.040	0.030	0.079	0.003				
- X2 (Console Release, COVID)	-	-	0.099	0.024				

Methodology

- Market growth from GDP regression* – Established comprehensive industry groups for each Microsoft subdivision. Regressed total growth against global GDP growth. Used regression equation with forward GDP estimates per IMF to find market growth rates. Applied growth rates to MSFT divisional revenue figures.
- Market growth from industry research* – Compiled industry research on current and forward total market revenue for each industry subdivision. Derived 5-Year forward CAGR by industry. Applied to Microsoft subdivisions, assuming market share stays constant.
- Minimum previous 2-year divisional growth* – Straight-lined Microsoft divisional growth based on the minimum growth rate of the past two years.

Valuation Football Field



The Impact of AI

Office 365 Copilot



Release date in “next several months”



Reduces work time by a significant amount
(55% from GitHub)



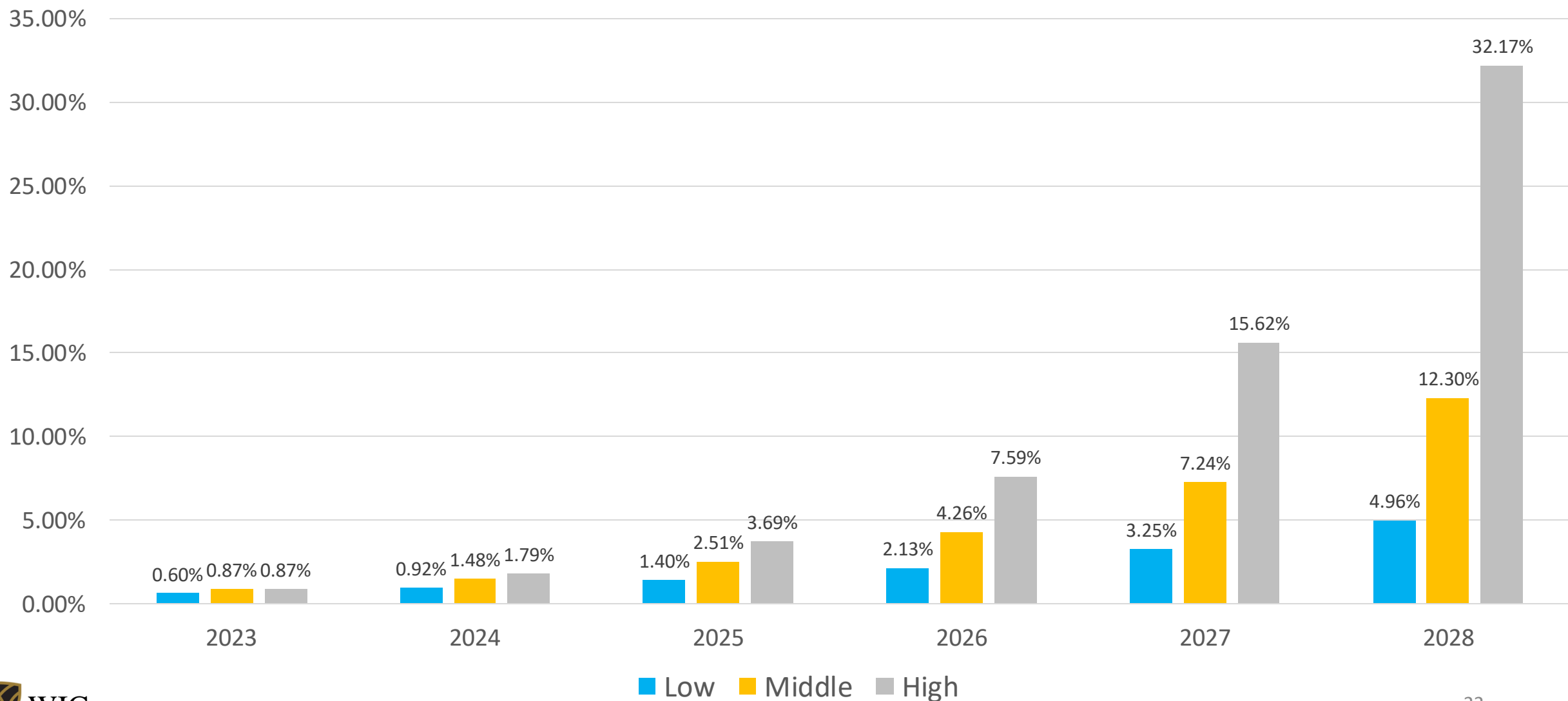
Hard for Google and others to compete as
Office 365 has over 345 million users



Soft launched right now with rave reviews



Potential Divisional Revenue Growth From Copilot

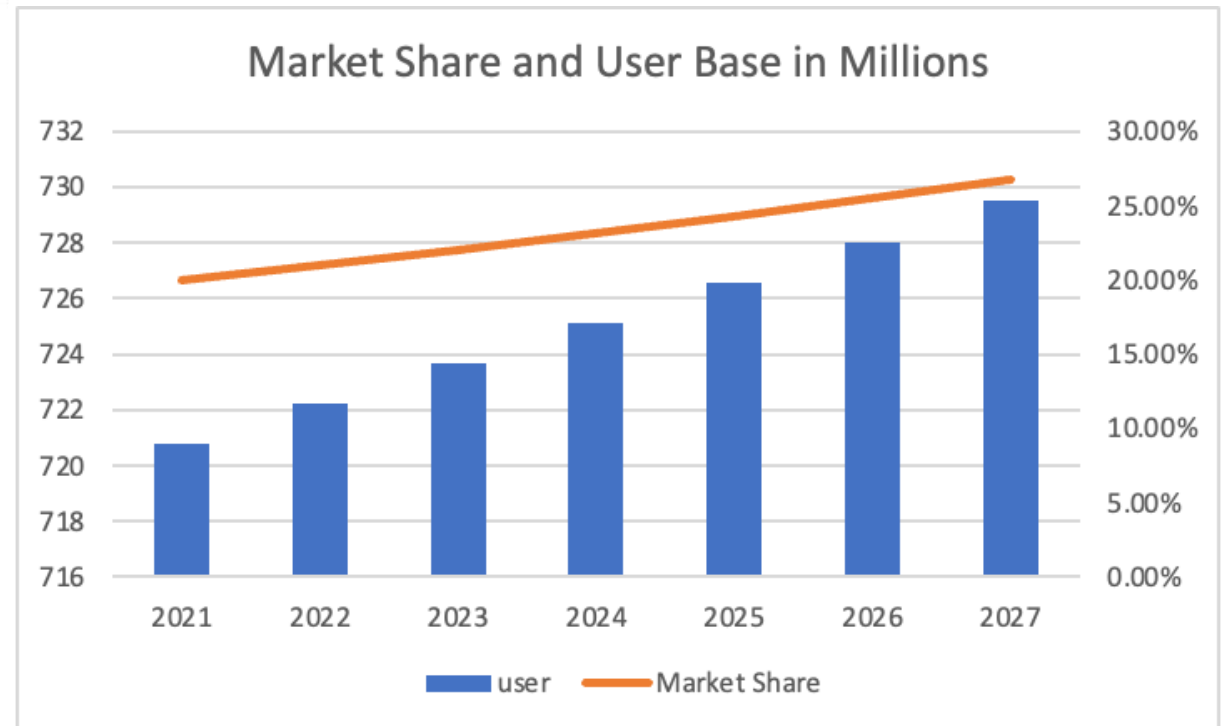
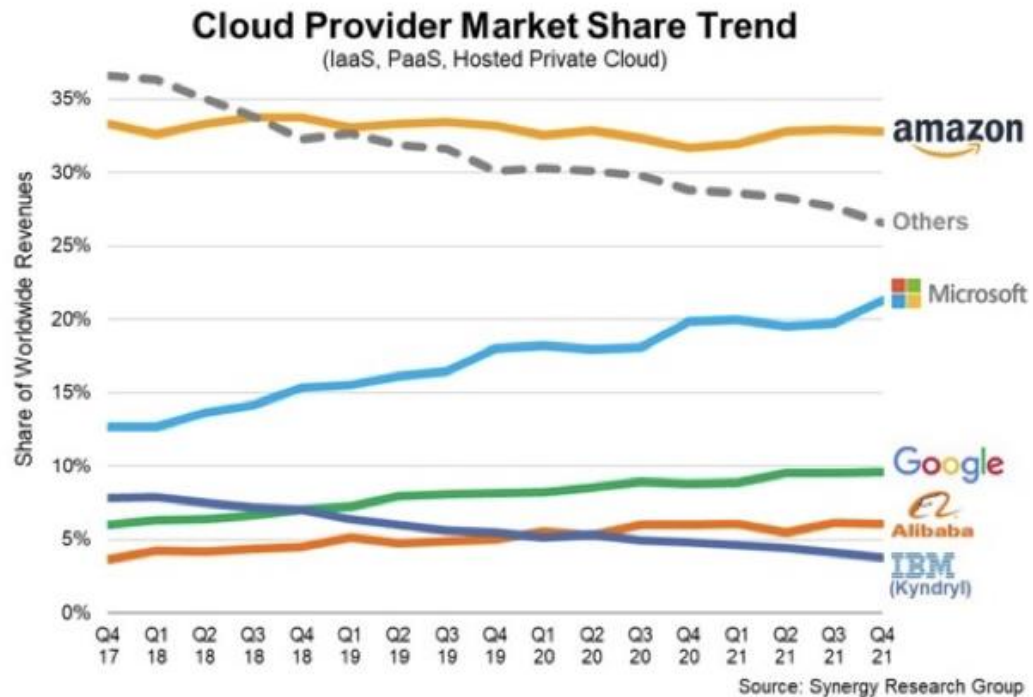


Qualitative Context – AI Cloud Platform Race

	Azure	AWS
Market Share	21%	34%
Core Differentiation	<ul style="list-style-type: none"> Integration with OpenAI and functionality across the broader Microsoft software suite Microsoft invested \$10B into OpenAI, have its own AI technology More than 95% of Fortune 500 companies use Azure Dominant in niche industries like Healthcare. Microsoft acquired Nuance and its total addressable market in cloud for healthcare had doubled to \$500B. Nuance were used in 77% of US hospitals 	<ul style="list-style-type: none"> Amazon has developed AWS since 2006 and built long-term customer relationships AWS delivered over 3,300 new features and services in 2022 Recently announced Amazon Bedrock: a new service for building, scaling generative AI applications, and accessing language models, like Amazon's Titan models
Key Catalyst: Processor Chip Capacities	<ul style="list-style-type: none"> Developing in-house AI chip 	<ul style="list-style-type: none"> Trainium: between 40 percent and 250 percent higher performance in BF16 and 32-bit TensorFlow workloads than its Nvidia A100-powered P4d instances (Microsoft is also currently using this one)
Challenge: Multicloud	<ul style="list-style-type: none"> Designed Azure Arc to support multicloud networks and Microsoft Sentinel to support cloud security system across different clouds 	<ul style="list-style-type: none"> AWS was slow on adopting multicloud concepts.
Stage of Development	<ul style="list-style-type: none"> Microsoft has brand recognition in the AI space and existing AI infrastructure within Microsoft Azure Spans 140 available zones 	<ul style="list-style-type: none"> In the latest shareholder letter, the CEO claims that AWS is at its early stage of developing Amazon was unprofitable last year, and may have difficulty finding necessary resources to develop a full-scale AI platform Spans 99 available zones

Quantifying Market Share Effects

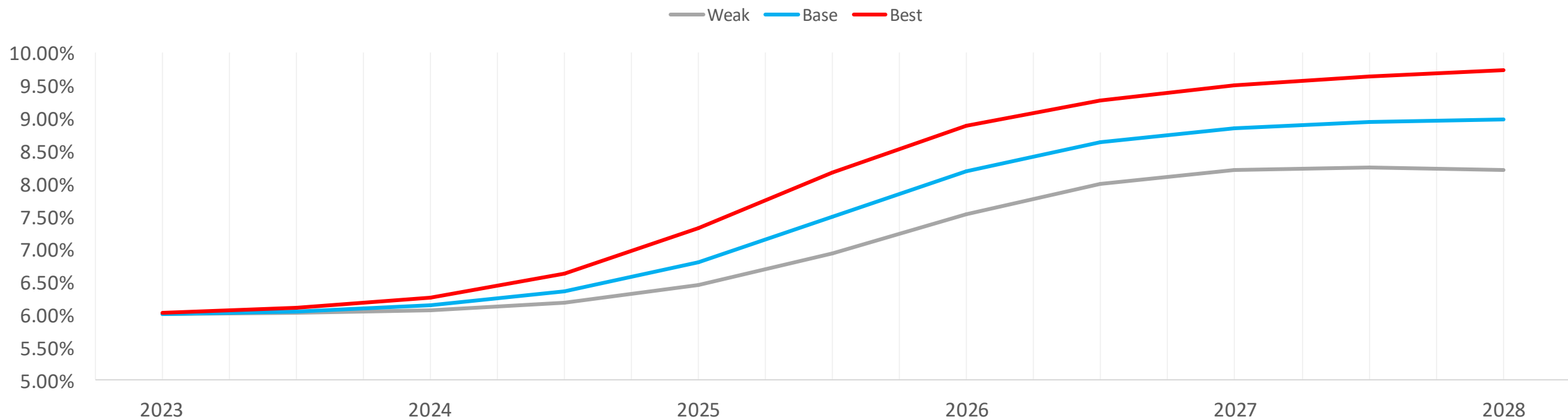
Assumption	Realistic Case Growth Rate
Market share growth rate	5.00%
User growth (4% of market growth)	0.20%



The Search AI Arms Race

	Bing	Google
2022 Annual Revenue Share	6%	85%
Core Differentiation	<ul style="list-style-type: none">Better Search Engine Optimization tools, as well as ability to port Google SEO data to Microsoft platform.Bing points system for users.Integration with Office 365 productivity suite.Native search engine of Edge browser, default browser for all Windows devices.	<ul style="list-style-type: none">Google has historically had a larger suite of apps such as translate and finance, this gap has been bridged.Google's largest differentiator is size, the Google web crawler provides access to 100s of billions of websites vs approx. 20 billion.Google's long tenure as the largest search engine creates stickiness from both advertising clients and users (brand equity).
AI Development Strategy	<ul style="list-style-type: none">AI development subdivided across divisions to focus on specific products.Acquire developed technology e.g OpenAI.	<ul style="list-style-type: none">Dedicated "Google AI" division since 2017.Smaller, early-stage AI acquisitions e.g DeepMind (2014).Historically high focus on AI ethics has caused inefficiencies.
Model	<ul style="list-style-type: none">Runs on highly successful and publicized GPT model with Prometheus model overlay to allow access to all Bing accessible web information.	<ul style="list-style-type: none">Runs on LaMDA model, reported plans to update model.
Stage of Development	<ul style="list-style-type: none">Universally accessible.Integrated into Bing Search Engine.	<ul style="list-style-type: none">Still being soft-launched to limited testers, waitlist to access.Reportedly producing inaccurate results at this stage.
Monetization Scheme	<ul style="list-style-type: none">Plans to monetize through advertisementMassive upside in terms of capturing market share from Google within core business	<ul style="list-style-type: none">Necessarily must integrate advertisement into platform in order to recoup investment.Limited capturable market share.

Quantifying Market Share Effects



Phase 1

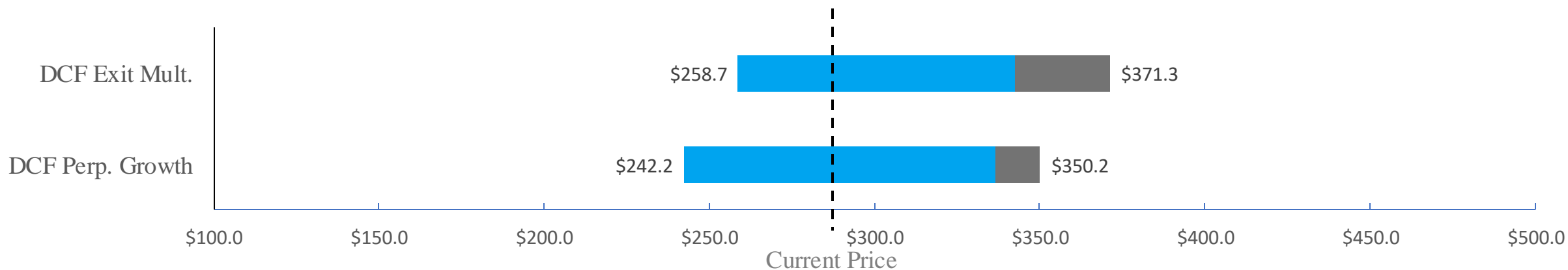
Initial consumer stickiness in the early period makes growth exponential. Thus, we see slow market share capture early, with growth accelerating in the mid-term. Our growth range of circa 4% is based on precedent fluctuations of market share in search, as well as the edging out of smaller search companies like Yahoo, DuckDuckGo, who cannot compete in the expensive AI market and control single digit market share.

Phase 2

In the long term, Microsoft loses its advantage from early adoption, and competition slows the exponential growth trend. Ultimately, depending on consumer preference, Bing either continues to grow at a slowed rate in the newly competitive environment or begins to lose share.

Artificial Intelligence DCF Output

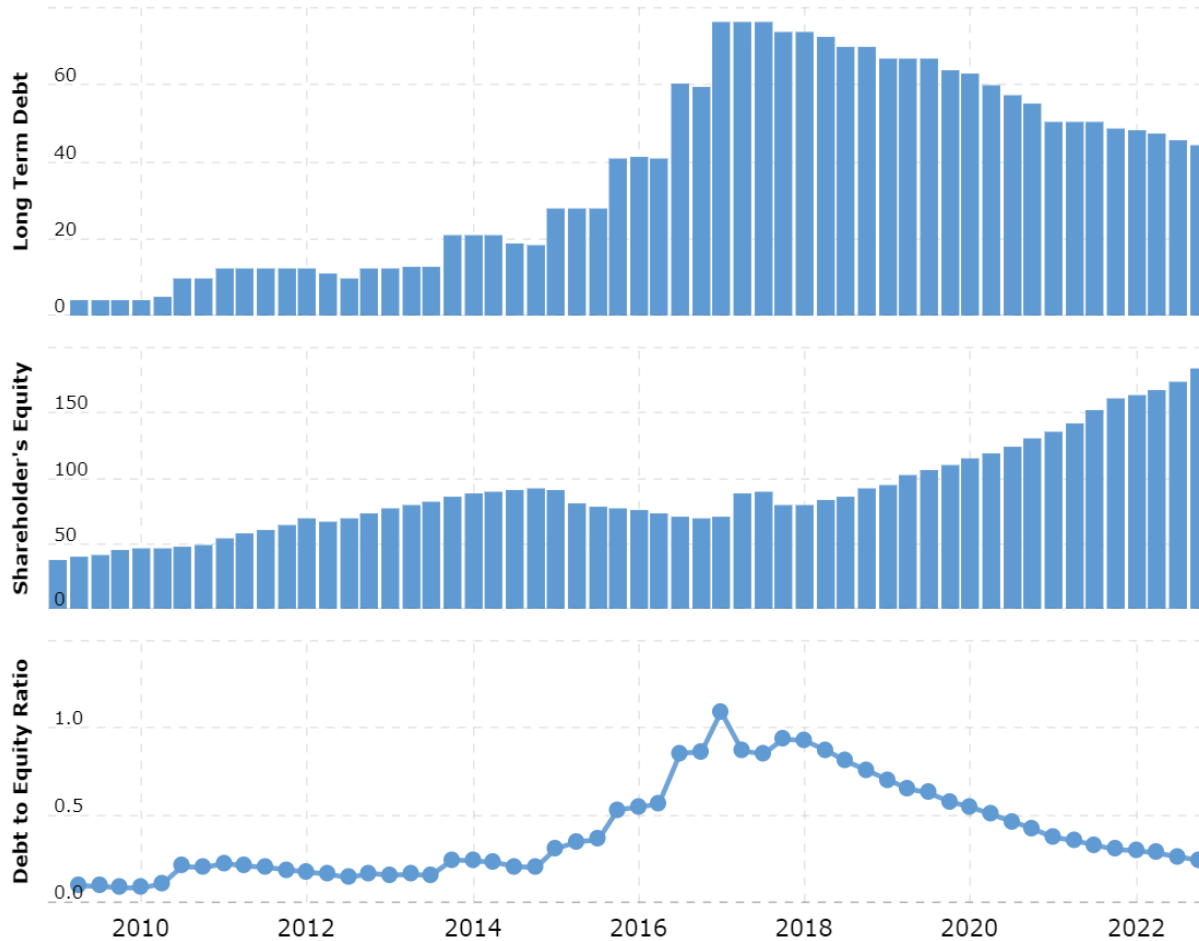
	2021A	2022A	2023E	2024E	2025E	2026E	2027E	CAGR
Server products and cloud services	41,379	52,589	67,321	60,067	72,459	86,736	103,068	
		27.09%	28.01%	14.22%	20.63%	19.70%	18.83%	18.16%
Office products and cloud services	35,316	39,872	44,862	51,302	58,988	68,052	79,267	
		12.90%	12.52%	28.67%	14.98%	15.37%	16.48%	18.16%
Search and news advertising	8,524	9,267	11,591	10,298	11,655	13,459	17,946	
		8.72%	25.08%	11.13%	13.18%	15.48%	33.34%	16.58%
Old Gross Profit Margin	68.9%	68.4%	68.35%	68.47%	68.62%	69.45%	69.65%	
New Gross Profit Margin	68.9%	68.4%	68.74%	68.88%	69.07%	69.86%	70.08%	



Risk Analysis

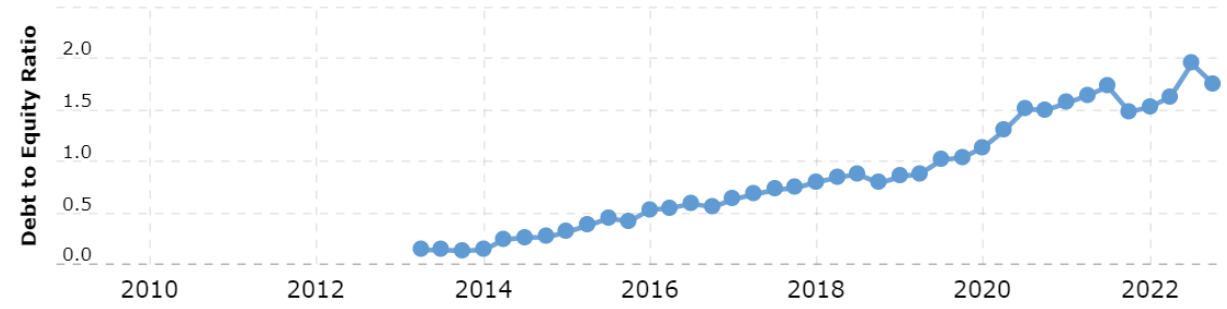
Risk Analysis: Leverage Ratio Comparison

Microsoft's D/E
2010-2022



Cash flow leverage ratios look at whether a company is generating enough cash to pay off its debt. To the left Microsoft is shown to have a substantial Debt to Equity Ratio below 1.0 putting it in a good place compared to Apple's much higher and riskier D/E Ratio primarily above 1.0:

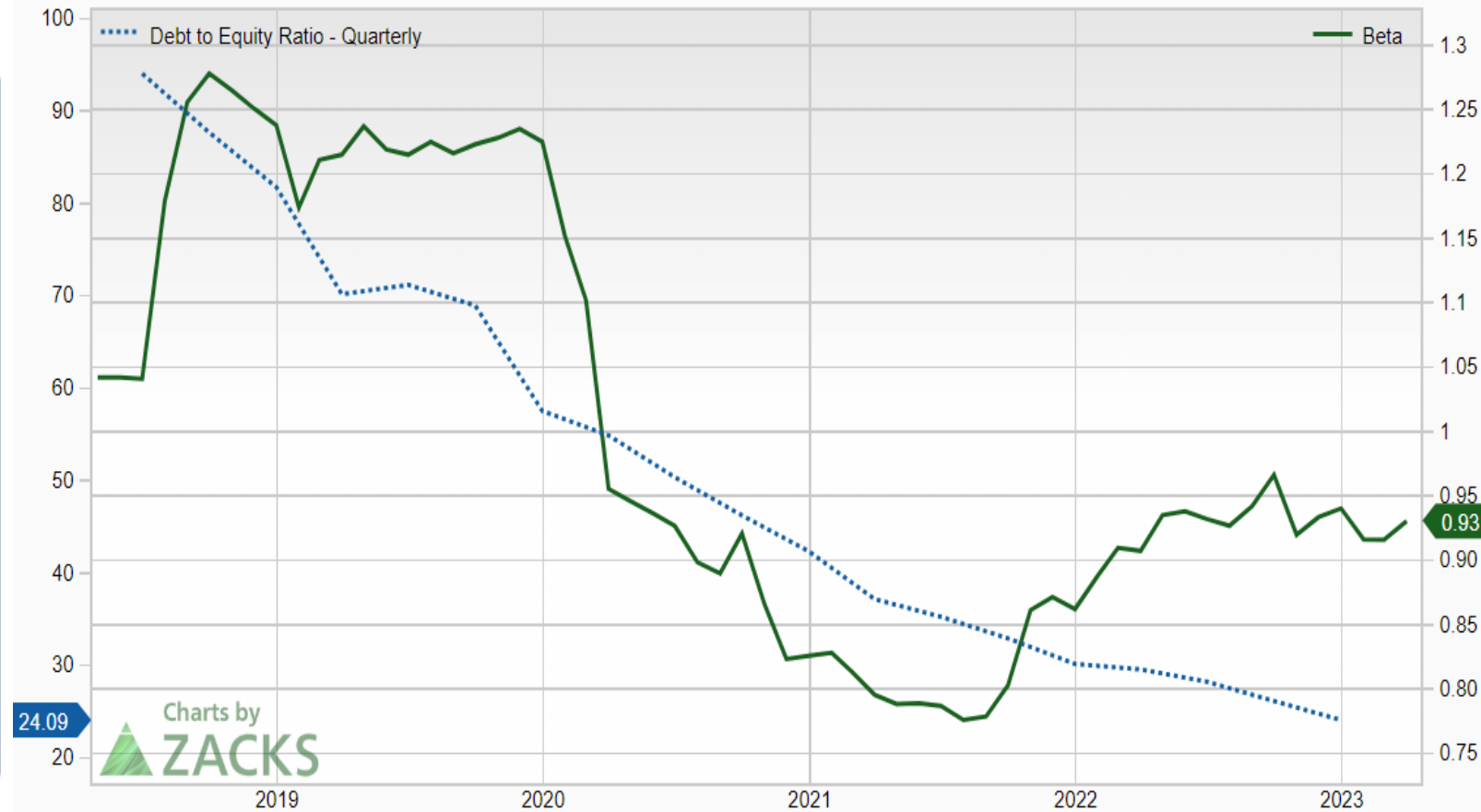
Apples D/E
2010-2022



Risk Analysis: Systematic Risk

- Beta is a metric that represents exposure to market risk. In other words, it indicates how sensitive a company is to movements in the market.
- Microsoft's beta has been below 1.3 since 2019 and has steadily continued to fall
- To the left Microsoft's D/E Ratio is charted next to their beta of 1.3
- The average beta in the tech industry is 1.427 compared to Microsoft's 1.3 average

Microsoft's Beta and Debt to Equity Ratio



Risk Analysis: Comparable Betas, Cash Allocations and IR Risks

Comparable Companies	Ticker	Levered Beta
Salesforce, Inc.	NYSE:CRM	1.563
Oracle Corporation	NYSE:ORCL	1.062
Alphabet Inc.	NasdaqGS:GOOGL	1.221
VMware, Inc.	NYSE:VMW	0.899
ServiceNow, Inc.	NYSE:NOW	1.687
Amazon.com, Inc.	NasdaqGS:AMZN	1.454
Snowflake Inc.	NYSE:SNOW	1.696
Workday, Inc.	NasdaqGS:WDAY	1.377
Adobe Inc.	NasdaqGS:ADBE	1.669
Splunk Inc.	NasdaqGS:SPLK	1.641
Average Beta		1.427

Gross Debt:
48,116 Bn

Cash & ST Investments:
99,495 Bn

- Microsoft's shareholders could walk away with nothing if the company can't fulfill its legal obligations to repay debt. However, a more frequent occurrence is when companies like Microsoft sell additional shares at bargain prices, diluting existing shareholders. Debt, in this case, can be an excellent and much better tool for Microsoft to invest in growth at high rates of return. When we think about Microsoft's use of debt, we should always consider it together with cash and equity.
- Microsoft bond ratings play a critical role in determining how much Microsoft have to pay to access credit markets, i.e., the amount of interest on their issued debt. The threshold between investment-grade and speculative-grade ratings has important market implications for Microsoft's borrowing costs. Microsoft's Fitch ratings were upgraded to AAA in 2021.

Microsoft (NAS:MSFT) Altman Z-Score : 8.99 (As of Today)

Risk Analysis: Litigation and Ethical Debate of AI

- Microsoft, GitHub, and OpenAI are being sued for allegedly violating copyright law by reproducing open-source code using AI. But the suit could have a huge impact on the wider world of artificial intelligence.
- Additionally, Microsoft recently laid off team that taught employees how to make AI tools responsibly
- This could lead to legal problems if it is considered that AI is infringing on labor rights
- Any negative sentiment on AI could be a risk to Microsoft's brand equity

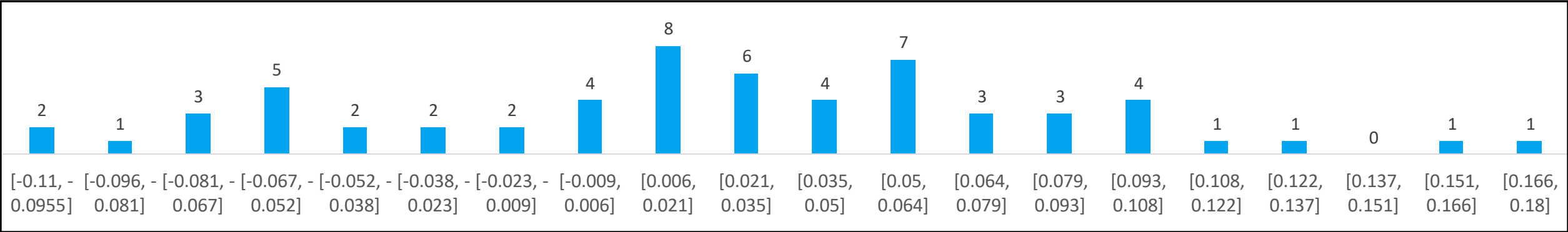


“This is the first class-action case in the US challenging the training and output of AI systems. It will not be the last.”

- Worldwide business spending on AI is expected to hit \$50 billion this year and \$110 billion annually by 2024
- This poses threats for the advancement of AI and potential abuse
- The three major concerns regarding AI include:
 - Privacy and surveillance, bias and discrimination

Empirical Analysis

	MSFT	AAPL	AMZN	GOOG	IBM
E(R _M)	1.94%	2.31%	0.59%	1.18%	-0.26%
Annualized	25.86%	31.49%	7.38%	15.05%	-3.10%
Div. Adj. R _M	2.03%	2.41%	0.59%	1.18%	0.11%
Div. Adj. R _A	27.33%	33.02%	7.38%	15.05%	1.29%
Standard Deviation	6.37%	9.39%	9.94%	7.72%	7.67%
Semi-deviation	4.56%	6.87%	6.77%	5.66%	5.41%
Sharpe ratio (10 yr)	1.02	0.86	0.11	0.43	-0.25
C.I Monthly	[0.3%, 3.5%]	[-0.1%, 4.7%]	[-1.9%, 3.1%]	[-0.8%, 3.1%]	[-2.2%, 1.7%]
C.I Annualized	[4%, 51.9%]	[-0.8%, 73.2%]	[-20.8%, 44.4%]	[-9%, 44.7%]	[-23.4%, 22.1%]



Closing Remarks