DERIVATIVES AND RISK MANAGEMENT

Report Analysis on U.S stock market simulator

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1. **Application of theory, practical themes, and technical grasp**

Trading Philosophy

Our portfolio targets to maximize the profits while maintaining the least risk level associated amplifying the blended preference: *GARP* – a combination of value and growth investing preference. Regarding stock selection, *top-down analysis* is preferred to identify market concentration commencing with the US macroeconomic snapshots. Coming to the growth/value stocks, due to short-term trading timeframe of 12 days, our trading schemes would clarify upon 70% of technical analysis (TA) and 30% of fundamental analysis (FA) (30%).

(a) TA: practicing SMA with the combination the crossover of 20-period MA and 50-period MA to signal for buying/selling motives; however, pre-examining stock price movement reaction to MA cross is important to decide whether to apply MA cross indicator; or combine it with Bollinger Bands to check the volatility and market reaction (overbought/underbought).

(b) FA: assessing the firms earning capability and debt structure via net margin, D/E; while compiling comparable company analysis metrics of the firms relative to industry benchmark to further classify growth/value stock:

Comparable metrics	Industry Benchmark	Classification
P/E	Higher	Growth
EV/EBITDA	Higher	
P/E	Lower	Value
EV/EBITDA	Lower	

Table 1. **Valuation metric criteria to identify growth/value stocks.**

We also practice derivatives instruments: *Futures* contracts on the initial portfolio to hedge risks associated with potential losses; and purchase *Options* contracts to minimize losses for the most volatile ticker.

Portfolio construction

The 2024 U.S sentiment gains resilient momentum via the stable rising GDP, wages, employment, cooler-down inflation, steady increasing 10-year bond yields.

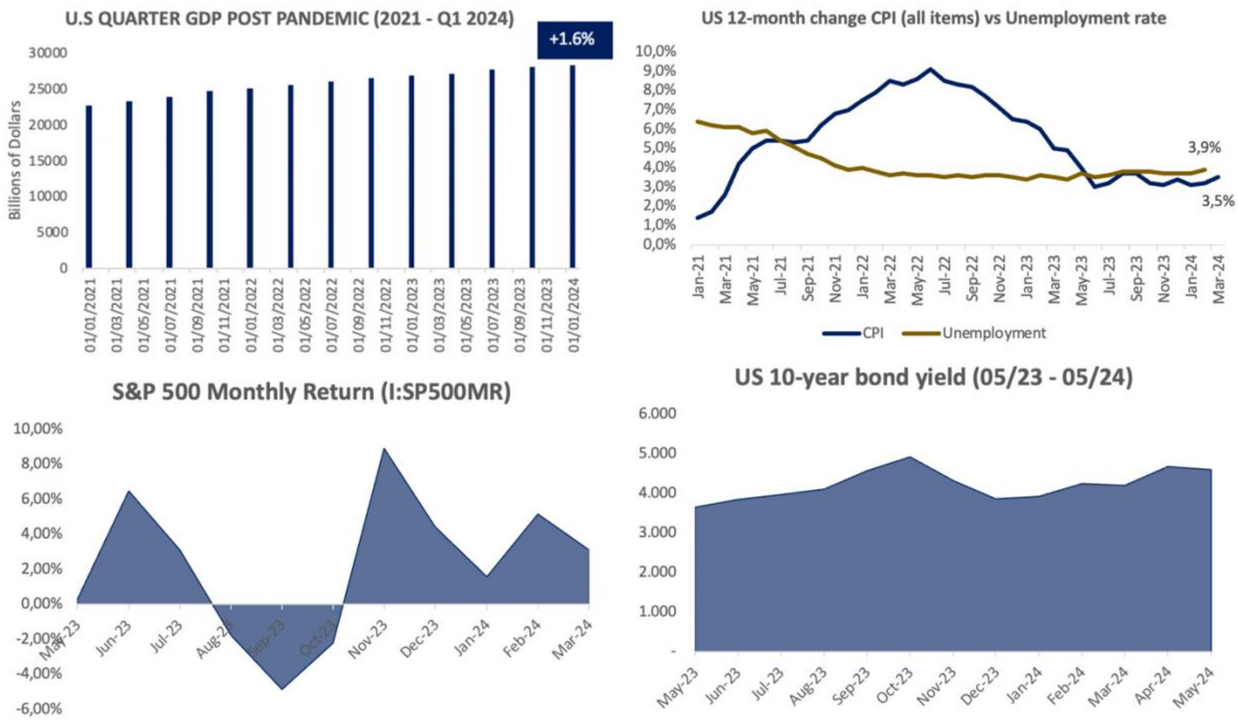

Figure 1. **Macroeconomics snapshot of the US over the past few post-pandemic years**

Source: FRED 2024; BLS 2024; BEA 2024; Investing.com 2024

Fed sustained their conservative position and reserves by not decreasing the interest rates, updated at the latest public declaration – 2nd May (Mercado 2024). However, this has already facilitated a better investment landscape compared to 2022 and 2023 where the rates hiked up to 9,1% to curb inflationary pressure (OECD 2022).

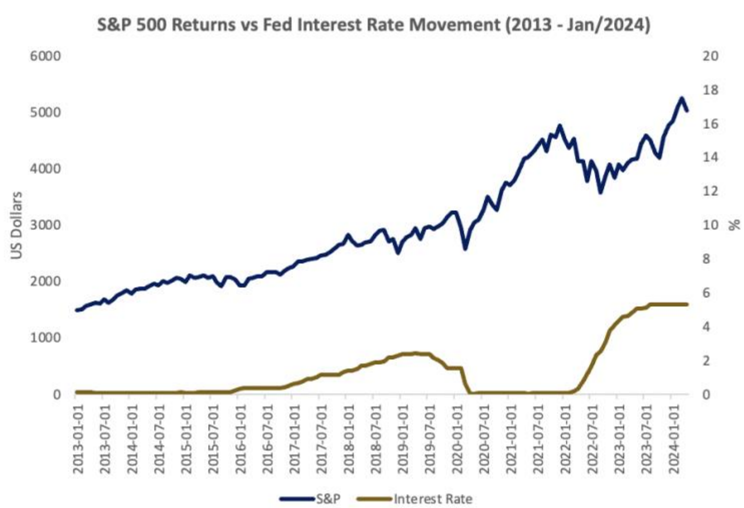

Figure 2. **S&P500 Returns vs Fed Interest Rate.**

Source: Macrotrends 2024

Hence, U.S since 2023 has been leaning on AI-based products and high-technology innovation. Of which, Blackrock (2024) claim that firms securing high-quality earnings with AI integration are notably functioning within ***tech*** and ***telecommunication*** sectors.

- *Initial portfolio construction*

With $1m-portfolio net worth, we put initial portfolio and active portfolio under respective weight – 70% versus 30%; the latter is fixed with 5 stocks while the former would actively trade intraday to maximize gains and focuses majorly on most-active stocks of S&P/Nasdaq and favorable TA. This split is decided upon risk appetite and limited portfolio duration nature, thus focus more on growth investing to realize short-term gain.

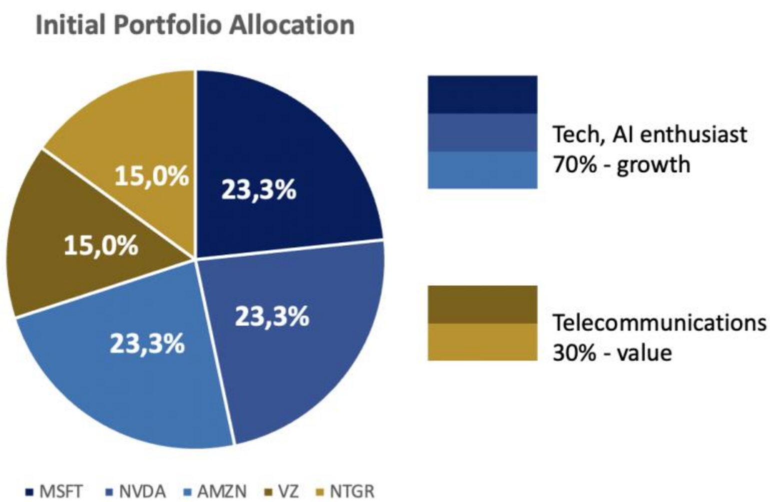

Figure 3. **Initial Portolio Allocation with detailed weights**

Together with prospects of tech and telecommunications markets, we select 5 stocks: 3 tech, AI-driven firms, 1 large-cap and 1 most-active in terms of trading volume telecommunication firms: MSFT (23,3%), NVDA (23,3%), AMZN (23,3%), VZ (15%), NTGR (15%).

Microsoft Corp. (MSFT: NASDAQ)

MSFT is top-tier tech firm with largest market capitalization in 2023 – US$3,142bil functioning majorly in personal computing (26%), intelligent cloud (41%), and productivity and business processes (33%) (Statista 2024). Firm dominates the domestic software and programming market with largest revenue generated for 6 consecutive years. MSFT's consensus earnings also capture quarter upward momentum (Yahoo Finance 2024).

MSFT	2020	2021	2022	2023	Q1-24	Industry average
Net Margin	31,0%	36,5%	36,7%	34,1%	35,5%	14,1%
D/E	154,7%	135,1%	119,1%	99,8%	91,3%	145,1%
Valuation						
P/E	38,04					50,2
EV/EBITDA	29,49					28,43

Table 2. **MSFT Fundamental Snapshot[1].**

[1] Industry average is calculated upon the net margin of top 10 *Software* firms regarding market capitalization.

Source: Self-calculation, MarketWatch 2024; Statista 2024; Yahoo Finance 2024.

FA illustrates the earning ability of the firm compared to Software industry. Overwhelming industry P/E could be explained via the over-optimistic of the US market upon tech and Ai-enthusiasm firm. Firms align with AI hype have seen big-earning weeks and MSFT as one of the industry leaders has led the trend, hence, despite the lower P/E, MSFT is still a growth stock (Field 2024). Besides, MSFT cloud infrastructure captures higher growth and better market share, coupled with increasing Microsoft Copilot and Office 365 license revenue.

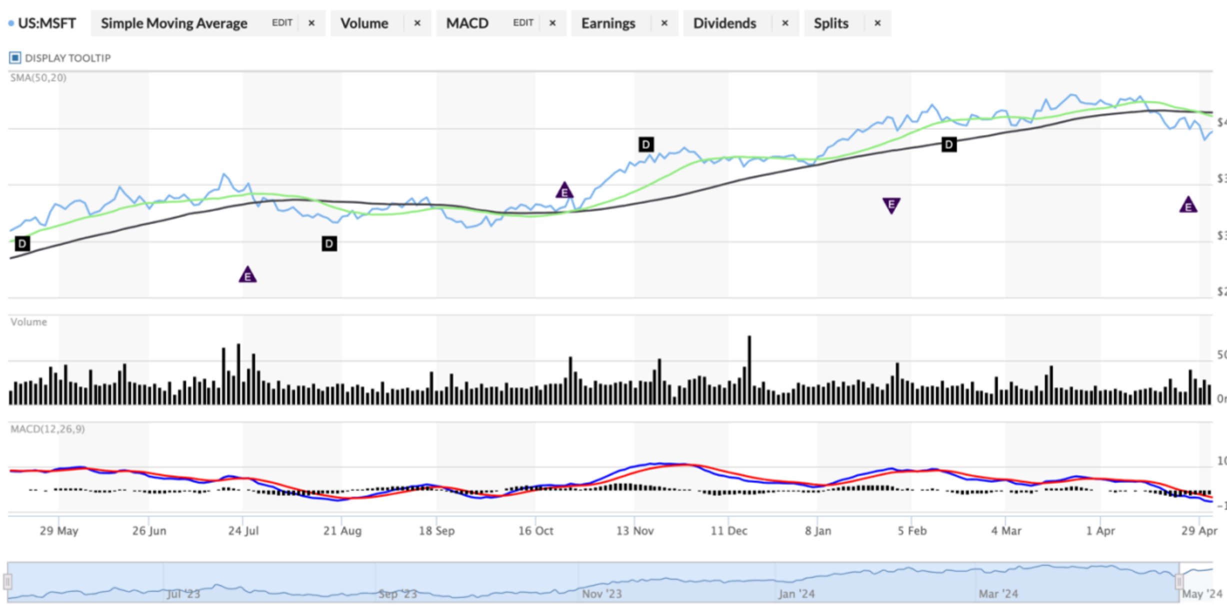

Figure 4. **MSFT 1Y Chart.**

Source: MarketWatch 2024

MSFT price movement has a high tendency to follow the SMA cross where the trend is relatively clear when MA20 cuts MA50. Looking into 10D chart, we look for cross down to utilize the cheaper price as we maintain the optimistic and buy position for MSFT with 2 primary motives: (1) tech giants are dominating market in terms of profitability and favorable market sentiment; (2) MSFT trailing EPS is leading upward momentum and difference between estimated and actual EPS pictures firm positive earning ability (Portfolioslab 2024).

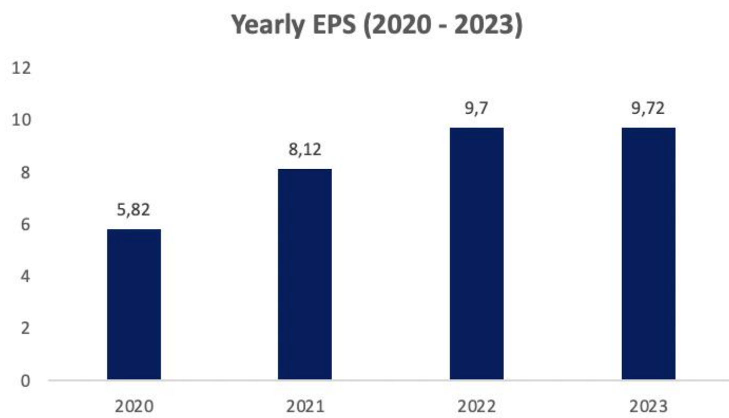

Figure 5. **MSFT Annual EPS.**

Source: MarketWatch 2024

NIVIDIA Corp. (NVDA: NASDAQ)

US stock market investors are most optimistic on Semiconductors industry according to the exceeding P/E (58,2x) (Simply Wall St 2024). AI chip market is predicted to surge from US$23bil to US$341bil (2023-2033) (Statista 2024). Hence, we select NVDA, the Semiconductors giant contributing 53,36% to the industry revenue operating majorly in: Graphics (22%) and Compute & Networking (78%) (ibid.). NVDA has increased revenue approx. 265% since post pandemic and +125,9% QoQ in Q1/2024.

NVDA	2020	2021	2022	2023	Q1-24	Industry average
Net Margin	25,6%	26,0%	36,2%	16,2%	48,9%	14,6%
D/E	41,9%	70,5%	66,1%	86,3%	52,9%	36,0%
Valuation						
P/E	75,77					58,2
EV/EBITDA	65,12					31,59

Table 3. **NVDA Fundamental Snapshot[2].**

Source: CSI Market 2024; MarketWatch 2024; Yahoo Finance 2024

Valuation metrics perspicuously display the growth investing and favorable market sentiment of Semiconductors market. NVDA has improved their profitability and protected the margin due to soaring demand for such high-quality and complex chips (Poletti 2024). Their debt structure is relatively high compared peer average, but the ratio has declined by -38,7% QoQ in Q1/2024.

[2] Industry average is calculated upon the net margin of top 10 *Semiconductors* firms regarding market capitalization.

Figure 6. **NVDA 1Y Chart.**

Source: MarketWatch 2024

TA shows the increasing EPS coupled with upward price momentum (+586.30% QoQ in Q1/2024). MACD also crosses up the MACD signal indicating buy position.

We select NVDA for (1) firm's market dominance together with tremendous market potentials and hypes in AI race; (2) favorable market sentiment via bullish momentum.

Amazon.com Inc. (AMZN: NASDAQ)

AMZN is a multinational technology firm leading over 90% of the US internet retailing market (ibid.). Firm has been practicing AI to boost efficiency and product upgrade such as conversational Alexa, AI in product listings for sellers, etc. (Amazon 2023).

AMZN	2020	2021	2022	2023	Q1-24	Industry average
Net Margin	5,5%	7,1%	-0,5%	5,3%	7,3%	3,3%
D/E	243,9%	204,2%	216,8%	161,5%	145,1%	46,0%
Valuation						
P/E			64,83			32,7
EV/EBITDA			23,45			16,63

Table 4. **AMZN Fundamental Snapshots[3].**

Source: Yahoo Finance 2024; MarketWatch 2024

AMZN excels its profitability compared to average industry and the rocketing P/E to see investors' expectations on AMZN. Its debt structure is overwhelming compared to peers; hence this could be realized as unsystematic risk when investing in this firm. However, this leveraged structure is compatible with such tech giant with the exposure to AI and continuous product innovations.

[3] The industry average is calculated upon the net margin of top 10 *Internet Retailing* firms regarding market capitalization.

Figure 7. **AMZN 1Y Chart.**

Source: MarketWatch 2024

Adding Bollinger Bands, we can observe the price volatility is within the bands coupled with the MACD is about to cross up the MACD signals motivating buy position.

AMZN selection satisfies (1) tech giant in retailing sub-sector with a strong profitability compared to peers, (2) upward price momentum from TA favored by first quarter positive market sentiment and quarter-constantly increasing EPS (ibid.)

VZ Communications Inc. (VZ: NYSE)

VZ is the second largest listed telecommunication stock regarding market capitalization. The telecommunications industry also navigates their concentration on pursuing cutting-edge technologies such as AI or RPA[4] (FTI 2024).

VZ	2020	2021	2022	2023	Q1-24	Industry average
Net Margin	13,9%	16,5%	15,5%	8,7%	14,0%	6,6%
D/E	356,9%	340,6%	310,6%	305,4%	297,1%	144,7%
Valuation						
P/E	14,33					26,2
EV/EBITDA	7,27					9,01

Table 5. **VZ Fundamental Snapshots[5].**

Source: MarketWatch 2024; Yahoo Finance 2024

[4] Robotic Process Automation

[5] The industry average is calculated upon the net margin of top 10 *Telecom Services* firms regarding market capitalization.

As a top-tier telecommunications firm, VZ earns double-folded compared to peers with a solid financial position ranked on latest SEC fillings (Macroaxis 2024). Opting for VZ, we navigate more strongly towards it fundamental. Its undervalued P/E and EV/EBITDA indicate investing prospects in VZ (Hayes 2023).

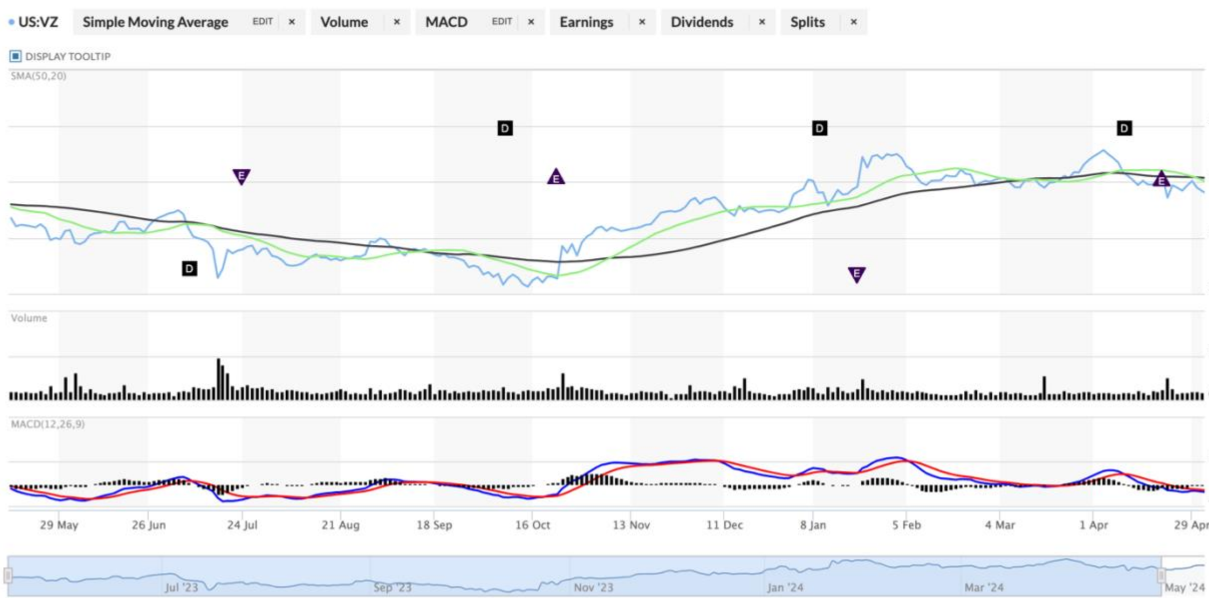

Figure 8. **VZ 1Y Chart.**

Source: MarketWatch 2024

Price movement reacts correspondingly to the SMA cross, hence would be used as the indicator to capture the better prices as the MACD at the buying position signaled a cross up.

NETGEAR Inc. (NTGR: NASDAQ)

NTGR is a multinational telco firm offers wireless and broadband access connectivity. According to the most active trading Nasdaq-listed stocks, NTGR gained top position coupled with the upward earning surprise at the end of 2023, grinding from the dry-up business activities in April (Zacks 2023). Besides, the communications equipment market 1M-yield reaches approx. 4,32%, even better than tech.

NTGR	2020	2021	2022	2023	Q1-24	Industry average
Net Margin	4,6%	4,2%	-7,4%	-14,1%	-11,3%	13,98%
D/E	60,4%	54,8%	6,4%	58,2%	56,7%	82,0%
Valuation						
P/E	-102,58					24,3
EV/EBITDA	0,13					13,98

Table 6. **NTGR Fundamental Snapshots[6].**

Source: CSIMarket 2024; NYU 2024

[6] The industry average selects only average metrics of *Communications Equipment* firms.

This stock selection represents the value combining with intraday investing approach (Smith 2022). As we seek for the most active trading stock in telco industries listed on Nasdaq on 30th April. Besides, this stock contains both prospects and perils due to high dependency on international sales which are highly correlated to the current uncertain geopolitical landscape (Zacks 2024).

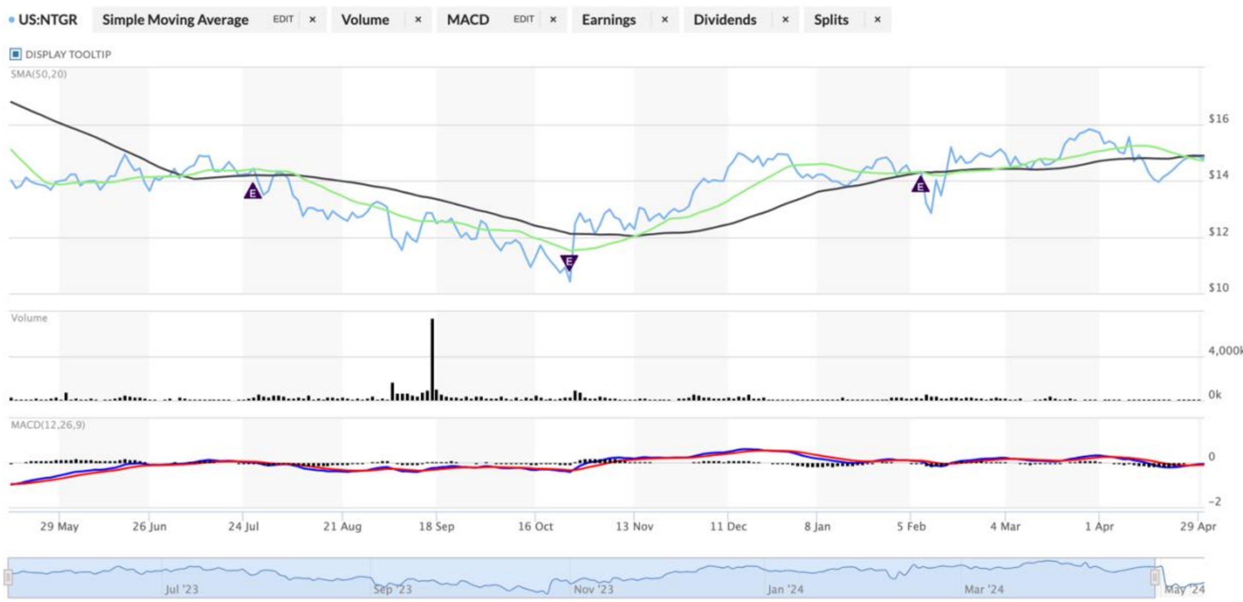

Figure 9. **NTGR 1Y Chart.**

Source: MarketWatch 2024

Price reaction to SMA cross is relatively good to witness corresponding historical price trend. MACD crosses up signal a buy where the MA cross down would help open buy position with a better price.

- *Expected Portfolio Return*

Ticker	Allocation	Stock Beta	Weighed Beta
MSFT	23,33%	1,19	0,28
NVDA	23,33%	1,75	0,41
AMZN	23,33%	1,08	0,25
VZ	15,00%	0,44	0,07
NTGR	15,00%	0,89	0,13
Initial Portolio Beta			**1,14**

Table 7. **Initial Portfolio Beta**

Source: Nasdaq 2024; self-calculation

Initial portfolio β_{port} is calculated upon the regression result between 5-year horizon HPY return of each stock with S&P500 Index. Expected return of our portfolio would be:

CAPM Model	
Risk-free rate	0,21%
Market expected return	0,35%
Risk premium	0,001
Beta	1,14
Expected return	**0,37%**

Table 8. **CAPM Calculation**

Applying the 3-month U.S treasury bills as a proxy for risk-free rate, we retrieve the 5,4% April/2024 rate and cater to 2-week frequency. Likewise, we calculate the average HPY return of S&P 500 catering 2-week frequency. Thus, the portfolio expected return will be 0,37%, which is understandably low due to high volatility of "Magnificent 7" stocks, short-term trading, and low expected yield from the benchmarked indexes.

Risk identification

- *Systematic risk*

U.S market has witnessed an optimistic landscape with the soaring stock market in Q1/2024 (Krauskopf 2024). In two weeks, the market volatility is expected to be 1,14 (β_{port}). Labor market has added 350,000 jobs in 2024 with a better full-time jobs contribution over part-time hereby delaying the rate cuts since March (Smart 2024; Steve 2024). Hence, our portfolio is exposed to tendency of share price fall due to high rates anchoring making bond yield more attractive (Hall 2024). Besides, world commodity prices fluctuations have been soaring the inflation, such as Russia-Ukraine conflict generated commodity prices fluctuation, hiked inflationary pressure across Europe, U.S and other economies (Kim 2022). These uncertainties and constraints may endure since the wake of Israeli-Hamas conflict – Middle East tensions (US Bank 2024). Henceforth, some commodities increase prices since the early 2024 implying the inflationary burdens (ibid.).

- *Unsystematic risk*
    - *MSFT*

MSFT is a multinational, thus, firm's exposure to **exchange/translation risk** could not be overlooked. Coupled with higher-than-1 beta coefficient, MSFT is sensitive to market movement, even international market landscapes counted. AWS as firm major rivalry is competing against cloud-based products. Henceforth, not just **competition risk** associated, this endless races in tech world would make MSFT also face **technological risk** where constantly innovative products lead to on-premises stockpile (Romanoff 2024).

- - *NVDA*

NVDA financial strength and structure is yet to concerned due to its low probability to face current distress (ibid.). Major unsystematic risk is related to the instability of Semiconductors **industry** (Trefis 2024). Firm's stock price short-term volatility is even fiercer than Bitcoin due to

AI excitement and cross-border competition between US and China (Haill 2024; White 2024). Besides, **product risk** is also foreseeable when the GPU demand growth shall slow down when the AI hype signals a cool-off (ibid.)

- *AMZN*

AWS might expose AMZN to similar risks: **competition** and **technological**. Besides, its leveraged structure is prone to **financial risk** where the financial markets uncertainty would hurt firm cash flow margins. Most notably, AMZN is combatting the 30-year largest legal liabilities (Deffenbaugh 2024). Hence, firm's exposure to **litigation risk** is high as the competitors like Kove, FTC recently filed the firm for manipulating market power and data patents rights (Scarcella 2024; Brittain 2024). Altogether, these risks majorly impact firm's profitability and brand value regarding market share and customer's trust.

- *VZ*

VZ has lost over 68,000 monthly subscribers since Jan'24. Despite its flexible planning and campaigns, **operational risk** is expected to lower revenue generated (Reuters 2024). Constantly decreasing asset turnover since post pandemic has proven the persisting operational efficiency failure (GuruFocus 2023).

- *NTGR*

NTGR is also exposed to **operational risk** regarding heavy reliance on 3rd parties and **technological risk** to retain customers. According to firm 10-K submission, NTGR elaborates their high dependency on third-party manufacturers might incur variable costs as well as the final product quality consistency. Firm's failure to have control over logistics competence also needs mitigation plan.

Our diversification may carry risk due to high level of correlation between MSFT, NVDA, and AMZN due to their inclusion in Magnificent 7 stocks that has dominated over 30% market capitalization of S&P 500 index (Shalett 2024). However, the correlation between tech and telco firms indicates low magnitude to hedge unsystematic risk:

	MSFT	NVDA	AMZN	VZ	NTGR
MSFT	1,00				
NVDA	0,89	1,00			
AMZN	0,67	0,52	1,00		
VZ	-0,67	-0,66	-0,01	1,00	
NTGR	-0,52	-0,60	0,16	0,80	1,00

Table 9. **Correlation between initial selected stocks**

VZ is reversely correlated with 3 tech stocks while NTGR has negative correlation with MSFT and NVDA, and low magnitude with AMZN. Despite risk carrying 3 highly correlated stocks, we still be able to apply diversification to minimize unsystematic risk, but the effectiveness remains low due to limited pool of stocks.

NVDA's price swings is the most significant, we opt for Options to secure a lower price and realize profit in short term.

- *One day 99%-VaR*

Our VaR depicts our portfolio's minimal loss of **US$32.406** with 99% confidence. Calculations shall refer to Excel file with retrieved data timeframe is 01/09/2019-09/05/2024:

One day 99% VaR	$ (32.406)

Table 10. **One day 99%-VaR of Portfolio Calculation**

The initial portfolio yields mostly between -2% to 4% as plotted:

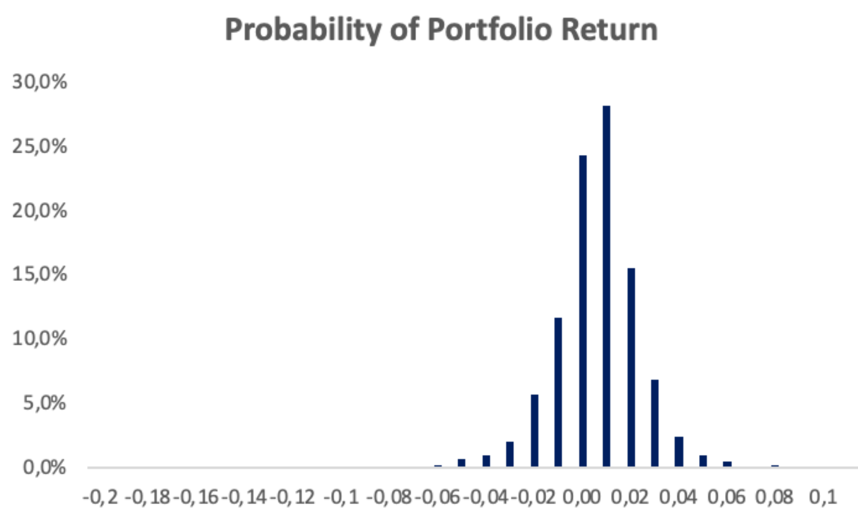

Figure 10. **Initial Portfolio Return Probability based on varying return frequency.**

Hedging

- *Futures*

We opt for E-mini-Nasdaq 100 futures contracts to hedge for portfolio possible downside risk,

Figure 11. **E-Mini Nasdaq Futures Continuous Contract**

with calculation for hedge ratio shall be:

$$h = \boldsymbol{\beta}_{port} \times \frac{700.000}{17.696{,}50 \times 20} = 2{,}25\ (contracts)$$

Rounding the h ratio down to 2, we short 2 contracts with total value equates:

Timeline	Spot Market	Futures Market
30/04/2024	Initial port value: $ 700.000	Contract price: $ 17.696,50 Contract value: $ 707.860,00

Table 11. **Futures Contract Transaction Summary**

To hedge for any potential market slump, we decide to sell 2 futures contracts on initial trading day (30/04) to secure a cheaper price when buyback at the end of trading session, assuming market downside scenario.

- *Options*

Emphasizing on the bullish momentum of NVDA together with firm's price above-the-sector volatility, we are drawn towards *Straddle* strategy to utilize the market fluctuations to offset the risk and capture better payoff. We also refer to in-the-money call options accepting the higher premium to gain immediate profits due to contracts expiry date. NVDA performance strengthens our decision to select lower strike price but with not-so-excessive premium at $830 strike price:

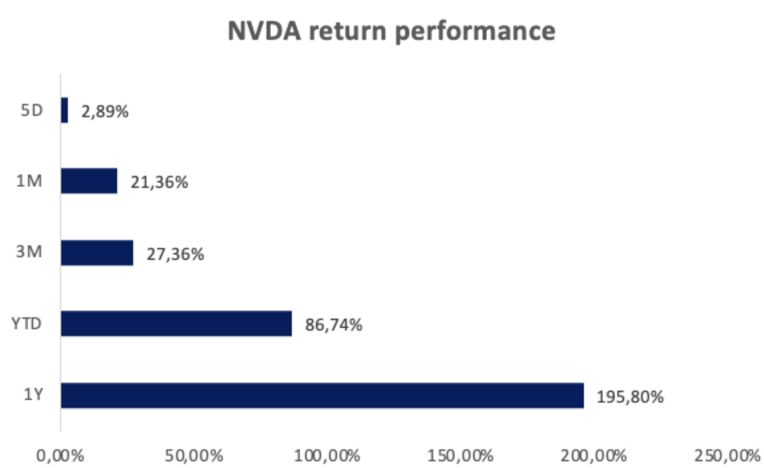

Figure 12. **NVDA Stock Performance.**

Source: MarketWatch 2024

54.90	25.08	50.90	55.10	323	1,079	805.00	0.46	-4.19	0.41	0.48	4,604	2,978
49.00	21.30	46.90	50.10	528	1,343	810.00	0.58	-5.22	0.55	0.56	9,789	3,758
44.13	13.78	42.90	45.10	428	2,167	815.00	0.75	-6.00	0.72	0.82	19,567	2,927
39.42	18.82	38.60	40.30	1,674	2,591	820.00	1.00	-8.00	0.95	1.03	34,662	4,480
34.50	16.45	34.30	35.70	2,342	2,241	825.00	1.36	-9.74	1.33	1.39	13,753	7,706
30.60	16.60	29.85	31.05	5,638	2,660	830.00	1.80	-11.28	1.80	1.98	26,596	4,633
25.55	13.25	25.50	26.85	5,966	2,465	835.00	2.56	-13.25	2.43	2.72	16,881	4,137
22.40	12.32	21.35	22.50	19,725	4,194	840.00	3.40	-14.60	3.40	3.65	34,328	3,285
18.26	10.34	17.75	18.70	24,154	2,721	845.00	4.55	-16.90	4.60	4.90	23,218	1,907
15.25	8.73	14.50	15.25	57,238	6,983	850.00	6.44	-18.46	6.20	6.60	32,613	5,291
12.00	6.60	11.65	12.20	30,872	3,498	855.00	8.45	-19.75	8.20	8.70	11,301	2,493
Current price as of May 2, 2024 4:15 p.m.						858.17						
9.36	4.96	9.10	9.60	46,235	6,476	860.00	11.00	-21.66	10.70	11.10	6,235	3,387
7.40	3.95	7.15	7.50	20,340	4,478	865.00	14.05	-21.39	13.55	14.15	1,793	2,525
5.60	2.85	5.35	5.70	33,370	7,091	870.00	17.50	-22.29	16.65	17.70	2,721	3,731
4.21	2.01	4.10	4.40	21,288	6,573	875.00	20.85	-24.15	19.95	21.30	889	2,509

Figure 13. **Options Premium Recap.**

Source: MarketWatch 2024

We simultaneously purchase both call and put options aligning with the strategy as follows:

Timeline	Spot Market	Options Market
02/05/2024	188 NVDA shares value: $ 161.336	Call options premium: $ 6.120,00 Put options premium: $ 360,00

Table 12. **Options Contract Transaction Summary**

2. Depth of evaluation and explanation

Trading reflection

- *Risk preference*

At first, we are defined as moderate-aggressive risk investor due to the GARP philosophy also opt for overbought stocks in tech sector. Initial portfolio also has weighted beta >1. Only VZ is our defensive play while we accept the high level of volatile risk associated with NVDA, medium-to-high with MSFT and AMZN. NTGR beta is also close to 1 but as a value stock, we still consider its risk level as low-to-medium. In the active trading intraday activities, our risk preference navigates towards risk-seeking preference. We invest more in NVDA, MSFT when realizing the bullish trend sustained. Besides, we select 7 more stocks and 5 out of them belong to tech sector: LYFT, AAPL, SOFI, GOOGL, CTMX (Biotech); remaining is AAL (Transportation) and NEE (Electric Utilities).

- *CAPM model versus actual returns*

Date	Net Worth	% Return
05/12/2024	$1,009,661.08	0.97%
05/11/2024	$1,009,661.08	0.97%
05/10/2024	$1,009,661.08	0.97%
05/09/2024	$1,008,419.24	0.84%
05/08/2024	$1,004,865.72	0.49%
05/07/2024	$1,001,911.03	0.19%
05/06/2024	$1,014,276.07	1.43%
05/05/2024	$991,857.58	-0.81%
05/04/2024	$992,020.51	-0.80%
05/03/2024	$991,857.58	-0.81%
05/02/2024	$981,894.84	-1.81%
05/01/2024	$991,370.14	-0.86%
04/30/2024	$991,365.30	-0.86%

Table 13. **Time-serires portfolio return (30/04-12/5/2024)**

	Buying price	Selling price	No. of shares	P/L
MSFT	$ 395,03	$ 414,63	414	$ 8.114,40
NVDA	$ 868,13	$ 899,74	188	$ 5.942,68
AMZN	$ 179,49	$ 187,92	910	$ 7.671,30
VZ	$ 38,73	$ 40,24	2.646	$ 3.995,46
NTGR	$ 14,88	$ 11,90	7.052	$ (21.014,96)
Total portfolio gain:			**+0,67%**	**$ 4.708,88**

Table 14. **Actual return of Initial portfolio**

The CAPM model depicts different return compared to the actual ones (0,37% vs 0,67%[7]). CAPM model is subjected to Beta measurement and Market Expected Return:

$$E(R) = r_{risk-free} + \boldsymbol{\beta} \times (\boldsymbol{E}(\boldsymbol{R_M}) - r_{risk-free})$$

The 3-month treasury bills carry low level of wrongdoing the final expected return. Hence, Chen et.al (2022) claimed that the CAPM model would fail to calculate the true investment narrative due to:

(1) $\boldsymbol{\beta}$ is not designed to capture the unsystematic risk but solely to measure portfolio returns in relative to market risk; additionally, stable beta is implausible to achieve;

(2) number of stocks (5 stocks) holding fails to satisfy the assumption of CAPM model regarding diversification to mitigate unsystematic risks (>30 random-selected stocks) (Mullins 1982);

(3) misleading market expected return measurement due to its dependency on historical data and market efficiency assumption, thus be prone to errors and mislead the CAPM estimation.

[7] Initial portfolio yield only; calculated upon 5 initial selected stocks.

- *Net portfolio return with hedging strategy*
    - *Futures*

On the final trading day, E-Mini-Nasdaq Futures Contract price increases to $18,255.00 incurring the loss for this hedging strategy:

NQ00 US OPEN
$18,653.25 3.25 0.02%
Last Updated: May 17, 2024 at 2:10 a.m. CDT - Delayed quote

	SETTLEMENT PRICE 05/16/2024 $18,650.00	$18,707.00	$18,393.00	$18,691.80
		$18,433.00	$18,165.50	$18,415.00
		$18,336.30	$18,228.80	$18,295.50
05/10/2024	$18,226.00	$18,348.00	$18,188.50	$18,255.00

Figure 14. **Nasdaq Futures Contract (10/05/2024).**

Source: MarketWatch 2024

Bullish market due to optimistic market sentiment is the major reason for this hedging failure:

Timeline	Spot Market		Futures Market	
30/04/2024	$	697.500	$	17.696,50
10/05/2024	$	702.209	$	18.255,00
Realized P/L		0,68%		-3,06%
Net position	$	4.708,88	$	(22.340)
Total P/L	$			(17.631,12)

Table 15. **Futures Contract Evaluation**

The positive gain from initial portfolio is unable to offset loss.

- *Options*

Time	Spot Market			Options Market		
02/05/2024	NVDA stock prices:	$	858,17	Long 2 call options contracts:	$	6.120,00
	Positions:	$	161.335,96	Long 2 put options contracts:	$	360,00
	Short put options					
	NVDA stock prices:	$	892,81	Strike price	$	830,00
	Positions:	$	167.848,28	Premium:	$	360,00
	Net P/L:	$	6.512,32	Net P/L:	$	(360,00)
03/05/2024	Short call options					
	NVDA stock prices:	$	892,81	Strike price	$	830,00
	Positions:	$	167.848,28	Premium:	$	6.120,00
	Net P/L:	$	6.512,32	Net P/L:	$	5.688,28
				Total P/L:	$	11.840,60

Table 16. **Hedging Options outcomes**

Persisting the upward momentum of NVDA, we opt for lower and same strike price for both call and put options contracts. As predicted, when intraday price high establishes upward trend, we exercise the call options to realize instant profit. Final gain is deducted by the put options premium as we do not exercise these contracts.

- *Hedging transactions comparison*

	Non-hedging*	Futures Hedging	Options Hedging**	Futures & Options	
30/04/2024	$ 700.000	$ 707.860	$ 6.480	Futures Return	Options Return
10/05/2024	$ 702.209	$ 730.200	$ 178.562	$ (22.340)	$ 11.841
Net P/L	$ 2.209	$ (22.340)	$ 11.841	$ (10.499)	
Added value	$ 1.002.209	$ 977.660	$ 1.011.841	$ 989.501	
% Ratio	0,67%	-2,23%	1,18%	-1,05%	

Table 17. **Hedging/non-hedging strategies comparison**[8]

We successfully earn **$2.209** profit for initial portfolio holding 5 prior-selected stocks. Bullish landscape of US tech stock allows us to capture such gain offsetting the -20,03% NTGR decline. However, aligning with portfolio risk preference and trading philosophy, we suspect the market volatility, thus practice Futures hedging to mitigate market downside risks. Additionally, Semiconductors with excessive market concentration[9] is expected to yield better profit for our portfolio thanks to NVDA's bullish performance, thus practicing ITM options within *Straddle* strategy.

Any scenario and strategy contain 2-sided aspects regarding risk-reward relationship. Futures remains less effort-demanding to understand and practice; however, it contains higher level of risk compared to Options. As Options is more flexible for investors whether to exercise or not, and the maximum loss for not exercising is solely premium paid (Parakh 2024). Therefore, opting for Options hedging yields higher proportional value to our portfolio. However, it is challenging to compare due to different motives.

Despite market recovery via favorable macroeconomic indicators, Fed conservative position regarding interest rates could be a potential risk when rate cut decision has been delayed twice in Q1/2024. Hence, shorting Futures contract is expected to mitigate downside risk and protect portfolio margin. However, our assumption goes against the bullish conditions, especially in such short term for any sudden shock.

Futures contract is associated with systematic risk hedging strategy while Options is more applicable to unsystematic risk hedging of each stock. Therefore, major personal finding of risk management instrument application is the consistency regarding perspectives on market conditions and industry landscape. For instance, via top-down analysis we grasp a bullish stance on market conditions leading to the increase of favorable industries regarding industry revenue, P/E, etc. We could opt to long Futures contract, call Options for industry-selected stocks or writing a put Options. This contextual instance is supposed to be our primary strategy yet to

[8] *: Non-hedging portfolio value on 30/04 is rounding up from $697.500 due to time-lagged submission affecting the selling prices difference
**: Options Hedging starts from 02/05/2024 and the value $178.562 is NVDA price high multiplying by 200 (due to 2 call options contracts)
[9] Highest PE among sub-sectors in tech industry (Simply Wall St 2024).

execute due to incompatible to risk appetite. As it is dominantly straightforward and aggressive differing from ours.

- *AI Generative tool application in trading decision*

We apply ToggleAI to support active trading portfolio due to its fast-paced and fundamental stock outlook such as capitalization, trailing P/E, volatility, and analyst recommendation. Fundamental chart coupled with AI-processed bullish/bearish points are also user-friendly. We primarily select AAL (American Airlines) due to the bullish position (+14,65%)

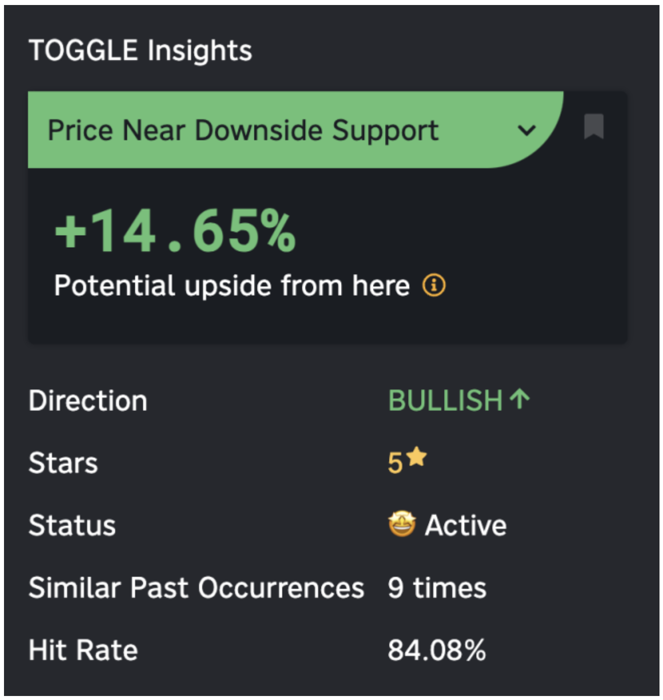

Figure 15. **ToggleAI's projection on AAL price**

We ignore the stock FA, industry-specific risks and solely depend on stock TA and daily update from ToggleAI. In fact, bullish performance of AAL motivates us to buy more in real trading session and finally realize 4,87% profit:

AAL	Transaction	Price	No. shares	Total yield
02/05/2024	Buy	$ 13,75	4364	$ 4.455,02
03/05/2024	Buy	$ 13,76	2130	
07/05/2024	Buy	$ 14,36	2089	4,87%
10/05/2024	Sell	$ 14,42	8583	

Table 18. **AAL Transaction Summary**

Timing is vital to intraday speculation, thus being supported by AI helps us capture better price. However, AI fails to incorporate risks to their analysis and recommendation further misleading investors with algorithm-driven by historical data. Supply chain constraints, incurring maintenance cost have blocked the soaring trend of airlines industry which could explained the modest yield of real trading compared to ToggleAI projection (Luman 2024).

Reference:

Amazon (19 December 2023), '8 ways Amazon is using generative AI to make life easier, from a more conversational Alexa to a better reviews experience', *Amazon*, accessed 15 May 2024. https://www.aboutamazon.com/news/innovation-at-amazon/how-amazon-uses-generative-ai

BEA (2024) *U.S. Economy at a Glance* [data set], BEA website, accessed 1 May 2024. https://www.bea.gov/news/glance

Blackrock (2024) *2024 Investment Outlook,* Blackrock website, accessed 2 May 2024. https://www.blackrock.com/us/individual/insights/blackrock-investment-institute/outlook#a-dynamic-approach

Brittain B (11 April 2024) 'Amazon owes $525 mln in cloud-storage patent fight, US jury says', *Reuters,* accessed 14 May 2024. https://www.reuters.com/legal/amazon-owes-525-mln-cloud-storage-patent-fight-us-jury-says-2024-04-11/

Chen Y, She C, Wu Q, Wang H (2022), 'The Ineffectiveness of Capital Asset Pricing Model and Its Possible Solutions', *Advances in Economics, Business and Management Research*, https://doi.org/10.2991/aebmr.k.220307.017

CSIMarket (2024) *Communications Equipment Industry Financial Strength Information,* CSIMarket.com website, accessed 5 May 2024. https://csimarket.com/Industry/industry_Financial_Strength_Ratios.php?ind=1001

CSIMarket (2024) *Technology Retail Industry Financial Strength Information,* CSIMarket.com website, accessed 5 May 2024. https://csimarket.com/Industry/industry_Financial_Strength_Ratios.php?ind=1308

CSIMarket (2024), *Semiconductors Industry Financial Strength Information*, CSI Market website, accessed 15 May 2024. https://csimarket.com/Industry/industry_Financial_Strength_Ratios.php?ind=1010

Deffenbaugh R (13 May 2024) 'Is Amazon Stock A Buy Coming Off Q1 Earnings, New Record Close?', *Investors Business Daily,* accessed 15 May 2024. https://www.investors.com/news/technology/is-amazon-stock-buy-now-amzn/

Deloitte (2024) *2024 telecom industry outlook - Five key trends shaping the telecom landscape,* Deloitte website, accessed 4 May 2024. https://www2.deloitte.com/content/dam/Deloitte/us/Documents/technology-media-telecommunications/2024-telecom-industry-outlook.pdf

Field H (2 February 2024), 'Tech execs are telling investors they have to spend money to make money on AI', *CNBC*, accessed 15 May 2024. https://www.cnbc.com/2024/02/02/techs-new-ai-game-plan-spend-money-to-make-money.html

FRED (2024), *3-Month Treasury Bill Secondary Market Rate, Discount Basis* [data set], Federal Reserve Bank website, accessed 2 May 2024. https://fred.stlouisfed.org/series/TB3MS

FRED (2024), *Gross Domestic Product (GDP)* [data set], Federal Reserve Bank website, accessed 15 May 2024 https://fred.stlouisfed.org/series/GDP

FTI Delta (1 February 2024), '2024 Telecom Predictions: The global telecommunications sector is undergoing a transformative journey into 2024, shaped by strategic imperatives, dynamic trends and new opportunities for innovation and resilience', *FTI Delta*, accessed 15 May 2024. https://www.ftidelta.com/insights/perspectives/2024-telecom-predictions

GuruFocus Research (6 October 2023), 'Verizon Communications (VZ) Stock: A Hidden Value Trap? Unpacking the Risks and Rewards', *Yahoo Finance*, accessed 15 May 2024 https://finance.yahoo.com/news/verizon-communications-vz-stock-hidden-153502713.html

Haill O (13 March 2024), 'Nvidia is even more volatile than bitcoin, but Microstrategy takes the crown', *Proactiveinvestors*, accessed 15 May 2024. https://www.proactiveinvestors.co.uk/companies/news/1043103/nvidia-is-even-more-volatile-than-bitcoin-but-microstrategy-takes-the-crown-1043103.html

Hall M (12 May 2024), 'How Do Interest Rates Affect the Stock Market?', *Investopedia*, accessed 15 May 2024. https://www.investopedia.com/investing/how-interest-rates-affect-stock-market/

Hayes A (1 September 2023), 'Value Investing Definition, How It Works, Strategies, Risks', *Investopedia*, accessed 15 May 2024. https://www.investopedia.com/terms/v/valueinvesting.asp

Kim K, Martin M, and Rao G (2022), *Russia-Ukraine war impact on supply chains and inflation*, KPMG website, accessed 15 May 2024 https://kpmg.com/us/en/articles/2022/russia-ukraine-war-impact-supply-chains-inflation.html

Krauskopf L (29 March 2024), 'How the US stock market rocketed through the first quarter', *Reuters*, accessed 15 May 2024. https://www.reuters.com/markets/us/how-us-stock-market-rocketed-through-first-quarter-2024-03-28/

Luman R (16 May 2024) 'Why supply constraints are clouding the skies for airlines', *ING,* accessed 18 May 2024. https://think.ing.com/articles/global-aviation-outlook-supply-constraints-cloud-the-skies-for-airlines/

Macroaxis (2024) *Verizon Communications Stock Buy Hold or Sell Recommendation,* Macroaxis website, accessed 10 May 2024. https://www.macroaxis.com/invest/advice/VZ

Macrotrends (2024) *S&P 500 vs Fed Funds Rate* [data set], Macrotrends website, accessed 2 May 2024. https://www.macrotrends.net/2638/sp500-fed-funds-rate-compared

Mercado D (1 May 2024) 'Fed meeting recap: Powell pretty much rules out a hike as the central bank's next move', *CNBC,* accessed 2 May 2024. https://www.cnbc.com/2024/05/01/fed-meeting-today-live-updates-on-may-fed-rate-decision.html#:~:text=Federal%20Reserve%20leaves%20interest%20rates%20unchanged&text=The%20fed%20funds%20target%20rate,decision%20from%20CNBC's%20Jeff%20Cox.

Mullins D. W (1982) 'Does the Capital Asset Pricing Model Work?', *Harvard Business Review,* accessed 2 May 2024. https://hbr.org/1982/01/does-the-capital-asset-pricing-model-work

Nasdaq (2024) *Most Active,* Nasdaq website, accessed 1 May 2024. https://www.nasdaq.com/market-activity/most-active

NTGR (2022) *Form 10-K,* accessed 10 May 2024. https://s22.q4cdn.com/334267776/files/doc_financials/2022/q4/4b2c9fad-122b-4327-857b-e3f8b02c2252.pdf

NYU (2024), *Enterprise Value Multiples by Sector (US),* NYU website, accessed 5 May 2024.https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/vebitda.html

OECD (2022) *United States: Continue to tackle macroeconomic challenges while supporting the middle class and preparing for population aging, says OECD*, OECD website, accessed 2 May 2024. https://www.oecd.org/economy/united-states-continue-to-tackle-macroeconomic-challenges-while-supporting-the-middle-class-and-preparing-for-population-ageing.htm

Parakh A (09 March 2024) 'Futures vs Options: Understanding the differences and choosing the right derivative instrument', *The Economic Times,* accessed 18 May 2024. https://economictimes.indiatimes.com/markets/options/futures-vs-options-understanding-the-differences-and-choosing-the-right-derivative-instrument/articleshow/108343850.cms?from=mdr

Poletti T (24 February 2024), 'Nvidia's sheer dominance can be summed up by this one underrated number', *Morningstar*, accessed 15 May 2024. https://www.morningstar.com/news/marketwatch/20240224199/nvidias-sheer-dominance-can-be-summed-up-by-this-one-underrated-number

Portfolioslab (2024), *Microsoft corporation (MSFT)*, Portfolioslab website, accessed 15 May 2024 https://portfolioslab.com/symbol/MSFT

Reuters (22 April 2024) 'Verizon reports fewer quarterly subscriber losses on flexible plan demand', *The Economics Times,* accessed 10 May 2024. https://telecom.economictimes.indiatimes.com/news/industry/verizon-reports-fewer-quarterly-subscriber-losses-on-flexible-plan-demand/109504614

Romanoff D (19 April 2024) 'Going Into Earnings, Is Microsoft a Buy, a Sell, or Fairly Valued?', *MorningStar,* accessed 3 May 2024. https://www.morningstar.com/markets/going-into-earnings-is-microsoft-buy-sell-or-fairly-valued

Scarcella M (15 May 2024), 'Amazon fights FTC probe of data safeguards in antitrust lawsuit', *Reuters*, accessed 15 May 2024 https://www.reuters.com/legal/transactional/amazon-fights-ftc-probe-data-safeguards-antitrust-lawsuit-2024-05-14/

Shallet L (2024), 'Why Mega-Cap Tech Stocks' Dominance Is a Risk', *Morgan Stanley*, accessed 15 May 2024. https://www.morganstanley.com/ideas/magnificent-7-stocks-portfolio-risk#:~:text=Because%20of%20their%20narrow%20focus,invest%20directly%20in%20an%20index.

Simply Wall St (2024), *U.S. Consumer Discretionary Sector Analysis*, Simply Wall St website, accessed 15 May 2024 https://simplywall.st/markets/us/consumer-discretionary

Simply Wall St (2024), *U.S. Tech Sector Analysis,* Simply Wall St website, accessed 15 May 2024 https://simplywall.st/markets/us/tech

Smart T (2 Februray 2024), 'Whopper! Employers Added 353K Jobs in January, Blowing Past Estimates', *U.S News*, accessed 15 May 2024 https://www.usnews.com/news/economy/articles/2024-02-02/whopper-employers-added-353k-jobs-in-january-blowing-past-estimates

Smit T (2024), Most Active: What It Means, How It Works, Example, Investopedia website, accessed 15 May 2024 https://www.investopedia.com/terms/m/mostactive.asp

Statista (2024), *Microsoft: Statistics report on Microsoft,* Statista website, accessed 5 May 2024. https://www.statista.com/study/11419/microsoft-statista-dossier/

Statista (2024), *Nvidia: Statistics report on Nvidia*, Statista website, accessed 15 May 2024 https://www.statista.com/study/82548/nvidia/
Trading Economics (2024), *United States Unemployment R
ate* [data set], Trading Economics website, accessed 2 May 2024. https://tradingeconomics.com/united-states/unemployment-rate

Trefis (29 February 2024), 'With A $2 Trillion Valuation, What Are The Risks For Nvidia Stock?', *Nasdaq*, accessed 15 May 2024. https://www.nasdaq.com/articles/with-a-$2-trillion-valuation-what-are-the-risks-for-nvidia-stock

U.S Bank Wealth Management (10 May 2024), 'How commodity prices can impact markets and inflation', *U.S Bank Wealth Management*, accessed 15 May 2024. https://www.usbank.com/investing/financial-perspectives/market-news/commodity-prices-impact-on-the-market.html

U.S. BUREAU OF LABOR STATISTICS (2024) *12-month Percentage change, Consumer Price Index* [data set], U.S. Bureau of Labor Statistics website, accessed 1 May 2024. https://www.bls.gov/charts/consumer-price-index/consumer-price-index-by-category-line-chart.htm.

White W (23 April 2024), 'NVDA Stock: China Is Still Buying Top Nvidia Chips Despite U.S. Ban', *Investorplace*, accessed 15 May 2024. https://investorplace.com/2024/04/nvda-stock-china-is-still-buying-top-nvidia-chips-despite-u-s-ban/

Zacks (11 July 2023), 'Why NETGEAR, Inc. (NTGR) is a Top Momentum Stock for the Long-Term', *Yahoo!news*, accessed 15 May 2024. https://sg.news.yahoo.com/finance/news/why-netgear-inc-ntgr-top-135007507.html#:~:text=NTGR%20boasts%20an%20average%20earnings,Momentum%20and%20VGM%20Style%20Scores.

Zacks (6 May 2024), 'NETGEAR (NTGR) International Revenue Performance Explored', *Nasdaq*, accessed 15 May 2024. https://www.nasdaq.com/articles/netgear-ntgr-international-revenue-performance-explored