RIVERPARK FUNDS

Wedgewood Fund
(RWGIX/RWGFX)

Wedgewood. PARTNERS, INC.

Second Quarter 2024 Review and Outlook

Performance: Net Returns as of June 30, 2024

	Current Quarter	Year to Date	One Year	Three Year	Five Year	Ten Year	Since Inception
Institutional Class (RWGIX)	3.46%	15.70%	25.78%	7.77%	16.17%	11.66%	13.38%
Retail Class (RWGFX)	3.45%	15.66%	25.41%	7.49%	15.84%	11.42%	13.13%
Russell 1000 Growth Total Return Index	8.33%	20.70%	33.48%	11.28%	19.34%	16.33%	16.85%
S&P 500 Total Return Index	4.28%	15.29%	24.56%	10.01%	15.05%	12.86%	14.23%
Morningstar Large Growth Category	4.92%	17.43%	28.86%	5.98%	14.53%	12.85%	13.75%

Total returns presented for periods less than 1 year are cumulative, returns for periods one year and greater are annualized. The inception date of the fund was September 30, 2010. The performance quoted herein represents past performance. Past performance does not guarantee future results. High short-term performance of the fund is unusual, and investors should not expect such performance to be repeated. The investment return and principal value of an investment will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost, and current performance may be higher or lower than the performance quoted. For performance data current to the most recent month end, please call 888.564.4517.

Expense Ratio: Institutional: 1.09% gross and 1.00% net, Retail: 1.34% gross and 1.25% net as of the most recent prospectus, dated January 26, 2024.

The Adviser has agreed to waive fees and reimburse expenses until at least January 31, 2025 to the extent necessary to assure that expenses will not exceed certain pre-agreed limits. The Adviser has the ability, subject to annual approval by the Board of Trustees, to recapture all or a portion of such waivers. The Gross Expense Ratio reflects actual expenses, and the Net Expense Ratio reflects the impact of such waivers or recaptures, if any.

Index performance returns are for illustrative purposes only and do not reflect any management fees, transaction costs, or expenses. Indexes are unmanaged and one cannot invest directly in an Index.

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Apple of Our AI

"Apple Computer's sustainable growth, we believe, is a powerful function of a multi-product foundation whose growth is driven by product excellence, ease-of-use adoption and the significant new influx of first-time customers to the Apple product line…Ironically, where once the Company's 30-year history of independent hardware and software development was without a doubt a limiting factor to growth, operating leverage and profitability, we believe, if not paradoxically so, that such tight hardware and software development has morphed into not only the Company's greatest competitive advantage, but arguably the Company's "Crown Jewel." In this reversal of fortune, Apple is now the only major PC company that is vertically integrated – profitability does not lie. Apple has the highest operating margins of any major PC company."

"With the stock currently trading at $75 (ED. $3 per share, split-adjusted in 2024, versus $230 today), the valuation is certainly not cheap at 32X our 2006 earnings (expectations). Even after factoring the cash per share of $10, the shares are valued at a more reasonable 28X. At current valuations we are only adding partial positions. Actually, we would welcome a pullback in these shares in order to position the company as one of our larger holdings."

Wedgewood Partners. ***Apple of Our Eye.*** **January 2006.**

Source: Apple

	2Q	YTD	1-Year	3-Year	5-Year
Wedgewood Composite Net	3.7	15.7	25.7	7.9	16.4
Standard & Poor's 500 Index	4.3	15.3	24.6	10.0	15.1
Russell 1000 Growth Index	8.3	20.7	33.5	11.3	19.3
Russell 1000 Value Index	-2.2	6.6	13.1	5.5	9.0

	10-Year	15-Year	20-Year	25-Year	30-Year
Wedgewood Composite Net	11.9	14.6	10.7	9.2	12.9
Standard & Poor's 500 Index	12.9	14.8	10.3	7.7	10.8
Russell 1000 Growth Index	16.3	17.3	12.2	8.2	11.5
Russell 1000 Value Index	8.2	11.8	8.1	6.9	9.6

Top performance contributors for the second quarter include Taiwan Semiconductor Manufacturing, Alphabet, Apple, Motorola Solutions and Meta Platforms. Top performance detractors for the second quarter include PayPal, PoolCorp, CDW, Old Dominion Freight Line and Visa.

There has been no portfolio activity during the quarter to report.

Top Contributors to Performance for the Quarter Ended June 30, 2024	Average Weight	Percent Impact
TSMC	7.10%	1.79%
Alphabet Inc.	9.04%	1.77%
Apple Inc.	6.73%	1.47%
Motorola Solutions, Inc.	5.08%	0.47%
Texas Pacific Land Corp.	1.81%	0.47%

Top Detractors to Performance for the Quarter Ended June 30, 2024	Average Weight	Percent Impact
PayPal Holdings, Inc.	6.66%	-0.91%
CDW Corp.	4.53%	-0.68%
Pool Corp.	2.43%	-0.65%
Old Dominion Freight Line, Inc.	2.45%	-0.59%
Visa Inc.	7.28%	-0.41%

Portfolio Attribution is produced by RiverPark Advisors, LLC (RiverPark), the Fund's adviser, using FactSet Research Systems Portfolio Analysis Application. Please take into account that attribution analysis is not an exact science, but may be helpful to understand contributors and detractors.

Performance attribution is shown gross of fees. Holdings are subject to change.

Taiwan Semiconductor Manufacturing was a top contributor to performance during the quarter. The Company's revenue growth continued to accelerate due to the rollout of its leading-edge N3 manufacturing node along with strong demand for chips used in artificial intelligence applications. Unlike in traditional CPUs, the Company has blue-chip customers, monopoly market share for manufacturing AI chips, such as GPUs. The Company's aggressive investment in capital equipment several years ago should continue to pay off as fabless chip designers proliferate and require a manufacturing partner to shoulder capex risk. The Company's continued aggressive investment and deployment in semiconductor manufacturing equipment is not an easily replicable competitive advantage.

Alphabet was also a top contributor to portfolio performance during the quarter. The Company's core search business showed a healthy +14% growth, while its cloud infrastructure business grew +28%. The infrastructure business is at a nearly $40 billion revenue per year run-rate; however, we think it underearns compared to its peers as the Company has priced its services to take share from its two larger peers, AWS and Azure. Despite of this competitive stance, Alphabet has a differentiated service offering that it has have developed over the years, particularly related to AI, that should yield better returns as customers look to allocate more of their IT budgets to generative AI.

Apple also contributed to performance after unveiling its AI strategy to its software developers. The Company has been at the forefront of proprietary computer processor development for over a decade. Given the compute-intensive nature of AI applications, Apple is well-situated to develop a suite of compelling, consumer-friendly AI services that are also cost-effective. While revenue growth has been relatively flat post-Covid-19, we expect Apple's AI value proposition will be compelling enough for consumers to continue growing their engagement in the Apple ecosystem over the next several years.

Motorola Solutions was a contributor to performance as the Company continued its steady execution with +10% sales growth and +20% operating earnings growth. Motorola also continues to grow its backlog due to its competively advantaged core land mobile radio (LMR) business is a critical long-term solution for emergency services around the globe. The technology behind LMR is relatively simple compared to current 5G wireless standards, but it is an extremely robust implementation that must withstand regular and even mega catastrophes to guarantee uptime to the emergency services that depend on it for communications. Motorola has unmatched competitive positioning in this core business and should be able to continue to expand value-added service offerings to LMR and drive attractive long-term growth.

Booking Holdings contributed to performance as travel spending across the U.S. and Europe remains quite healthy, whereas the Company took share in alternative accommodations, and looks set to expand margins after a few years of reinvestment. The Company has also been aggressively reducing its share count at reasonably attractive valuation multiples. Booking should be able to compound earnings at an attractive, double-digit rate for the next few years given these various initiatives.

PayPal Holdings detracted from portfolio performance during the quarter despite continued solid corporate performance. Revenues grew +10% (FX neutral), while adjusted operating income grew +15%, driven by higher transaction margin dollars and excellent expense discipline. The Company's core branded payments volume accelerated compared to last quarter and continues to grow in line with e-commerce. PayPal has several investment initiatives that we expect will contribute to accelerating growth over the next few years to help take advantage of their leading market share in e-commerce payments. The Company serves over 35 million online merchants. PayPal's large, online merchant acceptance base is a rare and crucial component to profitably monetizing payment volumes that many competitors lack. The Company trades at earnings multiples that we think are quite cheap, given its strong positioning in the long-term secular expansion of global e-commerce.

CDW’s gross profit dollar slightly declined compared to last year as small and medium-sized businesses; IT budgets remained languid after a boom during the Covid-19 years. Often, hardware and software cycles help drive small and medium-sized business investment activity. CDW should benefit from a couple larger upcoming cycles, particularly related to the proliferation of AI-enabled edge computing devices as well as the refresh of Covid-19-era hardware. CDW's core customer typically has very limited IT department staffing and resources, making it difficult for large enterprise-focused IT vendors to reach those customers. As a result, there are plenty of proven technologies that have been adopted by larger businesses, often long ago, that will eventually find their way into small and medium-sized businesses with the help of CDW. CDW is agnostic to the consumption models or form factors of technologies, which is why the Company has been able to maintain superior returns over many different technology cycles and innovation trends. Helping small and medium-sized businesses set up and run their IT departments is more

important than any specific technology that happens to enable those departments and should help the Company continue to grow and take share of IT budgets over time.

PoolCorp preannounced second quarter sales that declined -7% due to lower-than-expected activity during the important summer selling season. After a few years of elevated sales driven by Covid-19 dynamics, PoolCorp has gone through a multi-quarter digestion period. The Company continues to maintain market share and excellent returns despite the difficult industry backdrop. PoolCorp differentiates itself by carrying a large array of industry-specific products compared to mass-market retailers that carry more standardized products or smaller industry competitors that have less availability or narrower selections. When financial conditions for consumers eventually ease, we expect PoolCorp will be able to leverage its leadership position, growing above the long-term normalized industry trend, with mid-to-high single digit revenue growth plus double-digit earnings growth from the increased penetration of private-label and supply chain efficiencies.

Old Dominion Freight Line detracted from performance during the quarter. The Company reported a tempered seasonal rebound early in the quarter, consistent with the weaker overall macroeconomic trends seen in the U.S. industrial economy. Despite continued weakness in the industrial economic environment, the Company continues to take pricing, which is a key testament to the high-valued nature of the prompt service they provide to their shipping customers. When the freight cycle gets back to normal, especially after the industry's digestion of a large, bankrupt competitor, plus a growing list of smaller, debt-ridden trucking companies, Old Dominion should be able to resume its long-term trajectory of operating leverage and volume share gains relative to other modes of shipping.

Visa detracted from performance despite healthy corporate results. The Company grew earnings per share +12% as payment volume growth was up +8% and cross-border payment grew +16%, adjusted for currency. There are over 4.4 billion Visa debit and credit cards in circulation generating over $15 trillion in volume over the past 12 months. There is another estimated $10 trillion in cash and check volume, globally, which we think Visa can continue to move over to its electronic payment rails. In addition, the Company has spent the past several years extending its payment capabilities into new flows of commerce, particularly for business-to-business transactions. This is another, extremely large (+$200 trillion) long-term growth opportunity for Visa that we believe investors are ignoring.

Company Commentaries

Apple

Apple finally announced their AI initiatives at the Company's Worldwide Developer's Conference (WWDC) in mid-June. The preceding narrative on the 'Street was Apple is woefully behind in "AI." Never mind the fact the Company has been deep into AI for years. For example, two features built into the Apple Watch (fall detection and crash detection) are examples of AI "machine learning."

Well.

Narratives can change in a heartbeat on Wall Street, and my, have they changed fast as Apple has brilliantly relabeled "artificial intelligence" as "Apple Intelligence." No slouches these Cupertino folks.

We have owned Apple continuously since late 2005. While Apple is a quite a different company from what it was 18 years ago, in a key aspect, Apple is very much the same company. In preparing to write about Apple for this Letter, we traveled down memory lane to reread our first Letter on Apple way back in early 2006. And what a trip it was.

It would be 12 short months before Steve Jobs would introduce the world-changing, revolutionary iPhone, but in early 2006 the Company's iPod "ecosystem" and overall company "halo-effect" were in full bloom. So much so, that we wrote back then, *"The bottom line: iPod has become to mp3 players what Kleenex has become to tissue paper."*

Torrent iPod growth wasn't the only story emanating from Cupertino then. Mac growth was up +38% in fiscal 2005. In the Company's most recent quarter then, Mac shipments grew +48% the second-best quarter of growth on record at that time. Mac was taking swaths of market share. Such market share take would continue in the intervening years as the Company was rapidly transitioning its entire Mac lineup to the prolific Intel microprocessor.
The key competitive advantage of Apple circa-2005 – ecosystem, halo-effect - remains considerably stronger today. Once a new customer enters the Apple ecosystem they stick around for years, buying an ever-growing list of new hardware products and software services.

We wrote the following then:

"Few of us have time, let alone, the desire to become product specific, digital experts. We want, no, check that – demand that our digital devices seamlessly connect to one another with absolute minimal effort and angst on our part as users.

"This is where Apple Computer excels.

"Apple customers, whether they be iPod, iBook, iMac, Mac mini, PowerMac, PowerBook or Xserve users know that all of Apple's products connect and communicate with the 'ease of use and adoption' (There is that phraseology again) unlike any other family of products, much less any other combination of independent digital products."

"The hub of the Company's product integration is the Apple Store. We dare say that the uniqueness of Apple stores has become a 'Digital Ellis Island' for people just entering the digital world. The Company has just 130 stores worldwide, yet they are a marvel of consumer experience. Here is one key Apple store stat to keep in mind – and one that we will monitor closely as long as we are Apple investors – the Company reports that 45% of the customers buying a Mac in their stores are new to Mac. This stat speaks volumes to us. For Apple Computer to sustain growth, take market share and leverage incremental sales to higher levels of profitability, the Company must capture new users. It appears to us that they are doing that in droves!"

Fast forward to the past 12 months. The Company reports the following:

- Third Quarter 2023. Nearly 50% of Mac buyers were new to the Mac. Over 50% of iPad buyers were new to iPad.

- Fourth Quarter 2023. Two of three college students choose Mac. iPhone set new record for switchers. Mac installed base at all-time high. Over 50% of Mac buyers were new to Mac. Over 50% of iPad buyers were new to iPad. Nearly 66% of Apple Watch buyers were new to Watch.

- First Quarter 2024. 100th retail store opened in Asia/Pacific. Almost 50% of Mac buyers were new to the Mac. There was an all-time record of iPhone upgraders. Installed base of active devices surpassed 2.2 billion - an all-time high, across all products and geographic segments.

- Second Quarter 2024. All-time services record reached. Installed base of active devices is at an all-time high. Installed base of active iPhone is at an all-time high. Installed base of iPad is at an all-time high. Almost 66% of Apple Watch were new to Watch. Paid subscription across Services was +1 billion. Both paid and transacting accounts reached an all-time high.

So, what is Apple Intelligence? Apple Intelligence is Apple's use of artificial intelligence (AI), specifically "generative AI," in which the Company will imbed personalized, user-approved access of their respective data within email, messages and photos, enhanced then with generative AI content, including text, imagery, audio and synthetic data, including the integration of OpenAI's ChatGPT into the Company's operating systems – most notably Siri at first – powered by at least the iPhone Pro 15. The soon to be released iOS 18 and macOS Sequoia will leverage Apple AI silicon on-device processing across software products including Mail, Notes, Pages, Safari, Voice Memos and Photos across on-device iPhone, iPad and Mac.

Siri, employing Apple device generative AI small language models, will offer the most comprehensive Apple Intelligence at first, with a deeper dive in time into Apple apps. For example, the Company states, "*Siri will be able to deliver intelligence that's tailored to the user and their on-device information. For example, a user can say, 'Play that podcast that Jamie recommended,' and Siri will locate and play the episode, without the user having to remember whether it was mentioned in a text or an email. Or they could ask, 'When is Mom's flight landing?' and Siri will find the flight details and cross-reference them with real-time flight tracking to give an arrival time."*

The rollout for Apple Intelligence will be modest in scale, scope and pace and will be presented first in English. Hardware requirements for AI will require the latest and greatest Apple silicon, plus a heavier dosage of on-device memory. The iPhone upgrade cycle will certainly get an AI upgrade tailwind, but that too will be modest after the usual earlier adopter's upgrade and first-time buyers to the iPhone. Indeed, Bloomberg reports that Apple plans to ship at least 90 million iPhone 16s in the latter half of this year, +10% above prior launches, as the Company counts on artificial intelligence (Apple Intelligence) services to drive demand.

We expect other collaborations with AI large language modeling tools from Alphabet and Anthropic. Please note, Apple is in the enviable position for consumers to access AI as any number of AI providers would be first in line to collaborate with Apple and its gold mine of soon to be millions of active AI purposed devices – yet another lock in feature of Apple's ecosystem. Note too that just as Apple partners with Alphabet with Google Search, Apple, at least in its AI early innings, may never need to expend countless billions building its own AI large language models, so it will choose best-in-class partners and others in time in AL. At the end of the day, we expect Apple Intelligence to be an evolutionary rather than a revolutionary feature in terms of enhancing the user experience, allowing Apple users their ability to "step their toes in the water" of the new, uncertain world of Artificial Intelligence.

Future iterations of Apple Intelligence that may surprise could well be centered not on off-device ChatBots, which are large language models, but rather silicon developments within Apple's "edge" devices (e.g., iPhone, Mac, iPad), in addition to significant silicon developments within Apple Cloud, particularly in the realm of Apple's obsession with customer security and privacy.

A few years ago, in our fourth quarter 2021 Letter we commented on Apple's often overlooked semiconductor design superiority, about which we expect to hear much more over the next few years. Given the interplay between semiconductor design and software in AI, we'd like to again share our thoughts on Apple's silicon prowess:

"Apple continues to develop new products and services that capture dominant profit share in some of the largest and most competitive industries around the globe[1]. Having owned Apple continuously for the past 16 years, we find it surprisingly difficult to know what new products the Company will unveil over a multi-decade timeframe. For example, in 2006, we did not know Apple would sell MacBooks with Apple-developed CPUs starting in the year 2020. In 2006, Apple had just made a huge pivot by launching its first Intel-based computers, moving away from IBM PowerPC.[2] But we did know that Apple's vertically integrated (software and hardware) product development strategy was unique and extremely capable of creating products and experiences that customers thought worthwhile enough to spend growing amounts of time and money on. Today, that development strategy culture is still intact and as entrenched as ever thanks to Apple's methodical long-term investments in key areas such as semiconductors and integrated circuits (IC), which have been complemented by continuous software innovation.

"In just a few years after Apple's switch to Intel for its PCs, Apple made a couple of strategic acquisitions that launched its internal semiconductor development platform. These acquisitions, including PA Semi and Intrinsity, saw the Company add several hundred silicon engineers in the process, initially with the stated goal of expanding Apple's parallel processing capabilities for its line of Mac computers.[3] However, Apple's first internally designed system on a chip (SoC), the A-4 (launched in 2010), was not a multicore chip, nor was it designed for a PC. Yet by 2011 it was rumored that Apple had "1,000 engineers working on chips."[4]

"With the introduction of the iPhone and the creation of the Open Handset Alliance in 2007, off-the-shelf solutions for the touchscreen smartphone industry exploded, setting up supplier-customer dynamics reminiscent of the "Wintel" era of the 1990's. Samsung, Qualcomm, Broadcom, and NVIDIA (to name a few) often provided off-the-shelf inputs for original equipment manufacturers (OEM) like Nokia, Samsung, ZTE, Sony, and Apple. By definition, these inputs were not custom made; therefore, those parts alone would not provide any sort of differentiation. So, the real benefit of recruiting semiconductor design talent was that Apple could create custom inputs to make products that would significantly stand out from the competition.

"Apple has developed well over a dozen custom processors and other integrated circuits since it launched its first "A-series" processors. The A-series processor family seems to be an annual iteration of Apple's mobile CPUs, often enabling new iOS-specific functions that sometimes takes competitors years to mimic. For example, in 2017 Apple's A11 Bionic processor featured a "neural processing unit" that provided the iPhone X with enough processing power specifically dedicated to operating the device's FaceID 3D mathematical algorithms so users could securely unlock their phones and also make digital payment authorizations. It took years for competitors to copy this feature using similar biometric scanning, but even those have been sparingly embraced by users, meanwhile Apple's FaceID helps authorize over 600 million payments per year.[5] Payments alone are probably not a huge reason to go out and buy an iPhone or iPad, but after more than a dozen years of chip iterations we would argue that regular device feature innovations along with quality improvements have yielded a consistent and differentiated value proposition that regularly convinces consumers to stay and grow in the Company's lucrative ecosystem.

"To capture the vast majority of the profit share in mobile, Apple has had to do more than generate revenue by focusing on user experience. The Company has also had to maintain a disciplined value chain to keep expenses under control. One obvious but immensely important aspect of their strategy has been a focused product set.

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1 https://www.counterpointresearch.com/global-handset-market-operating-profit-q2-2021/

2 https://www.apple.com/newsroom/2005/06/06Apple-to-Use-Intel-Microprocessors-Beginning-in-2006

3 https://bits.blogs.nytimes.com/2008/06/10/apple-in-parallel-turning-the-pc-world-upside-down/

4 https://techcrunch.com/2011/10/09/apple-1000-engineers-chips/

5 Mobile Payment Authentication: Biometrics, Regulation & Market Forecasts 2021-2025

This concentrated purchasing power likely affords raw chip procurement economics that are not far from off-the-shelf solutions.[6] In addition, Apple has been able to secure leading-edge fabrication technology at its fabrication partners at huge scale. This rare capacity alone provides a multiyear head start on many processing competitors. So, Apple can reap the benefits of custom chips without paying exorbitant prices, which creates value for most everyone involved.

"We expect Apple's strategy of differentiation through silicon will continue for years to come. According to Apple's website, Apple currently has as many job openings for silicon-related development as they do for software applications and frameworks. More recently, Apple has started to displace Intel CPUs from its PC lineup and replaced it with Apple's M-Series silicon. Apple also plans to replace Qualcomm modem silicon by including an internally developed modem on upcoming A-Series processors.[7] Of course, Apple does not participate in the server CPU market or cater to hyperscale customers, despite iCloud, the App Store, and all of its other cloud-based services. However, we would not be surprised if one day Apple tried to bend the curve in the cloud. None of these moves are mean feats given Intel and Qualcomm have been competing in processor design and production for generations.

"Apple has effectively created a semiconductor business that rivals and even surpasses some of the most established semiconductor-focused businesses in the industry. Apple continues to differentiate through vertical integration, which has been a hallmark of Apple's long-term strategy to grow and capture superior profitability. It is difficult to predict what new products will be unveiled; however, we think this strategy should continue to serve shareholders quite well."

And from a more recent Letter is the following:

"Apple continues to develop new products and services that capture dominant profit share in some of the largest and most competitive industries around the globe. Having owned Apple continuously for the past 16 years, we find Apple's vertically integrated product development strategy has been consistently ahead of the curve, including their capabilities in machine learning and AI.

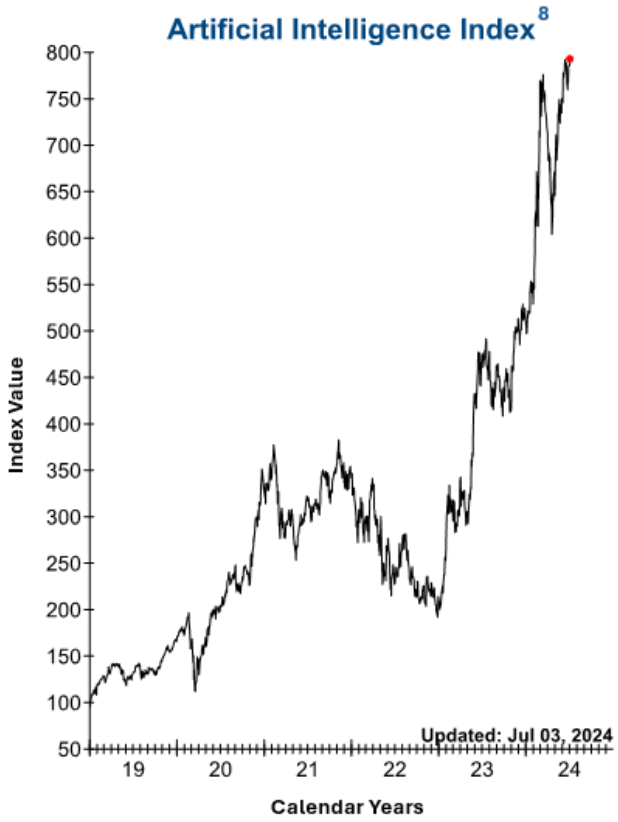
"Apple has developed well over a dozen custom processors and other integrated circuits since they launched their first "A-series" processors. The A-series processor family enables Apple-specific functions that sometimes takes competitors years to mimic. For example, in 2017 Apple's AI muscles began to flex with their A11 Bionic processor which featured a "neural processing unit" that provided the iPhone X with enough processing power specifically dedicated to operating the device's FaceID 3D mathematical algorithms so users could securely unlock their phones and also make digital payment authorizations. It took years for competitors to copy this feature using similar biometric scanning, but even those have been sparingly embraced by users.

"Meanwhile Apple's FaceID helps authorize over 600 million payments per year. FaceID is now standard for most Apple mobile devices – which we think ships over 200 million units per year - thanks to the Company's investment in and development of its neural processing units."

[6] From 2014 to 2018, Apple reported more than 250 million total iPhones and iPads per year; In 2020, Apple spent $11 billion at TSMC to procure its custom chips, according to filings, or about $44 per processor.

[7] https://www.bloomberg.com/news/articles/2020-12-10/apple-starts-work-on-its-own-cellular-modem-chip-chief-says

The Magnificent Roaring '20's – Roars On



Source: Investech

In our last Letter we chronicled the incredible performance of a select number of AI-related technology companies and its outsized impact on market indices. Well, these stocks didn't skip a beat during the quarter. (As of this writing, the so called Magnificent Seven are up +47 year-to-date, while the rest of the S&P 500 Index is just up +7.5%.) Indeed, some of the "diversified" benchmarks stock weightings have reached absurd levels. Take the Standard & Poor's 500 Index, by far the money management's most common benchmark. The S&P 500 Index is currently composed of 503 constituent stocks. As of this writing, the top six stocks make up 31% of the index. If that isn't extreme enough, consider the Russell 1000 Growth Index. This index is currently made up of 440 stocks. The same top 6 stocks make up *50%* of this benchmark!

The *raison d'être* of our investment philosophy is that to improve the odds of outperforming any benchmark, an active equity manager must build a portfolio that looks different from its respective peers and associated benchmarks – in our case, we are quite different. That's why we invest in only 20 or so stocks. For example, currently our top four holdings, all technology stocks

[8] The Artificial Intelligence Index is a proprietary measure of AI-related stocks created by InvesTech Research.

(Alphabet, Meta Platforms, Taiwan Semiconductor Manufacturing and Apple), make up nearly 32% of our portfolio. We do live (and invest) in interesting times when our focused, 20-stock portfolio is arguably as diversified (if not more) than our benchmarks that carry hundreds of stocks.

According to Bloomberg, there is over *$30 trillion* invested in passive index related funds and ETFs – and growing by billions per day. They note that the NASDAQ 100 market valuation was just over $12 trillion as recently as the first quarter last year. Fast forward a quick 15 months and that valuation figure has surpassed *$24 trillion!* The wonderful feature of most indexed funds and ETFs (and most successful investors we follow) is that such vehicles "let their winners run." Most investors, both professional and lay find this to be quite difficult. As the late, great Charlie Munger has often quipped, *"The waiting is the hardest part."* That said, the downfall of indexation is the complete absence of any valuation strictures or discipline. Today, every new dollar allocated to a S&P 500 Index fund; $.31 cents goes into just 6 stocks – regardless of valuation. Passive aggressive, indeed.

In light of the historically concentrated benchmark weightings, it is important to mention that in our technology-related holdings, we are currently only overweight in our Alphabet, Meta Platform and Taiwan Semiconductor Manufacturing holdings. Of significant note, our +8% weighting in Taiwan Semiconductor Manufacturing is rather unique in that this +$980 billion market cap company (and arguably the most critical cog in the global technology sphere) is *not* represented at all in either of these two benchmarks. Thus, we are beneficiaries of huge active share in a single portfolio holding. However, each of these three holding are approaching our self-imposed maximum weight, so future likely weights will be lower, rather than higher still. Our biggest concerns with the current AI-hype, as it pertains to our few holdings that are spending billions in AI, specifically Alphabet and Meta Platforms, are the current and nearer-term returns such billions in capex are and will generate for shareholders. Bernstein Research illustrates this below on Meta Platforms

EXHIBIT 5: **Meta's ranking algorithm has been a ROIC accretive investment**

	2021	2022	2023	2024E
Core AI investment (AI content ranking algo.)	2,530	12,460	12,086	14,118
% Content from AI content ranking algo. (people you don't follow)				
Facebook			25%	40%
Instagram			30%	50%
Increase in time spent tied to AI content ranking algo				
Facebook		4%	7%	11%
Instagram		3%	6%	10%
Total time spent on FB+IG (Tn Mins)		40,507	47,057	52,732
Recommendation algorithm driving increase time spent (T Mins)		1,316	3,059	5,590
Monetization rate ($/1000 mins)		2.83	2.81	2.92
Revenue contribution ($B)		3,719.6	8,608.3	16,312.5
NOPAT (assuming 70% incremental margin, 20% tax rate)		2,083.0	4,820.6	9,135.0
ROIC on recommendation algorithm		14%	18%	22%

Core AI investment aslo includes investment in ad tech rebuild, the benefit of which is harder to quantify and has not been included, so the ROIC could be higher.

Core AI investment is Bernstein estimates, Meta shared % content from AI content ranking algo; Meta shared increase in time spent tied to AI content algo; We use NOPAT/ Cumulative CapEx to calculate ROIC for this investment
Source: Company report and Bernstein analysis

Return on Investment ("ROI")
Return on Invested Capital ("ROIC")

The good news for these two companies is they both have been utilizing AI for some years now with concomitant profitability. The more concerning reality is both companies, plus the entire AI space are spending at levels indicative of an "AI arms race." At this stage of the AI boom (mania?), woe to the company that chickens-out and isn't aggressively competing in the trillion-dollar AI spending sprint. As such, the lines between maintenance capex and growth capex have become blurred. We expect much more scrutiny from investors on this conundrum in the quarters and years ahead. This much is certain: The moment any one of the largest data center providers suggest a "pause" in its AI spending to "digest" the many billions already spent, then investors (speculators) will suddenly discover just how cyclical the AI race really is.

Yardeni Research reports the following:

- But at some point, too much capital can end even the best of parties. There are hundreds of small companies that have raised billions of dollars from venture capitalists hoping to discover the next ChatGPT.
- Investors have poured $330 billion into 26,000 AI startups over the past three years, which is two-thirds more than was spent funding 20,350 startups from 2018-20, according to an April 29 *NYT article* citing PitchBook data. Likewise, generative AI deals attracted $21.8 billion last year, up fivefold from 2022, according to CB Insights data in an April 29 WSJ article.

- The AI kings talk big. Like every hip new tech industry, the AI world has its rockstars, including Nvidia's Jensen Huang, ChatGPT's Sam Altman, and Tesla's Elon Musk. Some sound like they've drunk too much AI Kool-Aid.
- Huang also noted that the company's business was about to expand into the robotics and the sovereign AI businesses. "The next wave of AI is set to automate the $50 trillion in heavy industries" with robotics factories that "will orchestrate robots that build robots that build products that are robotic."
- Not to be outdone, ChatGPT CEO Sam Altman at the Aspen Institute Ideas Festival compared the rise of AI to the discovery of agriculture and the invention of industrial-era machines. He claimed that AI will dramatically increase productivity and help global GDP grow 7% annually to double within 10 years. While we concur with Altman that AI will enhance productivity and boost economic growth, doubling the size of the world economy in a decade is quite a claim.

The following is a sober reflection of the AI boom circa-2024 from Sequoia Capital (July 2024):

"What has changed since September 2023?"

- **The supply shortage has subsided:** Late 2023 was the peak of the GPU supply shortage. Startups were calling VCs, calling anyone that would talk to them, asking for help getting access to GPUs. Today, that concern has been almost entirely eliminated. For most people I speak with, it's relatively easy to get GPUs now with reasonable lead times.
- **GPU stockpiles are growing:** NVIDIA reported in Q4 that about half of its data center revenue came from the large cloud providers. Microsoft alone likely represented approximately 22% of NVIDIA's Q4 revenue. Hyperscale CapEx is reaching historic levels. These investments were a major theme of Big Tech Q1 '24 earnings, with CEOs effectively telling the market: *"We're going to invest in GPUs whether you like it or not."* Stockpiling hardware is not a new phenomenon, and the catalyst for a reset will be once the stockpiles are large enough that demand decreases.
- **OpenAI still has the lion's share of AI revenue:** The Information recently reported that OpenAI's revenue is now $3.4 billion, up from $1.6 billion in late 2023. While we've seen a handful of startups scale revenues into the <$100M range, the gap between OpenAI and everyone else continues to loom large. Outside of ChatGPT, how many AI products are consumers really using today? Consider how much value you get from Netflix for $15.49/month or Spotify for $11.99. Long term, AI companies will need to deliver significant value for consumers to continue opening their wallets.
- **The $125B hole is now a $500B hole:** In the last analysis, I generously assumed that each of Google, Microsoft, Apple and Meta will be able to generate $10 billion annually from new AI-related revenue. I also assumed $5 billion in new AI revenue for each of Oracle, ByteDance, Alibaba, Tencent, X and Tesla. Even if this remains true and we add a few more companies to the list, the $125 billion hole is now going to become a $500 billion hole.
- **It's not over—the B100 is coming**: Earlier this year, NVIDIA announced their B100 chip, which will have 2.5X better performance for only 25% more cost. I expect this will lead to a final surge in demand for NVDA chips. The B100 represents a dramatic cost vs. performance improvement over the H100, and there will likely be yet another supply shortage as everyone tries to get their hands on B100s later this year.

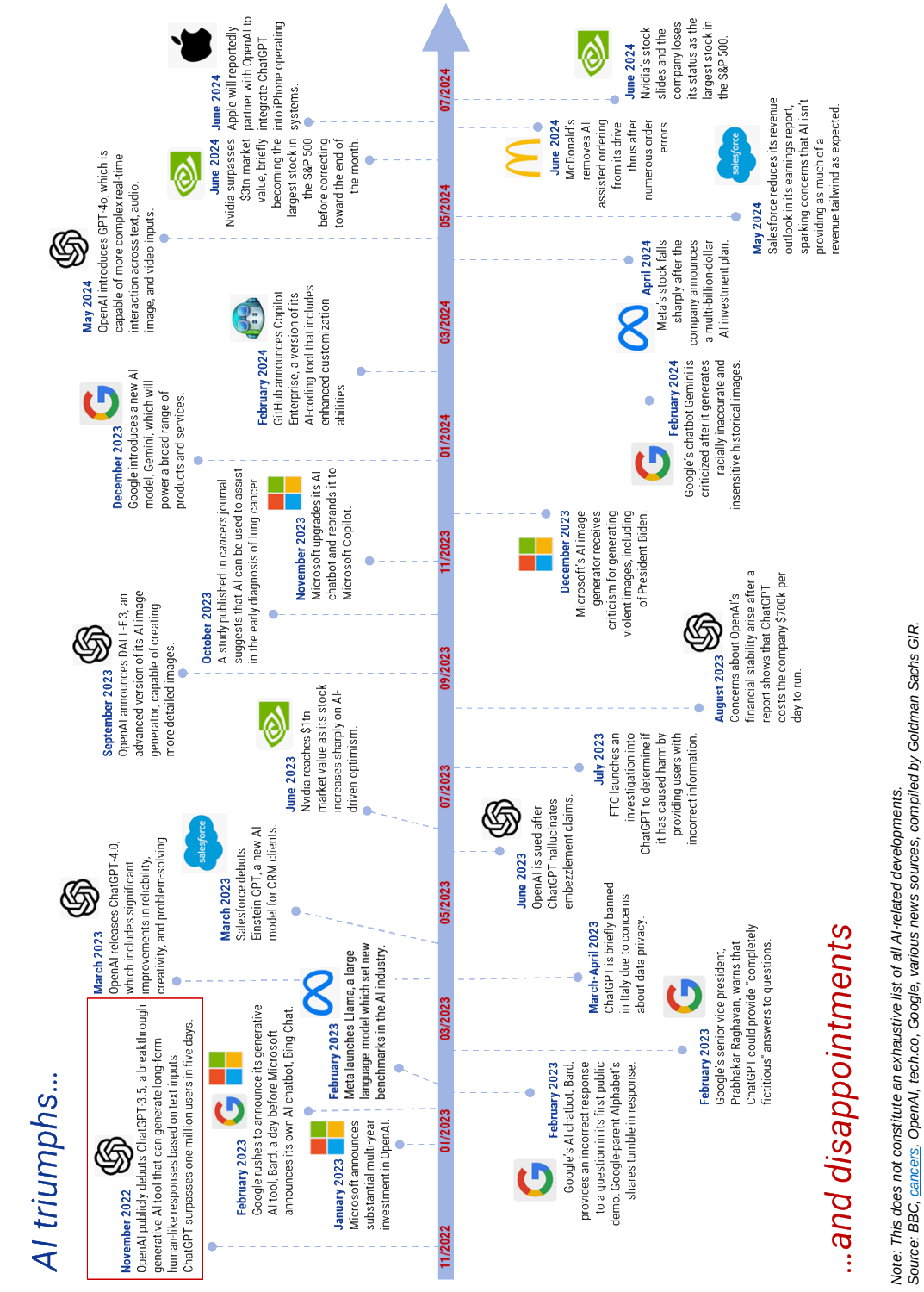
"One of the major rebuttals to my last piece was that "GPU CapEx is like building railroads" and eventually the trains will come, as will the destinations - the new agriculture exports, amusement parks, malls, etc. I actually agree with this, but I think it misses a few points:"

- **Lack of pricing power:** In the case of physical infrastructure build outs, there is some intrinsic value[9] associated with the infrastructure you are building. If you own the tracks between San Francisco and Los Angeles, you likely have some kind of monopolistic pricing power, because there can only be so many tracks laid between place A and place B. In the case of GPU data centers, there is much less pricing power. GPU computing is increasingly turning into a commodity, metered per hour. Unlike the CPU cloud, which became an oligopoly, new entrants building dedicated AI clouds continue to flood the market. Without a monopoly or oligopoly, high fixed cost + low marginal cost businesses almost always see prices competed down to marginal cost (e.g., airlines).
- **Investment incineration:** Even in the case of railroads - and in the case of many new technologies - speculative investment frenzies often lead to high rates of capital incineration. *The Engines that Move Markets* is one of the best textbooks on technology investing, and the major takeaway - indeed, focused on railroads - is that a lot of people lose a lot of money during speculative technology waves. It's hard to pick winners, but much easier to pick losers (canals, in the case of railroads).
- **Depreciation:** We know from the history of technology that semiconductors tend to get better and better. NVIDIA is going to keep producing better next-generation chips like the B100. This will lead to more rapid depreciation of the last-gen chips. Because the market under-appreciates the B100 and the rate at which next-gen chips will improve, it overestimates the extent to which H100s purchased today will hold their value in 3-4 years. Again, this parallel doesn't exist for physical infrastructure, which does not follow any "Moore's Law" type curve, such that cost vs. performance continuously improves.
- **Winners vs. losers:** I think we need to look carefully at winners and losers - there are always winners during periods of excess infrastructure building. AI is likely to be the next transformative technology wave, and as I mentioned in the last piece, declining prices for GPU computing is actually good for long-term innovation and good for startups. If my forecast comes to bear, it will cause harm primarily to investors. Founders and company builders will continue to build in AI - and they will be more likely to succeed, because they will benefit both from lower costs and from learnings accrued during this period of experimentation.

"A huge amount of economic value is going to be created by AI. Company builders focused on delivering value to end users will be rewarded handsomely. We are living through what has the potential to be a generation-defining technology wave. Companies like NVIDIA deserve enormous credit for the role they've played in enabling this transition and are likely to play a critical role in the ecosystem for a long time to come. Speculative frenzies are part of technology, and so they are not something to be afraid of. Those who remain level-headed through this moment have the chance to build extremely important companies. But we need to make sure not to believe in the delusion that has now spread from Silicon Valley to the rest of the country, and indeed the world. That delusion says that we're all going to get rich quick, because AGI is coming tomorrow, and we all need to stockpile the only valuable resource, which is GPUs. In reality, the road ahead is going to be a long one. It will have ups and downs. But almost certainly it will be worthwhile."

[9] Intrinsic value is a measure of what an asset is worth.

A short history of AI developments



Note: This does not constitute an exhaustive list of all AI-related developments.
Source: BBC, cancers, OpenAI, tech.co, Google, various news sources, compiled by Goldman Sachs GIR.

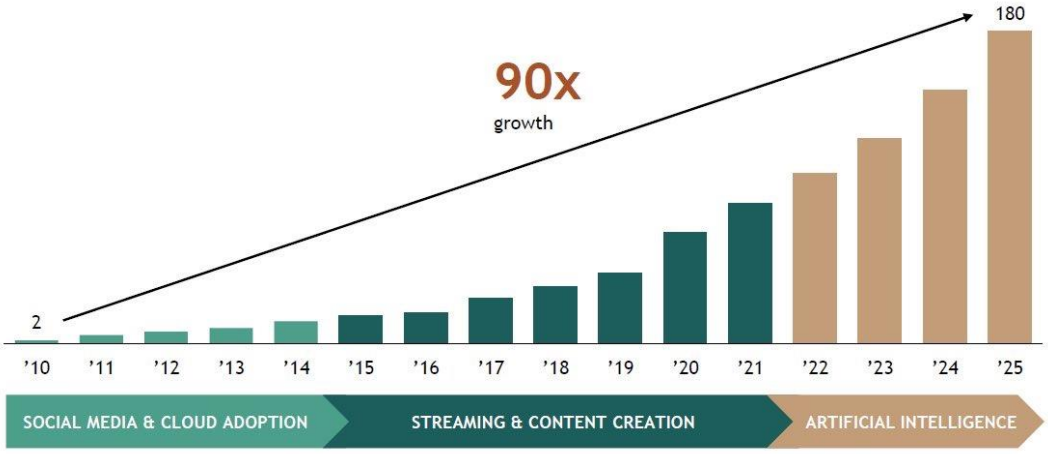
Blackstone: On AI:

DATA MEGA TREND

More data created in the last 3 years than in all of history

Explosive Growth in Data[1]

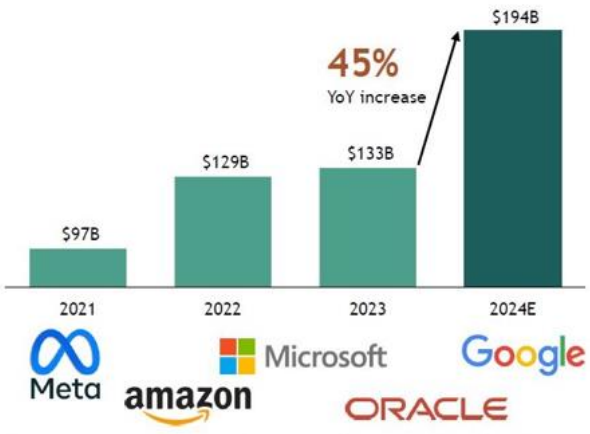
Data Created, Consumed & Stored in Zettabytes



GROWTH HORIZON

Advancements in AI drive momentum: $1+ Trillion to be invested by hyperscalers in data infrastructure

Data Center CapEx by 5 Largest Hyperscalers[1]



What is Driving the Investment?

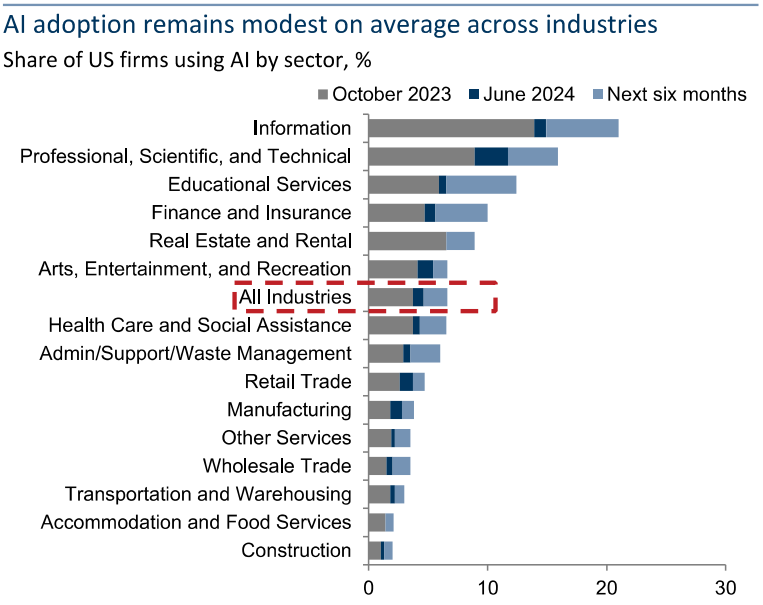
- Competition: AI arms race underway
- More compute unlocks new capabilities
- Continued strong growth of the cloud and content

There can be no assurance that any of the trends described herein will continue in the future or will not reverse. There can be no assurance that any Blackstone fund or investment will achieve its objectives or avoid substantial losses.

Note: $1+ Trillion to be invested by hyperscalers reflects Credit Suisse Estimates, as of January 13, 2023. Investment expected over the next 5 years.

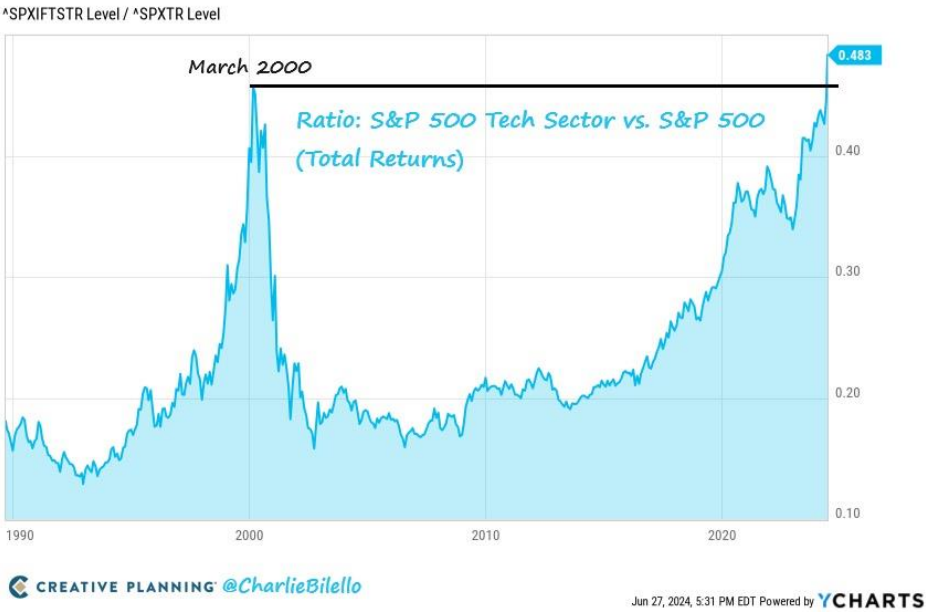
(1) Morgan Stanley Equity Research Models. Oracle actuals as of December 31, 2023.

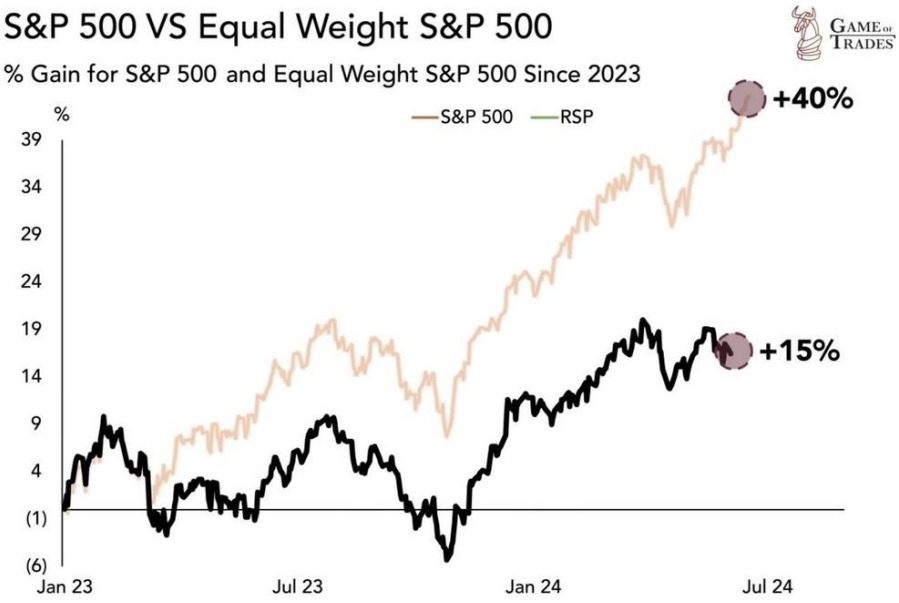
Indeed, the road ahead, circa-2024, looks quite long as industry adoption of AI thus far doesn't match much of the Wall Street hype.



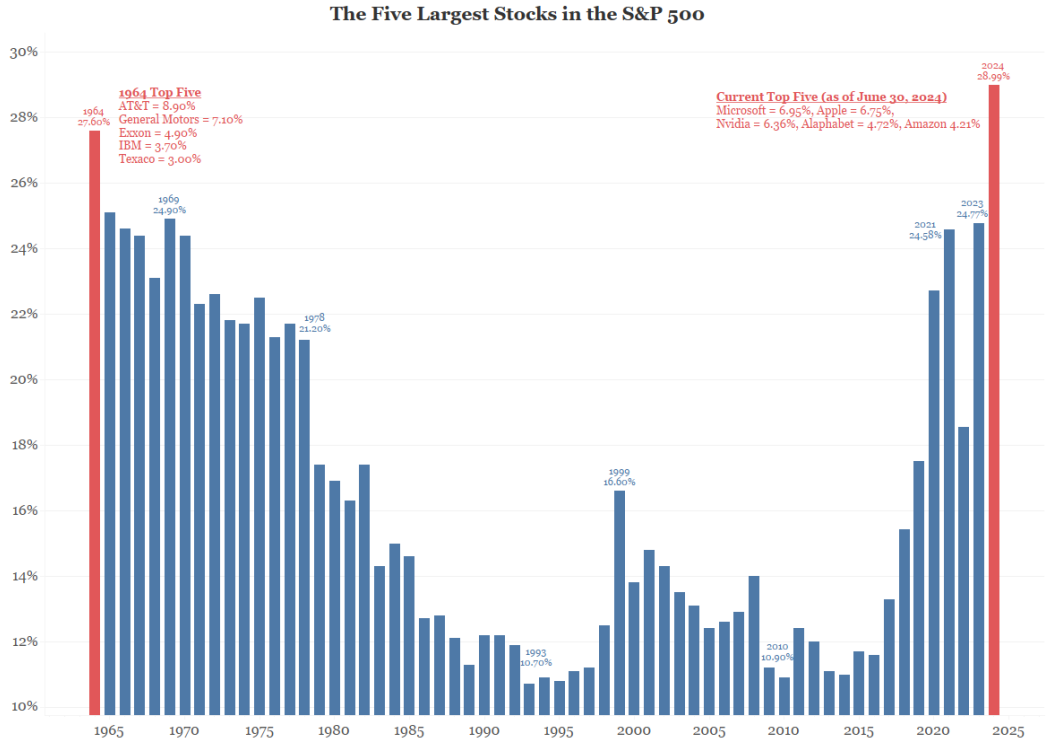
Source: Census Bureau, Goldman Sachs GIR.

The following charts illuminate the continuing, extraordinary dominance of technology stocks. Please note the last two charts. It goes without saying that our new idea buy list is dominated these days by non-tech stocks.

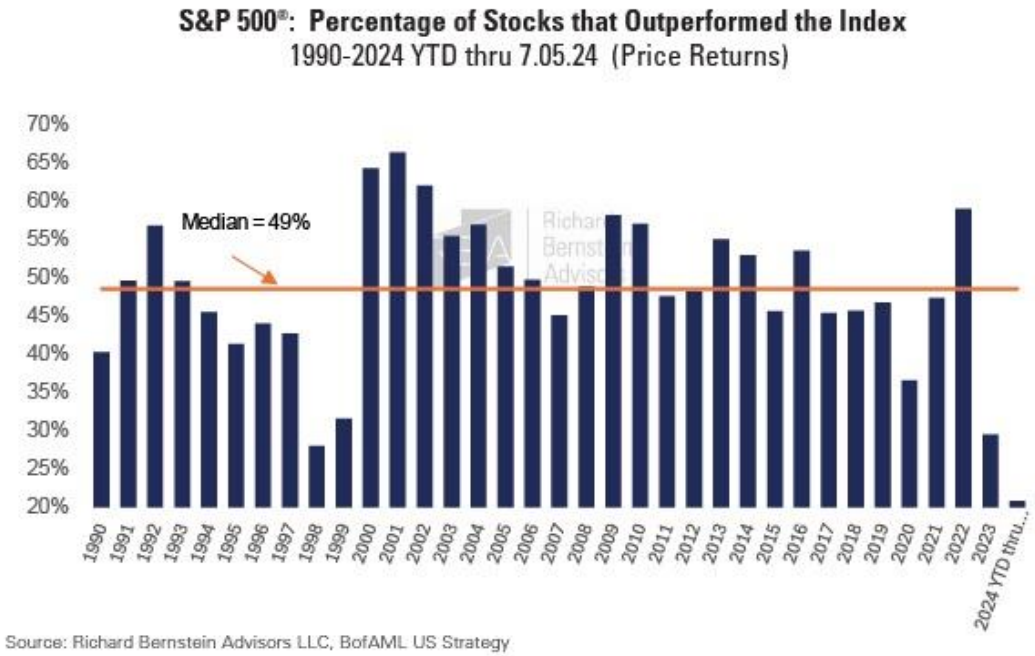




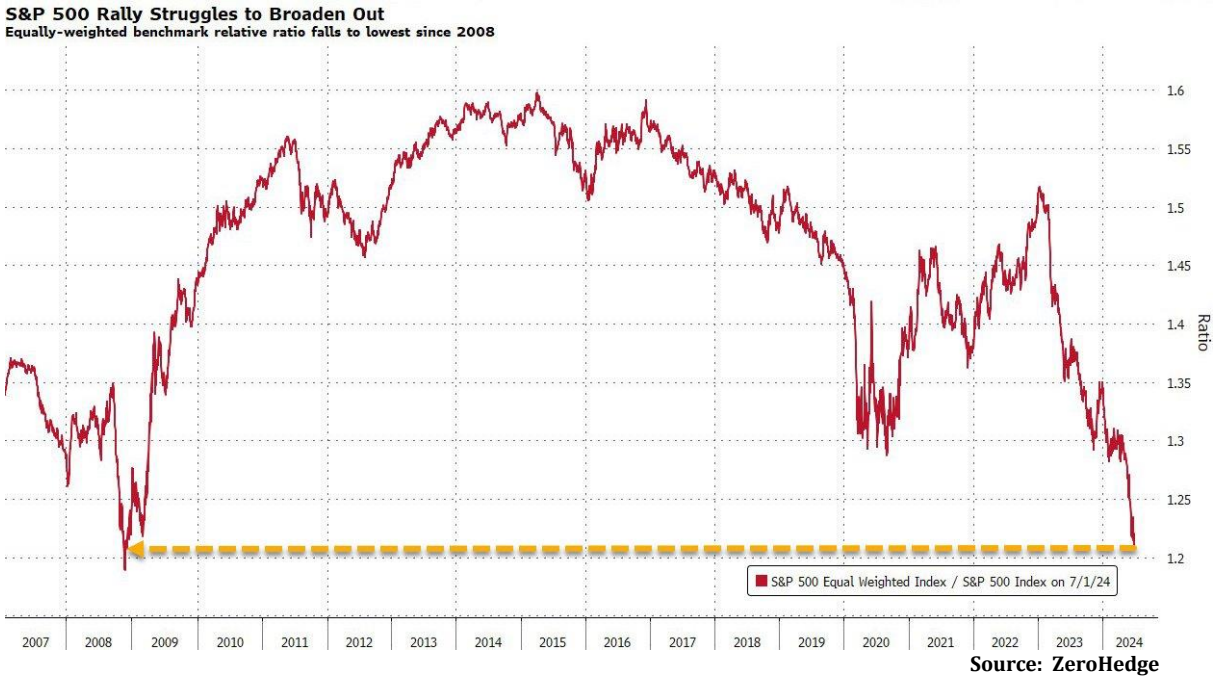
Date: 2023 Through 4th June 2024.
Source: Bloomberg L.P., Game of Trades.



Source: S&P. Dow Jones, Bloomberg



Source: Richard Bernstein Advisors LLC, BofAML US Strategy



Source: ZeroHedge

July 2024

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Research Analyst

Top Ten Holdings

The below charts depict the top 10 holdings as of the end of the quarter.

Holdings	Percent of Net Assets
Alphabet Inc.	8.9%
Meta Platforms, Inc.	7.9%
TSMC	7.5%
Apple Inc.	6.7%
Visa Inc.	6.5%
UnitedHealth Group Inc.	6.0%
Microsoft Corp.	6.0%
PayPal Holdings, Inc.	5.8%
Motorola Solutions, Inc.	5.4%
Copart, Inc.	5.3%
Total	**66.0%**

Holdings are subject to change. Current and future holdings are subject to risk.

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To determine if this Fund is an appropriate investment for you, carefully consider the Fund's investment objectives, risk factors, charges, and expenses before investing. This and other information may be found in the Fund's summary and full prospectuses, which may be obtained by calling 888.564.4517, or by visiting the website at www.riverparkfunds.com. Please read the prospectus carefully before investing.

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