The Margin of Safety Quarterly [1]
Southeast Asset Advisors, LLC
Lanigan Wealth Management
Investment Management & Consulting
Thomasville – Atlanta – Tallahassee – Mobile – Charleston

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Member of
The Lanigan Group of Companies

TO: Clients and Friends
FROM: SAA Managing Directors
RE: 2nd Quarter 2023 Commentary
DATE: July 2023

WE STRIVE TO PROTECT AND GROW
OUR CLIENTS' CAPITAL OVER THE LONG TERM BY:

(1) Focusing on individual client goals and objectives.

(2) Having the proper asset allocation to reflect each client's tolerance for volatility (i.e., temperament).

(3) Stress testing short-term liquidity needs.

(4) Investing with a value orientation and utilizing managers who understand the intrinsic value of a business and margin of safety along with passive strategies as appropriate.

(5) Rebalancing portfolio holdings/managers when appropriate to take advantage of underpriced and to avoid overpriced assets based on the client's profile of asset allocation ranges.

2nd Quarter and Year to Date

The US Equity market, as measured by the "market cap weighted" S&P 500 index, returned 3.7% for the 2nd quarter and 16.9% year to date. It was led by the "Mag 8" (Alphabet, Apple, Amazon, Meta, Microsoft, Netflix, Nvidia, and Tesla) that makes up ~27% of this index! Correspondingly, the S&P 500 Index, without these 8 stocks, returned only 2.9% for the quarter and 4.2% year-to-date through June 30, 2023. International equities as measured by the MSCI EAFE returned ~3% for the quarter and ~12% for the first six months of 2023.

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[1] <u>Margin of Safety (MOS)</u>: Many investing greats have said these are the most important three words in investing. We agree and call our quarterly letter accordingly. MOS is key in determining anything with variables occurring in the future, i.e., price to future value, all future outcomes, etc. Its magic is that the higher your MOS, the smaller your edge needs to be to have a favorable outcome.

The bond market, as measured by the Bloomberg Aggregate bond index, has returned ~(0.9%) for the quarter and ~2.3% year to date through June 30, 2023. We continue to ladder out short maturity treasuries in our fixed income allocation, which is now yielding over 5% annually.

Narrow Breadth in US Equities

We, once again, find ourselves in an environment where just a handful of stocks are conveying a skewed view of the return for equities as a whole. In many ways, the performance of the S&P 500 has distorted the look and movement of the overall stock market. The Mag 8 contributed ~80% of the entire gains of the S&P 500 this year. Without exposure to those names, one's portfolio returns looks much different than the S&P index returns. The median return of all component stocks in the S&P index is just ~5% for the year with ~40% of stocks in the index showing negative returns. There is considerable concentration risk for index trackers. We caution using the concentrated S&P index as a measurement of Mr. Market. Historically, some bull markets have been carried by ~10% of stocks, or so, but this year that number is closer to ~2%. Concentration risk of this magnitude is indeed unusual and subject to big short term increases and drawdowns, accordingly.
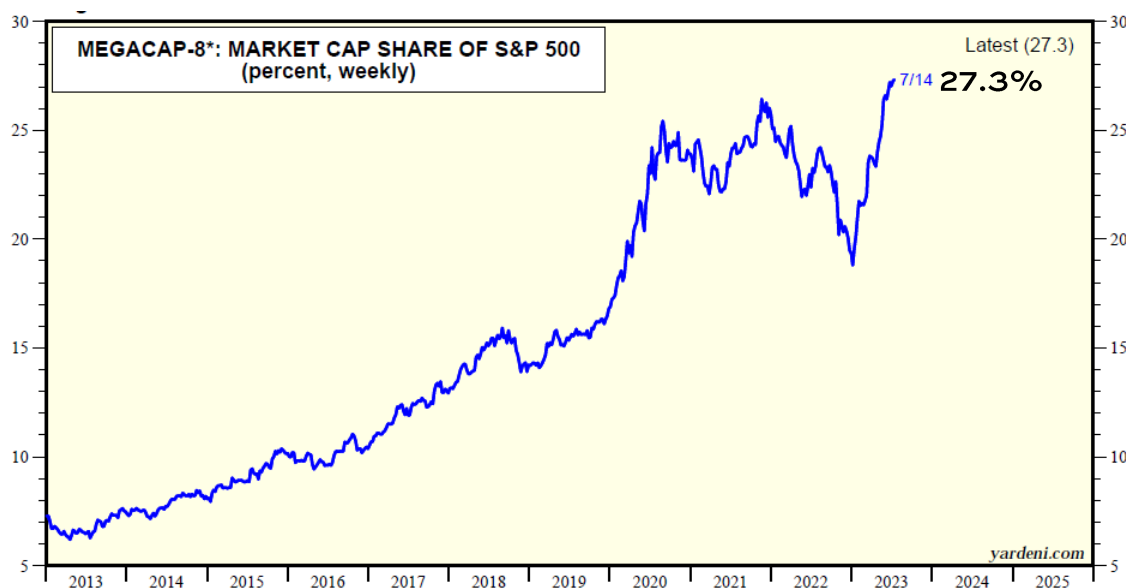
MEGACAP-8*: MARKET CAP SHARE OF S&P 500 (percent, weekly). Latest (27.3). 7/14 **27.3%**

* MegaCap-8 stocks include Alphabet, Amazon, Apple, Meta, Microsoft, Netflix, NVIDIA, and Tesla. Both classes of Alphabet are included
Source: Standard & Poor's and I/B/E/S data by Refinitiv.
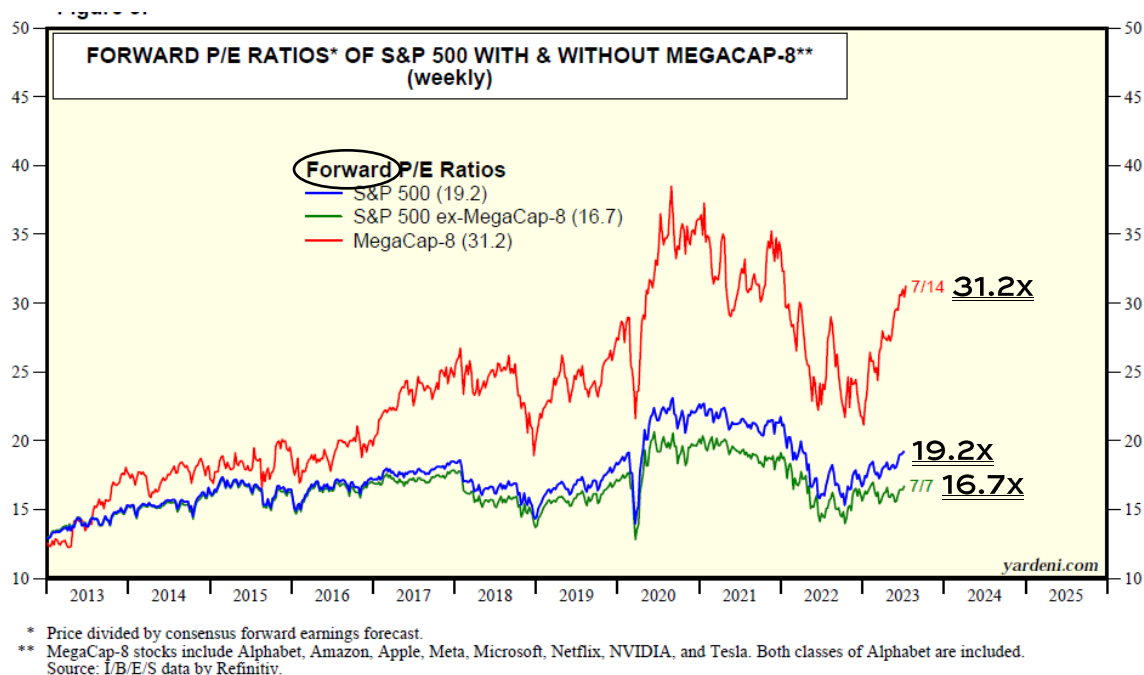
SOUTHEAST
ASSET
ADVISORS

In the last several weeks, we have been encouraged to see signs that the market performance is broadening. For example, the equal weighted S&P index has outperformed the concentrated market weighted S&P index since the end of the quarter, or the last 3 weeks. If this continues, it might be an indicator that the rally could broaden and continue upward. However, there are many other factors in the economy that will impact short-term market performance, not the least of which is inflation and corresponding interest rate changes as dictated by the Fed. Many feel the Fed will increase interest rates once more and then begin to reduce rates as inflation is reduced. We are doubtful that the Fed's goal of 2% inflation is possible or realistic.

Where do we stand in the cycle as far as "Valuation and Psychology?"

A recent WSJ headlines says it all in our opinion, *"Tech stocks, meme stocks, crypto: Investors are feeling bold again... the market looks a lot like 2021 as if the 2022 drawdown never happened...".* The WSJ article continues, "*the Mag cap tech stocks that are the market drivers are largely driven by AI (Artificial Intelligence) hype.*" Some aspects of AI are indeed hype, and some will turn out to be real (more on AI further in this letter). The 'Mag 8' has an average forward PE of ~31x up from ~21x at the end of 2022 compared with PE multiples of indexes as adjusted and shown in the graph below:

FORWARD P/E RATIOS* OF S&P 500 WITH & WITHOUT MEGACAP-8**
(weekly)

Forward P/E Ratios
— S&P 500 (19.2)
— S&P 500 ex-MegaCap-8 (16.7)
— MegaCap-8 (31.2)

7/14 **31.2x**

19.2x
7/7 **16.7x**

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* Price divided by consensus forward earnings forecast.
** MegaCap-8 stocks include Alphabet, Amazon, Apple, Meta, Microsoft, Netflix, NVIDIA, and Tesla. Both classes of Alphabet are included.
Source: I/B/E/S data by Refinitiv.

FOMO (Fear of Missing Out) is once again alive and well, as the retail bullish sentiment is at the highest level since 2021, according to surveys by AAII. Many retail and other investors who moved to cash and are not in Mag 8 are now experiencing FOMO. They are moving back into the Mag 8 market, fueling the performance. We are reminded of the saying, "what is smart early is dumb late!"

As we have repeatedly written, we do not think anyone can predict the macro future. However, at market extremes, we believe that we can make rational 'macro guesses' about the future. Through our valuation lenses, we do not yet see an "everything bubble" i.e., in times past that were driven by ultra-low interest rates used to stimulate the economy following the GFC of 2008, as well as during the pandemic of recent years. The S&P trades at a forward PE of ~20x (5% earning yield). The Mag 8 are at ~31x PE, so the remaining 492 stocks in the S&P 500 trade at a PE of ~16.7. This is above the historical average of ~15x but not extreme depending on the current interest rates that you use to discount earnings, etc.

Internally, we use a scale of 1 - 10 (1 being most defensive and 10 being the time to be most aggressive) to describe the risk / reward offered by the market. We guess the risk / reward measure is currently ~4. Thus, we are slightly defensive in most of our portfolios.

We want to know what we own, i.e., how much "Mag 8", etc. Our cash position (held in very short laddered maturities) is somewhat elevated in all, but the most aggressive portfolios, and yes, we are participating in some of the Mag 8's.

We are also watching for more opportunities and making sure we stay diversified in our equity holdings. In the AI (Artificial Intelligence) area, we like the companies that have significant cash balances and high free cash flow such as Alphabet, Apple, Microsoft, or Berkshire Hathaway (that own a lot of Apple).

Unknown Unknowns

The market continues to be caught in a tug-of-war between those predicting a soft landing, and those who think a recession is imminent. Of course, recessions are a normal part of the economic cycle, and a mild one is not a big worry.

What is most important to us as long-term investors, and key to long-term valuation is the ultimate interest rate environment and corresponding inflation rate. We believe great companies bought at fair prices that can raise prices are by far the best way to keep up with inflation (see our prior memo on inflation that we attached to our letter in July 2021.

We continue to see a "Helicopter Money Drop" (HMD) that may have been essential during the pandemic times, but this continued too long in our view. As we move into a Presidential election year, we can expect more HMD. This may help keep the economy going strong in the short term.

The deficits and social security looming crisis continue as U.S. politicians do not seem to worry about running ever increasing deficits. If we cannot control deficits in peace times, when will we? Our base case includes higher taxes of all kinds at some point. How long can large deficits continue without some negative impact? This is a big 'unknown unknown'. Also, our long-term crystal ball sees higher long-term interest rates and continued higher than 2% inflation, and may be somewhat higher.

In Closing

Looking at the stock market, we see a barbell in valuations, where many companies (some deserving) trade at multiples that are priced for perfect (high growth) and have little margin for error or margin of safety in price to value. At the same time many companies trade within range of fair values (especially if lower interest rates exist in the future).

We have enclosed an article with detailed information and thoughts on AI (Artificial Intelligence). Present developments and progress in AI will surely provide opportunities for productivity gains to some; however, winners and losers will emerge as always in the capitalist system.

We are neutral and somewhat defensive in our equity allocation, as we watch for more good risk adjusted return opportunities and stay diversified. We are now earning a ~5% yield on short-term fixed income holdings.

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As always, please reach out to us if you need us in any way. We are working diligently on your behalf and continue to have our north star as valuation, and proper asset allocation that is right for each client's goals and objectives.

Have a great balance of the summer. Enjoy your family!

Your SAA Team

Enclosure: Article on AI

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"In the short run, the market is a voting machine but in the long run, it is a weighing machine." – Ben Graham

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"Good, better best, never let it rest, until the good is better and better is best."

- S. Beall (graduation speech)

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"Even the most serious efforts to make predictions can end up so far from the mark as to be more dangerous than useless." - Peter Bernstein

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"We worry top down, invest bottom up by trying to determine intrinsic value of a company with a margin of safety in price to value if held for long-term." - SAA

AI's potentially large economic impacts

Joseph Briggs finds that widespread adoption of generative AI could potentially significantly boost global productivity and GDP

The recent emergence of generative artificial intelligence (AI) raises the question of whether we are on the brink of a rapid acceleration in task automation that will significantly save time and labor costs, lead to a productivity burst, and increase the pace of economic growth. Although significant uncertainty still exists around the capabilities and adoption timeline of current generative AI models, we find that generative AI could potentially raise annual labor productivity growth by around 1.5pp over a 10-year period following widespread adoption in the US and other DM economies, and eventually raise annual global GDP by 7%.

The labor market impact of generative AI

The largest effects of generative AI on the economy will likely come from its impact on the labor market. To assess the potential size of this impact, we use data on the specific work tasks that are undertaken in a typical work week for over 900 occupations in the US and 2000 occupations in the Euro area. These data contain measures on the importance and difficulty of various tasks associated with each occupation, which we combine to estimate the share of total work exposed to labor-saving automation by AI. Specifically, we select work activities that are most exposed to AI automation based on our review of probable use cases of generative AI and assume that AI will ultimately be capable of completing moderately difficult tasks (up to a difficulty level of 4 on a 7-point task complexity scale). We then take an importance- and complexity-weighted average of essential work tasks for each occupation to estimate the share of its total workload that AI could potentially replace.

Our key finding is that a lot of workers spend a lot of time performing tasks that AI models are well-suited to automate. In particular, we estimate that roughly two-thirds of US occupations are exposed to at least some degree of automation by AI, and that of those occupations which are exposed, most have a significant—albeit partial—share of their workload (25-50%) that can potentially be replaced. After weighting our occupation-level estimates by the employment share of each occupation in the US, we estimate that a quarter of current work tasks could be automated by AI, with particularly high exposures in administrative (46%) and legal (44%) professions and low exposures in physically-intensive professions such as construction (6%) and maintenance (4%).

Using European data, we estimate that a similar 24% of work tasks in the Euro area could potentially be automated by AI. Although detailed work task data are not available for other countries/regions, reweighting our industry-level AI exposure estimates by country-specific industry-employment shares suggests that generative AI could eventually automate around 18% of global work, with larger shares in DMs than EMs.

A quarter of work tasks in the US could be automated by AI
Share of industry employment exposed to automation by AI in the US, %
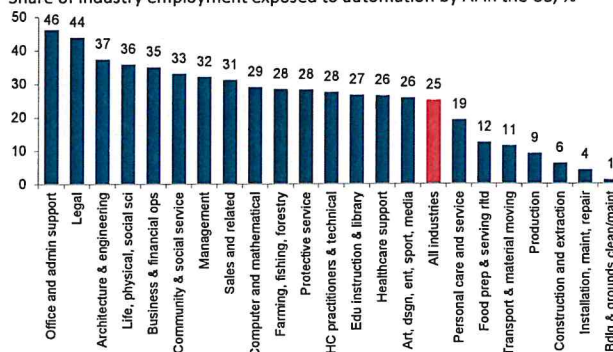
Source: Goldman Sachs GIR.

The productivity boost from generative AI

The large share of employment exposed to automation from generative AI raises the potential for a boom in labor productivity that significantly increases global growth. We see two channels through which AI-driven automation could raise global productivity and GDP.

First, most workers are employed in occupations that are partially exposed to AI automation and, following AI adoption, will likely apply at least some of their freed-up capacity towards productive activities. This dynamic is observable at firms that have already adopted AI, with studies[1] generally finding that AI adoption led to a 2-3pp annual boost to labor productivity growth for several years afterwards.

Second, while AI technology will inevitably displace some workers, we anticipate that most displaced workers will eventually become reemployed in new occupations that emerge either directly from AI adoption or in response to the higher levels of aggregate and labor demand generated by the productivity boost from non-displaced workers.

The reemployment of displaced workers due to the direct and indirect effects of technological change has plenty of historical precedent. Information technology, for example, displaced some workers in the early 2000s, but also directly led to the creation of new occupations like webpage designers, software developers, and digital marketing professionals, and indirectly increased labor demand in service industries such as healthcare, education, and food services.

The positive employment effects of technological change are especially clear over longer time horizons. 60% of workers today are employed in occupations that did not exist in 1940, implying that over 85% of employment growth in the last 80 years can be explained by the technology-driven creation of new positions.

To estimate how these channels might together raise US productivity growth, we combine estimates of the productivity boost for non-displaced workers, the labor cost savings of displaced workers, and a composition effect from the reemployment of displaced workers in new positions. In particular, we assume that around 7% of workers are fully

[1] Alederucci et al. (2022), Czamitzki, Fernandez, and Rammer (2022), Behrens and Trunschke (2020), Acemoglu et al. (2022), Bessen and Righi (2019).

displaced (given our estimate that automatable tasks account for the majority of the work of 7% of US workers), but that most are able to secure new employment in only slightly less productive positions, and that partially exposed workers experience a boost in productivity consistent with estimates from existing studies (those mentioned in the footnote on the previous page). For illustrative purposes, we assume that the full productivity boost of generative AI is realized over a 10-year period (but not necessarily the *next* 10 years) that starts when a large share of businesses has adopted generative AI.

Under these assumptions, we estimate that widespread adoption of generative AI could raise overall labor productivity growth in the US by around 1.5pp annually. A boost of this size would roughly double the recent pace of US productivity growth, and would be about the same size as the boost that followed the emergence of prior transformative technologies like the electric motor and personal computer.

Generative AI could also raise productivity growth outside of the US. Assuming that differences in the industry-composition of labor can account for most of the differences in the impact of AI on labor productivity growth, we estimate similarly sized boosts to productivity in other DM economies, and that that globally widespread AI adoption could boost global annual productivity growth for countries in our coverage by over 1pp annually (FX-weighted average), although the impact would likely be delayed in EM economies.

Tech innovation has led to the creation of new occupations that account for the bulk of employment growth over the last 80 years
Contributions to ann. job growth 1940-2018, new vs. pre-existing jobs, %
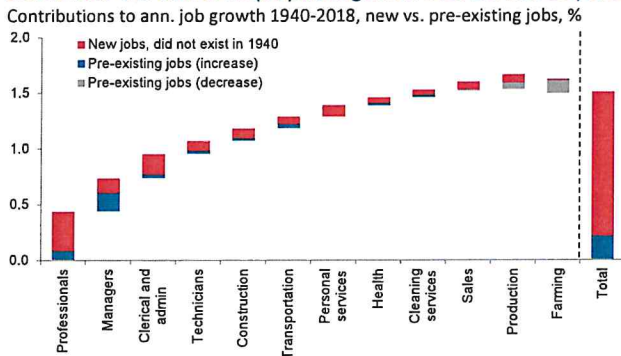
Source: Autor et al. (2022), Goldman Sachs GIR.

Widespread AI adoption could boost global annual productivity growth by over 1pp over a 10-year period
Effect of AI adoption on ann. productivity growth, 10yr adoption horizon, pp
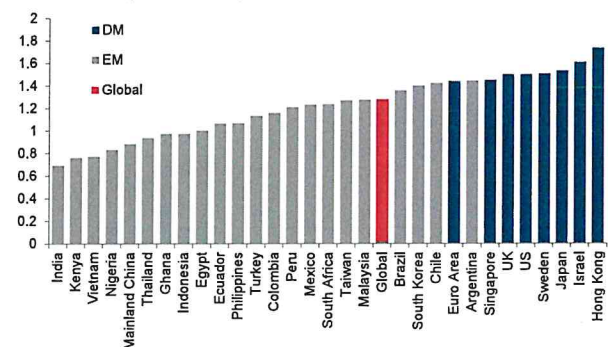
Source: Goldman Sachs GIR.

Large, but highly uncertain, impacts

While our estimated boost to productivity growth from widespread AI adoption is quite large, it is also highly uncertain, and will ultimately hinge on the difficulty level of tasks generative AI can perform, how many jobs are automated, and the speed of adoption. Varying our assumptions around each of these factors suggests that the boost to annual US productivity growth could range from 0.3-3.0pp, although in most scenarios the boost would remain economically significant.

The size of the productivity boost will ultimately depend on AI's capabilities and adoption timeline
Effect of AI adoption on ann. labor productivity growth, 10yr adoption period, pp
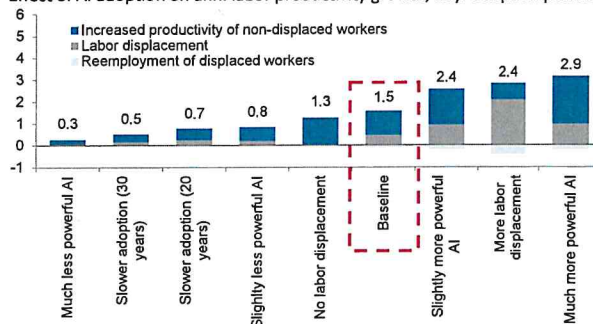
Note: A much less powerful AI scenario is where, for example, generative AI can only "skim a short article to gather the main point" (difficulty score 2) rather than "determine the interest cost to finance a new building" (difficulty score 4). A much more powerful AI scenario is where, for example, generative AI can "analyze the cost of medical care services for all US hospitals" (difficulty score 6). Source: Goldman Sachs GIR.

We also see the timing of any macroeconomic impact from generative AI as particularly hard to predict based on the evidence from past technological breakthroughs. The burst in productivity due to the electric motor and personal computer, for example, occurred around 20 years after the key technological breakthrough, at a point when roughly half of US businesses had adopted the technology.

It is possible that the surge in interest in generative AI could speed up its adoption and lead macroeconomic impacts to materialize sooner. However, AI adoption rates by US firms were only 3.2% in 2019, and though many major companies are currently exploring how to use AI, only ~20% of CEOs expect that generative AI will lower labor needs in the next 1-3 years. For example, companies still need to navigate several barriers to adoption like data privacy before most start incorporating generative AI in their everyday workflows. We therefore suspect that the effect of generative AI will probably not be visible in aggregate productivity data for at least several more years.

Nevertheless, the significant work task exposure to AI automation, combined with our sizable estimates of potential productivity increases, highlight the enormous economic potential of generative AI if it does deliver on its promise. Indeed, applying the estimated productivity boost to countries in our coverage, we find that widespread AI adoption could eventually drive a 7%, or almost $7tn, increase in annual global GDP over a 10-year period, and therefore view generative AI as a significant upside risk to our medium- and longer-run global economic growth projections.

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US equities: gauging the AI upside

Ryan Hammond and David Kostin argue that potential AI-related productivity boosts could lead to more upside for US equities

With a surge in focus on generative artificial intelligence (AI) driving recent outperformance of US tech stocks and sending some of them to record-highs, how much more AI-driven upside remains for US equities? Despite the recent gains, we estimate that potential AI-related productivity boosts could lead to significantly more upside for S&P 500 earnings and stock prices over the medium-to-longer term, although substantial uncertainty and risks remain.

A potential boost to US productivity, earnings, and equities...

Our economists estimate that widespread generative AI adoption (which we assume occurs in 10 years) could boost US productivity growth by 1.5pp annually over a 10-year period and lift trend real GDP growth by 1.1pp for 10 years (see pgs. 14-15). Under these assumptions in our dividend discount model (DDM), we estimate that S&P 500 EPS CAGR over the next 20 years would be 5.4%, 50bp greater than our current assumption of 4.9%, and S&P 500 fair value would be 9% higher than current levels, holding all else equal.

Widespread AI adoption could lead to S&P 500 EPS in 20 years 11% greater than our current assumption
S&P 500 EPS forecasts over the next 20 years, $
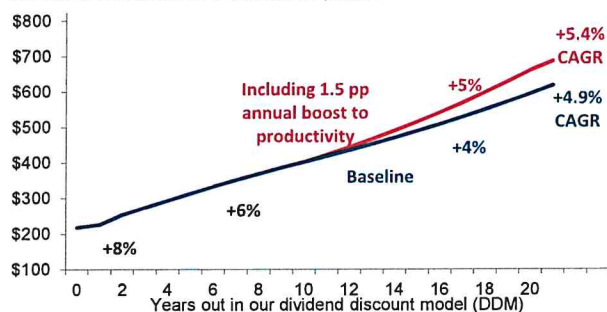
Source: Goldman Sachs GIR.

...but an uncertain one

That said, the range of potential AI impacts on the S&P 500 is wide—and therefore unlikely to be fully priced by investors in the near term—for four key reasons:

1. **Our economists' estimates of the impact of AI adoption on productivity growth vary** from 0.3pp to 3.0pp annually, depending on the speed of adoption, the power of AI, and the breadth of labor displacement. Based on this range of productivity scenarios, we estimate that the upside to S&P 500 fair value could be as small as 5% and as large as 14%. And the potential upside could be even larger if the uplift in GDP and revenue growth is also accompanied by an increase in corporate profit margins.
2. **Policy responses could constrain the ability of companies to retain the additional profits generated from AI.** Corporate profits as a share of GDP stand at elevated levels relative to history, while wages as a share of GDP remain near historic lows. If AI adoption leads to increased corporate profits at the expense of labor,

policymakers could respond by raising corporate tax rates. The effective corporate tax rate would need to rise by 8pp to fully offset the 11% increase in the stream of future S&P 500 earnings that may otherwise occur as a consequence of corporations embracing AI.
3. **A higher interest rate environment could negate much of the potential increase in S&P 500 fair value.** While a productivity boom that leads to lower prices could be disinflationary and put downward pressure on rates, our economists note that AI could increase investment demand and in turn lift estimates of the neutral rate, a key input in monetary policymakers' decisions. We estimate that interest rates would only need to rise by 30bp from current levels to fully offset the upside to fair value from AI adoption, all else equal.
4. **S&P 500 prices are more clearly tied to near-term cyclical dynamics**, even if AI adoption could provide a boost to the S&P 500 index in the long term. If economic data weaken and a recession becomes more likely (with the consensus of forecasters already assigning 65% odds to a recession in the next 12 months versus our estimate of 25% odds), S&P 500 prices would likely decline, regardless of the long-term impact of AI.

The potential productivity boost from AI adoption could lead to significantly more upside for the S&P 500 index
Estimated effect of AI adoption on S&P 500 fair value, % change from today
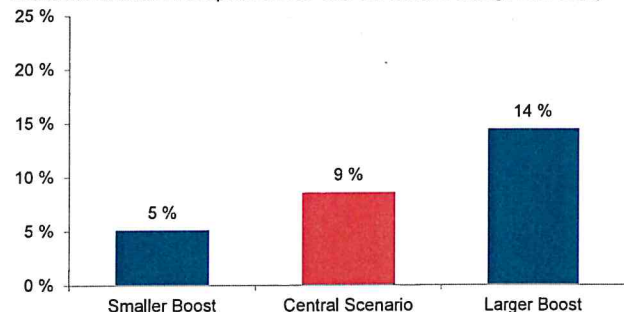
Source: Goldman Sachs GIR.

The perils of euphoric expectations

At the index level, the current equity risk premium and long-term EPS growth expectations are roughly in line with historical averages, suggesting investor optimism on AI adoption is not at extreme levels. However, at the stock level, the current valuation of the largest AI beneficiaries, like NVDA, is similar to the valuation accorded in the 2000s to some of the largest Dot Com Boom beneficiaries (MSFT, INTC), though not as high as the most extreme example (CSCO). Historical precedent from the Dot Com Boom shows the perils of high expectations. Even though most TMT companies were still able to generate strong sales growth between 2000 and 2002, the failure to meet lofty investor forecasts led to a sharp 50%+ contraction in P/E multiples and a plunge in share prices. Euphoric growth expectations, therefore, are another risk worth watching.

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Markets around past productivity booms

Dominic Wilson and Vickie Chang assess the impact of past innovation-driven productivity booms on markets and what that could mean for the potential AI productivity boom ahead

With generative artificial intelligence (AI) potentially ushering in a period of sustained substantial productivity growth (see pgs. 14-15), a key question is how that might impact major macro markets. We turn to history as a guide on the macro market impacts of innovation-driven productivity booms, focusing on two major episodes: the widespread adoption of electricity after World War I (1919-1929) and the broad adoption of PCs and the internet in the late 1990s and early 2000s (1996-2005).

Of course, factors beyond the productivity boom also drove markets during these episodes. The EM crises of 1997-1998 significantly impacted the global economy and asset prices, and after 2003, China's accession to the WTO prompted big shifts in manufacturing. Similarly, the start of the 1920s productivity boom overlapped with the transition from a wartime to a peacetime economy. Limited data availability and changes in financial markets prevent a full comparison across the major markets in the two episodes.

But markets around these prior productivity booms nonetheless shared some commonalities: Both booms had the biggest impact on equities and equity valuations—which rose substantially—and both ultimately ended in bubbles and subsequent busts. We find that the potential AI productivity boom ahead shares some of the key features of these prior periods, so could this boom/bust cycle happen again?

Major innovation-driven productivity booms occurred around the adoption of electricity and of PCs/the internet

US labor productivity, % change, 5y annual rate
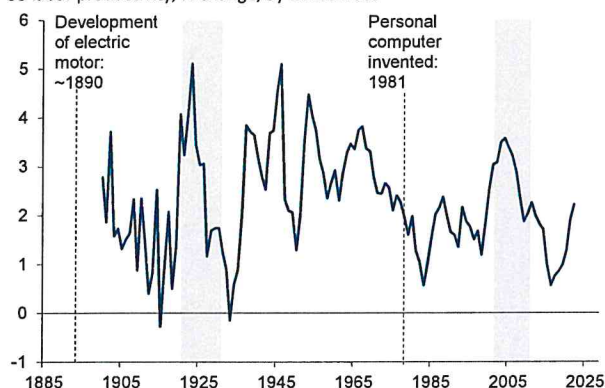
Note: Grey shaded areas represent resulting productivity boom.
Source: US Bureau of Labor Statistics, Woolf (1987), Goldman Sachs GIR.

The nineties boom and bust

During the period of PC/internet adoption (1996-2005), US equities posted healthy, if unspectacular, gains. Profits and earnings outpaced GDP somewhat, but the S&P 500 gains were broadly in line with nominal GDP gains. US Dollar appreciation was relatively modest and, excluding EM economies, FX was little changed on net. Similarly, both the Fed funds rate and 10-year yields declined over the period and

tracked the domestic demand cycle. Oil prices fell sharply during the EM crises in 1997-98 but moved higher by 2005.

**Asset market performance during 1996-2005 productivity boom**

	Change from:		
	1996 to 2005	1996 to 2000 peak	2000 peak to 2005
Effective Fed Funds Rate	-140bp	98bp	-238bp
10-year Treasury Yield	-118bp	101bp	-219bp
Real Broad Dollar	9%	21%	-10%
Nasdaq 100	199%	687%	-62%
S&P 500	105%	142%	-15%
Oil (WTI)	218%	83%	74%

Source: Haver Analytics, Goldman Sachs GIR.

But these relatively modest shifts over the period mask a much larger economic and market boom and bust within the period. During the initial productivity boom, the pattern of market shifts, though not the magnitudes, match what would be expected from an (over-) anticipated productivity boom—equities rose sharply and valuations climbed to extreme levels.

A significant domestic economic boom accompanied these moves. The investment share of GDP climbed, the savings rates fell, and the current account deteriorated. Both the Fed funds rate and longer-dated yields fell over 1997-1998 as the Asian financial crisis and Russian default hit, but with domestic demand booming, the funds rate rose to a fresh cycle peak in 2000. Longer-dated yields rose too but remained below their 1996 levels as low and stable inflation held down the term premium. Significant US Dollar appreciation in the late 1990s (peaking in early 2002) largely owed to the EM devaluations of 1997 and 1998, but the Dollar—as the preferred recipient of capital flows—also rose against other advanced economies. However, as boom turned to bust, equities saw large declines, interest rates fell, and the bulk of the Dollar strength reversed.

Over 1996-2005, profits and earnings outpaced GDP, but S&P 500 gains broadly tracked nominal GDP gains

Index, 1996=100
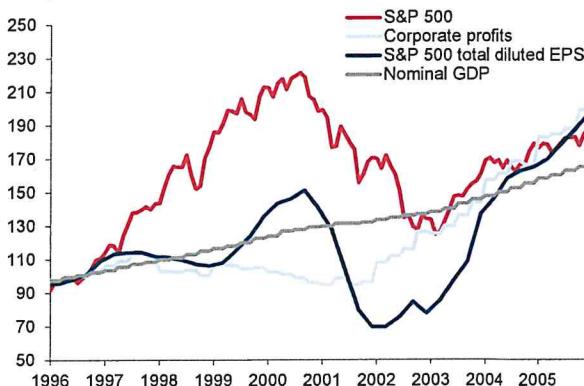
Source: Haver Analytics, Goldman Sachs GIR.

The roaring twenties

The evidence around the productivity boosts in the 1920s, as electricity adoption spread, is sparser but provides some parallel lessons. Once again, equities saw sustained gains and a sharp climb in valuations alongside the productivity boom, but the 1929 crash ultimately ensued. The story for rates and FX is

harder to map to the current context given the differences in monetary policy and exchange rate management. Inflation was extremely low over the period. But the Fed's discount rate again followed the economic and equity cycle, falling in 1924 as the economy weakened before rising steadily and hitting new peaks as the equity bubble accelerated and then burst.

Overall, these two prior experiences suggest that the biggest impact on asset markets was felt in equities and equity valuations, which ended in bubbles both times. The behavior of rates and FX appears to have been driven more by domestic demand than by persistent structural shifts from the change in trend productivity growth, though the 1990s provide some support for the idea that economies experiencing outsized productivity gains could see FX appreciation pressures.

Bubble trouble

Consistent with history, US equities have already been the focus of expectations of AI-related productivity gains in the recent period. Our equity strategists have laid out benchmarks for the equity index upside that an AI-induced productivity boom might fundamentally justify (see pg. 16). So, will the market overshoot those valuations—creating a bubble that ultimately ends in a bust—as the historical experience suggests?

Valuations climbed rapidly during prior innovation periods before retracing
Shiller Cyclically-Adjusted P/E
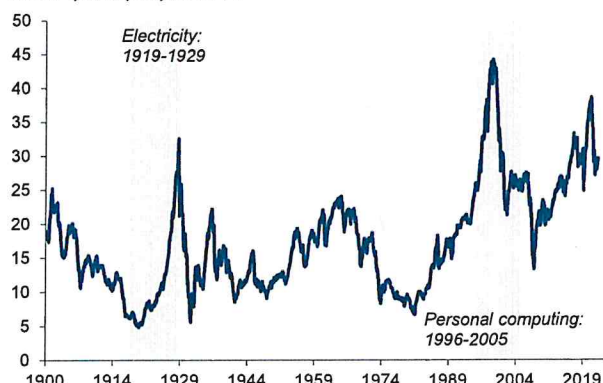
Source: Robert Shiller, Goldman Sachs GIR.

Bubbles are complicated phenomena, often driven by momentum and self-fulfilling price dynamics. But several reasons explain why productivity booms can lead markets to overpay.

First, investors may fall prey to a fallacy of extrapolation. With genuine innovation, productivity gains will be real. In the short term, accelerating productivity growth can increase profit shares even at the economy-wide level. But, on average, competition or investment largely eroded those initial gains over subsequent years. This implies that a faster phase of profit growth at the start of periods of innovation tends to be "paid back" over time. To the extent that markets price initial increases in profit growth as persistent, the long-term potential shift in the earnings trajectory may be overestimated.

Second, investors can fall prey to a fallacy of aggregation. During periods of innovation, some individual companies may be capable of stretches of stunning earnings growth driven by a

new technology. But it is a mistake to assume that what can be true for an individual company can be true on aggregate. Even at the individual level, competition and market entry can ultimately limit the potential for sustained high profits. With potential "winners" sometimes more obvious than losers, investors may price a chance of increased profitability across a broad range of potential winners. The result may imply a rate of economy-wide profit growth that is unlikely to be feasible.

Third, activity fueled by the bubble itself can appear to justify the optimism. As asset prices rise, they may encourage a boom in investment and consumer spending. This in itself may provide a boost to the profitability of companies supplying those areas. But if increased revenues and profits are ultimately based on unsustainable demand that is generating economic imbalances, then those gains too will eventually unwind. In other words, a domestic boom created by overvalued asset prices can fuel the perception that higher profit growth can be maintained. For example, in the late 1990s, the domestic boom generated a major savings-investment imbalance that ultimately unwound in the bust but that generated more rapid demand growth for a period.

Fourth, to the extent that an acceleration in productivity growth leads to monetary policy that is easier than it "should" be, it can help fuel asset price overvaluation. This could happen for several reasons: the acceleration in productivity growth could lead inflation to undershoot; central banks could be slow to appreciate that the neutral rate has risen; or unsustainable current account deterioration could postpone the inflationary consequences of a boom. This is particularly a risk when a boom overlaps with other disinflationary forces, as it did for the US in the late 1990s.

The challenge of keeping it real

All that said, bubbles can form without these conditions, and not all high-productivity periods lead to bubbles. But the challenge with periods of sustained productivity improvement is that the underlying economic shifts are both powerful and real. They provide fundamental support for higher asset prices—and create the basis for dramatic gains for some companies–even if that fundamental improvement is then too widely or too dramatically priced. The coming potential AI productivity boom shares some of the key features that led to these issues in the past: a breakthrough innovation that might lead to sizable increases in productivity and profitability, which then creates the basis for substantial new investments and fuels belief in a broader cycle of innovation.

If the market does overpay for the AI productivity boom, that has the capacity to impact a broad set of asset price shifts. The 1990s history suggests that this dynamic could be associated not just with a period of unsustainably high equity prices, but also larger demand booms, greater FX appreciation, and higher interest rates in the leading countries than would have otherwise been the case.

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