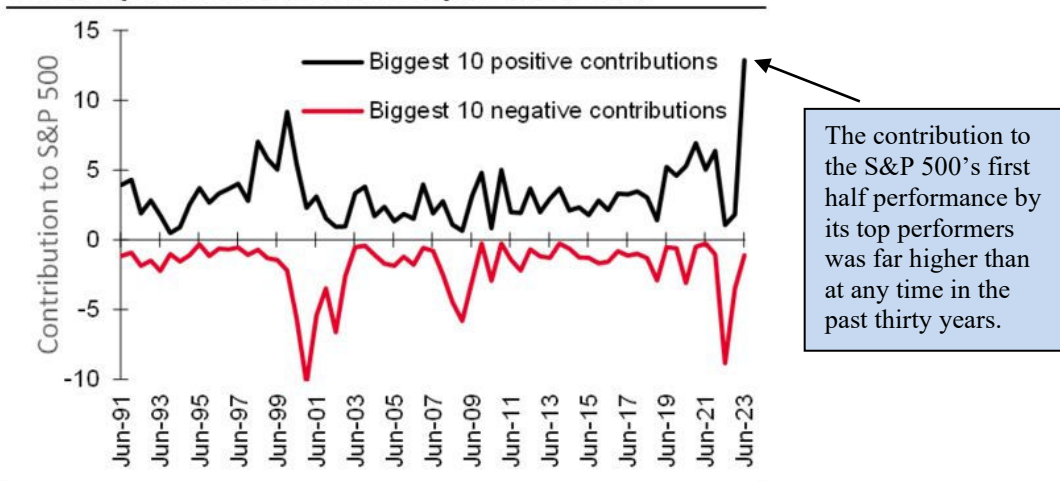


Investment Commentary—July 2023

On June 8th the S&P 500 Index of large company U.S. stocks closed just shy of 4,294, more than 20% above last October's low. In crossing the 20% threshold, the index (and the U.S. stock market generally) officially entered a bull market. There's no mystery as to what is fueling the rally. At one point in the second quarter, the entire stock market gain for the year was attributable to seven stocks—Alphabet (Google's parent), Amazon, Apple, Meta Platforms (Facebook's parent), Microsoft, NVIDIA and Tesla. After a very rough 2022, the giant technology/communications stocks have come roaring back. The chart below, courtesy of the research team at Société Générale, illustrates just how unusual the concentration of gains in a small number of stocks is.

The biggest positive and negative contribution to S&P 500 6-month performance (overall % impact on S&P 500)



The spark igniting the surge in the "S&P 7" seems to have been the flashy debut of ChatGPT¹, an artificial intelligence (AI) "chatbot" developed and operated by OpenAI. For years AI researchers have been developing models that respond intelligently to complex natural language (e.g., English) prompts. The AI models are trained on massive data sets that include billions of pages of internet content. There is some controversy as to whether these "large language models" actually understand anything. Nevertheless, they have improved rapidly and their ability to respond to complex prompts with well-organized and very sophisticated output is quite spectacular.

¹ ChatGPT debuted at the end of November 2022, but it was the introduction of a new and much improved version in March of this year that seemed to ignite the current AI frenzy.

In January Microsoft announced a \$10 billion investment in OpenAI and plans to rapidly integrate ChatGPT into its Bing search engine and other products. Leading up to Microsoft's announcement, founder Sam Altman had a series of meetings with Bill Gates. Gates was initially skeptical and told Altman last summer that he would be more interested if ChatGPT could pass the Advanced Placement biology exam. Which, to Gates's great surprise, it did with flying colors.

The large language models underlying ChatGPT and other AI chatbots have important limitations including occasional striking lapses in accuracy. While able to pass an AP biology exam, they often struggle with basic reasoning about everyday situations. Despite these limitations there is no question that products like ChatGPT will eventually revolutionize a myriad of fields from customer service to journalism to education.

While it's unclear exactly how this revolution in AI will unfold, there are already clear winners such as NVIDIA Corp. NVIDIA began adapting its graphics chips and related software for AI products nearly fifteen years ago and dominates the AI chip market. Shares are up 185% this year and the stock market is valuing the company at an astonishing 24x sales (almost ten times the multiple for the overall stock market). With its OpenAI partnership, Microsoft may be another beneficiary of the AI revolution. But the reality is, that with a few exceptions, it's probably too early to declare winners and losers. Even with a clear winner like NVIDIA, the near tripling of the share price may be a case of much too far, much too fast.

The excitement over ChatGPT quickly spread to stocks with any sort of AI connection, including the five companies that have long dominated the digital economy: Alphabet, Amazon, Apple, Meta and Microsoft. The share price surge in these five stocks (and NVIDIA and Tesla) has left the U.S. stock market extraordinarily top-heavy, a fact that was highlighted when Apple became the first company in the world to achieve a market value of \$3 trillion less than five years after becoming the first publicly traded company to cross the \$1 trillion mark!

The enclosed chart traces the three most valuable companies in the S&P 500 Index since 1980. It illustrates just how heavily concentrated the U.S. stock market has become and the risks that entails. As dominant as companies like Apple, Microsoft and Alphabet appear today, they will inevitably follow the path of companies like GE, IBM and Exxon, whose days of dominating the U.S. stock market are long gone. Even more worrisome is the possibility (likelihood?) that even if these three companies are on top in ten years, they may comprise much less than the 18% of the S&P 500 they represent today. If that 18% becomes a more historically normal 9% or 10%, the resulting investment returns would be disappointing to say the least.

This year's stock market climb has come despite widespread concern that the U.S. economy could tip into a recession in the next six to twelve months. Over the last sixty years, the Federal Reserve's track record of cooling inflation by raising interest rates without tipping the economy into a recession has been poor. To make matters worse, the rate hike cycle that began early last year is one of the most aggressive in decades. Many economists had expected the economy to roll over by now and the

fact that it hasn't has revived hopes for a "soft landing," where the Fed is able to tame inflation without triggering a recession.

Economists and market analysts are split on whether a soft landing is likely or even plausible. Pessimists point to the fact that interest rate hikes take as long as five or six quarters to work their way through the economy. Furthermore, it is generally thought that real interest rates must be positive before they have a significant impact on the economy. Until the last few months real interest rates, i.e. rates adjusted for inflation, have been **negative**. Most of the economic pain from interest rate hikes may be yet to come.

Adding to the case for an imminent recession are the aftereffects of the recent collapse of Silicon Valley Bank (and a few others). Many small and medium-sized banks, facing a significantly less dangerous but still impactful version of the dynamics that sunk SVB, are pulling back on lending to conserve capital. While these banks may not be household names, they provide a vital source of funding to the small and medium-sized businesses that comprise a huge part of the U.S. economy. Some banks may also become more cautious as they look ahead to a slow-moving but inevitable reckoning in the commercial office-space sector. With millions of office workers continuing to work either mostly or exclusively from home, tens of thousands of half-vacant office buildings around the country are generating enough cash flow to make monthly loan payments but not nearly enough to make the large principal payment that is typically required at the end of a commercial mortgage. Bottom line: the case that the recession has been delayed but not avoided is quite strong.

Optimists would point to several countervailing factors, including consumer balance sheets that remain healthy and a very strong labor market. With labor shortages fresh in the minds of CEOs, companies have been reluctant to shed jobs even if they see some indications of a weaker economy. Perhaps most notably, in recent months the housing market has shown surprising resilience. Residential home construction is one of the most interest rate-sensitive sectors in the economy. New home construction was declining rapidly as mortgage rates soared last year but rebounded this spring due to stabilizing mortgage rates and persistent demand.

It's impossible to know for sure whether a recession can be avoided. However, it's striking that the Federal Reserve's own internal economic forecast last month "continued to assume ... that the effects of the expected further tightening in bank credit conditions, amid already tight financial conditions, would lead to **a mild recession starting later this year.**" When the very folks steering the economic ship predict choppy waters ahead one ought to pay heed.

Recessions are an ordinary part of the economic cycle, so a mild recession would hardly be devastating. But if the buoyant U.S. stock market is counting on a soft landing, even a mild recession could trigger a meaningful pullback.

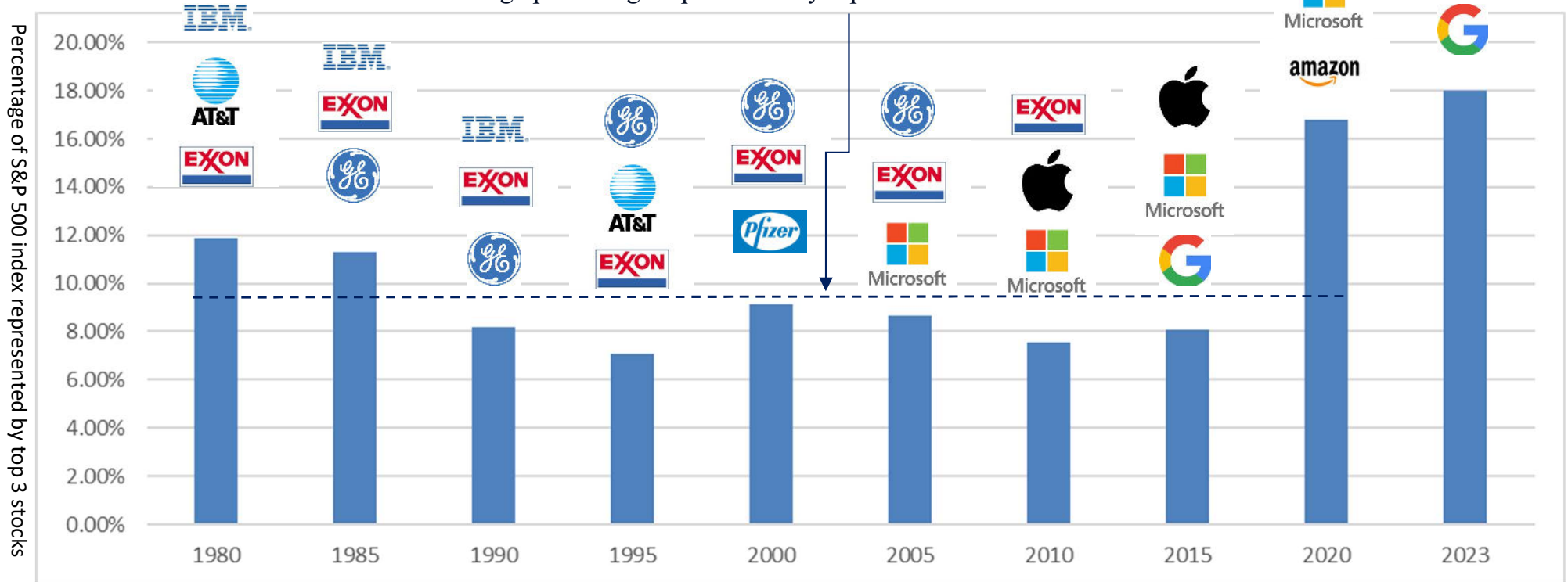
*Boston, MA
July 14, 2023*

The most valuable companies in the S&P 500 Index since 1980

Lessons and Questions:

- By historical standards, the US stock market is extremely “top heavy.”
- Today’s winners may not be on top in five, ten or twenty years.
- What will returns for 2023’s top companies look like when others surpass them?
- How will returns be impacted if the top three companies fall from 18% of the index to a more historically normal 7% to 12%?

Average percentage represented by top 3 stocks 1980 to 2020 was 9.5%.



Source: spglobal.com, LAM calculations. Stock weightings based on year-end market capitalization (share price x number of outstanding shares).