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Viruses, Wars and Chips – How the world has changed in 4 short years

Four years since the outbreak of COVID, life in the United States appears almost back to normal. We mourn the lives lost—and know many still cope with lasting health effects—but most workers are now back at work. Most small businesses are rebounding. Most families (mine included) have resumed their pre-pandemic routines and are no longer consumed with creative ideas for indoor entertainment.

To understand today's economy and financial markets, one has to go back a few years to appreciate how truly transformative the last four years have been for humanity. In 2020, we went through a pandemic which shut down most of the global economy and dealt a heavy toll on many lives. We also witnessed the miracle of science and human ingenuity at work with vaccinations deployed in record time which allowed economies to open back up. We further saw the continuation of massive fiscal and monetary stimulus especially in the U.S., which supported economic growth and the consumer in 2021. And as consumer demand skyrocketed – first for goods and later for pent up spending on services, supply chains snarled up, and inflation spiked to a 40-year high, central banks led by the Federal Reserve (Fed), raised interest rates at a record pace, handing investors losses in their equity and bond portfolios in 2022. That year also saw the outbreak of the largest land war in Europe since World War II, as Russian forces marched into Ukraine.

Towards the end of 2022, a little-known organization called OpenAI introduced the ChatGPT app, bringing artificial intelligence (AI) to the masses, kick starting a stock market gold rush. 2023 proved to be the year of the U.S. consumer and immaculate disinflation. Many had feared at the start of the year that the US economy and consumer would succumb to higher interest rates. The opposite happened as growth accelerated through the year, with the economy creating 3 million jobs, and remarkably inflation moderated from the 8% levels the year before to a more manageable 3-4%.

In this month's CIO Perspectives, we explore key transformations that have grown out of these developments, which have challenged previously established paradigms and perhaps permanently altered how the economy functions and businesses operate, consumers consume, and innovation happens.

Evolution of macroeconomic dynamics

- Consumers prefer to spend on experiences rather than products.
- Government debt levels keep rising at least until the bond market challenges and forces fiscal discipline and changes.
- Interest rates and inflation stay higher than the decade preceding the pandemic.
- Rising hybrid / remote work flexibility leads to higher labor force participation, especially for women.

Shifts in international relations

- The splintering of the global economy along trade and technology lines continues to play out. Countries prioritize national security and companies build resilience into supply chains over efficiency.
- Geopolitical fractures, scarcity premium, and energy transformation lead to higher average price levels for commodities.
- Increasing migration of people escaping conflict, hardship, and climate change impacts, leads to an increase in political polarization but also changes in the labor force.

Technology

- The pace of innovation and digital transformation picks up across all sectors as AI applications proliferate. Health care, manufacturing and financial services are especially transformed.
- AI adoption may be slow and more expensive in the near term, but it will drive costs lower over time.

FIGURE 1
How the world is changing in a post-pandemic environment

 Then vs. Now: How the World is Changing		
	2019	2024
INTERNATIONAL	Globalization	Localization
TRADE	Free Trade	Protectionism
GEOPOLITICS	International Cooperation	Decoupling
RESOURCES	Resource Abundance	Resources Scarcity
WORK	In-Person Work	Hybrid/Remote Work
DEMOGRAPHICS	Population Growth	Population Aging
GOVERNMENT	Small Government	Big Government
TECHNOLOGY	Web Servers	AI/IoT/Cloud
INFLATION	Fighting Deflation	Fighting Inflation
INTEREST RATES	Low Volatility	High Volatility

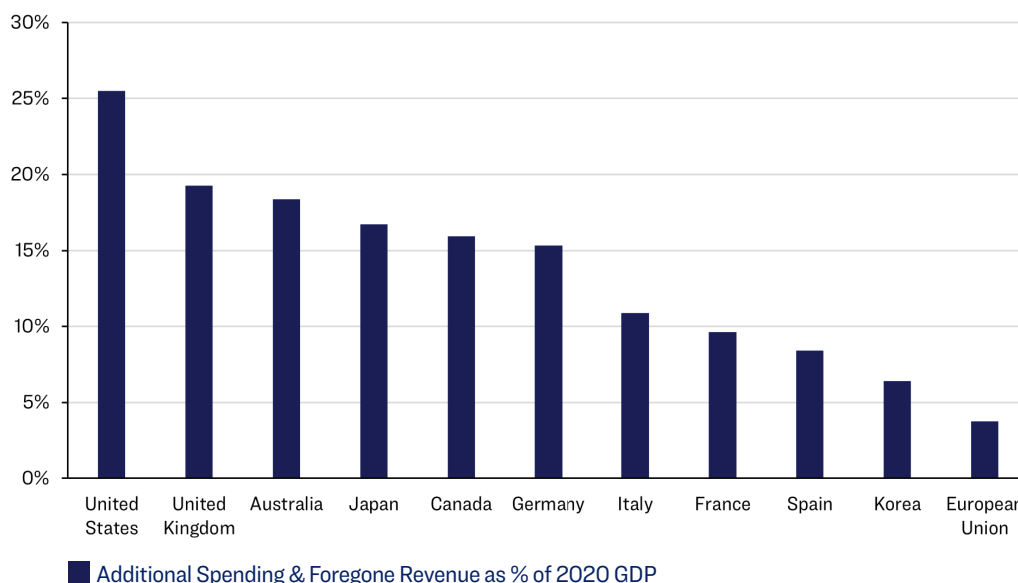
Source: TIAA Wealth Chief Investment Office

Evolution of macroeconomic dynamics

When global economies were forced to shut down in March 2020, a strong response from world governments and central banks was desperately needed. Taxpayers had lost their jobs, businesses could not operate, and healthcare systems were becoming overwhelmed. The cumulative cost of additional fiscal spending and lost tax revenues wound up being \$10.1 trillion¹ for the G20 (the world's 20 largest economies). Other liquidity support measures totaled \$6.4 trillion, according to the International Monetary Fund.

For the U.S., this amounted to 25% of gross domestic product (GDP), compared to the combined ~7% of GDP spent following 2008's Great Financial Crisis (Figure 2). At the same time, central banks stepped in to ensure financial markets remained operational and to absorb some of the added debt that governments were forced to issue. Cumulatively, the balance sheets of the Fed, European Central Bank, Bank of Japan and Bank of England swelled to close to 60% of their economies' GDPs by mid-2021, up from 35% in February 2021.

FIGURE 2
The fiscal response to COVID was enormous



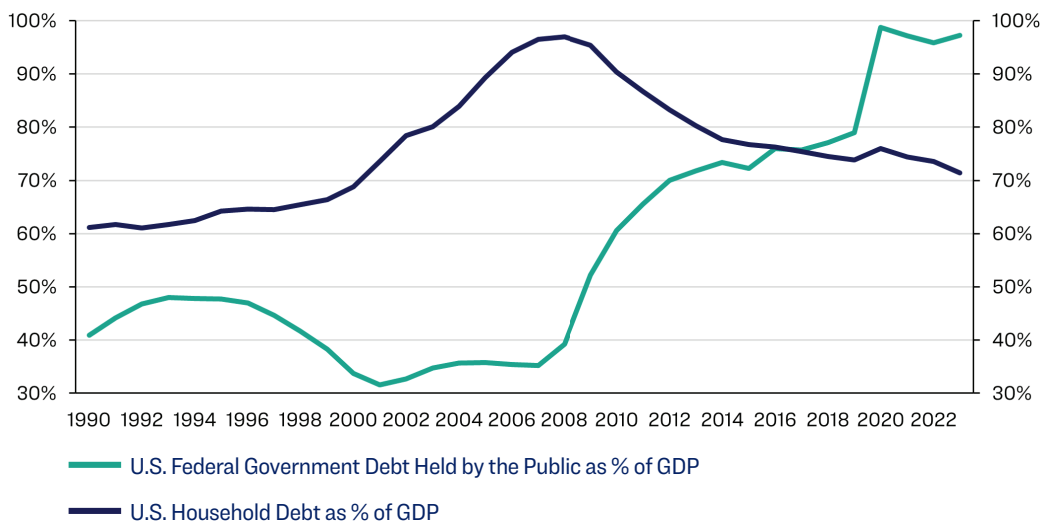
Source: IMF, TIAA Wealth Chief Investment Office

While the spending may have seemed extreme, these measures were necessary to support the global economy at a vulnerable time. Plus, increased federal support at a time of crisis wasn't altogether new in the U.S.: It started well before the pandemic, tracing back to 2008, when the government intervened to avert a bank meltdown and 1929-style depression.

The increased fiscal spending has allowed U.S. households to reduce their debt without reducing their spending, strengthening Americans' ability to weather economic volatility. (Figure 3). Lofty fiscal spending and a larger monetary imprint by central banks are now deemed necessary. On the fiscal side, government is expected to fund technological advancements, pay for the green energy transition, and bankroll retirement for a growing share of an aging population. This means policymakers may struggle to return to the fiscal and monetary policies of the pre-pandemic era.

Investing in revenue-generating projects should minimize the impact on fiscal deficits. The three flagship spending bills passed by Congress during the Biden administration (the CHIPS Act,ⁱⁱ the Inflation Reduction Actⁱⁱⁱ and the Bipartisan Infrastructure Law)^{iv} are expected to result in \$2 trillion in additional spending but add only add \$71 billion to the deficit through 2032. Growing entitlement spending, however, is expected to keep upward pressure on government debt as a percentage of GDP. The Congressional Budget Office (CBO)^v projects that mandatory spending—including Medicare and Social Security—will rise from 13.9% to 15.1% of GDP by 2034. Net interest payments on federal debt will rise from 2.4% to 3.9% of GDP over the same period. As a result, the CBO projects the budget deficit to average 5.6% of GDP over the next 10 years, much higher than the 3.7% average since 1973.

FIGURE 3
Federal fiscal spending has allowed households to strengthen their personal balance sheets without sacrificing consumption

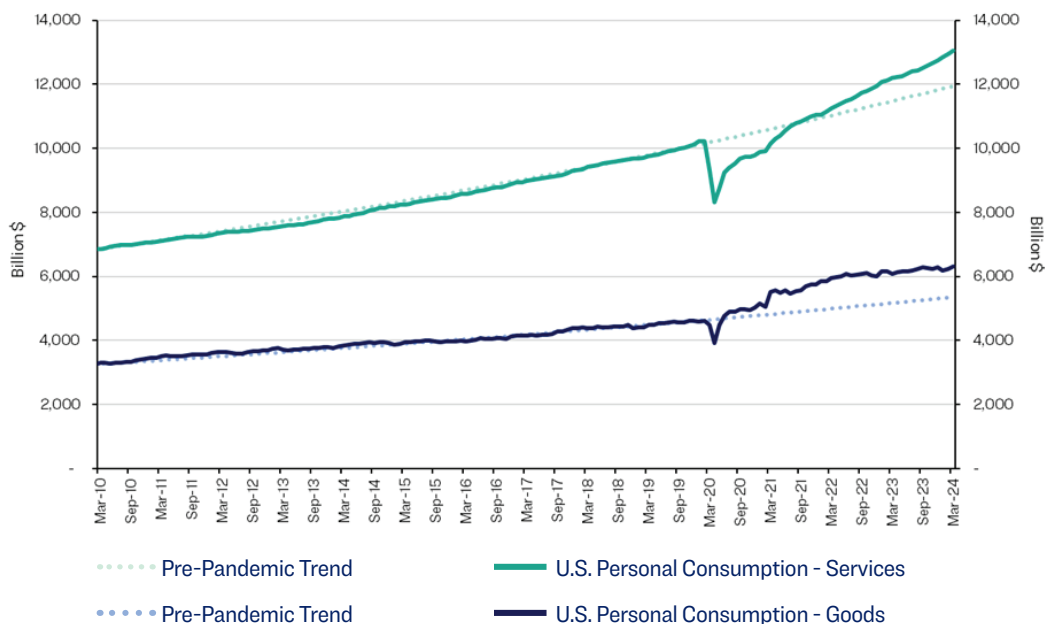


Source: Federal Reserve, BEA, CBO, Bloomberg, TIAA Wealth Chief Investment Office

Investors with more than a decade to save for retirement may benefit from an attractive entry point for bonds, since newly issued ones are delivering more attractive yields. This dynamic could set the stage for returns closer to historical norms (the median annual return for the Bloomberg U.S. Aggregate Bond Index from 2008 through 2022 was 4.2%). Bond yields today on the intermediate bond index are a good proxy for bond returns over the next 10 years, which suggests investors may realize above-average returns on bonds during that time span.

- More than \$2 trillion in excess savings was accumulated between March 2020 and year-end 2021. This was a result of sizeable income transfers from the government to households, contributing to robust consumption over the past few years. These savings have now largely been exhausted at the lower income household level.
- While spending was concentrated in goods during the darkest days of the pandemic, spending on services has rebounded significantly since the first COVID vaccines were rolled out in December 2020 (Figure 4). While we expect the pace of spending to normalize, consumers will likely still favor spending on experiences such as travel and entertainment.

FIGURE 4
Consumption has shifted from goods to services



Source: BEA, TIAA Wealth Chief Investment Office

- What started out as a necessity to work from home has morphed into a preference, and this preference is transforming the global real estate landscape. According to a survey of working arrangements and attitudes,^{vi} 27% of all U.S. workers have a hybrid work schedule, while 12% have a fully remote schedule. This trend is likely to persist.

There are several ramifications here, including the ongoing bifurcation between record high office vacancies (20.2%, according to Cushman and Wakefield) and record low homeowner vacancies (0.8%, according to the Census Bureau). This is driving relentless price pressure in the residential real estate market, feeding into higher inflation. Meanwhile, office valuations have fallen by 35% so far,^{vii} and Fitch Ratings expects the delinquency rate on office loans to rise to 9.9% in 2025, impacting lenders, especially the regional banks. It could take several years before this divergence normalizes, likely reducing the ability of banks saddled with bad loans to ease lending standards. One possible outcome: Small-business startups and other lower-quality borrowers may struggle to get loans. Alternative sources of capital like direct lending could gain market share from banks as a result.

- At the onset of the pandemic, the labor force participation rate (the percentage of the working age population working or looking for work) in the U.S. fell from 63.3% to 60.1%, and the recovery was slow and uneven due to excess COVID-related deaths and a wave of early retirements. The result was a labor shortage. While the labor force participation rate has improved recently (and currently stands at 62.6%), worker shortages remain a long-term threat, based on demographics. The percentage of people aged 65 or older is projected to rise from 17% in 2023 to 22% in 2054.^{viii}

There's also a skills mismatch that policymakers will need to address. McKinsey & Co. estimates that U.S. companies will face a shortfall of 300,000 engineers and 90,000 skilled technicians by 2030.^{ix} The Bureau of Healthcare Workers projects a 10% shortage of registered nurses in 2026 and 2031.^x Against this backdrop, the rise in women's participation in the labor force is a welcome development. Currently at 78%, the participation rate of women aged 25 to 54 years old is the highest it has ever been. The flexibility afforded by hybrid work arrangements is one of the reasons behind this surge. Better education is another. Every year since 2000, there have been at least 33% more U.S. bachelor's degrees awarded to women than men, and this college gender gap keeps getting wider. According to projections from the National Center for Education Statistics, the college class of 2028 should become the first undergraduate class in American history to have 50% more female graduates than male ones.^{xi}

Shifts in international relations

The most direct impact COVID had on international relationships was the disruption of trade routes and supply chains. The cost of shipping goods from the port of Shanghai to the port of Los Angeles spiked to \$12,000 per 40 feet box in 2021 from an average of \$1,700 between 2010 and 2019. The busiest ports around the world experienced snowballing backlogs as lockdowns disrupted normal trade operations. Pressure on global supply chains accelerated shifts from offshoring to onshoring and from globalization to localization—shifts that had already started during the Trump administration.

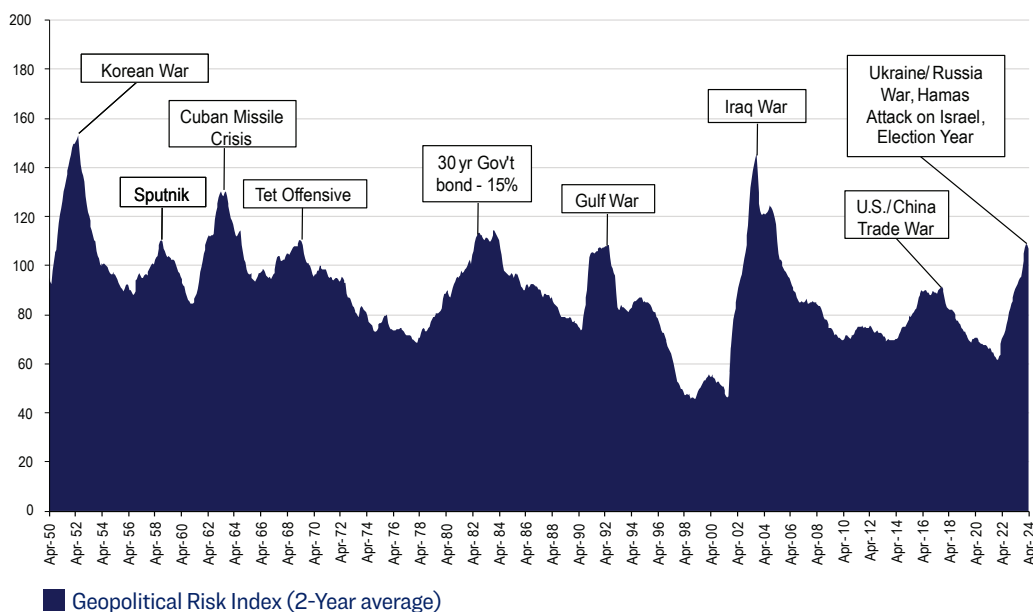
Tariffs are a key expression of the transformation in international relationships, as countries are prioritizing jobs and national security over free trade. In the run-up to the U.S. presidential election in November, trade policy remains a prominent issue for both Republicans and Democrats. One of the key campaign promises of former President Trump is a blanket 10% tariff on all U.S. imports and a 60% tariff on all Chinese goods. At the same time, President Biden supports extensive tariffs on key imports from China and recently announced the quadrupling of existing tariffs on electric vehicles. Taken together, these trends point to escalating trade tensions across the globe—a byproduct of decoupling in the wake of the pandemic.

Additionally, in early 2022, just as the world was emerging from the most difficult global challenge since World War II, Russia invaded Ukraine, starting a war that continues to destabilize Eastern Europe. Following an initial strong and unified response from Western countries, support for the war has waned, causing political divisiveness. The war has exacerbated diplomatic tensions between the U.S. and China, as the Asian superpower has been reluctant to condemn the Russian invasion and has supported the Russian oil industry.

Taiwan remains a flashpoint and as tensions rise, maintaining diplomatic relationships with China is paramount. Continued cooperation with China is also imperative in the Middle East, as instability there has reached dangerous levels since Hamas attacked Israel in October 2023. The rise of geopolitical instability, paired with the uncertain future of global institutions like NATO, is now leading to an increase in defense spending (Figure 5). This fragmentation points to weakening international cooperation at a time when collaboration is required on global challenges like climate change, public health, food security and artificial intelligence regulations.

The rise of geopolitical tensions is likely to slow or reverse the globalization trend that was at the core of lower labor costs, extensive global supply chains, thriving trade flows and low inflation. For investors, this could mean higher inflation, greater volatility and lower correlation among and within asset classes.

FIGURE 5
Geopolitical risks are on the rise



Source: Federal Reserve Board, TIAA Wealth Chief Investment Office
(The Geopolitical Risk Index measures the frequency of news articles on adverse geopolitical events.)

Technology

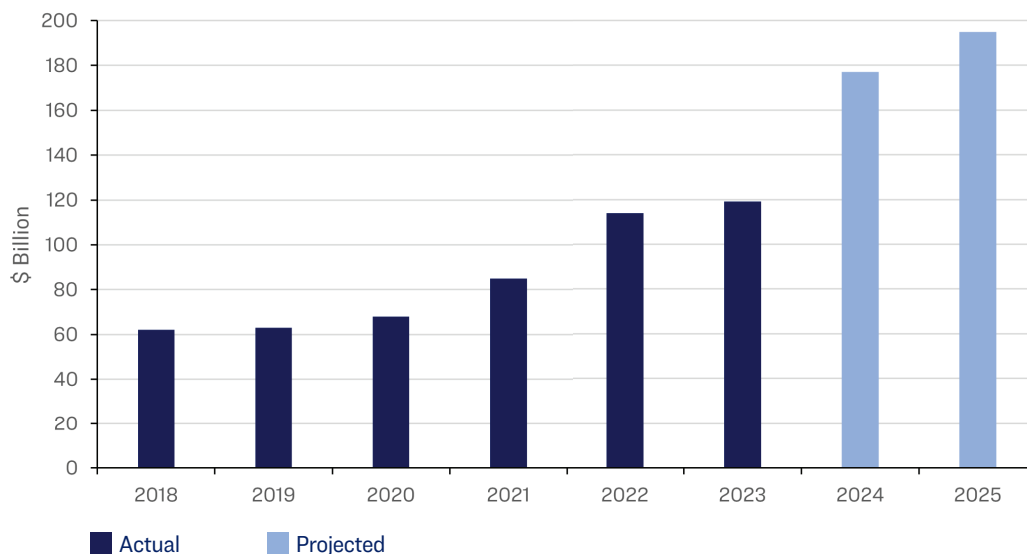
There are numerous historical examples of major scientific and technological advancements born out of crises. World War II, for example, spurred the development—and later the mass commercialization—of technologies first intended as tools of war. The Electronic Numerical Integrator and Computer, one of the first general purpose computers, was released to the public in 1946. The cavity magnetron, a technology used to improve the accuracy of radar, was put to work after the war to develop the microwave oven. The need to respond to devastating injuries on the battlefield led to improvements in blood transfusion and other trauma treatments—and also to the mass deployment and production of life-saving antibiotics like penicillin.

Much like penicillin—which was discovered by Alexander Fleming in 1928 but not commercialized until after WWII—synthetic mRNA had been under development for decades before it was used to develop the Pfizer and Moderna COVID vaccines. By leveraging and improving the existing technology, scientists working on COVID vaccines were able to move from the pre-clinical stage to emergency approval in less than a year, and to the full approval stage in just 18 months (compared to the normal timeline that could stretch to as many as 10 years).^{xii} A global crisis led to a scientific breakthrough that holds the promise of an expanded pipeline of pharmaceuticals that could address some of the deadliest and most common diseases.

The COVID crisis led to an acceleration in the development and adoption of AI. A study by PwC^{xiii} found that 52% of surveyed companies accelerated their AI strategy in 2020, and since then, a little-known start-up called OpenAI launched ChatGPT, a chatbot based on large language models that represent the first step towards mass adoption. As uses for AI become more visible, we have seen increased corporate investment in AI services and infrastructure. The mega-cap tech companies have accelerated spending meaningfully in 2024 (Figure 6). While the ultimate return on investment is uncertain, these companies appear well positioned to participate in the long-term growth of AI. The unprecedented amount of capital being allocated to its development is a testament to its revolutionary impact.

AI will likely foster greater productivity growth. McKinsey estimates AI has the potential to automate the work activities that absorb 60%-70% of employee’s time, boosting labor productivity by 0.1%-0.6% annually through 2040.^{xiv} The potential uses are countless—from faster discovery and production of medicines to improved efficiencies for supply chains. There are, however, challenges that must be addressed. Among them is disruption to labor. By 2030, activities accounting for up to 30% of hours currently worked in the U.S. could be automated. Energy use is another concern. By 2030, data centers are expected to consume 7.5% of all electricity production capacity in the U.S.^{xv} (as much as one-third as all homes consume). These challenges will require investments aimed at prepping the labor force to coexist with AI and at upgrading our energy infrastructure.

FIGURE 6
Combined capital expenditures by Microsoft, Alphabet, Meta and Amazon Web Services



Source: Company filings, Goldman Sachs, TIAA Wealth Chief Investment Office

Of course, governments still face the urgent task of developing policies and technologies to combat climate change, and upgrading energy infrastructure will be challenging without new policies and technologies. In 2020, only 28% of all energy produced globally was generated from renewable resources; the International Renewable Energy Agency estimates this number will need to be 91% by 2050 to meet the consensus goal of capping the rise in temperature to 1.5 degrees Celsius. This would require \$44 trillion in investments by 2030.^{xvi}

Moreover, current production of the critical raw materials needed for the green energy transition is falling well short of what is needed. The International Monetary Fund estimates that by 2050, the supply of copper and lithium will only meet 60% of demand in a scenario of net-zero carbon emissions.^{xvii} For nickel and graphite, it will be only 35% and 15%, respectively. Production levels will remain limited given the physical constraints for accessing and extracting some commodities but can be expanded for others by investing in new mining technologies and exploration.

Conclusions

Even as daily life has returned to normal, the legacy of the pandemic is still impacting the global economy. Increased fiscal stimulus, rising outlays for defense, persistent shortages of workers, soaring real estate prices, the upsurge in protectionism, the fracturing of international relationships, generational advancements in technology—these are all direct or indirect byproducts of the pandemic. So too are higher interest rates and persistent inflation. For all these reasons, the pandemic continues to shape our market outlook, even as the lockdowns and mask mandates slowly fade from memory. In the equity market, investment opportunities should multiply as more companies use AI to enhance profitability. In the bond market, massive fiscal stimulus and soaring budget deficits inform our “higher for longer” position on interest rates—and on when the Fed might start cutting.

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