Research

Fidelity Institutional Insights

A Strategic Allocator's Guide to Productivity and Profits

Could a new regime with shifting trends and sometimes unexpected motives influence productivity and fundamentally reshape the investment-decision process?

A feature article from our U.S. partners.
Originally published in May 2024.

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KEY TAKEAWAYS

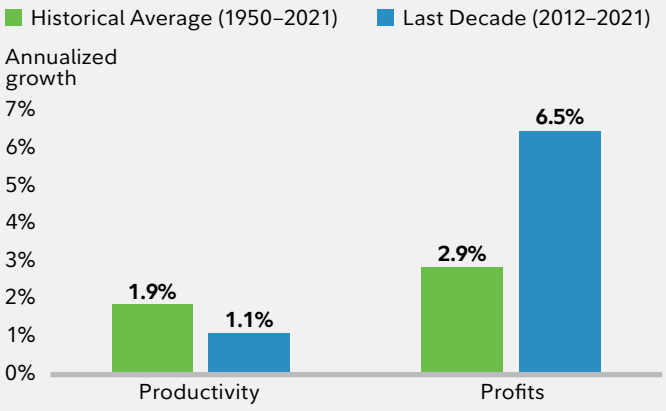
We have transitioned to a more volatile, inflationary world that will require nimbler investment strategies and more nuanced diversification that is less reliant on the extrapolation of past trends.

In this new world, better analysis and understanding of the underpinnings of productivity gains – and their links to profits and asset-class returns – could hold the key to successful strategic asset allocation in an evolving investment landscape that is likely unfamiliar to many investors.

Potential opportunities in this changing environment may come into focus when viewed through the lens of two important trends:

- **Productivity growth:** Is a reacceleration of productivity trends possible? Real productivity gains in the United States slumped to 1.1% on an annualized basis over the past 10 years – barely more than half the pace achieved since 1950 (Exhibit 1).
- **The relationship between productivity and profit growth:** Will the divergence between productivity and profit growth persist, and can profits continue to rise rapidly without increased productivity gains? Despite slower productivity growth, real corporate profits rose at a 6.5% annualized pace over the past decade, more than twice their post-WWII average. This dynamic reflected both strong growth in company earnings and a reduction in the share count due to a rise in stock buybacks.

EXHIBIT 1: Productivity growth diverged from profit growth.
Real Productivity Growth vs. Real Profit Growth



Productivity is real GDP per hour. Profits are real S&P 500 earnings per share. Chart compiled using annual data. Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Standard & Poor's Dow Jones Index, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

The answers to these questions are likely to impact earnings trends and may create new opportunities for investment managers and asset allocators. Some of these opportunities are likely to be driven by the actions of governments, corporations, and citizens. Such potential could take the form of:

- **A boost to investment spending in many developed and some emerging markets:** Historically depressed rates of capital expenditures, public investment, and productivity may receive a lift from shifting structural trends, such as reshoring, rising cost of capital, and clean energy. The countries, industries, and companies that are at the center of these rising investment trends may provide the best asset-market opportunities.
- **Historically high global equity correlations giving way to lower correlations, creating greater opportunities to diversify portfolios according to geography:** Geopolitics and climate risks (climate-related technological transformation) could contribute to even more differentiation across the outlooks for productivity and profits around the world.
  - **Many emerging and frontier markets are located far from the systemic geopolitical fault lines and are endowed with key resources.** Countries that can create a favorable environment for domestic and foreign investments may provide an attractive backdrop for investing opportunities.
  - **Despite the end of its unipolar global dominance, the United States is well positioned.** It possesses a rich base of financial, corporate, institutional, and natural resources to adapt to shifting secular trends.
  - **Europe's economic position may be improving.** Overall, the bloc seems to be headed toward greater economic, fiscal, and political cohesion, and it is increasingly prioritizing new investments in climate and energy security.
- **Thematic portfolios:** Regime shifts in inflation, interest rates, globalization, and climate may increasingly be areas to exploit, based on their ties (or lack thereof) to increased productivity.

See Chapter 3 for additional allocation implications.

Introduction

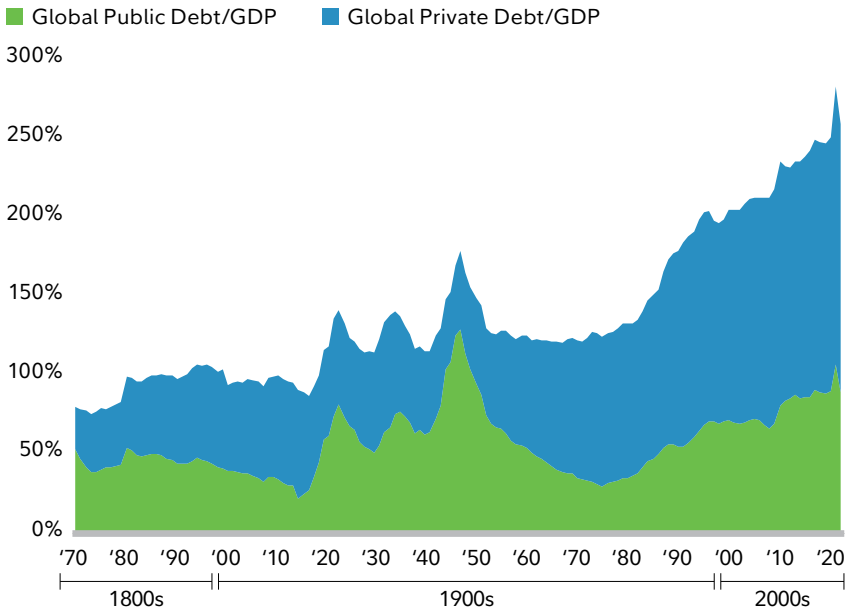
The secular forecast we articulated in our 2020 paper – *Unsustainable Global Debt: Roadmap for Strategic Asset Allocation* – is playing out (see story reference, at right).

The likelihood that inflation will stay higher and more volatile than in the past 20 years implies that a transition to a new secular regime may have just begun – even if inflation cools over shorter time periods ahead.

During the past decade, the United States experienced some of the fastest earnings-per-share growth since the early 1950s, but it did so amid the slowest productivity growth in modern history. More-persistent inflation uncertainty will likely make some of the key investment drivers of the prior regime – such as financial repression and increased leverage – more difficult.

EXHIBIT 2: Global debt surged in recent decades to new record highs.

Global Public and Private Debt as a Share of World GDP



The data covers 15 developed markets starting in 1870 and 10 emerging markets starting in 1990, aggregated using GDP weights. Chart compiled using annual data. Source: Bank for International Settlements; IMF; World Bank Publication; and Òscar Jordà, Moritz Schularick, and Alan M. Taylor, "Macrofinancial History and the New Business Cycle Facts," NBER Macroeconomics Annual 2016, volume 31, edited by Martin Eichenbaum and Jonathan A. Parker. Chicago: University of Chicago Press, as of 12/31/21.

* Diversification does not ensure a profit or guarantee against a loss.

Lessons from our *Unsustainable Global Debt* paper (2020)

Our previous foundational work, *Unsustainable Global Debt: Roadmap for Strategic Asset Allocation*, has proven to be on point. It examines the investment implications of historically high global debt as it relates to inflation, plan governance, and strategic asset allocation.

Following are some conclusions of this paper:

- A confluence of political, economic, and social forces has fostered and enabled the use of debt as a panacea for economic ills.
- Unprecedented global debt levels are ultimately unsustainable (Exhibit 2).
- In the past, high sovereign debt has often resulted in greater inflation. As in the past, we expected greater fiscal and monetary policy experimentation to be the catalyst for a shift to a more inflationary regime.
- Therefore, prudent, long-term investment governance must explicitly consider the impact of high levels of debt on capital market prices.
- Because higher and more volatile inflation tends to be associated with increased correlations between stocks and bonds, traditional stock-bond diversification* may not be sufficient.
- Allocators may need to consider diversification through other exposures, including inflation-resistant assets, value stocks, non-U.S. assets, and diversifying strategies by time horizons.
- Investors might also consider ways to implement more nimble strategies to take advantage of policy-related volatility swings, including through increased risk budgets for active asset allocation.

In this new era, the backdrop for global asset performance is more likely to reattach to core fundamentals, such as productivity gains, as past trends that drove productivity in excess of profits appear to be ending. This ongoing transition requires allocators who are developing frameworks and long-term investment outlooks to understand and analyze the economic underpinnings of core productivity increases and their links to profits and asset-class returns.

At the same time, the global landscape faces an ever-expanding array of evolving trends that will affect productivity and profits in new and different ways. Considerations – such as climate, geopolitics, and income inequality – are increasingly influencing the behavior of governments, corporations, and citizens. It is not our place to opine on the normative value of such considerations, although understanding their potential impact on productivity and profits will be essential to the long-term investment outlook.

Looking ahead, we believe these shifting secular trends imply a broader range of winners and losers across multiple asset categories. The keys to success in this changing environment will be managing a shifting array of risks and identifying profitable opportunities among regions, countries, sectors, and companies. Some of these opportunities likely will be tied to lower global correlations and could provide an advantage for investment managers.

CHAPTER 1

Productivity and Profits: Trends and Drivers

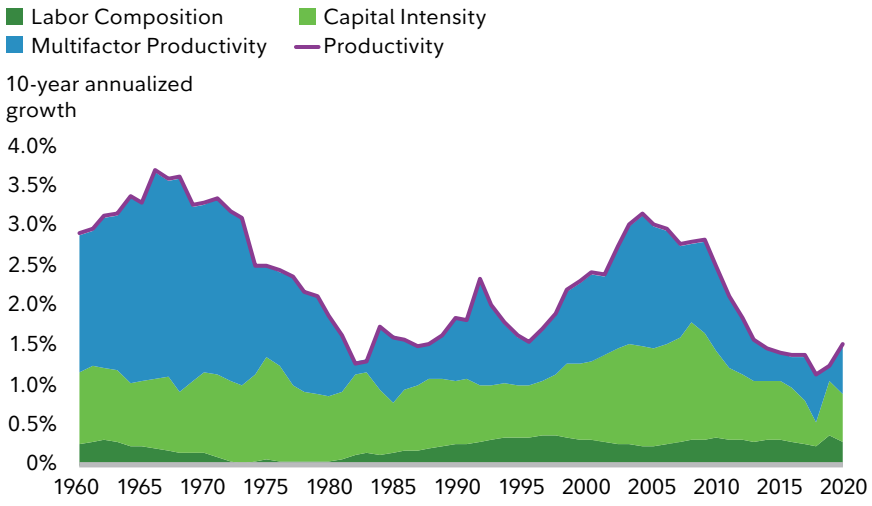
Measures and drivers of productivity

Labor productivity (we refer to it simply as productivity in this paper) is typically measured as output per worker or per hour worked. We can disaggregate it into various components to generate a better understanding of the core drivers. Specifically, productivity is a function of labor composition (the quality of human capital), capital intensity (how much capital workers use to produce goods and services), and multifactor productivity, which is essentially all the additional productivity gains that cannot be explained by changes in the labor and capital inputs (Exhibit 3).

Multifactor productivity (or MFP) is usually associated with technological advances and efficiency improvements, as well as favorable economic environments that allow ideas to flourish and businesses to thrive. It's the "special sauce" of productivity. MFP is the core driver of long-term growth and not subject to diminishing returns. It also is not directly measurable and, instead, must be calculated as the residual growth in output once the contributions from inputs have been measured. For all these reasons, MFP tends to be the key long-term driver of overall productivity, but it also experiences the widest swings and is the most difficult to forecast.

EXHIBIT 3: Slumping multifactor growth drove productivity slowdown.

Components of Productivity



Productivity is real output per hour for U.S. private businesses. Chart compiled using annual data.
Source: Bureau of Labor Statistics, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

Productivity primer

Productivity is the main long-term driver of economic growth and higher living standards, and a key source of profit opportunities. It can:

- Facilitate economic growth without requiring more workers
- Empower employees to achieve income gains that outpace inflation
- Enable companies to boost profit growth without raising prices

Of the three factors that drive economic growth – productivity, labor, and capital – productivity is unique.

- Labor and capital inputs are subject to diminishing returns. Employing more workers, building new structures, or installing new equipment will boost economic output but eventually at a declining rate.
- There are no limits to how much more productive the use of labor and capital can become. For example, productivity gains may be perpetually achieved by training and educating the workforce, investing in innovative, efficiency-enhancing technologies, and cultivating an environment that allows new ideas to flourish (Solow 1956; Romer 1990).[1]

The primacy of productivity as a driver of GDP growth is even more pronounced among advanced economies, such as the United States, where installed capital bases are already high and the diminishing-return dynamic for additional labor and capital inputs is most acute.

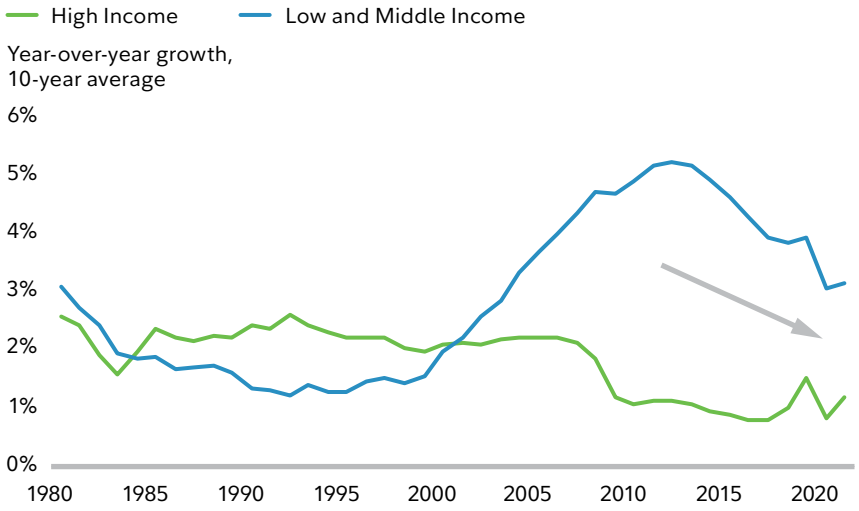
Generally, there is higher potential for productivity growth in emerging economies than in developed markets from all the subcomponents of productivity. With developing economies starting from a lower base, there is more room for human and physical capital deepening – i.e., improving labor quality and empowering the workforce with more advanced capital equipment. Besides strengthening productivity directly, increasing human and physical capital may help increase MFP as well. Developing economies can also directly boost MFP through technology transfer via cross-border trade, investment, and connectivity. In contrast, developed economies tend to be closer to the technology frontier, where progress is more difficult to achieve.

Recent trends: Slower productivity everywhere

Growth in both MFP and capital intensity driven by the investment boom in information technology in the late 1990s had largely worn off by the early years of the 21st century. Over the past decade, productivity growth exhibited a slowing secular trend around the world (Exhibit 4). In the United States, the deceleration in MFP mainly drove this slowing, sinking far below its historical average.

EXHIBIT 4: Slower per capita growth around the world.

Real Per Capita GDP Growth by Country Income Level



World Bank defines high-income countries based on gross national income per capita over $13,205. Low-income and middle-income countries are under this threshold. Compiled using annual data. Source: World Bank Publication, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

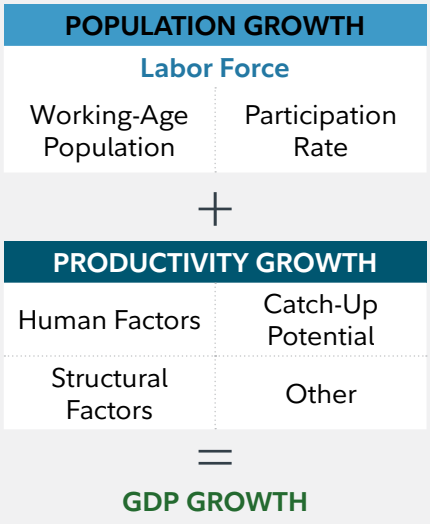
Productivity Primer (continued)

We study economic growth because it is the backdrop for asset markets. It serves as the opportunity set and influencer of key trends, such as corporate profit growth and interest rates.

- For the past decade, our long-term GDP forecasts have served as the foundation for developing our 20-year capital market assumptions for asset returns (see our latest update Secular Outlook for Global Growth: The Next 20 Years).
- In our calculations, we break down GDP into two key components: population growth – how many workers are added to an economy – and productivity growth – how much those workers produce (Exhibit 5).

EXHIBIT 5: Productivity is the primary driver of economic growth.

The Components of GDP Growth



Source: Fidelity Investments (AART), as of 2/28/23.

Although standardized and detailed non-U.S. productivity data is generally less available and reliable, productivity is closely linked to GDP per capita, a product of GDP per worker and the share of workers in total population (Exhibit 5). Estimates suggest that post-GFC (Global Financial Crisis), productivity rates diminished globally in the steepest, longest, and broadest multiyear slowdown in modern history (World Bank 2021).[2] According to the World Bank, subdued investment activity (less growth in capital intensity) accounted for much of the productivity slowdown in advanced economies post-GFC. In developing economies, weak investment and MFP mattered roughly equally.

Some economists attribute the broad-based productivity weakness to fading technological progress, as innovations have become less impactful (Gordon and Sayed, 2019). Others view the slowdown as temporary, owing to the time lags involved in incorporating new digital technologies into production processes (Brynjolfsson, Rock, and Syverson, 2018). Both views emphasize the key role of technological innovation in generating sustainable productivity growth.[3] While we refrain from taking sides in this long-standing debate, we focus below on the role of investment in funding technological innovation.

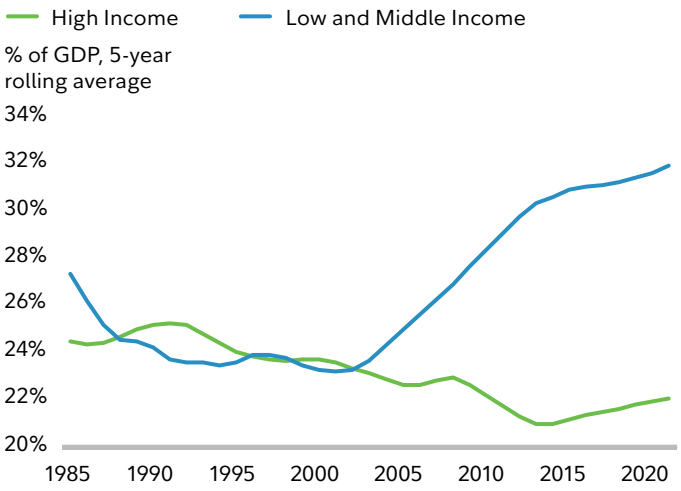
Investment as the productivity catalyst: Recent stalling

Investment activity – such as expenditures on research and development, public infrastructure, and corporate capital outlays – is often a direct and measurable manifestation of productivity trends. Investment drives productivity not only directly via capital deepening, but also indirectly via MFP. Even though the response is not immediate, investments often serve as catalysts for MFP gains in the future.

The slowing productivity trends over the past decade are manifest in the declining investment activity registered in many major economies. Investment, defined as gross fixed capital formation, has long been on the decline in high-income economies, and it took another turn lower after the GFC in 2008 (Exhibit 6). In contrast, middle-income emerging markets, driven largely by the economic rise of China, experienced a sustained upturn in fixed capital formation over the past two decades. The slower pace of capital formation in the past decade, and the concomitant deceleration in EM productivity growth, is likely at least partly explained by the diminishing returns of ever-higher investment activity in China.

EXHIBIT 6: Investment growth higher in low- and middle-income countries.

Gross Fixed Capital Formation by Country Income Level



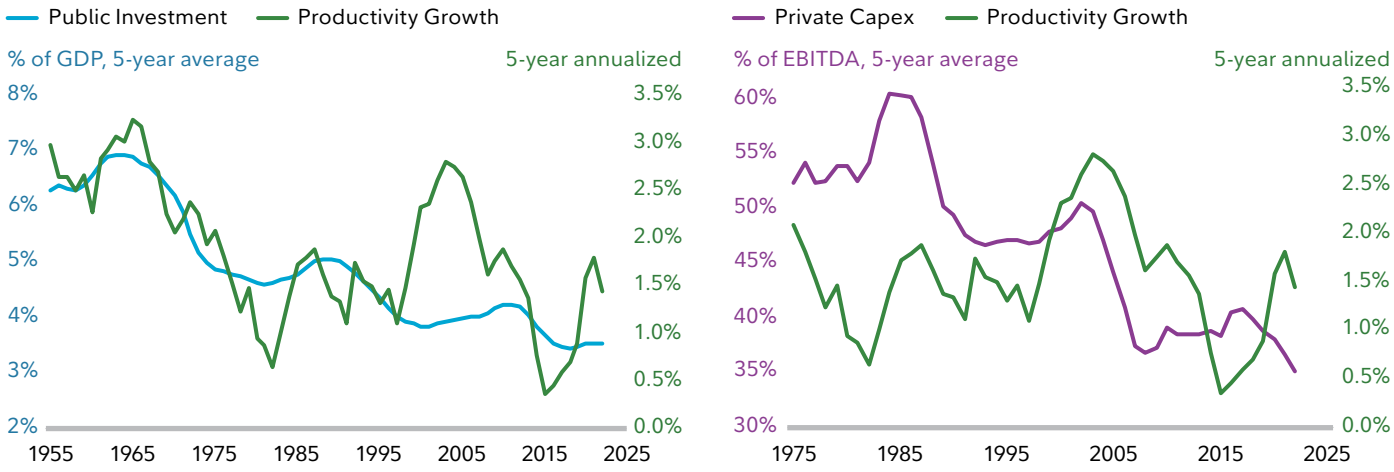
World Bank defines high-income countries based on gross national income per capita over $13,205. Low-income and middle-income countries are under this threshold. Compiled using annual data. Source: World Bank Publication, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

Worldwide, the decades of rapid globalization effectively outsourced a significant share of production, as well as a meaningful portion of investment from developed to emerging economies via activities of multinational corporations. Viewed globally, slower productivity growth in developed economies, including the United States, was, in part, a reflection of lower rates of domestic investment, while investment channeled outward – especially to China – contributed to faster productivity growth in emerging economies.

In the United States, the decrease in investment activity occurred as both public investment and private capex declined to levels not seen in postwar history (Exhibit 7). On the private side, capex sank to its lowest level ever as a proportion of corporate earnings during the past decade. On the public side, all categories of investment – defense and non-defense, federal and state level – dropped to their lowest levels in several decades. This implies that both private-sector behavior, as well as public-policy choices, contributed to the productivity slowdown.

EXHIBIT 7: Declining rates of investment spending and productivity.

Public Investment and Private Capital Expenditures vs. Productivity Growth



Productivity is real GDP per hour. Public investment includes federal, state, and local. Capex aggregated across top 3,000 publicly traded companies (ex. financials and real estate). Charts compiled using annual data. Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Fidelity Investments (AART), as of 12/31/22.

CHAPTER 2

Understanding the Divergence between Productivity and Profits

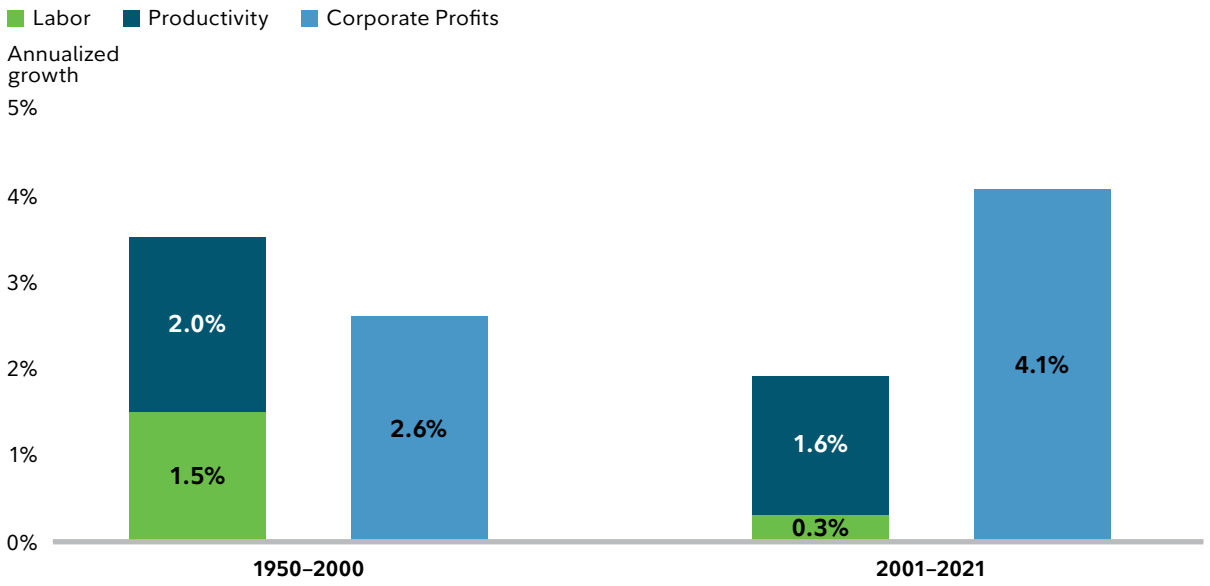
An economy's output each year (after net government taxes) is distributed to the workforce as labor compensation and the corporate sector as profits. As the primary thrust for economic growth, productivity therefore serves as the major underlying source of growth for both wages and profits over the long run. This link is central to our secular capital market assumptions and underpins our secular equity earnings expectations (see *Capital Market Assumptions: A Comprehensive Global Approach for the Next 20 Years*).

In the United States from 1950 to 2000, real (inflation-adjusted) rates of GDP and economy-wide corporate profit growth were in the same ballpark, averaging about 3.5% and 2.6% on an annualized basis, respectively. Profit growth was 1.3 times productivity growth during this period (Exhibit 8).

In the past two decades, however, a massive divergence occurred. From 2001 to 2021, GDP growth slowed to a meager 1.9%, but economy-wide profit growth rose to 4.1%. Productivity growth slowed (to 1.6%), but profit growth rose more than 2.5 times its pace. A similar divergence occurred if we observe the rising earnings growth (4.6%) of the large corporations that make up the S&P 500 index, which far outpaced slowing private-sector productivity growth (2%). In the past decade, this divergence reached even greater extremes, with real S&P 500 earnings-per-share growth receiving an extra boost from record-high share buyback activity and hitting 6.5%.[4]

EXHIBIT 8: Productivity and profit growth diverged the past two decades.

U.S. Real GDP Growth vs. Real Economy-wide Profit



GDP growth is equivalent to the summation of labor (hours worked) and productivity (output per hour). Corporate profits are economy-wide profits from NIPA data. Chart compiled using annual data. Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

Why did this dramatic divergence occur? Empirically, the strength of the link between productivity and profits has varied over time, and prolonged divergences are common. The key reason for such divergences is that profitability is driven not only by productivity but also by the evolution of output prices and input costs. If unit prices outpace unit costs for reasons unrelated to productivity improvements, profits can outpace productivity.

This dynamic was likely at play over the past two decades, as several factors combined to depress business costs. One of the key drivers was the unprecedented level of global integration, as booming world trade accounted for a greater proportion of global economic output by 2008 than at any point in the modern industrial age (Exhibit 9). The rapid increase in offshoring and globalization of supply chains provided advanced economies with unprecedented access to foreign labor that heightened competition in the labor markets, curbed domestic wage growth, and subdued labor costs. This was likely an important driver behind the increasingly depressed labor compensation, which lagged labor productivity for several decades (Exhibit 10, left). Industrial automation and labor-saving technologies more broadly were another factor that kept wage pressures limited over this period.

EXHIBIT 9: Historically high levels of globalization may be peaking.

Trade Globalization

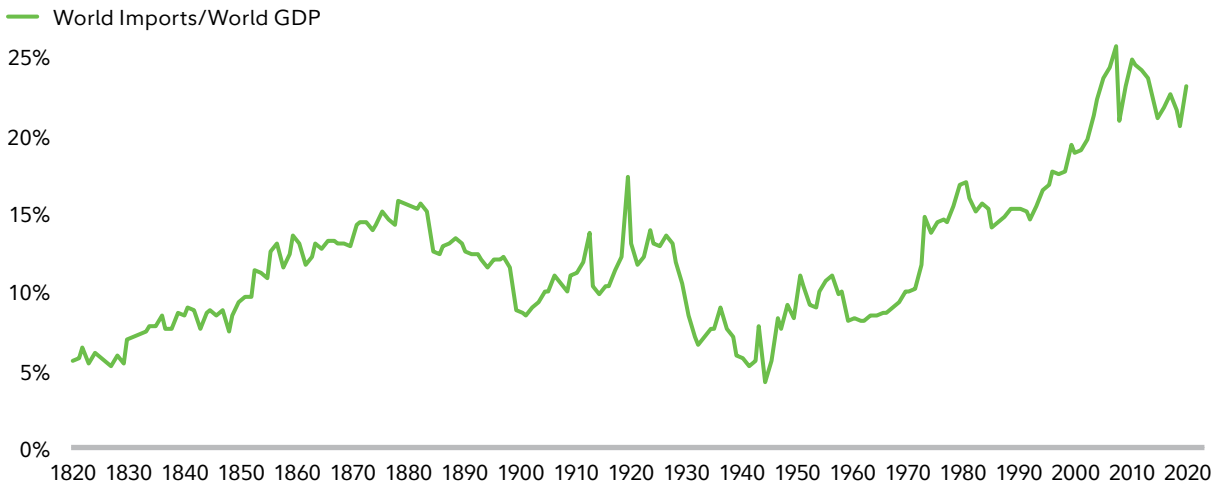
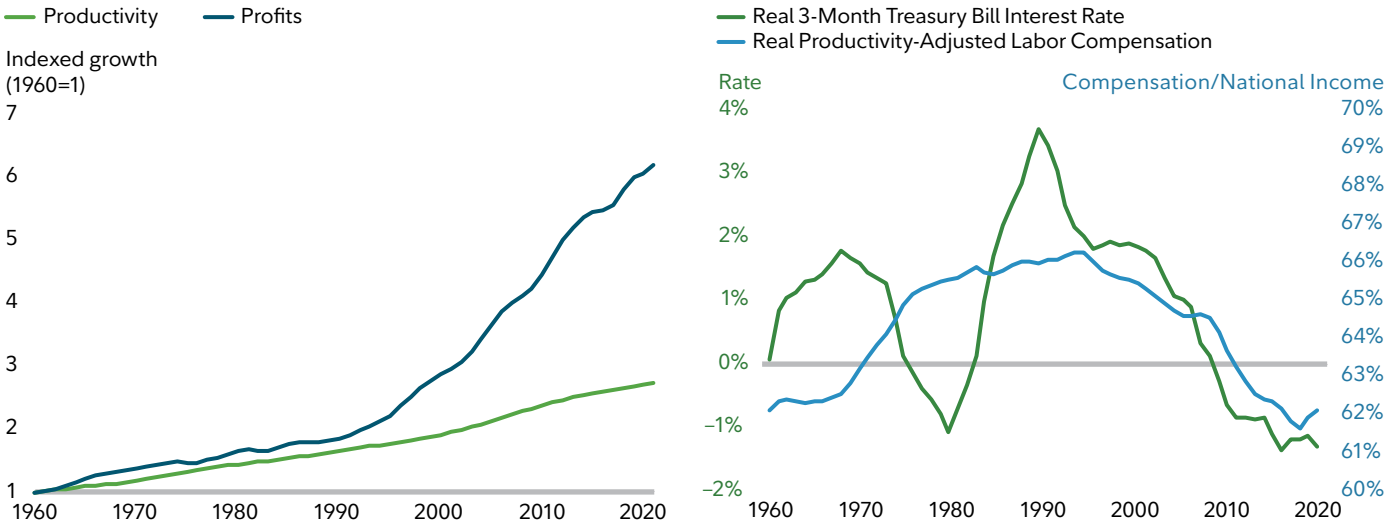


Chart compiled using annual data. Source: IMF, World Bank Publication, Fidelity Investments (AART), as of 12/31/21.

At the same time, the world's leading central banks engaged in a sustained period of financial repression. Since the GFC in 2008, monetary authorities in the United States, Europe, and Japan frequently implemented extraordinary accommodation measures and consistently maintained domestic interest rates at dramatically low levels. The rise in financial globalization also played a role in pushing global interest rates down, as the capital flows from large trade surpluses in China and other countries were circulated back into the fixed income markets in the United States and other advanced economies. These dynamics helped reduce the cost of capital to historic lows, as real interest rates persisted in negative territory for the better part of the last two decades (Exhibit 10, right).

EXHIBIT 10: Lower rates and labor costs drove divergence in productivity and profits.

Real Productivity and Profit Growth vs. Real Interest Rates and Labor Compensation, 10-Year Rolling Averages



The sustained decline in real interest rates and labor compensation began in the 1990s and coincided with the emergence of the prolonged gap between productivity and real profit growth.

LEFT: All data is inflation adjusted (real). Productivity is GDP per hour. Profits are NIPA corporate profits. **RIGHT:** Real productivity-adjusted labor compensation is calculated as compensation of employees divided by the national income. Charts compiled using annual data. Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

In addition, industry concentration rose significantly over the past decade. The ascendency of larger companies in several key industries, particularly in winner-take-all technology markets with high network effects, allowed dominant firms to effectively influence prices and wages (Autor, 2020; OECD, 2019).[5] Key indicators of business dynamism and competition dropped to multi-decade lows, including the rate of new business and job formation and the share of smaller firms relative to larger ones (Exhibit 11).

The modern-era highs in levels of globalization and industry concentration, in addition to the modern-era lows in interest rates and the labor share, generated a unique backdrop for corporations. In this environment, corporate behavior gravitated toward offshoring supply chains and financial engineering activities – adding financial leverage, making acquisitions, and buying back stock. Many large corporations issued low-cost debt to repurchase their own equity, buying back more than $5 trillion of the S&P 500 index's shares from 2010 to 2019, boosting earnings-per-share growth by nearly 1.5% annually (Source: Standard & Poor's/Haver Analytics/Fidelity). Meanwhile, accommodative monetary policies kept unproductive "zombie" companies from going out of business and subsidized output from unprofitable companies that accessed cheap financing in private markets.

EXHIBIT 11: Rising industry concentration and declining business dynamism over the past two decades.

Indicators of Business Size and Dynamism, 1978–2020, 5-Year Moving Averages

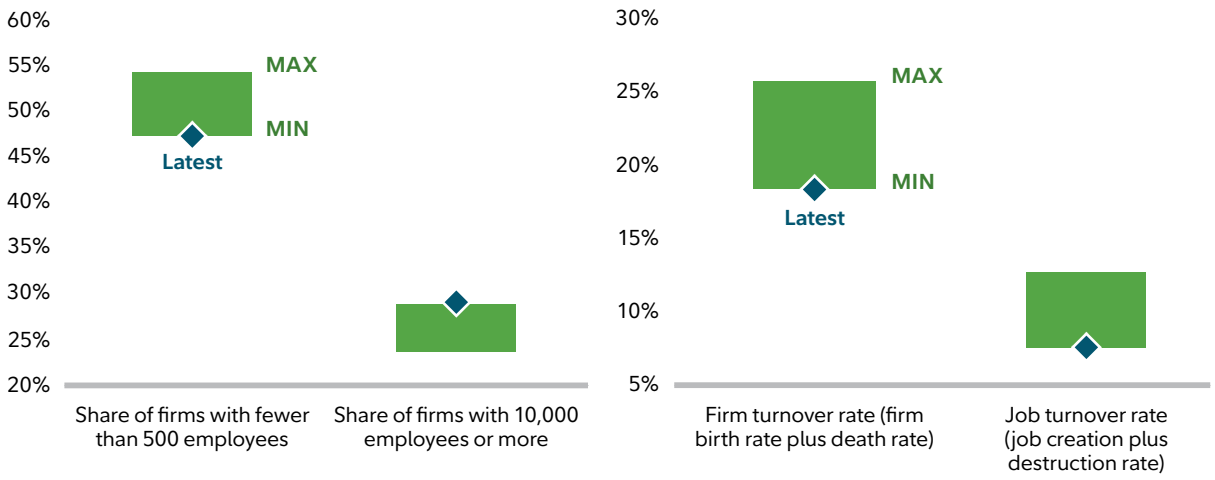


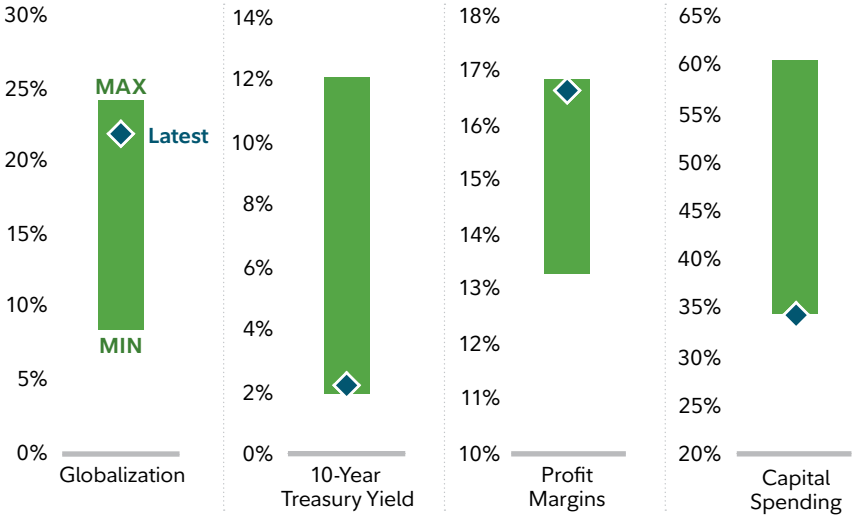
Exhibit compiled using annual data. Source: Census Bureau, Haver Analytics, Fidelity Investments (AART), as of 12/31/20.

Corporations achieved record-high profit margins over the past decade, but the amount of money they plowed back into investments (capex) sank to record-low levels as a proportion of these profits (Exhibit 12). Thus, in the aggregate, corporations enjoyed tremendous profitability due largely to the reduction in costs and financial engineering, and despite falling rates of capex and productivity.

The decoupling of profits from productivity was not limited to the United States. Across non-U.S. developed markets (DM), productivity and real earnings per share diverged sharply during the past two decades (Exhibit 13, left). As in the United States, this dynamic likely reflected a combination of falling borrowing rates and globalization that provided non-U.S. DM companies with access to lower labor costs in emerging markets. Emerging markets (EM) enjoyed strong productivity and profit gains in the first decade of the 21st century, benefiting from higher commodity prices, foreign direct investment inflows, and higher revenues from expanding global trade. Over the past decade, however, EM productivity rates decelerated while profit growth lagged far behind, likely due in part to the impact of peaking globalization trends (Exhibit 13, right).

EXHIBIT 12: Corporations enjoyed record-high profit margins with low capex reflecting low interest rates and high levels of globalization.

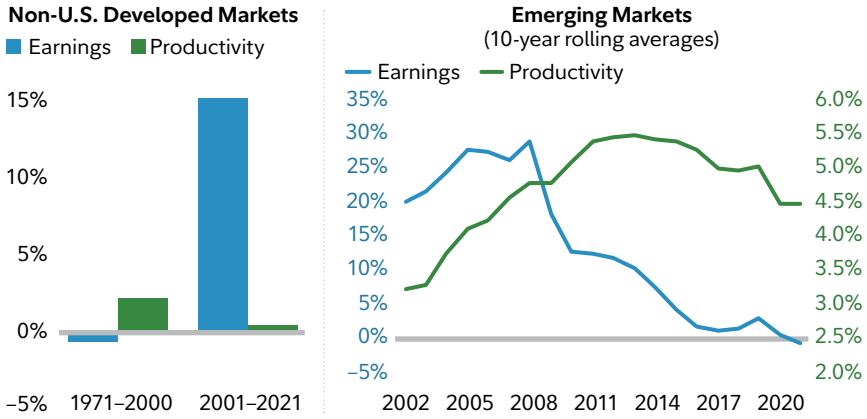
Historical Range of Corporate Indicators, 1962–2022, 5-Year Moving Averages



Global trade measured as global imports/GDP. Profit margins measured as EBITDA/Sales. Capital spending is relative to EBITDA and excludes financials and real estate. Exhibit compiled using annual data. Source: IMF, World Bank Publication, Federal Reserve Board, Fidelity Investments (AART), as of 12/31/22.

EXHIBIT 13: Productivity and profits decoupling: developed markets vs. emerging markets.

Real Corporate Earnings and Productivity, Annualized Growth Rates



Productivity: Year-over-Year Growth of Real GDP per Employed Person, GDP Weighted. Exhibits compiled using annual data. Source: OECD, Haver, Fidelity Investments, as of 12/31/21. Earnings: Year-over-Year Growth of Real Earnings per Share, Market Capitalization Weighted. Source: Factset, Haver, Fidelity Investments, as of 12/31/21.

Outlook: The faster profit/slower productivity growth trend may be peaking

Going forward, the decoupled trend in profits and productivity is unlikely to be sustained. The key drivers of the divergence – globalization, financial repression, and industry concentration – are either peaking or already in retreat. For the first time in decades, interest rates and labor costs may be on a sustainable rise (Exhibit 14). Emerging-market profit growth has already fallen below productivity rates. In short, we believe that the confluence of factors that drove surging profits to decouple from flagging productivity to such a large degree is unlikely to persist.

EXHIBIT 14: Unit-labor costs approached rates last seen in the 1980s.

U.S. Unit Labor Costs, 5-Year Annualized Growth Rate

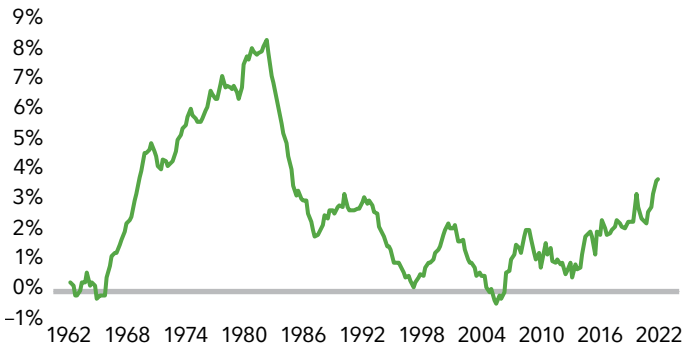


Exhibit compiled using quarterly data. Source: Bureau of Economic Analysis, Haver Analytics, Fidelity Investments (AART), as of 9/30/22.

This means that going forward, we expect economic growth to re-emerge as the main driver of corporate profit growth. Because demographics will constrain the growth in labor, we expect productivity to take center stage. As a result, productivity is once again becoming the fundamental, sustainable driver of corporate profitability.

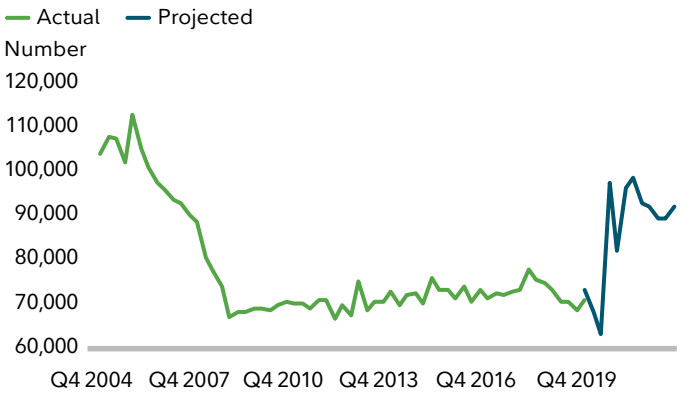
Does this condemn the profit outlook to converge to the depressed productivity rates of the past decade? Our base case assumes no material improvement in the productivity rate. That said, we see potential for an upside scenario, driven by waning secular trends (globalization, financial repression, and industry concentration), and potential extrinsic X-factor catalysts (addressing climate change, onshoring, and domestic inequality). Alongside these forces, another boost to future productivity may come from recent breakthroughs in artificial intelligence technologies, once their adoption becomes widespread.

Although our model-based, base-case forecasts do not indicate a productivity boom ahead, we suspect the shifting secular landscape has the potential to boost productivity rates above the modern-era lows experienced in recent years. Most recently, business formations are sharply up and may indicate a revival in business dynamism amid changing work practices in the wake of the global pandemic (Exhibit 15).

To break out of the slowing trend, new technological advances and efficiency improvements are needed.

EXHIBIT 15: Business formations show signs of revival post-COVID.

U.S. Business Formations



Projections are Census Bureau estimates. Source: Census Bureau, Haver Analytics, Fidelity Investments (AART), as of 12/31/22.

These, in turn, require new investment in innovations that will defy the law of diminishing returns. Investment – both public and private – may be crucial to strengthening productivity both directly via capital deepening and indirectly via multifactor productivity. Complementary investment in training and managing talent is a way to enhance productivity via labor quality.

CHAPTER 3

Extrinsic X-Factor Motivations

How X-factor motives may impact productivity and profits

We believe the broad secular shifts in interest rates, inflation, and globalization are already on their way to changing the incentive structure facing corporations in a way that is likely to alter their behavior away from the low-capex mentality of the past decade.

In addition, there are several evolving considerations that are increasingly affecting the behavior and choices of corporations and policymakers, including addressing the impact of changing climate conditions, increasing manufacturing self-sufficiency for national security reasons, and addressing the unequal distribution of wealth and prosperity. The corresponding decisions often involve trade-offs, and their impact is highly influenced by the quality of their design and implementation.

These extrinsic X-factor motives can be difficult to predict and can influence the productivity outlook both positively and negatively, although some can serve as important catalysts for new investments and are tied to our core belief that capex and productivity could rise from depressed levels. Also, as these motives evolve, they are likely to result in relative winners by asset class, region, industry, and at the company level, resulting in opportunities for active investment managers.

On the negative side, incorporating more "preferences" into capital allocation decisions – rather than an exclusive focus on the highest return-on-investment potential – may run the risk of de-prioritizing efficiency gains. On the positive side, some of these motivations could incite businesses to raise capex or governments to make public investments. For example, efforts to bolster investments in promising technologies or mitigate wasteful externalities, such as pollution, may have the potential to increase productivity outcomes.

The productivity landscape of the future is unlikely to replicate the experience of the past two decades. The focus on greater global integration, hyper-efficiency, and growing the economic pie is giving way to greater domestic and national focus, the rising influence of other considerations, and improving the quality and distribution of the economic pie (Exhibit 16).

The following framework evaluates how opportunities and risks in three major areas affect the outlooks for productivity, profits, and investment outcomes: (1) climate, (2) geopolitics, and (3) domestic income inequality.

EXHIBIT 16: Shifting priorities: the past vs. the future

Past Priorities and Return Drivers	Future Priorities and Return Drivers
The overall economic pie	Quality of pie and distribution of slices
Global integration	National focus and reshoring
Efficiency	Extrinsic X-factor considerations

Source: Fidelity Investments (AART), as of 2/28/23.

A changing world

There is considerable uncertainty around the global policy and political outlook for addressing the impacts of climate change, but we believe two secular trends are well established and likely to persist in the years ahead:

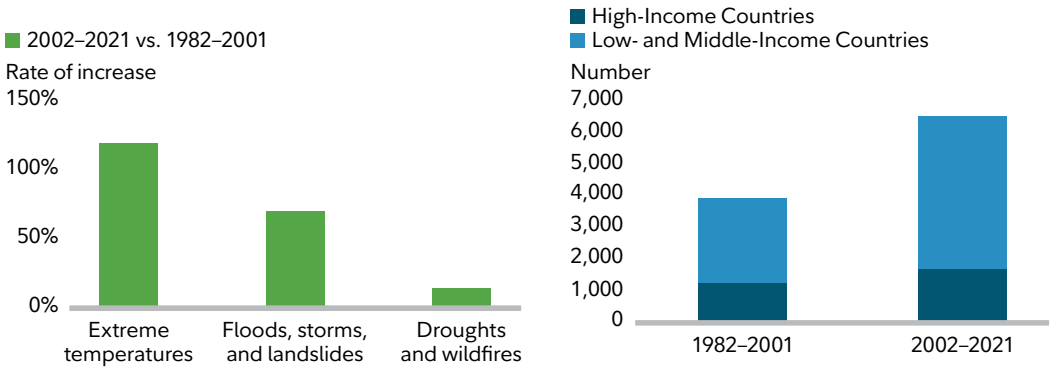
1. The **physical risks** from the broad impacts of climate change represent rising costs to the global economy.
2. Efforts to **mitigate** these costs and to **transition** to cleaner energy (decarbonization) represent both potential opportunities and costs for economies and businesses.

This section articulates the framework for our belief that climate-change motivations offer a potential catalyst for investments and productivity gains, and it includes our views about how to evaluate potential relative winners and losers from these trends.

Climate change has contributed to natural disasters that are a key source of risks for both productivity and profits. The frequency of heat waves, floods, storms, landslides, droughts, and wildfires has risen in recent years, impacting a growing number of people worldwide.[6] Globally, the last two decades saw a more than 100% increase in the incidence of extreme temperature events, compared with the two previous decades (Exhibit 17, left). Developing countries have been more affected than advanced economies, reflecting both their geography (many are in warmer areas) and the capacity to withstand such adverse events, owing to the generally less robust infrastructure and the more limited economic means (Exhibit 17, right). Studies found that both labor supply and productivity suffer from extreme temperatures and tend to decrease under future warming scenarios in most parts of the world, particularly in tropical regions.[7] At the same time, natural disasters cause supply disruptions that tend to result in price fluctuations, compounding the hardships of the population and undermining profitability of businesses.

EXHIBIT 17: The increase in the frequency of natural disasters is a risk for productivity and profits.

Frequency of Natural Disasters



LEFT: Disasters in these data conform to at least one of the following three criteria: 10 or more deaths; 100 or more people affected; the declaration of a state of emergency and/or a call for international assistance.

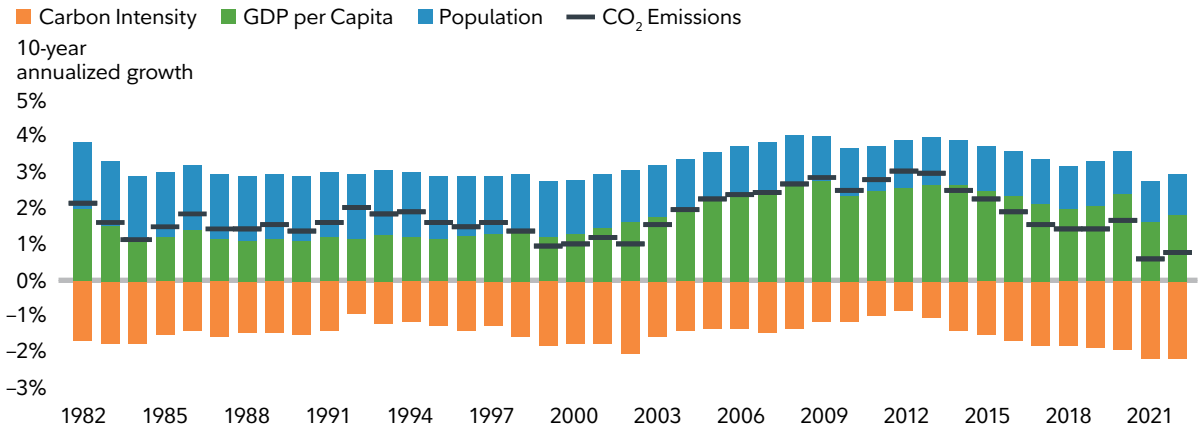
RIGHT: Country income groupings correspond to the World Bank classification. Both charts compiled using annual data. Source: IMF, EM-DAT, Fidelity Investments (AART), as of 12/31/21.

Scientists link climate change to greenhouse gas emissions, in particular, carbon dioxide (CO_2). Global carbon emissions have grown at an average rate of 1.8% a year over the last 50 years. This dynamic reflects three components: population growth, GDP per capita growth, and growth in the CO_2 intensity of production, or CO_2 emitted per dollar of GDP.[8] Emissions have been a by-product – something that economists call an externality – of supporting the growing global population and improving global standards of living. Technological advancement has countered rising emissions through the diminishing carbon intensity of the global economy over time, but this offset has been only partial (Exhibit 18).

Although past emissions will continue to pose formidable climate risk for several decades, a reduction in new emissions may limit temperature increases farther into the future. There are secular forces that can help lower emissions going forward – naturally slowing demographic growth, for example. Over the next 50 years, the global population is expected to increase at an average annual rate of 0.5%, below the 1.5% rate of the prior 50 years.[9] However, lowering carbon emissions sufficiently to avoid even higher temperatures will require further reductions in the carbon intensity of production. It is possible that a technological transformation that lessens emissions and boosts productivity is already underway.

EXHIBIT 18: Global carbon emissions continue to rise but diminishing carbon intensity is encouraging.

Global CO_2 Emissions Growth



Carbon intensity is measured relative to GDP using annual data. Source: Global Carbon Atlas, Fidelity Investments (AART), as of 12/31/21.

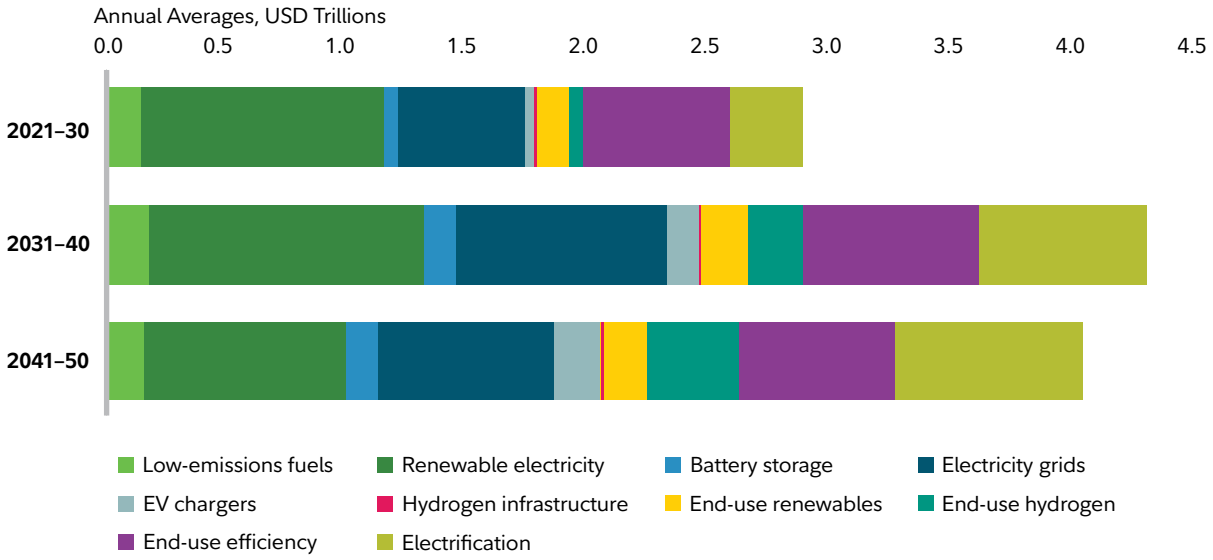
Transition and mitigation efforts as potential catalysts for investment and productivity gains

Global public and private investment to address the implications of climate change has grown steadily in recent years. To date, 194 countries plus the European Union have joined the 2015 Paris Agreement, which seeks to achieve net-zero emission targets (Exhibit 19). Signatories have committed to keeping global warming to no more than 1.5° C, and achieving carbon neutrality – whereby emissions are either eliminated or balanced by carbon removal by 2050. The International Energy Agency (IEA) estimates that hitting a global net-zero target over the next 30 years would require nearly $4 trillion in new investments (IEA, 2021).[10] Some public funding has been dedicated toward addressing climate change impacts. For example, the Inflation Reduction Act in the United States channels nearly $400 billion in federal funding to clean energy through a mix of tax credits, grants, and loans.

According to the IEA, the largest investment need over the next decades is in electricity generation, with a transition to renewable electricity and the development of battery storage to resolve intermittency issues. More investment will be needed for the buildout of clean energy infrastructure for electricity grids, electric vehicle charging stations, hydrogen refueling stations, and import and export terminals. Substantial funding will also be required for low-carbon end-user technologies, such as deep retrofitting of buildings, transformation of industrial processes, the purchase of new low-emissions vehicles, and more efficient appliances.

EXHIBIT 19: The goal of net-zero emissions requires investment in infrastructure and technology.

Global Estimated Investment Needs to Achieve Net-Zero Emissions

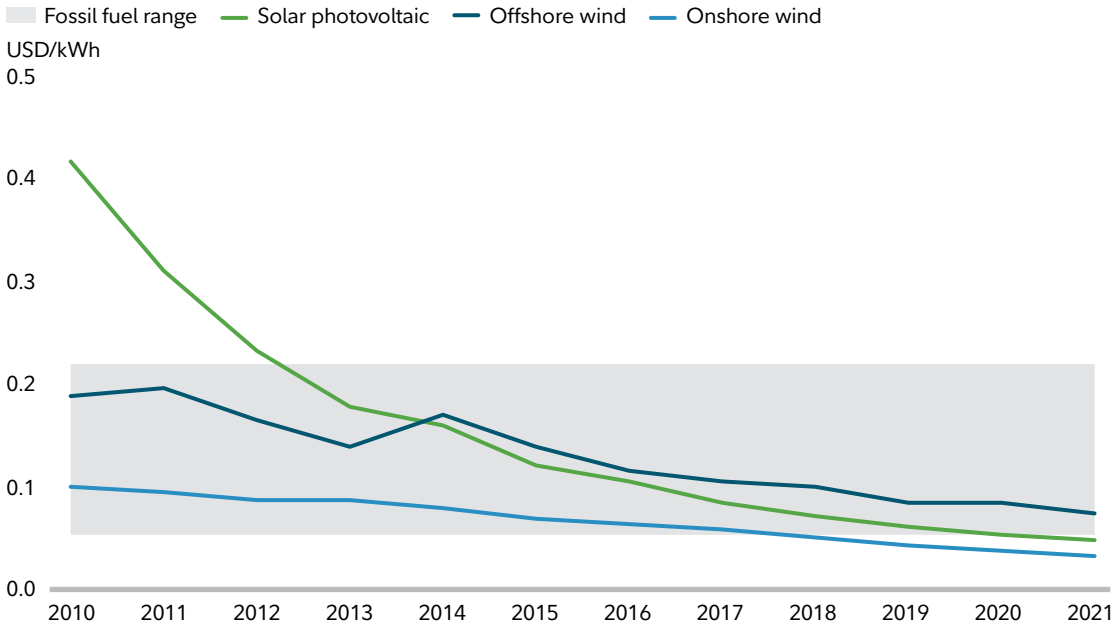


IEA estimates, excluding investments associated with fossil fuels, nuclear electricity, and carbon capture technologies. Source: International Energy Agency, Fidelity Investments (AART), as of 12/31/21.

For the United States to achieve its current climate policy commitments, the energy sector will need to transition from low-productivity commodity extraction to high-productivity renewable technology. The diminishing role of fossil fuels in power generation will be accompanied by an evolution of energy costs. While the recent experience points to high and volatile energy prices, partly from underinvestment and partly from geopolitical drivers, longer-term trends will likely be different (Exhibit 20). The cost of electricity generation from key renewables has already fallen substantially and is now competitive relative to fossil fuels (IRENA, 2022).[11] In fact, commonly used models have been shown to underestimate deployment rates for renewable energy technologies and overestimate their costs.[12] The declining costs of these technologies reflect "Wright's Law," which states that for every exponential increase in installed capacity, the price falls exponentially.[13] As the use of renewables becomes more widespread, electricity may become cheaper, benefiting company profits.

EXHIBIT 20: The declining costs of renewable energy offer benefits for productivity and profits.

Global Renewable Energy Costs

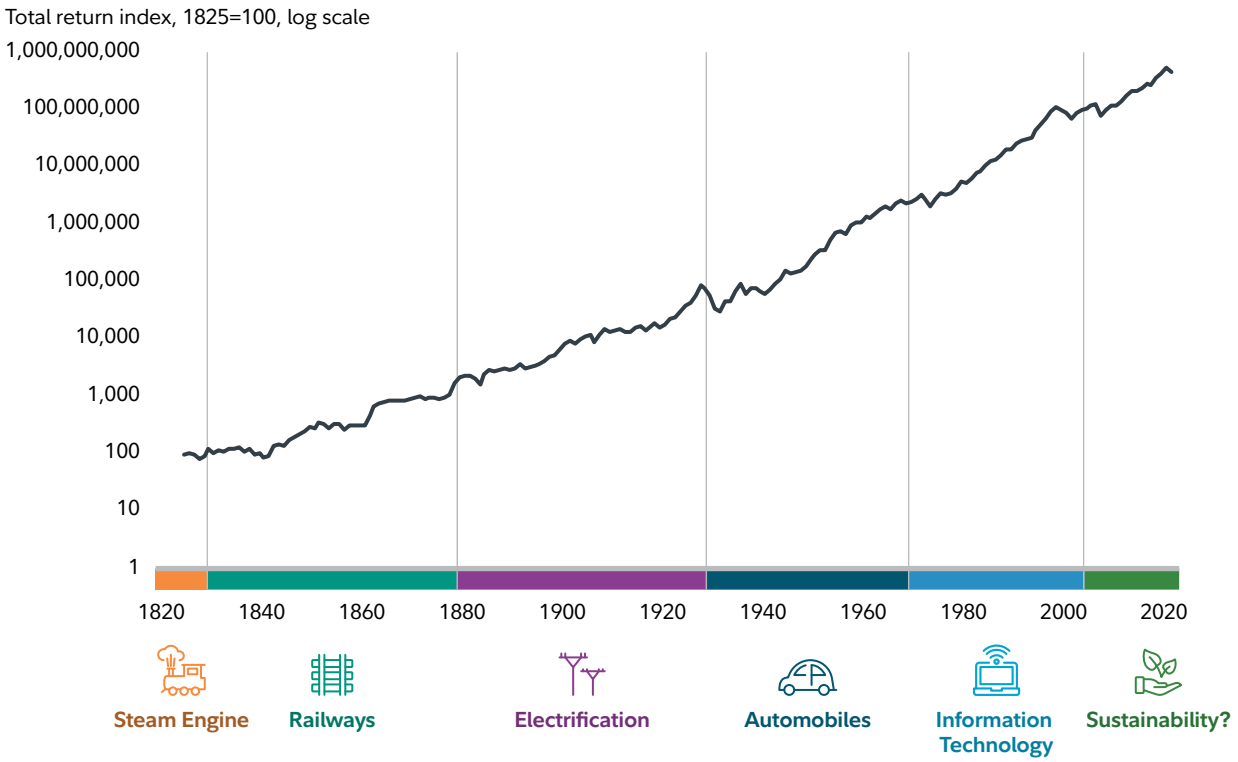


Global weighted average LCOE (USD/kWh) of newly commissioned utility-scale solar PV, onshore and offshore wind. Levelized Cost of Energy (LCOE) estimates the net present value of total capital and operating costs of a generic power plant and divides it by the electricity generated by that plant over its operating life. Source: International Renewable Energy Agency, Fidelity Investments (AART), as 12/31/21.

Decarbonization efforts may be a secular positive for both productivity and profits because they represent a technological transformation. This view suggests parallels with prior technological transformations, from the invention of the steam engine to the information technology revolution. Historically, such transformations tended to entail upfront costs for certain sectors, followed by economy-wide productivity benefits that lowered costs across the board. The associated process of evolving technologies produced winners and losers among companies and industries at various stages of the transformation but bolstered overall economic and market performance longer term (Exhibit 21). One can view decarbonization as the incipient technological transformation, driven by climate change.

EXHIBIT 21: Sustainability viewed as a technology transformation is a potential secular positive.

Historic Technology Transformations and U.S. Equity Returns



Total return index = U.S. equity total return index. Source: Fidelity Investments (AART), as of December 31, 2022.

Country implications

The implications of climate change and climate transition will vary significantly by region, country, industry, and company. From the productivity and profitability standpoints, the outcomes will depend on both the physical exposures to climate change and the economic exposures to the move from fossil fuels to more sustainable energy sources. Importantly, the outcomes will also depend on the capacity of various countries to invest in innovative technologies that would facilitate adaptation and mitigation of climate change. Below, we focus on a few dimensions that are important in evaluating the prospects of countries in terms of productivity and profitability.

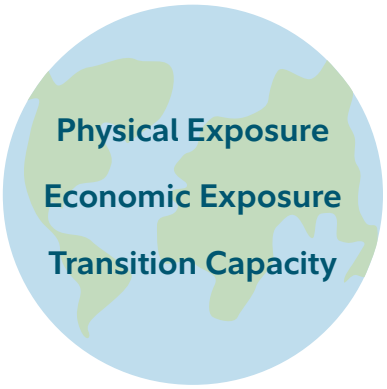
It is important to point out that the position of various countries with respect to climate transition is likely to shift over time, in particular:

- Commodity producers – particularly of fossil fuels – may benefit during the early phase of the transition. The prolonged under-investment in traditional energy infrastructure in recent years, in addition to climate-related disruptions to agriculture, have already pushed commodity prices into higher and more volatile territory.
- However, traditional energy producers may suffer disadvantages over the long term, as renewable energy becomes more affordable and new technologies help in adapting to changing weather patterns.

Longer term, we can evaluate the impact of climate change and climate transition on various countries along three broad dimensions (Exhibit 22):

1. **Physical exposure:** damage caused by rising temperatures and more extreme weather.
2. **Economic exposure:** disruption to existing economic models from the transition to cleaner energy; for instance, headwinds for oil exporters, domestic coal producers, and heavy industries. More carbon-intensive economies will generally have higher economic exposure.
3. **Transition capacity:** the ability to incentivize and fund climate-change investments, through public fiscal expenditures and private-sector capital expenditures. Economies with higher average incomes, better educated populations, and more advanced technologies and institutions will likely have more transition capacity.

EXHIBIT 22: Evaluating the impact of climate change across countries.



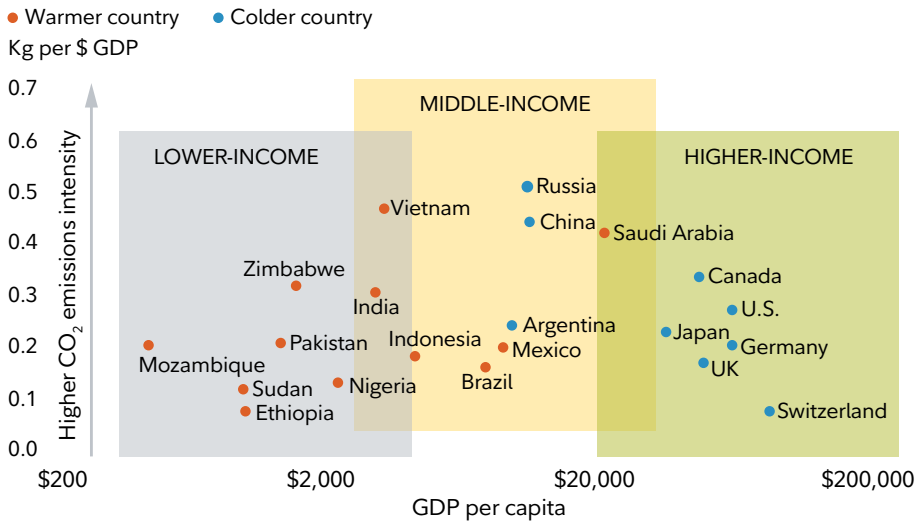
Source: Fidelity Investments (AART), as of 2/28/23.

Using these three considerations, we can make some generalizations across countries, depending on their economic structures and development levels. To help with this, Exhibit 23 shows carbon intensities relative to per capita GDP in U.S. dollars as of 2021. Countries higher up on the chart are more carbon-intensive and those lower down are less carbon-intensive. Also, countries highlighted in red are hotter and those in blue are colder.[14] We identify three broad groups of countries in terms of their income status and likely exposures to climate change:

- Industrialization has made some middle-income countries very carbon-intensive, which implies that decarbonization may generate the greatest economic damage to existing production and require the biggest transition effort. For example, China and Russia are near the top of the chart owing to their strong industrial base and, in Russia's case, the role of fossil fuel extraction. In this subgroup, economic exposures tend to be high. Other middle-income countries are less carbon-intensive, with physical risks from higher expected temperatures somewhat mixed.
- Many low-income countries are less carbon-intensive and may present opportunities for green industrialization that could potentially bypass the traditional high-emission technologies. Many of these, however, are in areas where temperatures are projected to increase to challenging levels with detrimental effects on productivity. For this reason, physical exposures in this group tend to be high, while domestic transition capacities are challenged by the relatively low-income base.
- Many high-income countries are in cooler areas and are less immediately threatened by extreme heat. They are, however, experiencing natural disasters, including heat waves. Many of these countries are more service based, with extractive and heavy industries generally playing smaller roles, limiting their economic exposures. A notable exception are fossil fuel exporters, like Saudi Arabia, which are highly exposed to the climate transition and challenged by rising temperatures. Many countries in this group can afford the investment needed to develop effective climate adaptation and mitigation strategies, thanks to their high-income base.

EXHIBIT 23: Carbon intensities partly reflect economic structures and development levels of countries.

CO_2 Emissions Relative to GDP

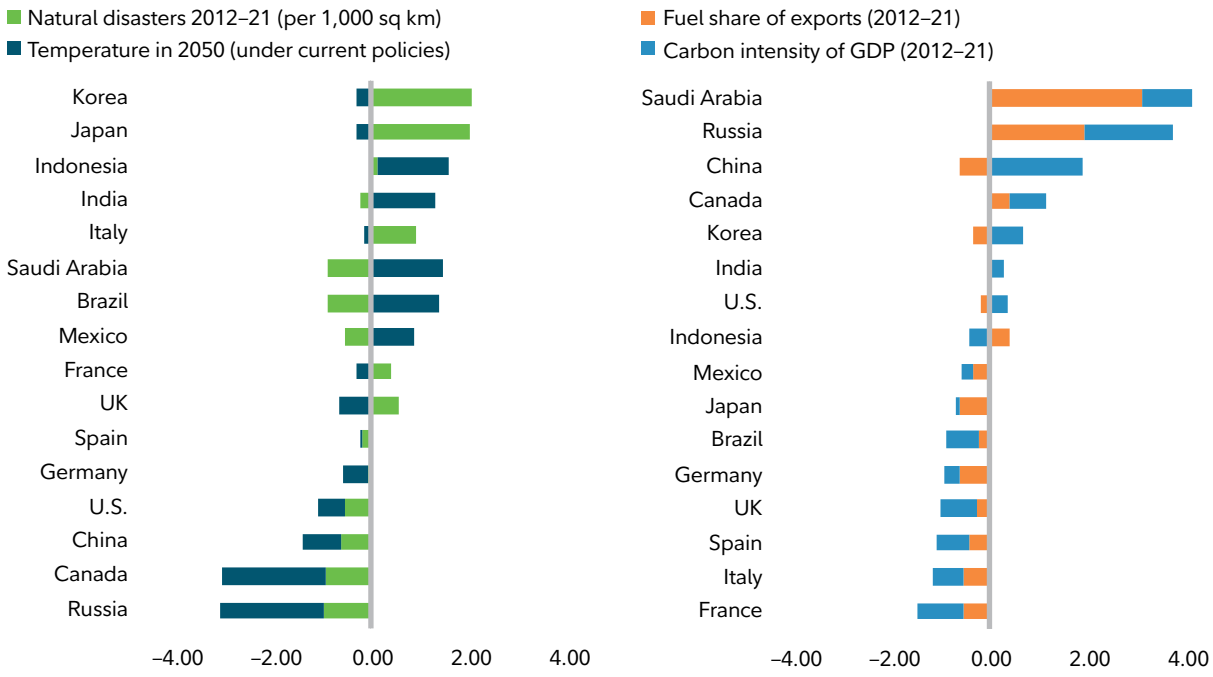


GDP per capita levels are shown on a log scale. Average 2050 temperature projection of 20 degrees Celsius is used to separate warmer countries (red dots) and colder countries (blue dots). Dollar GDP per capita is used to divide countries into three partially overlapping income groups – lower, middle, higher – for illustrative purposes only. Source: Climate Analytics, Global Carbon Atlas, World Bank Publication, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

To dig deeper into physical and economic exposures of various countries, we created a few illustrative metrics. We scored physical exposures in terms of average temperature projections and the frequency of historical natural disasters per unit of land area and economic exposures in terms of carbon intensity and the fuel share in merchandise exports (Exhibit 24). While these are not fully comprehensive metrics, they are useful to compare countries. For example, Korea and Japan are likely more exposed to physical risks owing to the relatively high incidence of natural disasters over the last decade, while Canada and Russia may be less exposed based on the relatively low projected temperatures. Similarly, Saudi Arabia and Russia face higher economic exposures due to their fuel exports and carbon intensity, while European countries have generally lower economic exposures.

EXHIBIT 24: Country exposures to climate depend on physical and economic circumstances.

Selected Physical and Economic Exposure Z-Scores

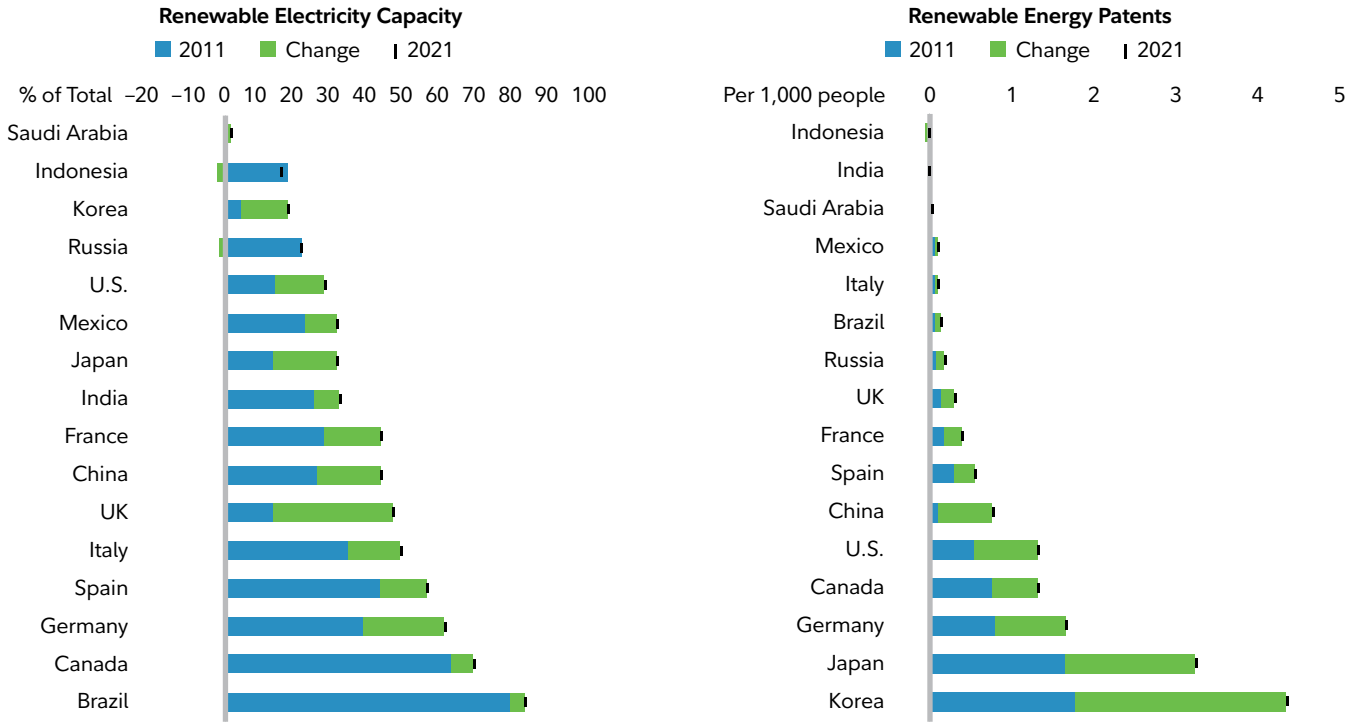


Z-scores measure the number of standard deviations above or below the mean of the sample. Positive Z-scores represent larger exposures to climate change and negative Z-scores represent smaller exposures. Source: IMF, EM-DAT, World Bank Publication, Climate Analytics, Global Carbon Atlas, Fidelity Investments (AART), as of 12/31/21.

Many countries have already made great strides toward decarbonization, offering a signal of their transition capacity (Exhibit 25). According to the International Renewable Energy Agency, several countries have lifted their share of renewable electricity capacity – the maximum net-generating capacity of power plants and other installations that produce electricity – over the last decade. For instance, many European countries, as well as China and Japan, have made substantial investments in renewable electricity capacity. The filings of renewable energy patents, a measure of innovation activity, also has risen in multiple countries, especially wind and solar energy. For example, Korea and Japan have seen large increases in patent filings, and Germany, North America, and China also saw an increase relative to their populations. While these metrics have shortcomings, they provide some help identifying countries with demonstrated transition capacity. They also suggest that transition capacity does not always align with carbon intensities but depends on the policy direction and on incentivizing decarbonization as well.

EXHIBIT 25: Ongoing progress toward more renewable energy demonstrates transition capacity.

Selected Transition Capacity Indicators



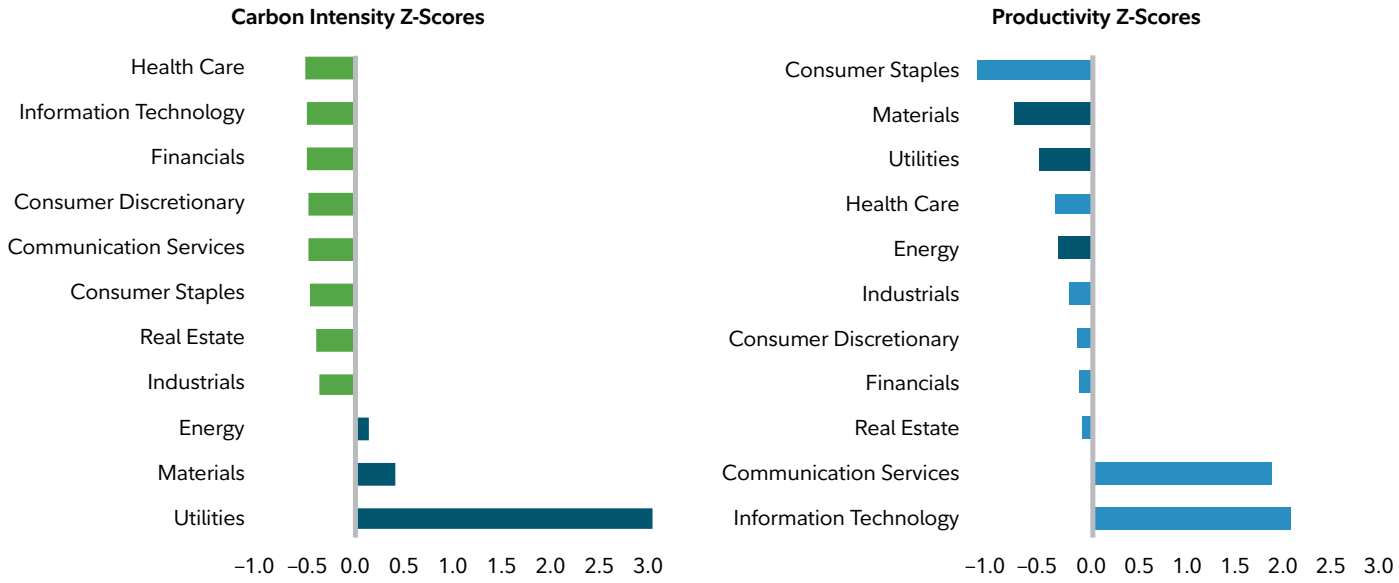
Source: International Renewable Energy Agency, United Nations, Fidelity Investments (AART), as of 12/31/21.

Industry implications

The sectors at the bottom of Exhibit 26 at left – energy, utilities, and materials – will likely be at the heart of the technological transformation associated with the climate transition. These three sectors have the highest starting carbon intensity, and they generally have lower historical rates of productivity. The combination of market and policy demands will likely see higher capex in transition associated areas, such as high productivity renewable technologies. Some of this capex may be associated with other sectors, such as technology and industrials, which can both compete with incumbent producers and supply the next-generation, market-share winners (Exhibit 26, right). In any case, we believe the longer-term impact on productivity and profitability has positive potential, even though identifying the winners and losers across industries, companies, and geographies will require strong active management and a keen awareness of shifting conditions over time.

EXHIBIT 26: Most carbon-intensive sectors exhibit relatively low productivity rates.

Sector Productivity vs. Carbon Intensity, Averages over Last Decade



Sector productivity defined as output per hour and matched to the Global Industry Classification Standard. Carbon intensity defined as Scope 1 + Scope 2 greenhouse gas emissions normalized by sales and weighted by market capitalizations. Averages over the last decade. Source: Bureau of Labor Statistics, Haver Analytics, MSCI, FactSet, Fidelity Investments (AART), as 12/31/21.

Broad climate conclusions

Climate change, and the incorporation of decarbonization strategies by businesses and policymakers, is driving a broad array of risks and opportunities that will affect the long-term productivity and profit outlook. Our broad conclusions include:

- The physical damage from climate – more-frequent and severe natural disasters and dangerously high temperatures in some regions – is a headwind for productivity.
- **In the shorter term,** the impact of the early phase of the climate transition implies a solid backdrop for commodity producers and fossil-fuel exporters.
- **Longer-term** investment trends likely favor productivity-enhancing innovations and could result in cheaper energy, although slow-to-transition or less-innovative fossil-fuel producers may be disadvantaged.
- The countries facing the **greatest risks** have high physical and economic exposure and limited adaptation/mitigation capacity, while the **biggest opportunities** are among innovators with supportive regulatory backdrops and favorable business environments.
- Industry implications: The transformation of the energy complex may result in higher productivity rates and profit opportunities both within the sector and in other industries, with differentiated risks and opportunities across companies.

Geopolitical risk and deglobalization pressures

Peak globalization

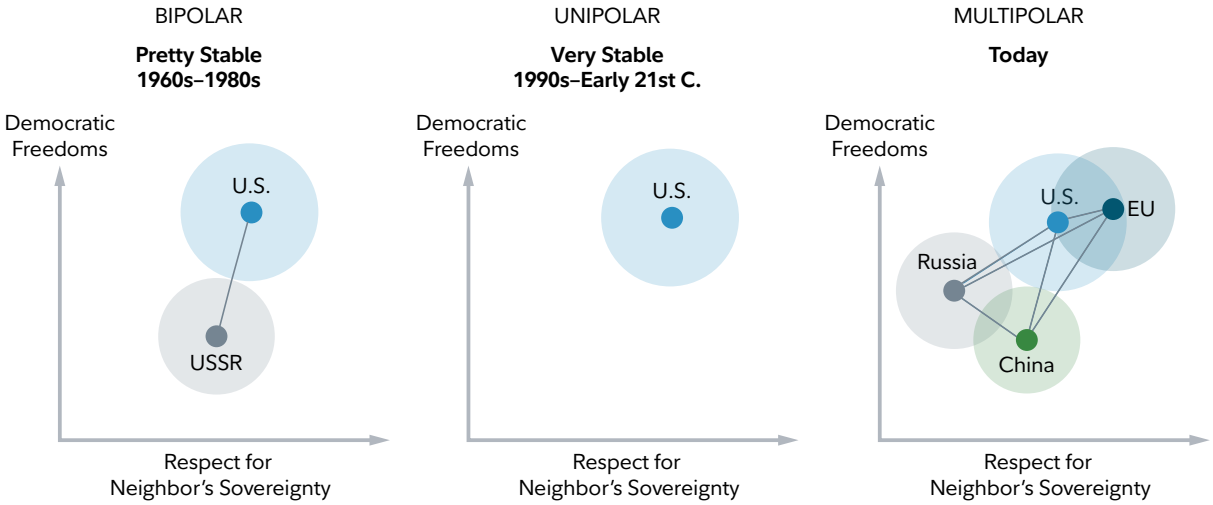
As we highlighted in prior work over the past several years, the world reached an era of "peak globalization," where global integration remains at a high level, but stops advancing. (See our 2019 paper *Rising Policy and Political Risk: Implications for Asset Allocation*.) Globalization stalled for many reasons. In many advanced economies, peak globalization became associated with stagnating household incomes and shrinking manufacturing sectors. The political winds switched from viewing unfettered trade as an opportunity for businesses and consumers toward a threat to workers and domestic production. The pandemic highlighted the fragile nature of extended global supply chains. Policy momentum has switched away from facilitating cross-border efficiencies and toward prioritizing onshoring, reshoring, near-shoring, friend-shoring, and greater self-sufficiency.

Multipolar geopolitics

At the heart of peak globalization, however, has always been the underlying transition in the geopolitical order (Exhibit 27). The stability of the global regime is determined foremost by the distribution of power among the world's great powers, with fewer powers representing higher stability. Starting with the end of the Cold War, we were fortunate to enjoy nearly three decades of benign, unipolar stability under U.S. hegemony. Before that, a relatively balanced bipolar era kept the Cold War from ever becoming hot. In recent years, however, the relative decline and ambition of U.S. power, along with the ascendance of China's capabilities and aspirations, created a transitional phase to a more multipolar dynamic. Historically, multipolar regimes have tended to be the most unstable backdrops, contributing to a less-balanced security equilibrium among a larger number of powers. These regimes do not always gravitate toward outright great power wars, but the Russian invasion of Ukraine is a clear manifestation that the new multipolar era has begun.

The original architecture of modern globalization has its origins in collective action by like-minded democracies at the end of World War II. The widening of geopolitical fault lines during the 21st century – as well as China's emergence as the world's largest trader at the center of the global system – raises unprecedented political and economic challenges to the postwar global system.

EXHIBIT 27: The geopolitical backdrop has shifted to a less stable, multipolar world order.



Source: Fidelity Investments (AART), as of 12/31/22.

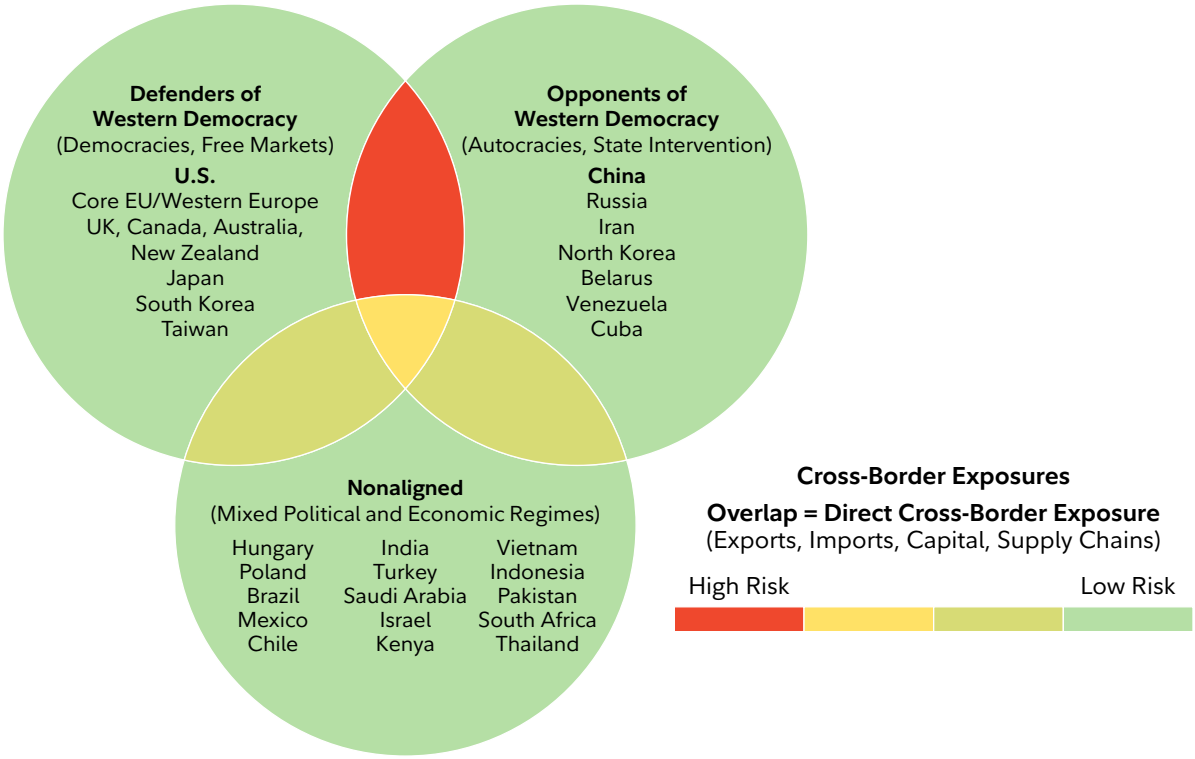
What will the new world order look like?

Going forward, we don't believe rapid deglobalization is the most likely scenario, nor autarky the goal of the world's most important economies. The broad contour of the evolving global system will likely be defined by the division between those countries seeking to defend and renew the essence of the postwar global architecture and those that seek to fundamentally alter it (Exhibit 28). The defenders of the Western world view are democracies with relatively developed market-oriented economies, with the United States as the largest economy and most powerful member. The opponents of Western democracy are generally autocracies with economies that tend to be more state directed, with China as the largest economy and most powerful member. A large third group of "nonaligned" nations, made up mostly of developing economies such as India, will deliberately attempt to steer clear of the defender-opponent divisions and follow their own political and economic interests.

These three geopolitical blocs conjure an obvious resemblance to the Cold War landscape, and the analogy is reasonable at a high level. However, there are several important differences, including:

1. **Bloc relationships are less rigid:** These blocs represent looser affiliations and less cohesive groups than the "democracy vs. communism" divisions of the Cold War. This implies potentially more fluidity and less formality of alliance within the blocs.
2. **Bloc leadership is less pronounced:** The United States and China have less influence over their respective blocs than the United States and Soviet Union did during the height of the Cold War. This implies that multipolarity, in contrast to Cold War bipolarity, will increase the range of potential outcomes.
3. **The system's starting point is more globally integrated:** The Cold War emerged from the devastating deglobalization of WWII, but we begin this new era at a historically high level of globalization. This implies the economic (and investment) consequences of geopolitical shifts are likely to be much higher.
4. **Today's nonaligned group is more economically consequential:** Much of the world's population lives in countries – including six out of the world's largest 20 economies – that are nonaligned, much less socialist, and more integrated with the global economy.

EXHIBIT 28: Loosely defined geopolitical blocs may define the new era.



Source: Fidelity Investments (AART), as of 2/28/23.

An analysis framework by country and industry:

The economic and investment implications of higher geopolitical and deglobalization risks will vary significantly by region, country, industry, and company. The outcomes will depend on how much exposure these entities have to these trends, and what their response will be to changing dynamics. As a road map for these shifts, we can evaluate the risks and opportunities across the world by investigating a handful of key perspectives.

First, what are the geographic implications of these shifts? Each country's economic exposure to systemic geopolitical risk is heavily influenced by its bloc membership and the bloc membership of its commercial partners. For example:

- **Opponents** generally have the **highest economic exposure to geographic geopolitical risk**. Their autocratic political systems are most likely to inject nationalistic and geopolitical influences into their economic policies, and they are most likely to be targets of sanctions or other negative economic actions by defenders.
- **Defenders** generally have the **second-highest** economic exposure to geographic geopolitical risk. As democracies, they are most likely to economically discriminate against other countries based on perceived violations of human rights or international law.
- **Nonaligned** countries have the **lowest** economic exposure to geographic political risk. Their domestic political and economic systems are generally viewed as less objectionable and less likely to be sanctioned than opponents, and their allegiance is coveted by both the other groups in a manner that potentially generates more favorable economic treatment.

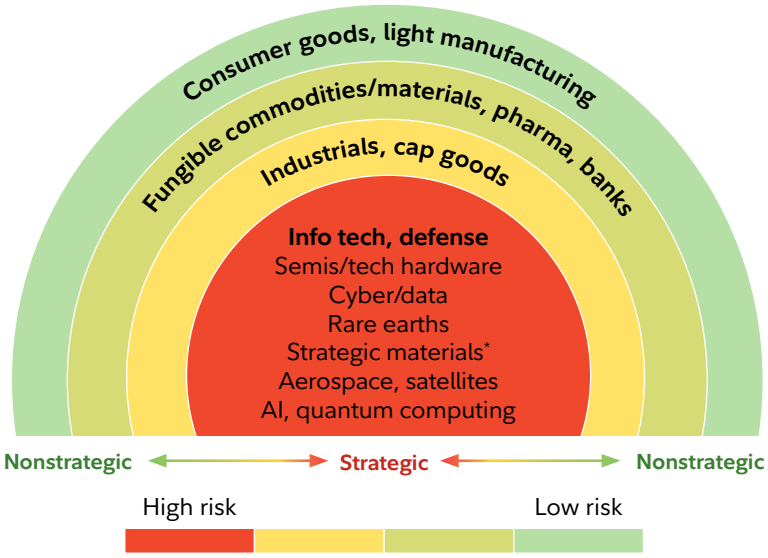
Economic exposure to geopolitical risk also depends on the bloc memberships of a country's key commercial relationships. In general, the more a country trades and interacts within its own bloc, the less exposure it has to geographic geopolitical risk. The area of greatest risk lies at the nexus of defender and opponent interaction. For instance, the U.S.–China relationship is fraught with peril, as both sides look to reduce their dependencies on their key geopolitical rival. Nonaligned countries tend to have the least exposure to geopolitical risk, and they have the highest opportunity of take advantage of their flexible position within the global order.

Second, what are the industry implications of shifting geopolitical and globalization trends? When national security becomes a predominant consideration, how much economic exposure a country has in the form of "strategic" industries becomes a critical consideration.

We believe industries can be ranked according to their strategic significance. On one end of the spectrum, industries with critical military applications are highly strategic. In the 21st century, this includes advanced technologies and critical materials, including aerospace, semiconductors, and rare earths. On the other end of the spectrum, nonstrategic industries such as consumer goods and luxury items are less likely to be targets of government intervention.

Strategic industries will naturally experience higher levels of X-factor decision-making. This implies these industries are more likely to be in the crosshairs of geopolitical friction (Exhibit 29). Such industries face a higher risk of restrictions or sanctions from other countries, such as U.S. export restrictions on semiconductor and technology hardware to China. On the other hand, strategic industries are also likely to benefit the most from favorable domestic policies, such as subsidies. Excessive government intervention may be a negative for efficiency, but policy support may offer favorable opportunities in an environment where market forces remain significant. Our assessment of a country's geopolitical industry risk includes its overall exposure to strategic industries and how well its economic system may be able to take advantage of government support.

EXHIBIT 29: Strategic industries will likely be more influenced by geopolitical considerations than less strategic ones.



Source: Fidelity Investments (AART), as of 2/28/2023.

* Strategic materials refers to resources that could cause manufacturing disruptions in the event of supply shortages.

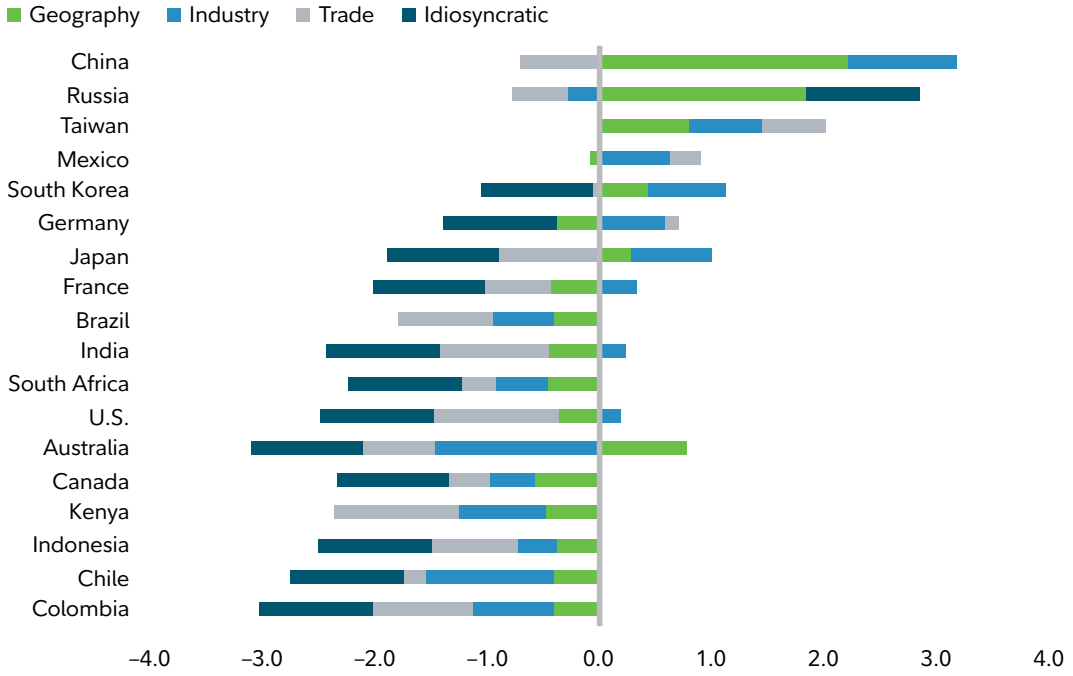
Country scores: In addition to geographic and industry exposures, countries have different exposures to systemic geopolitical and deglobalization pressures, based on their overall economic sensitivity to global commercial relationships, as well as their idiosyncratic geopolitical dynamics (Exhibit 30). We evaluate their sensitivity to global activity through measures of trade openness, and we assess a proprietary idiosyncratic score based on a multidimensional assessment of their political strengths and challenges. We convert our four-component grades into Z-scores for more than 60 countries, which can be interpreted as their exposure to systemic geopolitical and deglobalization risks. Our summary findings include:

- Opponent countries tend to have the greatest exposure to risks. China and Russia appear near the top due in significant part to their heavy export exposure to countries in the defender bloc.

- Defender countries with high levels of export exposure to opponent countries also face higher risks. Taiwan and South Korea are the prime examples, due largely to their interdependence with China and their reliance on strategic high-tech industries at the epicenter of geopolitical competition.
- Nonaligned countries dominate the lower end of the risk spectrum, with Latin America, Africa, and South Asia offering several countries that enjoy comparatively few geopolitically risky dependencies, positive industry exposures that include domestic commodity resources, and reasonable levels of domestic economic and political freedom.

EXHIBIT 30: Geopolitical and deglobalization pressures would have varying impacts across different countries.

Country Z-Scores Measuring Exposure to Geopolitical and Deglobalization Pressures



Z-scores are standardized scores indicating how much a value differs from the standard deviation of the sample. These calculations are based on our proprietary methodology, incorporating a variety of different metrics. Positive Z-scores represent greater exposure to geopolitical strife or deglobalization pressures, while negative Z-scores represent relative opportunities. Source: World Bank Publication, IMF, Heritage Foundation, Freedom House, Fidelity Investments (AART), as of 12/31/22.

Summary of broad geopolitical conclusions

It remains to be seen how acute the systemic geopolitical and deglobalization pressures become in the years ahead. The world may continue to operate at a relatively high level of integration relative to long-term history, but the marginal shift in directional trends from the prior three decades is likely to spur several broad implications.

A multipolar world order is an inherently less stable backdrop for the globalized integration achieved in recent decades. This implies:

- Downward pressure on profit margins, as cost reductions become harder to achieve.
- Upward pressure on inflation, as goods disinflation becomes less pronounced. Higher geopolitical tensions also tend to increase military spending and strategic competition for resources, which typically supports commodity prices and inflationary trends.
- Lower correlations among global assets, as regionalization and bifurcation of key industries such as technology hardware gain prominence.

Reshoring, onshoring, and near-shoring (regionalization) efforts have the potential to catalyze greater investments, particularly among developed economies. Over time, higher investment levels may spur greater productivity gains for some regions and countries.

- For example, in the United States, there is incipient evidence of a revival in onshoring U.S. manufacturing jobs and attracting foreign direct investment (FDI) in industrial sectors. According to the Reshoring Initiative, 364,000 new jobs were announced in 2022 due to companies reshoring or attracting FDI, up from only a few thousand in 2010. Meanwhile, federal legislation approved in 2021–2022 mandates multiyear increases of several hundred billion dollars in public investments in areas such as infrastructure, semiconductor manufacturing, and climate initiatives. Similarly, Europe's multiyear fiscal commitment to foster a clean-energy transition is likely to gain further momentum amid the energy-security challenges posed by the war in Ukraine.

There are likely to be relative winners and losers from shifting global conditions across multiple dimensions, implying there may be greater global active management opportunities across regions, countries, industries, and companies.

- Developing economies face a varied outlook, but as suggested by our country scores, many are not at the center of systemic geopolitical risks and may benefit from their nonaligned positions. In a world where cheaper labor is a less important component of global competition, successful EMs will use this dynamic as motivation to shore up their domestic institutions and capabilities and solidify their place within more regionally focused partnerships.

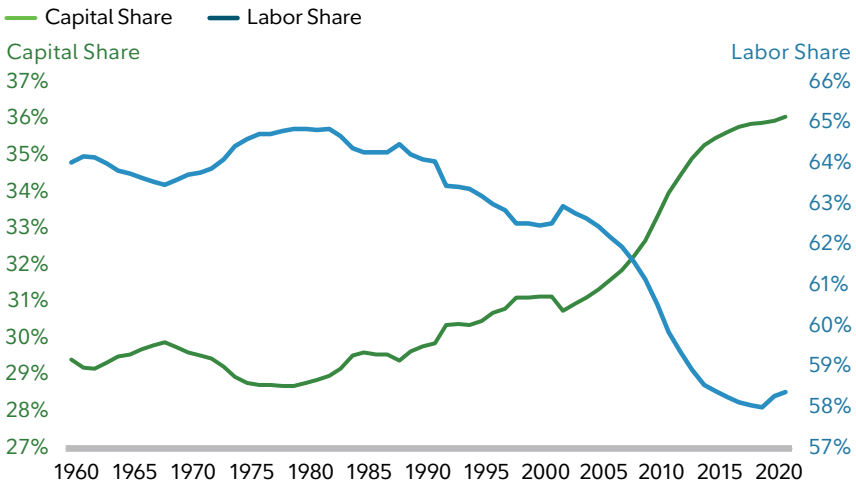
Domestic policies: Focus on addressing inequality

In response to rising income and wealth inequality in recent years, many countries are considering how domestic policies affect the distribution of economic gains. While it's beyond the scope of this paper to address the outlook for all the possible domestic policies across the world, we'll make a few observations about one of the most common policy themes across countries – prioritizing the living standards of low- and middle-income classes.

The record-high U.S. profit margins the past decade are reflected in the historically elevated "capital share" of the economy (Exhibit 31). The flip side of this is the depressed "labor share" of national income that persisted in recent years. This dynamic occurred partly due to structural changes, such as globalization, which tended to benefit multinational corporations more than workers, as well as myriad other factors, including a more supportive tax and regulatory environment for businesses beginning in the 1980s. The declining labor share trend tracked closely with rising income inequality in recent decades.

EXHIBIT 31: Record-low labor share reflects high inequality, but it appears to have bottomed.

Business Capital and Labor Shares of the Economy, 10-Year Averages



Shares represent proportion of the private, nonfarm economy. Chart compiled using annual data.
Source: Bureau of Labor Statistics, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

Lessons from our paper on inequality policies (2021)

Our previous work, *Investment Implications of a Shift in Policy to Address Inequality*, explored potential government policy changes that aim to reduce inequality and how they might influence the outlook for corporate profits, inflation, and the asset markets.

Following are some conclusions of this paper:

- Policy changes aimed at reducing inequality from record-high levels may result in downward pressure on corporate profit margins, upward pressure on nominal growth and interest rates, and create a modest headwind for aggregate asset market returns.
- The areas of greatest impact are likely to be aimed at raising the "labor share" of the economic pie by supporting low- and middle-income workers, particularly policies that weave together elements of government spending on infrastructure, made in America (and anti-China) self-sufficiency, and support for manufacturing and blue-collar jobs.
- These trends have the potential to create diversification opportunities for inflation assets, smaller cap and value equities, industries involved in domestic manufacturing, and businesses that cater to lower-income households.

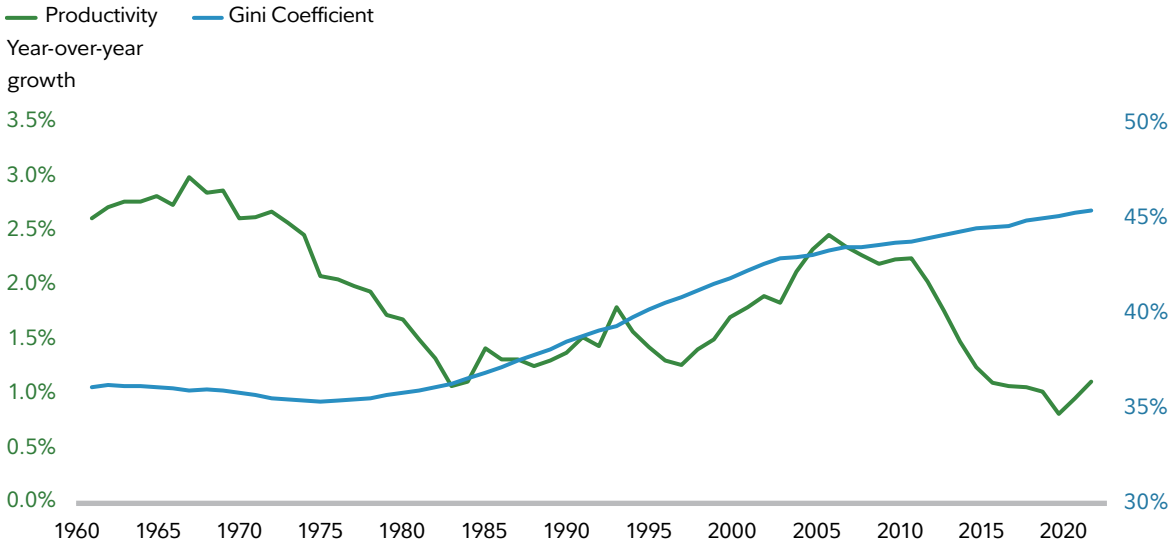
More recently – as we discussed in our 2021 paper *Investment Implications of a Shift in Policy to Address Inequality* – the labor share bottomed, then generally trended higher, due to a variety of economic and political factors shifting in its favor. Peak globalization and policy efforts to support domestic middle-income workers, in areas such as manufacturing and infrastructure, have gained steam, while demographics have contributed to tighter labor markets and more favorable compensation gains. Labor unions and state and local minimum-wage laws have gained in popularity, while large corporations have faced increased regulatory scrutiny. Although we don't expect policy changes to catalyze a transformational shift that will compress inequality back to its postwar levels, a sustained rise in the labor versus capital share ratio would likely portend a shift with meaningful economic and investment implications.

Like the other motivations, the outcomes of any future efforts to combat inequality will be shaped by the details and the quality of the policies and their implementation. Following are our general observations about their potential impact on productivity and profits:

- Excessively interventionist policies run the risk of impairing productivity gains. Moreover, a rising labor share is typically synonymous with downward pressure on corporate profit margins.
- However, it's important to note that productivity rates were higher during the postwar decades (1950s and 1960s), when inequality was much lower than it is today, and the modern-era highs in inequality occurred during the past decade of lower productivity growth (Exhibit 32).
- In advanced economies, such as the United States, prior eras of higher public investment coincided with larger productivity gains. If policy efforts focus on rebuilding diminished public investment and incentivizing capex in industries with a large share of low- or middle-income workers, they may boost the backdrop for productivity gains.

EXHIBIT 32: Historically, productivity has sometimes been higher when inequality was lower.

Productivity Growth and Income Inequality, 10-Year Averages



Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve Bank of St. Louis, Haver Analytics, Fidelity Investments (AART), as of 12/31/21.

CHAPTER 4

Outlook and Conclusion

Macro-level outlook: The divergence with profits may narrow, but productivity rates may rise

We believe public investment and capex have the potential to rise from depressed levels, representing upside for productivity growth. Macro shifts in inflation, interest rates, demographics, globalization, and other factors are likely to play a role, and extrinsic X-factor motives may offer potential catalysts as suggested above. The outlook for profits is likely to be more connected to productivity trends because the profit tailwinds from globalization, new technologies, market concentration, and financial repression are fading.

This implies some headwinds from the recent above-average pace of profit growth, but a potential rise in productivity growth would help offset this dynamic.

In summary, we believe multiyear trends are directionally shifting in the following manner:

- Rates of capex and public investment may increase, leading to higher productivity rates.
- Profit growth is unlikely to surpass productivity growth to the degree it did the past decade.
- Profit margins may peak, suggesting somewhat slower profit growth.
- Productivity and profit growth rates will remain positive.

Forecasting Productivity

Forecasting productivity is inherently difficult because hard-to-predict qualitative and intangible factors play a large role. Productivity – especially multifactor productivity – is driven by innovation that introduces new technologies or improves existing business practices. Furthermore, investment activity that leads to productivity gains can only be measured after the fact.

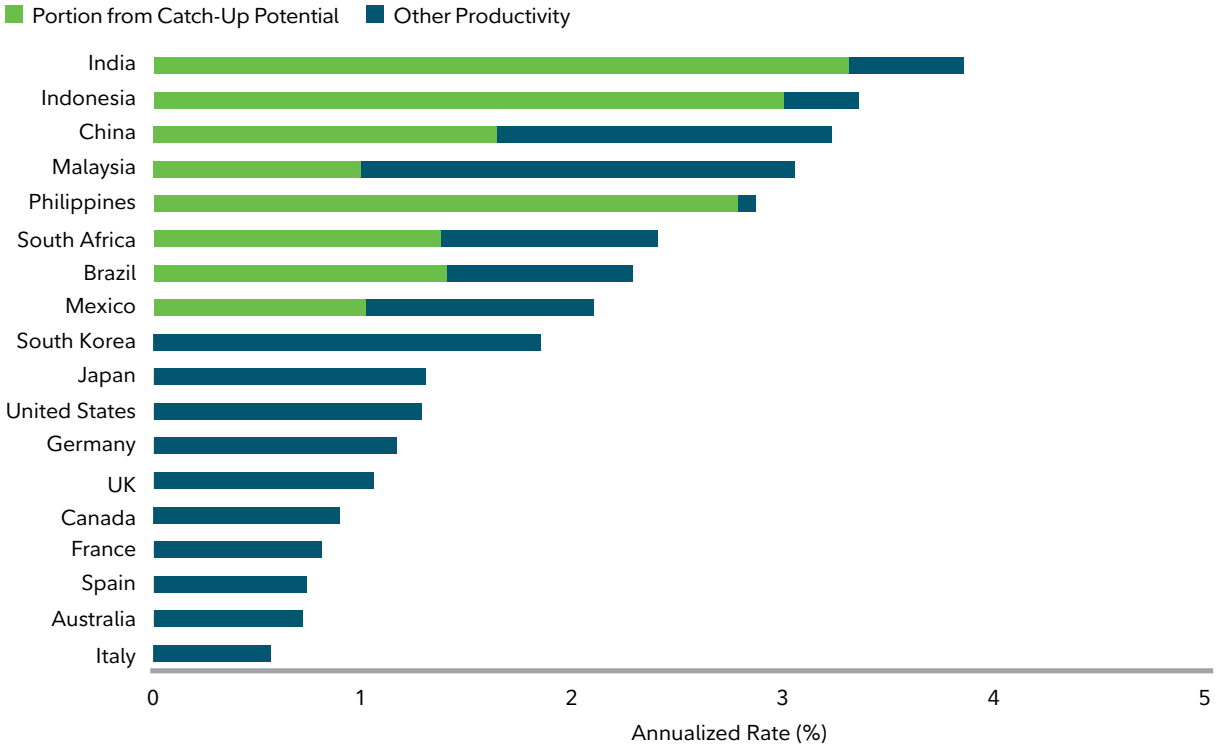
For these reasons, our forecasting process focuses on the degree to which the underlying structure of an economy can foster productivity (see *Secular Outlook for Global Growth: The Next 20 Years*). We compare common productivity drivers across emerging and developed economies and analyze the categories of economic conditions that drive secular productivity at a conceptual level and that we have identified empirically as the most predictive. The following forms the methodology for our 20-year base-case assumptions in Exhibit 33:

- Human capital: Our proprietary Human Capital Index incorporates measures of educational and scientific achievement as key drivers of future innovation and the adoption of new technologies. We also consider demographic factors, including the age composition of the labor force.
- Economic complexity: Our Economic Complexity Index builds on academic research.[15] Complex economies tend to be more competitive, use technology more effectively, and foster a better business climate and more nurturing institutions. Greater variety and more sophisticated products in a country's output signal a more complex economic structure and potentially higher productivity.
- Catch-up potential: Less advanced economies tend to have higher growth prospects due to their potential to catch up to the higher incomes of developed countries. This is due to their starting from a smaller base and their ability to benefit from the adoption of existing technologies.

Our model-based, baseline expectation is for long-term productivity rates to remain subdued across most major economies relative to their long-term histories, particularly for advanced economies. Our metrics of human capital and economic complexity for developed countries are at high levels but haven't improved much in recent years. In contrast, emerging markets derive much of their productivity growth from catch-up that exists due to the vast distance between their living standards and those of advanced economies. Moreover, the human capital and economic complexity of some EM countries rose over the past two decades. However, even our estimates for EM productivity growth rates are lower than the results achieved in recent decades.

EXHIBIT 33: Our baseline estimates of productivity are subdued relative to history.

Productivity Growth Forecasts, 2022–2041



Source: Fidelity Investments (AART), as of 12/31/21.

Investment as the productivity catalyst: Change on the horizon?

Our models do a reasonable job of forecasting how the long-term structure of economies may be more conducive to innovation and productivity gains, but they can't predict the idiosyncratic catalysts that may cause investments to accelerate. Specifically, changes in corporate behavior, public policy, and technological breakthroughs are both critical and difficult to predict.

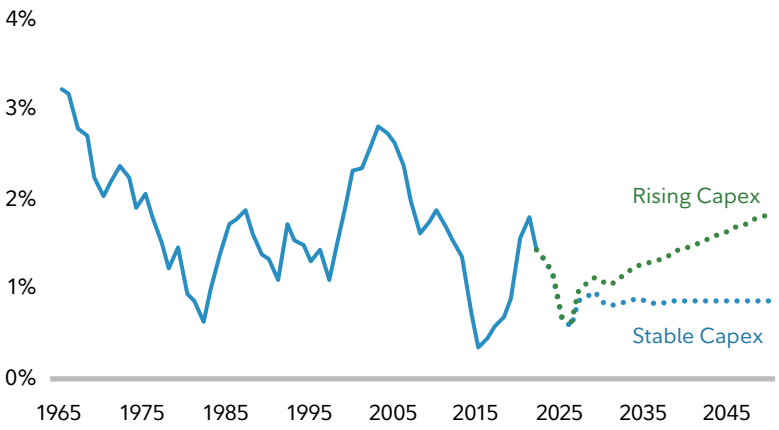
How much productivity acceleration upside is there and how impactful will it be from a macro standpoint? The answer is nearly impossible to forecast with accuracy, but we'll show that the potential upside is meaningful through an illustrative scenario.

Let's assume the upper bound of a U.S. capex acceleration might be a return to the peak capex growth rates during the 1970s – roughly 50% of EBITDA. Then we'll assume that acceleration would take the next three decades. If we then take into consideration the dynamics of how higher capex affects productivity, the rise to a 50% capex/EBITDA ratio would imply a boost of about 1% per year in real GDP per hour (Exhibit 34). The productivity boost would come from both an increase in capital intensity and a higher rate of multifactor productivity growth. This illustration underscores the potential for a reversal in falling capex trends to dramatically change the secular productivity outlook for the better. We would likewise expect a productivity upside from higher public investment.

Of course, such a massive increase in capex likely represents a high upper bound of the range of scenarios that may unfold. A lower-bound scenario would be that the capex/EBITDA ratio stagnates at its historically depressed level of about 30%. Our best guess is it will end up somewhere in between, with the secular trends and the extrinsic X-factor catalysts we explored in this paper combining to support a rise in capex rates and a concomitant increase in productivity growth.

EXHIBIT 34: Higher capex could boost productivity growth above baseline expectations.

Scenarios of Capex and Productivity Trends, 5-Year Averages



Productivity is real GDP per hour. Capex is aggregated across top 3,000 publicly traded companies (ex. financials and real estate). Scenarios are generated by a time-series model connecting capex to productivity. Chart compiled using annual data. Source: Bureau of Economic Analysis, Bureau of Labor Statistics, Fidelity Investments (AART), as of 12/31/22.

Strategic investment conclusions

No matter how the aggregate impact of these many crosscurrents ultimately plays out, we believe the backdrop for strategic asset allocation will be very different in the coming years compared with recent decades. The keys to success in this changing environment will be managing a shifting array of risks and identifying profitable opportunities among regions, countries, sectors, and companies.

Not all changes will be positive. Challenges and considerations in the coming years likely will include risks to specific industry groups and corporations tied to extrinsic X-factor objectives. If noneconomic motivations manifest as overly intrusive and significantly impair market-oriented mechanisms, expectations for profit growth and return-on-equity may suffer.

Also, greater political risks may present analytical challenges for investment professionals. Both geopolitical and domestic political risks are generally higher for many countries than during recent decades, implying a clear political framework is a necessity for asset allocators.

Other possible risks include:

- **Rising temperatures could continue to cause disruptions:** Damage from more extreme weather patterns is likely to be a regular feature of the economic backdrop for many countries and regions.
- **Inflation may be higher and more volatile:** Shifts in the supply side of the global economy may make it difficult for central banks to restore an era of low, stable inflation rates. These factors include resource-intensive climate transition and geopolitical competition, tighter labor markets due to aging populations, and the move to reconfigure supply chains according to national security and other non-efficiency-related concerns.
- **Real rates may be higher:** A return to ultra-easy monetary policy may be difficult, implying the upside for asset valuations may be lower compared with the prior decade's near-record highs.
- **Asset price volatility will likely be higher:** The many potential shifts listed above imply that uncertainty about many key trends will remain high and shifting investor expectations may generate more sustained asset-price fluctuations relative to the lower volatility average of the past decade.

That said, there will likely be many opportunities tied to lower global correlations. If peak globalization implies some bifurcation (between Western- and China-centered technology ecosystems) and more regionalization (near-shoring and friend-shoring of manufacturing supply chains), then a dominant global cycle or trend may hold less sway. The high global equity correlations of the past decade may give way to lower correlations and greater opportunities to diversify portfolios according to geography.

The United States may be in a position of strength. Despite the end of its unipolar global dominance, the United States possesses a rich base of financial, corporate, institutional, and natural resources to adapt to shifting secular trends.

As for Europe, it may be on a more cohesive trajectory. Several of the major secular challenges confronting the European Union – including the geopolitical and energy security risks exposed by Russia's invasion of Ukraine – are pushing the bloc toward greater economic, fiscal, and political cohesion. For example, fiscal and regulatory support for a transition to a cleaner and more reliable energy system may provide investment opportunities across multiple industries.

The "nonaligned" countries may be in a geopolitical sweet spot. Many emerging and frontier markets are located far from the systemic geopolitical fault lines, and they may benefit from favorable treatment. Countries that can create a favorable environment for domestic and foreign investments, including those that are endowed with key resources, may provide an attractive backdrop for investing opportunities. In these locations, an upturn in public and private capital expenditures could potentially boost productivity and create an environment for winning companies to generate sustained profit growth.

And, in general, there may be more active opportunities, in the coming years. After a long period of dominance by large multinational corporations, a different backdrop for inflation, geopolitics, and monetary policy implies a broader range of winners and losers across multiple asset categories.

Other possible opportunities include:

- Thematic portfolios: Allocations could be tilted toward or away from exposures to big themes, such as climate or globalization. We suspect identifying industries and companies that may benefit from an uptick in capex would be a good place to start.
- Higher investment spending in many developed and some emerging markets: Historically, depressed rates of capex, public investment, and productivity may receive a boost from shifting structural trends, such as reshoring, rising cost of capital, and clean energy.
- Addressing climate change as a catalyst for innovation: The push for investments to mitigate climate-change impacts and transition to more sustainable technologies is likely to gain even more momentum.
- Decarbonization efforts and the energy complex as key drivers of shifting market leadership: The shorter-term, supportive backdrop for commodity producers and fossil-fuel exporters may give way over the longer term to rewarding innovators and beneficiaries of cheaper renewable energy, which represents a technological transformation. Active management opportunities are likely to evolve and abound, both within the energy and power complex and in other industries, such as technology and industrials. The geographies facing the greatest risks have high physical and economic exposure and limited adaptation/mitigation capacity, while the highest opportunities are in innovators with supportive regulatory backdrops and favorable business environments.

We can use our productivity forecasting models, as well as our frameworks for analyzing trends in areas such as climate change and geopolitics, to generate country profiles. These profiles help identify relative investment risks and opportunities to inform allocation decisions. Following are several example profiles:

India

- High catch-up productivity potential.
- Benefited from globalization, but has a large domestic economy and low-end manufacturing base that will be less in the crosshairs of potential deglobalization pressures.
- Nonaligned, key swing player and coveted partner in geopolitics. Challenging neighborhood, but strategically located in the 21st-century world's busiest trade routes.
- Challenged by warming climate (average temp 26°C projected in 2050) and natural disasters, including floods. Relatively low income presents a challenge for funding the green transition via adaptation and mitigation. Renewable power capacity expanding slowly and progress in green tech appears limited.

Canada

- Solid productivity outlook compared with other DMs.
- Geopolitical risk is relatively low.
- Well-developed industrial base is not overly vulnerable to deglobalization risks due to strong ties/close integration with the United States and a public sector that tends not to be overly interventionist.
- Climate position is mixed, but somewhat positive. During the transition to clean energy, rich natural resource base provides energy security, but fossil fuel exports expose it to economic costs. It looks good on the green patents' metric of green innovation, has a relatively favorable physical climate risk position (average 2050 temp still below freezing), and a relatively high renewable electricity capacity (approaching 70% of total).

France

- Solid productivity outlook versus other DMs.
- Major industrial economy. Deglobalization and geopolitical risks somewhat minimized by strong alliances, but somewhat more interventionist economic model than other DMs is a productivity risk.
- High installed base of nuclear power provides energy security during climate transition. The share of renewable electricity is also increasing at a healthy rate. Thanks to this, its economic exposure is low and carbon intensity is only 0.1% (Kg CO_2 per $ GDP).

South Korea

- Highest productivity outlook, sophisticated industrial base/high economic complexity positive for baseline estimate.
- Faces greater geopolitical/deglobalization risk as a result of high-tech industries being in the epicenter of geopolitical fault lines, including important economic/trade ties with China, risk of disruption from North Korea.
- Impressive record on green innovation as measured by patents and meaningful rise in the share of renewable power (although that share is still under 20%). Substantial physical climate risk from natural disasters (floods, storms).

Chile

- Relatively solid productivity outlook, thanks to both some catch-up potential and progress on structural factors.
- Nonaligned country with a rich resource base, including strategically desirable minerals, implies a relatively low level of geopolitical and deglobalization risk. Risk of greater domestic economic intervention but remains a relatively market-oriented economy compared to other developing countries.
- Physical and economic climate exposures appear manageable. Good progress on renewables in power generation, relatively high share of renewable electricity capacity (over 50%).

Conclusion

We believe updating investment frameworks to better understand and analyze the underpinnings of productivity gains – and their links to profits and asset-class returns – may be essential for the long-term success of your strategic asset allocation approach in the new era.

Past models that sought to identify outsized profits but were not tied to productivity and other core fundamentals may be unlikely to work in the new regime.

Conversely, a focus on the link between productivity and profits – including increasingly important factors that influence the rate of productivity increases – will likely be an important element for any actively managed strategic allocation. We believe it will be a critical element to identifying trends, themes, catalysts, and investment opportunities.

ENDNOTES

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[8] This decomposition is a version of the so-called Kaya Identity that was developed by the Japanese economist Yoichi Kaya in the 1990s.

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[11] Levelized Cost of Energy (LCOE) estimates the net present value of total capital and operating costs of a generic power plant and divides it by the electricity generated by that plant over its operating life. International Renewable Energy Agency, Renewable Energy Statistics, 2022.

[12] See Way, et al., "Empirically Grounded Technology Forecasts and the Energy Transition," Joule, Volume 6, Issue 9, September 2022, pp. 2057–2082.

[13] Wright's Law is closely related to Moore's Law, according to which the number of transistors in a microchip doubles every two years. However, while in Moore's Law technological change is a function of time, in Wright's Law it is a function of experience, or "learning."

[14] We chose the average 2050 temperature projection of 20 degrees Celsius – near the median in our country sample – to divide the two groups, using data from the climate impact explorer by Climate Analytics (https://climate-impact-explorer.climateanalytics.org).

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