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Assessing climate risk in portfolios

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Summary

We believe climate change will play a central role in the risk/reward profile of long-term portfolios. In our view, climate change can have a potentially material impact on the revenue and operations of a meaningful number of public companies.

Key takeaways

- We examine climate risk in the context of two categories – stranded assets and weather-related loss – to help demonstrate there is a clear economic impact due to climate change.
- We believe assets at higher climate risk have greater long-term drawdown risk; investors should consider the longterm implications of climate risk facing their portfolios.
- We provide analysis highlighting the risks and opportunities facing investors in the age of climate change.

Assessing climate risk entails identifying significant blind spots and business risks facing a company due to climate-driven events – both big and small – that are occurring and expected to continue. However, it also entails finding investment opportunities due to a changing climate. Based on broadly accepted projections, there is a wide range of outcomes as it pertains to future climate risk and mitigation efforts (**Exhibit 1**). We provide analysis highlighting the risks and opportunities facing investors in the age of climate change.

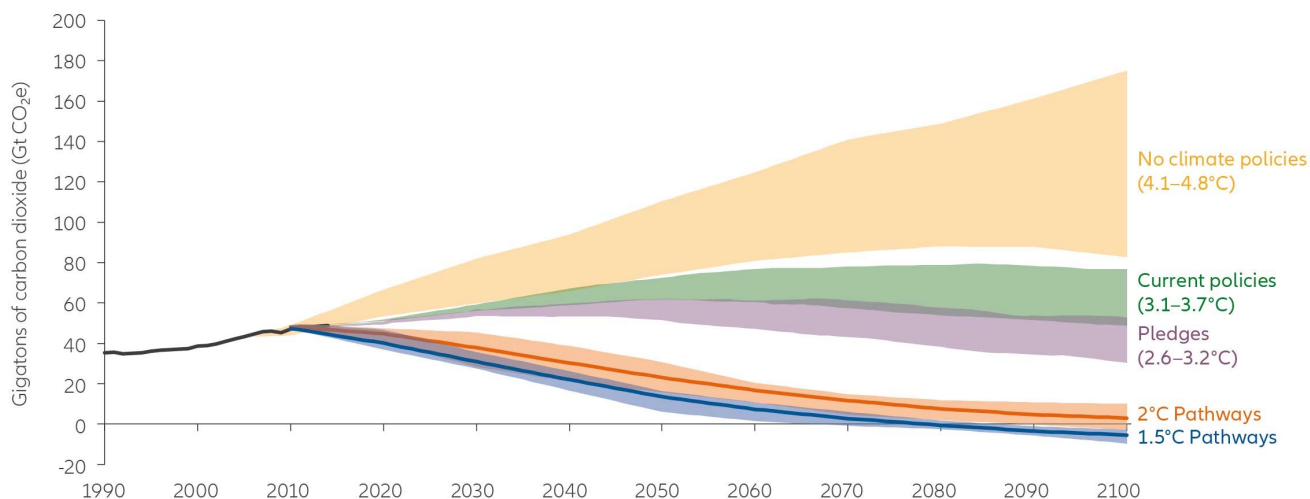
“To the extent that climate change and the associated policy responses affect productivity and long-run economic growth, there may be implications for the long-run neutral level of the real interest rate. If prices of properties do not accurately reflect climate-related risks, a sudden correction could result in losses to financial institutions, which in turn reduce lending in the economy... Banks also need to manage risks surrounding potential loan losses resulting from business interruptions and bankruptcies associated with natural disasters.”

– Lael Brainard, Federal Reserve Board of Governors member, November 2019

Using an ESG framework to assess risk

There is a growing body of applied and academic research demonstrating how an environmental, social and governance (ESG) framework helps investors to understand the risk drivers of a company better. It has become an indispensable tool for assessing the potential tail risks a company faces, as well as short- and long-term strategic threats.

Exhibit 1: Global greenhouse gas emission scenarios



Source: Climate Action Tracker (CAT)

Temperature figures represent the estimated average global temperature increase from preindustrial levels by 2100.

We see climate change as one of the preeminent challenges facing humanity in the coming decades. One should look at climate risks within a broader ESG framework, not solely within the vacuum of the “E” rating of an ESG-themed investment. We believe comprehensive ESG integration should incorporate fundamental analysis, viewed through a lens of sustainability and business practices.

To illustrate this idea, we examine Tesla, Inc. The company’s electric vehicles and batteries are well suited to deal with business risks associated with climate change, and it has accordingly earned a best-in-class environmental rating from most providers. However, the company tends to rank below average on governance and poorly on social scores based on MSCI and AllianzGI’s sustainable and responsible investing (SRI) models. From an investment perspective, the lower social and governance factors may outweigh the positive aspects of its business model as it relates to climate change and should be considered by investors in their totality.

Another example is Pacific Gas and Electric (PG&E), which plays a significant role in facilitating California’s transition to a low-carbon economy. California’s Renewable Portfolio Standard requires utilities such as PG&E to generate 60% of their supplied power from renewable sources by 2030. Given PG&E’s vast domain, serving roughly 6 million Northern California residents, it is one of the country’s most renewable utilities. However, under Sustainalytics’ newer risk rating framework, PG&E scored dead last in product governance – a category that encompasses quality and safety events – in a universe of over 2,900 companies. This led Sustainalytics to rate PG&E as “severely risky.” An analysis from Morningstar Direct showed that only 3.7% of ESG funds held PG&E, despite the utility’s potential role as a solution for achieving the United Nations Sustainable Development Goal #7, Affordable and Clean Energy.

On the opportunity side, as counterintuitive as it sounds, a large multinational oil and gas company making significant investments in renewables may turn out to be a compelling climate change-related investment, despite the longer-term risk of stranded assets.

The economic impact of stranded assets

Stranded assets refer primarily to carbon-intensive assets that will become obsolete should the global economy transition away from its heavy dependence on fossil fuels, including proven reserves of oil, natural gas and coal. Proven reserves have a high probability of being extracted profitably using current equipment and operating conditions.

As a planet, we can emit approximately 81 gigatons of carbon globally between 2017–2050 and still have an 80% probability of falling within or below the widely accepted 2 degrees Celsius global warming target consensus. Yet the top 100 publicly traded oil and gas firms alone have 151 gigatons of reserves, which does not include private firms with significant reserves.¹ Even if we ignore coal, which makes up the majority of proven reserves and is falling out of favor globally, only half of the current oil and gas reserves can be consumed to stay within this target. Put another way, at least half of proven oil and gas reserves must remain in the ground if a global carbon budget aims to meet the 2 degrees Celsius target, thereby giving them a value of zero.

This scenario would have a profound effect on current and future valuations of energy companies and negatively impact other sectors, including electric utilities, agriculture, autos, banking, insurance and transportation. Oil and gas companies could stand to lose out on \$20 trillion in revenue over the next two decades based on conservative stranded asset estimates.² There is also a threat to fixed income markets, particularly sovereign bonds issued by countries heavily reliant on fossil fuel production.

Additionally, reserves are still growing rapidly due to technological advancements in exploration and extraction, especially in emerging markets. Based on current and expected exploration and extraction costs, plus the cost of renewables at a meaningful scale, oil and gas companies are on track to increase reserves threefold beyond the current 2 degrees Celsius target over the next 100 years. In other words, there are still plenty of fossil fuel sources to be discovered, potentially putting these assets at odds with climate goals. Should this play out, we believe oil and gas companies may face long-term headwinds to earnings and valuations.

The economic impact of weather

Investors do not question that equity and fixed income valuations are affected by interest rate volatility, currency fluctuations and legislative changes. Yet investors have been slow to accept weather volatility as a meaningful source of economic risk. The weather does not follow a normal distribution pattern but is rather one of tail events. As weather volatility increases, event-driven tail risk will likely have outsized effects on revenue, long-term planning, insurance costs, input/output costs and supply availability, and logistics for a business.³

While larger natural disasters like hurricanes and flooding make headlines, minor weather events can also have major economic costs. A prolonged cold or heatwave by even a few degrees can affect agriculture, transportation and power generation. With 76% of companies directly affected by the weather, routine weather variation has a \$530 billion annual effect on the US economy and a \$449 billion impact on the European Union's economic bloc. In one instance, "Snowmageddon," a sudden, major two-day winter storm in 2010 in the Northeastern US, reduced the region's GDP by 0.3% – or approximately \$10 billion.

Economic and operational consequences have a direct effect on the insurance and banking sectors as they assess risk, bolster capital reserves and calculate premium requirements. Businesses facing a higher probability of weather-related catastrophic loss may have to pay higher insurance rates (or perhaps need to self-insure) and potentially have less access to affordable financing.

In the US, annual insurance payouts for hurricane-related damages have quintupled since the 1980s – well above the rate of inflation. And the average annual number of wildfires exceeding 1,000 acres has increased by nearly 80% during the 2000–2012 period, and they continue to grow in frequency and average size.

These statistics help explain why climate and weather risks were three of the top five risks in terms of likelihood and impact, according to the World Economic Forum 2019 Global Risk Report (Exhibit 2). A separate risk study by our parent Allianz found that natural catastrophes and climate change were a top 10 business risk based on responses from 1,900 corporate risk management experts worldwide.⁴

Exhibit 2: Top five risks in terms of likelihood and impact, 2009–2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 st	Asset price collapse	Fiscal crises	Financial failure	Financial failure	Fiscal crises	Water crises	Climate action failure	Weapons of mass destruction	Weapons of mass destruction	Weapons of mass destruction	Climate action failure
2 nd	Deglobalization (developed)	Climate change	Water supply crises	Water crises	Climate action failure	Infectious diseases	Weapons of mass destruction	Extreme weather	Extreme weather	Climate action failure	Weapons of mass destruction
3 rd	Oil price spikes	Geopolitical conflict	Food shortage crises	Fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	Extreme weather	Biodiversity loss
4 th	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Weapons of mass destruction	Unemployment	Interstate conflict	Involuntary migration	Natural disasters	Climate action failure	Water crises	Extreme weather
5 th	Fiscal crises	Energy price volatility	Volatile energy and agriculture prices	Climate action failure	Information infrastructure breakdown	Climate action failure	Energy price shock	Climate action failure	Water crises	Natural disasters	Water crises

■ Economic ■ Environmental ■ Geopolitical ■ Social ■ Technological

Source: World Economic Forum 2019, The Global Risks Report 2019, 14th edition, p.6. Global risks may not be strictly comparable across years, as definitions and the set of global risks have evolved with new issues emerging on the 10-year horizon. For example, cyberattacks, income disparity and unemployment entered the set of global risks in 2012. Some global risks were reclassified: water crises and rising income disparity were re-categorized first as societal risks and then as a trend in the 2015 and 2016 Global Risks Reports, respectively.

 **Case study: Not all munis are created equally**

Quantifying the impact of climate change in portfolios

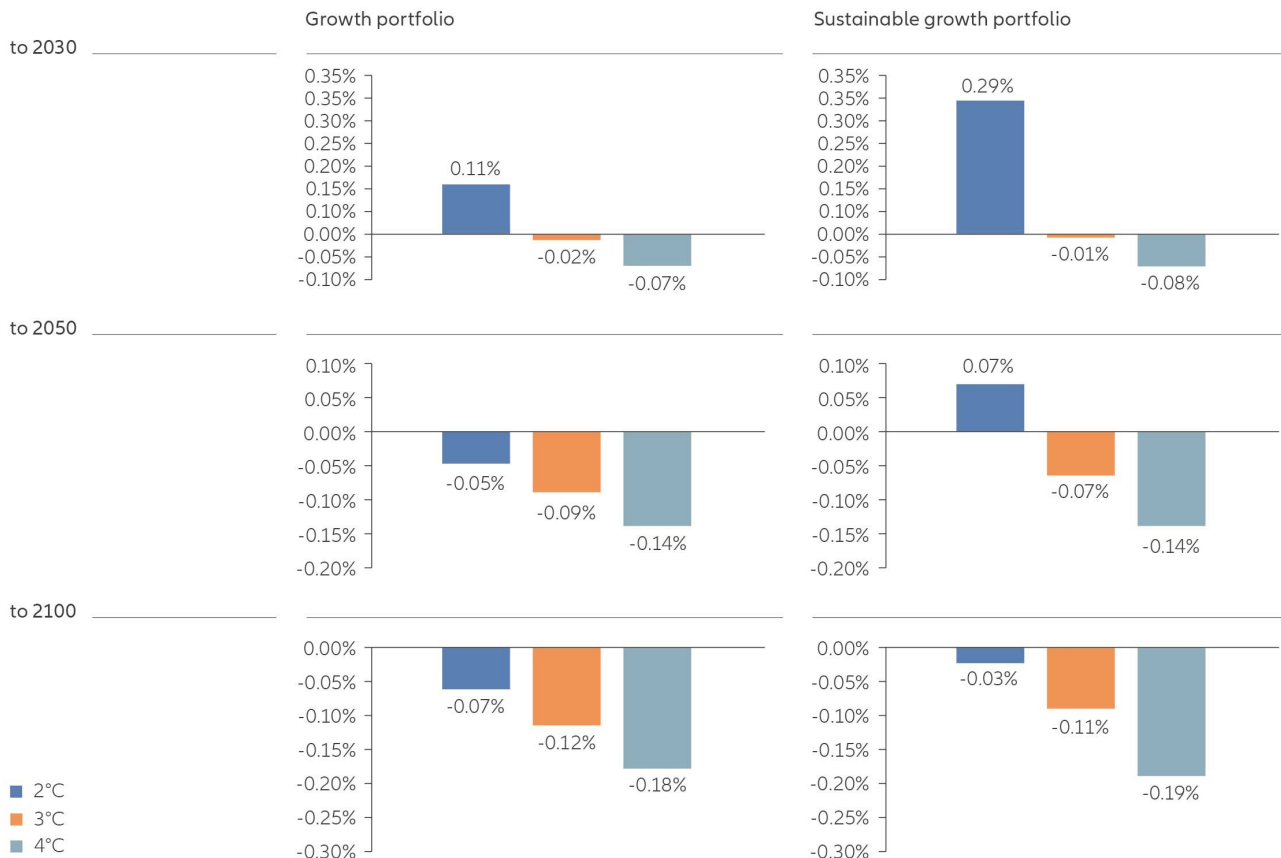
We believe assets at higher climate risk have greater longterm drawdown risk; investors should consider the long-term implications of climate risk facing their portfolios.

Mercer's second installment of its comprehensive Investing in a Time of Climate Change report (published in 2019) reiterates that its 2015 findings remain valid: Investors should "incorporate climate change considerations as part of good governance and investment decision-making."

Mercer analyzed different climate change scenarios and estimated the impact on long-term returns in two diversified growth-oriented portfolios consisting of stocks, bonds, real assets and alternatives, with one portfolio allocated to sustainability-themed investments in multiple asset classes (Exhibit 3).

For both portfolios, keeping the climate budget within a 2 degrees Celsius scenario had the best return outcome, while the 4 degrees scenario had the worst outcome. The sustainability-themed portfolio helped reduce portfolio drag in the 3 degrees scenario, but the benefits were considered poor in the 4 degrees scenario. According to Mercer, the adverse outcome of the sustainability portfolio in the 4 degrees scenario "speaks to the challenge of adapting to significant changes in weather patterns and the lack of adaptation-focused investment opportunities in the market today."

Exhibit 3: Estimated climate impact on annual returns



Source: Mercer.

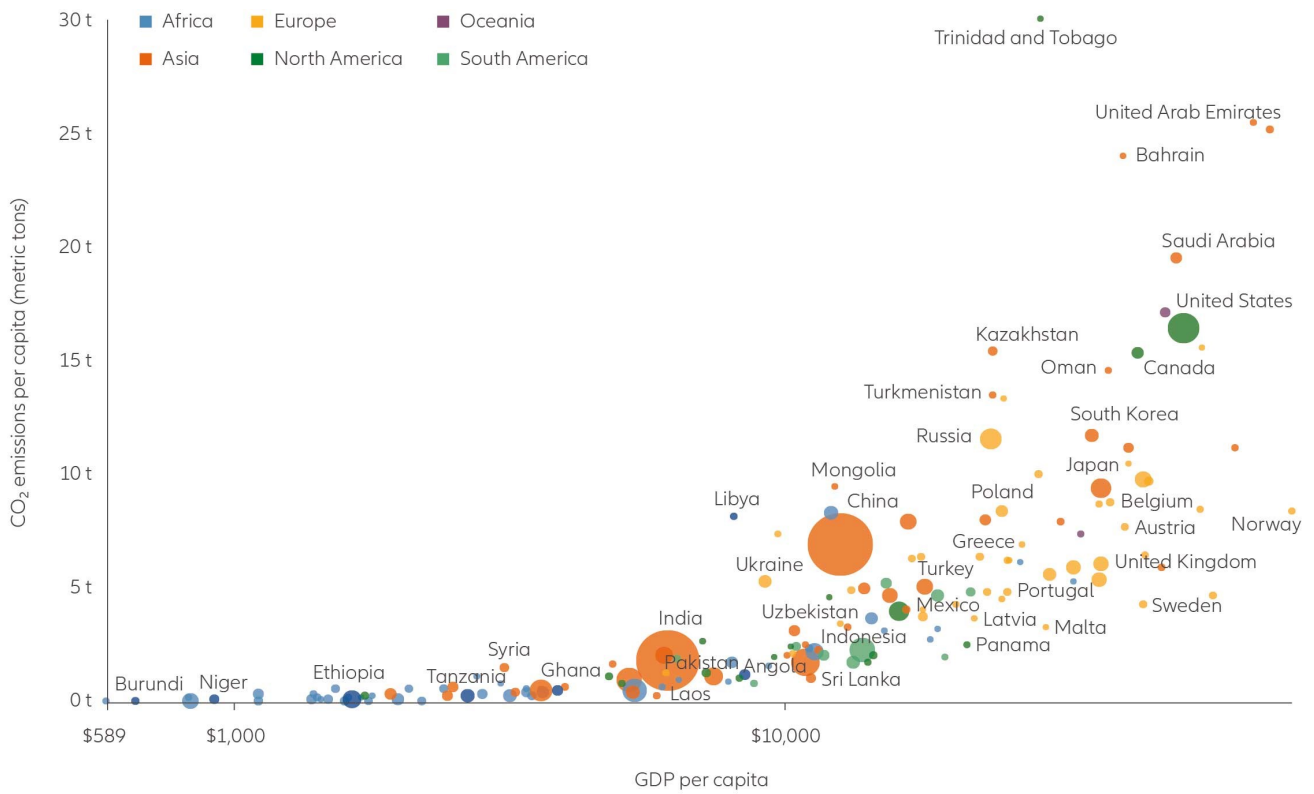
There will also be risks and opportunities for fixed-income portfolios as it relates to climate change. Unlike public equity divestments, fixed income divestment due to climate risk is affecting the financing ability of certain fossil fuel companies. In particular, thermal coal producers have seen a significant rise in financing costs as an increasing number of banks and insurers retreat from the sector. Investors also have shown a lower risk appetite for sovereign debt from countries that are highly reliant on fossil fuels and heavy materials production.

Coal, oil and gas are particularly sensitive to the availability of financing due to the capital-intensive nature of these industries. In the ten years that ended September 30, these industries generated \$0.63 of revenue for every \$1 of net fixed assets. The software sector, by comparison, generated \$15.23 in sales for each \$1 in net fixed assets.⁵ Consequently, the ability to self-finance growth is often challenging for many fossil fuel producers, especially considering the volatility of energy prices affecting cash flows.

Ironically, this may present an opportunity for income-seeking investors, as transitioning from fossil fuels will likely take considerable time to manifest. Oil and gas producers – particularly the mega-cap firms with significant proven reserves – may become attractive income-producing equity investments as they focus less on growth and more on high cash generation. This shift in focus could prove similar to how the tobacco industry transitioned into a more mature business.⁶

Exhibit 4 shows a clear relationship between a country’s economic prosperity and greenhouse gas emissions. Larger economies and governments may be able to promote increased financing of fossil fuel extraction and production for their own needs. However, overall emerging market debt portfolios may be affected if the financing costs of sovereign issuers are highly dependent on fossil fuel exports. Our analysis indicates a correlation of -0.6 between an ESG score and sovereign wealth spreads, of which the environmental score carries greater weight for countries with higher relative net energy exports.

Exhibit 4: Greenhouse gas emissions vs. GDP per capita



Source: Global carbon project; Maddison (2017).
 GDP per capita is measured in international dollars in 2011 prices to adjust for inflation and for the price differences between countries.

Understanding how climate change affects a portfolio is not only about identifying risks, but it is also about identifying potential investment opportunities. Netherlands-based DSM, a mid-cap company specializing in nutrition, health and sustainable living, is one example of a potential investment opportunity in the age of climate change. The company developed a feed solution for cattle – one of the planet’s largest methane emitters – that reduces their methane output by approximately 30%.

Conclusion

We believe there are potential risk/reward opportunities across asset classes due to climate change. Investors should look past the political rhetoric around climate change and instead consider the short and long-term implications of climate change facing their portfolios. We encourage investors to approach climate change with a comprehensive risk assessment that goes beyond traditional ESG screens, by incorporating fundamental analysis, viewed through a lens of sustainability and business practices. Furthermore, we believe investors should factor climate change into their investment manager due diligence process.