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CLIMATE CHANGE AS A MACROECONOMIC RISK MULTIPLIER

WHY CLIMATE CHANGE IS CENTRAL TO THE IMF'S MANDATE

CLAIRE PERALDI DECITRE & SALVATORE SERRAVALLE

In the twenty-first century, climate change, emergent technologies, and geopolitical tensions require novel and agile approaches to safeguard financial stability and economic growth. Despite the speed of change, overarching lessons can be learned from past economic disruptions to better inform current choices. In this briefing, we draw six key risk areas from past macroeconomic and financial shocks and demonstrate that climate change acts as a risk multiplier in each case.

In an increasingly shock-prone world, the first step to containing risks is knowing they exist. Technological change and geopolitical risks are intensifying and creating new policy challenges. Simultaneously, climate change, driven by greenhouse gas (GHG) intensive economies, is also a **macro-critical** issue as it "affects, or has the potential to affect, domestic or external stability"[1] through bilateral and/or spillover risks.

From more frequent and extreme weather events to financial destabilization and price shocks, climate both multiplies pre-existing risks and exposes and worsens previously ignored vulnerabilities in the global economic and financial system.[2] Frank Elderson, member of the Executive Board of the European Central Bank (ECB), summarizes this well: climate and nature-related risks "are a risk driver

[1] IMF, 2015, **Guidance Note for Surveillance under Article IV Consultations**

[2] Along these lines, a recent World Bank publication, 2025, **Reboot Development: The Economics of a Liveable Planet**, argues that "maintaining a liveable planet is not merely a distant environmental concern but a present economic threat".

[…]. Ignoring them would mean failing to account for a material determinant of financial soundness. Ignoring them, therefore, would be a very political thing to do."[3]

We highlight six crucial risk areas of macroeconomic and financial shocks and argue that climate change is a macro-critical issue that requires adequate monitoring from macroeconomists. From this analysis, we draw the conclusion that the IMF must be equipped with a robust framework to monitor and assess the macro-financial risks that climate change can pose and that it has a responsibility to engage with these challenges.

> **Risk area 1: Debt sustainability.** Recent floods in Pakistan and Hurricane Fiona in the Dominican Republic showed how natural catastrophes can trigger or exacerbate debt vulnerabilities. The Latin American and eurozone debt crises of the 1980s and 2010s showed that country debt crises and potential defaults threaten macroeconomic stability and can trigger regional debt crises.

> **Risk area 2: Trade and supply chains.** Operational challenges to semiconductor production in drought-hit Taiwan revealed that a localized supply chain shock can have deep trade impacts in an interconnected global economy. Worsening extreme weather events and environmental stressors due to climate change are likely to increasingly destabilize supply chains and trade, turning critical local shocks into global crises.

> **Risk area 3: Energy markets.** The historical volatility of fossil fuel energy markets demonstrates that the reliance on a finite set of geographically dependent energy commodities is a significant macroeconomic risk for both fossil-fuel-importing and -exporting countries. Moreover, GHG-intensive economies, largely fossil-fuel-intensive energy economies, are exacerbating climate change and creating spillover risks for climate-vulnerable countries.

> **Risk area 4: Food markets, inflation and monetary policy.** Shocks to agricultural production cause inflation and instability, threatening growth and creating challenges for monetary policy. With climate change and climate impacts weakening agricultural yields, more acute and/or persistent inflation with lower supply will pose challenges for short-term price stability and long-term monetary policy formulation.

[3] Elderson, F, 2025, **What good supervision looks like**, keynote speech at the 24th Annual International Conference on Policy Challenges for the Financial Sector

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> **Risk area 5: Financial stability.** The 2008 financial crisis revealed that an asset crash coupled with the interconnectedness of financial systems could have devastating macroeconomic and financial implications worldwide. Today, growing climate-induced physical losses and transition risks are threatening asset classes and insurance markets. Given the speed of information technologies and suddenness of climate shocks, a climate-induced financial crisis is not unlikely.

> **Risk area 6: Labor and productivity.** The COVID-19 pandemic demonstrated that human health is intimately linked to productivity and growth. With climate driving more extreme and frequent flooding, millions in densely populated South-East Asian regions are at risk of vector-borne disease outbreaks, putting in jeopardy regional growth.

Introduction

The Bretton Woods Institutions emerged in the wake of World War II to safeguard the world's economic system and prevent a renewed global crisis. At their core, they are institutions that seek to reduce risks and build prosperity through economic policy. Working in tandem, the International Monetary Fund (IMF or "Fund") was tasked to promote macroeconomic and financial stability. Its partner, the World Bank Group (WBG), was tasked with reconstruction, growth, and development.

Since 1944, they have evolved to respond to emergent global challenges and meet their members' needs. For the WBG, development in the Global South and poverty reduction became an institutional pillar for growth. After the painful lessons of an interconnected financial system during the 2008 financial crisis, the IMF adapted its surveillance tools to better monitor multilateral/spillover risks.[4]

This evolution, responsive to emergent issues, sharpened the IMF's ability to monitor policies and issues that bear "macro-critical" risks, that is, issues that "affect, or have the potential to affect, domestic or external stability" (see the Annex for more).[5]

The risks climate change and climate impacts pose to communities, countries, ecosystems, and economies are undeniable. The IMF has already noted that

[4] IMF, 2012, **Integrated Surveillance Decision (ISD)**

[5] IMF, 2015, **Guidance Note for Surveillance under Article IV Consultations**

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"climate change is an existential threat to global prosperity with significant macroeconomic and financial implications."[6] GHG intensive economies drive climate change and threaten the atmospheric balance on which humans and economic institutions rely.[7] Along with historical emissions, it causes interconnected and cascading macro-critical bilateral and multilateral/spillover risks (see Figure 1).

IMF monitoring

A core responsibility of the IMF is to monitor the economic and financial policies of member countries to prevent risks from arising.[8] This activity is done through an Article IV surveillance consultation.[9] Surveillance consultations are regular, structured, and in-depth processes that include dialogue between the IMF and each of its members.

To structure its monitoring, the IMF focuses on macroeconomic aggregates that may significantly affect a country's present or prospective domestic or balance of payments stability. In practice, this means a systematic coverage of exchange rates, monetary, fiscal, and financial sector policies, but also any macroeconomically relevant structural aspects of those policies.

While the IMF initiates its surveillance at the bilateral level, focusing on members' domestic policies, the 2008 financial crisis prompted the Fund to expand its Article IV surveillance mandate to include multilateral/spillover risks for issues that span beyond borders. Given the global impact of members' GHG-intensive economies, linking bilateral with multilateral/spillover risks is particularly important when integrating climate risks into IMF surveillance.[10]

The IMF has made significant progress to better monitor climate-related risks,[11] recognizing climate as a macro-critical risk for some countries[12] and regions,[13] and creating the Resilience and Sustainability Trust to address needs requiring

[6] IMF, 2022, **Guidance Note for Surveillance under Article IV Consultations**

[7] IPCC, 2023, "**Summary for policymakers**", in: Climate Change 2023: Synthesis Report

[8] IMF, 2023, "**Economic surveillance**", in: Committed to Collaboration, IMF Annual Report 2023

[9] IMF, 2022, **Guidance Note for Surveillance under Article IV Consultations**

[10] IMF, 2021, **2021 Comprehensive Surveillance Review—Background Paper on Integrating Climate Change into Article IV Consultations**; IMF, 2022, **Guidance Note for Surveillance Under Article IV Consultations**

[11] IMF, 2022, **Guidance Note for Surveillance Under Article IV Consultations**

[12] IMF, 2025, **Pakistan, IMF Country Report No. 25/109**

[13] IMF, 2024, **Climate Change in the WAEMU: Trends, Macro-criticality and Options Going Forward**

longer lending. However, there is an ongoing debate about whether the Fund should address climate issues or instead refocus on its core missions of preventing global imbalances and promoting macroeconomic and financial stability. This is an erroneous dichotomy.

Bilateral and multilateral climate-related risks

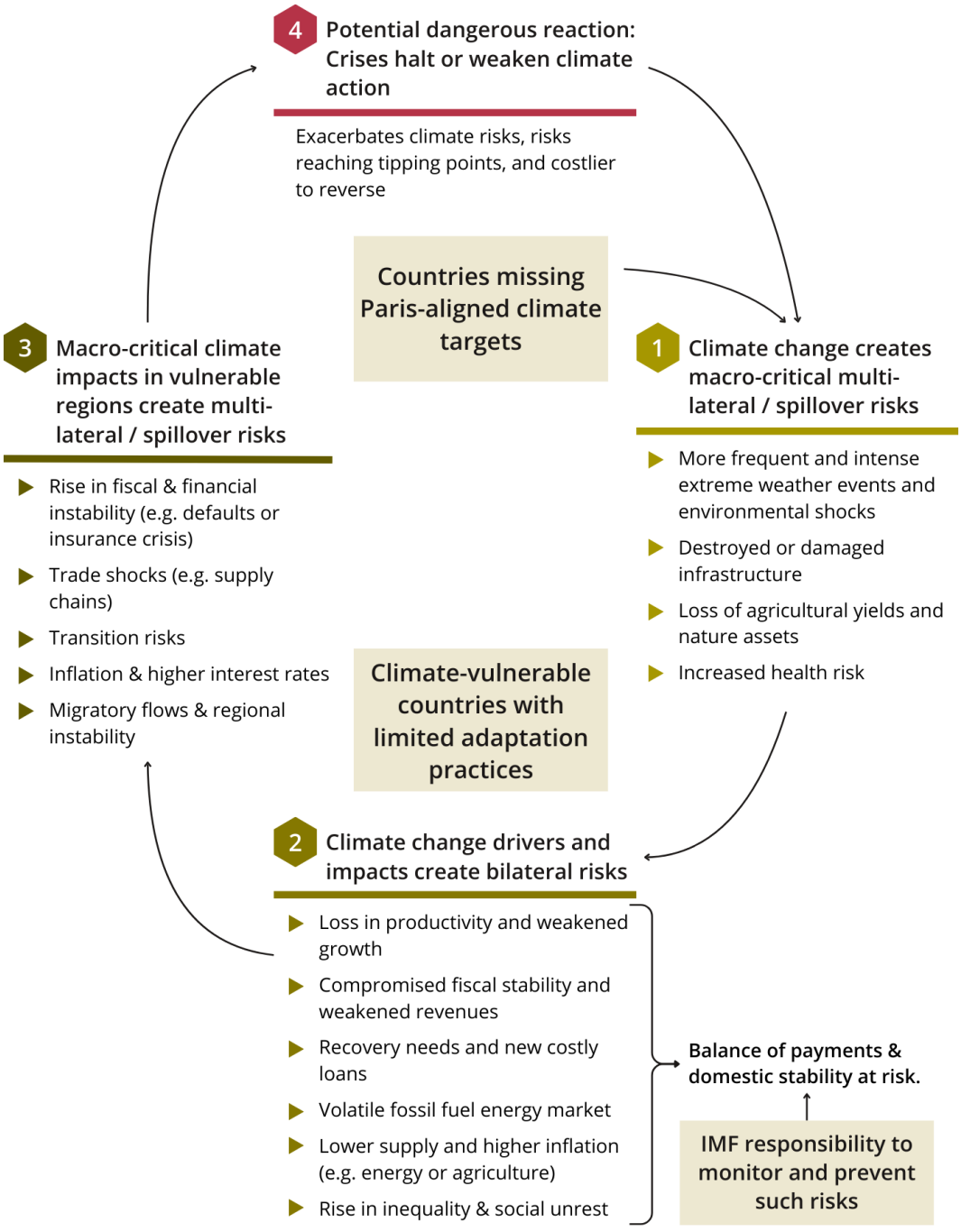

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Figure 1: Historical emissions and greenhouse-gas-intensive economies cause interconnected bilateral and multilateral / spillover risks. If not addressed, these risks would only create a vicious cycle of ever-increasing risk.

Considering this, we argue that **climate is a macro-critical issue that multiplies macroeconomic and financial risks, therefore requiring its rigorous incorporation in IMF activities** (see Table 1). By drawing lessons from six risk areas, we show how climate change:

1. Affects, or has the potential to affect, domestic or external stability.
2. Multiplies the risks of macro-critical issues like financial stability.
3. Exposes interconnected vulnerabilities previously ignored or underestimated.

Table 1. Summary of past macroeconomic crises and climate as a risk multiplier

Past economic crises	Climate as a risk multiplier
Debt crises (1980s, 2010s)	More frequent extreme weather events exacerbate debt pressures.
Supply chain shocks (2021)	Climate change impacts jeopardize industrial capacity for critical and global trade actors.
Shocks to energy markets (1970s, 2022)	GHG-intensive economies that rely on fossil fuel energy commodities expose countries to market volatility and create spillover risks on balance of payments for climate-vulnerable countries.
Agricultural shocks and inflationary impacts	More frequent extreme weather events and climate change impacts raise risks of severe and frequent crop losses.
Asset-crash-led financial instability (2008)	More frequent and intense climate-induced physical shocks and transition risks could trigger climate-induced financial destabilization.
Public-health-induced recession (2020)	Vector-borne diseases due to greater flooding and excessive heat threaten labor and productivity.

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Risk area 1: Debt sustainability

Debt crises and potential defaults threaten macroeconomic stability and can trigger regional debt crises through financial contagion. Today, climate change impacts, including more frequent and extreme weather events, are exacerbating sovereign debt pressures.

Case study

The 2010 floods led Pakistan to borrow an estimated $20–40 billion more than would otherwise have been the case, which resulted in annual interest payments of between $1.6 billion and $3.1 billion.[14] Following the 2022 floods, debt sustainability concerns intensified. The floods caused damages and economic losses totalling around $30 billion, with reconstruction needs estimated at $16.3 billion or more. To meet these needs, Pakistan had to rely heavily on debt financing. Combined with Pakistan's already high debt burden and challenging macroeconomic conditions, this prompted credit rating agencies Moody's[15] and Fitch[16] to downgrade Pakistan's sovereign ratings, citing higher debt sustainability risks.

Although there is no comprehensive public estimate of the full incremental debt burden caused by Hurricane Fiona in the Dominican Republic, the available evidence from World Bank emergency lending shows direct and substantial new debt incurred due to the disaster.[17]

Why climate change matters for debt sustainability

Safeguarding debt sustainability is a core mission of the IMF. It involves monitoring countries' fiscal policy and advising them on appropriate policies to maintain sustainable debt levels. This is checked against the Debt Sustainability Analyses (DSA).

Climate shocks are exacerbating sovereign debt pressures and putting debt sustainability in jeopardy, as climate vulnerability and sovereign debt are intimately linked (see Figure 2).[18]

[14] Development Initiatives, 2022, **Filling the gap: New funding for resilience in Pakistan**

[15] Moody's, 2023, **Moody's downgrades Pakistan's rating to Caa3; changes outlook to stable from negative**

[16] Fitch, 2023, **Fitch Downgrades Pakistan to 'CCC-'**

[17] World Bank, 2022, Dominican Republic - Hurricane Fiona Emergency Response Project **World Bank Document**

[18] E3G, July 2024, **Breaking the Cycle of Risk: Addressing Resilience and Debt for a New Global Financial Architecture**

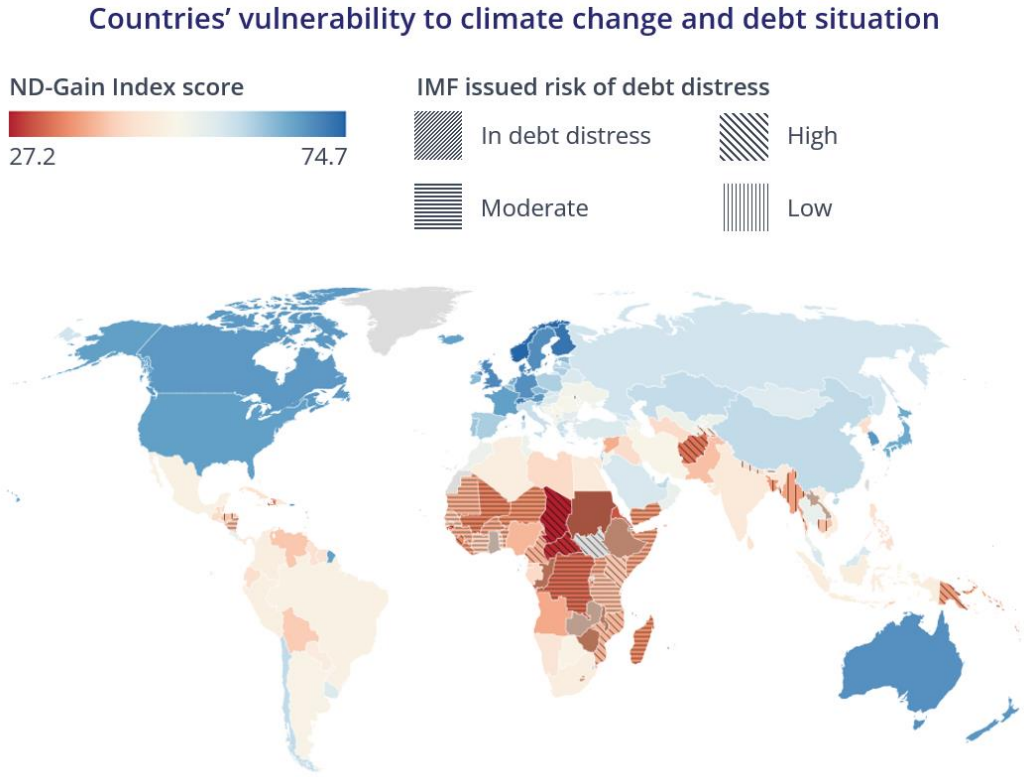

Figure 2: Countries in or at risk of debt distress are among those most vulnerable to the impacts of climate change. View an interactive version of the map at ***https://datawrapper.dwcdn.net/tDBv9/1/***

First, existing debt burdens limit climate-vulnerable countries' ability to invest in adaptation measures. Second, if and when disasters strike, direct losses, weakened creditworthiness, high recovery needs, slowed growth, and weakened tax bases exacerbate debt pressures. Third, stronger debt pressures further limit fiscal space for adaptation investment, leaving countries vulnerable to new shocks. This loop is commonly referred as the "debt–climate nexus." Small Island Developing States (SIDSs), particularly vulnerable to the effects of climate

change, are also often experiencing debt distress. Of the 24 countries at "high risk" of debt distress, 13 are SIDSs.[19]

Damage from extreme weather events

The increased frequency and severity of extreme weather events exposes climate-vulnerable countries to more macro-level shocks. According to the V20 group of climate vulnerable and low-income countries, extreme weather events have already cost them $525 billion between 2000 and 2019, equivalent to one-fifth of their collective gross domestic product (GDP). For the most at-risk V20 countries, economic losses due to climate change are estimated to exceed half of all growth since 2000.[20] Notable examples include Dominica in 2017, which lost over 225% of its GDP due to Hurricane Maria[21] or The Bahamas in 2019, which lost 25% of its GDP just in direct damage from Hurricane Dorian.[22]

Weakened creditworthiness and fiscal costs

Disasters worsen public debt due to higher spending, lower growth, and lower tax base. According to the IMF,[23] gross public debt increases by an average of 7 percentage points of GDP within three years of a natural disaster. Disaster impacted regions require new recovery loans, but their denoted creditworthiness translates in high costs of capital.[24] On top of new spending, impacted countries also suffer shrinking revenues as productivity capacity, tax bases, and targeted sectors like tourism are negatively impacted.

Spillover risks

Domestic balance of payments issues and potential defaults bear risks for both creditor and neighboring countries. For creditors, debtors' inability to repay can constrain already tight budgets. Private creditors may become reluctant to continue investing, further narrowing the resource base for Low-Income Countries (LICs).

Without adequate disaster preparedness, environmental shocks are projected to displace vulnerable communities, which could heighten geopolitical tensions and threaten neighboring countries' stability. While climate migration projections are

[19] IMF, March 2025, **List of LIC DSAs for PRGT-Eligible Countries**

[20] V20, 2022, **Climate Vulnerable Economies Loss Report**

[21] IMF, 2021, **Country Report No. 21/182, Dominica**

[22] IMF, 2025, **The Bahamas: Selected Issues**

[23] Fuje, H., Yao, J., Choi, S. M., & Mighri, H, 2023, **Fiscal Impacts of Climate Disasters in Emerging Markets and Developing Economies,** IMF Working Paper

[24] Buhr B. et al., 2018, **Climate Change and the Cost of Capital in Developing Countries**

extremely difficult to estimate, the United Nations High Commissioner for Refugees found that more than 90% of the world's refugees come from countries that are the most vulnerable to climate change.[25]

As we move towards a more shock-prone world, the debt–climate nexus and its direct and indirect impacts will both pose macro-critical risks to members' debt sustainability and bring important spillover effects.

Risk area 2: Trade and supply chains

Due to the interconnectedness of the global economy, a localized supply chain shock can have deep trade impacts. With climate change worsening extreme weather events and environmental stressors, its destabilizing impact on supply chains and trade is also likely to worsen, turning critical local shocks into global crises.

Case study

The Taiwan Semiconductor Manufacturing Company (TSMC) is the world's leading semiconductor manufacturer, with 54% of market share. Its operations are key to the Taiwanese economy and multinational corporations.[26] Domestically, the Taiwanese central bank keeps a close eye on TSMC[27] as the company accounts for nearly 40% of Taiwan's total market capitalization, 8% of the island's overall economic output and 12% of its exports,[28] and strongly influences the Taiwan Stock Exchange. TSMC's operations are also critical for trade partners in the tech and auto industry.

While electronics demand surged and COVID-19 shut down factories in 2021, Taiwan experienced its most severe droughts in over fifty years.[29] This caused significant challenges as semiconductor production is an extremely water-intensive industry,[30] where a single factory can use tens of millions of gallons of water per day. Coupled with two successive power outages at a nearby coal- and

[25] UNHCR, 2021, **Climate change link to displacement of most vulnerable is clear**; ODI & UNDP, 2017, **Climate Change, Migration and Displacement: The Need for a Risk-informed and Coherent Approach**

[26] Time Magazine, 2022, **The chips that make Taiwan the center of the world**

[27] Taiwan News, 2025, **Central Bank analyzes TSMC impact on Taiwan economy**

[28] Economics Observatory, May 2025, **How did semiconductors become so central to Taiwan's economic progress?**

[29] United Nations Institute for Environment and Human Security (UNU-EHS), 2022, **Taiwan Drought**

[30] Semiconductor Digest, 2022, **Water Supply Challenges for the Semiconductor Industry**

gas-fired power plant,[31] the droughts severely hindered TSMC's capacity and operational continuity.[32]

The operational slowdown caused billion-dollar losses for trading partners. For the first time in a decade, Apple had to pause product assembly and delay shipments, which cost the company $6 billion in revenue loss.[33] The price was also steep for automakers[34] with estimates around $210 billion in lost revenue.[35]

While this episode led Nvidia to build its first semiconductor factory on US soil, the crisis revealed two broader lessons. First, major economies are not immune to environmental stressors. Second, the interconnectedness of the global supply chain can mean that local shocks have macro effects at the international level through trade channels.

Why climate change matters for trade and supply chains

Climate change is heightening the frequency and scope of environmental shocks.[36] With deep and cross-cutting global supply chains, local environmental shocks then ripple to trade partners abroad.

Increased water stress

Water-related risks, for example, are projected to increase with every degree of global warming.[37] Water supplies are critical for globalized industries like semiconductors, tech, automobiles, and agriculture. As local actors face higher environmental stressors, their trade partners will also bear the negative effects.

Moreover, the severity and frequency of shocks in climate scenario "tail risks" (i.e. low-probability but high-impact events) may pose insurmountable challenges for vulnerable regions. TSMC, historically at risk of water stress, had estimated that a serious drought could impact its revenues by up to 1.1%.[38] However, some experts have warned that consecutive droughts, as seen in tail

[31] Tapei Times, 2021, **Second power outage hits Taiwan**

[32] Nikkei Asia, 2021, **Apple's nightmare before Christmas: Supply chain crisis delays gift deliveries**

[33] CNBC, 2021, **Apple sales miss expectations, Tim Cook says supply issues cost company $6 billion**

[34] The Jamestown Foundation, 2022, **When The Chips Are Down: Taiwan's Water and Energy Conundrum**

[35] Reuters, 2022, **Automakers, chip firms differ on when semiconductor shortage will abate**

[36] IPCC, 2023, "**Summary for policymakers**", in: Climate Change 2023: Synthesis Report

[37] IPCC, 2022, **Working Group II contribution: Impacts, Adaptation and Vulnerability**

[38] Commonwealth Magazine, 2022, **How Taiwan's expanding semiconductor industry deals with water shortages.**

risks, would be intolerable to the company's health,[39] with devastating impacts for the country.

In other regions, climate change is exacerbating existing vulnerabilities and creating new ones. According to the ECB, "although southern Europe experiences the heaviest water scarcity pressures, […] central and northern European countries are increasingly at risk." While agriculture is the most impacted sector, under an extreme but plausible drought with a 25-year return period, nearly 15% of European economic output would be at risk.[40]

More frequent and intense damages to energy infrastructure

Physical hazards like typhoons and extreme temperatures are also damaging or shutting off energy infrastructure, which could impact critical supply chain actors. These extreme events can take many forms, like in February 2021 when a nine-day freeze engulfed the state of Texas, causing power outages that left nearly 10 million people in the dark,[41] and damages between $80 billion and $130 billion in direct and indirect economic loss.[42]

Spillover risks

The growing frequency and scale of extreme weather events heightens the risks for critical supply chain actors to be hit, which may hinder the entire production line. Given the deeply interconnected global economy, based on liberal trade, mutual economic interests and regional specialization, local shocks carry negative consequences for the international economic system.

Risk area 3: Energy markets

The volatility of fossil fuel energy markets demonstrates that the reliance on a finite set of geographically dependent energy commodities is a significant macroeconomic risk for both fossil-fuel-importing and -exporting countries. Moreover, GHG-intensive economies are largely contributing to climate change and creating spillover risks for climate-vulnerable countries.

[39] Commonwealth Magazine, 2023, **Taiwan's water woes: Can anything be done?**

[40] The European Central Bank Blog, May 2025, **The European economy is not drought-proof**

[41] NOAA, 2023, **The Great Texas Freeze: February 11-20, 2021**

[42] Federal Reserve Bank of Dallas, 2021, **Cost of Texas' 2021 deep freeze justifies weatherization**

Case studies

Historical shocks to petroleum

When the Organization for Petroleum Exporting Countries imposed an oil embargo against the United States from 1973 to 1975, the supply shock inflicted damages to the US real economy and monetary conditions. GDP declined by 3% while inflation and unemployment skyrocketed, with the Federal Bank raising interest rates to 13% in the first half of 1974 to contain the crisis.[43]

Dependence on fossil fuel-led revenues posed solvency challenges to exporting countries too. For example, Mexico expected high oil prices to persist and took out large loans for industrialization, structuring repayment plans around projected continued strong oil revenues. When oil prices collapsed in the early 1980s, Mexico's key export earnings were slashed and the country found itself struggling to repay its debt. Combined with rising interest rates, Mexico defaulted in 1982, and financial risks spread throughout the region.

Recent shocks to gas

A similar tale is perhaps unfolding today; when Russia invaded Ukraine in February 2022, energy prices spiked globally with important fiscal and monetary implications.[44] In Europe, post-sanctions gas prices reached 10× pre-war levels.[45] In the UK, wholesale gas costs jumped to a combined £140bn in four years (2021–2024), amounting to an additional £90bn compared to prior trends, or £1,300 more per member of the UK population.[46] Like governments and households, energy intensive industries, such as fertilizer production,[47] faced higher production costs. In turn, they raised consumer prices, compounding food inflation.

Driven by surging energy and food prices, consumer prices in Germany rose by 7.9% in 2022 on an annual average compared to 2021.[48] The same trend was

[43] Congressional Research Service, 2002, **The Current Economic Recession: How Long, How Deep, and How Different From the Past?**

[44] The Nation, 2024. **How the war in Ukraine has been a major contributor to global inflation**

[45] Rogoff, K., 2022, **The long-lasting economic shock of war**, IMF Finance & Development Magazine; Rojas-Romagosa, H., 2024, **Medium-term Macroeconomic Effects of Russia's War in Ukraine and How it Affects Energy Security and Global Emission Targets**, IMF Working Paper

[46] Energy and Climate Intelligence Unit, 2025, **Russian invasion anniversary: £140bn gas bill for UK since crisis began**

[47] Hebebrand, C. and Glauber, J., 2023, **The Russia–Ukraine war after a year: Impacts on fertilizer production, prices, and trade flows**, IFPRI Blog

[48] Destatis, 2023, **Inflation rate at +7.9% in 2022**

observed in the US and UK.[49] Small fossil fuel importing nations like Cabo Verde also saw their inflation jump from around 1% in June 2021 to 9% by June 2022.[50] For other emerging markets and developing economies (EMDEs), the resulting global rise in interest rates further heightened their debt pressures, with the IMF warning that a new sovereign debt crisis could boil over.[51]

Why energy markets matter for economic stability

The IMF's Article IV surveillance mandate requires the IMF to advise members with sound economic policy recommendations to safeguard macroeconomic and financial stability. As energy policies are key to economic activity, they require particular attention. Economies that largely rely on fossil fuels (oil, gas, and coal) expose both importing and exporting countries to cyclical risks, as energy commodity markets are highly volatile.

Bilateral risks for importing countries

Empirical evidence shows that the volatility of fossil fuel energy markets[52] poses macro-critical risks for fossil-fuel-importing countries.[53] In response, central banks often deploy aggressive monetary tightening to contain inflation. With higher interest rates, the cost of capital goes up, impacting investments and development. If supply shocks are persistent, countries that over-rely on fossil fuels for energy needs may also experience hindered growth, with insufficient energy sources to fuel their economic activity.

Beyond the established risks of fossil fuel dependence, a new set of challenges is emerging associated with the transition to green technologies. These challenges stem from a growing reliance on critical raw materials used in electric vehicle batteries, solar panels, and wind turbines. Market movements in these materials, influenced by geopolitical tensions or supply chain disruptions, can heighten price volatility or even lead to shortages, posing macroeconomic risks to the economies.

[49] For the UK: **Consumer price inflation, UK - Office for National Statistics**; For the US: **Consumer Price Index News Release - 2022 M06 Results**

[50] Trading Economics, **Cape Verde inflation rate** (webpage)

[51] Mammadov, K., 2025, **Emerging markets face a perfect storm**, IMF PFM Blog

[52] Office for Budget Responsibility, 2023, **Fiscal risks and sustainability**; E3G, 2023, **A new gold standard in the fiscal analysis of the energy transition**

[53] IMF, 2024, **Medium-term Macroeconomic Effects of Russia's War in Ukraine and How it Affects Energy Security and Global Emission Targets**

Bilateral risks for exporting countries

The volatility of fossil fuel energy markets also creates macroeconomic risks for exporting countries. Without a diversified economy, countries that center revenues on fossil fuel commodities put balances of payment in jeopardy when supply goes up, as seen with Mexico's 1982 default.

Renewable technologies are also emerging as a highly competitive alternative, increasing energy supply and lowering costs. Given renewable energies' greater efficiency for energy production and falling costs per watt (e.g. the price of solar fell by 80% in the last decade[54]) they are expected to growingly outcompete fossil fuel energy sources. As countries develop domestic renewable energy sources,[55] market prices and fossil fuel imports will fall. This shift in energy systems could compromise balances of payments for non-diversified economies centered on (projected) fossil fuel revenues.

Multilateral/spillover risks of energy policies

Energy is fundamental to economic growth. Energy, given its current sources, is also responsible for roughly 70% of GHG emissions.[56] As we know, GHG emissions drive climate change, which "can have detrimental effects on macroeconomic stability" acting through several environmental and economic pathways[57] and create spillover risks for climate-vulnerable countries.[58]

As part of multilateral surveillance, Article IV consultations "shall include […] spillover effects of a member's […] domestic economic and financial policies that may significantly influence the effective operations of the international monetary system, for example, by undermining global economic and financial stability."[59]

Given the link between energy policies, GHG emissions, and risks of economic and financial instability, which countries' energy policies should, by extent, be monitored by the IMF? According to the IMF: "Given the close link between GHG emissions and global warming, an intuitively compelling indicator for

[54] RMI, 2023, **X-Change: Electricity – On track for net zero**

[55] CNN, 2025, **How Pakistan pulled off one of the fastest solar revolutions in the world**; Energy For Growth Hub, 2025, **Ethiopia's EV Pivot: How One of Africa's Least Motorized Countries Became Its Most Electrified**

[56] Climate Watch, 2022, **Historical Greenhouse Gas Emissions.** and Our World in Data, 2020**, Sector by sector: where do global greenhouse gas emissions come from?**

[57] IMF, 2021, **2021 Comprehensive Surveillance Review—Background Paper on Integrating Climate Change into Article IV Consultations**, Annex II

[58] Ibid. and IMF, 2022, **Guidance Note for Surveillance Under Article IV Consultations**

[59] IMF, 2012, **Integrated Surveillance Decision**

'significance' is the share a country contributes to global emissions." The largest emitters today are China, the United States, and the European Union, which together "account for about half of global greenhouse gas emissions."

While today's largest emitters are an intuitive measure, there are also nuanced debates around how to best balance historical and current emissions and where the line of "significance" ends.[60]

Considering this, the IMF proposes the following pragmatic approach: country-level surveillance under Article IV should include mitigation efforts for the largest 20 emitters. For all other countries, coverage of mitigation will be encouraged and supported if desired by members but not necessarily expected (see the Annex for more detail).[61]

Risk area 4: Food markets, inflation and monetary policy

Environmental shocks to agricultural production cause inflation and instability, threatening real growth and creating challenges for monetary policy. With growing losses to agricultural yields from climate change and sudden shocks, more acute and/or persistent inflation with lower supply will pose challenges for short-term price stability and long-term monetary policy formulation.

Case studies

Historical evidence

Research shows a clear link between times of poor harvests, economic pressures, and social unrest. Already in medieval times, for example in England, annual harvest fluctuations were a fundamental driver of economic and social conditions, largely shaping population health and social stability.[62] In the early 2010s, spikes in international food commodity prices and consequent food riots in much of Africa and the Middle East renewed academic interest in the matter. Research found that a sudden increase in consumer food prices did contribute

[60] IMF, 2021, **2021 Comprehensive Surveillance Review—Background Paper on Integrating Climate Change into Article IV Consultations** (par. 13)

[61] Ibid., par. 15

[62] Hoskins, W. G., 1964, **Harvest Fluctuations and English Economic History, 1480—1619**, *The Agricultural History Review*, *12*(1), 28–46

significantly to an increase in the probability of unrest in that month, as consumers responded to the economic pressure of rising food prices.[63]

Agricultural shocks and price levels

Damages to agricultural yields raise food prices and increase overall inflation.[64] Weather-related impacts reduce crop harvests and lead to higher agricultural commodity prices globally, driving up domestic prices.[65] Particularly, droughts and their subsequent supply shocks tend to have the highest inflationary effect, which becomes acute for severe droughts. Given that food inflation "typically represents around 40% of the Consumer Price Index basket in LICs, the impact on headline inflation is also high."[66] In turn, short-term inflationary impacts and volatile food prices create difficult trade-offs for monetary policy.

Extreme weather events reduce growth

Globally, droughts and severe storms also reduce growth.[67] According to IMF research, the impact is particularly salient for EMDEs where agriculture tends to be the principal sector and the interlinkage between agriculture and other sectors is stronger than in advanced economies. For EMDEs, growth is lowered by 1.4 percentage point in the year of a drought due to crop losses and industrial and service slowdowns. Storms like tropical cyclones also reduce growth in EMDEs by 1.8 percentage points. For example, in March 2019, Cyclone Idai ravaged several southeastern African countries. In Mozambique alone, this caused damages of $1.4 billion, with reconstruction costs estimated at $2.9 billion.[68]

Revenues also tend to diminish in the year following a drought. The IMF found that "the absolute magnitude of revenue decline due to droughts is about 3.4 percentage points globally and 4.5 percentage points in EMDEs."[69]

[63] CCAPS, 2013, **Food Price Spikes and Social Unrest in Africa**

[64] CETEX, 2024, **The Case for Adaptive Inflation Targeting: Monetary Policy in a Hot and Volatile World**; Network for Greening the Financial System, 2024, **Acute Physical Impacts from Climate Change and Monetary Policy**

[65] De Winne, J., Peersman, G., 2021, **The adverse consequences of global harvest and weather disruptions on economic activity**, *Nature Climate Change*, vol. 11, 665–672

[66] Kabundi, A.N., Mlachila, M., Yao, J., 2022, **How Persistent are Climate-Related Price Shocks? Implications for Monetary Policy**, IMF Working Paper

[67] Fuje, H. et al., 2023, **Fiscal Impacts of Climate Disasters in Emerging Markets and Developing Economies**, IMF Working Paper

[68] PDNA 2019; Fuje, H. et al., 2023, **Fiscal Impacts of Climate Disasters in Emerging Markets and Developing Economies**, IMF Working Paper

[69] IMF, 2023, **Fiscal Impacts of Climate Disasters in Emerging Markets and Developing Economies**

Why climate change matters for supply-side resilience

With climate change and climate impacts on the rise and projected to worsen under current climate policies, "the effects of severe physical impacts will increasingly overwhelm economies' supply-side resilience."[70]

More physical shocks and damages

As temperatures rise, economic damages are rising in scope and impacting more regions globally.[71] In the past twenty years, annual global damage from weather-related impacts have more than doubled in real terms and are already affecting economic activity.[72] While early estimates only reflected direct damage, meaning they are likely underestimating total economic impacts, a new field of economic research has focused on encompassing multisectoral and cascading effects. In this field, new UN research shows that "disaster costs now exceed over $2.3 trillion annually when cascading and ecosystem costs are taken into account."[73]

Disproportionate vulnerabilities

With climate change affecting every continent, specific regions and vulnerable communities are disproportionately impacted. Climate vulnerability depends in part on environmental characteristics and dominant economic sectors. For example, "climate change can have particularly large macroeconomic effects in the West African Economic and Monetary Union (WAEMU) given its high dependence on the agricultural sector."[74] With half of the WAEMU population dependent on agricultural employment, the agricultural sector is a key contributor to the regions' GDP (26%) and tax base.

SIDSs are particularly at risk and have been sounding the alarm for years.[75] The Eastern Caribbean Currency Union alone has already faced sustained substantial economic losses averaging 4% of GDP annually from 1980 to 2023, with losses intensifying and compounding over time.[76]

[70] CETEX, 2024, **The Case for Adaptive Inflation Targeting: Monetary Policy in a Hot and Volatile World**

[71] Network for Greening the Financial System, 2024, **Acute Physical Impacts from Climate Change and Monetary Policy**

[72] Swiss Re Institute, 2023, **Natural catastrophes and inflation in 2022: a perfect storm**

[73] United Nations Office for Disaster Risk Reduction, 2025, **Global Assessment Report on Disaster Risk Reduction**

[74] IMF, 2024, **Climate Change in the WAEMU: Trends, Macro-criticality and Options Going Forward**

[75] Mia Mottley, opening of the COP27 World Leaders Summit, November 2022, **https://www.youtube.com/watch?v=5J0egwAfO0w**

[76] IMF, 2025, **Fiscal Sustainability and Natural Disaster Risks in the ECCU**

Beyond damages to local infrastructure and agricultural harvests, the destruction of natural ecosystems in coveted tourist regions can amplify economic damages from losses in tourism and damaged natural services.[77]

Greater inflationary pressure

Research also finds that more severe extreme weather events result in greater inflationary impacts.[78] "Inflationary effects of the physical impacts of climate change are likely to become substantially more pronounced and persistent as climate change intensifies."[79] This is detailed in CETEX' recent publication: "Climate change disproportionately affects agriculture[80] and food prices are systemically significant[81] […] for headline inflation."[82]

Challenges to monetary policy

As climate change and severe weather events intensify "so too will their macroeconomic effects, at both the monetary policy horizon, and in the longer run."[83] In 2022, the IMF had warned that "climate change is likely to lead to more frequent and more severe supply and demand shocks that will present a challenge to monetary policy formulation […]. Over the long run, the dominant monetary policy paradigm of flexible inflation targeting faced with supply-induced climate shocks may become increasingly ineffective."[84] Indeed, for inflation-targeting central banks, communication of monetary policy could become particularly complicated as "greater and persistent inflationary

[77] NGFS, 2023, **Nature-related Financial Risks: a Conceptual Framework to guide Action by Central Banks and Supervisors**

[78] Parker, M., 2018, **The impact of disasters on inflation**, *Economics of Disasters and Climate Change*, 2(1): 21–48; Kotz, M. et al., 2024, **Global warming and heat extremes to enhance inflationary pressures**, *Communications Earth & Environment*, 5(116); Faccia, D., Parker, M., Stracca, L., 2021, **Feeling the Heat: Extreme Temperatures and Price Stability**, European Central Bank Working Paper No. 2626; Kabundi, A., Mlachila, M., Yao, J., 2022, **How Persistent Are Climate-Related Price Shocks? Implications for Monetary Policy**, IMF Working Paper; Jirophat, C., Manopimoke, P., Suwanik, S., 2022, **The Macroeconomic Effects of Climate Shocks in Thailand**, Puey Ungphakorn Institute for Economic Research

[79] CETEX, 2024, **The Case for Adaptive Inflation Targeting: Monetary Policy in a Hot and Volatile World**

[80] Yusifzada, T., 2023, **Evaluating the global impact of climate change on agricultural inflation: an innovative climate condition index approach**, *Environment, Development and Sustainability*, 26(7): 18411–18438

[81] Van't Klooster, J., Weber, I.M., 2024, **Closing the EU's Inflation Governance Gap: The limits of monetary policy and the case for a new policy framework for shockflation**, European Parliament Think Tank

[82] Federal Reserve Bank of St. Louis, 2023, **What do components of key inflation measures say about future inflation?**

[83] NGFS, 2024, **Acute Physical Impacts from Climate Change and Monetary Policy**; NGFS, 2024, **Climate Change, the Macroeconomy and Monetary Policy**

[84] Kabundi, A., Mlachila, M., Yao, J., 2022, **How Persistent Are Climate-Related Price Shocks? Implications for Monetary Policy**, IMF Working Paper

pressures from severe weather events call for policy tightening against the backdrop of an extensive decline in supply"[85] and high investment needs.[86]

Risk area 5: Financial stability

The 2008 financial crisis showed that an asset crash coupled with the interconnectedness of financial systems could have devastating macroeconomic and financial implications worldwide. Today, growing climate-induced physical losses and transition risks are threatening asset classes and insurance markets. Given the speed of information technologies and suddenness of climate shocks, a climate-induced financial crisis is not unlikely.[87]

Case studies

According to the IMF, the 2008 financial crisis occurred due to a combination of excessive leverage, weak regulation,[88] and innovative complex financial products tied to the US real estate market.[89] The crisis began with the collapse of the US subprime mortgage sector which triggered a broader real estate downturn and a loss of confidence that spread globally, as banks and investors worldwide had significant exposure to these US mortgage-related assets.

Inadequate regulation and oversight allowed excessive risk-taking and leverage, amplifying the effects of the housing market crash.[90] Compounded with the interconnectedness of financial markets and systems, the asset crash turned into a global financial crisis that led to the worst global recession since the 1930s.[91]

Why climate change matters for financial stability

The 2008 financial crisis triggered a series of reforms in IFIs to prevent such a crisis from occurring again. Less than 20 years later, two important lessons appear neglected. The trigger for the 2008 global financial crisis was the decline in housing prices in the United States. But the conditions that led to that crisis

[85] NGFS, 2024, **Acute Physical Impacts from Climate Change and Monetary Policy**

[86] Bhattacharya, A. et al., 2024, **Raising Ambition and Accelerating Delivery of Climate Finance**, Independent High-Level Expert Group on Climate Finance No. 3, LSE

[87] E-Axes and EBI, 2025, **Navigating bank climate disclosure: Regulatory developments in the US and EU**, Webinar; Financial Times, 2025, **How the next financial crisis starts**

[88] IMF, 2008, **Preventing future crises**

[89] Merrouche, O., Nier, E., 2010, **What Caused the Global Financial Crisis?: Evidence on the Drivers of Financial Imbalances 1999–2007**

[90] Xafa, M., 2010, **Role of the IMF in the global financial crisis**, *Cato Journal*, 30(3): 475–489

[91] IMF, 2009, **The Perfect Storm**

stemmed from a systematic practice of assets being created, bought, and sold in a manner that made them "appear much less risky than they truly were."[92] The gap between perceived risk and actual risk may also apply to financial-related climate risks.

Today, climate change poses substantial threats to asset classes, including US real estate. The 2024 LA fires razed almost 40,000 acres of land and destroyed tens of thousands of homes causing at least $50 billion in damage, although federal cuts to NOAA block scientists' ability to determine and share more precise estimates.[93] In the state of New York, a climate risk assessment found that by the year 2040 up to 82,000 housing units could be lost due to permanent, chronic, and coastal flooding.[94] Consumers' insurance premiums are also skyrocketing and in vulnerable regions like the East Caribbean Currency Union, the IMF found that "a more sustained rise in property insurance premiums can have several adverse macro-financial stability implications."[95]

Financial stability and the IMF

Financial stability is a core mandate of the IMF. It involves ensuring favorable financing conditions and reliable access to credit for companies and households, enabling them to invest, expand facilities, renew physical capital, or purchase homes. For this to happen, financial institutions must be resilient to unexpected shocks and equipped with robust risk management tools. This resilience helps maintain confidence in the financial system and underpins sustainable economic growth.

The IMF's Financial Sector Assessment Program (FSAP) is central to this mandate. It provides an integrated analysis of financial stability and development issues, including in-depth sector analysis, stress testing, and assessments of international standards. It is a key instrument of the Fund's surveillance, informing Article IV consultations and guiding policy advice.

Climate change has become a critical threat to global financial stability, introducing new vulnerabilities and amplifying existing ones.[96] Yet these risks are

[92] IMF, 2009, The Perfect Storm

[93] NBC News, 2025, **How much damage did the L.A. wildfires cause? After federal cuts, a crucial estimate is missing**

[94] Regional Plan Association, April 2025, **Averting Crisis Zoning to Create Resilient Homes for All**

[95] IMF, 2025, **Property Insurance Challenges in the ECCU**

[96] NGFS, 2024, **NGFS publishes latest long-term climate macro-financial scenarios for climate risks assessment**

insufficiently and inconsistently addressed by financial actors.[97] In response, policymakers, regulators, and market participants increasingly recognize the need to understand and address how climate-related risks are transmitted through the financial system, potentially undermining its resilience and threatening economic prosperity. However, ambition on disclosure is wanting in both the US and EU. This is alarming as prudential regulation around climate risk disclosure precisely seeks to uncover and internalize the true risk profile of assets against of backdrop of growing climate impacts.

Physical risks

One primary threat to financial stability is through physical risks. They stem from the direct economic impacts of climate change, such as extreme weather events and gradual changes like rising sea levels and shifting climate patterns. These events are not hypothetical – many countries and communities are already experiencing them.

Physical risks can inflict substantial losses on companies and households by damaging property, disrupting supply chains, and reducing productivity. For example, widespread flooding or wildfires can destroy homes and infrastructure, erode the value of real estate assets, and impair borrowers' ability to access mortgages or repay loans. In February 2025, Federal Reserve Chair Jerome Powell told the Senate Banking Committee that some areas of the United States, including coastal areas or zones vulnerable to fires, may be uninsurable in coming years.[98] These losses, in turn, translate into higher claims for insurers, possible losses of insurance coverage or insurance gaps, in turn increasing credit risk for banks and other lenders.

With extreme events becoming more frequent and severe, their cumulative effect will result in greater economic damage. In turn, this may strain the balance sheets of financial institutions, which may impact their ability to continue to provide financial services in certain segments and geographies. For example, the world's largest sovereign wealth fund, Norges Bank Investment Management, designed its own climate stress testing which found that long-term impacts of

[97] Shears, E., Meckling, J., Finnegan, J. J., 2025, **How central banks manage climate and energy transition risks**, *Nature Energy*, vol. 10: 470–478

[98] American Bankers Association, 2025, **Fed's Powell says some areas of U.S. may be 'uninsurable' in next decade**

climate change could wipe out 19% of the value of its US equity holdings.[99] In response, the bank divested from high-risk companies.[100]

Transition risks

Transition risks represent another major transmission mechanism by which climate change endangers financial stability. They arise from the economic and financial adjustments required to move toward a low-carbon economy, and can be triggered by new environmental regulations, technological innovations, or shifts in consumer preferences. Such changes can abruptly alter asset values, create stranded assets, and increase market volatility.

For financial institutions, transition risks can translate into market risk, threatening the provision of core services if balance sheets adjust too rapidly. For example, insurers may become unwilling to cover properties at high risk from flooding or coastal erosion without fiscal support, reducing the availability of essential financial products.

Systemic amplification and feedback loops

The interconnectedness of the financial system means that climate-related shocks can propagate quickly and unpredictably. Losses in one sector – particularly for small actors such as insurers facing large payouts after a natural disaster – can spill over into banks, investment funds, and even public finance.[101]Similarly, shocks affecting investment funds can spread to other sectors, amplifying the initial impact.

Feedback loops between the financial system and the real economy can further amplify risks. Reductions in bank lending and insurance coverage can transfer risks to other parts of the financial and non-financial system, including the public sector, which is the de facto insurer of last resort. This can lead to sizable redistributive impacts and additional financial stability concerns, potentially resulting in systemic credit, market, and liquidity risks.

[99] Financial Times, 2025, **How the world's largest wealth fund looks at climate risk**

[100] Norges Bank Investment Management, 2024, **Climate and nature disclosures**

[101] E-Axes and EBI, 2025, **Navigating bank climate disclosure: Regulatory developments in the US and EU**, Webinar

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Risk area 6: Labor and productivity

The COVID-19 pandemic demonstrated that human health is intimately linked to productivity and growth. Looking ahead, climate change impacts including acute flooding and excessive temperatures are heightening public health risks with negative consequences for labor and productivity, pillars of growth.

Case study

The COVID-19 pandemic had devastating impacts on human and economic health. According to the World Health Organization (WHO), the full death toll associated with the pandemic over 2020–2021 was around 15 million.[102] The pandemic also reshaped global economic outlooks, with advanced economies facing the largest decline in growth. Despite steep losses, "swift policy action worldwide, including extraordinary monetary measures and $16 trillion in fiscal support, helped prevent another Great Depression. Without these measures, the global contraction [of 2020] would have been three times worse."[103]

Why climate change matters for labor productivity

If the COVID-19 pandemic revealed one thing, it is countries' unpreparedness for substantial public health shocks. Unfortunately, climate change also multiplies such risks in two important ways: greater risk of vector-borne diseases and excessive heat.

Greater risk of vector-borne diseases

More frequent and intense precipitation and flooding heighten the risk of vector-borne diseases, especially in low-lying and densely populated regions.[104] Pakistan is an example of a country that has recently experienced such an event, and where exposure to extreme weather events creates significant macroeconomic, fiscal, and development risks.[105] Already in June 2022, Pakistan was hit with devastating mega-floods that caused 81 districts to be declared as calamity hit, impacted over 33 million people, and caused economic losses exceeding $40 billion.[106] The disaster was triggered by a monsoon season that delivered 7–8

[102] WHO, 2023, **14.9 million excess deaths associated with the COVID-19 pandemic in 2020 and 2021**; WHO, updated 2023, **Global excess deaths associated with COVID-19 (modelled estimates)**

[103] IMF, 2021, "**COVID-19**", in IMF Annual Report 2021

[104] IPCC, 2022, **Working Group II contribution: Impacts, Adaptation and Vulnerability**

[105] IMF, 2025, **Pakistan: First Review under the Extended Arrangement for Modification of Performance Criteria and Request for an Arrangement under the Resilience and Sustainable Facility**

[106] WHO, 2022, **Disease outbreak news: Malaria – Pakistan**

times the 1990–2020 mean rainfall, flooding over 2,100 streams and breaching 177 check dams.[107]

Following the floods, reported malaria cases steeply increased. In Sindh province, confirmed malaria cases in August 2022 reached almost 70,000 compared to 20,000 cases reported in August 2021. In Baluchistan province, around 41,000 confirmed cases were reported in August 2022 compared to almost half (22,000 confirmed cases) in August 2021.[108] The two provinces combined accounted for 78% of all reported confirmed cases in Pakistan.

Research finds that under a fossil-fuelled development scenario (SSP5),[109] "the area of high flood risk zones (in Pakistan) is projected to expand by 6.62% by 2080 […] underscoring an urgent need for climate-resilient dam design, strategic sediment management, and adaptive flood-risk governance in similar vulnerable areas."

More prolonged and intense excessive heat

Global warming increases the frequency and intensity of excessive heat (temperatures exceeding 35 °C) in all inhabited regions, particularly in cities.[110] This has important public health and, by extension, economic implications. First, it increases the mortality rate for children and elderly. Beyond vulnerable populations, in the summer of 2024 over 1,300 pilgrims reportedly died in Saudi Arabia during the annual pilgrimage to Mecca, due to prolonged exposure to excessive heat with temperatures exceeding 50 °C.[111]

As excessive heat surges, productivity weakens. The IPCC expects a reduction in labor capacity during hot periods by 20% or more by 2050, up from 10% currently.[112] According to the World Bank, extreme heat impacts developing and developed economies, both for outdoor and indoor activities, with more severe impacts for lower-income areas where infrastructure is less equipped to handle

[107] Cui, P. et al., 2025, **Flood risk assessment with machine learning: insights from the 2022 Pakistan mega-flood and climate adaptation strategies**, *npj Natural Hazards*, vol. 2, 42

[108] WHO, 2022, **Disease outbreak news: Malaria – Pakistan**

[109] Cui, P. et al., 2025, **Flood risk assessment with machine learning: insights from the 2022 Pakistan mega-flood and climate adaptation strategies**, *npj Natural Hazards*, vol. 2, 42

[110] IPCC, 2022, **Working Group II contribution: Impacts, Adaptation and Vulnerability**

[111] New York Times, 2024, **More than 1,000 Hajj pilgrims died. Here's what to know**; Human Rights Watch, 2024, **Deaths during annual Hajj in Saudi Arabia underscore extreme heat dangers**

[112] Dodman, D. et al., 2022, **Cities, Settlements and Key Infrastructure**, in: Climate Change 2022: Impacts, Adaptation and Vulnerability

temperature extremes.[113] While losses are not linear, the World Bank found a conservative convergence towards estimates that indicate a 1 °C hotter year results in a 2% decline in overall economic activity.

Why climate policies matter for labor and productivity

Extreme heat exacerbates in a non-linear way for every additional degree of global warming, particularly for cities. "The highest increase of temperature of hottest days is projected […] at about 1.5 times to twice the rate of global warming."[114] For urban centers, "a 1.5 degrees C of warming is projected to cause 67 cities to experience 150 or more days a year with temperatures exceeding 35 degrees C. Under 3 degrees C of warming, it rises to 197 cities, with more than half of those cities (103) located in India."[115] Such prolonged periods of extreme heat can only be adapted to a certain extent. Poor communities will be disproportionately impacted while businesses face higher expenses (cooling systems), lower worker productivity, and loss of revenues from reduced foot traffic.

Given these risks, it is necessary to both limit warming and the degree of risk, and prepare for its impacts in the most vulnerable regions. A foundational first step to reduce risk is the realistic, systematic, and science-based account of climate risks in surveillance, equipping decision makers with the necessary tools for sound and resilient policy choices.

Conclusion

Driven by GHG-intensive economies, climate risks are growing in scale and frequency, systematically multiplying macroeconomic risk and jeopardizing financial stability through heightened debt vulnerabilities, destabilized trade, increasing price shocks, weakened financial stability, and eroded labor and productivity. Climate risks are macro-critical and the IMF should systematically integrate them into its monitoring activities.

[113] World Bank, 2023, **The heat is on: How high temperatures are impacting workers and the global economy**

[114] IPCC, 2022, "**Chapter 11: Weather and climate extreme events in a changing climate**", in Sixth Assessment Report, Working Group 1: The Physical Science Basis

[115] World Resources Institute, 2023, **The future of extreme heat in cities: What we know – and what we don't**

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Annex: What qualifies as macro-critical under Article IV?

Additional detail on what qualifies as macro-critical from the IMF 2015 Surveillance Guidance, and IMF 2022 Guidance Note for Surveillance Under Article IV Consultations:

> "An issue is macro-critical if it affects, or has the potential to affect, domestic or external stability." (2015 Surveillance Guidance, par. 75)

> "Exchange rate, monetary, fiscal, and financial sector policies are macro policies and always considered important for stability." (2015 Surveillance Guidance, par. 75)

> "Other domestic policies can also be macro-critical when they affect stability" (2015 Surveillance Guidance, par. 75)

> "Structural policies that aim to raise growth should be assessed under article IV consultations if they are macro-critical, i.e. if they affect the stability of the country" (2015 Surveillance Guidance, par. 7)

Bilateral and multilateral surveillance

The IMF provides detail on Article IV consultations as a tool for both bilateral and multilateral/spillover risk surveillance in the 2012 Integrated Surveillance Decision, the 2021 Comprehensive Surveillance Review (CSR),[116] and IMF 2022 Guidance Note for Surveillance Under Article IV Consultations.

Surveillance priorities:

> "Ensuring economic sustainability. Cover salient trends and policies that may impact longer-term stability and sustainability, including […] climate change." (Box 1 in 2021 CSR).

> "The sources and channels of spillovers have increased and expanded, sometimes beyond traditional areas of Fund expertise, including climate change." (2022 Guidance Note, par. 34)

[116] IMF, 2021, **2021 Comprehensive Surveillance Review – Overview Paper**; IMF, 2021, **2021 Comprehensive Surveillance Review – Background Paper on Integrating Climate Change into Article IV Consultations**

> “Climate change is an existential threat to global prosperity with significant macroeconomic and financial implications” (2022 Guidance Note, par. 100)

Bilateral surveillance:

> In its bilateral surveillance, the IMF “will focus on policies that can significantly influence present or prospective balance of payments and domestic stability” (2021 CSR, par. 6).

> “domestic policy challenges related to climate change—such as adaptation efforts for climate vulnerable countries, or policies to deliver a country’s Nationally Determined Contribution under the Paris climate accord (transition management)—are covered by the IMF’s bilateral surveillance mandate and therefore valid topics for Article IV consultations wherever these challenges cross the threshold of macro-criticality.” (2021 CSR Background Paper)

Multilateral surveillance/spillover risks:

> As part of multilateral surveillance, Article IVs consultations “shall include a discussion of the spillover effects of a member’s […] domestic economic and financial policies that may significantly influence the effective operation of the international monetary system, for example, by undermining global economic and financial stability”. (Surveillance Decision, par. 26).

> “Climate change mitigation is a global policy challenge and therefore falls under multilateral surveillance.” (2021 CSR Background Paper)

> “Climate change mitigation […] should be discussed in the context of the ISD’s spillover provision.” (2021 CSR Background Paper)

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E3G is an independent think tank working to deliver a safe climate for all.

We drive systemic action on climate by identifying barriers and constructing coalitions to advance the solutions needed. We create spaces for honest dialogue, and help guide governments, businesses and the public on how to deliver change at the pace the planet demands.

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