BY LOUDINA ERASMUS

Risk in a 2°C warmer world

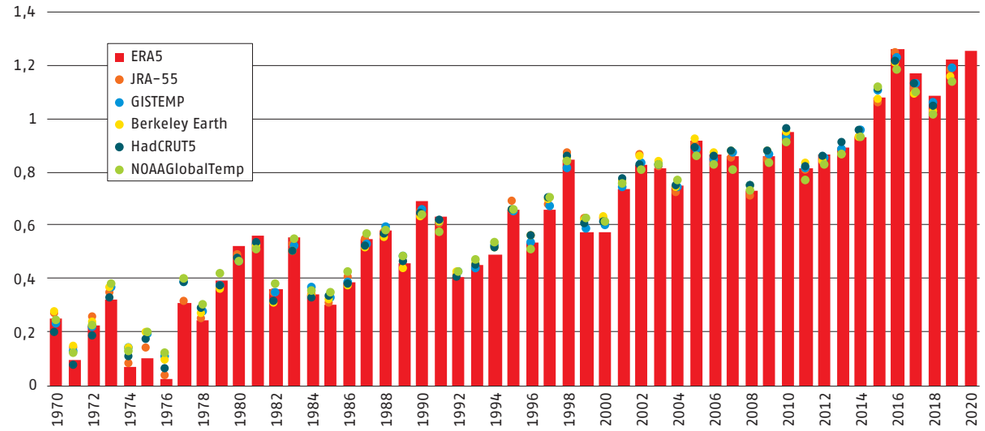
Climate change, from a long term physical risk phenomenon, has become a short term agenda item, with politicians becoming more active and vocal on it, climate litigations becoming more pressing and central banks and regulators taking a more pro-active role to address the systemic nature of this risk. Without a significantly expanded mitigation effort, the world is on course to warm by more than 2°C above preindustrial levels by 2050.

To reach the Paris agreement, limiting warming to 1.5°C by the end of the century and limiting the physical impacts of climate change, we need to reduce global greenhouse gas emissions by 55-60% by 2030 and achieve net-zero emissions by 2050. (United Nations Emissions Gap Report, 2020) (IPCC) During 2020, as the Covid-19 pandemic forced many economies to lockdown, emissions reduction stimulated calls for a green recovery. Many countries have strengthened their targets during 2020, with the 3 largest emitters (US, China, EU) committing to reduce more than 50% of global emissions to net-zero by 2050. (China net-zero by 2060). The EU strengthened an ambitious 2030 target of 49% reduction to 55% compared to 1990 levels.

2020 was also Europe's warmest year, as published by Copernicus Climate Change Service (C3S), with winter 2020 (December 2019 to February 2020) exceeding the previous warmest of 2016 by almost 1.4°C, while western Europe experienced a significant heatwave in late July and early August. Heat stress resulted in excess mortality during August of more than 400 lives in the Netherlands while there were fewer than expected mortalities during the milder winter. (CBS, 2020)

Globally, 2020 was tied with the previous warmest year 2016, making it the sixth in a series of exceptionally warm years starting in 2015, and 2011-2020 the warmest decade recorded.

Annual average temperature (deg C) relative to IPCC-defined pre-industrial level



Annual averages of global air temperature at a height of two metres estimated change since the pre-industrial period (left-hand axis) and relative to 1981-2010 (right-hand axis) according to different datasets: Red bars: ERA5 (ECMWF Copernicus Climate Change Service, C3S); Dots: GISTEMPv4 (NASA); HadCRUT5 (Met Office Hadley Centre); NOAAGlobalTempv5 (NOAA), JRA-55 (JMA); and Berkeley Earth. Credit: Copernicus Climate Change Service/ECMWF

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We have already warmed 1°C compared to the pre-industrial average. How this, and an additional 1°C warming exposes pensions funds, banks and insurers to a systemic risk cocktail are in some instances clear, in others less.

PHYSICAL RISK

Acute physical risks from climate change include damage from adverse weather events such as floods, hurricanes and drought, and are often exacerbated due to developments in vulnerable areas. Chronic physical risk mainly relates to heat stress, and the potential impact on labour productivity.

PHYSICAL RISK

The direction manifestion of climate change is in physical form: flood, drought, hurricanes, hail storms and rising sea level. Physical risk in turn creates financial and economic risk. Sea level rise poses one of the more severe and irreversible physical risk consequences of climate change. While projected over a very long term, and associated with a very low probability, the impact should a flood occur is severe. Initial research from ABN AMRO Group Economics to estimate the impact on the mortgage portfolio, shows:

- Moderate flooding (50 cm) and severe flooding (>200 cm) would have a GDP impact of -1.5 to -3% in the year of the flood;
- The impact of moderate flooding is mainly driven by a change in risk perception amongst home buyers;
- The impact of severe flooding is mainly driven by a one-month standstill of economic activity (-2% GDP) and a housing price shock of -30%, which work through the economy.

TRANSITION RISK

Higher commitments to reduce carbon emissions and the associated physical risk creates transition risk, which affects insurers, banks and pensions funds as large investors in energy majors and industrials. Transition risk materialises as risk to individual companies, and to the wider economy through the energy system as:

- Sudden economic obsolescence of the capital stock and sudden revaluation of fossil fuel reserves and revaluation of the market value of firms, according to their exposure to carbon-intensive resources, inputs or technologies (ESRB, 2016). During the 2020 pandemic related lockdown the transition was accelerated, with demand decline and overproduction reducing oil prices significantly, in turn affecting the stock market prices of oil majors.
- Energy system risk, around efficiency and price. Efficiency as congestion of the electricity grid and the risk of insufficient back-up capacity as output from flexible renewable energy sources outpaces investment in the electricity grid creating suboptimal solutions (or temporary switch off), while coal- and nuclear fired power plants are being decommissioned. In the UK, EU as well as the US, nuclear energy generation is rising in popularity for back-up capacity once more, however nuclear waste is an unwanted environmental problem. Price spikes from emission price increases and weather related variation is also a risk - the EU Emissions Trading System (ETS) observes record prices above EUR35 per ton of CO2 as trading commenced for 2021;
- Climate litigation, for example the Urgenda case in The Netherlands, creates mounting pressure to address the delay and divergence between promises and actions taken, increasing transition risk as countries could face a faster transition path.

For banks, insurers and pension funds, short term transition risks include:

- Increasing regulatory risk with central banks increasing reporting requirements (e.g. Bank of England (BoE) making Task Force on Climate-related Financial Disclosures (TCFD) reporting mandatory, where it was voluntary before), and EIOPA investigating minimum requirements for climate related capital (see also the article by R.E. Batten elsewhere in this edition).
- Implementation risk – with 2021 climate-related deadlines starting to bite (for example EU Sustainable Finance Disclosure Regulation (SFDR)) – the risk that we either miss the requirement, or need to spend significantly higher amounts on consultancy fees to meet them.
- Fierce competition for renewable projects results in lower margins and lower ROEs. The risk/reward ratio therefore falls under pressure and may become a risk in the future if this trend continues.

With the global focus on the corona pandemic, there is a risk to climate mitigation efforts that focus will be shifted to economic recovery, especially in emerging markets which are most exposed to the effects of climate change.

MODEL RISK AND FINANCIAL RISK

The underlying assumptions used in climate scenarios also poses some climate model risk. Global average surface temperature used as premise of the climate commitment to 1.5°C is calculated as a 50/50 average between the northern and southern hemisphere, using both ocean and land based temperatures. This averaging camouflages faster northern hemisphere warming, where climate tipping points of albedo effect and methane release from permafrost can cause warming at higher levels than current IPCC models estimate. This and other model shortcomings tend to underestimate the impact of increased emissions.

In addition to climate model risk, financial model risk to translate the climate forcing to a financial impact is substantial. The main drivers are the lack of historical data and the difficulty in correlating losses to climate events. Efforts to bridge the gap are being made with Actuarial Climate Indices (US ACI version 1 has been published, EUR ACI is in development), which track meteorological conditions which can cause physical damage, to eventually link these to financial losses incurred. These vary per region, and include increased variability in rainfall (both flooding and drought), hail, hurricanes, heat extremes and cold extremes.

IN CLOSING

Climate risk poses a systemic threat to economic growth and financial stability. Over the long term the threats come from physical impact such as flooding (acute) and labour productivity (chronic), and over a shorter horizon from the economic and financial impact of transition to a low carbon economy driven by international climate policy. In addition, the underlying models, both for climate and finance, are still in development and subject to high degrees of uncertainty. ■

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