Climate Change Challenges

Condensed Overview

Climate change scenarios and their impact on funding risk and asset allocation

November 2018

Aon
Empower Results®

Table of contents

Executive introduction

Man-made climate change is one of the biggest threats facing our world today. Governments have made commitments to reduce greenhouse gas emissions to limit its damaging effects. To meet these commitments, more aggressive policy action and a rapid shift away from fossil fuel use will be necessary. This may well cause considerable disruption, increasing costs and reducing growth globally, while raising the risk of a global recession.

Pension funds, as long-term investors, could find themselves exposed under many of the potential future scenarios around climate change. The long-term effects of untempered climate change are likely to be highly damaging, but the economic transformation required to deal with the challenges could also cause pain in the near term for those that are unprepared.

The Paris Climate Change Agreement aims to strengthen the global response to the threat of climate change by limiting the global temperature rise to well below +2°C above pre-industrial levels by 2100. The scientific consensus is that keeping the global temperature rise below this level will help avoid the worst effects of climate change.

Climate Change Tracker, an organisation dedicated to tracking policy action since 2009, estimates that the current implementation of policies worldwide will still lead to global temperature increases in excess of +3°C. Even if existing pledges were fully met, the global temperature rise would still be well above the danger limit. This puts our planet and society at risk from more severe climate change effects before the end of the century.

To remain below the +2°C target, CO_2 emissions need to begin falling and be close to zero by 2070, with net emissions turning negative thereafter. Consequently, to achieve this target, more ambitious goals than those set out in the Paris agreement are needed; these include international regulation of carbon emissions, development of green technologies and a rapid shift away from fossil fuels in favour of renewable energy sources.

Under different green scenarios, where global collaboration manages to act to address the challenges, there is still the likely threat of a shock from climate regulation changes that could lead to large losses across pension funds' portfolios in the near term. The implications of the alternative 'no mitigation' scenario is that while some of the near-term pain is avoided, delayed action simply defers the pain and the final cost will be far higher, putting future generations and investors' returns at risk.

The risks from climate change are much greater over the long run than over the next decade. However, the window for limiting emissions and avoiding disastrous change is narrow. Under different climate change scenarios there is scope for economic pain at some point on the road, either near or far.

This report considers four alternative scenarios (from no mitigation to smooth transition to a green economy) and their potential impact on assets and pension scheme funding levels. These scenarios can be used to provide context to discussions on climate change and gives another perspective on risk when looking at investment strategy and asset allocation.

Pension funds, insurers and other financial institutions will need to consider how likely they are to be impacted by climate change and decide how they will manage the material financial risks and future challenges over multiple timeframes. Scenario analysis can be used to help trustee boards and corporate treasurers to consider a range of climate change outcomes, and to better understand how their assets and liabilities are likely to be impacted. This analysis can be used to stress test investment strategy and make informed funding and investment decisions. This allows for better planning for future conditions, which will hopefully lead to a brighter future.

The full *'Climate Change Challenges'* report can be found here*

** http://www.aon.com/getmedia/8ddb2a56-c1a9-4689-81e6-f3b7c178e57c/Climate-Change-Challenges.aspx*

Background

Climate change is the large scale, long-term shift in the planet's weather patterns, in particular a change due to an increase in average global temperature (i.e. global warming).

The weight of evidence supports the conclusion that the world is warming. Global warming is largely the result of emissions of carbon dioxide and other greenhouse gases from human activities, including industrial processes, fossil fuel combustion and changes in land use, such as deforestation.

The consequences of failing to tackle climate change are well known and include:

- rising sea levels and coastal flooding
- more frequent heat waves
- more extreme and frequent rainfall in many regions and less rainfall in other regions
- desertification
- more destructive weather events
- vanishing ecosystems
- deforestation
- reduced agricultural yields
- costly and growing health impacts
- mass migration and increased conflict

The 2017 World Economic Forum Risk Report prioritises global threats in terms of likelihood and impact. Climate change related risks have been growing in prominence and have been a fixture in the top five threats in terms of likelihood and impact since 2011.

Extreme weather events are ranked as the most likely risk and the second-most impactful, trailing only the use of weapons of mass destruction. Failing to adapt to or mitigate climate change and a host of other climate-connected risks including water and food crises and involuntary migration also rank in the top ten.

The risks and costs from climate change are gradually becoming more substantial. Climate change is strongly interconnected with a multitude of other environmental and social risks (see table 1), which mean that the threat from climate change is likely to become progressively larger, unless further action is taken.

Table 1. **Topics linked to climate change**

Environmental themes	Social themes
• Water quality	• Energy supply
• Air pollution	• National security
• Waste management	• Human development
• Deforestation and land degradation	• Population growth
• Chemical and toxic emissions	• Global changes in demographics
• Dispersion of clean energy technology	• Poverty and income disparity
• Resource management	• Human and labour rights

Source: Aon

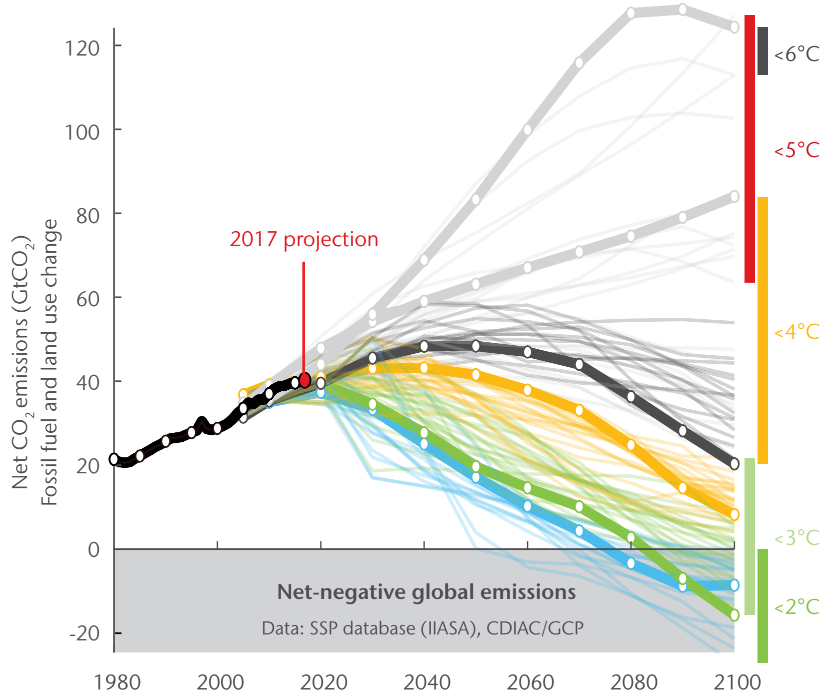
Where do we currently stand?

Figure 1 shows the current historical path of carbon dioxide emissions and a range of scenarios for emissions to the end of the century created by the Intergovernmental Panel on Climate Change (IPCC) and their possible outcomes for global warming.

It shows that if emissions continue on their current trend global warming is likely to be above 4°C. Even if carbon dioxide emissions remained stable at current levels global warming would likely be above 3°C. Thus to keep global warming below the 2°C danger limit a rapid reduction in emissions is needed.

To meet the challenge of stabilising and then lowering global temperatures a radically transformed, sustainable development path is needed on the back of a clean energy technological revolution.

Figure 1. **Global warming scenarios and the two degrees celsius goal**



Source: Global Carbon Project, IPCC

What is the current policy position?

The Paris Climate Change Agreement (COP 21) aims to limit the increase in the global average temperature to well below 2°C above pre-industrial levels (i.e. average temperatures over 1850–1900). Every country in the world, with the exception of the US, has now signed up to this agreement.

Participants agreed to pursue policies and provide finance to lower greenhouse gas emissions and adapt to the adverse impacts of climate change. However, the agreement relies on voluntary and nationally determined targets, rather than agreeing collective targets that are legally enforceable.

There is no legal requirement each country must meet or emissions reduction it has to achieve. Only the processes governing the reporting and review of these goals are mandated under international law.

The current pledges for carbon cuts put the world's nations on course for at least 3°C of global warming above the pre-industrial average and severe damage to the environment. However, the Paris agreement includes guidelines for the pledges to be reviewed and ratcheted up. The hope is that over time countries increase their ambition and accelerate plans to mitigate greenhouse gases and avoid the worst outcomes.

The vital groundwork for this framework started with the Bonn climate change summit in November 2017. The aim of the summit was to build a consensus on the rules that will enable the Paris deal to work. It has also focussed attention on the issue of financing climate change mitigation and adaptation projects.

It is hoped that the necessary rules and finances will be finalised by the next summit, which is due to be held in Poland in December 2018.

What is the investor stake?

Investors have a vested interest in climate policy because it will provide a relative level of certainty about the business environment they will operate in. It is therefore in the interest of investors to pursue proactive sustainable and responsible investing strategies that embed climate change considerations in the investment process and build in climate change resilience.

The long term impact on climate change will largely be determined by society's response to deal with climate change and the effectiveness of policies and technologies put in place.

What is certain is that climate change and the efforts made to tackle it will inevitably affect investment returns (and hence pension funding levels) globally.

The actions taken to mitigate climate change will have different effects across asset class types. The level and timing of activity to mitigate and adapt to climate change means that returns will also differ over different time horizons.

The effects of climate change over the short and long term are complex and will require a flexible, dynamic investment strategy. Considering different climate change scenarios helps to provide insight on some of the risks and opportunities that may arise.

Scenarios

We consider four potential climate change scenarios (covering a broad spectrum of outcomes) and their potential impact on assets and pension scheme funding levels, as follows:

- **The green regulation scenario** considers the impact of immediate, coordinated action to tackle climate change using taxes and regulation.
- **The forced green scenario** explores the impact of delayed action for five years, with governments eventually forced to address greenhouse gas emissions due to increasing extreme weather events.
- **The green skies scenario** shows how rapid advancement of green technology, private innovation and tiered environmental regulation and greenhouse gas taxes could achieve a smooth transition to a low carbon world.
- **A no mitigation scenario**, considers the potential impact of climate change if insufficient sustainable policy action is undertaken to manage global temperatures effectively over the next ten years.

We contrast these scenarios against our **base case scenario**, which is based on long-term return views of what is currently priced into the market. The market does not appear to be expecting a bad climate change outcome. For this reason, the base case scenario assumes that the worst effects of climate change do not come about, as the effects are not as damaging as first thought and that some progress is made to limit greenhouse gas emissions and global warming.

Table 2 summarises the macroeconomic and asset impacts under our climate change scenarios over the long-term compared to our base case. See our full 'Climate Change Challenges' report for further details.

The high degree of uncertainty surrounding climate change means that the final outcomes may look very different to those outlined. However, the themes illustrated in our scenarios are expected to be relevant when understanding risks and/or considering asset allocation decisions.

We continue to work with the view that enough progress will be made to mitigate and adapt to climate change, avoiding a disastrous outcome. However, we also recognise that based on current scientific information and the limited action taken to tackle climate change so far, the risks are currently skewed towards a poor climate change outcome.

Responsible investing practices are likely to prove critical in the fight against climate change. A better understanding of asset allocation decisions will help build robust investment portfolios and pension schemes that can adapt to change and are positioned to deliver the best risk-adjusted outcomes.

Table 2. **Long-term impact of climate change**

Likely five year impact

	Base case	**Green scenario**			**Climate change calamity**		
	World events unfold in a fashion consistent with our Capital Market Assumptions	*Coordinated global action is taken to aggressively tackle climate change*			*Insufficient consideration is given to sustainable long-term economic policies to manage global temperatures effectively*		
	Relative to the base case	**Lower**	**Similar**	**Higher**	**Lower**	**Similar**	**Higher**
Growth rate	UK and global growth gradually improve. Growth is in line with long-term consensus expectations						
Inflation rate	Inflation moves to and remains close to 2%, the Bank of England target, over the long-term						
Fixed interest government bond yields	Nominal yields gradually rise to higher levels as there is a gradual improvement in global growth prospects						
Index linked government bond yields	Real yields gradually rise to higher levels as there is a gradual improvement in global growth						
Corporate bond spreads	Corporate spreads stabilise at slightly higher levels and remain broadly stable						
Global equity returns	Equity returns are in line with our long-term return capital market assumptions						

Source: Aon

Further research

The Institute and Faculty of Actuaries have recently published a working paper 'Resource and Environment Issues for Pensions Actuaries: Considerations for Setting Financial Assumptions'. This paper examines how climate change may impact pension scheme funding matters. It summarises the research currently available and highlights the knowledge gaps and uncertainties that exist, pointing to the importance of judgement in this area.

Most other work in this area has focused on the investment implications of climate change, particularly the implications for equity portfolios, whereas this report considers a wider range of financial parameters that are relevant for pension scheme funding, including bond yields and inflation.

The report undertakes a review of available scenario analysis and concludes that our scenarios are currently at the cutting edge (as they consider both assets and liabilities) and are the "most useful [scenarios] to date".

Contacts

Mark Jeavons
Senior Economist / Principal Investment Consultant
Global Asset Allocation
+44 (0)20 7086 9563
mark.jeavons@aon.com

Andrew Claringbold
Principal Consultant
Retirement and Investment
+44 (0)1727 888617
andrew.claringbold@aon.com

About Aon

Aon plc (NYSE:AON) is a leading global professional services firm providing a broad range of risk, retirement and health solutions. Our 50,000 colleagues in 120 countries empower results for clients by using proprietary data and analytics to deliver insights that reduce volatility and improve performance.

For further information on our capabilities and to learn how we empower results for clients, please visit http://aon.mediaroom.com.

This document and any enclosures or attachments are prepared on the understanding that it is solely for the benefit of the addressee(s). Unless we provide express prior written consent, no part of this document should be reproduced, distributed or communicated to anyone else and, in providing this document, we do not accept or assume any responsibility for any other purpose or to anyone other than the addressee(s) of this document.

Notwithstanding the level of skill and care used in conducting due diligence into any organisation that is the subject of a rating in this document, it is not always possible to detect the negligence, fraud, or other misconduct of the organisation being assessed or any weaknesses in that organisation's systems and controls or operations.

This document and any due diligence conducted is based upon information available to us at the date of this document and takes no account of subsequent developments. In preparing this document we may have relied upon data supplied to us by third parties (including those that are the subject of due diligence) and therefore no warranty or guarantee of accuracy or completeness is provided. We cannot be held accountable for any error, omission or misrepresentation of any data provided to us by third parties (including those that are the subject of due diligence). This document is not intended by us to form a basis of any decision by any third party to do or omit to do anything.

Any opinions or assumptions in this document have been derived by us through a blend of economic theory, historical analysis and/or other sources. Any opinion or assumption may contain elements of subjective judgement and are not intended to imply, nor should be interpreted as conveying, any form of guarantee or assurance by us of any future performance. Views are derived from our research process and it should be noted in particular that we cannot research legal, regulatory, administrative or accounting procedures and accordingly make no warranty and accept no responsibility for consequences arising from relying on this document in this regard.

Calculations may be derived from our proprietary models in use at that time. Models may be based on historical analysis of data and other methodologies and we may have incorporated their subjective judgement to complement such data as is available. It should be noted that models may change over time and they should not be relied upon to capture future uncertainty or events.

Aon Hewitt Limited is authorised and regulated by the Financial Conduct Authority. Registered in England & Wales. Registered No: 4396810.

Registered Office:
The Aon Centre
The Leadenhall Building
122 Leadenhall Street
London EC3V 4AN

www.aon.com

Empower Results®