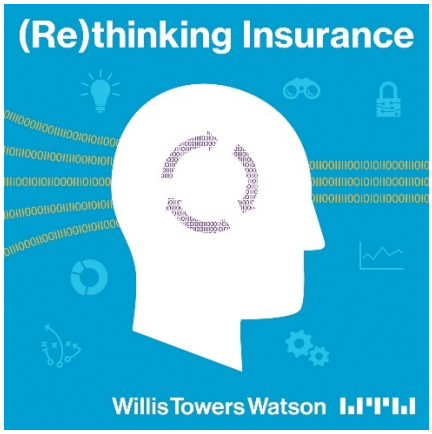

Episode 5: The mortality impact of climate change

RICHARD MASHALL: What would be the effect of moving from maintaining the status quo towards either a much faster move towards a low-carbon economy or deteriorating international participation in climate action?

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VITTORIO MAGATTI: So hello and welcome to Rethinking Insurance. I'm your host, Vittorio Magatti. And today, I am delighted to be joined by my guest, Richard Marshall, director UK leader of the Mortality and Longevity Modelling Group, and Kez Baskerville-Muscutt, risk analyst. Hello.

RICHARD MARSHALL: Hi, Vittorio. Pleasure to be with you today.

KEZIAH BASKERVILLE-MUSCUTT: Vittorio, I'm happy to be here.

VITTORIO MAGATTI: So in today's episode, we're going to be exploring the mortality impact of climate change. But first, let's find out a little bit more about the guest. So googling you, I can see that Richard Marshall is an amazing person in the football area. And searching also for Kez, I can see that she's-- and you are an artist. Could you confirm this?

RICHARD MARSHALL: I wouldn't say that I have anything to do with football at all. Vittorio, no.

KEZIAH BASKERVILLE-MUSCUTT: I would say I was perhaps an artist in a previous life when I've curated a couple of exhibitions but firmly in the mortality longevity space now.

VITTORIO MAGATTI: Super. Many thanks for this introduction. So I think it's the right time to start asking you some question. First of all, why should life insurers and pension schemes care about the potential impact of climate change or mortality?

RICHARD MARSHALL: Well, Vittorio, climate change is arguably one of the most pressing problems facing the world at present. It has the potential to affect how and where we live-- changes weather patterns leading to rising sea levels, causes displacement, and migration. There's going to be potential changes in biodiversity and habitats potentially leading to changes in the diseases that we're exposed to within our own countries.

Potentially, those diseases are things that we're not used to seeing or treating. They may even be new diseases that we haven't seen before for example as we've recently seen with COVID-19. The potential for climate change to affect how we live, our health, and ultimately how we die means that insurers and pension schemes need to properly understand the risks that they face as a result of climate change not occurring in line with their own expectations.

You see, it's not simply a question of making a prediction as part of a sort of best estimate view of the future about how climate change will happen, what implications that has for disease incidence, mortality rates, but rather a question of how wrong you could be. It seems to be broadly accepted that the changes, which have been predicted in some climate scenarios all shared socioeconomic pathways as their perhaps better known-- These pathways leading to high carbon emissions and resulting in greater increases in global temperatures will have a detrimental impact on overall human health and well-being albeit with the potential for some areas to benefit at least in the short term from higher economic growth.

Maintaining the status quo implies slightly less extreme changes in temperature, and taking drastic action to try and halt or mitigate against the effects of climate change. --may result in a less detrimental climate outcome but have economic implications not least the cost of the interventions. So for insurers and pension schemes, the question will be, what would be the effect of moving from maintaining the status quo towards either a much faster move towards a low-carbon economy or deteriorating international participation in climate action to the extent that these scenarios could affect the mortality of pensioners or the health and mortality of a working age insured population?

There will be a need to understand the size of this risk and the timescale over which changes in assumptions could emerge. It's also worth noting that regulators are starting to take a keen interest in climate risk. For example, the UK regulator, the PRA will be issuing its climate biennial exploratory scenario in June 2021. Details of the planning behind this can be found on the Bank of England's website for those that are interested. Clearly, it's in the interest of insurers to demonstrate to the regulator that they have got a good grasp of how climate change could impact both the assets and liability sides of their balance sheet.

Finally, quite apart from regulatory requirements, it's a principle of good financial governance to have an understanding of the material risks, which could affect the future security of member benefits in a pension scheme or the generation of cash by which an insurer is able to fund dividends or bonuses without at least examining the potential for climate risk to both directly and indirectly affect mortality and morbidity rates. Trustees or directors might inadvertently be neglecting a material risk. So we'd expect that most will be looking to at least assess the potential materiality following these different emission pathways over the coming year.

VITTORIO MAGATTI: Thanks, Richard. What approach did you take to modelling the potential impact of climate change on mortality in the UK? And is it easy to calibrate the model to different countries?

KEZIAH BASKERVILLE-MUSCUTT: So to answer the first part of your question, a very high level-- our approach was to calibrate Willis Towers Watson driver-based model of mortality to a range of climate variables and broad causes of death groups. And we use this calibrated model along with a range of climate scenarios, which Richard alluded to, to generate a potential range of effects on mortality improvement over the next 60 years. And I'm going to dig into that and explain about it a little bit more here.

So what is a driver-based model perhaps you might ask. A driver-based model of mortality also called a cause of death model considers the response of an overall population mortality to changes in the level of individual drivers where a driver of mortality could be understood as a variable that has a material link to mortality rates. So to give a traditional example if it's believed that there's going to be a continuing trend towards decreasing smoking prevalence, then by understanding the link between smoking and mortality from a range of different causes, the model will predict a change in mortality which reflects this change in behaviour.

Importantly for us though, there's no fixed choice of drivers for a driver-based model. So we can replace those traditional drivers with climate drivers of our choice. The approach we took to calibrating this model and generating the results has three main steps to it. The first is to identify what climate variables we consider to be drivers of mortality. These we selected following an initial desktop analysis. And they were chosen because we could find evidence of a material impact on mortality outcomes and also a convincing link to changes in climate.

For the UK, the climate drivers that we identified were extreme temperatures, both hot and cold, rainfall, snowfall, storms, and air pollution. The second step in our calibration approach was to calibrate the links between each of these drivers and, of course, specific mortality, which we did using academic papers, data, and some actuarial expert judgment. Finally, those calibrated links were combined with some indicators of how our climate drivers have changed over the recent past and also best estimate projections of how they might continue to change in the short to midterm future.

As Richard mentioned, the projections of how these drivers might continue to change are guided by a climate scenario pathways in this case those produced by the Intergovernmental Panel on Climate Change, which they call Representative Concentration Pathways. These pathways represent possible futures in which temperatures increase above pre-industrial levels by various amounts ranging from less than 2 degrees to exceeding 4 degrees by the end of the 21st century. And we're looking at a range from a central pathway towards either of the extremes so considering how moving from one pathway to the other would affect mortality.

To answer the second part of your question, I've talked specifically about calibrating the model to the UK, but the method can in theory be applied anywhere in the world. In fact, we've been carrying out some internal research recently on how we could apply this model to the Netherlands and the US as a proof of concept. But I should probably point out then practice. Acquiring enough good quality data may be challenging for some countries.

VITTORIO MAGATTI: OK. Many thanks, Kez. And I have another couple of questions in one. So what are the potential impacts of climate change on mortality in UK and outside?

KEZIAH BASKERVILLE-MUSCUTT: Yeah, so first some context. The model that we have will outer expectation of life and mortality for the years 2018 to 2078 and ages 20 to 120 for a best estimate under a stress scenario from which we can calculate improvements. Overall, our results suggest that none of the drivers we modelled has a particularly material impact on mortality in isolation and even when you combine the impact. The potential impact of climate change on mortality in the UK is probably going to be quite small. We should bring some comfort to insurers.

A few interesting observations from our research show that the effect of expectation of life is perhaps largest at younger ages, which makes sense if you think about it because younger people have a longer expectation of life in general. And they're also those most likely to be exposed to the worst effects of climate change, which are going to occur into the mid to the end of this century. A second observation was in the worst-case scenario the key drivers affecting mortality is air pollution. And in our best-case climate scenario was temperature. And this might help you when you're thinking about what climate drivers you might consider material.
It's also worth pointing out that we're only looking at trends over time not volatility. And if you do allow for volatility in the model, then the mortality in each year could increase in the future. But we'll also have to think about the potential impact from other drivers that we have not considered here.

It's really important to recognize that this is not the end of the story. The climate drivers that we've used are really only a subset of all the possible climate drivers, which could potentially have been modelled. By excluding them, we're not meaning to imply that there's going to be no impact on mortality from these sources although that may be the case for some, but rather what we're saying is there just wasn't enough evidence of their likely effect on mortality to include them within our modelling approach at this point in time.

That doesn't however mean that we or indeed other insurers shouldn't think about these potential impacts and more qualitative ways. So to give an example of other potential impacts thinking about transitioning to a low-carbon economy, this might entail extensive policy, legal, technology, and market changes to address mitigation and adaptation requirements related to climate change. And depending on the nature and speed and focus of these changing, transition risks might pose varying levels of risk.

There's not much academic research on the potential impacts of transition risk on mortality, but you could consider perhaps a couple of the following possibilities-- say public spending is diverted away from healthcare towards efforts to mitigate and/or adapt to the impacts of climate change. This might reduce the level of funding for healthcare services and could in turn have a knock on effect on patient outcomes such as morbidity and mortality rates or perhaps working habits. Exercise and diet habits might change in a changing climate, which could have a direct impact on health and well-being.

Some other connections to think about perhaps infrastructure damages from storms and flooding, which could isolate those in need of care away from medical facilities. Habitats for vectors of diseases could become extended and with that comes the risk of tropical diseases such as malaria, dengue fever, and [INAUDIBLE] and encephalitis. And in the extreme, food security or perhaps conflicts are a significant threat to life. What we've also thought about indirectly are the impacts of economic growth like transitional impacts. Economic growth could have a knock on effect on public services such as healthcare spending, social care spending, or public health initiatives or might have impacts for health and mortality in the UK.

VITTORIO MAGATTI: Kez, thank you again. And I have another question on insurance liabilities. So how should life insurers and pension schemes plan for future impacts on liabilities?

RICHARD MARSHALL: Well, first and foremost, they need to properly understand what those impacts could be. The old adage is that knowledge is power, and it certainly rings true here. Secondly, the impacts on the liabilities really ought not to be viewed in isolation. There will be transitional costs and physical risks, which affect assets in those different climate scenarios-- should be considered alongside the impacts on liabilities-- we get an overall view of how climate affects the balance sheet for an insurer.

For existing contracts, I guess there's relatively little that an insurer can do if they've got climate risk that they don't have an appetite for. And the same would be true for a pension scheme where they've got benefits that have already been specified. Really the only approach is to getting rid of that climate risk would be reinsurance. Perhaps if possible some better matching of the assets and liabilities and their relative movements under the effects of climate change or, of course, by transferring the liabilities to a third party seems perhaps quite an extreme approach to de-risking. However, with appropriate monitoring of global progress towards a low-carbon economy, insurers should be able to adjust the premiums that they offer for new business to reflect any changes in their views regarding the relative likelihoods of the various possible future climate change trajectories.

So having a sound understanding of the likely impacts within each scenario of those climate variables on mortality or morbidity rates for example the variables that were discussed by Kez earlier, an insurer should be able to more quickly determine how that price is ought to change in response to changes in their own best estimate view of how climate trajectories will evolve that along with the changing asset growth projections from the same scenarios, which would feed through into the insurance premium calculations. Another area where insurers could consider taking action would be in their product design and consumer engagement. For example, protection writers could develop products, which promote lifestyles which are conducive to the prevention of climate change. This could mean encouraging walking and cycling rather than use of a car-- maybe promoting certain dietary styles like veganism or the consumption of local produce to reduce food miles.

They could partner with suppliers to offer discounts on certain products, which promote energy efficiency in the home. Many of these would provide potential health benefits to consumers, to

their policyholders thereby reducing the risk of those policyholders making a claim. But by being able to offer these, the insurer may also benefit from a marketing perspective in the same way that a lot of asset managers have jumped on the ESG bandwagon.

And a lot of consumers are becoming increasingly aware of economic sustainability within the investments. The same consumers may be more interested in purchasing products from an insurer that is marketing these climate friendly insurance products. Finally, moving onto more environmentally sustainable investments, purchasing green bonds, supporting sustainable infrastructure developments, and perhaps at the same time divesting from or choosing not to buy bonds that are issued by high carbon industries would also put pressure on firms to reduce their carbon footprints and contribute to the lessening of the impacts of climate change.

VITTORIO MAGATTI: Richard and Kez, thank you again. And probably the final question for you is related to the actuarial community. So what are the key areas for future research and the potential role of the actuarial community on this climate change framework?

RICHARD MARSHALL: There are plenty of areas where additional research would be beneficial. We certainly need to better understand the links between individual climate variables and health or mortality. At present, the amount of academic research that has been carried out into the effects of those different climate variables on individual diseases and overall mortality is quite limited.

And because studies are carried out-- relatively small-scale studies might be carried out in individual countries, and different countries face different climate stresses, and they have different background weather patterns and so on. The results of their work might not be transferable between different geographical regions. So more understanding of the effects of those climate variables in specific countries or regions would be very useful. In fact, that's one of the major limitations of the work that we've done modelling the impacts of climate variables on mortality-- is that we've relied on the academic research some of which was not specific to the UK or was informed by information from all around the world.

We also need to have a better understanding of how the effects will disproportionately affect individuals in different socioeconomic and ethnic groups. Climate risk has the potential to affect different communities in different ways contributing to and perhaps exacerbating health inequalities that are already present in our respective countries. For example, poorer more densely populated inner-city areas may suffer more greatly from increases in air pollution than affluent suburban or rural areas, but they may benefit more from innovations, which reduce air pollution as a result. So the risk that there's a change in the projection for air pollution over time will be different in the two areas.

We need to better understand the more complex relationships between climate, migration, food security, conflict, and economic growth. This tangled web of interrelated global impacts of climate change is perhaps substantially more material in terms of its impact on health, through its impacts on diet and nutrition, prevalent disease, funding for health and social care, and, of course, the impacts of armed conflict than say the various weather related climate drivers that we talked about earlier in the session. Without a proper assessment of these indirect impacts of climate change, firms might be lulled into a false sense of security regarding the magnitude of effect that would be seen due to following a more optimistic or pessimistic climate scenario in the future.

The actuarial community can support individual actuaries in taking account of climate change within their work by providing guidance for actuaries covering things such as the areas of actuarial practice within which climate risks are relevant and, of course, the pathways via which climate change could affect each of those areas. The materiality of those could still be considered by individual actuaries. But having a sort of checklist so that actuaries can be sure that they're not missing any important considerations related to climate risk would be useful.

There could also be a range of resources provided by the actuarial community so that actuaries looking into these areas of climate change can consult the appropriate resources when making those decisions about materiality and the impacts on the work that they're carrying out.

VITTORIO MAGATTI: Richard, Kez. I would like to thank you very much for participating.

RICHARD MARSHALL: Thank you very much. It's been a pleasure.

KEZIAH BASKERVILLE-MUSCUTT: Yes, thank you very much.

VITTORIO MAGATTI: And thank you for listening to this episode of the Thinking Insurance podcast. Join us again soon for another episode. Goodbye.

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