CLUB VITA

COVID-19 longevity scenarios:
a bump in the road or a catalyst for change?

This paper discusses how the lingering after-effects of the global COVID-19 pandemic could affect longevity. We introduce four longevity scenarios that pension funds can use to help understand the increased longevity risk introduced by the pandemic and to stress test their funding strategies. These scenarios, together with consideration of other risks such as sponsor covenant and investment risk, can help pension funds quantify and communicate the potential ramifications of the coronavirus pandemic as part of their risk management framework.

Introduction

JENNIFER HAID

COVID-19 changed our lives in ways none of us could have expected. While our communities are showing impressive resiliency despite protracted stress, death rates are well in excess of those reasonably expected at the beginning of 2020 and we find ourselves in a situation unprecedented in modern times.

Not everyone has been impacted by the pandemic in the same way. Within our local and global communities, COVID-19 has brought to centre stage inherent health inequalities. This diversity in experience is important to remember as we try to understand the world post-COVID. We at Club Vita are hopeful that our disparate experiences will act as a catalyst to drive change in the future of healthcare access and delivery.

The question we receive most often from pension fund trustees and sponsors is 'what does this mean for me?' We've applied our skills and expertise to try to help narrow the range of possibilities by constructing four scenarios. Each scenario allows for the uplifted mortality during 2020, makes an assumption about how this will continue into the short-to-medium term (including allowance for knock-on impacts such as delayed medical treatments or economic fall-out from the pandemic), and charts a path for outcomes in the longer-term. Given the disparate outcomes for different individuals, we also provide the tools to allow users to adapt these scenarios for their own pension funds. Further details on each scenario and the calculations presented in this paper can be found in the accompanying Technical Appendix.

We hope you find these scenarios useful as you plan for a post-COVID world. We'd love to speak with you if you have any questions or want to explore our research further, so please do get in touch if we can help.

Wishing you a safe and healthy 2021,

Jennifer Haid CFA FSA
CEO, Club Vita

So, what's the scenario?

Scenario analysis for a pension fund is the process of assessing the effects of hypothetical events on the fund's future financial position. It allows us to assess the financial impact of potential risks arising from a complex system of possibilities, where outcomes are highly dependent on the interactions between many events.

To develop our COVID-19 scenarios,

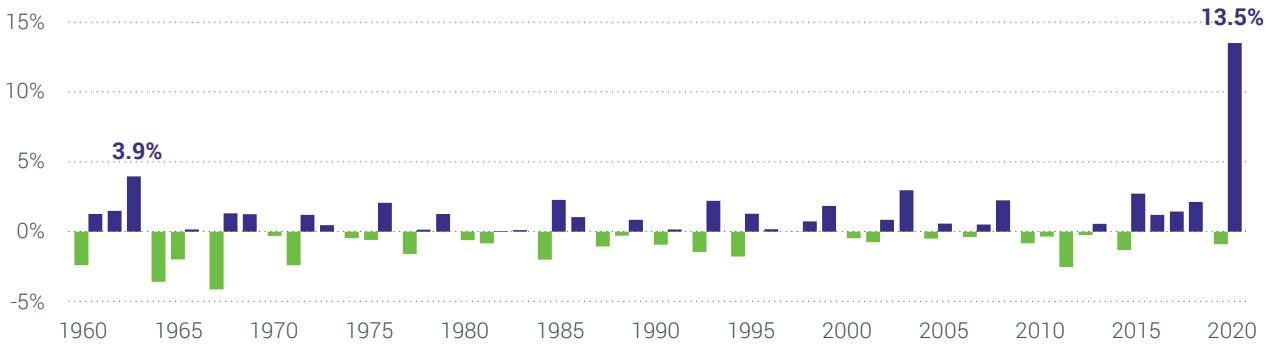
- we first create specific narratives around possible outcomes of the pandemic, considering events that will affect the severity of the pandemic and/or the longer-term outlook for longevity;
- we then analyse how the components of these scenarios will affect key drivers of mortality; and finally
- we calculate how the stresses of our key drivers will affect life spans of pension fund members and the resulting effect on a fund's cashflows and present value of liabilities.

Our aim when constructing these different scenarios is to capture a range of tangible and plausible examples of how the world may emerge. Analysing the development of your fund's finances under these different scenarios gives insights into the size and scope of the financial outcomes your fund is facing.

How unusual a year was 2020?

We see year-on-year volatility in the number of deaths as a result of things like the prevalence and timing of outbreaks of flu and different weather conditions. In the chart below we show how the number of deaths in England & Wales[1] has varied from year-to-year, in percentage terms, compared to the underlying trend[2].

ENGLAND & WALES: EXCESS DEATHS VERSUS UNDERLYING TREND

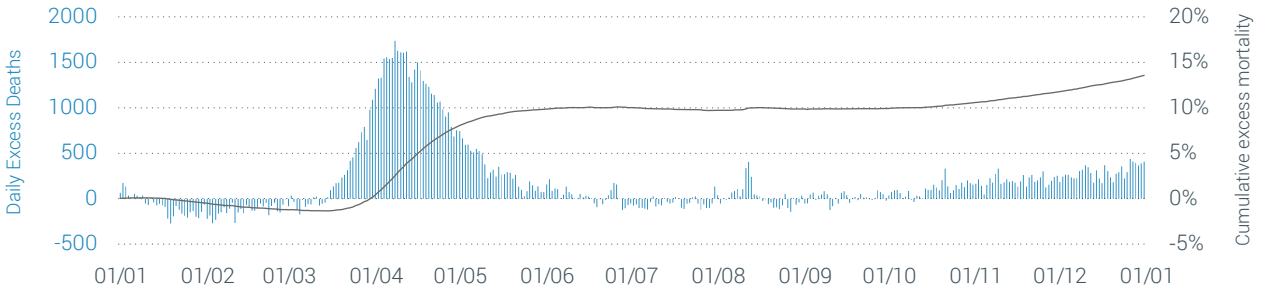


Source of data: own calculations based on data from the Human Mortality Database, ONS and Public Health England

The mortality rate in 2020 was around 13.5% higher than we would have expected at the start of the year, with similar levels of excess mortality in other parts of the United Kingdom. Even if we go back to the 1960s, 2020 is by far the biggest outlier in terms of excess deaths. The nearest comparison is 1963 when the number of deaths was around 4% higher than the underlying trend, caused by an influenza epidemic.

The chart below shows how excess deaths in 2020 varied throughout the year. You can clearly see the spike of deaths due to the initial outbreak in March-May. After a period of control in the autumn, the number of excess deaths again began to climb towards the end of the year, continuing into 2021.

DAILY EXCESS DEATHS DURING 2020 (PUBLIC HEALTH ENGLAND DATA)



Source: Public Health England and own calculations based on Public Health England data

2020 was an exceptional year and a tragic one for many families in our communities. However, when thinking about pension fund finances, the impact of 2020 in isolation on liabilities will be small. This is because we only expect a very small fraction of pension fund members to die each year, so even increasing this number by 10% or more leads to only a modest change to future cashflows. What is more important is the knock-on impact of COVID-19 on future improvements in life expectancy in 2021 and beyond.

[1] We would ideally present these results for the whole of the UK. Unfortunately, the data for each of the home nations becomes available at different times. The charts on this page use the widest data sets available at the time of printing.
[2] See the Technical Appendix for further details of how we calculated the underlying trend.

How will COVID-19 impact mortality in 2021 and beyond?

We have identified several key drivers that are likely to influence mortality rates in 2021 and beyond.

Immediate increase in deaths due to COVID-19

The latter part of 2020 saw good news in the development of several vaccines, but bad news in relation to a strong second wave of COVID infections as well as the emergence of new strains of the virus which appear to spread more easily.

This driver considers factors that include the efficacy of vaccines, take-up rates, improvements in treatments for COVID-19 and continued adherence to social distancing measures. It includes the risk of mutation leading to a faster spreading or more deadly virus as well as reduced effectiveness of vaccine programs.

Disruption to non-COVID-19 medical care

During 2020, healthcare systems have been severely strained, and many individuals have not received the treatment they would have prior to the pandemic. This driver considers how long this disruption could last and what its impact could be on mortality rates in the short-to-medium term.

Changes to health and care systems

The pandemic has highlighted shortcomings in our health and care systems and exposed the high level of health inequality in our societies. Could the pandemic act as a catalyst to improve the existing public health environment – for example with an increased focus on preventative measures and improving population health? In addition, the pandemic has driven innovation in the healthcare system and in vaccine technology. Could this innovation help drive change in the longer term?

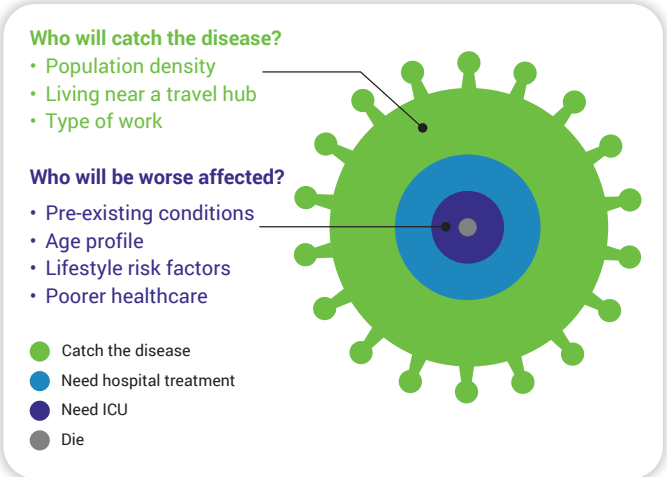
Global recession

On the other side of the coin, a long-lasting recession caused by the pandemic will limit the amount that governments, employers and individuals are able to spend on healthcare and on encouraging or making lifestyle changes which are associated with positive health outcomes. This driver captures the impact of a long-lasting economic downturn on the health of the population.

Variation by socioeconomic grouping

Different people have been affected by the pandemic in different ways. There is a range of factors that contribute to the risk of catching the disease, such as ability to work from home, population density or proximity to a local outbreak. There is another range of factors that affect how badly someone suffers once they catch the disease, such as pre-existing medical conditions, lifestyle risk factors and the level of healthcare available. Sadly, many of the factors contributing to a more severe impact of COVID-19 are most prevalent in the more disadvantaged sections of society. Inequalities are not unique to COVID-19, impacting outcomes from a whole range of diseases. Disadvantaged individuals will suffer most from cutbacks but *may* benefit most from public health initiatives arising from the pandemic.

We therefore also consider how each of our key drivers will vary by socioeconomic grouping.



Introducing our scenarios

Outcomes for our different key drivers will often be interconnected. For example, the successful development and deployment of an effective vaccine during 2021 should serve to reduce deaths from COVID-19, limit disruption to other services and constrain the economic damage caused by a long-lasting pandemic.

We have combined our drivers into four holistic scenarios, representing a range between optimistic and pessimistic outcomes in relation to longevity relative to pre-pandemic expectations[3].

BUMP IN THE ROAD

COVID-19 has a short and isolated effect and, after a marked increase in deaths due to the pandemic in 2020 and 2021, trends return to the pre-pandemic rate, although with a couple of "lost years" of longevity improvement that will never be recovered.

TYPICAL FUND **-0.9%** LIABILITIES | **-1** MONTH DURATION

INNOVATION IN ADVERSITY

We experience not only a swift recovery from the pandemic, but lessons learnt during the outbreak of COVID-19 act as a catalyst for longer term improvements in health and longevity, particularly for more deprived individuals who have been most impacted by the pandemic.

TYPICAL FUND **+2.1%** LIABILITIES | **+4** MONTHS DURATION

LONG ROAD TO RECOVERY

Challenges both to the efficacy and take up of the vaccine mean that society and the economy are left dealing with lingering effects of the pandemic for a prolonged period. The 2020s will be a decade of sluggish economic growth and low improvements in life expectancy.

TYPICAL FUND **-2.5%** LIABILITIES | **-3** MONTHS DURATION

HEALTHCARE DECLINE

The effectiveness of vaccine programmes is limited by emerging mutations and adverse publicity limiting the uptake. The second and subsequent waves prove more deadly than the first and mortality rates remain elevated for much of the 2020s, creating a prolonged economic recession. Healthcare enters a downward spiral as our systems struggle to provide regular care during the ongoing pandemic.

TYPICAL FUND **-5.3%** LIABILITIES | **-7** MONTHS DURATION

[3] Other intermediate and indeed more extreme outcomes are of course possible. The analysis in the coming pages shows impacts for 'typical' funds in terms of demographics, as well as for variations of these plans after shifting the assumed socioeconomic mix higher and lower. The impacts for the low and high socioeconomics funds provide insight into how the scenario varies based on socioeconomic level but these are not meant to imply that they capture the full range of socioeconomic mix among UK pension funds. Further details can be found in the technical appendix.

BUMP IN THE ROAD

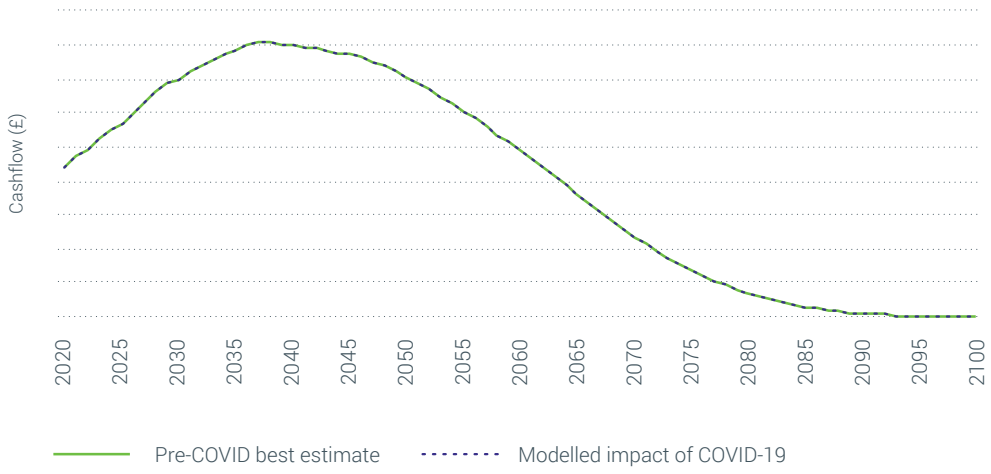
In this scenario, COVID-19 has a short and isolated effect. After a marked increase in deaths due to the pandemic in 2020 and 2021, we largely return to the pre-pandemic trajectory, although with a couple of "lost years" of longevity improvement that will never be recovered.

We assume that mortality is elevated in 2020 and 2021 (to a lesser degree) as a direct consequence of COVID-19. Following the successful rollout of the vaccine we return to the previous trend in longevity improvements from 2022 onwards, albeit with no "catch up" of lost ground (i.e., somewhat elevated mortality from 2022 onwards compared with pre-pandemic expectations).

SOCIOECONOMIC FUND TYPE	LIABILITY IMPACT	DURATION IMPACT
Low socioeconomic fund	**-1.0%**	**-1 month**
Typical fund	**-0.9%**	**-1 month**
High socioeconomic fund	**-0.8%**	**-1 month**

We note that this scenario incorporates the minimal possible set of events that we consider plausible in the future, so provides for a better comparator for assessing the impact of our other scenarios than the pre-2020 assumption.

MODELLED IMPACT OF COVID-19 ON ANNUAL CASHFLOWS OF A TYPICAL PENSION FUND
BUMP IN THE ROAD



INNOVATION IN ADVERSITY

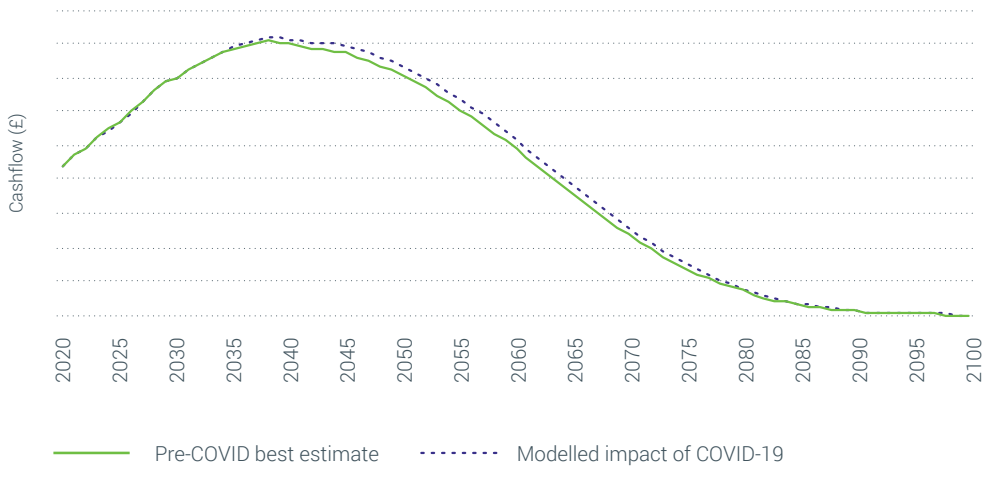
This scenario envisages not only a swift recovery from the pandemic, but also that lessons learnt during the outbreak of COVID-19 act as a catalyst for longer term improvements in health and longevity.

We assume that the roll-out of vaccines proves successful during 2021, and direct COVID-19 deaths will be much lower from 2022 onwards. This release in pressure, in combination with a focussed initiative on catching up on lost ground, means that disruption to non-COVID medical care is limited in impact beyond the first few years of this decade. This period of catch-up will be enabled by the emergence of a "V-shaped" economic recovery, with individual and public finances largely returning to pre-pandemic levels (albeit with large public finance deficits having accumulated during the pandemic).

SOCIOECONOMIC FUND TYPE	LIABILITY IMPACT	DURATION IMPACT
Low socioeconomic fund	+2.8%	+5 months
Typical fund	+2.1%	+4 months
High socioeconomic fund	+1.3%	+3 months

Once that lost ground has been recovered, the experience of the pandemic spurs on improvements in the way healthcare is delivered. In addition, intensive efforts will be made to reduce the level of health inequalities that the pandemic has exposed. These aftereffects will lead to a sustained period of above average longevity improvements during the mid-to-late 2020s and early 2030s. These improvements will be enjoyed across the population, but lower socioeconomic groups will benefit the most due to the concerted drive to reduce health inequalities.

MODELLED IMPACT OF COVID-19 ON ANNUAL CASHFLOWS OF A TYPICAL PENSION FUND
INNOVATION IN ADVERSITY



LONG ROAD TO RECOVERY

In this scenario we assume challenges both to the efficacy and take up of the vaccine mean that society and the economy are left dealing with lingering effects of the pandemic for a prolonged period.

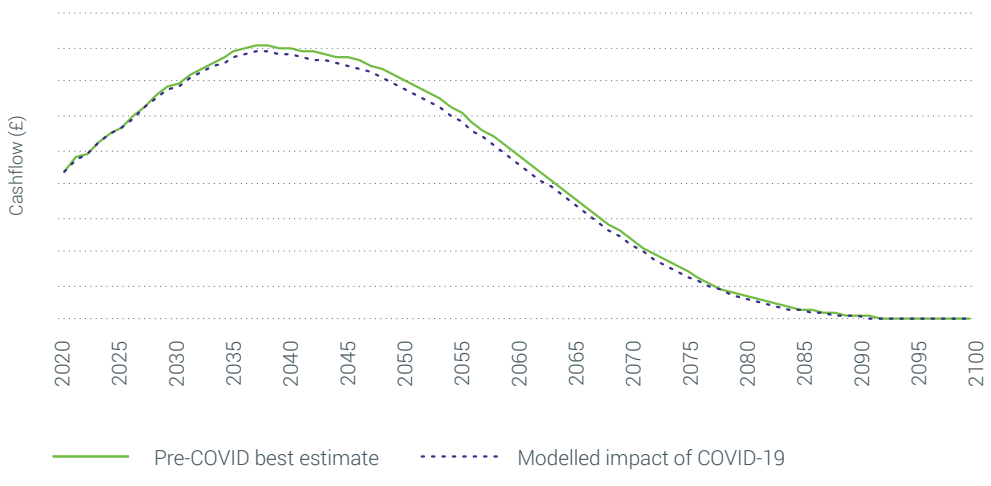
The 2010s have seen low levels of longevity improvement in many countries. Commentators have placed some of the blame for this slowdown on the lingering impact of the 2008 financial crisis. This could also explain the rise in health inequalities over the same period, with the less well-off feeling the effects of strained finances more severely. This scenario anticipates that we will continue to see very low levels of longevity improvements during the 2020s and into the early 2030s as economic growth continues to falter and governments and employers continue to tighten the purse strings.

SOCIOECONOMIC FUND TYPE	LIABILITY IMPACT	DURATION IMPACT
Low socioeconomic fund	**-3.1%**	**-3 months**
Typical fund	**-2.5%**	**-3 months**
High socioeconomic fund	**-1.9%**	**-2 months**

While reducing over time due to the emergence of effective vaccines, we will continue to see excess mortality driven by COVID-19 throughout the first half of this decade. Associated disruption to non-COVID medical care also continues to impact on mortality rates throughout the decade. However, by the end of the decade we will have largely caught up and have reached a new state of equilibrium.

Individuals in lower socioeconomic groups will suffer the brunt of these cutbacks, either directly through a change in their personal circumstances (for example losing their job) or through cutbacks in employer-provided or public healthcare.

MODELLED IMPACT OF COVID-19 ON ANNUAL CASHFLOWS OF A TYPICAL PENSION FUND
LONG ROAD TO RECOVERY



HEALTHCARE DECLINE

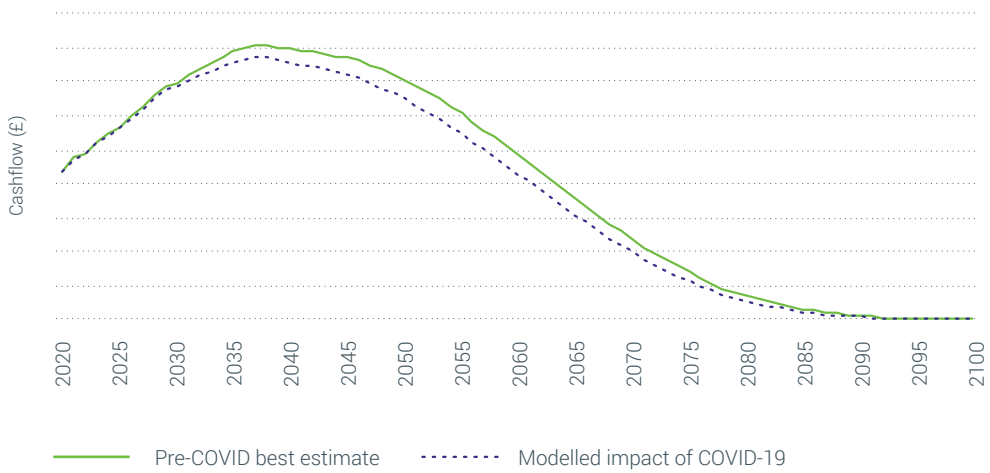
Initial optimism around vaccine programmes proves unfounded, with adverse publicity limiting uptake and emerging new mutations limiting effectiveness. We will continue to see persistent waves of high COVID-19 mortality throughout the coming decade. Early 2021 will see mortality rates in excess of those seen during the first wave as hospital capacities are breached. Healthcare provision continues to be overwhelmed by each wave, with ongoing massive disruptions to non-COVID-19 medical treatments and no periods of catch up possible.

As the backlog becomes untenable, deficits build and as the economy continues to suffer, existing preventative measures (cancer screening services, health checks to spot cardiovascular disease and diabetes) are scaled back or increasingly rationed. This leads to a rise in undiagnosed or untreated conditions and elevated mortality from cancers, heart disease and degenerative mental diseases over the coming decades.

SOCIOECONOMIC FUND TYPE	LIABILITY IMPACT	DURATION IMPACT
Low socioeconomic fund	**-6.2%**	**-8 months**
Typical fund	**-5.3%**	**-7 months**
High socioeconomic fund	**-4.5%**	**-6 months**

An increasing proportion of individuals will reach retirement in poor health, putting further strain on healthcare systems. Ultimately, COVID-19 will prove the catalyst which leads to high quality healthcare provision becoming increasingly a luxury item, leading to further growth in health inequality. Increases in life expectancy will stall or even go into reverse for some sections of the population.

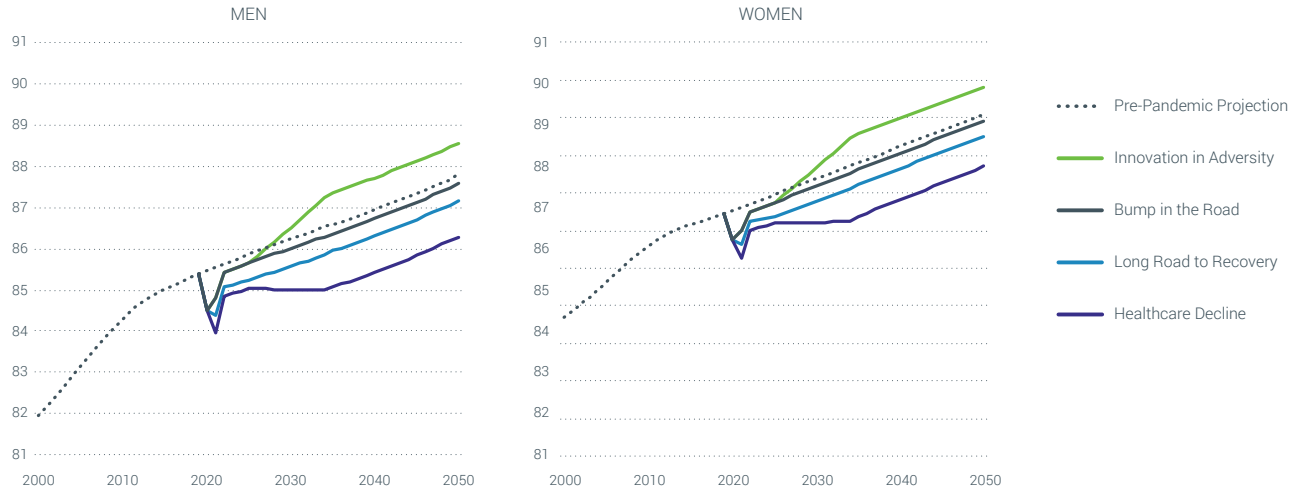
MODELLED IMPACT OF COVID-19 ON ANNUAL CASHFLOWS OF A TYPICAL PENSION FUND
HEALTHCARE DECLINE



Comparison of Scenarios

The graph below shows projected period life expectancy[4] from age 65 at each year into the future under each of our scenarios next to a typical assumption currently used by many pension funds.[5] We also show pre-2020 life expectancies smoothed in line with this typical assumption.

PERIOD LIFE EXPECTANCY FROM AGE 65

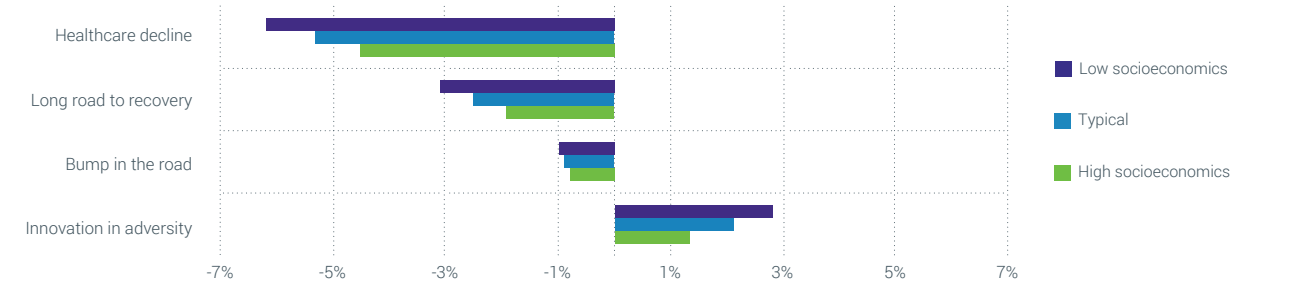


Period life expectancy is calculated for each year using the number of deaths occurring in that year. The extreme number of deaths experienced in 2020 and expected in 2021 mean that we see a sharp decline in period life expectancy in these years. None of our scenarios expect this level of excess deaths to continue past 2021, so period life expectancy would be expected to bounce back to some degree. This serves as a warning when constructing future life expectancy assumptions using data from 2020 and 2021.

Our most positive longevity scenario is our *Innovation in Adversity* scenario – with a significant gap in life expectancy opening up by 2035 compared to our *Healthcare Decline* scenario. Values are shown for a typical pension fund. For a more affluent mix of lives the gap between scenarios will be smaller because each of our scenarios is more extreme in impact for more deprived individuals. Conversely, the gap will be larger for a less affluent mix of lives.

For a typical fund, the liability impact ranges from around a 2% increase to a 5.5% reduction. This range increases to a 3% increase to a 6% decrease for a fund with a less affluent mix of lives. These impacts only consider longevity risk and will be compounded or offset by any related outcomes in financial markets.

LIABILITY IMPACTS



[4] Life expectancy is shown on a period basis i.e., prior to any allowance for future improvements. Please note that the projected life expectancy for individuals aged 65 will be higher when allowing for improvements; it is these projected (or "cohort") life expectancies that underpin the liability impacts shown in this paper.

[5] Our assumed typical assumption is based on the 2019 edition of the core CMI model with a long-term rate of 1.5% p.a and A parameter of around 0.4% (further details in the technical appendix).

Interaction with other risks

In this paper we have focussed on how the COVID-19 pandemic could affect the longevity of participants of defined benefit pension funds. However, when stress testing the funding strategies of your pension fund it is important to consider the holistic effects of a scenario on all risks to a fund. The events described in the scenarios in this paper will also have material effects on other fund risks, for example:

- **Funding bases:** any damage to the world economy is likely to affect investment returns, bond yields and rates of inflation, with knock-on effects for liability calculations.
- **Investments:** in addition to the jumps in asset prices seen early in 2020, investment returns may directly correlate to how well underlying businesses are affected by the pandemic.
- **Sponsor covenant:** some industries have been severely adversely affected by the pandemic, other industries less so and some have even benefited from the situation. The financial strength of government agencies will also be linked to tax receipts, that will be affected by the wider economy.

With so many variables still unknown, we cannot know for sure what the final impact of the COVID-19 pandemic will be, but with such an upheaval to everyday life as witnessed in 2020 and the start of 2021, we are likely to be talking about it for quite some time. We hope the scenarios we set out in this paper provide a helpful start to understanding the demographic risks introduced by the pandemic.

If you'd like to discuss COVID-19 longevity scenarios, or any wider aspect of longevity risk and the effects on your pension fund, please feel free to get in touch with Mark Sharkey at mark.sharkey@clubvita.net.

We wish everyone a safe and healthy 2021.

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Reliances and Limitations

In this research paper (the "Research"), Club Vita (UK) LLP ("CV") has provided to the UK pensions industry a discussion around some potential impacts of COVID-19, including the impacts on Defined Benefit pension funds and a number of illustrative scenarios for how life expectancy may evolve in the future. The scenarios are not intended to represent the complete range of possible outcomes for pension funds. They are intended to be used by pension funds considering stress testing their funding strategies, as well as facilitating wider discussions on potential impact of COVID-19. Further technical details of the calculations presented in this paper can be found in the accompanying Technical Appendix. The Research is based upon CV's understanding of legislation and events as of February 2021 and therefore may be subject to change. The Research is CV's high-level analysis of potential future scenarios and is not, nor is it intended to be, specific to the circumstances of any particular pension fund. The Research should not be construed as advice and therefore not be considered a substitute for specific advice in relation to individual circumstances and should not be relied upon. Where the subject of the Research refers to legal matters please note that CV is not qualified to give legal advice, therefore we recommend that you seek legal advice if you are wishing to address any of the legal matters discussed in this research. Please be advised that CV (or its respective licensors) does not accept liability for errors or omissions in the Research and CV (or its respective licensors) does not owe nor shall accept any duty, liability or responsibility in regards to the use of the Research, except where we have agreed to do so in writing. If you are seeking to use the information contained in this research sometime after it was produced, please be aware that the information may be out of date and therefore inaccurate. Please consult the Club Vita website for publication updates or contact enquiries@clubvita.net. This paper complies with the requirements of Technical Actuarial Standard 100, effective from 1 July 2017.

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