Pandemic impact on the insurance and pension industry

Introduction

The paper authored by John Dalmaris, Ashley Campbell, Aparna Batra and Naman Jain as part of the IFoA Covid-19 Action Taskforce summarises the impact of the recent pandemic caused by Covid-19 in the insurance and pension industry with respect to key demographic, economic, underwriting and operational components.

According to the ABI "the Covid-19 outbreak is unprecedented in modern times and has been a significant challenge to the UK economy and the insurance industry".[1]

What is a pandemic

According to the **Centres for Disease Control and Prevention** (CDC), a pandemic is the sudden outbreak of an infectious disease "spread over several countries or continents, affecting many people".[2] Pandemics have the potential to affect all industries and could potentially affect insurers' operations and various lines of business across all insurance sectors. Pandemics can also disrupt financial markets, potentially impacting insurers' investments. However, unlike losses from weather-related catastrophes, losses from pandemics do not come from destruction of physical structures.[2]

Life Insurance

Life insurance is a long-term business and therefore a number of assumptions is required. The life company must make assumptions about future mortality and morbidity, withdrawal and expense experience. It should also consider investment returns new business volumes and cross-subsidies. Furthermore, it should anticipate the effect any future management actions will have on the demographic and economic experience.

Many, if not most, of the assumptions critical to the valuation and pricing of insurance products will be stressed under a severe systemic event such a pandemic.

In the life insurance sector it is estimated that on a $180tr global sum assured amount the losses due to Covid-19 will be around $54bn.[3] This is translated roughly to a 1 in 20 year loss event (before diversification). Hence, the impact of this pandemic is not something that the industry is not prepared for or not able to handle.

Mortality rates

Tabulation of summary statistic from the general population before and during Covid-19 is shown below[5]. These are case fatality rates and can vary country by country significantly depending on the level of health care, the number of tests performed, the demographic, the cultural profile (e.g. level of use of nursing homes, big outdoor gatherings etc).

		Excluding Covid-19 impact	Covid-19 impact only	Covid-19 impact only

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[1] https://www.abi.org.uk/globalassets/files/publications/public/covid-19/helpingcustomerscitizensandcharities.pdf
[2] https://content.naic.org/cipr_topics/topic_pandemics.htm
[3] IFoA Webinar: Extreme Mortality Events – How Bad is Coronavirus?

Geography	Population (in m)	Deaths per 100K population (all causes)	Deaths per 100K population[4] (up to 30th Aug 2020)	Deaths per 100K population[5] (up to 1st Dec 2020)
Global	7,800	700	10.8[6]	17.6[6]
UK	66.4[7]	941[8]	62.5	87.7
Sweden	10.2[9]	914[10]	57.1	65.3
France	66.9[11]	962[12]	45.7	78.7
USA	327.2[13]	888[14]	55.9	81.5
Greece	10.7[15]	1,103[16]	2.4	22.4
India	1,354.1[17]	731[18]	4.7	10.1
Iran	83.2[19]	485[20]	26.1	58.2

Table 1: Cumulative deaths per 100K excluding Covid-19 and due to Covid-19 alone

Given that the Solvency II pandemic scenario is an excess death ratio of 1.5 per 1,000 (or 150 per 100,000) the impact from Covid-19 is much lower than a 1 in 200 event.

Mortality rates are key assumptions for life insurance and as we can see from the non-Covid-19 and Covid-19 relates mortality rates, the current pandemic seems contained and has not exploded to levels not within the risk appetite of the industry.

The mortality rates are dependant on[5]
-   Age – 6% to 8% per year increase at middle ages
-   Sex – 40% lower for females
-   Smoker – double for smokers (affecting respiratory diseases)
-   General health (obesity, diabetes, etc) – can give variance of 1,000% in mortality rates
-   Socio-economic level – 100% increase in mortality rates as in general wealthier populations have lower mortality rates but there are also diseases associated with higher socio-economic income
-   Cohorts – Annual mortality of improvement of 1-5%
-   Access to healthcare

[4] https://coronavirus.jhu.edu/data/mortality

[5] https://coronavirus.jhu.edu/data/mortality

[6] https://github.com/owid/covid-19-data/tree/master/public/data

[7] https://data.oecd.org/united-kingdom.htm

[8] https://www.macrotrends.net/countries/GBR/united-kingdom/death-rate

[9] https://data.oecd.org/sweden.htm

[10] https://www.macrotrends.net/countries/SWE/sweden/death-rate

[11] https://data.oecd.org/france.htm

[12] https://www.macrotrends.net/countries/SWE/france/death-rate

[13] https://data.oecd.org/united-states.htm

[14] https://www.macrotrends.net/countries/USA/united-states/death-rate

[15] https://data.oecd.org/greece.htm

[16] https://www.macrotrends.net/countries/greece/greece/death-rate

[17] https://data.oecd.org/india.htm

[18] https://www.macrotrends.net/countries/greece/india/death-rate

[19] https://en.wikipedia.org/wiki/Iran

[20] https://www.macrotrends.net/countries/SWE/iran/death-rate

The above dependencies suggest that mortality rates vary between different sub-population groups and therefore companies will be affected differently depending on their mix of business and their exposure to various socio-economic groups.

Risk factors that accentuate Covid-19 impact

Covid-19 seem to pose double the risk of death to males than females despite both genders having similar risk exposure.[21] Also, the risk of death from Covid-19 increases with age (older are more vulnerable).[22] From a pathological perspective, Covid-19 is affecting small vessels that could lead to multiple organ failure (with different time scale). A common failure is of the lungs, kidney and heart (arrythmias[23]).

From data of hospitalised patients, hypertension has been shown to be the most common comorbidity followed by obesity (BMI$\geq$30, diabetes, morbid obesity (BMI$\geq$35), coronary artery disease and asthma. From cases hospitalised for Covid-19, hypertension and diabetes were the most prevalent comorbidities.[24,25,26]

Smoking was shown to have a mild beneficial effect compared to non smoker Covid-19 infected people despite the fact that smoking is a material mortality risk factor.[27, 28, 29, 30] However, a WHO review found that "that smokers are more likely to develop severe disease from COVID-19 than non-smokers, and in hospitalised patients with COVID-19, smoking was also associated with increased severity of illness and death.[31]

Obesity is also reported as being a major risk factor for dying of Covid-19.[32] "Obesity is a disease[33] characterized by the accumulation of body fat, which leads to greater susceptibility to cardiovascular diseases, hypertension, type 2 diabetes, respiratory problems, fatty liver, airway disease, depression, and some types of cancer".[34] Respiratory failure and chronic inflammation can lead to rapidly escalating health issues when triggered by viral infections like Covid-19.

Covid-19 and accelerated deaths on people with certain comorbidities[35]

People with underlying health issues that are key risk factors from dying of Covid-19 (but not infected by Covid-19, would be expected to survive for a considerable time period, as shown in Table 2.

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[21] https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)31748-7/fulltext

[22] https://www.nature.com/articles/d41586-020-02483-2

[23] When the heart beats too fast, too slow, or with irregular rhythm

[25] https://health.economictimes.indiatimes.com/news/industry/hypertension-most-common-comorbidity-among-covid-patients-aiims-doctor/78161926

[26] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7314621/

[27] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7236870/#CR12

[28] https://pubmed.ncbi.nlm.nih.gov/32385628/

[29] https://pubmed.ncbi.nlm.nih.gov/31725711/

[30] https://doi.org/10.1101/2020.04.08.20057794

[31] https://www.publichealth.hscni.net/node/5284

[32] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7346803/

[33] Obesity is a complex disease according to the Mayo Clinic

[34] https://www.tandfonline.com/doi/full/10.1080/10408398.2020.1775546

[35] Challenging Conventional Wisdom – What Currently Accepted 'Truths' About COVID-19 Are Wrong?, IFoA , Life Insurance 2020

Age	Type II Diabetes	COPD[36]	Heart Disease
50	>15	>15	>15
60	10-15	>15	>15
70	5-10	10-15	10-15
80	3-5	5-10	5-10
90	1-3	1-3	5-10

Table 2: Life expectancy of people with certain underlying health conditions but Covid-19 free

The impact on life insurers is that if the assumption of accelerated deaths was becoming a working assumption the risk of cash flow problem could be more material as the expected deaths are not just deaths that would normally have happened in the next two years but brought forward but rather new deaths that would have provided cash flow for a considerable time had Covid-19 (or any other pandemic) not happened.

Meta-analysis has shown that the Covid-19 infection fatality rate (IFR) is 0.68%[37] (0.53%-0.82%). Due to age, potential underlying comorbidities, demographics and issues with mortality recordings these rates may vary widely between countries. A recent U.K. study found that mortality outcomes are strongly linked to specific comorbidities such as diabetes and obesity but did not resolve the question of whether those links reflect differences in prevalence or causal effects on IFR.

The age-specific fatality rates for Covid-19 infections are shown in Table 3.[38] The data used are based on meta-analysis from countries in advanced economies. Factors other than age have not been considered in this meta-analysis.

Age Group	Covid-19 IFR	95% CI
0 to 34	0.004%	0.003%-0.005%
35 to 44	0.064%	0.055%-0.075%
45 to 44	0.21%	0.18%-0.24%
55 to 64	0.7%	0.61%-0.81%
65 to 74	2.3%	1.9%-2.7%
75 to 84	7.6%	6.1%-9.5%
85+	22.3%	17.2%-29.1%

Table 3: Age-specific Covid-19 fatality rates

A study comparing the population fatality risks in terms of normal risks showed that for those over 55 who are infected with Covid-19, the additional risk of dying is slightly more than the "normal" risk of death from all other causes over one year, and less for under 55s.[39]

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[36] Chronic obstructive pulmonary disease
[37] https://www.medrxiv.org/content/10.1101/2020.05.03.20089854v4.full.pdf
[38] https://www.nber.org/system/files/working_papers/w27597/w27597.pdf
[39] https://www.bmj.com/content/370/bmj.m3259

Latest UK Mortality rate update

The graphs below show that whilst the Covid-19 cases increase (probably due to conducting a higher number of tests) the number of Covid-19 related deaths is decreasing (latest update of the figures was on 1st December 2020)[40]. On 27th November it was reported that the average number each person with coronavirus infects has falls to around for the first time since mid-August, which should have a marked impact on the cumulative number of Covid-19 cases in the graph below from December.[41]
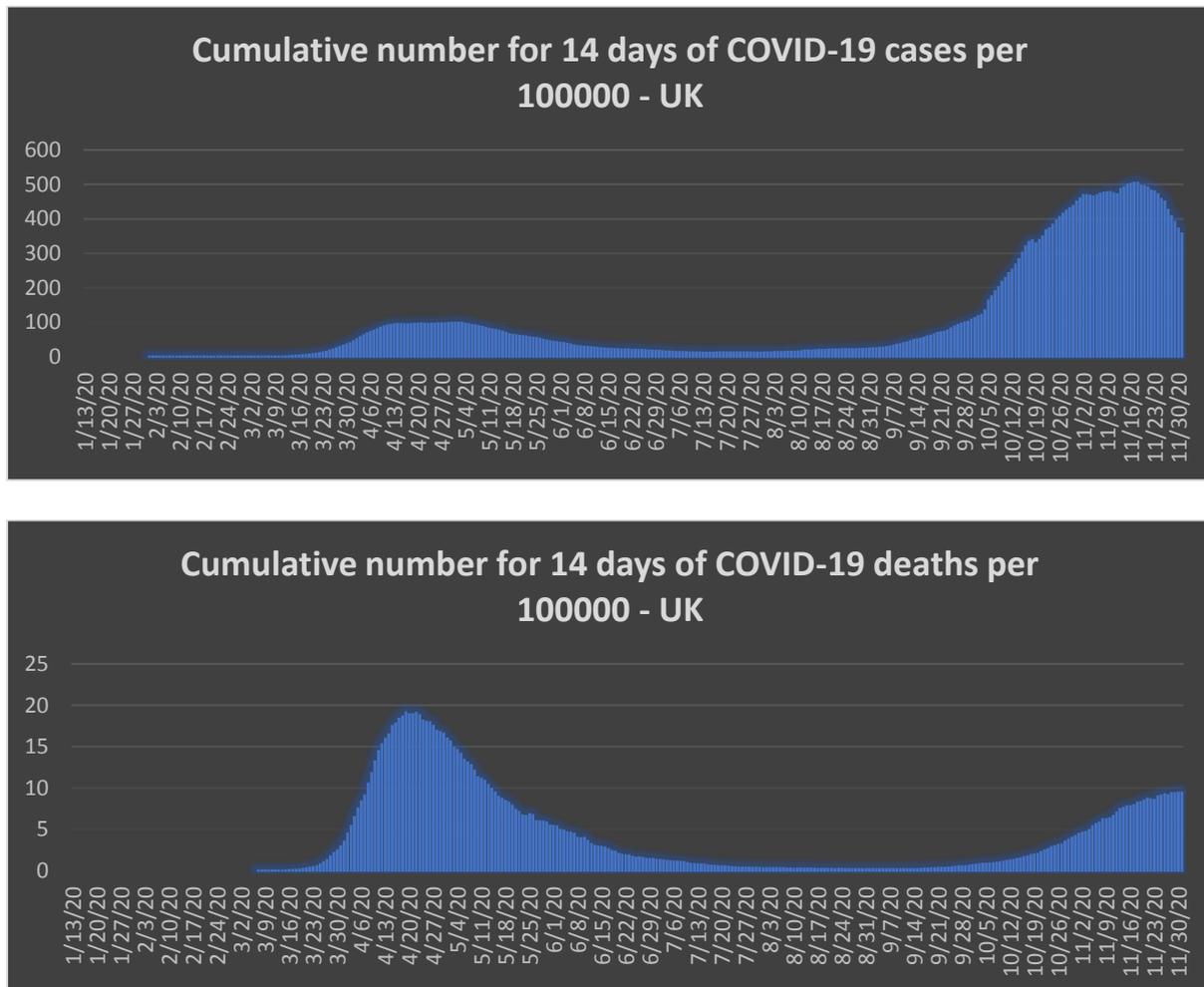

Figure 1: 14-day truncated cumulative incidence of COVID-19 cases and deaths per 100 000 population in the UK

Covid-19 and Economy

The financial losses for a life insurer as a result of a pandemic are inextricably linked to the macroeconomics of the event due to the high asset leverage on most life insurer balance sheets[42]. Mechanisms which economic loss can be broken down into 3 key components[43]:

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[40] https://www.ecdc.europa.eu/en/publications-data/download-todays-data-geographic-distribution-covid-19-cases-worldwide
[41] http://e/institute-of-global-health-innovation/imperial_react1_r7_interim.pdf?utm_medium=email&utm_source=CampaignMonitor_Editorial&utm_campaign=LNCH%20%2020201130%20%20House%20Ads%20%20SM+CID_c4077aaead9c7bf93ffd7b7634c72255
[42] https://www.spglobal.com/ratings/en/research/articles/200326-assessing-the-top-risks-covid-19-poses-to-north-american-life-insurers-11404668
[43] Carlsson-Szlezak, Philipp, Reeves, M., & Swartz, P. (2020, March 27). Understanding the Economic Shock of Coronavirus. *Harvard Business Review*. https://hbr.org/2020/03/understanding-the-economic-shock-of-coronavirus

- **Demand (Direct):** Direct hit to consumer confidence resulting in a reduction in consumption of goods & services, increased saving and general pessimism about longer term
- **Demand (Indirect)**: Financial Markets fall, resulting in a reduction in household wealth and this results in a knock on effect on consumption
- **Supply**: Supply chains disruption, reduction in labour demand leading to increased and potentially prolonged unemployment

The UK economy has had its first recession for the first time since 2009, with the worst contraction on record of 20.4 per cent between April and June, figures from the ONS revealed.[44]

Life Insurers are significant holders of equity and debt assets making them particularly vulnerable to equity falls, zero bound interest rates and corporate bond downgrades & defaults. To date, financial losses sustained due to equity drops and contraction of interest rates will have somewhat been dampened by increased credit spreads. Economic recovery can take the form of either a V, U or L shaped recovery, see
Figure *2*. The V-shaped recovery describes a displacement of output, but growth eventually rebounds. In this scenario, annual growth rates could fully absorb the shock. Historically we have seen a V shaped recovery from pandemic and epidemic outbreaks (1918, 1958, 1968, 2002). However, the measures implemented by countries to supress the spread of COVID-19 are unprecedented and therefore the fallouts such as sustained unemployment could inhibit a similar economic recovery. The U-shaped recovery represents a shock that persists, and while the initial growth path is resumed, there is permanent loss of output. Finally, the L-shaped recovery represents Covid-19's ability to do significant structural damage. [45]
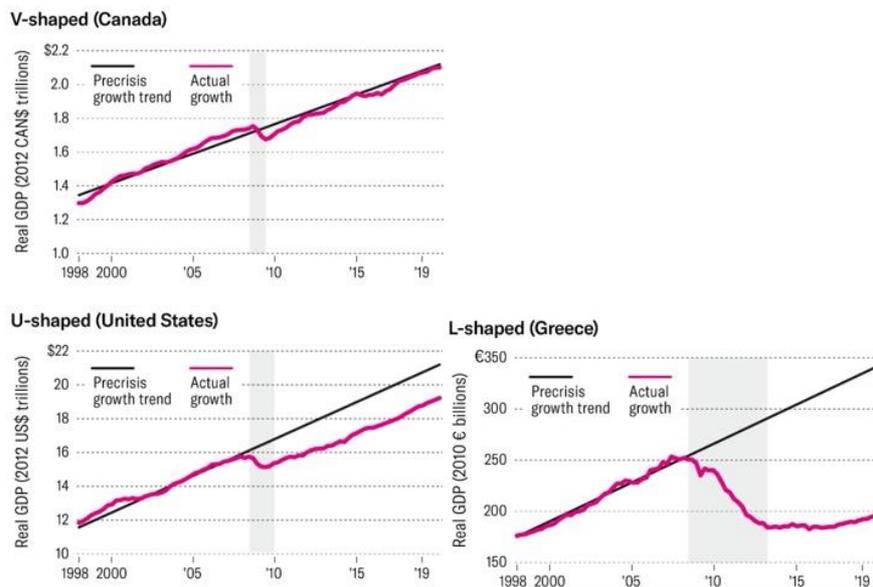

Figure 2: Shapes of Economic Recovery post financial crisis

Similar to that of the last financial crisis, the shape of recovery is unlikely to be country-agnostic, especially given the wide-ranging levels of stringency in each countries' public health response.

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[44] The Spectator, 12th August 2020

[45] Carlsson-Szlezak, Phillip, Reeves, M., & Swartz, P. (2020, March). What Coronavirus Could Mean for the Global Economy. https://hbr.org/2020/03/what-coronavirus-could-mean-for-the-global-economy

Underwriting and operational impacts

Below we discuss the underwriting and operational impact on life insurance companies due to pandemic.

Underwriting

With COVID-19 pandemic, Life Insurers need to made changes to underwriting processes by shifting to online platform.[46] Insurers are struggling to obtain medical exams or medical history and lab reports in the current environment. In the United States, some insurers are waiving medical exam requirements or postponing exams. The use of reports provided by current physician/medical facility and phone or face-time screenings are alternative sources for underwriting information to process applications. Several insurers have also changed the application forms by adding screenings for COVID-19, questions on travel history and close contact with known COVID-19 persons on their applications.[47]

In Life insurance industry, insurers have shown lot of flexibility. For example, some of them have moved much more rapidly on the electronic medical-record side or increases the face amount that they are willing to underwrite using available data, for example prescription drug history, instead of the medical exam. Options such as a self-testing kit— where consumers could do their own blood testing—are being considered. The implemented changes may stay longer post COVID-19 as well.[48]

Due to social distancing and government restrictions insurers are unable to complete applications and underwriting. They are considering changes to the policy application, binding process and waiting periods. They need to move to accelerated underwriting and electronic health records-based programmes and to increase elasticity of their sales and underwriting operations.[49] In addition to executing accelerated underwriting, insurers also are taking a new look at risk, for example changes to retention limits. "So if an applicant wants to take out a $3 million policy, for example, the insurer might say they only afford to cover, say $2.5 million and reinsure the remaining $500,000."[50] Reinsurers are also reviewing the risk they can take and the cost of it, which might impact the decisions taken by the insurers.

Some companies are postponing applications for a waiting period (generally 30 days) for people, who have travelled internationally, hence they may not qualify for term life coverage immediately. As the COVID-19 spread around the world, international travel has

[46] https://www.businessinsider.com/personal-finance/life-insurance-changes-coronavirus-affect-international-travelers-seniors-2020-6

[47] https://www.soa.org/globalassets/assets/files/resources/research-report/2020/2020-covid-19-research-brief-04-16.pdf

[48] https://www.mckinsey.com/industries/financial-services/our-insights/us-insurance-market-trends-during-the-pandemic

[49] https://www2.deloitte.com/us/en/pages/financial-services/articles/covid-19-impact-to-life-insurance-and-annuity-companies.html#:~:text=While%20the%20social%20and%20medical,and%20implied%20volatilities%20have%20increased.

[50] https://insurancenewsnet.com/innarticle/underwriting-among-early-effects-of-covid-19-on-life-insurance#

[51] https://www.whitehouse.gov/wp-content/uploads/2020/08/Evaluating-the-Effects-of-the-Economic-Response-to-COVID-19.pdf

[52] https://www.bls.gov/news.release/pdf/empsit.pdf

become a health risk for the insurers. The impacts of the COVID-19 on older population have made it harder for insurers to issue new policies to people over age 70.[46]

Unemployment

Due to increasing unemployment, potential loss of income and general market volatility, the appetite for purchasing new life insurance and annuity products may decline.[49]
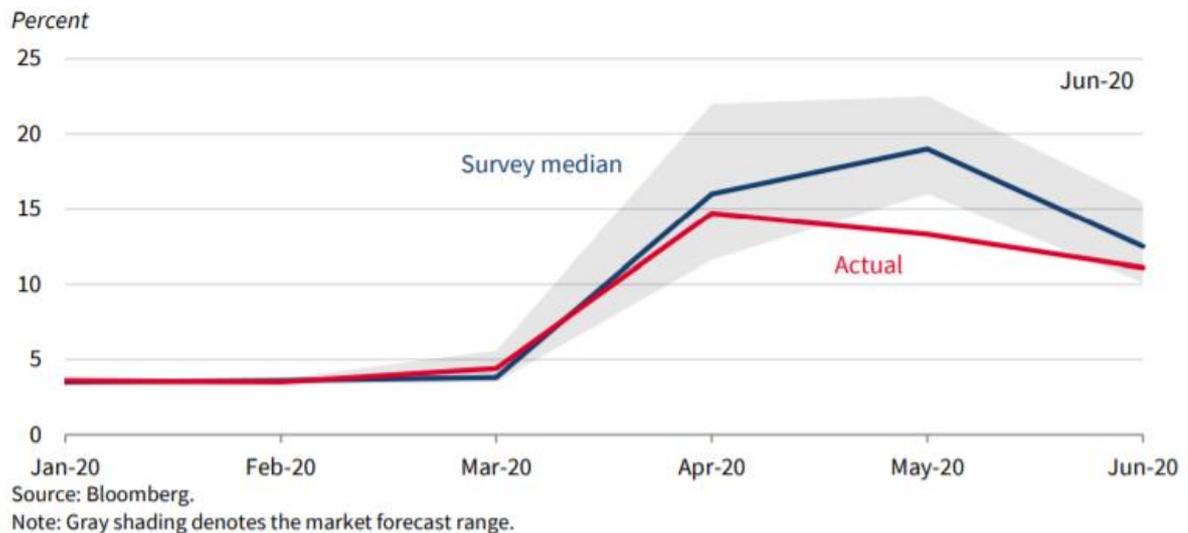

Source: Bloomberg.
Note: Gray shading denotes the market forecast range.

Figure 3: Market Forecast for the Unemployment rate, 2020 in the United States[51]

Due to lockdown measures in the United States, unemployment continued to rise as expected by forecasters. Evidence of a labour market collapse was shown on March's jobs report after which forecasters quickly revised their expectations upward to the levels which was not seen since the Great Depression. As shown in above figure, after the unemployment rate rose to 14.7 percent in April, some economists were expecting unemployment rates to increase above 20 percent in May. The market consensus forecast for May's unemployment rate was 19.0 percent, with the most optimistic forecasters still projecting 16.0 percent unemployment. However, as the economy reopened and businesses recalled workers, May's unemployment rate declined to an unexpected 13.3. Pay check Protection Program (PPP), have helped stabilize labour markets and facilitated recovery by allowing firms to retain workers and to rehire them as conditions improve. The research by Autor et al. (2020) using administrative payroll data shows that the PPP saved between 1.4 and 3.2 million jobs through just the first week of June. However, because PPP has also helped in decreasing business closures, the total employment effect is likely to be considerably larger over time as those recovered businesses re-hire furloughed workers. In total, S&P U.S. Chief Economist Beth Ann Bovino estimates that PPP could have saved upwards of 13.6 million jobs.[51]

Figure 4: Unemployment rate, seasonally adjusted,
October 2018 - October 2020
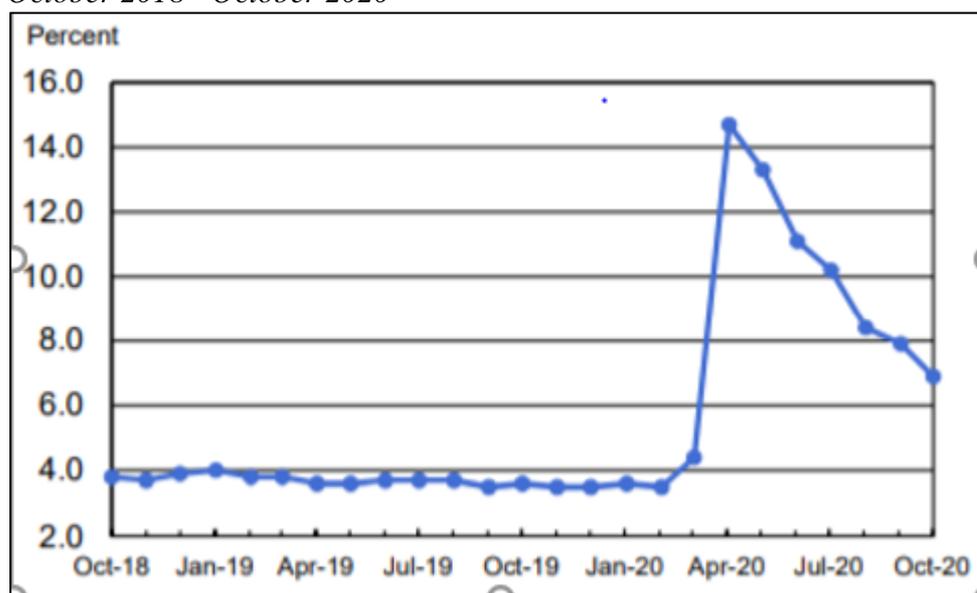
Before the COVID-19 shutdown, the unemployment rate was below 4 percent, after reaching a peak of 14.7 percent in April 2020, the unemployment rate declined to 6.9 percent as of October 2020. This improvement reflects the continued resumption of economic activity that has been reduced earlier due to COVID-19.[52]

Premium Payment Grace Period

Regulators in different countries (India, Singapore, Australia, Ireland, Japan and number of US States) are encouraging insurance companies to extend the grace period on premium payments. In some jurisdictions (such as in Italy), insurers are suspending, extending and/or deferring premiums payments for life insurance policies and are suspending all efforts to recover unpaid premiums and deductibles. In other jurisdictions (as in Canada, United States, Germany, New Zealand, Switzerland), flexible payment terms are provided by insurers on a case-by-case basis[53]. For example, California has requested that all insurance companies provide a minimum 60-day grace period for policyholder to pay premiums before the policy is cancelled for the non-payment of premium.[47]
If individuals are unable or choose not to pay premiums to keep their policies active, then the insurer might experience lapses.[49]

Extending Policyholder loans[53]

Some insurance supervisors are encouraging term extensions for loans provided to life insurance policyholders (e.g. China, Israel, Chinese Taipei). In Japan, life insurers have lowered interest rates on first-time policy loans and are providing forbearance in case of non-payment of interest or principle. In South Korea, life insurers will lower interest rates on policy loans in an effort to provide support to policyholders.

Virtual Workforce[49]

Mostly operations shifted virtually due to social distancing guidelines. Insurance and other Companies need to access the operating effectiveness of their controls. This movement

initially created business continuity challenges for companies as both employers and employees are adjusting to the new workspace environment.

Actuaries require significant computing power and capacity for handling large data sets and models, and handling this remotely adds a layer of complexity in terms of system access and processing time.

Over a longer time horizon, the shift to a virtual workforce might present an opportunity for companies to speed up future-of-work initiatives. Companies are gaining real-time experience in relation to flexible staffing models and remote capabilities. The COVID-19 crisis has provided evidence that increased flexibility can be effective.

Cybersecurity[54]

Companies needs to strengthen their cyber protections because of higher risk of cyber-attacks while working remotely. The remote access management policy and procedures should be stronger than previously implemented. They should also conduct phishing exercise to identify gaps in the process.

Managing Stress and Office Environment[54]

Considering the current situation, employees may struggle to adapt, face stress because of disruption to income, quarantines, or illness among family of neighbours. Some workers may become less engaged or abandon their work responsibilities, reducing productivity and quality, and harming customer experience.

Companies should communicate clearly with employees regarding future steps to reduce stress (for example allowing for flexible time off and paid leaves). They need to take care of the morale of the employees.

Pensions

The outbreak of the COVID 19 pandemic, the associated lockdowns and the related economic downturn are impacting retirement savings, retirement savings schemes, providers, regulators and supervisors, potentially leading to future lower incomes in retirement.

Research published by Willis Towers Watson suggested that a 4% increase in deaths in 2020 circa 25k deaths in UK would reduce the average pension scheme's liabilities by 0.1%[55]. The longer term impacts on mortality such as whether there will be a second wave, whether a vaccine is found, and secondary effects for example of cancer patient treatments being on the back foot are still early days and much harder to quantify.

The more obvious impacts for DB pensions have been in the financial market and the strengths of their employers. Most pension schemes invest in a range of assets depending on the maturity of their schemes. To the extent for example that a scheme is invested in equities, they will be directly hit by stock market falls. In US, the S&P 500 index started 2020 well over 3,200, and closed as high as 3,386 on February 19. Subsequently, in less than five weeks, it lost over a third of its value, dropping to 2,237 on March 23. Although pensions are long term investments and there may be time for the assets to recover, the length of and market depressions and the volatility of markets will feed directly through to their assets. It is worth investigations into the effect on the financial market of various scenarios and their resulting

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[55] https://www.willistowerswatson.com/en-GB/Insights/2020/04/what-could-the-mortality-impact-of-covid-19-be-for-pension-scheme-liabilities

effect on funding levels. It was reported in the FT that the average pension fund fell by 15% in Q1 2020.[56]

DB pension funds are usually supported by a combination of the assets held and the contributions paid by their sponsoring employer. Any impact on these sponsoring employers of COVID e.g. inability to trade during lockdown will put a strain on the cashflow of the employer and may result in contributions not being paid. The recent turmoil for businesses and pension plans from the COVID-19 pandemic has placed strain on the funding system. Government of different countries have introduced funding reliefs for Defined benefit pension plans. The CARES Act permits U.S. single employer pension plans to defer contributions due in 2020 to January 1, 2021. This is welcome liquidity relief for many organizations. In Canada, the federal government has announced that it will provide funding relief to federally regulated defined benefit pension plans in the form of a moratorium, through the remainder of 2020, on solvency payment requirements. The government will also be looking at 2021 funding relief options for federally regulated defined benefit plans.[57]

Conclusions

The mortality risk from the pandemic seems to have been largely managed in such a way that it does not pose an unmanageable insurance risk at this stage. On the contrary, the economic uncertainty is a bigger risk. Fear of high unemployment, inflationary pressure, negative real yields, low nominal yields and increase in corporate spreads could create a perfect storm and push many economies to depression. Central banks around the world (notably the Federal reserve, Bank of England and European Central Bank) have increased their balance sheet at levels not seeing even during the 2008 financial crisis. Around 60% of the total financial response to the Covid-19 crisis came from monetary stimulus.[58] This has kept interest rates low (which adds pressure to the insurance sector) and also delayed the widening of spreads despite the increase in defaults. Governments are providing fiscal stimulus in the form of tax reduction (e.g. VAT reduction on certain products, raising the threshold for stamp duty etc.) and increase in public spending (e.g. subsidising companies who create new jobs, bringing forward infrastructure spending etc.).

Next steps

The growing population of data on a local, national and international level with respect to cases and case fatality rates can be utilised to create scenarios of the impact we should expect on a typical insurer.

The Covid-19 fatalities can be grouped by age, underlying health issues and socio-economic background. This can be contrasted with similarly clustered data of a typical insurer offering protection coverage. That way an adjustment factor could be derived that could make the population observed Covid-19 case fatality rates more reflective of the typical insurer population. Subsequently, either by using observable data or modelled data, various scenarios (weak, best estimate, severe etc) with respect to population Covid-19 fatality rates can be produced, which in turn could be translated into a typical insurer Covid-19

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[56] https://www.ftadviser.com/pensions/2020/04/30/pension-funds-suffer-record-losses-as-covid-19-hits/
[57] https://www.soa.org/globalassets/assets/files/resources/research-report/2020/defined-benefit-covid-19-challenges.pdf
[58] https://www.bls.gov/news.release/pdf/empsit.pdf

fatality rate. This could be used to scale the standard pandemic stress scenario (in Solvency II this is an excess death ratio of 1.5 per 1,000).