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Scenario Modelling of COVID-19

Analysis of Key Classes in P&C Industry

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Scenario Modelling of COVID-19: Analysis of Key Classes in P&C Industry

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Abstract

COVID-19 along with the subsequent volatility in market conditions have undeniably been affecting insurers around the world. Sometimes events are very difficult to predict, and past trends are not always a good guide to the future. For example, although investigations of historical pandemics provide an insight into possible future scenarios, a simple extrapolation of can be highly misleading. This paper gives guidance on stress testing and scenario analysis and aims to offer a perspective on the forecast of some key classes of business for general insurers. This would allow the analysis of the impact of severe events or sequence of events on the financial state of short-term insurers.

Keywords

COVID-19, pandemics, general insurers, stress testing and scenario analysis.

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1. Introduction

The global socio-economic shocks from the COVID-19 pandemic are still being felt around the world. As the pandemic continues to spread, economies across the globe have been negatively impacted. COVID-19 has impacted and will continue to impact the insurance industry due to reduced returns from the markets, fall in premium and an increase in insurance claims in some classes of insurance business. As such, insurers need to evaluate the financial impact on both sides of its balance sheet.

An understanding of the insurer's operations and its own organisational structure is primordial to assessing the materiality of each risk and the likely financial impact. Along with underwriting risks, insurers are also exposed to many other financial risks and non-financial risks as well. The diagram below shows a schema of key risks that insurers are faced with:

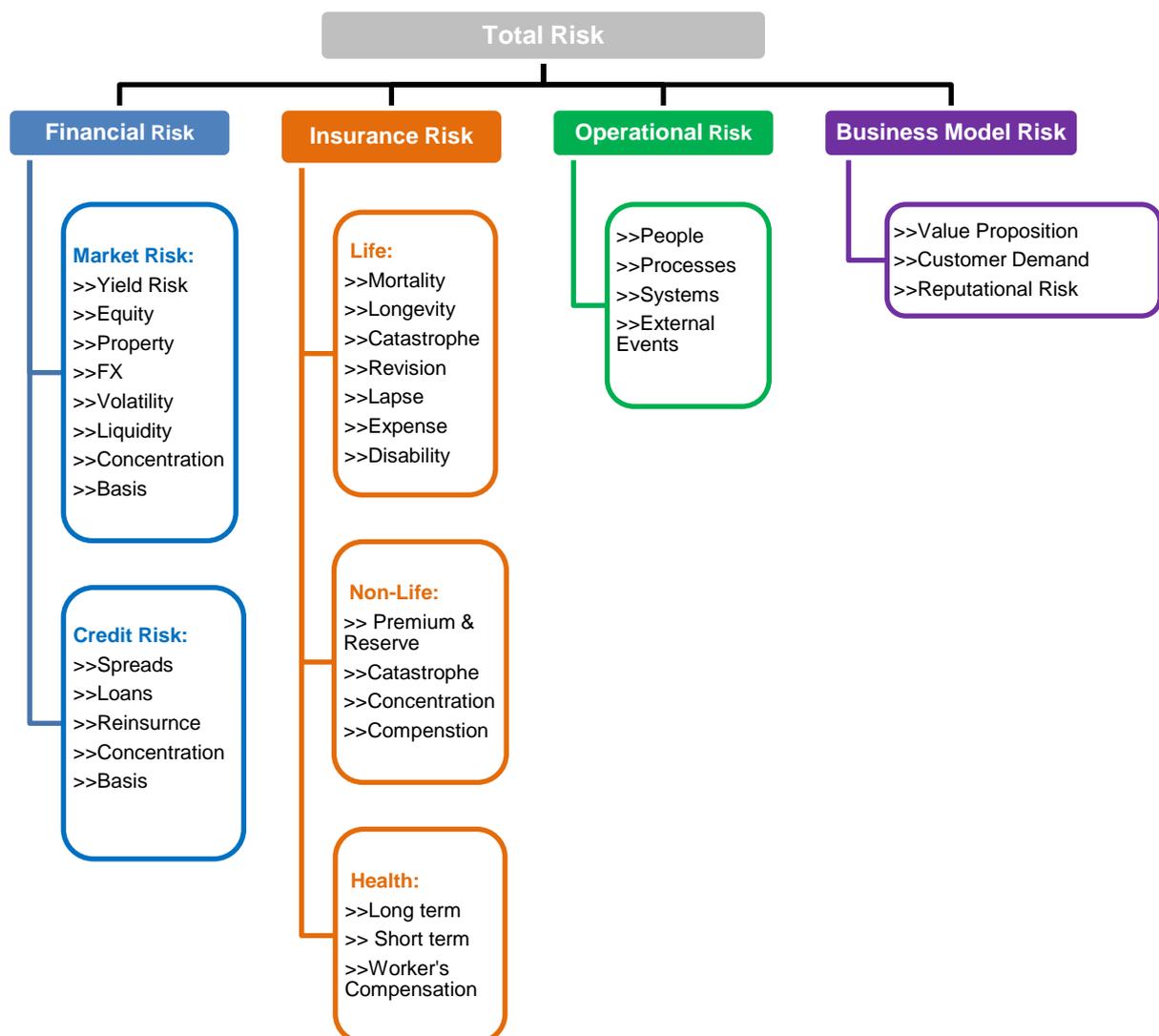


Figure 1: Insurers' Key Risk Exposure (source: Adapted from Moody's Analytics)

While the risks mentioned above are generic risks, it is important to note that some will materialise due to pandemic. For instance, the value proposition might not be valid under new environment. Companies will face change in customer behaviour as well as demands and will face pandemic specific reputational risks.

Stress and scenario testing is an important tool for both Management and the Regulator to ascertain whether insurers are sufficiently capitalised to absorb losses that could crystallise due to the emergence of various adverse real-world scenarios.

This paper provides guidance on stress and scenario testing that a short-term insurer could consider when analysing the potential impact of COVID-19 on some of its main class of business by considering:

- The importance of stress and scenario testing;
- Scenario analysis pertaining to COVID-19; and
- Analyses some main classes of business of a short-term insurer.

2. Stress and Scenario Modelling

2.1. Importance of Stress and Scenario Tests

Capital acts as a buffer against unexpected events and so the required capital should reflect the risks that an insurer faces. An insurer will need to hold provisions for:

- liabilities that have accrued but which have not yet been paid;
- future periods of insurance against which premiums have already been received; and
- claims already incurred but which have yet to be settled.

Given that the future is impossible to predict with certainty, capital may be required in addition to the provisions to ensure that adequate security is provided. A regulator will then monitor the adequacy of the provisions and capital that a provider sets aside against future liabilities. Stress and scenario testing has been a long-established process in the industry and in the recent years its importance has increased as Regulators around the world have imposed outputs from such exercise to be reported in Financial Condition Reports and/or Own Risk and Solvency Assessment (“ORSA”). It allows stakeholders to think about what “might” happen in the future and the impact to the business. This helps Management to think how to avoid such losses should any event crystallise.

ORSA processes is the core of effective enterprise risk management (“ERM”). It is an ongoing process by which a Company's Senior Management and Board assess the key risks to which the insurer is exposed, and the adequacy of capital held to support the risks underwritten or accepted after mitigation and management activities have taken effect, both now and in the future, under different scenarios and relative to the company's appetite for risk. The forward-looking solvency assessment is one of the main cornerstones of the ORSA as it considers the expected evolution of the insurer's balance sheet over its business planning period. During this process, the insurer will consider how its risk profile, capital needs and profitability will evolve. The ORSA also considers how different stresses and scenarios could impact its projection. Best practice also considers the use of reverse stress testing which helps to identify stresses and scenarios that could lead to the failure of the business.

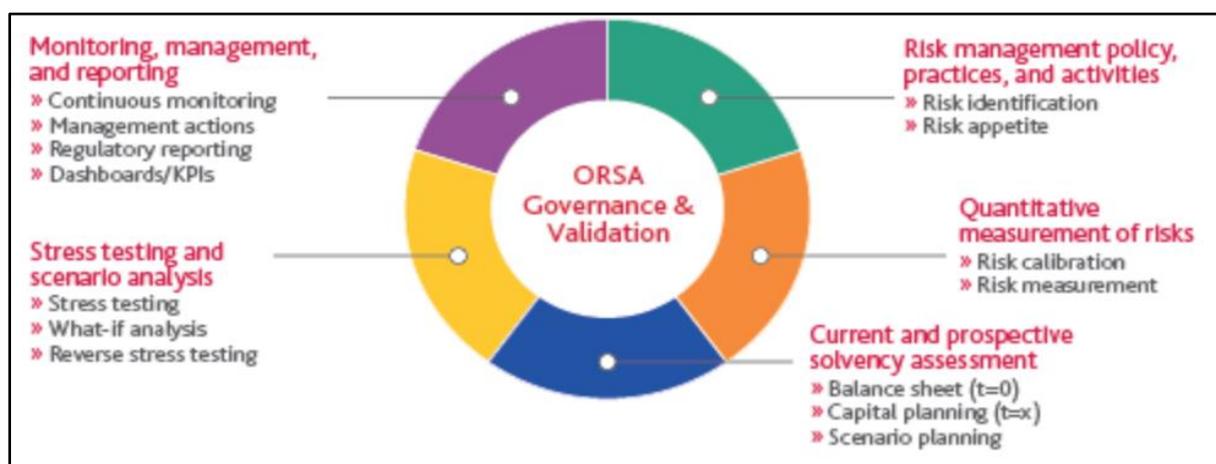


Figure 2: ORSA Process And Stress Testing (source: Moody's Analytics)

The diagrams below show a sample results of different solvency capital requirements under n scenarios and a typical ORSA output which might be included in the ORSA report.

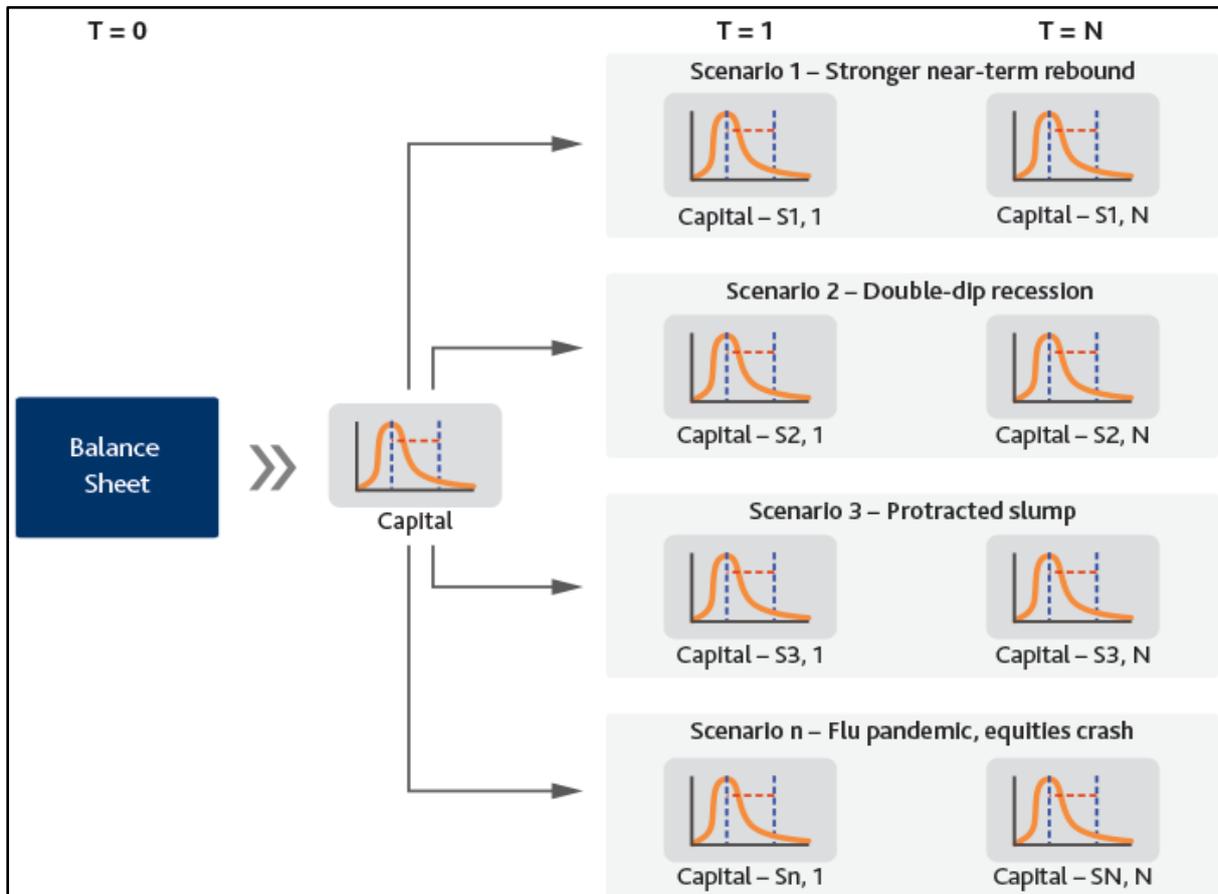


Figure 3: Solvency Capital Requirements Under A Range of Scenarios (source: Moody's Analytics)

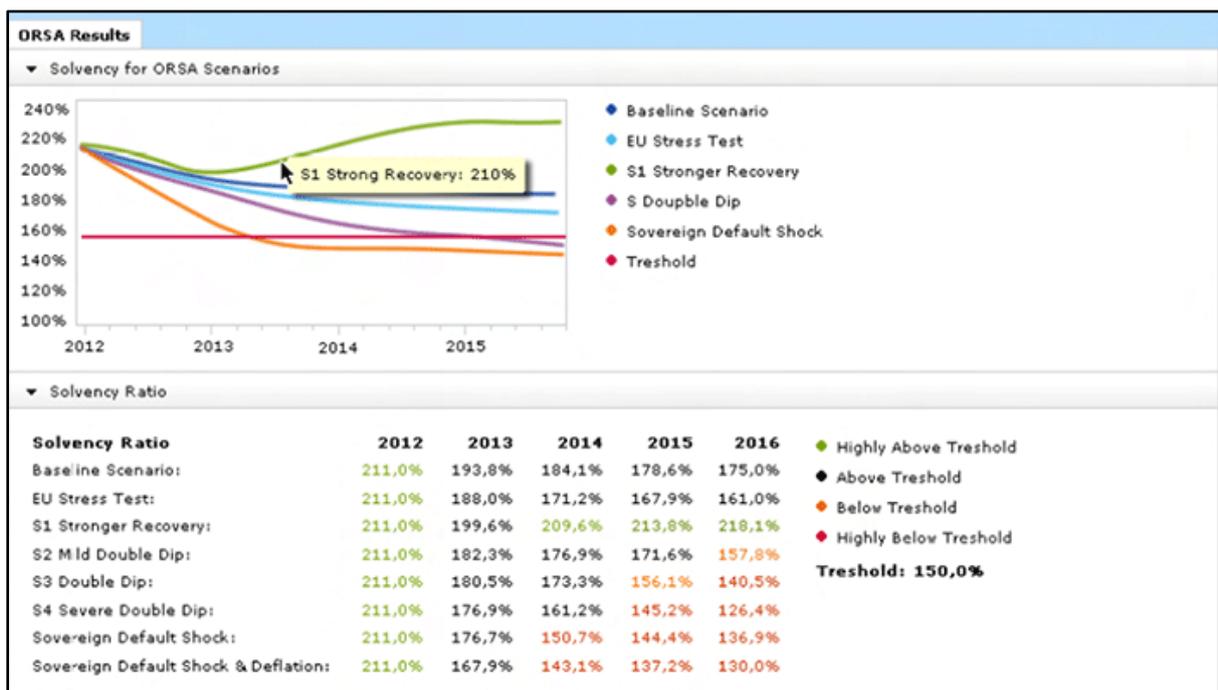


Figure 4: Typical ORSA Output (source: Moody's Analytics)

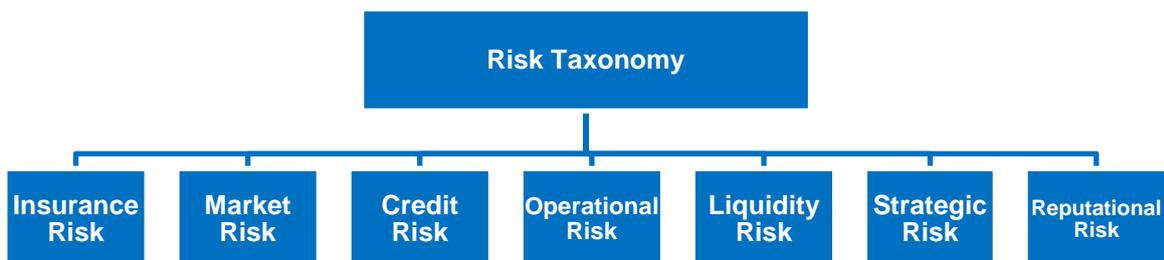
2.2. COVID-19 Scenario Analysis

A high-level process for applying scenario analysis for COVID-19 can be as follows:



The first step requires stakeholders to think what the current and anticipated exposures to COVID-19 are? For best result in risk identification, it is vital to include as many stakeholders as possible. It is important that everyone involved in an organisation is involved in risk identification, not just management and not just those employees who work in a dedicated risk management team. This is because those who work directly within the business and who use the processes on a regular basis are often most likely to be able to spot potential risk areas. It is also useful to involve individuals who are external to the organisation. In particular, experts may be used to assist with those risks that are more difficult to identify.

One key point here is to assess the materiality of those exposures. Risk materiality assessment can be performed by considering the internal risk taxonomy of the organisation. For example, when considering strategic risk, losses can crystallise in the event of a prolonged lockdown with companies' production and revenue being affected. A very basic risk taxonomy is illustrated below:



The outcome of this process could be a heat map for each business line or even at a portfolio level that are most affected by pandemic risks, as shown below.

Key risks	Sub key risks	Examples of portfolio	
Insurance Risk	Risk of claims being higher than usual.	Liability	Motor

Key:



The next step is to select scenarios with appropriate relevance to exposures. COVID-19 impact assessment on balance sheet must consider all assumptions explicitly and market impacts and dependencies such as reinsurance. Scenario analysis help to find the drivers of change and their interrelationships. The diagram below shows generic factors that can be considered within scenarios:



From this exercise, the output will be a set of parameters for each scenario. The next step is to evaluate the potential effects on the Company’s strategic and financial position under each of the defined scenarios. If parameters have been derived using expert judgement, the calibration of parameters can be allowed by taking a stated confidence level. This will help stakeholders to understand any probability associated with any parameter values or even the scenario itself. One important aspect is it helps stakeholders understand the drivers behind risks and will focus attention on parameters that matter most.

Any scenario impacts can be analysed by comparing base best-case projections with the stressed projections, as illustrated below. It is important to consider whether any scenario results in a breach of minimum capital requirements (or for short MCR) as set out by the Regulator or the internal risk appetite set by the Board. For example, the regulator may impose an MCR of 100% while the risk appetite of the Company could be: “We will not accept the solvency level to be less than 150% at any time”.

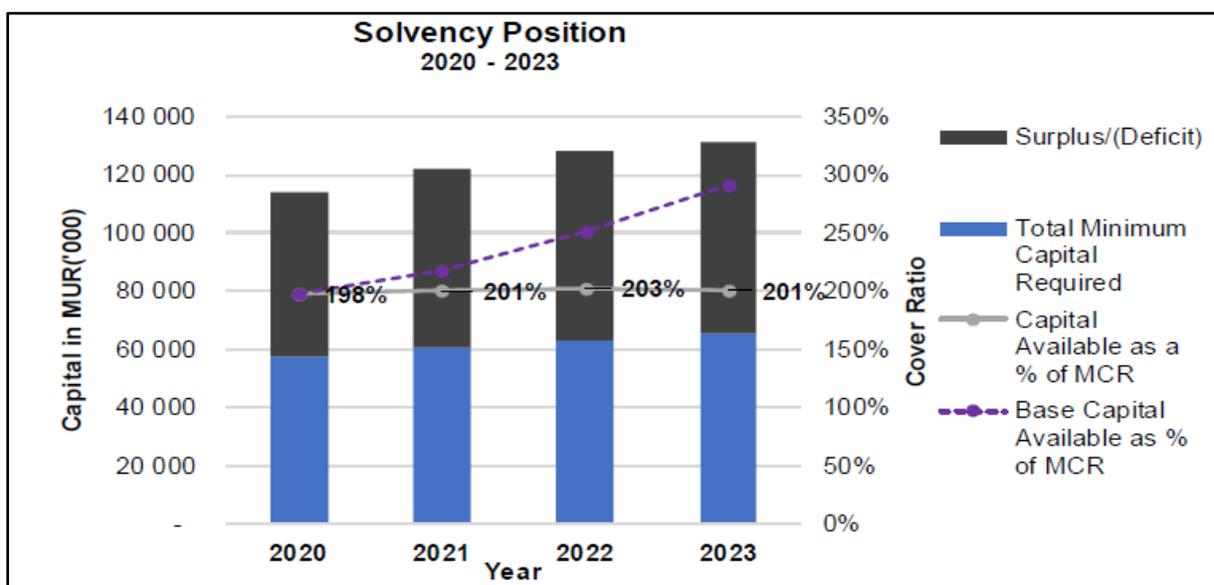


Figure 5: Illustration of Scenario Impact on Solvency Position

The last step of the process is to use the results to identify applicable, realistic decisions to manage the identified risks and opportunities. The output from the ORSA will, therefore, inform the decision as to whether the strengthening of solvency is required and how this will be achieved (for example, through a capital injection or other balance sheet optimisation techniques). The ORSA process is also a useful tool for informing risk appetite decision areas in the underlying processes where enhancement or further development is required, for example, amending the risk appetite statement to include dedicated pandemic related metrics.

How the asset side of an insurance company's balance sheet would be affected is hard to estimate. With the Coronavirus outbreak, it is plausible to expect that markets around the world are exposed to much higher uncertainty. With increasing volatility, insurers might need to force sell assets in an unfavourable environment to meet their liquidity needs. The extent of uncertainty in the market and the effects will nonetheless depend on the quality and accuracy of the asset-liability management strategy of the insurer.

In the next section, we will look at the liability side of the balance sheet by offering a perspective on the forecast of key classes of business for general insurers. This would allow the analysis of the impact of severe events or sequence of events on the financial state of firms. For each key business class, three scenarios are put forward: optimistic, best-case and worst-case as summarised below. They should not be regarded as predictions as they only provide a basis for discussing and analysing the possible impacts.

Scenarios	Optimistic	Best Case	Worst Case
Description	Government restrictions are very effective.	Government restrictions are quite effective.	Government restrictions are not that effective.
Duration of lockdown	3 months.	6 months.	9 months.

Table 1: Scenarios proposed

The above describes stress testing i.e., we analyse the output based on various assumptions we make about certain inputs. However, we can reverse the process and start with defined outputs and then arrive at conditions that would drive the predefined outputs, in other words we can also perform reverse stress test. This will help the institutions to better understand the process and identify strengths and weaknesses.

3. Analysis of Key Classes of Property & Casualty

3.1. Travel

Travel insurance policies indemnify the policyholder against losses arising from travelling in the event that the insured needs to incur medical expenses or flight cancellation or lost baggage and personal liability. Policies are usually sold either covering a single trip or multiple trips that the insured intends to have during a particular year.

Travel insurance has been impacted by COVID-19 due to the following:

- *Increase in cancellations:* Countries have put travel restrictions in place, for example, Canada has now announced that proof of a negative COVID-19 laboratory test result must be presented to the airline prior to boarding a flight. Any passenger who is tested positive will need to cancel its trip.
- *Economic downturn:* Many economies have been impacted with the global pandemic. According to the latest edition of the International Labour Organisation Monitor, 114 million jobs were lost in 2020, which, in combination with working-hour reductions within employment, resulted in working-hour losses approximately four times as high as during the financial crisis in 2009. Undeniably, this will result in reduction in disposable income in households and eventually lead to a fall in demand for holidays.
- *Government imposed lock-downs and/or quarantine:* People around the world are less likely to book holidays given government restrictions. Even after the lifting of any lockdowns, older people who are more vulnerable to COVID-19 will be less likely to travel due to the fear of contracting the virus.
- *Working from home:* The global pandemic has shifted working patterns as companies around the world were forced to embrace remote working. Millions of people now have the chance to experience days without long commutes. With technology such as Zoom, international travel for business meetings have become harder to justify, especially, with better technology such as Microsoft teams, Zoom and so on...

Travel insurance claims from the current coronavirus outbreak is tough to ascertain. Anyone who bought travel insurance before the virus was known about may be covered for medical expenses incurred due to testing positive, or for cancellation expenses.

After the collapse of international tourism in 2020 due the coronavirus pandemic, prospects for 2021 are mixed and still largely contingent on the evolution of the health crisis. Effective vaccination against COVID-19 and other medical advances will be crucial to reduce the risk of contagion and restore confidence among travellers. Coordination of health and safety protocols among governments, including testing and tracing also remain paramount.

The United Nation World Tourism Organisation (“UNWTO”) panel of experts presented three forward-looking scenarios which point to a return of international tourism to pre-pandemic levels in two and a half, three, and four years respectively. Scenario 2 shows international tourism modestly bouncing back in 2021 to levels which are still less than half of those in 2019. This assumes a gradual reversal of the pandemic by the second half of the year, including the rollout of COVID-19 vaccines, a significant improvement in global traveller confidence and major lifting of travel restrictions. According to this scenario, pre-pandemic levels would be recovered by the end of 2023.

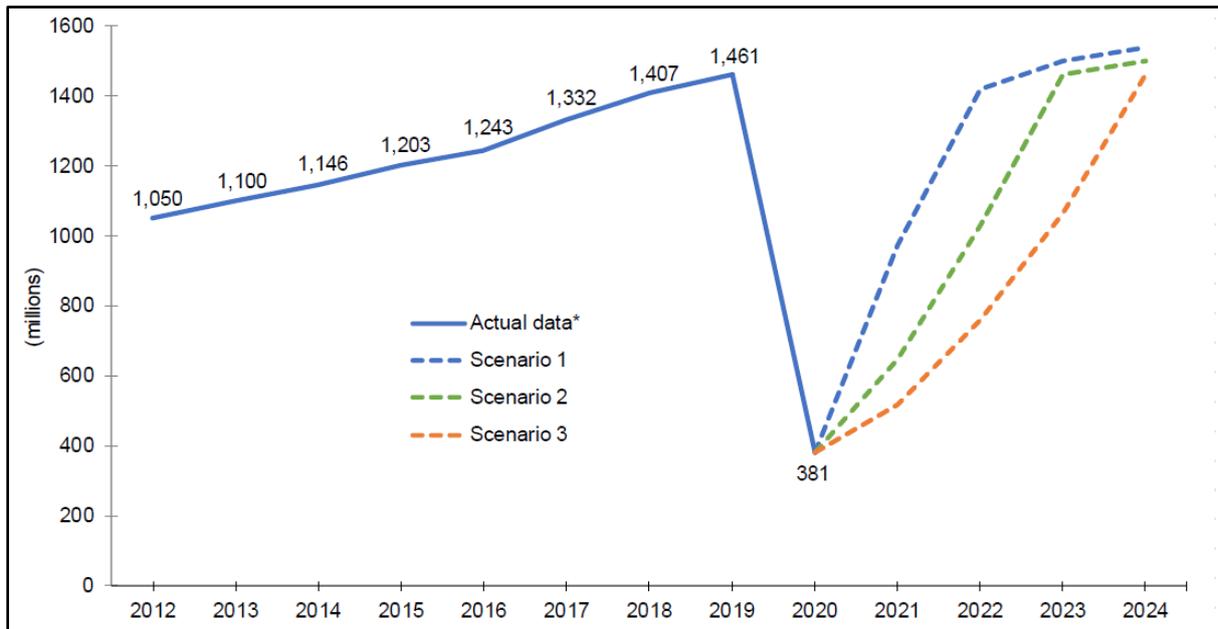


Figure 6: International Tourist Arrivals; Scenarios for 2021 – 2024

It is expected that future claims will be significantly lower than average until government-imposed lockdowns are lifted and demand for travel rises again. As such, estimates on losses have not been provided but rather impact on premium volumes presented.

Scenarios	Optimistic	Best Case	Worst Case
Description	Government restrictions are very effective and demand for travel rises quite fast.	Government restrictions are quite effective and demand for travel rises moderately.	Government restrictions are not that effective and demand for travel rises very slowly.
Impact on Premium Volume	A reduction of 5% in premium volumes.	A reduction of 10% in premium volumes.	A reduction of 25% in premium volumes.

Table 2: Scenarios for Travel class of business

3.2. Motor

Motor third party insurance indemnifies the owner of a motor vehicle against compensation payable to third parties for death, personal injury or damage to their property. This insurance is compulsory in many countries around the world. Optional covers include accident misfuelling, loss of keys, medical expenses and so on... Policies are typically annual but can be less for example for 1 day when hiring vehicle.

As of 25 March 2020, AFP news reported that one-third of the world's population were under "stay-at-home" orders and motor insurance has definitely been impacted by COVID-19. With a lengthy lockdown in place, many drivers are no longer on the road using their vehicles. The knock-on effect of this is that there has been a significant reduction in the number of motor insurance claims. It should be noted that some insurers around the world are providing a refund on the premium on motor policies to take into consideration that the underlying country is/was in lockdown. Examples include Admiral Group plc in the UK.

With fewer miles driven and fewer cars on the road, frequency rates should decrease considerably, improving loss ratios in the near term. According to EY, the UK motor insurance market is expected to record an underwriting profit in 2020, due to the lockdown and resultant reduction in motor claims with costs expected to fall by 12%. The Net Combined Ratio for 2020 is predicted to be 93.8% (a 7.2% improvement on 2019's performance). A note-worthy observation is that the decreased accessibility of mechanics and the shortage of spare parts due to supply chain disruption has caused severity inflation and additional costs for property damage perils. For third party damage claims, insurers have also observed increased credit hire periods from third parties. The pandemic has led to additional costs of cleaning such as cost of protection kits, sanitization of vehicles and workspaces.

A recent S&P Global Market Intelligence analysis demonstrated a sharp drop in the US private auto insurance claims resulting in a historically low loss ratio of 47.3% in the second quarter. Along with the loss ratio improvement, the industry saw direct premiums written fall 4.5% during the quarter.

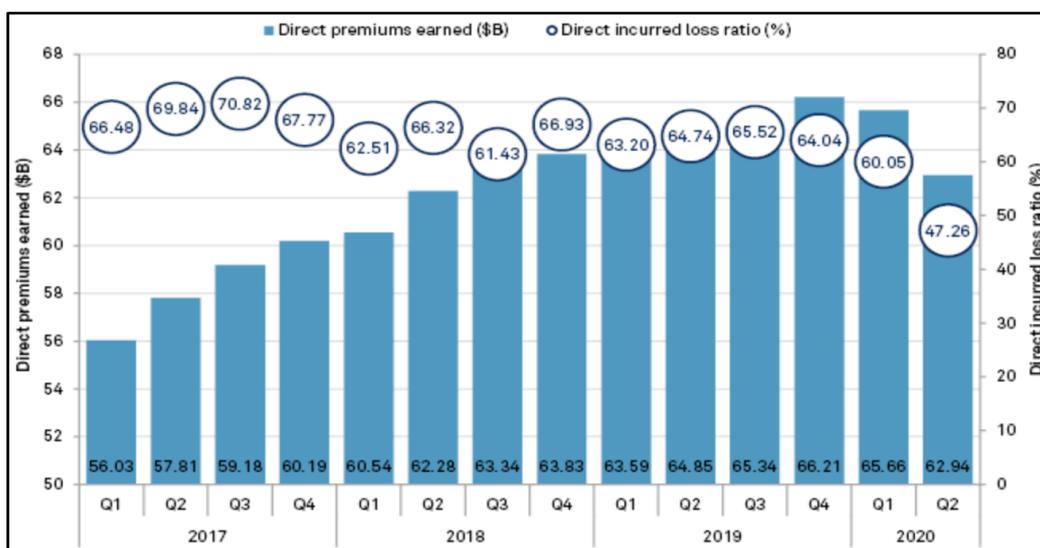


Figure 7: Historical auto loss ratios in the US

Based on the above arguments, some possible impacts of COVID-19 are presented below. While these estimates should not be considered as predictions, they provide some insights on the potential order of magnitude on premium reduction and losses that could eventuate from the different scenarios.

Scenarios	Optimistic	Best Case	Worst Case
Description	Government restrictions are very effective, and lockdown remains in force only for the next 3 months. As a result, impact on mileage is for a short duration because of Government imposed lockdown.	Government restrictions are quite effective, and lockdown extends over the next 6 months. As a result, impact on mileage is for a moderate duration because of Government imposed lockdown.	Government restrictions are not that effective, and lockdown extends over the next 12 months. As a result, impact on mileage is for a longer duration because of Government imposed lockdown.
Impact on Premium Volume	A reduction of 3% in premium volumes due to premium rebates and policyholders “shopping around”.	A reduction of 5% in premium volumes due to premium rebates and policyholders “shopping around”.	A reduction of 10% in premium volumes due to premium rebates and policyholders “shopping around”.
Impact on Losses	15% decrease in frequency and an increase of 0% in severity. A reduction of 5% in total claims cost.	20% decrease in frequency and an increase of 5% in severity taking into consideration the impact of inflation for Motor Third Party Liability. A reduction of 10% in total claims cost.	30% decrease in frequency and an increase of 10% in severity taking into consideration the impact of inflation for Motor Third Party Liability. A reduction of 15% in total claims cost.

Table 3: Scenarios for Motor class of business

3.3. Marine

Marine insurance covers the loss to damage of ships, cargo, and any transport by which the property is transferred, acquired, or held between the points of origin and the final destination. Marine insurance has been impacted by COVID-19 in the sense that border restrictions have led to disruption in the supply chain. As a result, there has been a decline in trade and transportation volumes.

Preliminary data from the World Trade Organisation (“WTO”) suggest that, in November 2020, global imports and exports were still 16% compared to the same period for November 2019 figures.

Prospects for recovery remain poor since a second wave of COVID-19 infections necessitated new, stricter lockdown measures in many countries, with tightened restrictions on travel and related services extending into the first quarter of 2021. The below diagram shows the year-on-year growth on world merchandise imports and exports:

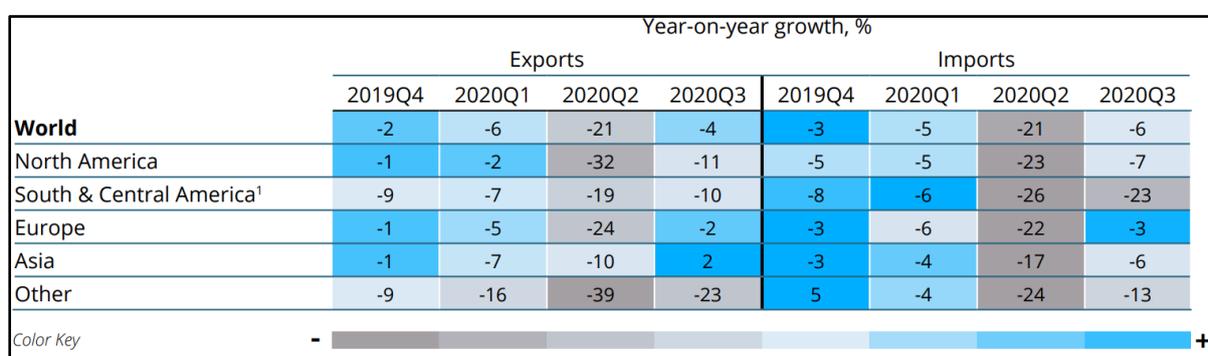


Figure 8: Year-on-year growth on World Merchandise Imports and Exports

In the light of the above, with reduced international trade pulse, it is expected that both premium volumes and future claims will be significantly lower until production resume and lockdown measures will be eased in major economies. The key aspect to consider here is inflation as the cost of the insured transport might increase, especially due to supply chain disruptions. Consequently, companies would need to ensure that the premium they are charging factors in the above argument.

Scenarios	Optimistic	Best Case	Worst Case
Description	Government restrictions are very effective and lockdown in major economies are lifted in the next 3 months.	Government restrictions are quite effective and lockdown in major economies are lifted in the next 6 months.	Government restrictions are not that effective and lockdown in major economies are lifted in the next 9 months.
Impact on Premium Volume	A reduction of 5% in premium volumes.	A reduction of 10% in premium volumes.	A reduction of 15% in premium volumes.
Impact on Losses	A reduction of 10% in claims.	A reduction of 15% in claims.	A reduction of 20% in claims.

Table 4: Scenarios for Marine class of business

3.4. Health

Health insurance is a type of insurance coverage that typically pays for medical, surgical, prescription drug and sometimes dental expenses incurred by the insured. Health insurance can reimburse the insured for expenses incurred from illness or injury or pay the care provider directly.

The impact on health insurance will be country specific as the number of actual cases and deaths vary greatly across the world. Many insurers learned the lessons from the SARS outbreak of 2003 and introduced exclusion clauses for communicable diseases and epidemics/pandemics into most non-life products. Most countries are doing rapid testing of individuals free of charge. However, it free treatment is not universal, and these costs can be substantial for Governments.

COVID-19 has caused a massive acceleration in the use of telehealth. According to a survey by data and analytics firm, GlobalData, a total 73% of cardiology, gastroenterology, pulmonology, and respiratory specialists in the US, Europe, the UK and Japan indicated that their use of telemedicine has increased during the pandemic. Telemedicine is the practice of medicine using technology to deliver care at a distance.

Another positive perspective of COVID-19 has been captured by the Max Bupa Health Insurance survey. This was conducted among 1700 respondents in the 27 - 35-year age group in 11 cities across the country. A key conclusion of the survey was that before the spread of the coronavirus, only 37% millennials were particular about having a health plan that covered diseases like coronavirus and now, 60% want such a comprehensive cover.

Based on the above arguments, it is expected that for insurers covering COVID-19 treatment future, claims will be significantly higher than average. As such, estimates on losses have not been provided but rather impact on premium volumes presented. Again, the companies would need to factor in any inflationary effects that could drive up the cost of claims associated with treatment and ensure that the premium they are charging factors in this.

Scenarios	Optimistic	Best Case	Worst Case
Description	Government restrictions are very effective and a low demand for health insurance is observed.	Government restrictions are quite effective and a moderate demand for health insurance is observed.	Government restrictions are not that effective and a high demand for health insurance is observed.
Impact on Premium Volume	An increase of 5% in premium volumes.	An increase of 10% in premium volumes.	An increase of 25% in premium volumes.

Table 5: Scenarios for Health class of business

4. Conclusion

Stress and Scenario testing allows embedding of risk management within an insurance company and is a powerful tool that Management can use in order to assess its exposure to risks. Given the ongoing Coronavirus pandemic, both shareholders and regulators are interested to see the results of such an exercise to gain assurance about the firm's resilience to "extreme" events should they crystallise in the future. This paper provides a starting point on how short-term insurers can prepare for stress and scenario testing for some key classes of business. It should be emphasised that Management should engage with various functions and levels of hierarchy during the stress and scenario process to formulate scenario(s) which are relevant to the organisation taking into consideration the firm's risk appetite set by the Board and any such requirements as determined by the Regulator of the country in which the organisation is operating.

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