Malta in Focus

Climate Change Scenarios

Zenith ACTUARIAL

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Contents

Foreword

Climate change is no longer a distant threat - it is a present and growing reality that is reshaping the world around us. For Malta, a small island nation with a unique climate, economy, and infrastructure, the risks are both specific and significant. As actuaries and risk professionals, we have a responsibility not just to understand these risks, but to help the industry prepare for them in a structured, informed, and collaborative way.

This paper is our contribution to that effort.

We created Malta in Focus: Climate Change Scenarios to support insurers in Malta as they navigate the evolving regulatory landscape, particularly the requirements under Solvency II to incorporate climate change into their Own Risk and Solvency Assessments (ORSA). But more than that, we hope this paper becomes a catalyst for conversation - within companies, across the industry, and with regulators and stakeholders.

The scenarios presented here are not predictions. They are plausible futures, grounded in data, informed by science, and shaped by our understanding of Malta's insurance market. They are designed to challenge thinking, to test resilience, and to support better decision-making. We know we won't have captured everything - and we certainly won't have got everything right - but we hope this paper provides a useful starting point.

We've drawn on a wide range of sources, spoken with industry professionals, and applied our own judgement and experience. Throughout, we've tried to balance rigour with practicality, and to present the material in a way that is accessible and actionable.

Above all, we hope this work helps insurers in Malta to not only meet regulatory expectations, but to build stronger, more sustainable businesses in the face of climate change.

We welcome your feedback, your questions, and your ideas. Let's keep the conversation going.

Warm regards,
Will Davies

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How to use this paper

This paper is intended to supplement discussion around the preparation of the ORSA.

In this paper we outline 7 potential scenarios that could be considered to be plausible when considering climate changes in the Maltese islands. Insurers could include the scenarios most relevant to their business in the ORSA.

Across the 7 scenarios, there are 3 types of impacts outlined. When working out the total impact of any given scenario, insurers should apply the impacts in the following way:

- Market level impacts: insurers should allocate the total market cost using their (estimated) market share.

- Uplifts to figures generally included in ORSA scenarios, such as claims levels and premium volumes: insurers should apply the uplift to their own historical data to estimate the impact of the scenario.

- Impacts on underlying model parameters such as rates of inflation and investment returns. These may require further modelling to estimate an impact, which can then be included in the ORSA.

1 Introduction

Background

1.1 Under Solvency II, insurers are required to carry out an Own Risk and Solvency Assessment ("ORSA"). ORSA is an internal process for insurance companies to evaluate their risk management and solvency positions. It involves identifying and assessing risks, ensuring continuous compliance with capital requirements, and integrating future business plans to maintain solvency.

1.2 Since August 2022[1], insurers are expected to integrate climate change scenarios into their risk management frameworks. By January 2027 this will become mandatory as part of the amendments to the Solvency II Directive. The European Insurance and Occupational Pensions Authority (EIOPA) mandates that insurers identify material climate change risks, both physical and transition, and assess their potential impacts on business operations.

1.3 Insurers must develop at least two long-term climate scenarios: one where global temperature increase remains below 2°C, preferably no more than 1.5°C, and another where it exceeds 2°C. These scenarios help insurers evaluate the resilience of their business models and ensure they maintain adequate solvency levels in the face of climate-related risks.

1.4 This forward-looking approach is crucial for the sustainability and viability of the insurance industry in Malta and beyond.

Purpose and users of this paper

1.5 Our paper is designed to serve as a resource for Maltese insurers, aiding the industry in the development of robust climate change scenarios required under Solvency II's ORSA framework. By providing guidance and practical examples, we aim to facilitate insurers in identifying and assessing both physical and transition risks associated with climate change. This will not only help in meeting regulatory requirements but also in enhancing the overall resilience of their business models.

1.6 One of the primary uses of our paper is to act as a tool for internal discussions within insurance companies. By offering a structured approach to scenario analysis, it will enable insurers to engage in meaningful conversations about potential climate impacts on their operations. This collaborative process is essential for developing a shared understanding of risks, for formulating effective risk management strategies, and for quantification of scenario impacts. Our paper will provide the necessary frameworks and methodologies to support these discussions, ensuring that all relevant aspects of climate change are considered.

1.7 Furthermore, we envision our paper as a dynamic, evolving document that adapts to the changing needs of the Maltese insurance market. As new data and insights emerge, we envisage that the paper will be updated to reflect the latest developments in climate science and regulatory expectations. This ongoing evolution will ensure that insurers have access to the most current information and best practices, enabling them to stay ahead of emerging risks and opportunities. By maintaining its relevance and applicability, our paper will continue to be a valuable resource for

[1] Application guidance on climate change materiality assessments and climate change scenarios in ORSA - EIOPA

insurers in Malta, helping them navigate the complexities of climate change and secure a sustainable future.

Data Used

1.8 We have used a number of resources to collect data and information on how climate change has and may in the future impact Malta. Where possible we have used data that is specific to the island but in some cases, we have extended this to the wider Mediterranean area. We have attempted to verify the data we have used in this report, however there are areas where we have applied judgement.

1.9 Data has been sought from many local sources including the Central Bank of Malta, the Malta Airport Met Office and, for the reported impacts of previous events, The Times of Malta.

1.10 Market data and trends have been sourced from research platforms such as tradingeconomics.com and macrotrends.net. For medical impacts of historic events, we have used medical research publishers such as Oxford University Press (academic.oup.com) and the World Health Organisation (www.who.int).

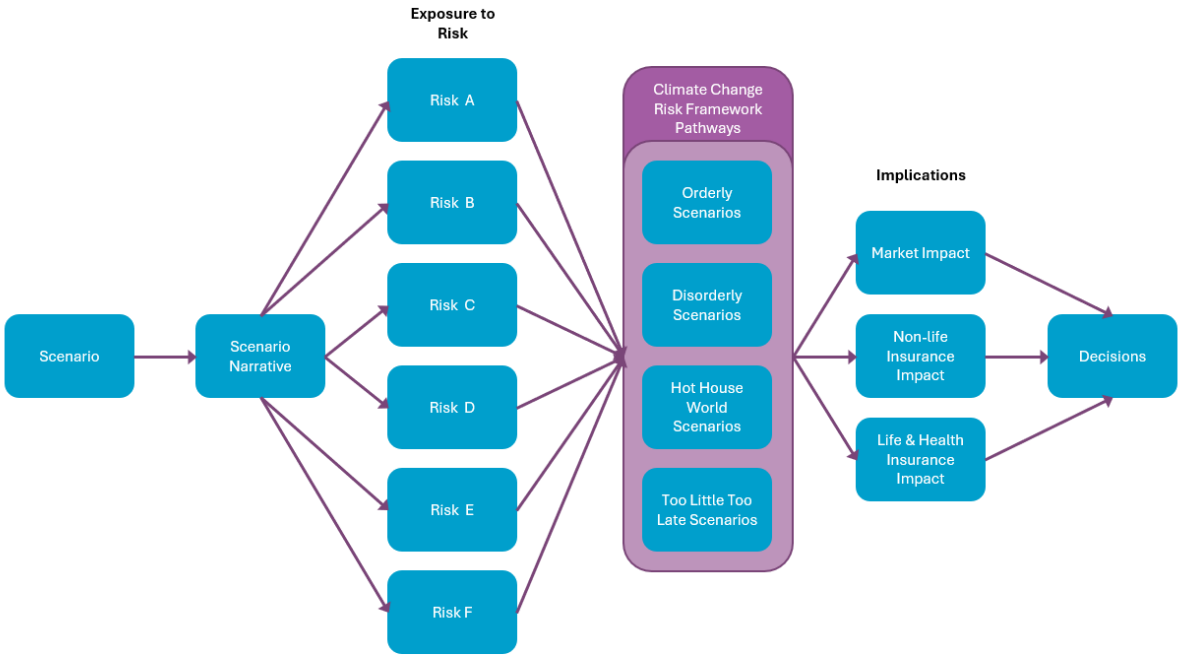
1.11 Research on Climate Change and the potential future impacts on insurance has been sourced from publications such as the European Environment Agency (www.eea.europa.eu) and the Climate Change Knowledge Portal, part of the World Bank Group (climateknowledgeportal.worldbank.org).

2 Climate Change Risk Framework

2.1 The framework we have used to produce our scenarios is in line with the 'IFoA Climate Change Stress and Scenario Testing Working Party'[1].

2.2 This is a top-down process which involves creating detailed narratives that describe how different climate futures could unfold and impact the insurance industry. These scenarios should encompass a range of plausible pathways, including both gradual and more extreme changes, to ensure a comprehensive assessment of potential risks and opportunities.

2.3 The framework used is set out as follows:



Scenario

2.4 Provides a high-level core scenario summary.

Scenario Narrative

2.5 Outlines the scenario development and key implications for the problem statement, highlighting critical events and outcomes.

2.6 These narratives should describe the potential impacts on various aspects of the business, including underwriting, claims, investments, and operations. For example, a scenario with significant physical risks might include increased frequency of natural disasters, leading to higher claims and potential challenges in maintaining solvency. Conversely, a scenario focused on transition risks might explore the effects of stringent climate policies on investment portfolios and the potential for stranded assets.

[1] Event Paper: Hot Topic 2 IFoA Working Party Climate Stress and Scenario Testing

Exposure to Risk

2.7 This should describe what exposures, both specific to the company and to the location in which it operates, are as a result of the specific information provided in the scenario narrative.

2.8 Relevant data is needed to support the risk assessment. This includes historical loss data, climate projections, and information on the company's asset and liability exposures. External sources such as climate models and scientific research can provide valuable insights into future climate scenarios.

Climate Pathways

2.9 Use the NGFS Climate Pathways to reflect on the likelihood, severity and impacts of the physical and transition risks.

2.9.1 Orderly Scenarios: These assume early and gradually increasing climate policies, resulting in relatively low physical and transition risks.

2.9.2 Disorderly Scenarios: These explore higher transition risks due to delayed or divergent policies across countries and sectors.

2.9.3 Hot House World Scenarios: These assume that some climate policies are implemented, but global efforts are insufficient to prevent significant global warming, leading to severe physical risks.

2.9.4 Too Little, Too Late Scenarios: These assume a late and uncoordinated transition, failing to limit physical risks.

2.10 The pathway used within the scenario will shape the severity of the impact as well as the time period over which the scenario plays out.

Implications

2.11 Consider the potential impacts of each scenario on various aspects of the business, such as underwriting, claims, and investments. Assess how the scenario could impact the company's future risk profile.

2.12 As the focus of the ORSA is on adverse scenarios, the potential impacts should be chosen to have a detrimental effect on the business. Implications of the scenario could include, but are not limited to:

- Interest rate movements (direction of an adverse movement will depend on the business)
- Increased inflation
- Falls in asset values
- Reductions to asset returns
- Increased claims
- Increased expenses
- Reductions in new business sales

- Reduced reinsurance cover
- Increased lapse rates

2.13 Would the controls and management information you have in place have alerted you to the issue before the full extent of the scenario is felt?

2.14 Quantify the identified risks using appropriate metrics. This may involve calculating potential losses under different scenarios, estimating changes in claim frequencies and severities, and assessing the impact on the company's solvency position. Advanced statistical and actuarial techniques can be employed to enhance the accuracy of these estimates.

Decisions

2.15 Are there low cost/low risk decisions that can be implemented quickly to reduce the probability or severity of the implications generated?

2.16 Develop and implement strategies to mitigate the identified risks. This could include revising underwriting guidelines, diversifying investment portfolios, enhancing reinsurance arrangements, and improving operational resilience. Regularly reviewing and updating these strategies ensures they remain effective in the face of evolving climate risks.

2.17 Are there any potential opportunities under this scenario?

2.18 Establish a framework for ongoing monitoring and reporting of climate-related risks. This involves tracking key risk indicators, reviewing the effectiveness of mitigation strategies, and updating risk assessments as new information becomes available. Transparent reporting to stakeholders, including regulators and investors, is essential for maintaining trust and demonstrating the company's commitment to managing climate risks.

Scenarios

2.19 This paper covers the following scenarios:

	Description
Scenario 1	Deadly Heatwave
Scenario 2	Chronic Temperature Rise
Scenario 3	Agriculture and Food
Scenario 4	Rising Sea Levels
Scenario 5	Unpredictable Weather
Scenario 6	Disease Migration
Scenario 7	New Pandemic

3 Scenario 1 – Deadly Heatwave

Narrative

3.1 In this scenario, we assume that temperatures in Malta consistently reach above 40°C every day for a 14-day period. Malta has seen temperatures over 40°C multiple times during the summer months over the last decade and the trend is that maximum temperatures are increasing. The longest recent heatwaves have lasted 8 and 12 days and so an increase to 14 seems like a reasonable 1-in-10 year event.

3.2 Independently of this, there is damage to Malta's electricity interconnector which results in large portions of the energy grid being down for multiple days. The power outages exacerbate the difficulties caused by the heatwave. As an event, damage to the interconnector would have a significant impact on the lives of the Maltese population, as has occurred twice in recent history. It is not unrealistic to think that it is an event that could happen again in the next decade; another 1-in-10 year event.

Market Impact

3.3 Food supply could be impacted by the heatwave affecting surrounding areas in the Mediterranean. For example, wildfires in Italy could decimate crop supplies and close ports. As a result, food prices could increase as they did following the 2023 heatwave where Malta saw food price inflation go up by 1.5%. A heatwave could also cause an increase in demand for energy, combined with a reduction in supply. The Maltese government has intervened in the past to prevent energy price inflation but may not be able to continue to do so in the future. Energy and food make up a significant proportion of the inflation rate in Malta. The scenario assumes a **1-year spike in inflation of +1%** before it reduces back to normal levels.

3.4 Property could be damaged due to the period of extreme temperatures meaning repairs or reconstruction may be required. Demand for properties in Malta could be impacted if extreme heatwaves become a regular occurrence and there is a longer-term impact on tourism. This could lead to stagnating or even falling property values. As a result, this scenario assumes a **zero return on property investment for 1 year.**

Non-Life Insurance Impact

3.5 Business Interruption Cover (BIC) for tourism industry is being used as a proxy for all BIC as the elements of the scenario impact the industry individually but combined could cause significant issues. With a tourism industry worth €2.7bn[1] in 2023, Malta generates around €70m of income from tourism per week in peak season. Assuming 50% of the insurable interest is covered by insurance, and that 50% of those covered can claim, the scenario would have a **€35m total market impact on Maltese insurers**.

3.6 The tourism BIC element of the scenario could be seen as extreme and to over-state the impacts. However, it is being used as a proxy for the whole BIC market which extends more widely than just tourism. Loss of power and supply chain issues will have an impact on many other sectors so increasing claims across the board. Much of the risk of the interconnector damage could be

[1] Visitmalta - The official tourism website for Malta, Gozo and Comino. https://www.mta.com.mt/en/file.aspx?f=35050

believed to be mitigated by businesses having back-up generators. There is a limit how long can they continually supply energy for in the extreme heat before they begin to breakdown (with a finite supply of repair services if they do) and there is consideration required regarding supply and cost of fuel.

3.7 In previous heatwaves the Maltese government has reimbursed for loss of goods. This may not be maintained in the future. **Loss of goods claims are assumed to quadruple for the duration of the heatwave**.

3.8 There is a higher risk of car fires in extreme heat conditions. The increased use of electric vehicles changes the risk profile for car fires. Petrol and diesel cars are more likely to catch fire, but it is significantly more difficult to extinguish an electric car fire due to the battery meaning it is more likely to spread to other vehicles leading to large losses. This large loss risk is exacerbated by the ever-increasing number of cars on Malta's roads. As part of the scenario a claim for fire damage to 100 cars has been assumed. An average claim size of €10,000 gives a **total motor claim amount of €1,000,000**.

3.9 There are many risks linked to construction due to heatwaves. Projects may be delayed if power is cut, the conditions mean people are unable to work, or there are impacts on the supply chain. **Insurers should consider whether** construction projects being put on hold gives rise to any claims in the short-term.

3.10 Both existing and newly-built structures could be damaged or weakened due to the adverse weather conditions, leading to increased claims during the event and higher risk of future claims. **Property damage claims rates increase by 5% for future years**.

3.11 Many of the adverse effects above will be covered by the reinsurance currently in place within Maltese non-life insurers. Reinsurers will reflect the increase in risk through their premium rates eventually. For this scenario we propose a **10% increase to reinsurance rates after 2 years** with no reversion to previous levels.

Life & Health Insurance Impact

3.12 A heatwave, especially combined with power outages will mean more deaths, particularly in the vulnerable population. You may think that the impact will be small and not worth considering. In the 2023 there were 80 excess deaths in a heatwave that lasted around a week and was less severe than the one in this scenario. The average number of deaths in June (when the heatwave in 2023 occurred) is around 370, or close to 90 per week. So, it is not unreasonable, especially if a heatwave were to happen in July or August when the temperatures are higher, that this scenario would see a **doubling of mortality rates for a month** (due to lasting effects).

3.13 There would be a PMI/HCP claim increase due to a spike in visits to St James' and other private medical institutions. Hospital stays increase in frequency and duration. This doesn't just impact the PMI claims from private hospitals. PMI claims from stays in state hospitals as well as claims from health cash plans will also rise. **Claims are assumed to double for the duration of the heatwave and gradually return to normal levels within 3 months.**

3.14 The increase in demand for emergency hospital stays and care from the effects of the heatwave, coupled with power outages and enforced power saving could lead to postponement of non-emergency procedures and delays in the diagnosis of critical illnesses. Similar to the effects observed during the COVID-19 pandemic, this could have medium-to-long term impacts on the

incidence rate of other medical related claims, such as on protection products in the future. **Critical illness rates are assumed to increase by 2.5% per year for the next 3 years and fall back to previous levels over the following 3 years**.

3.15 Reinsurance rates on life products will rise in the same way as for non-life products – see 3.11.

4 Scenario 2 – Chronic Temperature Rise

Narrative

4.1 Temperatures in Malta, and the wider Mediterranean area, rise by over 2°C following the hot house world pathway. In this scenario critical temperature thresholds are exceeded which will lead to severe physical risks and irreversible impacts. The occurrence probability of this event has been modelled at 0.5%.

4.2 With a chronic temperature rise, average temperatures may rise by 2-3°C by 2050, accompanied by prolonged dry spells and increased frequency of extreme weather events such as heatwaves and droughts. Energy and water demand increases, and the tourism industry goes into decline.

Market Impact

4.3 Tourism is one of Malta's primary industries and higher temperatures may lead to shifts in the tourist season. Summers may become too hot for traditional tourists which may prompt a decline in summer bookings. Infrastructure may also be affected by heat-induced deterioration.

4.4 A decline in tourist activities is likely to have an impact on indirect investment as a result of investors reducing their interests in the Maltese market. This would be partly due to an increase in operational expenses to upgrade things such as cooling systems, improve water efficiency or building outdoor facilities. The likely result is sentiment on investment in Malta declining which we expect will also result in **bank credit quality in Malta reducing**.

4.5 Chronic heat may reduce the value of certain properties, especially in areas less equipped to handle higher temperatures. Again, cooling costs and heat-resistant infrastructure needs could increase maintenance expenses. Sustained high temperatures could test even the best infrastructure. Demand for property in Malta is likely to reduce which will in turn reduce the value of property. A reasonable estimate is a **5% decline in property income and values.**

4.6 Rising temperatures will drive increased demand for cooling systems, leading to higher electricity consumption. Energy infrastructure may face difficulties meeting the extra demand, which may lead to more frequent breakdowns to all or part of the system. When energy usage rises, energy prices often increase due to supply constraints. This directly impacts the cost of utilities such as electricity, gas, and fuel which are major components of household expense. Since the end of 2021 the Maltese government has had a fixed energy price policy in place. This has had a positive impact on keeping overall inflation under control but comes at a cost, with the estimated impact on public debt to GDP ratio in 2023 being around 3%[1].However, in a case as this one, we believe the government may not be willing, or able, to maintain this policy. Therefore, we have assumed a **1% increase in inflation.**

Non-Life Insurance Impact

4.7 In this scenario we expect an **80% increase in BIC claims**, which will be an expected **€56mn impact on Maltese insurers.** We also expect payout challenges will arise as insurers may find it

[1] https://www.centralbankmalta.org/site/Reports-Articles/2024/RB-2024-Article-4.pdf

difficult to assess and validate the claims, for example, determining the extent to which the heatwave, as opposed to other factors, caused the revenue losses.

4.8 The tourism industry brings in c. €2.7bn a year[1] in revenue and a chronic rise in temperatures- such that being outdoors become unbearable- could lead to a 50% decline in tourism, reducing the GDP growth year-on-year. Almost 20% of the working population is employed in the tourism sector, therefore this could lead to a rise in unemployment rates, again adversely affecting economic growth. These factors could lead to constraints on disposable income and so a **reduction of 20% in new business and renewal sales of motor and private marine policies.**

4.9 Higher temperatures and related events, such as heatwaves and droughts, could lead to an increase in claims for damage to property due to cracked foundations, heat-related wear and deterioration of building materials. Aside from these environmental factors, properties will also be left vacant for a prolonged periods due to reduced tourism and this will lead to a higher risk of damage (e.g. theft and vandalism). Therefore, we have assumed a **20% increase in property insurance claims.**

4.10 A decline in tourism will lead to reduced income for businesses and individuals that rely on tourist income. As property owners look at ways to cut their costs, optional spending, such as on insurance, could be an area where cuts are made. We have also added a **15% decline in property insurance sales** as we expect business to be impacted for this type of cover.

Life & Health Insurance Impact

4.11 Higher temperatures are linked to increased heat-related illnesses like heat exhaustion and heatstroke, particularly affecting vulnerable populations like the elderly, young children, and individuals with pre-existing medical conditions. Sustained higher temperatures will inevitably exacerbate these illnesses and this will lead to an increase in emergency visits, hospital admissions, and potential strain on healthcare sources.

4.12 Prolonged exposure to elevated temperatures is associated with cardiovascular and respiratory diseases, potentially increasing the morbidity rates within Malta's population. We have assumed **a 20% increase in health-related claims across all product types.**

4.13 According to a landmark study done by the medical journal Lancet[2], which analysed data from 854 cities across Europe, rising temperatures will have deadlier consequences in Malta than in any other European country. It found that with a 3°C increase in temperatures, Malta would suffer 95 more yearly heat-related deaths per 100,000 people than it currently does; roughly 6 times the European average of 15 more heat-related deaths. The study estimated that, between 1991 and 2020, 78 deaths per year in Malta were attributable to heat, but this would triple to 258 deaths yearly with temperatures rising by just 1.5° and surge to over 600 if temperatures get 3°C higher. With our current 2°C scenario, we have assumed a conservative **5% increase in life insurance claims on the back of a 40% increase in heat-related deaths.**

[1] Visitmalta - The official tourism website for Malta, Gozo and Comino. https://www.mta.com.mt/en/file.aspx?f=35050

[2] https://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(24)00179-8/fulltext

4.14 Applying the same reasoning as in 4.8, a decline in disposable income would have an impact of life insurance products. We suggest an **increase in lapse rates of 10% across life products**.

5 Scenario 3 – Agriculture and Food

Narrative

5.1 Malta's agricultural sector is challenged by limited arable land and water scarcity, therefore the island's food security is highly dependent on food imports. Climate change will cause a reduction in global agriculture output[1] which has a disproportionately high impact on Malta given the significant need to import food.

5.2 As the food supply to the island becomes constrained, import prices increase. Higher fuel prices due to climate policies, carbon taxes and extreme weather disruptions can further drive up import costs. These factors will have an impact on the country's inflation as higher costs will be passed onto consumers.

Market Impact

5.3 Malta imports around 75% of its food products[2] with the main partners being Italy, Spain, Germany, Netherlands and the UK[3]. With a high level of food imports, it is highly susceptible to disruption in international food prices, other commodity prices that affect food production as well as transport costs. Disruptions in these food producing countries will lead to higher costs for staple imports such as grains, vegetables, and dairy. There are likely to be increased transport costs due to extreme weather events.

5.4 As food scarcity becomes a reality, there will be higher costs for businesses in the food retail and hospitality sectors, potentially leading to reduced profitability or business closures. There are also risks of political and social instability as rising food prices and shortages could increase economic inequality and pressure on government subsidies.

5.5 In the economy as a whole, this will result in inflationary pressure as food prices rise, reducing consumer spending on other goods and services. In this scenario, we assume that inflation reaches an annual rate of **25% (i.e. a 25% year-on-year increase in prices).**

Non-Life Insurance Impact

5.6 Due to food supply disruptions, retailers, restaurants and food distributors face higher risks of financial loss. As these businesses experience shortages, delays and cost spikes, we expect a **5% increase in commercial insurance claims, combined with flat premium levels**.

Life & Health Insurance Impact

5.7 As a result of higher food prices and reduced access to a healthy diet, we expect a higher prevalence of nutrition-related ailments as people will be forced to change their diets to suit what is available to them. This increases the risks of things such as diabetes, cardiovascular diseases and obesity as consumers are forced to shift to cheaper, processed foods. This will inadvertently

[1] Climate change threatens future of farming in Europe — European Environment Agency
[2] What food is grown in Malta? - Geographic FAQ Hub: Answers to Your Global Questions
[3] Malta Food Products Imports by country 2022 | WITS Data

increase health insurance claims, and we have forecast a **10% increase in health-related claims that emerges linearly over 4 years.**

5.8 An increase in climate-induced health problems will have an impact on life expectancy which will also increase underwriting risks for life insurers. We expect a **5% increase in life insurance claims** as a result of food shortages/quality reductions.

6 Scenario 4 – Rising Sea Levels

Narrative

6.1 In this scenario, we consider the impact of sea levels rising over a number of years. Under a 2°C temperature increase, sea levels are expected to rise by 0.5-0.7m by the end of the century[1]. This would lead to increased coastal erosion, severe flooding and potential damage to infrastructure and ecosystems.

6.2 Related to this are increases to frequency and severity of storm surges which affect more of the island due to the higher starting sea level.

Market Impact

6.3 Rising sea levels in the Mediterranean causes a reduction in food output in the region as agricultural land is flooded and becomes salinated. In addition, the more frequent storms cause transport costs to increase. These factors **increase inflation rates by 0.5% p.a**.

Non-Life Insurance Impact

6.4 Property and motor claims will be affected by the increase in storm surges, as more of the coastal areas are flooded causing damage. The rougher seas would be expected to cause greater damage to boats.

6.5 The ultimate stresses for these lines of business are assumed to be:

	Property	Motor	Marine
Claim Volume	+10%	+10%	+50%
Claim Amount	+25%	+50%	+50%

6.6 As sea levels progressively rise, and the frequency and severity of storm surges increase over time, the above stresses are assumed to also gradually increase over time until they reach the levels above. This scenario has **25% of the ultimate stress in Y1, 50% in Y2 and 100% in Y3+**.

Life & Health Insurance Impact

6.7 The increased frequency and severity of storm surges means there are more accidents caused by the bad weather resulting in broken bones and hospital stays. This increases **claims rates on PMI by 20% in line with the phased stress impact** in 6.6. Because of the gradual increase it is **year 5 before this is reflected in premiums** as insurers wait to see whether it is a spike or a trend. Once premiums increase the higher cost means **new business volumes stagnate**.

6.8 In a similar fashion to the PMI claims, the increased frequency and severity of storm surges causes some deaths. **Mortality rates increase by 10% in line with the phased stress impact** in 6.6. Because of the gradual increase it is **year 5 before this is reflected in premiums** as insurers wait

[1] https://climateknowledgeportal.worldbank.org/country/malta (https://www.thelancet.com/journals/lanpub/article/PIiS2468-2667(24)00179-8/fulltext, n.d.) (https://www.thelancet.com/journals/lanpub/article/PIiS2468-2667(24)00179-8/fulltext, n.d.)a/impacts-sea-level-rise

to see whether it is a spike or a trend. Once premiums increase the higher cost means **new business volumes stagnate**.

7 Scenario 5 – Unpredictable Weather

Narrative

7.1 As climate change intensifies, Malta faces an increase in unpredictable and extreme weather patterns. Weather events are much more volatile in this case, and these include sudden and severe storms, prolonged droughts, heatwaves, intense rainfall leading to flooding and unexpected cold spells. The frequency, intensity and variability of these events create a scenario where the historical climate data becomes less reliable for predicting future conditions.

7.2 Due to Malta's reliance on tourism and imports, the growing unpredictability of weather presents serious economic and infrastructural challenges.

Market Impact

7.3 The broader market in Malta will experience direct and indirect consequences due to unpredictable weather patterns. Sectors likely to be directly impacted the most are agriculture, tourism, infrastructure and logistics.

7.4 Increased flooding and storm damage will strain public and private infrastructure leading to higher maintenance and repair costs. Delays in the supply chain, and increased demand for construction materials, cause investments linked to construction projects to fall in value. We assume that the value of **domestic assets fall by 20%** in year 1.

7.5 Crop yields and livestock health will be affected by the unpredictable rainfall and extreme temperatures which may lead to supply chain disruptions and higher food prices. Supply chain disruptions due to weather-related transportation issues will increase costs and cause delays particularly for food imports which will affect business efficiency, profitability and livelihoods.

Non-Life Insurance Impact

7.6 Gale force winds, flooding and hailstorms all cause damage to vehicles. Claims for motor damage increase. There are **3 events per year in which 50 cars are damaged** each time, causing claims on insurance policies.

7.7 Increased impact of storms and other weather events means that reinsurers become uncomfortable with the level of volatility in claims. As a result, at renewal reinsurers want **insurers to retain at least 50% of each risk** for motor and hull cover, and **20% for property damage**.

7.8 Several events per year, each resulting in multiple claims means many insurers claim on their catastrophe cover in year one. In response, **catastrophe reinsurance doubles in price linearly over the next three years** causing insurers to choose between retaining the risk, increasing the catastrophe limits or paying the higher premium.

7.9 Companies affected by supply chain issues, infrastructure damage or less of revenue due to weather disruptions are also likely to file more BIC claims, raising insurers costs. We estimate BIC claims **to go up by 8% in year 1 increase as the weather patterns remain unpredictable.**

7.10 Unreliable weather conditions may deter tourists, particularly those drawn to the sunny climate, impacting revenue in this sector. We expect the initial impact to be a relatively small drop in tourist revenue but for this to increase yearly as the weather becomes more and more unpredictable. **We**

have assumed a reduction in new business volumes and renewals of 10% for property policies.

Life & Health Insurance Impact

7.11 The life insurance sector will also be affected by climate-drive changes in health and safety conditions. Heatwaves and extreme events increase the risk of heatstroke, respiratory issues and other climate-related health problems. More frequent accidents as a result of the poor and unseasonal weather increase the use of healthcare facilities so **PMI claims increase by 10%** for the duration of the projection.

7.12 Severe weather events can lead to increased mortality from accidents, natural disasters and health complications, resulting in higher life insurance payouts. So far there haven't been many deaths recorded due to these weather patterns in Malta, however, the risk that if the weather patterns remain inconsistent and severe, may lead to increased mortality.

8 Scenario 6 – Disease Migration

Narrative

8.1 Disease migration refers to the geographical shift of infectious diseases due to changing climate conditions, such as rising temperatures, altered precipitation patterns, and extreme weather events. Warmer temperatures and increased humidity create favourable conditions for disease-carrying vectors (e.g. mosquitoes, ticks) and pathogens, allowing diseases that were previously confined to tropical regions to spread into new areas.

8.2 Malta is therefore at risk of having non-native species of insects and animals migrating to the island. These species could bring with them diseases which have an impact on humans, as well as livestock/fish which may also end up affecting food supply. Examples of potential disease threats to Malta are dengue fever, malaria and the West Nile Virus which are mainly spread to humans and animals by mosquitoes. Waterborne diseases such as cholera can also be spread due to increased temperatures and extreme rainfalls which could contaminate water sources. For the purpose of this scenario, we assume that **the probability of any of these diseases migrating to Malta is 5% in any given year.**

Market Impact

8.3 The main impact of disease migration would be the strain on the public healthcare system and increased healthcare costs. The government will be forced to spend more on disease prevention mechanisms such as vaccination programmes, vector control and public health campaigns. A rise in the healthcare demands will also lead to shortages in medical personnel and resources available.

8.4 A fear of disease outbreaks could reduce tourist arrivals onto the island, affecting the hospitality, travel and leisure industry. Travel warnings may impact Malta's reputation as a safe travel destination. There are likely to be additional costs for screening travellers and implementing public health measures at airports and seaports which can also be another deterrent for travellers.

8.5 COVID-19 was an extreme case where travel was completely restricted, and this saw Malta's visitors falling by around 76%[1]. We therefore believe that disease migration could also see a fall in tourism, albeit not at the same levels as COVID-19 due to the unlikelihood of a total lockdown; for the purpose of this scenario we have forecast a significant decline in tourist arrivals. This will have a knock-on impact on property values as demand reduces. Therefore, we have assumed a **5% fall in property values each year for the first 4 years of the projection.**

8.6 Due to the likely increase in government subsidies to support public health measures, we expect this to cause a strain on Malta's budget. The increased government spending could be funded by more borrowing which, in turn, would cause upward pressure on interest rates. Higher interest rates mean higher costs for businesses which results in higher prices for consumers. The model assumes **inflation increases by 5ppts and interest rates increase by 2ppts throughout the projection.**

[1] https://www.centralbankmalta.org/site/Reports-Articles/2022/Covid-Tourism.pdf

Non-Life Insurance Impact

8.7 Outbreaks of climate-driven diseases could cause businesses to temporarily shut down leading to increased claims on business interruption policies. With tourist figures likely to decline, the hospitality industry will see a fall in demand for their services which will also result in BIC claims. **We have assumed a 10% increase in BIC claims.**

8.8 A decline in tourism income can lead to an economic downturn, reducing overall consumer spending power. This can affect the demand for non-life insurance products as consumers rein in non-essential purchases. We have assumed **new business and renewal volumes for travel, property and private marine policies fall by 10%.**

Life & Health Insurance Impact

8.9 As climate change drives the migration of diseases into Malta, the health insurance industry faces significant risks, including higher claims, increased premiums and underwriting challenges. The vector-borne diseases mentioned above will require hospitalisation, medical treatment and extended recovery periods which will lead to higher insurance payouts. Waterborne illnesses such as cholera may also result in hospital admissions, dehydration treatments and emergency care. The strain on public health will also mean that more and more people will be seeking private medical cover in order to get treatment. **We have assumed a 15% increase in medical expense claims as we expect an increase in healthcare utilisation in Malta due to these new viruses.**

8.10 The increase in health-related cases will also lead to an increase in critical illness and life insurance claims. 14.3 per 100,000[1] people that contract Malaria die while the fatality rate for dengue fever is anything from 1% to 26%[2]. Malta is currently free from these tropical diseases therefore, were these diseases to arise, we assume an initial spike of a **10% increase in mortality rates and a 15% increase in morbidity rates lasting throughout the projection period**.

[1] https://www.who.int/data/gho/indicator-metadata-registry/imr-details/16

[2] https://www.ncbi.nlm.nih.gov/books/NBK430732/#:~:text=Untreated%20severe%20dengue%20fever%20may,be%20reduced%20to%20approximately%201%25.

9 Scenario 7 – New Pandemic

Narrative

9.1 There is a new worldwide pandemic which results in lockdowns and severe travel restrictions that persist for a significant time. We suggest that a worldwide pandemic is around a 1-in-100 year event.

9.2 Tourism ceases for 6 months covering the entire peak season and multiple business are closed temporarily, with some shutting down completely. During the COVID-19 pandemic there was a complete ban on incoming flights for around 4 months with restrictions lasting for a further 12 months and so it is not difficult to envisage such a scenario.

Market Impact

9.3 An increase in government money supply, increased demand for energy and certain goods, and disruption to the food supply all act to increase inflation. The scenario assumes **inflation rates rise by 4% in the first year, a further 8% in the second year, and revert to normal levels after year 2**.

9.4 Demand for both residential and commercial property falls as jobs are lost, and businesses fail. There is a **10% shock to property values** and **expected real returns on property above risk free rate fall by 25% for the next 3 years**.

9.5 Economic lockdowns lead to significant drops in economic activity. This, coupled with supply chain disruptions lead many, especially small and medium sized, businesses to experience significant financial distress due to reduced revenues. To survive this, many companies take on additional debt, increasing their risk of default leading to a reduction in investor confidence and therefore stock prices. Reduced corporate earnings and investor confidence mean **equity values fall by 25%** and future returns are depressed, with **the real-world risk premium reduced by 50%** for the projection period.

Non-Life Insurance Impact

9.6 The restrictions implemented by the government alongside supply chain issues mean that many businesses will be unable to trade. This will result in increased payouts for on BI. **Claims are 50% higher than the expected position in year 1 and 25% higher in year 2**.

9.7 Due to the travel restrictions put in place there will be a significant number of claims for holiday cancellations and for repatriating Maltese citizens stuck abroad. The **claims on current travel insurance policies double for one year**. In addition to this, the **new business volumes for travel insurance fall to zero for a year.**

9.8 Job losses as businesses close or have to reduce staff numbers mean that people can no longer afford their insurance premiums or have to sell vehicles. There is an **increase of 50% to policy lapse rates for one year** and a **reduction to new business and renewal volumes from plan of 20% in year 1, 10% in year 2 and 5% in year 3** as it takes time for the economy to recover.

Life & Health Insurance Impact

9.9 The new pandemic will cause excess deaths. This scenario has a spike in **mortality rates of +30% for one year**, as was seen in Italy during COVID-19.

9.10 Due to lockdown measures people are not able to attend hospital appointments and non-emergency procedures are postponed. This causes a backlog following the pandemic and a delay in the diagnosis of critical illnesses. As a result, critical illness claims rates **increase by 10% per year for the next 5 years before falling back to pre-pandemic levels over the following 5 years**.

9.11 Lapse rates increase and new business rates decrease in the same way as for non-life products – see 9.8.

10 Limitations

10.1 This paper is intended as a practical resource to support Maltese insurers in developing climate change scenarios for use in their Own Risk and Solvency Assessments (ORSA). While we have taken care to ensure that the scenarios and impacts presented are grounded in credible data, informed by scientific research, and shaped by our understanding of the local insurance market, it is important to emphasise that these are not forecasts or predictions.

10.2 The scenarios outlined are designed to be plausible rather than probable. They represent a range of potential futures that could arise under different climate pathways and policy responses. The impacts described are illustrative, based on reasonable assumptions and expert judgement, but they are not definitive. As with all scenario analysis, there is inherent uncertainty in both the likelihood and the consequences of future climate-related events.

10.3 We have drawn on a wide range of publicly available data sources, supplemented by professional insight and dialogue with industry stakeholders. Where data specific to Malta was unavailable, we have used regional or global proxies and applied judgement to ensure relevance. While every effort has been made to ensure accuracy and consistency, users should be aware of the limitations of the underlying data and the assumptions applied.

10.4 This paper should be viewed as a starting point—a tool to stimulate internal discussion, support regulatory compliance, and encourage deeper engagement with climate-related risks. We encourage users to adapt the scenarios to reflect their own business models, exposures, and risk appetites, and to supplement them with their own data and insights.

10.5 As the science, regulation, and understanding of climate risk continue to evolve, so too should the scenarios and methodologies used to assess them. We anticipate that this paper will be updated over time to reflect new developments, and we welcome feedback from the industry to help shape future iterations.

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Glossary

Term	Definition
Bank Credit Quality	A measure of a bank's financial strength and ability to meet its obligations, relevant to insurers' investment risk and counterparty exposure.
BIC (Business Interruption Cover)	Insurance that compensates for loss of income due to a disruption in operations.
Catastrophe Insurance	Protects against large-scale natural disasters such as floods, hurricanes, and earthquakes.
Commercial Insurance	Covers businesses against losses from property damage, liability, and other risks.
Critical Illness	Insurance that pays a lump sum upon diagnosis of specified serious illnesses such as cancer, heart attack, or stroke.
EIOPA (European Insurance and Occupational Pensions Authority)	The EU regulatory authority overseeing insurance and pensions. It issues guidelines on integrating climate risk into ORSA and supervises Solvency II compliance.
HCP (Health Cash Plan)	A type of insurance policy that provides cash payments to cover everyday healthcare costs such as dental treatment, optical care, and physiotherapy.
Health Insurance	Covers medical expenses.
IFoA (Institute and Faculty of Actuaries)	The UK's professional body for actuaries, providing guidance, standards, and research relevant to actuarial practice, including climate risk modelling.
Life Insurance	Provides a payout upon the policyholder's death or after a set period.
Marine Insurance	Covers loss or damage to ships, cargo, and terminals.
Morbidity Rates	The frequency of illness or disease in a population.
Motor Insurance	Covers liability and damage related to the use of motor vehicles.
NGFS Climate Pathways	Scenarios developed by the Network for Greening the Financial System to assess the macroeconomic and financial impacts of climate change under different policy and transition assumptions.
ORSA (Own Risk and Solvency Assessment)	An internal process under Solvency II requiring insurers to assess their own risk profile and solvency needs, including forward-looking climate change scenarios as mandated by EIOPA.
PMI (Private Medical Insurance)	Health insurance purchased by individuals or employers to cover medical expenses not funded by the state.
Real World Risk Premium	The excess return investors require for holding risky assets over risk-free assets, reflecting real-world probabilities rather than risk-neutral ones. Used in economic scenario generators and valuation models.
Solvency II	The EU-wide regulatory framework for insurance and reinsurance firms, structured around three pillars: quantitative requirements, governance and risk management, and disclosure and transparency.
Travel Insurance	Covers trip cancellations, medical emergencies, and other travel-related risks.

About Zenith Actuarial

Our business

Zenith Actuarial is a specialist actuarial consultancy firm. It is committed to delivering high-quality actuarial and technology services through innovative and agile solutions.

Zenith's clients include domestic insurers, mutuals and multinational corporates and includes life, non-life, health insurers and reinsurers. With a wealth of experience, Zenith is well-positioned to support insurers across a range of territories and jurisdictions, including the UK, its dependencies, Europe and Bermuda.

We have offices in the UK and Malta. We are Malta's only specialist actuarial consultancy.

We work in partnership with our clients to deliver actuarial services, technology solutions and advice. Our expanding advisory and technology team ranges from senior actuaries through to junior analysts and works to provide clients with the expertise and insights they need.

Navigating complexity is a constant challenge. That's why we developed evo-insight, a cloud-based technology platform with a range of actuarial and business applications that delivers insightful analytics without the need for coding.

About us

Zenith was established in 2016 and has grown organically since then. We continually invest in the business and place our collaborative culture at the centre of everything we do, both with our clients and with our team.

Contact us

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