Annex 3: Mapping of climate change risks to prudential risks – Non-life insurance

Climate change risk channel	Sub type	Underwriting risk	Market risk	Credit / Counterparty risk	Operational / Reputational / Strategic risk
Transition risk	**Policy**	- Economic impact of a policy-triggered transition to a low-carbon economy leads to higher claims for some lines of business, e.g. credit insurance.	- Energy efficiency regulation of commercial and residential property reduces the value of undertakings' investments in real estate that do not comply with the requirements. - Increase in carbon taxes and/or reduction in emission rights, negatively affects investments in carbon intensive sectors, like mining, energy, transport and manufacturing. - Late government intervention to achieve transition to low carbon economy disrupts the stability of the real economy and the financial sector, depressing asset values and interest rates. - Transition to low-carbon economy results in higher spreads on government bonds of countries that are economically dependent on oil & gas exploration, coal mining and/or carbon-intensive industries.	- Collateral backing of commercial and residential mortgage portfolio decline in value e.g. due to government policy with regards to the energy efficiency of real estate.	- Maritime insurance undertakings experience market contraction as policy-induced transition to a low-carbon economy leads to a fall in global shipping of oil and gas. - Transition to a low-carbon economy reduces demand for insurance products and services where undertakings' customer base is heavily exposed to conventional carbon-intensive industries.
	Legal	- Higher climate change-related claims under liability policies, like directors & officers, professional indemnity and third-party environmental policies.	- Price declines of investments in carbon-intensive sectors due to companies facing litigation for failing to avoid or minimise adverse impacts on the climate, or failing to	- Reinsurance undertaking faces claims for not considering the impact of its underwriting decisions on climate change, resulting in a lower credit standing and higher exposure of	- Undertakings that do not take into account the impact of their underwriting and investment decisions on climate change experience direct claims for damages and litigation costs.

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			adapt to climate change.	undertakings to reinsurance losses.	
	Technology	- High claims on new insurance products covering green technologies because of underpricing due to lack of data.	- Advances in clean energy technology result in stranded assets of companies involved in oil & gas exploration and carbon-based power generation. - Companies or sectors invest in new low-carbon technologies but some of those prove not to be successful, depressing their asset values.	- Advances in clean energy technology result in losses on private loans to companies dependent on carbon-based power generation as well as companies developing unsuccessful clean energy technologies.	- Undertaking's strategy fails to take into account disruption of conventional industrial organisation induced by technology-driven transition to low-carbon economy with firms demanding new insurance products and services, leading to a drop in demand for its products.
	Market sentiment		- Shift in customer preferences for climate-friendly goods and services, e.g. electrical cars and transport vehicles, puts investments in producers of conventional, carbon-based goods and services under pressure.	- Shift in business preferences to occupy sustainable office and retail space lowers the value of mortgage loans on climate-unfriendly commercial property.	- Shift in customer preferences for sustainable companies diminishes demand for the undertaking's insurance products and services, as its business strategy does not sufficiently take into account the long-term impact on sustainability factors.
	Reputation		- Investments in certain companies perform poorly because of their reputation of contributing to climate change.	- Higher spreads on loans to certain companies and real estate funds that have a climate-unfriendly reputation, resulting in lower revenue for these companies and lower occupancy rates of the real estate.	- Non-life underwriting in economic sectors contributing to climate change, e.g. coal-fired power infrastructure, damages the reputation of undertakings, making it difficult to attract and retain customers and staff.

Climate change risk channel	Sub type	Underwriting risk	Market risk	Credit / Counterparty risk	Operational / Reputational / Strategic risk
Physical risk	**Acute**	- Climate change increases the frequency and concentration of extreme weather events and natural catastrophes, e.g. heat waves, landslides, floods, wildfires and storms, resulting in higher insurance claims. - Climate change increases the frequency and concentration of extreme weather events and natural catastrophes, damaging property and resulting in higher insurance claims. -Motor and auto underwriting losses increase over time due to increased severe hailstorm events. - Aviation hull claims increase over time due to increased hailstorm and lightning strike losses. - Higher frequency/intensity of hails or floods result in higher claims on crop insurance. - Climate change increases the losses related to Non-Damage Business Interruption (NDBI) insurance by preventing firms' operations following a natural disaster, even if they have not been physically impacted (for example	- Higher credit spreads on government bonds issued by countries that are highly susceptible to acute physical risks. - Downgrade of municipal bonds issued by municipalities whose infrastructure, economy and/or revenues are impacted by extreme weather events. - Values of real estate portfolios decline due to properties being located in areas highly sensitive to the increase in extreme weather events. - Climate change-related shocks, e.g. a pandemic, negatively affecting the economy and the financial system and depressing interest rates and asset values. - Increased currency volatility of countries that are vulnerable to the rise of extreme weather events and natural disasters, increasing undertakings' foreign exchange risk.	- Higher frequency and concentration of extreme weather events and natural disasters reduces the credit standing and/or leads to defaults of reinsurance undertakings, exposing undertakings to reinsurance losses. - The availability and cost of reinsurance cover becomes prohibitive for smaller insurers in certain markets due to the increase in frequency, correlation and severity of natural disasters. - Higher frequency and severity of extreme weather events reduces the credit standing of non-life undertakings, raising their cost of capital. - Uninsured losses on commercial and residential property arising from climate change-induced physical perils negatively affect the performance of mortgage loans.	- Climate change-related increase in extreme weather events and natural disasters affecting undertakings' own assets (property, equipment, IT systems and human resources), increasing costs and potentially compromising operations. - Undertaking's risk management and pricing fails to take into account the potential non-linear character of acute physical risks, e.g. coincidence of previously un-correlated event, resulting unexpectedly claim burdens, resulting in unexpected losses. - Increasing acute physical risks, like wildfires, floods and storms, constrains insurers to underwrite property and assets. - Inappropriate strategy relating to acute physical climate risk mitigation reduces the insurer's competitiveness. - Melting arctic ice due to climate change is likely to lead to an opening up of the Northwest Passage leading to new opportunities for marine insurance.

Climate change risk channel	Sub type	Underwriting risk	Market risk	Credit / Counterparty risk	Operational / Reputational / Strategic risk
		aviation companies). - Increase of extreme events will impact the creditworthiness of firms and individuals, resulting in higher credit insurance claims			
	Chronic	- Higher frequency and severity of epidemics and pandemics due to climate change lead to higher non-life insurance claims, e.g. business interruption and credit insurance. - Increase in temperatures will negatively affect the productivity of crop farming, thereby increasing crop insurance claims that cover revenue losses. - Decreasing river water levels prevent firms from operating, resulting in higher losses related to Non-Damage Business Interruption (NDBI) insurance .	- Higher credit spreads on government bonds issued by countries that are highly susceptible to chronic physical risks. - Fall in value of real estate portfolios due to properties being located in areas highly impacted by the increase in chronic physical risks, e.g. coastal urban areas vulnerable to sea level rise. - Government prioritises water supply to households and resulting water scarcity will put pressure on non-essential business activities.	- Higher incidence of pandemics results in losses on commercial mortgages, as consumers avoid shopping malls and working from home reduces demand for office space.	- Climate change-induced sea level rise renders residential and commercial property in vulnerable areas uninsurable. - Agricultural insurance undertakings experience a market contraction as crop farming is no longer possible due to temperature increases and lower water availability and as rising ocean temperatures reduces the productivity of fish farming. - Travel insurance undertakings face a severe market contraction following a climate change-induced pandemic. - Sea level rise constrains the insurability of houses located next to the coast, resulting in lower revenues for non-life insurers.