7th Seminar on Current Issues in General Insurance
Hotel Sea Princess, Mumbai
July 13, 2023

Solvency II Technical Provisions and Standard Formula
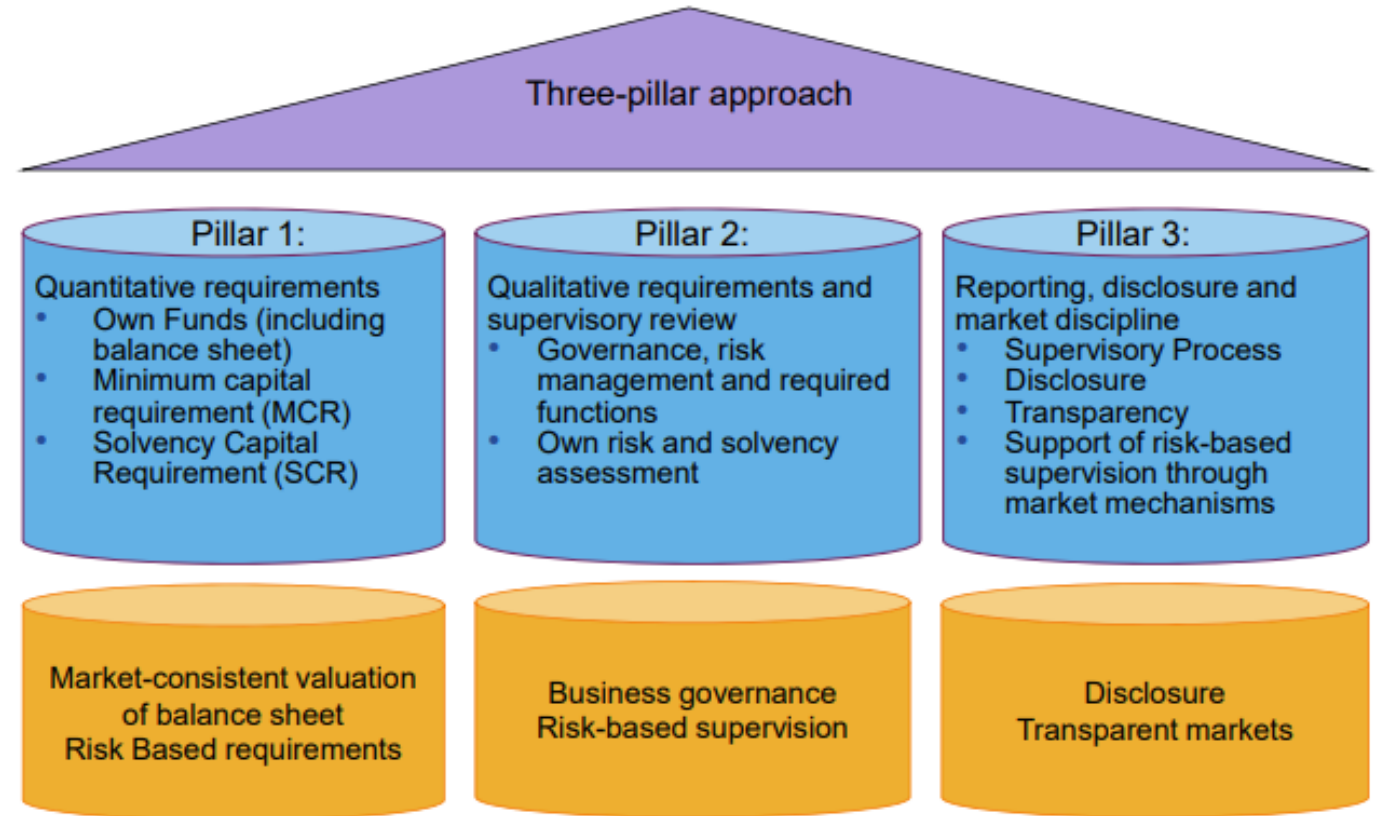- Charchit Agrawal

Institute of Actuaries of India

What is Solvency II?

► European-wide framework, approved in 2009 as Solvency II Framework Directive 2009/138/EC

► Came into force on 1st January 2016

► Risk-based system defining the capital requirements with a standard formula or an internal model
   ► Standard formula is a standardised calculation and therefore not tailored to the individual risk profile of a specific undertaking

► Aims to identify the risks an undertaking is exposed to and allocate capital accurately to the identified risks

► Risk-based prudential regulation based on a total balance sheet approach, taking into account diversification and risk-mitigation effects

► Risk-averse undertakings are rewarded with lower capital requirements
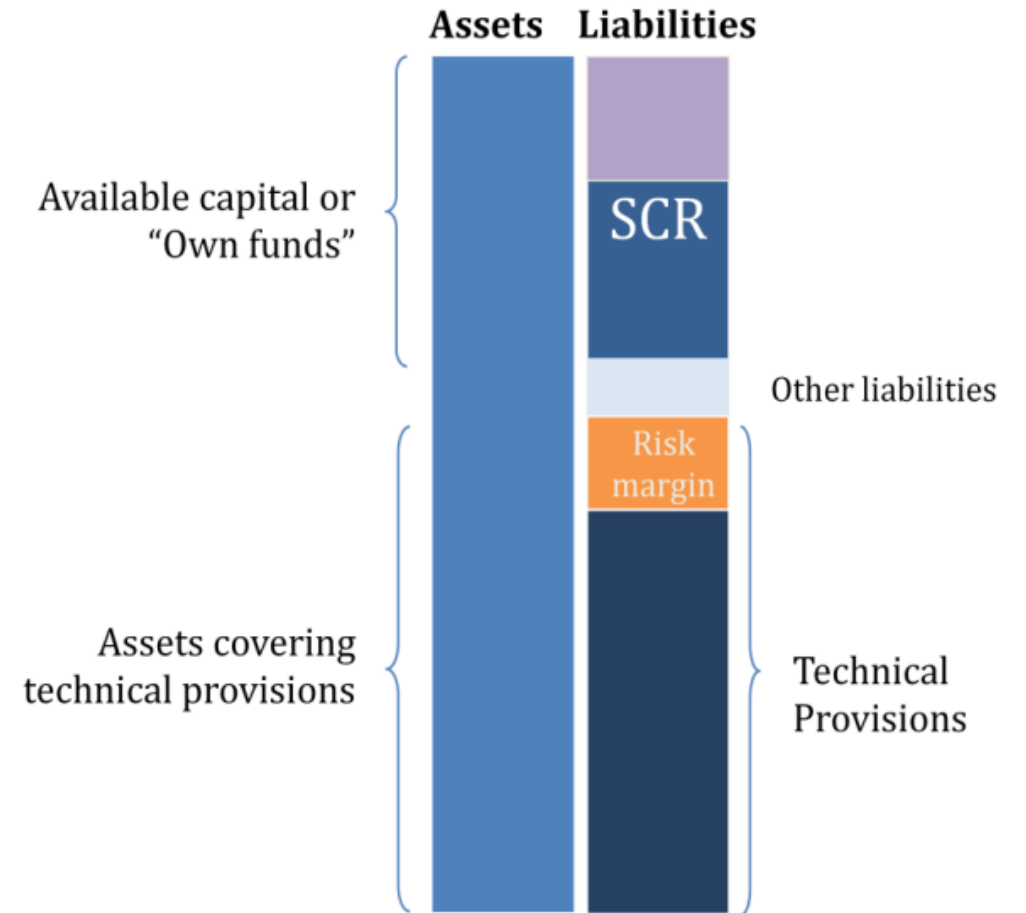
The 3 pillars of Solvency II

The Solvency II regulatory framework is built on a three-pillar structure:

▶ <u>Pillar I sets the quantitative requirements</u> i.e. the assets and liabilities valuation and capital requirements.

▶ <u>Pillar II sets the qualitative requirements</u>, including governance and risk management of the undertakings and the Own Risk and solvency Assessment (ORSA).

▶ <u>Pillar III sets the supervisory reporting and public disclosure</u>.

Three-pillar approach

Pillar 1:
Quantitative requirements
- Own Funds (including balance sheet)
- Minimum capital requirement (MCR)
- Solvency Capital Requirement (SCR)

Pillar 2:
Qualitative requirements and supervisory review
- Governance, risk management and required functions
- Own risk and solvency assessment

Pillar 3:
Reporting, disclosure and market discipline
- Supervisory Process
- Disclosure
- Transparency
- Support of risk-based supervision through market mechanisms

Market-consistent valuation of balance sheet
Risk Based requirements

Business governance
Risk-based supervision

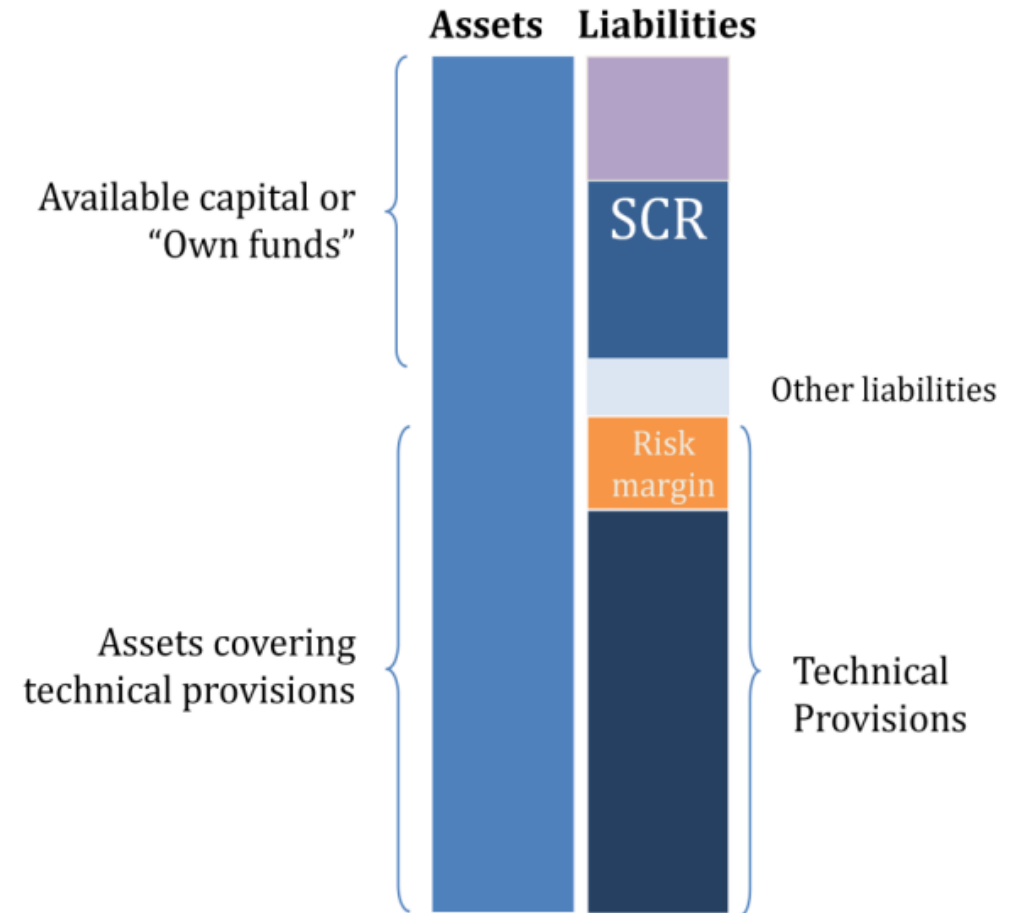Disclosure
Transparent markets

Solvency II – Balance Sheet

► Technical Provisions are a direct input in the balance sheet.

► They are a key input in the SCR calculation. Thus, if we get the TPs wrong the capital could equally be wrong.

► A key consideration for management in making significant decisions will be the excess of the value of assets over technical provisions, other liabilities (such as outstanding tax payments) and the solvency capital requirement. *(The purple box on top right)*

► The excess of "own funds" to use Solvency II terminology, over the solvency capital requirement will determine whether the (re)insurer can expand existing business, move into new areas, consider mergers/acquisitions with less capital rich entities, etc, or whether they need to consider reducing the volume of business they write, moving out of more volatile, capital intensive types of risk, purchasing additional reinsurance, and so on. The level of own funds will also often impact an insurer's credit rating.

Assets   Liabilities

Available capital or "Own funds"

SCR

Other liabilities

Risk margin

Assets covering technical provisions

Technical Provisions

SII Technical Provisions - Introduction

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Assets | Liabilities

Available capital or "Own funds"

SCR

Other liabilities

Risk margin

Assets covering technical provisions

Technical Provisions

SII Technical Provisions - BEL

➤ The Best Estimate Liabilities can be broken down into:

o Claims Provisions – is the discounted best estimate of all future cash flows (claim payments, expenses and future premiums) relating to claim events prior to the valuation date.

o Premium Provisions – is the discounted best estimate of all future cash flows (claim payments, expenses and future premiums) relating to future exposure arising from policies that the (re)insurer is obligated to at the valuation date.

➤ Premium provisions are further split between:

o Unearned exposure
o Bound But Not Incepted exposure (BBNI)

Best estimate Liabilities = Claims provision + Premium provision (Unearned and Un-incepted)

SII Technical Provisions - BEL
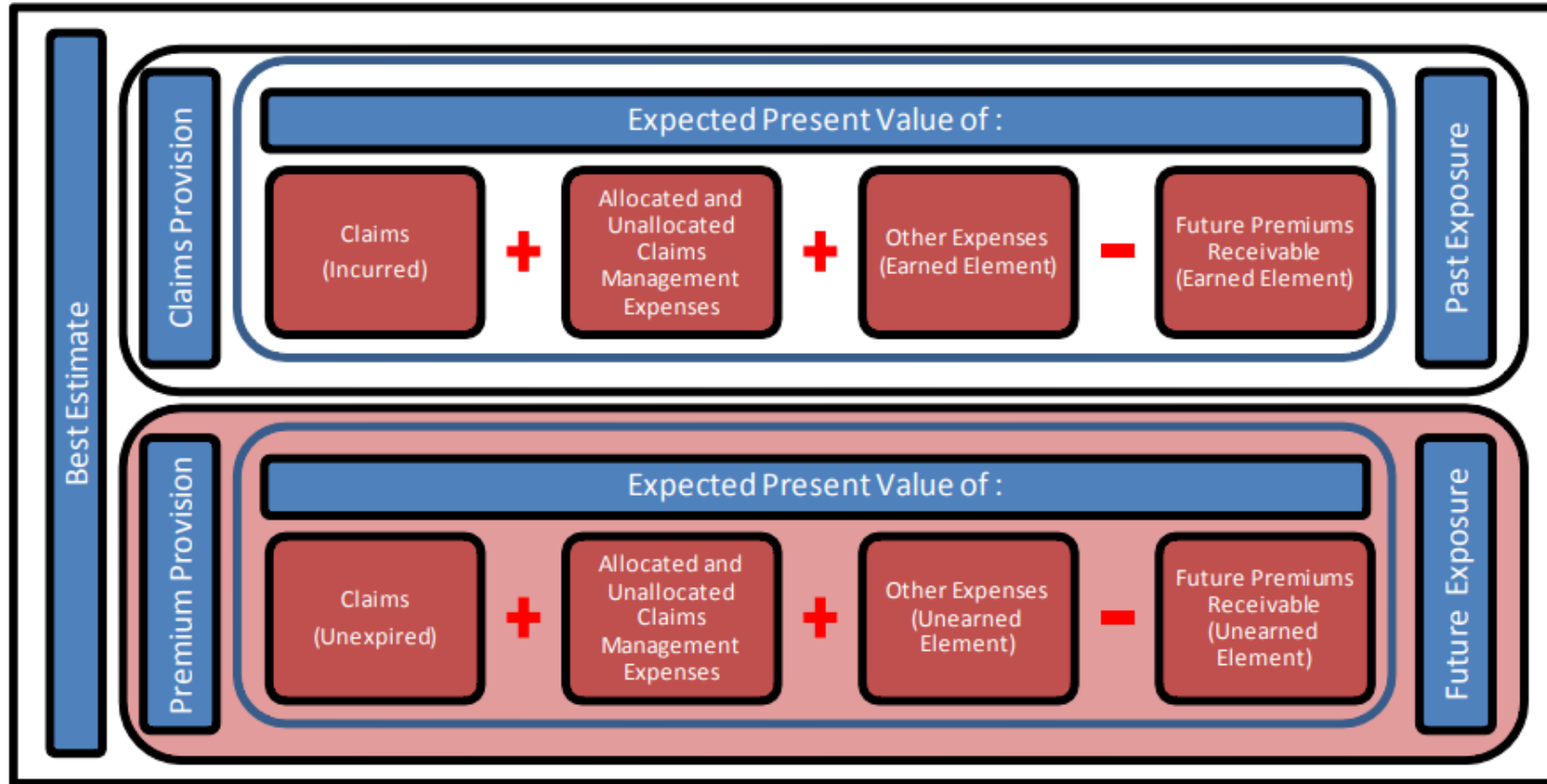
Figure 3.1 Breakdown of the best estimate calculation

► Source: sii-tp-wp-paper-giro40.pdf (actuaries.org.uk)

SII Technical Provisions – Claims provision (Earned)

⬇ Earned Future Premium (Gross – Ceded)

⬆ Net Earned Claims (Gross – Ceded)

⬇ Removal of any prudence

⬆ ULAE (Gross – Ceded)

⬆ Provision for RIBD

⬆ Operating Expenses

⬇ Time Value of Money

⬆ Events not in Data (ENIDs)

SII Technical Provisions – Premium provision (Unearned)

⬆ Claims on Unearned Exposures (Gross – Ceded)

⬆ Cost of Ceded RI for unearned exposure (LOD, Net of Commission)

⬆ ULAE (Gross – Ceded)

⬆ Provision for RIBD

⬆ Operating Expenses

⬇ Time Value of Money

⬇ Unearned Future Premium (Gross – Ceded)

⬆ Provision for Lapses

⬆ Events not in Data (ENIDs)

SII Technical Provisions – BBNI exposure

BBNI Premium (Gross - Ceded)

ULAE (Gross – Ceded)

Claims on BBNI exposure (Gross – Ceded)

Provision for RIBD

Operating Expenses

Events not in Data (ENIDs)

Time Value of Money

Provision for Lapses

GAAP/IFRS to SII Technical Provisions

Events Not In Data (ENIDs)

► Traditional reserving methods implicitly account only for losses which are evident in the data (or "reasonably foreseeable" losses).

► Under Solvency II we must account for "all possible outcomes".

► We therefore need to derive an uplift to apply to our reserves which will account for extremely high or extremely low losses which are not evident in our historical data.

► Some methodologies assume that via additional loadings in the reserves "all possible outcomes" have already been accounted for, and as such no additional ENID loading is added to the TPs. If this is the case then this assumption needs to be validated.

Provision for Bad debt

► Unlike GAAP, a bad debt provision is required within the TPs.

► It is calculated as a reduction to recoverables from the reinsurers based on a probability of default of reinsurers, depending on their credit rating.

► The bad debt uplift is calculated based on AM Best credit ratings for each reinsurer.

GAAP/IFRS to SII Technical Provisions

Bound But Not Incepted (BBNI)

► Under Solvency II all insurance contracts are covered up to the point where you can unilaterally terminate a contract, refuse to accept premium, or amend the benefits or premiums without limits.

► There are two components of the BBNI premium included within the premium provision:

  ► Pure BBNI: For the policies which are considered bound but not incepted at the relevant as at date.

  ► BBNI through binders: Where a third party writes business on your behalf

Binders – Under this agreement, the Managing Agent delegates its authority to enter into a contract of insurance to be underwritten by the members of a syndicate managed by it to the coverholder in accordance with the terms of the agreement.

Additional expenses

► GAAP reserves do not require inclusion of expenses.

► Under Solvency II we need to include all expenses relating to our bound business.

► This includes salaries, property costs, admin expenses, IT costs, investment management expenses, reinsurance team expenses and acquisition costs including commissions, as well as ULAE.

Discounting

- ► Under Solvency II, we need to discount cashflows for the time value of money.

- ► This involves turning premiums, reserves, expenses etc. into cashflows and then discounting them using a yield curve.

- ► The payment patterns used are derived from Lloyd's Risk Code data.

- ► We split the different components of the Technical Provisions into paid items and premium items, and have used claims payment or premium payment profiles depending on this split.

- ► For paid items, different profiles are used depending on if the business is earned, incepted unearned, or un-incepted.

- ► For discounting, we use EIOPA and PRA yield curves.

Risk Margin

▶ Risk Margin is also required to be included in Technical Provisions (in addition to the BEL)

▶ Risk Margin represents the additional amount an insurer would require to take on obligations, above and beyond the best estimate present value of cashflows.

▶ Calculated as the cost to transfer the insurance obligations of the business to a third party at the balance sheet date, and immediately place that business in run-off.

▶ It is estimated by applying the prescribed cost of capital (i.e. 6%) to the discounted value of the capital requirement of the business at each future point in time until the business is fully run off.

▶ Risk Margin is only calculated on a net basis.

▶ It does not include any hedgeable risks (eg: Market risk)

Risk Margin

- For many smaller insurers, the cost of capital approach may be appealing due to the potential for leveraging existing Solvency II calculations. Note, however, that the Solvency II Risk Margin as calculated is not a perfect drop-in for the following reasons:
  - The Solvency II Risk Margin is calculated by a prescribed 6% cost of capital rate. The IFRS 17 risk adjustment should be calculated using the entity's actual own cost of capital.

  - The Risk Margin under Solvency II includes the non-hedgeable part of the SCR. In effect this makes the scope of risks covered by the Risk Adjustment and the Solvency II Risk Margin **very similar**, i.e. insurance risk and other non-financial risks such as lapse and expense risk. However IFRS 17 explicitly **excludes** any allowance for operational risk.

  - The Risk Margin under Solvency II is net of reinsurance. However, under IFRS 17 both a gross Risk Adjustment and the amount of Risk Adjustment passed to the reinsurer must be estimated separately

SII Capital Requirement - Background

▶ Under Solvency II, insurers and reinsurers are required by regulators to hold a certain level of capital in addition to the Technical Provisions. Two thresholds are prescribed, a Minimum Capital Requirement ('MCR') and Solvency Capital Requirement ('SCR').

▶ The SCR is the level of capital required to meet all insurance obligations with a 99.5% probability over the following 12 months, or to withstand a 1 in 200 year event. This is calculated either using a Standard Formula provided by the regulator or an internal model approved by the regulator.

▶ Should the level of capital held fall below the SCR, intervention by the regulator would become progressively more intense as the shortfall approaches the level of the MCR.

▶ The MCR is the level of capital required to meet all insurance obligations with an 85% probability over the following 12 months. MCR has a floor of 25% and cap of 45% of SCR

▶ The Standard Formula is a prescribed 'standard' approach to calculating the SCR.

Standard Formula
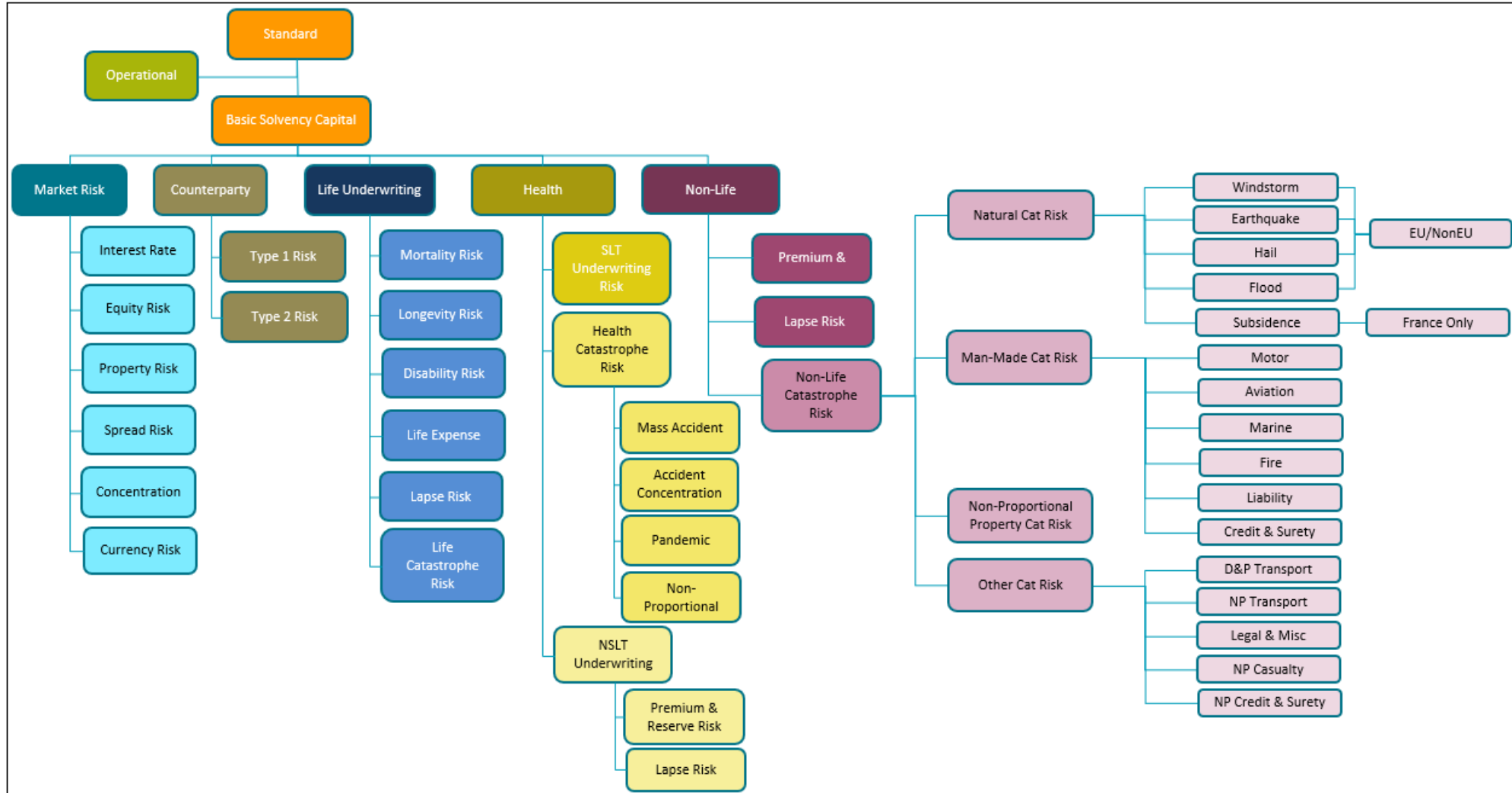
Non-Life UW Premium Risk

➤ The risk that the premiums charged estimated are not sufficient to cover claims from both historical business and business written over the next year.

➤ This is calculated by applying prescribed factors to premium and technical provisions, where the factors vary by class of business and high-level geography.

➤ The inputs for Premium Risk Include –

Net premium earned in the last 12 months.

Net premium expected to be earned in the next 12 month

Premium bound at the balance sheet date that would earn after 12 months from the balance sheet date

Premium from contracts written in the next 12 months that would earn more than 12 months from that contract's inception

Non-Life UW Reserve Risk

➢ The risk that the reserves estimated are not sufficient to cover claims from both historical business and business written over the next year.

➢ Best estimate claims provisions which we calculate each quarter for each SII lines of business are allocated to geography in proportion to the net premium earned in the last 12 months input.

➢ The SII lines of business as per the Llyod's model are shown on the right

Full Name
Direct and Proportional Medical Expenses
Direct and Proportional Income Protection
Direct and Proportional Workers' Compensation
Non-Proportional Health Reinsurance
Direct and Proportional Motor Vehicle Liability
Direct and Proportional Other Motor
Direct and Proportional Marine, Aviation and Transportation
Direct and Proportional Fire & Other Damage to Property
Direct and Proportional General Liability
Direct and Proportional Credit & Suretyship
Direct and Proportional Legal Expenses
Direct and Proportional Assistance
Direct and Proportional Miscellaneous Financial Loss
Non-Proportional Casualty Reinsurance
Non-Proportional Marine, Aviation and Transportation Reinsurance
Non-Proportional Property Reinsurance

Non-Life UW Lapse Risk

➢ The risk that profitable contracts lapse, resulting in loss of profits. This is calculated by applying a prescribed factor to expected profit in premium yet to be received.

➢ The input in the lapse module is the net Expected Profit in Future Premiums ('EPIFP'), i.e. the impact on the net technical provisions if policies were discontinued, for policies where discontinuance would increase the technical provisions.

➢ For unearned and BBNI business, we can assume that all outstanding premium is not received or is refunded, related gross claims and expenses are not paid and reinsurance recoveries are not received

Non–Life Catastrophe Risk
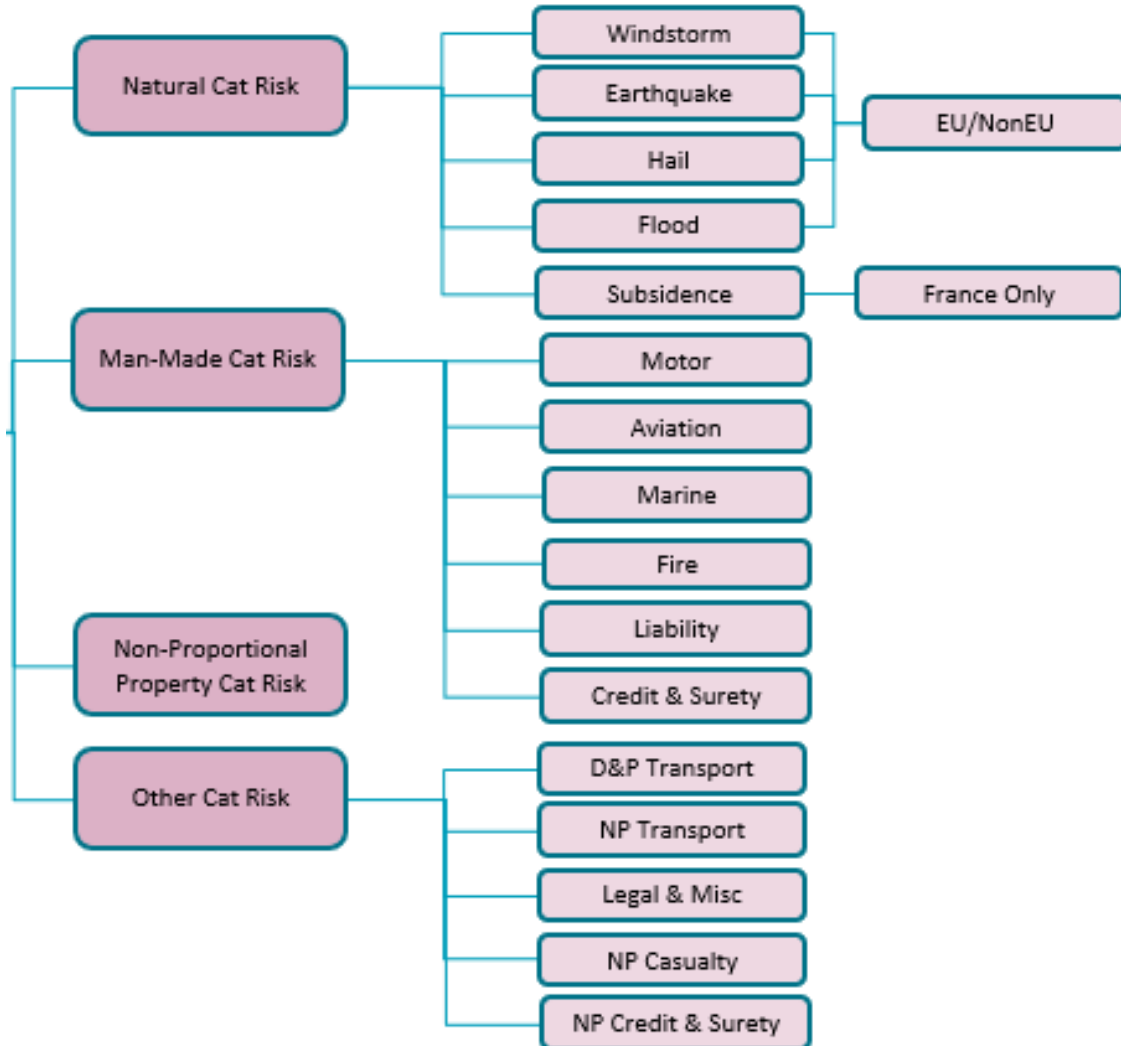
- The risk that a catastrophe event occurs impacting the business.

- This is calculated through a number of scenarios designed to impact all classes of business in some relevant way.

- It is then allowed to use reinsurance program to mitigate these events.

Market Risk

➤ Market Risk is the risk of loss or of adverse change in the financial situation resulting, directly or indirectly, from the fluctuations in the level and in the volatility of market prices of assets, liabilities and financial instruments

➤ It is composed of six sub-modules that are aggregated and diversified to give the overall Market Risk SCR

```
Market Risk
    ├── Interest Rate Risk
    ├── Equity Risk
    ├── Property Risk
    ├── Spread Risk
    ├── Concentration Risk
    └── Currency Risk
```
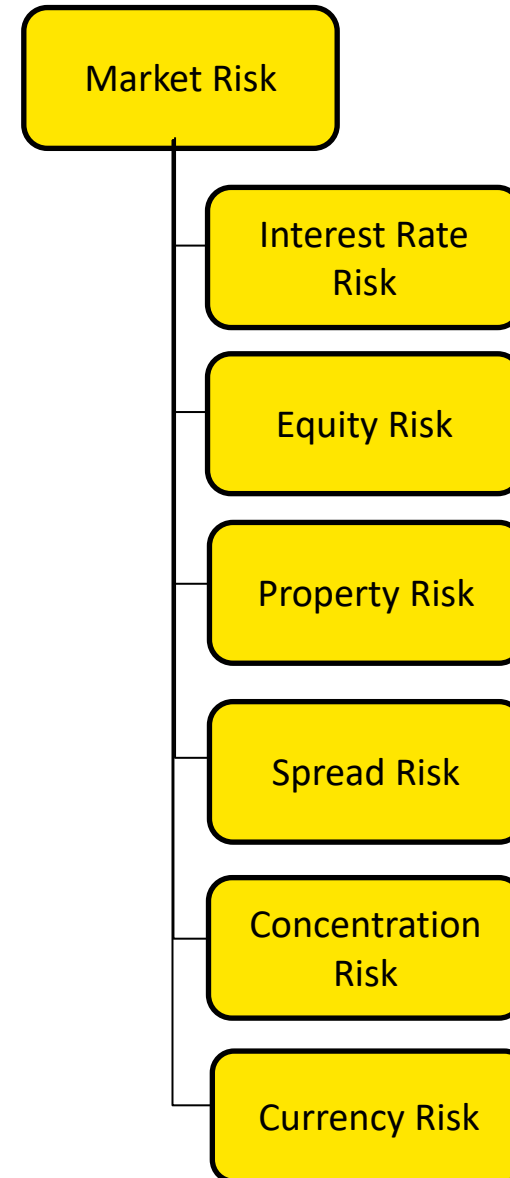
Interest Rate Risk

Basis 1 (including Funds in Syndicate)

	Assets	Liabilities	Surplus	Impact on Surplus
Undiscounted		671,174.7		
Discounted - Unshocked	1,863,016.7	597,378.5	1,265,638.2	
Discounted - Upward Shock	1,795,023.3	561,326.3	1,233,697.0	(31,941.2)
Discounted - Downward Shock	1,938,335.7	632,580.7	1,305,755.0	40,116.7

Worst individual shocks (not currently used)	(33,099.6)
SCR Basis 1 (including Funds in Syndicate)	31,941.2

The image shows the SCR calculation for Interest rate Risk

- The risk that interest rates will differ significantly from expectations, resulting in a mismatch in the present value of assets and liabilities that are exposed to interest rate changes.
- It is calculated by applying various prescribed yield curves to the future cashflows (both assets and liabilities).
- Inputs to this module are as follows, split by currency:
  - The undiscounted value of the assets exposed to interest rates (e.g. bonds) and their modified duration.
  - The undiscounted value of the TPs and their expected payment pattern
- Factors defined in the Standard Formula are then applied to the yield curves used to discount these assets and liabilities, by currency, to produce a net asset value under two shock scenarios from which a risk charge is derived.

Equity Risk

➢ Equity risk is the risk of changes in the market value of the held equities. In general, non-life insurers tend to only hold small amounts of equities and so this risk charge tends to be small.

➢ Equity in this context should not be confused with the equity of the company, which is the difference between its assets and its liabilities. Equity here refers to shares held as assets on the balance sheet.

➢ In this module, factors defined in the Standard Formula are applied to the value of equity holdings depending on whether the equity is a strategic, long term, 'Type 1', 'Type 2', infrastructure, or infrastructure corporate equity.

  ➢ **Type 1 equities**: These are equities listed in regulated markets in countries which are members of the EEA or OECD.

  ➢ **Type 2 equities**: These are equities listed in other countries, unlisted equities, commodities and other alternative investments. It should also include other assets which are not considered in the interest rate sub-module, the property risk sub-module or the spread risk sub-module.

  ➢ The value of strategic participation. A strategic participation is one in which the undertaking can demonstrate that the equity investment is likely to be less volatile in the next 12 months than other equities and that the nature of the investment is strategic. Strategic participations may be Type I or Type II and receive a smaller risk charge of 22%. The charge is added to the other Type I or Type II charge.

Currency Risk

➢ Currency risk is the risk of adverse movements in the FX rate. Often currency risk can be large, especially if the insurer writes in many different territories and does not match its assets and liabilities closely.

➢ The risk charge is 25% of the difference between assets and liabilities (valued on a Solvency II basis), in all currencies except for the reporting currency.

➢ Note that the capital requirements are summed over the currencies and there is no diversification.

Concentration Risk

➢ Concentration risk is the increased market risk which arises due to reduced diversification in the asset portfolio.

➢ The Solvency II calculation involves calculating what proportion of the assets a single name exposure makes up. A charge will be made on any amount over the threshold.

➢ The threshold and the charge depend upon the type of asset and counterparty – more risky exposures typically have a lower threshold and a higher charge for excess exposure.

➢ For the purposes of this module, assets need to be grouped into single name exposures. This means grouping together:
  ➢ All exposures/bonds/shares issued by the same corporate group.
  ➢ All immoveable properties located within the same building.

Property risk

➤ Property risk is the risk of changes in the valuation of immovable property (e.g offices, warehouses, and houses). The risk charge is 25% of the value of immoveable property .

➤ Moveable property (e.g. art, Motor Vehicle) that contributes towards own funds should be considered as Type II equity.

Spread Risk

➢ Spread risk is the risk of changes in the credit spreads over the risk free rates.

➢ Bonds usually have a lower value than that implied by the risk free rates due to additional risk on most bonds. Equivalently, bonds usually achieve a higher yield than the risk free rate to reward the investor for the additional risk. The difference between the risk free rate and the yield is known as the spread and it will be larger for riskier bonds. These are usually corporate bonds, and bonds with lower ratings.

Counterparty Default Risk

➤ Counterparty Default risk, is the risk of losses due to the default or change in credit rating of certain counterparties to whom the insurer is exposed, whose credit risk is not covered under Market Risk.

➤ The difference between Counterparty Default Risk and Market Risk is that Market Risk deals with tradeable assets such as bonds and equities, whereas Counterparty Default Risk deals with non-tradeable assets, such as moneys owed by individuals and companies.

➤ Counterparties are split into two categories:

  ➤ Type I counterparties are generally exposures to companies that can be named. These counterparties will often have a credit rating. If they do not have a credit rating, their audited Solvency ratio can be used as a proxy, or the counterparty can be categorised as unrated. This category will include **reinsurance recoveries, cash at bank, derivatives and letters of credit**.

  ➤ Type II counterparties are usually counterparties that cannot be named. They are often debts due from individuals such as **policyholders and brokers**.

Operational Risk

➢ The non-insurance and non-market risks that the insurer faces as part of their day to day operations.

➢ The Standard Formula applies factors to the gross premium earned in the previous 12 months, and the 12 months before that, which Finance team provides, and the gross TPs.

➢ Within the Standard Formula SCR, operational risk is assumed not to diversify with the other risk types.

➢ The basic capital requirement for operational risk shall be calculated as follows:

$$Op = \max(Op_{premiums}; Op_{provisions})$$

(a) Op premiums denotes the capital requirement for operational risks based on earned premiums;
(b) Op provisions denotes the capital requirement for operational risks based on technical provisions.

Thank You