



Institute
and Faculty
of Actuaries

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of Actuaries

Asset Modelling in presence of liabilities

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IFoA India Conference 2024

Agenda

1 Why does an insurer need assets

2 Assets classification and different asset types

3 Asset modelling focusing on

- Data
- Model setup
- Assumptions
- Reinvestment strategy

4 Sample Balance and Income statement projections

5 Regulations around asset allocation under different regions

6 Why is Reinsurance important for life insurance?

Why does an Insurer need assets

According to IFRS (International Financial Reporting Standards)

- “An asset is a present economic resource controlled by the entity as a result of past events. An economic resource is a right that has the potential to produce economic benefits”.
- “A liability is a present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits”



To meet the financial liabilities of a company



To support capital, both regulatory and internal



To meet expenses



To support new business



To reduce risk inherent in the liabilities

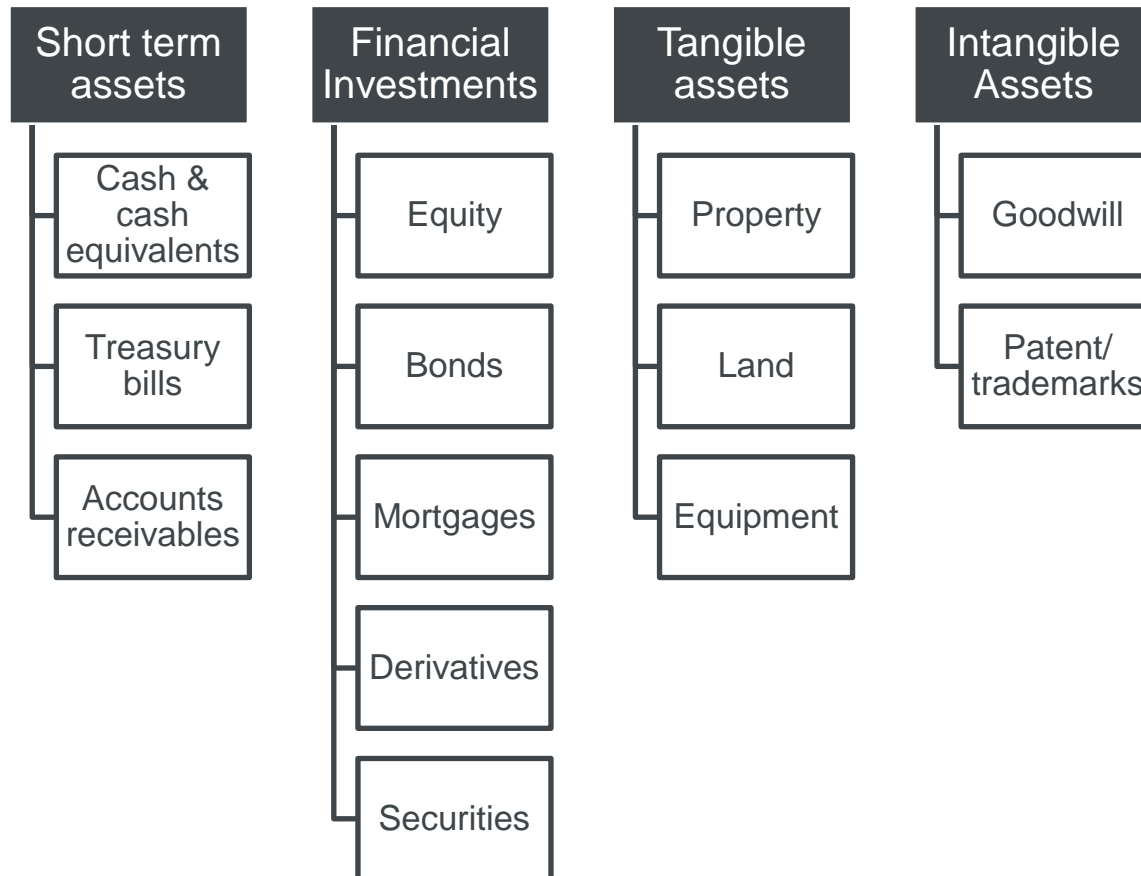


For investment return



Flexible features of distribution and accumulation

Asset Classification



Cash can also be used as an input in the model during projection as a flat input amount.

Mostly, only financial investments are modelled within actuarial software.

Any change on asset side doesn't impact projected liability cashflows.

Liabilities of indexed based products are impacted by corresponding index.

Other assets are directly shown in the balance sheet on their book or market value depending upon reporting.

What are the different types of financial investments

• Derivatives

Derives its value from underlying assets

- Options
- Interest rate swaps
- Credit default swaps
- Cross currency swaps

• Bonds

Provides a stream of income and a principal amount on maturity. Income rate can be fixed or floating, based on an interest rate or an index. Can be a callable or a sinking fund bond.

• Mortgages

Secured by a mortgage or a pool of mortgages. Income is based on mortgage payment by owners. Includes commercial and residential mortgage.

• Mortgage-backed securities (MBS)

Securities backed by pooling of mortgages. Mortgages can be commercial or residential, agency or non-agency

• Collateralized mortgage obligation (CMO)

Mortgages are ranked into tranches, or categories, based on their maturity date and risk level. Investors receive interest and principal payments from the CMO based on the predetermined rules and agreements for each tranche.

• Collateralized Debt obligation (CDO)

Pools various types of debt, such as mortgages, bonds, or loans, and repackages them into tranches sold to investors.

• Equity

Stocks of publicly traded companies.

• Hedge fund

Only available to private wealthy investors whose money is pooled and managed by professional fund managers. Aim is to achieve higher return than market.

• Private equity fund

Collective investment scheme that invests in equity securities of private companies.



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Life cycle of Asset Modelling

Data

- Investment team make investments based on the liability profile and nature of insurance company.
- Data for modelling can be picked up from investment repository.
- Data should be standardized according to the requirements of the model.

Assumptions

- Can be based on internal and external data.
- Subject to regulatory requirements.
- Prudent or best estimate depending on reporting requirement.

Model setup

- Calibrate the model depending on regulatory requirement.
- Calibration can include for example initial asset setup, reinvestment frequency.

Projection runs

- Together with liability based on the runoff of the business.
- Can be dynamic or non dynamic.
- Deterministic or stochastic scenarios based on market data.

Reports

- Balance sheet and income statement.
- Detailed asset report with individual asset line items.
- Comparison with previous reports for analysis.

Adjustments

- Any topside adjustment if required.

Asset Modelling Data & Model setup considerations

Asset Modelling Data requirement



Book value



Market value



Par value



Date of issue



Data of maturity



Coupon Type -
Fixed or floating or
both



Payment frequency

Model Setup Considerations



Initial Asset
Setup



Grading in spreads
from short term to
long term.



Calculation method
for book value



Calculation method
for market value



Different
assumptions for
pricing and reserving
basis



Treatment of realised
and unrealised gains
and losses

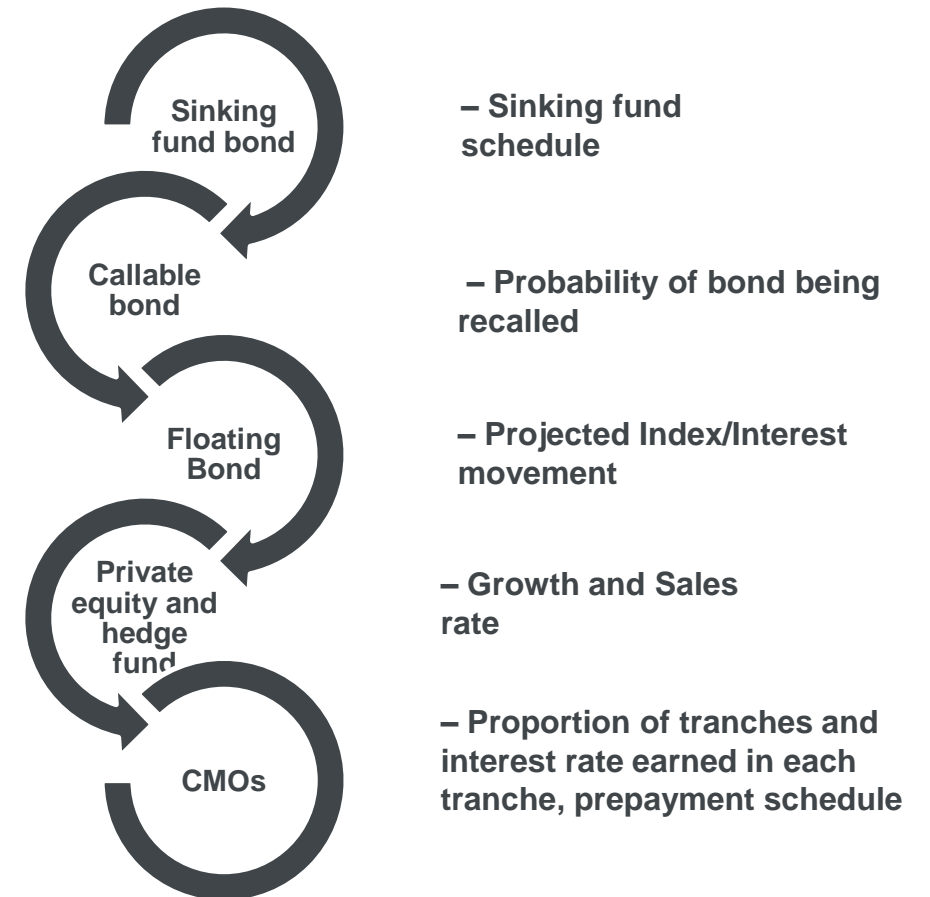


Number and source
of scenarios to be
used.

What are the key assumptions for asset modelling

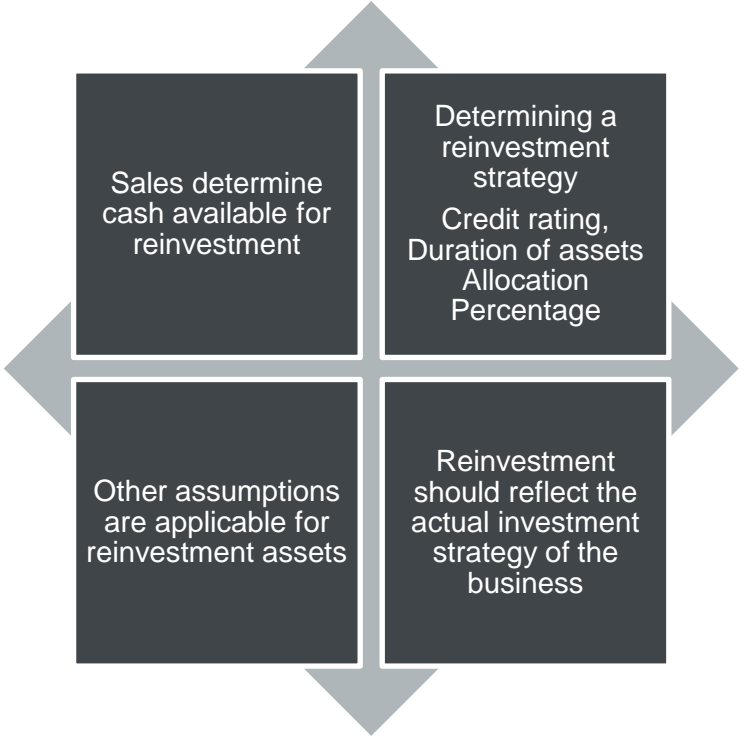
- 1 Defaults – Based on historic data categorized by rating and asset type
- 2 Spreads – Market data based on asset ratings
- 3 Investment expense – Vary from company to company and internally calculated
- 4 Inflation – Based on historic data and country of asset origination
- 5 Transaction/Selling cost – Based on historic data
- 6 Reinvestment strategy – Mirror of actual investment strategy subject to regulatory requirements
- 7 Interest rate – Stochastic/Deterministic scenarios including shocks
- 8 Tax rate – Standard rate depending upon the region and regulation.
- 9 Discount rate – Based on market data

Assumptions specific to some assets



Reinvestment Modeling In Actuarial Software

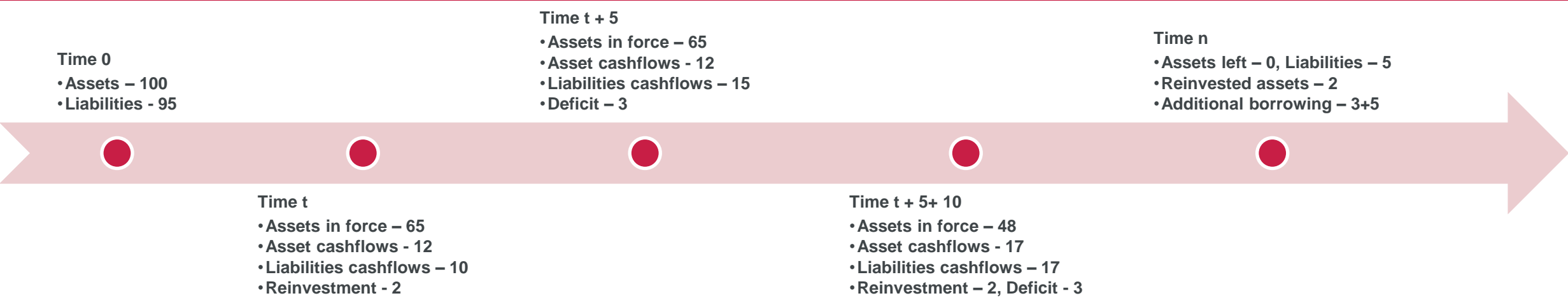
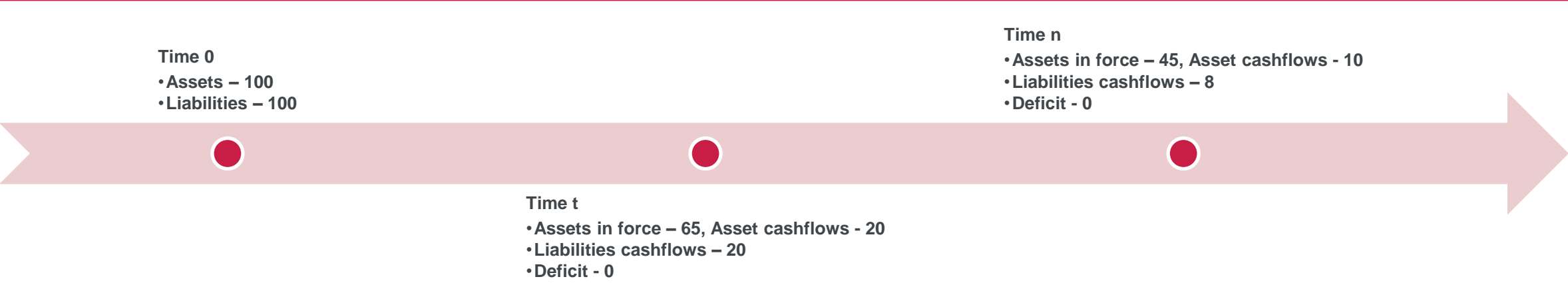
At the valuation date and each projection interval as appropriate, Reinvestment is modelling the purchase of general account reinvestment assets with available cash and net asset and liability cash flows. This is done in a manner that is representative of and consistent with the company’s investment policy for each model segment, subject to some requirements.



Assumptions						
Defaults	Spreads	Reinvestment allocations	Credit ratings	Investment Expense	Borrowing Rate	Disinvestment Strategy

Disinvestment
 Consistent with the company’s investment policy that reflects the company’s cost of, provided that the assumed cost of borrowing is not lower than the rate at which positive cash flows are reinvested at the same time, taking into account duration, ratings, and other attributes of the borrowing mechanism.

Reinvestment Modeling In Actuarial Software



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Sample Income statement/Balance sheet



Microsoft Excel Worksheet

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Life Insurance Asset Allocation – UK under Solvency II

UK Insurers calculate their Solvency Capital Requirement ("SCR"), based on a number of risk modules including market risk, which sets the capital charge applicable for individual investments. The market risk module accounts for a large percentage of an insurer's capital charge and effectively assigns risk weightings to equity, property and debt-based investments.

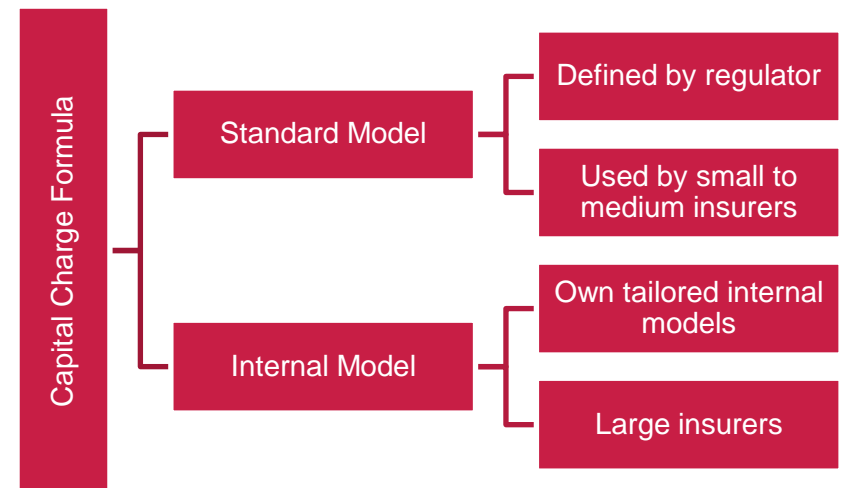
Prudent Person Principle

Insurers are required to invest all their assets in accordance with PPP which can include to invest only in assets and instruments:

- whose risks can be properly identified, measured, monitored, managed, controlled and reported;
- that ensure the security, quality, liquidity and profitability of the portfolio as a whole;
- that are appropriate to the nature and duration of insurance and reinsurance liabilities; and
- in the best interest of policyholders and beneficiaries.

Look-Through

- In accordance with the PPP, insurers investing in funds are also required to adopt the "look through approach" in calculating their SCR. This means that the SCR will generally need to be calculated on the basis of the underlying assets in a fund structure and this approach will need to be applied a sufficient number of times to capture all material risk.

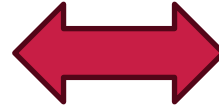


Life Insurance Asset Allocation – US

Each insurance company has their own internal investment policy which they follow pertaining to certain rules.

The asset mix of U.S. insurance companies' investment portfolios includes

- Bonds as largest component, representing 62.3%
- Common stock investments are the second largest holding at 13.2%
- Followed by mortgages at 8.9%.



- U.S. insurance companies are increasing exposure to mortgages, for attractive and higher yields but are relatively illiquid.
- Illiquid investments generally have less credit and pricing transparency and greater price volatility.
- Exposure to mortgages has increased over the last 10 years

The U.S. insurance industry's four largest asset classes have remained unchanged since the NAIC Capital Markets Bureau began tracking U.S. insurers' investment trends.

U.S. government bonds, agency-backed residential mortgage-backed securities (RMBS), and private label commercial mortgage-backed securities (CMBS) accounted for the next three largest bond types. These bond types had little to no change in their share of total bond exposure YOY



U.S. Insurers also deal in derivatives specially for Guaranteed Investment Plan (GIC) product type. The most common derivative on US side is interest rate swap post LIBOR move to SOFR market on USD currency.

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Reinsurance impact on assets adequacy

How reinsurance benefits Insurance company?

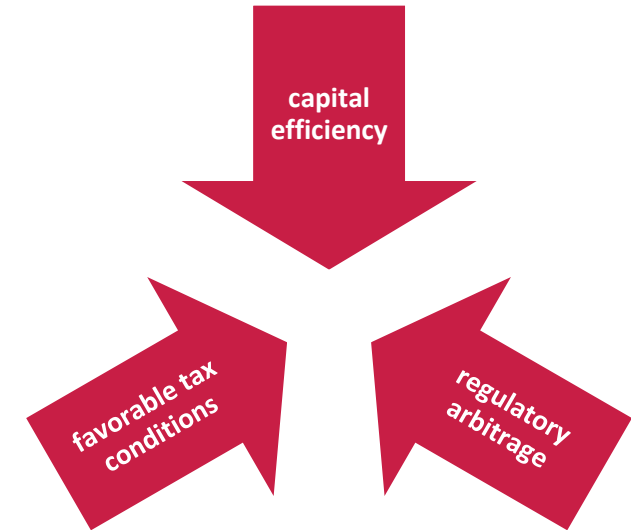
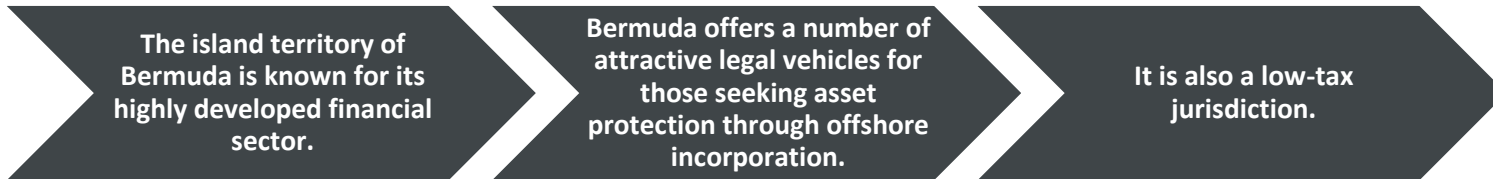


How does reinsurance help in balance sheet management?



Why is Bermuda Reinsurance famous?

Bermuda received full Solvency II Equivalence.
US National Association of Insurance Commissioners (NAIC) approved Bermuda as a Reciprocal Jurisdiction.



Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.