FINANCIAL MARKETS AND INSTITUTIONS

INSURERS AND PENSION FUNDS

A.Y. 2020/2021

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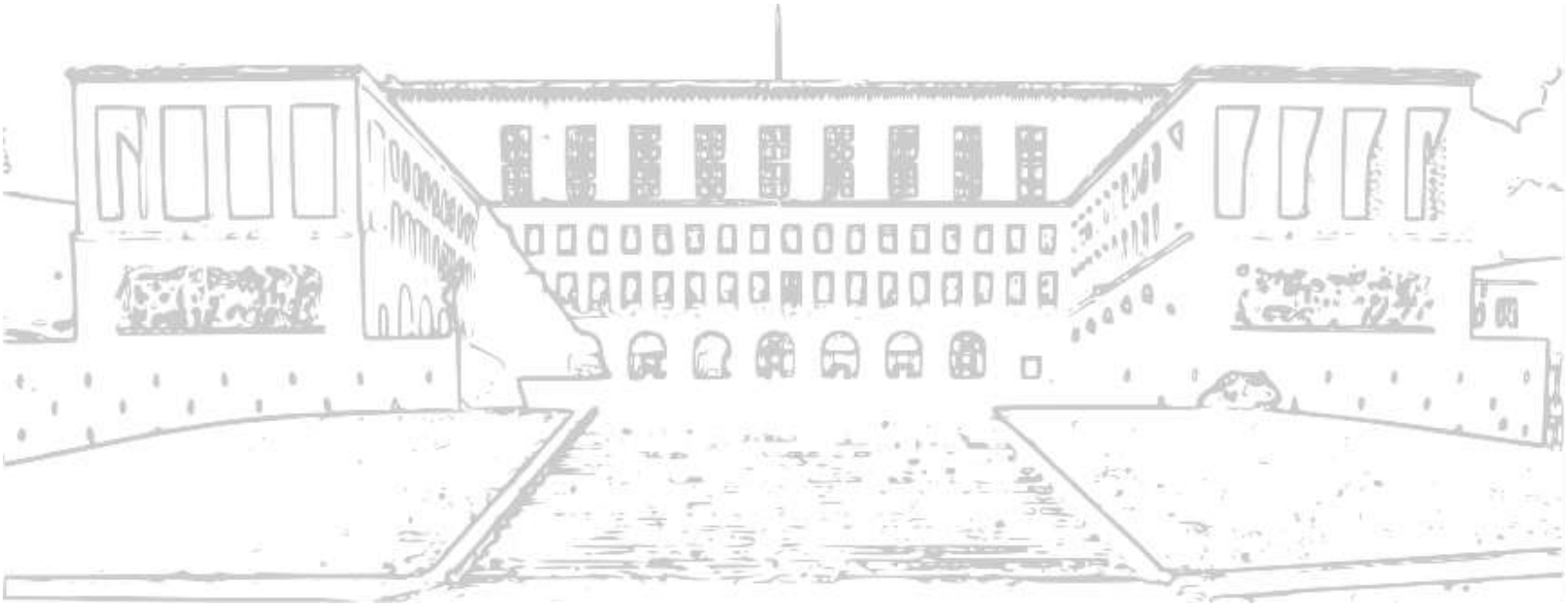


DEAMS
University
of Trieste

AGENDA

- Why insurance? How does it work?
- Types of insurers and policies
- Why pensions? How does it work?
- Types of pensions and funds
- The Italian pension system

WHY INSURANCE?

Future «unpredictable» events with adverse financial consequences

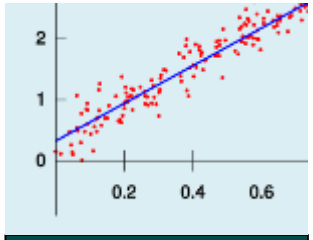
First solution: **mutuality** – the *uncertain individual risk*
is *transformed* in
a *share* in the *uncertain collective risk*…

WHY INSURANCE?

What do we need to insure?

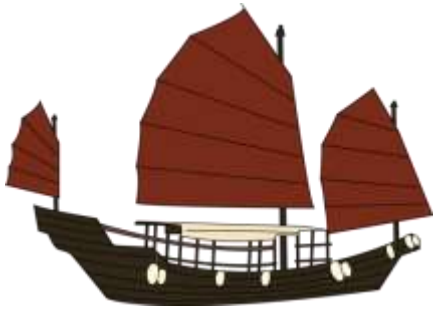
Money?

Financial markets?



Statistics?

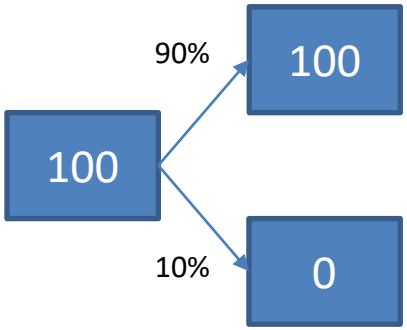
Insurers? Agents?



WHY INSURANCE?

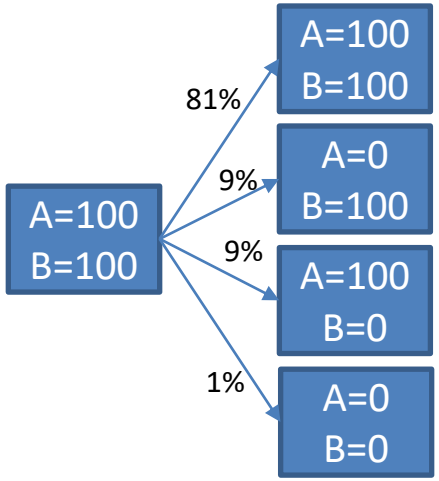
Example:

You own land worth 100. A flood can destroy it. You don't know that *p=10%*



$E(A) = 90$

$\sigma(A) = 30$



$E(A) = 90$

$\sigma(A) = 21$

With 100 exposures?

$E(A) = 90$

$\sigma(A) = 3$

With 1000 exposures?

$E(A) = 90$

$\sigma(A) = 0{,}95$

How insurance works

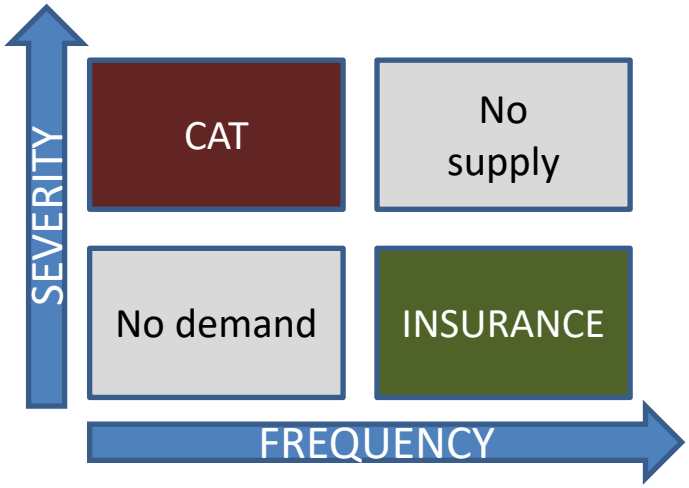
How to reduce uncertainty? Through *experience* and *data*

- "Modern" **insurance**:
  - Individual risk turns into an up-front certain cost (**premium**): expected frequency times severity (plus safety margins / costs)
  - If/when the event occurs (**risk**) the consequences are indemnified (**claim**)
  - If timing/magnitude of claims are predicted correctly, **profits** are made
- Usual issues…
  - **Adverse selection** of "bad" risks
  - **Moral hazard**: incentive to misbehave (fraud)
  - **Conflicts of interests**

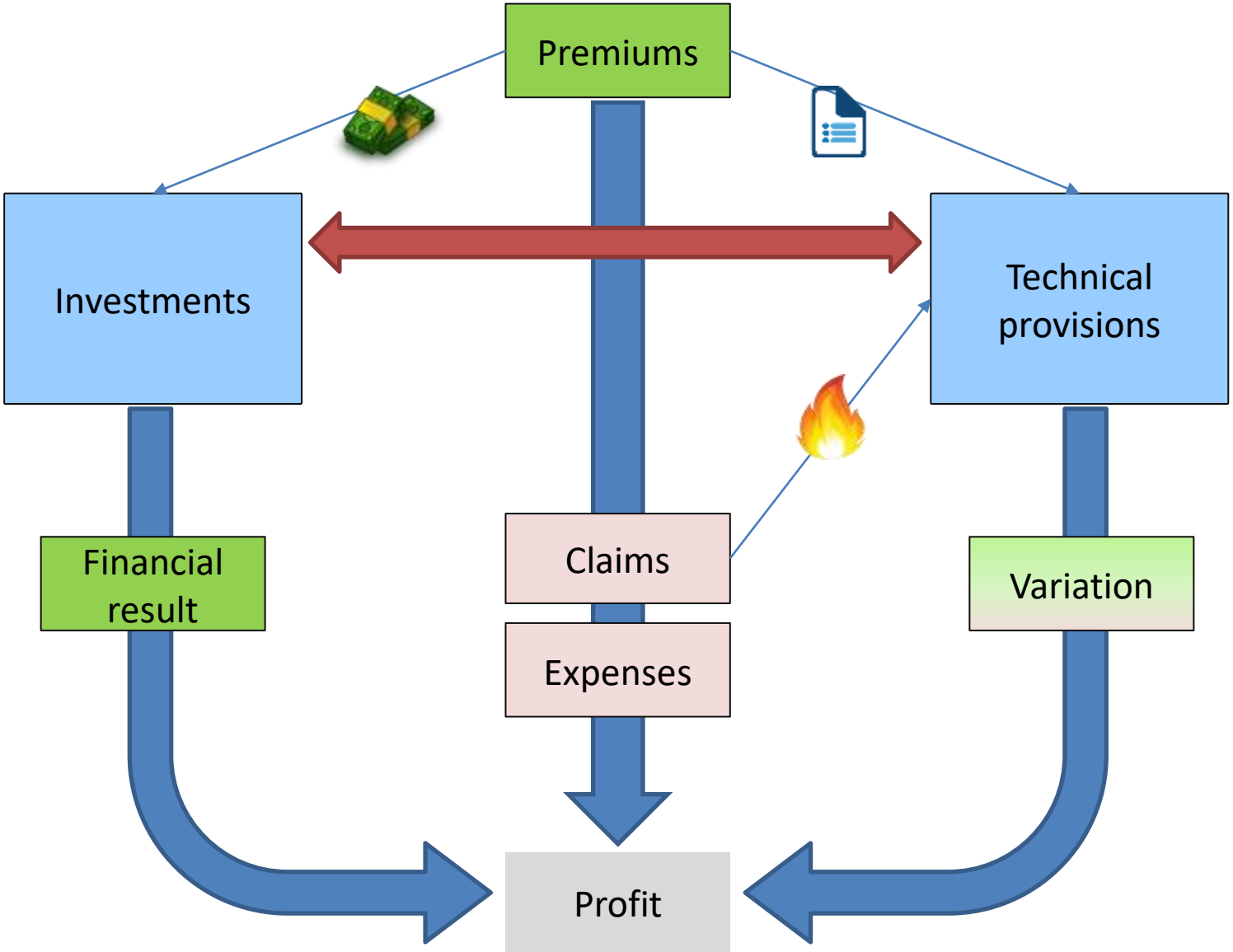
How insurance works

Asymmetry requires principle-based contracts:

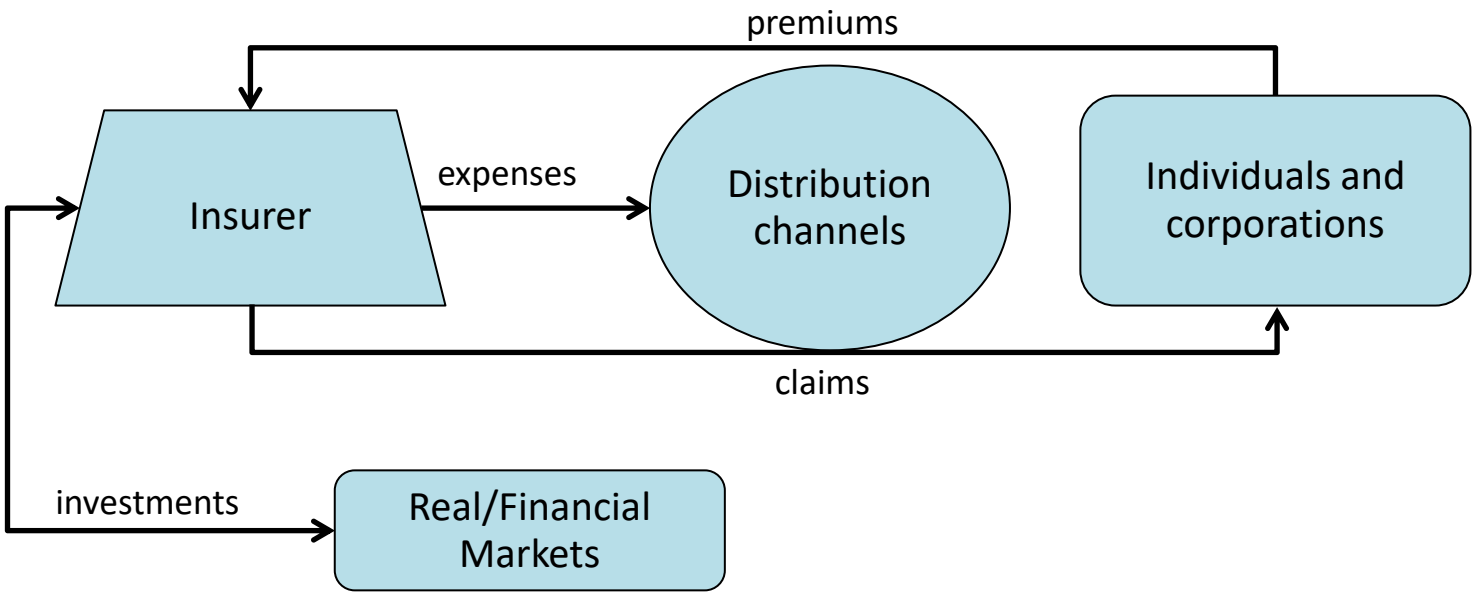
- **Qualified relationship** between insureds and risks/beneficiaries
- **Actuarial pricing** and **underwriting:**
  - High number of uncorrelated homogeneous exposures
  - Quantifiable (non-CAT) losses
- **Utmost good faith and indemnity principle**
- **«Covenants»:** exclusions and limitations to indemnities
- **Fraud** prevention
- **Self-insurance** and **risk-sharing**



How insurance works



How insurance works



Income statement

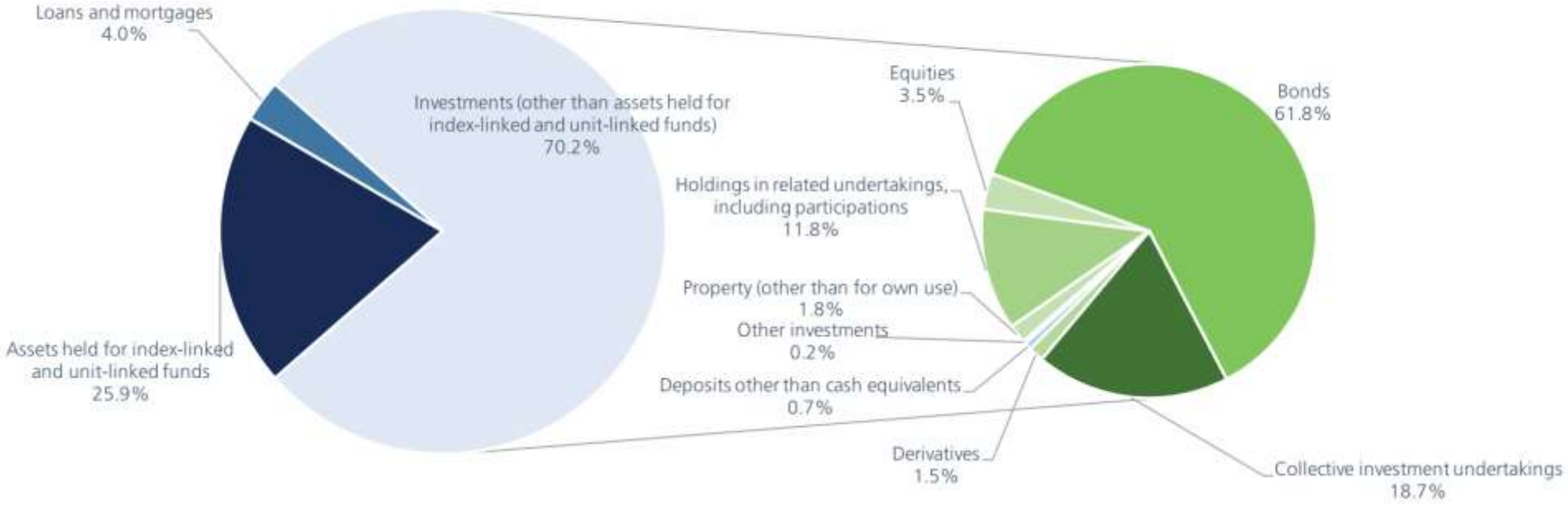
	+ Premiums - Claims - Expenses +/- Provisioning + Inv. returns ——————— Profit/loss

Balance sheet

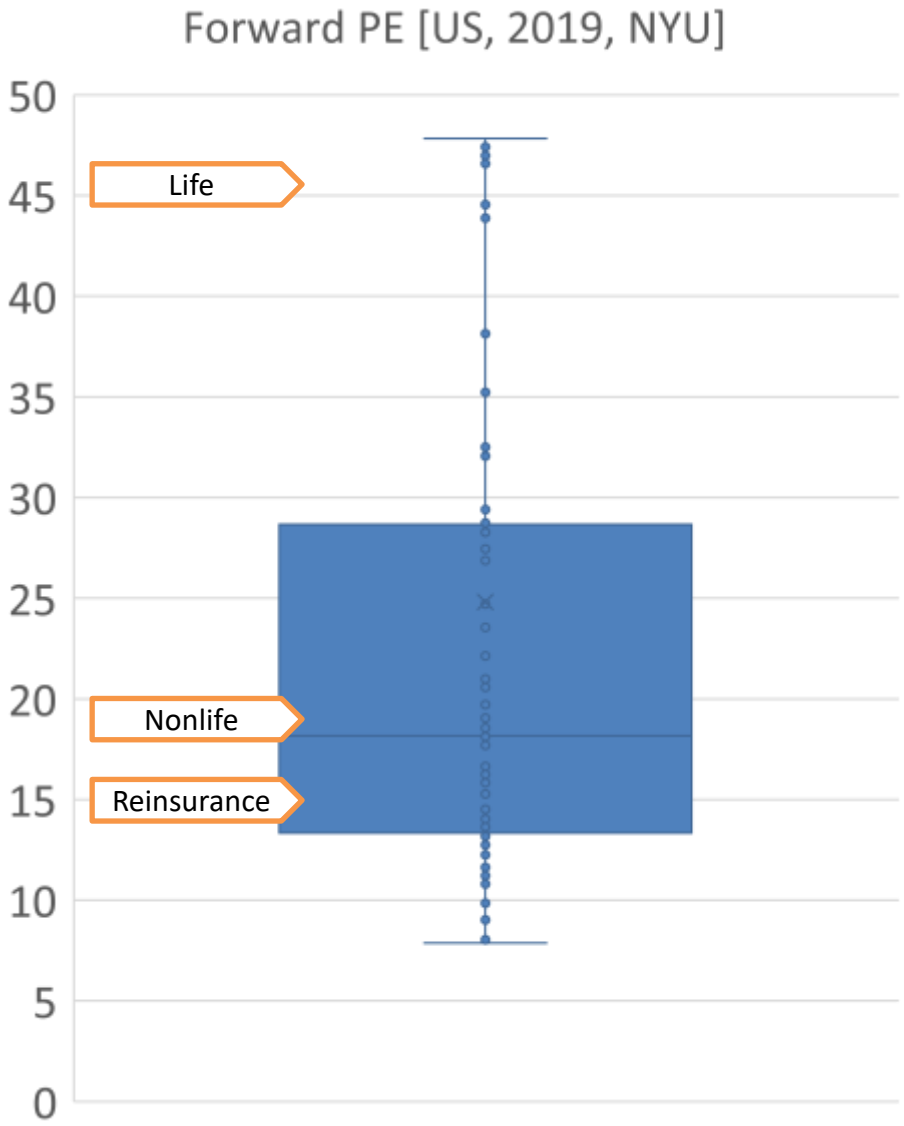
Assets	*Equity*
Investments - Stocks - Bonds - Funds - …	*Liabilities* Provisions on policies

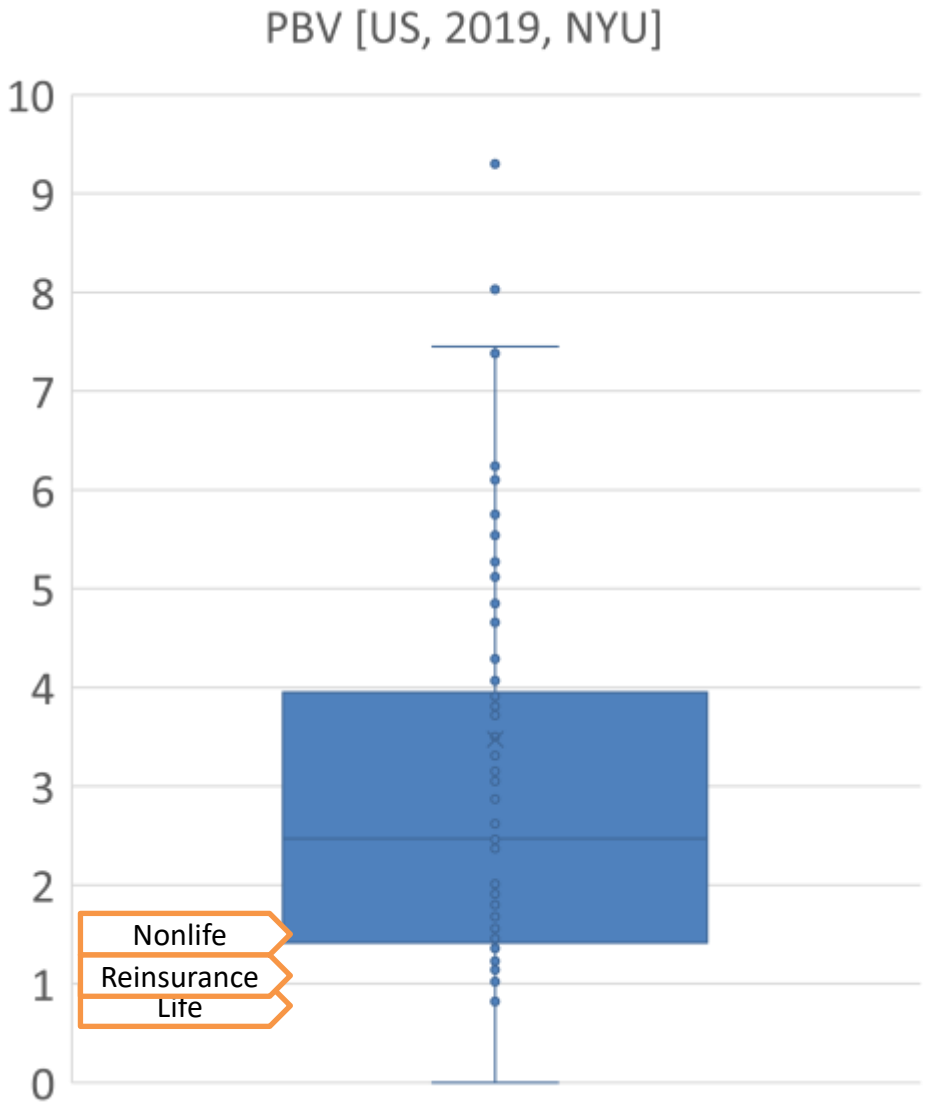
HOW INSURANCE WORKS

Breakdown of insurers' investment portfolio — fourth quarter 2018[3]

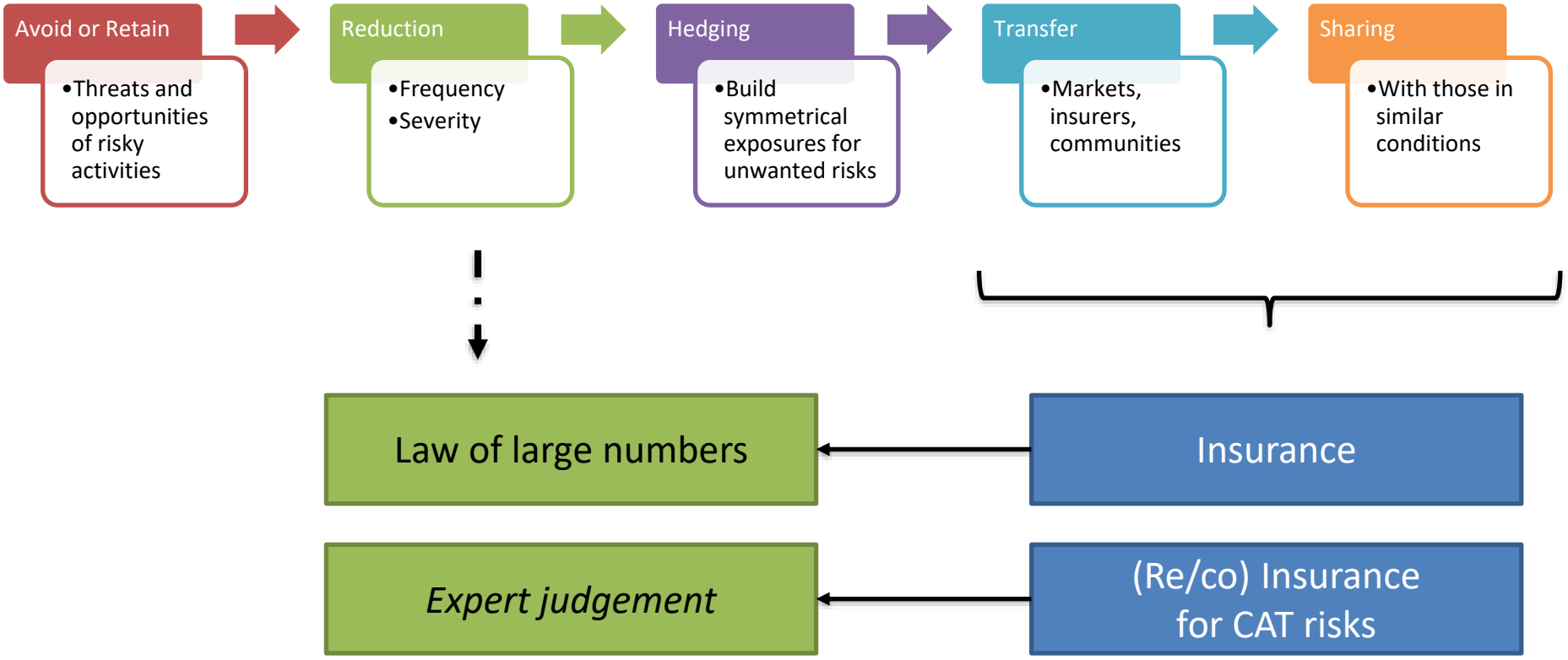


How insurance works





INSURANCE VS RISK MANAGEMENT



INSURANCE PRICING

$$\text{Commercial Premium} = \underbrace{\text{Frequency} \times \text{Severity}} + \text{Loadings} + \text{Taxation}$$

Pure risk premium

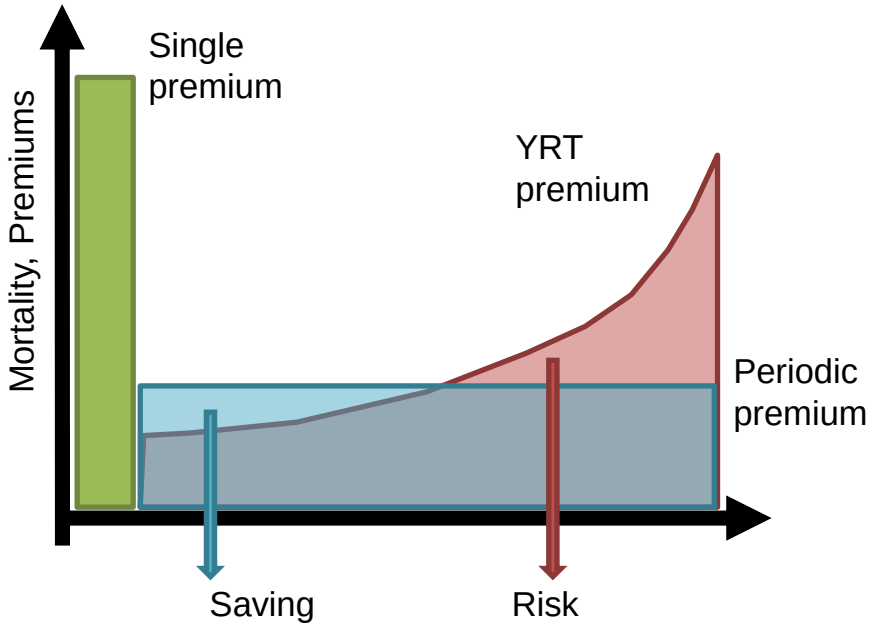
- Ultimate cost
- PV of future benefits

- Safety
- Acquisition and administrative costs

EX: single premium for a 20-y-o to get 1 € if alive after 10 years (i=1,5%) [ITA mortality tables]

$$\frac{\text{Cohort } 30-\text{y}-\text{o alive}}{\text{Cohort } 20-\text{y}-\text{o alive}} \times v^{10} = \frac{99160}{99465} \times 0{,}862 = 0{,}86€$$

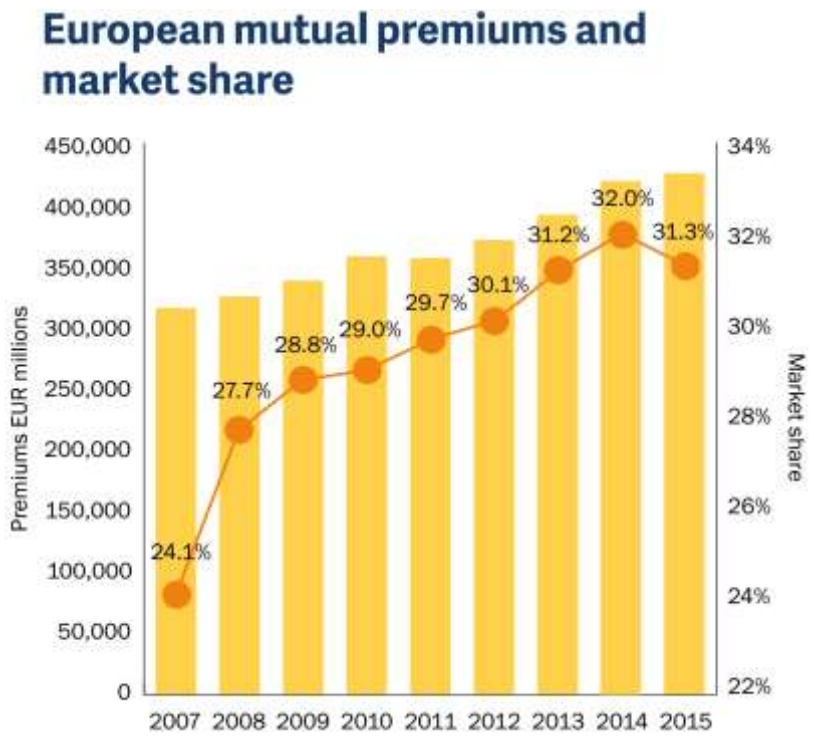
For a 80-y-o, 0,39€

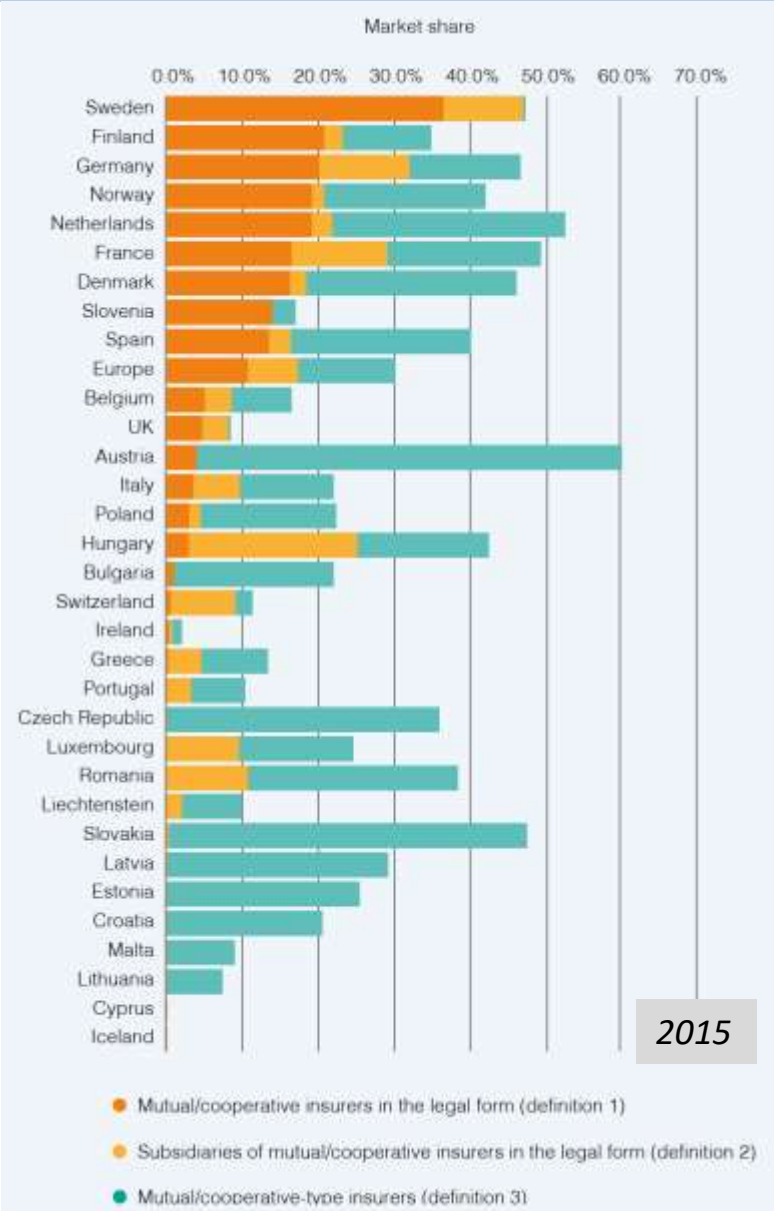


INSURANCE PRODUCTS AND COMPANIES

Two types of insurers:

- Stock companies
- Mutuals: owned by policyholders, profits as refunds or discounts

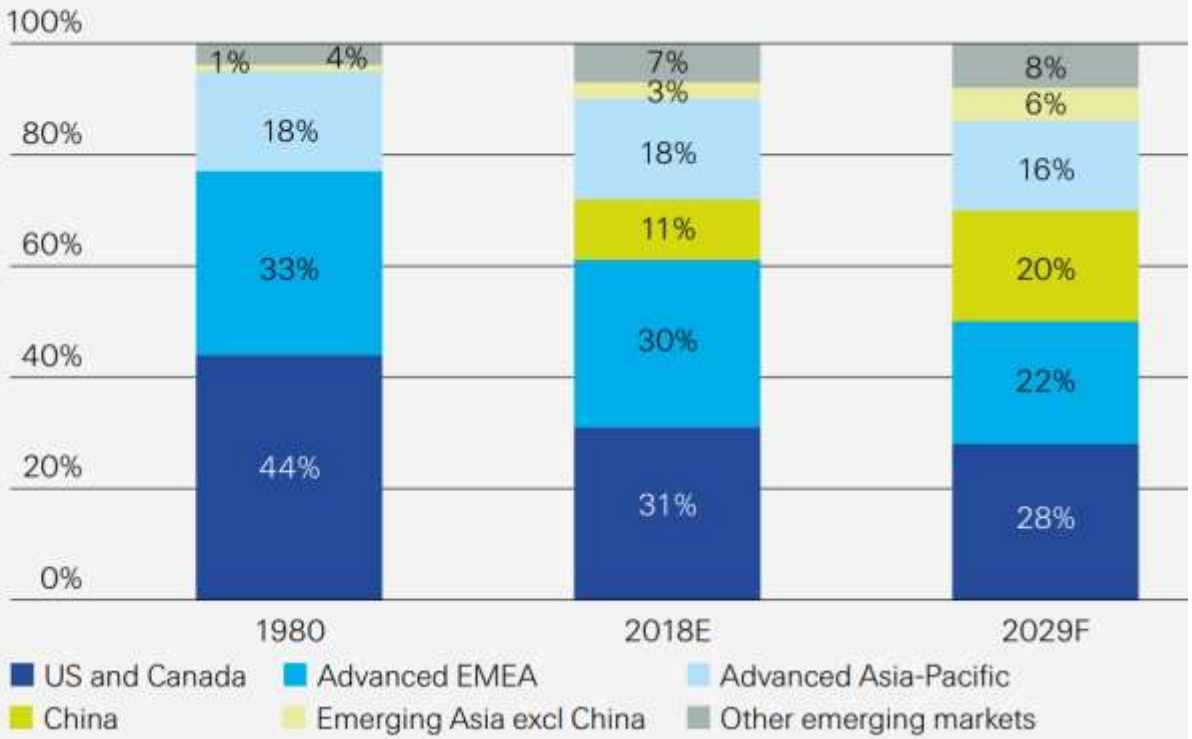




INSURANCE PRODUCTS AND COMPANIES

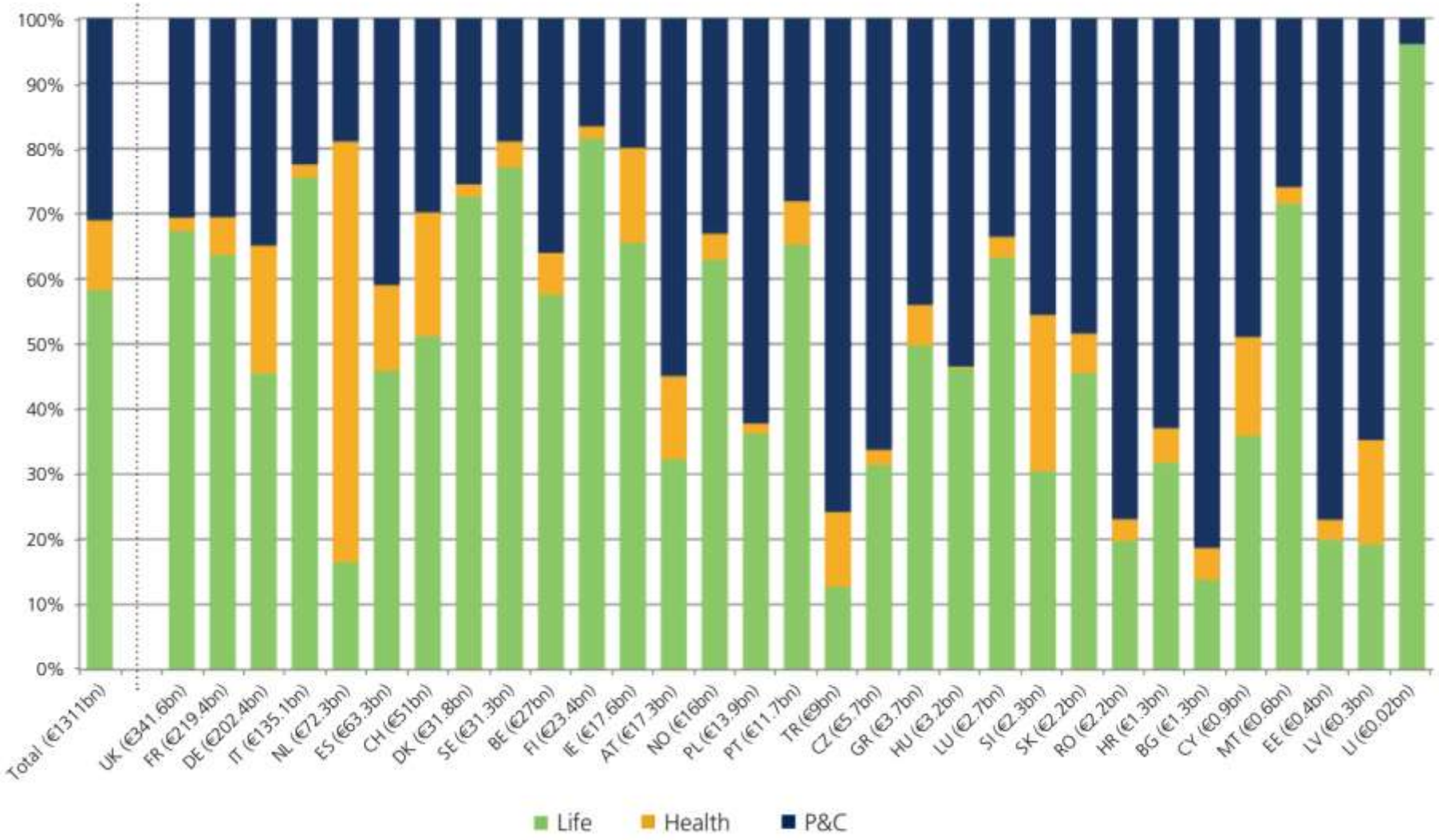
Market shares for total direct premiums written by main markets and by region, 1980–2029F

		Global market share		
		1980	2018E	2029F
1	US	42%	28%	25%
2	China	0.0%	11%	20%
3	Japan	16%	8.5%	7.1%
4	UK	7.4%	6.5%	4.7%
5	France	5.5%	5.0%	3.5%
6	Germany	8.6%	4.7%	3.5%
7	South Korea	0.4%	1.9%	3.3%
8	Italy	0.3%	3.4%	3.2%
9	Canada	1.8%	3.3%	2.7%
10	Taiwan	2.7%	2.5%	2.4%



INSURANCE PRODUCTS AND COMPANIES

Gross written premiums by country — 2018



INSURANCE PRODUCTS AND COMPANIES

Life insurance: **death**, **superannuation, long-term health**

- Offering term/whole life, LTC, annuities and products with **financial features** (unit/index linked, …)
- **Long-term investor**

Non-life insurance:

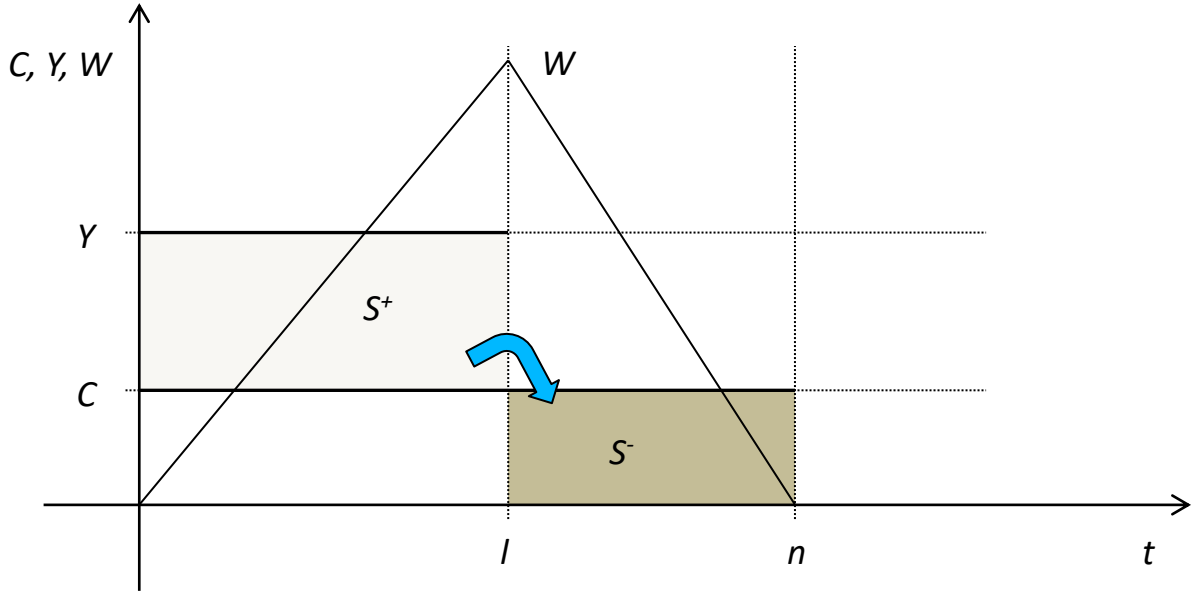
- Protecting **wealth** (assets) and **liability** (f.i. TPML)
- **Events are recurring** and **difficult to estimate**
- Offering frequently multiple guarantees (property, liability) but also credit insurance, protection from lawsuit's costs and assistance
- **Short-term liquid investor**

Reinsurance: insurance bought by insurers

- Complex B2B contracts and treaties
- Purposes: capacity and protection from CAT, expertise and entry/exit from markets, loss stabilisation

WHY PENSIONS?

Income and consumption are not stable: demographic and financial risks



- "life cycle"
- savings highest at mid-age
- people consume flat annuities of their wealth
- several behavioural constraints in planning for own life cycles

- Need for income after retirement + protection from uncertainties (health, inflation, unemployment, …)
- Long cumulation phases, pension funds are very large institutional investors
- Pension funds similar to mutual funds, but with constraints on liquidity and frequently with tax incentives

PENSIONS PRODUCTS AND FUNDS

Two main regimes:

- **Defined-benefit** (DB):
  - participants decide the future benefit
  - contributions are changed accordingly
  - risky for sponsors and participants
- **Defined-contribution** (DC):
  - participants decide the level of contributions
  - benefit will depend on cumulated contributions
  - financial and demographic risks passed on participants

Public funds are often **PAYG**, **many provide defined benefits** and usually **mandatory**

Private funds are funded, mostly DC and often **voluntary**

PENSIONS PRODUCTS AND FUNDS

Risks of PAYG systems:

LABOUR MARKET (AND DEMOGRAPHY) | PUBLIC BUDGET (AND DEMOGRAPHY)

$$\text{average pension} = \frac{contributions \times wages \times employed \times fiscal\_transfer}{dependency\_rate \times retired}$$

DEMOGRAPHY

Risks of funded systems:

- Demographic (annuity conversion)
- Financial
- Responsibility of individuals:
  financial literacy + long term planning

THE ITALIAN PENSION SYSTEM (BRIEFLY)

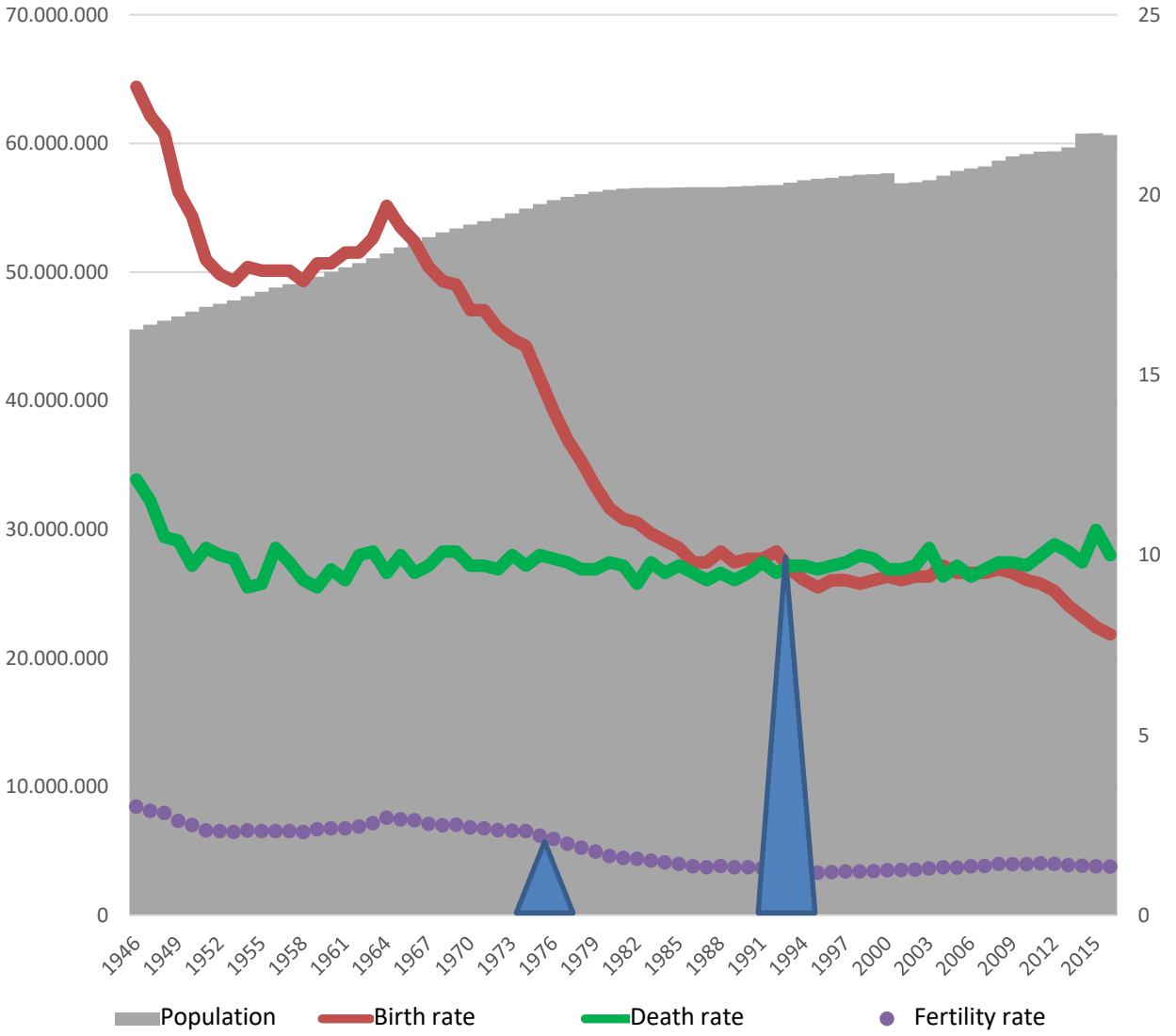
Long series of reforms, after emergence of «difficulties» since late 1980s:

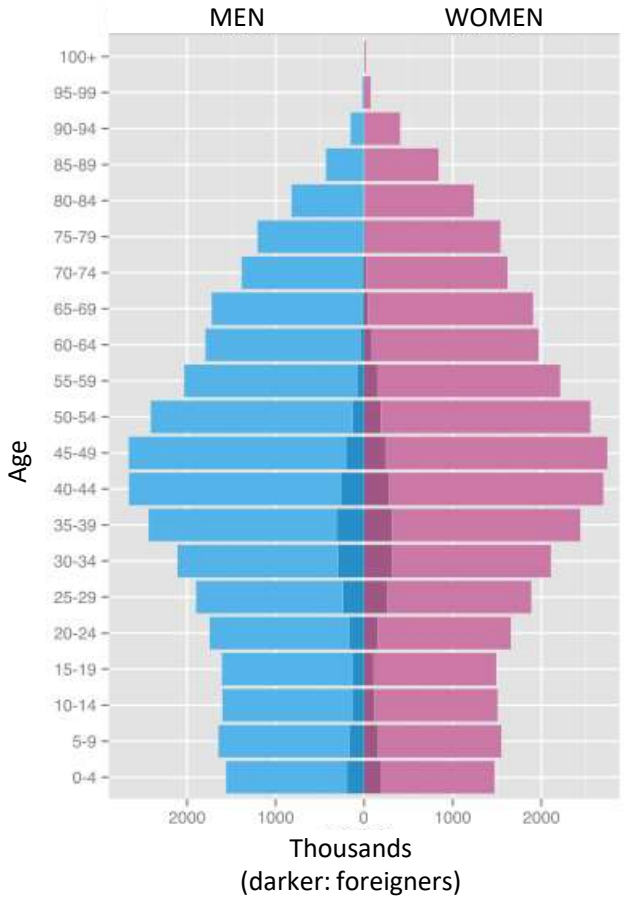
- **PAYG**
- now entirely **contribution-based** (with transition)
- Progressively **aligning requirements** between genders, public/private sector, employees and self-employed (not between/within generations)
- Progressively **removing «full» early retirement**: advance of old-age benefits with penalties on conversion rates

- **Retirement age** linked to life expectancy (67+, but effective age is much lower)
- Contributions **compounded as nominal average GDP growth**
- **Replacement rates vary** between 40-80%: huge impact of salary/careers/age

The Italian Pension System (briefly)

Why?



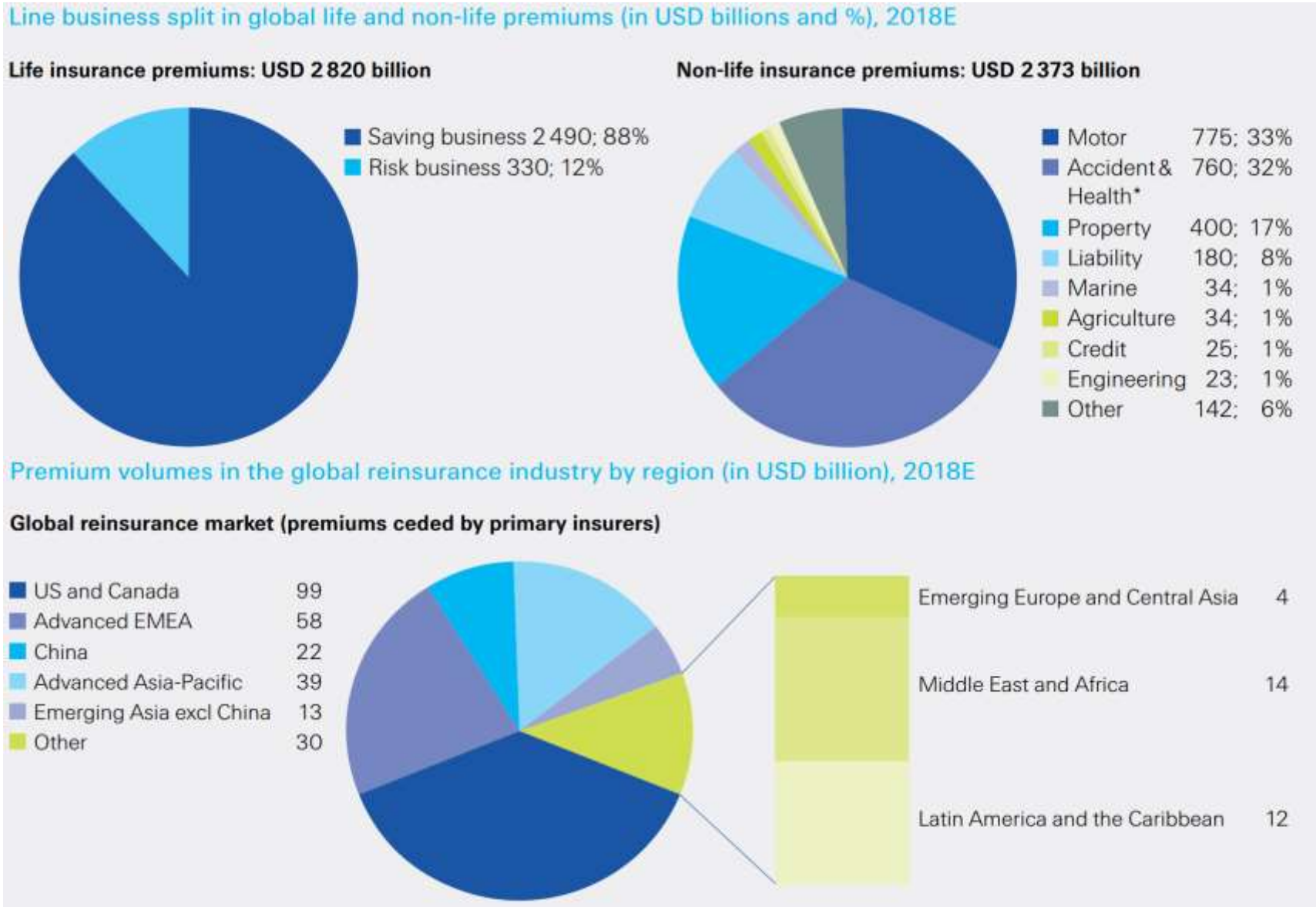


EXAMPLES

1. Insurance and growth around the world

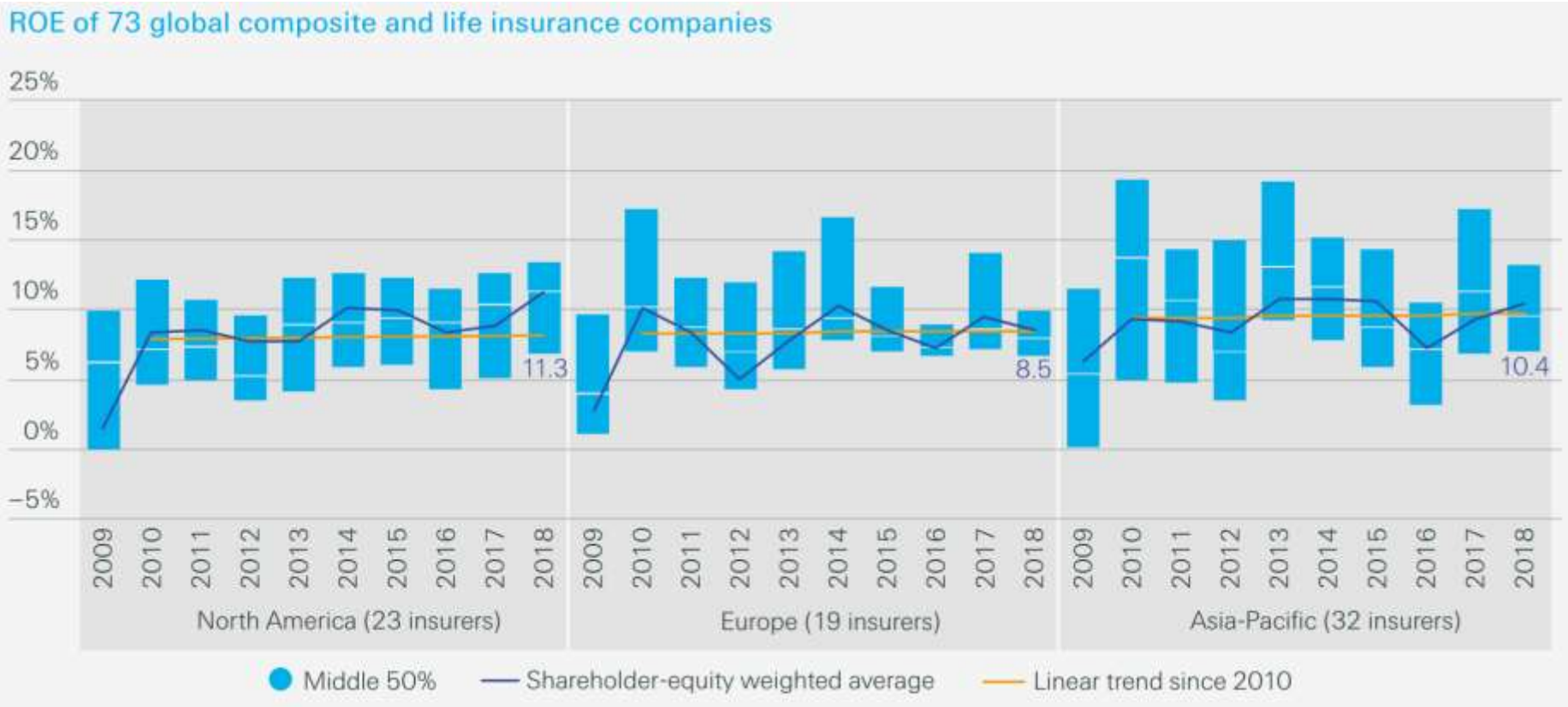
EXAMPLES

2. Insurance by LOB and reinsurance by geographic area



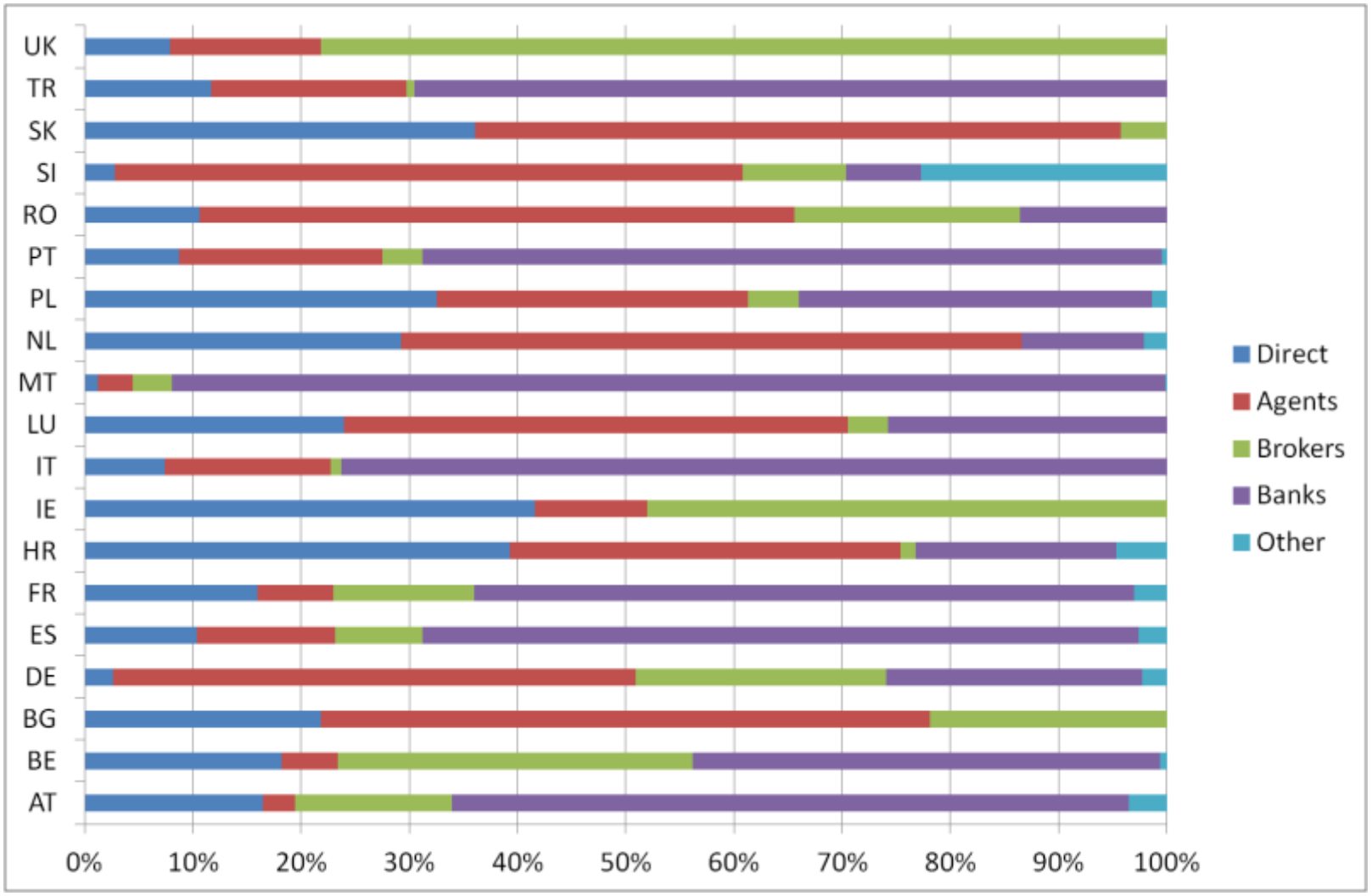
EXAMPLES

3. Profitability of insurers



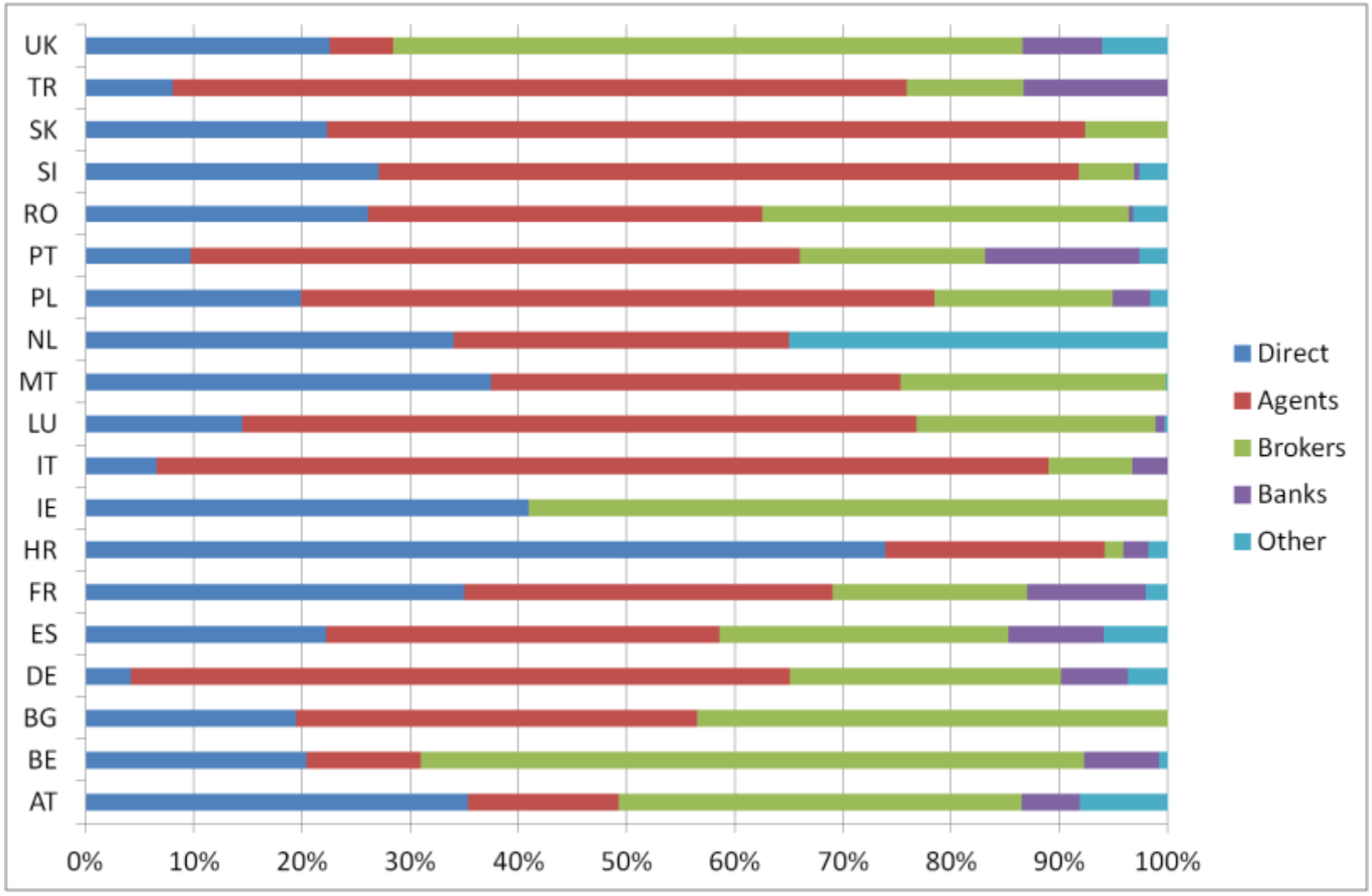
EXAMPLES

4. Insurance distribution - Life



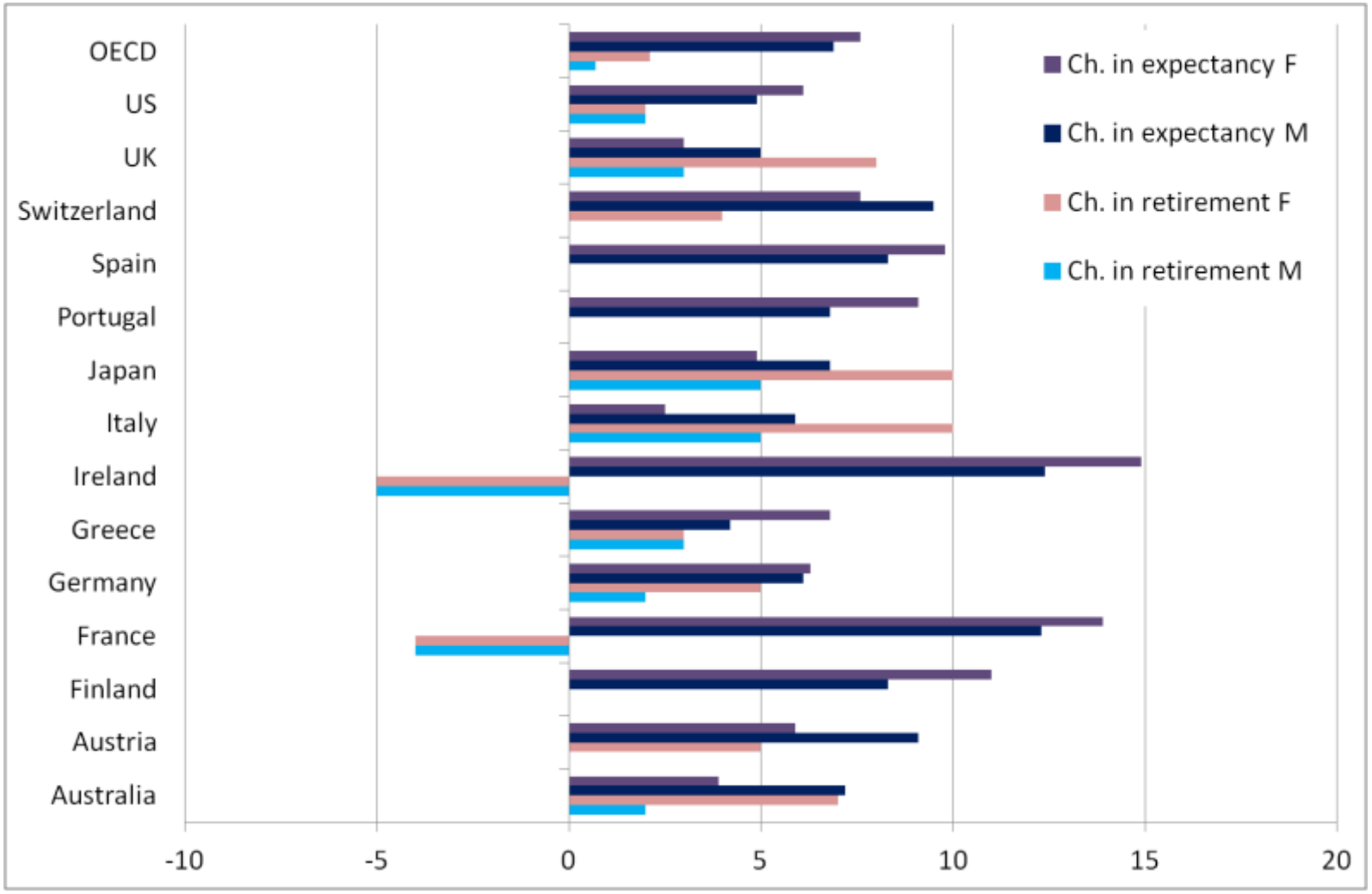
EXAMPLES

5. Insurance distribution - Nonlife



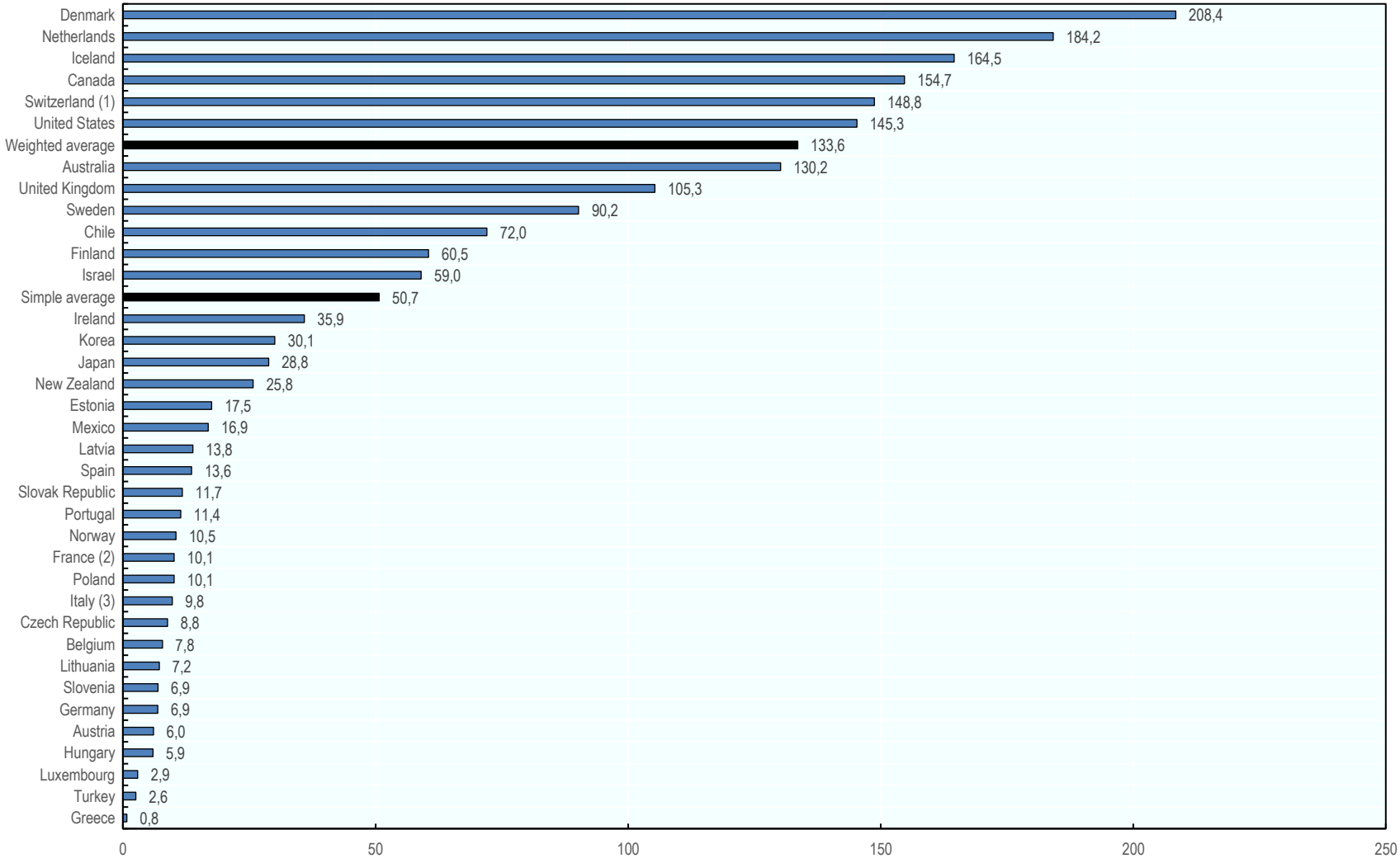
EXAMPLES

6. Life expectancy and retirement age: 1960-2050 differences (OECD)



EXAMPLES

7. Pensions assets (funded) as % of GDP (2017)



EXAMPLES

8. Pension funds asset allocation (2017)