

B13. INSURANCE AND PENSIONS

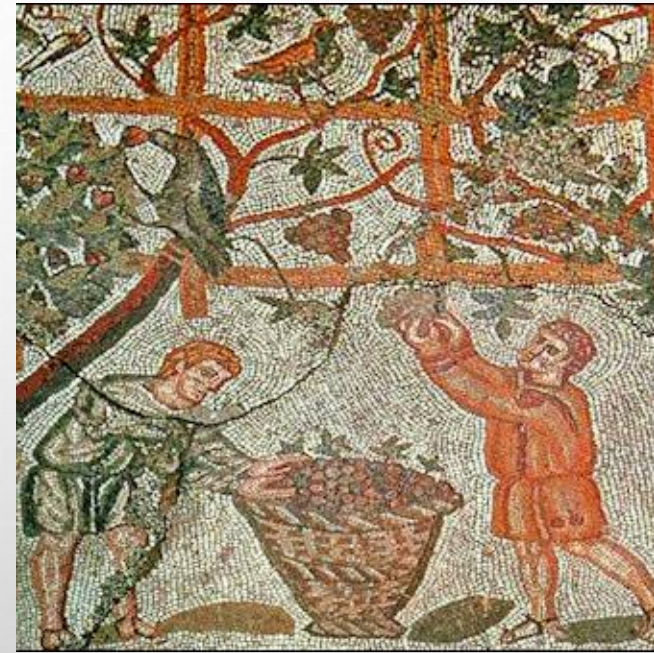
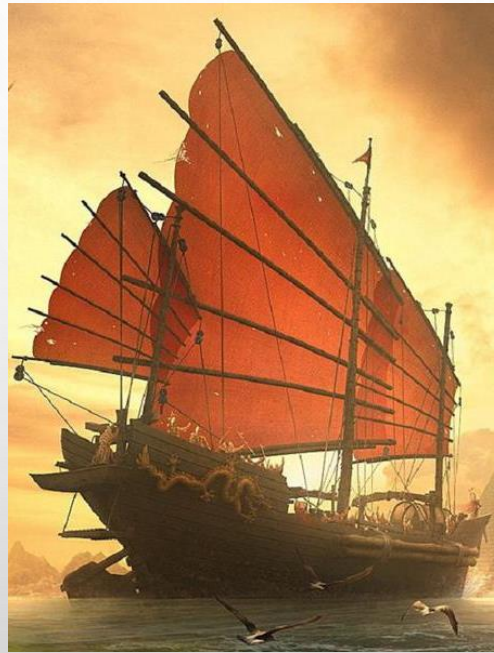


- WHY INSURANCE? HOW DOES IT WORK?
- WHY PENSIONS? HOW DOES IT WORK?
- A GLANCE AT THE ITALIAN PENSION SYSTEM

WHY INSURANCE?

Future, unpredictable events with adverse financial consequences on communities and/or individuals

First solution: **mutuality** → the *uncertain individual* exposure is pooled and turns into a *share of an uncertain collective exposure*

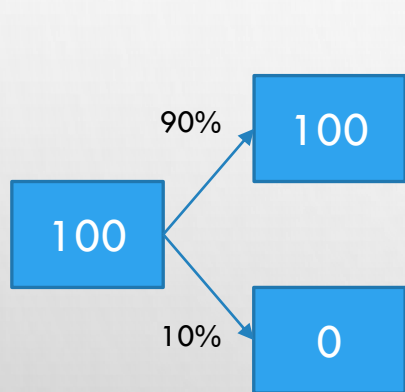


Second solution: **insurance** → *upfront cost (premium)* in exchange of *indemnity* if a future uncertain event occurs (**claim**)

WHY INSURANCE?

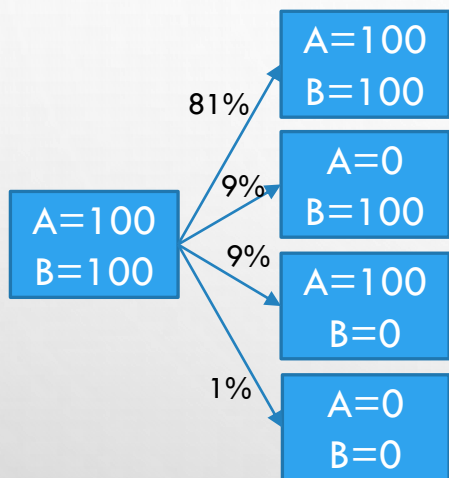
Example:

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?

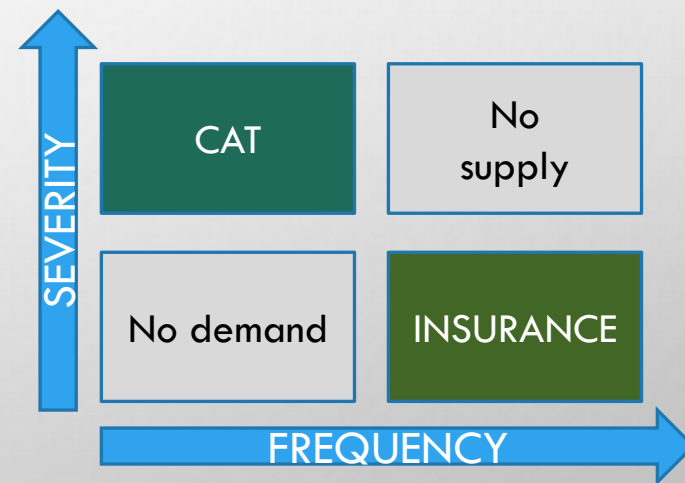
$$E(A) = 90$$

$$\sigma(A) = 3$$

With 1000 exposures?

$$E(A) = 90$$

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

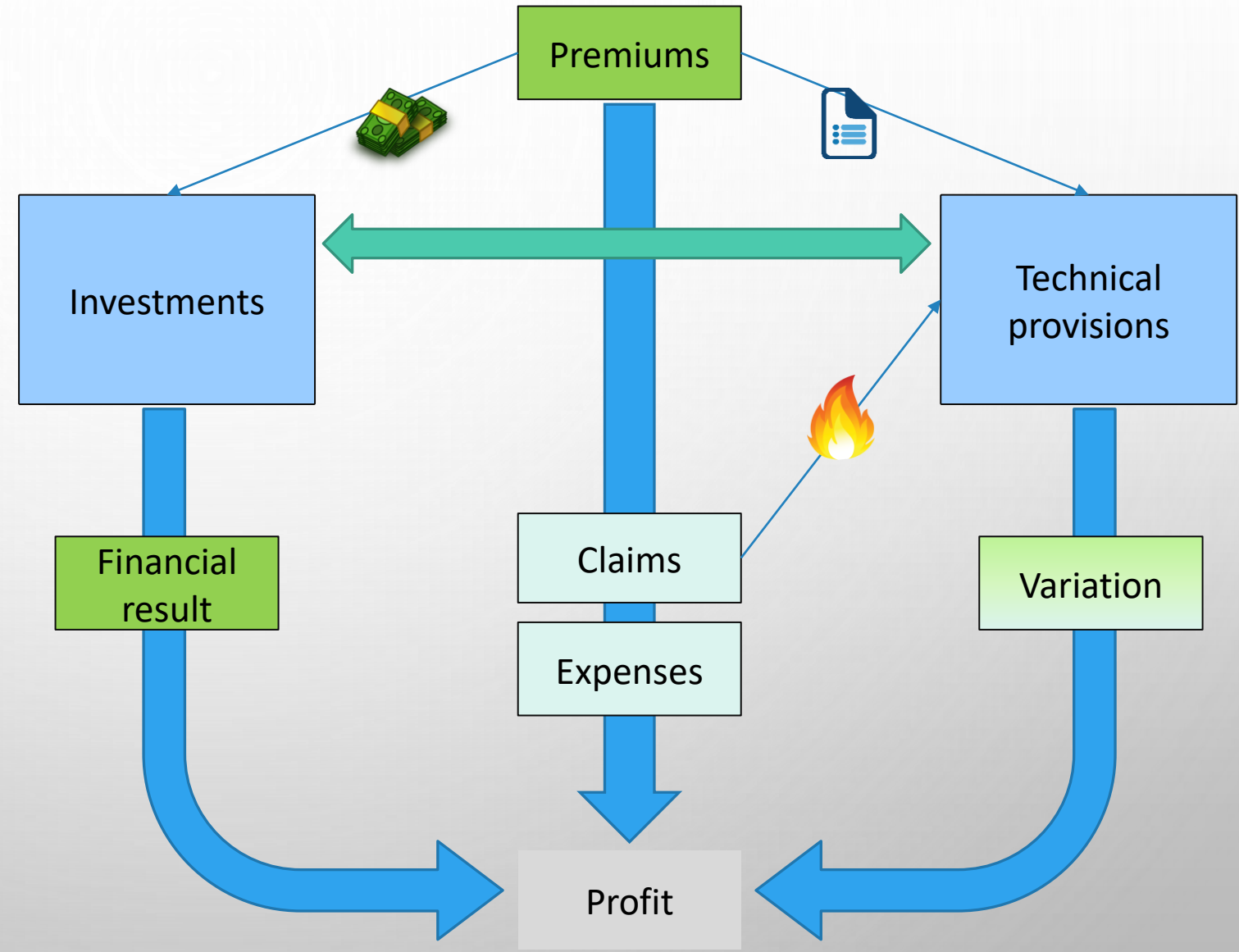


$$\text{Premium} = \text{Frequency} \times \text{Severity} + \text{Cost loadings} + \text{Safety loadings}$$

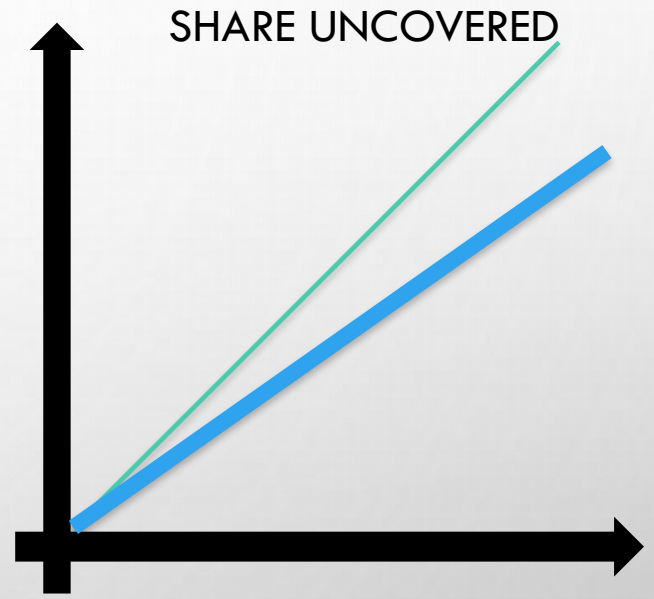
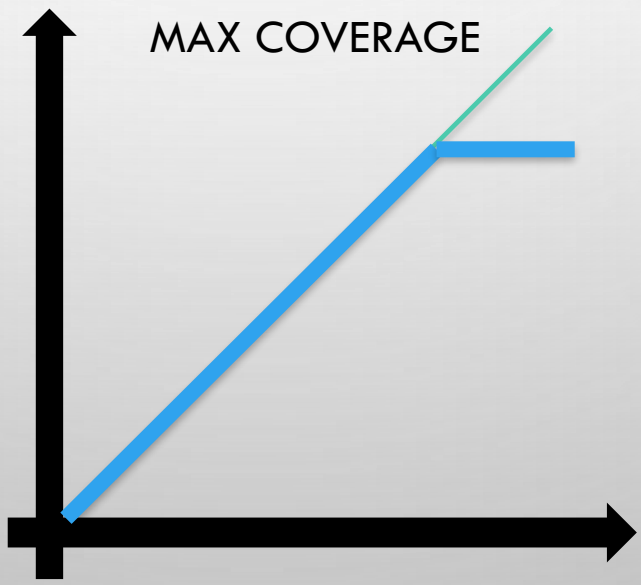
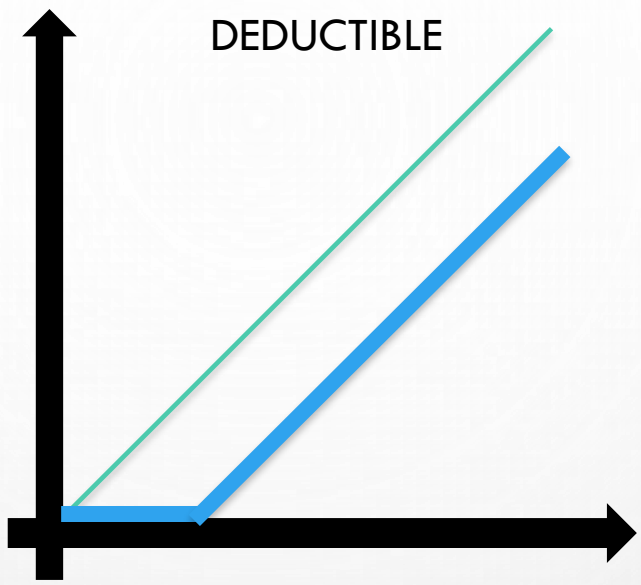
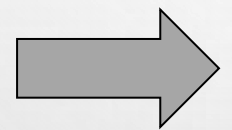
HOW INSURANCE?

Wide asymmetric information issues → principle-based contracts:

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



HOW INSURANCE?



WHO INSURANCE?

Table 1.2-a
Non-Life: 2022 overall ranking of European insurance groups
(ranking by premium volume)

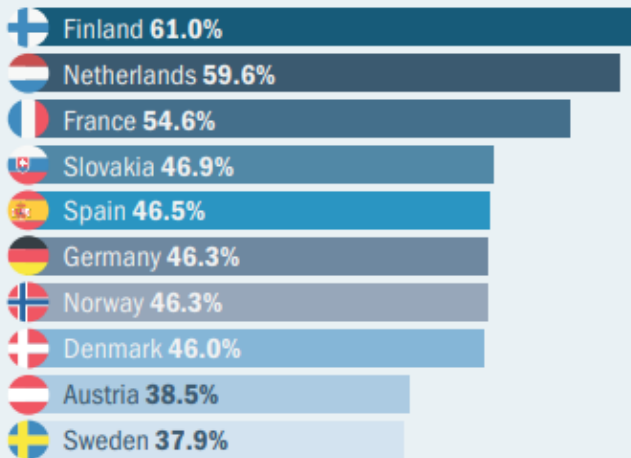
	Group	Country	Premiums (millions of euros)					%Δ premium 2012-2022	% YoY premium 2012-2022 (annual average)	% YoY premium 2021 -2022
			2012	2021	2022	Δ 2012-2021	Δ 2021-2022			
1	ALLIANZ	Germany	46,889	60,273	67,716	13,384.0	7,443.0	44.4%	4.0%	12.3%
2	AXA ¹	France	31,359	53,590	56,217	22,231.0	2,627.0	79.3%	7.2%	4.9%
3	ZURICH	Switzerland	27,559	33,937	41,211	6,378.5	7,273.1	49.5%	4.5%	21.4%
4	TALANX	Germany	15,127	30,825	38,814	15,698.0	7,989.0	156.6%	14.2%	25.9%
5	GENERALI	Italy	22,803	24,145	28,636	1,342.0	4,491.0	25.6%	2.3%	18.6%
6	MAPFRE	Spain	15,479	17,267	19,342	1,788.1	2,074.7	25.0%	2.3%	12.0%
7	COVÉA	France	10,466	13,493	16,318	3,027.0	2,825.0	55.9%	5.1%	20.9%
8	ERGO ¹	Germany	11,323	14,765	15,631	3,441.8	866.0	38.0%	3.5%	5.9%
9	AVIVA	United Kingdom	11,749	10,840	12,117	-909.3	1,277.7	3.1%	0.3%	11.8%
10	GROUPAMA	France	9,121	9,925	10,476	804.0	551.0	14.9%	1.4%	5.6%
11	R+V	Germany	5,713	9,760	9,920	4,047.0	160.0	73.6%	6.7%	1.6%
12	VIG	Austria	5,065	7,468	8,740	2,403.0	1,272.4	72.6%	6.6%	17.0%
13	AÉMA GROUPE	France	-	6,961	8,695	6,961.2	1,733.6	-	-	24.9%
14	UNIPOL	Italy	7,265	8,214	8,502	949.0	288.3	17.0%	1.5%	3.5%
15	SAMPO GROUP	Finland	4,698	7,644	8,136	2,946.0	492.0	73.2%	6.7%	6.4%
First 5 total			143,737	202,770	232,594	59,033.5	29,823.1	61.8%	5.6%	14.7%
First 15 total			224,616	309,107	350,471	84,491.3	41,363.9	56.0%	5.1%	13.4%

Table 1.3
Life: 2022 overall ranking of European insurance groups
(ranking by premium volume)

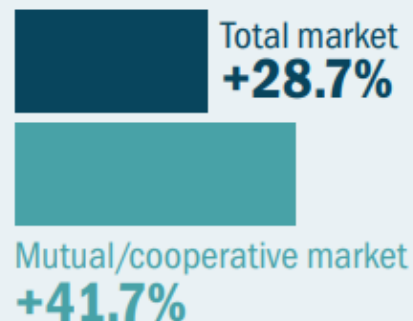
	Group	Country	Premiums (millions of euros)					%Δ premium 2012-2022	% YoY premium 2012-2022 (annual average)	% YoY premium 2021 -2022
			2012	2021	2022	Δ 2012-2021	Δ 2021-2022			
1	GENERALI	Italy	46,810	51,680	52,902	4,870.0	1,222.0	13.0%	1.2%	2.4%
2	AXA ¹	France	53,596	43,795	43,836	-9,801.0	41.0	-18.2%	-1.7%	0.1%
3	CNP	France	23,555	29,061	33,325	5,505.4	4,264.0	41.5%	3.8%	14.7%
4	CRÉDIT AGRICOLE ASSURANCE ²	France	16,200	31,224	27,931	15,024.3	-3,293.3	72.4%	6.6%	-10.5%
5	ALLIANZ	Germany	25,303	25,884	26,568	581.0	684.0	5.0%	0.5%	2.6%
6	BNP PARIBAS CARDIF ²	France	16,315	24,761	21,532	8,445.4	-3,229.1	32.0%	2.9%	-13.0%
7	POSTE VITA	Italy	10,504	17,574	17,179	7,069.8	-394.6	63.5%	5.8%	-2.2%
8	LEGAL&GENERAL	United Kingdom	6,554	12,070	16,063	5,516.5	3,992.5	145.1%	13.2%	33.1%
9	TALANX	Germany	11,532	14,749	14,700	3,217.0	-49.0	27.5%	2.5%	-0.3%
10	SOGECAP	France	8,887	14,519	13,484	5,632.4	-1,035.3	51.7%	4.7%	-7.1%
11	SWISS LIFE	Switzerland	9,857	12,920	13,469	3,063.2	549.1	36.6%	3.3%	4.2%
12	AEGON	Holland	16,666	13,400	12,848	-3,266.0	-552.0	-22.9%	-2.1%	-4.1%
13	BPCE ASSURANCE ³	France	2,347	12,651	11,692	10,304.6	-959.0	398.3%	36.2%	-7.6%
14	ZURICH	Switzerland	10,517	9,973	10,086	-543.7	112.8	-4.1%	-0.4%	1.1%
15	AVIVA	United Kingdom	16,276	11,728	10,079	-4,547.5	-1,649.0	-38.1%	-3.5%	-14.1%
First 5 total			165,464	181,644	184,562	16,179.7	2,917.7	11.5%	1.0%	1.6%
First 15 total			274,918	325,990	325,694	51,071.3	-295.9	18.5%	1.7%	-0.1%

WHO INSURANCE?

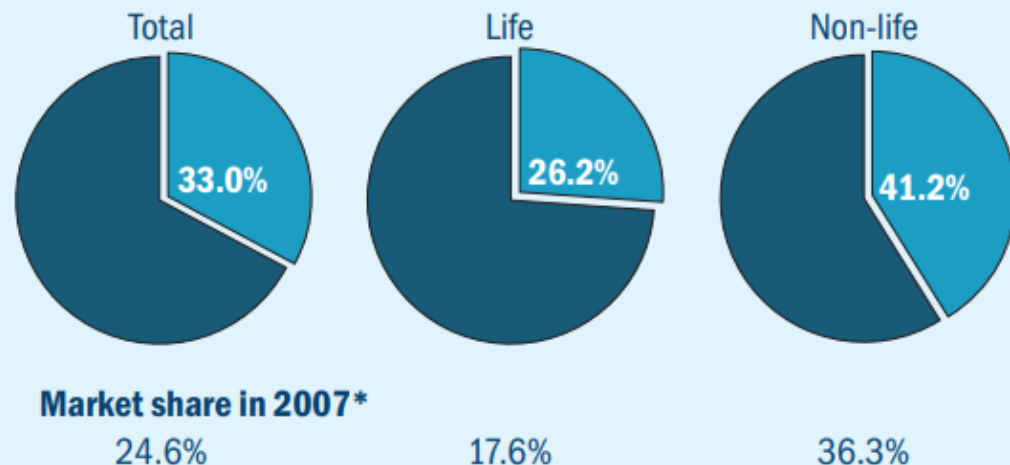
The largest European insurance markets in terms of mutual/cooperative market share in 2022



Ten-year premium growth (2012-2022)

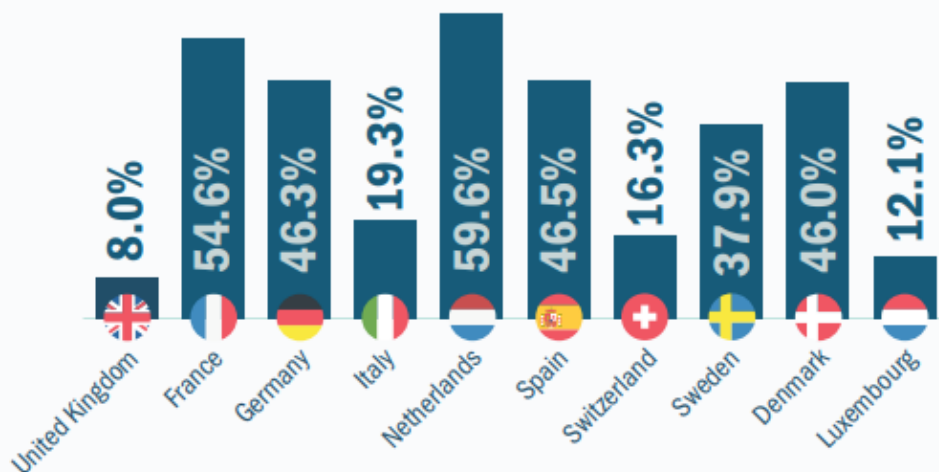


European mutual/cooperative market share in 2022

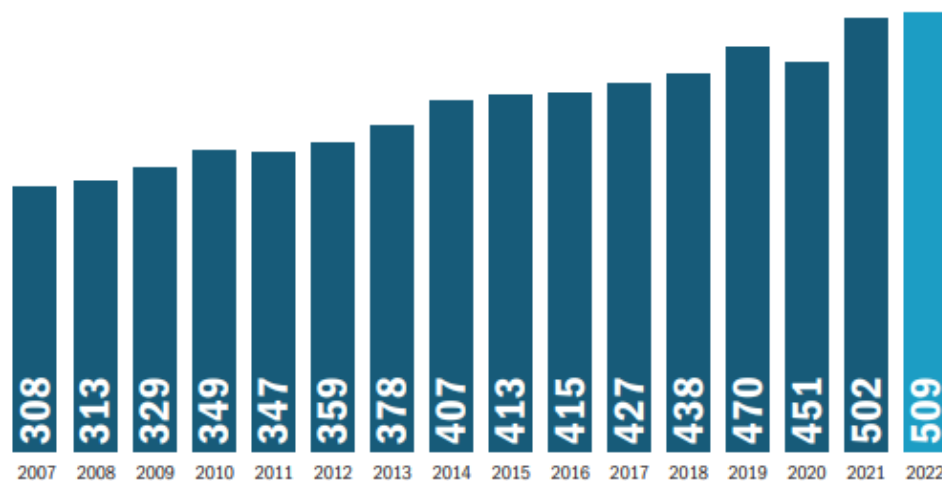


*Earliest available market share data

Mutual/cooperative market share in the 10 largest European insurance markets in 2022



Mutual and cooperative premium income (EUR billions)



INSURANCE MARKETS/INSTITUTIONS

Life insurance:

- Risks: **death, superannuation, long-term health**
- Offering term/whole life, LTC, annuities and products with **financial features** (unit/index linked, ...)
- **Long-term investor, frequently with AM features**



Non-life insurance:

- Risks: loss of **wealth** and **liability**
- **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/treaties)
- Mostly non-life, especially MAT
- Purposes: loss stabilization, capital capacity, protection from CAT, expertise and entry/exit from markets



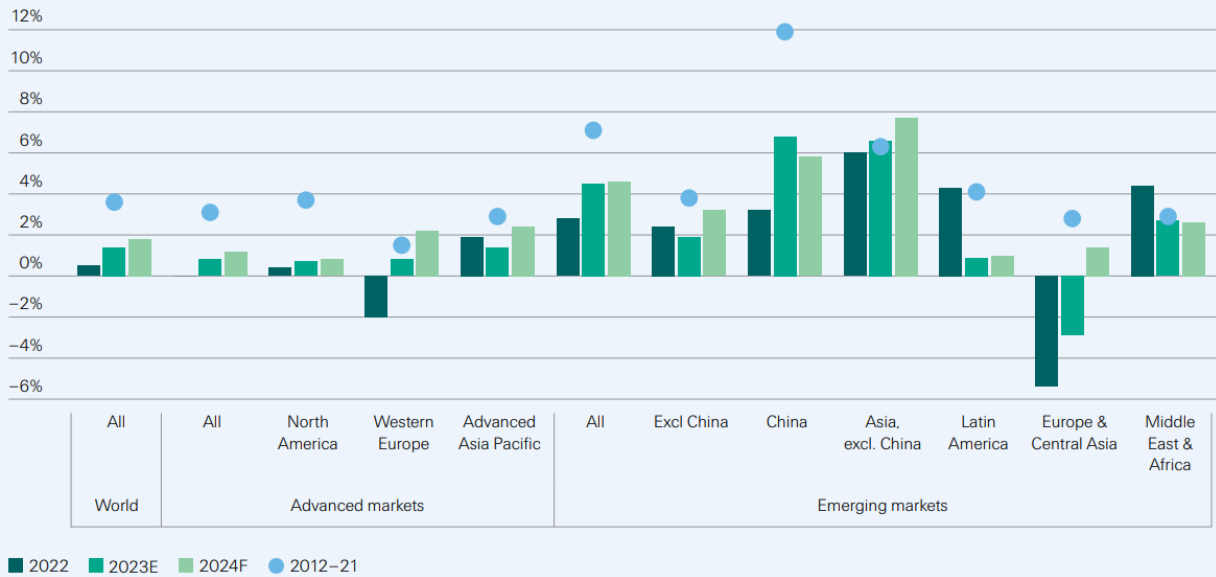
INSURANCE MARKETS/INSTITUTIONS

The world's 20 largest insurance markets by nominal premium volumes, 2022 vs 2021

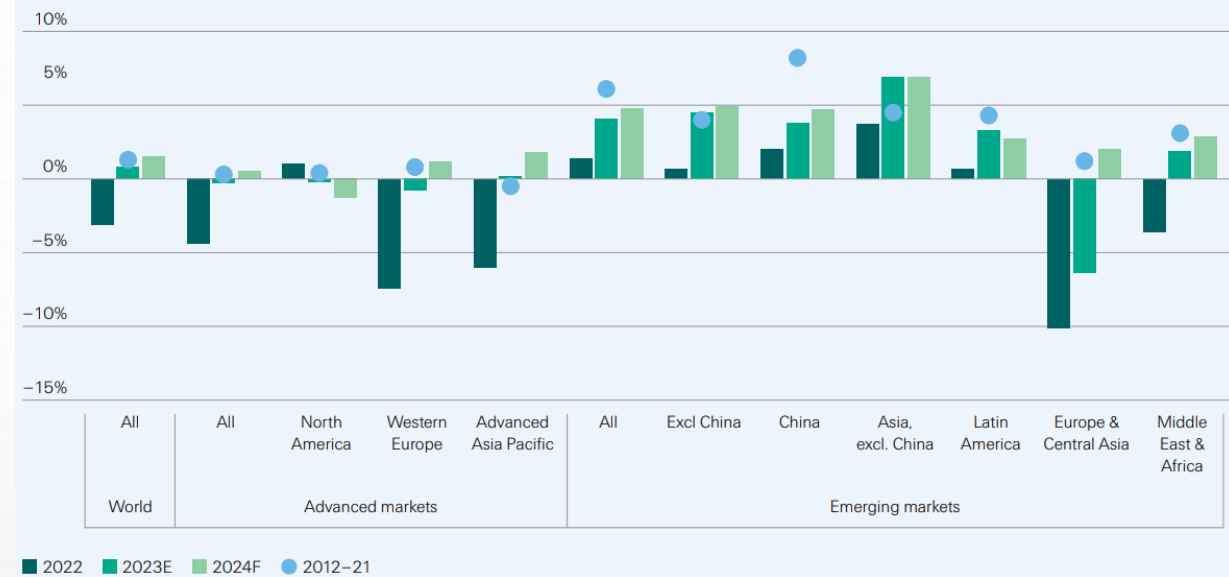
Rank	Country/market	Total premium volume (USD bn)	Total premium volume (USD bn)	Total premium volume (USD bn)	Global market share	Global market share
		2022	2021	% change	2022	2021
1	US	2 960	2 725	8.6%	43.7%	40.3%
2	China	698	696	0.2%	10.3%	10.3%
3	UK	363	374	-2.8%	5.4%	5.5%
4	Japan	338	398	-15.1%	5.0%	5.9%
5	France	261	293	-10.7%	3.9%	4.3%
6	Germany	242	272	-11.3%	3.6%	4.0%
7	South Korea	183	193	-5.3%	2.7%	2.9%
8	Canada	171	166	2.8%	2.5%	2.5%
9	Italy	160	192	-16.5%	2.4%	2.8%
10	India	131	123	6.5%	1.9%	1.8%
11	Taiwan	86	113	-23.8%	1.3%	1.7%
12	Netherlands	84	92	-9.2%	1.2%	1.4%
13	Brazil	76	63	20.7%	1.1%	0.9%
14	Australia	72	72	-0.7%	1.1%	1.1%
15	Hong Kong	69	73	-5.6%	1.0%	1.1%
16	Spain	68	73	-6.7%	1.0%	1.1%
17	Switzerland	56	58	-3.2%	0.8%	0.9%
18	Sweden	54	59	-8.5%	0.8%	0.9%
19	Singapore	47	45	3.9%	0.7%	0.7%
20	South Africa	46	50	-7.9%	0.7%	0.7%
	Top 20 markets	6 165	6 131	-0.5%	91.0%	90.7%
	World	6 782	6 765	0.3%		

INSURANCE MARKETS/INSTITUTIONS

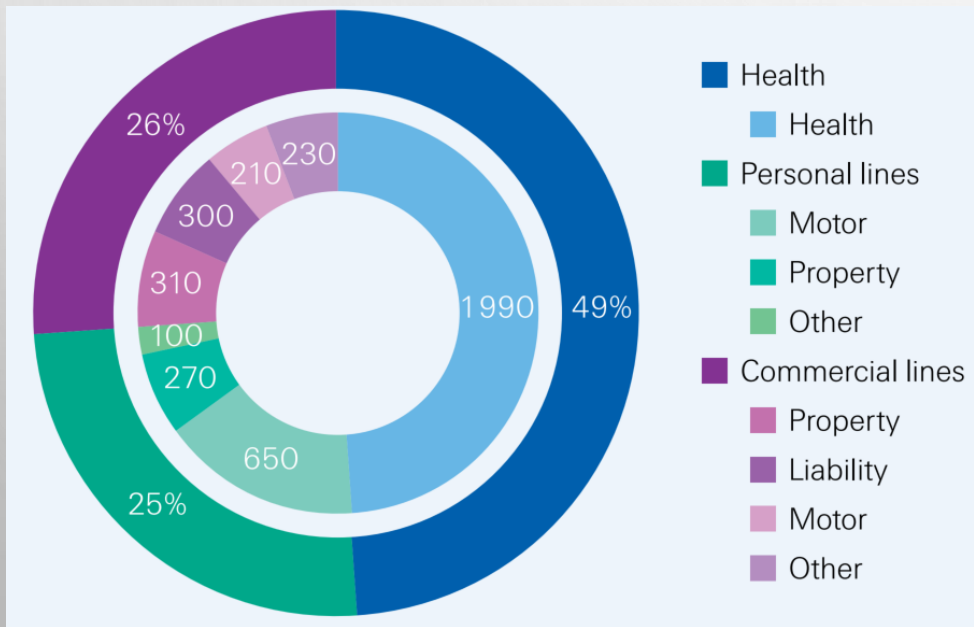
Non-life real premium growth, by region



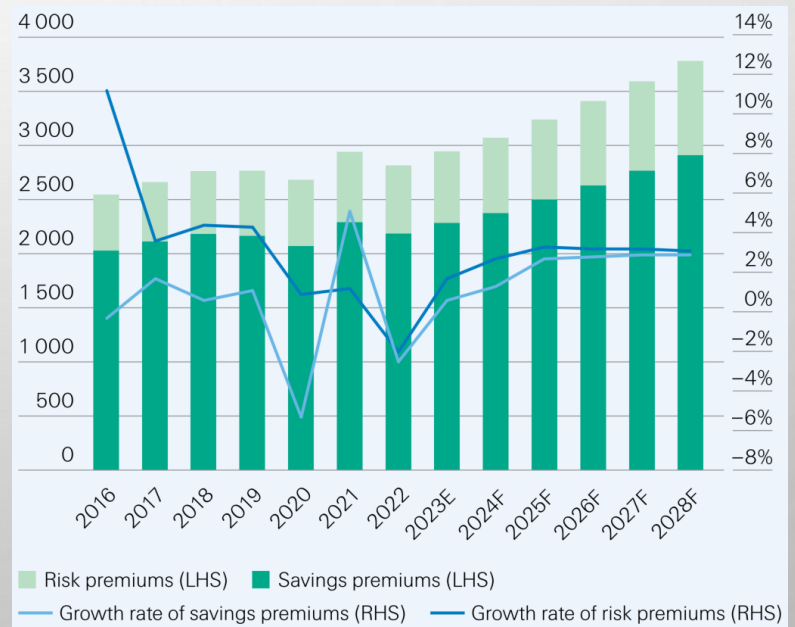
Life real premium growth, by region



Global non-life market share and volumes by LoB, 2022 (USD bln)

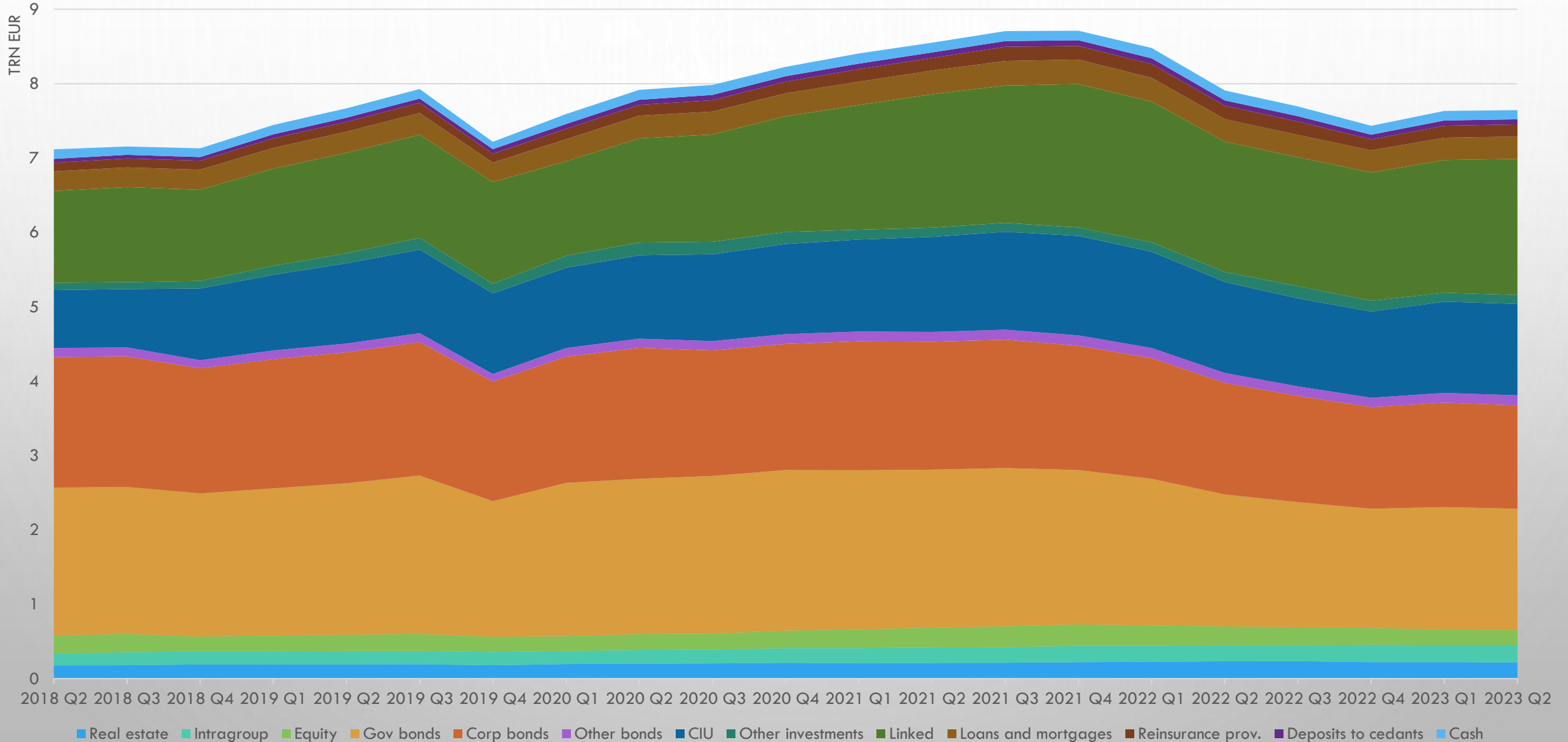


Global life premiums and growth by LoB, 2022 (USD bln)



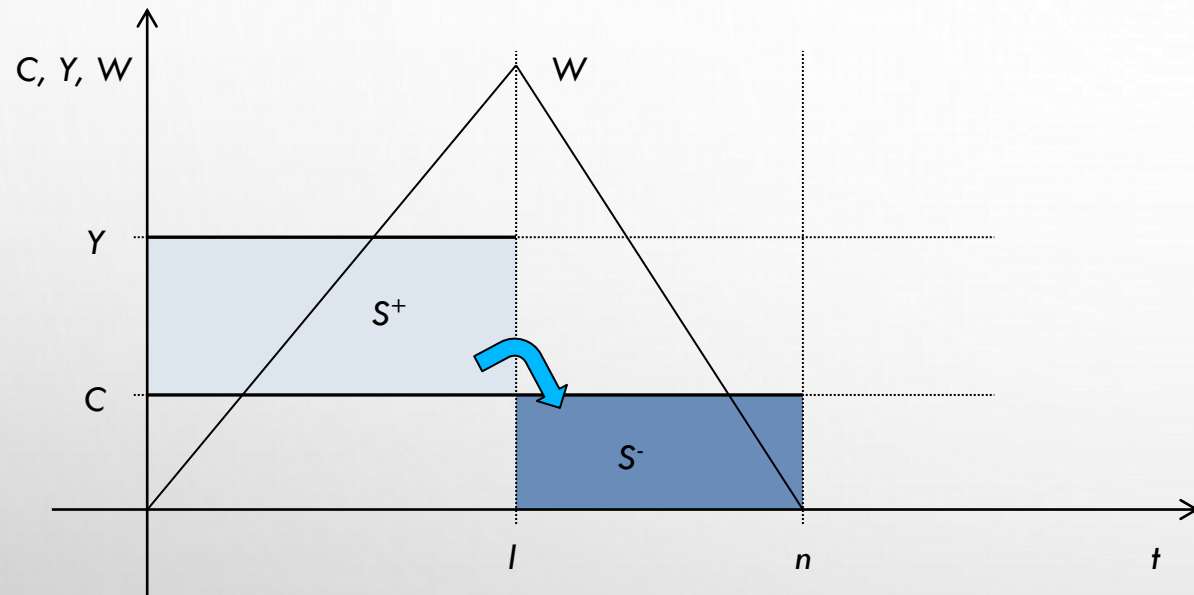
INVESTMENTS IN INSURANCE

Investments under S2 (EIOPA, group)



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

HOW PENSIONS?

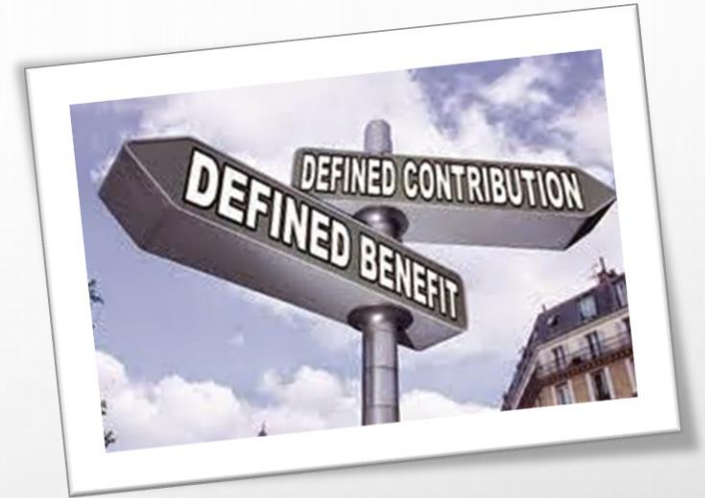
Two main regimes:

- **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

Don't confuse this for retribution/contribution-based pensions!

Public funds are often **PAYG** and **mandatory**

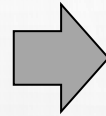
Private funds are funded, mostly DC and often **voluntary**



HOW PENSIONS?

Risks of PAYG systems:

*average pension × retired =
= average contribution × workers*



$$\text{average pension} = \frac{\text{rate of contributions} \times \text{wages} \times \text{employed} \times \text{tax_transfer}}{\text{dependency_rate} \times \text{retired}}$$

**LABOUR MARKET
AND DEMOGRAPHY**

**PUBLIC BUDGET
AND DEMOGRAPHY**

DEMOGRAPHY

Risks of funded systems:

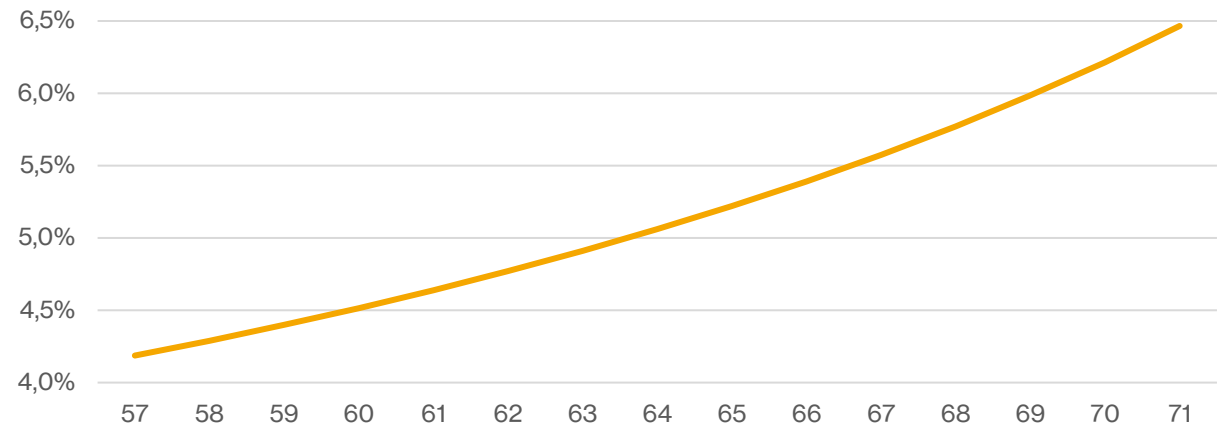
- Demographic (annuity conversion)
- Financial (returns on contributions, inflation)
- Responsibility of individuals:
financial literacy + long term planning



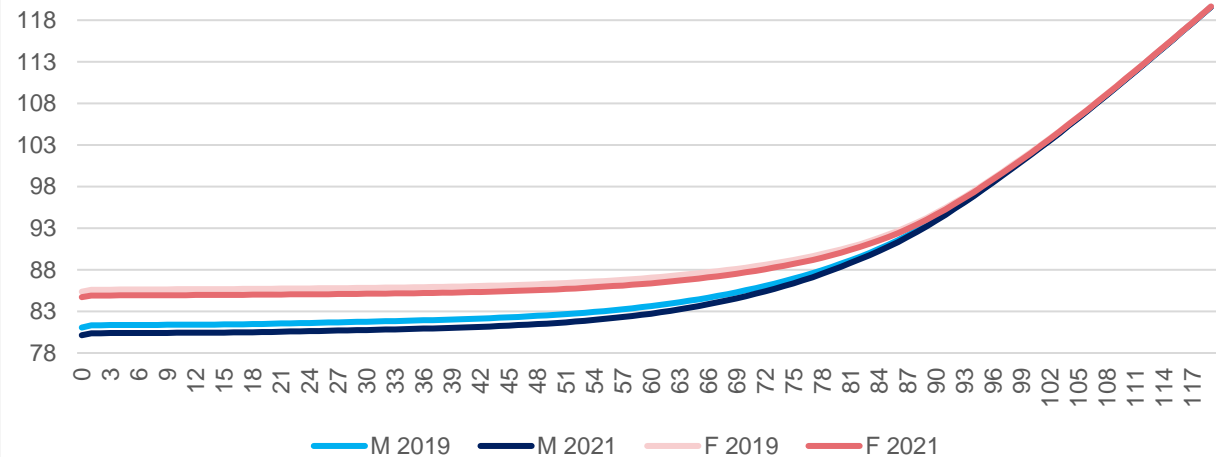
Endless reforms, «difficulties» since late 1980s:

- now entirely **contribution-based** (with transition)
- Progressively **aligning requirements** between genders, public/private sector, employees and self-employed (yet not between/within generations)
- Progressively **removing or penalising early retirement**
- **Retirement age** linked to life expectancy (67 today, expected to be 69 in 2050, but effective age is now 63)
- Contributions **compounded at the nominal 5-year GDP growth** (2,31% in 2023, hit zero in 2014 and 2021)
- **Replacement rates vary** widely (average around 70% in the long run on a net-net basis): huge impact of individual salary/careers/age

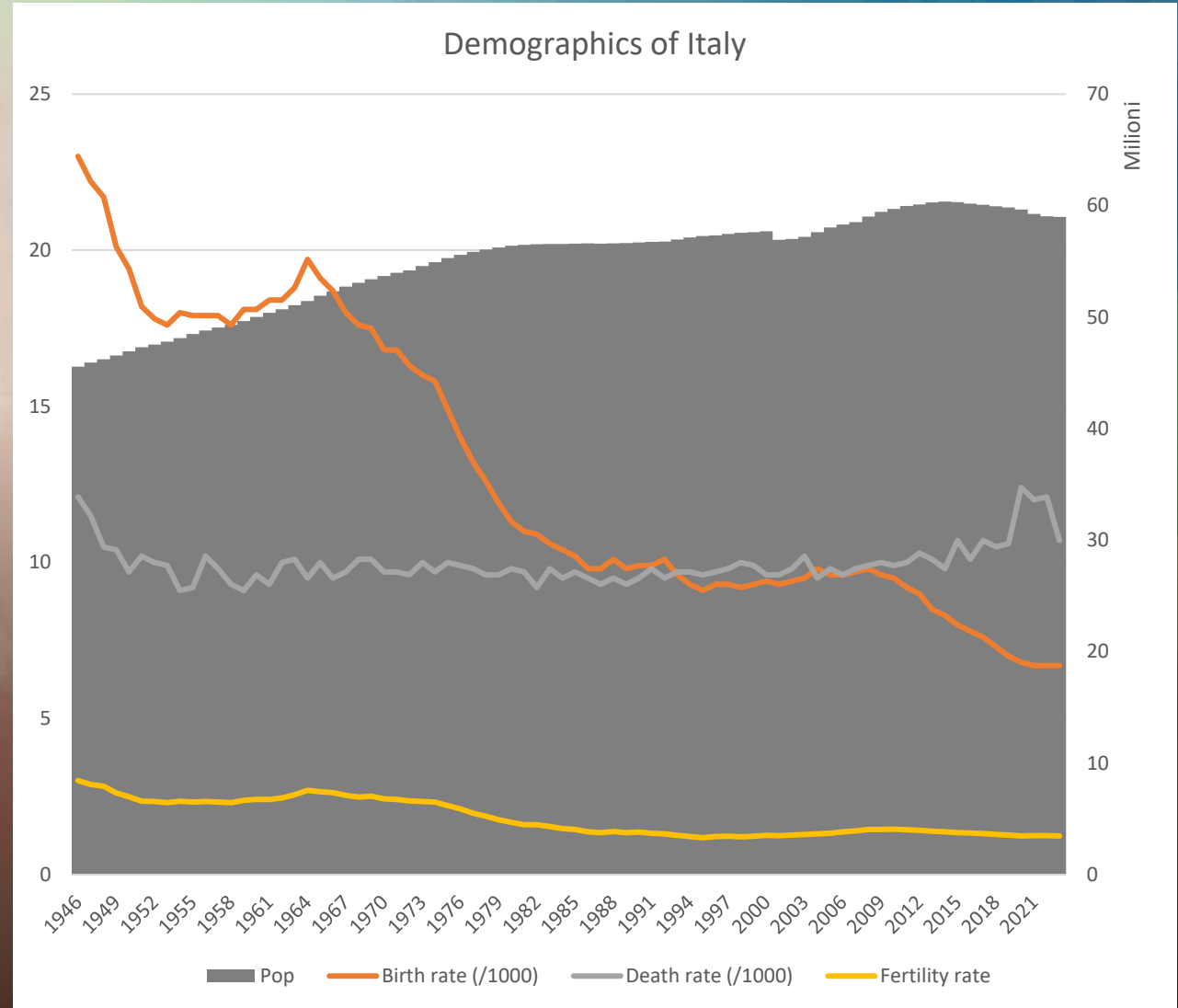
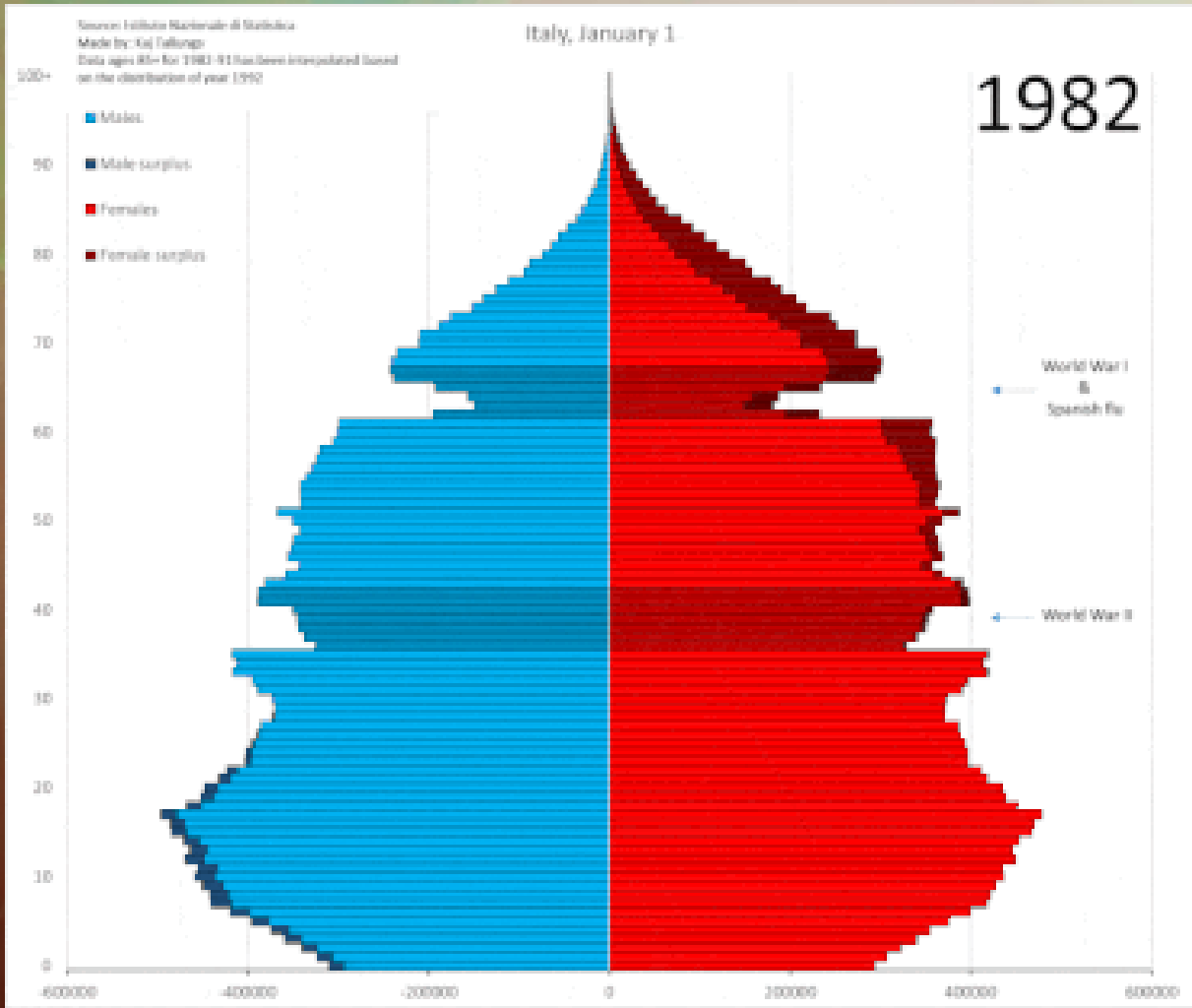
Conversion factors (final C --> annual P)



Life expectancy by age, sex, year



A GLANCE AT THE ITALIAN PAYG SYSTEM



A GLANCE AT THE ITALIAN PAYG SYSTEM

Chart 44: Life distribution channels (% of GWP) — 2019

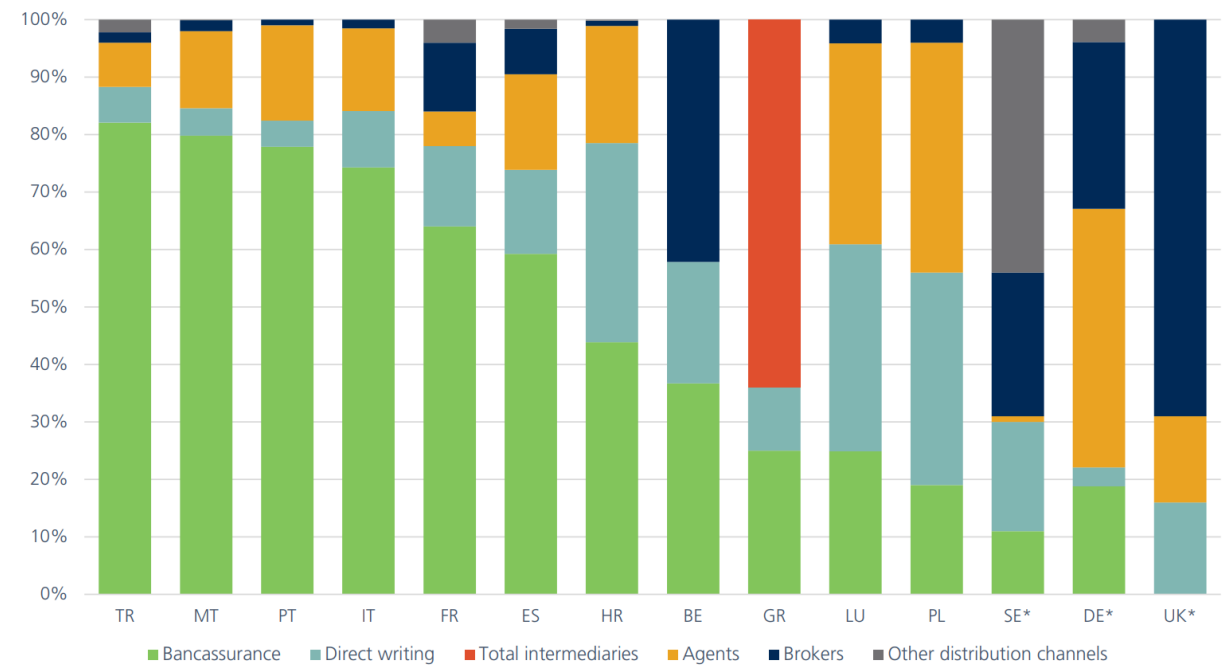
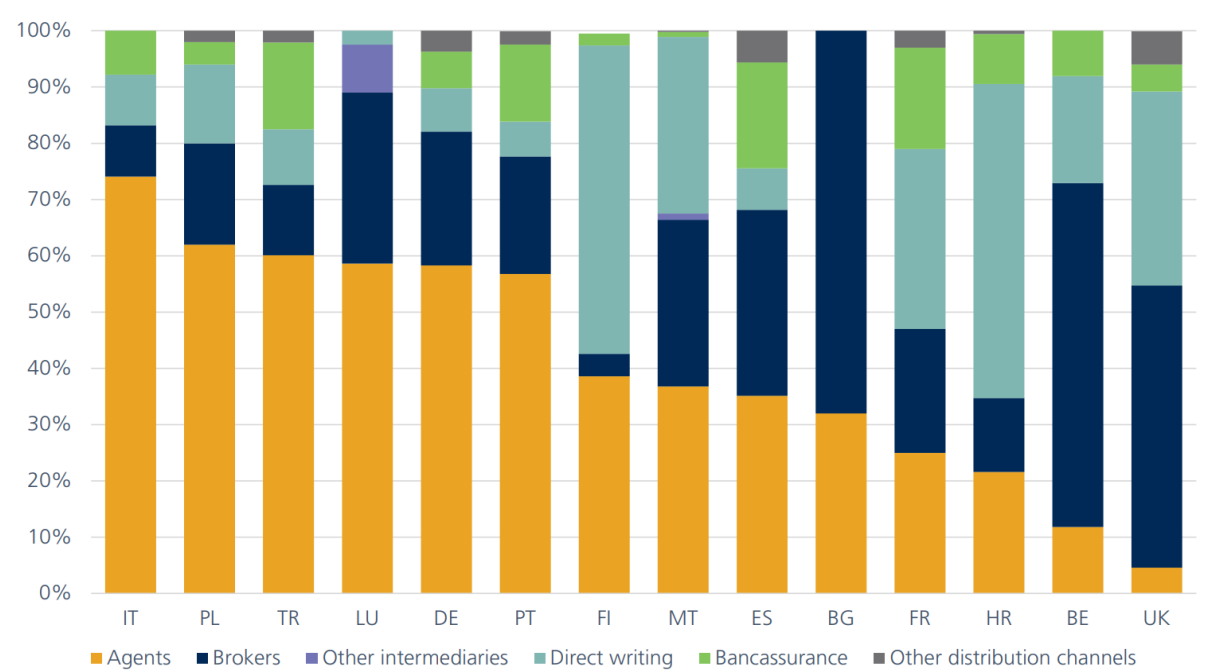


Chart 45: Non-life distribution channels (% of GWP) — 2019



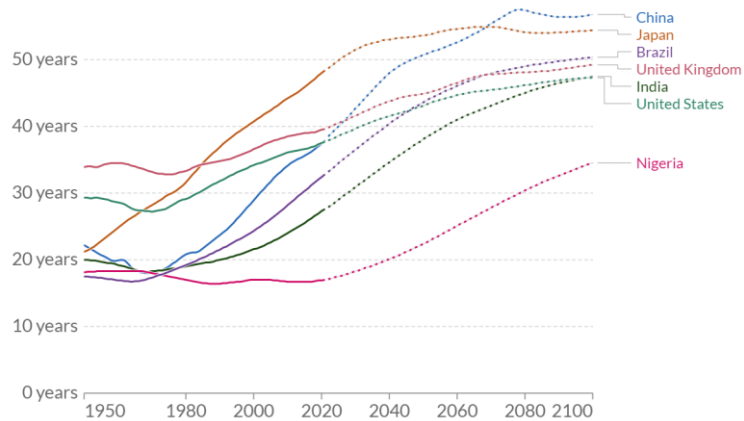
EXAMPLES

Median age, 1950 to 2100

The median age divides the population into two parts of equal size; that is, there are as many people with ages above the median age as there are with ages below.

Our World in Data

+ Add country



Life expectancy, 1770 to 2019

Our World in Data

LINEAR

LOG

+ Add country

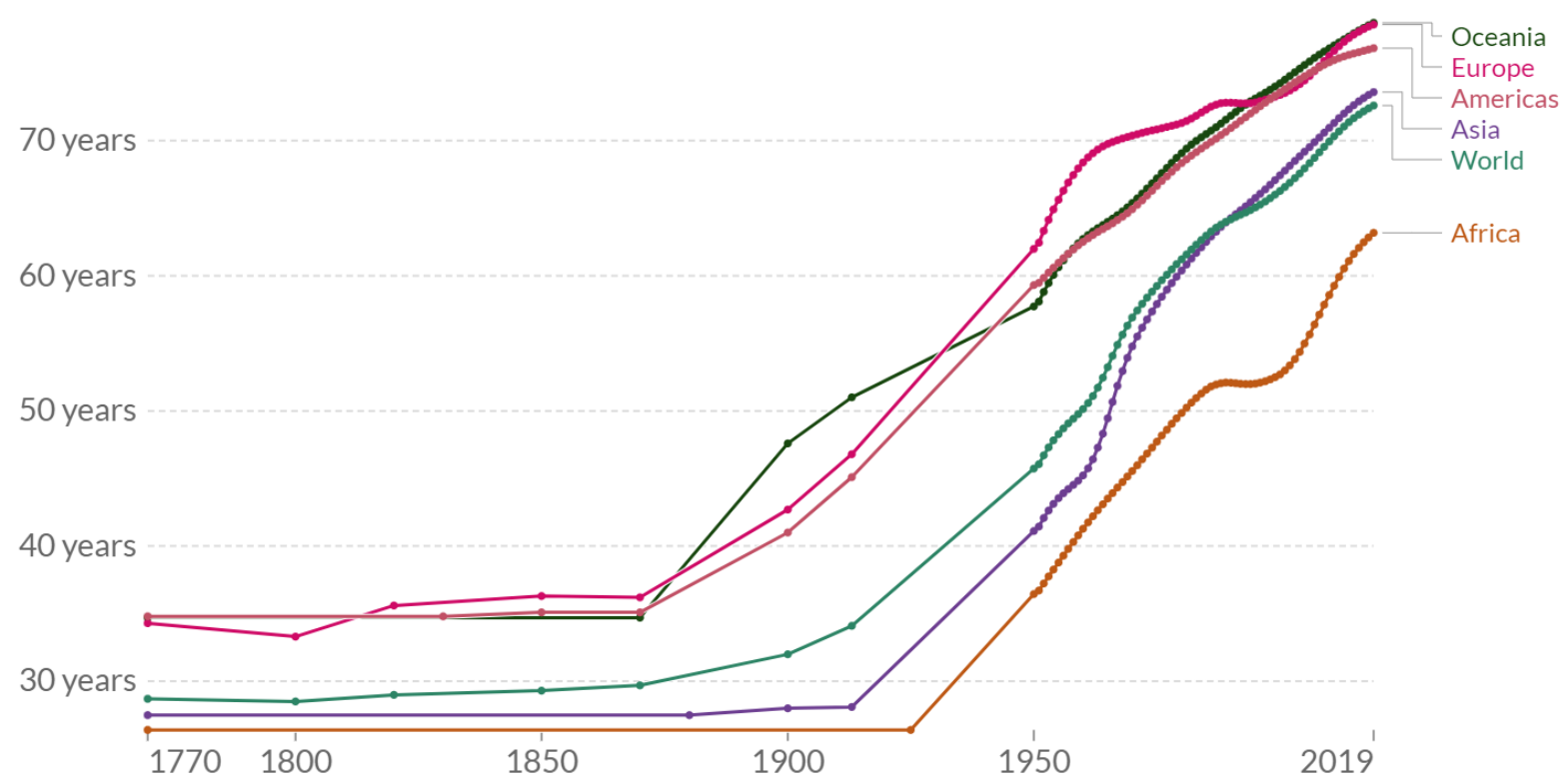
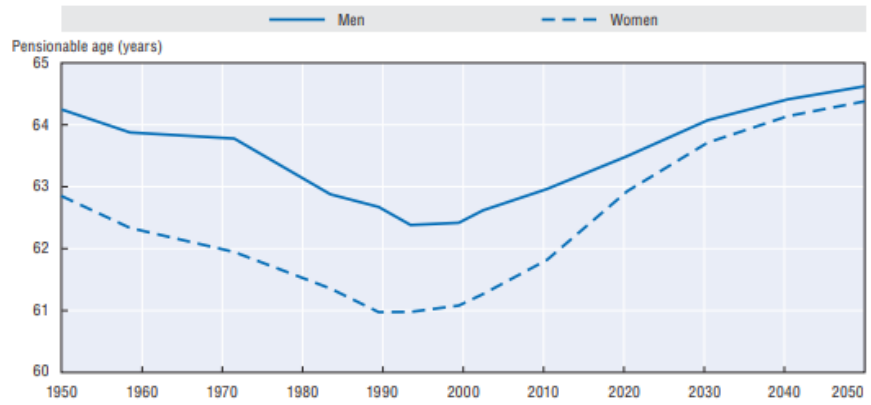
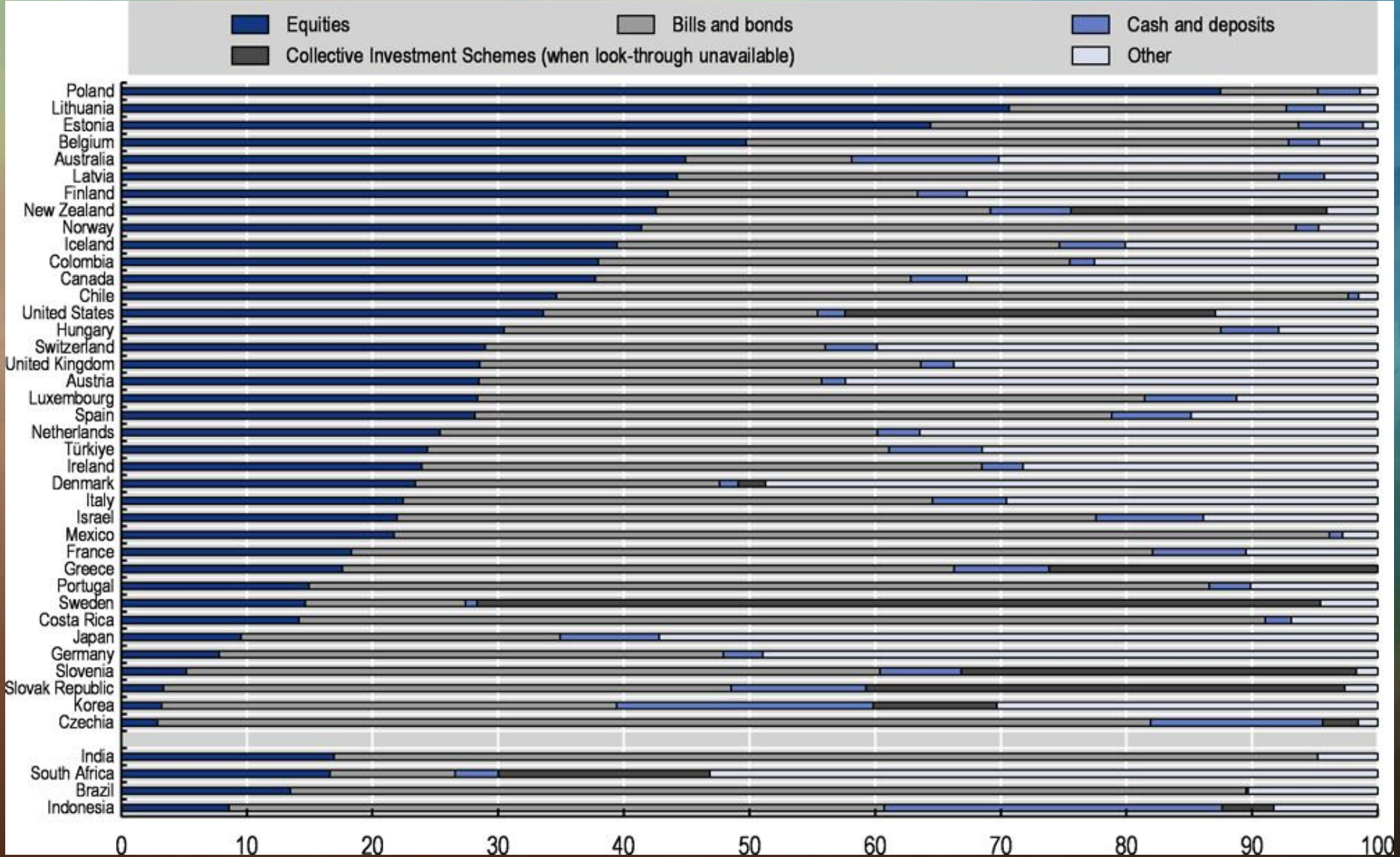


Figure 1.6. Average pensionable age in OECD countries by sex, 1950-2050



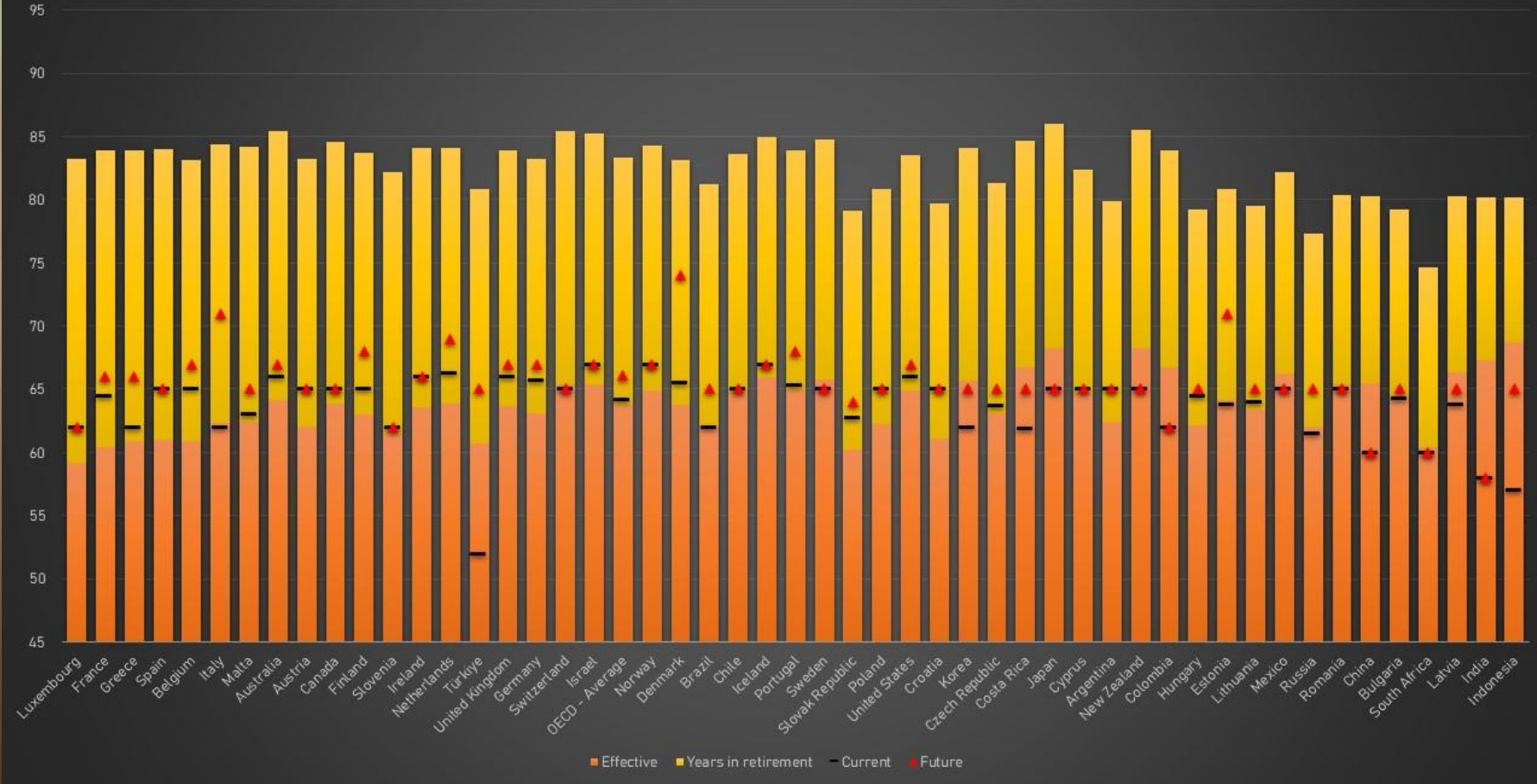
Source: National officials, OECD calculations and Turner (2007).
 StatLink <http://dx.doi.org/10.1787/888932370246>

EXAMPLES



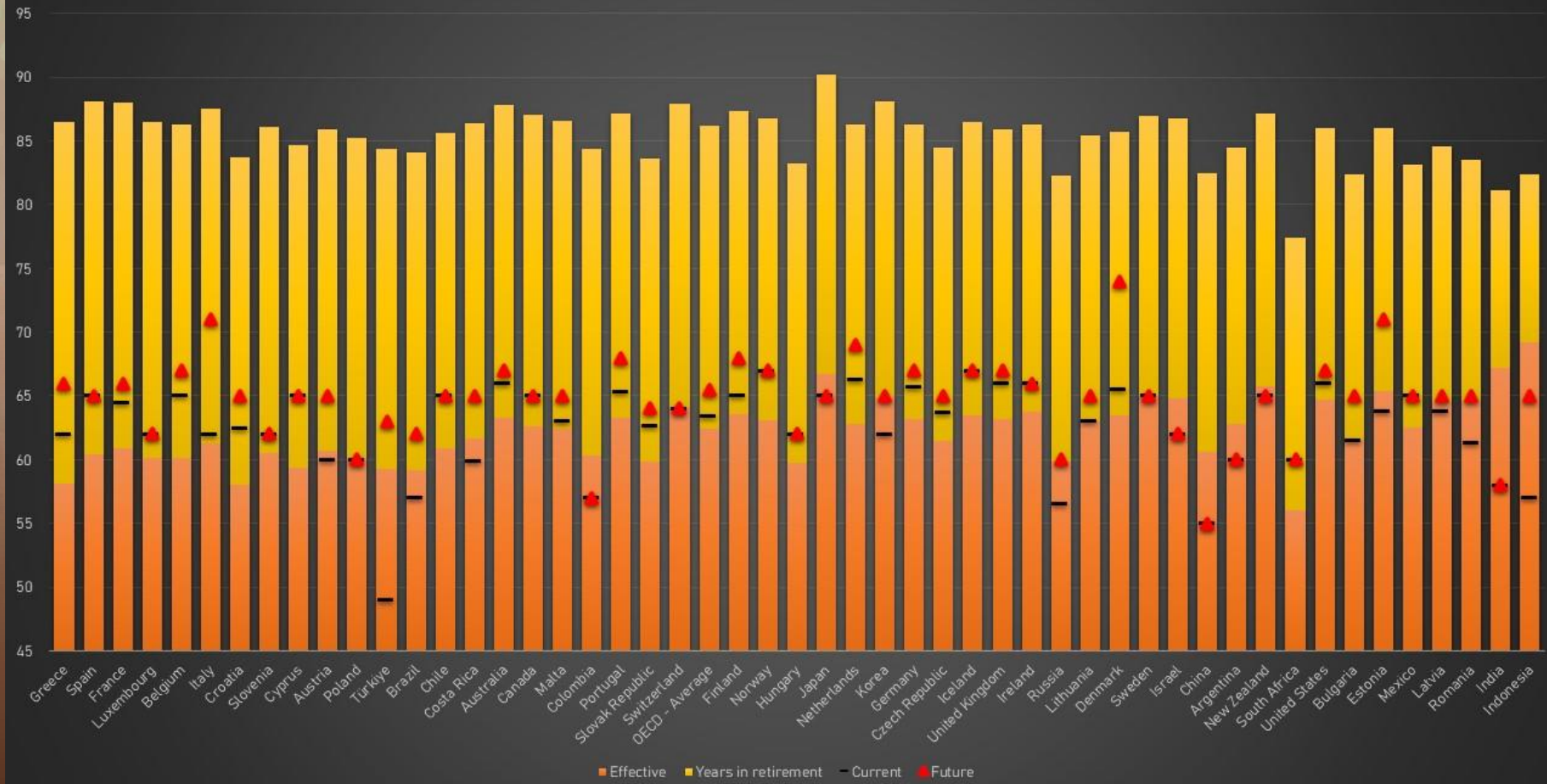
EXAMPLES

Retirement age and expected years in retirement by country, MEN – ranked by decreasing years expected in retirement (OECD: PAG, 2020)

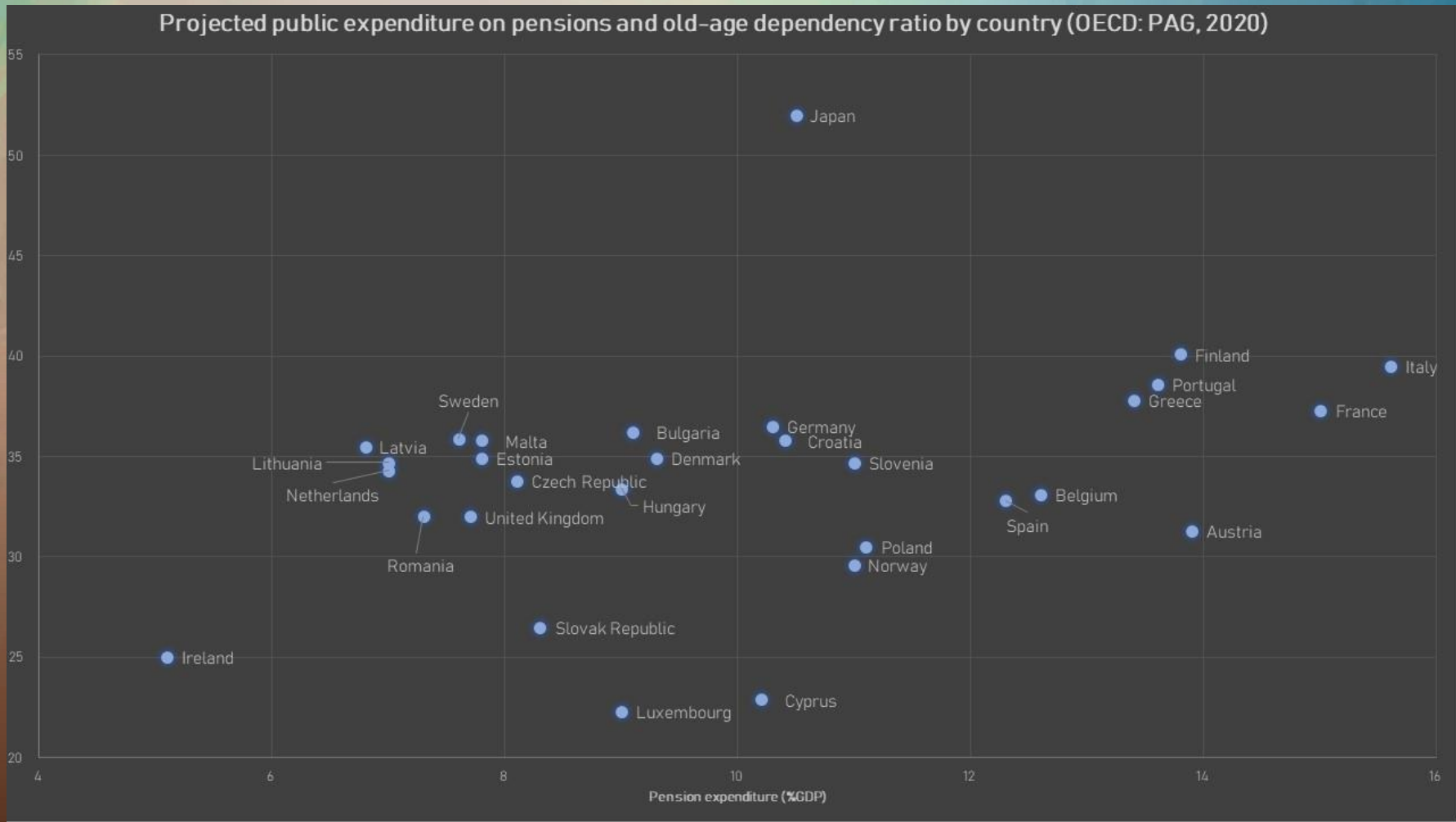


EXAMPLES

Retirement age and expected years in retirement by country, WOMEN - ranked by decreasing years expected in retirement (OECD: PAG, 2020)



EXAMPLES



EXAMPLES