



**Technical Seminar of the ISSA Technical Commission of  
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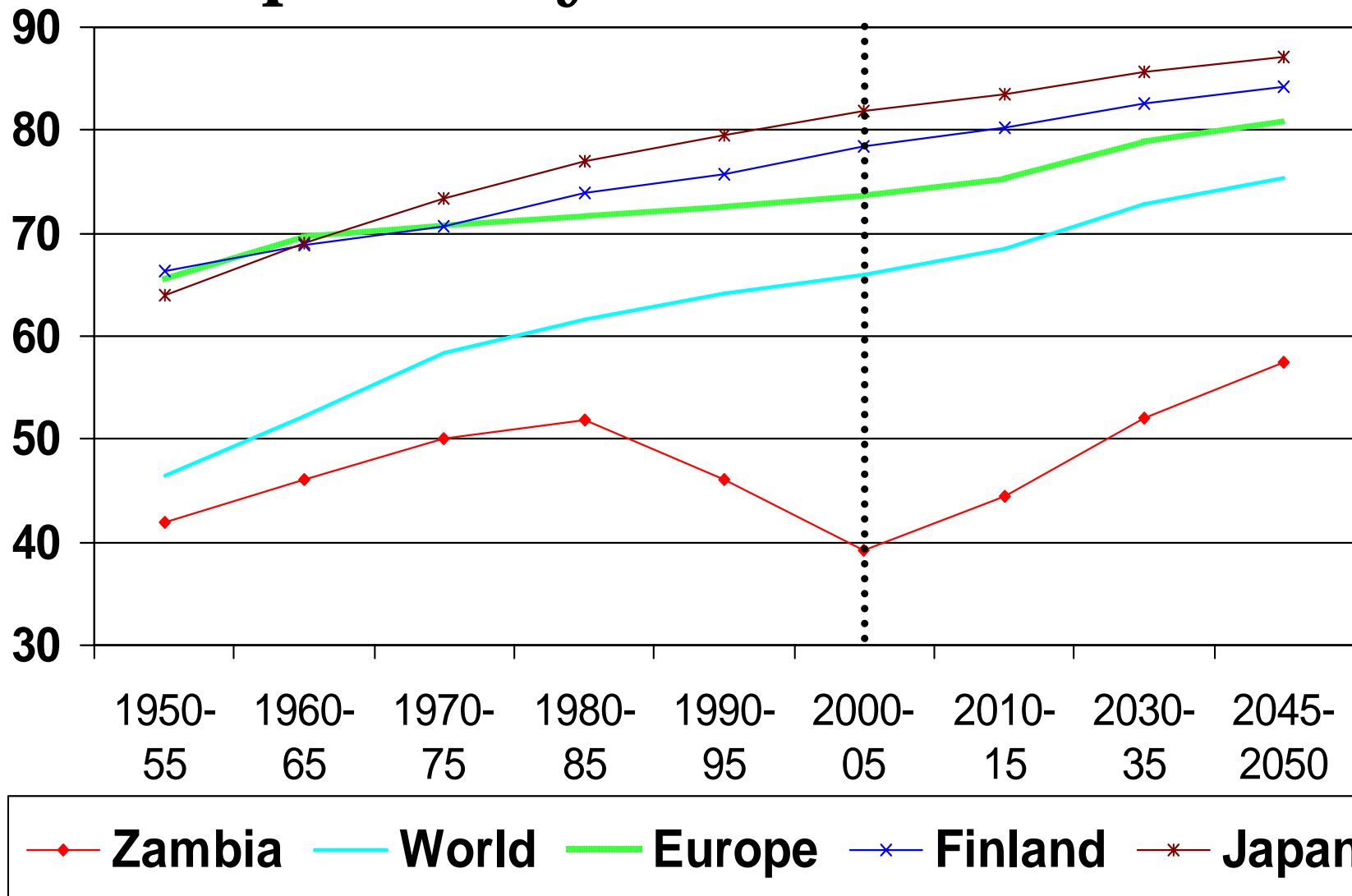
***Optimal financing of social security pension schemes***

**Financing of Pension Schemes**

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# Life expectancy at birth 1950-2050



# The retirement age in selected countries

Country	Current retirement age	Changes in retirement ages
Austria	65(M) 60(F)	60 → 65 (2024–2033) (F)
Denmark	65(national pension); 67 (ATP)	65→67 (2024-2027)(national pension)
Czech Republic	61y10m(m) 60y4m(F)	65 (2030)
Estonia	63(M) 60y 6m(F)	60→63(2016)(F)
Germany	65	65→67 (2012-2029)
Great Britain	65(M), 60(F)	60→65 (2010–2020) (F); 65→ 68 (2024-2046)
Hungary	62(M), 61y 6m(F)	55(1996) →62 (2009) (F)
Iceland	67	–
Ireland	65(employees), 66 others	–
Italy	65(M), 60(F) (gradually phased out in 19 years)	57–65 (gradually implemented in 19 years)
Japan	65(national pension); 60 <sup>3)</sup>	60→65 (2013–2025)
Norway	67	flexible from 62 on (2010 or 2011)

# Adjusting the pension scheme to increased longevity

Defined contribution (DC) or notional DC schemes an accumulated (notional) pension capital is changed into a series of payments by dividing the capital with the present value of a unit pension ( ${}_i\ddot{a}_w$ ). The present value depends mainly on two components: mortality rates and discount rate

Simplified formula:  $\text{Pension}(t) = \text{Capital}(t) / {}_i\ddot{a}_w(t)$

## – Defined contribution schemes (DC)

- Mexico
- DC plans: Hungary, Latvia, Lithuania, Poland, The Slovak Republic, Sweden

## – Notional defined contribution schemes (NDC)

- Sweden, Poland, Latvia, Norway(2011)

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# Adjusting the pension scheme to increased longevity

## Defined benefits schemes (DB)

The payments (accrued pensions) are known, while the present value (pension capital) is calculated by multiplying the accrued pension by the present value of a unit pension

Simplified formula:

$$\text{Capital}(t1) = \text{Pension} * {}_i\ddot{a}_w(t1)$$

$$\text{Capital}(t2) = \text{Pension} * {}_i\ddot{a}_w(t2)$$

$$= \text{Pension} * {}_i\ddot{a}_w(t1) * ({}_i\ddot{a}_w(t2) / {}_i\ddot{a}_w(t1))$$

If the pension capital is not allowed to increase

➔  $\text{Pension}(t2) = \text{Pension} * ({}_i\ddot{a}_w(t1) / {}_i\ddot{a}_w(t2))$

Longevity coefficient

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# Adjusting the pension scheme to increased longevity

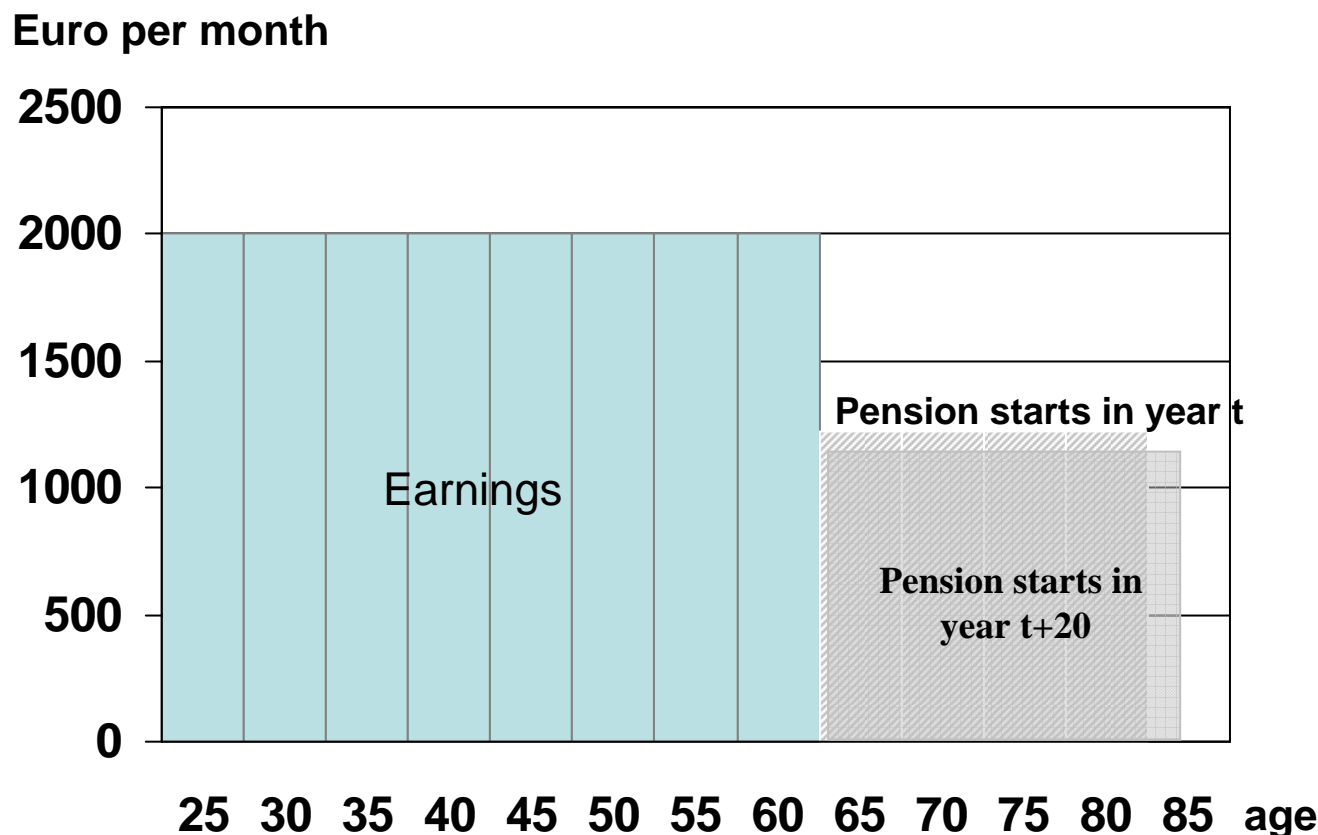
## Defined benefit schemes:

The accrued pension is linked to changes in life expectancy

– Finland, Portugal

- The number of years required for full pension is linked to changes in life expectancy: France 2012 –
- The retirement age is linked to changes in life expectancy: Denmark 2028-

# Longevity coefficient and increased life expectancy



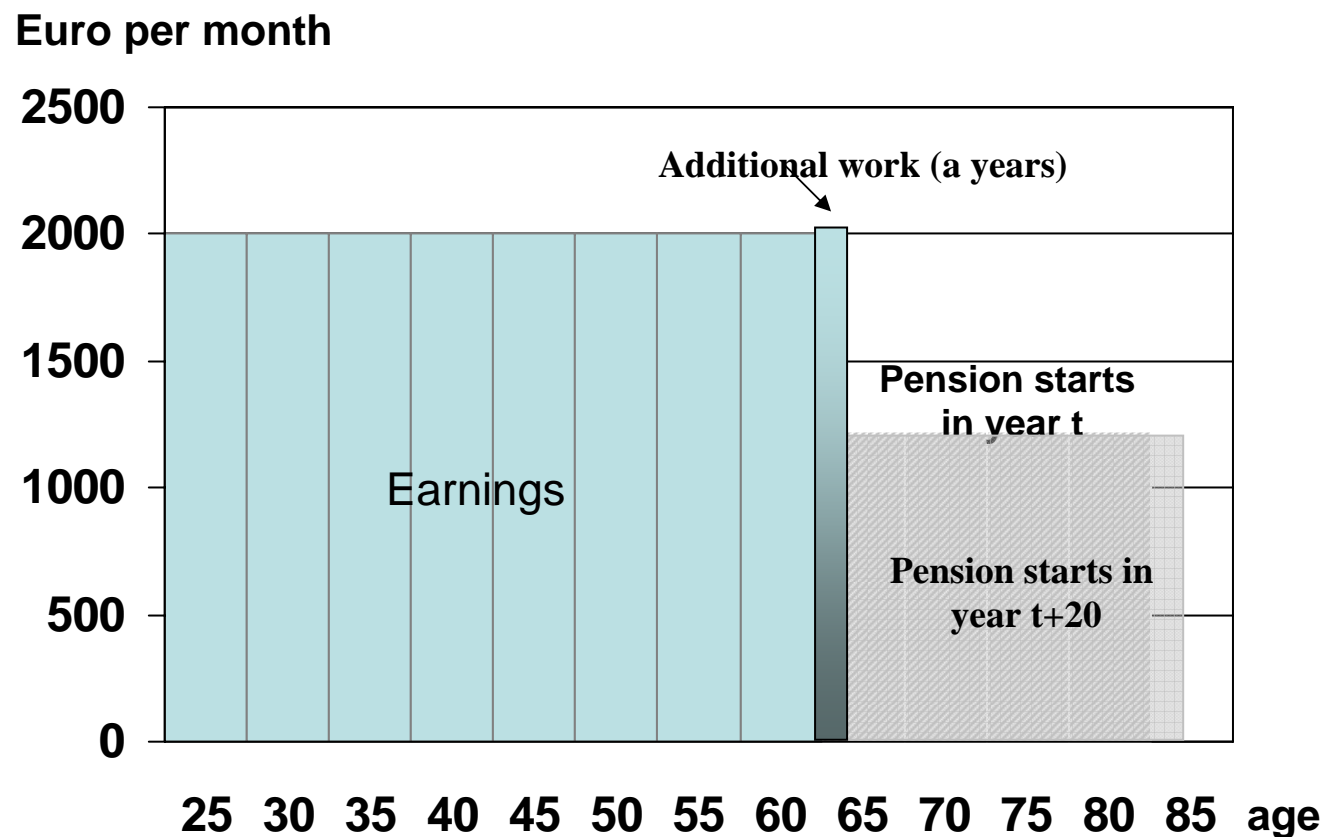
**Year t+20:**

**Alternative 1**

An employee can retire at the same age as in year t (e.g. at age 65), but the initial amount of the old-age pension decreases. The total value of the pension remains the same, however

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# Longevity coefficient and increased life expectancy



## Year t+20: Alternative 2

An employee can retain the same pension level as in year t by continuing to work an additional time a

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# A flexible old-age pension in Finland

Old-age pension at ages 62 – 68

- Accrued old-age pension at the age of 63
- Bonus accrual between ages 63 and 68
  - 4.5%/year (3 times normal accrual)
- Early old-age pension at the age of 62
  - abate for early retirement 0.6%/month (7.2% maximum)
- Postponement increase after the age of 68
  - 0.4%/month (4.8%/year)

# Longevity coefficient in Finland

## ■ WHY

the increase in the pension expenditure due to changes in life-expectancy is limited

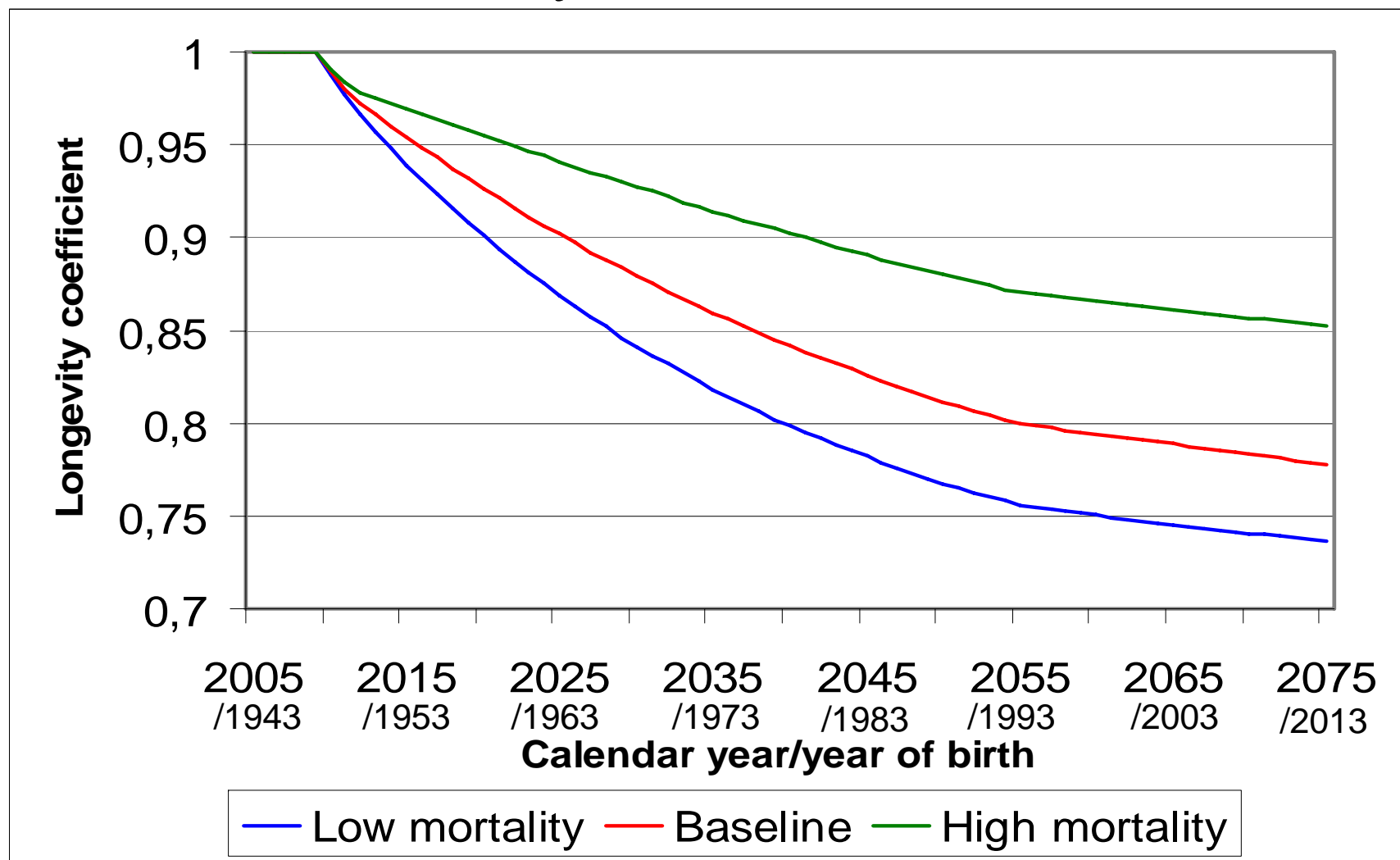
## ■ WHEN

- old-age and widower's pensions are adjusted when granted and disability pensions when they are changed into an old-age pension
- beginning from year 2010
- applied on persons born 1948 and later (widowers may be younger)

## ■ HOW

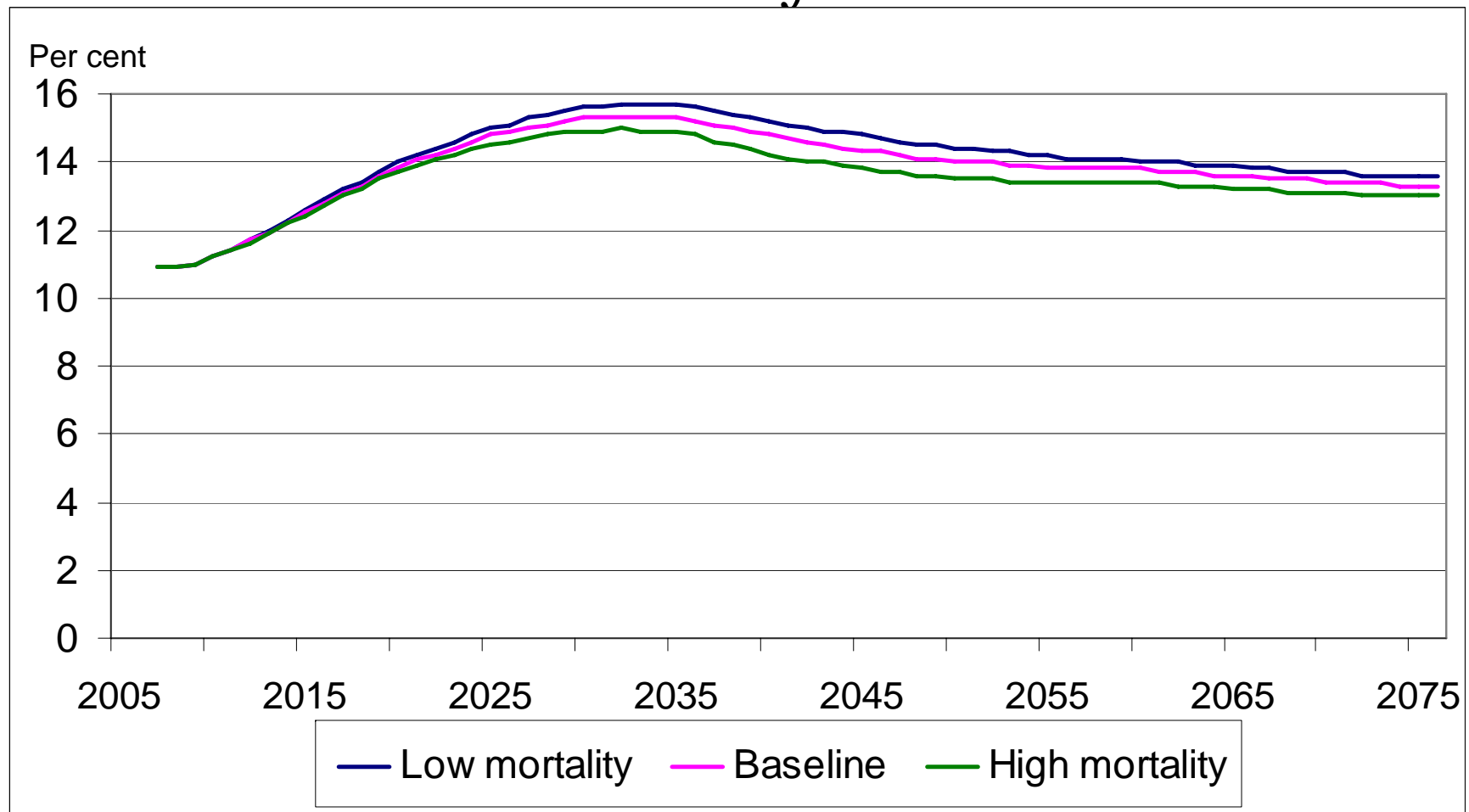
calculated and set separately for each cohort at the age of 62 using official life tables and a discount rate of 2%.

# Longevity coefficient in Finland under different mortality alternatives in 2005-2075



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# Total statutory pension expenditure in Finland as a percentage of the GDP under different mortality alternatives



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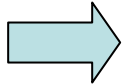
## Impact of the longevity coefficient in Finland (projections)

Year of birth retirement		Longevity coefficient	Compensating time of work		Growth of life-expectancy at age 63 (2009= 21,4 years)
			Accrued pension 50% of the wage	60%	
1947	2010	1	0 m	0 m	0 m
1957	2020	.926	9 m	11 m	21 m
1967	2030	.879	17 m	19 m	38 m
1977	2040	.842	23 m	27 m	54 m
1987	2050	.811	28 m	33 m	67 m

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# Conclusion

- Projections on life expectancy have usually failed. Life expectancy has increased more than projected
- Decisions concerning changes in the retirement ages are politically difficult to make



## **By adjusting the retirement age automatically according to changes in life expectancy:**

- only one decision is needed, where the rules are set but the level of the adjustment is not known in advance (like pension adjustment by price index: the rules are set in advance but the level is calculated separately for each year according to actual changes in prices)
- projections are not needed, the changes in life expectancy<sub>14</sub> are based on statistics

