

# LINKING RETIREMENT AGES TO LIFE EXPECTANCY DOES NOT LESSEN THE CONSEQUENCES OF UNEQUAL LIFESPANS

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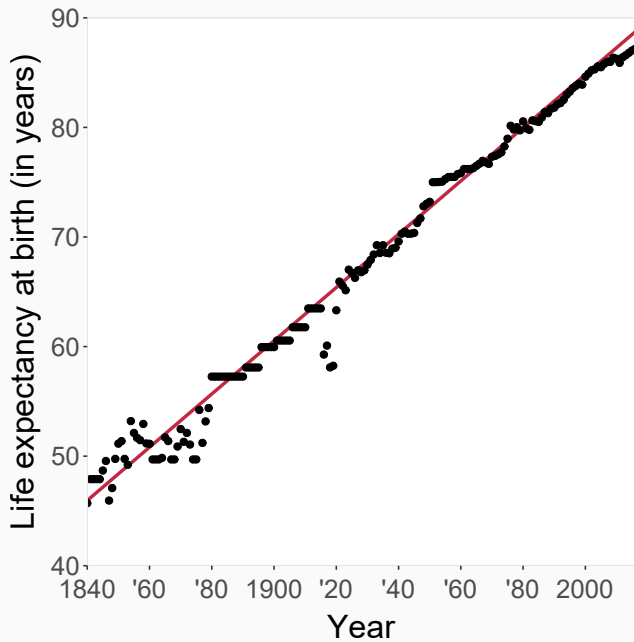
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Søren Kjærgaard  
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AARHUS UNIVERSITET

## BEST PRACTICE LIFE EXPECTANCY AT BIRTH



**so what?**

## **Challenges for pension systems**

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## CHALLENGES FOR PENSION SYSTEMS

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- Individuals from more recent cohorts **spend more time in retirement** than those from previous cohorts,
- Exacerbates **inter-cohort inequality** of the pension system  
(Sanderson and Scherbov, 2013),
- Put preasure on **national finances**.

**What to do?**

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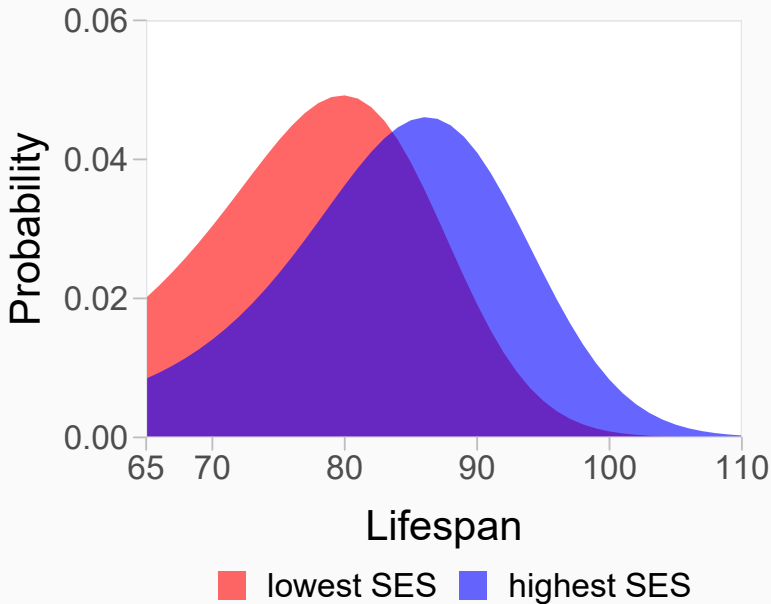
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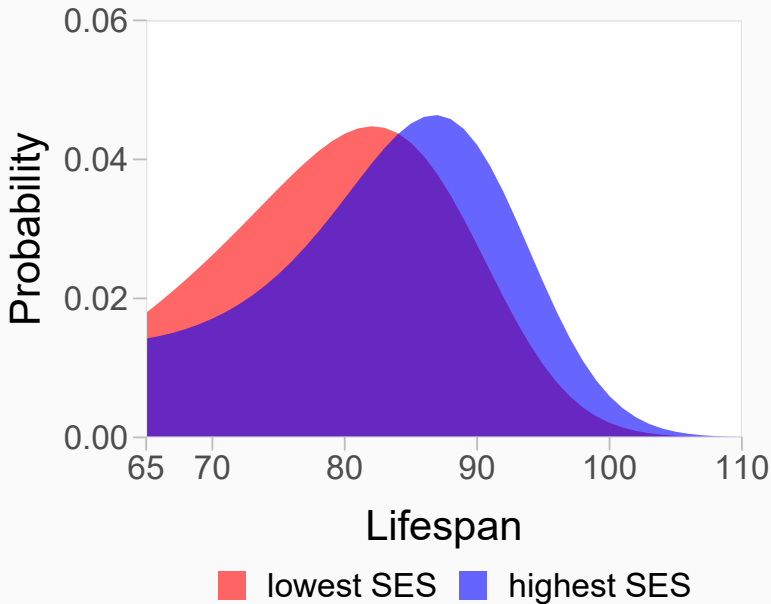
$$e(r) = 14.5$$

In the long run, it is expected that the indexation rule will **alleviate the burden of increased longevity**.

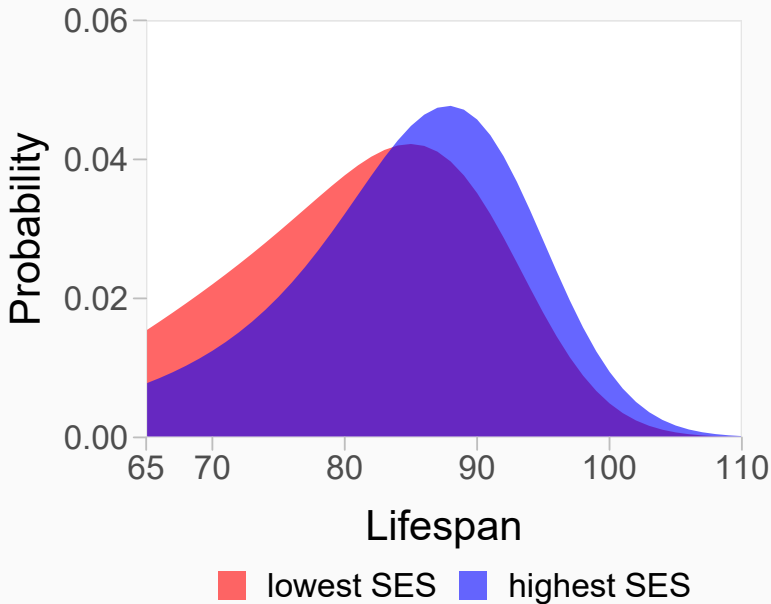
# DISTRIBUTION OF LIFESPANS FOR DANISH FEMALES, 1985



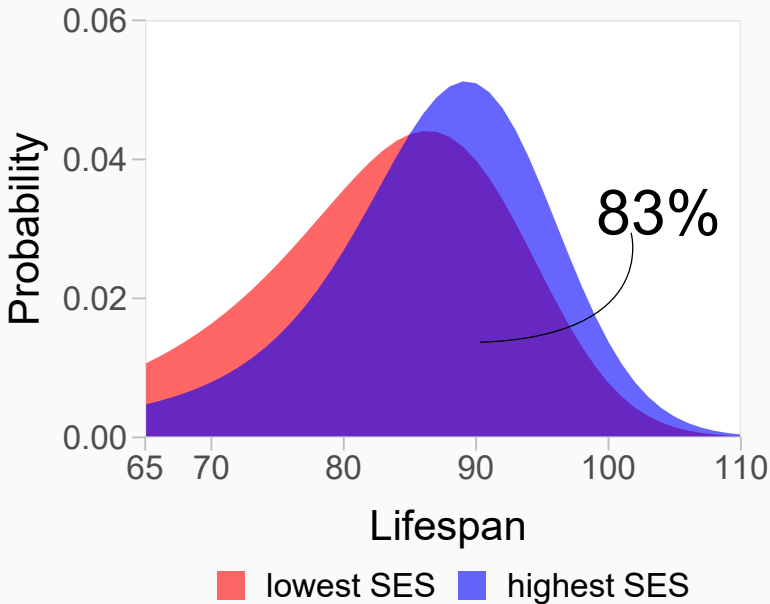
# DISTRIBUTION OF LIFESPANS FOR DANISH FEMALES, 1995



# DISTRIBUTION OF LIFESPANS FOR DANISH FEMALES, 2005



# DISTRIBUTION OF LIFESPANS FOR DANISH FEMALES, 2016



## Measuring the implications of

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- How **unequal** are lifespans after age  $r$ ?
- How does the indexation rule affect the **pension payments** for the different **socio-economic (SES) groups**?

- Register data from **1985 to 2016**

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- **Socio-economic (SES) groups**
  - Affluence index based on individuals' income and wealth (Cairns et. al, 2019),
  - Lock-down at age 67,
  - 5 equally sized groups (quintiles) over time.

### Life expectancy

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***”Elasticity of  $a(x)$  due to changes in death rates (Haberman et. al, 2010)”***

If  $\delta = 0$ , then  $a(x) = e(x)$  and  $H(x, \delta = 0) = H(x)$ .

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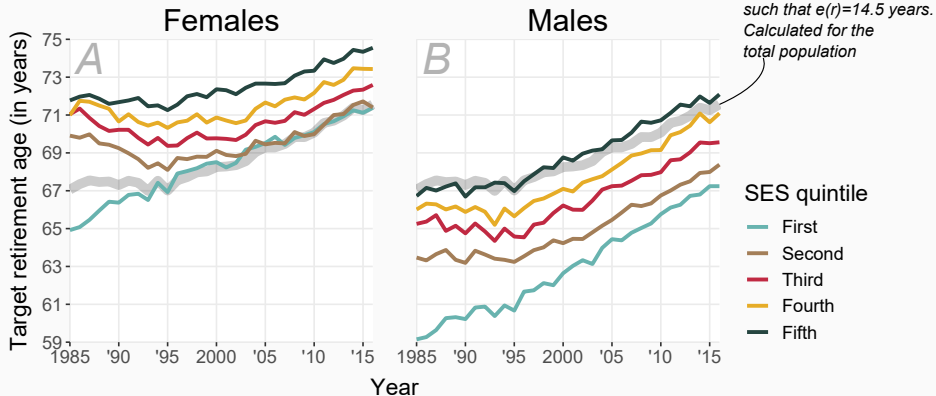
Compute **demographic** and **actuarial** measures:

- over time,
- by SES and for the total population,
- at age 65 and at age  $r$ .

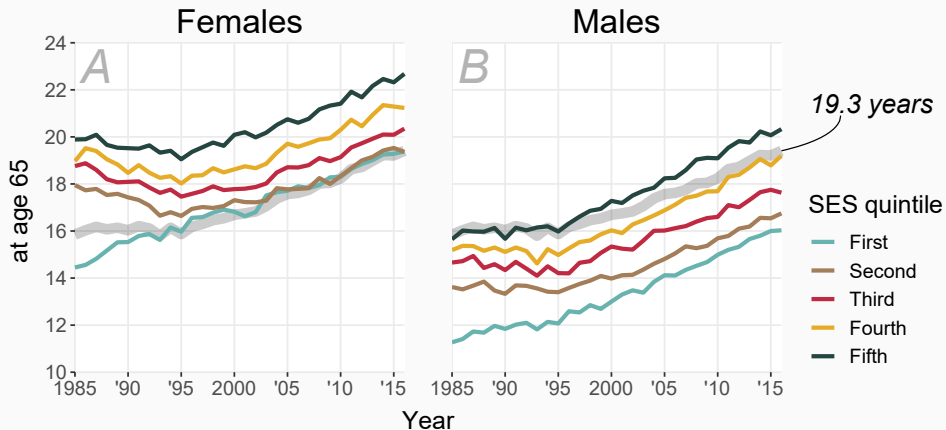
## Demographic panorama, $\delta = 0\%$

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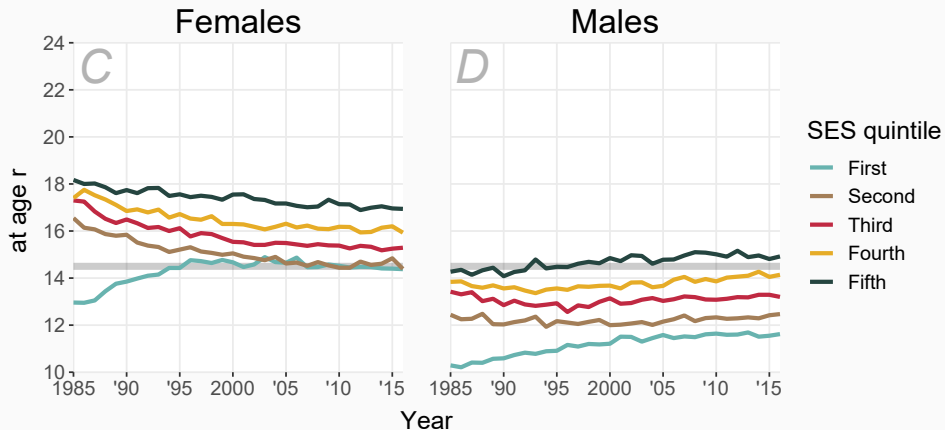
# TARGET RETIREMENT AGE, $r$



# REMAINING LIFE EXPECTANCY AT AGE 65 (CURRENT RETIREMENT AGE)



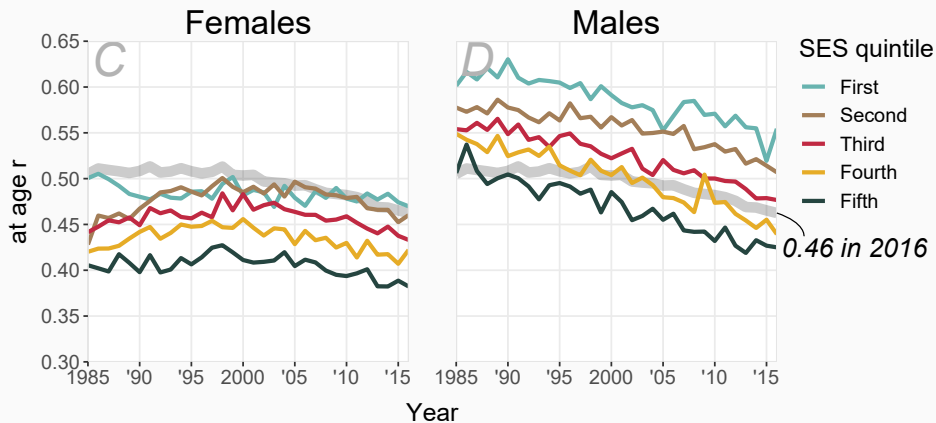
# REMAINING LIFE EXPECTANCY AT AGE $r$ (TARGET RETIREMENT AGE)



# POPULATION ENTROPY AT AGE 65 (CURRENT RETIREMENT AGE)



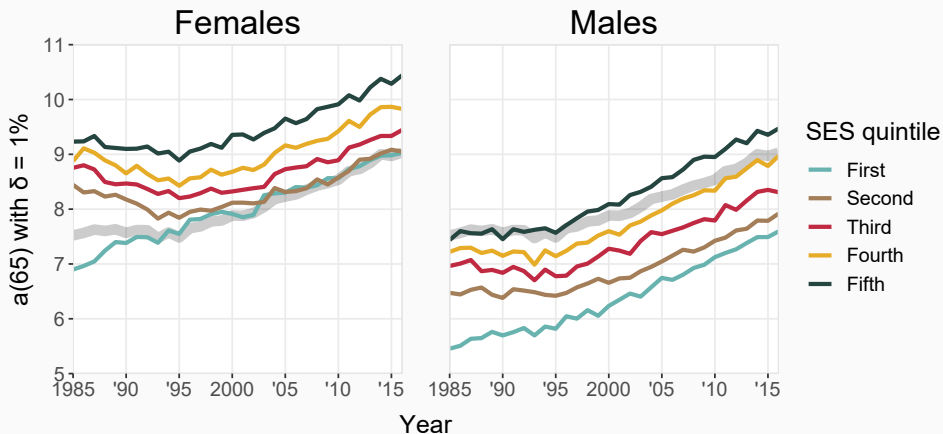
# POPULATION ENTROPY AT AGE $r$ (TARGET RETIREMENT AGE)



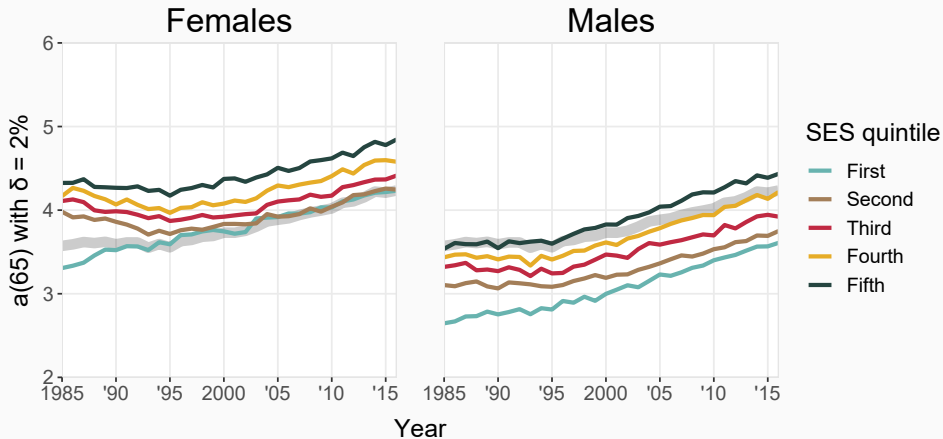
**Actuarial perspective,  $\delta > 0\%$**

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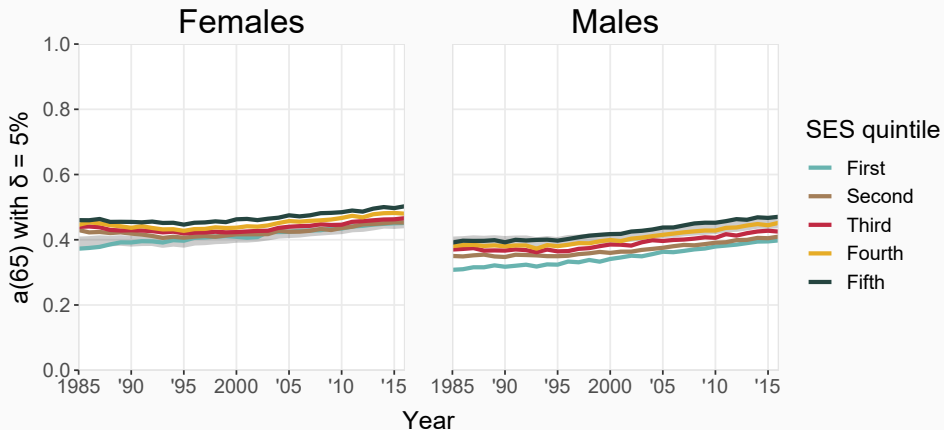
# LIFE ANNUITY AT AGE 65, $\delta = 1\%$



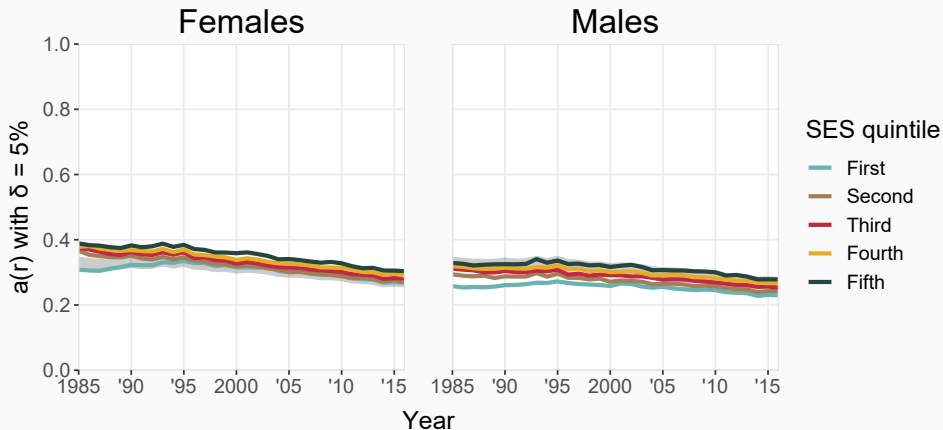
# LIFE ANNUITY AT AGE 65, $\delta = 2\%$



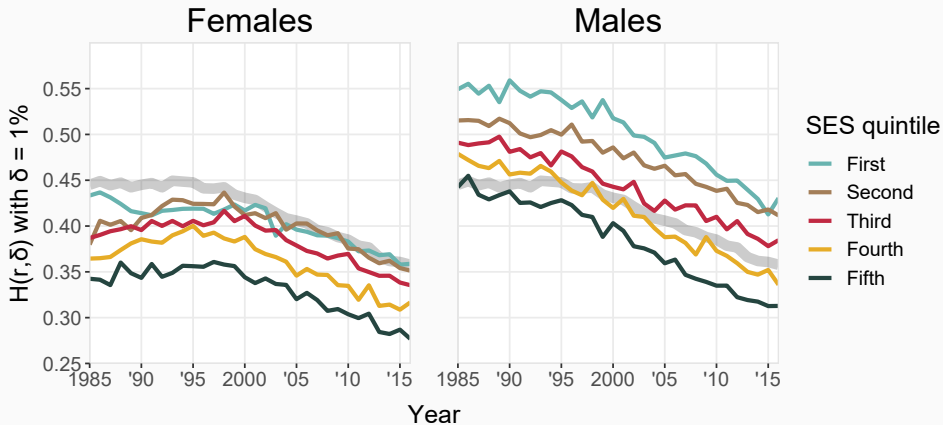
# LIFE ANNUITY AT AGE 65, $\delta = 5\%$



# LIFE ANNUITY AT AGE $r$ , $\delta = 5\%$



# ACTUARIAL ENTROPY AT AGE 65 WITH $\delta = 1\%$



# ACTUARIAL ENTROPY AT AGE 65 WITH $\delta = 5\%$



# ACTUARIAL ENTROPY AT AGE $r$ WITH $\delta = 5\%$



# Implications

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By increasing the retirement age, the **demographic panorama** changes:

- The **increasing pattern** of life expectancy is **offset** by the target retirement age  $r$ ,
- **Inequalities across SES**
  - Gap between higher and lower SES prevails over time and in all longevity measures,
  - Males are in disadvantaged with respect to females.

**Intergenerational** balance is achieved: equilibrium between the needs of **previous** and **current** generations, without placing an unfair burden on either (Willets, 2017).

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Disruption on the **intragenerational** balance: Those from **lower SES** will struggle more to cope with changes in retirement ages.

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**Ineffective planning** affects directly the **financial stability of pension systems**.

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DANMARKS  
NATIONALBANK

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The natural real interest rate in Denmark has declined

-  The natural real interest rate has declined since the 1990s
-  Demographic trends pull down interest rates
-  Higher emphasis on other monetary policy tools

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This reflects the importance of **longevity risk** management (Haberman et. al, 2011; Blake et. al, 2019).

**INCREASING  
LIFE EXPECTANCY  
& UNEQUAL LIFESPANS**



**IMBALANCED  
PENSION SYSTEMS**

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