



# T-DYMM 2.0: simulation results

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**IESS**

Improving Effectiveness  
in Social Security

**IESS – Final Conference**

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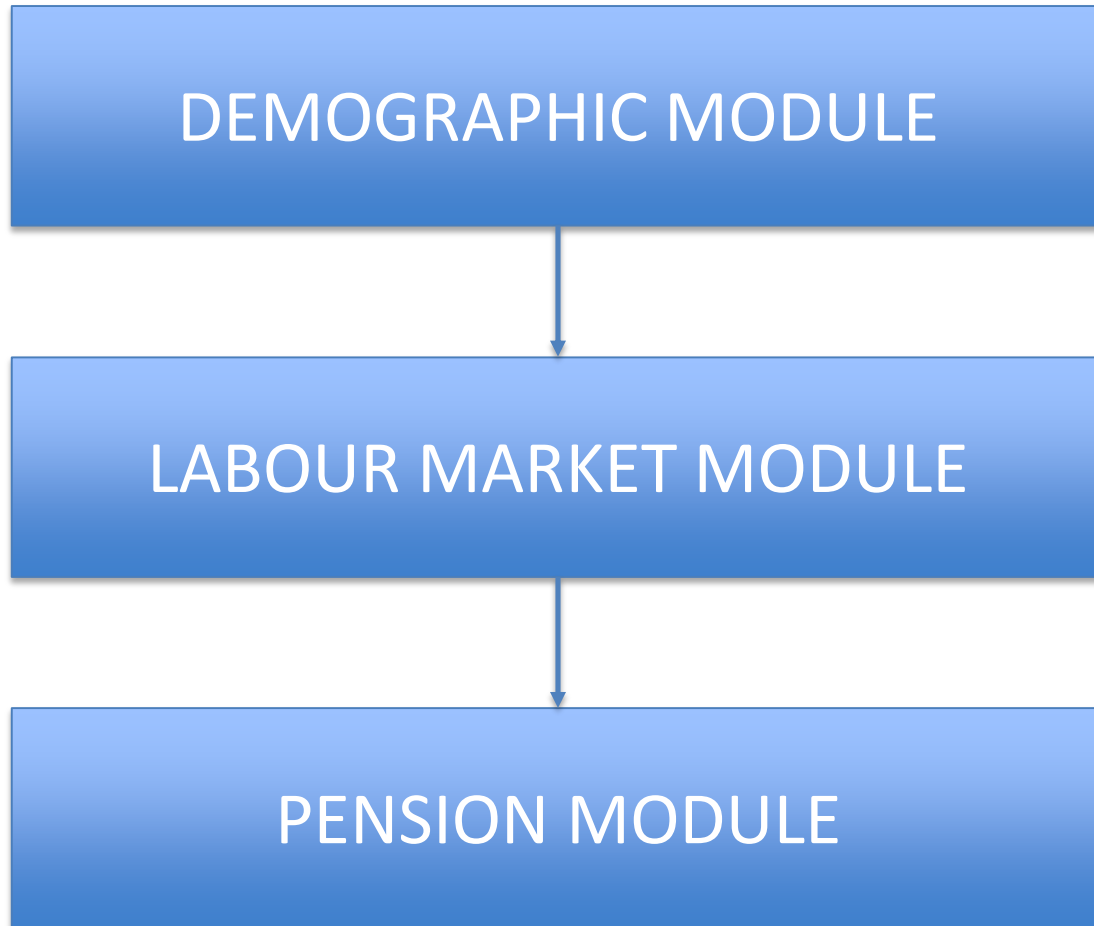
# Outline

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- Structure of T-DYMM 2.0
- Simulation results
  - Baseline scenario
  - Policy scenarios
  - Sensitivity analyses

# Modules in T-DYMM 2.0

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# Processes in the pension module

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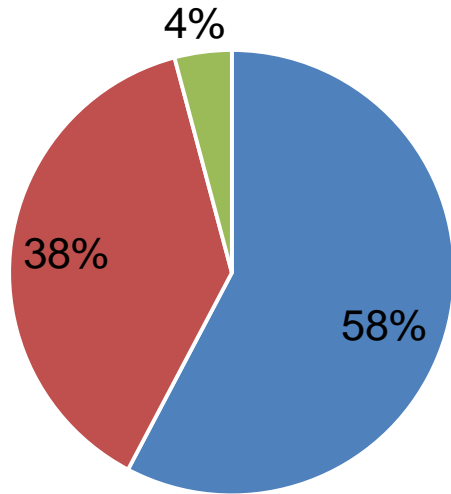
## PENSION MODULE

- Benefit computation
- Verification of retirement criteria
- Retirement choice
- Pension indexation

# Sample evolution: computation rules (1)

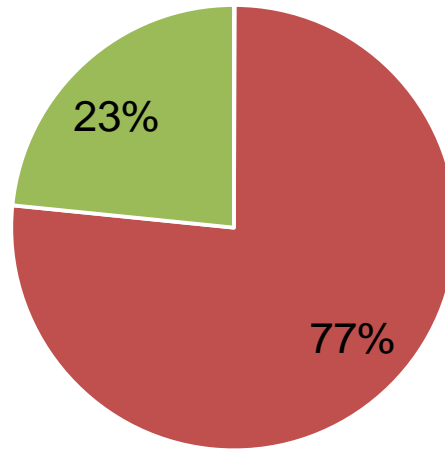
## New pensioners

2012-2021



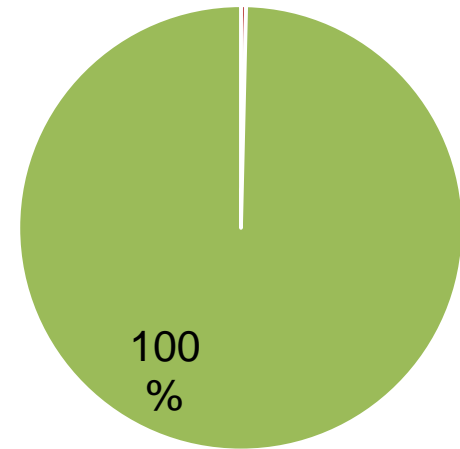
- Mixed 2011
- Mixed 1995
- NDC

2030-2039



- Mixed 2011
- Mixed 1995
- NDC

2050-2059

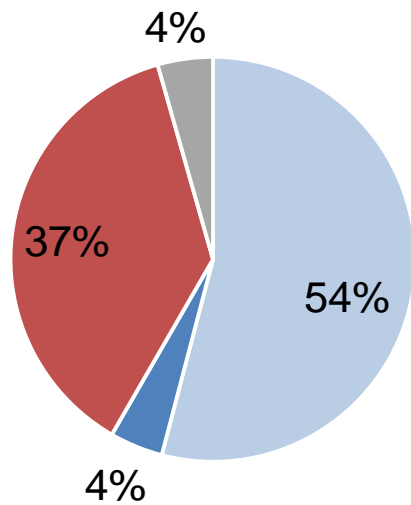


- Mixed 2011
- Mixed 1995
- NDC

# Sample evolution: computation rules (2)

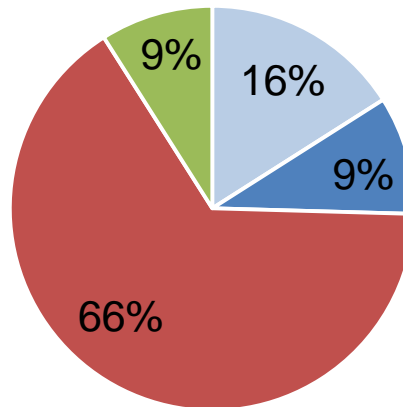
## Stock of pensioners

2012-2021



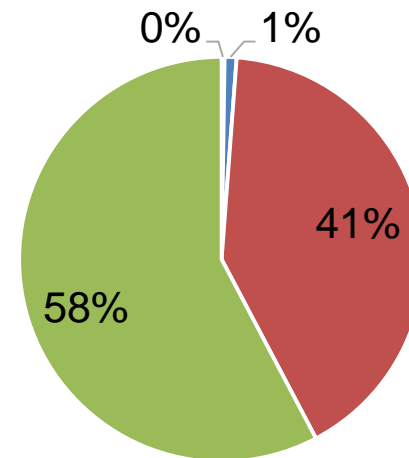
- DB
- Mixed 2011
- Mixed 1995
- NDC

2030-2039



- DB
- Mixed 2011
- Mixed 1995
- NDC

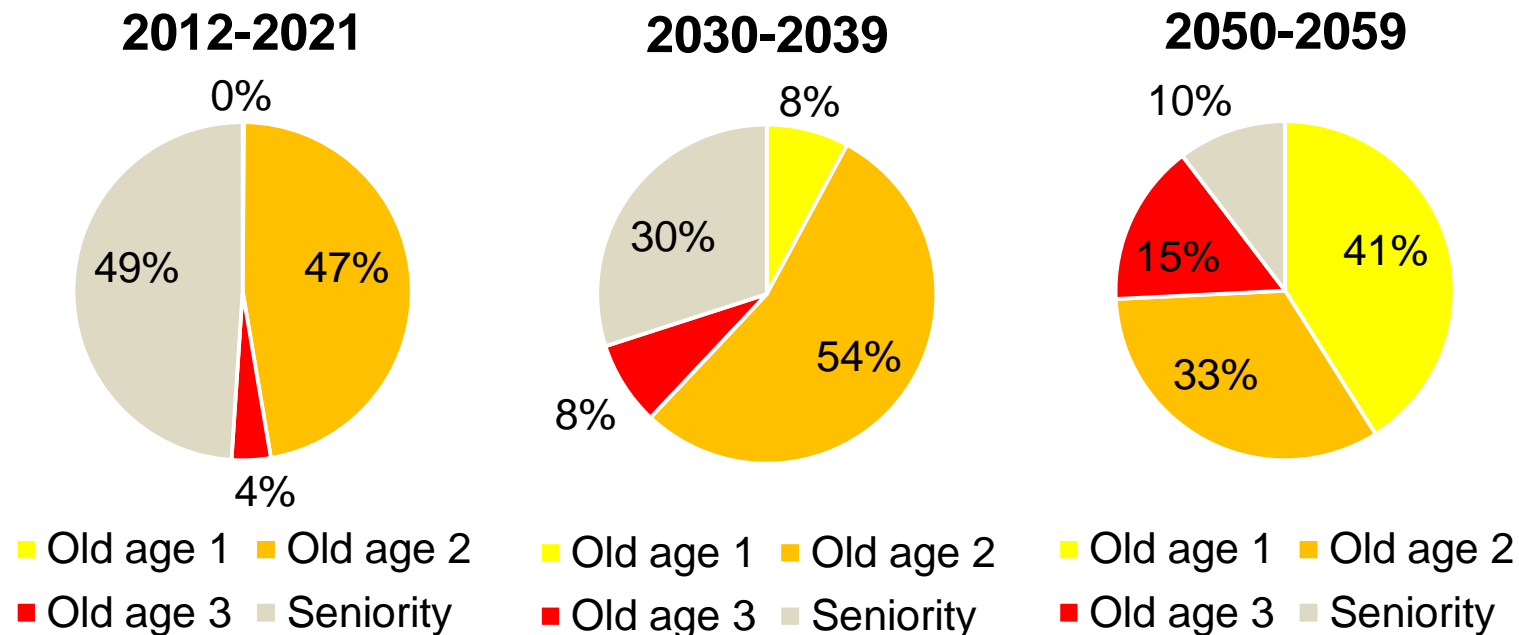
2050-2059



- DB
- Mixed 2011
- Mixed 1995
- NDC

# Sample evolution: retirement criteria (1)

## New pensioners



## Retirement criteria (2011 Reform):

**Old age 1:** 63, 20 years of contribution, 2.8xAS

**Old age 2:** 66, 20 years of contribution, 1.5xAS

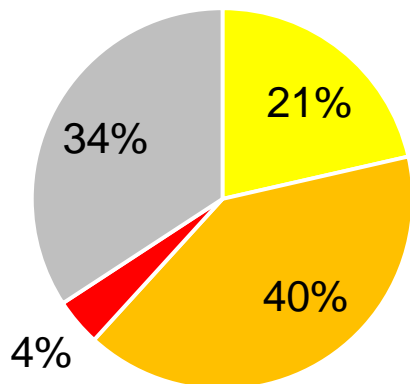
**Old age 3:** 70, 5 years of contribution

**Seniority:** 41 years 1 month of contribution (F), 42 years 1 month of contribution (M)

# Sample evolution: retirement criteria (2)

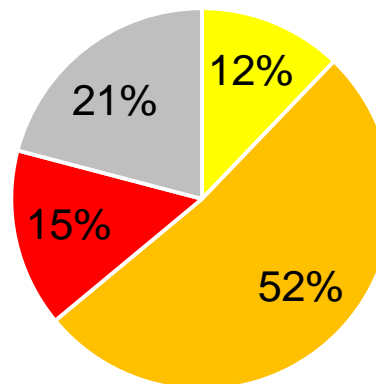
## New pensioners, 2012-2059

### Male



■ Old age 1 ■ Old age 2  
■ Old age 3 ■ Seniority

### Female



■ Old age 1 ■ Old age 2  
■ Old age 3 ■ Seniority

## Retirement criteria (2011 Reform):

**Old age 1:** 63, 20 years of contribution, 2.8xAS

**Old age 2:** 66, 20 years of contribution, 1.5xAS

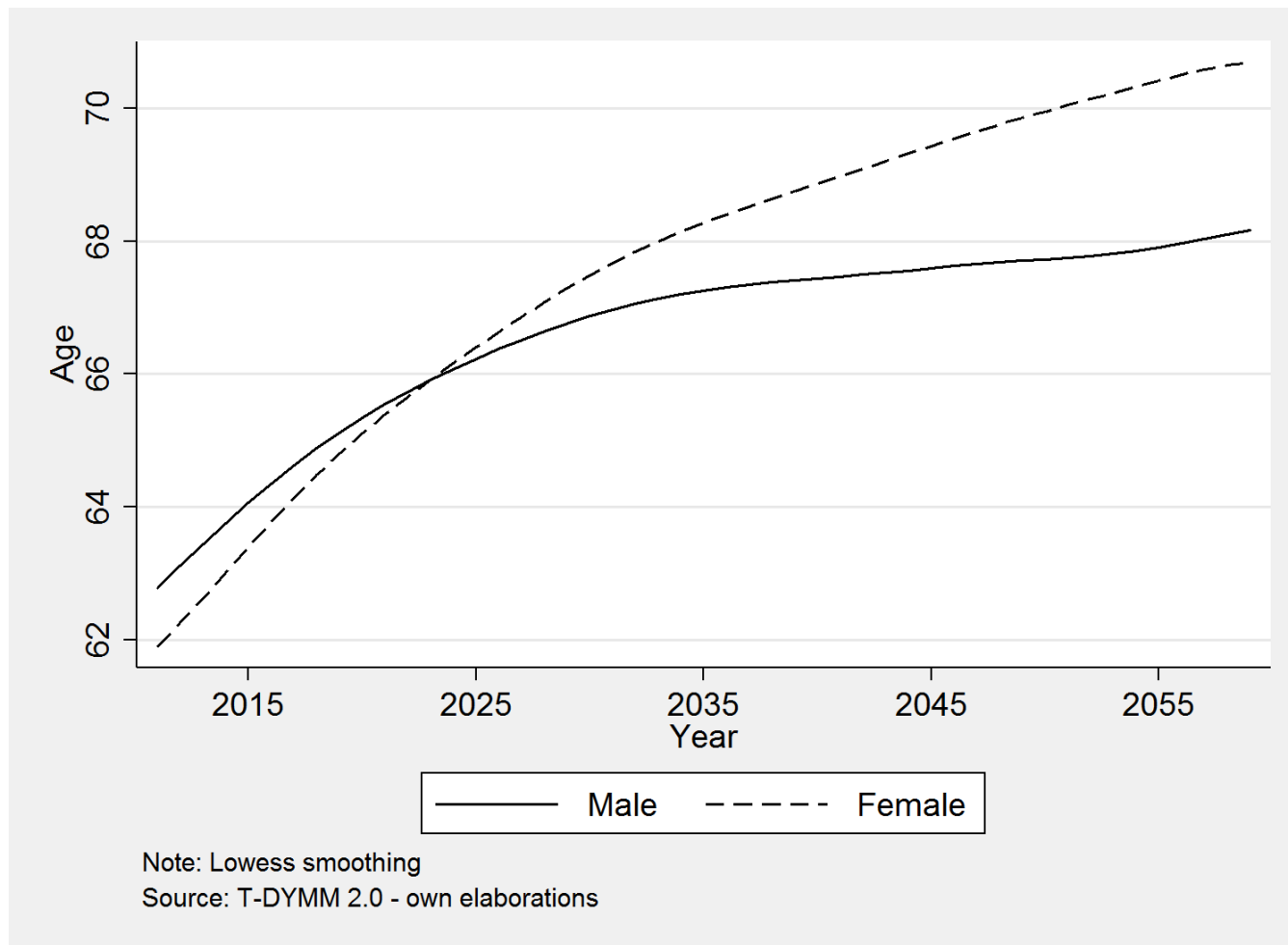
**Old age 3:** 70, 5 years of contribution

**Seniority:** 41 years 1 month of contribution (F), 42 years 1 month of contribution (M)



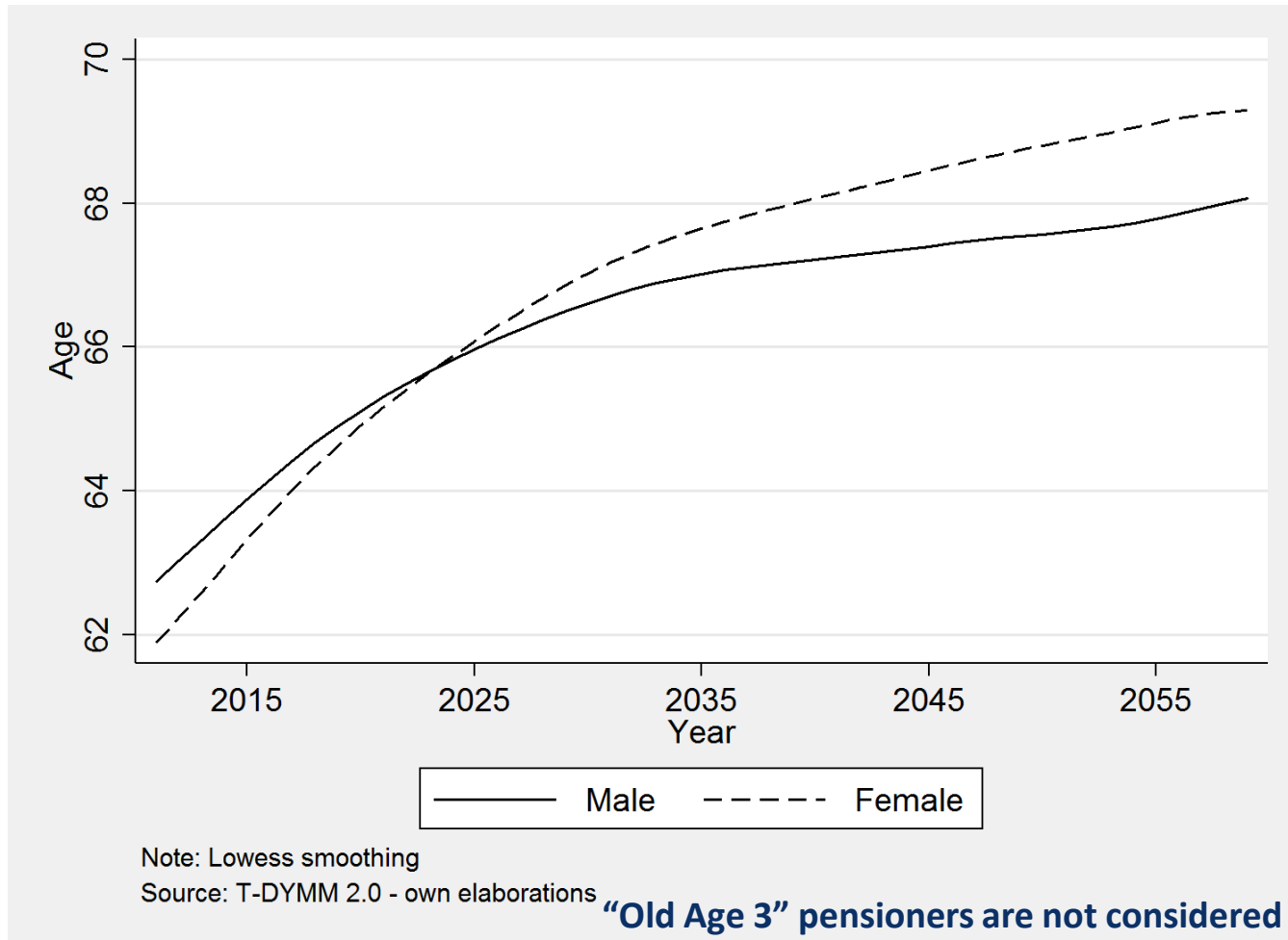
# Average effective retirement age (1)

## New pensioners



# Average effective retirement age (2)

## New pensioners



# Condition at retirement by birth cohort (1)

## New pensioners. All pensions

Birth cohort	Age	Years of contribution	Gross replacement rate	Pension / assegno sociale
<b>1950-59</b>	65.9	33.2	63%	3.6
<b>1960-69</b>	67.2	34.3	55%	3.2
<b>1970-79</b>	68.1	34.1	50%	2.9
<b>1980-89</b>	68.6	34.3	50%	3

**+2.7**

**-13 p.p.**

Average simulation period, 2012-2059

# Condition at retirement by birth cohort (2)

## New pensioners. Pensions $\geq 3 \cdot AS$

Birth cohort	Age	Years of contribution	Gross replacement rate	Pension / <i>assegno sociale</i>
1950-59	64.6	39.7	72%	5.3
1960-69	65.9	41	62%	4.9
1970-79	66.3	40.5	53%	4.4
1980-89	66.4	39.5	50%	4.3

**+1.8**

**-22 p.p.**

Average simulation period, 2012-2059

# Condition at retirement by birth cohort (3)

New pensioners. Pensions < 3\*AS

	Birth cohort	Age	Years of contribution	Gross replacement rate	Pension / assegno sociale
49.2%	1950-59	67.3	26.4	51%	1.8
	1960-69	68.2	29	49%	1.9
	1970-79	69.3	30	48%	2
63%	1980-89	69.9	31.3	50%	2.2

+2.6

-1 p.p.

Average simulation period, 2012-2059

# Condition at retirement by birth cohort (4)

## New pensioners

### Permanent employees

Birth cohort	Age	Pension / <i>assegno sociale</i>
1950-59	65.8	4.4
1980-89	67.1	3.4

Employees who have spent at least 2/3 of their working lives as permanent employees

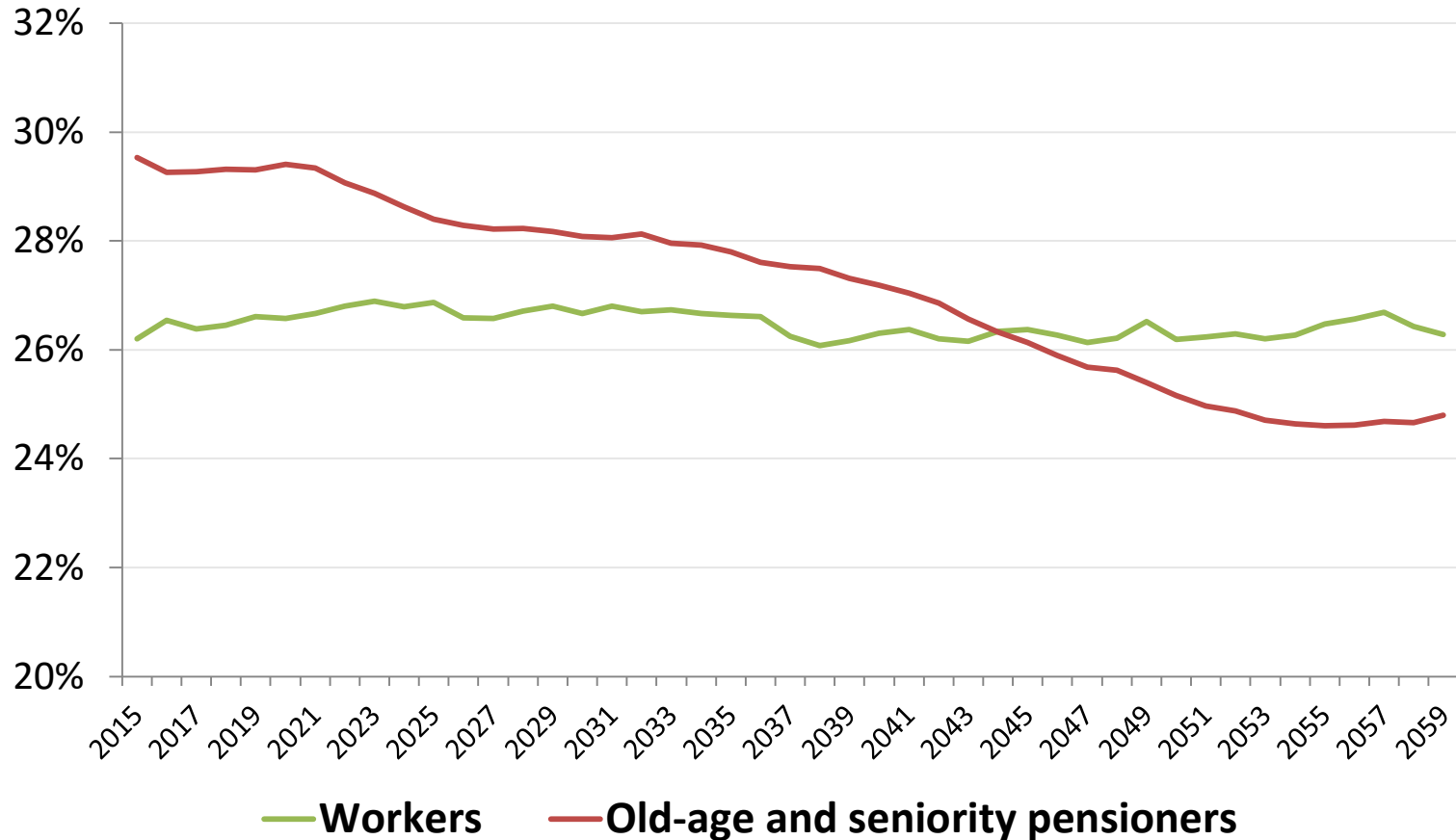
### Fixed-term employees

Birth cohort	Age	Pension / <i>assegno sociale</i>
1950-59	64.5	2.7
1980-89	70.2	2.3

Employees who have spent at least 2/3 of their working lives as fixed-term employees

# The evolution of inequality indicators (1)

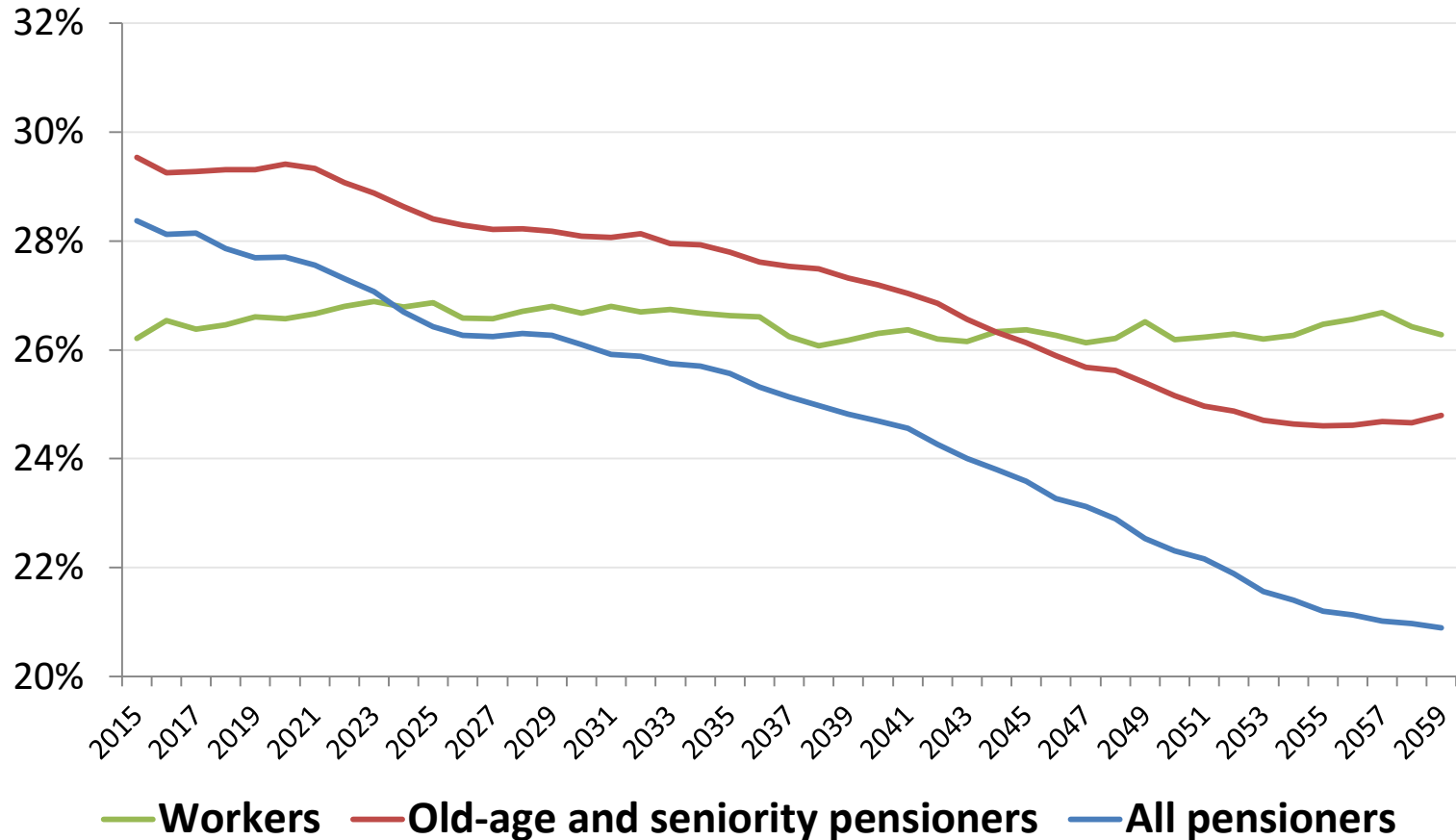
## Stock of pensioners. Gini index



Net pension incomes are considered

# The evolution of inequality indicators (2)

## Stock of pensioners. Gini index



Net pension incomes are considered



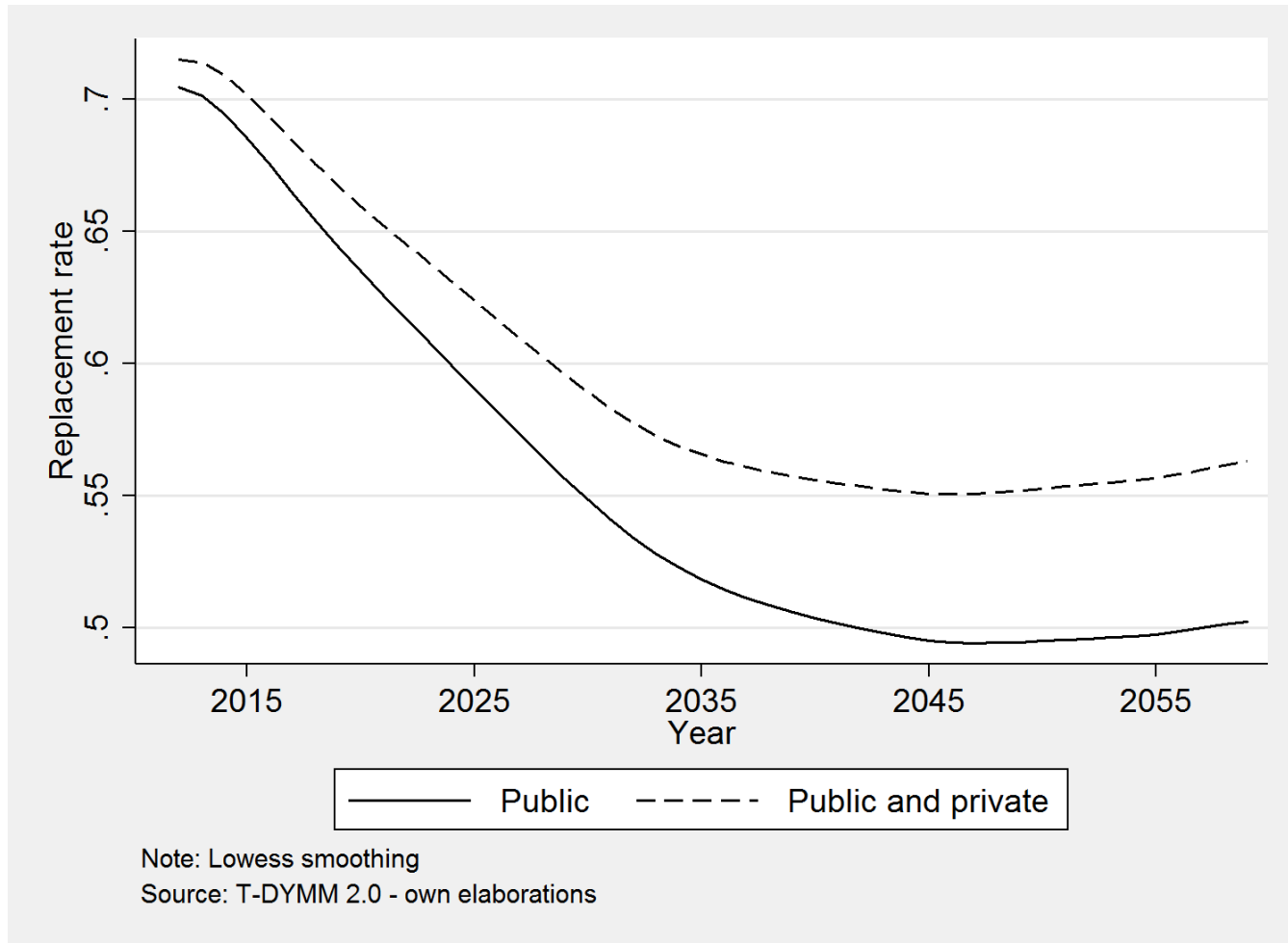
# The private pension sub-module

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- Enrolment choice
- Annual contribution accrual
- Return on contributions accrued
- Capital conversion into annuity
- Annuity indexation

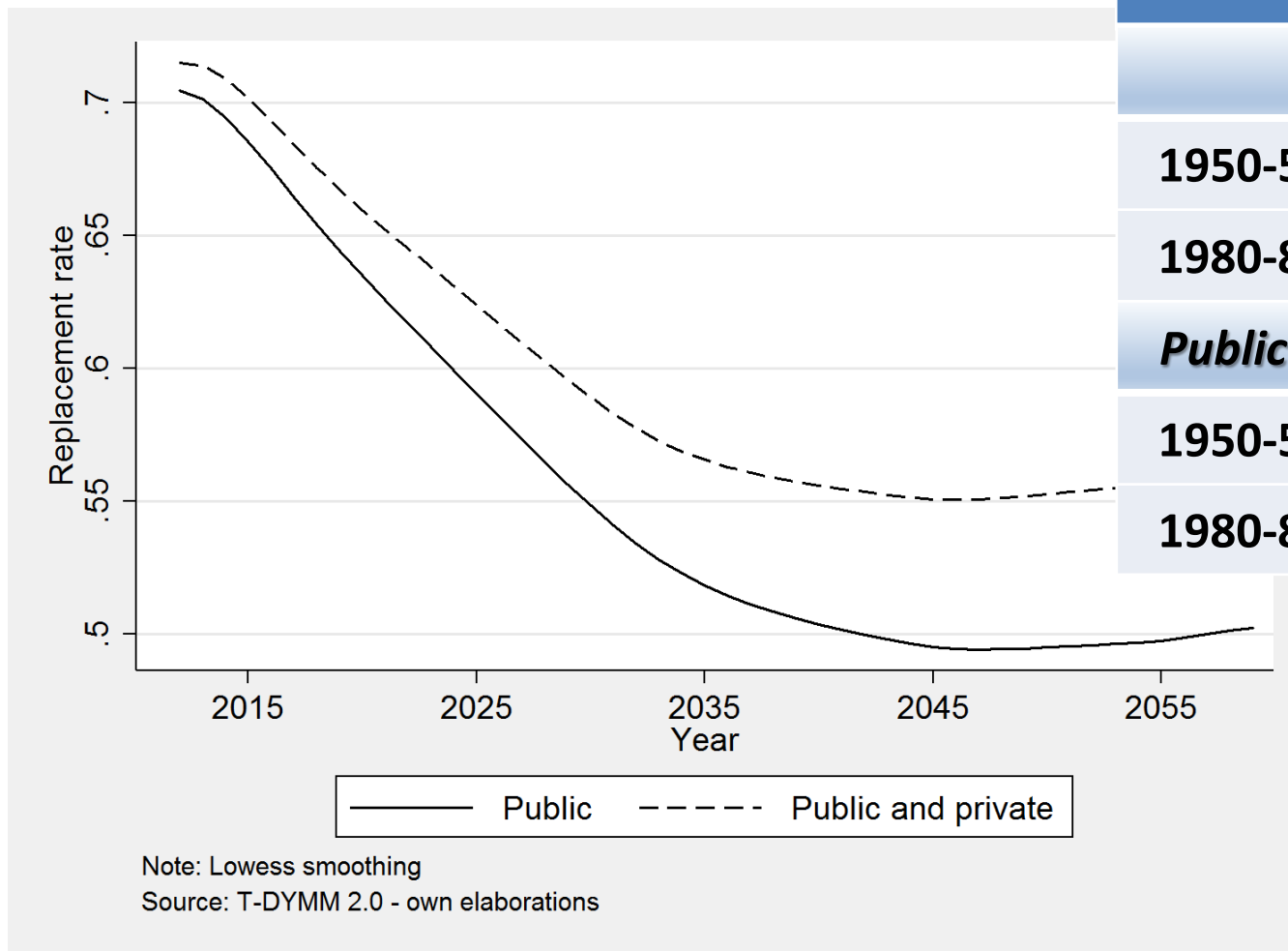
# The impact of private and occupational pension plans (1)

## New pensioners. Gross average replacement rate



# The impact of private and occupational pension plans (1)

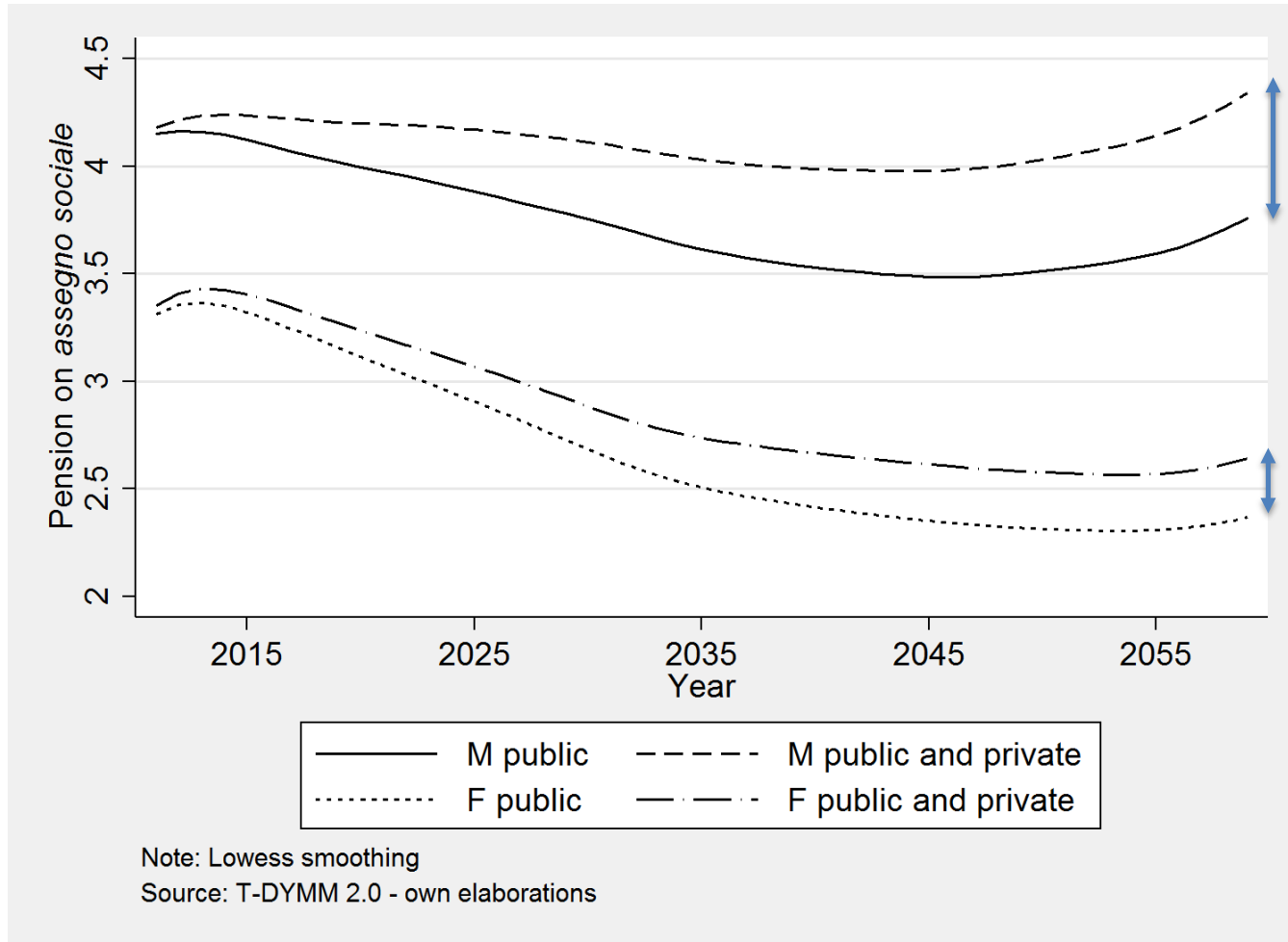
## New pensioners. Gross average replacement rate



<b>Pensions &lt; 3*AS</b>	
<b>Public</b>	
<b>1950-59</b>	49.2%
<b>1980-89</b>	63%
<b>Public and Private</b>	
<b>1950-59</b>	47.4%
<b>1980-89</b>	46.9%

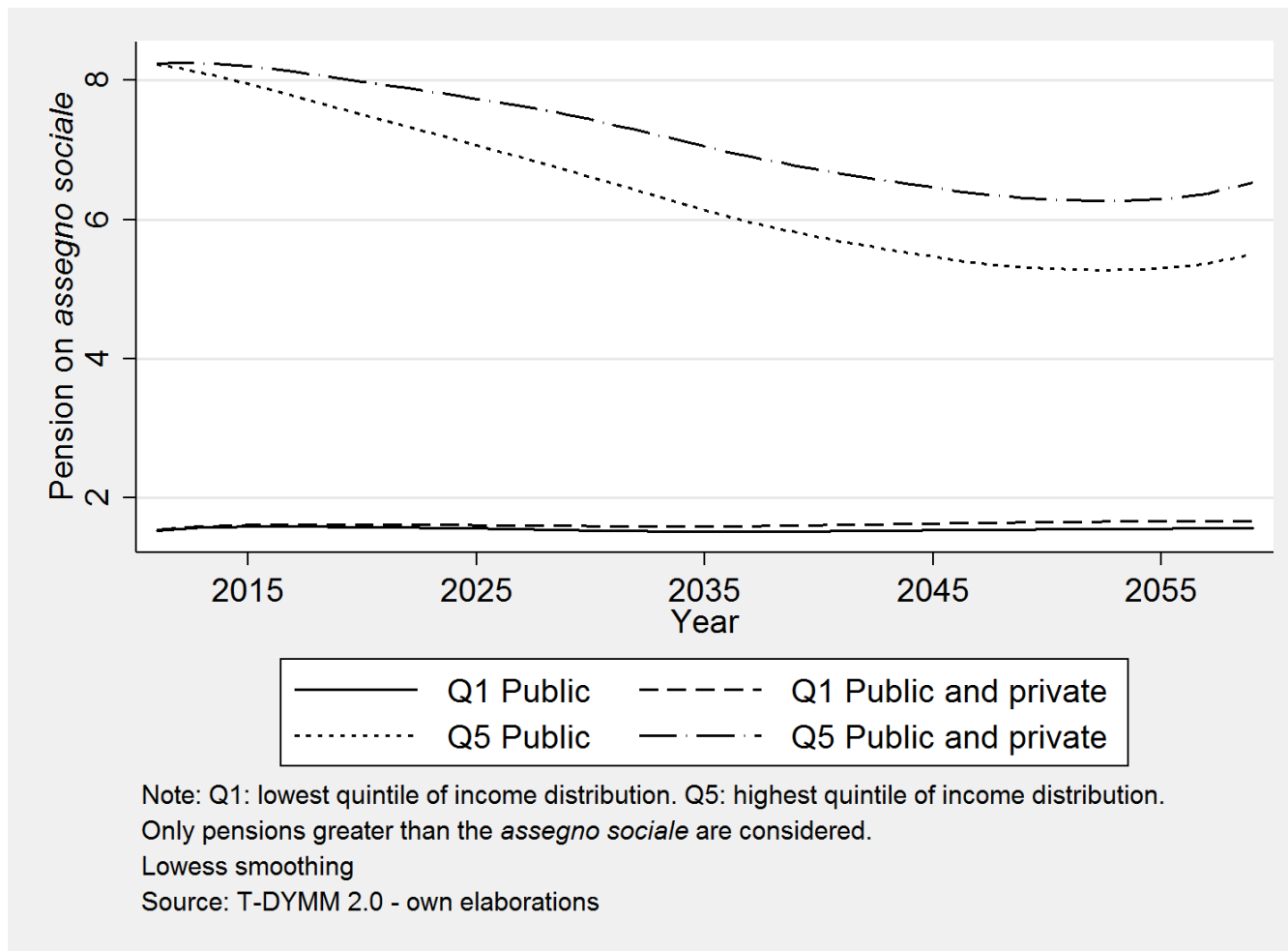
# The impact of private and occupational pension plans (2)

## New pensioners. Pension on *assegno sociale* ratio. Impact by gender



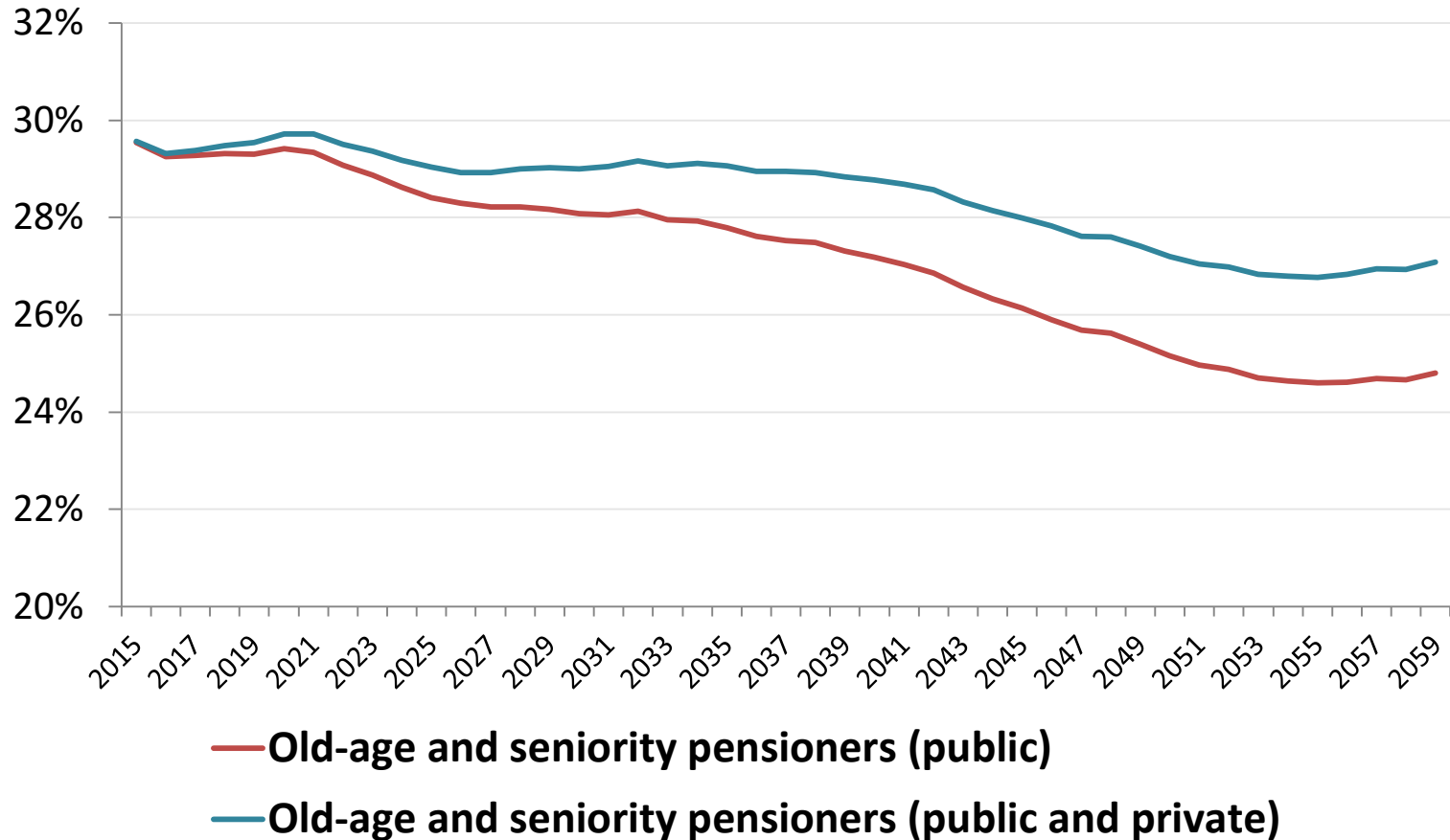
# The impact of private and occupational pension plans (3)

## New pensioners. Pension on *assegno sociale* ratio. Impact by income distribution



# The impact of private and occupational pension plans (4)

## Stock of pensioners. Gini index



Net pension incomes are considered

# Retirement choices – *Baseline vs Choice*

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- **Baseline scenario**

- Any criterion met → access to retirement

- **Choice scenario**

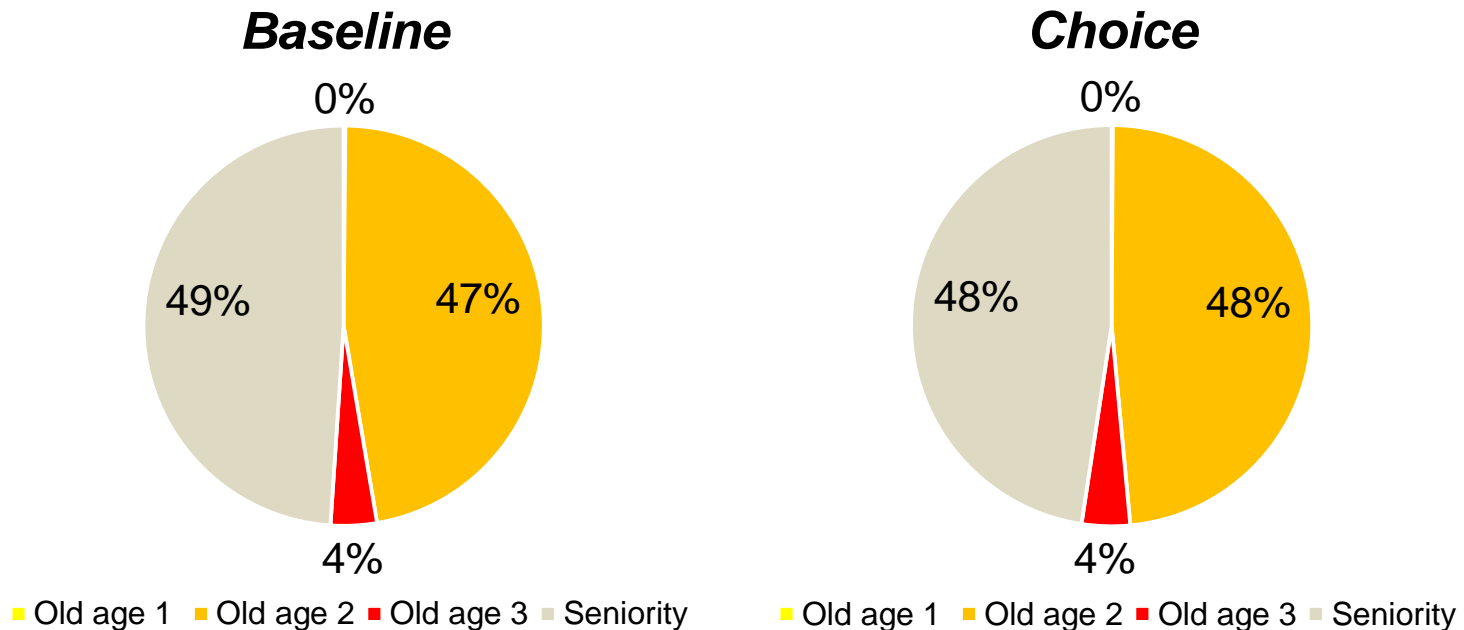
- Early retirement criteria met (Old Age 1, Seniority)

- $RR \geq 70.8\%$  → access to retirement
- $RR < 70.8\%$  → keep working (unless unemployed)

- Old-age retirement criteria met → access to retirement

# Sample evolution: retirement criteria (1)

## New pensioners. Retirement criteria, 2012-2021



## Retirement criteria (2011 Reform):

**Old age 1:** 63, 20 years of contribution, 2.8xAS

**Old age 2:** 66, 20 years of contribution, 1.5xAS

**Old age 3:** 70, 5 years of contribution

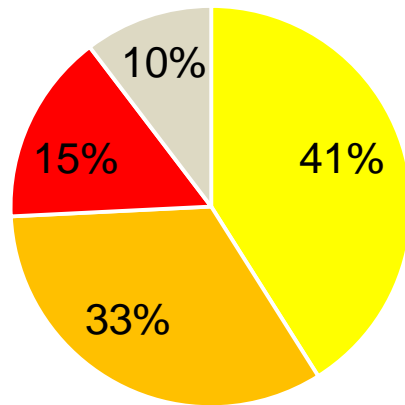
**Seniority:** 41 years 1 month of contribution (F), 42 years 1 month of contribution (M)



# Sample evolution: retirement criteria (2)

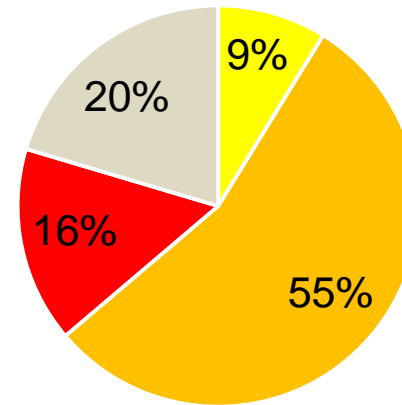
## New pensioners. Retirement criteria, 2050-2059

**Baseline**



■ Old age 1 ■ Old age 2 ■ Old age 3 ■ Seniority

**Choice**



■ Old age 1 ■ Old age 2 ■ Old age 3 ■ Seniority

## Retirement criteria (2011 Reform):

**Old age 1:** 63, 20 years of contribution, 2.8xAS

**Old age 2:** 66, 20 years of contribution, 1.5xAS

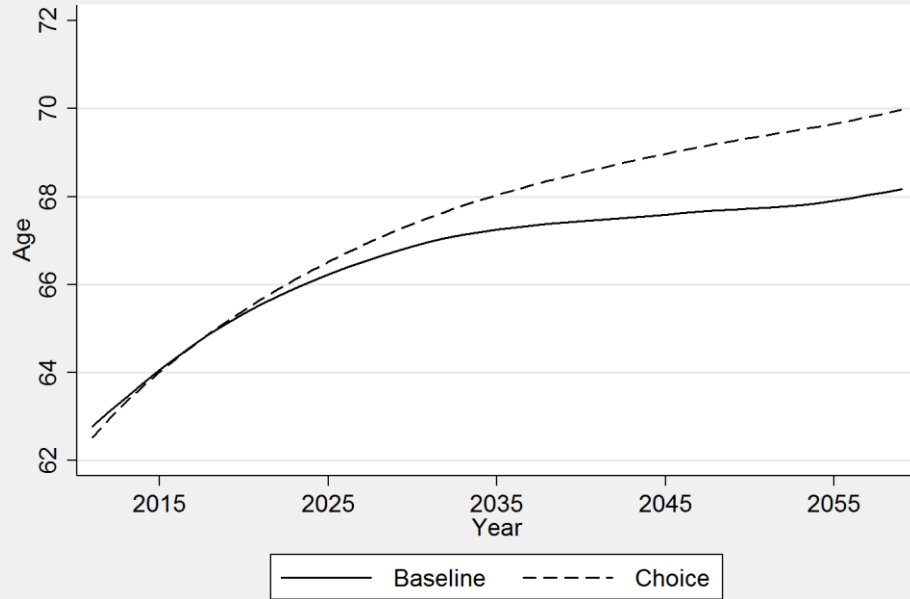
**Old age 3:** 70, 5 years of contribution

**Seniority:** 41 years 1 month of contribution (F), 42 years 1 month of contribution (M)

# Average effective retirement age

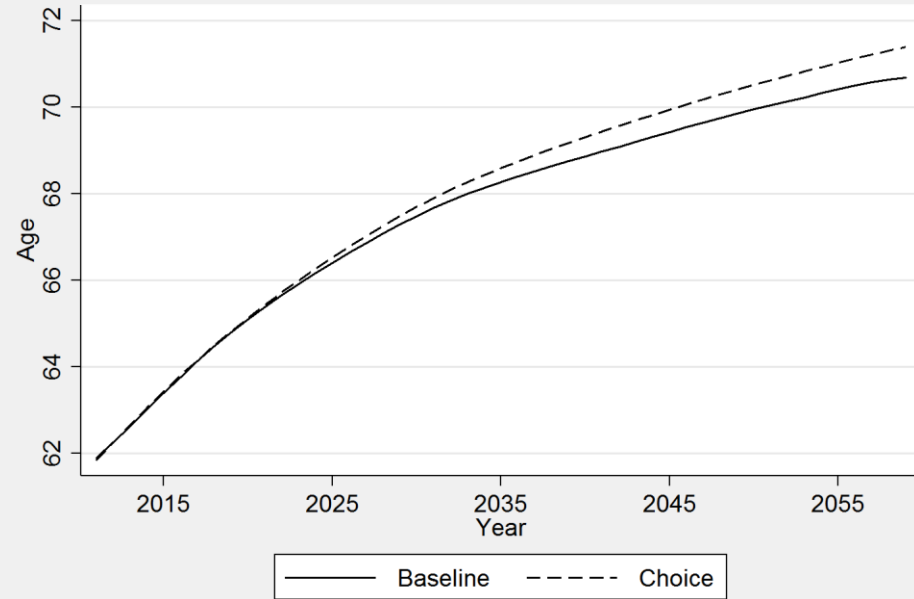
## New pensioners. Average effective retirement age

Male



Note: Lowess smoothing  
Source: T-DYMM 2.0 - own elaborations

Female



Note: Lowess smoothing  
Source: T-DYMM 2.0 - own elaborations

# Condition at retirement by birth cohort (1)

## New pensioners. All pensions

Birth cohort	Age	Years of contribution	Gross replacement rate	Pension / assegno sociale
1950-59	66	33.3	64%	3.7
1960-69	67.9	35	58%	3.4
1970-79	69.3	35.2	55%	3.3
1980-89	70.1	35.6	56%	3.4

**BL: +2.7**  
**CH: +4.1**

**BL: -13 p.p.**  
**CH: -8 p.p.**

Average over the period, 2012-2059

# Condition at retirement by birth cohort (1)

New pensioners. All pensions

				Pensions < 3*AS	
				<i>Baseline</i>	
Birth cohort	Age	Years of contribution	Gross replacement rate	1950-59	1980-89
1950-59	66	33.3	64%	<i>Choice</i>	
1960-69	67.9	35	58%	1950-59	48.6%
1970-79	69.3	35.2	55%	1980-89	52.2%
1980-89	70.1	35.6	56%	3.3	
				3.4	

**BL: +2.7**  
**CH: +4.1**

**BL: -13 p.p.**  
**CH: -8 p.p.**

Average over the retirement period, 2012-2059

# Condition at retirement by birth cohort (2)

## New pensioners. Pensions $\geq 3*AS$

Birth cohort	Age	Years of contribution	Gross replacement rate	Pension / <i>assegno sociale</i>
1950-59	64.8	39.9	73%	5.4
1960-69	66.9	42.2	66%	5.1
1970-79	68.5	42.5	60%	4.8
1980-89	69.4	42.2	58%	4.8

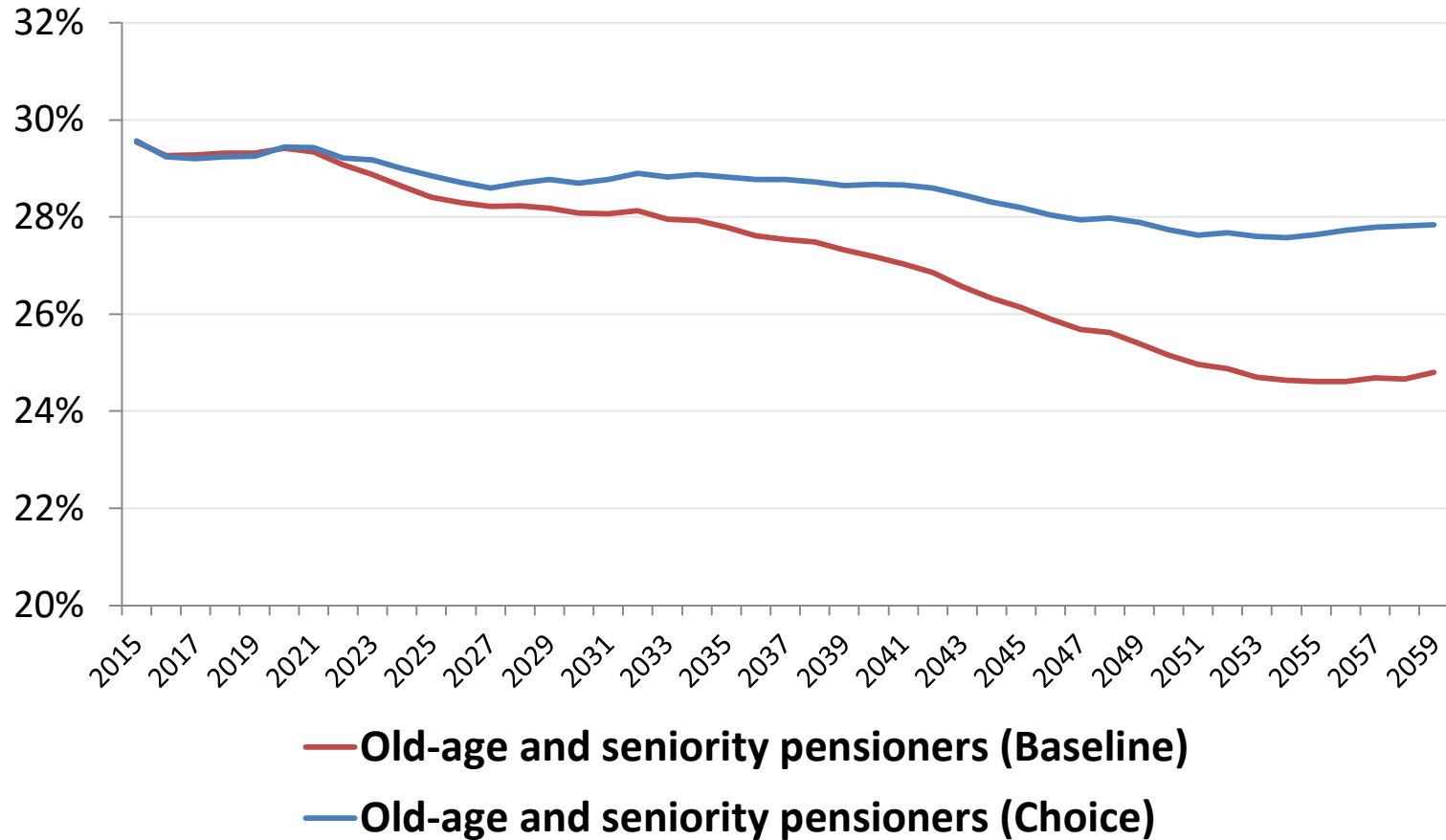
**BL: +1.8**  
**CH: +4.6**

**BL: -22 p.p.**  
**CH: -15 p.p.**

Average over the period, 2012-2059

# The evolution of inequality indicators

## Stock of pensioners. Gini index



Net pension incomes are considered

## 3 policy scenarios

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- *Ante Fornero*: before L. 92/2012
- *Fornero*: as of L. 92/2012
- *Baseline*: as of L.D. 22/2015

# Key assumptions

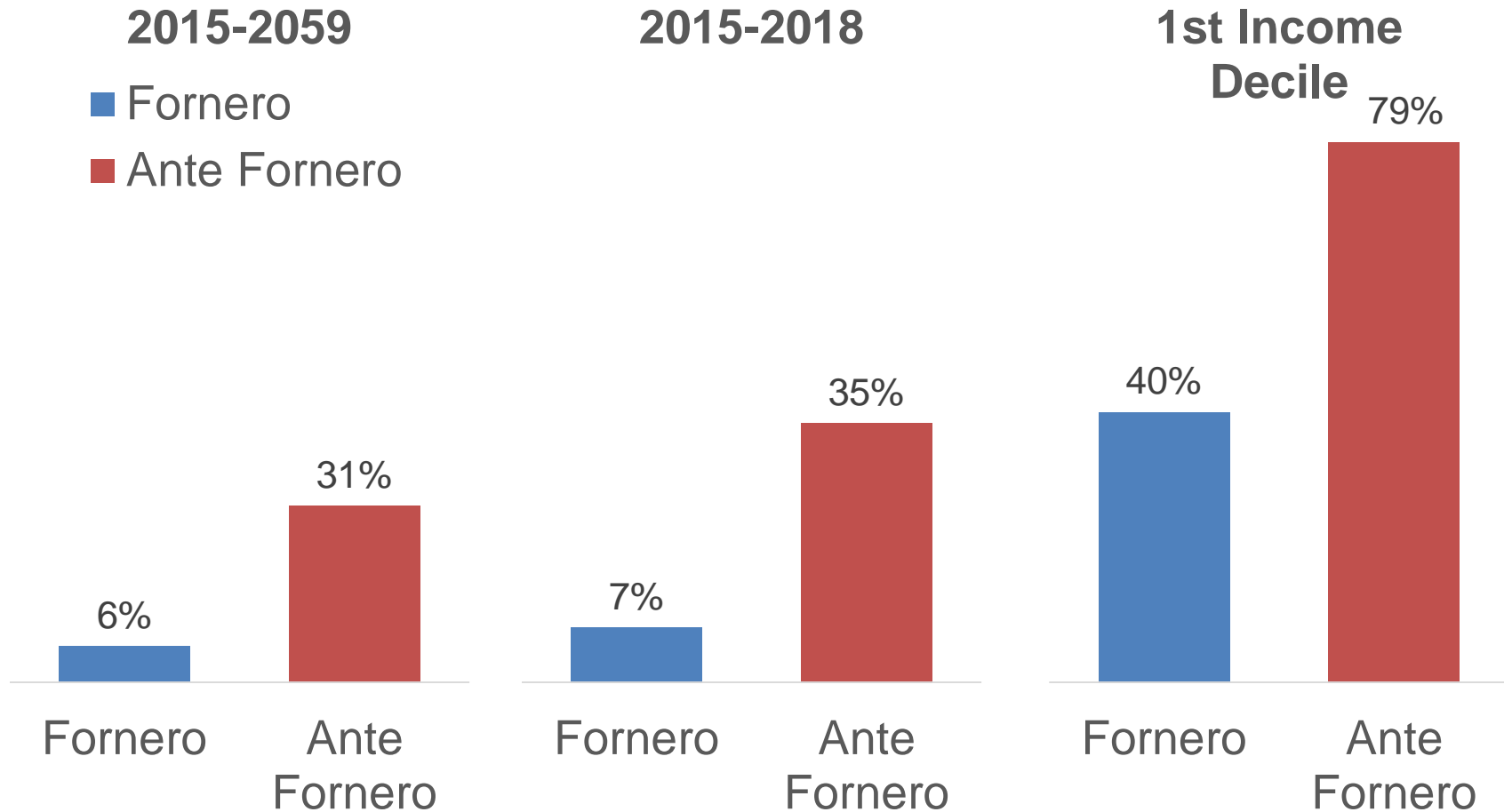
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- Only former employees are entitled to benefits
- All non-working individuals are assumed to fulfill the *stato di disoccupazione* requirements
- Unemployment benefits are not compatible with labour earnings



# Impact on workers (1)

## Coverage of unemployment. Variations in *Baseline* scenario



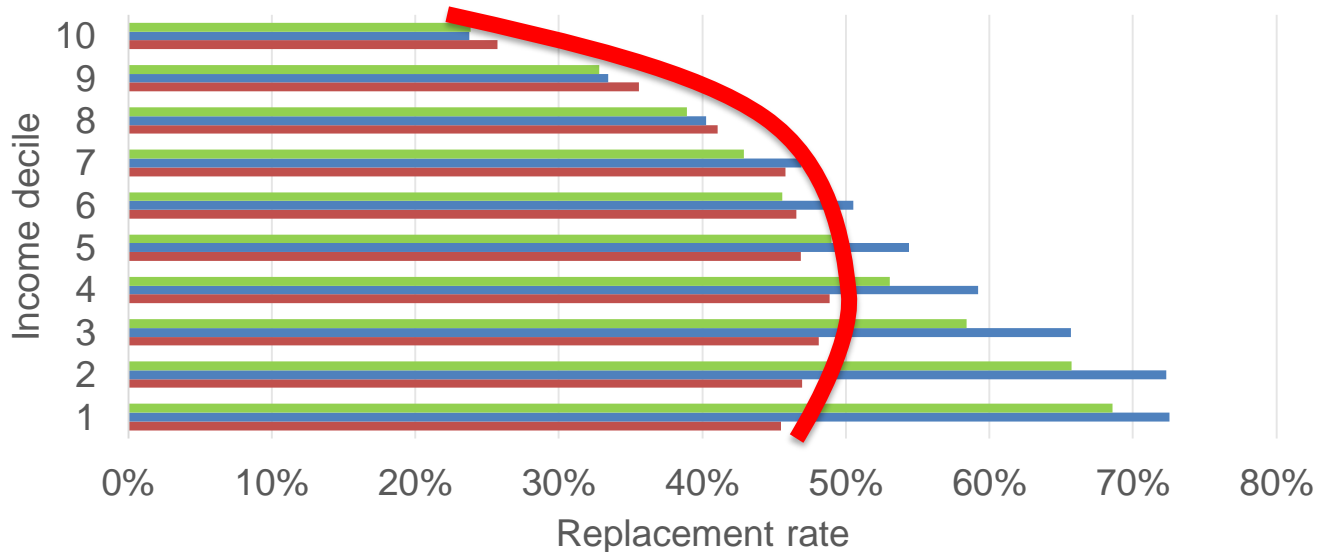
# Impact on workers (2)

## Replacement rate of unemployment benefits, 2015-2059

Overall

	Baseline	Fornero	Ante Fornero
2015-2059	54.8%	58.4%	45.4%

By income decile

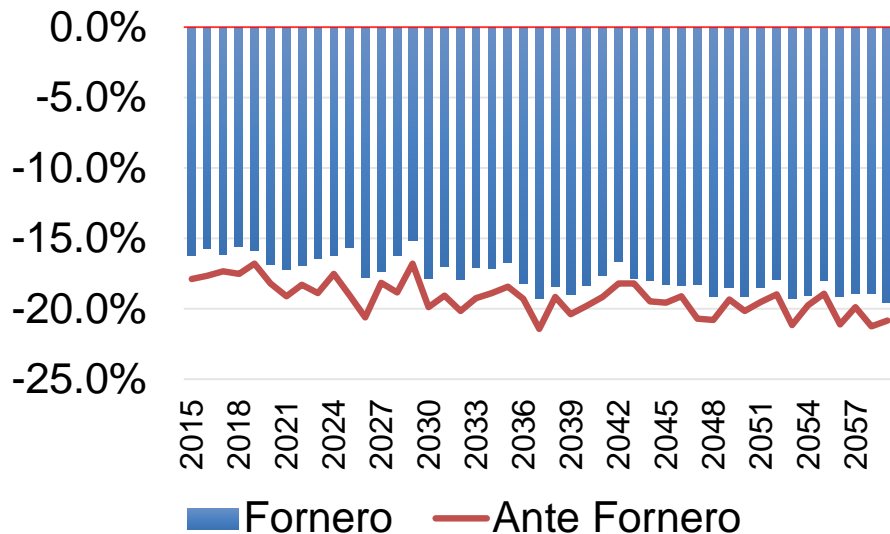


■ Baseline ■ Fornero ■ Ante Fornero

# Impact on pensioners (1)

## Accrual of social contributions in unemployment. Variations in *Baseline* scenario

Variation in average contributions accrued per month in unemployment



### *Baseline* scenario:

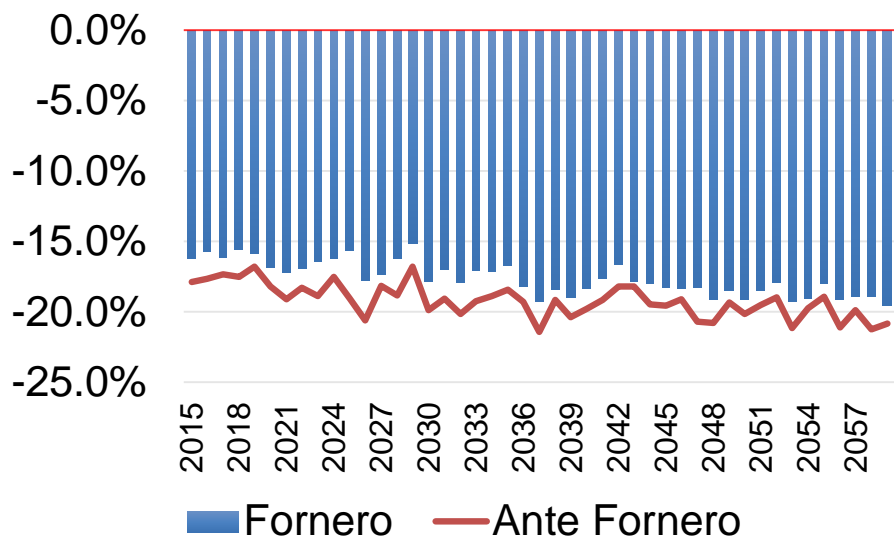
Social contributions in unemployment are paid up to  $33\% * 1.4 * \text{MAX NASPI}$

- **38%** of recipients undergo cuts in social contributions
- **65%** between 5<sup>th</sup> and 7<sup>th</sup> income decile
- Average cut=**5%**

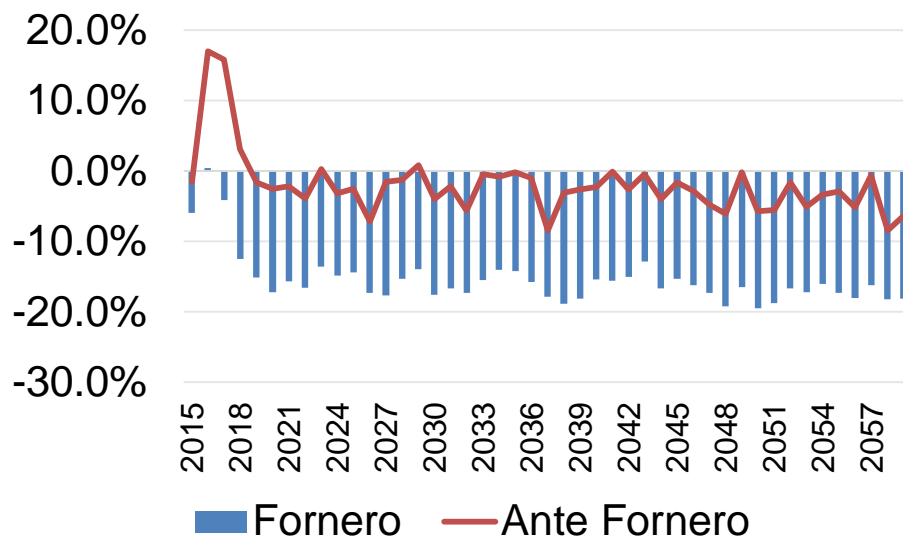
# Impact on pensioners (1)

## Accrual of social contributions in unemployment. Variations in *Baseline* scenario

Variation in average contributions accrued per month in unemployment



Variation in overall social contributions paid out on unemployment benefits



# Impact on pensioners (2)

## Condition of precarious workers at retirement. Variations in *Baseline* scenario, 2015-2059

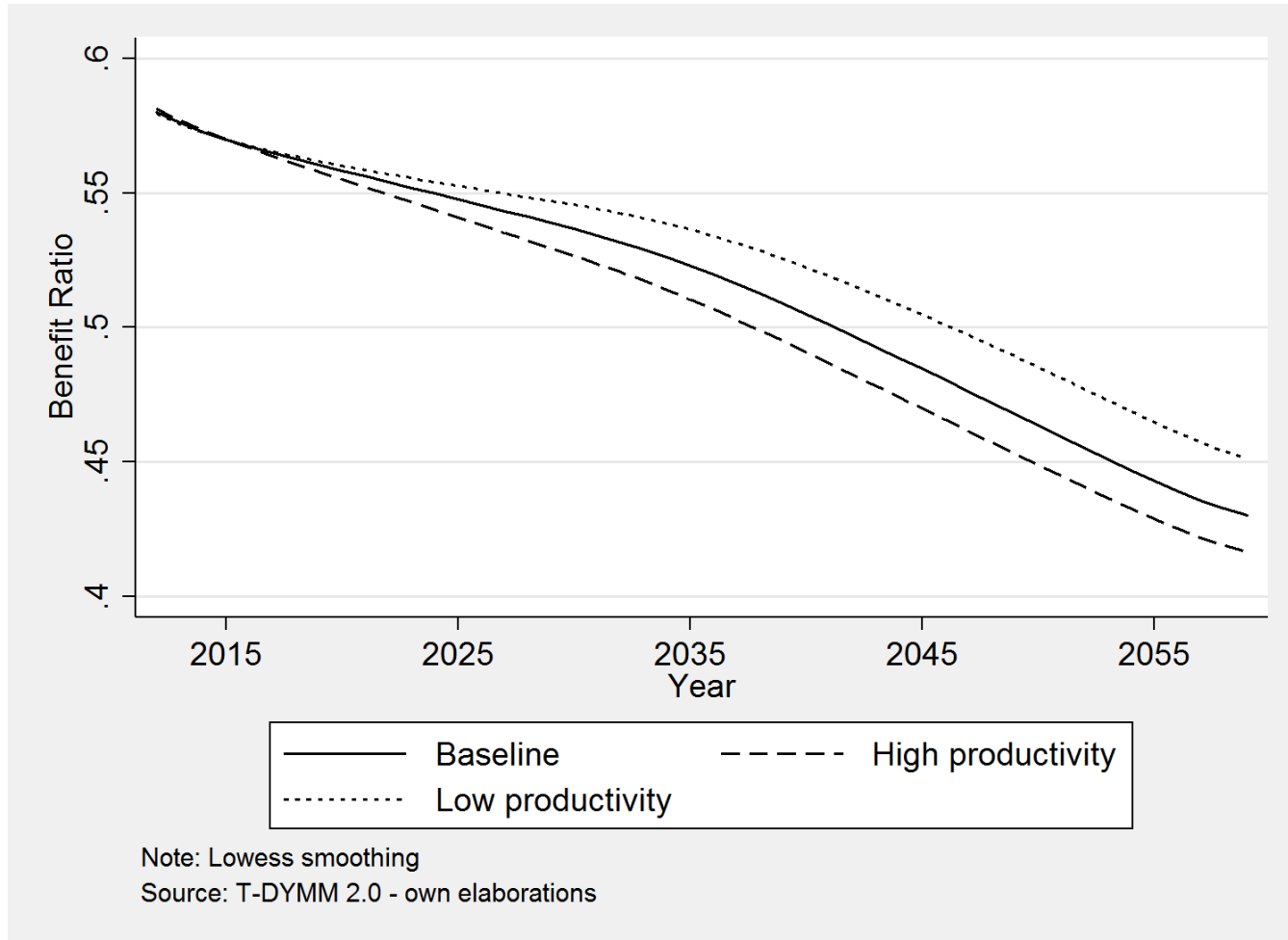
New pensioners, former employees who have worked >50% of the time on fixed-term contracts



# Shocks on productivity, AWG

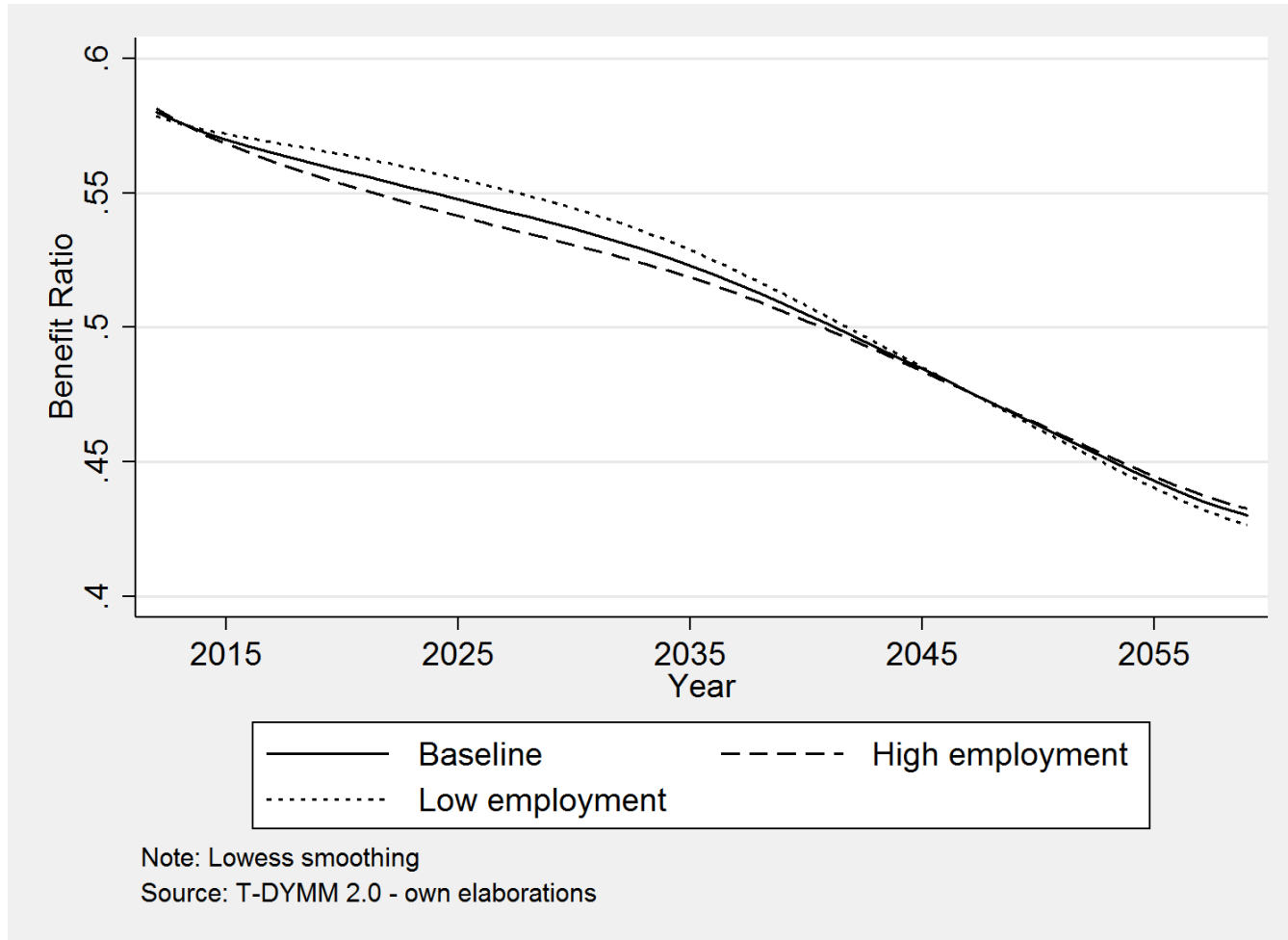
## Benefit ratio

$$BR_t = \frac{\text{Average pension}_t}{\text{Average wage}_t}$$

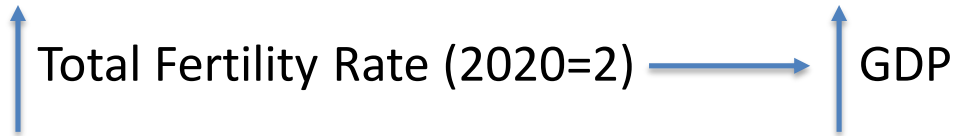


# Shocks on employment, AWG

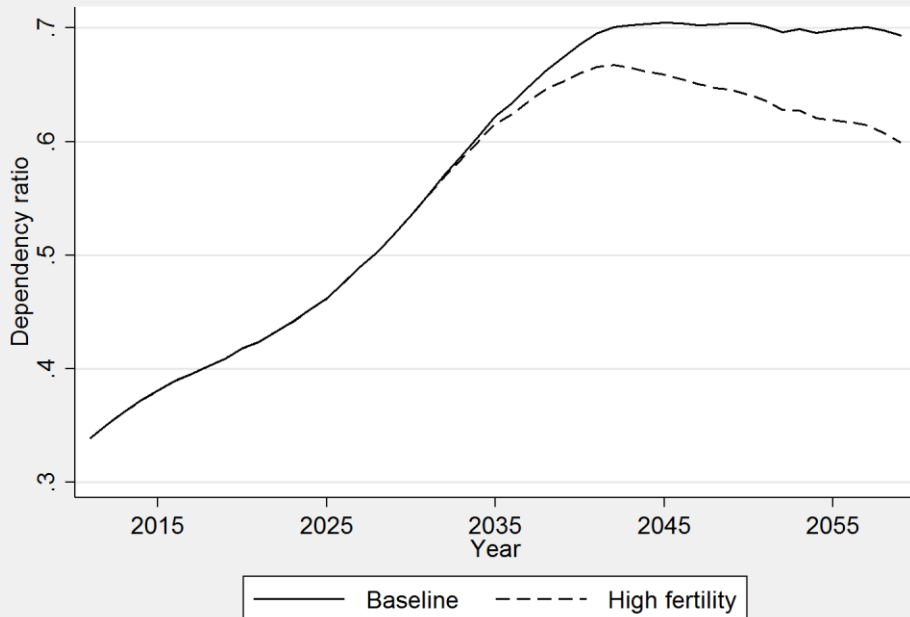
## Benefit ratio



# Shock on fertility (1)

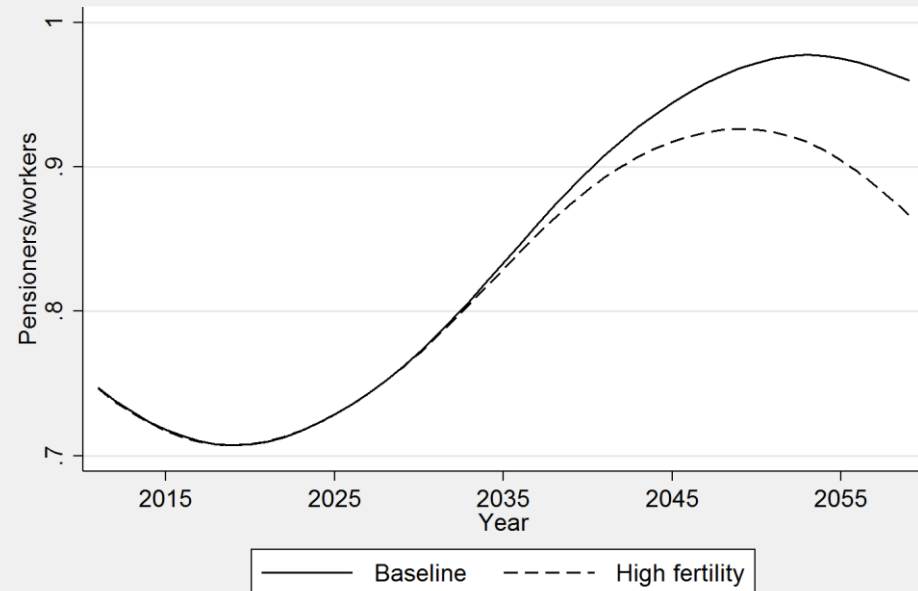


## Old age dependency ratio



Source: T-DYMM 2.0 - own elaborations

## Pensioners on workers ratio



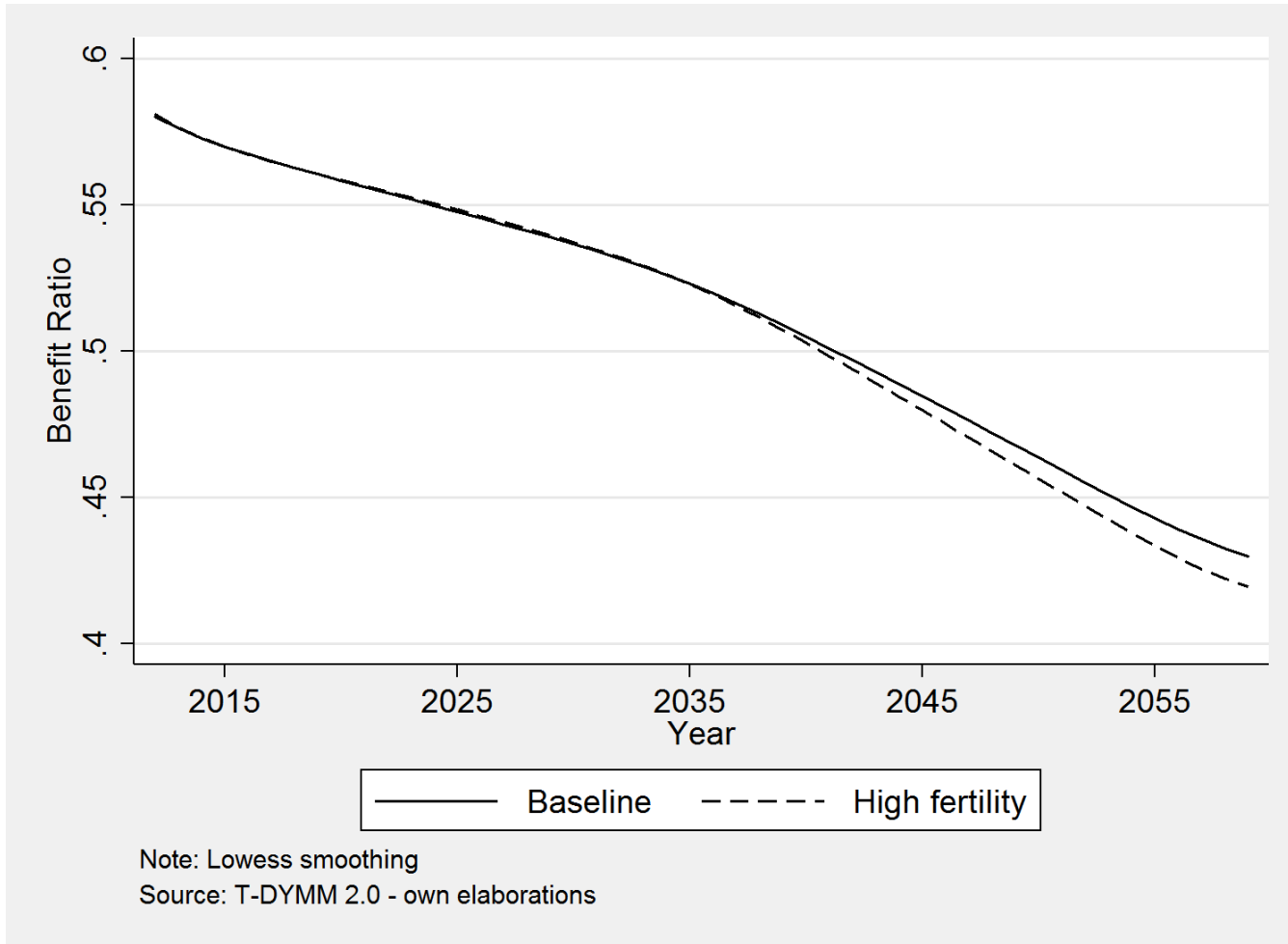
Note: Lowess smoothing

Source: T-DYMM 2.0 - own elaborations



# Shock on fertility (2)

## Benefit ratio



# IESS

Improving Effectiveness  
in Social Security

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