Minimum pension under NDC Pension Scheme

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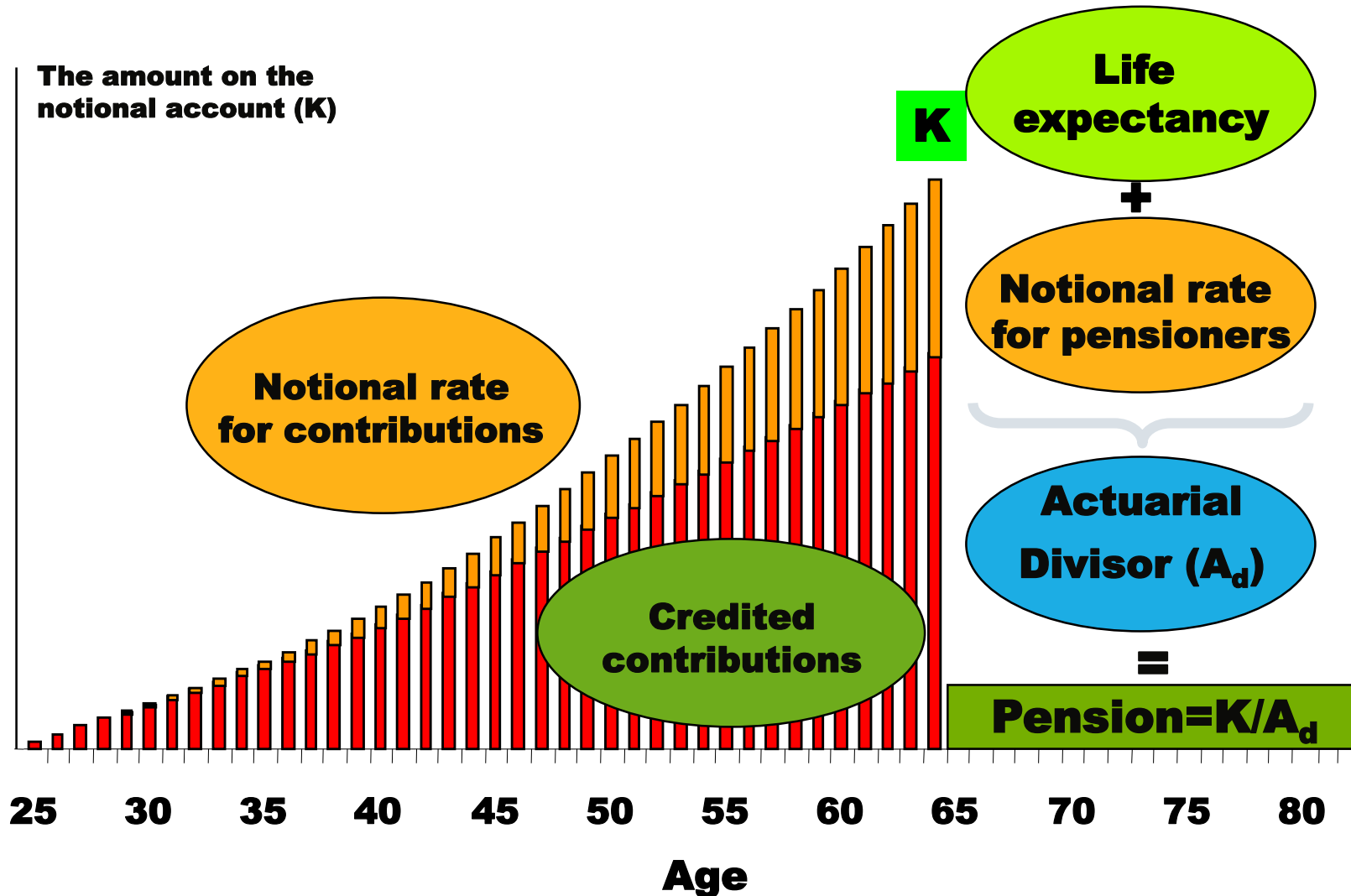Dr. María del Carmen Boado-Penas

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NDC Pension System

The fundamental choice (pay-as-you-go/funding) is present as well for defined benefit schemes (DB) as for defined contributions pension schemes (DC).

	Pay-as-you-go	**Funding**
DB	Clasical social security	Clasical employee Benefit DB plan
DC	Notional accounts (NDCs)	Pensions saving accounts

NDC Pension System

The amount on the notional account (K)

K

Life expectancy

+

Notional rate for pensioners

Notional rate for contributions

Credited contributions

Actuarial Divisor (A_d)

=

Pension=K/A_d

Age

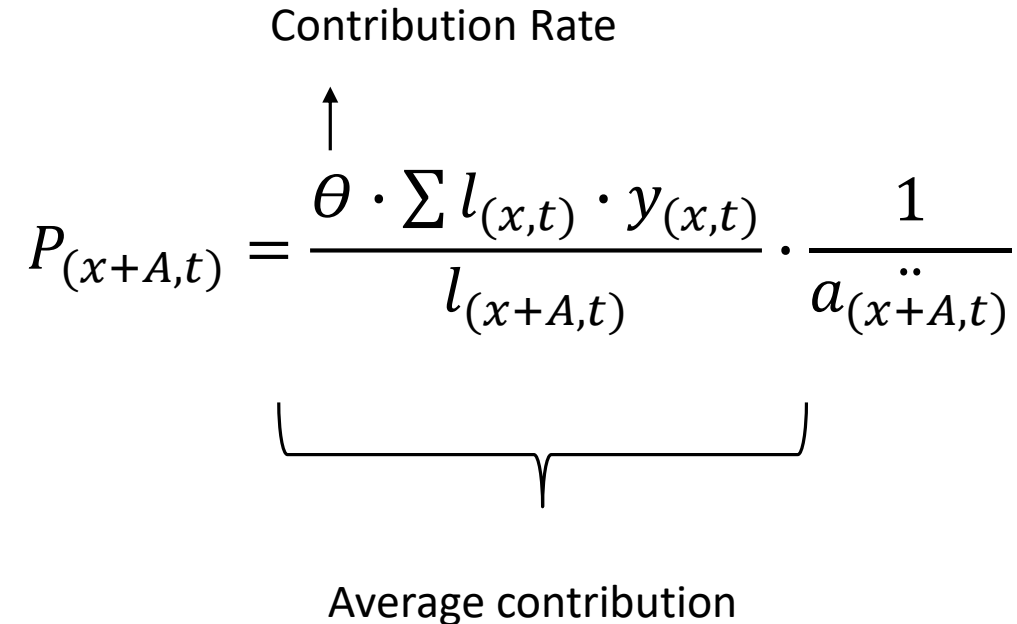25 30 35 40 45 50 55 60 65 70 75 80

Pension calculation under NDC Scheme

Contribution Rate

$$P_{(x+A,t)} = \frac{\theta \cdot \sum l_{(x,t)} \cdot y_{(x,t)}}{l_{(x+A,t)}} \cdot \frac{1}{\ddot{a}_{(x+A,t)}}$$

Average contribution

Rate paid by contributors: $\theta_c = \theta^*$: Rate to keep system balanced

- $l_{(x,t)}$: Number of survivors of age (x) at time t;
- $y_{(x,t)}$: Average earning of age (x) at time t.

Minimum Pension

- Divide pensioners into different groups based on different level of pension/contribution;

- Use following formulas for minimum pension:

$$B_0 = 0;$$
$$B_1 = B_0(1 + r) + D_{(x+A,1)} \cdot l_{(x+A,1)} - \sum(P^{min} - P_{(x+A,1)})^+ \cdot \ddot{a}_{(x+A,1)};$$
$$B_2 = B_1(1 + r) + D_{(x+A,2)} \cdot l_{(x+A,2)} - \sum(P^{min} - P_{(x+A,2)})^+ \cdot \ddot{a}_{(x+A,2)};$$
.....

Choose the largest P^{min} to make sure all $B_t > 0$

Results

Minimum pension under different salary growth rate

g	0	0.01	0.02	0.05
Minimum pension level	1302	1465.5	1656.9	2450.1
Number of groups benefited	6	6	6	6
Proportion benefited	58.1%	58.1%	58.1%	58.1%
Increase in average pension	113	124	137	187

Results

Minimum pension under different interest rate

r	0	0.01	0.02	0.05
Minimum pension level	1302	1336.8	1336.8	1336.8
Number of groups benefited	6	6	6	6
Proportion benefited	58.1%	58.1%	58.1%	58.1%
Increase in average pension	113	133	133	133