A Worker's Backpack as Alternative to PAYG Pension Systems

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Evolution of Dependency Ratios

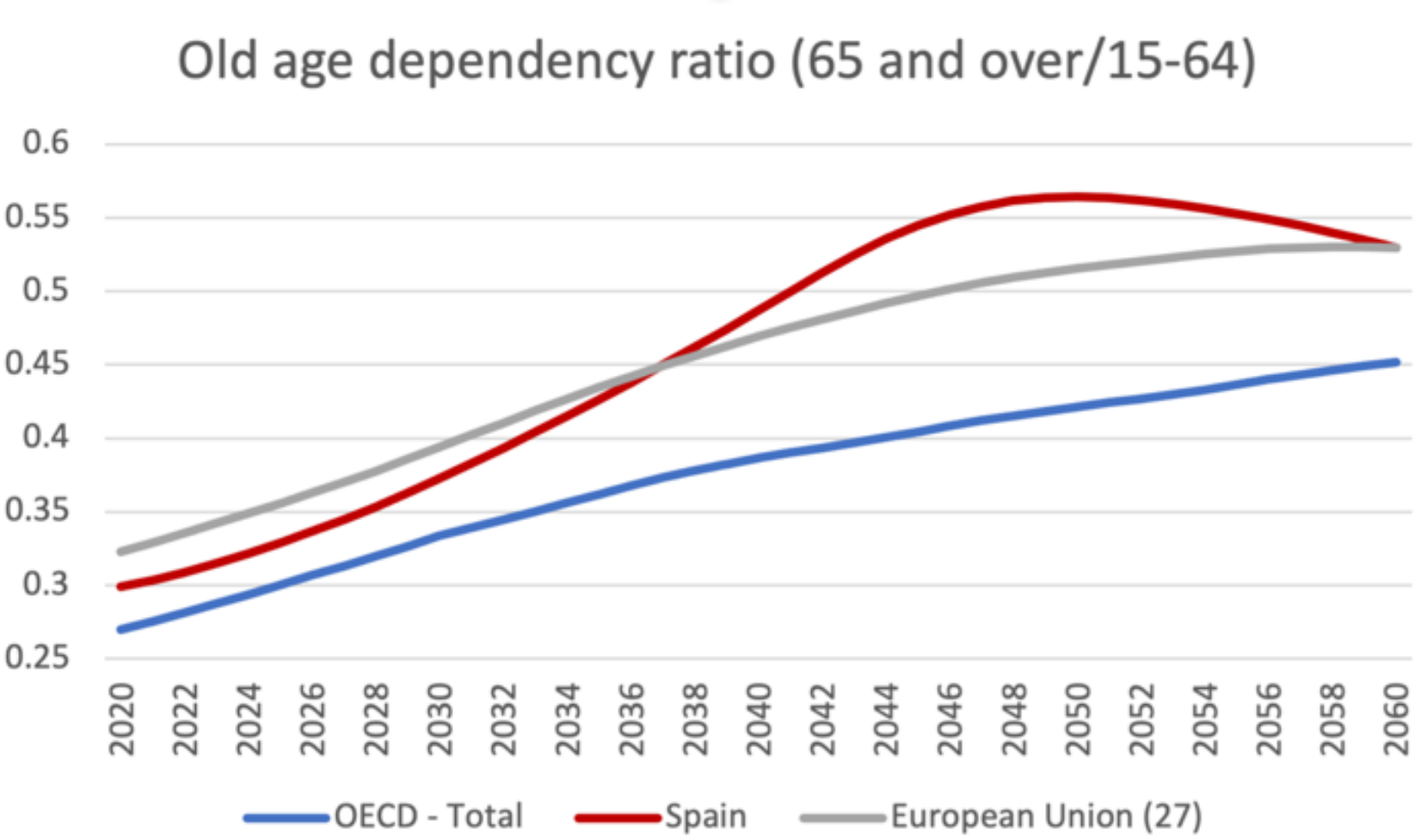

Figure: Evolution of the dependency ratios in selected countries (OECD).

Unfunded pension costs: Spain 2018 to 2068

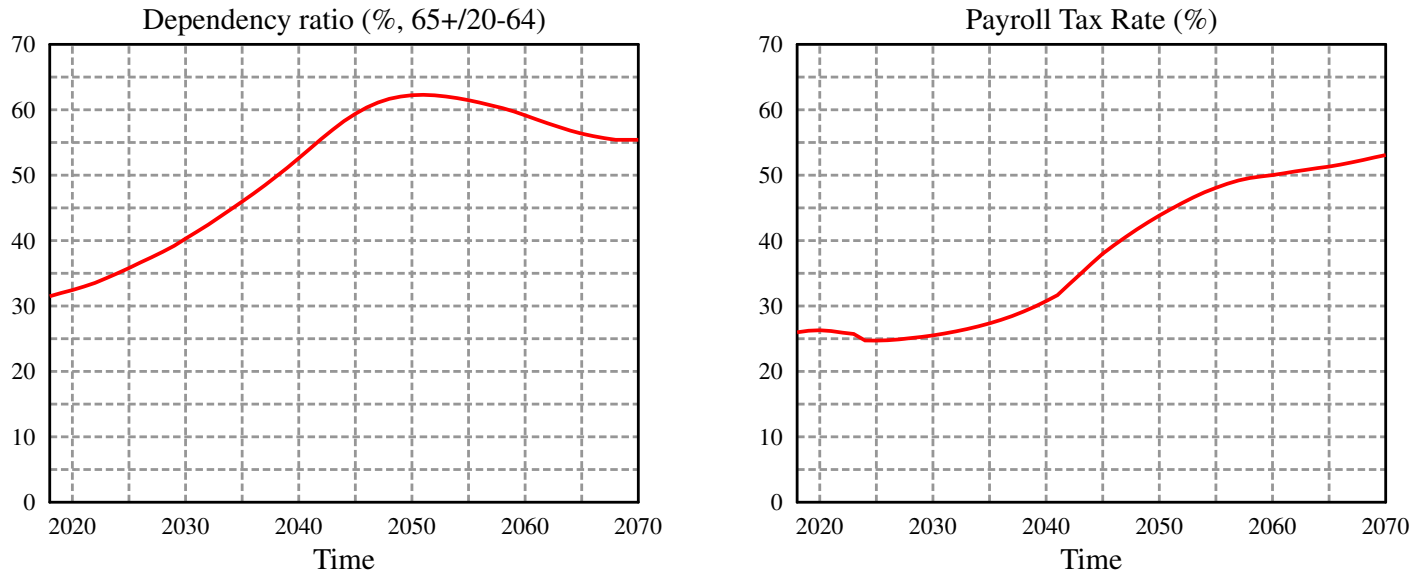

Figure: Evolution of the dependency ratio and model implied payroll tax rate in Spain between 2018 and 2068.

Unsustainable European pension systems

- Most advanced economies face a demographic transition in the incoming decades.
  - Dependency ratios (+65/20-64) will more than double.
- This transition implies that many Social Security systems are unsustainable or highly distortive.
  - PAYG: transfer from (few) workers to (many) retirees.

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- Some reforms (Spain 2010, 2013) improve sustainability at large welfare costs (low pensions) in the future (Díaz-Giménez and Díaz-Saavedra (2017)).
- We compare PAYG to alternative **funded** systems, and find that:
  - ❏ with aged population, funded systems dominate unfunded systems;
  - ❏ **worker 'Backpack'** best among funded systems, accounting for transition cost.

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- in our study (Spanish economy): a complement/substitute to UI/PAYG Pensions.

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- *How can the transition from PAYG to BP be implemented?*
  - *Is it possible to design a transition without losers (Pareto transition)?*
  - *Taking into account the demographic transition, how fast should it be implemented?*

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- Solve steady-state equilibrium, under the 2068 age distribution forecast:
  1. assuming PAYG pensions are in place;
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- Solve steady-state equilibrium, under the 2068 age distribution forecast:
  1. assuming PAYG pensions are in place;
  2. alternatively, PAYG pensions are replaced with BP system.
  3. compare BP to other funded systems.
- Solve transition path between 2018 and 2068+, **without default on PAYG promises**.

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- *How does it compare with economies under other funded pension systems?*
  - ❏ Similar in the aggregate, but BP delivers (U) insurance, higher welfare across different demographic groups.
- *How can a Pareto improving transition from PAYG to BP be implemented?*
  - ❏ We study debt-financed transitions:
    1. Gradual phase out: large pension deficits due to demographic transition;
    2. Fast reform: lower deficits during transition by anticipating the ageing process, lower entitlement debt.

Quantitative Exercise

Calibrate the model with Spanish data (2018):

- Age and education distribution;
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1. PAYG pension system stays in place;
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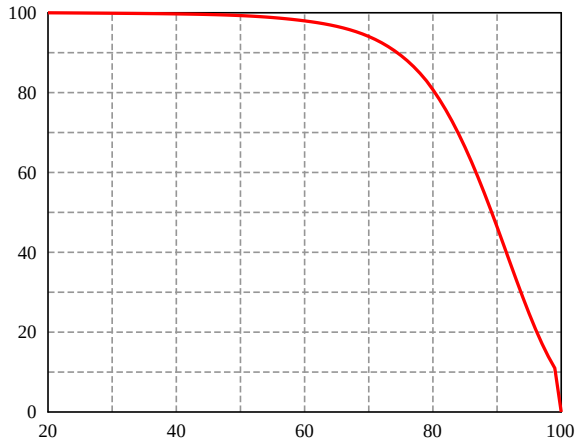
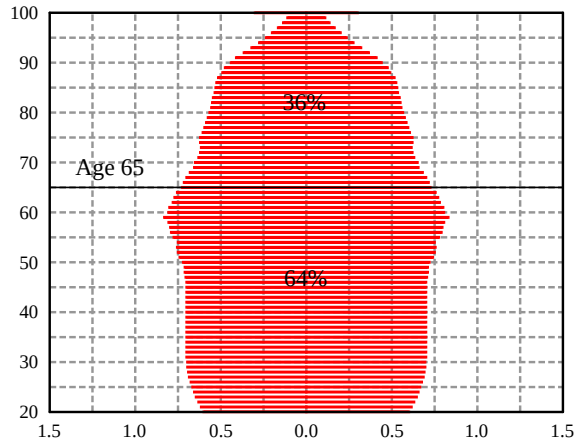
- In the following, no change in interest r and wage ω rates (open economy).
- Closed economy results in the paper.

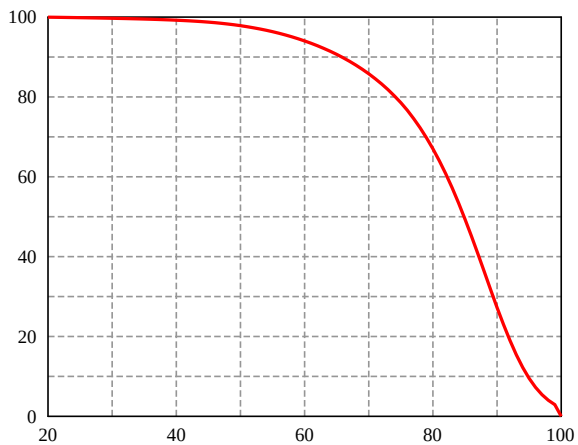
Quantitative Exercise



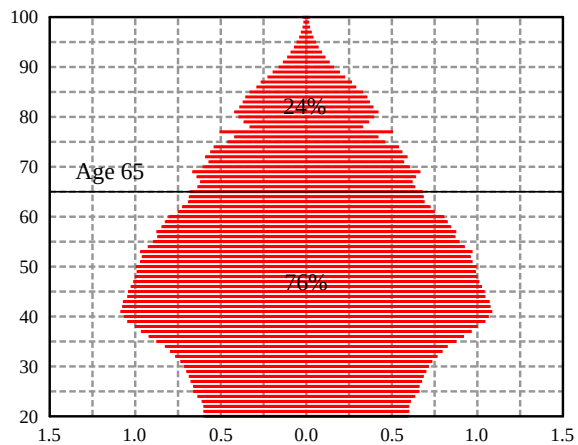
Panel A: Survival Probabilities in 2068 (%)



Panel B: Distribution by Age in 2068 (%)



Panel C: Survival Probabilities in 2018 (%)



Panel D: Distribution by Age in 2018 (%)

Figure: Survival Probabilities and Age distribution in Spain in 2018 and the 2068 forecast. Source: Instituto Nacional de Estadística, 2018-2068 series.

Baseline: PAYG transition 2018 - 2068

Under PAYG pension system:

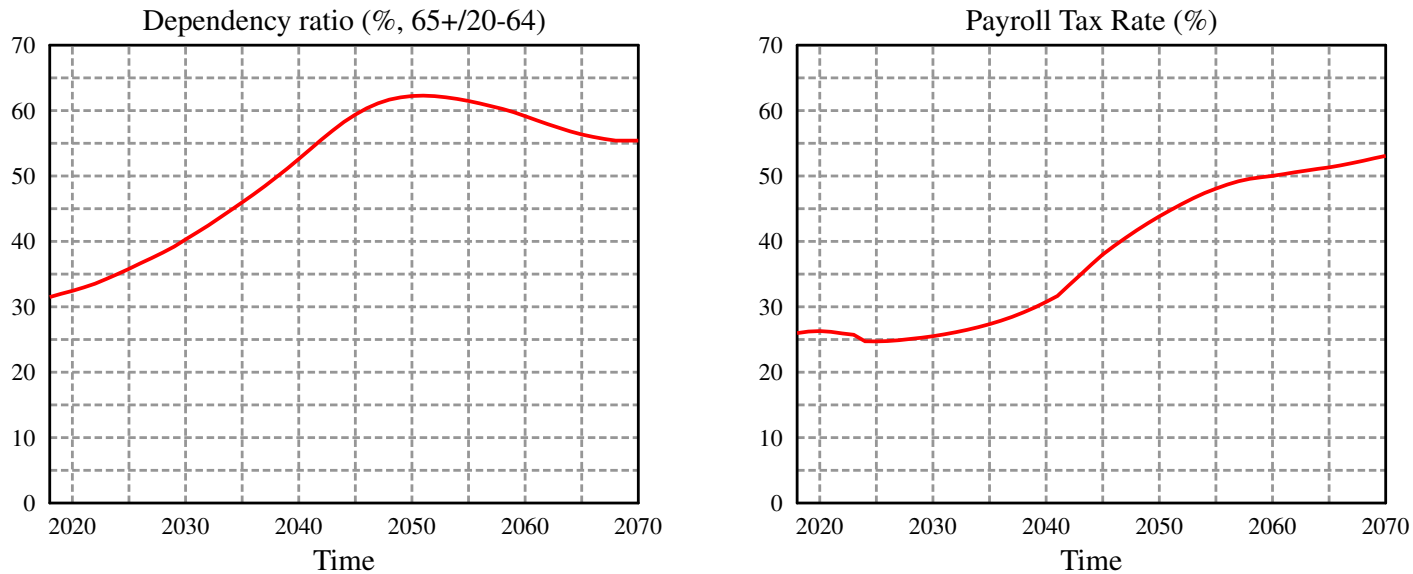


Figure: Evolution of the dependency ratio and payroll tax rate (τ_p) between 2018 and 2068.

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Assumptions:

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- PAYG system deficit financed with debt issuance, $i = 1\%$.

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3. Which cohort is the first to enter the BP system τ_b^*.

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Different choices of 1-3 imply different debt levels after the reform.

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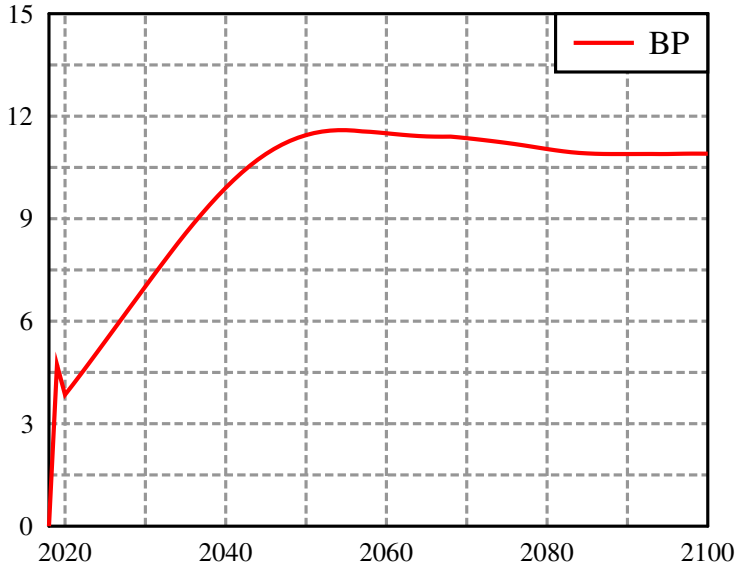
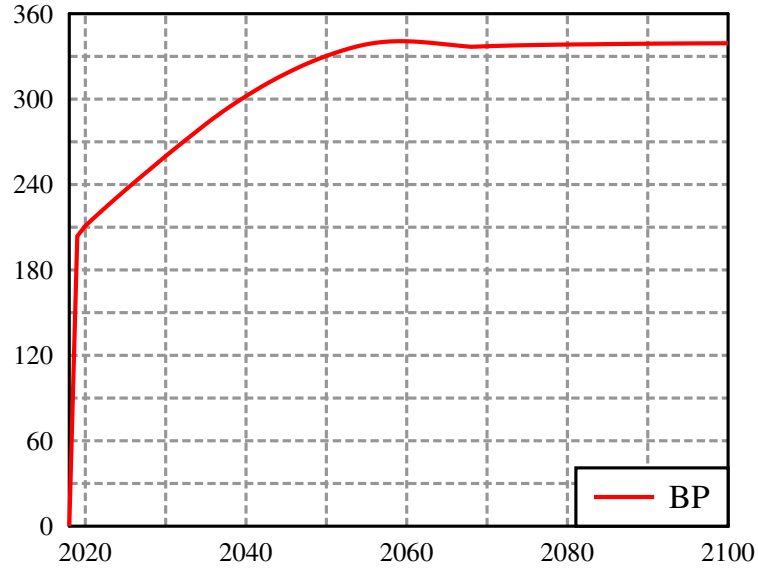
- Next slides: a *Fast* transition with $i = 1\%$ interest on "entitlement" debt.

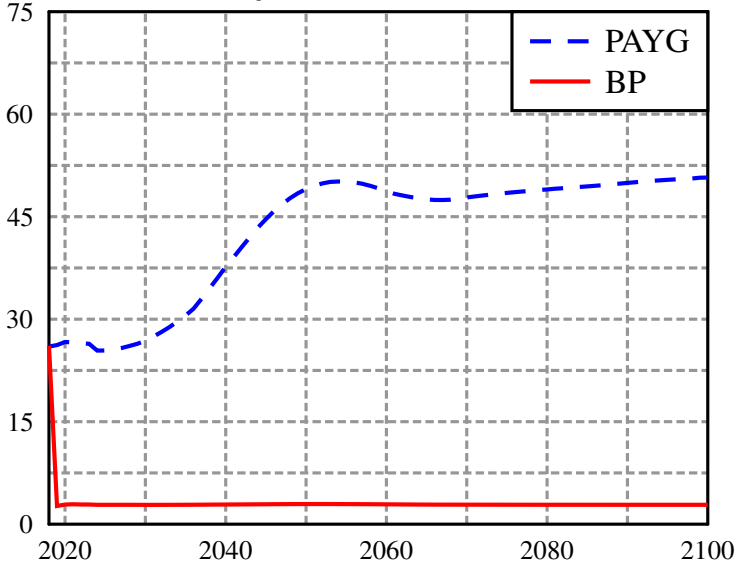
Fast transition from PAYG to BP economy



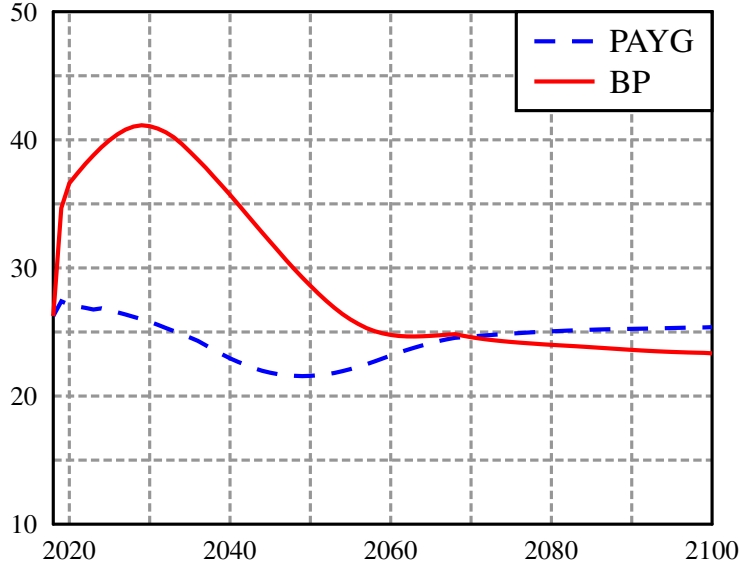
(a) Backpack Assets (Y ratio)



(b) Debt (% Y)



(c) Payroll tax (%)



(d) Consumption tax (%)

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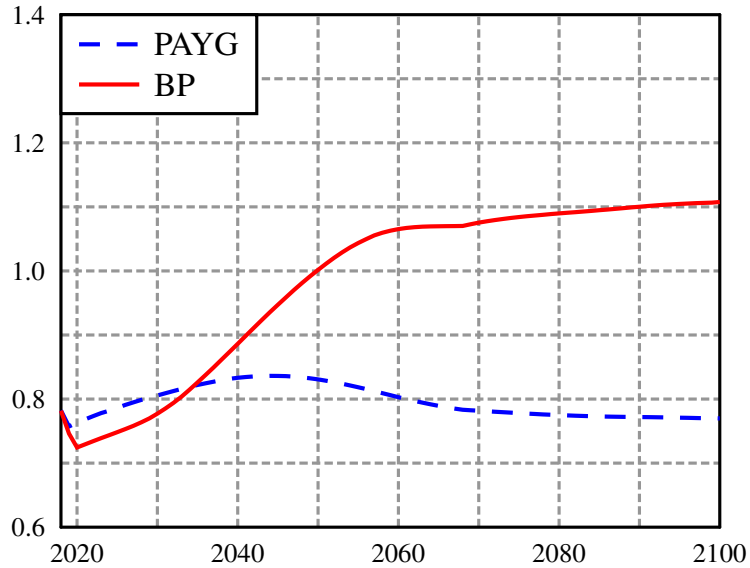
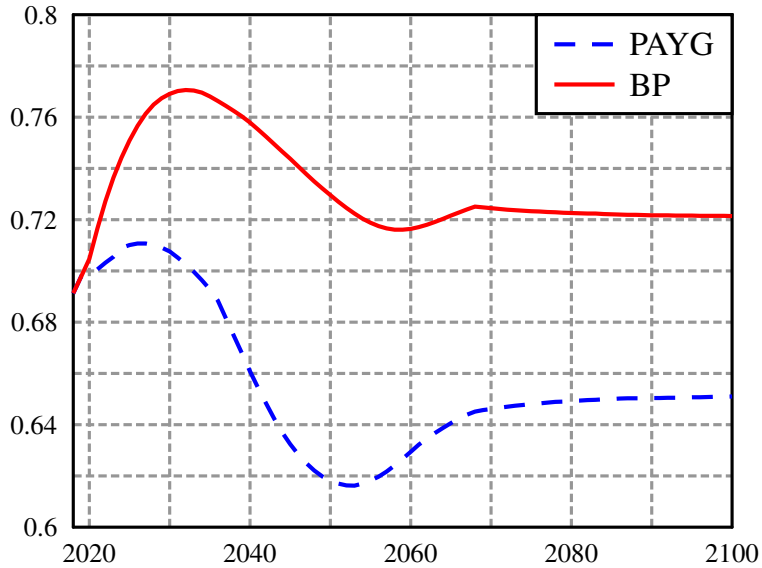
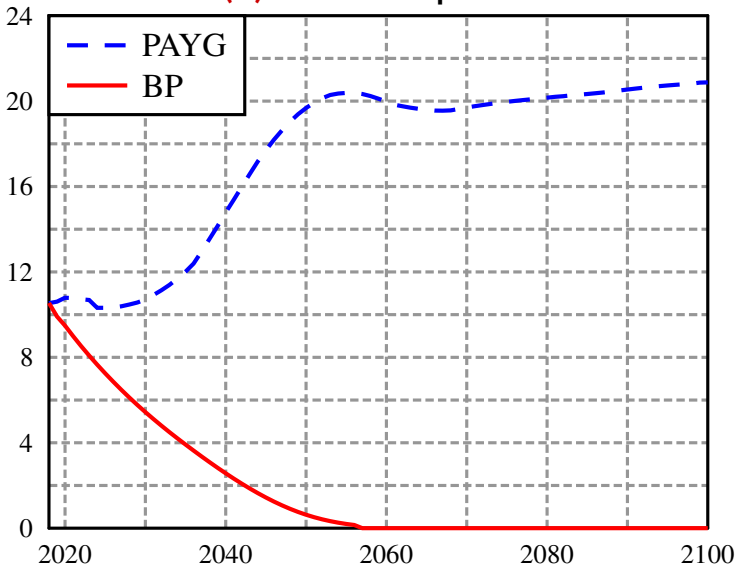


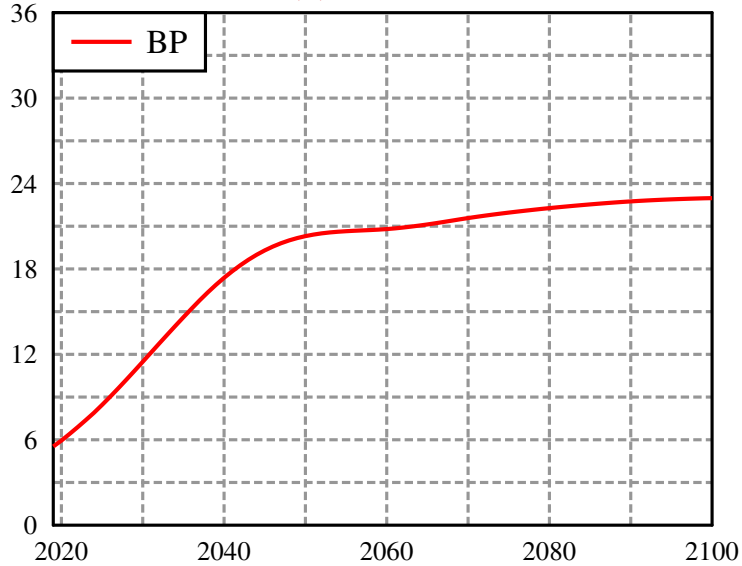
(e) Consumption



(f) Labour



(g) PAYG pension payments (% Y)



(h) Welfare (Δ)

Comparing PAYG and Backpack economies

Table: Aggregates in the PAYG and BP economics in 2068.

	Y	L	A/Y	C/Y
PAYG	2.2	0.7	1.0	0.3
BP	2.5	0.7	5.5	0.4

h: average share of disposable time allocated to the market.

Table: Labor Market Shares in the PAYG and BP economies in 2068 (% of population).

	W	U	I	R
PAYG	50.8	10.8	3.7	34.7
BP	58.9	13.3	5.0	22.8

W: workers, U: unemployed, I: inactive ($s = 0$), R: retirees.

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Table: Policy Parameters in the PAYG and in the BP economies.

	Tax Rates (%)	
	PAYG	BP
τ_c	25.7	23.7
τ_p	51.1	2.8
τ_B	-	22.0

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Table: Government Budget in the PAYG and BP economies in 2068 ($\%$ of output, Y).

	Gov. Expenditure				Tax Revenues			
	T_r	U	P	rB	T_c	T_k	T_y	T_p
PAYG	0.8	1.2	21.0	0.0	8.8	2.3	6.8	22.2
BP	1.0	1.1	0.00	3.4	10.4	2.3	8.6	1.1

T_r: gov. transfers, P: pension payments, U: UB expenditures, rB: interest payments; T_c: consumption taxes, T_k: capital income taxes, T_y: income taxes, T_p: payroll taxes .

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Welfare comparisons

Table: Consumption Equivalent Variation (% of lifetime consumption) in PS and BP economies, relative to the PAYG economy.

Pension system	Education			
	Dropouts	High School	College	All
Private savings	22.3	26.7	24.7	26.5
Pension fund	31.1	31.1	29.5	30.9
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Table: Consumption Equivalent Variation (% of lifetime consumption) in the BP economy, relative to private savings economy.

Pension system	Education			
	Dropouts	High School	College	All
Backpack	7.1	7.7	8.7	7.6

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- A fast transition to a BP economy can be achieved without imposing high costs for households alive during the reform.
- Results hold in a closed economy: amplification due to increase in wage rate (decrease in r).

Thank you

Households in the OLG economy

- Preferences:

$$\mathbb{E} \sum_{j=20}^{100} \beta^{j-20} \psi_j \Big[u(c, l) - \gamma(s) \Big], \tag{1}$$

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    - $s=0$: **Inactive**.
  - **Retired**: next slide.

Retirement in the OLG economy

Workers decide when to retire from the labor force:

- PAYG economy:
  - minimum retirement age R_0,
  - receive a **pension** $p = \phi \bar{y_h}$, where $\bar{y_h}$ average labour earnings of educational group h in their last N_b years of wages, ϕ is a replacement rate.
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where $bx = b$ if lost job, otherwise $bx = 0$. Back

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- *Steady-states*:
  - ❏ we take the age and educational distributions in Spain 2018 and in the 2068 forecast and solve for the steady-state equilibrium.
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