Lecture 7: Pension reforms

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Introduction

- **Demographic changes**
  1. Baby-boomers start retiring
  2. Increase in life-expectancy

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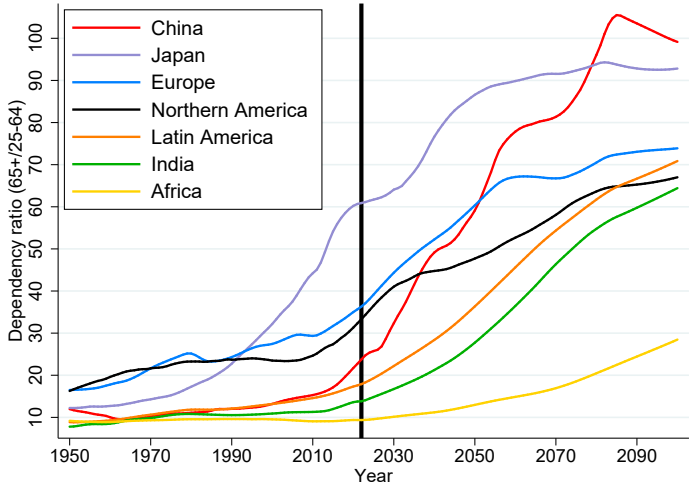
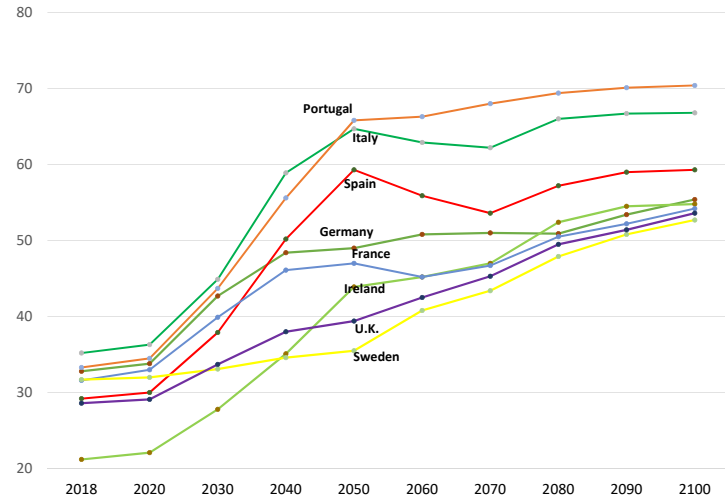
- **Demographic changes**
  1. Baby-boomers start retiring
  2. Increase in life-expectancy
- **Public finances consequences**
  - Long-term deficit forecasted in pension systems
  - Increase in expected burden from active population
  - Health care costs add to the gloomy picture

Figure 1 – Old-age dependency ratio (65+/25-64)



Source : United Nations, *World Population Prospects : The 2022 Revision*.
Note : Medium estimates.

Figure 2 – Old-age dependency ratio in Europe (2015–2080)



Source : Eurostat, population projection 2018, updated 2019.
Note : population 65 and over to population 15 to 64 years.

Policy options

1. **Higher level of funding**
   a) Higher public funding
   b) Higher savings rates

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   a) Switch from unfunded to funded system
   b) Individual savings account
   c) Switch from DB to DC systems

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3. **Parametric reforms of unfunded systems**
   a) Increase contributions
   b) Reduce benefits
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4. **Structural reforms of unfunded systems [next lecture]**

Outline of the lecture

I. Increased funding

1. Transition from unfunded to funded systems
2. Implicit debt
3. Partial funding
4. Public pension funds

II. Privatization of public pensions

1. What is privatization ?
2. Chile
3. Debate about privatization in the U.S.

III. Reforming PAYGO systems

1. The budget constraint
2. Classifying pension reforms
3. Case-study : pension reforms in France

I. Increased funding

1. Transition from unfunded to funded systems
2. Implicit debt
3. Partial funding
4. Public pension funds

Transition to funded systems

- **Arguments for funded systems**
  - Higher rate of return of funded systems
  - Lower cost of pension with funded systems
  - Higher savings, then higher investment, higher growth

Transition to funded systems

- **Arguments for funded systems**
  - Higher rate of return of funded systems
  - Lower cost of pension with funded systems
  - Higher savings, then higher investment, higher growth
- **Funding and demographic changes**
  - Demographic changes impact also funded systems
    e.g., higher life expectancy, means lower annuity
  - Issue for countries with declining population, where non-funded pensions can lead to negative rate of return

Transition to funded systems

- **Conditions for switch**
  - Higher market return than growth
  - Capital intensity is below welfare maximizing level

Transition to funded systems

- **Conditions for switch**
  - Higher market return than growth
  - Capital intensity is below welfare maximizing level
- **Comparing returns**
  - Accounting for risk
  - Accounting for administrative costs

Transition to funded systems

- **Transition towards full funding**
  1. Cut current pension benefits
  2. Ask new cohort to pay twice
  3. Emit explicit debt

Transition to funded systems

- **Transition towards full funding**
  1. Cut current pension benefits
  2. Ask new cohort to pay twice
  3. Emit explicit debt
- **Paying implicit debt has a cost**
  - If same interest rate for borrowing and investment, no gain in transition
  - If gov. can borrow to invest in equities, can get the equity premium to fund the transition

Implicit debt

- **How much implicit pension debt ?**
  - Implicit pension debt measures total unfunded liabilities
  - How much explicit debt would be needed to switch to full funding
  - Different approaches (Franco, 1995 ; Blanchet and Ouvrard, 2006)

Implicit debt

- **How much implicit pension debt ?**
  - Implicit pension debt measures total unfunded liabilities
  - How much explicit debt would be needed to switch to full funding
  - Different approaches (Franco, 1995 ; Blanchet and Ouvrard, 2006)
- **Three estimation methods**
  1. Accrued-to-date liabilities
  2. Projected liabilities of current workers and pensioners (closed-group method)
  3. Open-system liabilities

Implicit debt

Accrued-to-date liabilities

- **Definition**
  - PV of pensions to be paid on the basis of accrued rights
  - Neither future contributions nor accrual of new rights are taken into account

- **Are accrued pension rights public debt ?**
  - can be assimilated to conventional public debt (i.e., SSCs are equivalent to purchasing government bonds)
  - but no formal contracts behind pension rights
  - acquisition of pension rights is mandatory
  - pension rights are not tradable

- **What does it measure ?**
  - Not a measure of sustainability
  - But represents the cost of closing down a PAYG system

Implicit debt

2. **Current workers and pensioners' liabilities**
   - assumption that pension schemes continue their existence until last contributor dies
   - no new entrants allowed
   - takes into account future contributions of existing members and their new rights

3. **Open-system liabilities**
   - Adding PV of contributions and pensions of new workers under current rules
   - Potentially infinite perspective with children not yet born, etc.
   - Measure potential liabilities, not public debt
   - Role in assessing perspectives of pension schemes

Implicit debt

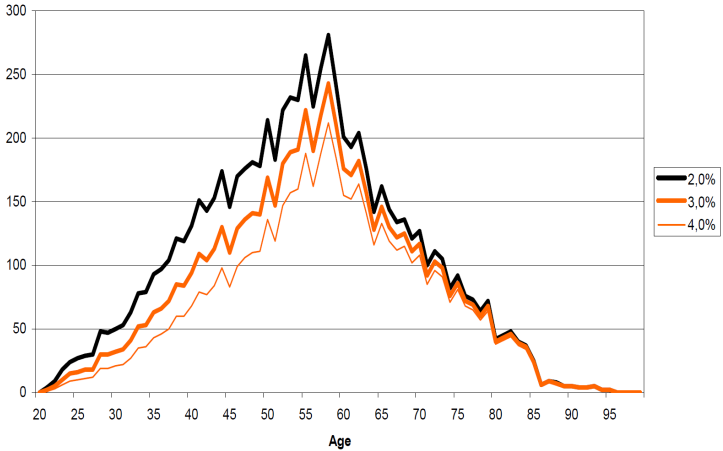
Table 1 – Estimates of implicit pensions debt in France (2005, % GDP)

Discount rate	(1) Accrued liabilities	(2) Projected liabilities
2%	470 %	450 %
3%	390 %	310 %
4%	320 %	210 %

SOURCE : Blanchet and Ouvrard (2006), Tab. 1 and Tab. 2.

Implicit debt

Figure 3 – Accrued pension liabilities by age in France in 2005 (in billion euros)



Source : Blanchet and Ouvrard (2006), Fig. 1, p. 9.

Implicit debt

Table 2 – Estimates of implicit pensions debt in OECD countries (% GDP)

	(1) OECD Van der Noord and Herd (1993)	(2) IMF Chand and Jaeger (1996)	(3) CPB Kune (1997)	
Belgium	–	–	101	75
Canada	121	94	–	–
Denmark	–	–	117	87
France	216	265	112	83
Greece	–	–	245	185
Ireland	–	–	78	55
Italy	242	357	207	157
Japan	162	166	–	–
Luxembourg	–	–	219	156
Netherlands	–	–	144	103
Portugal	–	–	128	93
Spain	–	–	129	93
Sweden	–	131	–	–
United Kingdom	156	117	92	68

SOURCE : Holzmann, Palacios and Zviniene (2001), Tab. IV, p. 111. [web link]

Implicit debt

- **Implicit pension debts are too large**
  - Hard to imagine full transition in France (or Germany, Italy, etc.)
  - Transition period would be huge (above 1 century)

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- **Implicit pension debts are too large**
  - Hard to imagine full transition in France (or Germany, Italy, etc.)
  - Transition period would be huge (above 1 century)
- **Funding is not 0/1 option**
  - Share of funding can take any value
  - No implication of private/public choice
  - Public pension fund or trust fund as an option

Partial funding

- **Dutta, Kapur and Orszag (EL, 2000)**
  - Portfolio approach to optimal funding of pensions
  - Choice over different assets (funded/non-funded) providing different returns and risks
  - Optimal choice depends on risk aversion and ratio of returns to risk

Partial funding

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  - Choice over different assets (funded/non-funded) providing different returns and risks
  - Optimal choice depends on risk aversion and ratio of returns to risk
- **Simple mean-variance model**
  - Share of funding w
  - Funded return r, unfunded return g
  - Pension $P = 1 + wr + (1 - w)g$
  - Choose optimal w to max $EU(P)$
  - If no risk aversion, and $r > g$, optimal to fully fund

Partial funding

- **Simple mean-variance model**
  - If risk aversion γ, optimal to diversify

$$EU(P) = EP - \frac{\gamma}{2} var(P)$$

$$Var(P) = w^2\sigma_r^2 + (1-w)^2\sigma_g^2 + 2w(1-w)\sigma_{rg}$$

  - with expectation μ_r and variance σ_r, σ_{rg} the covariance

Partial funding

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- **Optimal funded share**

$$w^* = \frac{\mu_r - \mu_g + \gamma(\sigma_g^2 - \sigma_{rg})}{\gamma\sigma_{r-g}^2}$$

Partial funding

- **Results**
  - Higher the difference in returns, higher the funded share
  - Higher the risk of financial markets, lower the funded share

Partial funding

- **Results**
  - Higher the difference in returns, higher the funded share
  - Higher the risk of financial markets, lower the funded share
- **Quantification**
  - Dutta et al. (2000) use return from 1900-1989 period
  - High risk on European financial markets, hence low level of funding optimal
  - With data from 1945-2016, higher returns with lower risks, hence higher level of optimal funding

Partial funding

Table 3 – Growth rates and total return on equity (1900–1989)

Country	GDP Growth (%)		Return on equity		Covar
	Mean	Variance	Mean	Variance	
	μ_g	σ_g	μ_r	σ_r	σ_{gr}
U.S.	3.2	0.7	6.3	47.6	0.7
U.K.	1.9	1.0	4.4	60.9	4.2
France	2.4	5.4	8.4	80.7	6.6
Germany	2.9	9.7	8.9	89.4	16.2
Japan	4.4	15.7	7.8	287.9	47.5

Source : Dutta, Kapur and Orszag (2000), Tab. 1, p. 203.

Partial funding

Table 4 – Optimal share of funding according to risk aversion

Country	Risk aversion parameter		
	$\gamma = 0.1$	$\gamma = 0.2$	$\gamma = 0.4$
U.S.	77.2%	38.6%	19.2%
U.K.	45.1%	19.3%	6.3%
France	20.6%	9.3%	3.5%
Germany	63.5%	24.9%	5.5%
Japan	0.1%	0	0

NOTE : Growth rates and total return on equity from the period 1900-1989.
SOURCE : Dutta, Kapur and Orszag (2000), Tab. 2, p. 203.

Partial funding

- **Conclusions**
  - Suggest that full-funding not optimal
  - Suggest that no funding not optimal
  - Depends on risk aversion and country experience in risk and return from capital markets

Partial funding

- **Conclusions**
  - Suggest that full-funding not optimal
  - Suggest that no funding not optimal
  - Depends on risk aversion and country experience in risk and return from capital markets
- **How to increase funding ?**
  - Through individual savings
  - Through public pension funds

Public pension funds

- **Some funding within unfunded schemes**
  - Trust fund (U.S.)
  - Fonds de réserve des retraites (France)
  - Swedish national pension funds
  - Norwegian pension funds

Public pension funds

- **Some funding within unfunded schemes**
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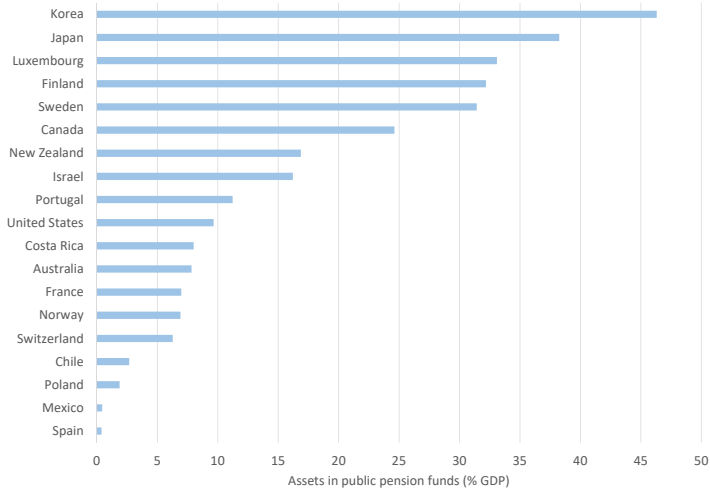
  - Swedish national pension funds
  - Norwegian pension funds
- **Rationales**
  - Smoothing babyboom cohorts
  - Increasing total pension returns

Figure 4 – Public pension funds as a share of GDP (Dec. 2023)



Source : OECD, *Pension markets in focus* (2024), Fig. 1.3, p 11.

Public pension funds

Table 5 – Public pension funds as a share of GDP

Country	Name of pension fund	Year created	Assets (in bn EUR)	% GDP
Norway	Gov. Pension fund	1990	509.1	122.8%
Singapore	Central Provident Fund	1955	200	73,3%
Japan	Gov. pension investment fund	2006	280.4	27.6%
Korea	National Pension Plan	1988	280	27.6%
Sweden	National Pension Funds	2000	124.7	27.2%
United States	Social Security Trust Fund	1940	2,609.0	17.9%
Ireland	National Pensions Reserve Fund	2000	32.3	15.9%
Canada	Canadian Pension Plan	1965	136.0	8.6%
Spain	Social Security Reserve Fund	1997	85.3	6.1%
Switzerland	Swiss Federal Social Security Funds	1948	32.4	5.1%
Belgium	Zilverfonds	2001	23.3	5.0%
China	National Social security fund	2001	126.5	2.2%
Chile	Pension Reserve Fund	2006	3.8	1.9%
France	Fonds de réserve des retraites	1999	36.3	1.7%

SOURCE : OECD, *Pension markets in focus* (2011) ; funds' website.

Public pension funds

- **Fonds de réserve des retraites (FRR)**
  - Created in 1999 with objectives of constituting reserves for smoothing shock from baby-boom pensions
  - 2010 pension reforms has stopped contributions to FRR
  - Funds are now used to pay debt of pension schemes

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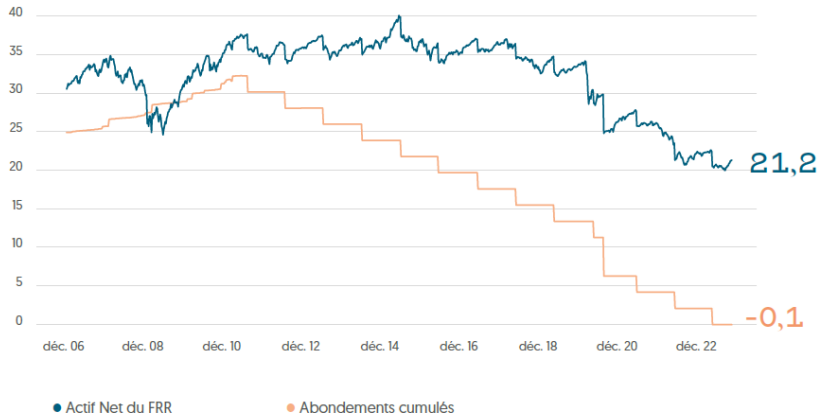
- **Limited funding in France**
  - FRR 21.2 bn euros in 2023 (0.7% GDP)
  - Reserves from French pension schemes 5.8% GDP
  - Mostly from complementary schemes

Public pension funds

Figure 5 – Change in asset from French *Fonds de réserve des retraites* (Dec. 2023)



Source : Fonds de réserve des retraites, *Rapport d'activité* (2024), p. 23.

Public pension funds

Table 6 – Funds from French pension schemes (2017)

Scheme	Population	Amount (bn euros)	Amount (months of benefits)
Agirc-Arrco	Priv. sec. complementary scheme	62.5	9 months
RAFP	Pub. sec. (bonuses)	23.7	
CNAVPL	Liberal professions	16.2	110 months
RSI	Self-employed (craftsmen, traders)	12.8	101 months
Ircantec	Pub. sec. complementary scheme	10.9	48 months
BdF	Bank of France	5.7	156 months
CNRACL	Hospitals and local auth.	2.5	1.5 month
MSA	Agricultural sec.	0.7	1 month
CRPCEN	Notaries	0.4	6 months
Total		135.3	

Source : Conseil d'orientation des retraites, séance du 26 nov. 2013, doc. 6 ; *Rapports d'activité* 2017 for updates.

U.S. Social security Trust Fund

- **OASI Trust Fund**
  - Created in 1937
  - Off-budget accounts
  - Invested in Treasury Bills

$$TF_{t+1} = TF_t(1 + r) + SSTax_t - SSBen_t$$

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- **Greenspan Commission (1982)**
  - Advise to increase funding in expectation for babybomers retirement
  - 1983 reform : increase in 2 ppt payroll tax to fund the US Trust fund
  - Today Trust Fund at \$2.5 trillion (8.6% GDP)

U.S. Social security Trust Fund

- **Off-budget and On-budget**
  - Social security accounts are off-budget
  - But U.S. gov. deficit is unified budget
  - Media and political discussion on unified budget
  - Do increases in TF lead to changes in On-budget ?

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  - Do increases in TF lead to changes in On-budget ?
- **Smetters (AER 2004)**
  - Impact of surplus in off-budget S_t^{OFF}

$$S_t^{ON} = \alpha + \beta S_t^{OFF} + X_t \delta + \varepsilon_t$$

  - Results : $\beta < 0$
  - Suggestive evidence that TF has led to higher on-budget deficit

Table 7 – OLS regression on primary on-budget surplus, S_t^{ON}, 1949–2002

Variable	(1)	(2)	(3)	(4)
S_t^{OFF}	0.524	-0.643	-2.292	-2.755
	(0.736)	(0.688)	(0.877)	(0.649)
GDP_t		0.449	0.431	0.006
		(0.094)	(0.084)	(0.119)
$Year_t$			-0.0036	-0.0043
			(0.0008)	(0.00074)
$Year_t^2$			0.000047	0.000066
			(0.000012)	(0.000011)
Wage and salaries				0.582
				(0.128)
Intercept	-0.019	-0.458	-0.377	-0.256
	(0.002)	(0.093)	(0.078)	(0.077)

SOURCE : Smetters (2004), Tab. 1, p. 179.

Public pension funds

- **Investing the Trust Fund in equities**
  - Clinton's proposal in the 1990s
  - Aim to get higher return for TF

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  - Same issue of substitution with on-budget
  - Government as a poor stock picker ?
  - Issue of political involvement in investment decisions (lobbying, corruption, etc.)

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  - Clinton's proposal in the 1990s
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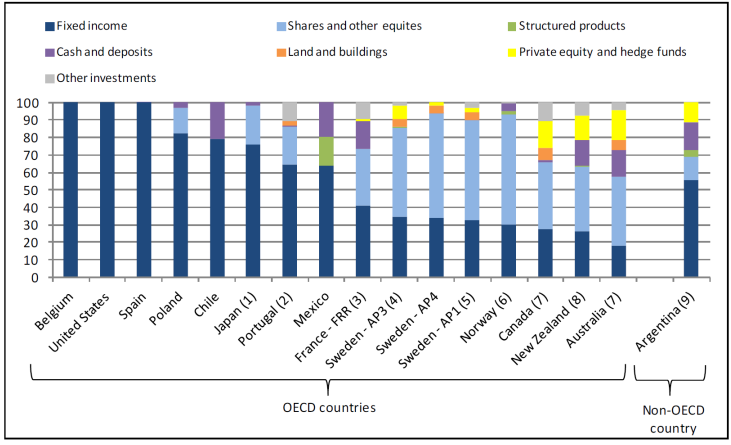
- **Issues**
  - Same issue of substitution with on-budget
  - Government as a poor stock picker ?
  - Issue of political involvement in investment decisions (lobbying, corruption, etc.)
- **Very different choices**
  - Large investment in equities (Sweden, Norway, Canada, NZ)
  - No equity (U.S., Belgium, Spain)

Public pension funds

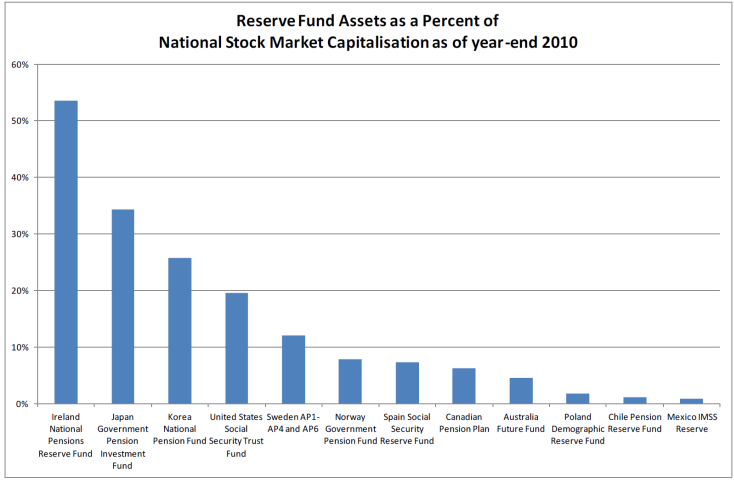
Figure 6 – Assets of public pension funds



SOURCE : OECD, *Pension markets in focus* (2011).

Public pension funds

Figure 7 – Public pension funds as a share of stock market



SOURCE : OECD, *Pension markets in focus* (2011).

II. Privatization

1. What is privatization ?
2. Chile
3. Debate about privatization in the U.S.

What is privatization ?

- **Possible components**
  1. Switch to full-funding
  2. Setting-up individual accounts
  3. Replace DB by DC
  4. Offer choice of providers (or not)
  5. Offer choice of portfolio
  6. Change (or not) mandatory contributions
  7. Change (or not) mandatory annuitization

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  6. Change (or not) mandatory contributions
  7. Change (or not) mandatory annuitization
- **Various policy options**
  - How much choice offered to employees
  - How much public regulation

The Chilean reform

- **System before the reform**
  - Unfunded public pension system
  - Very complex, fragmented into 35 schemes
  - Very different benefits
  - High contribution rates (16 to 25%)
  - Unfunded liability of 80% of GDP

The Chilean reform

- **System before the reform**
  - Unfunded public pension system
  - Very complex, fragmented into 35 schemes
  - Very different benefits
  - High contribution rates (16 to 25%)
  - Unfunded liability of 80% of GDP
- **1981 reform**
  - Military regime under Gen. Pinochet
  - Reforms in 1980, implemented in 1981, towards a privatized funded pension system

The Chilean reform

- **New system in 1981**
  - Mandatory savings rate of 10% of earnings
  - Funds managed by private firms, *Administradoras de Fondo de Pensiones* (AFPs)
  - Additional charge to cover for administrative costs
  - Workers are free to select any AFP
  - No mandatory annuitization, but constraints on withdrawal rate

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  - Workers are free to select any AFP
  - No mandatory annuitization, but constraints on withdrawal rate
- **Poverty relief**
  - Minimum pension guarantee for low earners with 20 years of contribution
  - Means-tested welfare pension for the elderly poor
  - Funded by general revenue

The Chilean reform

- **Transition issues**
  - Old unfunded system was closed
  - Workers joining the new system received *recognition bonds* for past contributions
  - Pensions were paid for by general revenue

The Chilean reform

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  - Pensions were paid for by general revenue
- **Cost of pre-funding**
  - Budget surplus of 4-5% per year from 1980 to late 1990s
  - Means extra national savings during that period

Figure 8 – Transition cost of Chilean reform (% GDP)

Year	Operational deficit[a]	Recognition bond	Social assistance pensions	Minimum pensions	Civilian deficit (1+2+3+4)	Military deficit	Total deficit (5 + 6)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1981	3.6	0.0	0.2	0.0	3.8	n.a.	3.8
1982	6.0	0.1	0.3	0.0	6.4	n.a.	6.4
1983	6.5	0.2	0.4	0.0	7.1	n.a.	7.1
1984	6.9	0.2	0.5	0.0	7.6	n.a.	7.6
1985	6.0	0.2	0.5	0.0	6.7	n.a.	6.7
1986	5.9	0.3	0.5	0.0	6.7	n.a.	6.7
1987	5.2	0.4	0.5	0.0	6.1	n.a.	6.1
1988	4.6	0.4	0.4	0.0	5.4	n.a.	5.4
1989	4.7	0.4	0.3	0.0	5.4	n.a.	5.4
1990	3.3	0.5	0.3	0.0	4.1	1.2	5.4
1991	3.3	0.5	0.3	0.0	4.1	1.2	5.3
1992	3.2	0.5	0.3	0.0	4.0	1.1	5.1
1993	3.2	0.6	0.3	0.0	4.1	1.2	5.3
1994	3.1	0.7	0.3	0.0	4.1	1.1	5.2
1995	2.8	0.7	0.3	0.0	3.8	1.1	4.9
1996	3.1	0.7	0.3	0.0	4.1	1.1	5.2
1997	3.0	0.8	0.3	0.0	4.1	1.1	5.2
1998	3.2	0.9	0.3	0.0	4.4	1.1	5.5
1999	3.2	1.1	0.4	0.0	4.7	1.2	5.9
2000	3.1	1.1	0.4	0.0	4.7	1.3	6.0
2001	3.1	1.1	0.4	0.1	4.7	1.3	6.0
2002	3.0	1.1	0.4	0.1	4.6	1.3	5.9
2003	2.9	1.2	0.4	0.1	4.5	1.3	5.8
2004	2.5	1.3	0.3	0.1	4.2	1.3	5.5

SOURCE : Arenas de Mesa and Mesa-Lago (2006).

The Chilean reform

- **Assessment : pros**
  - Isolation of pension system from political risk
  - High regulation of AFP
  - Development of capital markets
  - Higher national savings, contributing to higher growth

The Chilean reform

- **Assessment : pros**
  - Isolation of pension system from political risk
  - High regulation of AFP
  - Development of capital markets
  - Higher national savings, contributing to higher growth
- **Assessment : cons**
  - High administrative costs (18% of total), higher than well run public systems
  - Lack of competition between AFPs
  - Limited coverage of population
  - Limited poverty relief

The Chilean reform

- **Towards a new overhaul**
  - Gov. Michelle Bachelet (2006-2010)
  - Pension Advisory Commission Report (2006)

The Chilean reform

- **Towards a new overhaul**
  - Gov. Michelle Bachelet (2006-2010)
  - Pension Advisory Commission Report (2006)
- **2008 pension reform**
  - Creation of new solidarity pillar, *Sistema de Pensiones Solidarias* (SPS)
  - Basic pensions for those above 65, without any other pension
  - Gradual extension of coverage to self-employed
  - Bond worth 18 months of contributions for women having had children
  - In case of divorce, possibility to split the individual retirement account
  - Regulations to lower administrative fees

Debate in the U.S.

- **Debate**
  - Main proponent : M. Feldstein
  - Main critic : P. Diamond
- **Key elements of the debate**
  1. The gains from pre-funding
  2. Increased risk
  3. Lack in annuitization
  4. Reductions in redistribution
  5. Administrative costs
  6. Financial literacy issue

Debate in the U.S.

1. **The gains from pre-funding**
   - Increase in national savings could lead to higher investment, then higher growth
   - Switch to funded systems implies transitional costs

Debate in the U.S.

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   - Unfunded system has risk related to political process
   - Funded system has investment risk from financial markets

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   - Increase in national savings could lead to higher investment, then higher growth
   - Switch to funded systems implies transitional costs
2. **Increased risk**
   - Switch from DB to DC means shift in risk-sharing
   - Unfunded system has risk related to political process
   - Funded system has investment risk from financial markets
3. **Lack in annuitization**
   - Lack of annuity markets
   - Mandatory annuitization possible but often harder to implement within funded system

Debate in the U.S.

4. **Reductions in redistribution**
   - Progressive formula of US Social Security
   - Individual accounts would remove progressivity
   - Need to add minimum pension for poverty relief
   - Feldstein and Liebman (2002) argue that individual accounts can lead to gains to all income groups
   - Partial annuitization can remove some regressivity due to life expectancy differentials

Debate in the U.S.

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5. **Administrative costs**
   - Higher administrative costs from funded systems than unfunded system
   - Cost of advertisement, cost of investment

Debate in the U.S.

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   - Progressive formula of US Social Security
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   - Cost of advertisement, cost of investment

6. **Financial literacy issue**
   - Difficult portfolio choice for individuals

III. Reforming PAYGO systems

1. The budget constraint
2. Classifying pension reforms
3. The case of France

Budget constraint

- **Budget constraint from unfunded pensions**

$$\text{Tax rate} = \frac{\text{average pension}}{\text{average earnings}} \times \frac{\text{Pop. retired } P_r}{\text{Pop. 15-64 } P_t} \times \frac{1 - \text{activity rate } P_r}{\text{employment rate } P_t} \quad (1)$$

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- **Parameters from the budget constraint**
  1. Level of contributions
  2. Level of replacement rate
  3. Retirement age

The policy options

- **Pension policy options**
  - Effective retirement age is not a "policy lever"
  - It's the output from labour market (supply/demand)
  - Policy options : change in parameters of pension formula, including age parameters

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- **Pension policy options**
  - Effective retirement age is not a "policy lever"
  - It's the output from labour market (supply/demand)
  - Policy options : change in parameters of pension formula, including age parameters
- **Basic policy choice : level of contribution rate**
  - Private consumption
  - Public consumption (public spending other than pensions)
  - Time spent in retirement

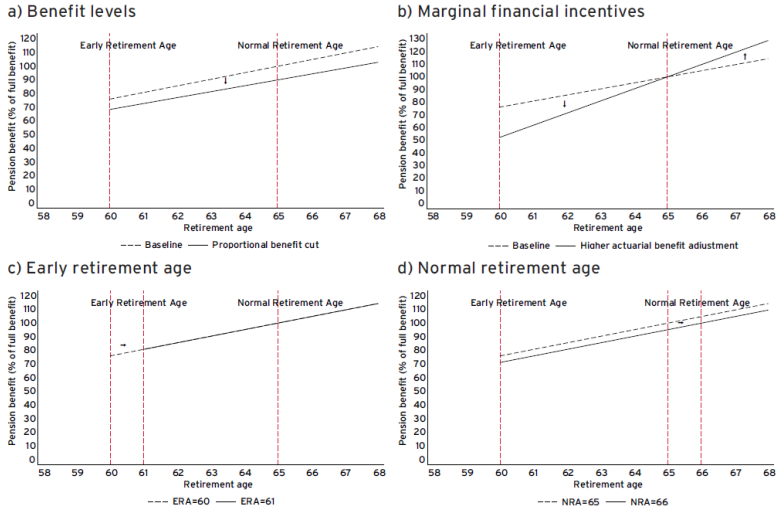
Classifying pension reforms

- **Pension reforms are complex in practice**
  - Complex set of rules which vary across countries
  - Easy to confuse the effects of different parameters

Classifying pension reforms

- **Pension reforms are complex in practice**
  - Complex set of rules which vary across countries
  - Easy to confuse the effects of different parameters
- **Classifying pension reforms (Giupponi and Seibold (2024)**
  i) Level of pension benefits
  ii) Marginal incentives
  iii) Early retirement age
  iv) Normal retirement age

Figure 9 – Stylised pension reforms



SOURCE : Giupponi and Seibold (2024), Fig. 1, p. 12.

Changing the level of benefits

- **Indexation rules**
  - e.g., France in 1987 from wage growth to inflation
  - e.g., Germany in 1992 from gross wage growth to net wage growth
  - e.g., Italy in 1993 from wage growth to inflation

Changing the level of benefits

- **Indexation rules**
  - e.g., France in 1987 from wage growth to inflation
  - e.g., Germany in 1992 from gross wage growth to net wage growth
  - e.g., Italy in 1993 from wage growth to inflation
- **Change in the formula to compute reference earnings**
  - e.g., Austria in 1985 from last 5 to best 10 years of earnings
  - e.g., Austria in 1988 from last 10 to best 15 years of earnings
  - e.g., Italy in 1992 from best 5 to entire history
  - e.g., France in 1993 from best 10 to best 25 years of earnings
  - e.g., Austria in 2000 from best 15 to best 40 years of earnings

Changing the level of benefits

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  - e.g., Germany in 1992 from gross wage growth to net wage growth
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  - e.g., Austria in 1985 from last 5 to best 10 years of earnings
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  - e.g., Italy in 1992 from best 5 to entire history
  - e.g., France in 1993 from best 10 to best 25 years of earnings
  - e.g., Austria in 2000 from best 15 to best 40 years of earnings
- **Change in the headline replacement rate**
  - e.g., Switzerland in 2024 adds a 13th month of pension benefit

Marginal incentives to retire

- **Introducing penalty/bonus**
  - e.g., Switzerland in 1997 introduced penalty for early retirement at 3.4%
  - e.g., Germany in 1997 introduced penalty for early retirement at 3.6%
  - e.g., Austria in 2000 increased penalty for early retirement at 3%
  - e.g., France in 2006 introduced bonus for later retirement at 5%

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  - e.g., Switzerland in 1997 introduced penalty for early retirement at 3.4%
  - e.g., Germany in 1997 introduced penalty for early retirement at 3.6%
  - e.g., Austria in 2000 increased penalty for early retirement at 3%
  - e.g., France in 2006 introduced bonus for later retirement at 5%
- **Introducing actuarially fair adjustments**
  - e.g., Norway in 2011 introduced actuarially fair adjustment
  - e.g., Sweden in 1998 moves to NDC and actuarially fair pensions
  - e.g., Italy in 2011 applies NDC actuarially fair pensions to all cohorts

Early retirement age

- **Increases in ERA**
  - e.g., Germany in 1992 increased ERA from 60 to 65 (women), from 60 to 63 (invalidity), from 60 to 65 (unemployed)
  - e.g., UK in 1995 increased ERA from 60 to 65 (women)
  - e.g., Austria in 2000-2003 from 55 to 60 (women) and from 60 to 65 (men)
  - e.g., France in 2010 increased ERA from 60 to 62
  - e.g., UK in 2016 increased ERA from 65 to 67 (all for 2028)
  - e.g., UK in 2018 increased ERA from 67 to 69 (all for 2039)
  - e.g., France in 2023 increased ERA from 62 to 64

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  - e.g., Austria in 2000-2003 from 55 to 60 (women) and from 60 to 65 (men)
  - e.g., France in 2010 increased ERA from 60 to 62
  - e.g., UK in 2016 increased ERA from 65 to 67 (all for 2028)
  - e.g., UK in 2018 increased ERA from 67 to 69 (all for 2039)
  - e.g., France in 2023 increased ERA from 62 to 64
- **More flexible/specific ERA**
  - e.g., Switzerland in 1997 introduced early retirement at 62 or 63
  - e.g., Norway in 2011 introduced ERA at age 62
  - e.g., France in 2003 and 2014 introduced new ERA for long career at 58, 60 and 62

Normal retirement age

- **Increases in NRA**
  - e.g., Germany in 2007 increased NRA from 65 to 67
  - e.g., Austria in 1993 from 60 to 65 (women)
  - e.g., France in 2010 increased NRA from 65 to 67
  - e.g., Netherlands in 2015 increased NRA from 65 to 67

Normal retirement age

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  - e.g., Germany in 2007 increased NRA from 65 to 67
  - e.g., Austria in 1993 from 60 to 65 (women)
  - e.g., France in 2010 increased NRA from 65 to 67
  - e.g., Netherlands in 2015 increased NRA from 65 to 67
- **Group-specific NRA**
  - e.g., Germany in 1992 from 60 to 65 for women
  - e.g., France in 1993 NRA at 60 if 40 years contribution
  - e.g., France in 2003 NRA at 60 if 41.5 years contribution
  - e.g., France in 2014 NRA at 62 if 43 years contribution

Case-study : Pension reforms in France

1. Numerous pension reforms
2. Change in indexation rules
3. Impact on financial balance
4. Impact on retirement age
5. Redistributive impact

Reforms in France

- **1993 reform**
  - Increase in contribution length to 40 years
  - Reference wage W_{ref} = best 25 years of earnings
  - Indexation on inflation of past earnings and pensions

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  - Indexation on prices rather than wage growth
  - Lower pension benefit growth
  - Lower pension at older ages

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  - Indexation on prices rather than wage growth
  - Lower pension benefit growth
  - Lower pension at older ages
- **Impact of earnings indexation**
  - Indexation on prices rather than wage growth
  - Lower reference wage, hence lower replacement rate
  - Replacement rate depends on growth

Figure 10 – Impact of the 1993 pension reform

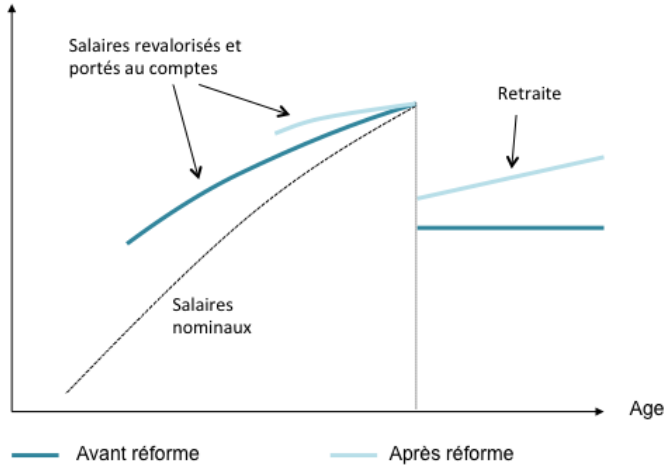
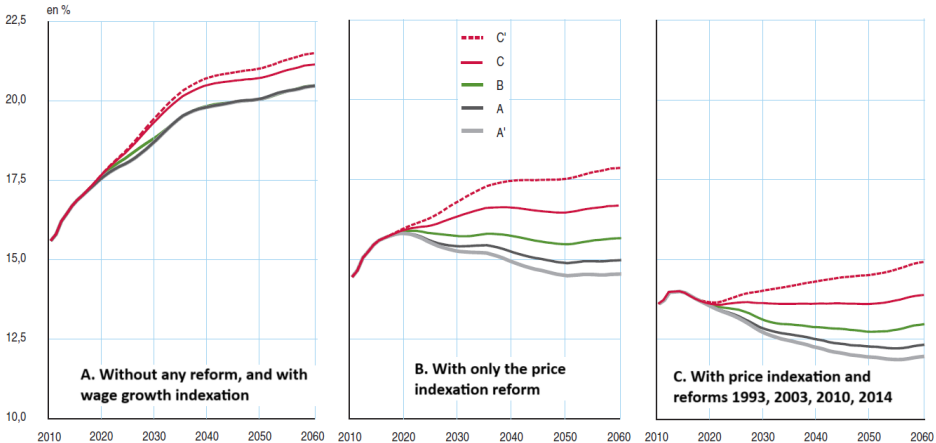
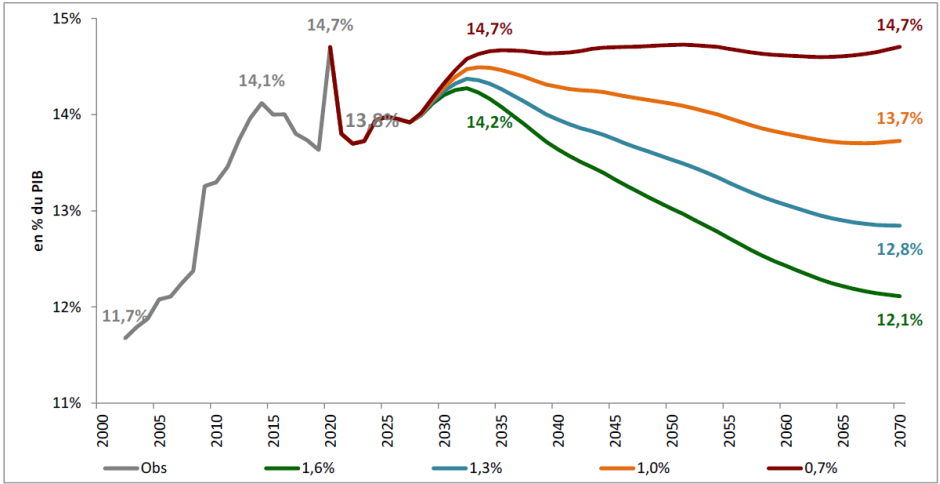


Figure 11 – Pension spending before and after reforms (% of GDP)



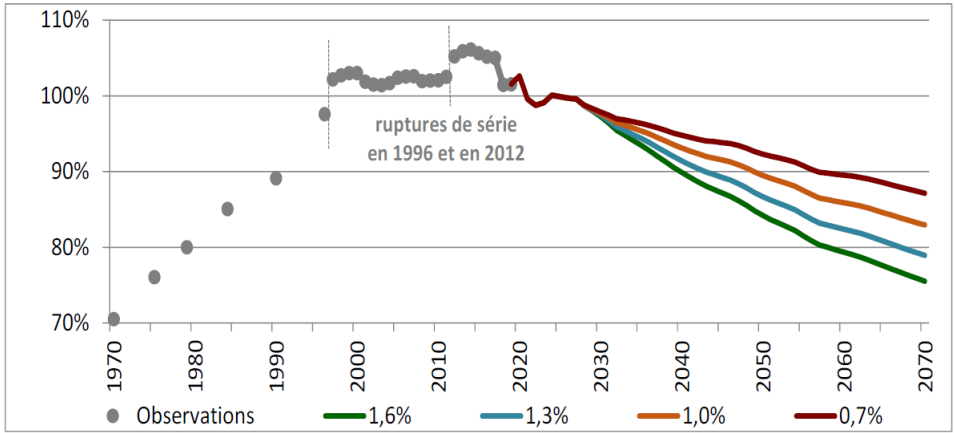
NOTE : Macroeconomic scenarios are defined by the COR in 2012. Scenario A assumes productivity growth at 1.8%, scenario B 1,5% and A' 2%, with unemployment rate at 4.5%. Scenario C assumes 1.5% growth and unemployment rate at 7%, scenario C' assumes 1% growth. Simulations are done with model Destinie 2.
SOURCE : Marino (2014), *Insee Analyses*, No. 17, Fig. 1.

Figure 12 – Pension spending projection by level of productivity growth (% of GDP)



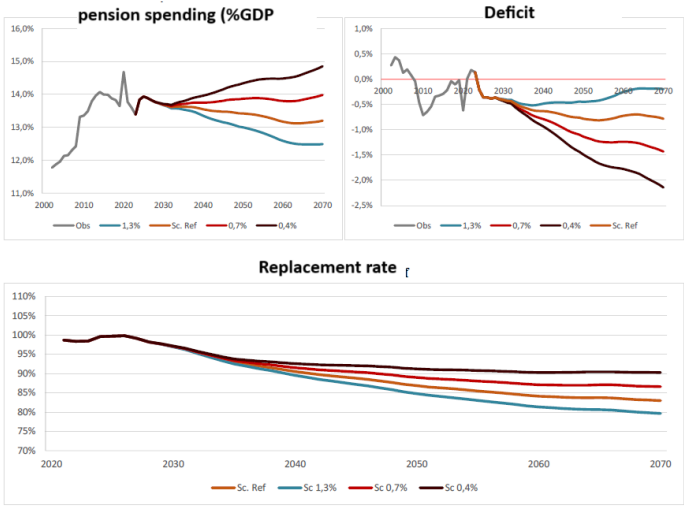
SOURCE : Conseil d'orientation des retraite, *Rapport annuel 2022*, Fig. 2.1, p. 65.

Figure 13 – Disposable income of retiree over disposable income of the entire population



Source : Conseil d'orientation des retraite, *Rapport annuel 2022*, p. 8.

Figure 14 – Sensitivity to productivity growth assumptions



SOURCE : Conseil d'orientation des retraite, *Rapport annuel 2024*, p. 23.

Reforms in France

- **Price indexation reduce pension liabilities**
  - Big impact of price indexation on reducing pension benefits
  - Biggest reform in terms of financial balance

Reforms in France

- **Price indexation reduce pension liabilities**
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  - Biggest reform in terms of financial balance
- **Pension balance dependent on growth**
  - Need sufficient growth to balance French pension system
  - Large variations in financial balance for small changes in expected growth
  - Create unneeded financial risk

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  - Biggest reform in terms of financial balance
- **Pension balance dependent on growth**
  - Need sufficient growth to balance French pension system
  - Large variations in financial balance for small changes in expected growth
  - Create unneeded financial risk
- **Other impact**
  - Create uncertainty on expected replacement rate
  - Affects less individuals with steep earnings profile

Reforms in France

- **2003 reform : public sector**
  - contribution length requirements
  - application of penalty for early retirement

Reforms in France

- **2003 reform : public sector**
  - contribution length requirements
  - application of penalty for early retirement
- **2003 reform : for all**
  - Increase in contribution length to 41 years
  - Decrease of pension penalty from 10% to 5%
  - Increase of pension bonus from 0 to 3%
  - Principle of indexing contribution length on life expectancy
  - Early retirement option at age 58 for long careers

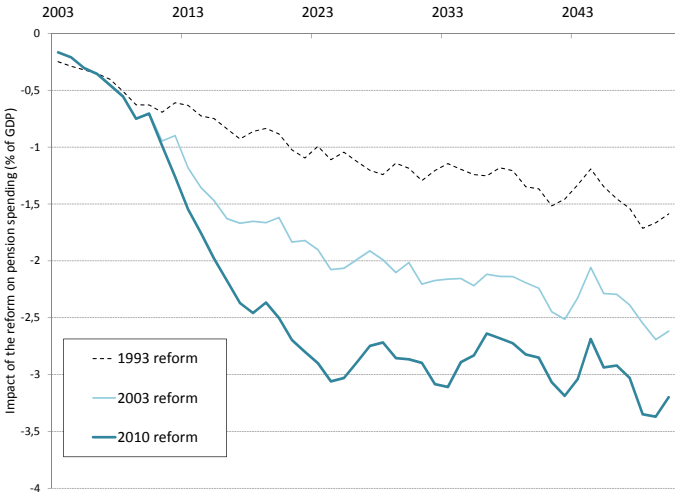
Reforms in France

- **2010 reform**
  - Increase of minimum age to 62 (57 for some public sector workers)
  - Increase of age with full pension to 67
  - Progressive increase, over short period (2010-16)

Reforms in France

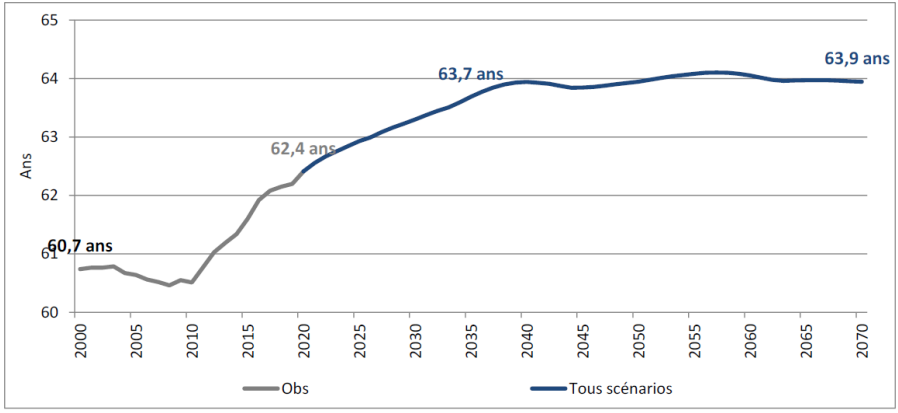
- **2010 reform**
  - Increase of minimum age to 62 (57 for some public sector workers)
  - Increase of age with full pension to 67
  - Progressive increase, over short period (2010-16)
- **2013 reform**
  - Increase in contribution length to 43 years
  - Increase in contribution rates

Figure 15 – Impact of the French pension reforms on pension spending



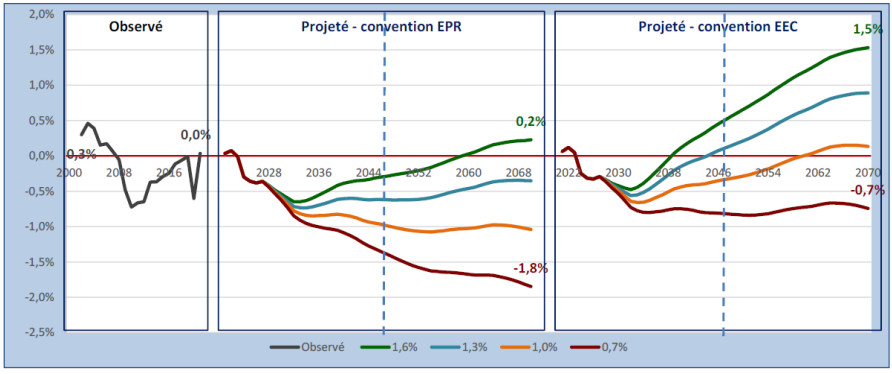
Source : Blanchet and Le Minez (2012), Blanchet (2013).

Figure 16 – Average projected claiming age (before 2023 reform)



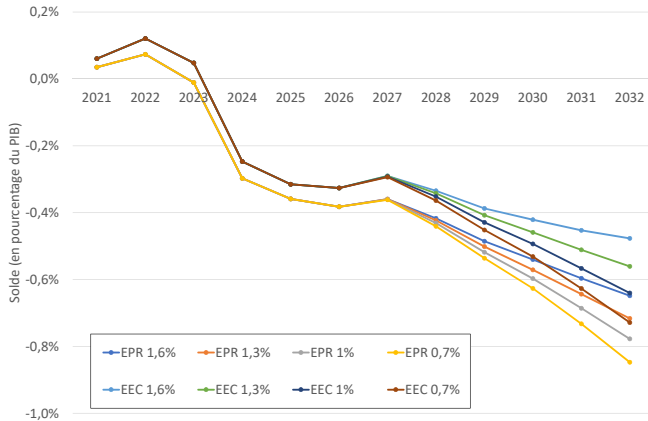
SOURCE : Conseil d'orientation des retraite, *Rapport annuel 2022*, Fig. 2.7, p. 74.

Figure 17 – Projected deficit of the French pension system (before 2023 reform)



Source : Conseil d'orientation des retraite, *Rapport annuel 2022*, Fig. 2.19, p. 100.

Figure 18 – Projected deficit of the French pension system at 10 years (before 2023 reform)



Source : Bozio, A. billet blog IPP, "Le système de retraite français est-il en péril ?".

The 2023 French reform

- **Increase in the early retirement age from 62 to 64**
  - 62 years and 3 months for those born after Sept. 1961
  - 63 years and 3 months for those born in 1965 (in 2025)
  - 64 years in 2030 (born after 1968)

- **Acceleration of the increase in contribution length**
  - currently 42 years (those born in 1961), planed increase to 43 years (for those born after 1973)
  - increase to 43 years for those born in 1965

- **No change to the full-rate retirement age**
  - full-rate retirement age : age at which full-rate is obtained without contribution length requirement
  - maintained at age 67

The 2023 French reform

- **Early retirement for long careers**
  - 58, if worked before 16
  - 60, if worked before 18
  - 62, if worked before 20
  - 63, if worked before 21
  - But conditions on strict contribution length

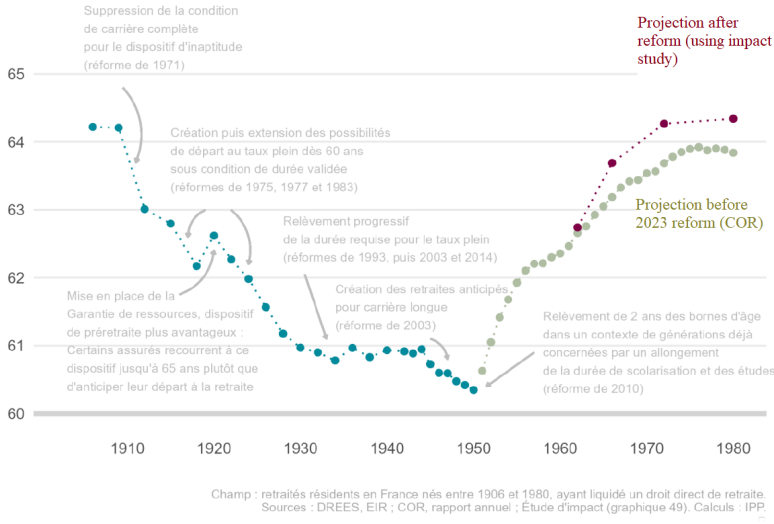
The 2023 French reform

- **Early retirement for long careers**
  - 58, if worked before 16
  - 60, if worked before 18
  - 62, if worked before 20
  - 63, if worked before 21
  - But conditions on strict contribution length
- **Early retirement for incapacity or disability**
  - No change for disability pension (ERA maintained at 62)
  - No change for those disabled because work accident (ERA maintained at 60)

The 2023 French reform

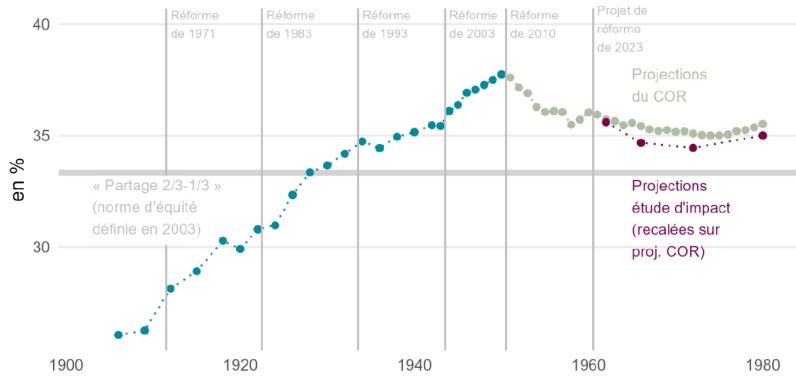
- **Early retirement for long careers**
  - 58, if worked before 16
  - 60, if worked before 18
  - 62, if worked before 20
  - 63, if worked before 21
  - But conditions on strict contribution length
- **Early retirement for incapacity or disability**
  - No change for disability pension (ERA maintained at 62)
  - No change for those disabled because work accident (ERA maintained at 60)
- **Other measures**
  - Increase in the minimum contributory pension
  - Bonus of 5% for mothers who would have full-rate at 63
  - Bonus of 10% for three kids extended to self-employed

Figure 19 – Average retirement age, by cohort



Source : Aubert P. et Bozio, A. billet blog IPP, "L'âge de départ à la retraite en perspective historique : un retour sur 50 ans de réformes".

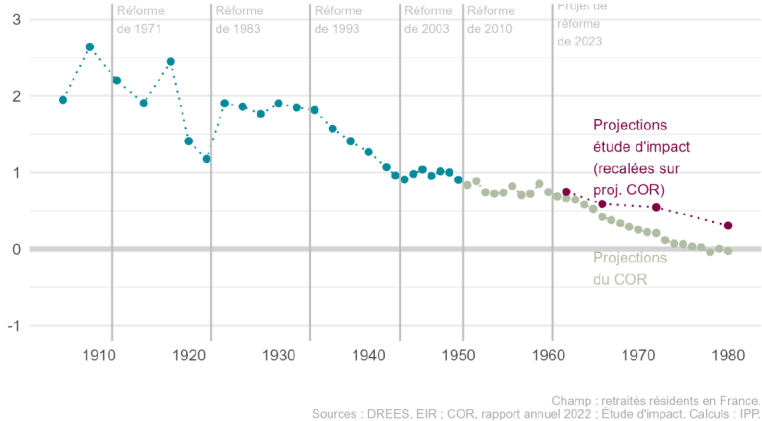
Figure 20 – Expected retirement length, by cohort



Champ : retraités résidents en France, ayant liquidé un droit direct.
Sources : DREES, EIR ; COR, rapport annuel ; Étude d'impact ; Insee, projections de population 2021-2070 (scénario central). Calculs : IPP.

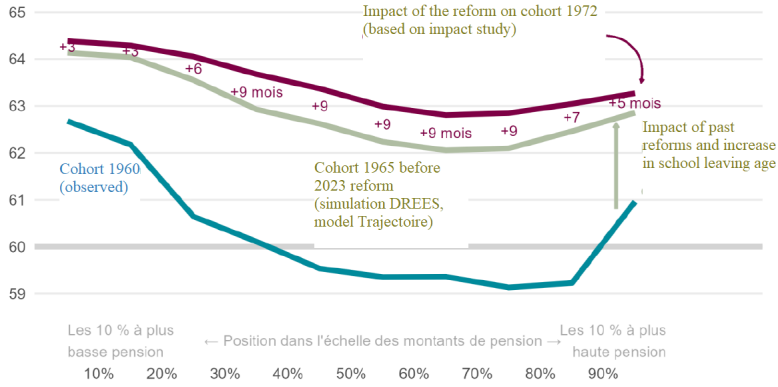
SOURCE : Aubert P. et Bozio, A. billet blog IPP, "L'âge de départ à la retraite en perspective historique : un retour sur 50 ans de réformes".

Figure 21 – Difference between retirement age of male and female



SOURCE : Aubert P. et Bozio, A. billet blog IPP, "L'âge de départ à la retraite en perspective historique : un retour sur 50 ans de réformes".

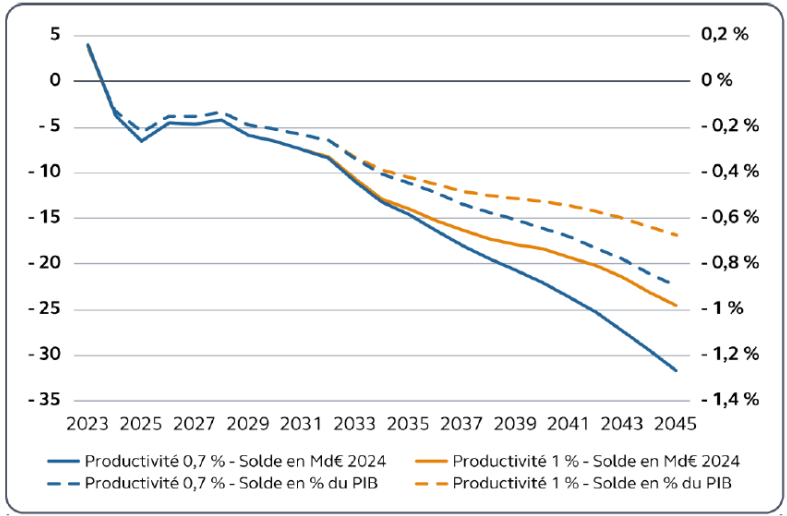
Figure 22 – Average retirement age increase, by decile of pension



Sources : EIR (génération 1950) et modèle Trajectoire (génération 1965) de la DREES ; étude d'impact du projet de loi. Calculs : IPP.

SOURCE : Aubert P. et Bozio, A. billet blog IPP, "L'âge de départ à la retraite en perspective historique : un retour sur 50 ans de réformes".

Figure 23 – Projected deficit of the French pension system after the 2023 reform (2025)



Source : Cour des comptes, *Situation financière et perspectives du système de retraite* 2025, Fig. 1, p. 9.

Reforms in France

- **Still an issue of financial balance**
  - Small current deficit (0.2% GDP)
  - Growing larger by 2035 (0.5% GDP)

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  - Small current deficit (0.2% GDP)
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  - Complexity of the system
  - Dependance to growth
  - Lack of transparency of contributions/benefits
  - Non linearity of pension rights

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  - Small current deficit (0.2% GDP)
  - Growing larger by 2035 (0.5% GDP)
- **Other major problems**
  - Complexity of the system
  - Dependance to growth
  - Lack of transparency of contributions/benefits
  - Non linearity of pension rights
- **Structural vs parametric reforms**
  - Structural : point system or notional accounts
  - Parametric : continue current strategy

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