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Demographic Change and the Sustainability of European Pension Systems

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Abstract: European pension systems are increasingly challenged by profound demographic transformations, most notably population ageing and declining fertility rates. As Barr and Diamond underline, "pension systems are uniquely sensitive to demographic change because their liabilities extend far into the future" (Barr and Diamond, 2008, p. 3). These trends raise critical concerns regarding both the financial sustainability and the social adequacy of retirement systems, particularly those relying predominantly on pay-as-you-go financing. This essay addresses the following research question: to what extent do demographic changes threaten the sustainability of European pension systems, and how have European countries adapted their institutional arrangements in response?

Keywords: Life expectancy, Pensions systems, intergenerational equity.

INTRODUCTION

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DEMOGRAPHIC DYNAMICS AND DEPENDENCY RATIOS

Demographic projections for France point to a structural transformation of the population age profile. According to INSEE projections, the proportion of the working-age population is expected to decline steadily throughout the twenty-first century (INSEE, 2022).

This evolution reflects declining fertility and sustained gains in longevity. As INED notes, *"the increase in life expectancy has become a central driver of population ageing in France"* (INED, 2024, p. 12)

Pourcentage of retired and active 20-64 in 2121

Years	Pop. French (in thousands)	Actives 20-64 ans en %	Retired 65 & plus in %
2021	67407	55.4	20.7
2040	69225	52.4	26.5
2050	69206	51.2	27.2
2080	67767	49.3	30.7
2100	66619	48.5	32.1
2121	64950	47.1	33.6

Source: *Insee*

The consequences of these trends are particularly visible in the evolution of the worker-to-retiree ratio. In 1978, approximately 2.83 workers financed one retiree; by 2024, this figure had fallen to 1.4 and is projected to decline further. Such developments directly challenge the logic of pay-as-you-go financing, which assumes a relatively stable balance between contributors and beneficiaries. As the World Bank famously argued, *"pay-as-you-go pension systems become increasingly fragile as dependency ratios rise"* (World Bank, 1994, p. 18).

Number of active financing one retired and life expectancy

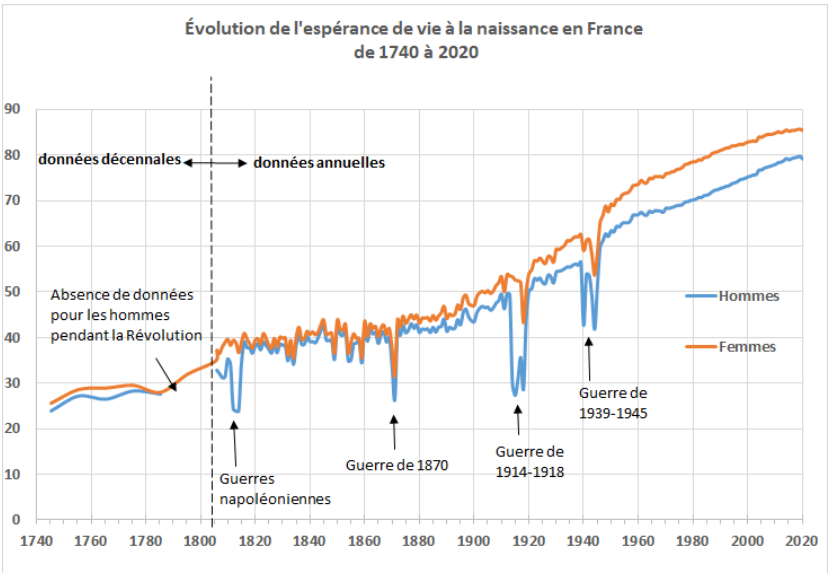
Years	Nb actives for 1 retired	Life expectancy Men Women 2021 à 2121	
1978	2.83	70	78
1980	2.77	71	79
1990	2.6	74	82
2004	2.02	76	85
2024	1.4	80	85
2050	1.2	84	91

Adaptation of Ined, 2010-2023 "L'évolution démographique récente de la France 2024"

EUROPEAN RESPONSES: RETIREMENT AGES AND PENSION ADEQUACY

European countries have responded to demographic ageing through a variety of institutional adjustments. A central policy lever has been the statutory retirement age. According to the OECD, *"linking retirement ages to life expectancy is one of the most effective ways to stabilise pension systems in ageing societies"* (OECD, 2023, p. 44).

Evolution of life expectancy in France from 1740 to 2020 (Napolean wars, 1870 war, 1914-1918, 1939-1945)



Countries such as Germany, Denmark and the Netherlands have implemented or announced automatic adjustment mechanisms, whereas others have relied on more discretionary reforms. Despite these measures, pension adequacy varies widely across Europe. The European Commission observes that *"replacement rates remain highly uneven across Member States, reflecting both institutional choices and economic capacity"* (European Commission, 2024, p. 67).

Comparison of Ages Retirement in Europe

Age retirement	European Countries
69	Danemark (Date of birth)
68	Danemark (Date of birth issance)
67 ns :	Allemagne, Danemark (Date of birth), Italie, Pays Bas, Islande, Grèce (Insurance 40 ans).
66	Irlande, Portugal (+4mois), Royaume Uni, Espagne (years of contributions), Danemark (Date of birth).
65	Autriche, Belgique, Espagne, Hongrie, Chypre, Luxembourg, Pologne (H), Slovénie, Suisse (H), Bulgarie (H), Croatie (H), Lichtenstein, Malte, Roumanie (H), Espagne (years of contributions), Danemark (Date of birth).
64	France, Finlande, Estonie (+ 9 monthes), Lettonie (+ 9 monthes), Malte (id), Tchèquie (id), Suisse (F), Slovénie
63	Suède Croatie (F) Slovaquie.
62	Bulgarie (F), Norvège, Roumanie (F), Grèce (insurance 15 ans).
61	
60	Pologne (F).

Sources: Verneuil Julien 2024

France occupies an intermediate position, combining relatively generous coverage with increasing financial pressure. This tension reflects the limits of parametric reform in the absence of deeper institutional diversification.

INSTITUTIONAL DIVERSITY OF PENSION SYSTEMS

While several European countries have adopted hybrid pension systems incorporating funded components, this approach is not without controversy. Critics argue that funded schemes expose retirement income to financial market volatility and may exacerbate inequality. Orszag and Stiglitz notably caution that *"moving from pay-as-you-go to funded systems does not, by itself, resolve the fundamental problem of population ageing"* (Orszag and Stiglitz, 2001, p. 23).

From this perspective, funded pensions are seen less as a structural solution than as a redistribution of risk from the state to individuals. Moreover, critics emphasise that returns on financial markets are uncertain and unevenly distributed, potentially increasing disparities in retirement outcomes.

However, this critique does not imply that funded components are ineffective per se. Rather, it highlights the importance of institutional design. When introduced as a regulated complement to pay-as-you-go systems—rather than as a substitute—funded schemes can diversify sources of pension financing without undermining collective risk-sharing. As Barr argues, *"the key issue is not funding versus pay-as-you-go, but how risks are shared and regulated"* (Barr, 2012, p. 221).

Pensions per European Countries

Monthly retirement pension	**Countries**
De 2138 € à 2762€	Islande 2762 €, Luxembourg 2575 €, Norvège 2438 €, Danemark 2417 €, Suisse 2138 €.
De 1010 € à 1962 €	Autriche 1962 €, Pays-Bas 1931 €, Irlande 1906 €, Suède 1838 €, Belgique 1737 €, Finlande 1714 €, Italie 1561 €, France 1457 €, Espagne 1450 €, Allemagne 1440 €, Europe 1294 €, Grèce 1035 €, Chypre, 1010 €.
De 131 € à 880 €	Portugal 888 €, Malte 851 €, Slovénie 692 €, Tchéquie 600 €, Estonie 569 €, Pologne 538 €, Lettonie 421 €, Hongrie 398 €, Lituanie 394 €, Croatie 388 €, Slovaquie 386 €, Roumanie 382 €, Monténégro 280 €, Serbie 276 €, Turquie 255 €, Bosnie-Herzégovine 237 €, Bulgarie 226 €, Albanie 131 €.

Adaptation of Yanatma Servet 2024

POLITICAL CONSTRAINTS AND INTERGENERATIONAL EQUITY

Pension reform is politically contentious because it redistributes resources across cohorts. Maintaining low retirement ages in ageing societies effectively transfers costs to future generations. Barr and Diamond describe this dynamic as *"a form of implicit debt imposed on younger cohorts without explicit political consent"* (Barr and Diamond, 2008, p. 91).

Tirole similarly warns that delayed reform can undermine long-term credibility, noting that *"refusing to confront predictable demographic trends amounts to postponing adjustment at a higher social cost"* (Tirole, 2023, p. 142). These observations highlight the central role of political incentives in shaping pension outcomes.

Tableau adapted to retirement systèms in Europe: comparison of european countries

Annuity Allocation	France, Espagne, Belgique, Portugal, Autriche, Grèce, Pologne, Tchéquie, Hongrie.
Répartition points	Allemagne
Répartition + Capitalization	Italie, Pays Bas, Suède, Finlande, Danemark.
Points + Annuity Allocation	Roumanie.
Mixed (lump sum + private supplement)	Irlande.

Duris Sébastien 2025 Adaptation des tableaux » Systèmes de retraite en Europe : comparatif des pays européens, Systèmes de retraite en Europe: comparatif des pays européens 28 septembre EuropArchive.org

POLICY IMPLICATIONS

The French case illustrates the limits of purely parametric reform.

Retraite: comparison of programs (RN, du NFP, d'Ensemble, de LR, UDR) on a base of 2024

Parti	**Age departure**	**Durée cotisation**	**Revalorisation. Retraite**	**Pension min**
RN	60 years for long careers. 62 if finances	40 years for actives éligibles, 42 years for others	On inflation	NC
NFP EELV LFI PS Communistes	62 years in 2024, 60 years before 2027	43 annuities from the génération 1973, 40 years, one day, may be…	On salaries	100% du Smic
EPR ,UDI, Radic., Renaiss.Horizons, Modem UDI	62 à 64 years (depending birth date)	43 years from the génération 1965	On inflation	85% du Smic
Les Républicains	65 years	NC	NC	100% du Smic
UDR	Choice between 65 ans or cotisation length longer	43 à 45 years	Introduction of a system of capitalization	100% SMIC

Adaptation Dubosc Philippe Dubosc

While the increase of the statutory retirement age to 64 represents a significant adjustment, demographic projections suggest that further measures will be required. International experience indicates that funded components, if properly regulated, can play a complementary role. As Barr emphasises, *"funded pensions should be seen as a supplement to, not a substitute for, pay-as-you-go systems"* (Barr, 2012, p. 219).

CONCLUSION

This essay has shown that demographic change constitutes a structural challenge for European pension systems. Rising life expectancy and declining worker-to-retiree ratios place increasing strain on pay-as-you-go arrangements. Comparative evidence suggests that hybrid systems combining public redistribution with funded components are better equipped to balance sustainability and adequacy.

For France, maintaining the current retirement age while cautiously expanding funded mechanisms appears to be a coherent response to demographic realities. Ultimately, as Barr and Diamond succinctly conclude, *"good pension design is about managing unavoidable trade-offs, not eliminating them"* (Barr and Diamond, 2008, p. 5).

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