The German Statutory Pension Insurance (Gesetzliche Rentenversicherung)

Mechanism Design, Demographic "Greying," and the Rentenpaket II Paradigm Shift

Richard Schulz Jakob Frerichs

Supervised by Dr. Cheng Wan, ETH Zurich
Population Ageing and Pension Economics (PAPE)

December 2, 2025

The Economic Trilemma & Mackenroth's Theorem

The Fundamental Constraint: The "Pension Trilemma."

- **Contribution Rate** (*Beitragssatz*): How much workers pay. Politically capped (approx. 20-22%)
- **Replacement Rate** (*Rentenniveau*): How much pensioners get. Politically protected (floor at 48%)
- **Retirement Age**: How long you work. Also politically sensitive

You can only fix two; the third must adjust. Germany is trying to fix all three.

Theoretical Basis: *Mackenroth's Theorem (1952)*:

> *"All social expenditure must always be paid out of the current national product."*
> *(Goods for retirees are made by current workers, regardless of funding type)*

Institutional Design: A System Reliant on One Pillar

Structure:

- **Pillar 1 (GRV):** Mandatory Pay-As-You-Go (PAYG)
  - Covers ∼90% of the workforce, providing ∼75% of old-age income, but notably EXCLUDES civil servants (*Beamte*), who have a separate, state-financed pension system
  - **Result:** A "mono-pillar" system, highly exposed to demographic shifts
- **Pillar 2 (bAV) & 3 (Private):** Voluntary and have seen limited uptake

Financing:

- Contributions (Employer/Employee split 50/50)
- **Federal Subsidy (Bundeszuschuss):** ∼20% of the budget comes from general taxes, not contributions

Pillar 1: The "Points System" (*Entgeltpunkte*)

The Logic: Your pension reflects your lifetime relative income, it's not a "final salary" system.

- **Accumulation Mechanism:**

$$EP_t = \frac{\text{Individual Gross Income}_t}{\text{Average Gross Income}_t}$$

Example (2024): The provisional average income is ∼€45,400. Earning this amount gets you 1.0 point. Earning €68,100 gets you 1.5 points

- **Incentive Structure (The Equivalence Principle):**
  - Strict linearity (*Contribution* $\propto$ *Benefit*)
  - **Economic Goal:** Makes contributions feel like "deferred wages," not a tax, to minimize labor supply distortions

The Pension Formula: Turning Points into Euros

The Equation:

$$\text{Pension}_{\text{Monthly}} = \sum EP \times ZF \times RAF \times AR$$

Variables:

- $\sum EP$: Your total lifetime earnings points
- ZF (Access Factor): An early retirement penalty. 0.3% permanent cut for every month you retire before the statutory age
- RAF: Pension Type (1.0 for standard old age)
- AR (Current Pension Value): The "exchange rate" for one pension point. As of July 2024, its value is **€39.32**

Pillar 2: Occupational Pensions (*Betriebliche Altersversorgung - bAV*)

Scope:

- Company-sponsored pension schemes, typically covering only employees of larger firms
- Voluntary system with tax incentives for both employers and employees

Relevance: Despite tax incentives, coverage remains limited:

- Only ∼50% of employees have access to occupational pensions
- Coverage is concentrated in large companies and public sector
- Small and medium enterprises (SMEs) rarely offer bAV
- **Result:** Provides only ∼5-10% of total old-age income, far below the intended complement to Pillar 1

Pillar 3: Private Pensions (*Riesterrente*)

The Concept: State-subsidized private pension savings (introduced 2001)

Why Low Uptake?

- **Complexity:** Multiple product types, confusing eligibility rules, and bureaucratic application processes
- **Low Returns:** High fees and conservative investment strategies erode returns, making it unattractive compared to alternatives
- **Means-Testing Penalty:** For low-income savers, Riester benefits are offset by reductions in *Grundsicherung*, creating a 100% effective marginal tax rate
- **Trust Deficit:** Public skepticism about private financial products after financial crises

Reality: Only $\sim$16 million contracts (out of 45 million eligible)

The Demographic Time Bomb is Ticking

- This rule-based static system now faces a massive exogenous shock: demography
- By 2035, the last of Germany's "Baby Boomer" generation will have retired
- The Old-Age Dependency Ratio (OADR) is projected to soar from 35 to over 50
  - **Today:** $\sim$3 workers support 1 pensioner
  - **By 2050:** $\sim$2 workers will have to support 1 pensioner
- **The Fiscal Squeeze:** Without reform, the contribution rate is forecast to rise from 18.6% to over 24% by 2040

The "Generational Contract" is under unprecedented stress.

Labor Supply & The Politics of Retirement Age

- **Policy Response: "Rente mit 67" (2007 Reform)**
  - Gradually increases the Statutory Retirement Age (SRA) to 67 by 2031 to keep people working longer
- **The Policy Anomaly: "Rente mit 63" (2014)**
  - Allowed long-term contributors to retire early without penalty
  - **Economic Critique:** A huge "deadweight loss" by subsidizing the exit of highly productive, skilled labor during a growing labor shortage
- **Result:** The effective retirement age (64.7) remains below the statutory age

The Sustainability Factor: Shifting Risk by Dampening Growth

The Goal: Automatically adjust for demography

- Given the demographic pressure, the formula has a built-in endogenous adjustment mechanism
- **The Dampener: The Sustainability Factor (enacted 2004)**
  - If the dependency ratio (pensioners/workers) worsens, pension increases are "dampened" and do not fully follow wage growth
  - **Crucial Distinction:** This factor does **not** cut nominal pensions. It reduces the annual *rate of increase* of the pension value (AR), making it lag behind national wage growth

$$AR_t \approx AR_{t-1} \times \text{WageGrowth}_t \times (1 - \alpha \cdot \Delta R_t)$$

where R_t is the pensioner-to-contributor ratio

The "Standard Pensioner" & Falling Replacement Rates

- These pressures and adjustments have direct consequences for the key political trade-offs
- **Standard Pensioner ("Eckrentner"):** A theoretical person with 45 years of average contributions
  - **Problem:** This ignores fractured careers and part-time work, thus painting a deceptively rosy picture
- **Replacement Rate Trends (The Worry):**
  - The net replacement rate is currently held at $\sim$48%
  - *Forecast:* The Sustainability Factor would have caused it to drop to 45% by 2040
- **Contribution Rate Trends (The Other Worry):**
  - Currently $\sim$18.6%
  - *Forecast:* Set to break the politically sensitive 20% barrier by 2028

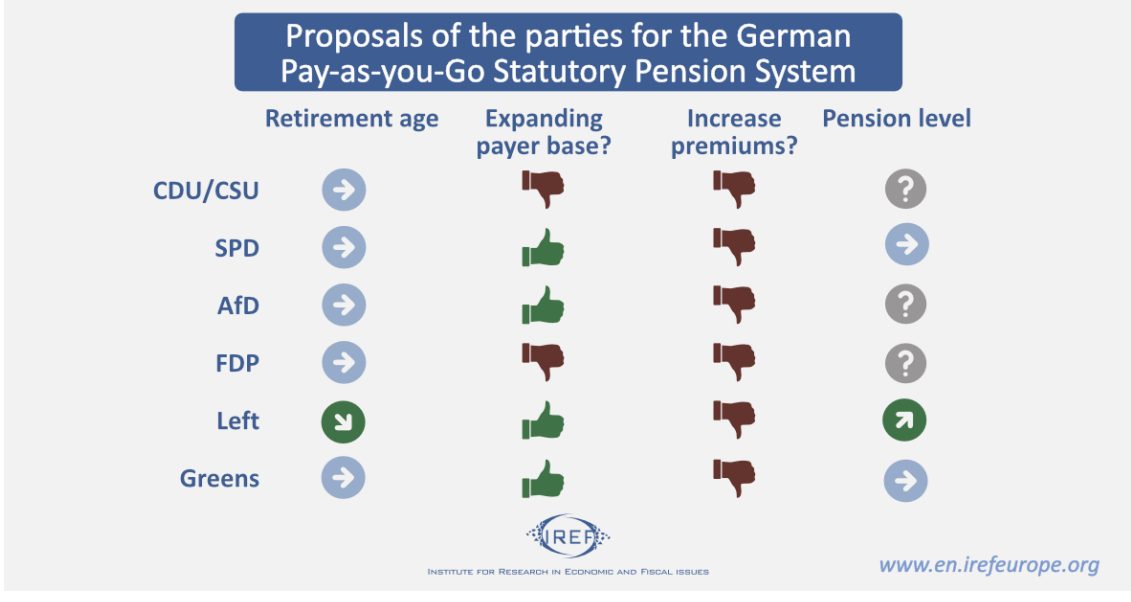
The Social Safety Net

The Reality for Low-Income Pensioners:

- **Problem:** A low statutory pension level can lead to old-age poverty. The average monthly pension for those with 35+ years of contributions ranges from ∼€1,460 (women) to ∼€1,890 (men)
- **The Floor: Basic Income Support**
  - A means-tested social welfare benefit that acts as a floor if the state pension is insufficient to live on
  - At the end of 2023, ∼**690,000 pensioners** relied on this benefit
- **The Economic Incentive Problem:**
  - For low-income workers, private savings (Pillar 3) can be offset by reductions in means-tested benefits, creating a 100% marginal tax rate on those savings and discouraging private provision

Rentenpaket II: Politics Overrules Economics

- **The "Double Stop Line" (Doppelte Haltelinie):**
  - A political promise: Keep the replacement rate $\geq 48\%$ AND the contribution rate $\leq 20\%$
- **The New Deal (Rentenpaket II):**
  - This package is the subject of intense current political and economic debate
  - Permanently guarantees the 48% level until 2031
  - **The Cost:** This deactivates the Sustainability Factor, removing the automatic brake on spending
  - **The Consequence:** The fiscal burden is shifted entirely to the federal budget via massive tax subsidies (*Bundeszuschuss*)



Paradigm Shift? The *Generationenkapital*

Concept: Create a Sovereign Wealth Fund to help subsidize the pension system

- **Mechanism: "Debt-Financed Arbitrage"**
  - The state borrows money at low interest rates (cost of government bonds)
  - It invests this money in a globally diversified portfolio of stocks (aiming for higher equity returns)
  - The goal is to profit from the spread: $r_{\text{equity}} > r_{\text{bond}}$
- **Target:** €200bn fund by the mid-2030s
- **Advanced Risk Analysis:**
  - **Too Small:** Experts argue it needs more than €1 Trillion to have a meaningful impact on contribution rates
  - **Governance Risks:** Can investment decisions remain free from political interference?
  - **Systematic Risk Exposure:** A market crash during a recession creates a pro-cyclical fiscal liability, as the fund and tax revenues fall simultaneously
  - **Governance & Time Inconsistency:** Can a government resist the political temptation to alter investment strategy for short-term goals, compromising long-term returns?

Problems remain

- **Fiscal Crowding Out:**
  - Pension subsidies already consume ∼20% of the entire German federal budget
  - This severely limits fiscal space for infrastructure, defense, digitalization, and education
- **The "Boomer Voter" Effect:**
  - The large voting bloc of the elderly creates strong political resistance to actuarially necessary cuts (Median Voter Theorem)
- **The Reform Challenge:**
  - The German government now wants to create a *Rentenkommission* to find a compromise in the pension problem
  - Supposedly no constraints on potential solutions
  - **The Reality:** It is hard to reform pension systems in demographically changing countries due to political resistance, path dependency, and the long-term nature of pension commitments

Conclusion

Summary:

- Germany's PAYG system is efficient in its design but fundamentally vulnerable to its own demographic decline
- Recent reforms (*Rentenpaket II*) have prioritized short-term benefit security for current pensioners over long-term fiscal sustainability, effectively passing the bill to future generations

The Outlook:

- The *Generationenkapital* is a historic step towards capital funding, but it is too small to solve the structural problem
- The "Contract between Generations" is being rewritten, with the young bearing the demographic and fiscal risk

The final question remains: Who is paying for the pension system?

References

- German Council of Economic Experts (Sachverständigenrat)
- Deutsche Rentenversicherung (DRV) Reports 2023/2024
- OECD Pensions at a Glance 2023
- Mackenroth, G. (1952). *Die Reform der Sozialpolitik*
- ENIREF European Network for Research on Economic Policy (eniref.org)
- Pensionfriend.de
- *Note: Comparisons to Swiss and Japanese systems drawn from course materials*