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Unequal Effects of Pension Reforms and the Moderating Role of Institutions: An Empirical Investigation

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Extending Working lives & Social Inequalities



- Pension reforms to extend working lives since the 1990s
 - Population ageing, **fiscal pressures**: “averting the old-age crisis” (World Bank, 1994)
 - Social inclusion & well-being of older adults through **active ageing**
- **Rising social inequality** among older people
 - Privilege of high-skilled (male) workers?
 - Not everyone can work longer (health, skills, family responsibilities)
 - Some people are forced to work longer (limited retirement income)

Why is it a problem?



- Social inclusion & well-being through **active ageing**
 - But older adults take up undesired jobs to avoid poverty?
 - Lower-educated workers: high risk of job loss & precarious work (Radl, 2013; Raymo et al. 2011; Lain et al. 2019)
- Fiscal sustainability at the expense of intra-generational fairness?
 - Low-educated workers: earlier LM entry, shorter retirement period
- Issue of **social sustainability** if socially disadvantaged older adults are mainly affected by pension reforms & work longer **involuntarily**

Institutional Approaches & Pension Reforms



- Reversal of early retirement: push-pull-retention factors (Ebbinghaus, 2006)
- **Retrenchment** of public pensions & other welfare benefits
 - Raising standard pension age & reducing early retirement pensions
 - Tightening up contribution-benefit link → need longer contribution
 - Changing benefit rules (final → average salary), index formulae (wage growth → inflation), introducing sustainability factor
 - Privatisation & multi-pillarisation: introducing voluntary, individual schemes, PAYG to funded, DB to DC (occupational pensions)
 - Cutback of disability pensions & long-term unemployment benefits

Unequal Effects of Pension Reforms



- Public pension cuts may universally affect older adults with diverse SES, but...
- High-SES: financial motivations to work longer may be affected but they are at low risk of poverty & have autonomy
- Low-SES: reductions in pension income may increase the risk of poverty after retirement → more financial necessities, chance of **involuntary** work

- Question 1: What has been the **heterogeneous effects** of pension reforms on older people's employment?
 - Level of education / gender-specific effects
 - If low-educated/female workers' employment was more affected → more likely to be associated with **involuntary** postponement of retirement

Moderating Role of Institutions (1)



- Redistributive structure of public (& mandatory private) pensions
 - Beveridgean (basic security) vs Bismarckian (status maintenance)
 - Reflects the tradition & redistributive orientation of public pensions
 - Beveridgean models: focus on minimum income or social assistance for socially disadvantaged older adults? (thus less impact?)
 - ‘[Paradox of redistribution](#)’ (Korpi & Palme, 1998): earnings-related systems would still better protect low-educated workers?

Moderating Role of Institutions (2)

- Labour Market Dualization: insider-outsider divides
 - not only in employment relations (wage/job security) but also access to welfare & political representation
 - High level of dualization: welfare state often reproduce/exacerbate inequalities in the labour market
- Dualization within the older age group?
 - More chances of precarious work among 'outsider' older workers
 - Access to **alternative welfare benefits** may be limited
- Role of unions: **centralized union structures** matter

- Question 2: How do the effects of pension reforms differ by institutional characteristics across countries?
 - Role of **redistributive orientation** of pension institutions & **union structures** (**labour market dualism**)

Data & Variables



- Time-series cross-sectional data: 21 countries, 1995-2017 (mostly OECD data)
 - Countries: 20 Europe (Eurostat EU-LFS) + USA (CPS-IPUMS)
- DV: Group-specific employment rate, age 55-64
 - Education: Low/Mid/High (ISCED 0-2/3-4/5-8)
 - Gender-specific rates (f/m)
- *Estimand*: Impact of **Pension Spending**, % of GDP (Public/Mandatory Private)
 - Aggregate measure of policy effort (generosity & coverage & complex rules)
- Pension institutions: **Replacement rate ratio** $(0.5 * \text{av. salary}) / (1.5 * \text{av. salary})$
- Labour market dualization: **Union (Collective Bargaining) Centralization**

Challenge to Identification

- Challenge: claiming **causality** with non-experimental (observational) study
 - Isolating employment changes “caused by” pension reforms very important!
 - Otherwise interpreting voluntary/involuntary extension does not make sense!
 - **Endogeneity**: confounding factors (omitted variables bias), reverse causality
 - Possibility of merely **spurious (mechanical) correlation** in time-series data
 - Need a lot of caution for causal interpretation, but let’s try our best
- Covariates: **share of the older population**, HLE, incapacity benefit spending, unemployment/out-of-work benefit spending, unempl. rates, output gap, logGDPpc, government debt

Modelling Strategy 1: Error Correction Model

- Error correction model (Engle-Granger method)
 - Assumes a long-run equilibrium relationship exists between X & Y
 - Regress ΔY on ΔX : **avoids spurious correlation** from unit roots
 - Model short-term changes with **deviations from long-run equilibrium** ($Y_{t-1} - \beta X_{t-1}$)
 - Can use both levels & change information (unlike fixed-effect models!)

ECM 1

$$\Delta Emp_{it} = \alpha Emp_{i,t-1} + \beta_{p1} (\Delta PenExp_{it} \cdot Edu_i) + \beta_{p2} (PenExp_{i,t-1} \cdot Edu_i) + \beta_{x1} \Delta X_{it} + \beta_{x2} X_{i,t-1} + \varepsilon_{it}$$

ECM 2

$$\begin{aligned} \Delta Emp_{it} = & \alpha Emp_{i,t-1} + \beta_{p11} (\Delta Institution_{it} \cdot \Delta PenExp_{it} \cdot Edu_i) \\ & + \beta_{p12} (\Delta PenExp_{it} \cdot Edu_i) + \beta_{p13} (\Delta Institution_{it} \cdot Edu_i) \\ & + \beta_{p21} (Institution_{i,t-1} \cdot PenExp_{i,t-1} \cdot Edu_i) \\ & + \beta_{p22} (PenExp_{i,t-1} \cdot Edu_i) + \beta_{p23} (Institution_{i,t-1} \cdot Edu_i) \\ & + \beta_{x1} \Delta X_{it} + \beta_{x2} X_{i,t-1} + \varepsilon_{it} \end{aligned}$$

Modelling Strategy 2: System GMM

- System GMM estimation (Blundell & Bond, 1998)
 - **First-differencing**: remove time-invariant heterogeneities (cf. fixed effects)
 - Use lagged levels and differences as **instruments** for endogenous variables: addresses remaining **time-varying heterogeneities** (also possibility of **reverse causality**)
 - Small-sample bias not so much a problem (Hayakawa, 2007)

$$\text{GMM 1} \quad \Delta Emp_{it} = \alpha \Delta Emp_{i,t-1} + \beta_p (\Delta PenExp_{it} \cdot Edu_i) + \beta_x \Delta X_{it} + \Delta \gamma_t + \Delta \varepsilon_{it}$$

$$\begin{aligned} \text{GMM 2} \quad \Delta Emp_{it} = & \alpha \Delta Emp_{i,t-1} + \beta_{p1} (\Delta PenExp_{it} \cdot \Delta Institution_{it} \cdot Edu_i) \\ & + \beta_{p2} (\Delta PenExp_{it} \cdot Edu_i) + \beta_{p3} (\Delta Institution_{it} \cdot Edu_i) \\ & + \beta_x \Delta X_{it} + \Delta \gamma_t + \Delta \varepsilon_{it} \end{aligned}$$

Table 1. Effects of Pension Spending on Old-Age Employment Rates

DV: ΔEmp_t	All persons, age 55-64		Male, age 55-64		Female, age 55-64	
	ECM	GMM	ECM	GMM	ECM	GMM
Emp_{t-1}	-0.0541*** (-9.46)		-0.0705*** (-6.64)		-0.0573*** (-6.56)	
ΔEmp_{t-1}		0.9363*** (78.22)		0.8693*** (38.77)		0.9250*** (53.06)
$HighEdu \times \Delta PenExp_t$	-1.1455*** (-4.15)	-0.0821** (-3.01)	-0.7888* (-2.13)	-0.1039+ (-1.80)	-1.5102*** (-4.14)	-0.0832* (-2.12)
$HighEdu \times PenExp_{t-1}$	-0.0506* (-2.00)		-0.0659+ (-1.78)		-0.0538 (-1.5489)	
$MidEdu \times \Delta PenExp_t$	-0.9373*** (-3.67)	-0.1597*** (-4.82)	-1.0750** (-2.80)	-0.2830*** (-4.14)	-0.8082*** (-3.50)	-0.1814*** (-3.43)
$MidEdu \times PenExp_{t-1}$	-0.1145*** (-4.46)		-0.1471*** (-3.51)		-0.1316*** (-3.76)	
$LowEdu \times \Delta PenExp_t$	-0.6008* (-2.10)	-0.2678*** (-6.26)	-0.3513 (-0.74)	-0.4470*** (-5.55)	-0.8268** (-3.26)	-0.3150*** (-4.60)
$LowEdu \times PenExp_{t-1}$	-0.2161*** (-6.82)		-0.2582*** (-5.17)		-0.2447*** (-5.59)	
Long-run Effects						
HighEdu × PenExp	-0.9361	-1.2878	-0.9340	-0.7949	-0.9387	-1.1089
MidEdu × PenExp	-2.1188	-2.5061	-2.0855	-2.1655	-2.2949	-2.4190
LowEdu × PenExp	-3.9973	-4.2027	-3.6613	-3.4210	-4.2681	-4.1995
Adj. R ²	0.1248		0.1730		0.0904	
Sargan p-value		0.7256		1.000		1.000
N × T	2,621	2,898	1,314	1,449	1,307	1,449



Note: + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; t-statistics (ECM) or z-statistics (GMM) in parentheses.

Table 1. Moderating Effects of Replacement Rate Ratios

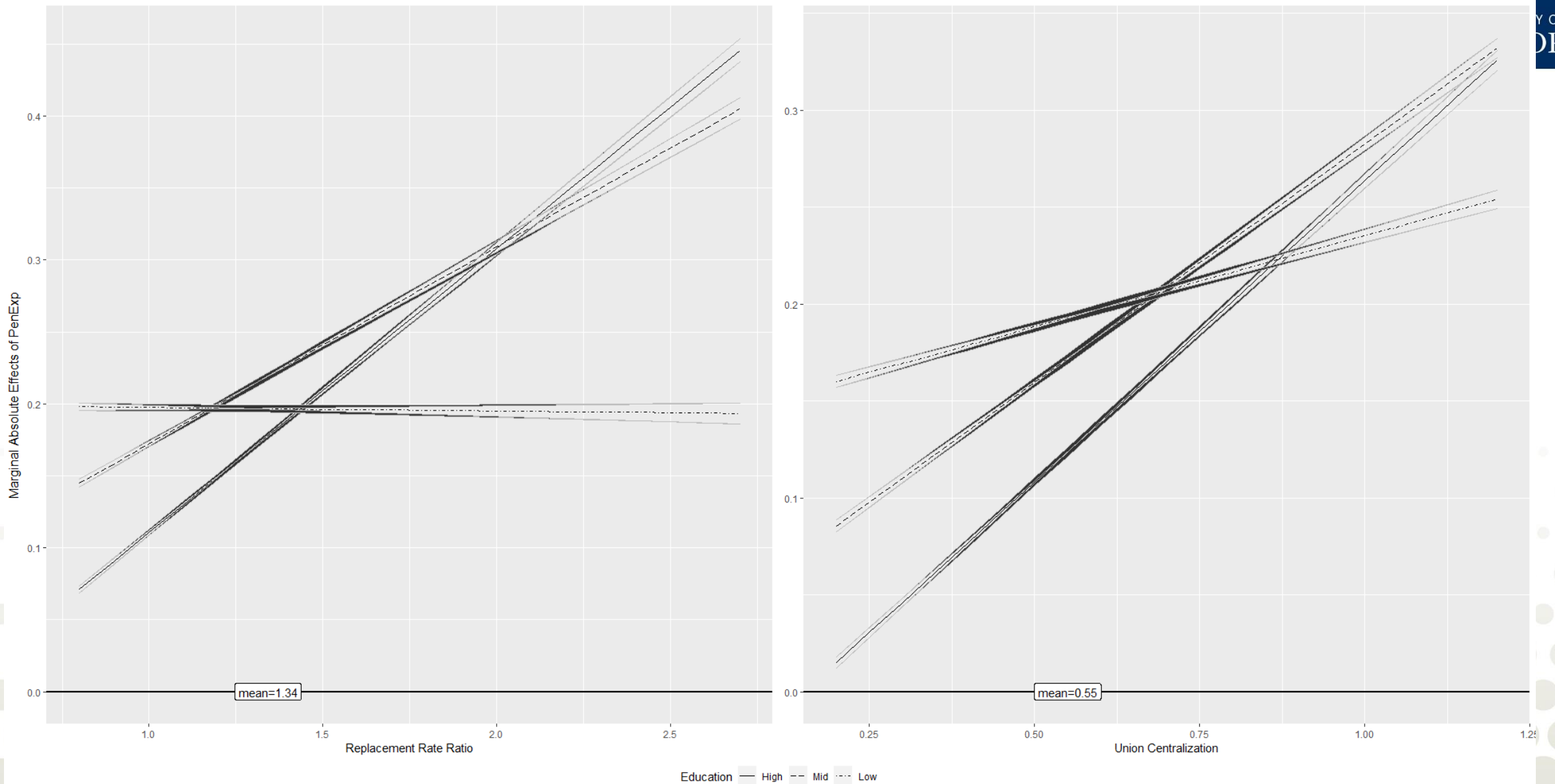
DV: ΔEmp_t	All persons, age 55-64		Male, age 55-64		Female, age 55-64	
	ECM	GMM	ECM	GMM	ECM	GMM
Emp_{t-1}	-0.0609*** (-9.41)		-0.0784*** (-6.76)		-0.0723*** (-6.77)	
ΔEmp_{t-1}		0.9308*** (72.72)		0.8561*** (36.32)		0.9112*** (51.29)
$HighEdu \times \Delta RRR_t \times \Delta PenExp_t$	-2.7026 (-1.18)	-0.1971*** (-3.37)	-4.0082 (-0.97)	-0.2237* (-2.11)	-2.1262 (-0.61)	-0.2722** (-3.12)
$HighEdu \times RRR_{t-1} \times PenExp_{t-1}$	-0.1536*** (-3.31)		-0.1079+ (-1.79)		-0.2042** (-2.80)	
$MidEdu \times \Delta RRR_t \times \Delta PenExp_t$	-1.4925 (-0.61)	-0.1369** (-2.73)	0.0334 (0.01)	-0.1588 (-1.43)	-3.5346 (-1.54)	-0.1005 (-1.42)
$MidEdu \times RRR_{t-1} \times PenExp_{t-1}$	-0.1220** (-2.64)		-0.1261+ (-1.87)		-0.0817 (-1.23)	
$LowEdu \times \Delta RRR_t \times \Delta PenExp_t$	-1.3953 (-0.50)	0.0024 (0.04)	-2.7068 (-1.04)	-0.0077 (-0.06)	0.1194 (0.04)	0.1001 (1.27)
$LowEdu \times RRR_{t-1} \times PenExp_{t-1}$	0.0090 (0.16)		-0.0226 (-0.29)		-0.0226 (1.44)	

Table 1. Moderating Effects of Collective Bargaining Centralization



DV: ΔEmp_t	All persons, age 55-64		Male, age 55-64		Female, age 55-64	
	ECM	GMM	ECM	GMM	ECM	GMM
Emp_{t-1}	-0.0634*** (-9.62)		-0.0818*** (-6.98)		-0.0761*** (-6.28)	
ΔEmp_{t-1}		0.9314*** (71.85)		0.8565*** (35.32)		0.8934*** (41.91)
$HighEdu \times \Delta Cent_t \times \Delta PenExp_t$	-3.2666 (-0.67)	-0.3106*** (-4.94)	0.8814 (0.20)	-0.3300** (-2.78)	-7.6069** (-3.04)	-0.2313* (-2.36)
$HighEdu \times Cent_{t-1} \times PenExp_{t-1}$	-0.2687*** (-4.88)		-0.2113* (-2.58)		-0.2203** (-2.87)	
$MidEdu \times \Delta Cent_t \times \Delta PenExp_t$	1.9005 (0.63)	-0.2463*** (-4.43)	-0.5520 (-0.13)	-0.1894 (-1.41)	3.9506 (1.47)	-0.1238 (-1.16)
$MidEdu \times Cent_{t-1} \times PenExp_{t-1}$	-0.2254*** (-3.91)		-0.1309 (-1.32)		-0.1788* (-2.39)	
$LowEdu \times \Delta Cent_t \times \Delta PenExp_t$	0.3513 (0.07)	-0.0940 (-1.62)	-1.8902 (-0.24)	0.0394 (0.27)	1.9394 (0.58)	0.1697 (1.18)
$LowEdu \times Cent_{t-1} \times PenExp_{t-1}$	-0.0821 (-1.40)		-0.0058 (-0.06)		0.0460 (0.54)	

Moderating Role of Institutions (GMM)



Key Findings



- The lower the education level, the larger the impact on employment rates
 - Similar patterns in gender-specific analysis but larger long-run effect on female workers
 - Pension cuts may have increased **involuntary extensions?**
- The relationship is reversed in more **‘Beveridgean’** pension systems & **centralized union structure**
 - In Bismarckian systems, low-educated group’s employment no less affected than in Beveridgean systems but high-educated group’s employment much less affected
 - ‘Paradox of redistribution’ does not hold in the retrenchment phase
 - Centralized union structure & less dualization: low-skilled workers’ income may be relatively more protected

Limitations



- Not causal (but hopefully small **omitted variables bias**)
- Moderating effects of institutions: mere **correlational** – further interpretations are theory-based
- Limitations of using **macro-level data**: individual motivations for early/late retirement, income situation, socio-economic characteristics, occupations..
 - Interpretations may be an overstatement
 - Directions for further research!

Comments Q&A

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