

Long-term effects of population change on the European income distribution

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Motivation

- EU facing demographic challenges: increase in life expectancy, changes in fertility → [population ageing](#)
- Uncertainty arising from other population developments: changing skill distribution and migration → amplify or smooth shocks?
- Impact on future labour markets, income distribution, government budgets...

Research questions

Previous work:

- Dolls et al (2014) How will demographic change affect labour supply (↓), wages (↑) and fiscal revenues (↑)?

This paper:

- How will demographic changes shape household income distributions in the EU?
- How well will existing tax-benefit systems cope?

Preview

Four-step method:

- ① Reweight EU-SILC data to represent the projected 2030 population
- ② Model labor supply and labour demand using micro-estimates of elasticities
- ③ Use EUROMOD to simulate disposable income distribution, personal income taxes and social security contributions for 2010 and 2030
- ④ Use decomposition technique to isolate changes in the income distribution of each country attributable to
 - demographic change
 - wage change

Theoretical considerations

- A larger share of older people increases overall inequality (von Weizacker, 1988; Deaton, 1997)
 - life cycle theory
 - retirees have lower income than workers
 - scarcity of workers may increase wages
- Upskilling leads to higher average wages but not necessarily to increased wage inequality (Forster and Toth, 2015)

Related literature I

Projections of future labour market and/or income distribution

- Aziz et al (2013) - distributional impact of population ageing and changes to labour force participation in New Zealand up to 2060: inequality stable, poverty declines
- Edwards and Lange (2013) - evolution of returns to education and gender in US by 2030 given projections of education attainment and demographics, trend towards high skilled and female labour continues
- Dolls et al (2014) - effect of demographic change in Europe on labour supply, wages and fiscal revenues in 2030

Related literature II

Decomposing changes in hh income distribution: policy vs other factors

- Long tradition in microsimulation literature
- Bargain and Callan 2010 provide a formal framework
- Recent applications: UK (Bargain 2012a, b), US (Bargain et al, 2013), EU countries (Bargain et al, 2013; DeAgostini et al, 2014; Hills et al, 2014)

Population projections for 2030

Come from Huisman et al, 2013 under the EU FP7 'NEUJOBS' project

- Start from assumptions underlying the Eurostat projections EUROPOP2010
- Deviate from these based on assumptions (below) to create "tough" and "friendly" scenarios

Characteristic	Scenario	
	tough	friendly
Net international migration	low	high
Rural-to-urban migration	high	low
Fertility	low	high
Increase in life expectancy	low	high
GDP growth	low	high
Old-age dependency ratio	high	low
Educational attainment	low	high

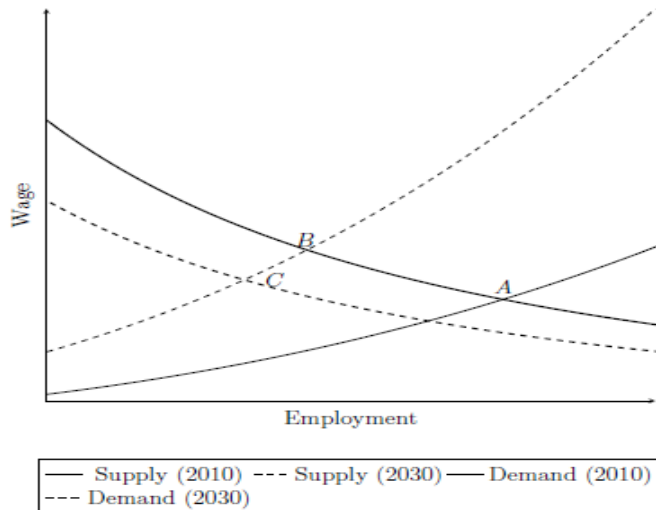
EUROMOD

- 2010 policies
- SILC 2008 as input data (FRS 2009/10 for UK)
 - Sample size: from 9,000 (LU) to 57,000 (UK) individuals
 - 2007 incomes (updated to 2010 levels by components)
- Base (2010) and counterfactual (2030) datasets
 - reweighted by age, education attainment, hh structure, rural/urban using reweighting procedure of Cai et al, 2006.

Labour market adjustments

- Simple labour market model
- Micro-founded country specific elasticities for supply and demand
 - Supply side elasticities from Bargain et al, 2014, JHR
 - differentiated by marital status, gender, education.
 - lower in Eastern Europe, higher in Anglo Saxon and Southern European countries. Higher for the low skilled.
 - Demand side elasticities from Lichter et al, 2014
 - differentiated by education.
 - higher in Eastern Europe countries and for the low skilled
- Solve system of equations (iteratively) to obtain new equilibrium wage and employment levels (hours)

Linking labour supply and labour demand



Decomposition of income distribution

- Bargain and Callan 2010 framework: $I [d_i(p^j, y^l)]$
 - y hh market income (and socio-demogr. characteristics)
 - d 'tax-benefit function'
 - p policy parameters with monetary values
 - I distributional index
- Total change = (direct) policy effect + other factors

$$\Delta I = \left\{ I \left[d_1(p^1, y^1) \right] - I \left[d_0(\alpha^1 p^0, y^1) \right] \right\} \\ + \left\{ I \left[d_0(\alpha^1 p^0, y^1) \right] - I \left[d_0(p^0, y^0) \right] \right\}$$

Our approach

- Focus on market factors (assuming current policies continue $d_0 = d_1$, $p_0 = p_1$)
- Distinguish further between demographic and wage effects:

$$\Delta I^c = \left\{ I[d(\alpha^1 p, y_w^1)] - I[d(\alpha_d^1 p, y_d^1)] \right\} \\ + \left\{ I[d(\alpha_d^1 p, y_d^1)] - I[d(p, y^0)] \right\}$$

- Counterfactual indexation (α)
 - $\alpha = 1 \rightarrow$ benchmark policies with constant parameters in real terms
 - $\alpha = \bar{y}_w^1 / \bar{y}_0 \rightarrow$ benchmark policy parameters in line with (private) income growth (results not shown)

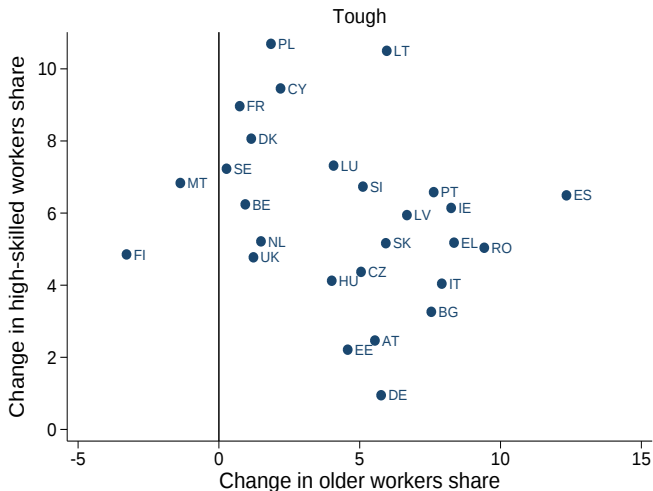
Aggregate statistics

Table 1 : Changes in population structure between 2010 and 2030

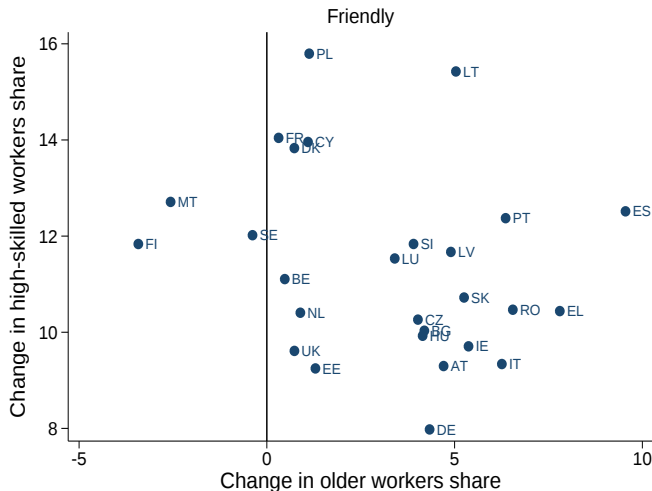
		TOUGH			FRIENDLY	
	change	below av.	above av.	change	above av.	below av.
Total population	-2.6%	BG EE LT LV RO	LU CY SE	7.9%	BG LT LV	BE CY IE LU SE
Share over 65	5.8%	BE EL HU LU SE UK	FI MT PL	6.1%	EE RO SE	FI MT NL PL SK
Share 15-65	-4.5%	FI MT	EL HU PT	-5.6%	FI MT	EL ES IE IT LU
Total labour force	-9.2%	BG EE LT LV	LU	-1.0%	BG DE LT LV PL	CY IE LU
Share low-skilled	-17.0%	BE CY FR SI	DE EE LT LV	-29.3%	CY LV PL RO SK	IT MT PT
Share high-skilled	27.6%	MT PL PT RO	DE EE	54.7%	MT PL PT RO	EE IE UK
Before wage adj.						
Emp. rate	0.0%	AT DE RO SI	MT PL	1.6%	AT	CY LT MT PL RO SE
Hours worked	-7.0%	BG DE EE LT LV RO	BE LU UK	3.0%	BG DE LT	CY IE LU
Wage adj.	11.8%	DK HU LV SK	AT DE ES SI	13.0%	HU LV RO	AT DE ES PL SI
After wage adj.						
Emp. rate	0.2%	BG EE	CY CZ MT PL	2.7%	BG IT	BE CY MT PL RO SK
Hours worked	-8.5%	BG EE LV RO	BE LU SE UK	1.9%	BG DE LV	CY IE LU

Notes: EU-27 average change (unweighted)

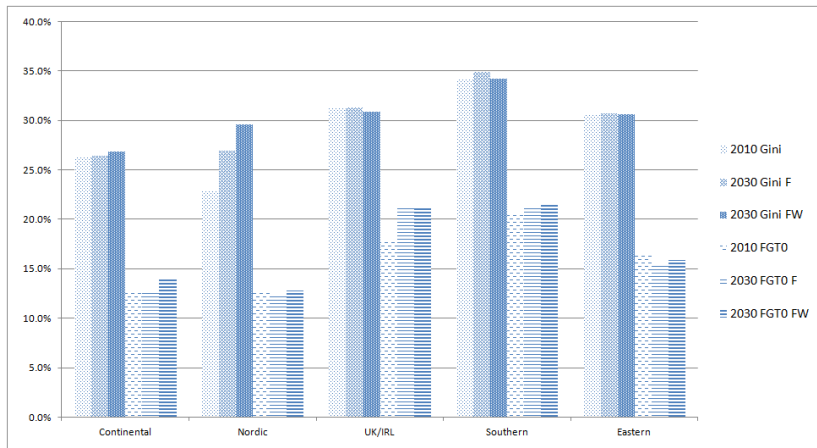
Population ageing and upskilling



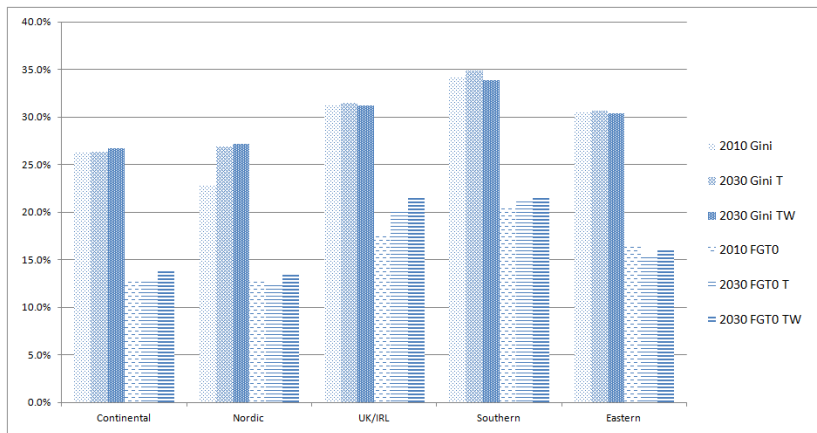
Population ageing and upskilling



Changes in inequality and poverty 2010-2030 (friendly scenario)



Changes in inequality and poverty 2010-2030 (tough scenario)



Preliminary conclusions

- Inequality
 - EU average likely to increase
 - Demographic changes $\uparrow$ inequality, wage adjustments $\downarrow$ (UK/Irl, Southern, Eastern) and $\uparrow$ (Continental, Nordic)
 - Some convergence across country groups likely
 - stable or decreasing in IE
- Poverty
 - Relative effects larger
 - More sensitive to demographic scenario
 - Both demographic change and wage adjustment $\uparrow$ poverty in Continental, Anglo-Saxon and Southern countries. Ambiguous effects in Northern and Eastern countries.
 - Large increases in IE (demographic change)

Preliminary conclusions

- Demographic change and the resulting wage changes will both play a role in shaping future labour markets and income distributions
- Current tax-benefit systems may encourage convergence in income inequality across Europe in the long-term
- Policy responses needed in some countries to avoid large increases in poverty
- Results robust to both 2030 scenarios and to alternative policy indexing assumptions

Thank you!

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