Regional Studies Association Winter Conference

Global Recession: Regional Impacts on Housing, Jobs, Health and Wellbeing

27th November 2009, The Resource Centre, London

Assessing the implications of population ageing on Tuscan well being: a microsimulation approach

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Outline

- **Overview**: Most european regions are experiencing a rapid population ageing
- **Main objective**: to explore the social and economic implications of demographic change forecasted in Tuscany over the period to 2030
- **Model**: *Irpetdin* is a population based dynamic microsimulation model constructed by Irpet for the Tuscan Region
- **Main feature**: it covers demographic processes, education, labour market partecipation, earnings, pensions and disability

Irpetdin's general features

- **Closed model:** except in the case of newly born children and new migrants, the model only uses a fixed set of individuals (Survey on Income and Living Conditions)
- **Dynamic ageing**: produces a longitudinal database of histories of the condition and behavior of each individual in each period of the simulation
- **Probabilistic**: transition among states are achieved through probabilistic methodologies. In particular, transitions are obtained by means of a Monte Carlo technique
- **Discrete time**: transition and updating processes are carried out at the end of each year
- **Units of analysis**: Individuals and households
- **Level of analysis**: Regional level (Tuscany)

Irpetdin's modules

Event	Potential candidates	Estimation	Variables used to determine event
	Demographic module		
Ageing	All individuals		
Mortality	All individuals	Transition matrix	Age, gender
Marriage	Single, divorced, widowed aged 18-48	Transition matrix	Age, gender, educational status, nationality
Dissolution	Marriage below 70	Transition matrix	Age, gender, educational status, nationality
Fertility	Married women aged 15-45	Transition matrix	Age, number of children, educational status, nationality
Leaving home	Children 18-34	Transition matrix	Age,, gender
Migration flows	All individuals	Transition matrix	Age, gender, educational status, work status, household size

Irpetdin's modules

Event	Potential candidates	Estimation	Variables used to determine event
	Health Module		
Disability	All individuals	Logit	Age, education, gender
	Education module		
Choice of secundary school	Individuals aged below 16	Multinomial logit	Gender, parents' educational level
Educational attainments at secondary school (drop-out, repeating, high school certificate)	All individuals enrolled at upper secondary school	Transition matrix	Gender, type and year of upper secondary school
Entry to tertiary school	Individuals with a high school certificate	Logit	Gender, type of high school certificate and mark
University career (drop outs, three- and five-year degree)	All individuals enrolled at university	Logit	Gender, type of upper secondary school, mark and year of course

Irpetdin's modules

Event	Potential candidates	Estimation	Variables used to determine event
	Labour Market Module		
Entry in the labour force	Individuals leaving the school (aged 15-39)	Logit	Gender, age, level of education
Employment status	Individuals belong to the labour force	Matching between labour demand (macro model) and labour supply (Irpetdin)	Educational level
Branch of activity	All individuals employed	Matching between labour demand (macro model) and labour supply (Irpetdin)	Educational level
Work status	All individuals employed	Transition matrix	Educational level, branch of activity
Career employment	All individuals employed	Transition matrix	Work status
Wages and earnings	All individuals employed	OLS	Age, gender, contributory seniority, educational level, work status, number of hours worked, citizenship

Irpetdin's modules

Event	Potential candidates	Computation rules
	Social Security Module	
Retirement	All non-pensioners accruing retirement requirements	Pensions and contribution rules
Pension benefits	All pensioners in the three regimes (defined benefit, defined contribution and mixed)	Pensions and contribution rules
Social pensions entitlement	Individual aged above 65 entitled to assistance benefits	Pensions and contribution rules
Supplements to minimum and social assistance supplements	Pensioners fulfilling age and economic condition requirements	Pensions and contribution rules

Standard scenario parameters

Exogenous variables

Demographic variables

Female life expectancy	IRPET forecast: 84.6(2010); 85.7 (2020); 86.9 (2030)
Male life expectancy	IRPET forecast: 80.8 (2010); 82.9 (2020); 85.0 (2030)
Total fertility rate	IRPET forecast 1.35 (2010); 1.45 (2020); 1.50 (2030)
Migratory rate per 1,000 inhabitants	IRPET forecast 6.8 (2010); 4.9 (2020); 4.8 (2030)

Macroeconomic variables

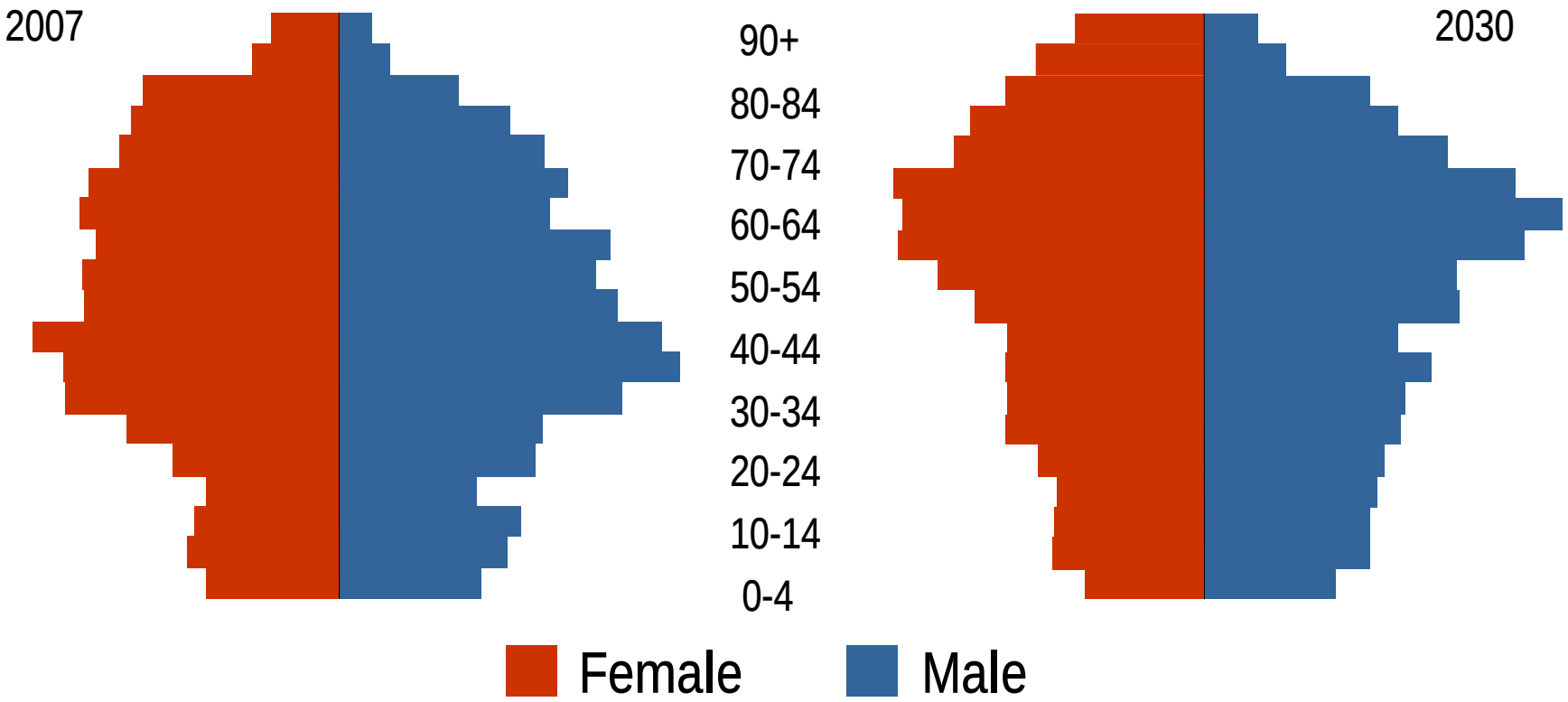
Real GDP growth rates	Irpet forecast: 0.5% (2005-2010); 1.2% (2010-2020); 1.1% (2020-2030)
Labour productivity growth rates	Irpet forecast: -0.2% (2005-2010), 0.8% (2010-2020); 0.9% (2020-2030)
Labour input growth rates	IRPET forecast: -1.8% (2005-2010); 2,5% (2010-2015); 1.2% (2015-2030)

Pension variables

Thresholds, pension and contribution ceilings	GDP indexed
Welfare transfers (social allowances, supplements to the minimum, social assistance supplements)	GDP indexed

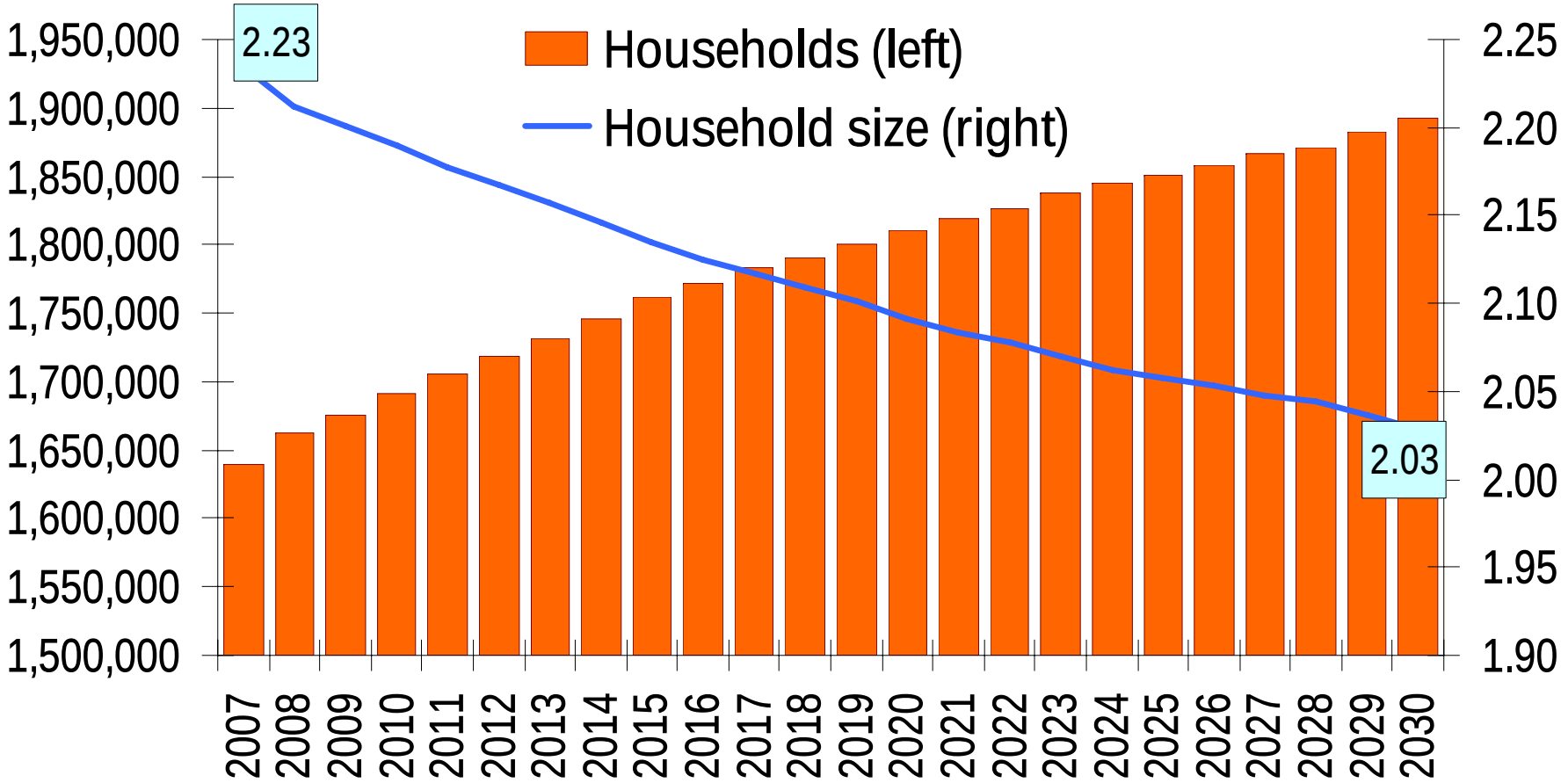
Population ageing

MOVING AGE PYRAMIDS



	2009	2030
Old age dependency ratio	36%	48%
Economic dependency ratio	84%	98%

More households but smaller



	2009	2030
Single person households	30%	38%

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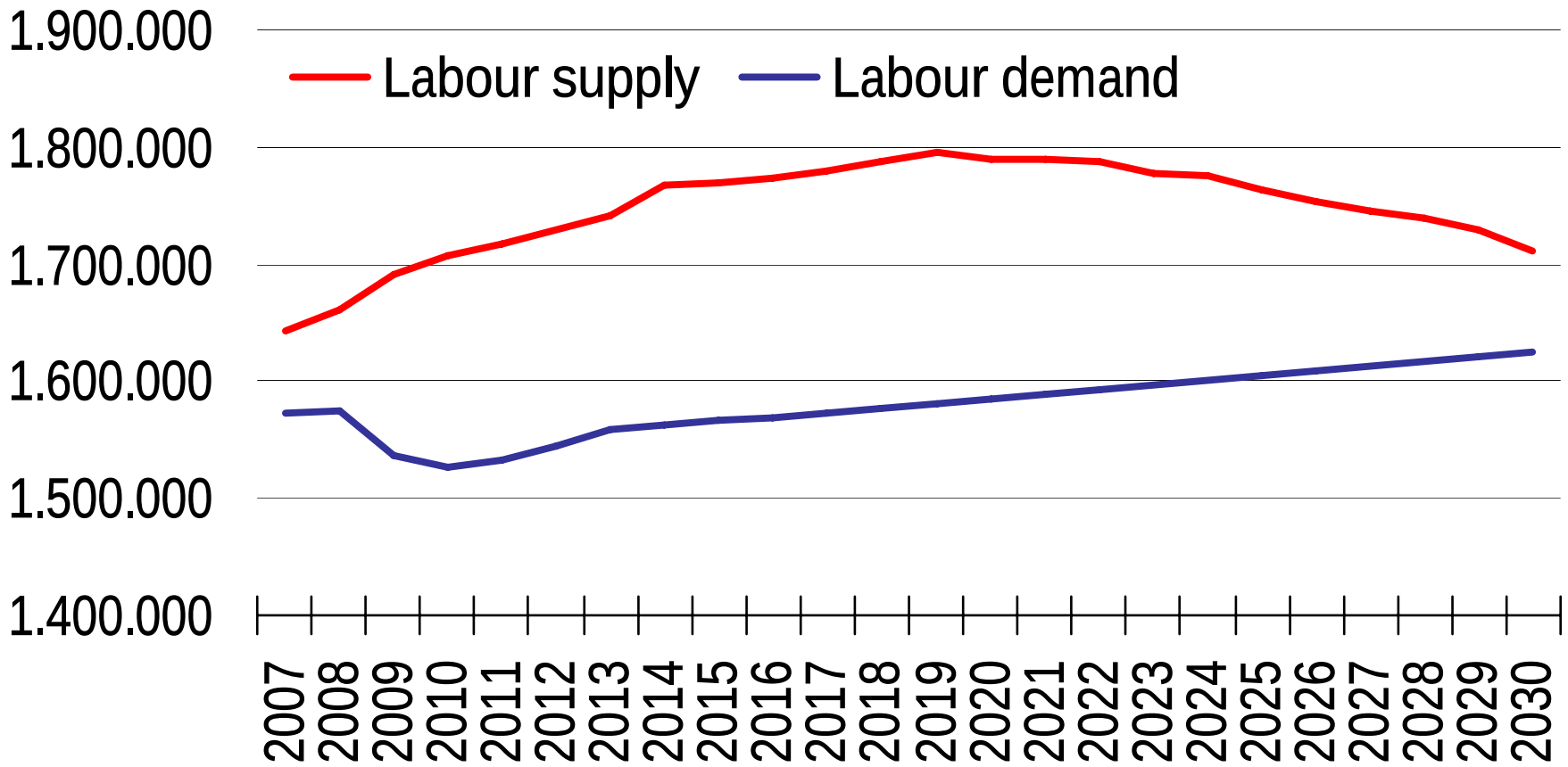
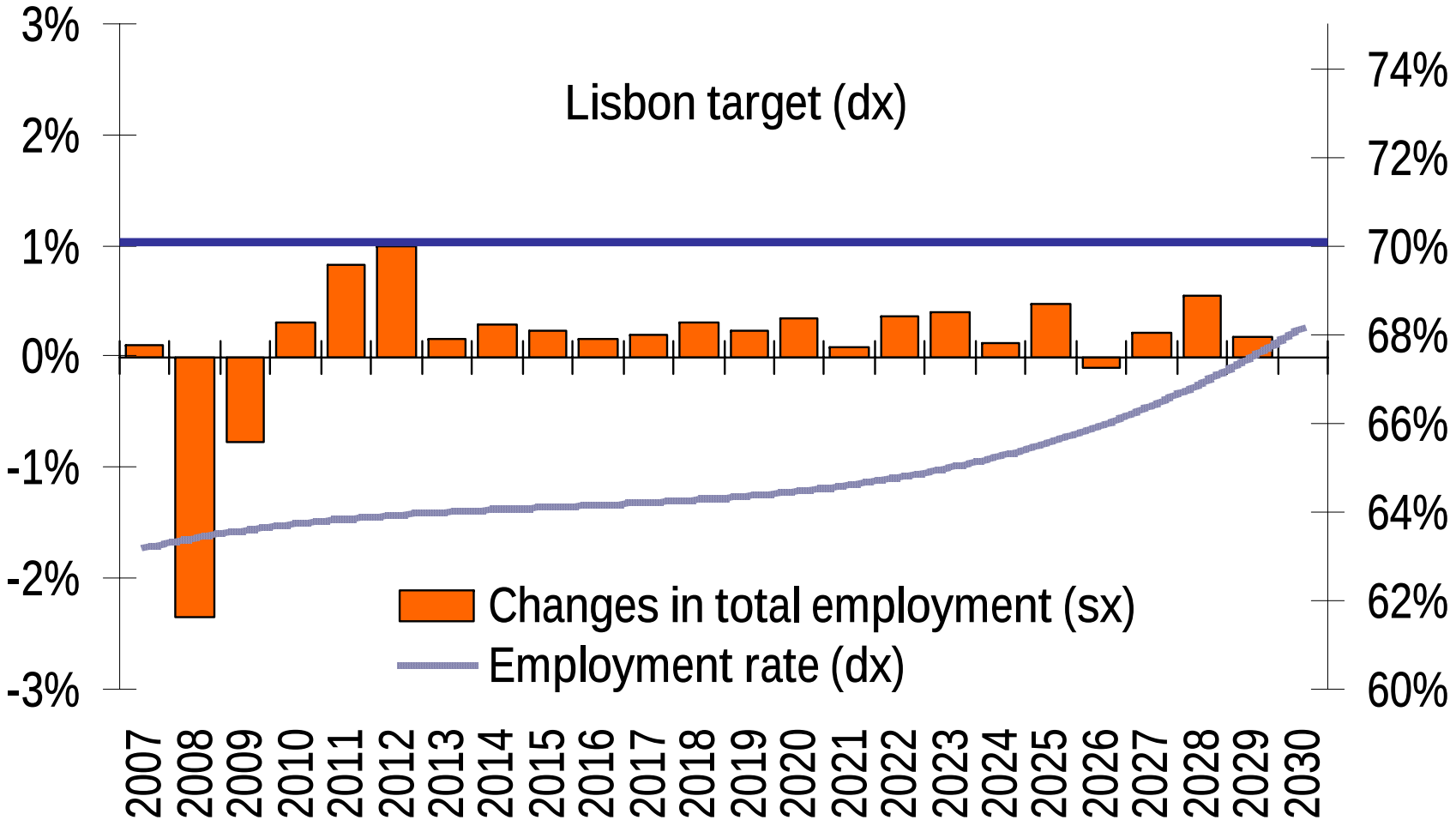
Trends in labour market



The labour market mismatch

	2009	2020	2030
Labour demand	1.536.448	1.584.951	1.623.932
Labour supply	1.692.096	1.789.248	1711104
Unemployed	120.139	205.888	86080
Employment rate	65%	66%	68%
Unemployment rate	7,0%	11,0%	5,0%

Trends in employment



The composition of employed population

SEX	2008	2030
Male	57%	55%
Female	43%	45%
AGE		
<30	15%	8%
30-50	60%	51%
>50	24%	41%
EDUCATION		
First	49%	35%
Second	36%	38%
Third	16%	27%
NATIONALITY		
Natives	92%	75%
Immigrants	8%	25%

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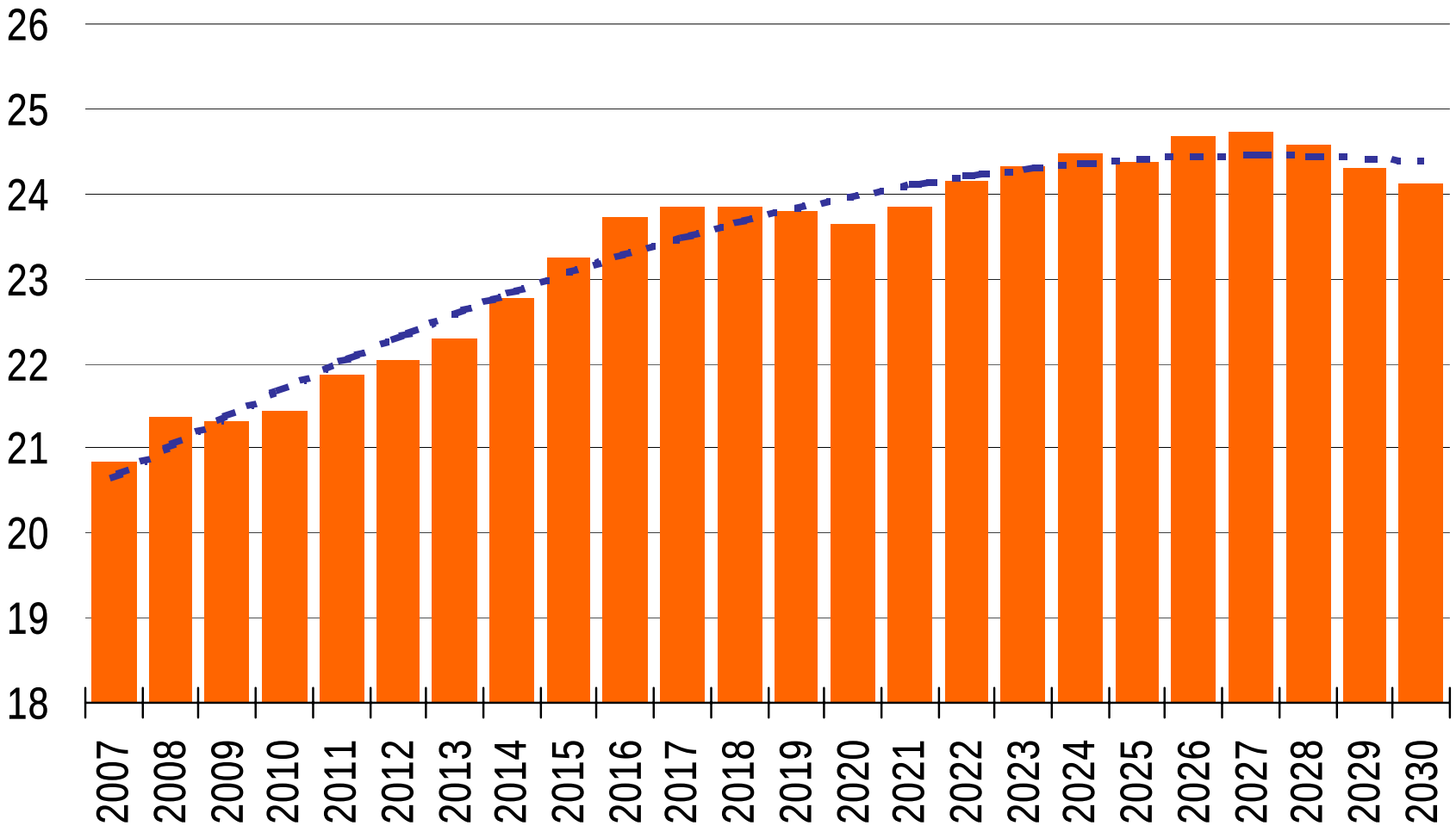
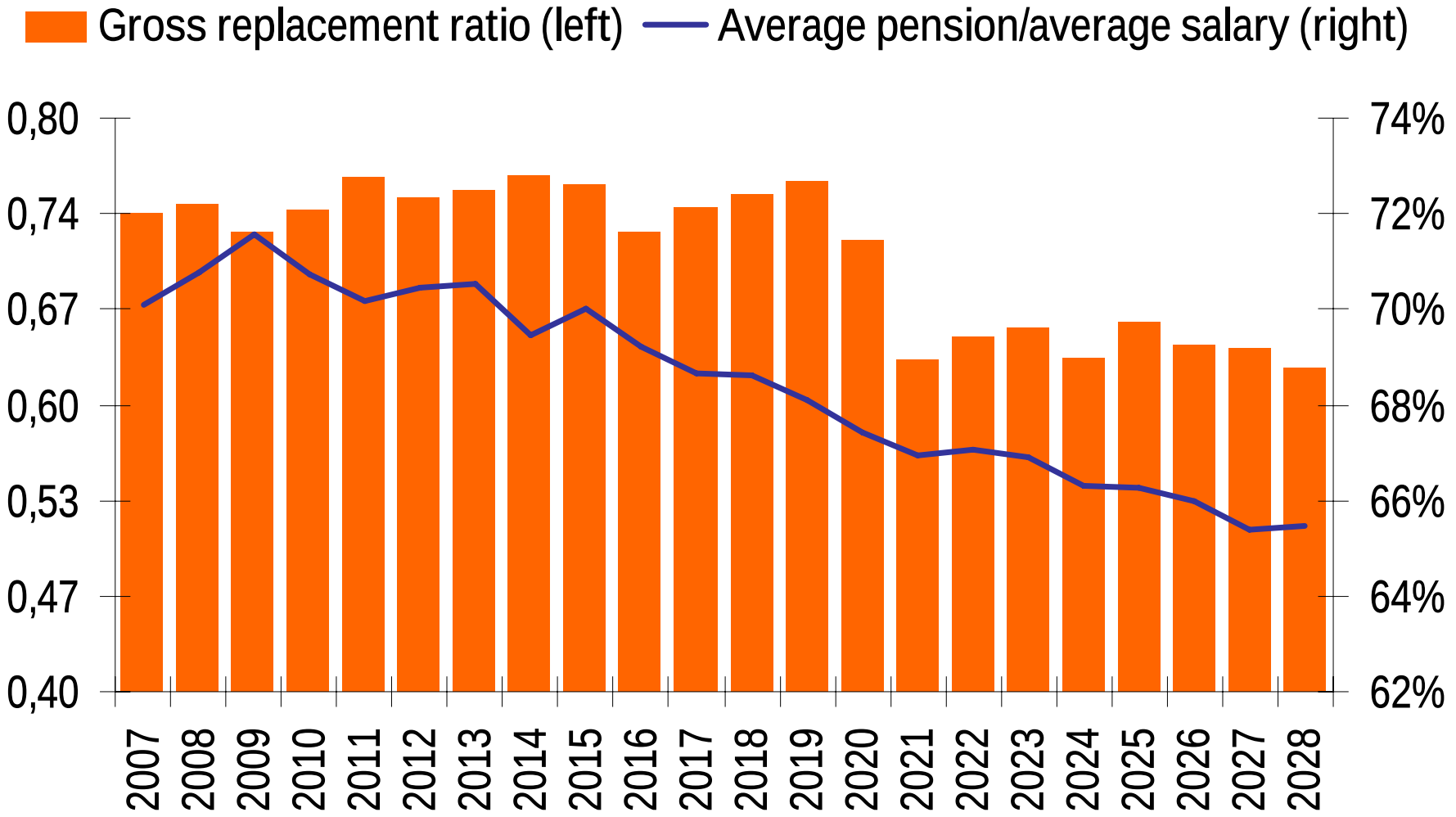
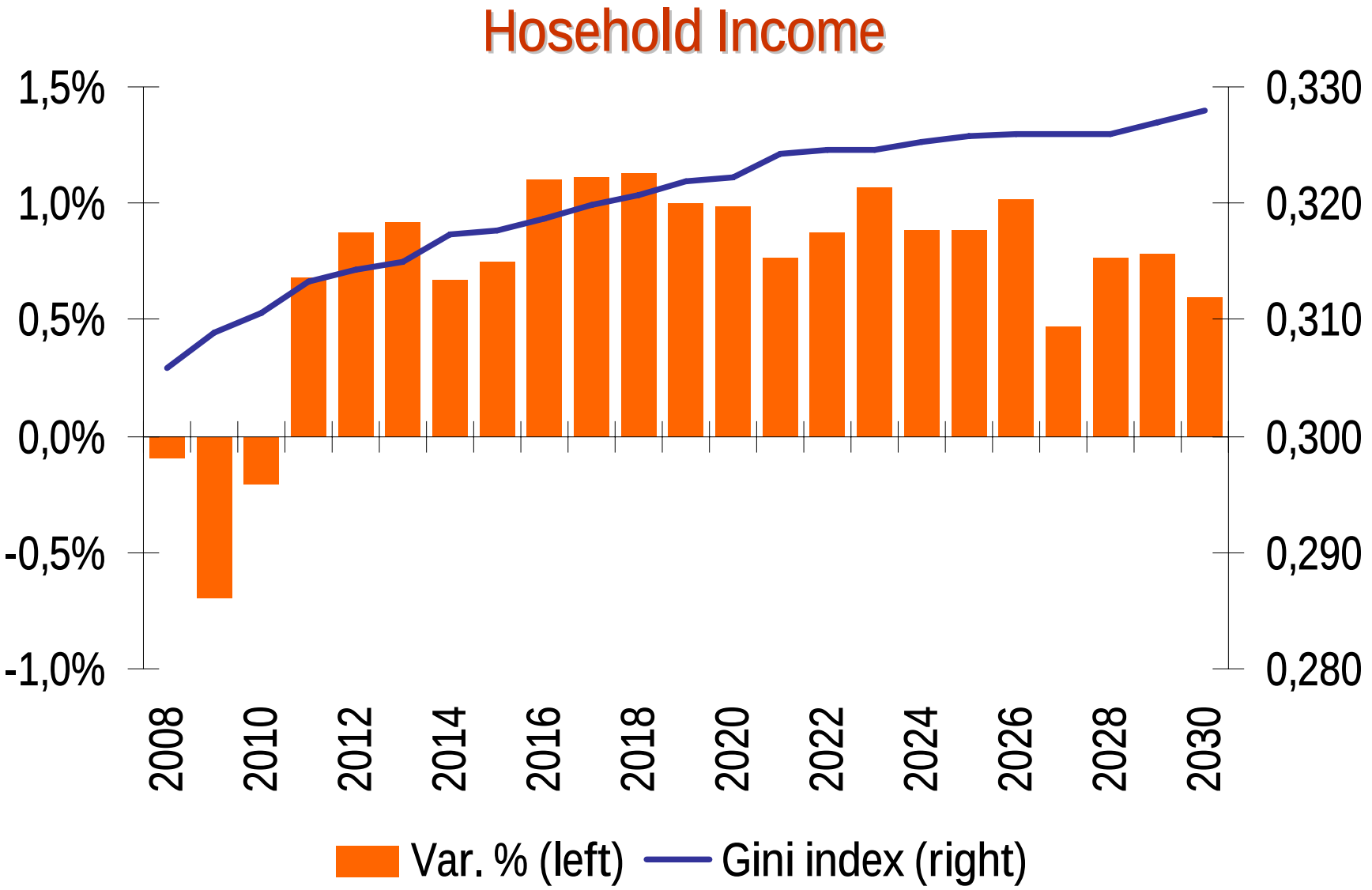
Working poors



Trends in social expenditures: pensions



Income trends: less growth more inequality



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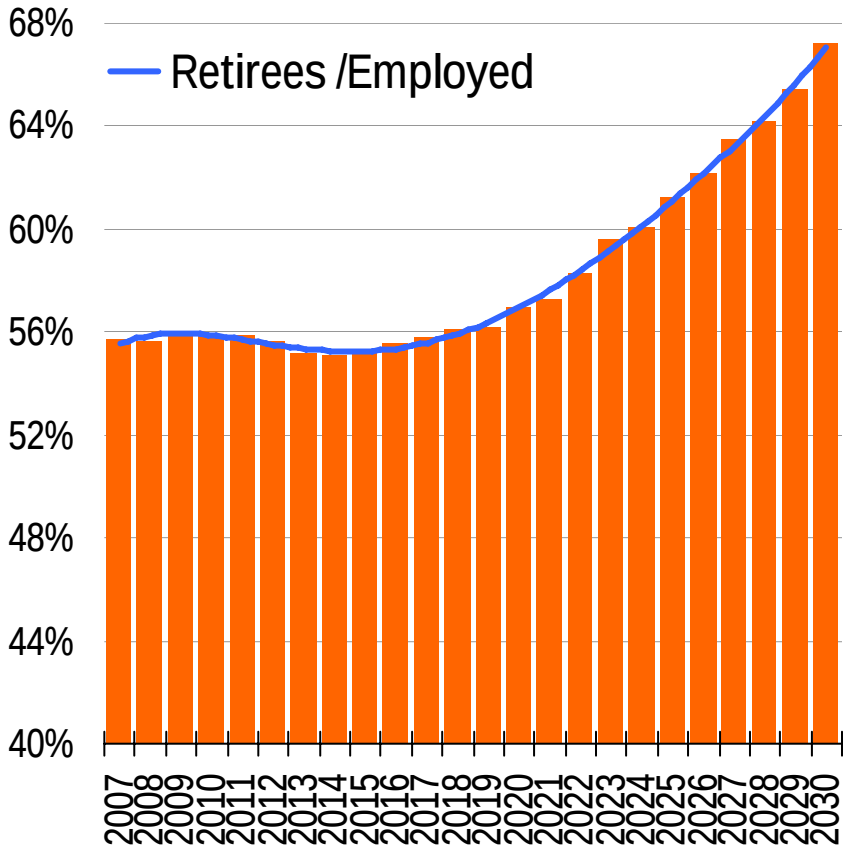
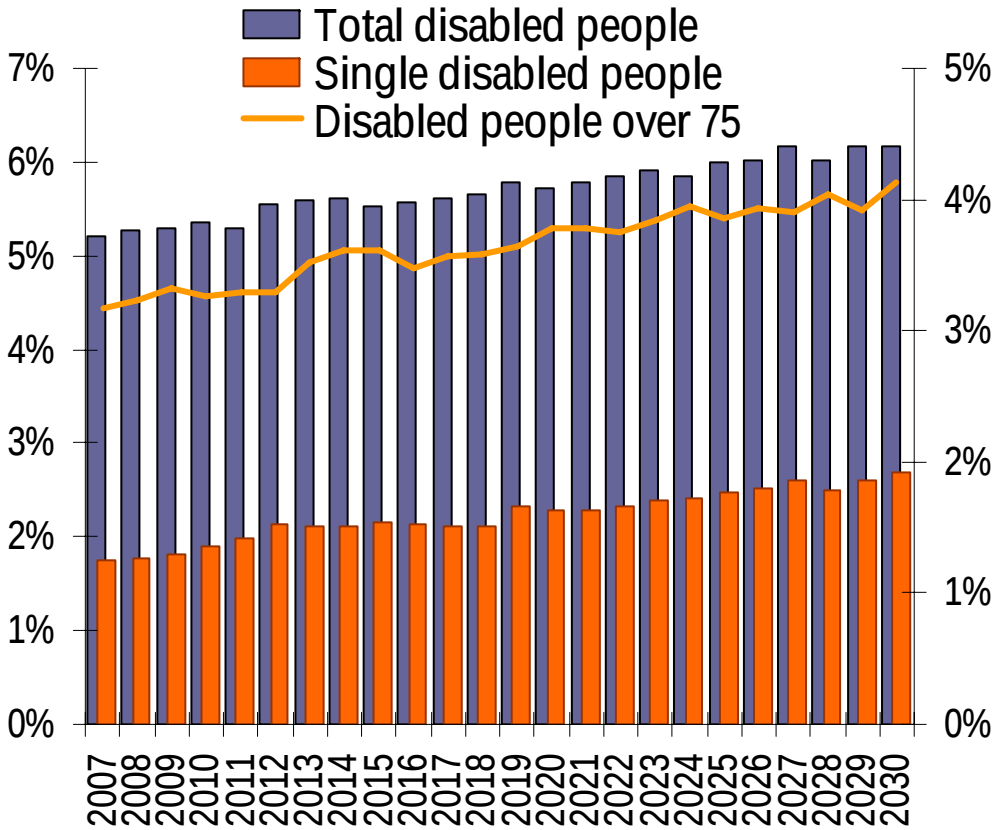
Trends in social expenditures





	2008	2030
Pension expenditure on GDP	14,3%	18,1%

	2008	2030
LTC expenditure on GDP	1,7%	2,3%

Conclusions

Relevant changes are expected both in the level and the composition of the main aspects influencing standards of living

More needs	*..but less resources*
More single person households	
More disabled people	
Mismatch in the labour market	*Low real GDP growth rates*
More working poor	*Low productivity growth rates*
More pensioners compared to workers	
Lower pension benefits	
More inequality in household income	

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