

agenta

Ageing Europe – An Application of
National Transfer Accounts for Explaining
and Projecting Trends in Public Finances

IMPACT OF DEMOGRAPHIC CHANGE ON PUBLIC EXPENDITURE AND REVENUE IN EUROPE

11th Global Meeting of the NTA Network

Saly, June 22nd, 2016



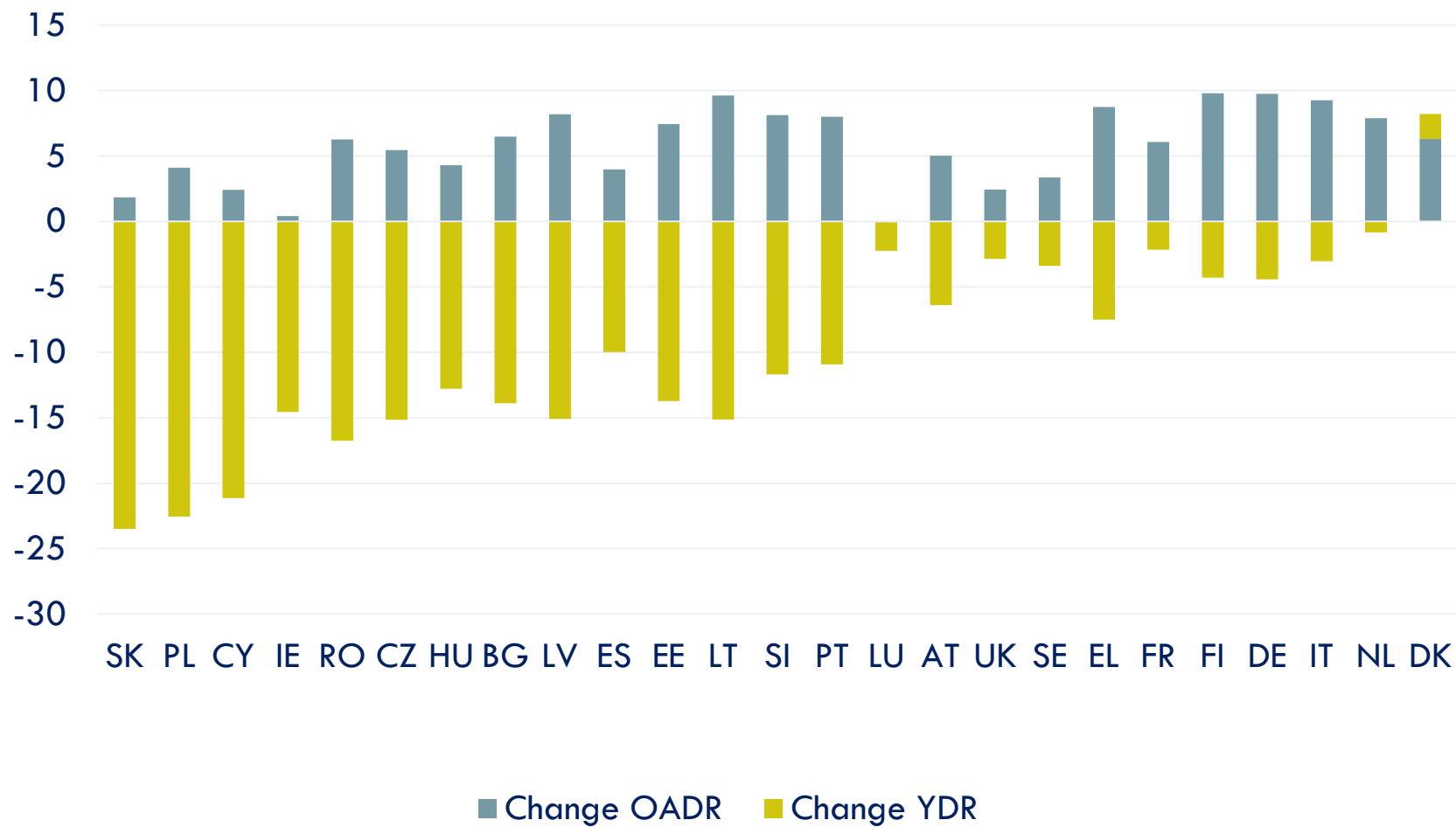
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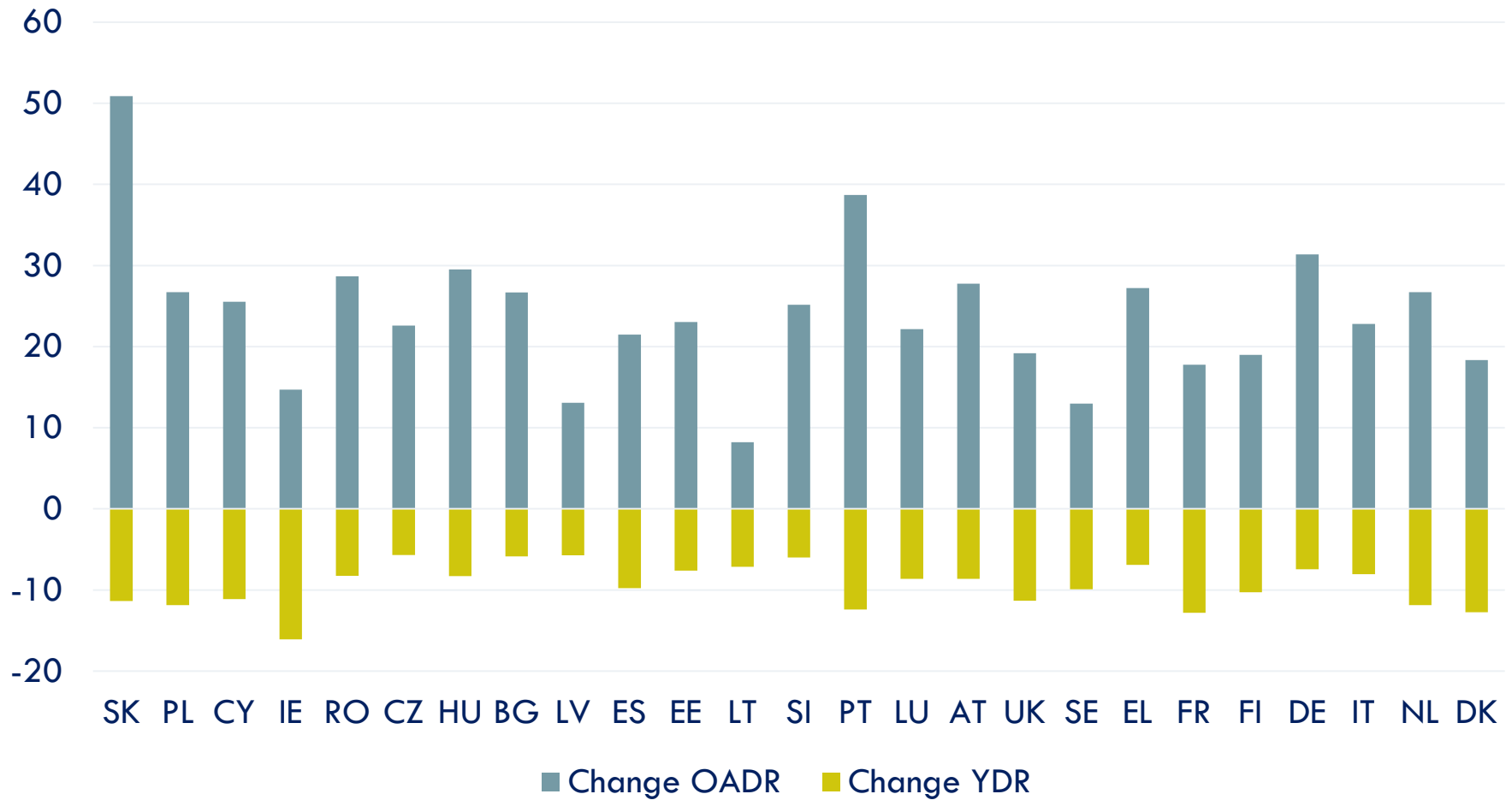
OBJECTIVES

- Analysis of public revenues and expenditures in a demographic context:
 - How did demographic and economic support ratios evolve in the past in the EU countries?
 - How are public revenues and expenditures related to the demographic and institutional contexts in the EU-27 countries, measured by demographic and economic support ratios?

CHANGES IN THE DEPENDENCY RATIO IN EU COUNTRIES BETWEEN 1995 AND 2014—DEMOGRAPHIC OPPORTUNITY CLOSING



CHANGES IN THE DEPENDENCY RATIO IN EU COUNTRIES BETWEEN 2014 AND 2070— POPULATION AGEING

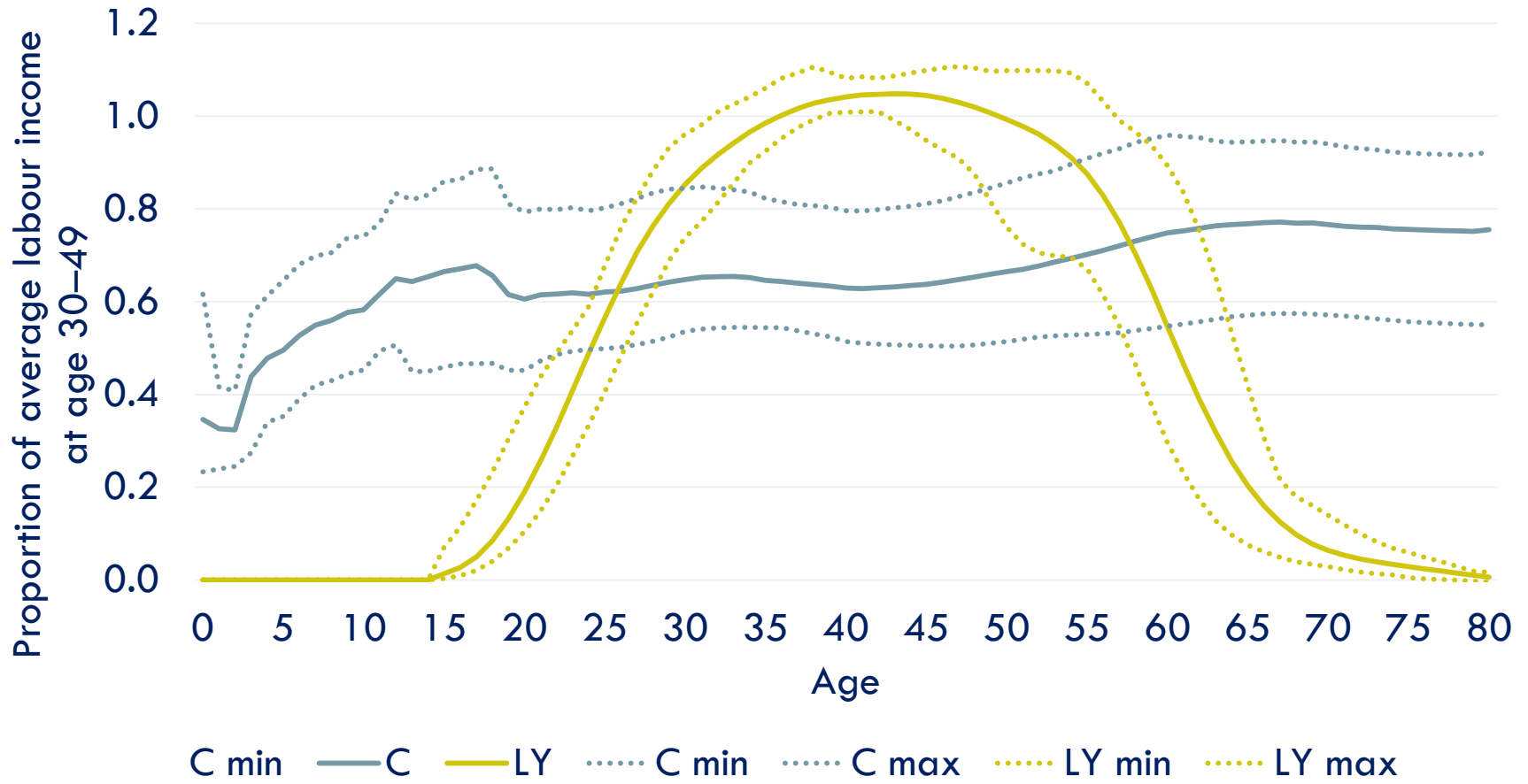


SUPPORT RATIOS—DEFINITIONS

Acronym	Name and definition
DSR	Demographic Support Ratio: The number of people in age group 20–64 per 100 of population age 0–19 and 65 and over
GSR	General Support Ratio: Labour income and asset-based reallocations (difference between income from assets and savings made) of all cohorts divided by consumption of all cohorts
FSR	Fiscal Support Ratio: Ratio of taxes on labour income (public transfer outflows) paid by all cohorts divided by benefits (public transfer inflows) received by all cohorts.

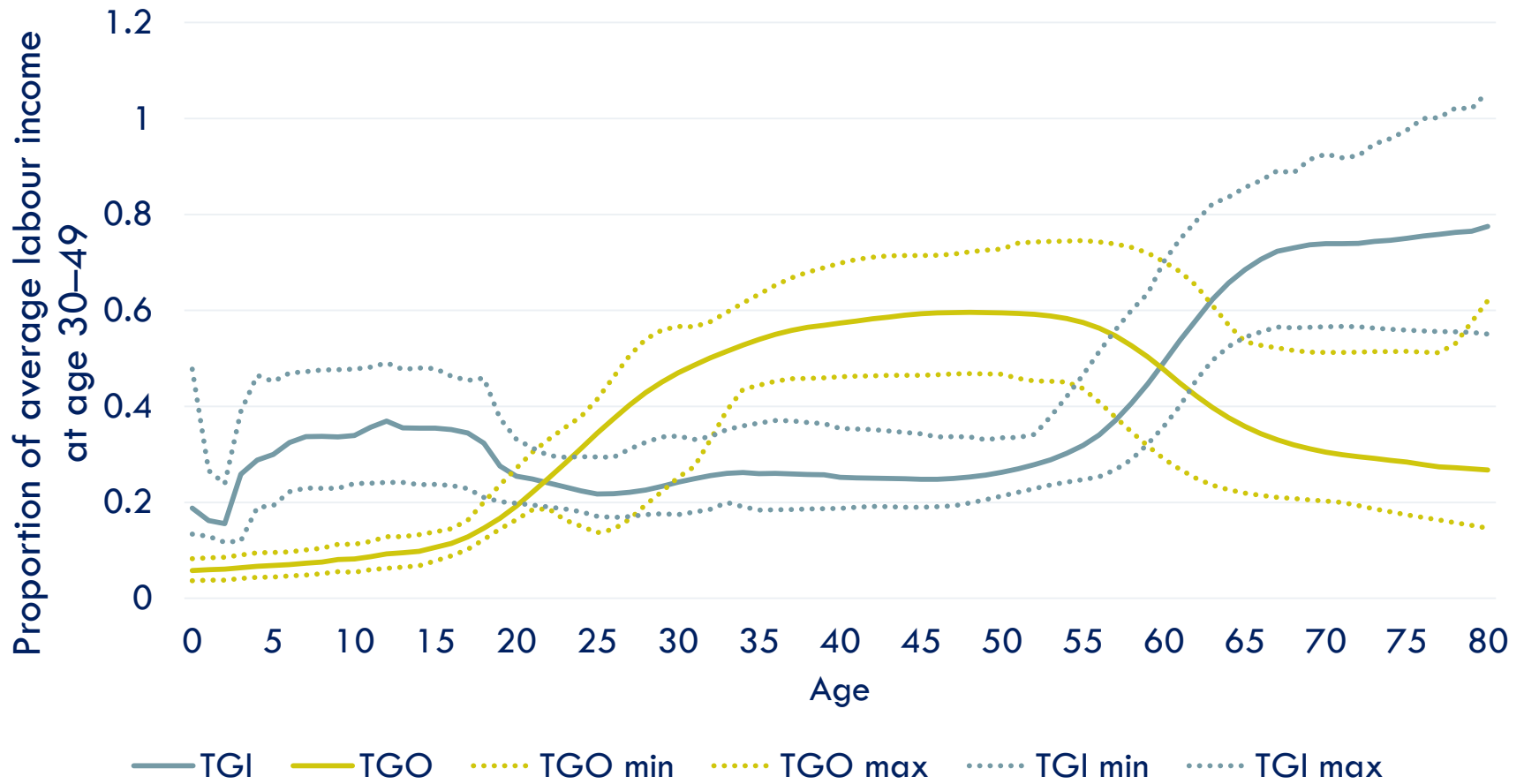
Source: (Lee and Edwards 2002; Lee and Mason 2013).

CONSUMPTION AND LABOUR INCOME AGE PROFILES



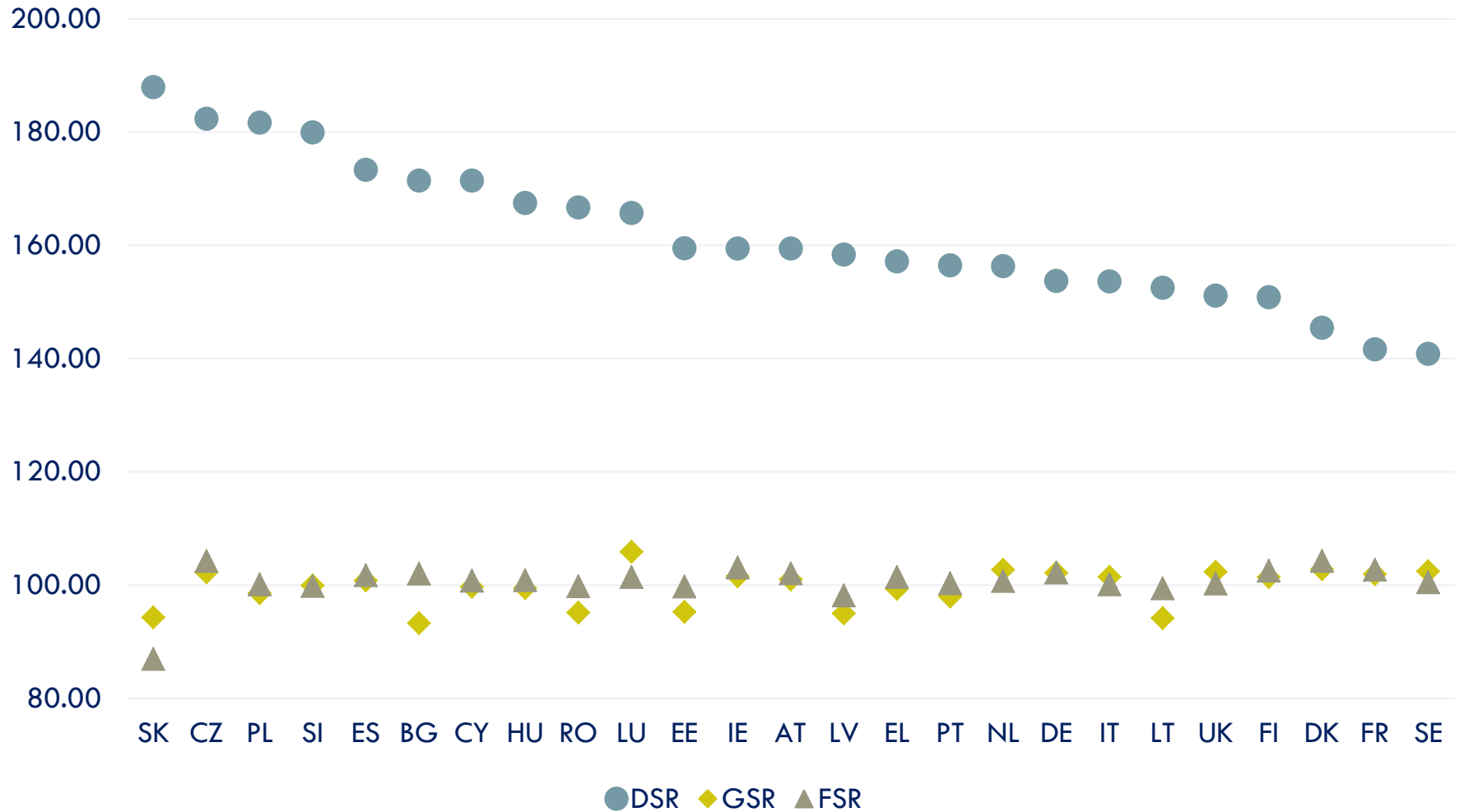
Note: Estimates based on AGENTA WP1 preliminary results

PUBLIC TRANSFER INFLOWS AND OUTFLOWS IN EU COUNTRIES



Note: Estimates based on AGENTA WP1 preliminary results

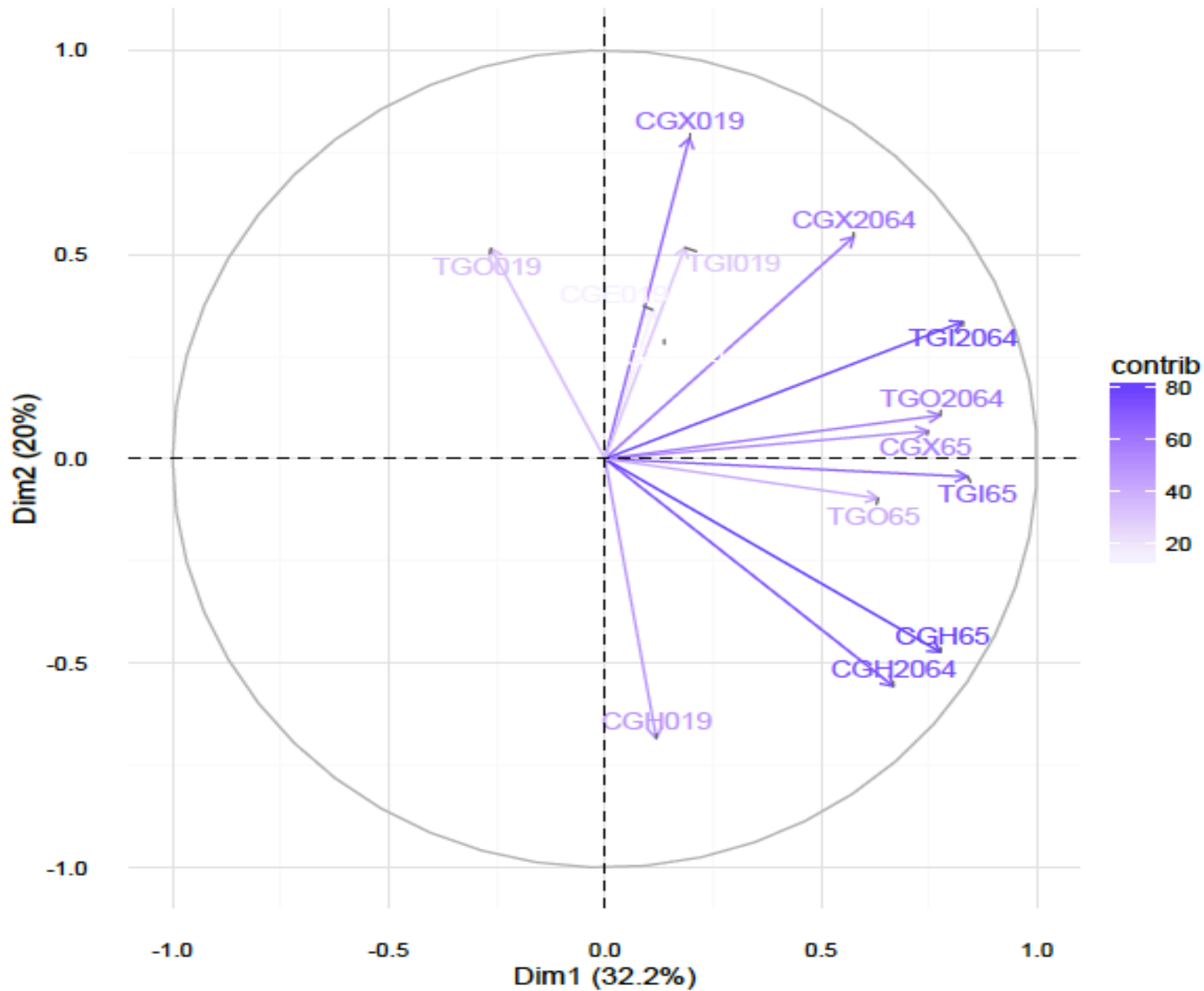
SUPPORT RATIOS IN EU COUNTRIES. 2012



WELFARE STATE ANALYSIS

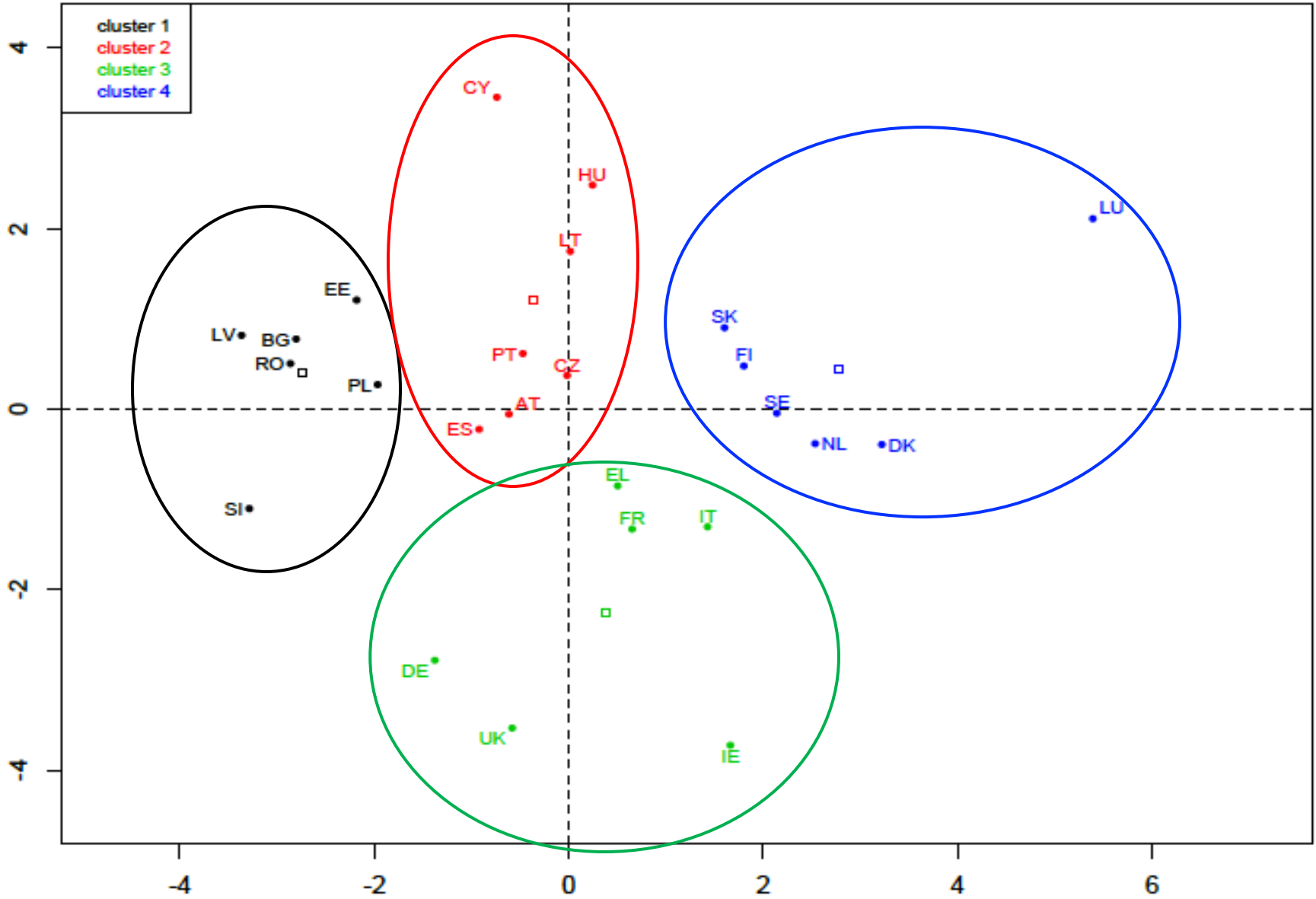
- Classification of welfare states using NTA age profiles
- By age groups and types of transfers
 - 3 age groups: 0–19 years, 20–64 years, 65 and older
 - Age profiles for:
 - Public consumption education (CGE)
 - Public consumption health (CGH)
 - Public consumption other (CGX)
 - Public transfers inflows (TGI)
 - Public transfers outflows (TGO)
- Method: Hierarchical clustering after principal component analysis

Variables factor map - PCA



Factor map

Higher public health consumption
Higher other public consumption



Lower transfers for old-age pensions

Dim 1 (32.25%)

Higher transfers for old-age pensions

FOUR CLUSTERS OF COUNTRIES BY PUBLIC CONSUMPTION AND TRANSFERS BY GENERATION

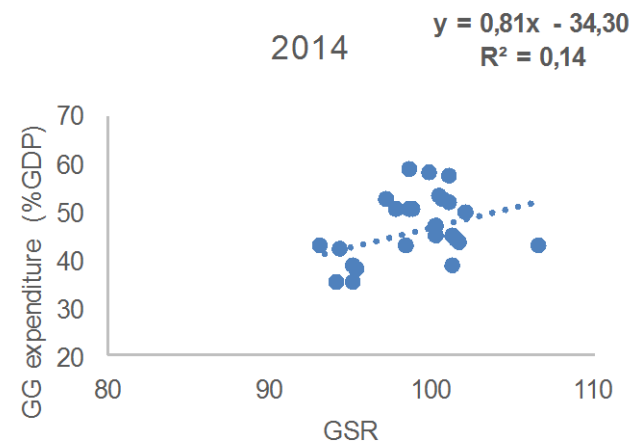
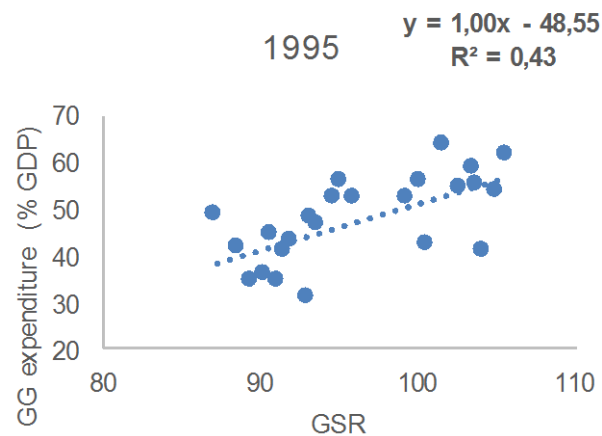
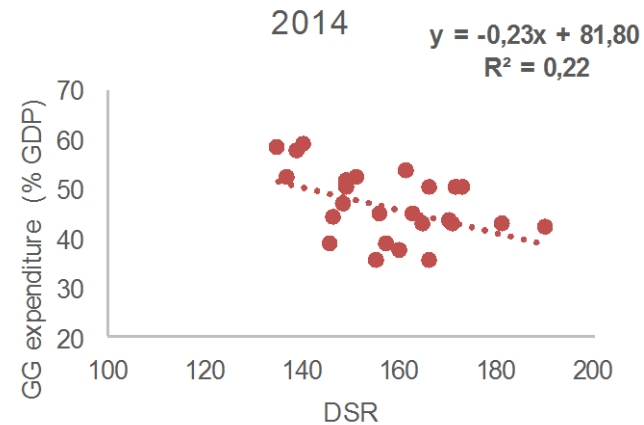
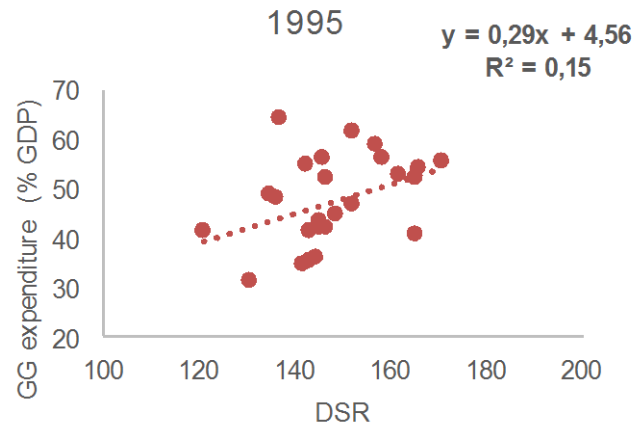
Countries		Central and Eastern Europe	Southern and Central Europe	Continental and Anglo-Saxon	Scandinavian/Social democratic
		LV, SI, RO, EE, BG, PL	LT, AT, PT, CY, CZ, ES, HU	EL, IE, FR, IT, DE, UK	LU, SK, NL, DK, FI, SE
Dimension 1	Public transfers, inflows, 65+	84.6	98.6	107.0	112.9
	Public transfers, inflows 20-64	90.3	102.2	98.6	113.2
	Public transfers, outflows 20-64	87.5	101.3	102.5	109.1
	Public consumption, health 65+	74.9	93.7	119.0	120.1
	Public consumption, other 65+	92.9	102.9	86.2	125.7
Dimension 2	Public consumption, health 0-19	92.3	112.6	64.9	126.9
	Public consumption, health 20-64	78.9	93.8	118.8	116.1
	Public consumption, other 0-19	90.0	86.7	122.1	101.3
	Public consumption, other 20-64	92.9	102.9	86.2	125.7
	Public transfers, inflows 0-19	98.7	106.9	91.2	101.9

HOW ARE PUBLIC REVENUES AND EXPENDITURES RELATED TO DEMOGRAPHIC AND INSTITUTIONAL CONTEXTS IN THE EU-25 COUNTRIES?

■ Research approach

- OLS models with dependent fiscal variables (GGE—general government expenditure and GGR—general government revenue) explained by support ratios: Demographic Support Ratio (DSR) and General Support Ratio (GSR)
- Cross-sectional (current for EU countries)
- Historic time series for countries with historic NTA profiles
 - Panel data
 - Individual countries

CROSS SECTIONAL MODEL, 1995 AND 2014 GG EXPENDITURE EXPLAINED BY DEMOGRAPHIC AND ECONOMIC SUPPORT RATIO



Note: GSR assumes 2010 age profiles of consumption, asset-based transfers and labour income

RESULTS OF PANEL REGRESSIONS WITH FIXED EFFECTS: PARAMETERS β OF THE REGRESSIONS VARIABLES

	Total sample	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Until 2007	After 2007
Model with dependent variable: GGE							
DSR	-0.00736 (0.0188)	-0.00323 (0.0492)	0.0873 (0.0944)	0.154*** (0.0511)	-0.198*** (0.0261)	-0.0978* (0.0534)	-0.143* (0.0775)
Model with dependent variable: GGE							
GSR	0.275 (0.192)	0.393** (0.198)	0.528* (0.311)	0.798*** (0.259)	-0.861*** (0.190)	-0.210 (0.193)	0.422 (0.317)
Model with dependent variable: GGR							
DSR	-0.0214 (0.0389)	-0.0270 (0.0357)	0.0949* (0.0553)	-0.0694* (0.0369)	-0.114*** (0.0179)	-0.0191 (0.0512)	-0.136*** (0.0499)
Model with dependent variable: GGR							
GSR	0.0832 (0.155)	0.0277 (0.173)	0.387 (0.260)	-0.0293 (0.374)	-0.405 (0.267)	0.117 (0.192)	-0.172 (0.210)
Observations	500	120	140	120	120	325	200
Number of countries	25	6	7	6	6	25	25

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

RESULTS OF OLS REGRESSIONS: INDIVIDUAL COUNTRIES' PUBLIC FINANCE IN 1995–2014

Dependent variables:

- General government expenditure (GGE)
- General government revenue (GGR)
measured as % of GDP

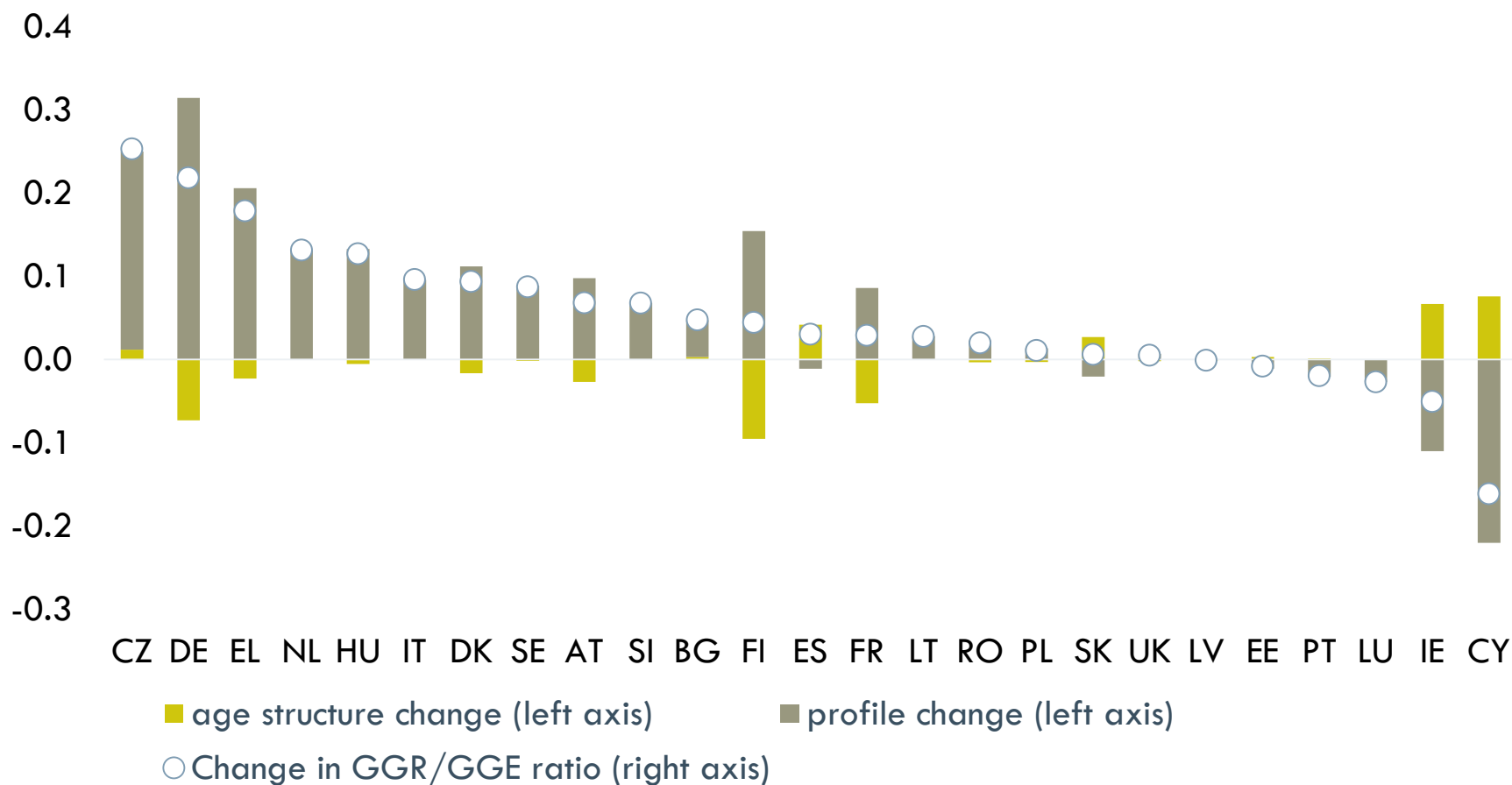
Independent variables:

- DSR
- GSR

	Demographic Support Ratio					
	GGE		R ²	GGR		R ²
CY	0.252	***	0.80	0.195	***	0.69
UK	1.346	***	0.77	0.356	***	0.42
SK	-0.189	***	0.58	-0.126	***	0.66
DE	0.291	***	0.47	0.120	***	0.50
LU	0.349	***	0.34	0.111	*	0.17
SE	-1.073	***	0.34	-0.314		0.06
FI	-0.709	***	0.34	-0.182	**	0.22
PL	-0.066	**	0.31	-0.078	***	0.46
RO	0.165	**	0.29	0.082	**	0.22
HU	-0.104		0.18	-0.025		0.01
FR	-0.464	***	0.14	-0.602	*	0.67

	General Support Ratio					
	GGE		R ²	GGR		R ²
CY	1.357	***	0.85	1.044	***	0.72
FR	-1.617	***	0.83	-0.894	***	0.71
SK	-1.535	***	0.62	-1.055	***	0.74
EL	1.774	***	0.58	1.174	***	0.50
PT	1.240	***	0.57	0.778	***	0.59
AT	-5.253	***	0.47	-2.138	***	0.35
DE	2.173	***	0.41	0.750	**	0.31
DK	-1.703	***	0.35	-0.607	**	0.30
PL	-0.623	***	0.34	-0.723	***	0.49
LU	1.563	***	0.32	0.281		0.05
UK	3.153	**	0.27	1.739	***	0.64

FISCAL SUPPORT RATIO EVOLUTION: IMPACT OF AGE STRUCTURE AND PROFILE CHANGES 1995–2014



FUTURE CHANGE IN SUPPORT RATIO AND PUBLIC FINANCE ADJUSTMENT IN THE PAST

	GSR change 2014–2070		
	0-10 p.p	10-15 p.p.	15 and more
Fiscal pressure	FR DK		AT PL SK
Fiscal adjustment	CY UK	EL PT	DE
Results not significant	FI IE LT LV SE	BG EE ES HU IT LU NL RO	CZ HU SI

SUMMARY

- The general support ratio (GSR) depicted better than the demographic support ratio (DSR) past changes in general government expenditure and revenue
- Both support ratios are positively correlated with expenditures in Cluster 3 and negatively correlated with expenditures in Cluster 4
- Some countries adjust their age profiles and public expenditure to upcoming population ageing, while other are lagging behind
- If current policies are continued, it will lead to further increases in fiscal pressures due to progressing ageing