



# **The redistributive effects of fiscal policy**

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**Views expressed do not necessarily represent the views of the European Commission**

# Acknowledgement

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# Outline PFR 2017

## I. Current developments and prospects

## II. Recent developments in fiscal surveillance

## III. Impact of fiscal policy on income distribution, including automatic stabilisers

- distributional effects of fiscal policy
- automatic stabilisers across income groups

## IV. Government investment in the EU: the role of institutional factors

- key drivers of public investment
- monography - five case studies



Focus of today's presentation



# Impact of fiscal policy on income distribution

## Part III

## **Part III:**

# **Impact of fiscal policy on income distribution**

## **Outline**

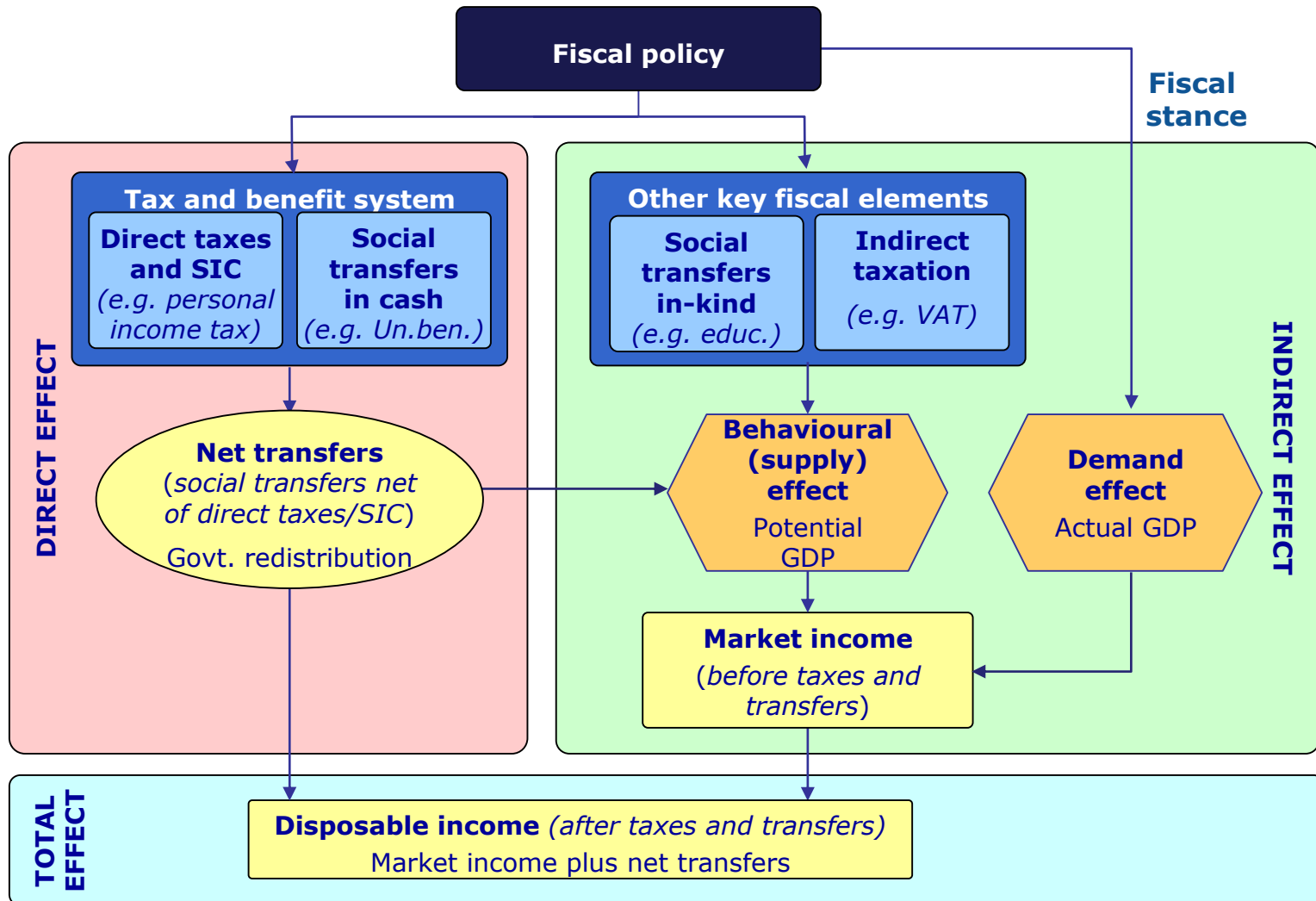
1. Motivation
2. Effectiveness of fiscal policy in reducing inequality
3. Functioning of automatic stabilisers across income groups
4. Conclusions

# 1. Motivation

- **"Excessive" inequality matters for growth**
  - "Mainstream" economic theory: trade-off between equity and efficiency (*Okun, 1975*)
  - However, "excessive" inequality can have negative effects on growth
    - Lower demand (*Galor and Zeira, 1993*)
    - Contribute to under-investment in human capital, lower social mobility and productivity (*Stiglitz, 2012*)
    - Lead to misallocation of resources and rent-seeking (*Alesina and Rodrik, 1994; Alesina and Perotti, 1996*)
- **Social issues are also a priority for the EU** (e.g. European Pillar of Social Rights), although tackling inequality is mainly a national prerogative in the EU

# 1. Motivation

## Distinction between direct and total effects of fiscal policy on inequality



## Sizeable direct effects of the tax and benefit system on inequality reduction

Largely depend on size and progressivity of sub-components

- **Cash transfers**
  - ✓ Pensions: low progressivity, redistribution across time rather than across income groups
  - ✓ Family and housing allowances: more progressive, but smaller
  - ✓ Some countries: smaller transfers but more means-tested, same redistributive power
- **Taxes**
  - ✓ Direct taxes generally progressive; some countries *de jure* very progressive, *de facto* with large tax loop holes

**Cash transfers have greater direct distributive effects than direct taxes:  
3/4 of income inequality reduction from transfers**



# 1. Motivation

## But total effects of the tax-benefit system on inequality are less clear cut

### Higher taxes can trigger disincentives

- **Competitiveness losses, unemployment -> inequality**
  - ✓ Tax wedge: depending on LM functioning, high income earners can bargain -> inequality
  - ✓ Tax loop holes as electoral response -> inequality
  - ✓ Tax evasion/fraud -> inequality

### Dis-incentive effects from cash benefits

- **depend on institutional factors.** Example: social benefits in the framework of ALMP

**Overall, possible to design a tax-benefit system that reduce inequality in the long run (if dis-incentives factored-in)**

## The distributive effects of social transfers in kind

**Key social transfers in kind:** Education, health, other transfers in kind (social protection) (childcare, housing)

**Sizeable budgetary impact:** *13% of GDP in 2016 (6.5% in CY, 19.1% in SE)*

**Can contribute to reduce (future market) income inequality, e.g.**

- Education (early childhood and schooling)
- Well-designed ALMP, professional & vocational training
- Health and long-term care

**But:**

- Effects take longer than cash benefits
  - Effects also not negligible on "current" inequality + other immediate effects e.g. activation policies via childcare
- need to be well-designed and financed in a growth-friendly manner

## The distributive effects of indirect taxes

**Indirect taxes** (consumption taxes: *VAT, excise duties*)

- Key component of public revenues (second after income taxes)
- Generally regressive (relative to income)
- But high income earners pay more (absolute and relative of spending), as they consume more highly taxed goods [annex]

**Possible indirect effects** (*competitiveness, labour supply*)

## **2. Effectiveness of fiscal policy in reducing inequality: What do the data say?**

### **Outline**

#### **a. Direct effects of tax benefit system**

→ Micro data on the tax and benefit system using EU-SILC, 2004-2014

#### **b. Total effects of fiscal policy**

→ Macro data on COFOG from OECD, 1980-2014, panel regressions

### Key indicators and data sources

#### Indicators of inequality

- Gini index of market/gross (excl. tax and benefits) and disposable/net (incl. tax and benefits) income inequality
- Income ratios: S90/S50, S50/S10

#### Indicators of redistribution

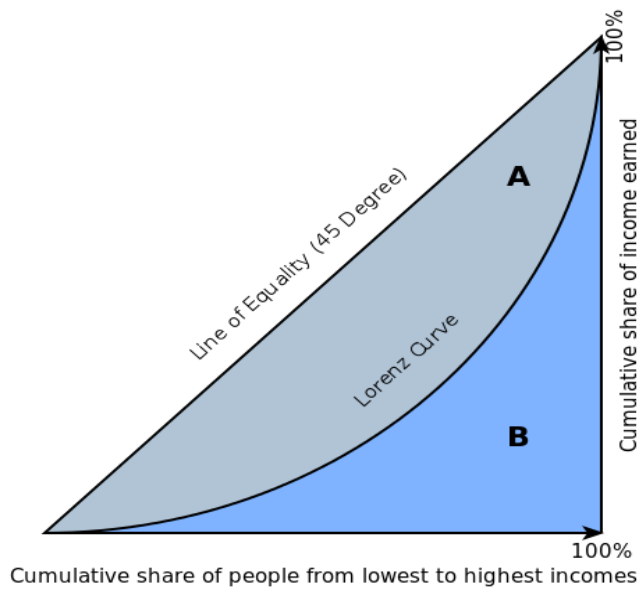
- Difference between Gini market and disposable income
- Gini elasticities: impact of a marginal increase of an income source on the reduction of Gini, keeping all other income sources unchanged

#### Data sources

- Household data (2004-2014): EU statistics on income and living conditions (EU-SILC) database; data for the UK stem from the Family Resource Survey
- Country data (1980-2014): Solt (2016): Standardised World Income Inequality Database (SWIID)

# Gini index – a key inequality measure used here

*Reminder: Key idea of Gini*



- **Gini = A / (A + B)**
- It ranges from 0% (perfect equality) to 100% (max. inequality)

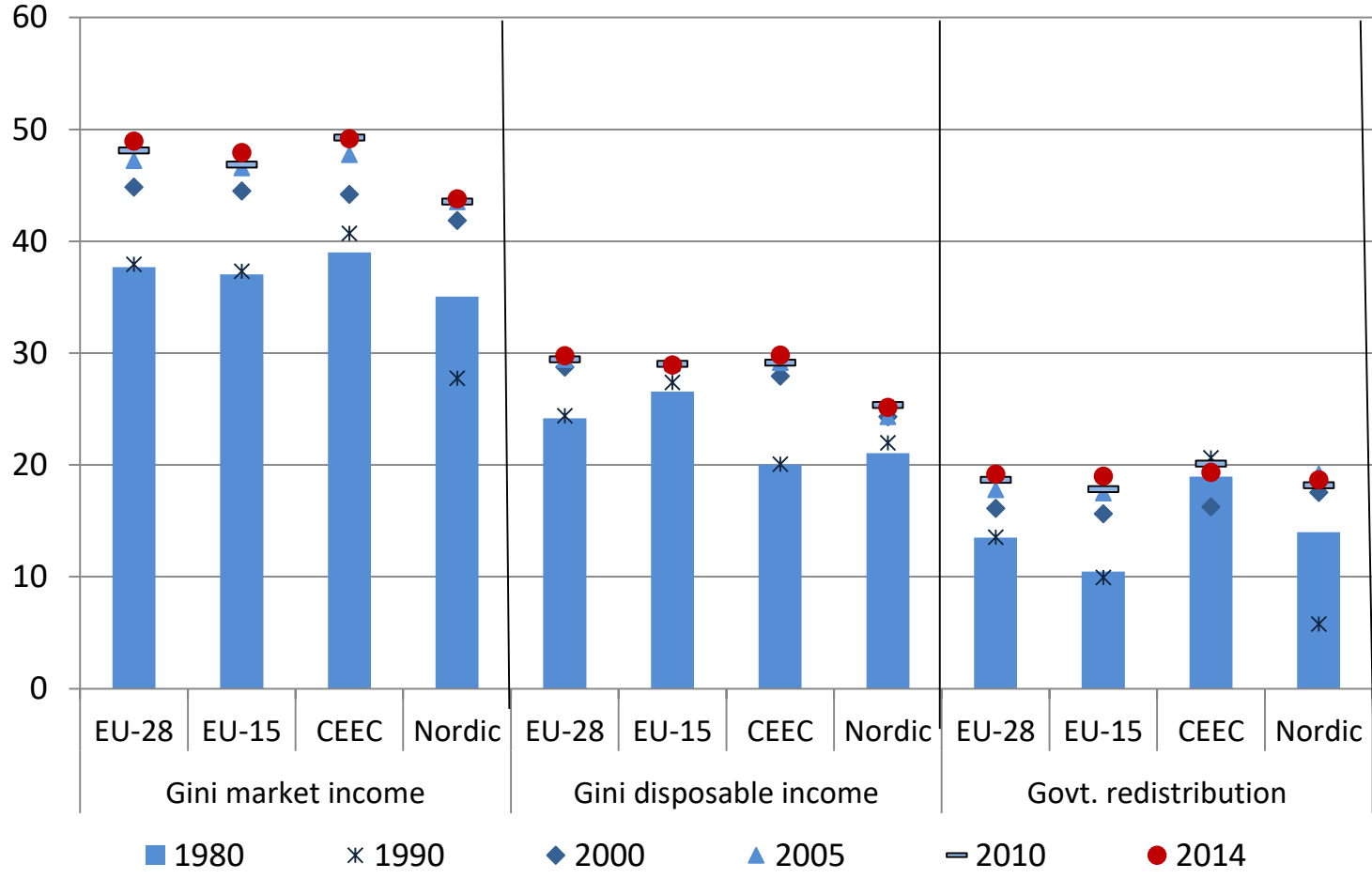
*Illustration: Sensitivity of Gini to changes in household income*

	France		Italy	
	Gini	Change vs. SQ	Gini	Change vs. SQ
Status-quo (SQ)	29.2	-	31.7	-
Scenarios: 100 EUR more for each household with ...				
• S1: Low-income (deciles 1 and 2)	28.5	-0.7	30.8	-0.9
• S2: Medium-income (deciles 5 and 6)	29.0	-0.2	31.4	-0.3
• S3: High income (deciles 9 and 10)	29.6	0.4	32.0	0.3

*Source: European Commission (2017): PFR, p. 84 based on own EUROMOD simulations.*



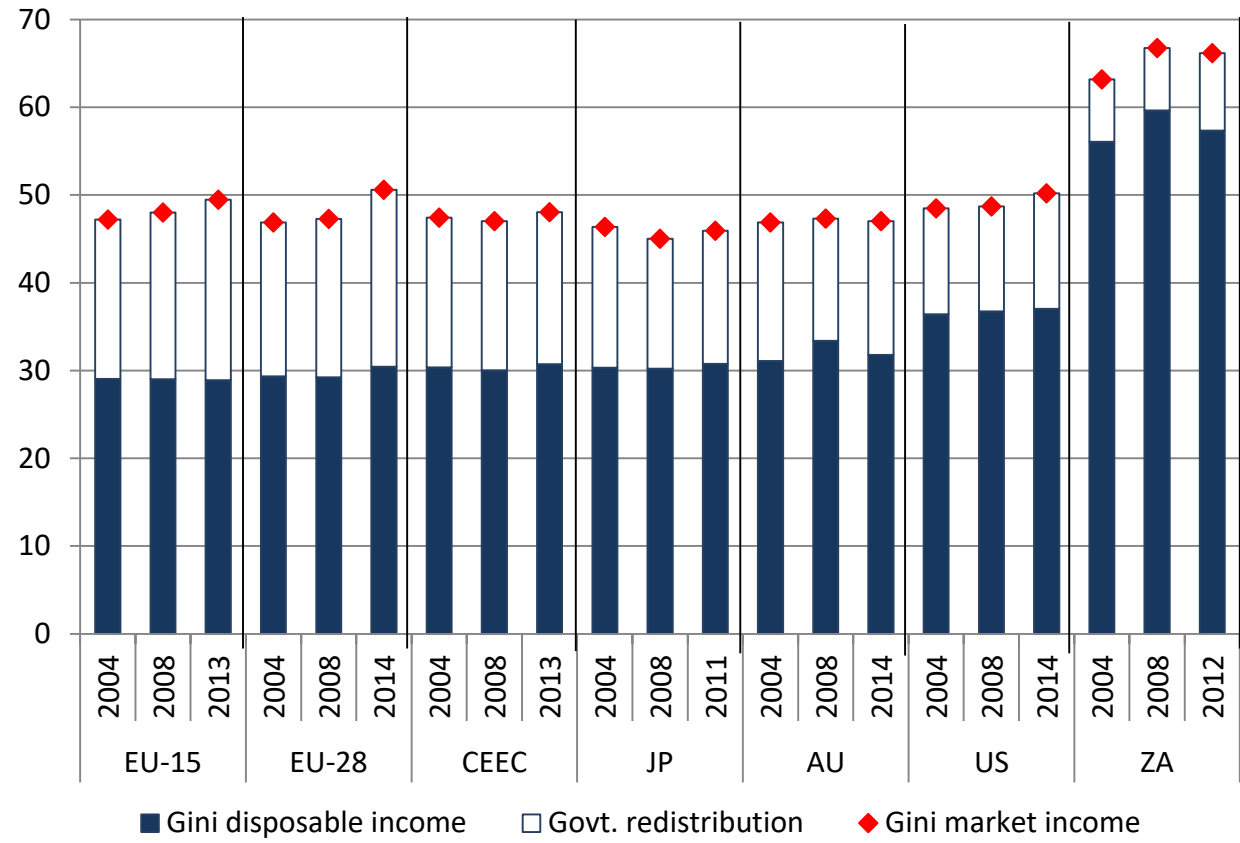
**Inequality in the EU increased strongly in 1990s, but has remained broadly stable since 2000**



Source: Authors' calculations using data from Solt (2016): Standardised World Income Inequality Database (SWIID).



## Market inequality in EU close to US level, but disposable inequality still relatively low

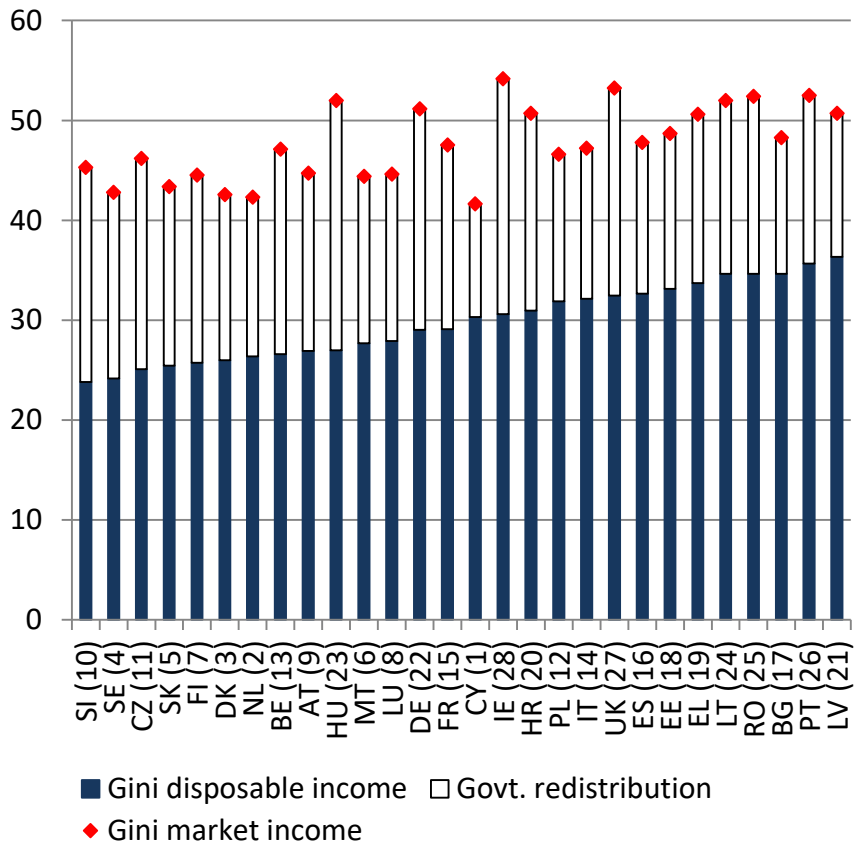


Source: Authors' calculations using data from Solt (2016): Standardised World Income Inequality Database (SWIID).

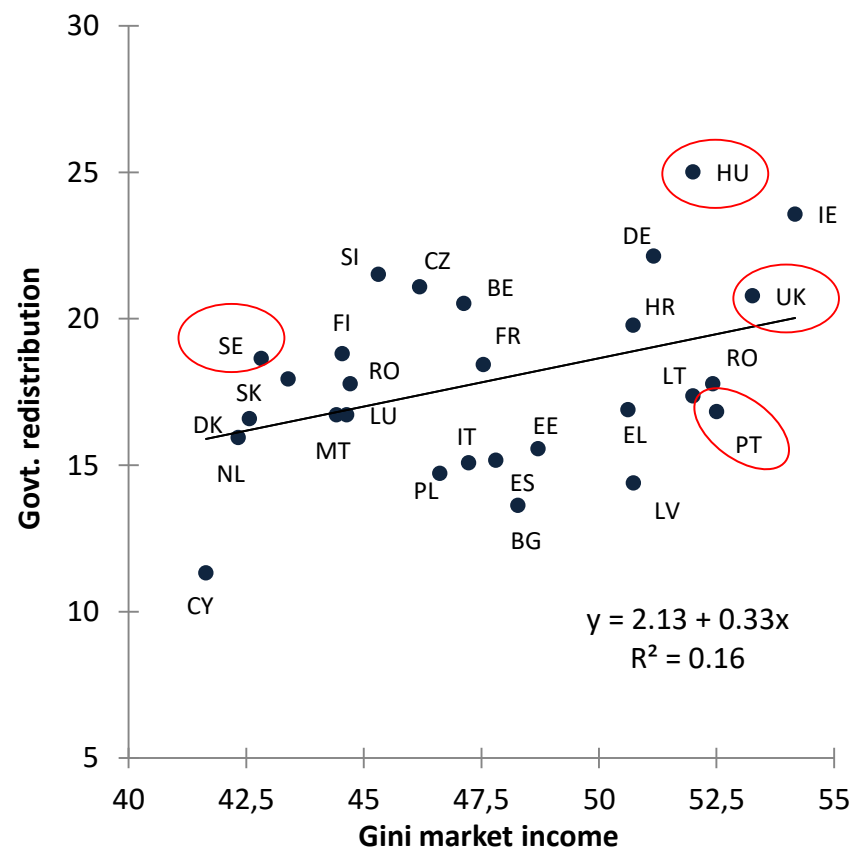


# Sizeable diversity between levels of inequality across EU Member States

**Inequality and redistribution in the EU**  
(average 2004-2014)



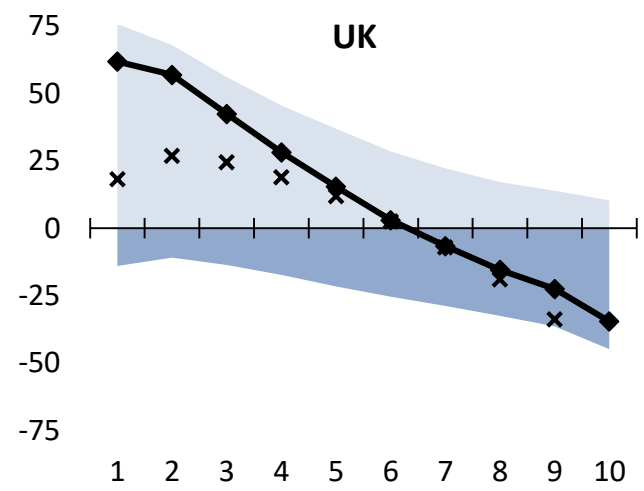
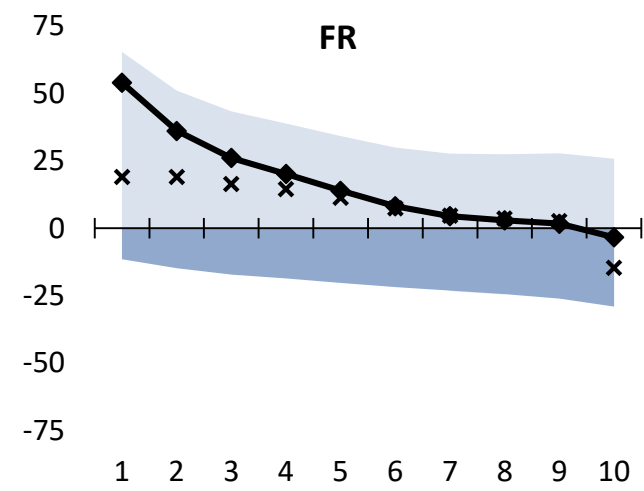
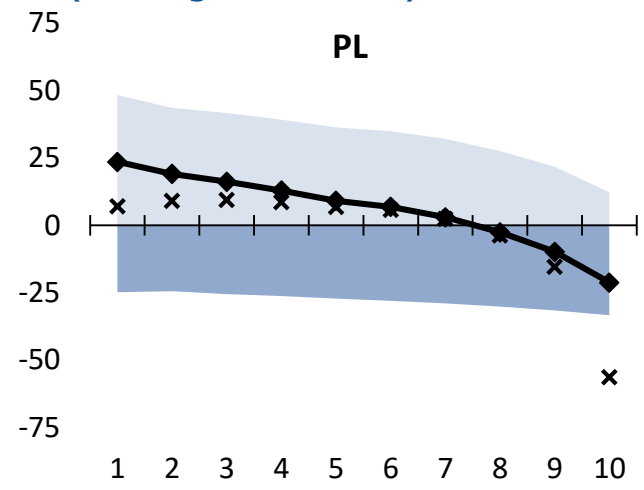
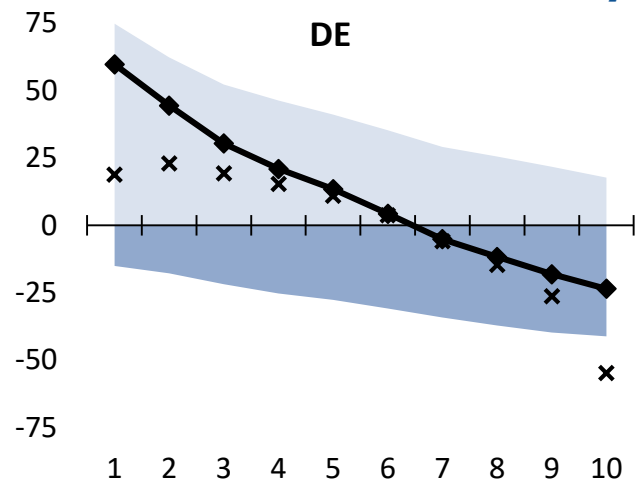
**Relationship Gini market income and redistribution**



Source: Authors' calculations using data from EU SILC.

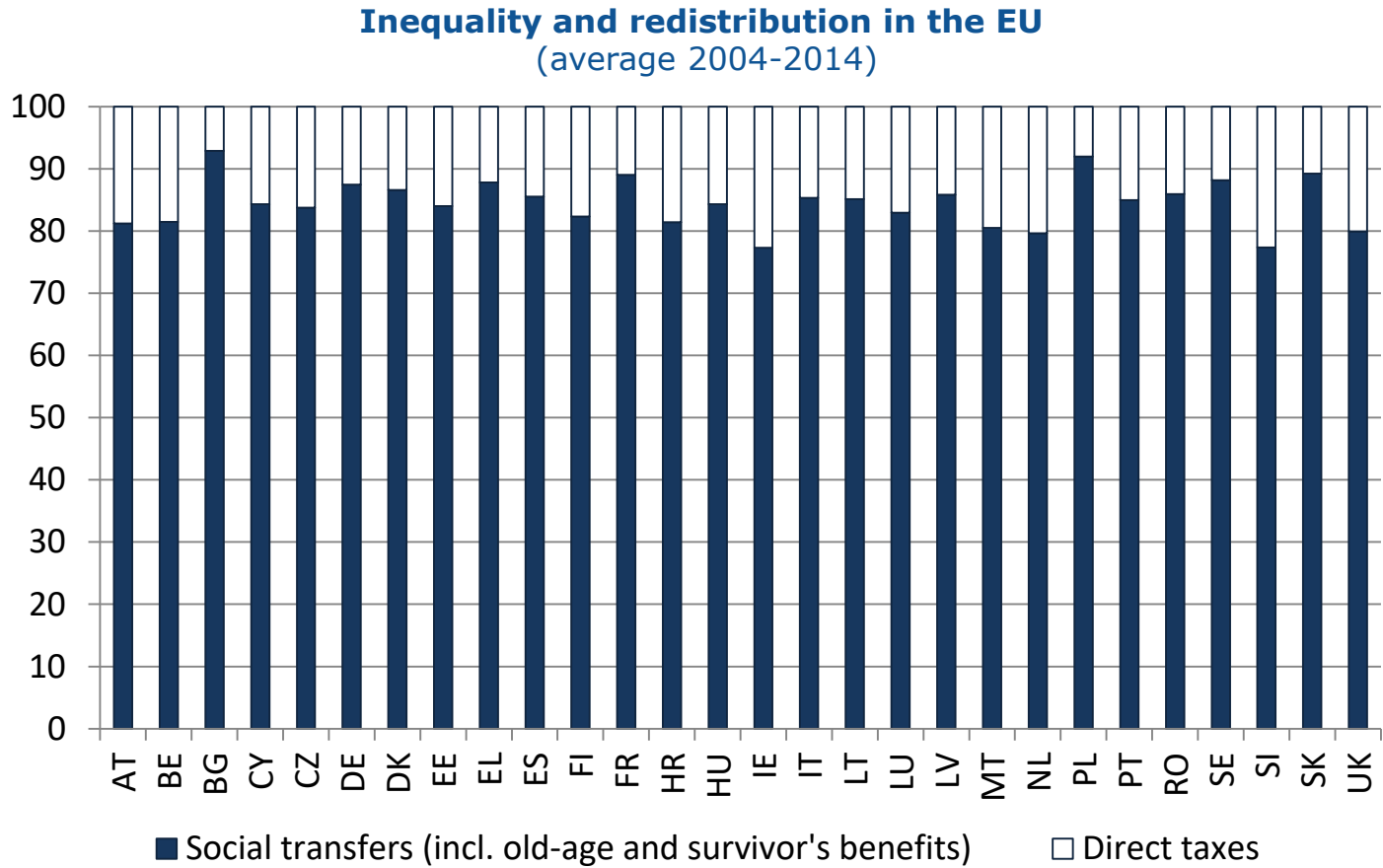
# Low- and middle-income households benefit in particular from redistribution

Net transfers by income decile (average 2004-14)



Social transfers    
  Direct taxes    
 + Net transfers (% decile income)    
 \* Net-transfers (% average income)

## Social transfers have a larger impact in reducing inequality than direct taxes

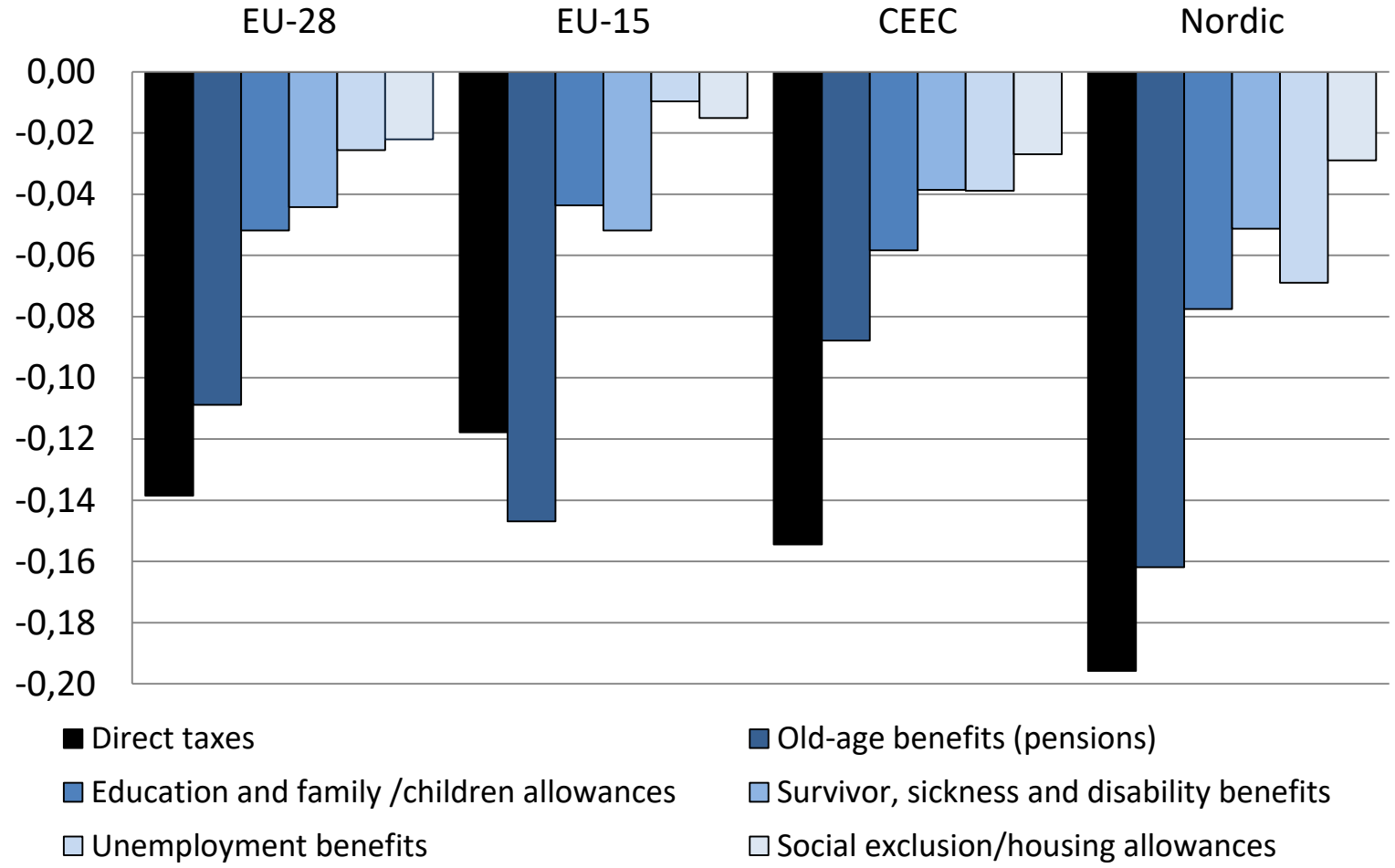


*Note:* This graph shows the contributions to government redistribution, distinguishing between direct taxes and social transfers (including pensions).

*Source:* Author's calculations based on EU-SILC.

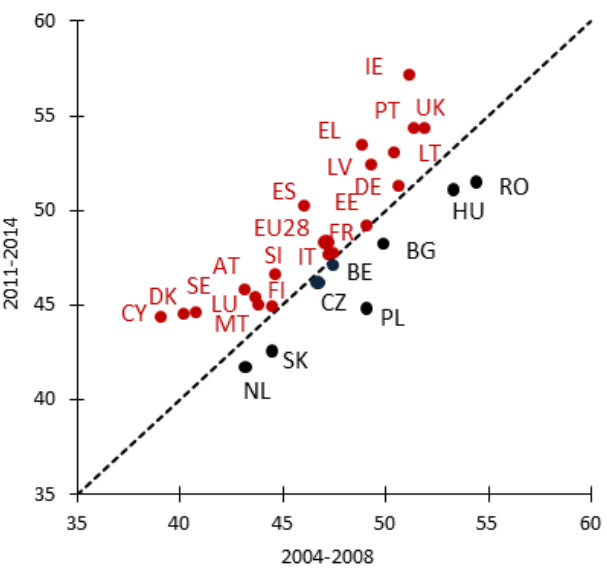
## Effectiveness in inequality-reduction depends on fiscal policy instrument

Gini elasticities in % (average 2004–2014)

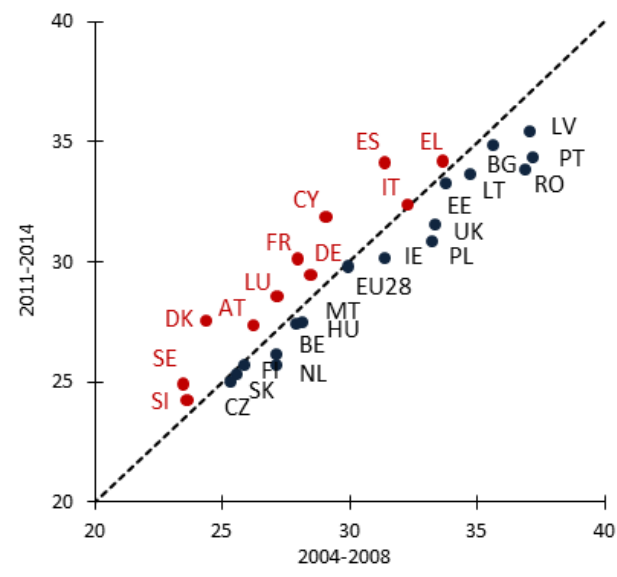


## Market inequality increased after the crisis, but disposable inequality remained broadly stable

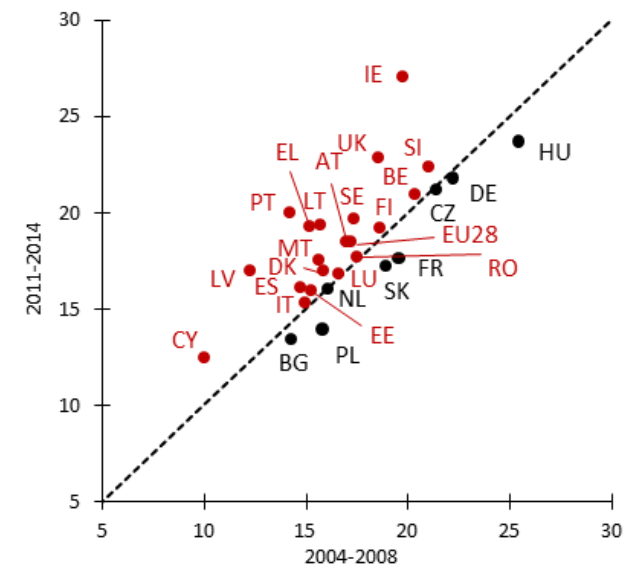
### A. Gini market income



### B. Gini disposable income



### C. Govt. redistribution



# Total effects of fiscal policy on income inequality: a regression analysis

### Starting point

- EUROMOD helpful to analyse direct effects of fiscal policies on inequality
- But it does not control for indirect effects (e.g. macro feedback effects)

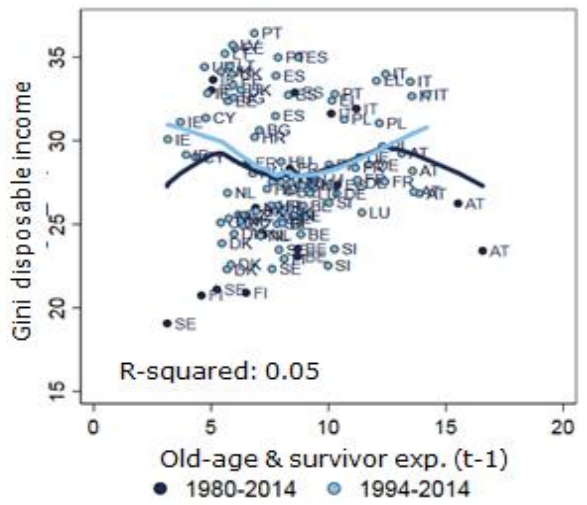
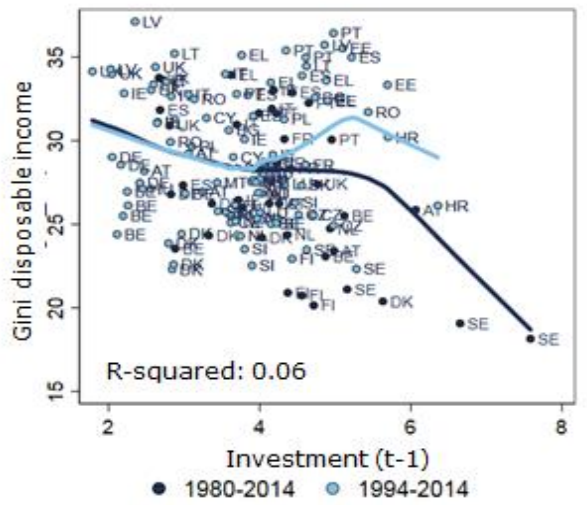
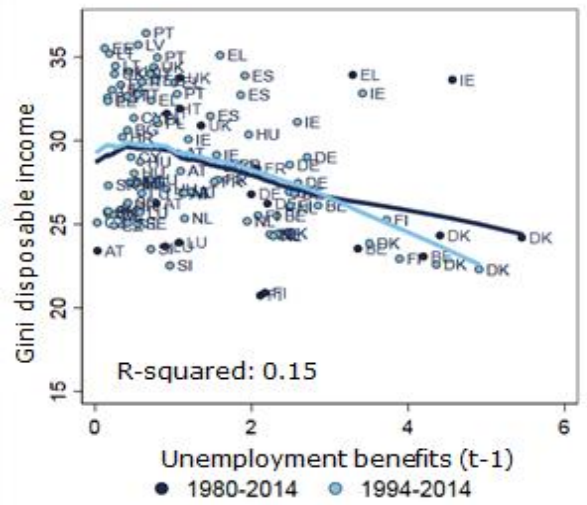
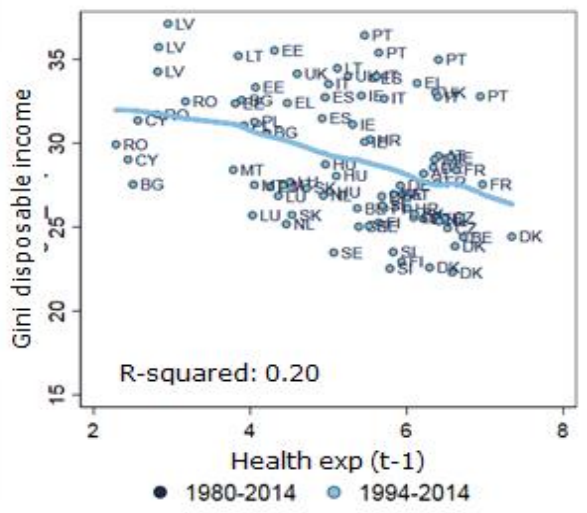
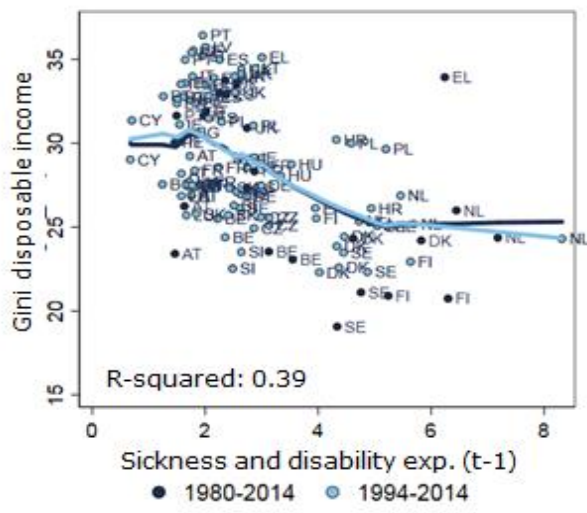
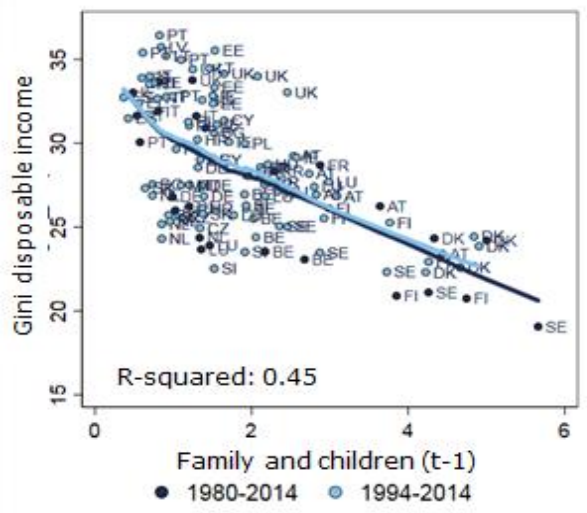
### Key objective of the panel regression

- Aims at identifying causal links between fiscal policy (COFOG) and inequality, while controlling for indirect effects

### What's new?

- New extended OECD data series allow for more precise measures of fiscal policies by functions of government (COFOG series, a bit broader than the sub-components analysed with EUROMOD)

# Relationship between inequality and COFOG fiscal policy items (EU, 1980-2014)



## 2B. Total effects of fiscal policy on inequality

### Estimation approach

- **Key dynamic panel specification**

$$Gini\ DI_{i,t} = \beta_1 Gini\ DI_{i,t-1} + \beta_2 Gini\ MI_{i,t} + \beta_3 COFOG_{it-1} + \beta_4 X_{it-1} + \varepsilon_{it}$$

- Up to 28 EU countries ( $i$ ) and eight 5year-periods bw. 1980 and 2014 ( $t$ )
- $DI/MI$  refers to disposable/market income;  $X$  is a vector consisting of key non-fiscal control variables derived from the literature

- Short-/long-term elasticities:  $\left. \frac{\partial Gini\ DI}{\partial Cofog} \right|^{ST} = \beta_{cofog}$  ;  $\left. \frac{\partial Gini\ DI}{\partial Cofog} \right|^{LT} = \frac{\beta_{cofog}}{(1-\beta_1)}$

- Similar estimation strategy: Barro (2000, JEG), Berg and Nilsson (2010, EJPE), Woo et al. (2016, IMF EconRev)

- **Estimation approach**

- Fixed effects likely to be biased due to endogeneity
- Two-stage system GMM estimator to control for endogeneity
- One-step first difference GMM used in robustness tests



### Key finding: total effects of fiscal policy seem to be smaller than direct effects

- **Some fiscal expenditure variables have had an inequality-mitigating total effect**
  - Education, health expenditures
  - Some benefits (family allowances, sickness and disability)
- **But, indirect effects can weaken the impact of fiscal policy on inequality**
  - Behavioural responses of firms, workers consumers (labour supply)
  - Macroeconomic feedback effects (e.g. high public debt can weigh on growth)
- **Some caveats remain** (e.g. findings only hold for EU on average; inequality a multi-dimensional phenomenon -> omitted variables, collinearities; 5-year averages reduces nbr of observations; impact may only occur with a lagged effect)



### 3. Functioning of automatic stabilisers

## Key focus on functioning of automatic stabilisers

### Two ways to conduct counter-cyclical policies

- **Automatic stabilisers:** Rely on the *existing* legal provisions of the tax and benefits system
  - When the economy grows, tax revenues increase and social benefit payments decrease (→ help prevent the economy from overheating)
  - When the economy slows, tax revenues decrease and social benefit payments increase (→ help stimulate the economy)
- **Discretionary fiscal policy measures**

### Focus here on automatic stabilisers

- **Direct effects on income and consumption** (EUROMOD simulations)
- **Total effects on income, consumption and GDP** (QUEST simulations)

## Direct effects of automatic stabilisers – a microeconomic perspective using EUROMOD

- **Size of automatic stabilisation of income**

$$\tau_h^{micro} = \frac{\Delta Y_h^M - \Delta Y_h^D}{\Delta Y_h^M} = 1 - \frac{\Delta Y_h^D}{\Delta Y_h^M}$$

where  $Y^D/Y^M$  stands for disposable/market income;

It varies between 0% (shock is not absorbed at all by tax and benefit system) to 100% (shock is fully absorbed)

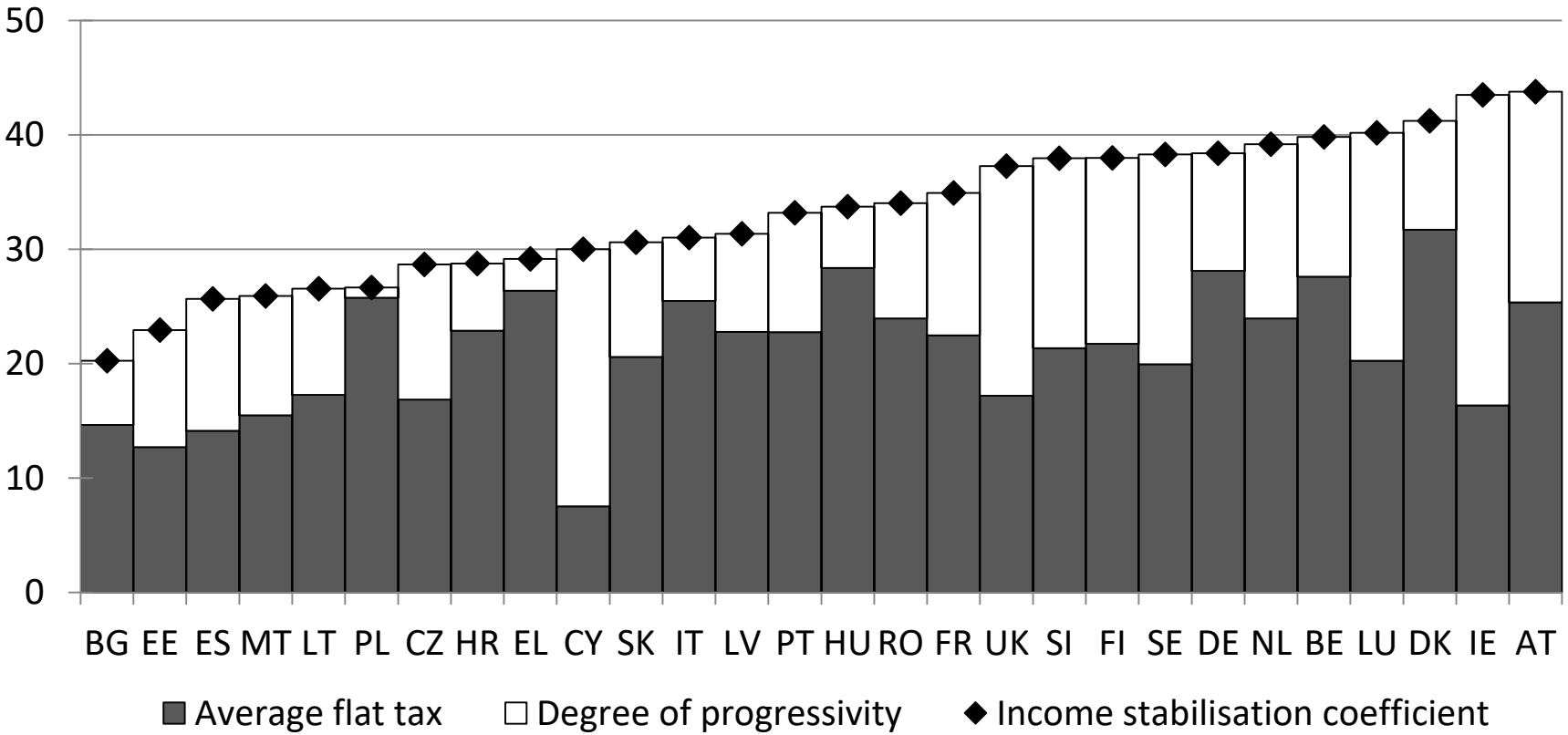
- **Size of automatic stabilisation of consumption/demand**

$$\theta_h^{micro} = 1 - \frac{\Delta C_h}{\Delta Y_h^M} = 1 - \frac{\alpha_h * \Delta Y_h^D}{\Delta Y_h^M}$$

$\alpha$  stands for MPC (taken from Japelli and Pistaferri, 2014);

It varies between 100% (consumption does not react to shock,  $\alpha = 0$ ) to  $\tau^{micro}$ % (consumption reacts fully to shock,  $\alpha = 1$ )

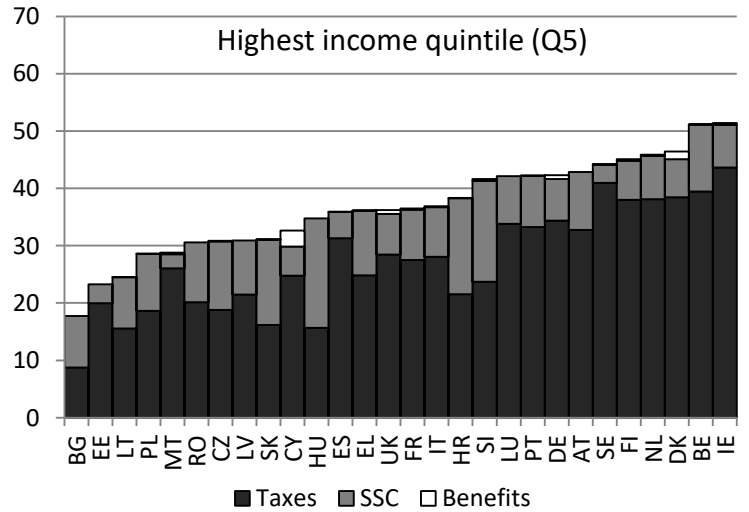
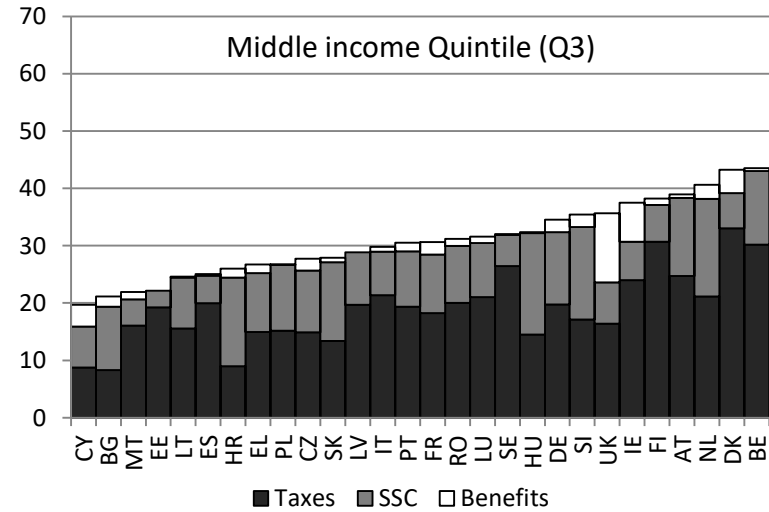
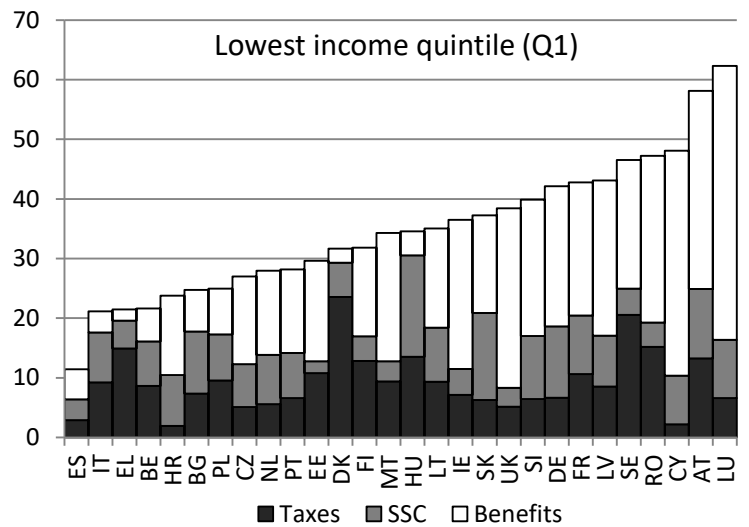
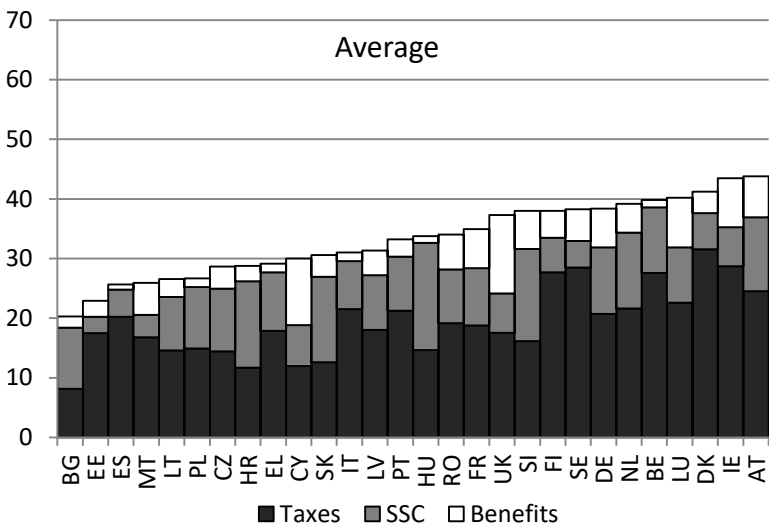
## Size of income stabilisation fairly high in the EU, but sizeable differences across countries



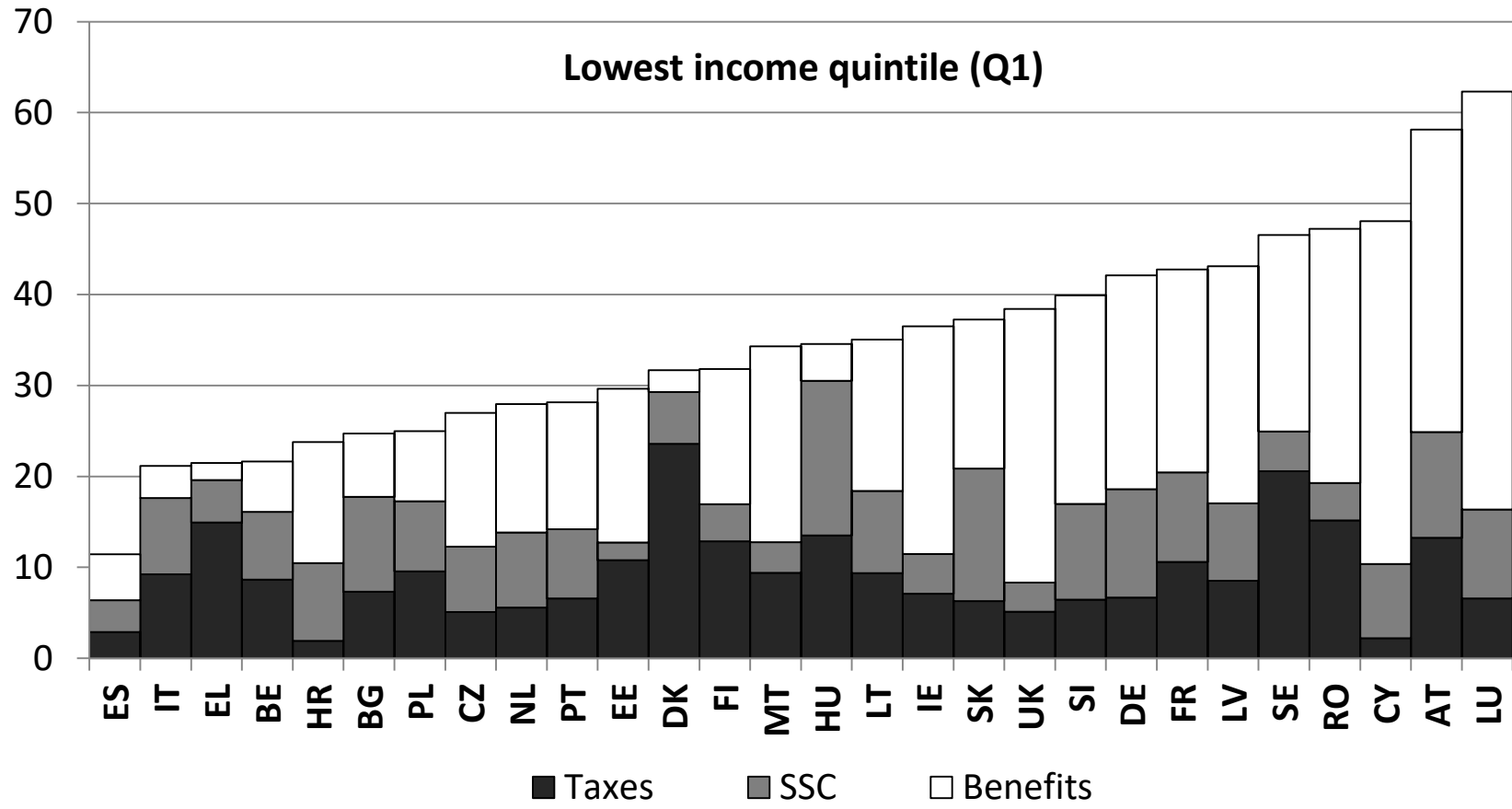
*Memo:* The income stabilisation coefficient measures the share of disposable income which is absorbed following a shock to market income due to the tax and benefit system.

*Source:* EUROMOD simulations based on EU SILC data for 2014.

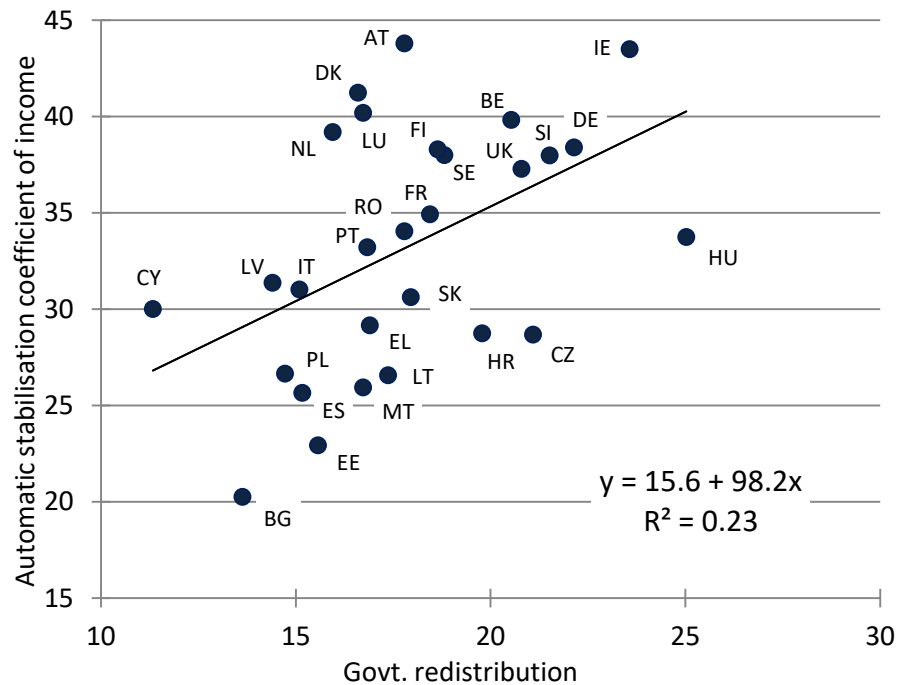
# Stabilisation mostly results from benefits (taxes) for low- (high-)income households



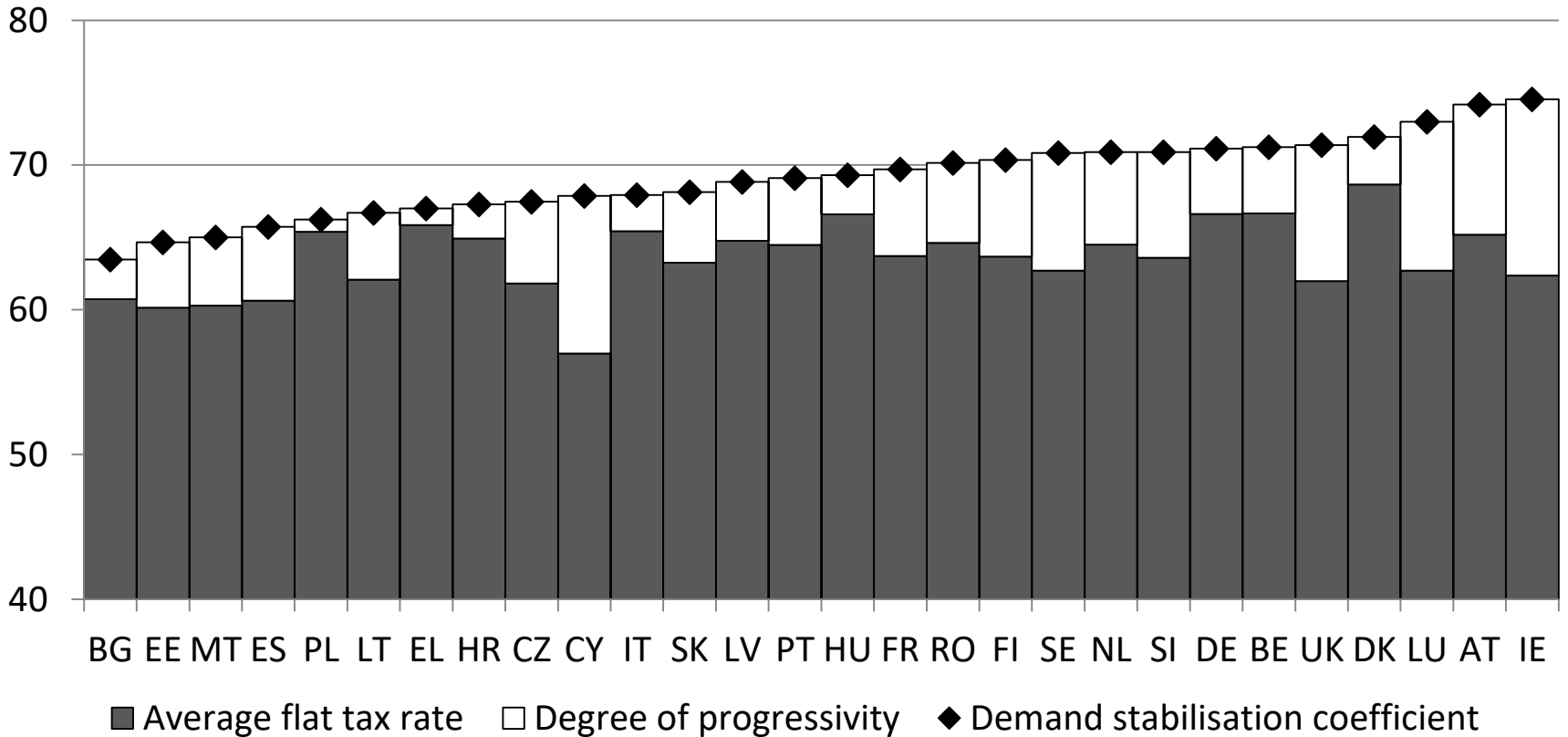
# Stabilisation mostly results from benefits for low-income households



## Weak correlation between income stabilisation and redistribution



## Size of demand stabilisation fairly high in the EU, differences across countries smaller



*Memo:* The consumption stabilisation coefficient measures the share of consumption which is absorbed following a shock to market income due to the tax and benefit system and the marginal propensity to consume (MPC).

*Source:* EUROMOD simulations based on EU SILC data for 2014. MPC indicators are taken from Jappelli and Pistaferri (2014) based on estimates for Italy.



# Total effects of automatic stabilisers – a macroeconomic perspective using QUEST

## Key objective

- EUROMOD helpful tool to analyse the direct automatic stabilisation effects, but it does not control for indirect effects effects)
  - complement the analysis by assessing total effect using QUEST simulations for Italy

## Analysis of automatic stabilisers in QUEST

- Total automatic stabilisation effects in QUEST are derived based on two scenarios:
  - (i) situation where AS are operating as normal,
  - (ii) counter-factual benchmark scenario where AS do not operate
    - Assumption: expenditures and taxes are kept fixed at their baseline level. (robustness: kept constant as a share of GDP)
- Simulations combine the effects of a temporary shock to TFP and exports (mix of supply and demand)

## Total effects of automatic stabilisers – a macroeconomic perspective using QUEST

	Stabilisation coefficients	
	Direct effects (EUROMOD)	Total effects (QUEST)
Disposable income	33.3	29.1
Consumption	69.1	54.8
Real GDP	NA	5.8

### ***Impact of fiscal policy on income distribution***

- Income inequality in the EU on average is today clearly higher than in 1980, but its increase mainly results from an upward shift in the 1990s
- The tax and benefit system had a *direct* effect in reducing income inequality in the EU by almost one-third
- However, *total* effects of fiscal policy on inequality reduction are supposed to be smaller (in particular due to the behavioural responses and macroeconomic effects)

## 4. Conclusions (II)

### *Functioning of automatic stabilisers*

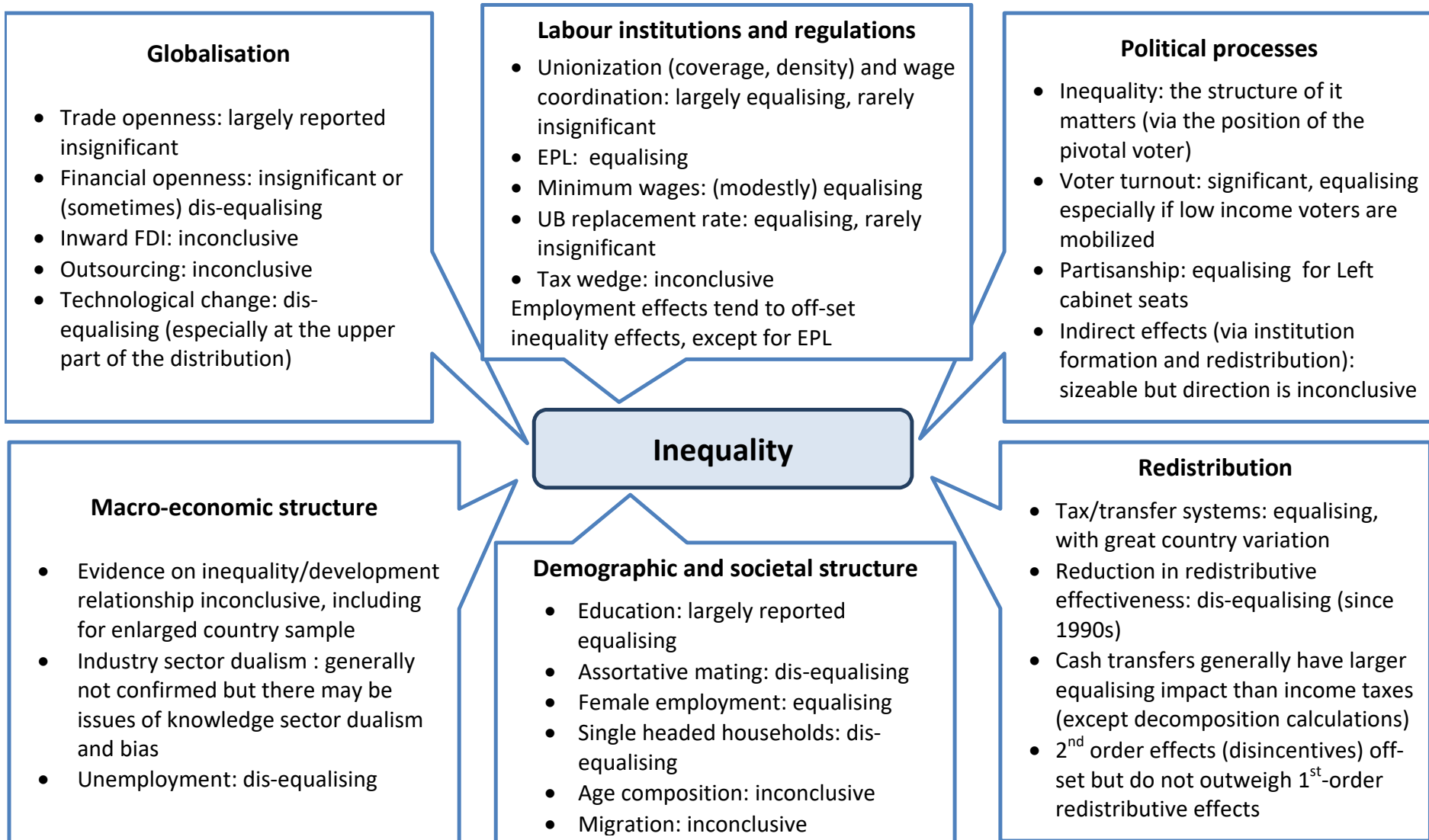
- The degree of *direct* automatic stabilisation is fairly high in the EU in 2014 according to EUROMOD simulations
  - 33% of income variation is absorbed due to the tax benefit system
  - 70% of consumption variation is absorbed due to the tax benefit system and the dissaving behaviour
- The size of *total* automatic stabilisation is smaller than its direct effect as shown for Italy using new QUEST simulations (in particular due to the behavioural responses and macroeconomic effects)



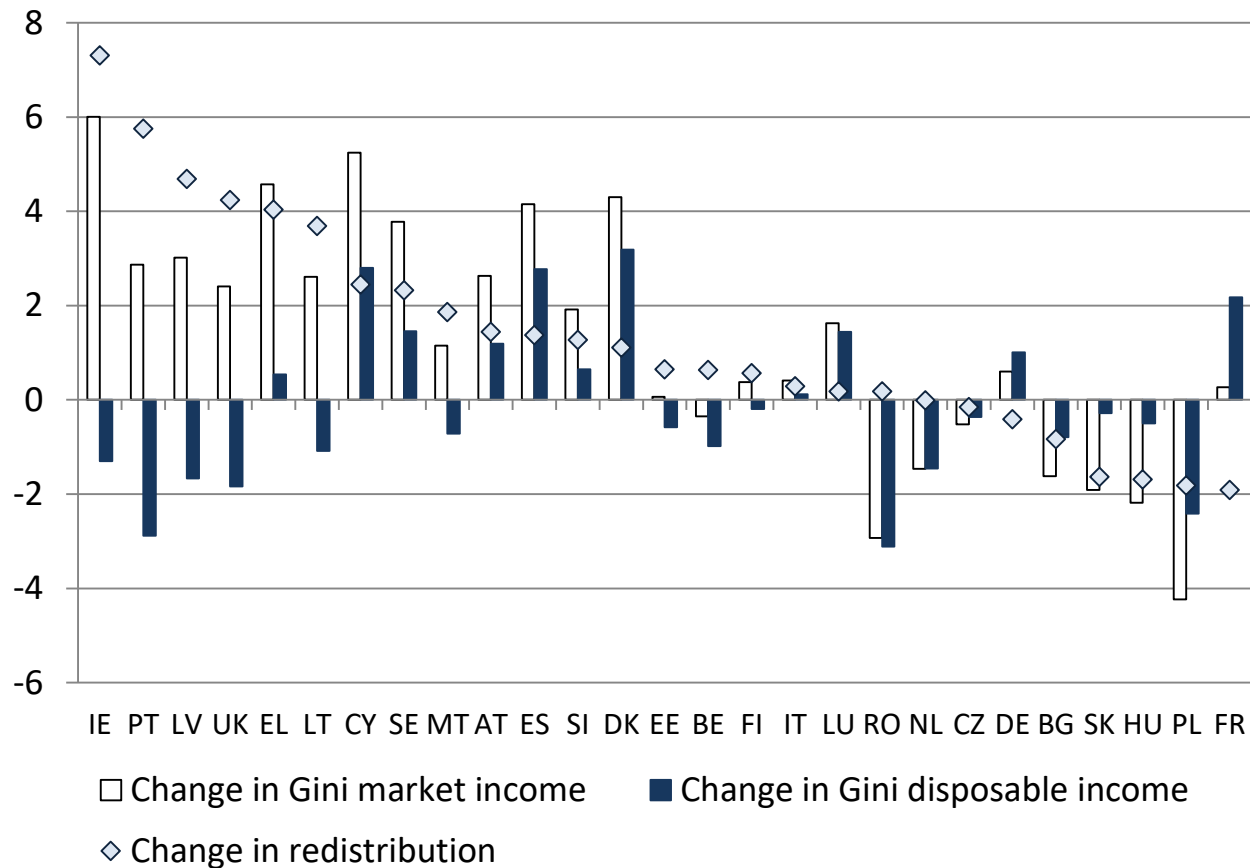
# Background slides

## Part III

# General drivers of inequality: OECD view



## Market inequality increased after the crisis, but disposable inequality remained broadly stable



# Decomposition of Gini elasticities

## (EU28, average 2004-14)

$$\frac{\partial G/\partial e}{G} = \frac{S_k G_k R_k}{G} - S_k.$$

$$R_k = \frac{\sum_k \text{Cov}(Y_k; \text{Rank}_k)}{\sum_k \text{Cov}(Y_k; \text{Rank}_k)}$$

$$G_k = 2 \frac{\sum_k \text{Cov}(Y_k; \text{Rank}_k)}{\text{mean\_income}_k}$$

$$S_k = \frac{\text{mean\_income}_k}{\text{mean\_income}}$$

- share of the income source with respect to total income ( $S_k$ ) (e.g. pensions)
- how equally or unequally distributed the income source is ( $G_k$ ), (e.g. if the income is equally distributed ( $G_k = 0$ ), it cannot influence inequality);
- the correlation of the income source with the distribution of total income ( $R_k$ ), (e.g. if the income source is large and unequally distributed ( $S_k$  and  $G_k$ ), it may either increase inequality ( $R_k$  is positive and large) or decrease it ( $R_k$  is negative or close to 0))

Source	Gini elasticity	Contributions		
		S	G	R
Direct taxes	-0.14	0.46	0.55	-0.81
Pensions	-0.12	0.34	0.79	0.14
Education, family, children	-0.05	0.07	0.74	-0.12
Survivor, sickness and disability	-0.04	0.08	0.89	-0.01
Unemployment benefits	-0.02	0.04	0.94	-0.04
Social exclusion, housing	-0.02	0.01	0.95	-0.45





# Key findings I: key control variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	FE	First-Diff GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM
ln gini (t-1)	0.294*** (4.999)	0.362** (2.115)	0.258** (1.981)	0.325** (2.372)	0.597*** (3.486)	0.631*** (5.362)	0.693*** (3.885)	0.673*** (5.361)	0.603*** (4.327)	0.711*** (4.077)	0.588*** (2.639)	0.666*** (4.654)	0.310* (1.734)
ln gini market income (t)	0.477*** (4.505)	0.038 (0.126)	0.187 (0.721)	0.120 (0.477)	0.292 (0.753)	0.376** (2.334)	0.355* (1.700)	0.479** (2.096)	-0.045 (-0.170)	0.337 (0.998)	0.494** (2.340)	0.360** (2.030)	0.775*** (6.966)
ln real GDP pc (t-1)	-0.077 (-1.045)	-0.044* (-1.884)	-0.040* (-1.801)	-0.040 (-0.698)	-0.040** (-2.080)	-0.033*** (-3.232)	-0.034*** (-2.625)	-0.038*** (-3.506)	-0.056*** (-2.791)	-0.038** (-2.480)	-0.036 (-0.975)	-0.035*** (-2.825)	-0.070*** (-4.293)
ln real GDP pc squared (t-1)				-0.025 (-0.087)									
real GDP growth (t)					-0.003 (-0.824)								
ln govt. headline balance (t-1)						-0.349* (-1.897)	-0.371** (-2.118)	-0.500 (-1.261)	-0.094 (-0.249)	-0.108 (-0.161)	-0.234 (-1.410)	-0.389** (-2.315)	-0.323 (-1.430)
ln unemp. rate (t-1)							-0.016 (-0.675)	-0.022 (-0.971)	-0.030* (-1.822)	-0.011 (-0.339)	-0.019 (-0.698)	-0.011 (-0.513)	-0.003 (-0.129)
ln openness (t-1)								-0.013 (-0.795)					
ln part-time work (t-1)									0.031 (1.640)				
ln share pop > 65 (t-1)										0.021 (0.474)			
ln value added high-medium tech (t-1)											-0.016 (-0.670)		
ln govt. left (t-1)												0.024 (1.138)	
ln # school years (t-1)													-0.282** (-2.325)
# observations	153	153	153	153	153	143	143	143	112	143	76	143	143
# countries	28	28	28	28	28	28	28	28	28	28	23	28	28
Max # of obs per country	8	8	8	8	8	8	8	8	6	8	8	8	8
Min # of obs per country	3	3	3	3	3	2	2	2	2	2	2	2	2
Avg # of obs per country	5.5	5.5	5.5	5.5	5.5	5.1	5.1	5.1	4.0	5.1	3.3	5.1	5.1
AR(1) (p-value)		0.03	0.04	0.04	0.0472	0.04	0.05	0.05	0.01	0.06	0.12	0.05	0.09
AR(2) (p-value)		0.32	0.32	0.34	0.190	0.11	0.14	0.15	0.73	0.12	0.94	0.11	0.90
Hansen (p-value)		0.73	0.73	0.74	0.916	0.92	0.87	0.90	0.92	0.80	0.88	0.90	0.67
# instruments		27	27	31	28	28	29	30	31	33	30	30	30

*Note:* The sample includes up to 28 EU countries covering the period 1980-2014 using 5-year average. All estimations include time dummies. Estimation approaches: (1) Fixed effects using heteroskedasticity-robust Huber-White standard errors; (2) Two-step system GMM (SYS-GMM) estimator following Blundell and Bond (1998), controlling for endogeneity of the lagged dependent variable and the real GDP per capita. Due to the small sample size the set of internal instrumental variables is restricted by "collapsing" the matrix of instruments and restricting its lags up to t-4. The standard errors are corrected following Windmeijer (2005). AR(1,2) and Hansen tests confirm the validity of the system GMM specifications. \*\*\*, \*\* and \* denote respectively statistical significance at 1, 5 and 10%.

# Key findings II: Cofog variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM	Sys- GMM
ln gini (t-1)	0.325* (1.686)	0.386* (1.847)	0.488*** (3.462)	0.380** (2.394)	0.385** (2.245)	0.684*** (5.066)	0.576*** (3.031)	0.484** (2.301)	0.648*** (2.577)	0.333* (1.910)	0.424** (2.530)	0.408* (1.789)
ln gini market income (t)	0.603*** (3.698)	0.701*** (4.742)	0.591*** (5.951)	0.540*** (3.105)	0.902*** (4.950)	0.543** (2.255)	0.603*** (4.275)	0.818*** (5.045)	0.268 (0.651)	0.673*** (2.982)	0.770*** (4.950)	0.783*** (3.316)
ln real GDP pc (t-1)	-0.073*** (-4.002)	-0.069*** (-4.828)	-0.061*** (-4.519)	-0.048*** (-2.853)	-0.101*** (-3.084)	-0.020* (-1.869)	-0.038* (-1.889)	-0.046 (-1.236)	-0.039** (-2.018)	-0.075*** (-4.576)	-0.046** (-2.237)	-0.075*** (-3.303)
ln govt. headline balance (t-1)	0.442 (0.711)	-0.526** (-2.273)	-0.803*** (-2.804)	0.115 (0.341)	1.073 (1.346)	-0.457 (-1.046)	-0.192 (-0.426)	0.409 (0.952)	-0.376* (-1.813)	0.106 (0.182)	0.371 (0.912)	0.314 (0.461)
ln unemp. rate (t-1)	0.006 (0.260)	0.027 (1.502)	0.021 (1.045)	0.013 (1.189)	0.007* (1.867)	0.023 (1.042)	0.028 (1.024)	0.026 (1.003)	0.024 (0.728)	0.022 (0.767)	0.015 (1.101)	0.031* (1.849)
ln openness (t-1)	-0.012 (-0.437)	-0.005 (-0.301)	-0.018 (-1.422)	-0.017 (-0.788)	0.017 (0.511)	-0.005 (-0.364)	0.001 (0.070)	0.020 (1.166)	-0.016 (-0.404)	-0.010 (-0.286)	-0.007 (-0.264)	-0.003 (-0.094)
ln share pop > 65 (t-1)	0.022 (0.322)	-0.019 (-0.408)	-0.032 (-0.731)	-0.011 (-0.274)	-0.020 (-0.232)	0.012 (0.292)	0.024 (0.403)	0.044 (0.723)	-0.018 (-0.221)	0.027 (0.292)	-0.013 (-0.273)	0.018 (0.240)
ln # school years (t-1)	-0.245** (-2.238)	-0.307** (-2.464)	-0.235* (-1.929)	-0.259*** (-2.712)	-0.152* (-1.863)	-0.052 (-1.542)	-0.172* (-1.758)	-0.108 (-1.264)	-0.154 (-0.943)	-0.250** (-2.110)	-0.165*** (-3.041)	-0.212* (-1.730)
ln education exp. (t-1)		-0.115*** (-2.631)										
ln health exp. (t-1)			-0.058 (-1.577)									
ln other wages/interm cons. exp. (t-1)				-0.078 (-0.992)								
ln old-age & survivor pensions exp. (t-1)					0.067 (1.561)							
ln sickness and disability exp. (t-1)						-0.036** (-2.368)						
ln unemployment benefits exp. (t-1)							-0.011 (-0.867)					
ln family and children exp. (t-1)								-0.044* (-1.890)				
ln subsidies exp. (t-1)									-0.009 (-0.286)			
ln investment exp. (t-1)										-0.026 (-0.743)		
ln other primary exp. (t-1)											-0.033 (-0.911)	
ln property income paid exp. (t-1)												0.015 (0.643)
# observations	143	87	87	77	105	116	106	112	141	140	75	140
# countries	28	28	28	27	27	27	27	27	28	28	27	28
Max # of obs per country	8	4	4	4	6	6	6	6	8	8	4	8
Min # of obs per country	2	2	2	1	1	1	1	1	2	2	1	2
Avg # of obs per country	5.1	3.1	3.1	2.9	3.9	4.3	3.9	4.1	5.0	5.0	2.8	5.0
Short-term effect cofog (size)		-0.115	-0.058	-0.078	0.067	-0.036	-0.011	-0.044	-0.009	-0.026	-0.033	0.015
Short-term effect cofog (p-value)		0.009	0.115	0.321	0.119	0.018	0.386	0.059	0.775	0.457	0.362	0.520
Long-term effect cofog (size)		-0.187	-0.127	-0.125	0.108	-0.115	-0.025	-0.086	-0.026	-0.039	-0.058	0.026
Long-term effect cofog (p-value)		0.001	0.142	0.227	0.192	0.016	0.410	0.010	0.747	0.410	0.263	0.517
AR(1) (p-value)	0.08	0.05	0.07	0.06	0.08	0.04	0.08	0.09	0.06	0.10	0.06	0.12
AR(2) (p-value)	0.85	0.30	0.36	0.28	0.75	0.86	0.88	0.61	0.26	0.99	0.30	0.86
Hansen (p-value)	0.96	0.41	0.98	0.91	0.51	0.63	0.94	0.75	0.91	0.96	0.55	0.98
# instruments	38	26	35	32	28	28	37	31	36	39	29	39

*Note: For more details on the estimation procedure see previous slide.*



# Key findings III: Cofog robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Sys	Sys	Sys	Sys	Sys	Sys	Sys	Sys	Sys
	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM
<b>Control variables</b>									
ln gini	t-1	t-1	t-1	t-1	t-1	t-1	t-1	t-1	t-1
ln gini market income	t	t	t	t	t	t	t	t	t
ln real GDP pc	t-1	t-1	t-1	t-1	t-1	t-1	t-1	t-1	t-1
ln govt. headline balance	t-1	t-1	t-1	t-1	t-1	t-1	t	t	t
ln unemp. rate	t-1	t-1	t-1	t-1	t-1	t-1	t	t	t
ln openness	-	t-1	t-1	t-1	t-1	t-1	t-1	t-1	t-1
ln share pop > 65	-	-	t-1	t-1	t-1	t-1	t-1	t-1	t-1
ln # school years	-	-	-	t-1	t-1	t-1	t	t	t
ln govt. left	-	-	-	-	t-1	t-1	-	t	t
ln personal inc. tax revenues (t-1)	-	-	-	-	-	t-1	-	-	t
<b>Cofog variables (are included one-by-one controlling for the variables listed above)</b>									
	<i>variables are lagged</i>					<i>variables are not lagged</i>			
ln education exp.	-0.056 (-1.282)	-0.053 (-0.970)	-0.116** (-2.544)	-0.115*** (-2.631)	-0.115*** (-2.886)	-0.064* (-1.957)	-0.131** (-2.397)	-0.099** (-2.377)	-0.089** (-1.985)
ln health exp.	-0.062* (-1.696)	-0.054* (-1.728)	-0.021 (-0.577)	-0.004 (-0.100)	-0.029 (-0.793)	-0.101** (-2.527)	-0.078* (-1.700)	-0.077* (-1.700)	-0.116** (-2.501)
ln other wages/interm cons. exp.	-0.082 (-0.570)	-0.063 (-0.708)	-0.103 (-1.024)	-0.078 (-0.992)	-0.072 (-0.744)	-0.057 (-0.950)	-0.15 (-1.468)	-0.028 (-0.279)	-0.082 (-0.985)
ln old-age & survivor pensions exp.	0.069 (1.021)	0.014 (0.484)	0.085 (1.165)	0.067 (1.561)	0.052 (1.054)	0.066 (1.181)	0.018 (0.558)	0.056 (0.884)	-0.008 (-0.302)
ln sickness and disability exp.	-0.044** (-2.519)	-0.036*** (-2.581)	-0.028* (-1.938)	-0.036** (-2.368)	-0.031** (-2.269)	-0.043** (-2.539)	-0.051*** (-2.830)	-0.054*** (-3.082)	-0.061* (-1.886)
ln unemployment benefits exp.	-0.003 (-0.189)	-0.015 (-1.216)	-0.025 (-1.431)	-0.011 (-0.867)	-0.011 (-1.101)	-0.012 (-1.379)	-0.024 (-1.505)	-0.030 (-1.604)	-0.022 (-1.235)
ln family and children exp.	-0.021 (-0.685)	-0.034* (-1.813)	-0.041** (-2.130)	-0.044* (-1.890)	-0.049** (-2.414)	-0.048** (-2.224)	-0.076** (-2.462)	-0.050 (-1.263)	-0.052*** (-2.934)
ln subsidies exp.	-0.013 (-0.525)	-0.013 (-0.526)	-0.029 (-0.766)	-0.009 (-0.286)	-0.027 (-0.926)	-0.024 (-1.462)	-0.023 (-0.738)	-0.023 (-0.884)	-0.029 (-1.630)
ln investment exp.	-0.014 (-0.332)	-0.008 (-0.181)	-0.026 (-0.797)	-0.026 (-0.743)	-0.021 (-0.574)	-0.009 (-0.316)	-0.020 (-0.452)	0.001 (0.018)	0.017 (1.156)
ln other primary exp.	-0.056 (-1.585)	-0.072* (-1.811)	-0.034 (-0.935)	-0.033 (-0.911)	-0.045 (-1.074)	-0.052 (-1.583)	-0.047 (-1.075)	-0.029 (-0.825)	-0.013 (-0.432)
ln property income paid exp.	0.016 (0.901)	0.022 (0.855)	0.014 (0.575)	0.015 (0.643)	0.010 (0.408)	0.014 (0.750)	-0.017 (-0.748)	-0.006 (-0.204)	0.005 (1.610)

*Note: For more details on the estimation procedure see previous slide.*

