Inequality and Economic Growth

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Roadmap of the presentation

1. Growing unequal

2. Beyond GDP: the impact of policies on inequality matters

3. The impact of policies on inequality: trade-offs and complementarities between inequality and growth

Growing unequal

Income inequality on the rise in OECD countries

Increase in Gini coefficient of income inequality
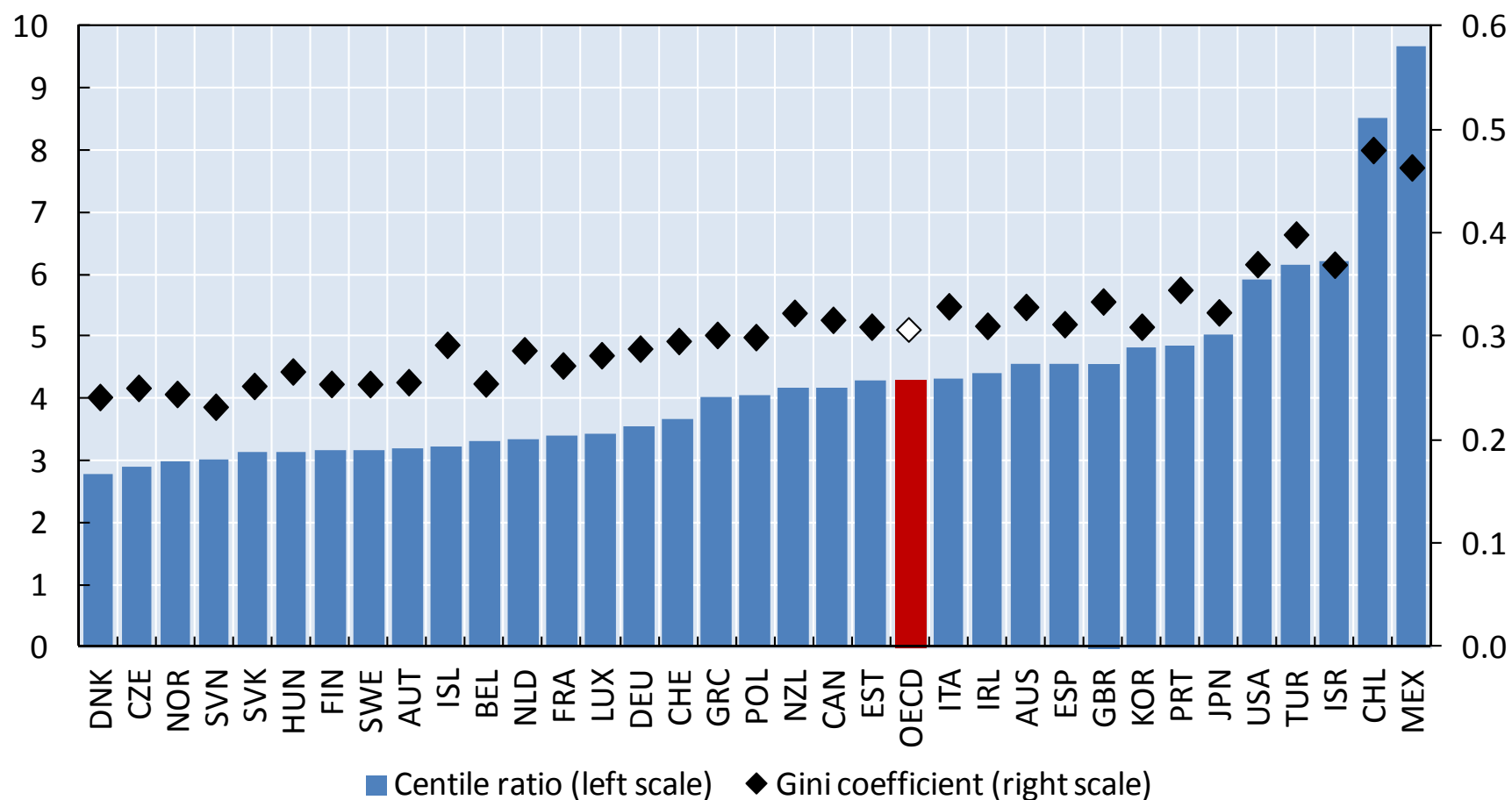OECD average, mid-1980s = 100
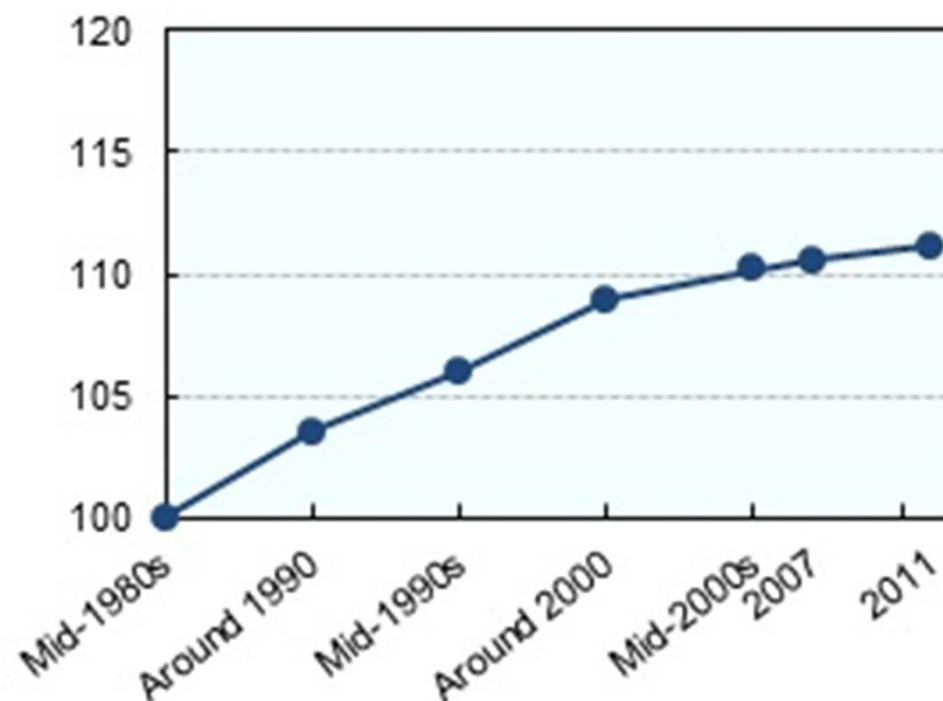
- The average income of the richest 10% of the population is about nine times that of the poorest 10% across the OECD, up from seven times 25 years ago.

Growing unequal

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OECD — BETTER POLICIES FOR BETTER LIVES

Inequality in household disposable income varies considerably across countries

Gap between the 10th and the 90th centile and the Gini index

Household disposable income in the late 2000s

Growing unequal

Legend: ■ Centile ratio (left scale)   ◆ Gini coefficient (right scale)

Countries (x-axis): DNK, CZE, NOR, SVN, SVK, HUN, FIN, SWE, AUT, ISL, BEL, NLD, FRA, LUX, DEU, CHE, GRC, POL, NZL, CAN, EST, OECD, ITA, IRL, AUS, ESP, GBR, KOR, PRT, JPN, USA, TUR, ISR, CHL, MEX
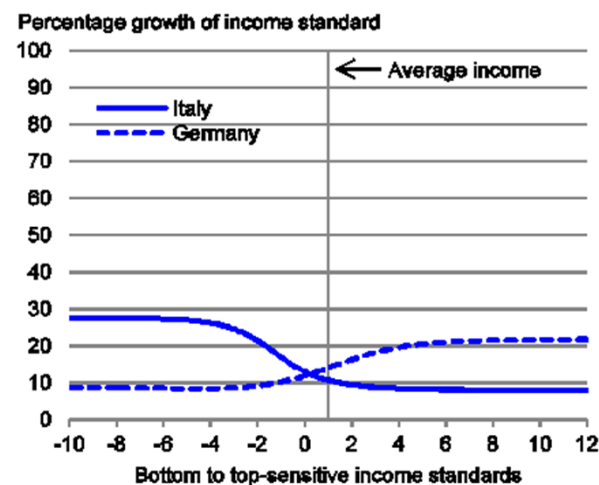
Source: OECD Income Distribution and Poverty Database

Growth across the distribution between the mid-90s and late 2000s
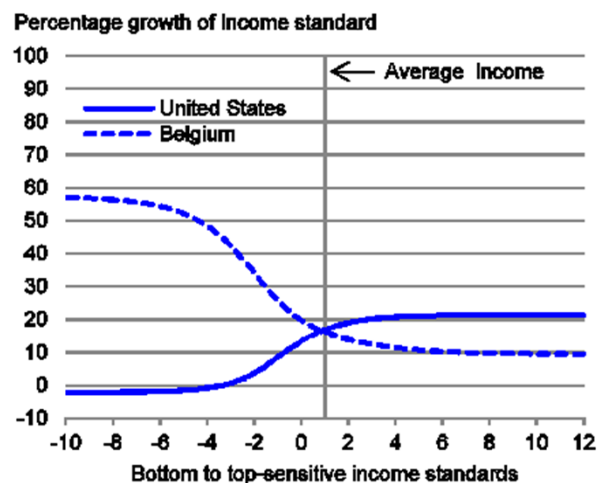
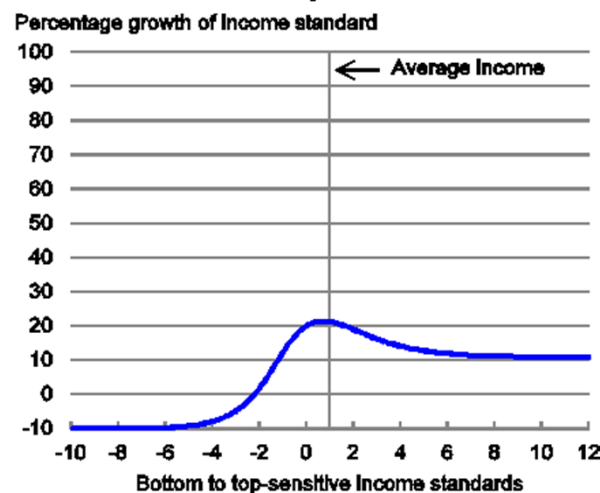**A. Sweden and Turkey**
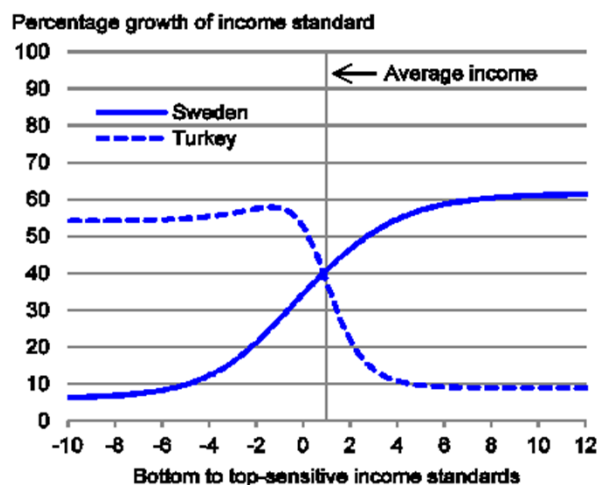
B. Italy and Germany

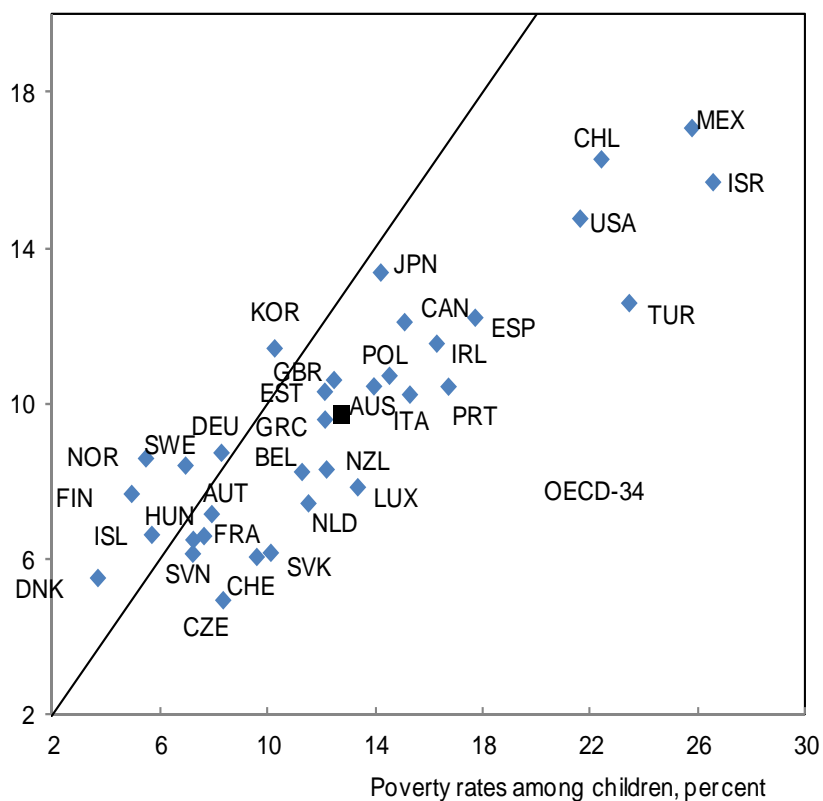**C. United States and Belgium**

D. Spain

Poverty rates among children and retirement-age people are often higher

Late 2000s

Growing unequal

Poverty rates among people of working age, per cent

Poverty rates among children, per cent

Poverty rates among children, per cent

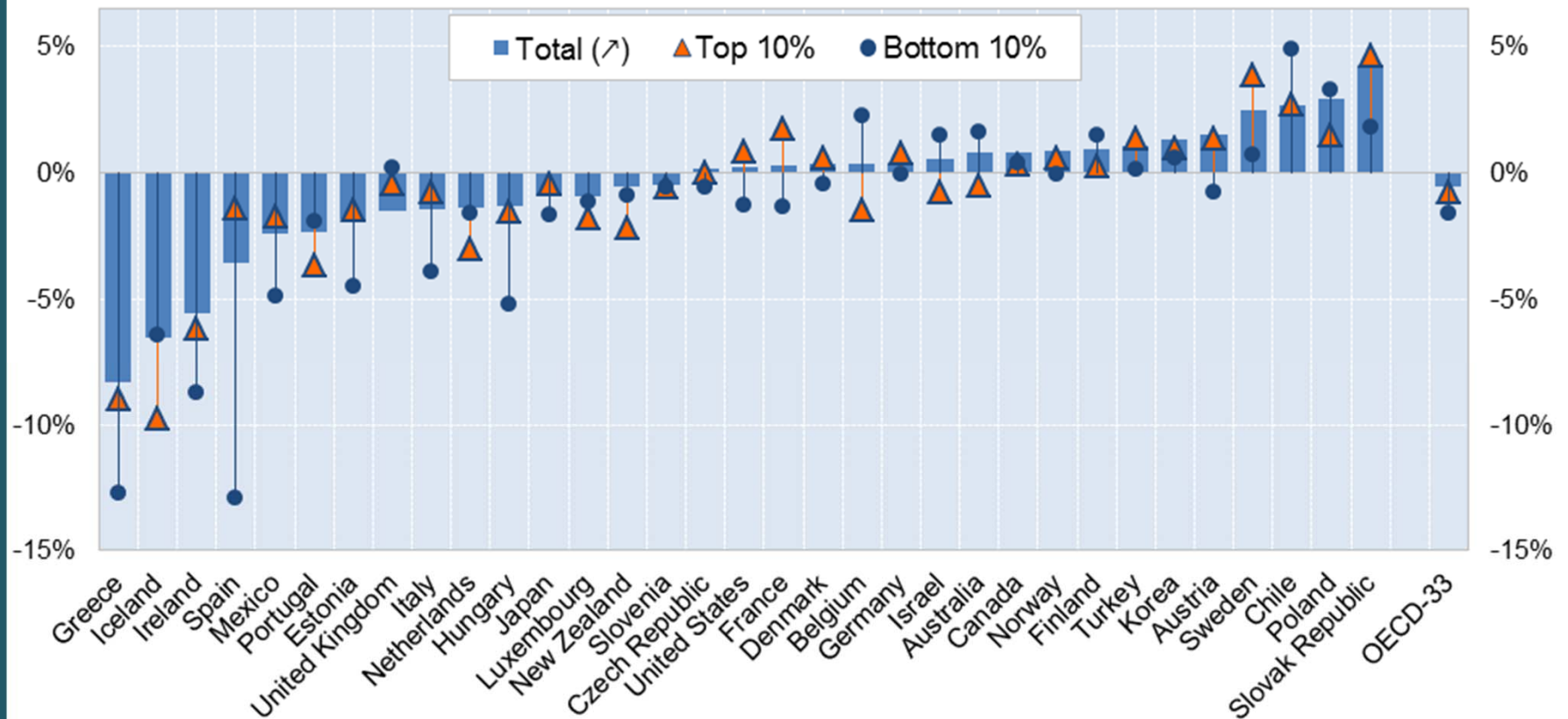Poverty rates among people of retirement age, per cent
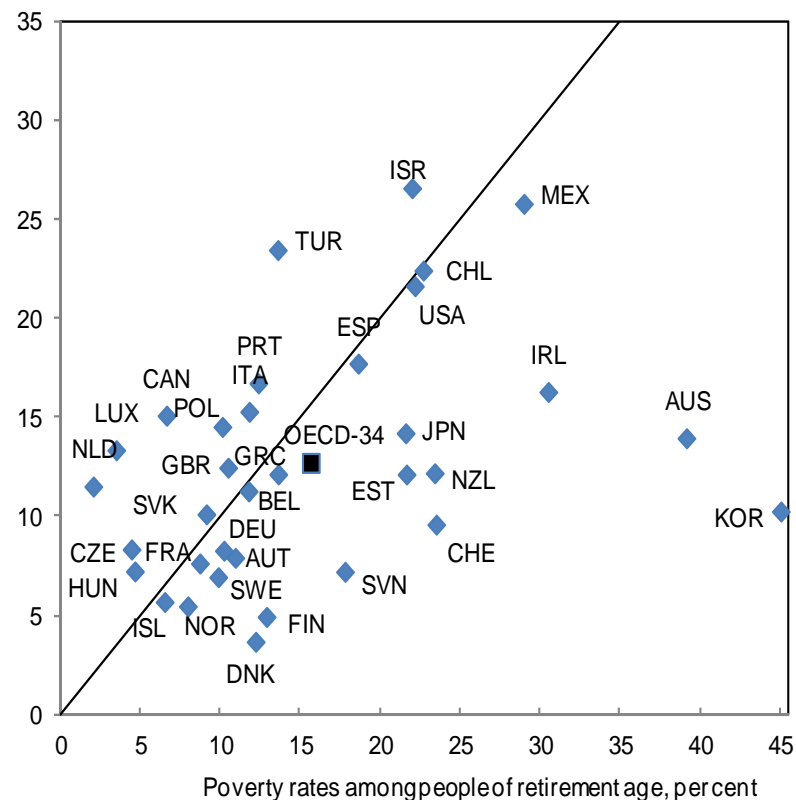
Source: OECD Income Distribution and Poverty Database.
Note: Poverty is measured as the share of individuals with equivalised household disposable income less than 50% of the median income of the whole population.

Poorer households tended to lose more or gain less since 2007

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Growing unequal

Annual percentage changes in household disposable income between 2007 and 2011, by income group

Legend: ■ Total (↗) ▲ Top 10% ● Bottom 10%

Countries (left to right): Greece, Iceland, Ireland, Spain, Mexico, Portugal, Estonia, United Kingdom, Italy, Netherlands, Hungary, Japan, Luxembourg, New Zealand, Slovenia, Czech Republic, United States, France, Denmark, Belgium, Germany, Israel, Australia, Canada, Norway, Finland, Turkey, Korea, Austria, Sweden, Chile, Poland, Slovak Republic, OECD-33

Beyond GDP: the impact of policies on inequality matters

Why such a rise?

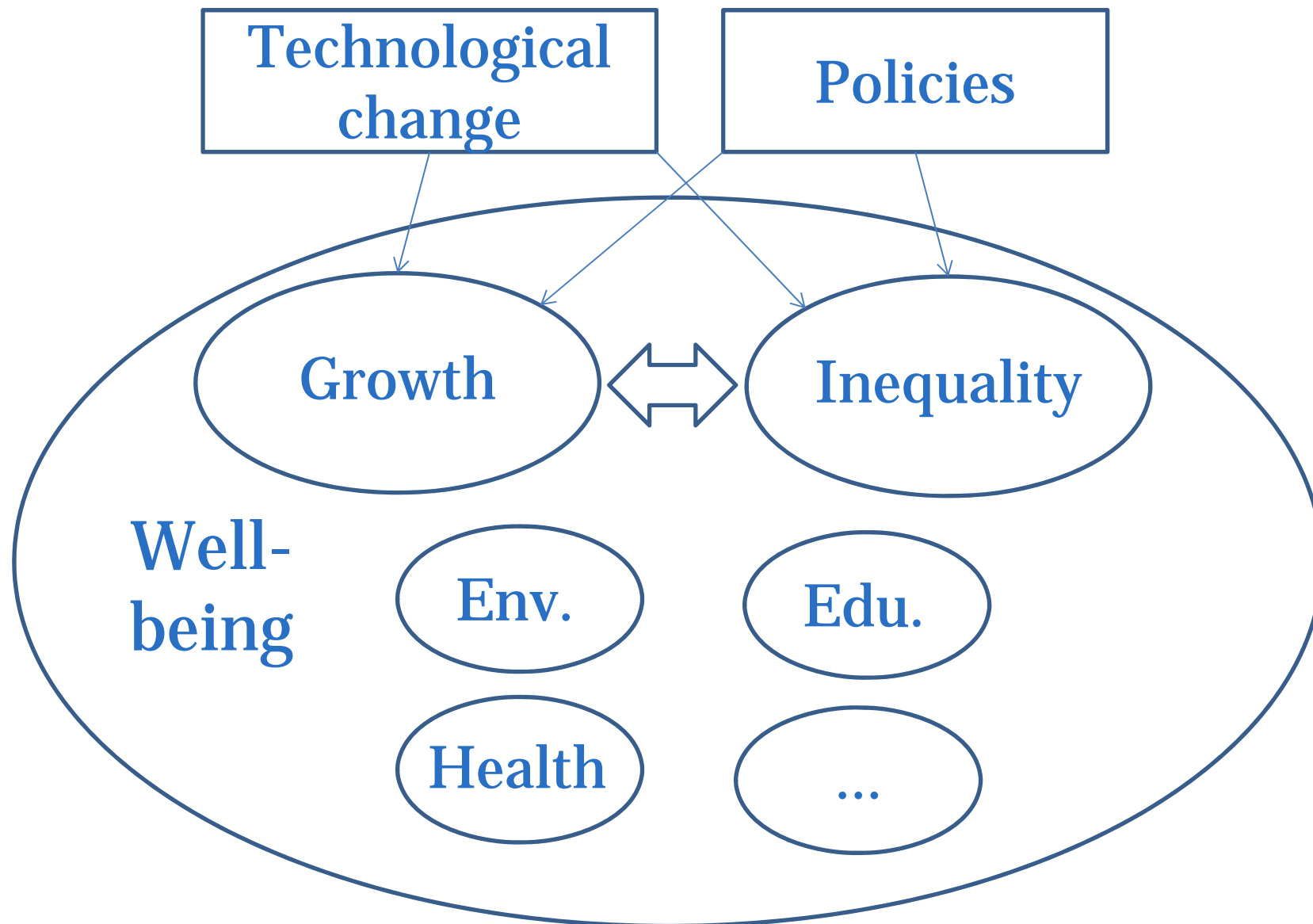**Skill-biased technological change**

- Canonical view (Tinbergen, 1974, 1975; Katz and Murphy, 1992): technological progress raising the productivity and thus wages more for the high-skilled workers.

- Nuanced view (Acemoglu and Autor, 2010): computers are substitute for medium-skilled workers who perform routine tasks.

- "Winner-takes-all" technologies (*e.g.* natural monopoly in the internet economy).

Globalisation

- Offshoring makes labour demand more skill intensive in OECD countries (Feenstra and Hanson, 1996).
- Low-income workers may be concentrated on low-productive firms battered by import competition.
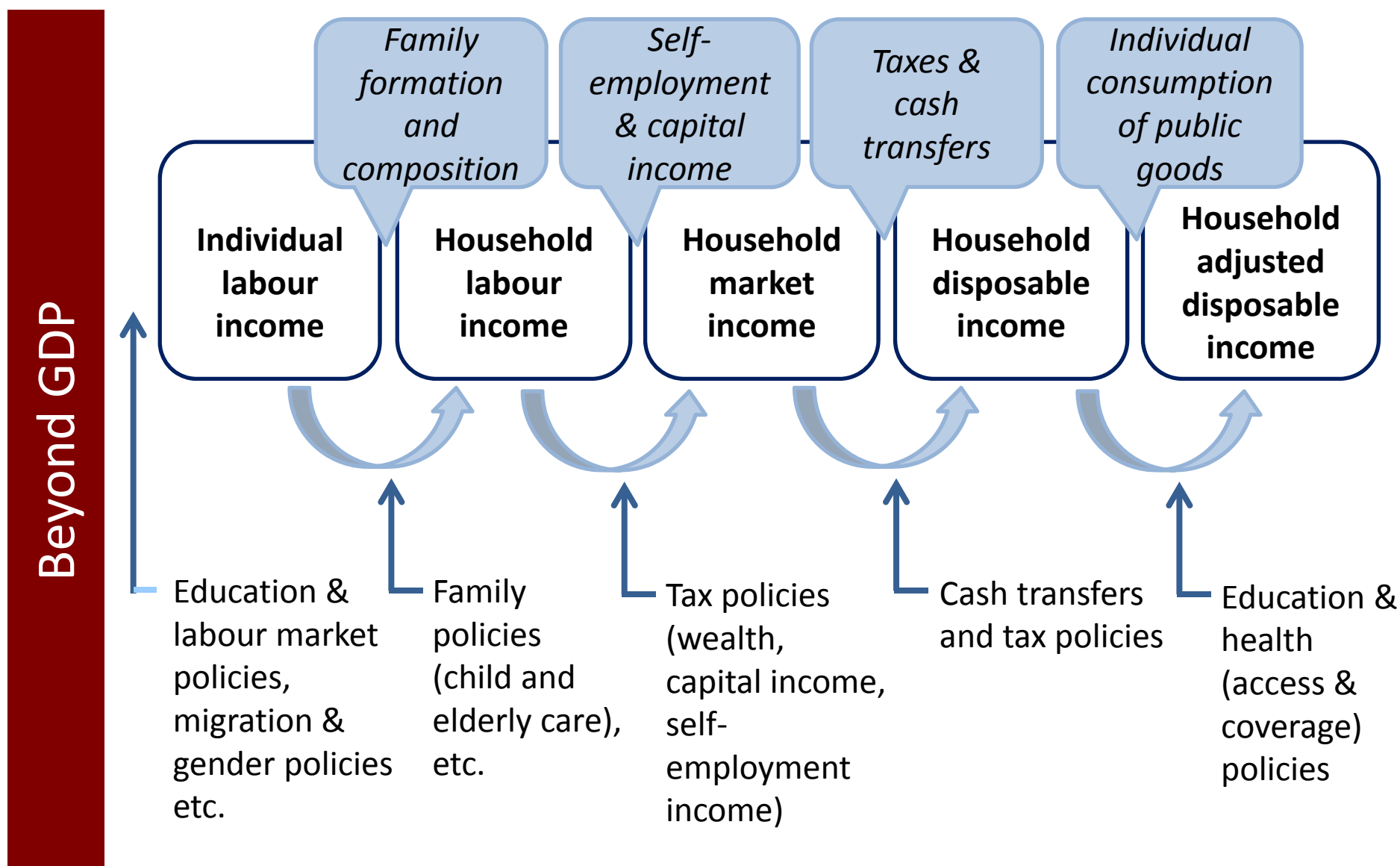- Trade can spur innovation, which is skill intensive.

Policies?

Targeting well being

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Beyond GDP

Technological change

Policies

Well-being

Growth

Inequality

Env.

Edu.

Health

...

Understanding inequality: accounting framework and policy levers

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Beyond GDP

Family formation and composition

Self-employment & capital income

Taxes & cash transfers

Individual consumption of public goods

Individual labour income

Household labour income

Household market income

Household disposable income

Household adjusted disposable income

Education & labour market policies, migration & gender policies etc.

Family policies (child and elderly care), etc.

Tax policies (wealth, capital income, self-employment income)

Cash transfers and tax policies

Education & health (access & coverage) policies

Beyond GDP

Generalised income means (Atkinson, 1970):

$$\mu_\alpha = \left[\frac{x_1^\alpha + \cdots + x_n^\alpha}{n}\right]^{1/\alpha} ; \alpha \neq 0$$

$$\mu_0 = exp\left[\frac{\log(x_1) + \cdots + \log(x_n)}{n}\right] ; \alpha = 0$$

- The lower α, the higher the emphasis on equality.

- μ_1 is the (neutral) arithmetic mean.

- The geometric mean ($\alpha = 0$) is close to the median (log utility).
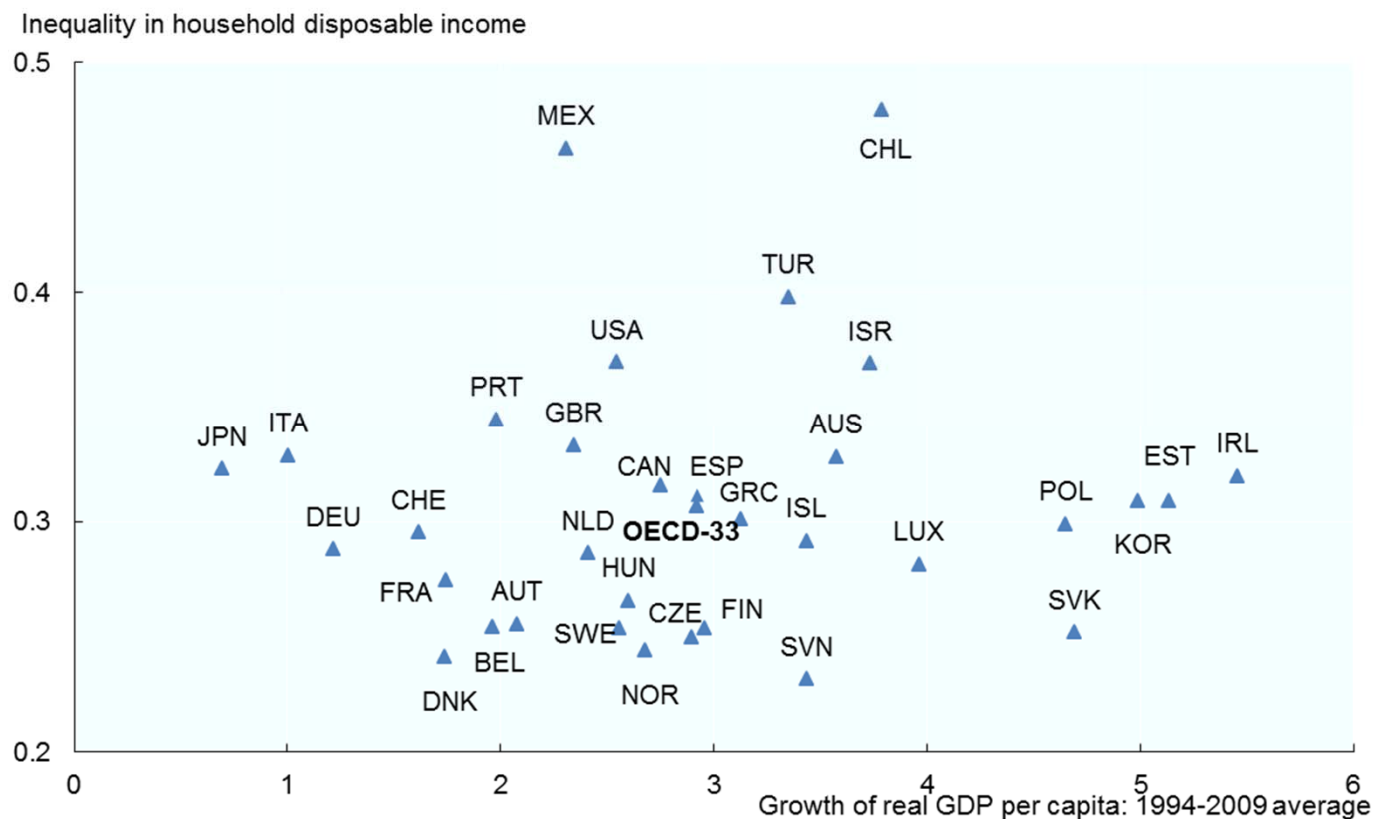
- This combine income and inequality:

$$\mu_\alpha = \underbrace{\mu_0}_{average\ income} * \underbrace{(1 - A_\alpha)}_{income\ equality}$$

where A_α is the Atkinson's index of inequality:

$$A_\alpha = \frac{1}{\mu_0}\left[\frac{x_1^\alpha + \cdots + x_n^\alpha}{n}\right]^{1/\alpha} - 1$$

Inequality and growth: there is no simple link

Beyond GDP

Inequality in household disposable income

Note: Inequality in household disposable income is measured by the Gini index. The inequality measures refer to the late 2000s, except for France and Ireland for, which they refer to the mid-2000s.

- Kuznets (1955): inverted-U curve between inequality and income.
- No evidence of Kuznets' hypothesis in studies using longitudinal data (Anand and Kanbur, 1993; Deninger and Squire, 1998).

Inequality may have a negative effect on growth

- Inequality can affect growth positively (Aghion *et al.*, 1999):
  - A higher saving rate of rich people: as growth potential is boosted by investment, which is supported by a higher saving rate.
  - Sunk costs and investment indivisibilities: wealth concentration favours the creation of new activities.
  - Work incentives: they are stronger in more unequal societies.
- Inequality can affect growth negatively (Perotti, 1996):
  - Endogenous fiscal policy: more unequal countries redistribute more, which creates distortions and lowers growth
  - Socio-political instability: large inequalities foster political and social instability, which deters investment.
  - Credit market imperfections: because of such imperfections, inequality results in an under-investment in human capital.
- Causa *et al.* (2014): a growth equation augmented with an inequality indicartors shows that a 1% increase in inequality may lower GDP by 0.6% to 1.1%.

The impact of policies on inequality: trade-offs and complementarities between inequality and growth

Beyond mean effects: econometrics tool

The impact of policies

- Unconditional quantile regressions (Firpo *et al.*, 2009): estimating an effect on a point of the income distribution:

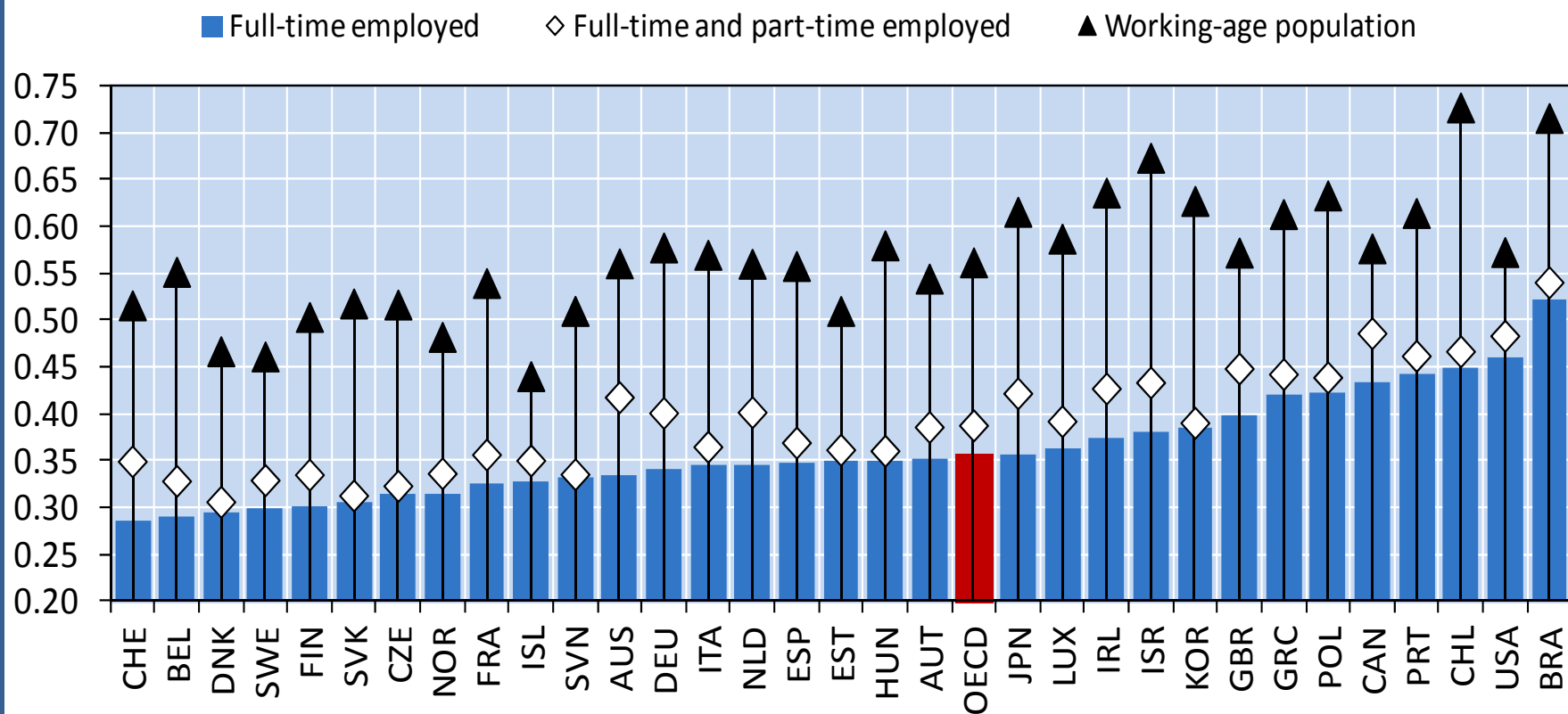$$\gamma(t) = \lim_{t \to 0} \frac{q_Y(\tau)\big[h(X+t,\varepsilon)\big] - q_Y(\tau)\big[h(X,\varepsilon)\big]}{t}$$

  where earnings Y are a function h of observed characteristics X and unobserved characteristics ε and $q_{Y(\tau)}[Y]$ is the τth quantile of the unconditional distribution of Y (Fournier and Koske, 2012).

- Different from quantile regressions (Koenker and Bassett, 1978) , which investigate the link between the effect of a policy and unobserved characteristics such as ability (Fournier and Koske, 2013).

- Inequality measures in cross-country panel data models, with bayesian model averaging (Sala-i-Martin *et al.*, 2004) to deal with model uncertainty (Koske *et al.*, 2012).

- Generalised income means taken as the dependent variable (Causa *et al.*, 2014).

Labour income inequality: the role of wage dispersion, part-time and non-activity

The impact of policies

Labour income inequality in the OECD

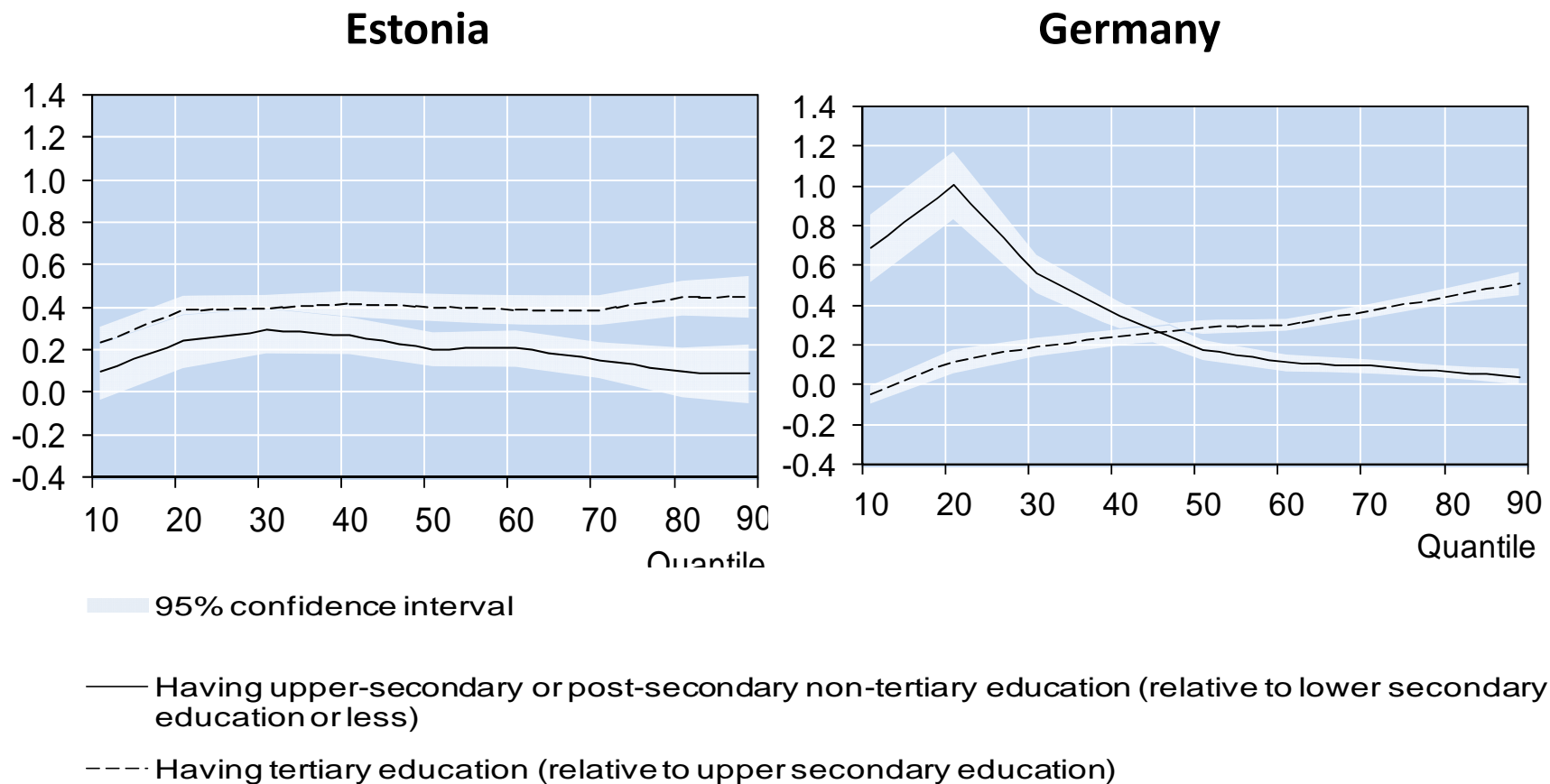■ Full-time employed　◇ Full-time and part-time employed　▲ Working-age population

Source: National Household Surveys

Education:
The effect of upper-secondary and tertiary education

The impact of policies

Estonia

Germany

95% confidence interval

—— Having upper-secondary or post-secondary non-tertiary education (relative to lower secondary education or less)
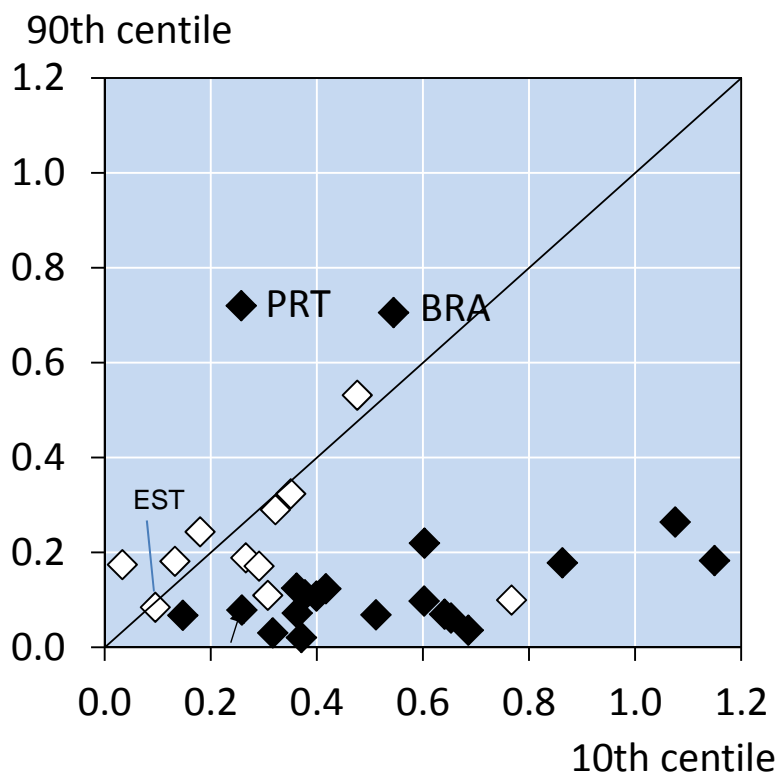
---- Having tertiary education (relative to upper secondary education)

Source: National Household Surveys. Note: Results based on quantile regressions.
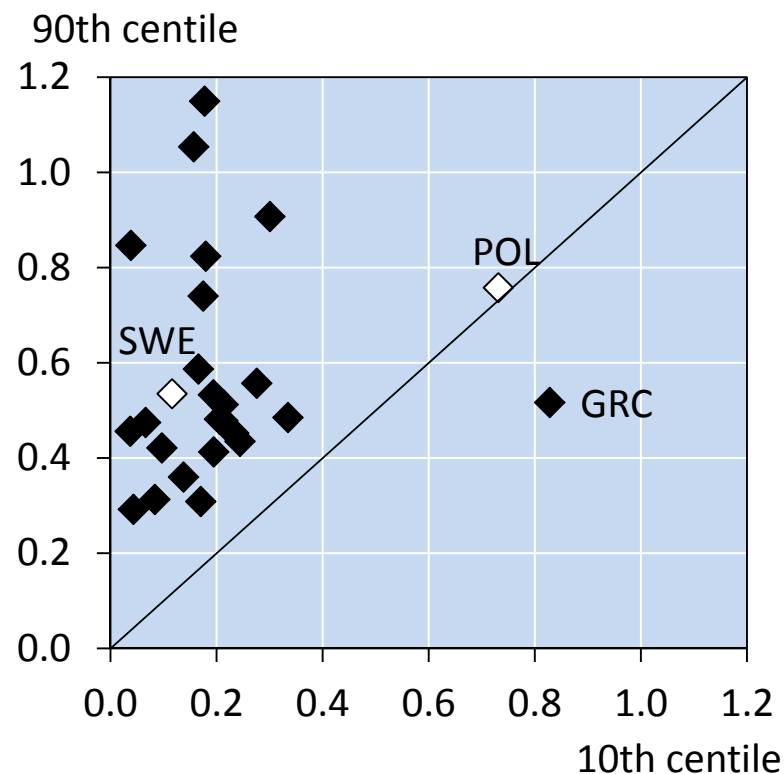
Upper-secondary education can help reducing inequality

Earnings impact of raising the share of better-educated workers

Upper-secondary or post-secondary non-tertiary education
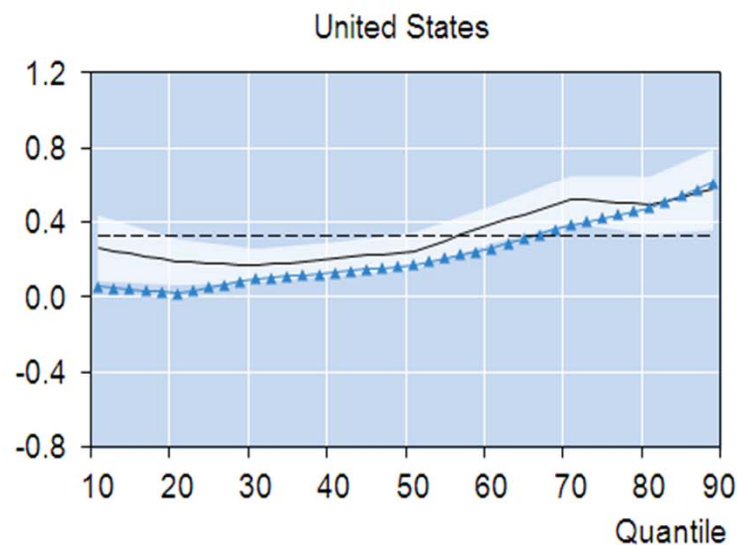
Tertiary education
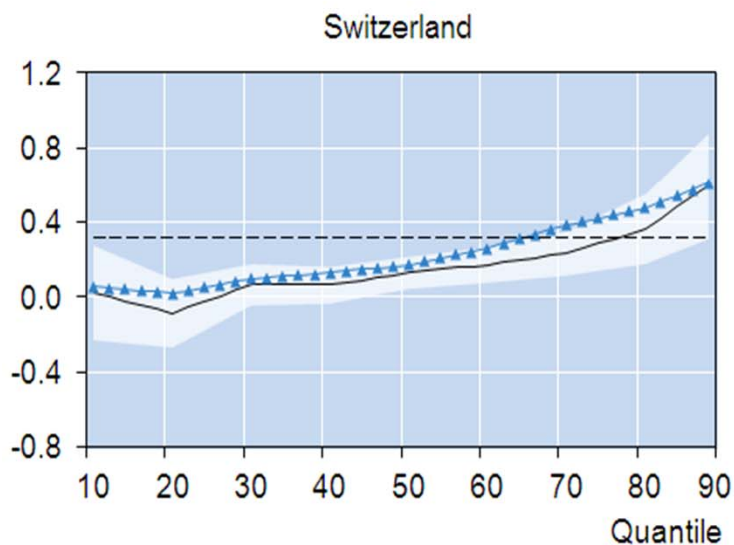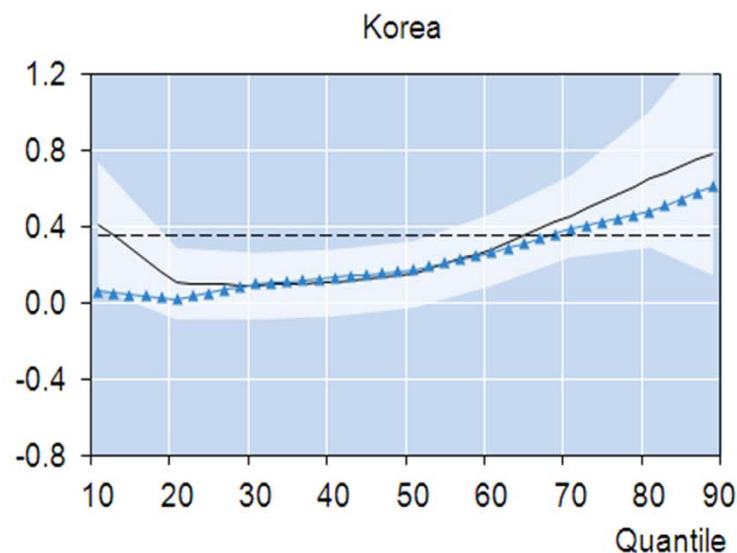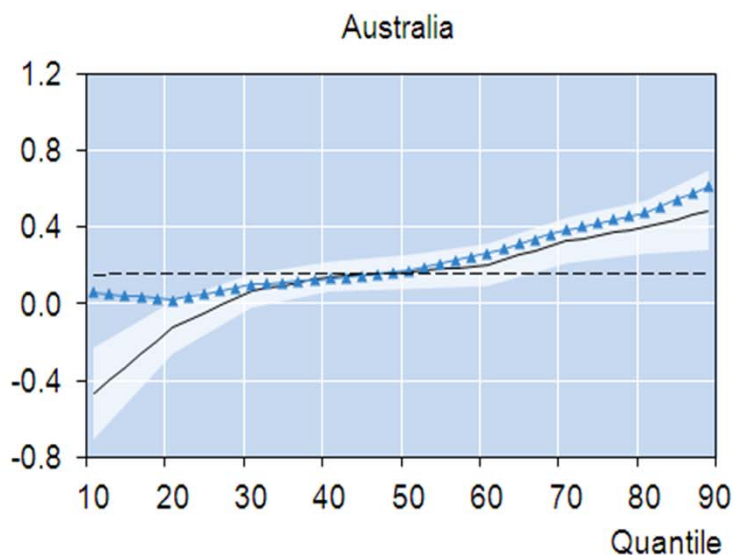
The impact of policies

Source: National Household Surveys. Note: Results based on quantile regressions.

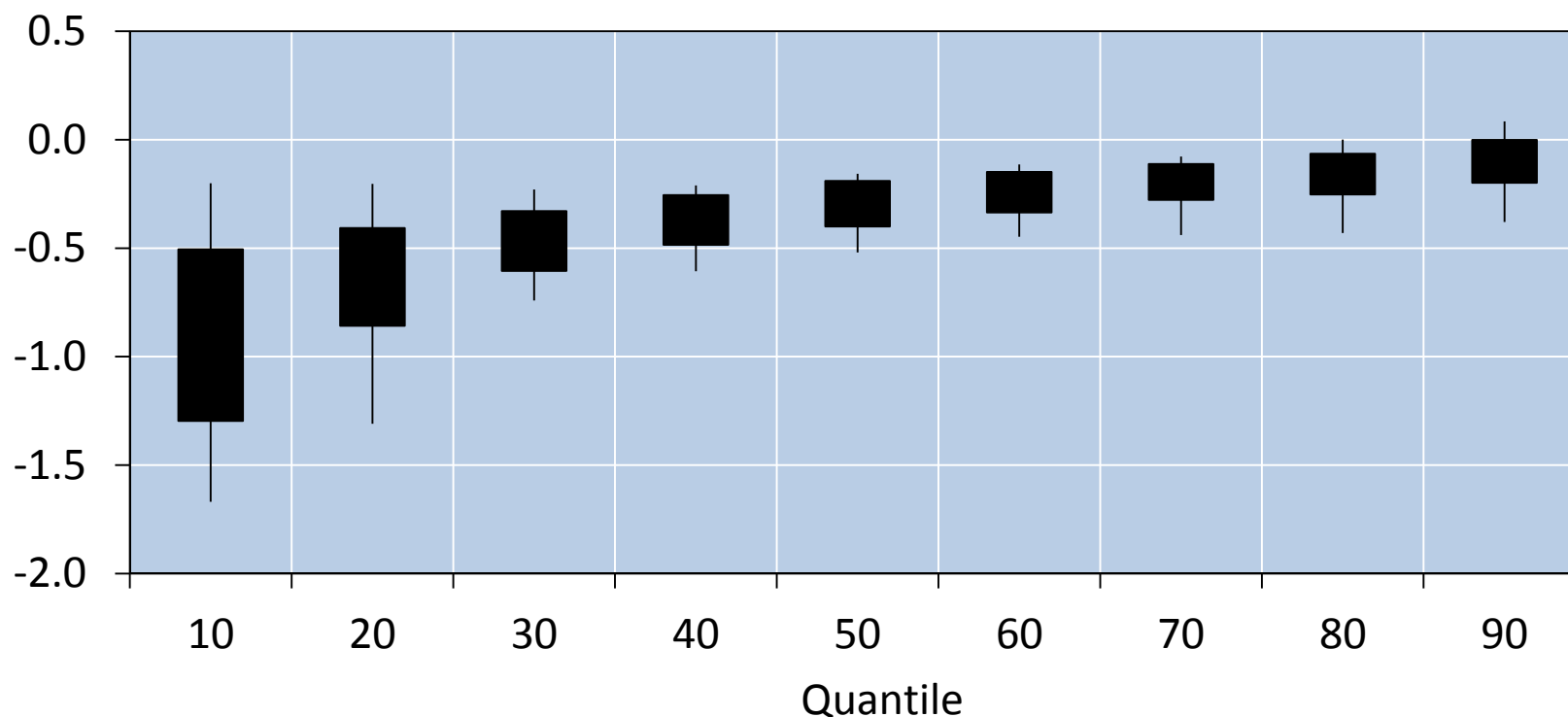# The effect of a rise in educational attainment on the distribution of earnings

Effect on log earnings of having a PhD

The impact of policies

Workers on temporary contracts earn less

Effect on log earnings of raising the share of workers with a temporary work contract by one percentage point

2008 or latest available year

The impact of policies

Quantile

Source: National Household Surveys. Note: Results based on quantile regressions; the thick bars depict the cross-country mean of the estimated effect +/- 1 standard deviation across countries, while the thin bars depict the cross-country maximum and minimum of the estimated effect.

Unionization benefits mostly low-income workers

Wage premium of union membership
Cross-country average, 2008 or latest available year

The impact of policies
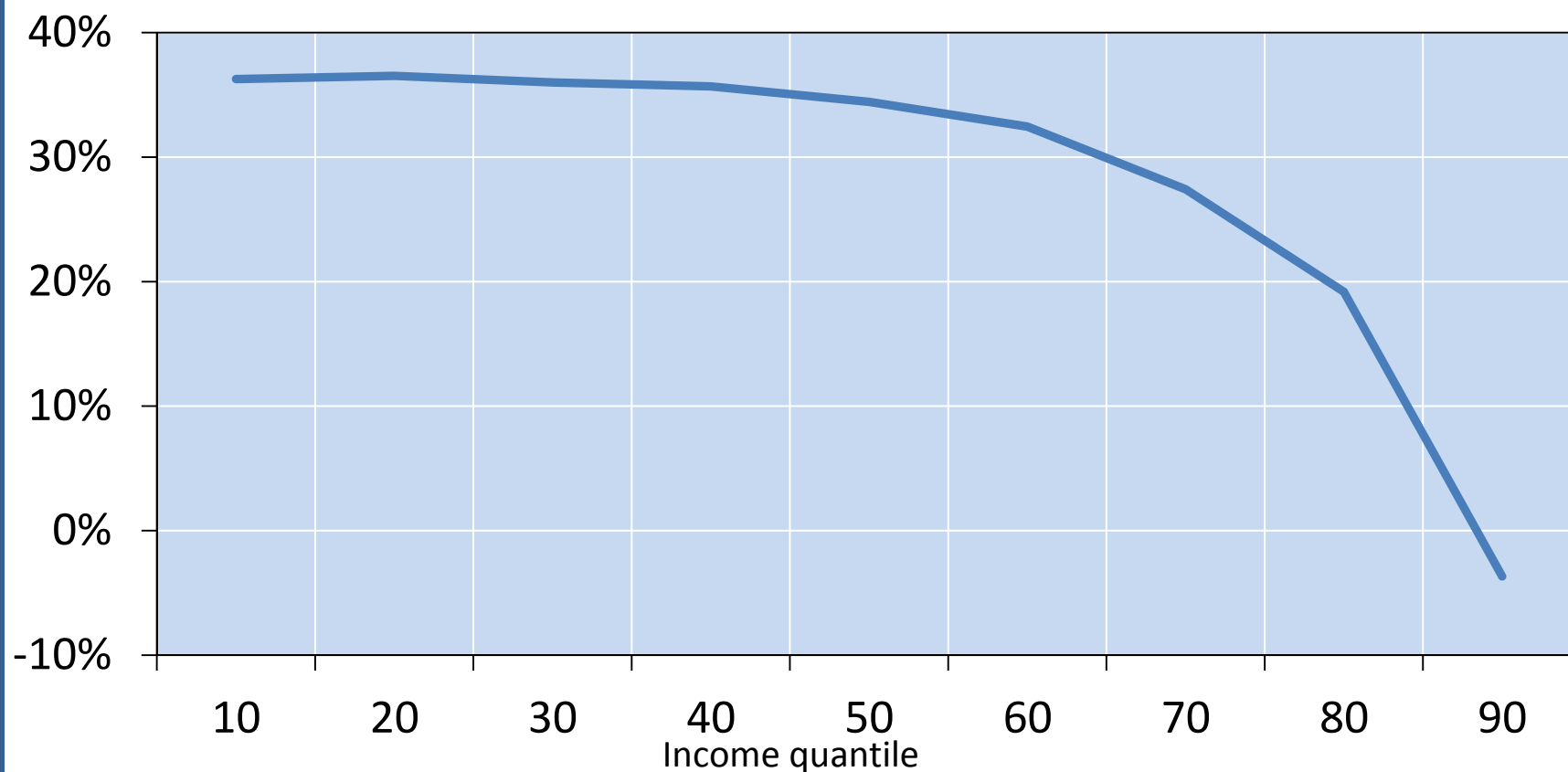
Source: National Household Surveys. Note: Results based on quantile regressions.

The overall effects of some labour market and welfare policies: determinants of generalised means

The impact of policies

|	Employment protection legislation			Unemployment benefit replacement rate, summary measure of generosity			Unemployment benefit replacement rate, long-term unemployment		
	GDP per capita	Household incomes		GDP per capita	Household incomes		GDP per capita	Household incomes	
		Total effect	*Direct effect*		Total effect	*Direct effect*		Total effect	*Direct effect*
Average income	ns	ns	*ns*	- *	- *	- *	- **	- *	*ns*
Bottom-sensitive income standards									
Median income		ns	*ns*		(- <) **	(- <) **		(- =) *	*ns*
Income of the lower middle class		- *	- **		(- <) **	(- <) **		(+ >) *	+ *
Income of the poor		(- <) *	(- <) ***		(- <) **	(- <) **		(+ >) *	(+ >) **

	Minimum relative to median wage			Active labour market policies, spending on public employment services and administration			Active labour market policies, spending on training and employment incentives		
	GDP per capita	Household incomes		GDP per capita	Household incomes		GDP per capita	Household incomes	
		Total effect	*Direct effect*		Total effect	*Direct effect*		Total effect	*Direct effect*
Average income	ns	+ ***	+ ***	ns	+ **	+ ***	ns	ns	*ns*
Bottom-sensitive income standards									
Median income		(+ =) *	(+ =) *		(+ =) **	(+ =) ***		ns	*ns*
Income of the lower middle class		ns	*ns*		(+ =) *	(+ =) **		ns	*ns*
Income of the poor		ns	*ns*		(+ >) *	(+ >) *		ns	*ns*

Workers in the financial sector enjoy an income premium, particularly at the top

Income premium of working in financial intermediation rather than in manufacturing

Cross-country average, 2008 or latest available year
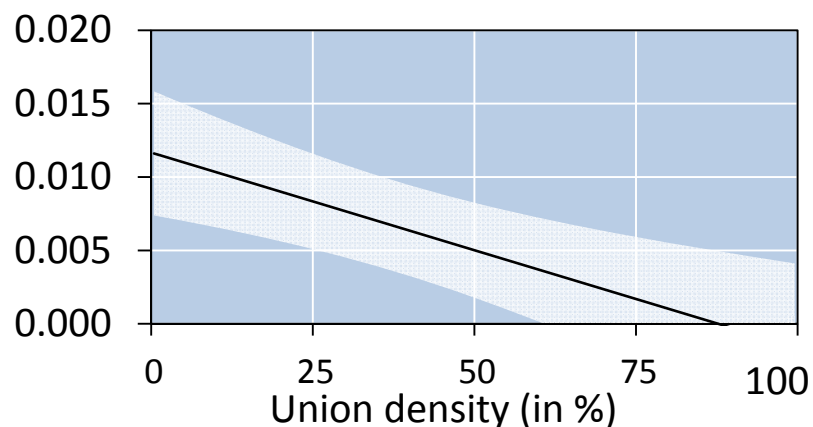

The impact of policies
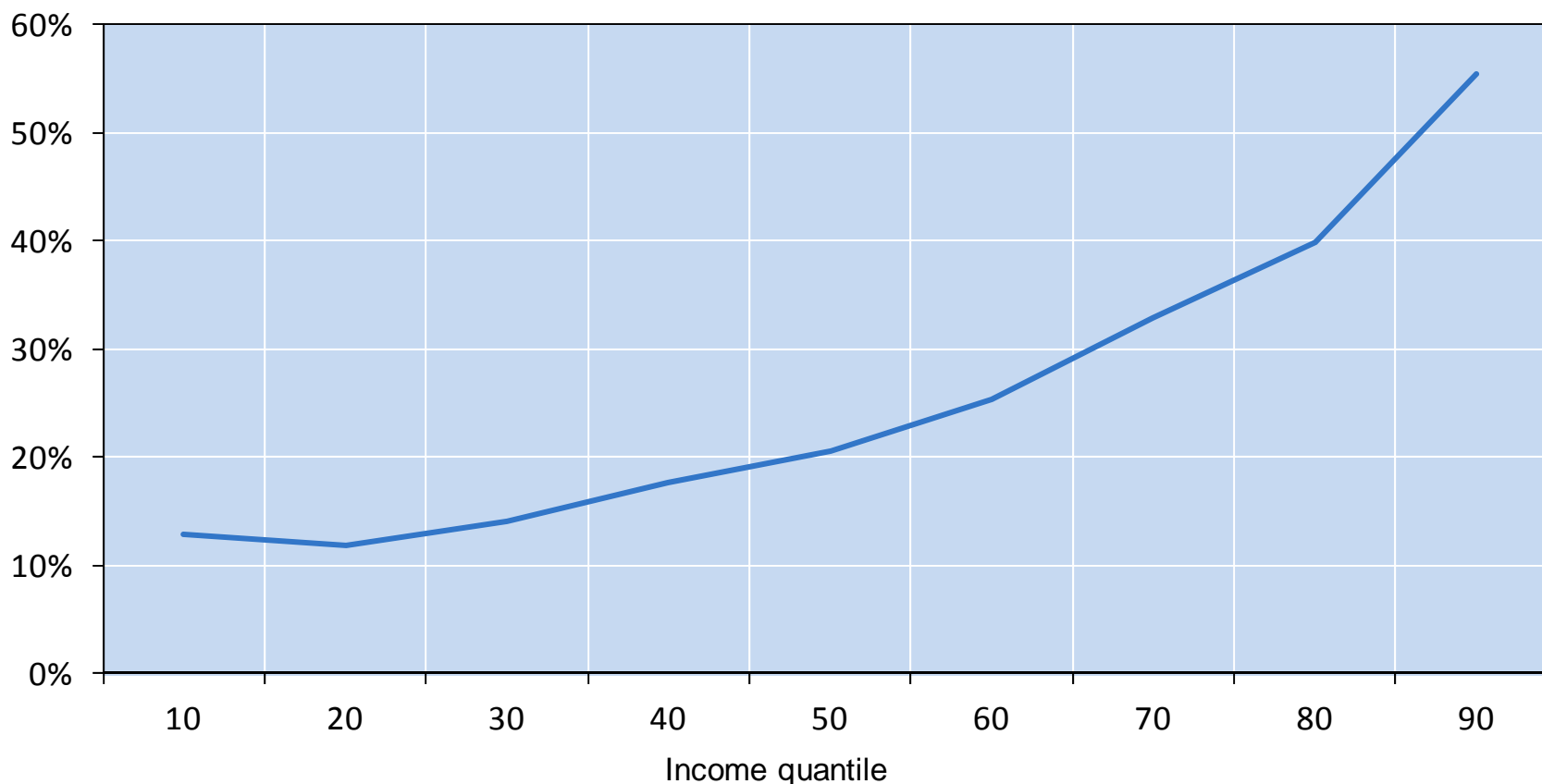
Source: National Household Surveys. Note: Results based on quantile regressions.
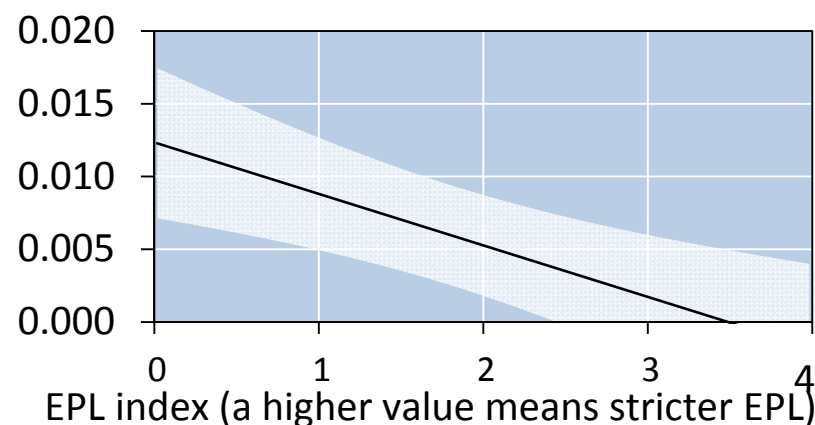
The inequality effect of trade depends on labour market institutions

The impact of policies

ppt change in the 90/10 ratio due to a 1% rise in the trade-to-GDP ratio

as a function of union density

as a function of EPL

Note: The white shaded areas show the 95% confidence interval. Results based on macro panel data regressions

The overall effect of product market regulations

- Generalised mean estimates suggest that reducing stringency of product market regulation not only boosts GDP, but also reduces inequality:

	GDP	Product market regulation			
		Household incomes			
		Total effect		Direct effect	
Average income	ns	-	*	-	*
Bottom-sensitive income standards					
Median income		(- <)	***	(- <)	***
Income of the lower middle class		(- <)	***	(- <)	***
Income of the poor		(- <)	***	(- <)	***

- However, evidence from the Bayesian Model Averaging analysis are not so clear-cut.

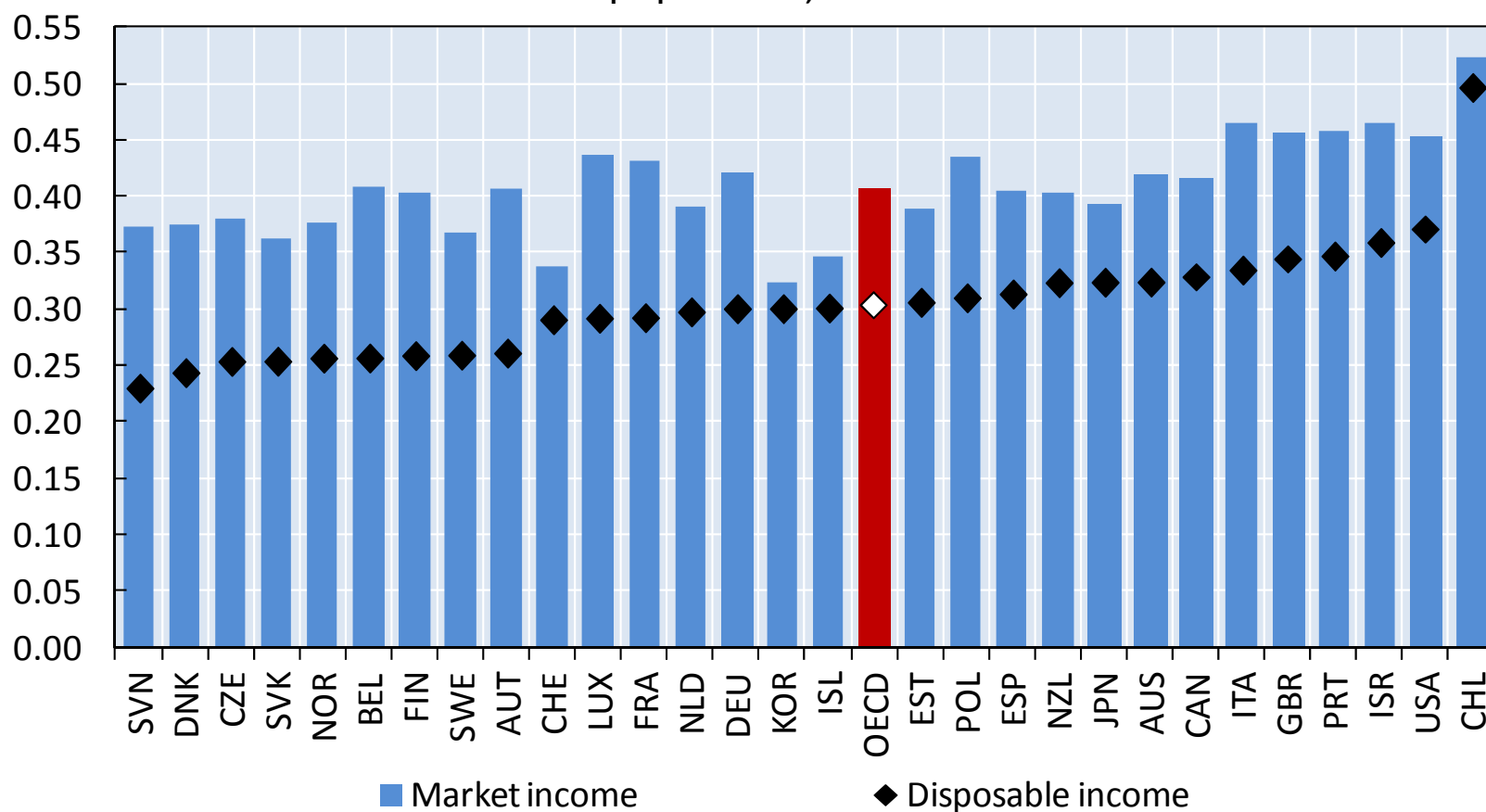# The role of taxes and transfers

Taxes and transfers reduce market income inequality by about one-fourth

Gini coefficient of market income and disposable income

Entire population, late 2000s

The tax and transfer system

Market income   ◆ Disposable income

Source: OECD Income Distribution and Poverty Database.

In most, but not all countries the redistributive impact of transfers is higher than that of taxes

Point reduction in concentration coefficients

Entire population, late 2000s

The tax and transfer system

Household taxes   Public cash transfers

Source: OECD Income Distribution and Poverty Database.
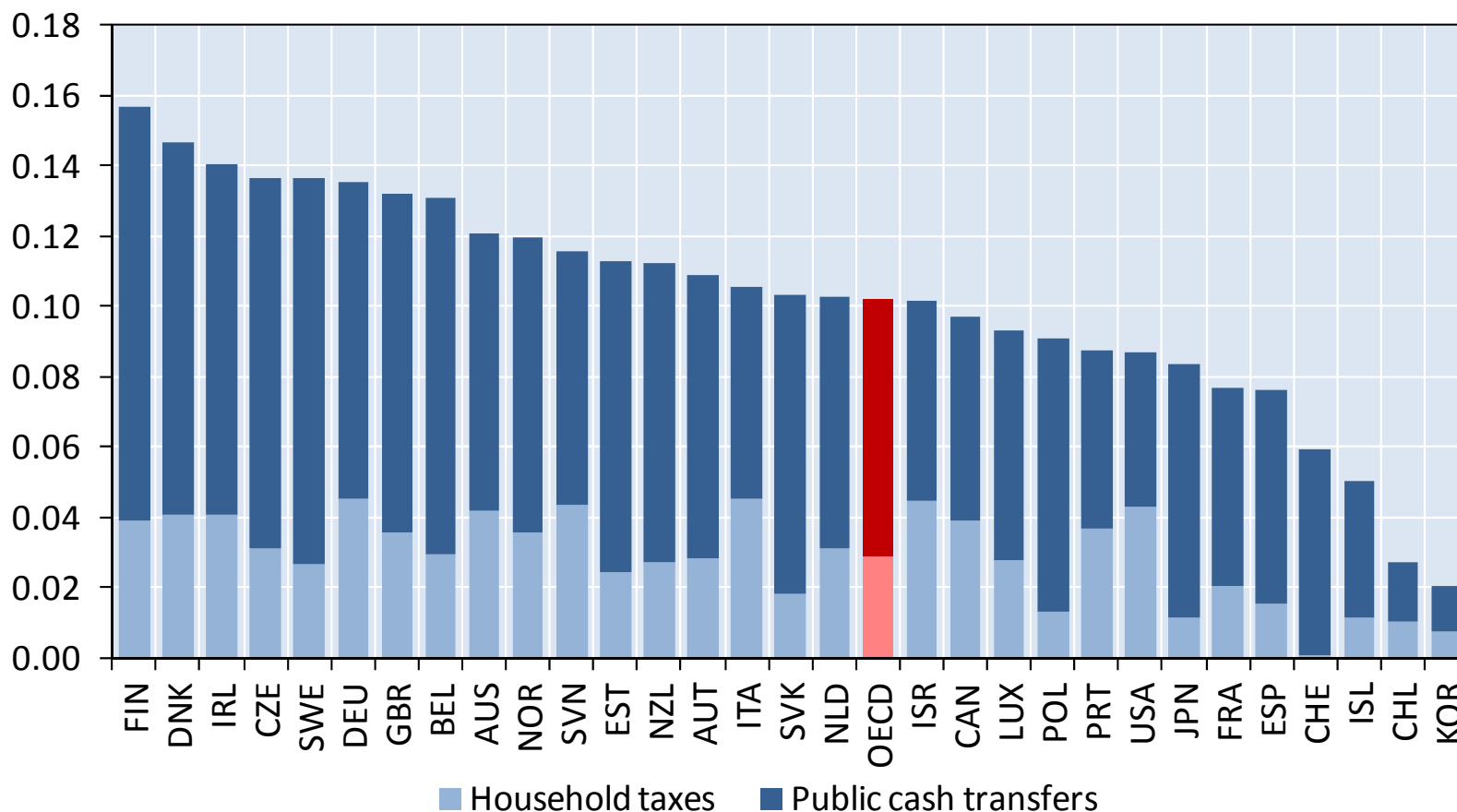
Large household income taxes tend to be less progressive

The tax and transfer system

Late 2000s

Progressivity index of household taxes

$y = -0.0022x + 0.1693$
$R^2 = 0.1438$

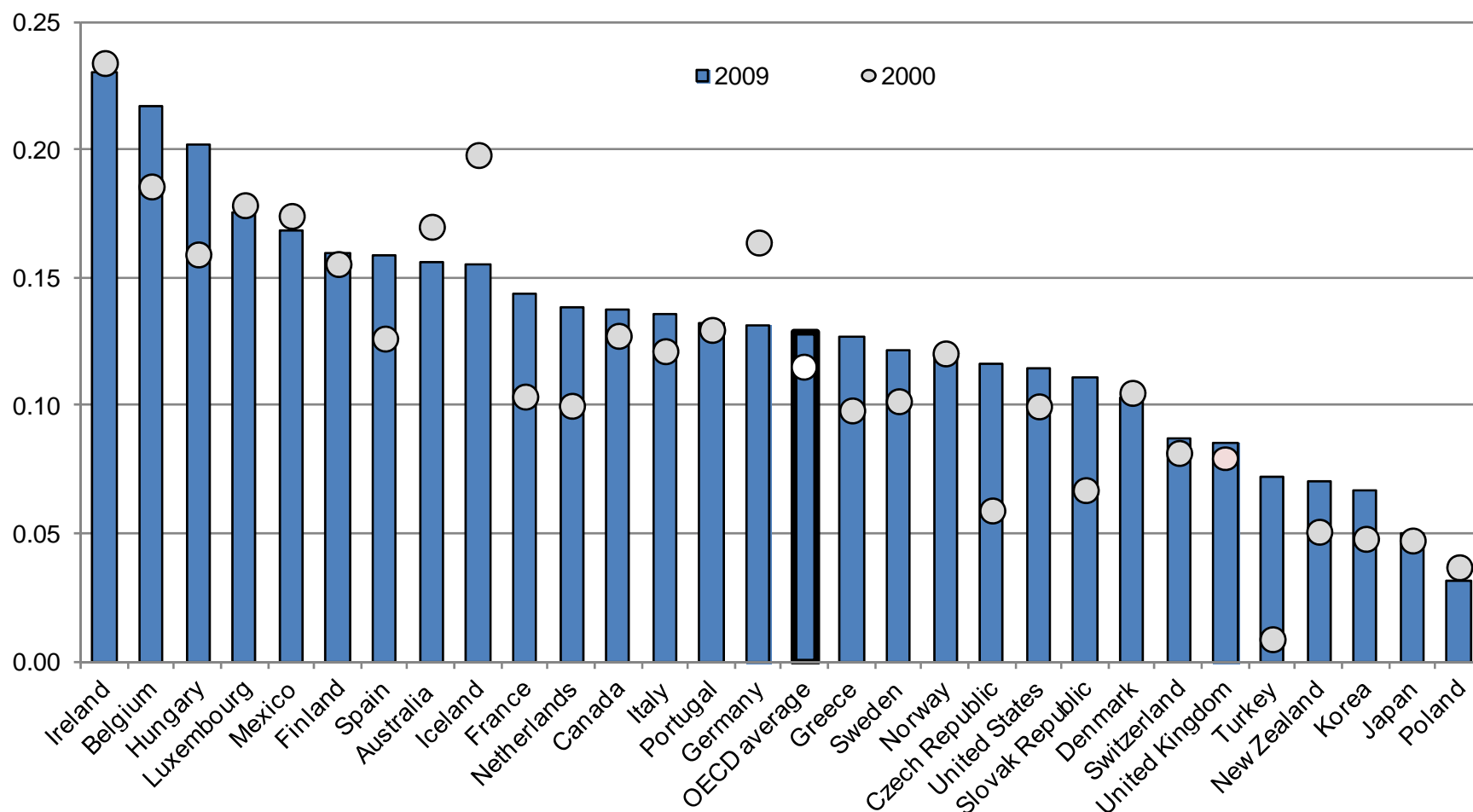Household taxes as a share of household disposable income
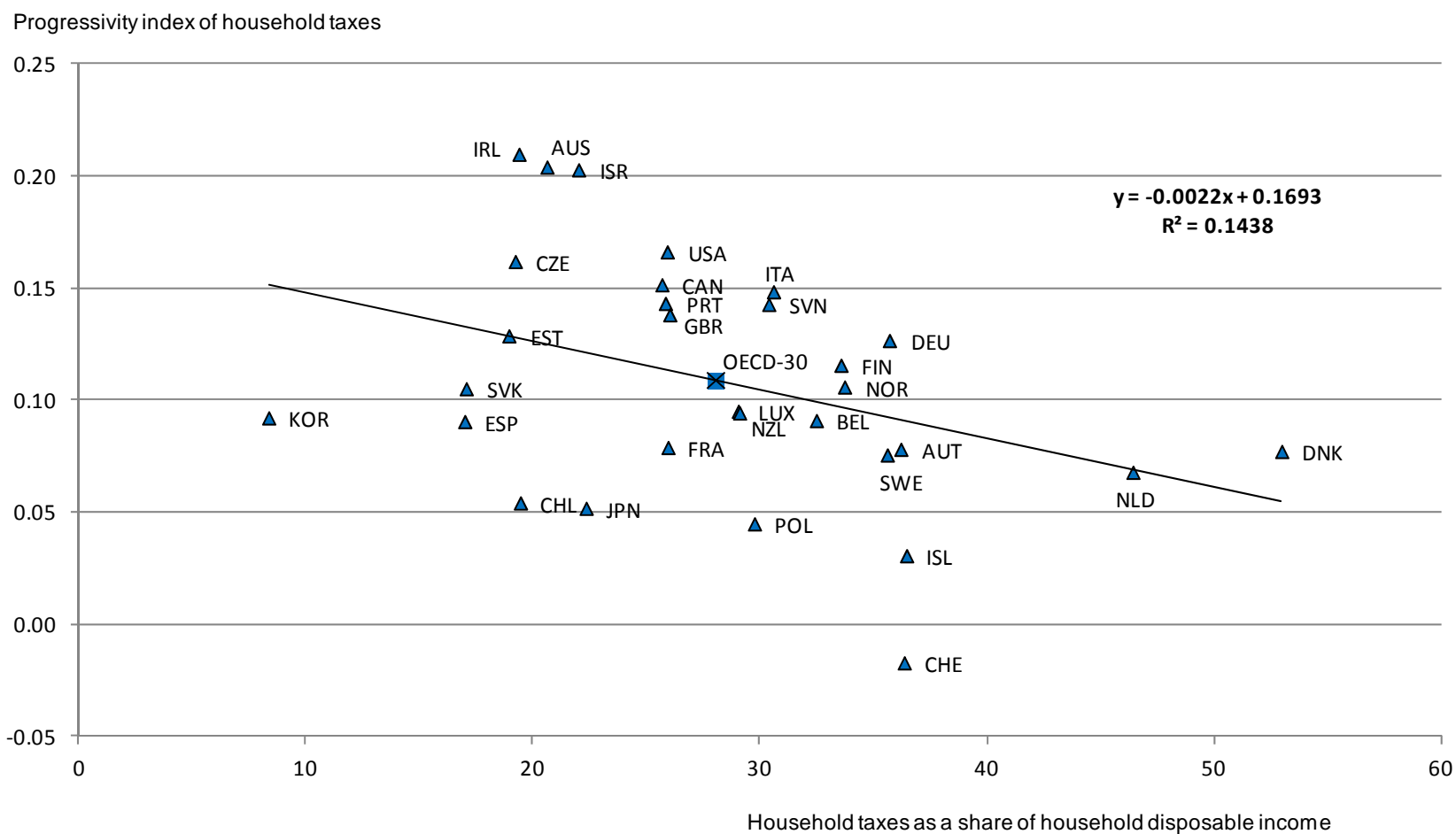
Source: OECD Income Distribution and Poverty Database.

The progressivity of statutory labour tax has increased in many countries

Progressivity indicator based on net personal income tax schedules
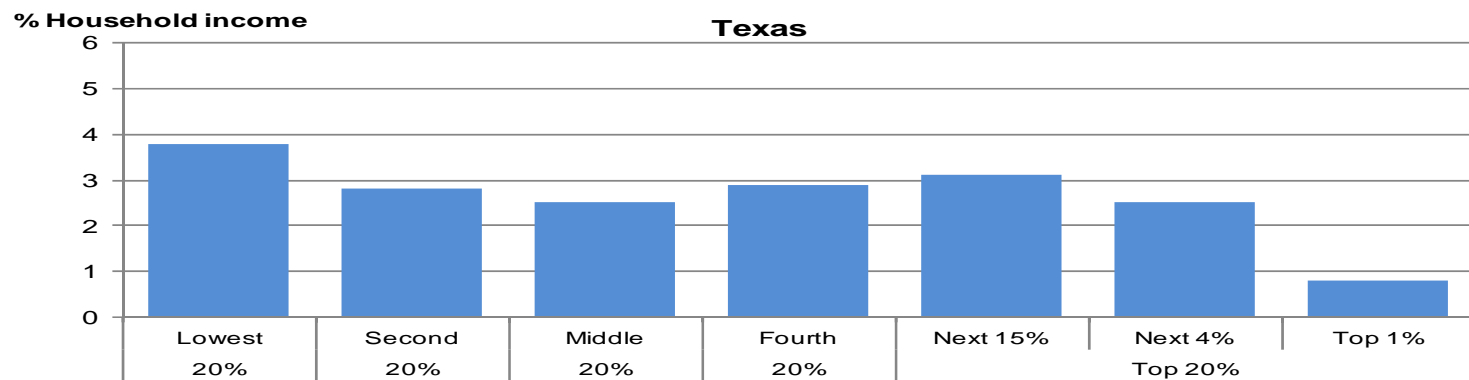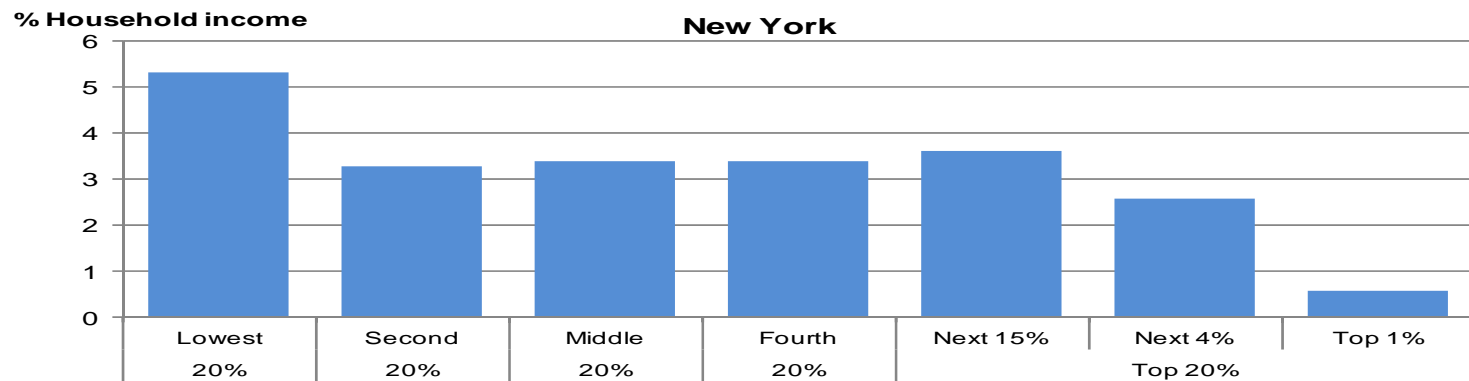for single taxpayers without children

The tax and transfer system

■ 2009   ○ 2000

Source: OECD Tax-Benefit Model

Real estate taxes are often regressive

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The tax and transfer system

United Kingdom

% Gross income

| | 1st | 2nd | 3rd | 4th | 5th | 6th | 7th | 8th | 9th | 10th Decile |

New York

% Household income

| | Lowest 20% | Second 20% | Middle 20% | Fourth 20% | Next 15% | Next 4% Top 20% | Top 1% |

Texas

% Household income

| | Lowest 20% | Second 20% | Middle 20% | Fourth 20% | Next 15% | Next 4% Top 20% | Top 1% |

Cash transfers: size and progressivity explain their impact on inequality

The tax and transfer system

Difference in the redistributive impact and the contribution of size and progressivity

In the late 2000s, working age population

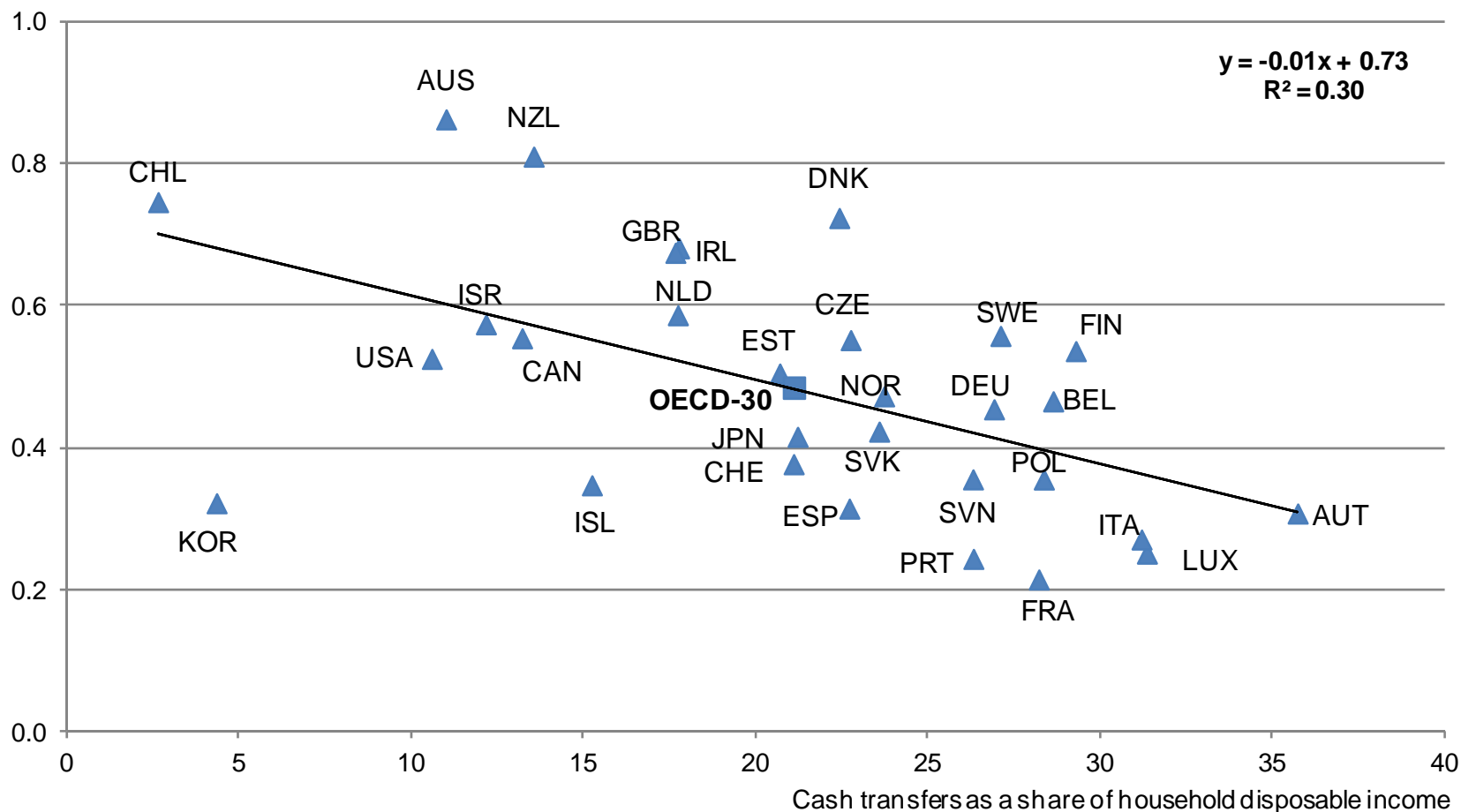■ Progressivity à la Kakwani ☐ Size ▲ Point reduction in inequality
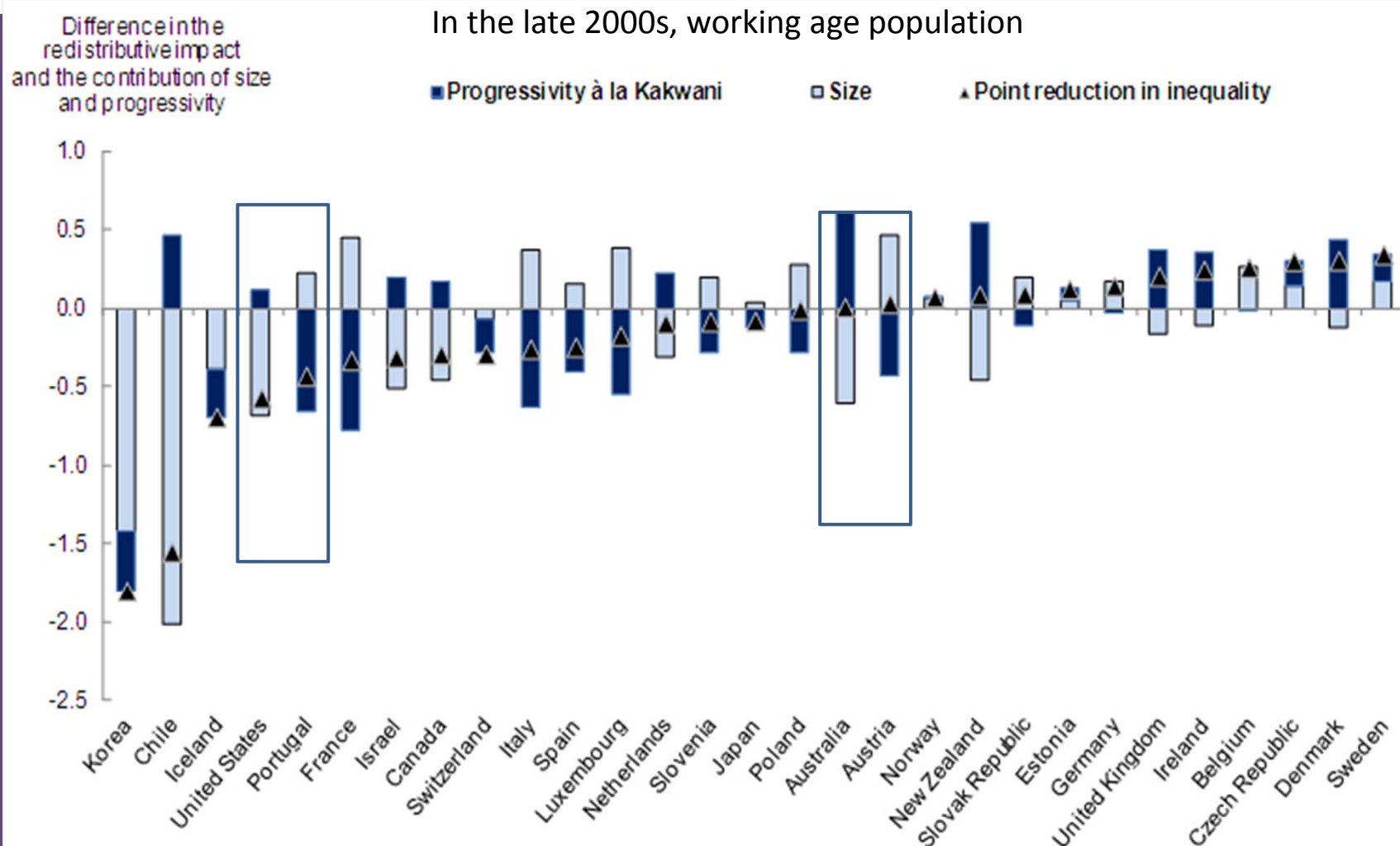
Source: OECD Income Distribution and Poverty Database.

Countries with large cash transfers tend to have less progressive systems

Late 2000s

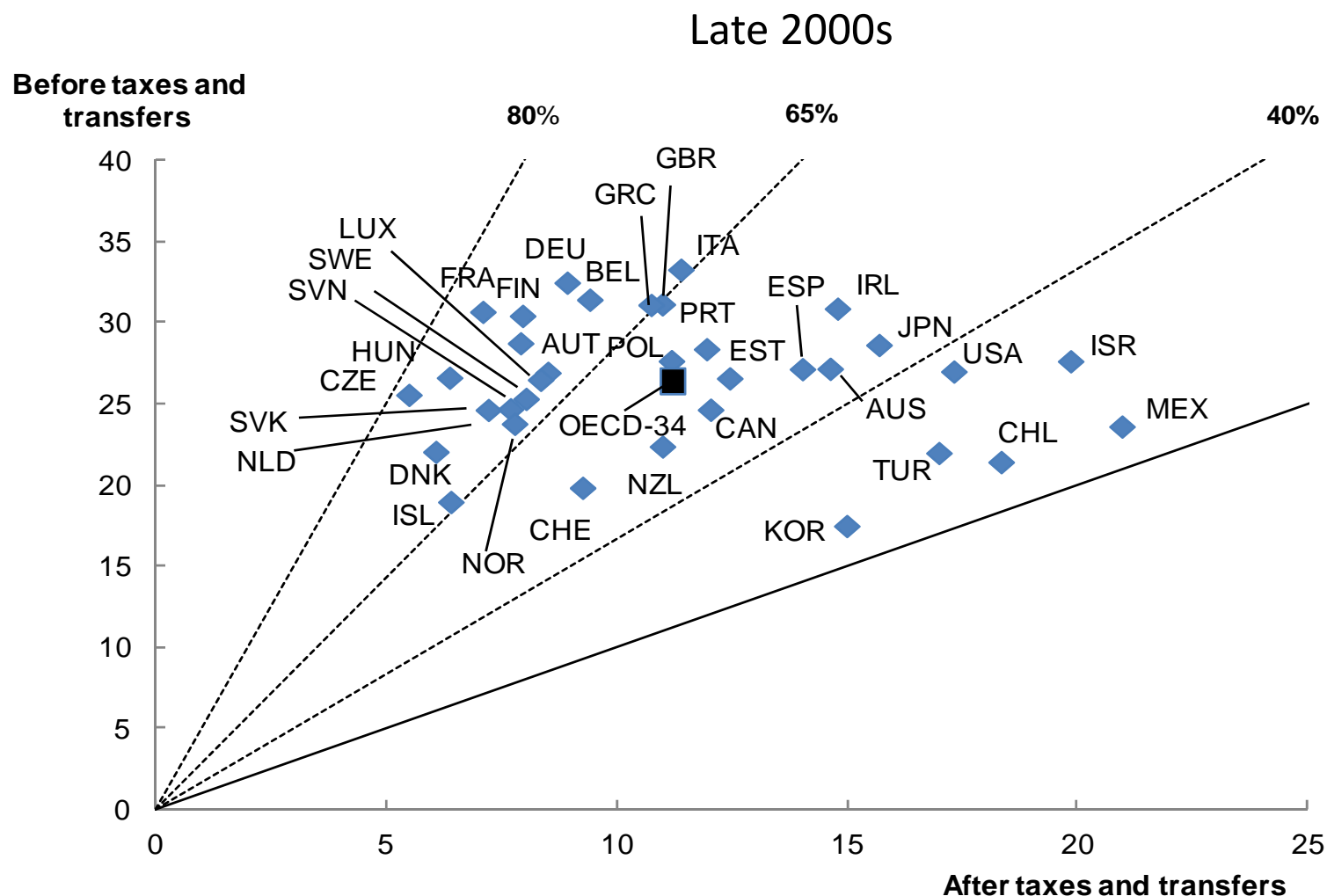**The tax and transfer system**

Progressivity index of cash transfers

$y = -0.01x + 0.73$
$R^2 = 0.30$

Cash transfers as a share of household disposable income

Source: OECD Income Distribution and Poverty Database.

Taxes and transfers reduce poverty by around half on average

The tax and transfer system

Late 2000s

Before taxes and transfers

80%   65%   40%

40	
35	LUX DEU GBR ITA
	SWE GRC
	SVN FRA FIN BEL ESP IRL
30	HUN AUT POL PRT JPN
	CZE EST USA ISR
25	SVK OECD-34 CAN AUS MEX
	NLD DNK NZL CHL
20	ISL TUR
	CHE KOR
15	NOR
10	
5	
0	

0   5   10   15   20   25

After taxes and transfers

In-kind transfers tend to be progressive

Percentage increase in household income from public in-kind services by quintile

OECD-27 average, 2007

	Q1	Q2	Q3	Q4	Q5	Total
Education	30.6%	18.5%	14.2%	10.4%	5.6%	11.8%
Health care	34.9%	22.2%	15.8%	11.8%	7.2%	13.9%
Social housing	1.8%	0.7%	0.4%	0.2%	0.1%	0.4%
ECEC	4.5%	3.0%	2.4%	1.5%	0.8%	1.8%
Elderly care	4.0%	1.9%	0.7%	0.4%	0.2%	0.9%
Total	75.8%	46.4%	33.5%	24.3%	13.7%	28.8%

The tax and transfer system

In-kind transfers reduce poverty rates by around 50% on average

The tax and transfer system

■ Extended income (including all services) ● Cash disposable income (↗)
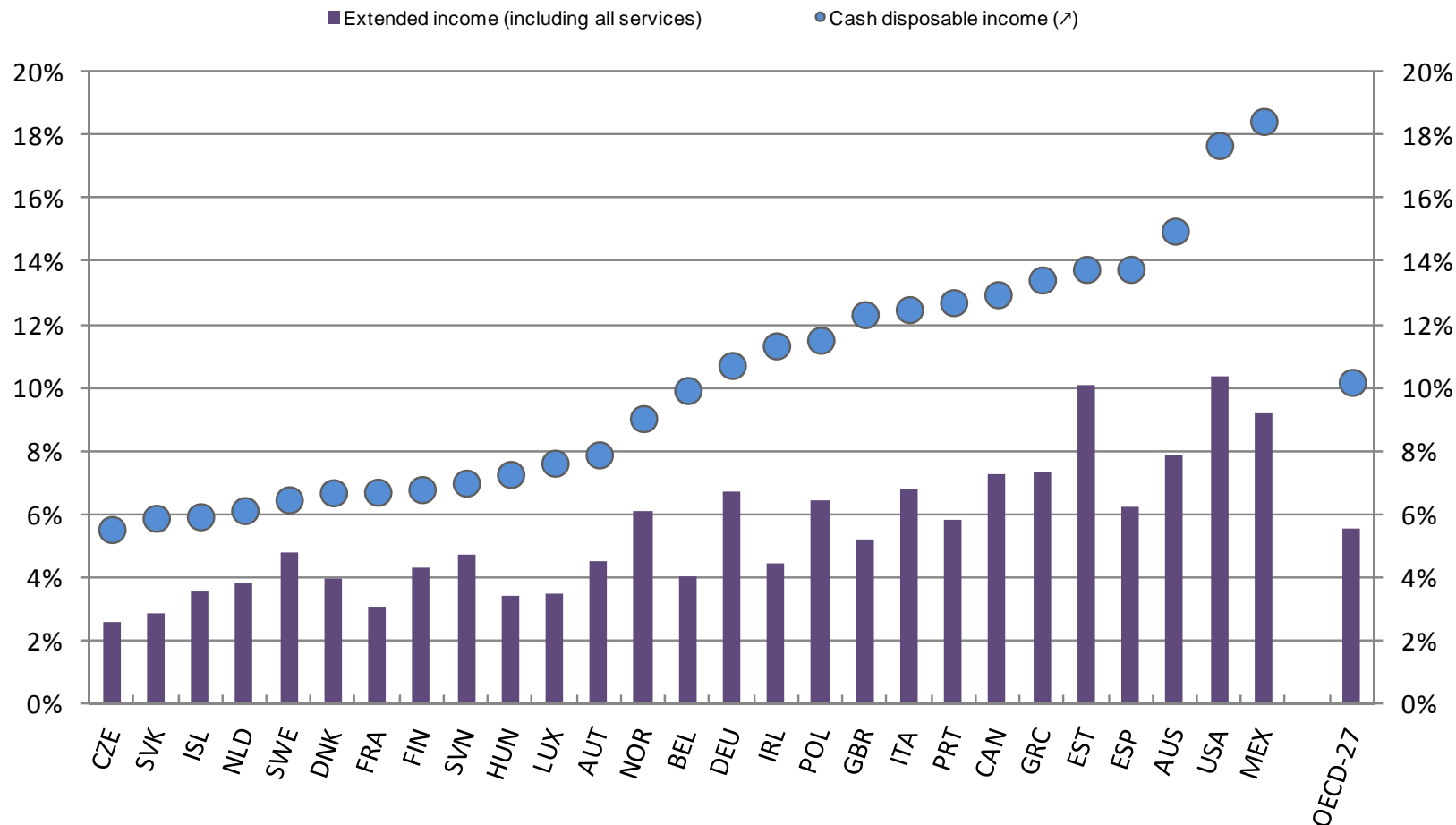
Source: OECD (2011) *Divided we stand*

The overall redistributive effect of tax policies is not as clear-cut as one could anticipate

- Beyond the static redistributive impact of taxes, the behaviour matters, as shown by the negative effect of marginal tax wedge.

	Share of direct taxes						Share of personal income tax						Share of corporate income tax						Share of consumption and property taxes					
	GDP per capita		Household incomes				GDP per capita		Household incomes				GDP per capita		Household incomes				GDP per capita		Household incomes			
			Total effect		Direct effect				Total effect		Direct effect				Total effect		Direct effect				Total effect		Direct effect	
Average income	-	***	-	**	+	***	-	***	-	***	ns		ns		+	**	+	**	+	***	ns		-	***
Bottom-sensitive income standards																								
Median income			(- <)	**	(+ <)	***			(- =)	***	ns				(+ >)	*	(+ >)	**			ns		(- <)	***
Income of the lower middle class			(- =)	***	ns				(- =)	***	ns				ns		ns				ns		(- <)	***
Income of the poor			(- =)	***	ns				(- =)	***	ns				ns		ns				+	*	ns	

	Share of consumption tax						Share of property tax						Labour tax wedge, marginal (2)					
	GDP per capita		Household incomes				GDP per capita		Household incomes				GDP per capita		Household incomes			
			Total effect		Direct effect				Total effect		Direct effect				Total effect		Direct effect	
Average income	+	***	+	*	-	***	+	**	+	**	ns		-	**	-	**	ns	
Bottom-sensitive income standards																		
Median income			(+ =)	*	(- >)	**			(+ =)	**	ns				ns		ns	
Income of the lower middle class			(+ =)	**	ns				(+ =)	**	ns				(- =)	**	ns	
Income of the poor			(+ =)	**	ns				(+ =)	**	ns				(- =)	**	ns	

Source: OECD (2011) *Divided we stand*

Growth and labour income inequality: policy trade-offs and complementarities

A rise in:	Effect on earnings equality	Effect on employment	Effect on GDP per capita
Upper-secondary graduation rates	+	?	+
PhD graduation rates	−	?	+
EPL gap between permanent and temporary work	−	−	−
Policy initiatives to foster the integration of immigrants	+	+	+
Policy initiatives to raise female participation	+	+	+
Product market regulation	−	−	−
Minimum wage (as share of median wage)	?	−	?
Unionization	+	?	−
Unemployment benefits	−	−	−
UB for the long term unemployed	+	−	−
Personal income tax	?	−	−

Note: This matrix was filled using the empirical results of ECO studies as well as existing empirical evidence.

Further information

Webpage

- www.oecd.org/economy/goingforgrowth/inequality

OECD Income Distribution Database

- http://www.oecd.org/social/income-distribution-database.htm

Going for Growth 2012

- Reducing income inequality while boosting economic growth: can it be done?, Chapter 5

Monograph:

- OECD (2012), Divided We Stand: Why Inequality Keeps Rising, Directorate of Employment, Labour and Social Affairs, OECD

Summary of the most recent OECD work on inequality

- http://www.oecd.org/economy/growth-and-inequality-close-relationship.htm

OECD Economics Department Working Paper Series

Further information

Working Paper Series on "Less income inequality and more growth – Are they compatible? "

- WP 924: Part 1. Mapping income inequality across the OECD
- WP 925: Part 2. The distribution of labour income
- WP 926: Part 3. Income redistribution via taxes and transfers across OECD countries
- WP 927: Part 4. Top incomes
- WP 928: Part 5. Poverty in OECD countries
- WP 929: Part 6. The distribution of wealth
- WP 930: Part 7. The drivers of labour earnings inequality – An analysis based on conditional and unconditional quantile regressions
- WP 931: Part 8. The drivers of labour income inequality – A review of the recent literature

Supplementary materials

And income inequality has been exacerbated by macroeconomic shocks…
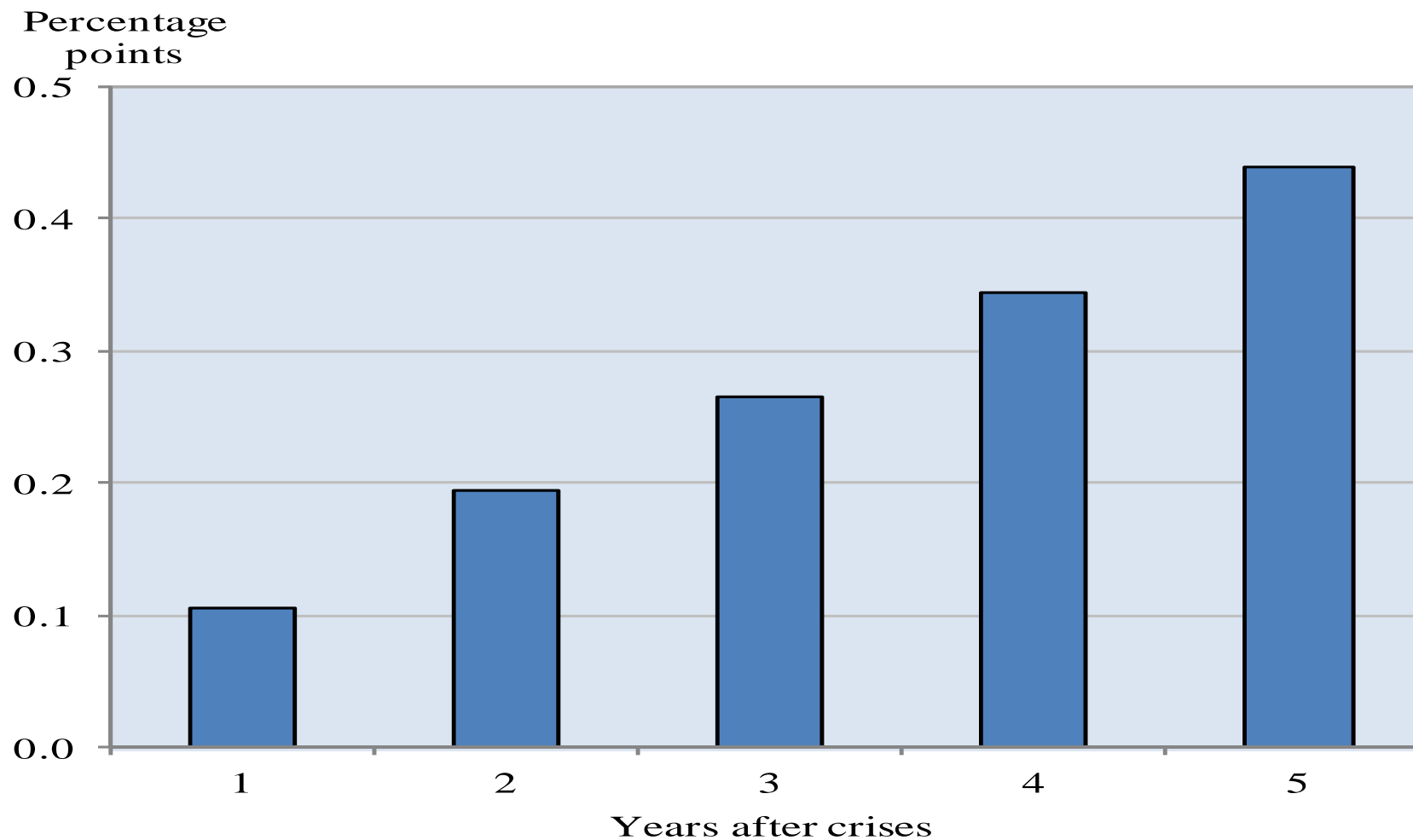
Tax system: Its redistributive impact is a function of its size and mix

Size and composition of total tax revenues

2009

The tax and transfer system
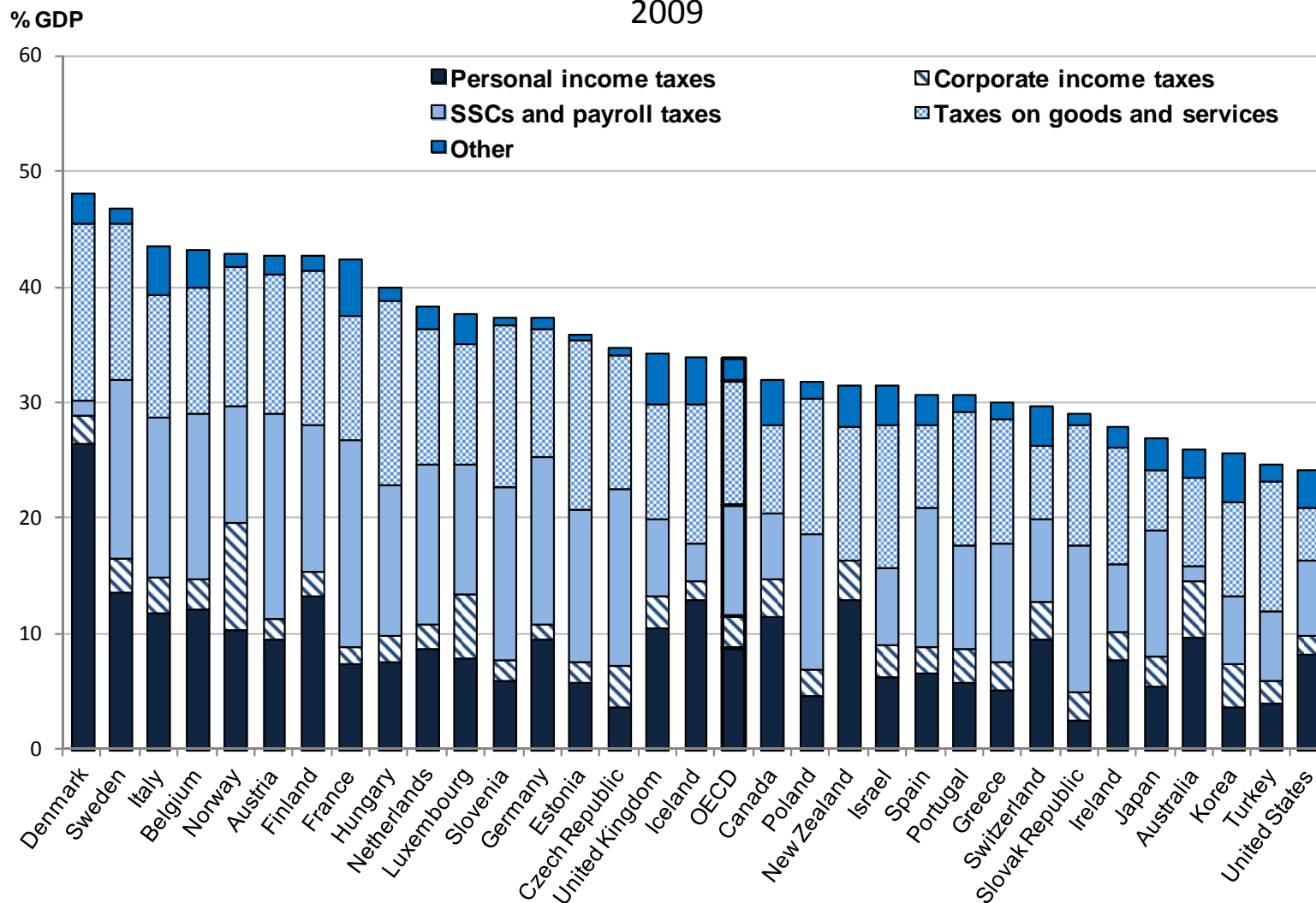
Source: OECD Social Expenditure Database.

Cash transfers: Their size and composition vary across OECD countries

The tax and transfer system

Public cash transfers to households

Percent of GDP, 2007

Legend: ■ Old age ▫ Incapacity [2] ▫ Family ▫ Unemployment ▫ Other social policy areas

%GDP

Countries (left to right): Mexico, Korea, Iceland, Chile, Turkey, Canada, Australia, United States, Estonia, Israel, Ireland, New Zealand, Slovak Republic, United Kingdom, Netherlands, Norway, Japan, Switzerland, OECD, Czech Republic, Luxembourg, Denmark, Sweden, Spain, Slovenia, Greece, Poland, Finland, Hungary, Germany, Portugal, Belgium, Italy, France, Austria

Source: OECD Social Expenditure Database.

In-kind transfers are large

% of GDP, 2007
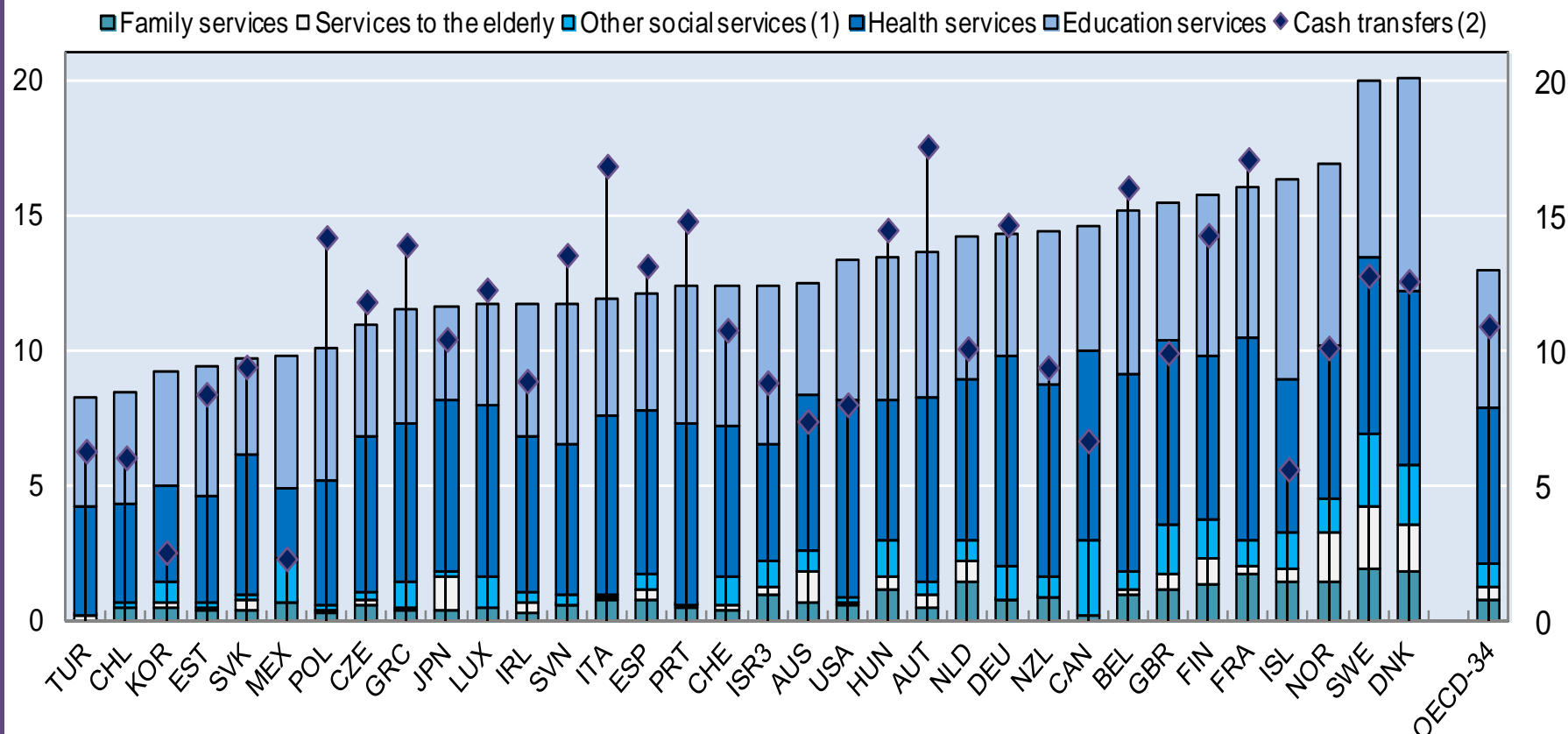
OECD BETTER POLICIES FOR BETTER LIVES

The tax and transfer system

■ Family services ■ Services to the elderly ■ Other social services (1) ■ Health services ■ Education services ◆ Cash transfers (2)

The property tax take is modest and varies greatly across countries

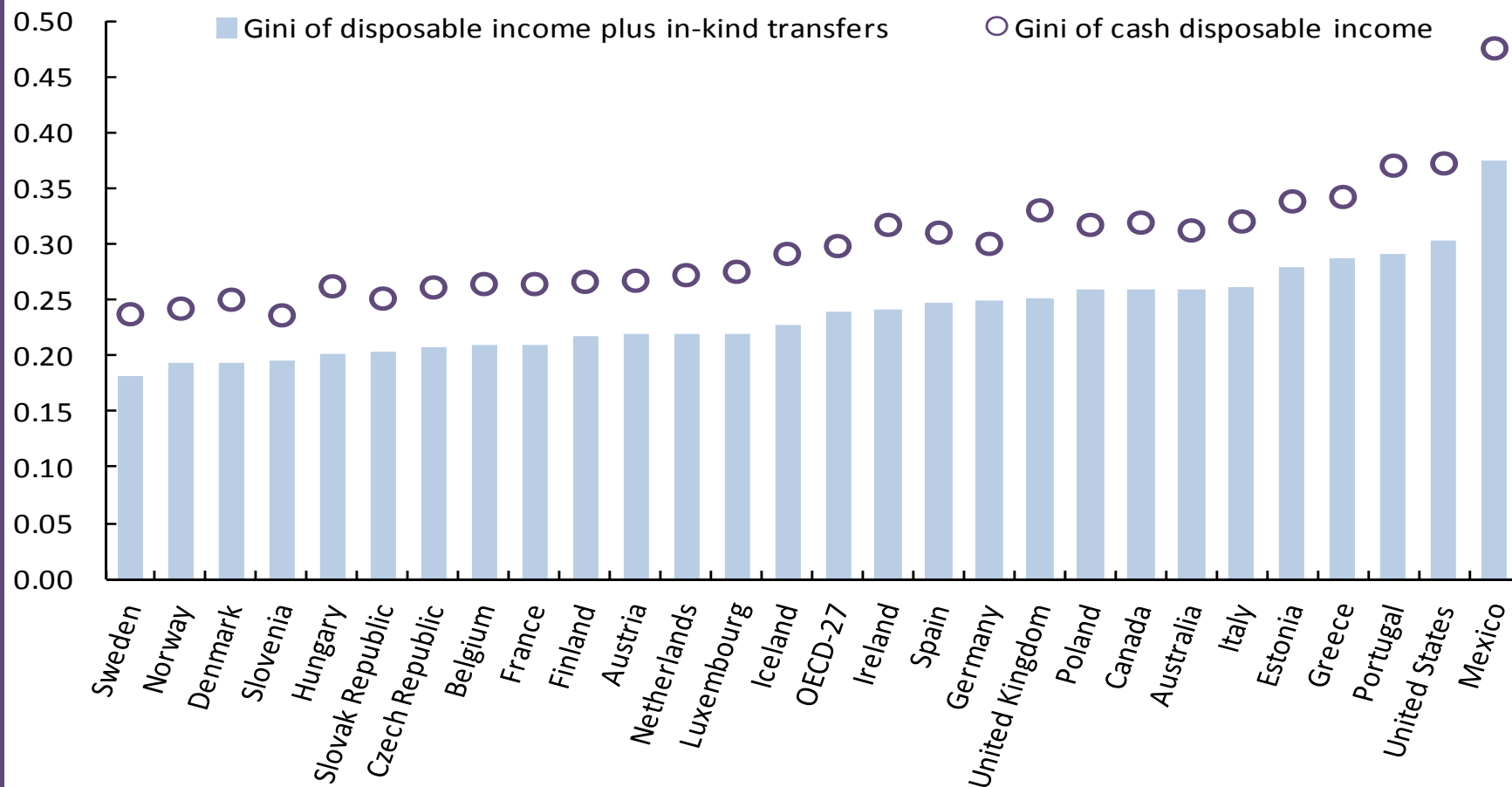2009, in per cent of GDP

Recurrent taxes on immovable property

The tax and transfer system
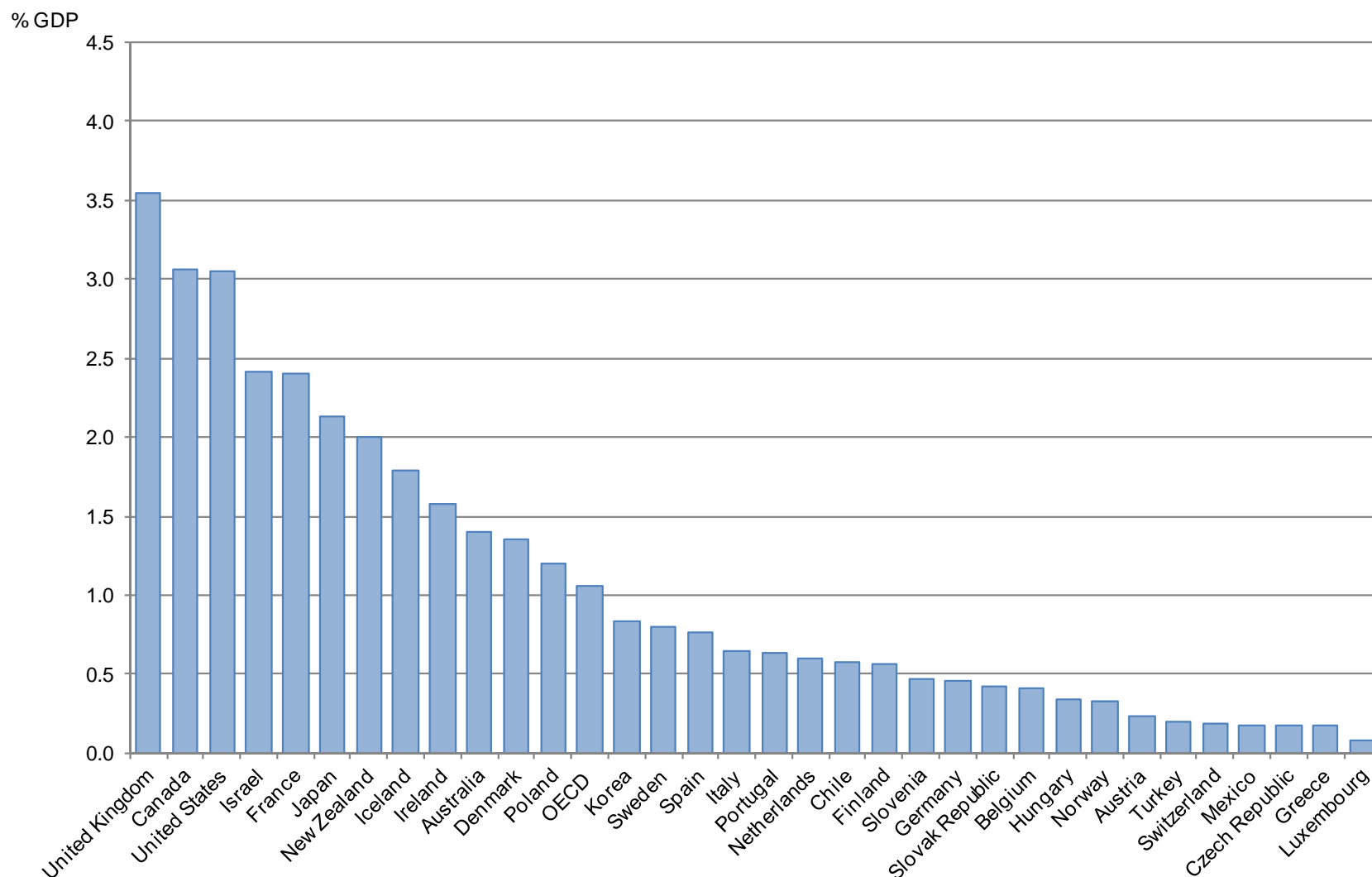
In-kind transfers reduce inequality by around 30% on average

2007

The tax and transfer system

Legend: ☐ Gini of disposable income plus in-kind transfers ◯ Gini of cash disposable income

Source: OECD (2011) *Divided we stand*

Work experience tends to narrow the income distribution in most countries

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The distribution of labour income

Effect on log earnings of raising the work experience by one year

■ 20th percentile　　　■ 80th percentile
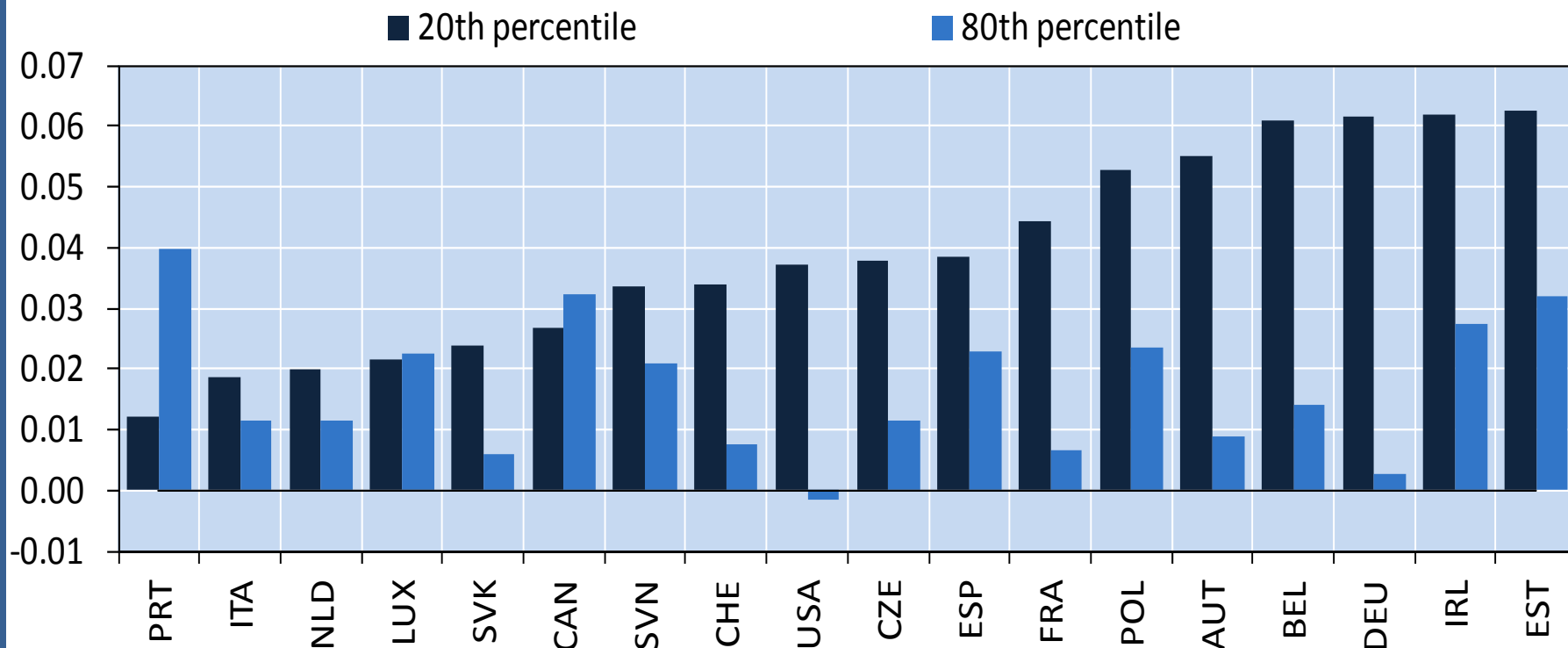
Source: National Household Surveys

Women's shorter working hours explain an important part of their lower earnings

The distribution of labour income

Oaxaca-Blinder decomposition of the gender earnings gap

Full-time and part-time workers, 2008 or latest available year

Composition effects: ⬜ Education 🟨 Sector 🟦 Hours worked 🟥 Occupation ⬛ Age

▨ Sum of all rate of return effects plus the contribution of the constant

◇ Total earnings gap between men and women
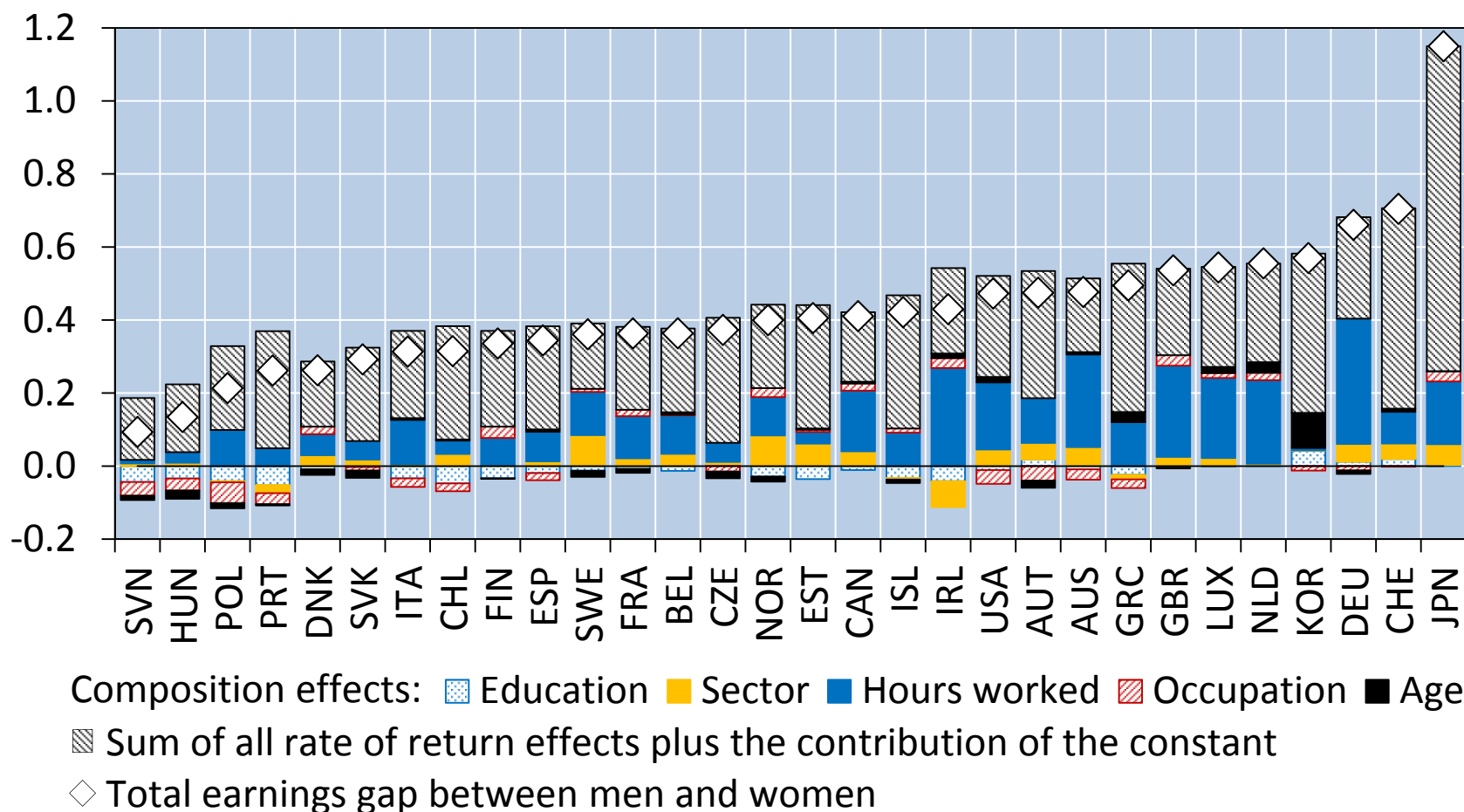
Source: National Household Surveys

Conditional and unconditional quantile regression answer two different questions
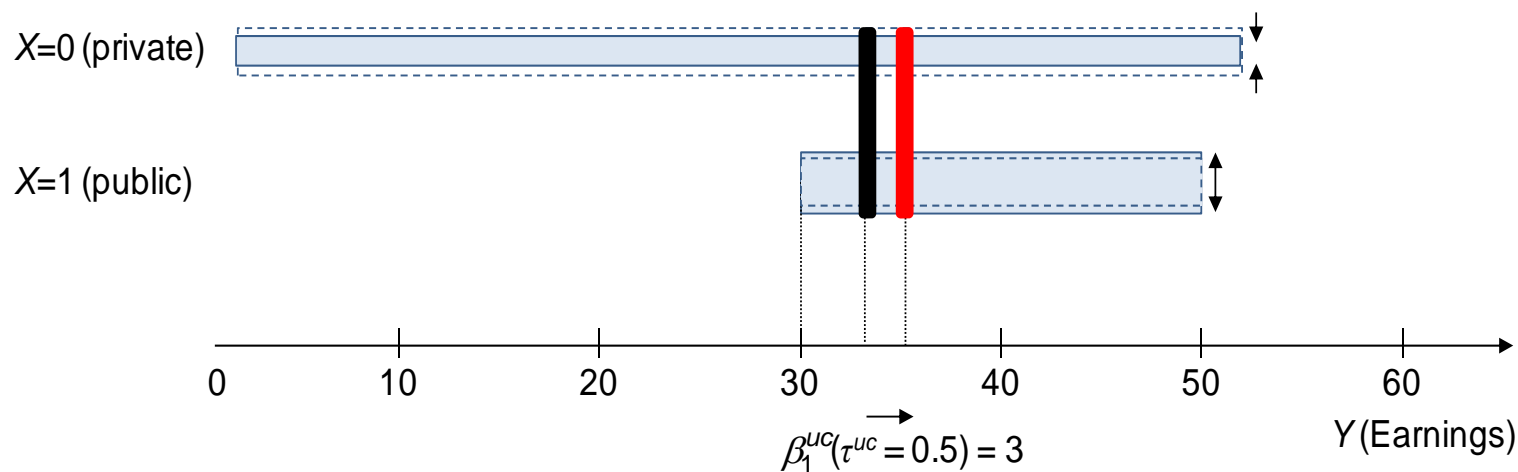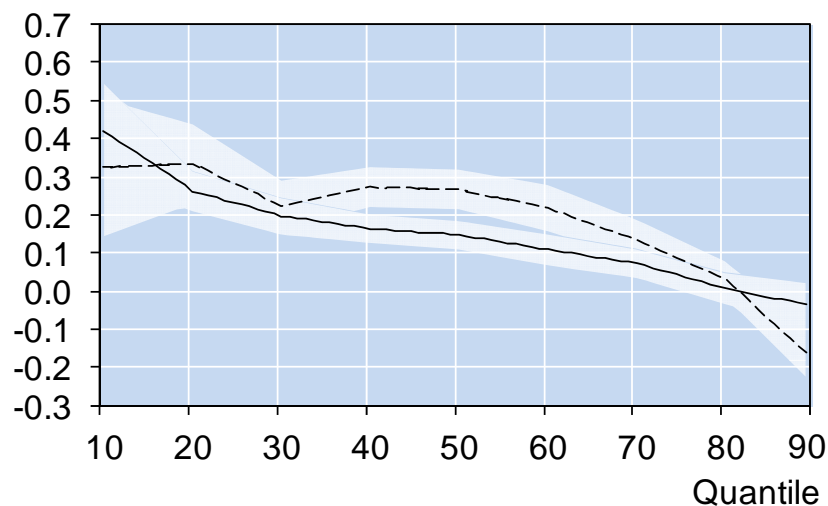
Conditional quantile regression

$$q_{Y|X}(\tau)[Y] = X\beta(\tau)$$

$$\underset{\beta(\tau)}{\text{argmin}} \sum_i \rho_\tau\left(y_i - x_i\beta(\tau)\right)$$
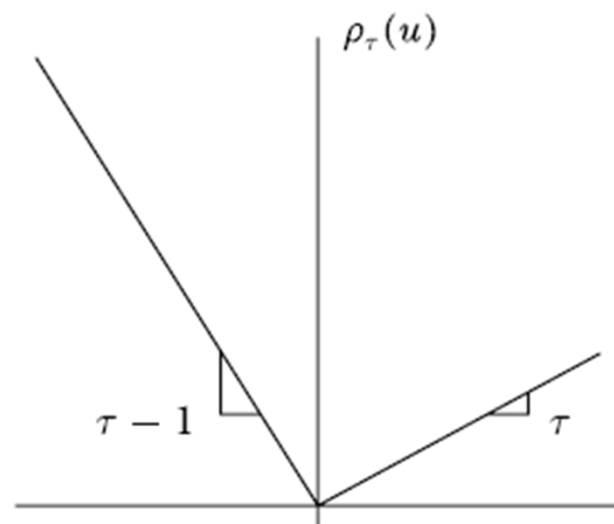
Interpreting conditional quantile regression

Empirical methodology

$\beta_0^c(\tau^c = 0.5) = 28$

X=0 (private)

X=1 (public)

$\beta_1^c(\tau^c = 0.5) = 12$

Y (Earnings)

Empirical methodology

Unconditional quantile regression
Firpo et al., 2009

$$Y = h(X, \varepsilon)$$

$$\gamma(t) = \lim_{t \to 0} \frac{q_Y(\tau)[h(X+t, \varepsilon)] - q_Y(\tau)[h(X, \varepsilon)]}{t}$$

$$RIF(Y, q_Y(\tau)) = q_Y(\tau) + \frac{\tau - 1_{Y \le q_Y(\tau)}}{f_Y(q_Y(\tau))}$$

Empirical methodology

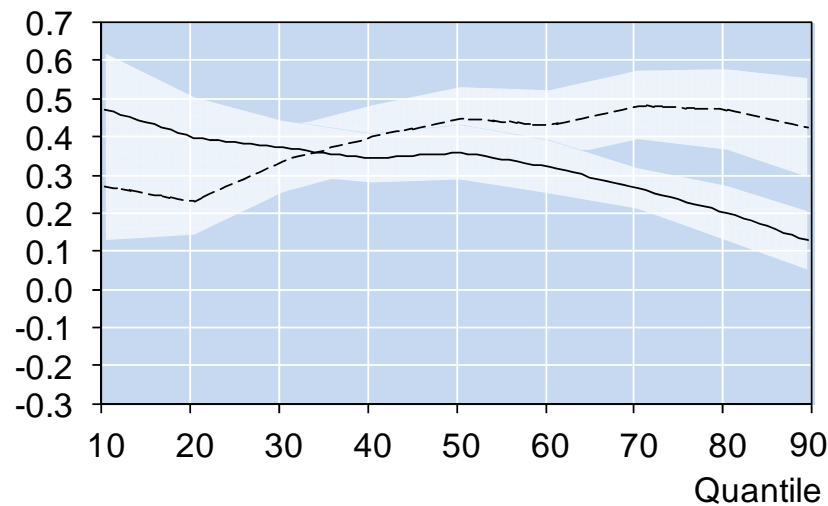**CQR focus on within-inequality while UQR focus on overall inequality**

$$\hat{W}_1 = \frac{Var_1 - Var_0}{2(Y_1 - Y_0)^2} + \frac{1}{2}$$

Effect on log earnings of working for the public sector

Australia

Korea

Quantile

Quantile

——— Conditional quantile regressions   - - - Unconditional quantile regressions