Polarization of work between households and changes in income inequality: the case of CEE countries, 2004-2015

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1.Introduction

- Transition led to significant increases in inequality and poverty in CEE countries (Milanovic 1999, World Bank 2000, Heyns 2005).

- At the time of accession to the EU CEE countries are heterogeneous in terms of overall income inequality.

- The period after 2004 has been characterized by considerable macroeconomic volatility: huge changes in employment levels.

- Focus: how changes in the distribution of employment among individuals and households have changed and how this contributed to changes in the income distribution during the 2004-2015 period?

2.Literature and research questions

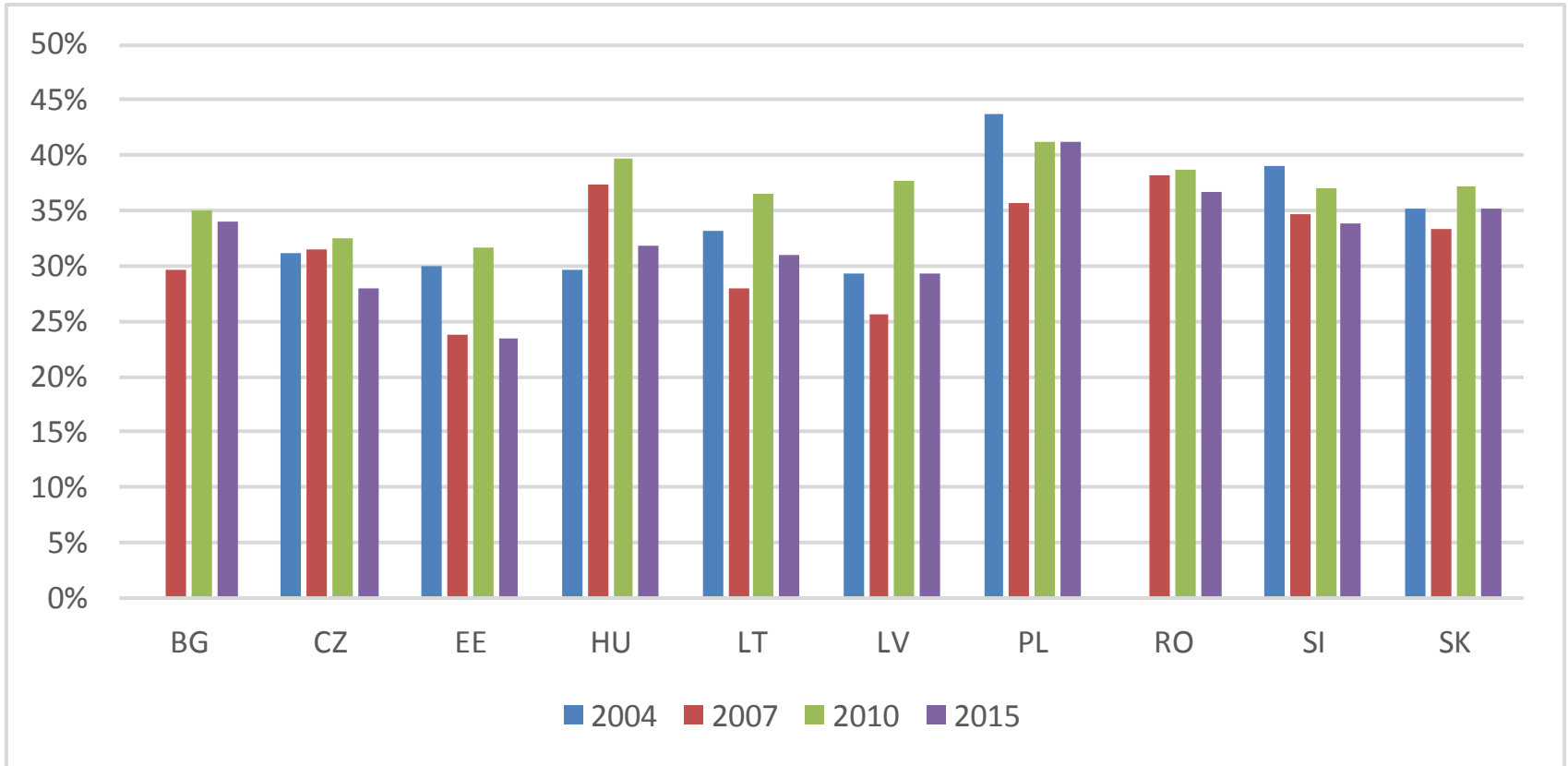Impact of employment changes on the income distribution:

- Declining employment increases inequality of labour earnings between those working and not working (Jenkins et al. 2011).

- Composition of the employed population can also change, which might have opposite effect.

- BUT: one has to consider how employment and earnings of individuals are combined in households.

- Some research on household joblessness and poverty (eg. Cantillon 2011, de Graaf-Zijl and Nolan 2011, Corluy and Vandenbroucke 2012).

- Here focus in on the relation between household joblessness and income inequality.
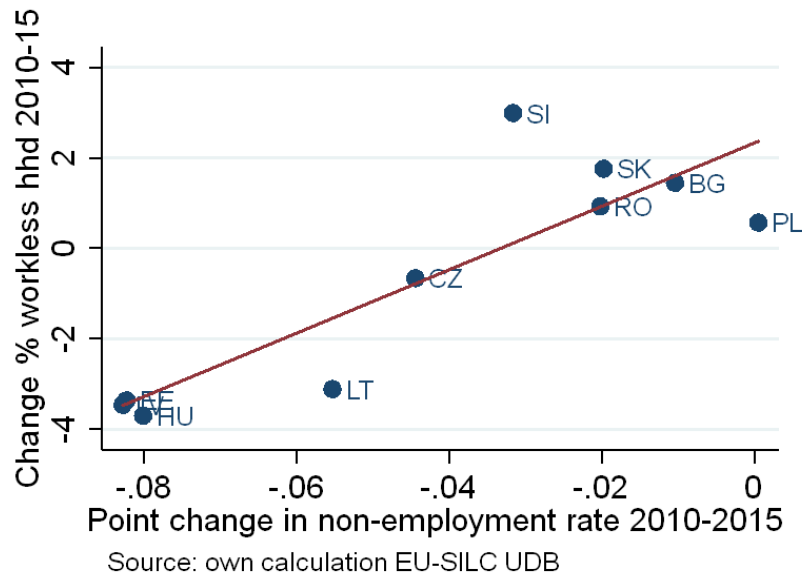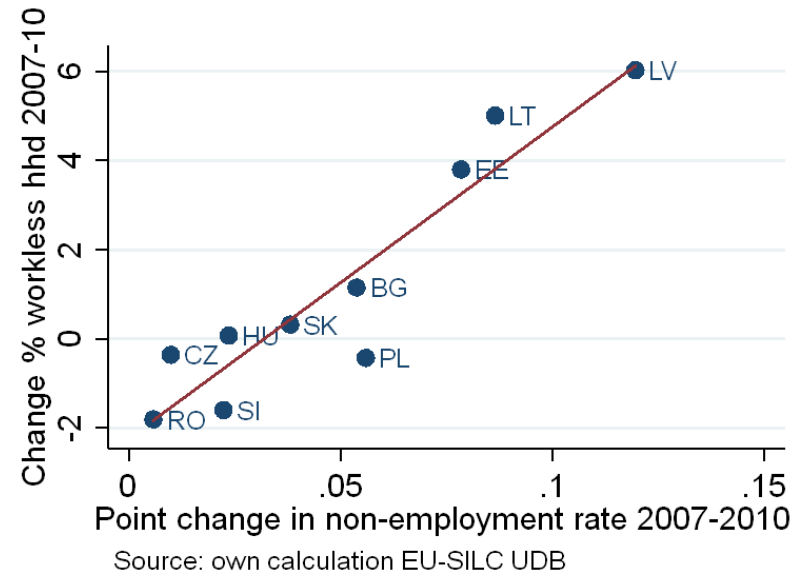
3.Data and measurement

- Based on the microdata from user databases of the EU-SILC 2005, 2008, 2011, 2016.

- Data cover 10 CEE countries (CZ, SK, PL, HU, Sl, EE, LT, LV, BG and RO), data for BG and RO is not available in EU-SILC 2005.

- Income: household disposable income (equivalised with OECD II scale). The income reference year is the calendar year prior to the year of study.

- Work intensity: taking into account no. of hours worked (see Özdemir and Ward 2013).

- The analysis focuses on households with working age hhd head (18-64)

4.Descriptives

Evolution of individual non-employment in EU-SILC
(% of working age individuals not working at all during the reference year)

Individual and household joblessness

Source: own calculation EU-SILC UDB

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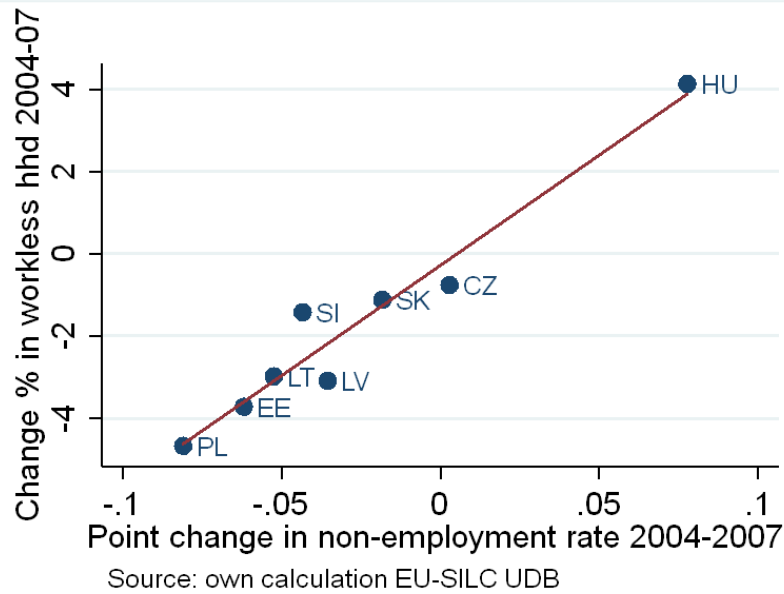
5.Studying the link between distribution of work and income: methodology (1)

Starting point:

$$Y_i = \Sigma\beta_k X_k + \varepsilon_i$$

Y=log household disposable income

X=

Work intensity of hhd: workless, 0<WI<0.5, 0.5<WI<1, WI=1

Age of hhd head: 18-35, 36-49, 50-64

Education level of hhd head: below up. 2ndary, upper 2ndary, tertiary

Household composition: 6 categories

- the proportionate contribution (s_k) of the composite variable $C_k = b_k X_k$ to overall inequality (Fields 2003, Cowell and Fiorio 2011):

$$s_k = b_k \, cov_{Xk,Y}/\sigma^2_Y$$

where b_k is the estimated regression coefficient for variable k, X_k is the value of the k-th explanatory variable, cov is covariance and σ is standard deviation.

5.Studying the link between distribution of work and income: methodology (2)

If incomes in period *a* and *b* are

$$Y_a = \beta_{0a} + \Sigma_k \beta_{ka} X_{ka} + \varepsilon_a$$
$$Y_b = \beta_{0b} + \Sigma_k \beta_{kb} X_{kb} + \varepsilon_b$$

Where y=log(income), X_{kt} are exogeneous variables end ε_t is the residual.

Yun (2006) defines the auxiliary equation, by replacing coefficients of income equation of time period *a* with those of time period *b*:

$$Y^* = \beta_{0b} + \Sigma_k \beta_{kb} X_{ka} + \varepsilon_a$$

If inequality is measured by the varlog (σ^2_y), inequality change can be decomposed as:

$$\sigma^2_{ya} - \sigma^2_{yb} = (\sigma^2_{ya} - \sigma^2_{y^*}) + (\sigma^2_{y^*} - \sigma^2_{yb}) =$$
$$= \Sigma_k(s_{kya}\, \sigma^2_{ya} - s_{ky^*}\, \sigma^2_{y^*}) + \Sigma_k(s_{ky^*}\, \sigma^2_{y^*} - s_{kyb}\, \sigma^2_{yb}) + (\sigma^2_{\varepsilon a} - \sigma^2_{\varepsilon b})$$

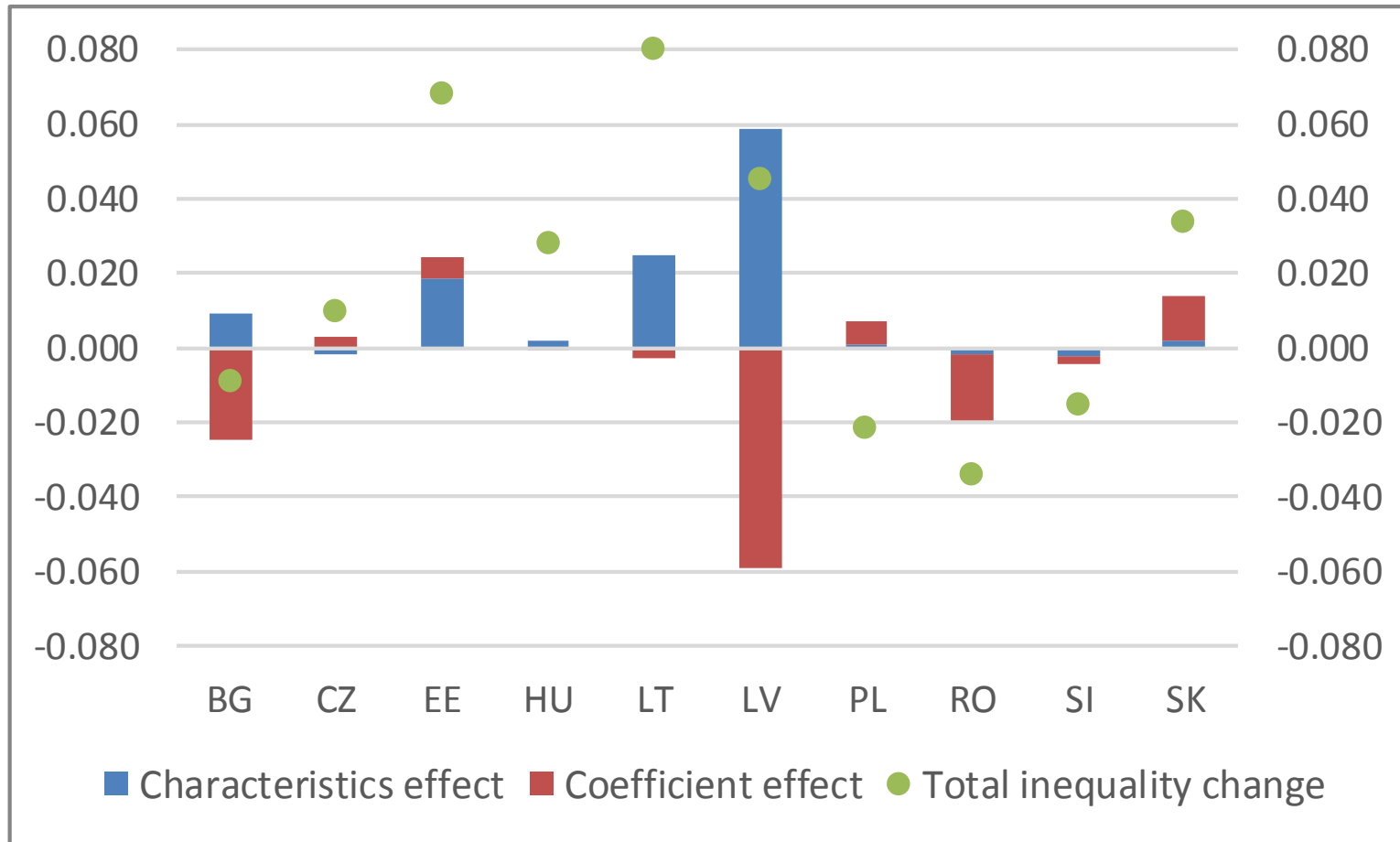(coefficients effect)   (characteristics effect)   (residual effect)

Absolute contributions to inequality change, 2007-2010

	BG			RO			HU		
	Char	Coeff	Sum	Char	Coeff	Sum	Char	Coeff	Sum
Age	0.000	-0.004	-0.003	0.000	0.002	0.002	0.001	-0.003	-0.002
Education	0.003	0.042	0.045	0.016	-0.010	0.006	0.001	0.016	0.017
Work int.	0.009	**-0.025**	-0.015	-0.002	**-0.018**	-0.020	0.002	0.000	0.002
HHd str.	0.002	0.007	0.008	-0.002	-0.003	-0.005	0.002	-0.002	0.000
Residual		-0.044	-0.044		-0.017	-0.017		0.012	0.012
Sum	0.014	-0.023	**-0.009**	0.012	-0.047	**-0.034**	0.005	0.022	**0.028**

	CZ			SK			PL		
	Char	Coeff	Sum	Char	Coeff	Sum	Char	Coeff	Sum
Age	0.000	-0.001	-0.002	0.000	0.000	0.000	-0.001	0.000	0.000
Education	0.001	0.007	0.008	0.001	-0.004	-0.003	0.005	-0.009	-0.004
Work int.	-0.002	0.003	0.001	0.002	**0.012**	0.014	0.001	0.006	0.007
HHd str.	0.000	-0.001	-0.001	0.000	0.003	0.003	-0.001	0.001	0.000
Residual	0.000	0.003	0.003	0.000	0.020	0.020	0.000	-0.024	-0.024
Sum	-0.002	0.011	**0.010**	0.003	0.031	**0.034**	0.004	-0.026	**-0.022**

	EE			LT			LV		
	Char	Coeff	Sum	Char	Coeff	Sum	Char	Coeff	Sum
Age	0.000	-0.001	-0.001	0.000	0.004	0.004	0.000	-0.002	-0.002
Education	0.002	0.006	0.008	0.020	-0.020	0.000	0.010	0.011	0.020
Work int.	**0.018**	0.006	0.024	**0.025**	-0.003	0.022	**0.059**	**-0.059**	0.000
HHd str.	-0.002	-0.010	-0.012	0.008	-0.020	-0.012	0.004	-0.008	-0.004
Residual		0.049	0.049		0.070	0.070		0.032	0.032
Sum	0.019	0.049	**0.068**	0.052	0.031	**0.084**	0.072	-0.027	**0.045**

|	SI		
	Char	Coeff	Sum
Age	0.001	0.000	0.001
Education	0.000	-0.003	-0.003
Work int.	-0.003	-0.002	-0.004
HHd str.	-0.002	0.002	0.000
Residual		-0.009	-0.009
Sum	-0.004	-0.012	**-0.015**

Absolute contribution of change in work intensity to inequality change, 2004-2007
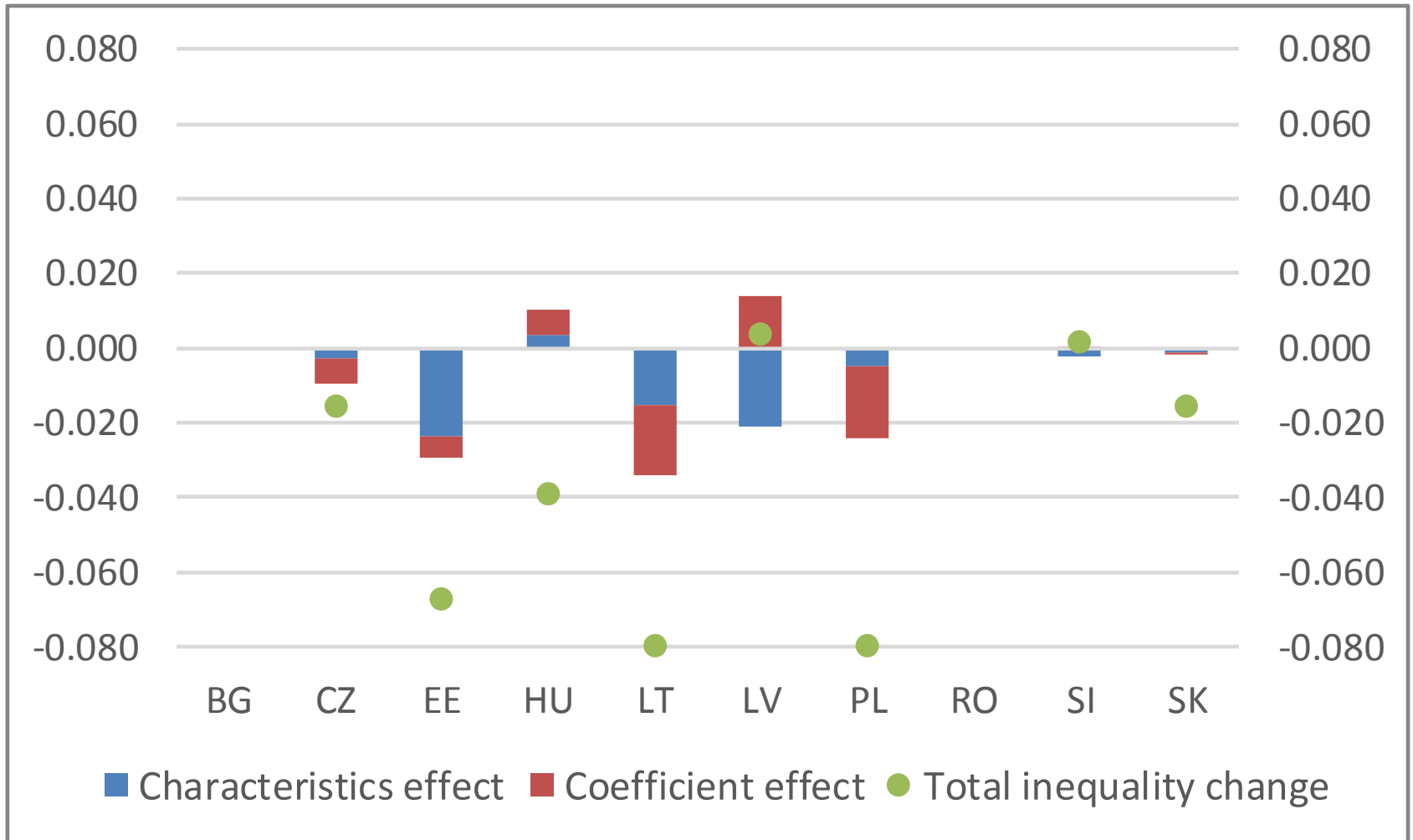
Absolute contribution of change in work intensity to inequality change, 2007-2010

Absolute contribution of change in work intensity to inequality change, 2010-2015

Legend: ■ Characteristics effect ■ Coefficient effect ● Total inequality change
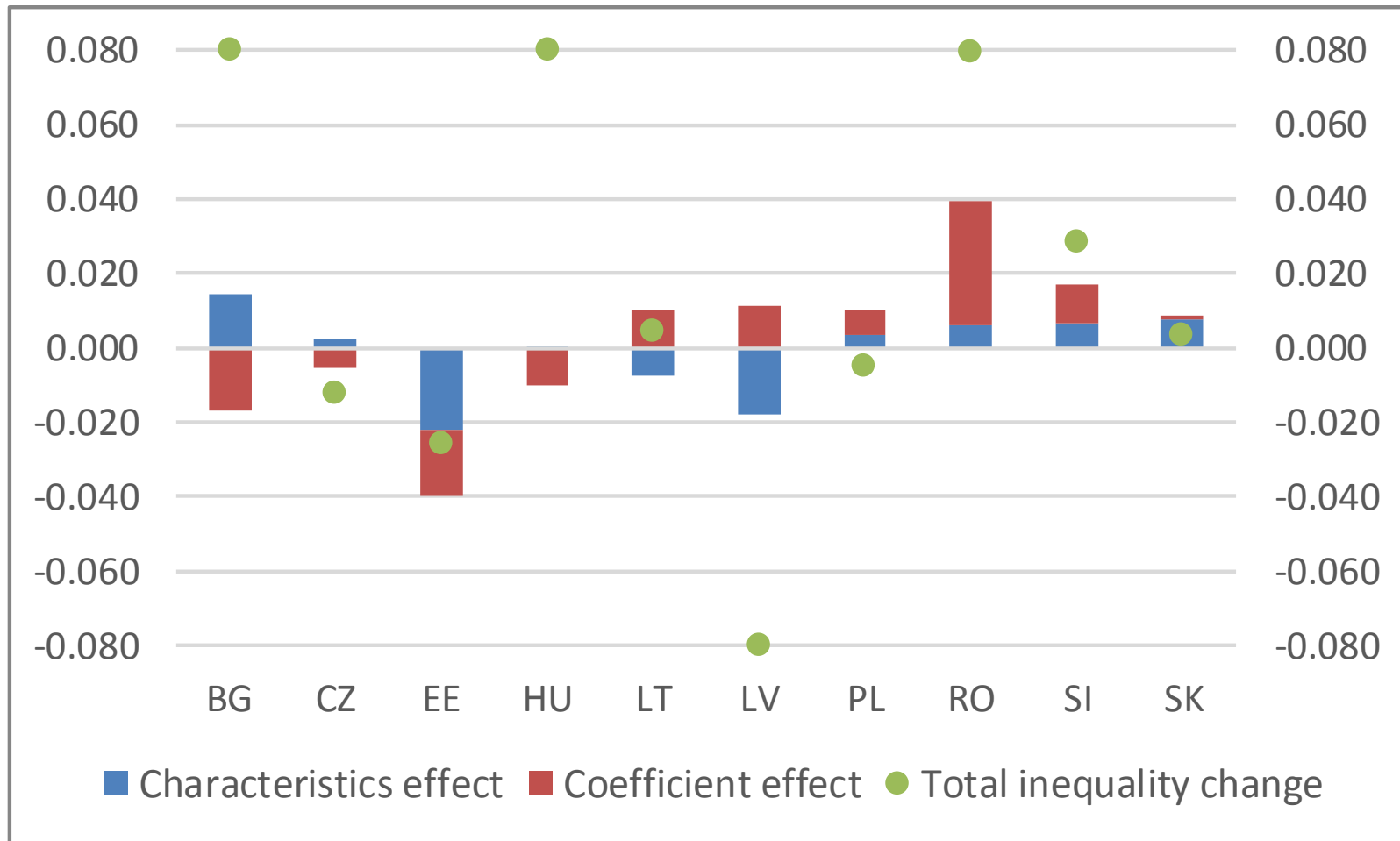
Relative contribution of changes in work intensity to inequality change

	Period 2004-2007			Period 2007-2010			Period 2010-2015		
	Character-istics effect	Coefficient effect	Total	Character-istics effect	Coefficient effect	Total	Character-istics effect	Coefficient effect	Total
BG				-104%	273%	169%	7%	-8%	-1%
CZ	19%	42%	62%	-21%	29%	8%	-18%	43%	24%
EE	35%	8%	43%	27%	8%	35%	86%	71%	157%
HU	-9%	-17%	-26%	6%	0%	6%	1%	-12%	-12%
LT	13%	16%	30%	30%	-3%	26%	-168%	235%	67%
LV	-607%	400%	-207%	130%	-131%	-1%	19%	-12%	7%
PL	3%	12%	16%	-5%	-28%	-33%	-65%	-136%	-201%
RO				4%	53%	57%	8%	42%	49%
SI	-156%	35%	-121%	16%	11%	28%	23%	37%	60%
SK	7%	4%	12%	6%	35%	41%	217%	38%	256%

6.Inequality among households in the distribution of work

- Gregg and Wadsworth (2008) have proposed to compare the actual workless household rate to the rate that would prevail, if non-employment was randomly and equally distributed in the population.

  $I = \Sigma_k s_k w_k - \Sigma_k s_k p^k$

Where household size $k=1....K$, s_k stands for population share, w_k is actual workless household rate, p is the individual non-employment rate

Worklessness at the household level and work inequality

	Inequality in the distribution of work between households				Standardized inequality			
	2004	2007	2010	2015	2004	2007	2010	2015
BG		2.8	1.8	1.2		9.5	5.1	3.7
CZ	1.7	1.0	-0.1	0.4	5.4	3.1	-0.3	1.5
EE	1.2	-0.4	-0.5	-0.3	3.8	-1.7	-1.5	-1.2
HU	1.4	2.4	1.3	0.0	4.6	6.5	3.2	0.1
LT	1.4	1.8	1.6	-0.3	4.2	6.3	4.3	-0.9
LV	1.4	0.3	0.1	-0.1	4.6	1.0	0.3	-0.4
PL	4.3	4.2	0.8	0.8	9.8	11.8	2.0	1.8
RO		2.0	0.1	0.5		5.3	0.2	1.4
SI	0.3	0.9	-0.1	0.3	0.9	2.5	-0.4	0.8
SK	0.7	1.0	-0.5	1.0	2.1	2.9	-1.2	2.9

Note: standardized inequality is inequality divided by individual non-employment rate

Conclusions

- Period between 2004 and 2015: important changes in employment in CEE countries, most importantly in Baltic states.

- I analyse the effect of these changes on income inequality with using decomposition suggested by Yun.

- In absolute terms most important effects of the changes in work intensity were detected during the crisis period (2007-2010).

- During the pre-crisis and the post-crisis period changing composition by work intensity decreases inequality, during the crisis period there is an inequality-increasing effect.

- Results showed that changes in the distribution of work among households (work intensity) contributed most in the Baltic states.

- Effect of work intensity seems to be less connnected to changes in inequality in the distribution of work between households.

Absolute contributions to inequality change, 2004-2007

	CZ			SK			PL		
	Char	Coeff	Sum	Char	Coeff	Sum	Char	Coeff	Sum
Age	0.000	0.001	0.001	-0.001	0.001	0.000	-0.001	-0.001	-0.001
Education	0.001	-0.004	-0.003	0.001	0.005	0.005	0.000	-0.006	-0.006
Work intens.	-0.003	-0.007	-0.010	-0.001	-0.001	-0.002	-0.005	**-0.019**	-0.024
HHd structure	0.000	-0.001	-0.001	-0.001	0.005	0.004	-0.002	-0.010	-0.012
Residual		-0.003	-0.003		-0.023	-0.023		-0.111	-0.111
Sum	-0.002	-0.013	**-0.016**	-0.003	-0.013	**-0.016**	-0.008	-0.147	**-0.155**

	EE			LT			LV		
	Char	Coeff	Sum	Char	Coeff	Sum	Char	Coeff	Sum
Age	-0.001	0.002	0.002	0.000	0.000	-0.001	0.000	0.003	0.002
Education	0.003	-0.015	-0.012	-0.001	-0.019	-0.020	0.008	-0.007	0.000
Work intens.	**-0.024**	-0.006	-0.029	**-0.015**	**-0.019**	-0.034	**-0.021**	**0.014**	-0.007
HHd structure	-0.004	0.004	0.000	-0.006	0.006	0.000	-0.001	0.004	0.004
Residual		-0.028	-0.028		-0.060	-0.060		0.004	0.004
Sum	-0.026	-0.042	**-0.067**	-0.023	-0.092	**-0.115**	-0.014	0.018	**0.003**

	SI			HU		
	Char	Coeff	Sum	Char	Coeff	Sum
Age	0.000	-0.002	-0.001	0.001	-0.002	-0.001
Education	0.011	-0.009	0.002	-0.001	-0.008	-0.009
Work intens.	-0.002	0.001	-0.002	0.004	0.007	0.010
HHd structure	0.000	-0.001	0.000	0.001	0.000	0.002
Residual		0.004	0.004		-0.042	-0.042
Sum	0.009	-0.007	**0.002**	0.005	-0.044	**-0.040**

Inequality of disposable income
(Variance of logarithms, households with working age head)