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**Working Paper**

# The effect of changes in tax-benefit policies on the income distribution in 2008-2015

EUROMOD Working Paper, No. EM6/16

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*Suggested Citation:* De Agostini, Paola; Paulus, Alari; Tasseva, Iva (2016) : The effect of changes in tax-benefit policies on the income distribution in 2008-2015, EUROMOD Working Paper, No. EM6/16, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:
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EUROMOD WORKING PAPER SERIES

EM 6/16

# The effect of changes in tax-benefit policies on the income distribution in 2008-2015

Paola De Agostini, Alari Paulus and Iva Tasseva

July 2016

# The effect of changes in tax-benefit policies on the income distribution in 2008-2015 [1]

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**Abstract**

We apply microsimulation techniques to estimate the first-order effects of tax-benefit policy changes since the beginning of the financial and economic crisis in 2008. Using the EU tax-benefit model EUROMOD in combination with the EU-SILC 2012 micro-data, we provide comparative estimates for EU-27 in 2008-2014 as well as for 21 EU member states in 2014-2015. The analysis covers direct tax and cash benefit changes and evaluates their effects on the income distribution, poverty and inequality levels, holding population characteristics and market incomes constant, thereby, isolating direct policy effects from other factors shaping the income distribution. Two different indexation approaches are used to adjust benchmark policies over time – prices and market incomes – and explore the sensitivity of results. We find substantial cross-national variation throughout the whole period. At the EU level, policy changes in the first half of the period (2008-2011) were poverty-reducing and had a positive effect on mean incomes, while the effects were the opposite in the later period (2011-2014); and inequality-reducing in both periods.

**JEL**: D31, H23, I38

**Keywords**: Income distribution, tax-benefit policies, European Union.

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[1] The work in this paper has been supported by the Social Situation Monitor (SSM), funded by the European Commission (Directorate-General for Employment, Social Affairs and Inclusion) and published as SSM Research Note 2/2015. The authors are grateful to Lina Salanauskaite and Maria Vaalavuo for valuable comments and suggestions. The results presented here are based on EUROMOD version G2.75. EUROMOD is maintained, developed and managed by the Institute for Social and Economic Research (ISER) at the University of Essex, in collaboration with national teams from the EU member states. We are indebted to the many people who have contributed to the development of EUROMOD. The process of extending and updating EUROMOD is financially supported by the European Union Programme for Employment and Social Innovation 'Easi' (2014-2020). We make use of microdata from the EU Statistics on Incomes and Living Conditions (EU-SILC) made available by Eurostat (59/2013-EU-SILC-LFS), for Estonia, Greece and Poland, the EU-SILC together with national variables provided by respective national statistical offices; for Belgium the national EU-SILC "PDB" data made available by respective national statistical offices; and for the UK Family Resources Survey data made available by the Department of Work and Pensions via the UK Data Archive. The authors alone are responsible for the analysis and interpretation of the data reported here.

# 1. Introduction

How household incomes and wealth are distributed, what socio-economic consequences that has and how the distribution is affected by public policies have gained considerable and increasing attention in academic and policy debates in recent years (e.g. Atkinson and Bourguignon, 2015; OECD, 2015). Among others, this reflects growing awareness that policy changes are rarely distribution-neutral (if ever). Raising legitimate questions about who gains and who loses from a given policy change and – more importantly – whether this is acceptable, is a healthy sign of transparent policy decision-making process. The general public is entitled to be informed about the distributive effects of public policies, both short-term and long-term, and such assessments should be(come) a standard practice.

An obvious example of public policy having a direct and indirect influence on the income distribution is the tax-benefit system. Changes in tax-benefit policies and/or their interactions with developments in market income distribution play an important role in shaping the distribution of household disposable incomes. Because incomes are inherently dynamic, the tax-benefit system needs regular adjustments to stay in line with developments in prices as well as wages. Keeping the whole or part of tax-benefit system nominally constant can still bear important implications as prices and wage distribution keep evolving. To identify potential imbalances and unintended policy consequences at an early stage it is therefore vital to carry out (ex ante) assessment exercises when designing new policies, monitor their actual implementation and evaluate their adequacy to meet the initial aims under prevailed macro-economic conditions.

Tax-benefit microsimulation models represent a useful tool for such exercises. Microsimulation techniques involve constructing various counterfactual policy or economic scenarios and simulating changes in the behaviour and/or status of a set of micro-agents (e.g. individuals, households) on the basis of deterministic or stochastic rules, taking into account their highly heterogeneous characteristics and possible interactions (e.g. Bourguignon and Spadaro, 2006; Figari et al., 2015). Tax-benefit models deal specifically with household incomes and allow deriving the whole distribution of household disposable income under alternative tax-benefit rules (or economic conditions).

In this research note, we evaluate the distributional effects of direct tax and cash benefit policies in EU member states since the beginning of the financial and economic crisis in 2008, distinguishing between various sub-periods reflecting how economies have evolved. The analysis covers policies up to 2015 and draws on the EU tax-benefit model EUROMOD and household data from the EU Statistics on Income and Living Conditions (EU-SILC) 2012 (with income information for 2011) and Family Resources Survey 2012/2013 (FRS) for the UK to estimate the direct policy effect on household income distribution, separately from the contribution of other economic and demographic factors. The paper continues a recent series of EUROMOD-based comparative assessments of policy effects (Callan et al. 2011; Avram et al. 2013; De Agostini et al. 2014; De Agostini et al. 2015b) and extends the latter in three directions by:

i. providing estimates for 2008-14 period for a larger set of countries (27 EU member states)[2] and by sub-periods (2008-11, 2011-14);

ii. adding estimates for the effects of tax-benefit policies in 2014-15 (for 21 countries for which 2015 policies are already available in EUROMOD);

iii. using more up-to-date data from EU-SILC 2012 (and FRS 2012/13 for the UK).

[2] Croatia is modelled in EUROMOD from 2011 onwards, hence it is excluded from the analysis.

To provide a robust and comprehensive assessment, we calculate the policy effect both in real terms and relative to growth in earnings. In other words, we use two counterfactual indexation scenarios: one based on price inflation and the other on earnings inflation.

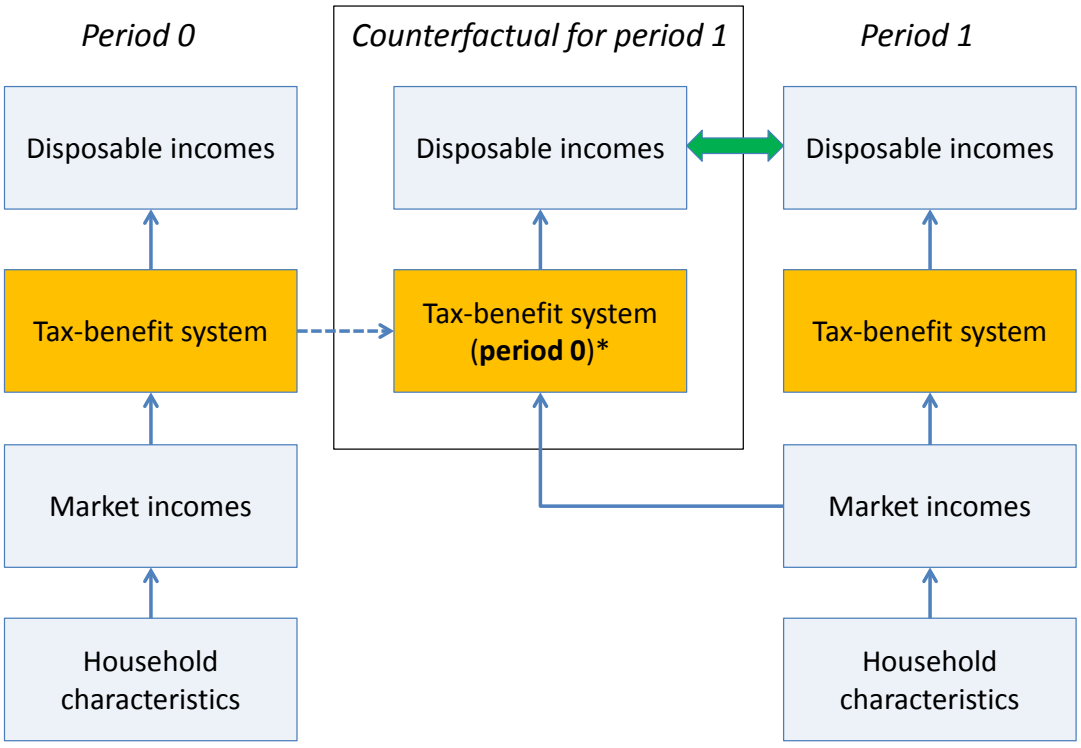
The methodology and data used are explained in more detail in Section 2. Empirical analysis is presented in Section 3 and Section 4, separately for 2008-2014 and 2014-2015 periods to highlight the latest developments from the rest. Section 5 concludes.

## 2. Methodology and data

We assess the direct (non-behavioural) effect of tax-benefit policies on the income distribution in EU-27 for the periods 2008-2011, 2011-2014 and 2014-2015. Based on the 2011 population and household gross market incomes, we simulate the distribution of household disposable income under the *actual* 2011 policy regimes and compare it with what the income distribution would have looked like if either 2008 or 2014 policies had been in force in 2011 instead. Similarly, we compare the income distribution under the actual policies in 2015 with what it would have looked like if instead 2014 tax-benefit policies had been in place (holding population characteristics and gross market incomes constant).

We first explain in detail the method used to estimate the policy effect and then how we measure the size of the policy effect in real terms and relative to earnings growth. Finally, we describe the tax-benefit model EUROMOD and the household micro-data used in the analysis.

**Figure 1: Decomposing the policy effect**




### The decomposition method

We identify and assess the effect of tax-benefit policy changes on household incomes between two points in time, drawing on the decomposition framework proposed by Bargain and Callan (2010), whereby policy effects are isolated from any other changes in the population characteristics and market incomes. The method is illustrated in Figure 1: household disposable income at different points in time is the result of interactions

between i) tax-benefit policies, ii) the distribution of market incomes and iii) household characteristics. Thus, the change in incomes between two periods can be attributed to each of these three factors. To isolate the effect of tax-benefit policy changes on household disposable incomes between two periods, one can compare the *actual* distribution of household disposable incomes under the policies of period 1 with a *counterfactual* income distribution replacing the tax-benefit policies with those from period 0, while keeping population characteristics and market incomes constant (from period 1).

The specific question we want to answer is: what would household disposable income be for the population in period 1 if the system from period 0 had been still in place.[3] There are two main channels through which tax-benefit policy changes between period 0 and 1 can affect household disposable income: first, a direct effect which can be calculated for each household taking their characteristics and market incomes as given; second, an indirect effect through tax-benefit changes, altering household behaviour and their work decisions. The accurate estimation of new population characteristics and market incomes is a challenging task with very substantial data requirements. This is outside the scope of our paper and we focus on the direct policy effects alone.

Formally, let us denote as $y_t$ a vector of individual and household characteristics and market incomes in period *t*; $p_t$ the (monetary) parameters of the tax-benefit system and $d_t$ the rules of the tax-benefit system. Household disposable incomes are then given by a function $d_t(p_t, y_t)$, where the tax-benefit rules transform market incomes taking the policy parameters and population characteristics as arguments. A generic welfare measure calculated on the basis of disposable income distribution can be denoted as $I[d_t(p_t, y_t)]$. In the first instance, the effect of policies on a given welfare indicator – in terms of period 1 population and market incomes – could be calculated as:

$$\Delta I = I[d_1(p_1, y_1)] - I[d_0(\alpha p_0, y_1)] \quad (1)$$

Here, the policy parameters which are expressed in monetary terms – for example, benefit amounts and tax thresholds – from period 0, $p_0$, have been adjusted (scaled up[4]) by a counterfactual indexation factor (α) equal to prices or market incomes changes to make them comparable with the parameters from period 1, $p_1$. As a result the policy effect in real terms or relative to growth in market incomes. The next subsection explains in detail the importance and implications of using different indexation factors.

## Counterfactual indexation

When comparing tax thresholds and benefit amounts over time, one needs to make a decision whether to compare their nominal levels or recognise that there have been changes in the economy and adjust the monetary parameters of tax-benefit policies accordingly. In our analysis, we index the policy parameters in the counterfactual scenario to reflect changes either in (average) market income (i.e. mostly earnings) or prices. As the choice of which index to use for counterfactuals can affect the estimated size[5] of policy effects, we present results for both of these indexation benchmarks, similar to e.g. Clark and Leicester (2004) and Hills et al. (2014):

[3] One could be equally interested in assessing period 1 policies with respect to period 0 policies (on population) in period 0 as is the case for 2011-2014 period in this research note.

[4] Note that when comparing 2011 and 2014 we will scale down 2014 parameters to 2011.

[5] The intuition behind this is the following: indexing the counterfactual system by a larger $\alpha$ will result in higher counterfactual benefit amounts and tax thresholds compared to the base system. The counterfactual system would appear more generous and any income gains (losses) for households due to moving from the tax-benefit system in $t_0$ to that in $t_1$ would be assessed as being relatively smaller (bigger). As further pointed out in Paulus et al. (2014), a higher $\alpha$ would show the base tax-benefit system typically less progressive relative to the counterfactual scenario.

- $\alpha_1 = MII$ (Market Income Index), 2008 (2014) benefit amounts and tax thresholds are indexed by the change in average market income between 2008-2011 (2011-2014);
- $\alpha_2 = CPI$ (Consumer Price Index), 2008 (2014) benefit amounts and tax thresholds are indexed in line with inflation between 2008-2011 (2011-2014).

Separately, 2014 policy parameters are inflated by MII and CPI in 2014-2015 (and then compared with 2015 policies). Appendix 1 presents the movements in CPI and MII in the three periods: 2008-2011, 2011-2014 and 2014-2015.

MII-based indexation implies that the overall balance between cash benefits and direct taxes would be broadly unchanged and the system fiscally neutral in this respect. For example, there would be no fiscal drag (on the whole) as tax brackets are adjusted in line with growth in private incomes. Such indexation would also be neutral between households regardless whether they rely on market income or public support. On the other hand, at times of economic downturn, MII-indexation implies that benefit amounts and tax thresholds may be *decreased* both in nominal and real terms, which could weaken further the position of the most vulnerable at times of hardship. CPI-based indexation adjusts tax-benefit parameters in line with prices and hence avoids erosion in their real values throughout the business cycle. However, as real market incomes are likely to grow over time, CPI-based indexation is not sufficient to maintain the level of public support (for benefit recipients) relative to market incomes (of e.g. wage earners).

**EUROMOD and micro-data**

We use EUROMOD, the tax-benefit microsimulation model for the EU to analyse policy effects across the whole income distribution. EUROMOD operates on nationally representative micro-data from the EU Statistics on Income and Living Conditions (EU-SILC) and Family Resources Survey (FRS) for the UK and simulates country-specific tax-benefit rules (as of 30th of June in the given year) for the 28 member states of the EU. It is a static microsimulation model, i.e. no behavioural responses to policies are taken into account. The model simulations cover cash benefit entitlements (unemployment benefits, family benefits and social assistance) and direct tax liabilities on households (property and income taxes as well as social insurance contributions). Due to data limitations, public pensions are mainly not simulated and information on them as well as any other non-simulated taxes and benefits is taken directly from the micro-data. For detailed information on EUROMOD, see Sutherland and Figari (2013), and for detailed information on the country-specific modules in EUROMOD, see EUROMOD Country Reports[6].

The micro-data we use in the analysis are the most recent available in EUROMOD (at the time of writing): EU-SILC 2012 and FRS 2012/13 for the UK (see Appendix 2). These contain information on market incomes in 2011 (2012 for the UK). When estimating the effect of policy changes in 2014-15, market incomes are uprated to 2015 as well, taking into account the growth in various market income components between 2011 and 2015. The levels of non-simulated taxes and benefits are also adjusted by factors reflecting the statutory indexation rules of each country. Population characteristics are assumed to remain the same as in the data collection year (2012).

Using EUROMOD and information on population characteristics and market incomes in 2011, we calculate disposable incomes under the actual 2011 tax-benefit policies. Keeping population and market incomes constant, we then apply in turn the 2008 and 2014 tax-benefit policies (adjusted by CPI or MII) to obtain the counterfactual income distributions. By comparing income distributions simulated in the actual and counterfactual policy

[6] EUROMOD Country Reports are available at https://www.euromod.ac.uk/using-euromod/country-reports/

scenarios, we can estimate the change in household disposable incomes as well as changes in poverty and inequality indicators due to the tax-benefit policies in 2008-2011 and 2011-2014. Furthermore, we apply the 2015 tax and benefit rules and 2014 rules (adjusted by CPI or MII) to the 2011 population and market incomes (with the latter uprated to 2015), to separately capture the effect of 2014-15 policy changes.

All income concepts used throughout the analysis have been adjusted for household size, using the modified OECD equivalence scale. We also provide standard errors for all our EUROMOD-based estimates to account for sample variation, employing the delta method (Taylor approximations). This however does not reflect the accuracy of policy simulations.

## 3. The effect of tax-benefit policies on the income distribution in 2008-2014

We consider separately 2008-14 and 2014-15 period, splitting the former further at the mid-point (2011) when most of fiscal consolidation had taken place and the GDP of EU-28 surpassed the pre-crisis level (measured in current prices).[7]

### EU-27 average policy effects

We begin with a brief summary of how tax-benefit policies affected the income distribution at the EU level in 2008-14 and whether the two sub-periods were similar in this respect. Table 1 shows average policy effects for EU-27, weighting country-level estimates by 2014 population figures.[8] At the EU level, tax-benefit policies increased household disposable incomes in 2008-11 (up to 2.6 percentage point) and decreased incomes in 2011-14 (by 1.1-1.3pp).

In the first period, the policy effect on incomes appears much more favourable with the MII-indexed counterfactual because in most countries market incomes on average fell in real terms (i.e. CPI exceeded MII). Furthermore, in 10 countries, market incomes fell even in nominal terms (i.e. MII < 1).

**Table 1: EU-27 population-weighted average policy effects**

| Period | Index | Mean DPI (%) | FGT0 (pp) | FGT1 (pp) | FGT2 (pp) | Gini (pp) |
|---|---|---|---|---|---|---|
| 2008-2011 | CPI | 0.44 | -0.13 | -0.05 | -0.03 | -0.04 |
| | MII | 2.60 | -0.70 | -0.21 | -0.10 | -0.45 |
| 2011-2014 | CPI | -1.13 | -0.01 | 0.05 | 0.05 | -0.25 |
| | MII | -1.28 | 0.02 | 0.08 | 0.08 | -0.19 |

*Notes: Average values of country-level estimates shown, weighted by 2014 population size. Change in mean disposable income is measured as a percentage of mean (counterfactual) income in 2011. The poverty line is 60% of the national median of equivalised household disposable income (in the corresponding scenario).*
*Source: Own simulations with EUROMOD.*

These opposite income effects in the two periods were accompanied by opposite effects on poverty in the two periods as reflected by nearly all indicators (FGT0, FGT1, FGT2).[9] During the first period (2008-11) policies contributed toward reducing poverty, whilst in the second period (2011-14) we observe a poverty-increasing effect. The effects on income inequality, measured by the Gini coefficient, were clearly inequality-reducing in both

[7] See Eurostat Online Database, indicator nama_gdp_c.
[8] Eurostat Online Database, indicator demo_pjan.
[9] See Foster et al. (1984) for the FGT index.

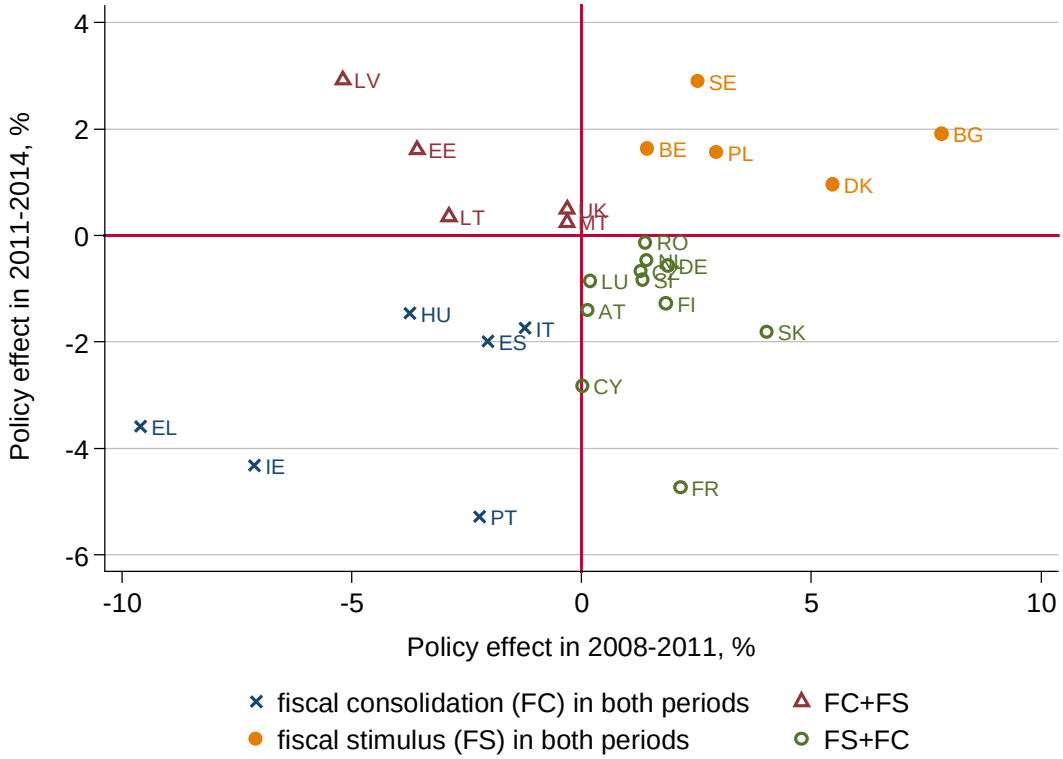
periods. At this level of aggregation, the direction of policy effects is fairly robust to the choice of benchmark indexation (CPI vs MII) and the estimates for the second period are also very similar numerically. The results for the EU as a whole, however, mask quite substantial differences at the country level which we explore next.

### Fiscal consolidation and stimulus

We divide countries into four groups, depending on whether the effect of tax-benefit policies on mean household disposable income was positive (fiscal stimulus) or negative (fiscal consolidation) and in which period (2008-11 or 2011-14). It should be emphasised that our concept of fiscal stimulus and consolidation refers narrowly to the (intended) effects of direct household taxes and cash benefits, and not to changes in the overall balance of governments' expenditures and revenues.

Policy effects on mean incomes in each period (measured against the CPI-benchmark) are shown in Figure 2. The largest group of countries appears in the bottom-right quadrant, suggesting that they initially pursued counter-cyclical fiscal policies to boost household incomes. As the crisis dragged on, they switched to fiscal consolidation to contain ballooning public deficits. Only the following five countries were able to pursue expansionary policies throughout the whole period: Belgium, Sweden, Poland, Denmark and Bulgaria (most generously). In contrast, there were four Southern European countries (Greece, Italy, Portugal, Spain) along with Ireland and Hungary, which carried through fiscal consolidation in both periods. The last group of countries carried out fiscal consolidation in the first period, but then reversed the direction in the second period. This group includes the Baltics (Estonia, Latvia, Lithuania) and, marginally, the UK and Malta.

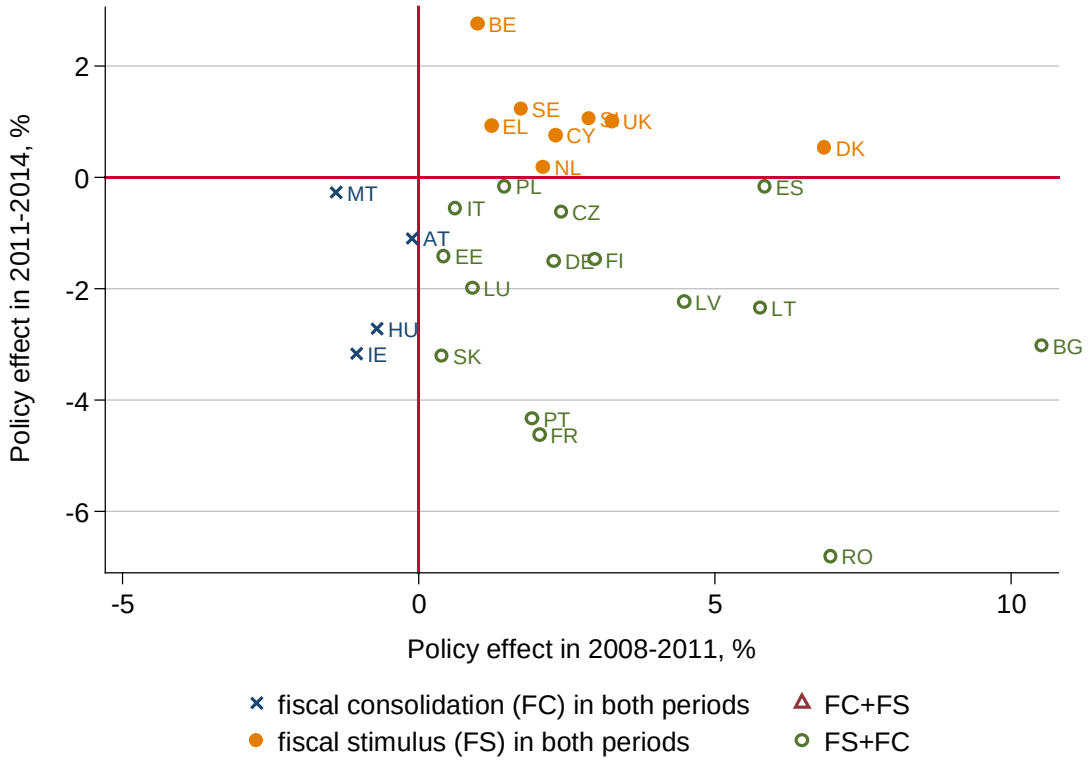
**Figure 2: Policy effects on mean equivalised household disposable income in 2008-2011 and 2011-2014 using the CPI-indexation**




*Notes: Change is measured as a percentage of mean (counterfactual) income in 2011, indexed by Consumer Price Index.*
*Source: Own simulations with EUROMOD.*

Overall situation appears somewhat more favourable against the MII-indexed benchmark (see Figure 3). In this case, a clear majority of countries show income-increasing effects in the first period – recall that real incomes fell then in many countries (i.e. MII < CPI). Notably, the countries pursuing contractionary policies in the two periods according to the MII-benchmark, are different from those considered as such against the CPI-benchmark: with Malta and Austria now included and, in particular, Southern countries excluded. What it says about Southern Europe is that even though policies considerably reduced incomes in real terms throughout the whole period, the effects were not so drastic as the extent to which market incomes fell (in nominal terms).

**Figure 3: Policy effects on mean equivalised household disposable income in 2008-2011 and 2011-2014 using the MII-indexation**




*Notes: Change is measured as a percentage of mean (counterfactual) income in 2011, indexed by Market Income Index.*
*Source: Own simulations with EUROMOD.*

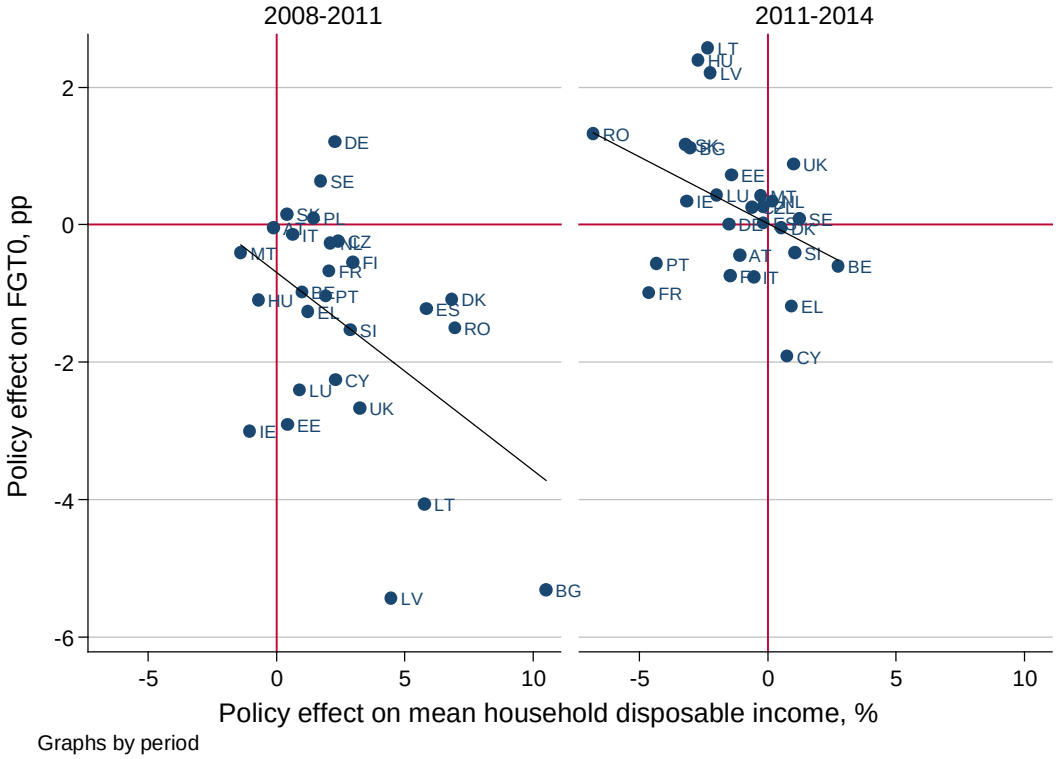
Detailed results for 2008-2011 and 2011-2014 policy effects on poverty, inequality and mean income in each country are presented in Table 2 to Table 6. Contrasting the effect of policies on poverty (FGT measures) and inequality (Gini coefficient) in the two periods, does not reveal any clear patterns across countries with the CPI-indexation. Along the four groups of countries, it is noticeable that those which pursued fiscal stimulus in both periods (the filled-in circle marker), performed also relatively well in terms of the poverty headcount measure (FGT0) in each period.

With the MII-indexation, an interesting intertemporal pattern emerges for poverty measures: for countries which pursued first fiscal stimulus and then fiscal consolidation (the hollow circle marker), there is a negative correlation between poverty effects in the two periods. In other words, within this group, countries which pursued more poverty-decreasing policies in the first period, show greater poverty-increasing effects in the second period. For countries which featured fiscal stimulus throughout the whole period (the filled-in circle marker), there is a positive correlation. That is, the more poverty

decreased (increased) as a result of policies in the first period, the more it also decreased (increased) in the second period. The same pattern can be observed for the Gini coefficient.

There is another noticeable pattern in both periods occurring with the MII-indexation alone: the effect of tax-benefit policies on poverty and inequality and mean household income is inversely related. Figure 4 demonstrates that for FGT0 and shows that the pattern is especially pronounced for the first period (with more cross-national variation). To put it differently, more expansionary policies were also more redistributive.

**Figure 4: Policy effects on mean equivalised household disposable income and on the poverty headcount (FGT0) in 2008-2011 and 2011-2014 using the MII-indexation**




*Notes: Change in mean disposable income is measured as a percentage of mean (counterfactual) income in 2011, indexed by Market Income Index. The black line denotes a simple linear fit (unweighted for population size).*
*Source: Own simulations with EUROMOD.*

**Table 2: The effect of policies in 2008-2011 and 2011-2014 on the poverty headcount (FGT0)**

| | 2011 **baseline** (%) | | Change in 2008-2011 (percentage points) | | | | Change in 2011-2014 (percentage points) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Country** | **MI** | **DPI** | **CPI** | | **MII** | | **CPI** | | **MII** | |
| BE | 36.3 (0.76) | 12.5 (0.56) | -1.1*** | (0.18) | -1.0*** | (0.17) | -0.5*** | (0.15) | -0.6*** | (0.16) |
| BG | 32.9 (0.84) | 20.2 (0.75) | -3.1*** | (0.31) | -5.3*** | (0.37) | -0.8*** | (0.20) | 1.1*** | (0.20) |
| CZ | 31.4 (0.60) | 9.0 (0.47) | -0.1 | (0.13) | -0.2* | (0.14) | 0.3* | (0.14) | 0.3* | (0.14) |
| DK | 34.3 (0.86) | 11.9 (0.74) | -0.3*** | (0.13) | -1.1*** | (0.19) | -0.3*** | (0.09) | 0.0 | (0.29) |
| DE | 36.3 (0.50) | 13.4 (0.37) | 1.5*** | (0.20) | 1.2*** | (0.20) | -0.1 | (0.08) | 0.0 | (0.08) |
| EE | 34.2 (0.76) | 18.2 (0.61) | 0.4** | (0.18) | -2.9*** | (0.29) | -1.5*** | (0.19) | 0.7*** | (0.12) |
| IE | 37.2 (1.04) | 16.9 (0.87) | 0.0 | (0.45) | -3.0*** | (0.40) | 0.8*** | (0.31) | 0.3 | (0.30) |
| EL | 36.2 (0.99) | 21.7 (0.91) | -1.2*** | (0.30) | -1.3*** | (0.31) | -0.5* | (0.31) | -1.2*** | (0.45) |
| ES | 35.6 (0.58) | 21.7 (0.55) | -0.4*** | (0.11) | -1.2*** | (0.23) | 0.0 | (0.13) | 0.0 | (0.13) |
| FR | 33.7 (0.52) | 12.5 (0.40) | -0.7*** | (0.16) | -0.7*** | (0.16) | -0.9*** | (0.13) | -1.0*** | (0.14) |
| IT | 33.9 (0.48) | 19.0 (0.44) | 0.1 | (0.09) | -0.1* | (0.09) | -0.6*** | (0.13) | -0.8*** | (0.14) |
| CY | 27.9 (0.77) | 13.7 (0.59) | -1.0*** | (0.17) | -2.3*** | (0.24) | -0.5* | (0.30) | -1.9*** | (0.33) |
| LV | 34.7 (0.73) | 17.9 (0.61) | 0.2 | (0.21) | -5.4*** | (0.35) | 0.0 | (0.25) | 2.2*** | (0.32) |
| LT | 36.2 (1.06) | 17.8 (0.87) | -1.6*** | (0.42) | -4.1*** | (0.56) | 2.3*** | (0.55) | 2.6*** | (0.55) |
| LU | 30.5 (0.94) | 8.9 (0.70) | -2.4*** | (0.38) | -2.4*** | (0.33) | 0.2 | (0.25) | 0.4 | (0.27) |
| HU | 35.7 (0.58) | 11.7 (0.41) | -1.0*** | (0.24) | -1.1*** | (0.24) | 2.4*** | (0.28) | 2.4*** | (0.28) |
| MT | 29.9 (0.82) | 16.8 (0.72) | -0.4*** | (0.12) | -0.4*** | (0.14) | 0.3* | (0.18) | 0.4** | (0.19) |
| NL | 27.9 (0.70) | 10.3 (0.59) | 0.1 | (0.16) | -0.3 | (0.17) | 0.7*** | (0.13) | 0.3*** | (0.12) |
| AT | 34.6 (0.79) | 13.6 (0.62) | -0.1 | (0.16) | 0.0 | (0.16) | -0.4*** | (0.09) | -0.4*** | (0.10) |
| PL | 31.1 (0.54) | 17.3 (0.47) | 0.0 | (0.12) | 0.1 | (0.09) | 0.2 | (0.13) | 0.3*** | (0.10) |
| PT | 33.8 (0.73) | 17.7 (0.62) | 0.0 | (0.22) | -1.0*** | (0.26) | -0.5*** | (0.18) | -0.6*** | (0.16) |
| RO | 36.0 (0.85) | 21.9 (0.80) | -1.2*** | (0.24) | -1.5*** | (0.26) | 0.2 | (0.13) | 1.3*** | (0.26) |
| SI | 32.4 (0.55) | 13.7 (0.42) | -1.3*** | (0.21) | -1.5*** | (0.21) | 0.0 | (0.21) | -0.4* | (0.21) |
| SK | 29.8 (0.73) | 11.1 (0.60) | 0.0 | (0.20) | 0.1 | (0.14) | 1.2*** | (0.25) | 1.2*** | (0.26) |
| FI | 34.9 (0.58) | 12.1 (0.41) | -0.1 | (0.10) | -0.5*** | (0.12) | -0.8*** | (0.12) | -0.7*** | (0.11) |
| SE | 31.5 (0.62) | 13.3 (0.50) | 0.4*** | (0.11) | 0.6*** | (0.11) | -0.7*** | (0.12) | 0.1 | (0.12) |
| UK | 36.2 (0.44) | 14.5 (0.34) | -0.6*** | (0.13) | -2.7*** | (0.17) | 1.2*** | (0.12) | 0.9*** | (0.12) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses. The poverty line is 60% of the median of equivalised household disposable income. MI=market income, DPI=disposable income.*
*Source: Own simulations with EUROMOD.*

**Table 3: The effect of policies in 2008-2011 and 2011-2014 on the poverty gap (FGT1)**

| | 2011 **baseline** (%) | | Change in 2008-2011 (percentage points) | | Change in 2011-2014 (percentage points) | |
|---|---|---|---|---|---|---|
| **Country** | **MI** | **DPI** | **CPI** | **MII** | **CPI** | **MII** |
| BE | 28.80 (0.64) | 3.23 (0.20) | -0.21*** (0.02) | -0.17*** (0.02) | 0.21*** (0.08) | 0.17** (0.08) |
| BG | 22.07 (0.60) | 5.72 (0.29) | -1.08*** (0.05) | -2.38*** (0.09) | -0.35*** (0.02) | 0.49*** (0.04) |
| CZ | 23.52 (0.46) | 2.01 (0.14) | 0.14*** (0.02) | 0.11*** (0.02) | -0.02 (0.02) | -0.02 (0.02) |
| DK | 24.45 (0.80) | 3.87 (0.55) | -0.06* (0.03) | -0.19*** (0.04) | -0.04*** (0.01) | 0.00 (0.01) |
| DE | 28.22 (0.41) | 2.58 (0.09) | 0.53*** (0.04) | 0.48*** (0.04) | -0.01 (0.01) | 0.05** (0.02) |
| EE | 24.32 (0.58) | 4.78 (0.21) | -0.08*** (0.02) | -0.93*** (0.04) | -0.52*** (0.03) | -0.03* (0.01) |
| IE | 27.27 (0.85) | 4.09 (0.26) | 0.05 (0.06) | -0.68*** (0.07) | 0.37*** (0.04) | 0.25*** (0.04) |
| EL | 27.34 (0.81) | 7.98 (0.41) | -0.55*** (0.06) | -0.36*** (0.10) | -0.73*** (0.10) | -0.54*** (0.10) |
| ES | 27.60 (0.47) | 8.00 (0.27) | -0.11*** (0.03) | -0.49*** (0.05) | 0.09*** (0.02) | 0.03* (0.02) |
| FR | 22.41 (0.38) | 2.68 (0.13) | -0.32*** (0.03) | -0.31*** (0.03) | -0.22*** (0.01) | -0.23*** (0.01) |
| IT | 24.29 (0.35) | 6.06 (0.20) | 0.01 (0.01) | -0.02* (0.01) | -0.01 (0.01) | -0.01 (0.01) |
| CY | 18.07 (0.51) | 2.69 (0.17) | -0.35*** (0.02) | -0.69*** (0.04) | -0.36*** (0.10) | -0.69*** (0.11) |
| LV | 25.35 (0.55) | 4.32 (0.17) | -1.20*** (0.08) | -2.65*** (0.12) | 0.51*** (0.05) | 1.06*** (0.06) |
| LT | 26.75 (0.81) | 5.19 (0.38) | -0.73*** (0.09) | -1.77*** (0.16) | 0.74*** (0.08) | 0.97*** (0.09) |
| LU | 20.92 (0.62) | 0.84 (0.10) | -0.29*** (0.03) | -0.33*** (0.03) | -0.01* (0.01) | 0.04*** (0.01) |
| HU | 26.63 (0.46) | 2.29 (0.10) | -0.54*** (0.05) | -0.57*** (0.05) | 1.13*** (0.07) | 1.13*** (0.07) |
| MT | 19.18 (0.55) | 3.55 (0.20) | -0.13*** (0.01) | -0.04*** (0.01) | 0.06*** (0.02) | 0.11*** (0.02) |
| NL | 16.02 (0.47) | 2.07 (0.15) | -0.05*** (0.01) | -0.13*** (0.02) | 0.19*** (0.02) | 0.14*** (0.02) |
| AT | 25.39 (0.58) | 2.59 (0.15) | -0.26*** (0.04) | -0.25*** (0.04) | -0.16*** (0.01) | -0.18*** (0.02) |
| PL | 21.11 (0.37) | 4.78 (0.16) | -0.04* (0.02) | 0.02 (0.02) | 0.07** (0.03) | 0.12*** (0.03) |
| PT | 25.29 (0.57) | 4.31 (0.18) | 0.33*** (0.06) | -0.17*** (0.06) | 0.26*** (0.06) | 0.21*** (0.06) |
| RO | 25.98 (0.60) | 6.90 (0.31) | -0.50*** (0.05) | -0.83*** (0.06) | -0.09*** (0.02) | 0.38*** (0.04) |
| SI | 23.20 (0.42) | 2.97 (0.11) | -0.50*** (0.04) | -0.62*** (0.04) | -0.49*** (0.05) | -0.67*** (0.05) |
| SK | 20.82 (0.55) | 2.09 (0.15) | -0.24*** (0.04) | 0.00 (0.02) | 0.46*** (0.04) | 0.55*** (0.04) |
| FI | 25.64 (0.46) | 2.17 (0.10) | 0.01 (0.01) | -0.07*** (0.01) | -0.25*** (0.01) | -0.24*** (0.01) |
| SE | 21.99 (0.48) | 3.12 (0.16) | 0.15*** (0.01) | 0.20*** (0.01) | -0.22*** (0.02) | -0.10*** (0.01) |
| UK | 25.02 (0.34) | 4.21 (0.14) | -0.10*** (0.02) | -0.55*** (0.03) | 0.38*** (0.02) | 0.33*** (0.02) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses. The poverty gap measures the average shortfall from the poverty line expressed as a percentage of the poverty line (across the whole population). The poverty line is 60% of the median of equivalised household disposable income. MI=market income, DPI=disposable income.*
*Source: Own simulations with EUROMOD.*

**Table 4: The effect of policies in 2008-2011 and 2011-2014 on the poverty severity (FGT2)**

| | 2011 **baseline** (%) | | Change in 2008-2011 (percentage points) | | Change in 2011-2014 (percentage points) | |
|---|---|---|---|---|---|---|
| **Country** | **MI** | **DPI** | **CPI** | **MII** | **CPI** | **MII** |
| BE | 26.77 (0.63) | 1.64 (0.14) | -0.08*** (0.02) | -0.06*** (0.02) | 0.25*** (0.08) | 0.23*** (0.08) |
| BG | 18.63 (0.54) | 2.34 (0.15) | -0.44*** (0.03) | -1.20*** (0.05) | -0.15*** (0.01) | 0.31*** (0.03) |
| CZ | 21.53 (0.44) | 0.72 (0.06) | 0.08*** (0.01) | 0.07*** (0.01) | -0.02** (0.01) | -0.02** (0.01) |
| DK | 20.56 (0.68) | 1.55 (0.22) | -0.03 (0.02) | -0.07*** (0.02) | 0.01 (0.02) | 0.02 (0.02) |
| DE | 25.54 (0.40) | 0.90 (0.05) | 0.21*** (0.02) | 0.19*** (0.02) | 0.03*** (0.01) | 0.05*** (0.01) |
| EE | 21.54 (0.55) | 1.98 (0.11) | -0.12*** (0.02) | -0.48*** (0.03) | -0.30*** (0.02) | -0.08*** (0.01) |
| IE | 24.01 (0.81) | 2.01 (0.17) | 0.05* (0.03) | -0.18*** (0.03) | 0.24*** (0.03) | 0.19*** (0.03) |
| EL | 25.56 (0.85) | 4.68 (0.31) | -0.30*** (0.04) | -0.06 (0.06) | -0.59*** (0.08) | -0.43*** (0.08) |
| ES | 25.44 (0.48) | 4.88 (0.22) | 0.02 (0.02) | -0.14*** (0.03) | 0.09*** (0.02) | 0.08*** (0.01) |
| FR | 18.77 (0.39) | 1.09 (0.11) | -0.13*** (0.03) | -0.13*** (0.03) | -0.06*** (0.02) | -0.07*** (0.02) |
| IT | 21.22 (0.33) | 3.36 (0.15) | 0.00 (0.01) | 0.01 (0.01) | 0.04*** (0.01) | 0.05*** (0.01) |
| CY | 15.77 (0.50) | 0.90 (0.10) | -0.12*** (0.01) | -0.25*** (0.02) | -0.24*** (0.07) | -0.36*** (0.08) |
| LV | 22.82 (0.54) | 1.55 (0.09) | -0.98*** (0.07) | -1.74*** (0.10) | 0.37*** (0.03) | 0.67*** (0.04) |
| LT | 23.88 (0.77) | 2.71 (0.30) | -0.23*** (0.04) | -0.75*** (0.08) | 0.27*** (0.02) | 0.37*** (0.03) |
| LU | 18.42 (0.62) | 0.15 (0.03) | -0.05*** (0.01) | -0.06*** (0.01) | 0.00 (0.00) | 0.01*** (0.00) |
| HU | 24.52 (0.48) | 0.79 (0.06) | -0.30*** (0.03) | -0.29*** (0.03) | 0.61*** (0.04) | 0.60*** (0.04) |
| MT | 16.08 (0.50) | 1.17 (0.09) | -0.06*** (0.01) | -0.02*** (0.01) | 0.05** (0.02) | 0.07*** (0.02) |
| NL | 12.05 (0.43) | 0.88 (0.10) | -0.03*** (0.01) | -0.05*** (0.01) | 0.05*** (0.01) | 0.04*** (0.01) |
| AT | 22.60 (0.55) | 0.68 (0.05) | -0.18*** (0.02) | -0.18*** (0.02) | -0.07*** (0.01) | -0.07*** (0.01) |
| PL | 18.47 (0.35) | 2.13 (0.10) | -0.05*** (0.02) | -0.04* (0.02) | 0.12*** (0.03) | 0.12*** (0.03) |
| PT | 22.75 (0.55) | 1.47 (0.07) | 0.23*** (0.03) | -0.03 (0.03) | 0.31*** (0.04) | 0.28*** (0.04) |
| RO | 22.73 (0.55) | 3.15 (0.18) | -0.29*** (0.04) | -0.50*** (0.04) | -0.11*** (0.01) | 0.19*** (0.02) |
| SI | 20.47 (0.41) | 0.97 (0.05) | -0.25*** (0.02) | -0.32*** (0.03) | -0.29*** (0.03) | -0.36*** (0.03) |
| SK | 18.69 (0.52) | 0.59 (0.06) | -0.15*** (0.02) | -0.02* (0.01) | 0.18*** (0.02) | 0.23*** (0.02) |
| FI | 22.58 (0.44) | 0.65 (0.04) | 0.01*** (0.00) | -0.01*** (0.00) | -0.09*** (0.01) | -0.09*** (0.01) |
| SE | 18.60 (0.44) | 1.24 (0.09) | 0.07*** (0.01) | 0.09*** (0.01) | -0.10*** (0.01) | -0.05*** (0.01) |
| UK | 21.25 (0.32) | 2.29 (0.10) | -0.01 (0.02) | -0.15*** (0.02) | 0.22*** (0.02) | 0.20*** (0.02) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses. The poverty line is 60% of the median of equivalised household disposable income. MI=market income, DPI=disposable income. DK estimated without two extreme outliers with very large negative (investment) incomes.*
*Source: Own simulations with EUROMOD.*

**Table 5: The effect of policies in 2008-2011 and 2011-2014 on the Gini coefficient of equivalised household disposable income**

| | 2011 **baseline** (%) | | Change in 2008-2011 (percentage points) | | Change in 2011-2014 (percentage points) | |
|---|---|---|---|---|---|---|
| **Country** | **MI** | **DPI** | **CPI** | **MII** | **CPI** | **MII** |
| BE | 49.4 (0.56) | 22.6 (0.31) | -0.53*** (0.02) | -0.45*** (0.02) | -0.14** (0.06) | -0.31*** (0.06) |
| BG | 46.8 (0.68) | 31.6 (0.57) | -1.86*** (0.06) | -3.35*** (0.08) | -0.59*** (0.02) | 0.91*** (0.03) |
| CZ | 46.5 (0.49) | 23.8 (0.37) | -0.12*** (0.04) | -0.42*** (0.04) | 0.11*** (0.03) | 0.09*** (0.03) |
| DK | 46.4 (0.85) | 25.7 (0.73) | 0.34*** (0.12) | 0.08 (0.12) | -0.16*** (0.02) | -0.06*** (0.02) |
| DE | 50.5 (0.40) | 26.0 (0.27) | 0.39*** (0.04) | 0.30*** (0.04) | 0.00 (0.01) | 0.16*** (0.02) |
| EE | 48.6 (0.55) | 31.5 (0.42) | 0.25*** (0.02) | -1.02*** (0.04) | -0.63*** (0.02) | 0.30*** (0.01) |
| IE | 53.6 (0.71) | 28.0 (0.41) | -1.02*** (0.08) | -2.51*** (0.09) | 0.61*** (0.03) | 0.38*** (0.03) |
| EL | 54.8 (0.94) | 34.5 (0.80) | -0.89*** (0.08) | -1.47*** (0.11) | -0.16 (0.14) | -0.66*** (0.11) |
| ES | 52.6 (0.40) | 32.2 (0.30) | -0.28*** (0.02) | -1.35*** (0.05) | -0.24*** (0.02) | -0.41*** (0.02) |
| FR | 49.5 (0.59) | 30.2 (0.49) | 0.40*** (0.07) | 0.41*** (0.07) | -1.48*** (0.07) | -1.50*** (0.07) |
| IT | 52.0 (0.41) | 33.0 (0.39) | -0.01 (0.02) | -0.21*** (0.02) | -0.49*** (0.02) | -0.62*** (0.02) |
| CY | 43.7 (0.64) | 29.6 (0.54) | -0.54*** (0.03) | -0.77*** (0.06) | -0.56*** (0.08) | -0.84*** (0.09) |
| LV | 53.3 (0.74) | 34.0 (0.68) | -0.68*** (0.09) | -4.12*** (0.11) | 0.30*** (0.06) | 1.89*** (0.08) |
| LT | 52.0 (0.71) | 31.8 (0.52) | 0.41*** (0.11) | -2.61*** (0.12) | -0.05 (0.08) | 0.81*** (0.08) |
| LU | 48.9 (0.84) | 25.1 (0.61) | -0.65*** (0.05) | -0.76*** (0.05) | -0.23*** (0.01) | -0.07*** (0.01) |
| HU | 51.5 (0.46) | 25.2 (0.33) | 2.01*** (0.13) | 1.90*** (0.12) | 1.83*** (0.07) | 2.04*** (0.07) |
| MT | 43.4 (0.69) | 27.5 (0.52) | -0.19*** (0.01) | 0.03* (0.01) | 0.23*** (0.02) | 0.36*** (0.02) |
| NL | 40.1 (0.45) | 24.7 (0.30) | 0.10*** (0.02) | -0.11*** (0.02) | 0.05** (0.02) | -0.12*** (0.02) |
| AT | 49.9 (0.58) | 26.2 (0.40) | -0.03 (0.03) | 0.01 (0.03) | -0.04** (0.02) | -0.09*** (0.02) |
| PL | 47.8 (0.43) | 30.8 (0.37) | 0.22*** (0.03) | 0.47*** (0.03) | -0.27*** (0.03) | 0.01 (0.02) |
| PT | 54.4 (0.66) | 32.9 (0.50) | -0.78*** (0.05) | -1.22*** (0.06) | -0.90*** (0.07) | -0.99*** (0.07) |
| RO | 51.5 (0.55) | 31.7 (0.40) | -0.52*** (0.05) | -1.39*** (0.07) | 0.07*** (0.02) | 1.09*** (0.05) |
| SI | 46.4 (0.39) | 24.0 (0.22) | -0.86*** (0.04) | -1.05*** (0.04) | -0.19*** (0.05) | -0.48*** (0.05) |
| SK | 42.0 (0.50) | 22.2 (0.30) | -1.01*** (0.04) | -0.10*** (0.02) | -0.01 (0.07) | 0.27*** (0.06) |
| FI | 48.2 (0.46) | 24.9 (0.34) | -0.16*** (0.01) | -0.38*** (0.01) | -0.54*** (0.01) | -0.51*** (0.01) |
| SE | 43.4 (0.49) | 23.6 (0.28) | 0.21*** (0.02) | 0.32*** (0.02) | -0.30*** (0.02) | -0.07*** (0.01) |
| UK | 52.2 (0.37) | 31.1 (0.27) | -0.55*** (0.04) | -1.79*** (0.04) | 0.41*** (0.02) | 0.26*** (0.02) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses. MI=market income, DPI=disposable income.*
*Source: Own simulations with EUROMOD.*

**Table 6: The effect of policies in 2008-2011, 2011-2014 and 2014-2015 on mean equivalised household disposable income**

| Country | Change in 2008-2011 (%) | | Change in 2011-2014 (%) | | Change in 2014-2015 (%) | |
|---|---|---|---|---|---|---|
| | CPI | MII | CPI | MII | CPI | MII |
| BE | 1.4*** (0.04) | 1.0*** (0.04) | 1.6*** (0.06) | 2.7*** (0.06) | -0.9*** (0.05) | -1.0*** (0.05) |
| BG | 7.8*** (0.15) | 10.5*** (0.21) | 1.9*** (0.05) | -3.0*** (0.06) | -0.1*** (0.01) | -0.1*** (0.01) |
| CZ | 1.3*** (0.05) | 2.4*** (0.06) | -0.7*** (0.05) | -0.6*** (0.05) | 0.4*** (0.01) | -0.3*** (0.01) |
| DK | 5.5*** (0.17) | 6.8*** (0.18) | 1.0*** (0.02) | 0.5*** (0.02) | -0.1*** (0.01) | -0.5*** (0.01) |
| DE | 1.9*** (0.05) | 2.3*** (0.05) | -0.6*** (0.02) | -1.5*** (0.02) | 0.2*** (0.00) | -1.0*** (0.01) |
| EE | -3.6*** (0.04) | 0.4*** (0.07) | 1.6*** (0.04) | -1.4*** (0.03) | 3.7*** (0.04) | 2.8*** (0.03) |
| IE | -7.1*** (0.12) | -1.0*** (0.17) | -4.3*** (0.06) | -3.2*** (0.05) | -0.6*** (0.01) | -0.6*** (0.01) |
| EL | -9.6*** (0.14) | 1.2*** (0.19) | -3.6*** (0.22) | 0.9*** (0.17) | -0.4*** (0.05) | -1.0*** (0.05) |
| ES | -2.0*** (0.03) | 5.8*** (0.08) | -2.0*** (0.03) | -0.2*** (0.03) | 1.5*** (0.02) | 1.1*** (0.02) |
| FR | 2.2*** (0.11) | 2.0*** (0.11) | -4.7*** (0.12) | -4.6*** (0.12) | 0.3*** (0.01) | 0.0*** (0.01) |
| IT | -1.2*** (0.04) | 0.6*** (0.04) | -1.7*** (0.04) | -0.6*** (0.04) | 0.6*** (0.01) | 0.3*** (0.01) |
| CY | 0.0 (0.06) | 2.3*** (0.09) | -2.8*** (0.11) | 0.8*** (0.13) | 0.1*** (0.01) | -0.3*** (0.01) |
| LV | -5.2*** (0.14) | 4.5*** (0.22) | 2.9*** (0.10) | -2.2*** (0.16) | 1.4*** (0.04) | 0.1*** (0.04) |
| LT | -2.9*** (0.20) | 5.8*** (0.20) | 0.4** (0.16) | -2.3*** (0.17) | n/a | n/a |
| LU | 0.2** (0.09) | 0.9*** (0.10) | -0.8*** (0.02) | -2.0*** (0.02) | n/a | n/a |
| HU | -3.7*** (0.25) | -0.7*** (0.24) | -1.5*** (0.12) | -2.7*** (0.12) | n/a | n/a |
| MT | -0.3*** (0.02) | -1.4*** (0.02) | 0.2*** (0.04) | -0.3*** (0.04) | n/a | n/a |
| NL | 1.4*** (0.03) | 2.1*** (0.03) | -0.5*** (0.04) | 0.2*** (0.04) | 0.3*** (0.02) | 0.5*** (0.02) |
| AT | 0.1*** (0.04) | -0.1*** (0.04) | -1.4*** (0.03) | -1.1*** (0.03) | -0.2*** (0.02) | -0.2*** (0.02) |
| PL | 2.9*** (0.05) | 1.5*** (0.05) | 1.6*** (0.04) | -0.2*** (0.03) | 0.5*** (0.02) | -0.4*** (0.01) |
| PT | -2.2*** (0.07) | 1.9*** (0.10) | -5.3*** (0.10) | -4.3*** (0.10) | 1.2*** (0.05) | 1.5*** (0.05) |
| RO | 1.4*** (0.11) | 7.0*** (0.16) | -0.1*** (0.03) | -6.8*** (0.10) | n/a | n/a |
| SI | 1.3*** (0.07) | 2.9*** (0.07) | -0.8*** (0.07) | 1.1*** (0.07) | n/a | n/a |
| SK | 4.0*** (0.07) | 0.4*** (0.04) | -1.8*** (0.11) | -3.2*** (0.11) | 0.0 (0.01) | -0.3*** (0.01) |
| FI | 1.8*** (0.02) | 3.0*** (0.02) | -1.3*** (0.02) | -1.5*** (0.02) | -0.3*** (0.01) | -0.6*** (0.00) |
| SE | 2.5*** (0.02) | 1.7*** (0.03) | 2.9*** (0.03) | 1.2*** (0.02) | 0.1*** (0.01) | -0.7*** (0.01) |
| UK | -0.3*** (0.07) | 3.3*** (0.08) | 0.5*** (0.03) | 1.0*** (0.03) | 0.6*** (0.01) | 0.1*** (0.00) |

*Notes: Change is measured as a percentage of mean (counterfactual) income in 2011 for 2008-2011 and 2011-2014 period and as a percentage of mean counterfactual income in 2015 for 2014-2015 period. Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses.*
*Source: Own simulations with EUROMOD.*

**The largest policy effects across countries**

We now take a closer look at policy changes which had the largest effects in these two periods across countries. Country rankings by the size of policy effects on poverty (FGT0 and FGT1), inequality (Gini) and mean disposable incomes for 2008-2011 can be found in Appendix 3 (Figure A1 to Figure A8). Policy effects on disposable income in 2008-2011 are further broken down by income decile group in Figure 5, by age group in Figure 6 and by main tax-benefit components in Figure 7 (CPI) and Figure 8 (MII) for all countries.[10]

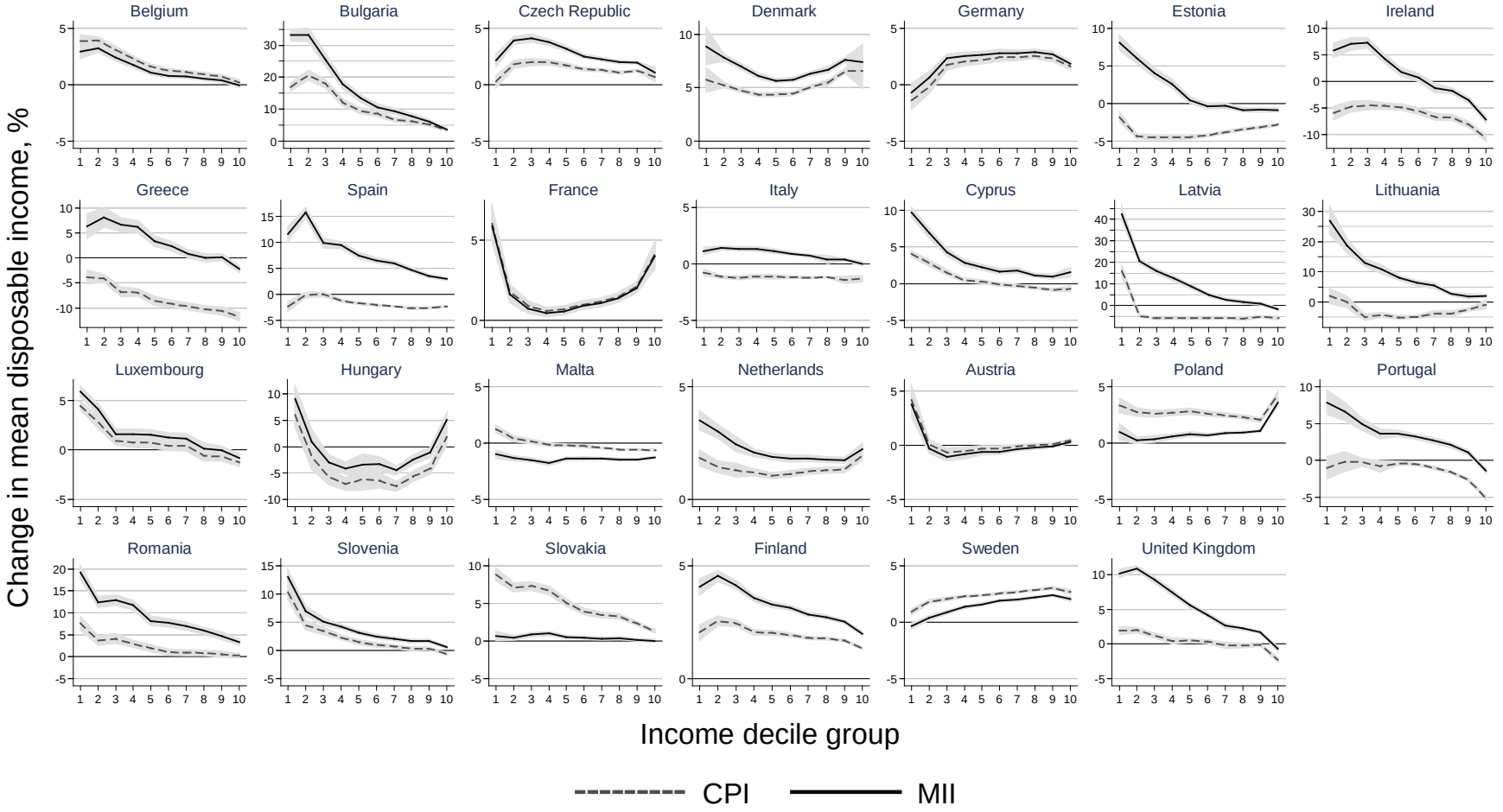
In the first period, 2008-11, **Germany** stands out for the largest increases in poverty due to tax-benefit policies (from 0.2 to 1.2pp for the FGT measures). This is also reflected in Figure 5 showing policy effects on household disposable income by income decile group. It results from regressive losses from means-tested benefits, which lagged behind growth in prices and market incomes although their levels were increased in nominal terms, as well as from small tax reductions, generating higher relative gains for richer households. Lower tax liabilities resulted from an increase in the tax free allowance and a drop in the level of some income tax tariff parameters, both relative to CPI and MII (Figure 7 and Figure 8). **Hungary**, in turn, features the largest income inequality-increasing policy effects in the first period (Gini +2pp) resulting from the flat tax reform in 2011.

On the other hand, 2008-11 policies in **Bulgaria** and **Latvia** achieved the largest decreases in poverty and inequality. In Bulgaria, the strong progressive effect stemmed mainly from increased public pensions (given the location of pensioners in the income distribution). In Latvia (and similarly in Lithuania), increased generosity of means-tested benefits played the key role, along with public pensions which were kept nominally constant while market incomes on average fell by the largest proportion in the EU-27. Bulgaria also had the biggest positive effect on mean household disposable incomes (+7.8% CPI; +10.5% MII). When interpreting these results, it should be borne in mind again that several countries experienced in this period a drastic decline in average market incomes (i.e. one of our indexation benchmarks): Latvia, Lithuania and Greece between 20-30%; Spain and Ireland around 15-16%; Bulgaria and Estonia 6-7%.

The largest negative policy effects on mean disposable incomes in the first period are revealed for **Greece** (-9.6%) and **Ireland** (-7.1%), with the CPI-benchmark, and **Malta** (-1.4%) and **Ireland** (-1.0%) with the MII-benchmark. These changes reflect a combination of cuts in or erosion of pensions/benefits as well as increased income taxes in all cases.

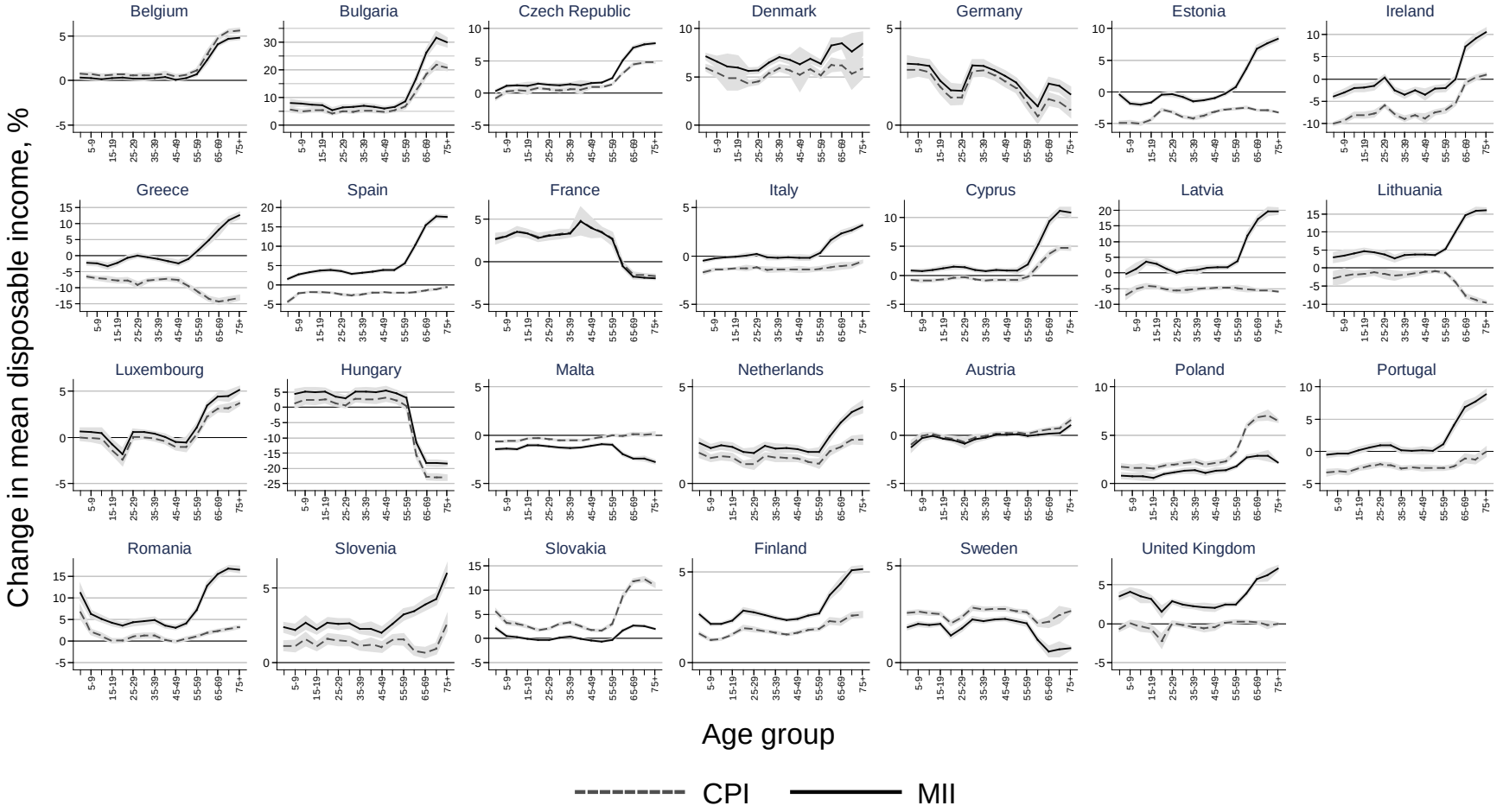
[10] For recent examples of more detailed national studies, see De Agostini et al. (2015a) for the UK, Decoster et al. (2015) for Belgium, and Figari and Fiorio (2015) for Italy.

**Figure 5: Percentage change in household disposable income due to policies in 2008-2011 by household income decile group**



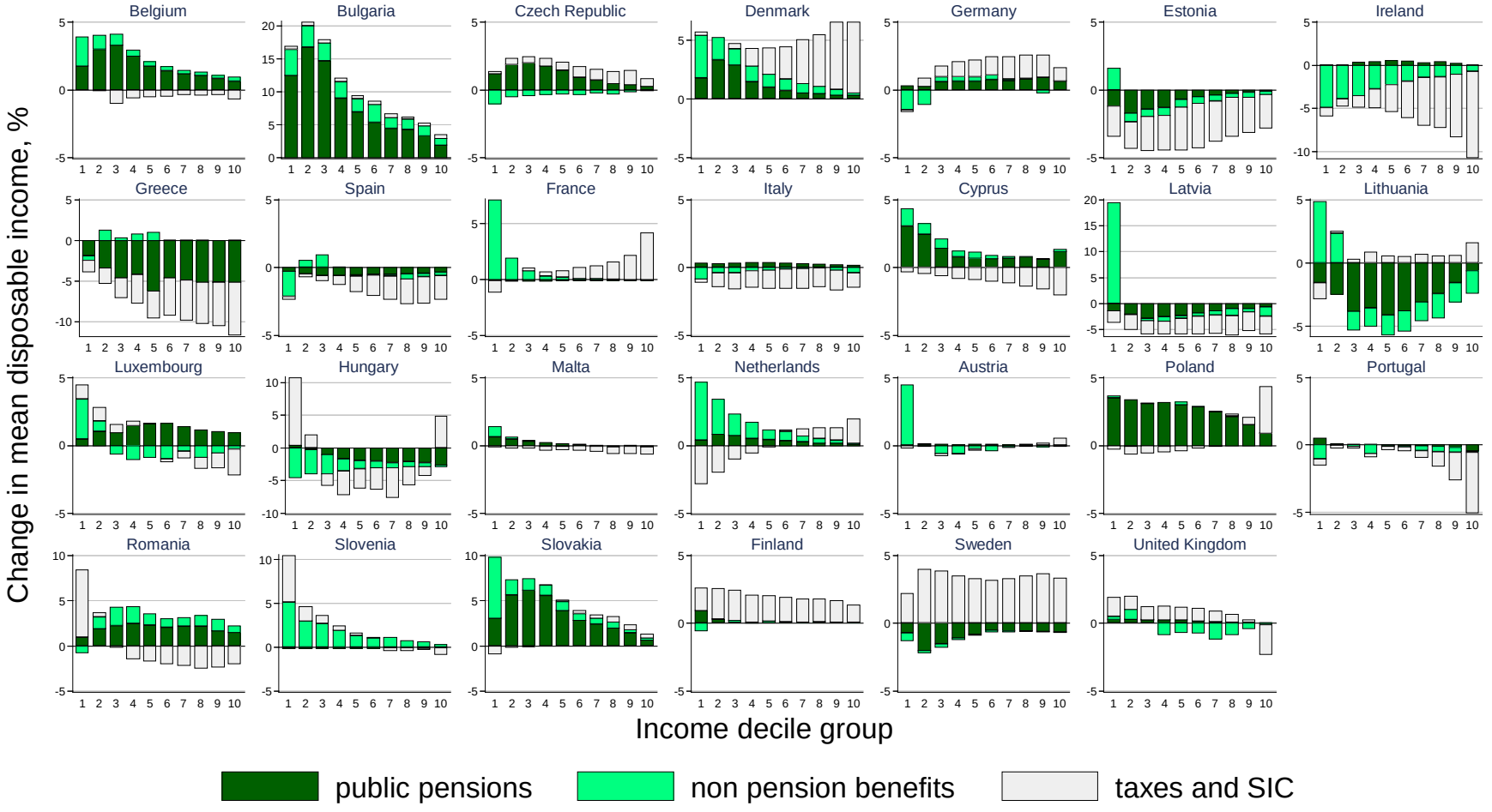

*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by one of the two counterfactual indexes. Change is measured as a percentage of mean counterfactual income in 2011. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 6: Percentage change in household disposable income due to policies in 2008-2011 by age group**



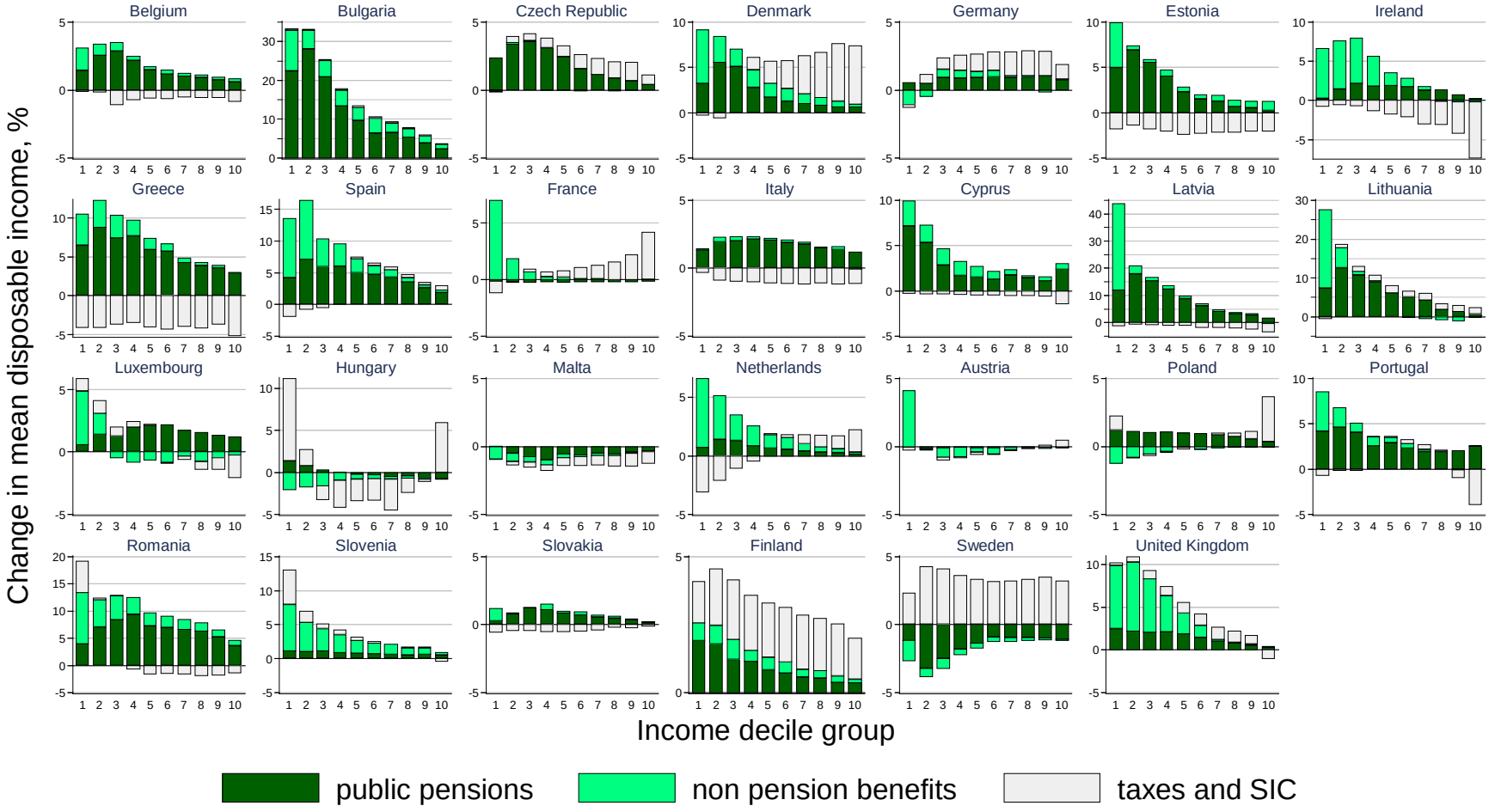

*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by one of the two counterfactual indexes. Change is measured as a percentage of mean counterfactual income in 2011. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 7: Percentage change in household disposable income due to policies in 2008-2011 by tax-benefit components using the CPI-indexation**




*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by Consumer Price Index. Change is measured as a percentage of mean counterfactual income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 8: Percentage change in household disposable income due to policies in 2008-2011 by tax-benefit components using the MII indexation**




*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by Market Income Index. Change is measured as a percentage of mean counterfactual income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

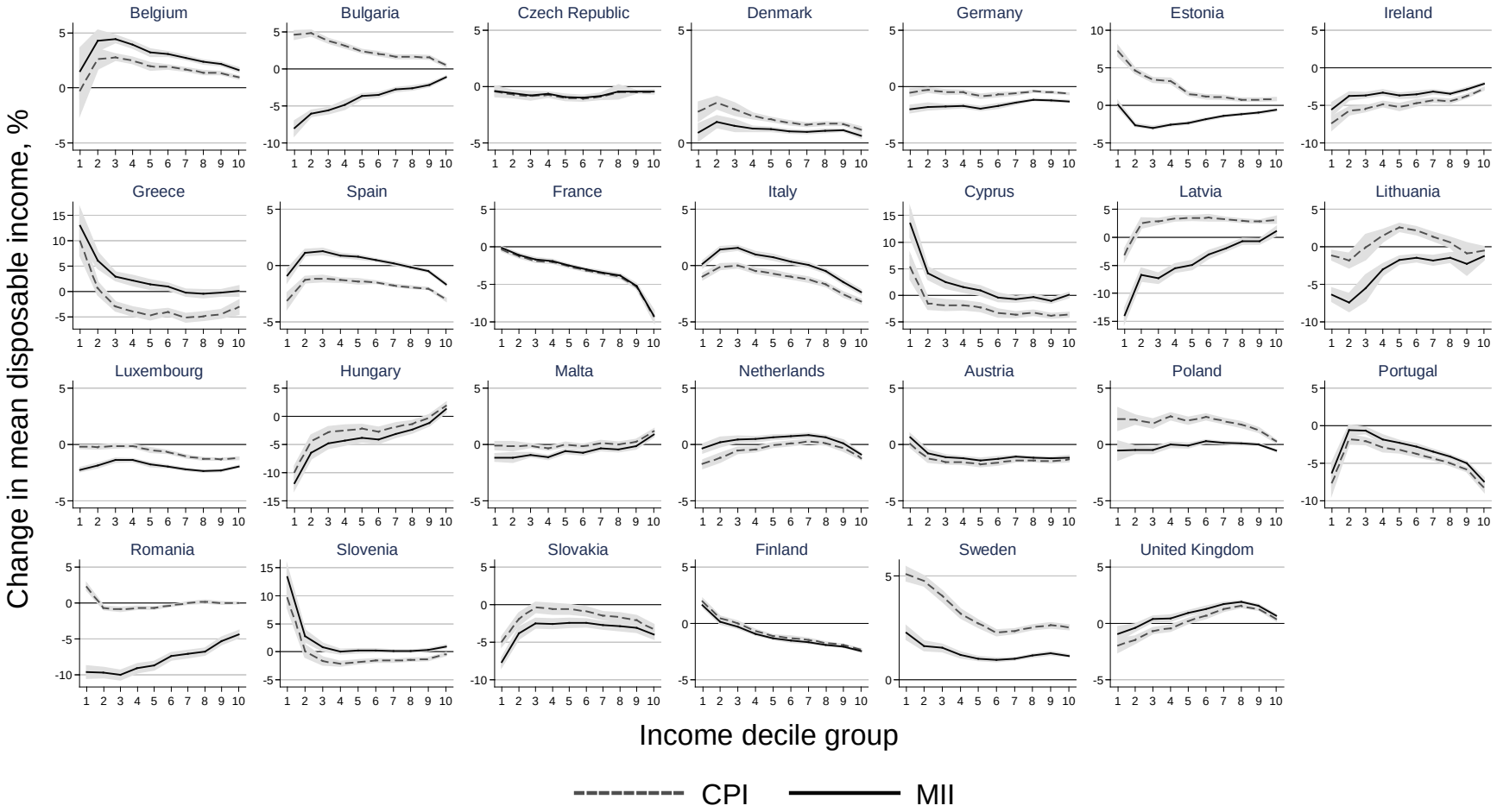
In the same way, country rankings by policy effects on poverty, inequality and mean disposable incomes for the second period, 2011-2014, are provided in Appendix 3 (Figure A9 to Figure A16). And full cross-country variation in policy effects on disposable income in 2011-2014 is shown by income decile group in Figure 9, by age group in Figure 10 and by main tax-benefit components in Figure 11 (CPI) and Figure 12 (MII).

In the second period, 2011-14, **Hungary** shows dominantly largest increases in poverty and inequality (another +2pp for the Gini coefficient and from +0.6 to +2.4pp for the FGT measures). The regressive nature of policy effects was then driven by losses in non means-tested benefits and further amplified by changes in income taxes.

The largest poverty-reducing policy effects in the second period are observed in **Estonia**, **Cyprus** and **Greece** (depending on a measure and type of counterfactual indexation). The main contributor in all three cases was increased generosity of means-tested benefits and, in the first two cases, increases in public pensions. Cyprus and Greece were also the only countries in the second period were market incomes on average still fell substantially (-6.7% and -13.5%, respectively).

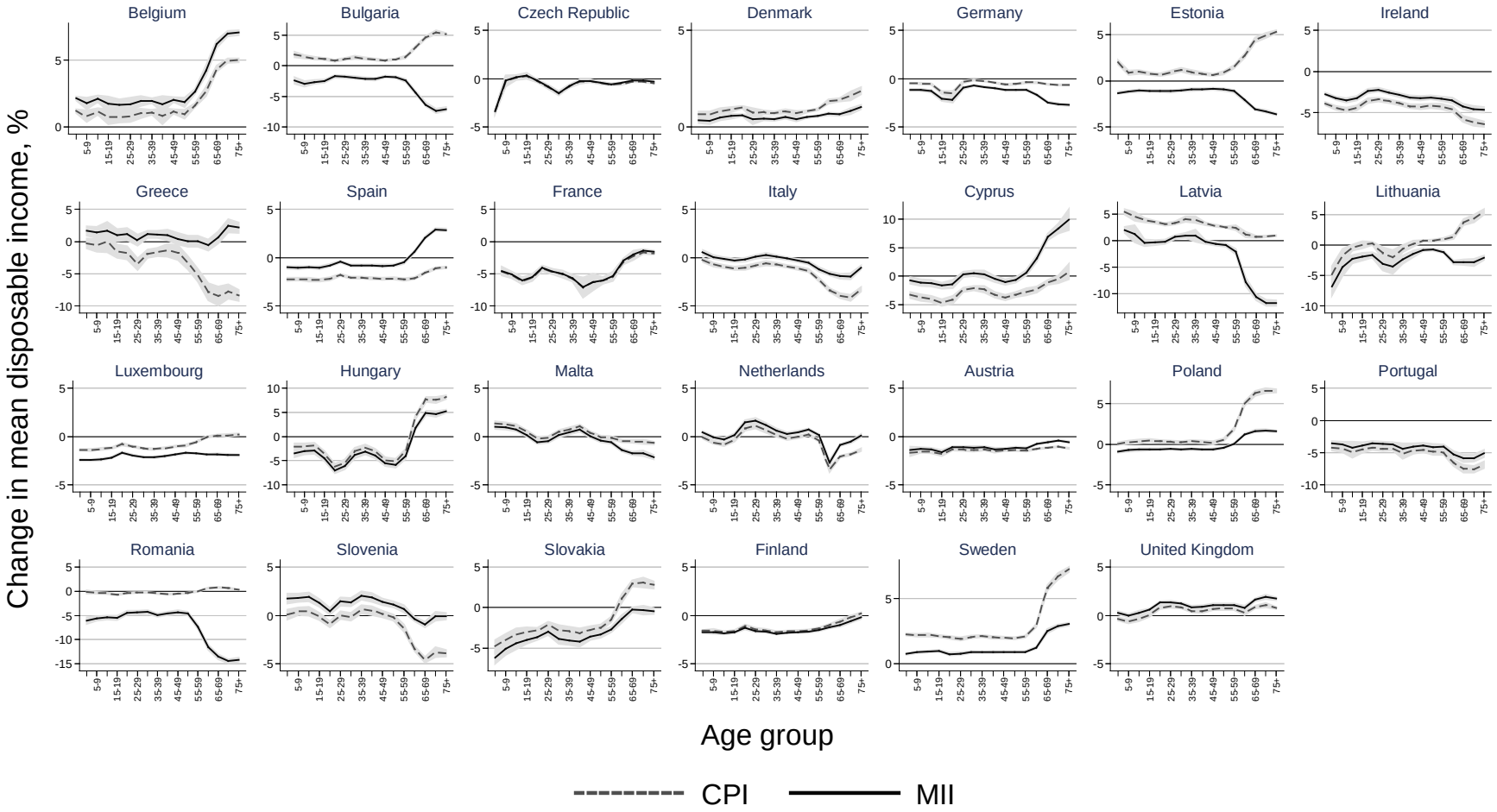
Highly progressive tax increases in **France** resulted in the largest inequality reduction (-1.5pp) but also in the second largest drop in mean disposable incomes (-4.6%). Policies deteriorated income positions more only in **Portugal** (-5.3%, CPI) and **Romania** (-6.8%, MII). The key instruments were however very different: there were progressive increases in contributions and income taxes in Portugal and a substantial loss from lower means-tested benefits; in the Romanian case, the income decreases were due to public pensions lagging behind growth in (average) market incomes (+29.2%). The largest positive impact on average incomes could be observed in Latvia (2.9%, CPI) and Belgium (2.7%, MII). In Latvia, mainly from cuts in taxes and contributions and increases in non means-tested benefits, in Belgium (and very similarly in Sweden) from increased public pensions.

**Figure 9: Percentage change in household disposable income due to policies in 2011-2014 by household income decile group**



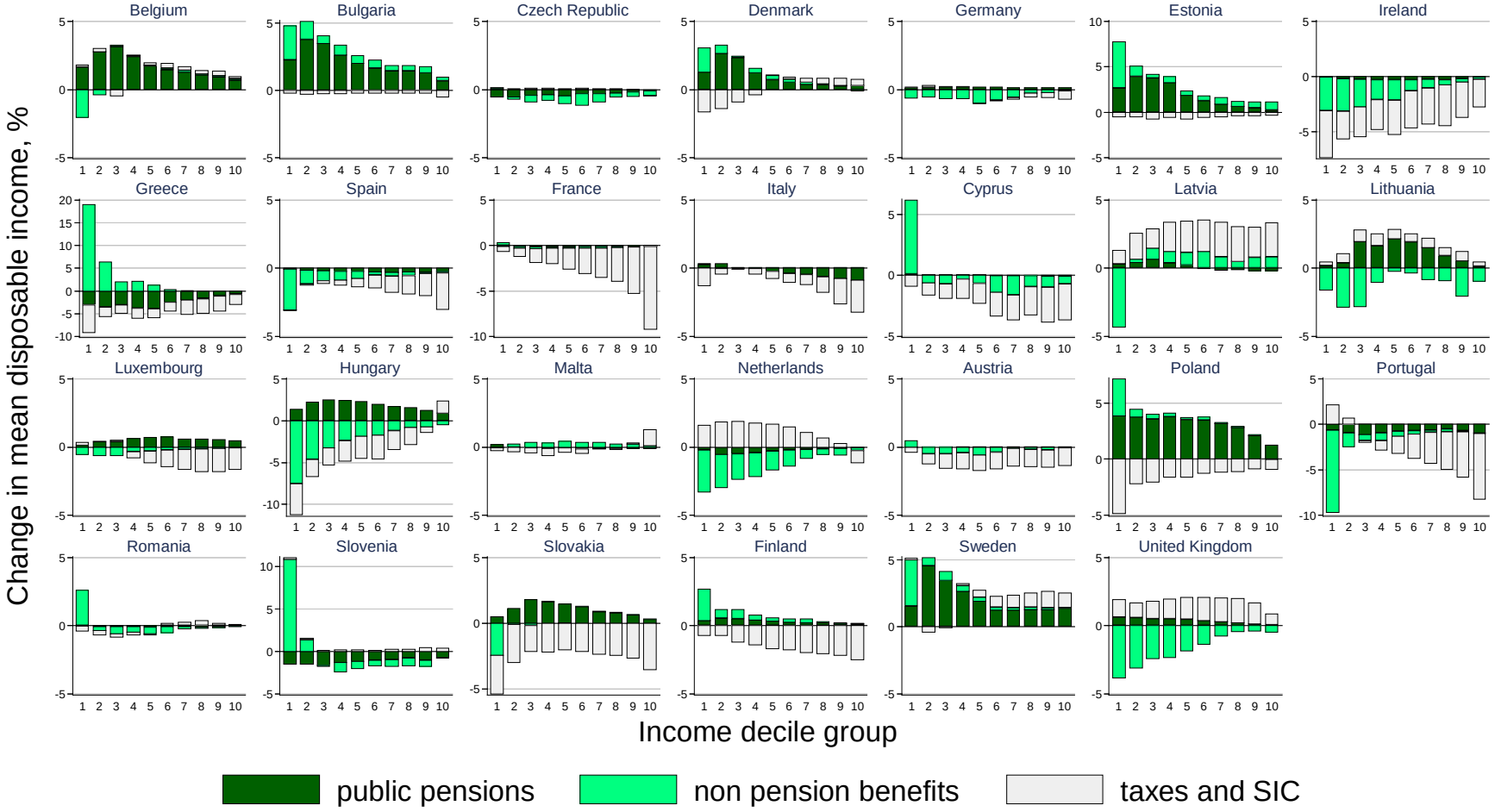

*Notes: Deciles are based on equivalised household disposable income in 2011. Change is measured as a percentage of mean income in 2011. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 10: Percentage change in household disposable income due to policies in 2011-2014 by age group**



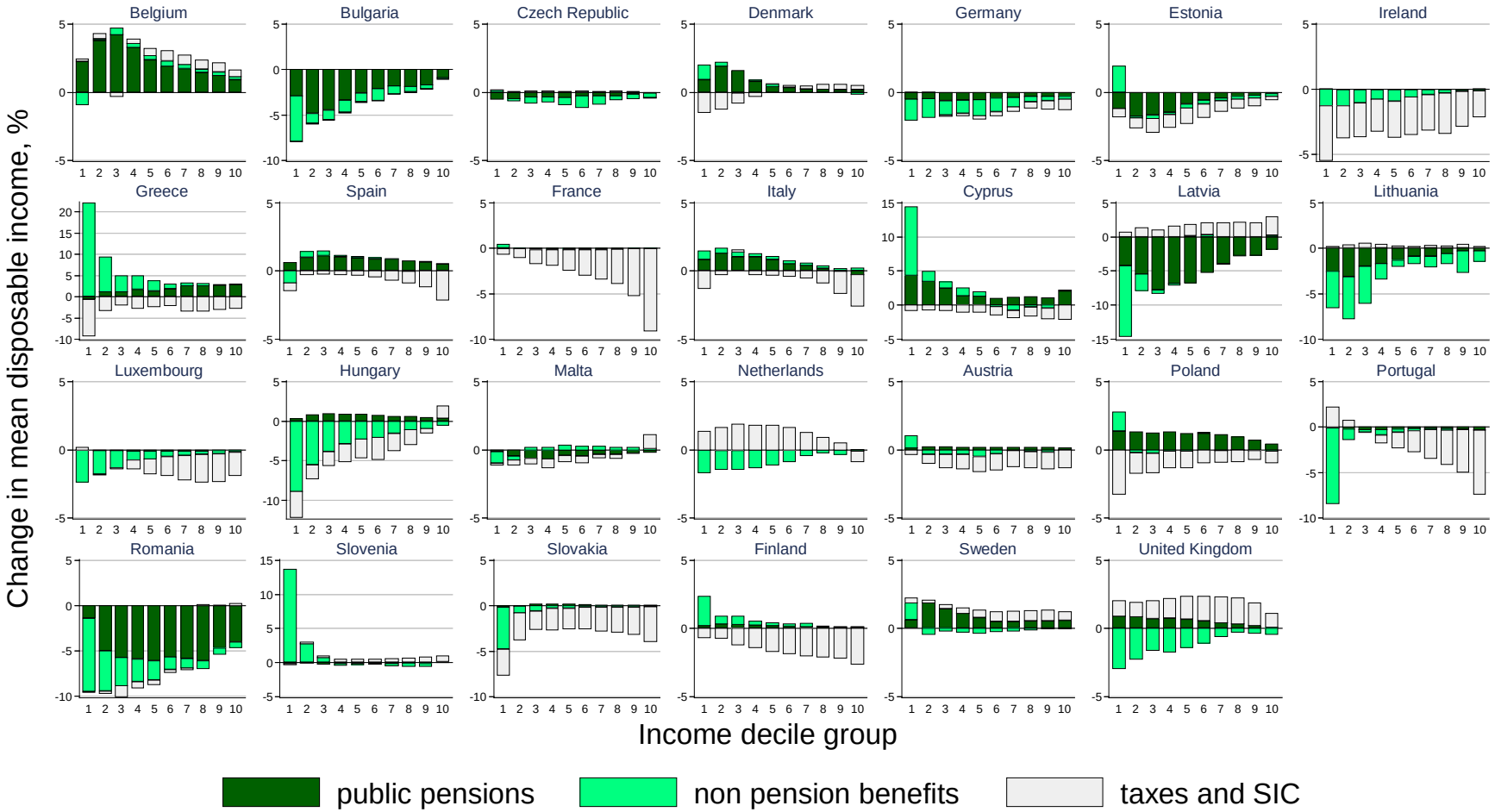

*Notes: Deciles are based on equivalised household disposable income in 2011. Change is measured as a percentage of mean income in 2011. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 11: Percentage change in household disposable income due to policies in 2011-2014 by tax-benefit components using the CPI-indexation**




*Notes: Deciles are based on equivalised household disposable income in 2011. Change is measured as a percentage of mean income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 12: Percentage change in household disposable income due to policies in 2011-2014 by tax-benefit components using the MII indexation**




*Notes: Deciles are based on equivalised household disposable income in 2011. Change is measured as a percentage of mean income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

The cross-national variation in policy effects is very substantial overall and indicates greater dynamics in the first period (see Table 7). The difference between the best and worst performances is about 12-17pp (2008-11) and 8-10pp (2011-14) in terms of mean disposable income, 5-7pp and 4pp for head-count poverty (FGT0) and 4-6pp and 3-4pp for the Gini coefficient.

**Table 7: The range of policy effects across EU-27 countries**

| Minimum values | | | | | | |
|---|---|---|---|---|---|---|
| **Period** | **Index** | **Mean DPI (%)** | **FGT0 (pp)** | **FGT1 (pp)** | **FGT2 (pp)** | **Gini (pp)** |
| 2008-2011 | CPI | -9.6 (EL) | -3.1 (BG) | -1.2 (LV) | -1.0 (LV) | -1.9 (BG) |
| | MII | -1.4 (MT) | -5.4 (LV) | -2.7 (LV) | -1.7 (LV) | -4.1 (LV) |
| 2011-2014 | CPI | -5.3 (PT) | -1.5 (EE) | -0.7 (EL) | -0.6 (EL) | -1.5 (FR) |
| | MII | -6.8 (RO) | -1.9 (CY) | -0.7 (CY) | -0.4 (EL) | -1.5 (FR) |
| **Maximum values** | | | | | | |
| **Period** | **Index** | **Mean DPI (%)** | **FGT0 (pp)** | **FGT1 (pp)** | **FGT2 (pp)** | **Gini (pp)** |
| 2008-2011 | CPI | 7.8 (BG) | 1.5 (DE) | 0.5 (DE) | 0.2 (PT) | 2.0 (HU) |
| | MII | 10.5 (BG) | 1.2 (DE) | 0.5 (DE) | 0.2 (DE) | 1.9 (HU) |
| 2011-2014 | CPI | 2.9 (LV) | 2.4 (HU) | 1.1 (HU) | 0.6 (HU) | 1.8 (HU) |
| | MII | 2.7 (BE) | 2.6 (LT) | 1.1 (HU) | 0.7 (LV) | 2.0 (HU) |

*Notes: Change in mean disposable income is measured as a percentage of mean (counterfactual) income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

## 4. The effect of tax-benefit policies on the income distribution in 2014-2015

This section focuses on the distributional effects on household disposable income of direct tax and cash benefit and pension policies between 2014 and 2015. It shows how adjustments to tax-benefit policies (or lack of them, against the benchmark) have affected household incomes, abstracting from changes in the population characteristics (e.g. higher unemployment) and the distribution of market incomes in this period. As before, the tax-benefit policies in a given year refer to those that applied on 30$^{th}$ of June. For a more detailed country-by-country analysis for 2015 the reader should refer to EUROMOD (2016).

We first present results for the effect of direct tax and benefit policy changes on poverty and inequality, then look at the effect of policy changes on mean household disposable income across countries, and finally consider how various groups in the population have been affected and the types of tax-benefit policy that contributed the most to these changes. Additional graphs illustrating country rankings by policy effects on poverty, inequality and mean disposable incomes in 2014-2015 are included in Appendix 3 (Figure A17 to Figure A24).

This section shows results for the 21 countries in EUROMOD for which 2015 policies are available.

**The policy effect on poverty and inequality levels**

As for the previous section, we use three FGT measures and the Gini coefficient to show the policy effects in 2014-2015 on overall poverty and inequality. For each measure, we show the estimated measure (in percent) in each country under the 2015 tax-benefit system and the change (in percentage points, pp) due to the policy effect separately for each counterfactual indexation assumption (CPI and MII) – see Table 8. A positive change means that the poverty (inequality) level has increased, while a negative value means it has fallen due to policies. One aspect needs to be noted: the discrepancy between CPI and MII is much smaller in 2014-2015 than in 2008-2011 and 2011-2014 and consequently, the policy effects in 2014-2015 are less sensitive to the choice of indexation.

Table 8 shows poverty measures and Gini under the 2015 tax-benefit system and the difference in comparison to the price-indexed (or income-indexed) 2014 tax-benefit systems. Our analysis shows that in the last year, tax-benefit policy changes were mostly poverty-reducing in Estonia, Belgium and Finland, whilst they were poverty-increasing in Greece and Latvia (in other countries the effect is mostly not statistically significant). In Estonia, Belgium, Finland and Greece, the findings are robust between CPI and MII counterfactual indexation. Estonia and Greece are the countries showing the largest policy-induced poverty reduction and increase respectively. In Estonia poverty headcount decreased by 1.3pp (CPI), while the poverty gap decreased by 0.6pp and 0.4pp respectively with the CPI and MII benchmark, and Gini fell by 0.7pp and 0.4pp respectively. At the other extreme is Greece, where policies increased poverty headcount by 1.4-1.6pp, poverty gap by 0.8pp and Gini by 0.6. This is in contrast with the general trends shown in the previous periods. In Belgium, Finland and Latvia the policy effects on poverty (and inequality) are much smaller and in Latvia, only statistically significant with the MII-indexation.

**The policy effect on mean income**

We consider next how household finances were affected. The policy effect on mean household disposable income (percentage change) is reported in Table 6 (and country rankings shown in Figure A23 and Figure A24, separately for each counterfactual indexation). A positive change in the mean implies that policies increased average household income with the cost to the public finances.

In Greece, the largest increase in poverty and inequality discussed above, coincided with drops in household incomes: -0.4% when 2015 is compared with the 2014 CPI-indexes system and -1% when 2015 is compared with the 2014 MII-indexed system. Other countries where policies reduced mean household incomes more notably between 2014 and 2015 are Belgium (-0.9% by CPI and -1% by MII), Ireland (-0.6% by both indexations), and Germany (-1% by income indexation). For these countries policy changes translated into opposite results in terms of poverty and inequality: in Belgium policy effects on the risk of poverty was rather small (-0.2pp) but with a greater effect on decreasing inequality (-0.3pp by CPI and by MII); Ireland and Germany saw a small increase in poverty risk and inequality (0.1-0.2pp).

Policies contributed to income-increases of more than 1% in Estonia, Spain, Latvia and Portugal. The results of Estonia, Spain and Portugal are also robust to the two indexations. Contrasting these results with the findings on poverty and inequality, they suggest that only in the case of Estonia was the increase in income driven by progressive policy changes which mostly benefitted the poor. In contrast, income increases in Spain and Portugal did not have a statistically significant effect on poverty (relative to the CPI counterfactual, and very small effects relative to the MII counterfactual), and slightly increased inequality.

**Table 8: The effect of policies in 2014-2015**

| | FGT0 | | | | FGT1 | | | |
|---|---|---|---|---|---|---|---|---|
| | 2015 **baseline** (%) | | Change in 2014-2015 (percentage points) | | 2015 **baseline** (%) | | Change in 2014-2015 (percentage points) | |
| **Country** | **MI** | **DPI** | **CPI** | **MII** | **MI** | **DPI** | **CPI** | **MII** |
| BE | 36.0 (0.76) | 11.7 (0.55) | -0.2*** (0.08) | -0.2*** (0.09) | 28.48 (0.63) | 3.31 (0.22) | -0.08*** (0.01) | -0.09*** (0.01) |
| BG | 32.9 (0.84) | 21.0 (0.75) | -0.2** (0.08) | -0.2** (0.08) | 21.97 (0.60) | 6.21 (0.31) | 0.03*** (0.01) | 0.03*** (0.01) |
| CZ | 31.4 (0.60) | 9.3 (0.47) | -0.1 (0.08) | 0.1 (0.09) | 23.55 (0.46) | 2.07 (0.14) | 0.01* (0.01) | 0.02*** (0.01) |
| DK | 34.2 (0.86) | 12.0 (0.74) | -0.1 (0.11) | 0.0 (0.10) | 25.41 (1.11) | 5.26 (1.11) | -0.05*** (0.01) | -0.01 (0.01) |
| DE | 36.5 (0.50) | 13.8 (0.38) | -0.2*** (0.06) | 0.2*** (0.05) | 28.36 (0.41) | 2.75 (0.10) | -0.08*** (0.00) | 0.04*** (0.01) |
| EE | 34.2 (0.76) | 18.7 (0.61) | -1.3*** (0.20) | -0.2 (0.18) | 24.32 (0.58) | 4.34 (0.19) | -0.60*** (0.04) | -0.39*** (0.04) |
| IE | 37.1 (1.04) | 17.2 (0.87) | 0.2* (0.12) | 0.2* (0.12) | 27.24 (0.85) | 4.33 (0.27) | 0.05*** (0.01) | 0.05*** (0.01) |
| EL | 35.7 (0.98) | 22.4 (0.92) | 1.4*** (0.38) | 1.6*** (0.38) | 27.30 (0.82) | 8.29 (0.41) | 0.77*** (0.05) | 0.76*** (0.05) |
| ES | 35.7 (0.58) | 21.8 (0.55) | 0.0 (0.10) | 0.0 (0.10) | 27.76 (0.47) | 8.05 (0.27) | 0.01 (0.01) | 0.00 (0.01) |
| FR | 33.8 (0.52) | 11.9 (0.39) | 0.1 (0.09) | 0.2** (0.09) | 22.59 (0.38) | 2.50 (0.12) | -0.01 (0.01) | 0.02* (0.01) |
| IT | 33.9 (0.47) | 18.2 (0.43) | 0.1 (0.07) | 0.1 (0.07) | 24.68 (0.36) | 5.96 (0.20) | 0.00 (0.01) | 0.00 (0.01) |
| CY | 27.9 (0.77) | 12.0 (0.59) | 0.0 (0.03) | 0.1 (0.07) | 18.09 (0.52) | 2.02 (0.12) | -0.02*** (0.00) | 0.01*** (0.00) |
| LV | 34.6 (0.73) | 20.9 (0.61) | -0.2 (0.15) | 0.7*** (0.15) | 25.28 (0.55) | 5.64 (0.21) | -0.01 (0.01) | 0.22*** (0.02) |
| NL | 28.2 (0.70) | 10.5 (0.59) | 0.0 (0.18) | -0.2 (0.18) | 16.18 (0.47) | 2.16 (0.15) | -0.02 (0.03) | -0.04 (0.03) |
| AT | 34.5 (0.79) | 13.3 (0.62) | 0.0 (0.05) | 0.0 (0.05) | 25.37 (0.58) | 2.40 (0.14) | -0.02* (0.01) | -0.02* (0.01) |
| PL | 31.3 (0.54) | 17.8 (0.48) | -0.1* (0.09) | -0.2* (0.11) | 21.22 (0.37) | 5.01 (0.17) | -0.03* (0.01) | 0.00 (0.01) |
| PT | 33.8 (0.73) | 17.3 (0.61) | 0.2** (0.09) | 0.2* (0.09) | 25.27 (0.57) | 4.65 (0.21) | 0.14*** (0.01) | 0.11*** (0.01) |
| SK | 29.8 (0.73) | 12.1 (0.63) | -0.2** (0.08) | -0.2** (0.08) | 20.85 (0.55) | 2.72 (0.18) | 0.08*** (0.01) | 0.08*** (0.01) |
| FI | 34.9 (0.58) | 10.9 (0.40) | -0.2*** (0.07) | -0.2*** (0.06) | 25.62 (0.46) | 1.82 (0.09) | -0.05*** (0.00) | -0.03*** (0.00) |
| SE | 31.5 (0.62) | 13.7 (0.50) | -0.1 (0.06) | 0.2*** (0.06) | 22.11 (0.48) | 3.20 (0.16) | 0.00 (0.00) | 0.07*** (0.00) |
| UK | 36.2 (0.44) | 15.5 (0.34) | 0.0 (0.05) | 0.2*** (0.05) | 25.15 (0.34) | 4.57 (0.14) | -0.01*** (0.00) | 0.04*** (0.00) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses.*
*Source: Own simulations with EUROMOD.*

*(Continues on next page)*

**Table 8** ***continues***

| | FGT2 | | | | Gini | | | |
|---|---|---|---|---|---|---|---|---|
| | **2015 baseline** (%) | | **Change in 2014-2015** (percentage points) | | **2015 baseline** (%) | | **Change in 2014-2015** (percentage points) | |
| **Country** | **MI** | **DPI** | **CPI** | **MII** | **MI** | **DPI** | **CPI** | **MII** |
| BE | 26.38 (0.63) | 1.83 (0.17) | -0.03*** (0.00) | -0.03*** (0.00) | 49.3 (0.56) | 22.0 (0.32) | -0.35*** (0.03) | -0.33*** (0.03) |
| BG | 18.51 (0.54) | 2.66 (0.17) | 0.04*** (0.01) | 0.04*** (0.01) | 46.7 (0.68) | 32.5 (0.58) | -0.01 (0.01) | -0.01 (0.01) |
| CZ | 21.55 (0.44) | 0.75 (0.06) | 0.01*** (0.00) | 0.01*** (0.00) | 46.5 (0.49) | 24.0 (0.37) | -0.13*** (0.01) | 0.04*** (0.01) |
| DK | 22.12 (1.16) | 3.45 (1.46) | 0.02 (0.03) | 0.05 (0.04) | 48.4 (1.13) | 28.5 (1.23) | -0.06*** (0.01) | 0.03*** (0.01) |
| DE | 25.68 (0.40) | 0.99 (0.05) | -0.03*** (0.00) | 0.02*** (0.01) | 50.6 (0.40) | 26.3 (0.27) | -0.09*** (0.00) | 0.13*** (0.01) |
| EE | 21.54 (0.55) | 1.72 (0.10) | -0.25*** (0.02) | -0.16*** (0.02) | 48.6 (0.55) | 31.4 (0.42) | -0.71*** (0.03) | -0.39*** (0.02) |
| IE | 23.98 (0.81) | 2.20 (0.19) | 0.01*** (0.00) | 0.01*** (0.00) | 53.5 (0.71) | 28.5 (0.42) | 0.11*** (0.01) | 0.12*** (0.01) |
| EL | 25.87 (0.88) | 4.85 (0.31) | 0.57*** (0.04) | 0.56*** (0.04) | 55.0 (0.92) | 34.4 (0.82) | 0.57*** (0.04) | 0.61*** (0.04) |
| ES | 25.68 (0.49) | 4.95 (0.22) | -0.01 (0.01) | -0.02* (0.01) | 52.7 (0.40) | 31.8 (0.30) | 0.07*** (0.01) | 0.10*** (0.01) |
| FR | 18.96 (0.39) | 1.04 (0.12) | -0.01 (0.00) | 0.00 (0.01) | 49.5 (0.58) | 28.4 (0.46) | -0.14*** (0.01) | -0.08*** (0.01) |
| IT | 21.82 (0.34) | 3.36 (0.15) | 0.00 (0.01) | -0.01 (0.01) | 52.1 (0.41) | 32.2 (0.40) | -0.17*** (0.01) | -0.14*** (0.01) |
| CY | 15.86 (0.51) | 0.55 (0.05) | -0.01*** (0.00) | 0.00*** (0.00) | 43.9 (0.63) | 29.0 (0.54) | 0.00 (0.00) | 0.03*** (0.00) |
| LV | 22.60 (0.53) | 2.32 (0.11) | 0.02*** (0.01) | 0.12*** (0.01) | 53.1 (0.72) | 36.1 (0.71) | -0.05** (0.02) | 0.39*** (0.02) |
| NL | 12.18 (0.43) | 0.91 (0.10) | -0.01 (0.01) | -0.01 (0.01) | 40.2 (0.45) | 24.5 (0.30) | -0.01 (0.02) | -0.04** (0.02) |
| AT | 22.59 (0.55) | 0.60 (0.05) | -0.01*** (0.00) | -0.01*** (0.00) | 49.9 (0.58) | 26.2 (0.39) | 0.00 (0.01) | 0.00 (0.01) |
| PL | 18.54 (0.35) | 2.31 (0.11) | 0.00 (0.01) | 0.00 (0.01) | 48.1 (0.44) | 31.1 (0.38) | -0.17*** (0.01) | 0.00 (0.01) |
| PT | 22.73 (0.55) | 1.81 (0.10) | 0.07*** (0.00) | 0.05*** (0.00) | 54.4 (0.66) | 32.2 (0.47) | 0.34*** (0.03) | 0.32*** (0.03) |
| SK | 18.72 (0.52) | 0.87 (0.07) | 0.04*** (0.00) | 0.05*** (0.00) | 42.0 (0.50) | 22.6 (0.31) | 0.01* (0.01) | 0.08*** (0.01) |
| FI | 22.55 (0.44) | 0.52 (0.04) | -0.01*** (0.00) | -0.01*** (0.00) | 48.3 (0.46) | 24.3 (0.35) | -0.13*** (0.00) | -0.07*** (0.00) |
| SE | 18.73 (0.44) | 1.26 (0.09) | 0.00** (0.00) | 0.02*** (0.00) | 43.4 (0.49) | 23.7 (0.28) | -0.07*** (0.00) | 0.03*** (0.00) |
| UK | 21.38 (0.32) | 2.52 (0.10) | 0.00*** (0.00) | 0.01*** (0.00) | 52.2 (0.37) | 31.3 (0.28) | -0.11*** (0.00) | 0.04*** (0.00) |

*Notes: Significance levels indicated as * p<0.1, ** p<0.05, *** p<0.01 and standard errors shown in parentheses. FGT2 for DK estimated without two extreme outliers with very large negative (investment) incomes.*
*Source: Own simulations with EUROMOD.*

## The distribution of policy effects

Figure 13 shows the effect of policy changes between 2014 and 2015 across the income distribution – using the CPI-indexed benchmark (dash line) and MII indexation (solid line). The percentage change in mean disposable income (vertical axis) is calculated for each income decile group (horizontal axis). There are several notable features. First, because of the short period that we are considering, the two indexation benchmarks yield quite similar results and most of the time show parallel (or the same) line shapes. Second, between 2014 and 2015, the policy effect was progressive (where the poor benefitted more/lost less) by both indexations in Belgium, Estonia, Spain, France, Italy, Finland and the Netherlands; it was regressive (where the poor benefitted least/lost most) by both indexations in Bulgaria, Ireland, Greece, Portugal and Slovakia; it was progressive only with respect to CPI in Czech Republic, Denmark, Germany and Poland; it was regressive only with respect to MII in Germany, Latvia and the UK. Third, although in most countries there are little differences between the assessments based on the two benchmarks, the policy effects are less favourable when measured against the MII-indexed 2014, both in term of size and progressivity in most countries. This is particularly the case of Czech Republic, Germany, Latvia, Poland, Sweden and the UK. In contrast with the previous period (2011-2014), between 2014 and 2015 policy effect measured against the MII-based benchmark has become less regressive (more progressive) in Bulgaria, the UK, Estonia and Latvia, whilst in Greece it has become more regressive.

## Which types of policy made a difference and who was the most affected?

To gain an understanding of which population groups were most affected and why, we explore changes by age groups and policy instruments. Figure 14 shows the distributional effects by the age group of each individual, taking account of all income changes in their household. Individuals are allocated to the age groups of 5-year bands.[11] Figure 15 and Figure 16 decompose the policy effect of 2014-2015 into changes in public pensions, non-pension benefits and taxes and social insurance contributions. (A more detailed country specific breakdown is provided by EUROMOD (2016).)

At a first glance, because of the large number of countries, these pictures may be difficult to interpret. Moreover, in the short term that they consider, differences between the price and market income indices are small (apart from a few cases) and trends follow similar patterns within the same country. Therefore many country specific figures look quite flat. However, when looking in greater detail and in relation to what we have discussed above, there are some interesting patterns that we would like to highlight here.

For example, let us start from Greece and Estonia, which are the countries showing the largest changes (at the two extremes) in poverty and inequality during this period. We can see that in Greece the significant increase in poverty and inequality resulted from policy changes of a strong regressive nature in 2014-15. They yielded a 0.4% decrease in household disposable income driven by a fall in means-tested benefits, as the social dividend distributed in 2014 was discontinued in 2015.[12] In addition, the policy changes penalized disproportionately elderly (by MII) relative to other age groups because of increasing social insurance contributions paid by pensioners for sickness insurance, despite pensions' real increase due to falling consumer prices. On the other end of the poverty and

[11] Note that this analysis assumes that household disposable income is pooled across household members (and equivalised), so that, children living with their parents would be affected in a similar way by the policy changes as each adult in the household. In reality, this sharing may be representing only what happens within some households.

[12] Note, however, that the analysis does not take into account of the near-cash transfers to the poorest households that were introduced in the March 2015 bill on humanitarian aid (rent subsidies, food vouchers and free provision of electricity).

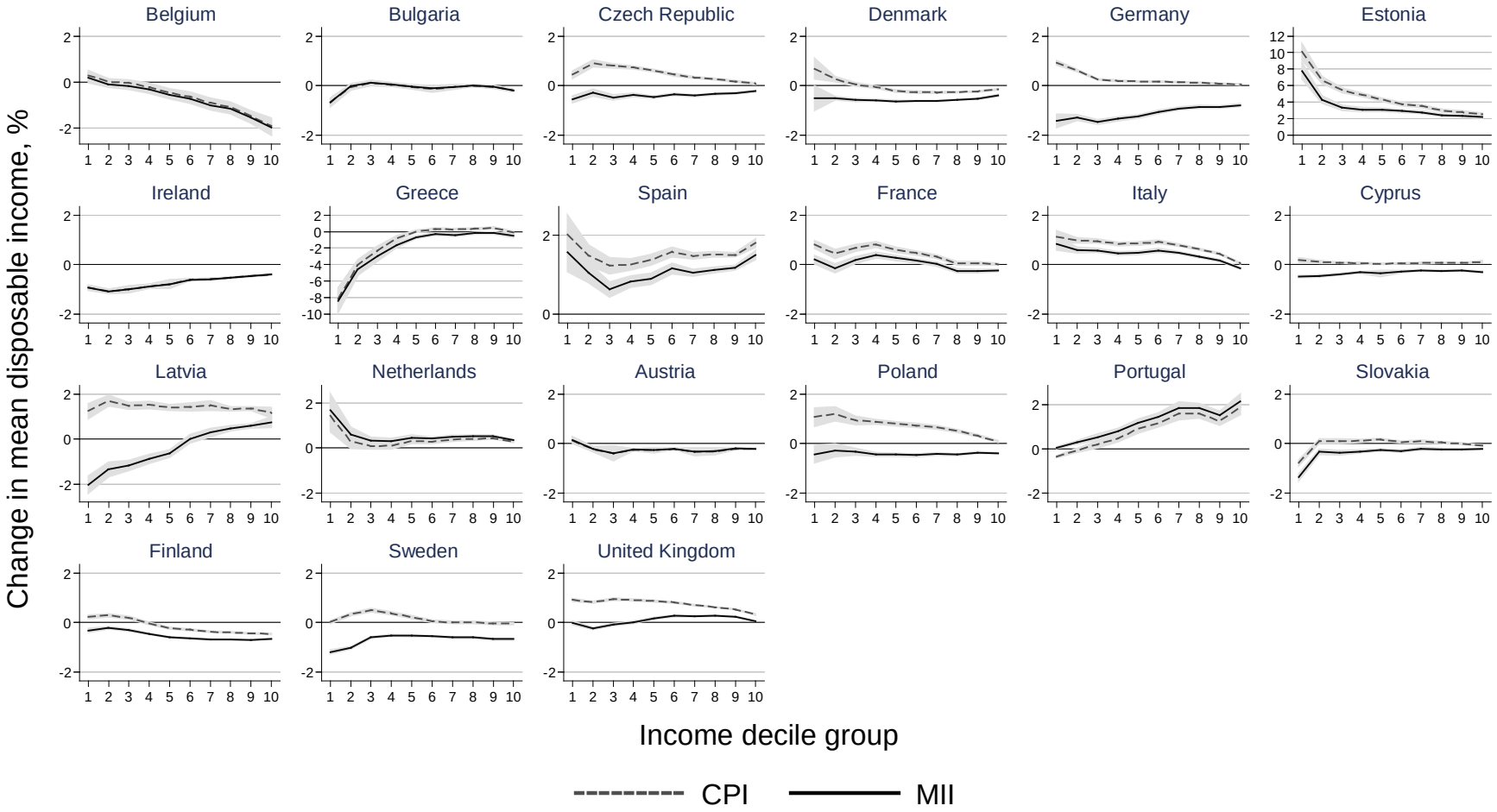
inequality changes we find Estonia, where implemented policy changes were strongly progressive by both CPI and MII and resulted respectively in an increase in average household income of 3.7% and 2.8%. This was achieved by indexing public pensions above the income growth and inflation rate, substantially increasing assistance to the bottom decile group by raising the child allowance and family benefit, as well as supporting the rest of the population by reducing the income tax rate and employee SIC rate. These policy changes resulted in a significant decrease in both poverty and inequality. By age groups, these meant similar gains for children and elderly with the CPI-indexed benchmark, indicating that policies have helped various types of family in maintaining their purchasing power with respect to inflation. On the other hand, elderly have gained more than other population groups against the MII-indexed benchmark, suggesting that child and family benefits have not kept pace with private incomes (contrary to pensions).

Our analysis shows that other countries, falling in between Greece and Estonia in terms of poverty and inequality changes, either used different types of intervention to affect household finances or used the same type of interventions but in a rather different way. Portugal and Latvia (the latter only by MII), like Greece, have implemented quite pronounced regressive policy changes between 2014 and 2015 which, like in Greece, resulted in growing poverty and inequality. However, policy changes in Portugal and Latvia yielded positive effects on the average household income. In Portugal, this was achieved by cutting the income tax and introducing an extraordinary pensioners' solidarity contribution in 2015. These policies mainly supported families with children and those with elderly, whilst those in their 50s and at the beginning of their 20s gained less. In Latvia, average household income was increased by 0.1% (MII), but the regressivity of policy changes such as cuts in pensions and non-pension benefits as well as reduced income tax, resulted in unfavourable policy effects for the elderly.[13] Other countries such as Germany, Sweden and the UK also implemented regressive policies (by MII), which increased poverty and inequalities. However, while in Germany and Sweden the policies lowered average household disposable income by -1% and -0.65% respectively, in the UK household income increased, mainly as a result of a substantially increased personal tax allowance. In all three countries, policy effects affected elderly disproportionately more compare to other age groups. In Germany, pensions fell in nominal terms at the same rate as prices, which in turn had a negative effect on household incomes of pensioners (by MII). In Sweden and the UK, pensioners gained from policy changes.

On the other side, Belgium, like Estonia, implemented progressive policy changes which reduced poverty and inequality (mainly against the MII-indexed counterfactual). However, the effect on the average household income was negative (-0.9%) and driven by the growth in direct taxes and social insurance contributions. These resulted in similar losses for families with children and elderly as well as those in their 20s, while other groups in the population lost slightly more. Other countries such as the Czech Republic, Spain and Poland also implemented progressive policy changes (against the CPI-indexed benchmark) raising average household income, but with mixed effects on poverty and inequality. In the Czech Republic and Poland households at the bottom of the distribution saw their incomes rising due to large real increases in non-pension benefits as well as public pensions. In Spain, a combination of benefit increases and income tax cuts resulted in similar gains across the income distribution. However, in all three countries elderly have been favoured (by CPI) as they experienced higher gains or smaller losses compared to the rest of the population.

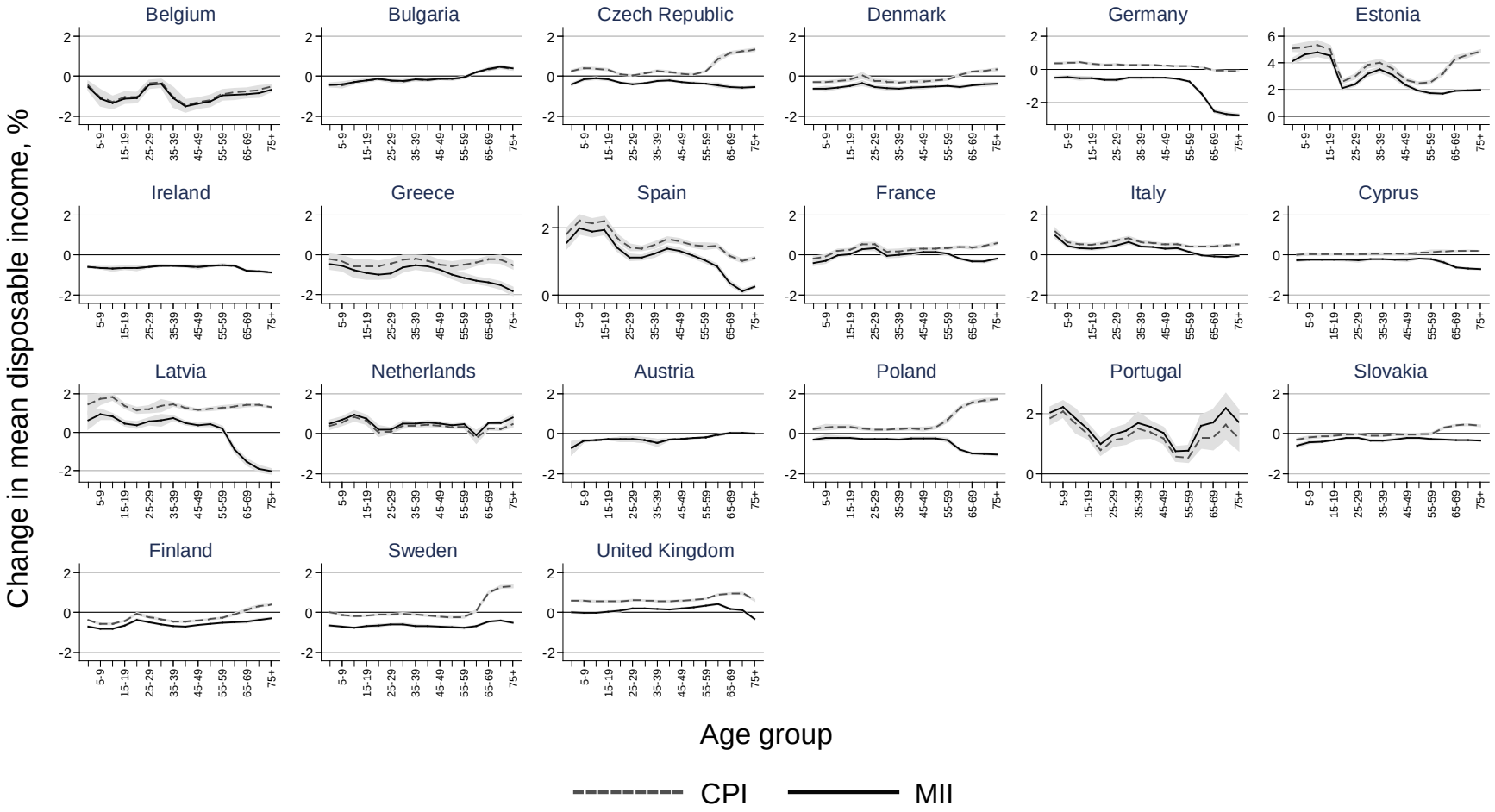
[13] The effect of policy changes in Latvia in 2014-2015 was progressive against the CPI-indexed benchmark and regressive against the MII-indexed benchmark. The most pronounced differences between the effects in the top and bottom deciles are shown with MII.

**Figure 13: Percentage change in household disposable income due to policies in 2014-2015 by household income decile group**



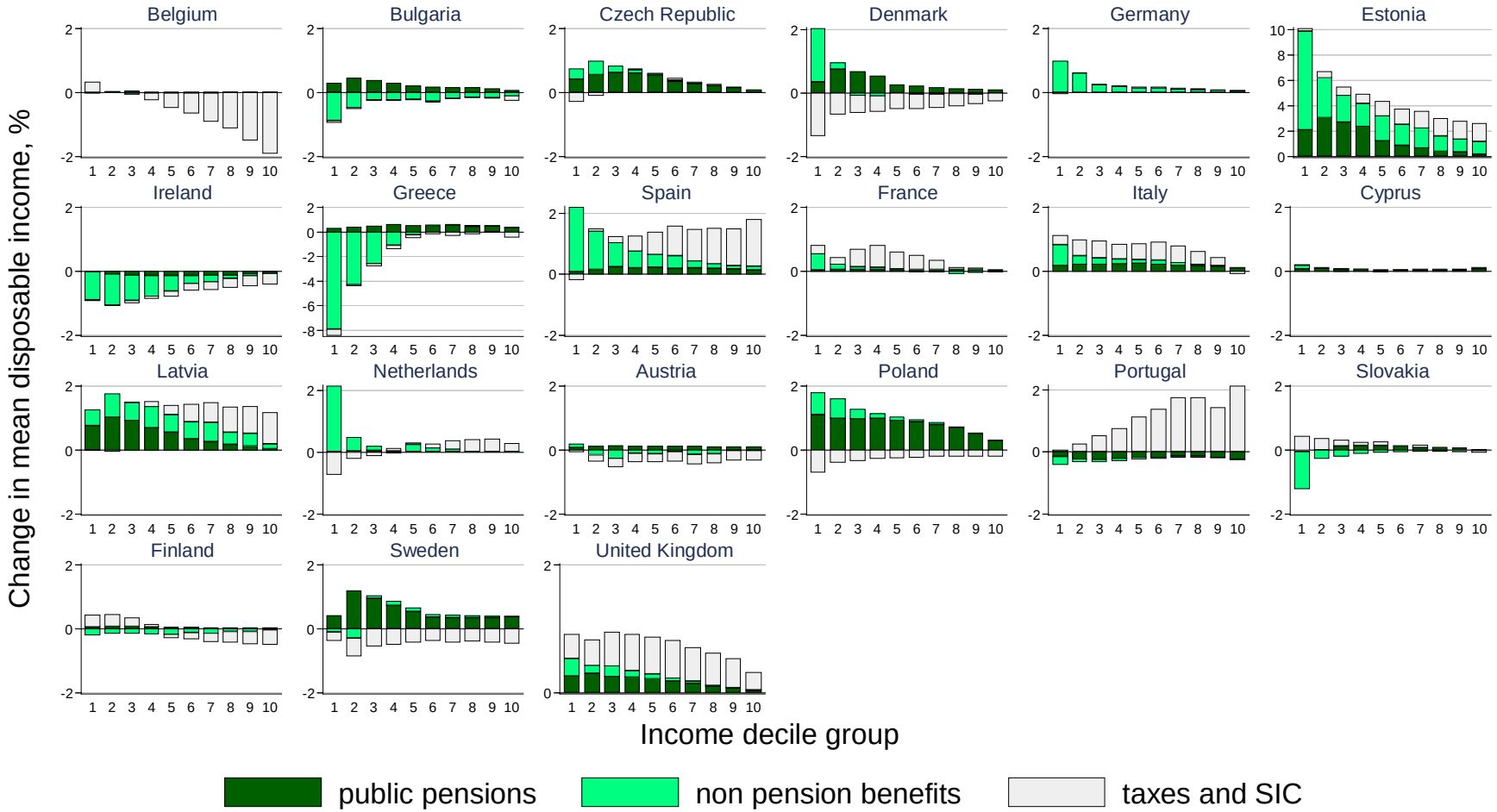

*Notes: Deciles are based on equivalised counterfactual household disposable income in 20151, i.e. with 2014 policies in place, indexed by one of the two counterfactual indexes. Change is measured as a percentage of mean counterfactual income in 2015. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 14: Percentage change in household disposable income due to policies in 2014-2015 by age group**



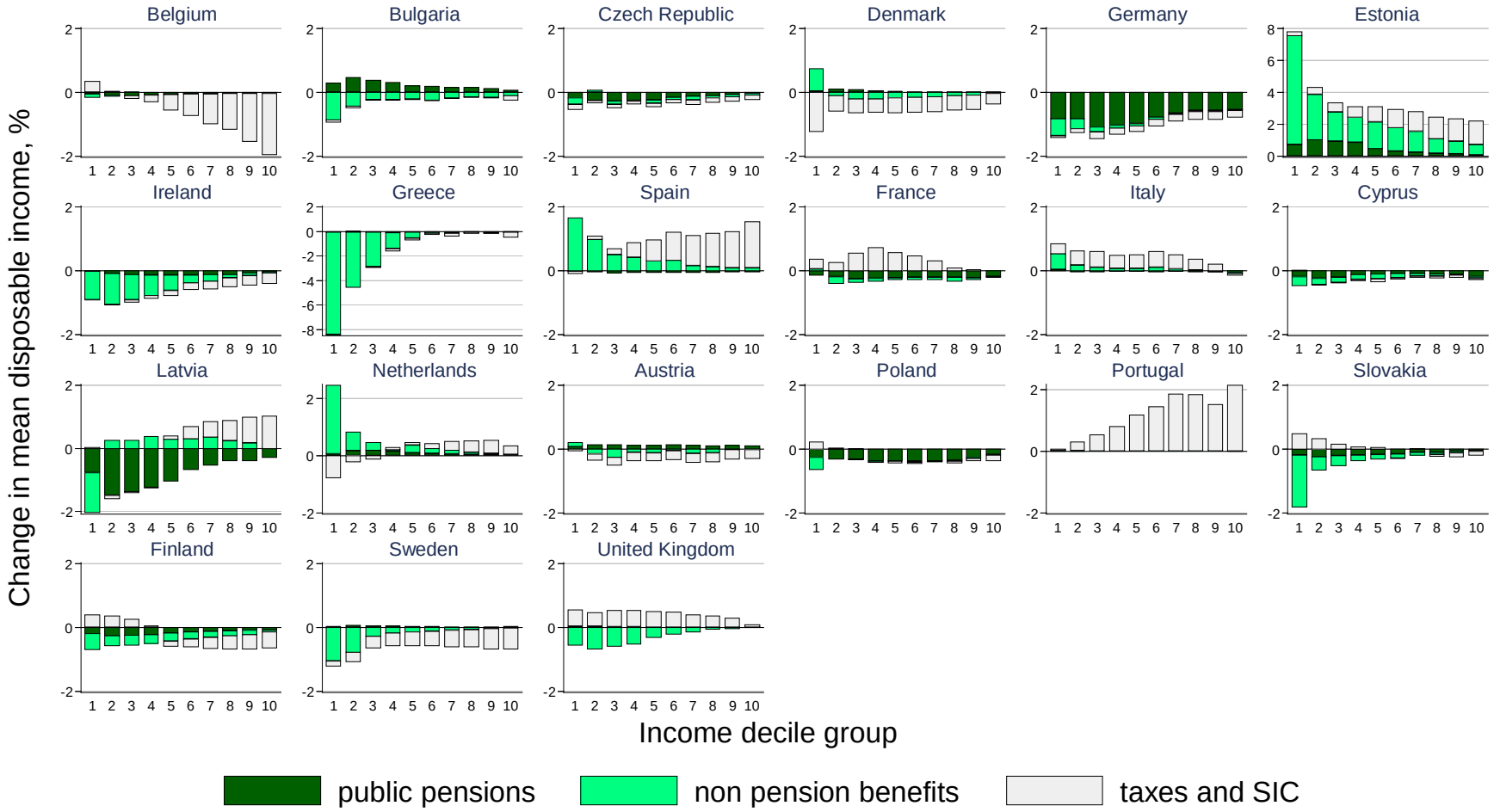

*Notes: Deciles are based on equivalised counterfactual household disposable income in 20151, i.e. with 2014 policies in place, indexed by one of the two counterfactual indexes. Change is measured as a percentage of mean counterfactual income in 2015. Shaded area shows 95% confidence intervals. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 15: Percentage change in household disposable income due to policies in 2014-2015 by tax-benefit components using the CPI indexation**




*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by Consumer Price Index. Change is measured as a percentage of mean counterfactual income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

**Figure 16: Percentage change in household disposable income due to policies in 2014-2015 by tax-benefit components using the MII indexation**




*Notes: Deciles are based on equivalised counterfactual household disposable income in 2011, i.e. with 2008 policies in place, indexed by Market Income Index. Change is measured as a percentage of mean counterfactual income in 2011. The charts are drawn to different scales, but the interval between gridlines on each of them is the same.*
*Source: Own simulations with EUROMOD.*

## 5. Concluding remarks

The research note estimates the effect of tax-benefit policies on the income distribution in EU-27 countries in 2008-2014 and separately in 2014-15 (for selected countries). We employ the EU tax-benefit model EUROMOD and micro-data (mainly) from EU-SILC 2012. As such we update and extend our previous analysis (De Agostini et al., 2015b), which covered 10 countries and policies up to 2014. Using microsimulation techniques we isolate direct policy effects from other factors shaping the income distribution, e.g. changes in population characteristics and market income distribution.

When contrasting tax-benefit policies over time, we use two different indexation approaches to adjust benchmark policies – prices and market incomes – and explore the sensitivity of results. A price-adjusted comparison allows us to assess policy effects in real terms, which has clear relevance for the well-being of households. In the longer run, it is also important to ensure that tax brackets as well as pensions and benefits reflect growth in private incomes to keep the relative tax burden unchanged and the system fiscally neutral overall. In practice, countries often apply a combination of the two when it comes to updating policy parameters over time.

Our analysis shows that policy effects in the first half of period (2008-2011) were larger than in the second half of period (2011-2014) and, on average, affected household budgets in opposite directions (positive in the early period and negative later). At the EU-27 level, there was a small poverty-decreasing policy effect in the first period, and a small opposite effect (by most indicators) in the second period. There are however large differences across countries in terms of policy effects on poverty, inequality and mean incomes, in both periods.

Germany and Hungary stand out for the largest poverty-increasing policy effects in 2008-2011 and 2011-2014, respectively, and Hungary for the largest inequality-increasing policy effects in both periods. In Hungary, this can be partly attributed to the flat tax reform in 2011. In Germany, it reflects a drop (in real terms and relative to market incomes growth) in the levels of means-tested benefits. It is notable that countries which are generally considered as having undertaken the most drastic fiscal consolidations recently (Greece, Ireland, Portugal) – and here reflected in the effect of policies on mean household disposable income in 2008-2014 (in real terms) – did so in a relatively distribution-neutral way or even by poverty and inequality-reducing policies. (One needs to be cautious though when interpreting results as poverty lines or the benchmark index, e.g. MII, have declined too in some cases.)

Overall, no clear relationship between fiscal effects (mean incomes) and distributive effects (poverty, inequality) emerges for 2008-2014 when policy effects are measured using the price-indexed benchmark. With the income-based indexation benchmark, which reflects better broad changes in the economy, the effect of tax-benefit policies on poverty and inequality indicators and mean household income appear to be inversely related in this period. That is, more expansionary policies were also more redistributive and vice versa.

In 2014-2015, policies had a large effect on poverty measures in Greece (rising) and Estonia (falling), especially for such a short period of time. The same countries had also the largest positive and negative policy effect on inequality, though here the differences with other countries were less pronounced. In both countries, large (one-off) changes in non-pension benefits were the main drivers of overall poverty and inequality effects (though in opposite directions). It is notable that similar to Greece, several other countries (Portugal, Spain, Latvia) which had previously gone through fiscal consolidation, pursued policies in 2015 with a positive effect on mean incomes but also (in some cases) increasing poverty or inequality.

Assessing the latest (annual) developments of tax-benefit policies is a useful exercise as it sheds light about governments' current priorities and policy directions, and may help to

provide early warnings about unintended (and undesirable) policy effects. A comparative angle provides further context and allows spotting unusual trends more easily. Cross-country rankings on an annual basis, however, can be sensitive to the timing of policy implementation and may in some cases reflect “lumping” of required regular policy adjustments into occasional “reform packages”. A trivial example is raising family benefits mainly in conjunction with elections while their values are quickly eroded by inflation and outstripped by wage growth in non-election periods. In this respect, it is instructive to take also a longer perspective and assess policy effects in the medium-term to see structural policy changes and permanent shifts in priorities more clearly.

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# Appendix 1: Movements in prices (CPI) and market incomes (MII)

| | 2008-2011 | | 2011-2014 | | 2014-2015 | |
|---|---|---|---|---|---|---|
| **Country** | **CPI** | **MII** | **CPI** | **MII** | **CPI** | **MII** |
| **BE** | 1.058 | 1.067 | 1.044 | 1.022 | 1.001 | 1.002 |
| **BG** | 1.092 | 0.926 | 1.011 | 1.210 | 1.018 | 1.018 |
| **CZ** | 1.040 | 1.008 | 1.053 | 1.052 | 1.003 | 1.025 |
| **DK** | 1.056 | 1.018 | 1.032 | 1.045 | 1.004 | 1.015 |
| **DE** | 1.038 | 1.029 | 1.046 | 1.070 | 0.996 | 1.026 |
| **EE** | 1.081 | 0.939 | 1.081 | 1.198 | 1.008 | 1.044 |
| **IE** | 0.979 | 0.848 | 1.028 | 1.005 | 1.012 | 1.012 |
| **EL** | 1.094 | 0.791 | 0.988 | 0.865 | 0.987 | 1.002 |
| **ES** | 1.049 | 0.834 | 1.038 | 0.991 | 0.994 | 1.005 |
| **FR** | 1.042 | 1.045 | 1.039 | 1.035 | 1.000 | 1.010 |
| **IT** | 1.047 | 1.000 | 1.055 | 1.026 | 0.998 | 1.005 |
| **CY** | 1.063 | 0.987 | 1.032 | 0.933 | 0.997 | 1.008 |
| **LV** | 1.063 | 0.723 | 1.031 | 1.225 | 1.007 | 1.055 |
| **LT** | 1.098 | 0.795 | 1.044 | 1.139 | n/a | n/a |
| **LU** | 1.052 | 1.035 | 1.059 | 1.085 | n/a | n/a |
| **HU** | 1.132 | 1.078 | 1.075 | 1.110 | n/a | n/a |
| **MT** | 1.065 | 1.103 | 1.050 | 1.069 | n/a | n/a |
| **NL** | 1.039 | 1.014 | 1.060 | 1.037 | 1.005 | 1.000 |
| **AT** | 1.057 | 1.063 | 1.063 | 1.055 | 1.013 | 1.013 |
| **PL** | 1.107 | 1.164 | 1.048 | 1.114 | 0.994 | 1.030 |
| **PT** | 1.040 | 0.935 | 1.031 | 1.009 | 1.007 | 1.000 |
| **RO** | 1.185 | 1.013 | 1.082 | 1.292 | n/a | n/a |
| **SI** | 1.051 | 1.012 | 1.052 | 1.006 | n/a | n/a |
| **SK** | 1.058 | 1.178 | 1.052 | 1.093 | 1.016 | 1.025 |
| **FI** | 1.068 | 1.038 | 1.067 | 1.072 | 1.002 | 1.010 |
| **SE** | 1.053 | 1.076 | 1.016 | 1.064 | 1.003 | 1.024 |
| **UK** | 1.103 | 0.977 | 1.061 | 1.045 | 1.005 | 1.020 |

*Sources: MII is based on own calculations using EUROMOD, CPI is based on Eurostat's series for Harmonised Indices of Consumer Prices (HICP).*

## Appendix 2: Description of micro-data sources

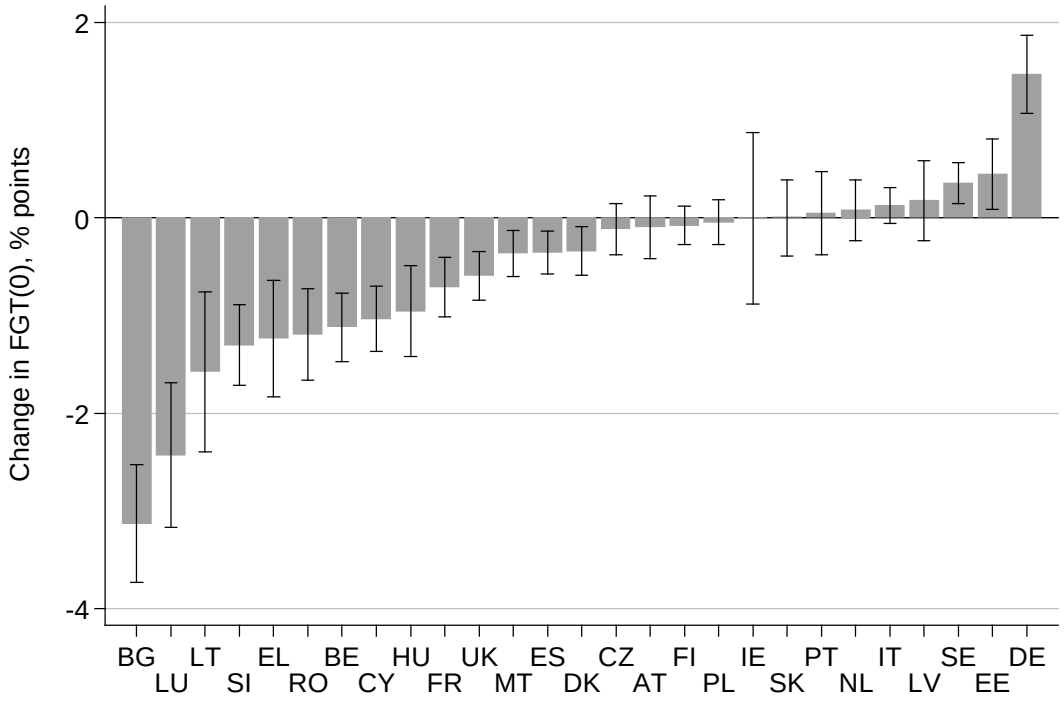
| Country | | Input dataset | Income reference period | Sample size | |
|---|---|---|---|---|---|
| | | | | Households | Individuals |
| Belgium | BE | National SILC 2012 | 2011 (annual) | 5,817 | 13,896 |
| Bulgaria | BG | EU-SILC 2012 | 2011 (annual) | 5,679 | 14,487 |
| Czech Republic | CZ | EU-SILC 2012 | 2011 (annual) | 8,773 | 20,213 |
| Denmark | DK | EU-SILC 2012 | 2011 (annual) | 5,355 | 13,319 |
| Germany | DE | EU-SILC 2012 | 2011 (annual) | 13,145 | 27,840 |
| Estonia | EE | EU-SILC 2012[a] | 2011 (annual) | 5,433 | 14,210 |
| Ireland | IE | EU-SILC 2012 | 2011 (annual) | 4,592 | 11,794 |
| Greece | EL | EU-SILC 2012[a] | 2011 (annual) | 5,626 | 13,832 |
| Spain | ES | EU-SILC 2012 | 2011 (annual) | 12,714 | 33,501 |
| France | FR | EU-SILC 2012 | 2011 (annual) | 11,999 | 28,413 |
| Italy | IT | EU-SILC 2012 | 2011 (annual) | 19,579 | 47,149 |
| Cyprus | CY | EU-SILC 2012 | 2011 (annual) | 4,638 | 13,306 |
| Latvia | LV | EU-SILC 2012 | 2011 (annual) | 6,499 | 15,165 |
| Lithuania | LT | EU-SILC 2012 | 2011 (annual) | 5,394 | 12,659 |
| Luxembourg | LU | EU-SILC 2012 | 2011 (annual) | 5,802 | 15,462 |
| Hungary | HU | EU-SILC 2012 | 2011 (annual) | 11,311 | 28,407 |
| Malta | MT | EU-SILC 2012 | 2011 (annual) | 4,350 | 11,925 |
| Netherlands | NL | EU-SILC 2012 | 2011 (annual) | 10,168 | 24,813 |
| Austria | AT | EU-SILC 2012 | 2011 (annual) | 6,232 | 13,861 |
| Poland | PL | EU-SILC 2012[a,b] | 2011 (annual) | 13,116 | 36,991 |
| Portugal | PT | EU-SILC 2012 | 2011 (annual) | 6,257 | 15,926 |
| Romania | RO | EU-SILC 2012 | 2011 (annual) | 7,578 | 17,685 |
| Slovenia | SI | EU-SILC 2012 | 2011 (annual) | 9,205 | 28,034 |
| Slovakia | SK | EU-SILC 2012 | 2011 (annual) | 5,291 | 15,440 |
| Finland | FI | EU-SILC 2012 | 2011 (annual) | 10,307 | 25,370 |
| Sweden | SE | EU-SILC 2012 | 2011 (annual) | 6,628 | 16,452 |
| United Kingdom | UK | FRS 2012/13 | 2012/13 (monthly) | 20,196 | 46,420 |

[a] *Includes selected national variables, added with the permission from the respective national statistical office.*
[b] *Microsimulation SILC indicator dataset complementing the Polish UDB SILC database was provided for the purpose of income source identification in EUROMOD by the Polish Central Statistical Office.*

# Appendix 3: Supplementary figures

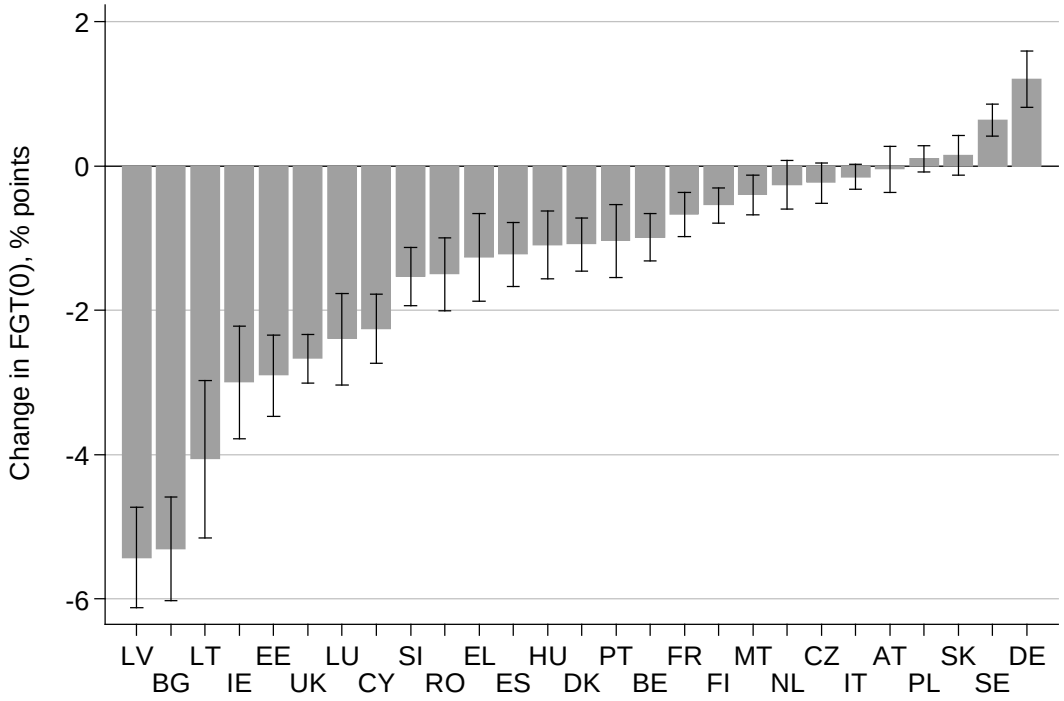
## Period 2008-2011

### Figure A1: The effect of policies in 2008-2011 on the poverty headcount (FGT0) using the CPI-indexation



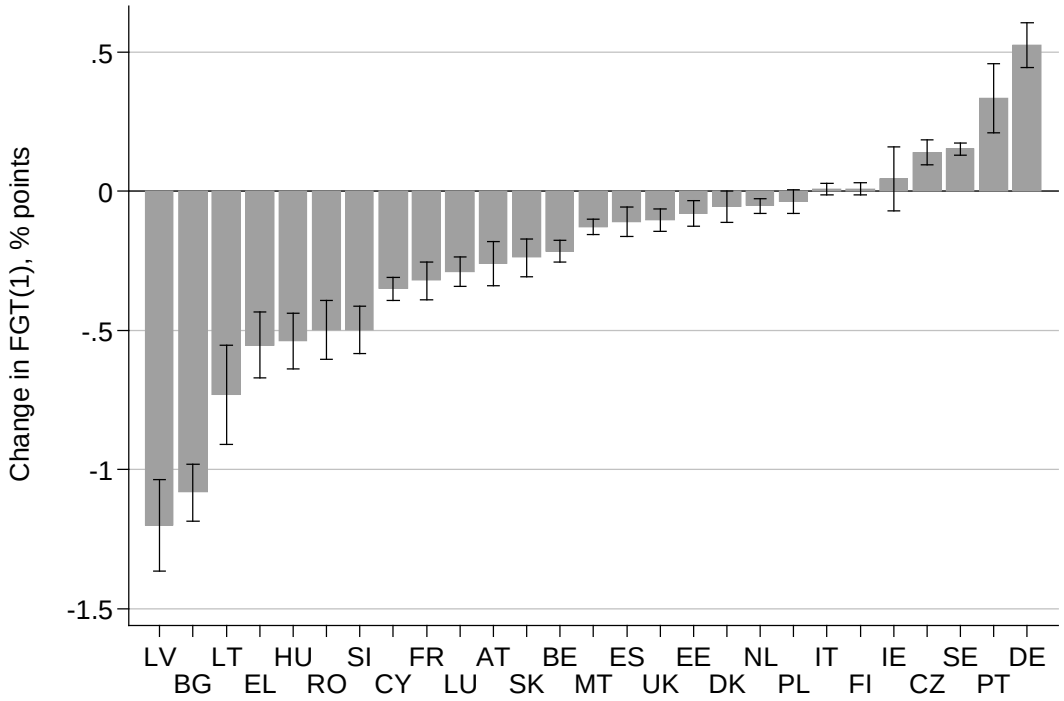

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

### Figure A2: The effect of policies in 2008-2011 on the poverty headcount (FGT0) using the MII-indexation



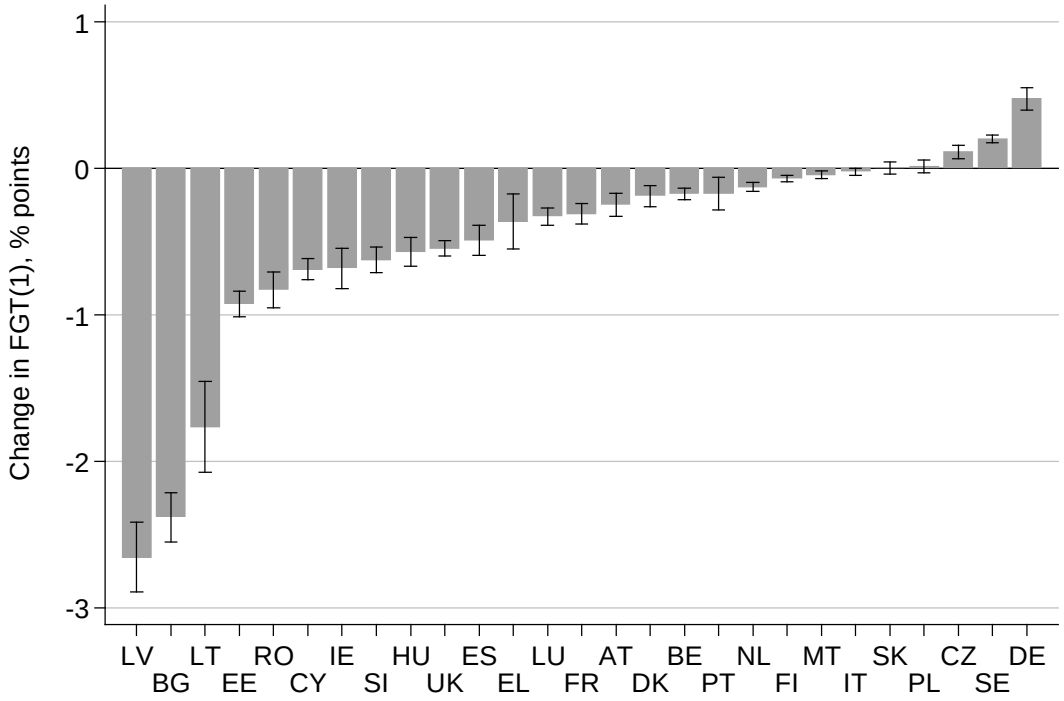

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A3: The effect of policies in 2008-2011 on the poverty gap (FGT1) using the CPI-indexation**



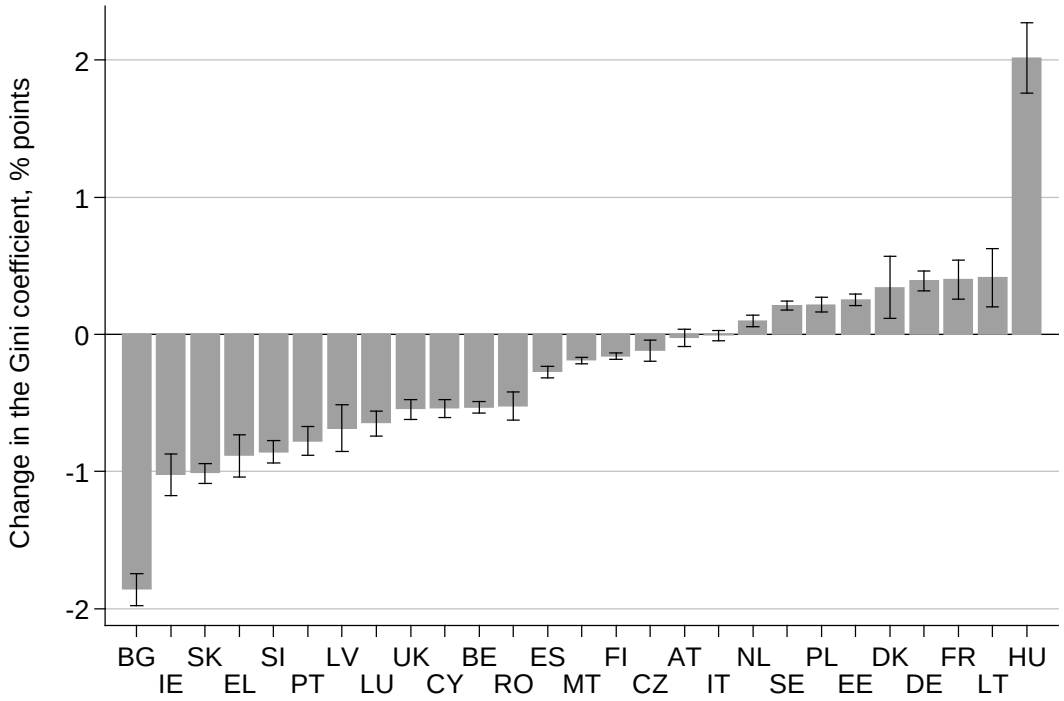

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A4: The effect of policies in 2008-2011 on the poverty gap (FGT1) using the MII-indexation**



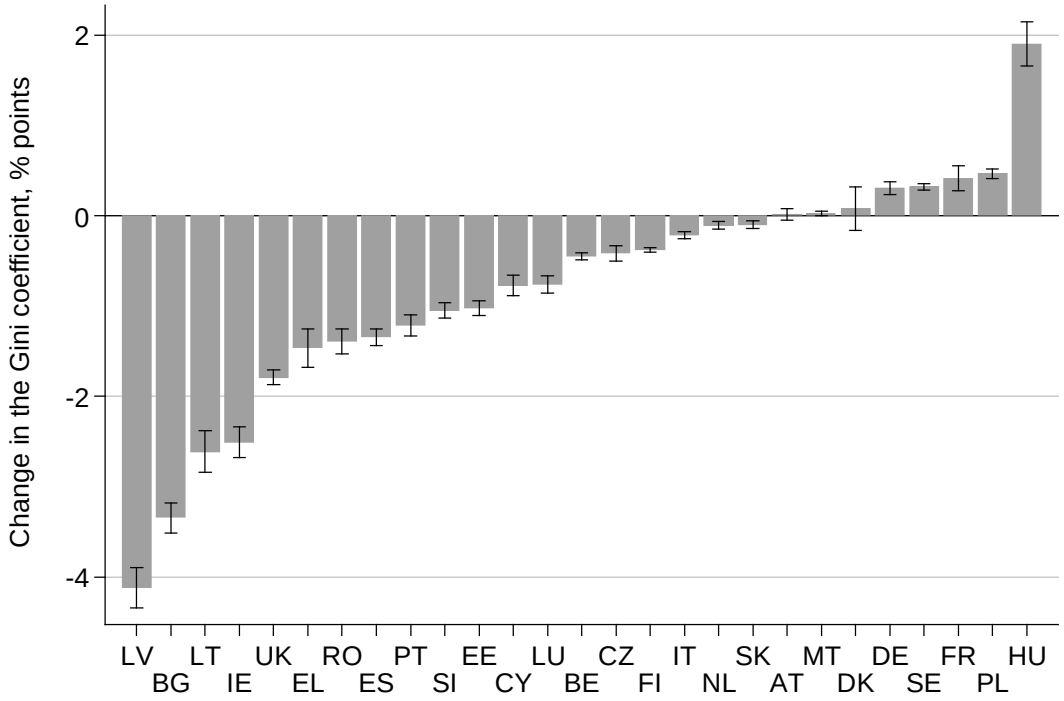

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A5: The effect of policies in 2008-2011 on the Gini coefficient of equivalised household disposable income using the CPI-indexation**



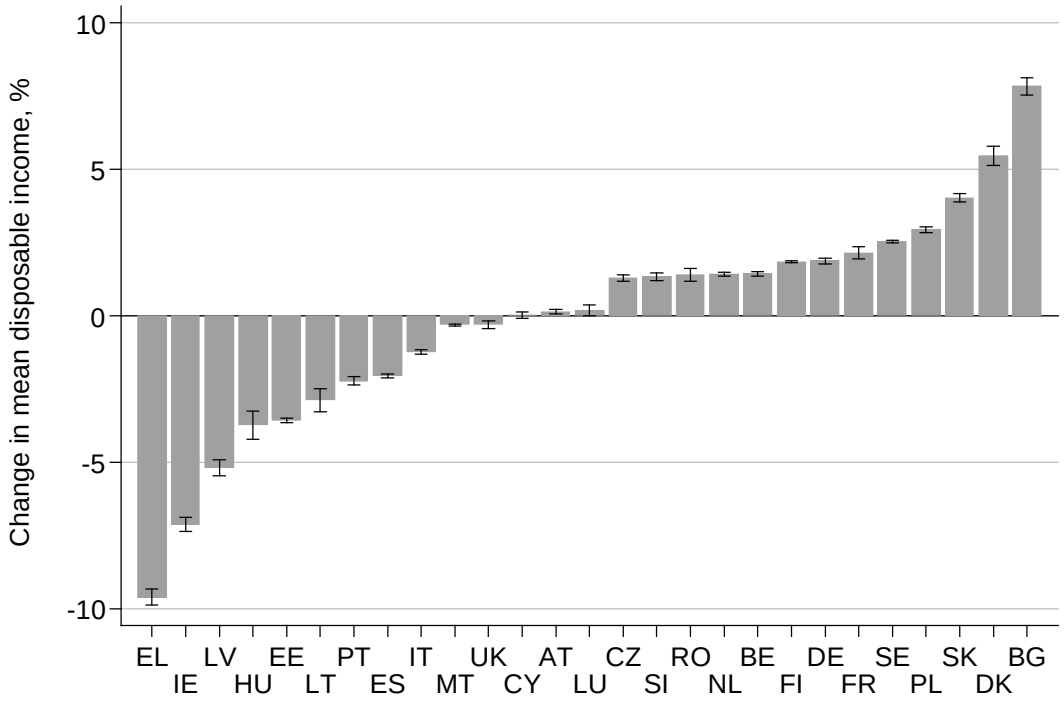

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A6: The effect of policies in 2008-2011 on the Gini coefficient of equivalised household disposable income using the MII-indexation**



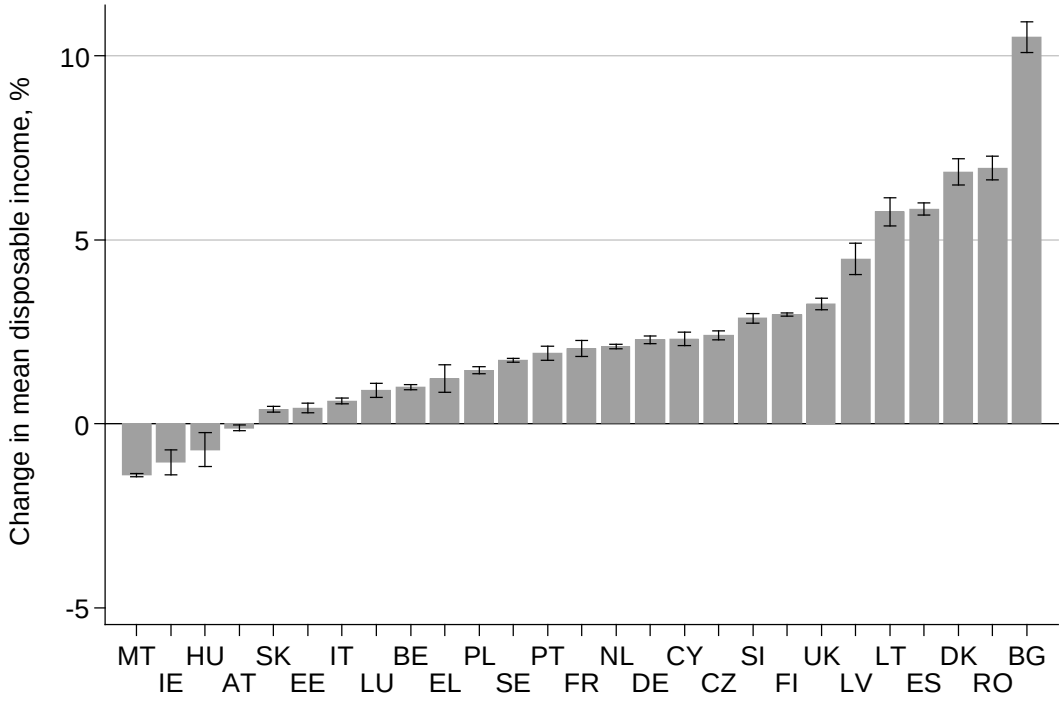

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A7: Percentage change in household disposable income due to policies in 2008-2011 using the CPI-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

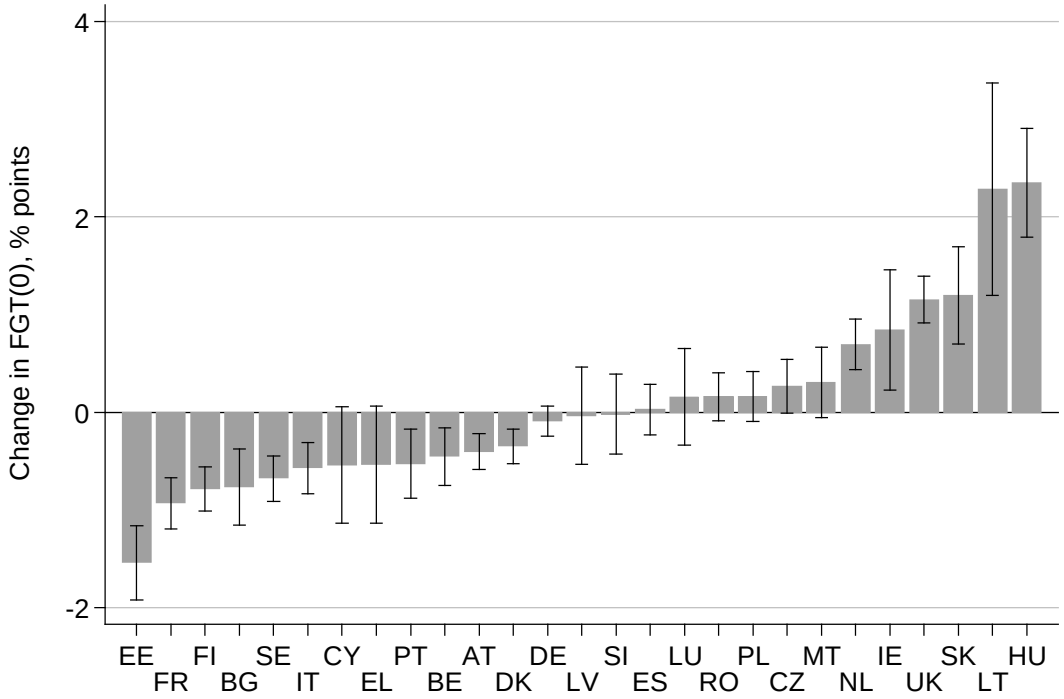
**Figure A8: Percentage change in household disposable income due to policies in 2008-2011 using the MII-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

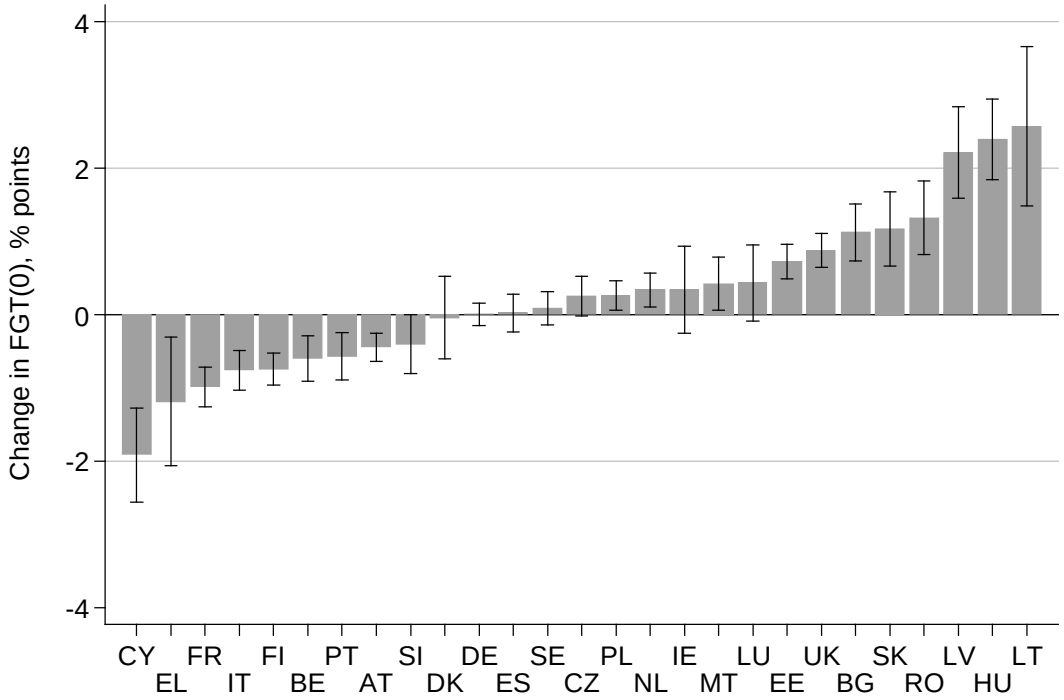
**Period 2011-2014**

**Figure A9: The effect of policies in 2011-2014 on the poverty headcount (FGT0) using the CPI-indexation**



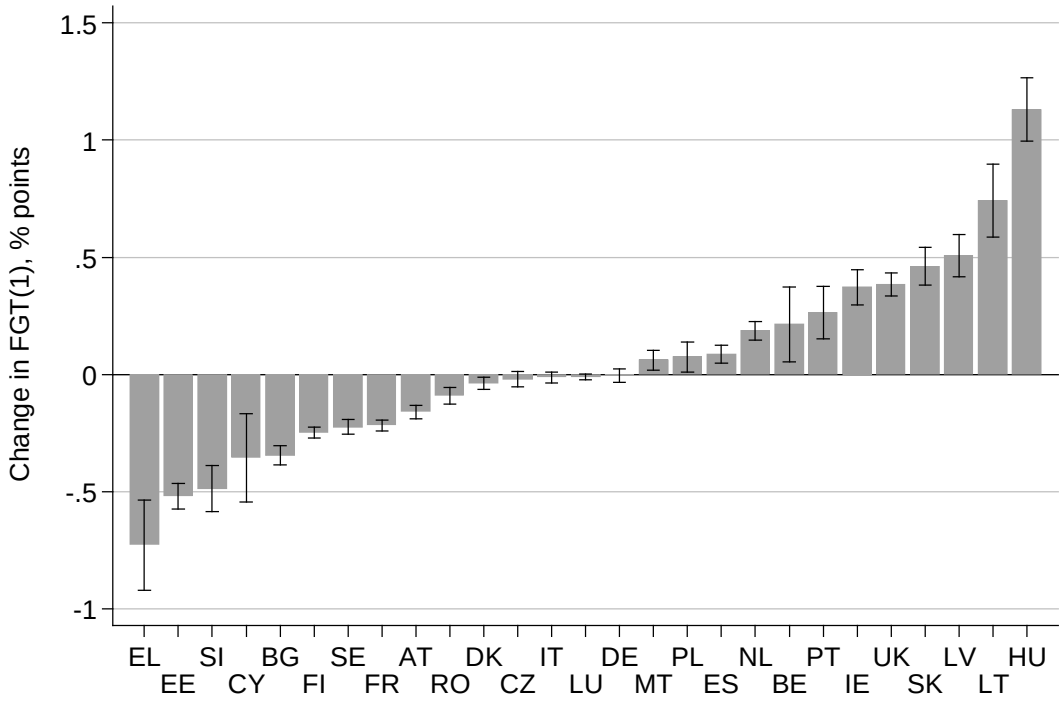

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A10: The effect of policies in 2011-2014 on the poverty headcount (FGT0) using the MII-indexation**



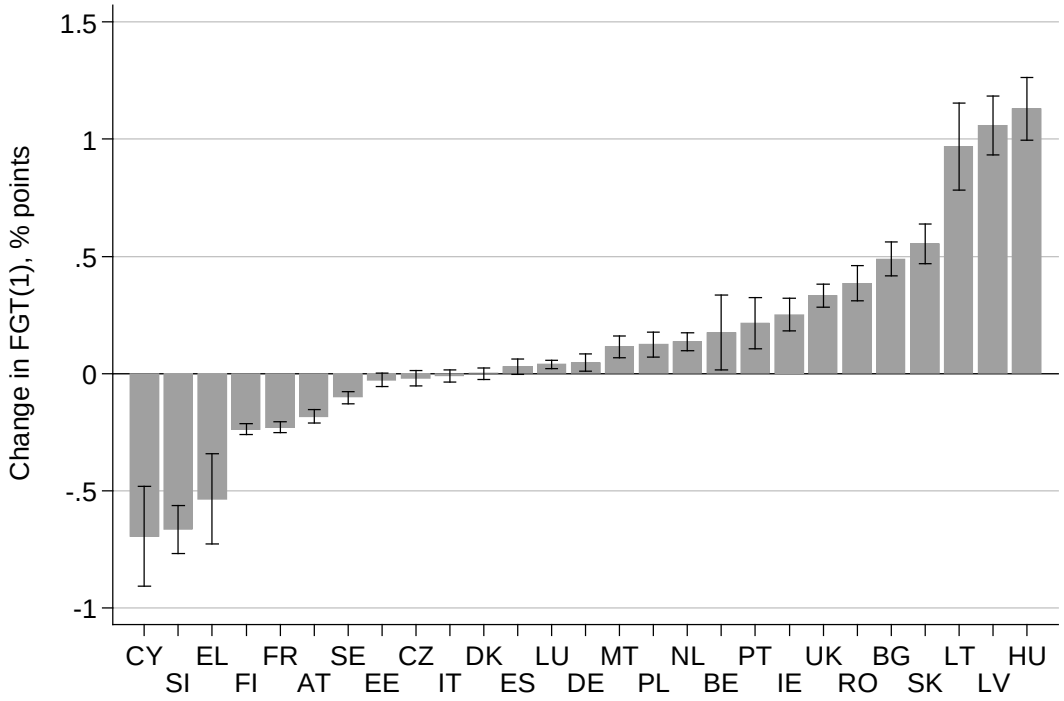

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A11: The effect of policies in 2011-2014 on the poverty gap (FGT1) using the CPI-indexation**



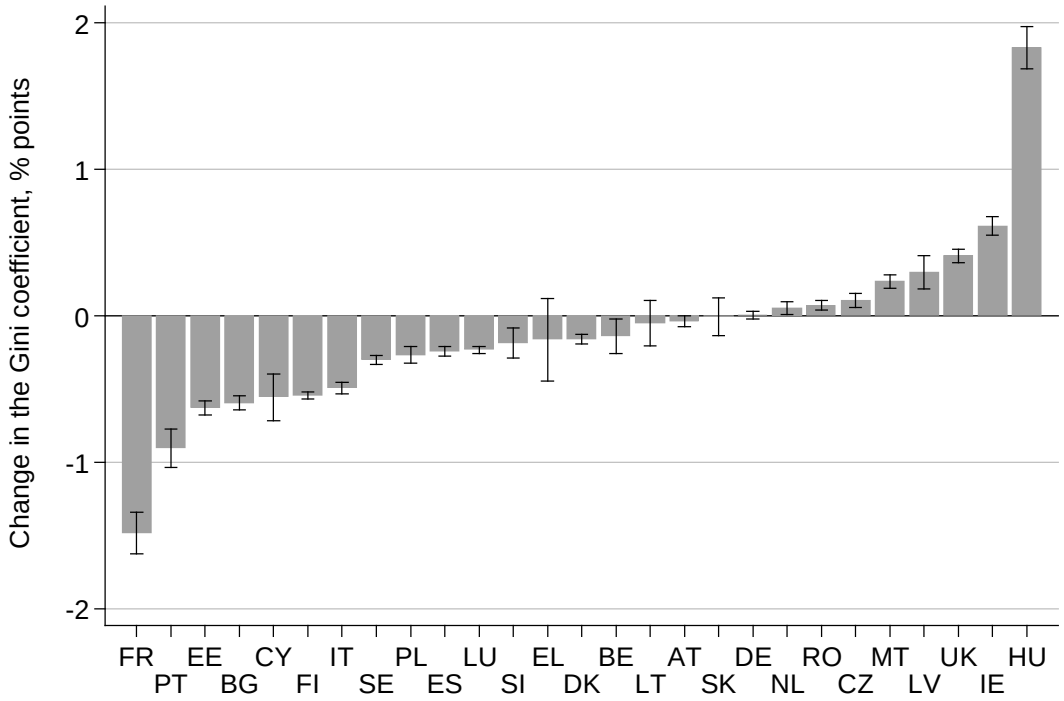

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A12: The effect of policies in 2011-2014 on the poverty gap (FGT1) using the MII-indexation**



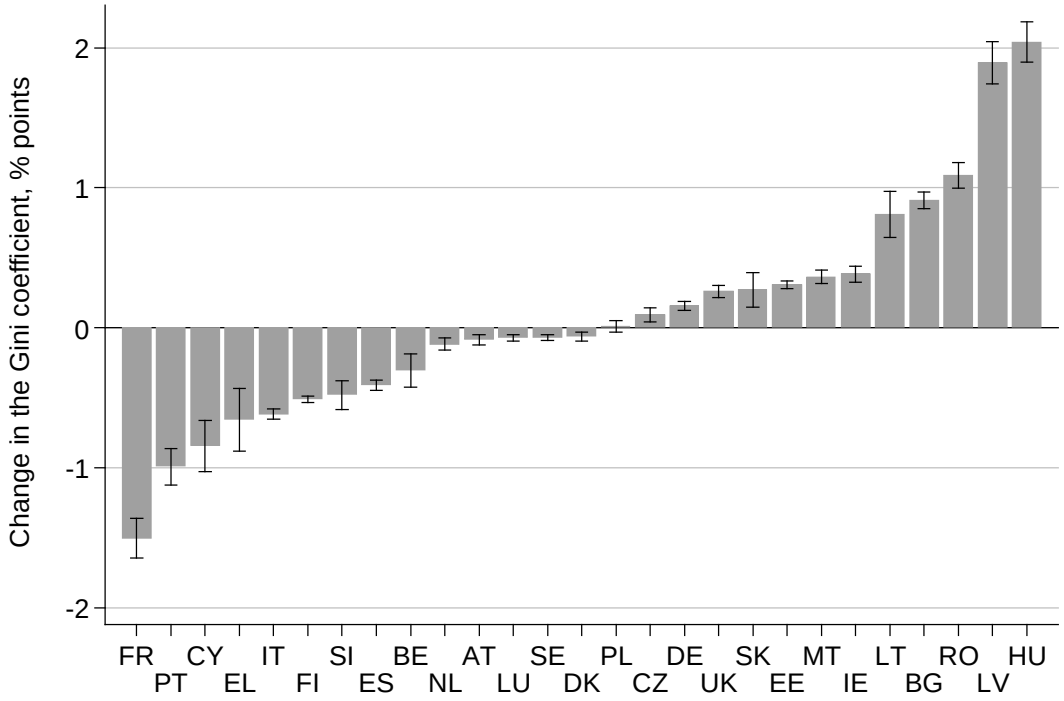

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A13: The effect of policies in 2011-2014 on the Gini coefficient of equivalised household disposable income using the CPI-indexation**



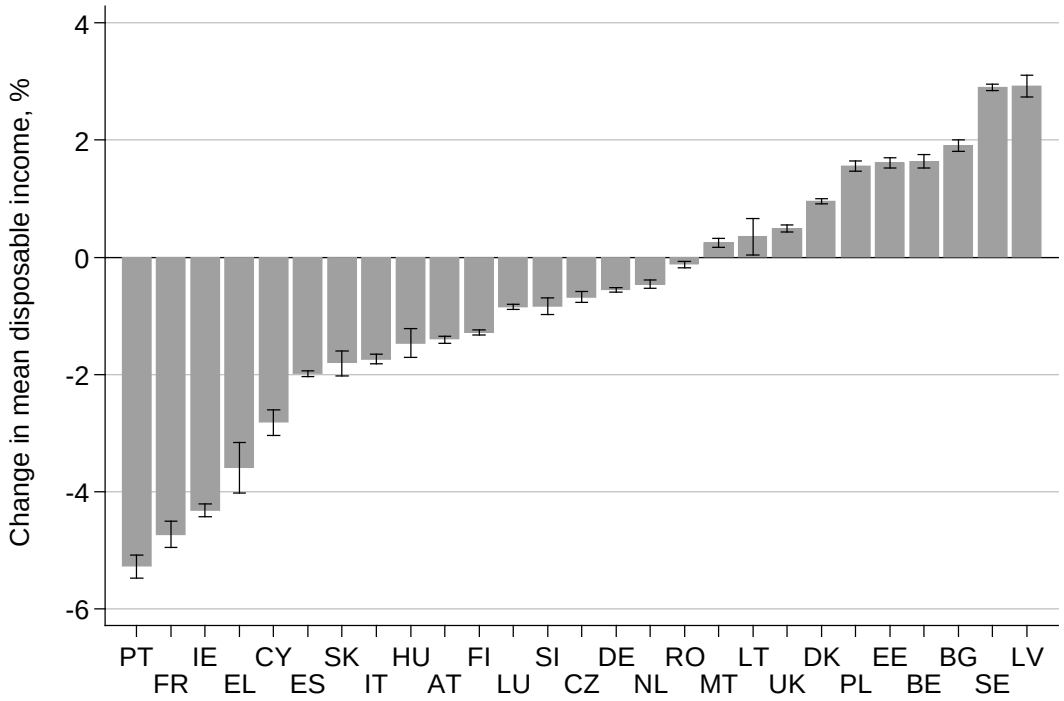

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A14: The effect of policies in 2011-2014 on the Gini coefficient of equivalised household disposable income using the MII-indexation**



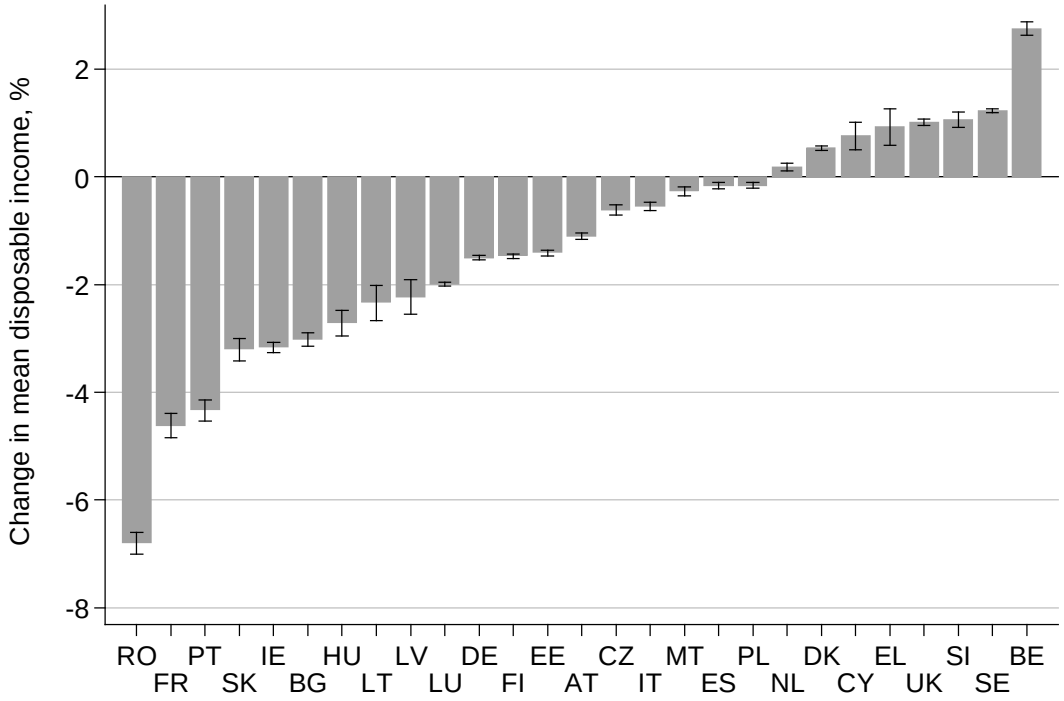

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

**Figure A15: Percentage change in household disposable income due to policies in 2011-2014 using the CPI-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

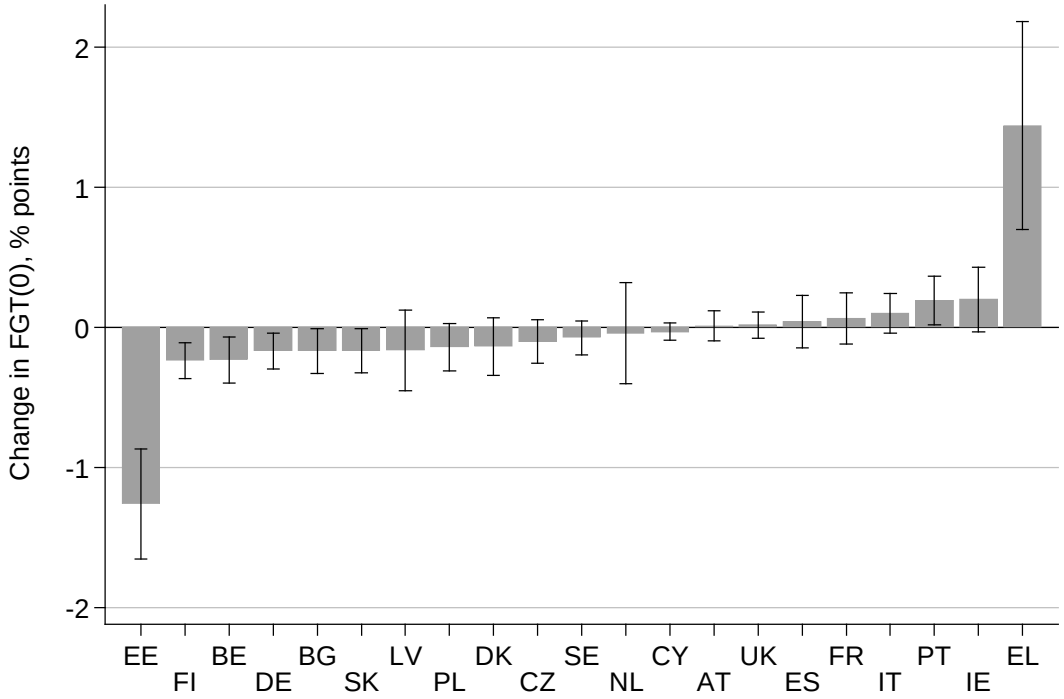
**Figure A16: Percentage change in household disposable income due to policies in 2011-2014 using the MII-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2011.
Source: own calculations using EUROMOD G2.75.

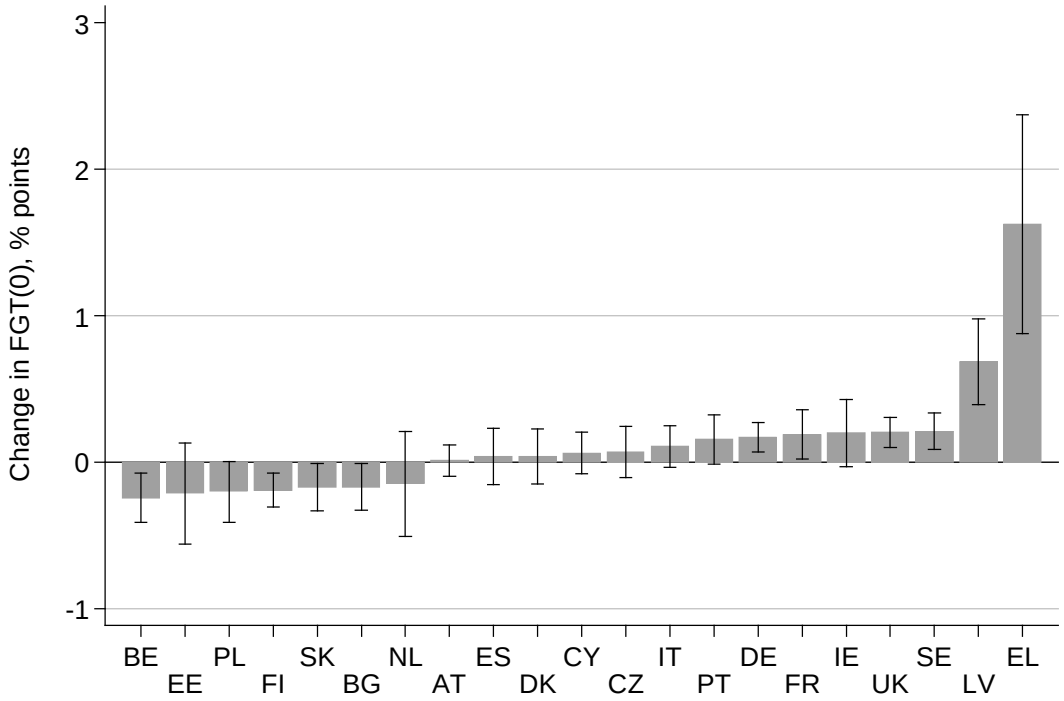
**Period 2014-2015**

**Figure A17: The effect of policies in 2014-2015 on the poverty headcount (FGT0) using the CPI-indexation**



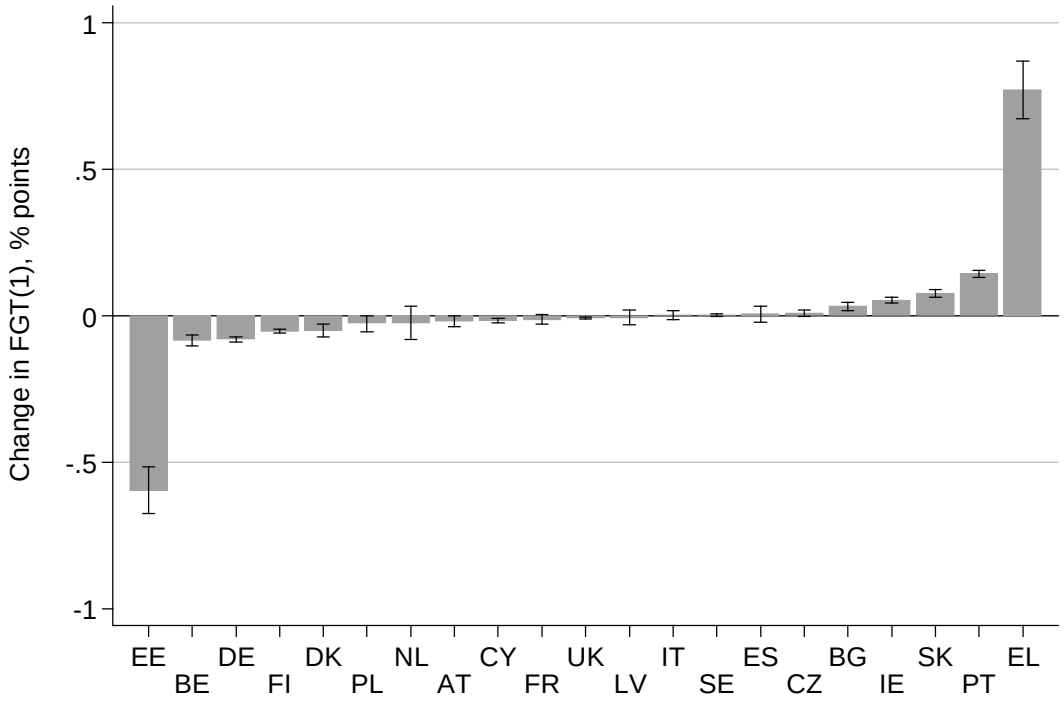

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A18: The effect of policies in 2014-2015 on the poverty headcount (FGT0) using the MII-indexation**



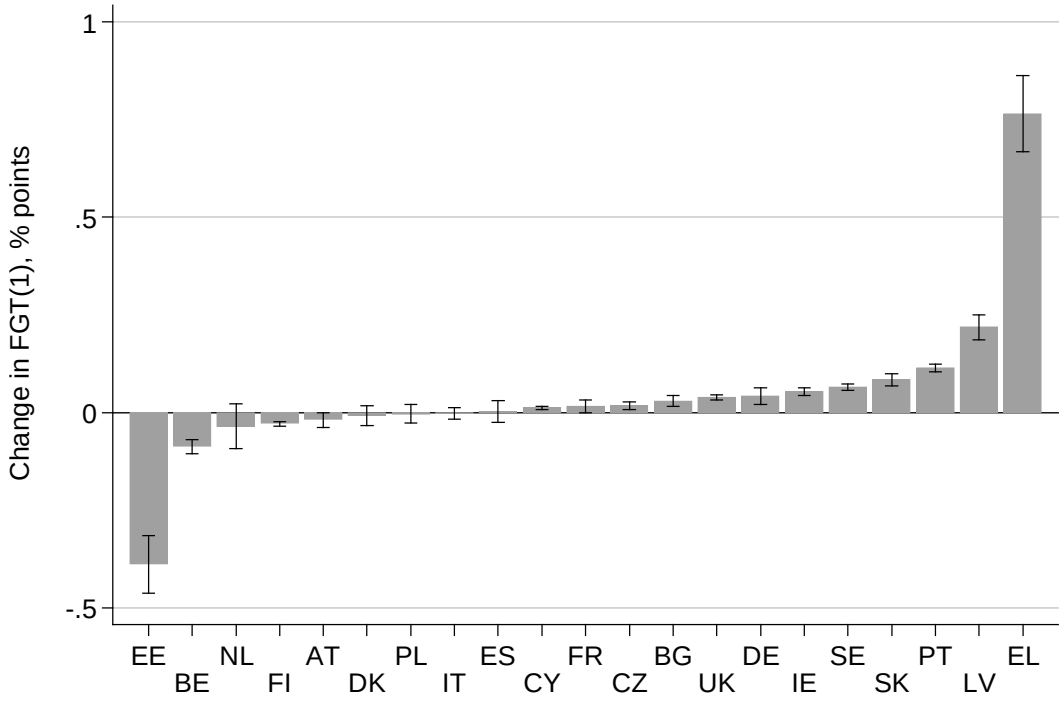

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A19: The effect of policies in 2014-2015 on the poverty gap (FGT1) using the CPI-indexation**



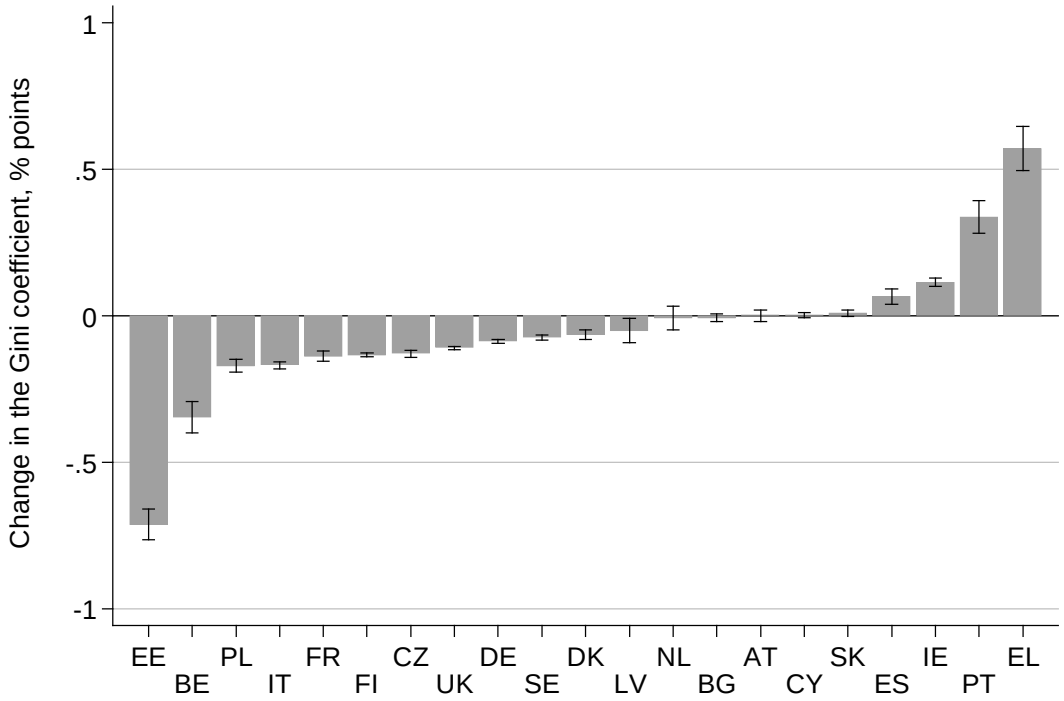

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A20: The effect of policies in 2014-2015 on the poverty gap (FGT1) using the MII-indexation**



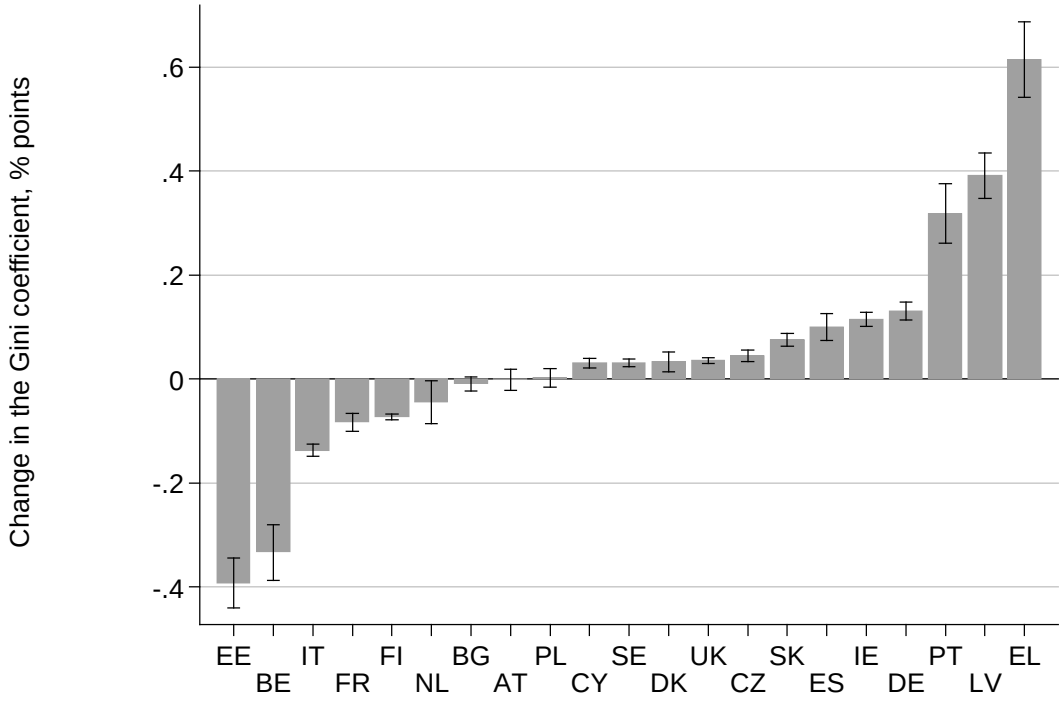

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A21: The effect of policies in 2014-2015 on the Gini coefficient of equivalised household disposable income using the CPI-indexation**



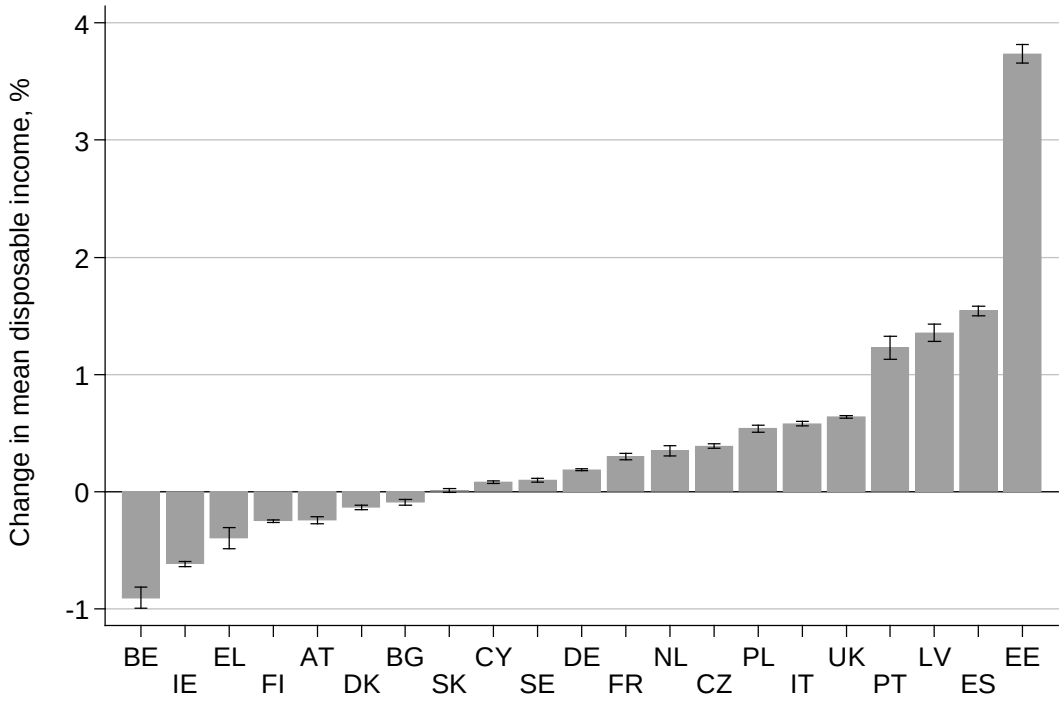

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A22: The effect of policies in 2014-2015 on the Gini coefficient of equivalised household disposable income using the MII-indexation**



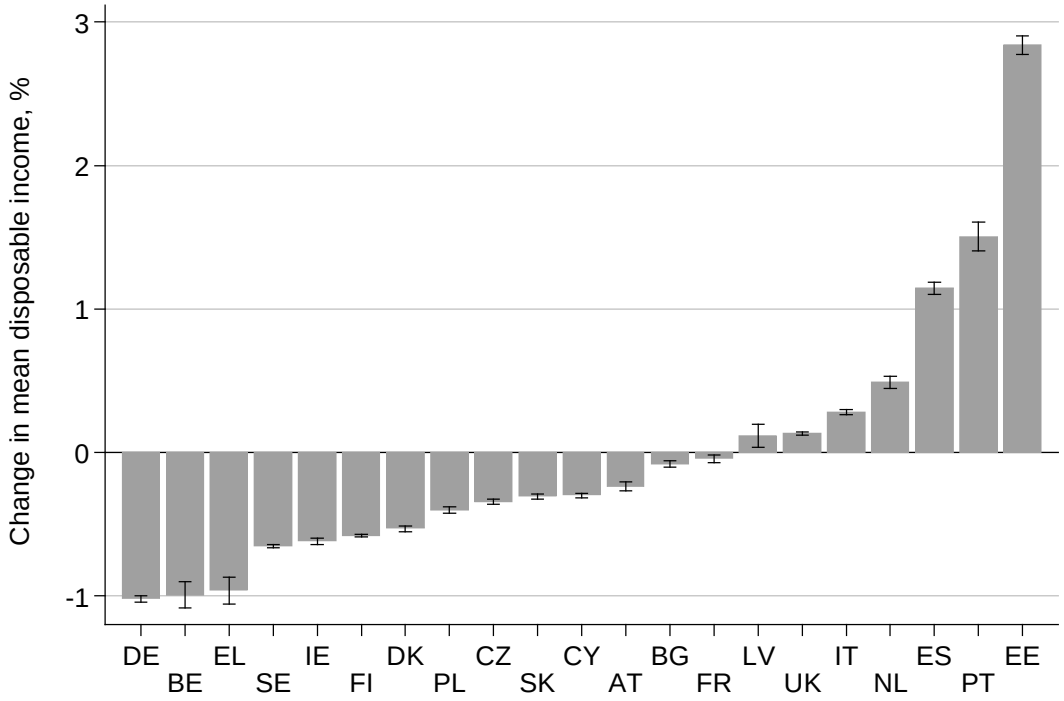

Notes: 95% confidence intervals shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A23: Percentage change in household disposable income due to policies in 2014-2015 using the CPI-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.

**Figure A24: Percentage change in household disposable income due to policies in 2014-2015 using the MII-indexation**




Notes: 95% confidence intervals are shown; estimates are conditional on market incomes in 2015.
Source: own calculations using EUROMOD G2.75.